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SILVER SPRINGS NUTRIENT PATHWAY CHARACTERIZATION PROJECT

FINAL REPORT

Silver Springs Nutrient Pathway Characterization Project

Final Report

Prepared for

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Table of Contents

List of Tables

List of Figures

Attachments

Attachment 1: Project Grant Work Plan

Attachment 2: Task One Report: Hydrogeologic Evaluation and Potential Nutrient Source Identification

Attachment 3 Task 2 Final Report: Potential Nutrient Groundwater Pathway Delineation near Silver Springs, Marion County, Florida (prepared by URS Corporation)

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Introduction and Objectives

The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River in central Marion County (Figure 1FR). Discharge from the spring group flows from the Upper Floridan aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large main vents and 28 smaller named vents spread throughout the upper reach (approximately 1200 meters (3900 ft)) of the Silver River (Butt et al, 2008). Maps of the karstic underground system supplying water to the SSG are limited to only hundreds of feet from the main vents. The extent of the karst conduit system feeding the vents is unknown, but believed to extend a significant distance from the vent openings. Discharge rates, measured periodically by the U. S. Geological Survey (USGS) in the Silver River downstream of the largest vents since the 1930's, varied from approximately 350 cubic feet per second (cfs) to approximately 1290 cfs, with a long-term annual median value of approximately 772 cfs (Munch et al, 2006).

The SSG has recently been listed by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients (specifically nitrates, or nitrates plus nitrites) (Hicks et al, 2009). Water quality at the Silver Springs Group has been monitored quarterly by FDEP since 2001. In addition, a study conducted by the SJRWMD for the FDEP characterized water quality and discharge rates from individual vents (Butt et al, 2008). During the monitoring period of these studies, nitrate+nitrite concentrations in the SSG Mammoth vents have ranged from 0.90 mg/L (Mammoth West vent) to 1.59 mg/L (Mammoth East vent), with a median concentration of 1.1 mg/L. Over the 7.5-year verified listing period of record the median nitrate+nitrite concentration for the Mammoth vents was 1.1 mg/L and 100 percent of the samples exceeded 0.6 mg/L.

Development of Total Maximum Daily Load (TMDL) rules for the SSG area will require gaining knowledge about the source areas of nutrients that are discharging from the spring vents. To date little detailed research has been conducted regarding the nature and extent of the groundwater flow pathways controlling SSG discharge or their relationship to potential source locations of nutrients.

This project, which was funded by a grant from the Environmental Protection Agency (EPA) with American Recovery and Reinvestment Act (ARRA) monies, is meant to support the FDEP's TMDL planning for the Silver Springs area. The objectives of the project are twofold. The first objective is to identify dominant groundwater pathways and travel times between specific locations and the SSG. The second objective is to identify the potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

This project supports the objectives set forth in Section 205(j)(2) of the Federal Clean Water Act, namely:

(2) Such sums shall be used by the Administrator to make grants to the States to carry out water quality management planning, including, but not limited to—

(A) identifying most cost effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards*; (TMDL/BMAP)*
(B) developing an implementation plan to obtain State and local financial and regulatory commitments to implement measures developed under subparagraph (A);
(C) determining the nature, extent, and causes of water quality problems in various areas of the State and interstate region, and reporting on these annually.

Specifically, the information from this project will be used to complete the TMDL for Silver Springs and to equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

Project Scope

The initial project proposal was approved by FDEP in June 2009 prior to final approval of ARRA funding. SJRWMD and FDEP representatives agreed at that time that ARRA funding would be used only for payment of SJRWMD contractors to complete specific tasks that were identified for completion by a contractor within the approved Grant Work Plan (Attachment 1). The cost of those subtasks not marked for completion by a contractor was absorbed by SJRWMD because those activities also directly support SJRWMD's mission to ensure the sustainable use and protection of water resources.
The project's Grant Work Plan contains three major tasks. Task 1 consisted of a hydrogeologic evaluation of the SSG area that included compilation of existing data, collection of new data, and an identification of potential groundwater nutrient sources with respect to their potential for supplying nutrients to the SSG. A detailed discussion of the Task 1 findings is included as Attachment 2. The second major task involved a long-term qualitative groundwater dye trace to assess potential karst pathways and estimate groundwater travel times within the SSG basin. Attachment 3 contains a detailed description of the methodology and the results of the dye trace study. Task 3 was a risk assessment for which the potential pathways and travel times determined by Task 2 were compared with the potential nutrient sources identified in Task 1.

This report contains a detailed description of the work completed for Task 3, as well as summaries of the results of Tasks 1 and 2. It also includes a discussion of the overall project results and accomplishments, lessons learned during the project and a summary of all of the monthly reported information.

Summary of Task 1: Hydrogeologic Evaluation and Potential Nutrient Source Identification

Beginning in June 2009 and extending through January 2010, SJRWMD staff compiled and reviewed existing information pertinent to the project. Data contained within available literature, locations of karst features such as sinkholes and caves, well information from production, observation and drainage wells, and locations of potential nutrient sources to groundwater (drainage retention areas, wastewater facilities) were evaluated. Collection of new data for aquifer characterization also occurred during this period. A group of wells were selected, geophysically logged, and surveyed in order to supplement the existing network of observation wells so that a detailed Upper Floridan aquifer (UFA) potentiometric map could be constructed for September 2009 conditions. This group included active drainage wells, county monitoring wells, monitoring wells from the FDEP's Very Intensive Study Area (VISA) network, old U. S. Geological Survey (USGS) test wells from the Cross Florida Barge Canal study (Faulkner, 1973) and unused irrigation and test wells within the Indian Lake State Forest property.

Geophysical borehole logs were collected from 21 wells. Logs collected from the Indian Lake State Forest wells (located roughly 3 to 5 miles directly north of the SSG) indicated that the top of the UFA is relatively near the surface, which is also indicated by the presence of many shallow, dry sinkholes in that area. Most of the caliper logs (indicating borehole diameter) illustrate the presence of abundant fractures within the top 100 to 200 ft within the UFA. This observation supports the conceptualization that most of the groundwater flow in the basin occurs within the upper 100 to 200 ft (Faulkner, 1973, Phelps, 2004). The four sets of logs from the drainage wells (all of which are less than approximately 200 ft deep) suggest the presence of fracture or solution cavity features near the bottom of each borehole. This is particularly true of the logs of well M-0649, which is the main drainage well receiving water from Tuscawilla Lake in the northern part of downtown Ocala. This well is reported to receive water nearly constantly from the lake. A video log of this well indicated significant downward flow through the borehole and into the formation near the bottom. However, evaluation of all of the logs collected (caliper, formation and fluid resistivity and temperature, natural gamma) did not indicate the presence of obvious very large conduit-like features that could be correlated between wells. The locations of known swallets and caves, nearly all located west of the SSG, as well as the lack of large mapped cave passages, also supported the conclusion that extensive large-scale conduit systems that are more obvious in other parts of Florida (e.g., Suwannee basin or Woodville Karst Plain) do not exist near the SSG. However, the apparent east-west trending slight depression in detailed UFA potentiometric surface maps (Faulkner, 1973, and Figure 13 in Attachment 2) could be an indication of large-scale conduit features.

Surface geophysical surveys were planned and conducted in order to evaluate the potential for large-scale conduit passages following a two-prong approach (see Attachment 2, Appendix 4). One group of surveys were located near and around the SSG to the north, west, and south to evaluate whether large-scale features extend outward from the mapped cave area toward the SSG recharge area. The other group was located near selected locations of direct recharge to the UFA upgradient of the SSG. This approach required selection of potential dye injection locations concurrent with selection of locations for ground-based geophysical surveys. All of the geophysical surveys provided strong evidence of karst features, but did not indicate the presence of large-scale conduit systems that might be directly connected to the SSG vents. Consequently, five locations were selected for dye injection during Task 2 of the project based upon their observed or potential direct input of recharge to the ground water flow system, as well as their accessibility.

Brief descriptions of the five locations initially selected for dye introduction, with their approximate distance from the Mammoth vents at the SSG are:

1. Ocala Civic Theatre property: a small active sinkhole within a DRA approximately 1.5 miles west-southwest (this is next to the Appleton Museum property at which a small scale, short term dye trace was conducted by Phelps (1994).
2. Tuscawilla Park drainage well M-0649: as mentioned above, this well receives nearly constant drainage from Tuscawilla Lake, approximately 5 miles west-southwest
3. Orange Lake Sink: this sink at the edge of Orange Lake receives a large amount of constant surface water inflow; approximately 17 miles northwest
4. Pontiac Pit: a natural sink with a small mapped cave that historically received stormwater input from a nearby developed area along Rte 27-441 in Ocala. It now receives relatively constant flow from a new stormwater treatment pond and wetland system; approximately 6 miles southwest
5. Spanish Palms: a DRA located within a depression; approximately 1.8 miles south

The locations of potential nutrient sources to groundwater that had been compiled earlier were compared to the 5 selected dye introduction sites. The number of potential nutrient sources of all types within a one-mile radius of each site were tabulated along with the approximate distance from the SSG.

Summary of Task 2: Potential Nutrient Pathway Delineation: Dye Tracing

Tracer test design and planning

Prior to the introduction of dye to the groundwater system at any of the selected sites, a network of sampling locations was constructed based upon knowledge of SSG vent characteristics and a survey of available production wells. Charcoal sampling apparatus were emplaced at 29 SSG vents, within the Silver River near the 1200 meter stream gauging station, at three locations receiving flow from the Rainbow Springs Group, and at 10 production well locations. Background sampling was conducted for 4 weeks at six SSG vents plus the Silver River station and for 2 weeks at the remaining Tracer test 1 sample sites (Attachment 3). The preliminary background sampling did not detect the presence of any dyes or sources of natural or anthropogenic fluorescent interference.

Four tracer dyes were used in the groundwater tracing studies for this project. Three of the dyes were introduced at 3 separate locations on April 23rd, 2010. These were fluorescein at Orange Lake Sink, eosine at the Tuscawilla Park drainage well M-0649, and rhodamine WT (RWT) at the Ocala Civic Theatre. The charcoal samplers were replaced on a weekly basis at most sites for several months followed by a biweekly frequency. A second dye introduction was originally planned for July 2010 at site 4 (Pontiac Pit Sink) and site 5 (Spanish Palms). The use of eosine was initially planned for the dye introduction at the Spanish Palms DRA, with Sulfo-rhodamine B (SRB) planned for Pontiac Pit Sink. However, the lack of detection of eosine, combined with the relatively rapid movement of RWT and fluorescein, resulted in a change of plan for the second dye trace. No dye was introduced at Spanish Palms and Tracer test 2 consisted of only the introduction of SRB into Pontiac Pit Sink (Attachment 3). Six additional production wells were added to the sampling network for this test. Data collection at a few wells was discontinued after confirmation of fluorescein detection from several samples. Sampling for all four dyes from both Tracer test 1 and Tracer test 2 continued at all other sites throughout the project.

Results:

Fluorescein:

Fluorescein from Orange Lake Sink was detected relatively quickly after the April 2010 release. This dye was reported at a concentration of 79.1 parts per billion (ppb) from the Reddick Elementary School Well #5 located about 4.2 miles due south of the introduction point from samples collected during the second week after release (Attachment 3). The other initial fluorescein detection (26.7 ppb) was at the Institute for Food and Agricultural Sciences (IFAS) Plant Science Unit Well D located southeast of Orange Lake Sink (Figure 2FR), also within the same time period. Fluorescein was later detected approximately 4 miles further south from a well at the Marion Correctional Center (MCC) within the 181-194 day interval after release. Fluorescein was not detected at any other sampling sites during the remaining course of the project.

RWT:

RWT released into the sinkhole at the Ocala Civic Theatre DRA was also detected relatively quickly. Six SSG vents had positive first detections of RWT dye within the 5-10 day interval after dye release. Laboratory data have since confirmed positive detection of RWT at a total of 20 SSG spring vents plus the Silver River station. Detection of RWT in samples from most of these vents continued throughout the project (Attachment 3).

Eosine:

Eosine was first detected at the South Boathouse vent during the 294-311 day period (between February 11 and February 28, 2011). Although this vent discharges at a low flow rate, it is the westernmost of the SSG vents. Eosine was subsequently detected from this vent in three samples collected during March and May 2011. No other vent or well samples showed evidence of eosine detection.

SRB:

After release into Pontiac Pit Sink on October 5, 2010, SRB was detected at the Cedar Hills well from a sample emplaced on November 24, 2010 and removed on December 1, 2010 (Attachment 3). This detection indicated that the dye traveled approximately 2.4 miles in 50-57 days. Further detections occurred at two additional wells located in the direction of the SSG vents at the Blue Skies well (93-113 day interval) and at the Fort King Forest well (147-164 day interval). The latter well is located about 2.5 miles southeast of the South Boathouse vent (Figure 2FR).

Task 3: Risk Assessment: Comparison of Dye Trace Results with Potential Nutrient Sources

Dye trace pathways:

Preferential groundwater flow paths in karst systems form along bedding planes, joints and fractures in response to prevailing hydraulic gradients (Bakalowicz, 2005). Over time, dissolution of carbonate rock by slightly acidic, fresh recharge water widens small partings in the rock, facilitating the flow of more groundwater through the space until a much larger solution related feature exists. In the Floridan aquifer, the limestone and dolostone matrix is also recognized to be fairly porous compared to other carbonate aquifers (Budd and Vacher, 2004). Therefore, a dual-porosity system exists within the SSG groundwater basin, with flow through solution cavities and fractures as well as the porous media rock matrix (Phelps, 2004, Water Resource Associates, 2005). Both Faulkner (1973) and Water Resource Associates (2005) postulated that abundant solution features have formed along two sets of fracture alignments that trend at roughly right angles from each other in northwest-southeast and southwest-northeast directions (Figure 3FR). Although the general directions of regional-scale groundwater flow can be estimated from potentiometric surface maps, local-scale flow is probably directed along the directions of these fractures. According to both Faulkner (1973) and WRA (2005), these features are very abundant and the fracture traces shown on Figure 3FR are only a small subset of the total. Detailed UFA potentiometric surface maps constructed for this study (Figure 3FR), and by Faulkner (1973), plus the less detailed maps prepared semi-annually by the USGS consistently indicate a low hydraulic gradient in the central part of the SSG basin. Weak gradients favor the development of complex conduit systems (Bakalowicz, 2005).

The dye trace paths shown on Figure 3FR indicate only the shortest possible, "straight-line" pathway between the dye release point and where the dye was detected. It is likely that the dye traveled a much more tortuous path, possibly by "zig-zagging" along multiple NW-SE and SW-NE trending solution features as it moved downgradient toward the SSG vents (or toward a well intake). Fluorescein covered the 4 miles south to Reddick very quickly, at a rate exceeding 1500 ft/day. After that, it took nearly 6 months to travel about the same distance to the Marion Correctional Center well. Estimates of the flow rate of surface water into Orange Lake Sink at Heagy Burry Park are approximate, but they exceed 20 million gallons per day (mgd) (Attachment 3). It is reasonable to conclude that the constant inflow of surface water to the UFA at this location has helped to create a significant conduit flow system that extends to the Reddick vicinity. Southward toward Ocala the conduit flow system is probably less prolific, although there are abundant karst features extending in that direction (see Figure 2 in Attachment 2).

Similarly, RWT dye traveled the 1.4 miles from the Ocala Civic Theatre to the SSG vents relatively quickly at a rate of 700-1400 ft/day. The UFA in this area is apparently well connected to the conduit system extending outward from the Mammoth vents at the SSG. Water Resource Associates (2005) noted that the passages in the Mammoth vent cave system are aligned with the dual NW-SE and SW-NE fracture networks. When the RWT travel time is compared to the greater length of time needed for eosine to travel approximately 5 miles northwest from Tuscawilla Park (about 10 months), it appears that a single SSG cave-conduit system may not extend southwestward from the SSG into downtown Ocala.

Previous estimates of groundwater travel times within the SSG springshed were made using regional scale flow models that assume flow occurs only through porous media and do not account for secondary porosity features such as solution-enhanced cavities or fractures (e.g., Munch et al, 2006). The dye travel times measured in this study show that groundwater travels much faster than the porous media flow based estimates (compare Figure 2FR with Figure 7FR). For example, the Orange Lake Sink at Heagy-Burry Park is located outside of the estimated 100-year capture zone delineated using a regional scale model (Figure 7FR). Fluorescein traveled roughly half the distance (8.5 miles) from the sink to the SSG vents in 6 months. Although fluorescein apparently didn't reach the SSG vents during the nearly 14-month time frame of this study (April 23 2010 through June 17 2011), it probably would not take many more years to reach them. Likewise, Tuscawilla Park is located outside of the 2-year capture zone delineated using a porous media model, but eosine dye traveled 5.1 miles to the South Boathouse Vent in approximately 10 months. It is important to note that this dye trace study was conducted during a period of relatively low rainfall. Groundwater velocities during normal or higher rainfall periods could be significantly greater than those estimated by this study (Attachment 3).

Comparison to potential nutrient sources and risk assessment:

Developed land (residential, commercial-industrial, improved pasture, and transportation) is relatively ubiquitous north, west, and south of the SSG vents (Figure 4FR). Thus non-point sources of nitrate, such as inorganic fertilizer, could accompany recharge water through karst features or via diffuse recharge into the groundwater system almost anywhere along the pathways discussed above. Other potential sources derived from wastewater systems, especially septic tanks (Figure 5FR) and from stormwater systems (drainage wells and DRA's, Figure 6FR) also exist throughout much of the SSG area in these directions upgradient of the springs. The dye trace results confirm only the travel time of groundwater from those specific dye input locations to the SSG. The travel times cannot be extrapolated to other potential input locations with certainty. Nevertheless, it is reasonable to assume that locations of potential nitrate input that are north, west and south of the SSG vents and within approximately the same radius from the springs as the Ocala Civic Theatre DRA (1.4 miles) may be directly connected to the SSG discharge vents.

The abundance of both potential nutrient sources and potential direct input points to the groundwater flow system (natural swallets, DRA's with sinkhole features) throughout the urbanized portion of the basin made it impractical to rank specific individual locations based on potential nutrient loading. Many potential inputs to the flow system exist that can receive nutrient input from a variety of sources. The project team realized that simply establishing the connection between known direct inputs to the groundwater system and the SSG vents or other sampling sites at several different points in the springshed would suffice to accomplish the project objectives.

A delineation of the area containing potential nitrate sources to the SSG vents should not be bounded by a single estimate of the steady-state extent of the springshed. Because the UFA potentiometric surface fluctuates in response to climatic changes, the boundaries of the basin change with time. This fluctuation, combined with gentle hydraulic gradients within the UFA, make the western boundary of the SSG basin difficult to define (Lane and Hoenstine, 1991, Phelps, 2004). Figure 8FR illustrates one depiction of the areal extent of the overlap that may exist between the SSG springshed and that of the adjoining Rainbow Springs Group. These springshed boundaries were estimated from multiple sources of data representing both springsheds (FGS, written communication, 2005).

All portions of the SSG basin may not be directly connected to the solution features directly feeding the SSG vents, but the dye trace results indicate that travel times within the UFA to the springs, even from the Orange Lake area, are on the order of months to years, rather than a decade or longer. In the distal area, nitrates released into the unsaturated zone above the UFA, or into the limestone matrix, can slowly drain into the more active solution cavity-dominated flow system over long periods of time (Katz, 2004). Consequently, all portions of the SSG groundwater basin that are not covered by a contiguous intermediate confining unit (ICU) between the surficial aquifer system and the UFA should be considered areas of significant risk for nutrient contamination to the conduit flow system that ultimately feeds the spring vents. Figure 8FR also displays the extent of areas where the thickness of the ICU exceeds 40 ft, as well as areas of UFA discharge, where the potentiometric surface is generally at or above the water table surface. The hatched region approximately outlines zones of low risk for nutrient loading to the SSG where these conditions exist in the northern and southeastern portions of the basin. The remainder of the SSG basin lies within a UFA recharge area where the ICU is either nonexistent or thin and perforated by sinkholes and thus should be considered as a high-risk area for nutrient loading. Finally, because Orange Lake Sink drains a significant amount of surface water from the Orange Lake surface water basin, consideration should also be given to extending the SSG springshed delineation to include the Orange Lake watershed, following the springshed definition given by Copeland (2003).

Summary of project expenditures, accomplishments and lessons learned

This project was funded in part by a grant from the U. S. Environmental Protection Agency using American Recovery and Reinvestment Act of 2009 (ARRA) funds. All grant monies were used only for payment of SJRWMD contractors to complete specific tasks that were identified for completion by a contractor within the approved Grant Work Plan (Attachment 1.) Of a total grant of $535,000, a cumulative total of $517,948.00 was invoiced. Invoiced funds were distributed to project tasks as listed in Table 1.

Amount	Project Task	Description
$57,045.00	1. 2) d	Vertical elevation surveys of wells for potentiometric mapping
$107,919.82	1. 4) a, b	Geophysical surveys
$352,983.18	2. 1) – 5)	Dye Trace Study
$517,948.00		**Total**

Table 1. Summary of ARRA-related Project Expenditures

The project duration was nearly two years (23 months). Expenditure of grant funds began during December 2009 and continued through July 2011. Monthly reports listing the amount invoiced and the number of full-time-equivalents (FTE) and actual workers began during January 2010. The number of ARRA-funded FTE's working on the project averaged 1.24 per month; the number of ARRA-funded actual workers averaged 7.7 per month.

The project objectives were accomplished. The two dye traces (Tracer test 1 from 4/23/2010 through 6/15/2011, and Tracer test 2 from 10/5/2010 through 6/15/2011) allowed the identification of dominant groundwater pathways and travel times between specific locations and the SSG. The potential nutrient sources compiled during Task 1 were then compared with the dominant groundwater pathways to identify potential direct connections to the SSG discharge vents.

The original approach outlined in the Grant Workplan (Attachment 1) was to identify potential large-scale solution features using surface geophysical surveys, then rank locations near these features based on proximity to the SSG and the magnitude of potential loading. The initial trace was originally meant to focus on the hydrologic connection between the 2 to 3 highest ranked potential source locations that act as "direct" inputs, such as drainage wells. The second dye trace was meant to either 1) focus on indirect sources (e.g., DRA's) or additional direct sources based on the results of tracer test 1. As the project unfolded, the project team adjusted the plan due to several circumstances. First, the geophysical surveys provided information about the presence of karst features, but could not identify large-scale conduit-like features. Second, drainage well M-0649 was postulated to provide a relatively direct connection to the conduits supplying the SSG vents. Eosine was not detected at any sampling stations by the originally scheduled starting time of the second dye trace. Consequently, Tracer test 2 was redesigned to evaluate whether a connection could be established between Pontiac Pit and the SSG within the remaining time frame of the study. Because a first detection of eosine had not yet been made, that dye could not be reused at the Spanish Palms site, which was considered a relatively "indirect" source area because it does not contain an active sinkhole.

The abundance of both potential nutrient sources and potential direct input points to the groundwater flow system (natural swallets, DRA's with sinkhole features) throughout the urbanized portion of the basin made it impractical to rank specific individual locations based on potential nutrient loading. Many potential inputs to the flow system exist that can receive nutrient input from a variety of sources. The dye trace results indicate that nutrients infiltrating to the UFA in the proximal portion of the basin (within about 5 miles of the SSG vents) can be discharged from the vents within a time frame on the order of one week to several months. Nutrient travel times from more distal portions of the basin are on the order of months to years, rather than decades or longer.

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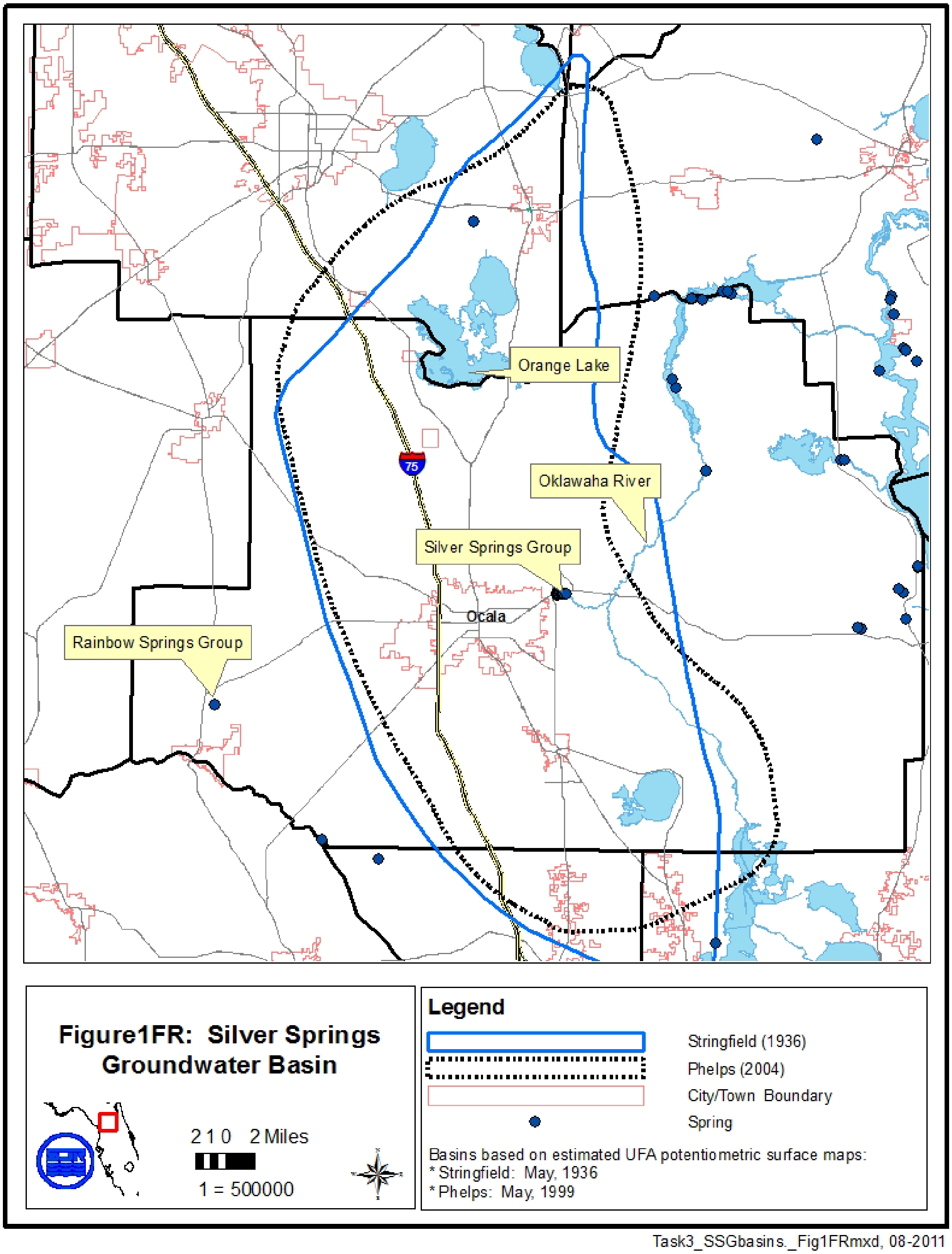

Figure 1FR. Extent of Project Area

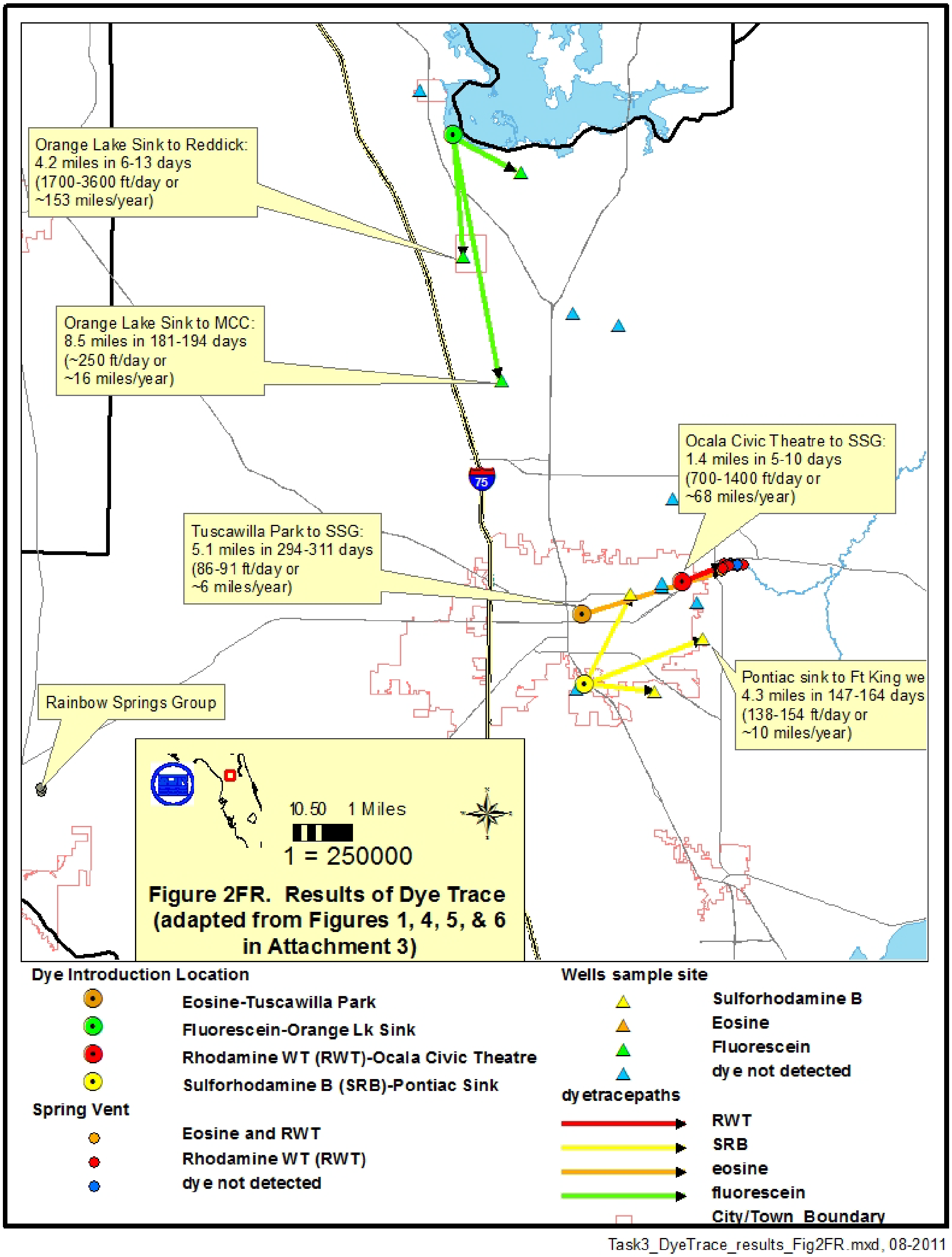

Figure 2FR. Results of Dye Trace

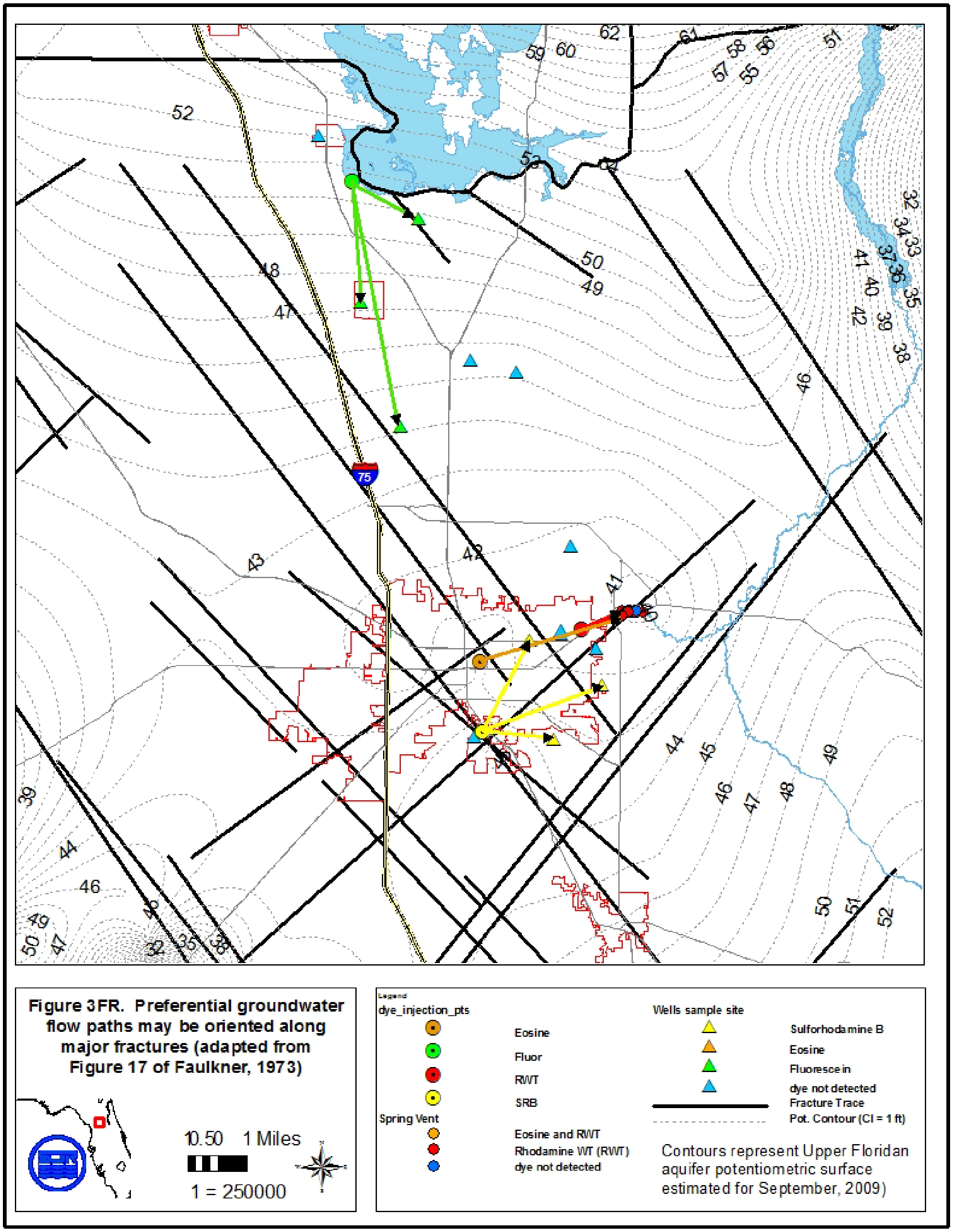

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Figure 3FR. Preferential groundwater flow paths may be oriented along major fractures

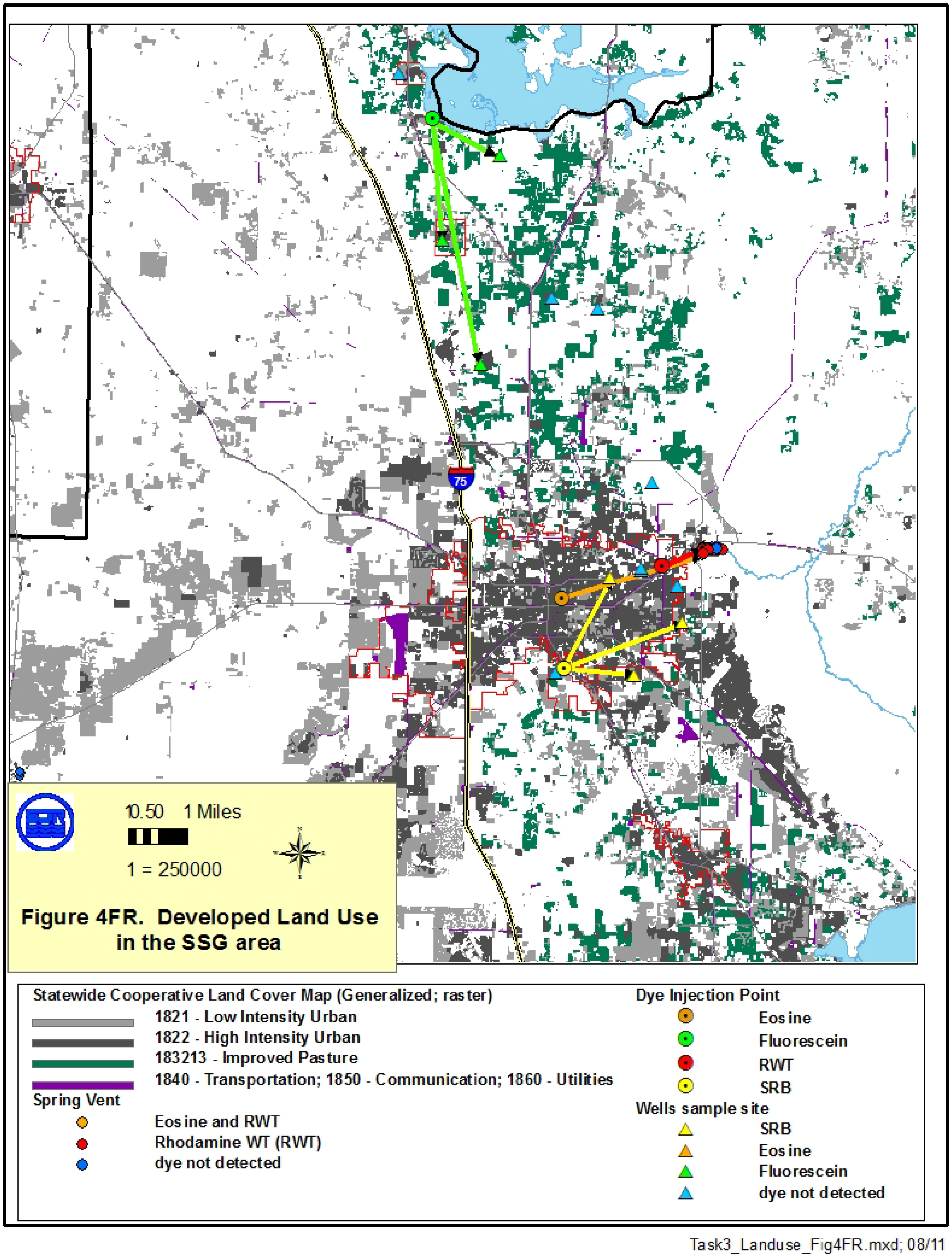


Figure 4FR. Developed land use in the SSG area

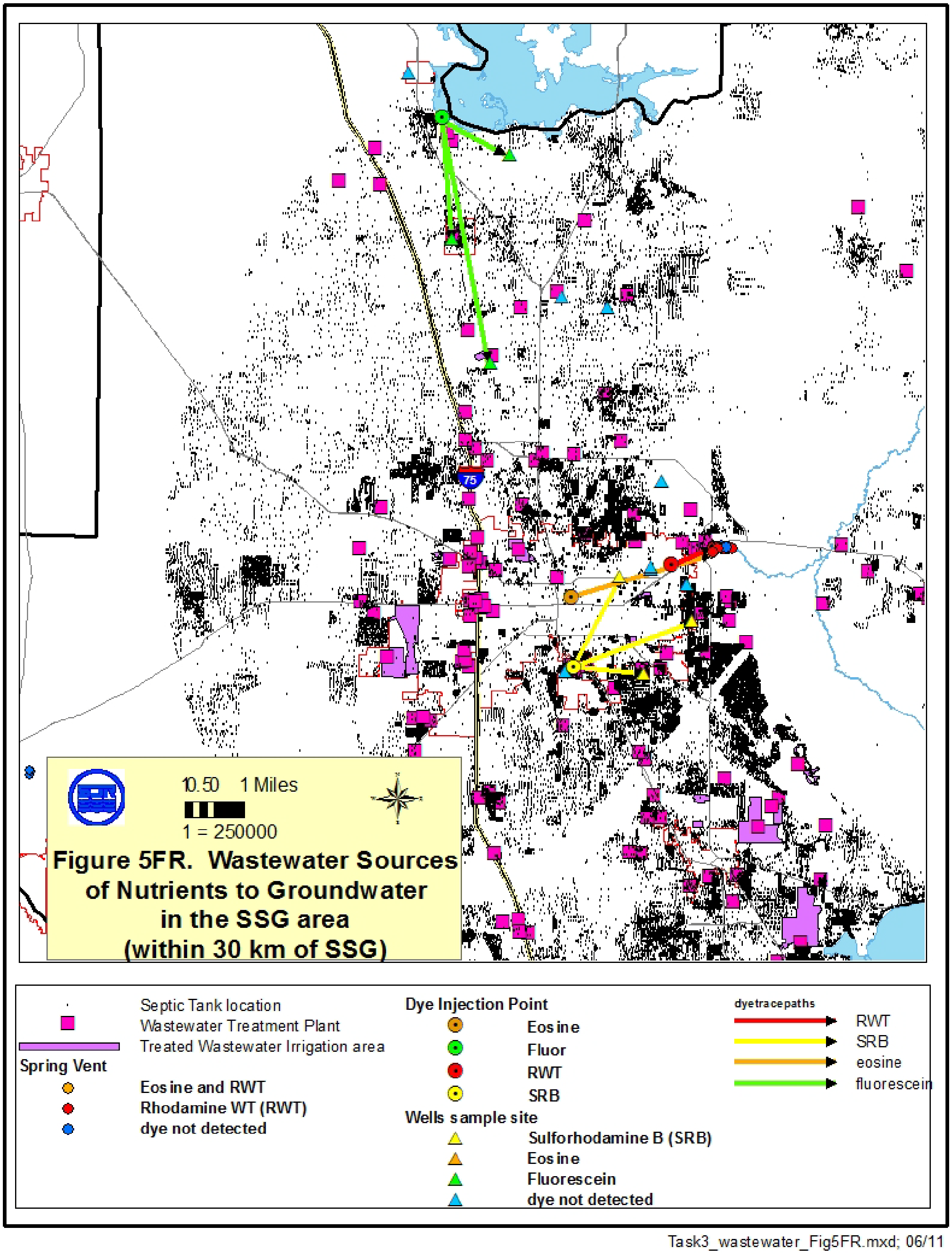
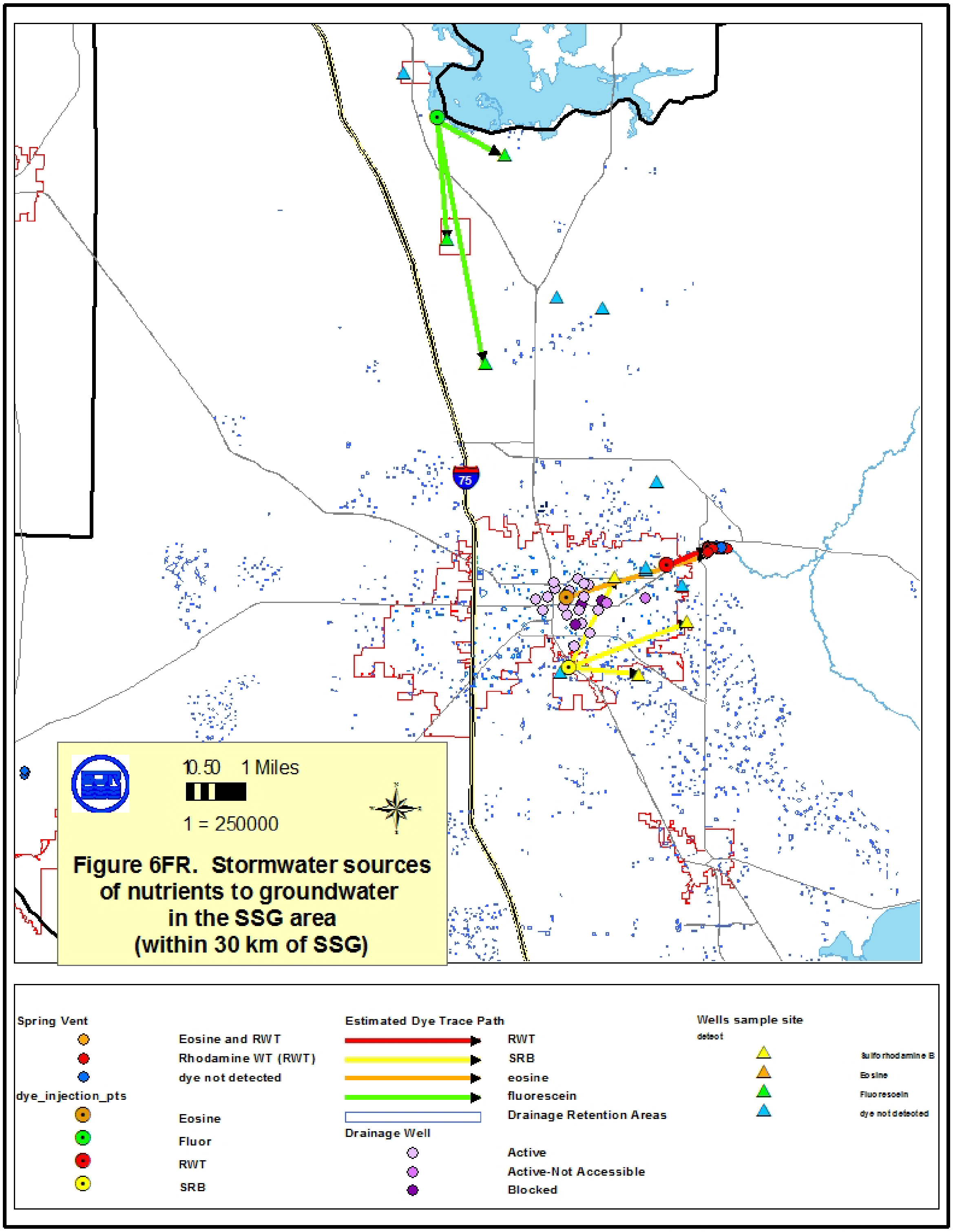
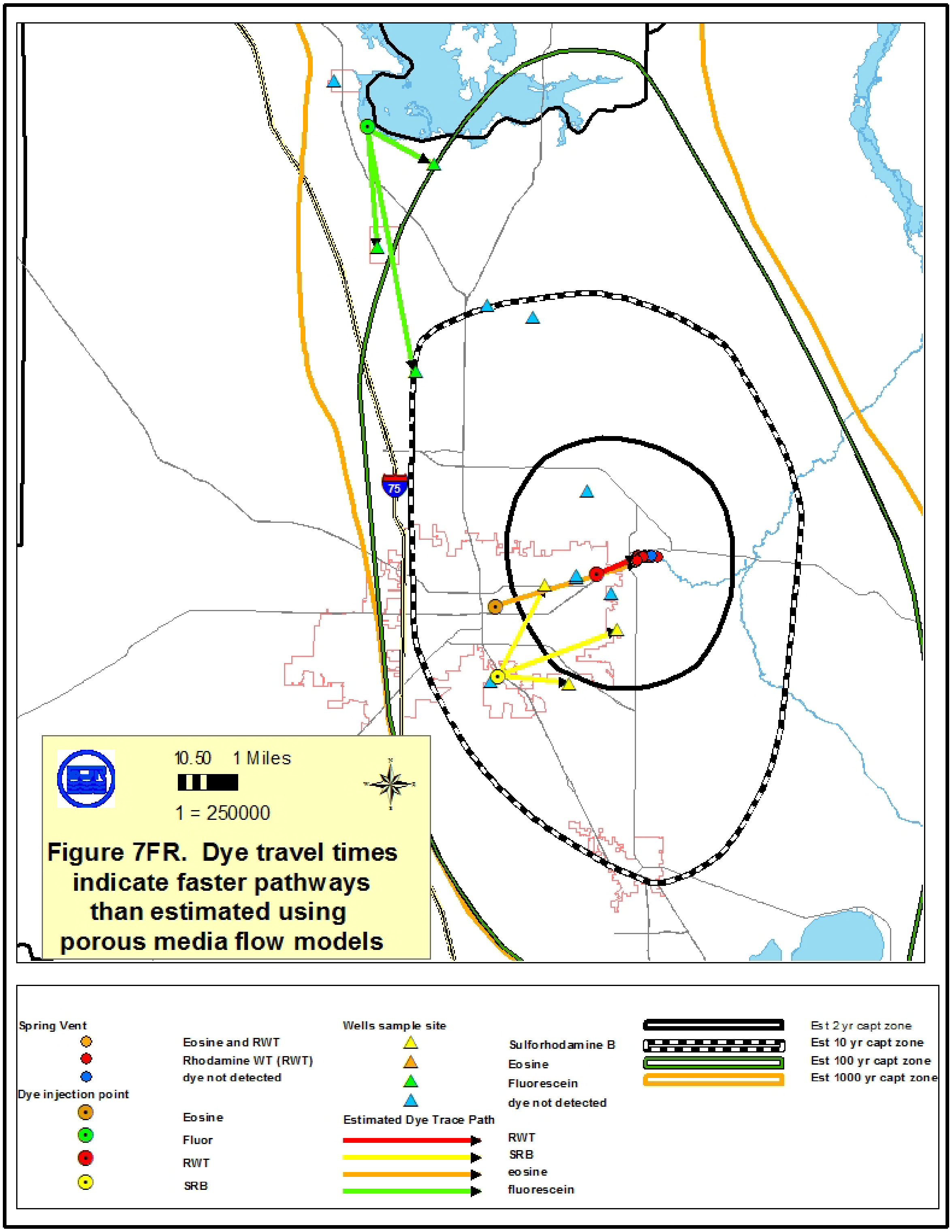


Figure 5FR. Wastewater sources in the SSG area



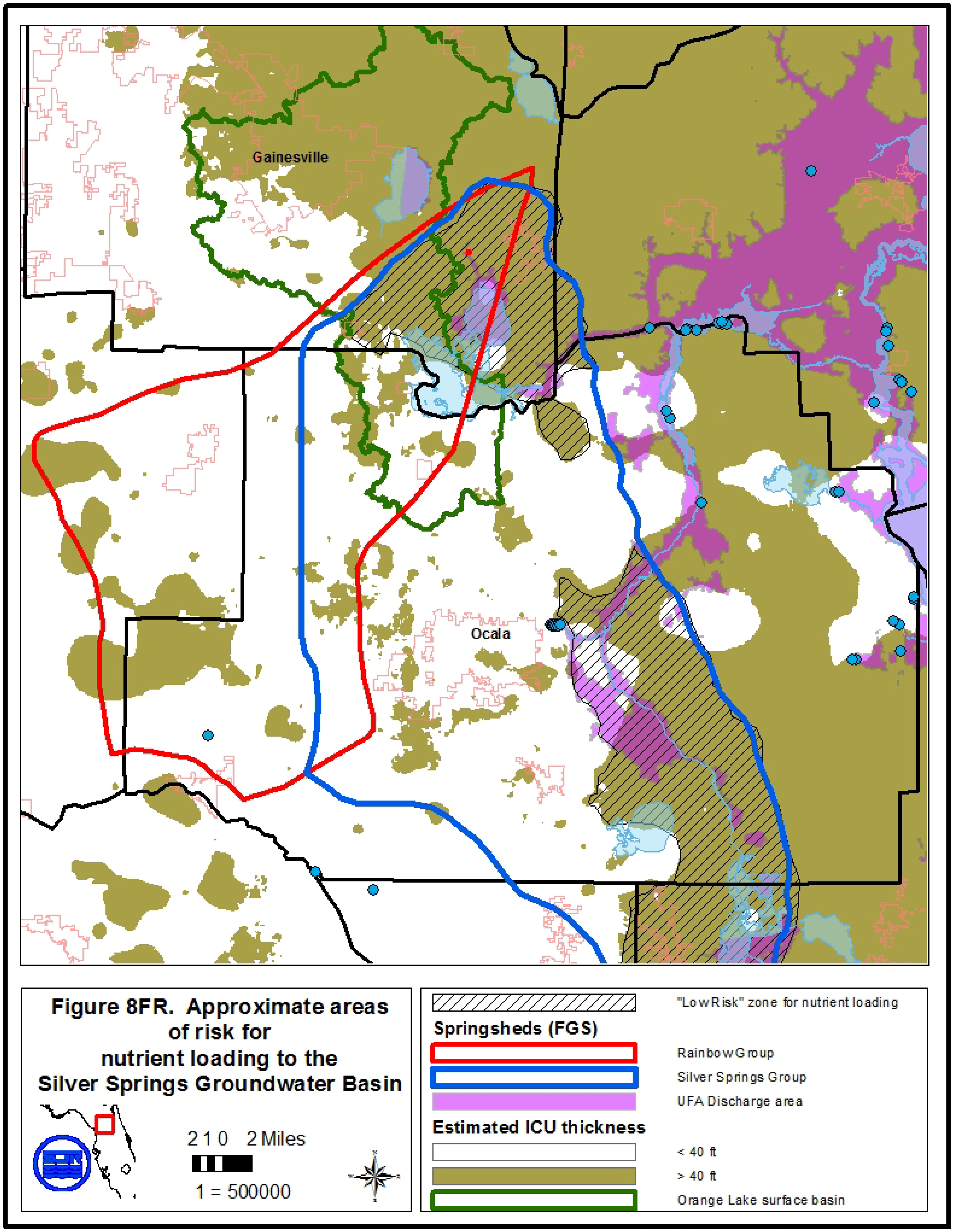
Task3_stormwater_Fig6FR.mxd; 08/11

Figure 6FR. Stormwater sources of nutrients to groundwater in the SSG area



Task3_springsheds_Fig7FR.mxd; 08/11

Figure 7FR. Dye travel times indicate faster pathways than those estimated using porous media flow models



Task3_rankingmap_Fig8FR.mxd, 08-2011

Figure 8FR. Approximate areas of risk for nutrient loading to the Silver Springs Groundwater Basin

Attachment 1:

<u>Project Grant Work Plan</u>

ATTACHMENT A
GRANT WORK PLAN

Project Title: Silver Springs Nutrient Pathway Characterization

Project Location: Silver Springs

Project Background:
The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River in central Marion County. Discharge from the spring group flows from the Upper Floridan aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large main vents plus 28 smaller vents spread throughout the upper reach of the Silver River. Maps of the karst system supplying water to the SSG are limited to only hundreds of feet from the main vents. However, the extent of the karst conduit system feeding the vents is unknown, but believed to extend a significant distance from the vent openings. Discharge rates, measured periodically by the USGS in the Silver River downstream of the largest vents since the 1930's, varied from approximately 350 cubic feet per second (cfs) to approximately 1290 cfs, with a long-term annual median value of approximately 772 cfs (Munch et al, 2007). An ongoing study conducted by the SJRWMD for the Florida Department of Environmental Protection (FDEP) is aimed at characterizing flow rates and water quality from individual vents (Toth, 2008).

The SSG has recently been listed by the FDEP as impaired by nutrients (specifically nitrates, or nitrates plus nitrites) (Hicks et al, 2009). Water quality at the Silver Springs Group has been monitored quarterly by FDEP since 2001. Over the monitoring period, nitrate+nitrite concentrations in Silver Main Spring have ranged from 0.91 to 1.4 mg/L, with a median concentration of 1.1 mg/L. Over the 7.5-year verified listing period of record the median nitrate+nitrite concentration for Silver Main was 1.1 mg/L and 100 percent of the samples exceeded 0.6 mg/L.

Development of Total Maximum Daily Load (TMDL) rules for the SSG area will require gaining knowledge about the source areas of nutrients that are discharging from the spring vents. To date little detailed research has been conducted regarding the nature and extent of the groundwater flow pathways controlling SSG discharge or their relationship to potential source locations of nutrients.

The objectives of this project are twofold. The first objective is to identify dominant groundwater pathways and travel times between specific locations and the SSG. The second objective is to identify the potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.
This project supports the objectives set forth in Section 205(j)(2) of the Federal Clean Water Act, namely:
(2) Such sums shall be used by the Administrator to make grants to the States to carry out water quality management planning, including, but not limited to—

(A) identifying most cost effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards; *(TMDL/BMAP)*

(B) developing an implementation plan to obtain State and local financial and regulatory commitments to implement measures developed under subparagraph (A);

(C) determining the nature, extent, and causes of water quality problems in various areas of the State and interstate region, and reporting on these annually; Consistent with the requirements.

Specifically, the information from this project will be used to complete the TMDL for Silver Springs and to equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

Project Description: The project area encompasses approximately 300 square miles around the Ocala area in central Marion County, including much of the steady-state springshed for the SSG. Major tasks will include:

1. **Detailed hydrogeologic evaluation** aimed at identifying and ranking locations of potential rapid or direct input to the major subsurface conduit system supplying groundwater flow to the SSG. This task will include a review of available data to determine the locations where potential sources of focused (point-source or relatively concentrated non-point-source) nutrient-enriched recharge occurs to the groundwater flow system. This task also includes borehole logging and detailed potentiometric mapping of the Upper Floridan aquifer (UFA) in order to guide karst pathway assessment. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. The surveyed locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG.

2. **Karst pathway assesssment and groundwater travel time** estimation using dye tracing from the potential groundwater input sites ranked highest in Task 1 to the SSG. An initial dye tracer test will involve tracer injected at sites selected in Task 1 with direct connection to the subsurface (drainage wells and active, direct input sinks). A second test will include tracer injection at shallow monitoring wells or surface sites (e.g. sinks without direct subsurface openings) near the identified conduit pathways where nutrients may seep into the aquifer from surface sources.

3. **Risk assessment,** comparing the delineated pathways and travel times with potential nutrient source types and land use categories.

Project Tasks/Deliverables:

Task 1: Hydrogeologic evaluation and potential nutrient source identification: This task includes a review of available data to determine locations within the project area where focused, nutrient enriched groundwater recharge commonly occurs. Concurrently with this review, a detailed survey of UFA potentiometric elevations will be conducted. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. These locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG. **(6/09 – 2/10)**

1) **Existing data compilation and review (6/09 – 9/09)**

a. Drainage well locations and characteristics ***(SJRWMD staff)***

i) Map and ground truth locations

ii) Obtain well characteristics and any existing geophysical and video logs

iii) Surface drainage characteristics (drainage basins for individual drainage wells)

b. Stormwater retention ponds and their drainage basins ***(SJRWMD staff)***

c. Wastewater disposal/recharge locations ***(SJRWMD staff)***

i) Reclaimed water distribution systems, spray fields & Rapid Infiltration Basins (RIBs)

d. Available source water quality data ***(SJRWMD staff)***

e. Active sinkholes

f. Map and ground truth locations of sinkholes with 1) direct openings and 2) drainage to ground water system through cover material ***(SJRWMD staff)***

g. Monitoring well survey ***(SJRWMD staff)***

i) Evaluate SJRWMD monitoring wells

ii) Locate any other monitoring or unused production wells, and obtain well characteristics and any existing geophysical and video logs

h. Review available ground water vulnerability maps and any existing surface geophysical surveys previously conducted in the area ***(SJRWMD staff)***

i. Evaluate existing data to determine locations for new data collection using GIS-based data overlays ***(SJRWMD staff)***

2) **<u>Data collection for aquifer characterization</u>** **(6/09 – 12/09)**

a. Collect geophysical and video logs at accessible drainage, monitoring, or unused production wells where needed ***(SJRWMD staff)***

b. Conduct slug tests at accessible drainage, monitoring, or other wells in order to assess the potential for direct connection to karst conduit system ***(SJRWMD staff)***

c. Perform water-level monitoring at Upper Floridan aquifer wells in the SSG area to supplement the September 2009 USGS statewide potentiometric survey (***SJRWMD staff***)

d. Perform vertical elevation surveys of the measuring points of those wells measured as part of subtask I. 2c.. Provide a report to SJRWMD describing and summarizing the surveying of water-level measuring point elevations. ***(Contractor)***

3) **<u>Data analysis and review:</u>** Synthesize the existing and newly collected potentiometric and borehole data and select optimal areas for conducting ground-based geophysical surveys ***(SJRWMD staff)*** **(8/09 – 2/10)**

4) **<u>Geophysical surveys</u>** **(11/09 – 2/10)**

a. Conduct reconnaissance-scale ground-based geophysical surveys near and down gradient from potential direct ground water inputs based upon results of Task 1 c. The specific types of geophysical surveys used may include some or all of the following methodologies:

i) Ground Penetrating Radar (GPR) surveys ***(Contractor)***

ii) Microgravity anomaly surveys ***(Contractor)***

iii) 2D Electrical resistivity imaging (ERI) surveys ***(Contractor)***

iv) Seismic Multichannel analysis of Surface Waves (MASW) ***(Contractor)***

b. Provide a report to SJRWMD summarizing the ground-based geophysical surveys and results. A

part of this subtask may also include presenting the results of the geophysical surveys at meetings. ***(Contractor)***

5) **<u>Identify and rank potential sources of nutrient input to SSG</u> (12/09 – 2/10)**

   a. Conduct GIS-based evaluation to document locations with land uses where nutrient producing inputs may intersect with any significant karst solution features identified in Task 1 d. ***(SJRWMD staff)***

   b. Rank the locations based upon proximity to the SSG and magnitude of potential nutrient loading ***(SJRWMD staff)***

6) **<u>Task 1 interim report</u> (1/10 – 2/10)**

   a. Prepare draft report (concurrent with other subtasks in Task 1) ***(SJRWMD staff)***

   b. DEP and internal SJRWMD review of draft interim report

   c. Respond to comments and finalize Task 1 interim report ***(SJRWMD staff)***

<u>Task 2: Potential nutrient pathway delineation</u>: In this task the hydrologic connections between the potential source locations ranked highest in Task 1 and the SSG will be assessed by conducting 2 qualitative dye trace studies. For each test, dye will be injected into the UFA and monitoring for dye presence will be conducted at representative SSG spring vents. Discharge rates from the SSG vents will also be measured during each dye trace study. The initial dye trace will focus upon the hydrologic connection between the 2 to 3 highest ranked potential source locations that act as "direct" inputs to the UFA (drainage wells and/or open and active sinks or swallets). The second dye trace will focus upon the hydrologic connection between 1 or 2 additional source locations that provide "indirect" nutrient input to the UFA conduit flow system. Potential indirect sources include sinks or stormwater retention basins without direct openings to the UFA or rapid infiltration basins that recharge reclaimed wastewater. However, if the results of Task 1 indicate that there are more than 3 highly ranked potential source locations with direct input to the UFA, the second dye trace may then focus upon the hydrologic connections between the additional direct inputs and the SSG. **(2/10 – 4/11)**

1) **<u>Design and planning of dye tracer tests:</u>** Plan dye tracer test details based upon results of Task One ***(Contractor)*** **(2/10 – 3/10)**

2) **<u>Background sampling and analysis:</u>** Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)*** **(3/10 – 4/10)**

3) **<u>Initial dye trace test</u> (4/10 – 7/10)**

   a. Background sampling and analysis. Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)***

   b. Dye release (using 2 or 3 different dyes) from 2 to 3 direct source locations (e.g., active sinks and/or drainage wells) identified in Task 1, and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 2 – 3 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the U. S. Geological Survey (USGS) ***(Contractor)***

d. Data evaluation and reporting, including preparation and submittal of a technical memorandum describing the dye trace and results ***(Contractor)***

4) <u>Second dye trace test</u> (7/10 – 3/11)

a. Review the design for the second dye trace based upon dye trace 1 results; redesign as needed

b. Dye release (using 1 or 2 additional dyes) from 1 - 2 non-direct source locations (e.g., sinks or stormwater retention basins) identified in Task 1and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 4 - 6 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the USGS ***(Contractor)***

d. Data evaluation, including a comparison of results from both dye traces ***(Contractor)***

NOTE: It is recognized that design of the dye trace tests may require staggering of the two tests resulting in overlapping sampling periods. In that case the total length of both tests would approximately span the period from 3/10 through 3/11.

5) <u>Task 2 Reporting</u> (12/10 – 4/11)

a. Prepare and draft interim Task 2 report that documents the dye tracer studies and presents the results. A part of this subtask may also include presenting the results of the dye tracing studies at meetings. ***(Contractor)***

b. DEP and SJRWMD review of draft interim report

c. Respond to comments and prepare final Task 2 interim report ***(Contractor)***

<u>Task 3: Risk Assessment</u>: Compare potential pathways and travel times determined in Task 2 with current and proposed land uses within the project area. **(4/11 – 8/11)**

1) **<u>Compare the potential groundwater flow pathways</u>** and travel times determined by Task 2 and identify areas of risk for nutrient loading to the groundwater flow system and transport to the SSG. If possible, rank the risk areas into low, medium, and high categories. ***(SJRWMD staff)*** **(4/11 – 5/11)**

2) <u>Final Project Report</u> (5/11 – 8/11)

a. Prepare a draft Final Report that summarizes the project and incorporates the interim reports that document tasks 1 & 2 ***(SJRWMD staff)***

b. DEP and internal SJRWMD review of draft Final Report

c. Respond to comments and prepare Final Report ***(SJRWMD staff)***

Task No.	Task Title	Start	Complete	Deliverable	Deliverable Due Dates
1	Hydrogeologic evaluation and potential nutrient source identification	June, 2009	February, 2010	Interim report	February 28, 2010
2	Delineation of potential pathways using dye tracer	February 2010	April 2011	Interim report	April 30, 2011
3	Risk assessment, comparing result of task 2 with land uses	April 2011	August 2011	Final report	August 11, 2011

Project Budget Narrative:
Contractual: To complete tasks 1 and 2.

Total Budget by Task:

Task		DEP Funding	Matching Funds and Source	
			Matching Funds	Source of Funds
1	Hydrogeologic evaluation and potential nutrient source identification	190,000	0	
2	Delineation of potential pathways using dye tracer studies and discharge measurements	345,000	0	
3	Final report		0	
	Total:	$535,000		
	Project Total:	$535,000		

Measures of Success:
The outcomes of this project are:

1. identification of dominant groundwater pathways and travel times between specific locations and the Silver Springs Group.

2. Identification of the potential sources of groundwater nutrient contamination that appear to be directly connected to the Silver Spring discharge vents.

Specifically, the information from this project will be presented in a final report and used to complete the TMDL for Silver Springs and equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

Attachment 2:

Task One Report: Hydrogeologic Evaluation and Potential Nutrient Source Identification

Silver Springs Nutrient Pathway Characterization Project

Interim Task One Report

Prepared by

Brian McGurk, P. G. (Project Manager)

Jill Stokes (GIS Analyst)

St Johns River Water Management District

For

Connie Bersok (Grant Manager)

The Florida Department of Environmental Protection

Agreement Number G0273

(SJRWMD Contract 25452)

This project and the preparation of this report was funded in part by a grant from the U. S. Environmental Protection Agency using American Recovery and Reinvestment Act of 2009 funds through an agreement with the Division of Environmental Assessment and Restoration, Springs Initiative of the Florida Department of Environmental Protection

Table of Contents

Introduction

The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River in central Marion County (Figure 1). Discharge from the spring group flows from the Upper Floridan aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large main vents and 28 smaller vents spread throughout the upper reach (approximately 1200 meters (3900 ft)) of the Silver River. Maps of the karstic underground system supplying water to the SSG are limited to only hundreds of feet from the main vents. The extent of the karst conduit system feeding the vents is unknown, but believed to extend a significant distance from the vent openings. Discharge rates, measured periodically by the U. S. Geological Survey (USGS) in the Silver River downstream of the largest vents since the 1930's, varied from approximately 350 cubic feet per second (cfs) to approximately 1290 cfs, with a long-term annual median value of approximately 772 cfs (Munch et al, 2006). An ongoing study conducted by the SJRWMD for the Florida Department of Environmental Protection (FDEP) is aimed at characterizing flow rates and water quality from individual vents (Toth, 2008).

The SSG has recently been listed by the FDEP as impaired by nutrients (specifically nitrates, or nitrates plus nitrites) (Hicks et al, 2009). Water quality at the Silver Springs Group has been monitored quarterly by FDEP since 2001. Over the monitoring period, nitrate+nitrite concentrations in Silver Main Spring have ranged from 0.91 to 1.4 mg/L, with a median concentration of 1.1 mg/L. Over the 7.5-year verified listing period of record the median nitrate+nitrite concentration for Silver Main was 1.1 mg/L and 100 percent of the samples exceeded 0.6 mg/L.

Development of Total Maximum Daily Load (TMDL) rules for the SSG area will require gaining knowledge about the source areas of nutrients that are discharging from the spring vents. To date little detailed research has been conducted regarding the nature and extent of the groundwater flow pathways controlling SSG discharge or their relationship to potential source locations of nutrients.

The objectives of this project are twofold. The first objective is to identify dominant groundwater pathways and travel times between specific locations and the SSG. The second objective is to identify the potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

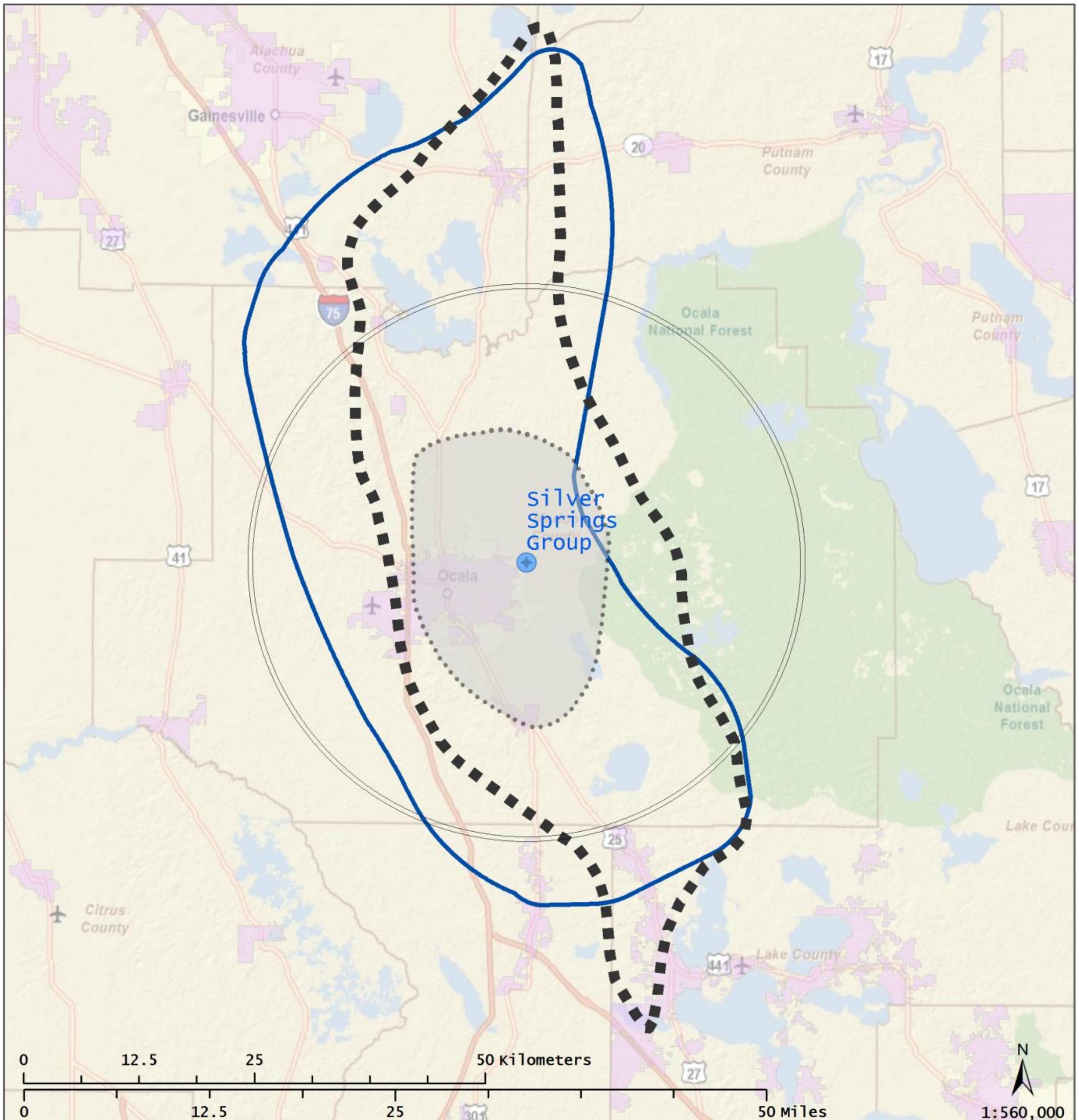


Figure 1: Silver Springs Groundwater Basin

Groundwater Model-Based
10-yr capture zone
1,000-yr capture zone

USGS May 1999 UFA Potentiometric Surface-Based
springshed

SSG 30 km Dataset Extent

This project supports the objectives set forth in Section 205(j)(2) of the Federal Clean Water Act, namely:

(2) Such sums shall be used by the Administrator to make grants to the States to carry out water quality management planning, including, but not limited to—

(A) identifying most cost effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards*; (TMDL/BMAP)*
(B) developing an implementation plan to obtain State and local financial and regulatory commitments to implement measures developed under subparagraph (A);
(C) determining the nature, extent, and causes of water quality problems in various areas of the State and interstate region, and reporting on these annually.

Specifically, the information from this project will be used to complete the TMDL for Silver Springs and to equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

This interim report describes the status of the project as of March 7 2010. It includes a description and summary of the project activities completed to date. The report also summarizes the information compiled and evaluated as part of Task 1 of the project Grant Work Plan (Attachment A of Agreement G0273) and describes the plan for performing project Task 2.

Summary of Project Activities Completed

The initial project proposal was approved by FDEP in June 2009 prior to final approval of ARRA funding. SJRWMD and FDEP representatives agreed at that time that ARRA funding would be used only for payment of SJRWMD contractors to complete those subtasks in the Grant Work Plan that are identified for completion by "contractor" within the approved Grant Work Plan. The cost of those subtasks marked for completion by "SJRWMD staff" is being absorbed by SJRWMD because those activities also directly support SJRWMD's mission to ensure the sustainable use and protection of water resources.

Task 1 consisted of a hydrogeologic evaluation of the SSG area that included compilation of existing data, collection of new data, and a review of potential groundwater nutrient sources with respect to their potential for supplying nutrients to the SSG. Subsequently, SJRWMD staff began collecting and compiling information pertinent to the project in June 2009, following the timeline contained within the approved Grant Work Plan. SJRWMD and FDEP staff prepared and entered into Agreement G0273 (SJRWMD Contract 25452) in September 2009 to perform the Silver Springs Nutrient Pathways project work. SJRWMD staff also completed a Request for Proposals in September 2009 for a hydrogeologic evaluation to perform subtask 1.4 (ground-based geophysical surveys) and Task 2 (Dye Tracing) of the Grant Work Plan. Consequently, SJRWMD awarded a contract to URS Corporation Southern (URS) in

November 2009 to perform those tasks. Also during this period, SJRWMD staff completed a work order for an existing contract with Degrove Surveyors, Inc to complete subtask 1.2d) of the Grant Work Plan (vertical elevation surveying).

Between June 2009 and the beginning of October 2009 SJRWMD staff completed the compilation and review of existing data within the SSG area (see detailed description below). Collection of new data for aquifer characterization began in June 2009 and extended through mid-January 2010. This subtask was delayed slightly due to a delay in finalizing procurement documents and mobilizing Degrove Surveyors in order to perform vertical elevation surveys of wells inventoried by SJRWMD staff. Degrove Surveyors completed their subtask in mid-January 2010 (see Appendix 3). URS began meeting with SJRWMD staff for project planning in early December 2009 and mobilized to perform ground-based geophysical surveys in early January 2010 (see Appendix 4). A meeting was held between URS and SJRWMD staff on January 16 2010 to review and discuss the results of the geophysical surveys. SJRWMD staff performed review and analysis of the compiled data (subtask 3) between August 2009 and late January 2010. Finally, all of the data were reviewed spatially using Arc-Info software to identify and rank potential sources of nutrient input to the SSG.

Results of Hydrogeologic Evaluation and Potential Nutrient Source Evaluation

Existing Data Compilation and Review

Prior to beginning the process of gathering data for the project area, publications concerning the SSG area were reviewed for information regarding available data and previous analyses of the SSG ground water flow system. These reports provided information regarding the types of available spatial data within the SSG springshed. Spatial data were gathered from a variety of sources representing locations within a 30 km (approximately 18 mile) radius surrounding the SSG. This “buffer zone” encompasses most of the SSG springshed, including the entire estimated 10-year capture zone (Figure 1).

The major sources of data were the files of local governments (City of Ocala and Marion County), the FDEP, the Florida Geological Survey (FGS), and the two water management districts (SJRWMD and SWFWMD) with jurisdiction in the area. Data were also obtained from the USGS and the Cave and Karst Research Institute (CKRI). Appendix 1 lists the various types of existing data that were compiled with corresponding data sources. Figures 2 through 10 illustrate the locations of the various types of data that were gathered. Anecdotal information about the locations of additional cave features was obtained from local members of the Florida Speleological Society (FSS).

Natural Features

The spring vents of the SSG flow from limestone of the Eocene Age Ocala Limestone to form the headwaters of the Silver River (Munch et al 2006). The Silver River flows approximately five miles to the northward flowing Oklawaha River. These streams, along with a few small tributaries to the Oklawaha, are the only significant perennial streams in the area (Figure 2). Topographic relief within the SSG area ranges from less than 20 ft NGVD along the Oklawaha River to over 200 ft NGVD in the Fairfield Hills uplands several miles northwest of Ocala. The Ocala Limestone is overlain by varying thicknesses of clayey and sandy sediments of the Miocene Age Hawthorn Group and younger sands and clayey sands. The thickness of the sediments overlying the Ocala Limestone is generally less than 50 ft throughout most of the SSG springshed (Munch et al 2006). The Hawthorn Group forms a continuous layer east of the SSG; west of the SSG, it is not present everywhere and its thickness is significant only in some of the higher elevation areas. Several dozen caves have been mapped along a northwest-southeast trending line that roughly follows Rte 441 and passes through downtown Ocala (Figure 2). Topographic depressions, sinkholes, and swallets are abundant throughout the springshed, particularly west of the SSG, including the higher elevations areas (Figure 3). Consequently, the landscape consists generally of rolling, karstic hills in the west and relatively flat, poorly drained topography east of the SSG.

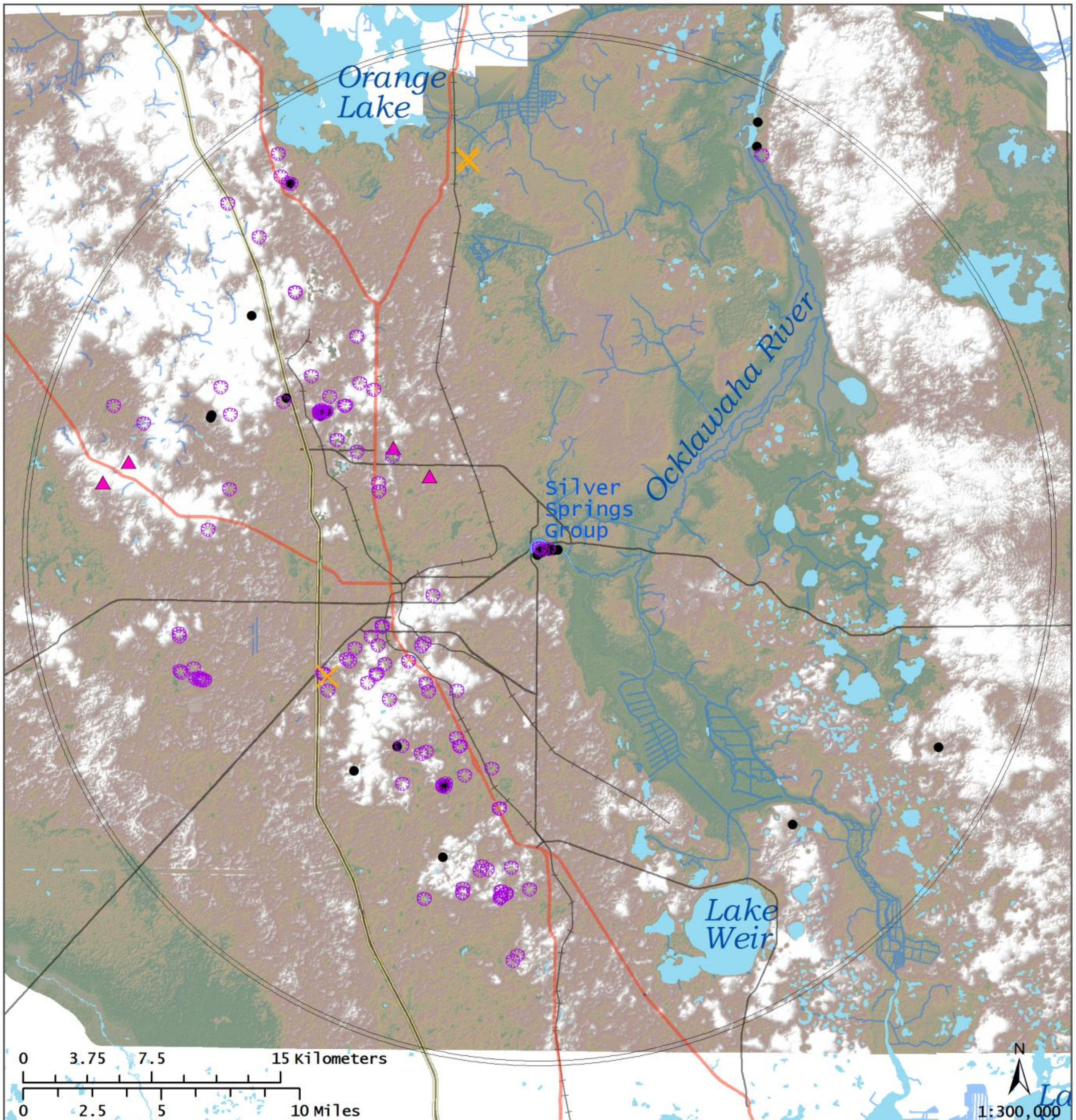


Figure 2: Natural Features

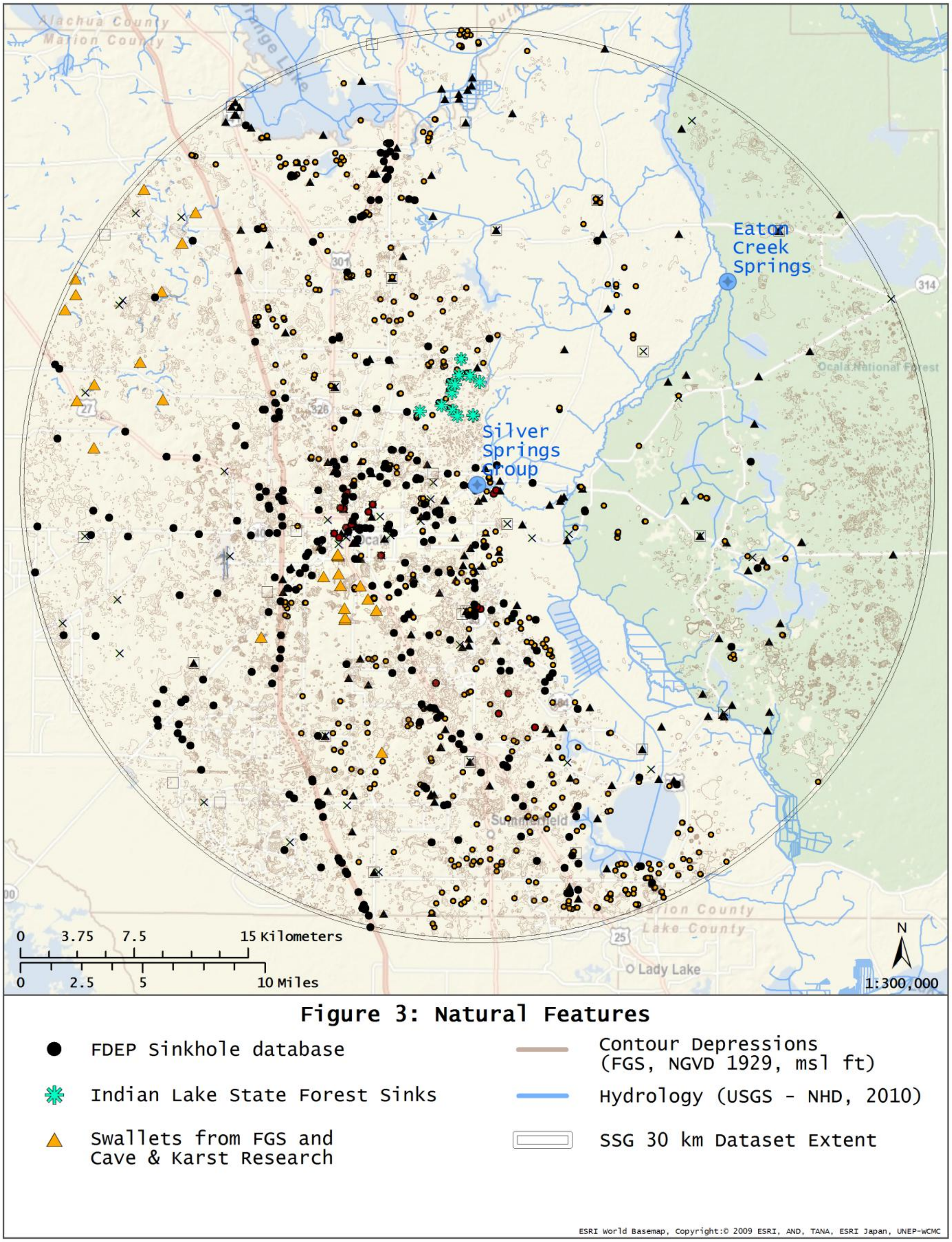


Figure 3: Natural Features

Lithologic and borehole geophysical logs are available from hundreds of test, monitoring, and production wells within the SSG springshed (Figure 4). Data from these logs have contributed to detailed characterizations of the regional aquifers and confining units in the area (Faulkner 1973, Arthur et al 2007, Copeland et al 2009). The Ocala Limestone and the upper part of the underlying Avon Park Formation form the Upper Floridan Aquifer. The Upper Floridan aquifer is the principal hydrostratigraphic unit in the springshed. It contains significant primary and secondary porosity, allowing significant ground water flow through its porous matrix as well as fractures and conduits. Average transmissivity of the Upper Floridan in the basin was estimated by Faulkner (1973) at approximately 2,000,000 ft^2/day. Based upon water quality (mainly sulfate content) and isotopic analyses, most of the ground water discharging from the SSG vents is believed to be derived from the uppermost 100 to 200 ft of the UFA (Faulkner 1973, and Munch et al, 2006).

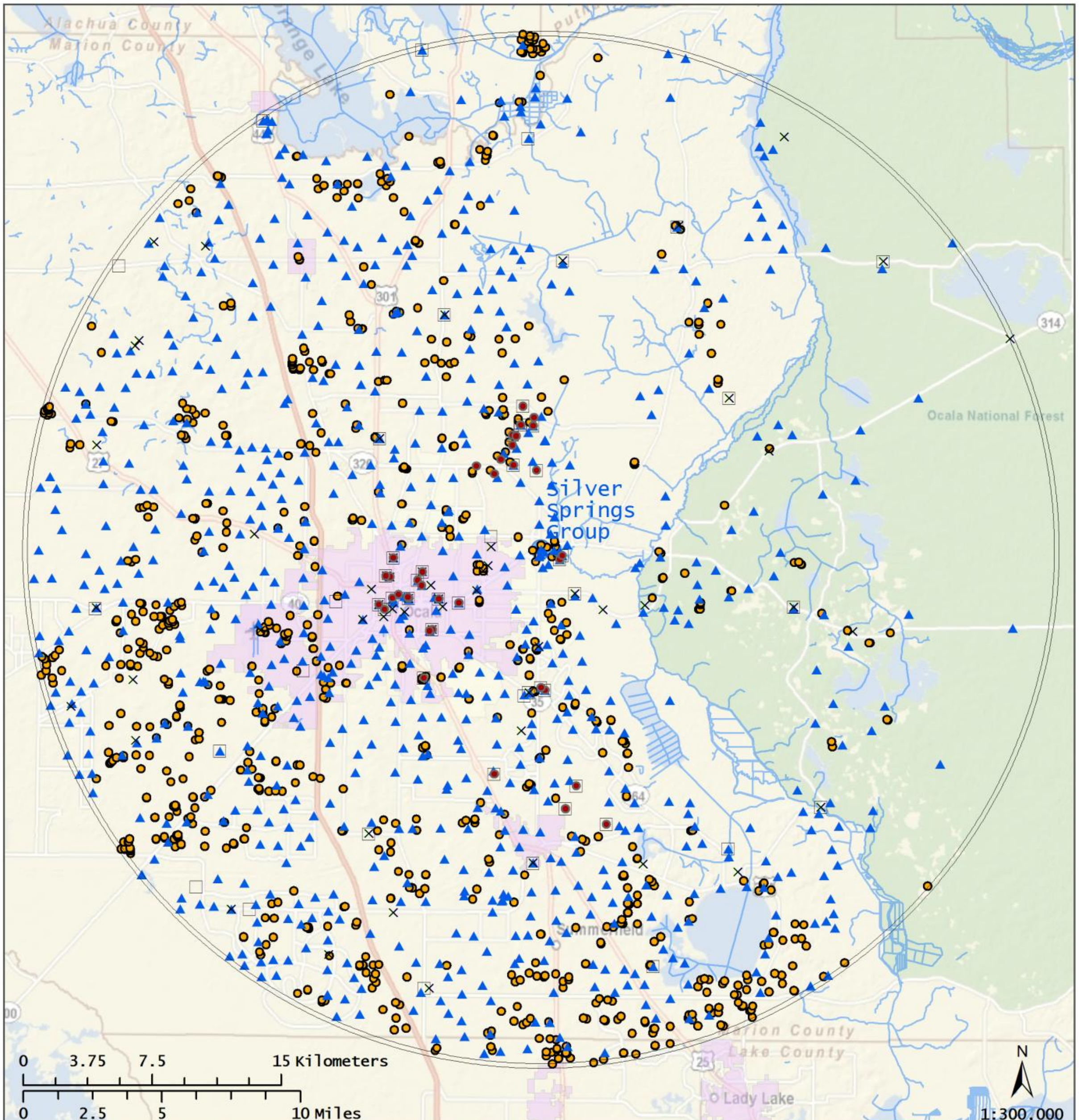


Figure 4: Well Data

- Wells Newly Documented For SSG Project
- Water Use Permit
- Upper Floridan Aquifer Water Level (Sept 2009)
- Water Quality (FDEP)
- Lithologic and/or Geophysical Logs
- SSG 30 km Dataset Extent

ESRI World Basemap, Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC

Man-made features

Historic land use changes within the SSG springshed have resulted in a significant shift from natural (forest, scrub, and wetland) landscapes to more urban and residential uses, particularly around Ocala just west and southwest of the SSG. For example, Munch et al (2006) found that within the 2-year capture zone of the SSG, natural lands decreased from over 70% of the total area in 1949 to less than 40% in 2005, while urbanized land increased from approximately 3% in 1949 to 37% of the total in 2005. The SSG estimated 2-year capture zone covers an area of about 52 square miles immediately surrounding the SSG main vents, including the easternmost part of the City of Ocala. The historic land use conversion to urban uses may have been more significant in the areas within the springshed located immediately south, west and north of downtown Ocala.

At least partly because of this urbanization, there are now hundreds of production wells throughout the SSG springshed (Figure 4). These wells withdraw ground water primarily from the Upper Floridan aquifer for agricultural, self-supplied domestic, public-supply, and commercial/industrial uses. The current total withdrawal permitted for consumptive uses by SJRWMD and SWFWMD within the 30 km buffer area is approximately 58 million gallons per day (mgd). The estimated actual average daily withdrawal rate by the City of Ocala (the largest single user) for 2006 was approximately 12 mgd. These flow rates equate to approximately 30 and 6 percent, respectively, of the estimated average 2006 flow from the SSG of about 193 mgd (298 cfs, (USGS 2010).

The combination of karst topography and urbanization in the Ocala area produced the need for storm-water drainage control (Phelps 1994). Hundreds of drainage retention areas within the springshed (Figure 5) collect and hold storm water runoff. These DRAs hold runoff temporarily, with some of the storm water evaporating while the rest seeps ultimately into the UFA. Within the central part of the City of Ocala, however, storm-water drainage is primarily through drainage wells constructed into the UFA (Figure 6). The City controls 27 active drainage wells (Andreyev 2004, City of Ocala, 2008). Sixteen of the wells are located within DRAs that receive storm water and overflow into the wells occurs only occasionally. There are 11 other wells that receive either direct street runoff or relatively constant overflow from lakes or ponds that act as storm-water retention basins. The City has recently plugged 15 wells and has plans to abandon several other inactive drainage wells. The City's drainage well inventory contains estimates of the area drained by some of the drainage wells (Andreyev, 2004). Detailed drainage basin information for the individual drainage wells or for the DRA's within the jurisdictions of both the City and Marion County are not yet available.

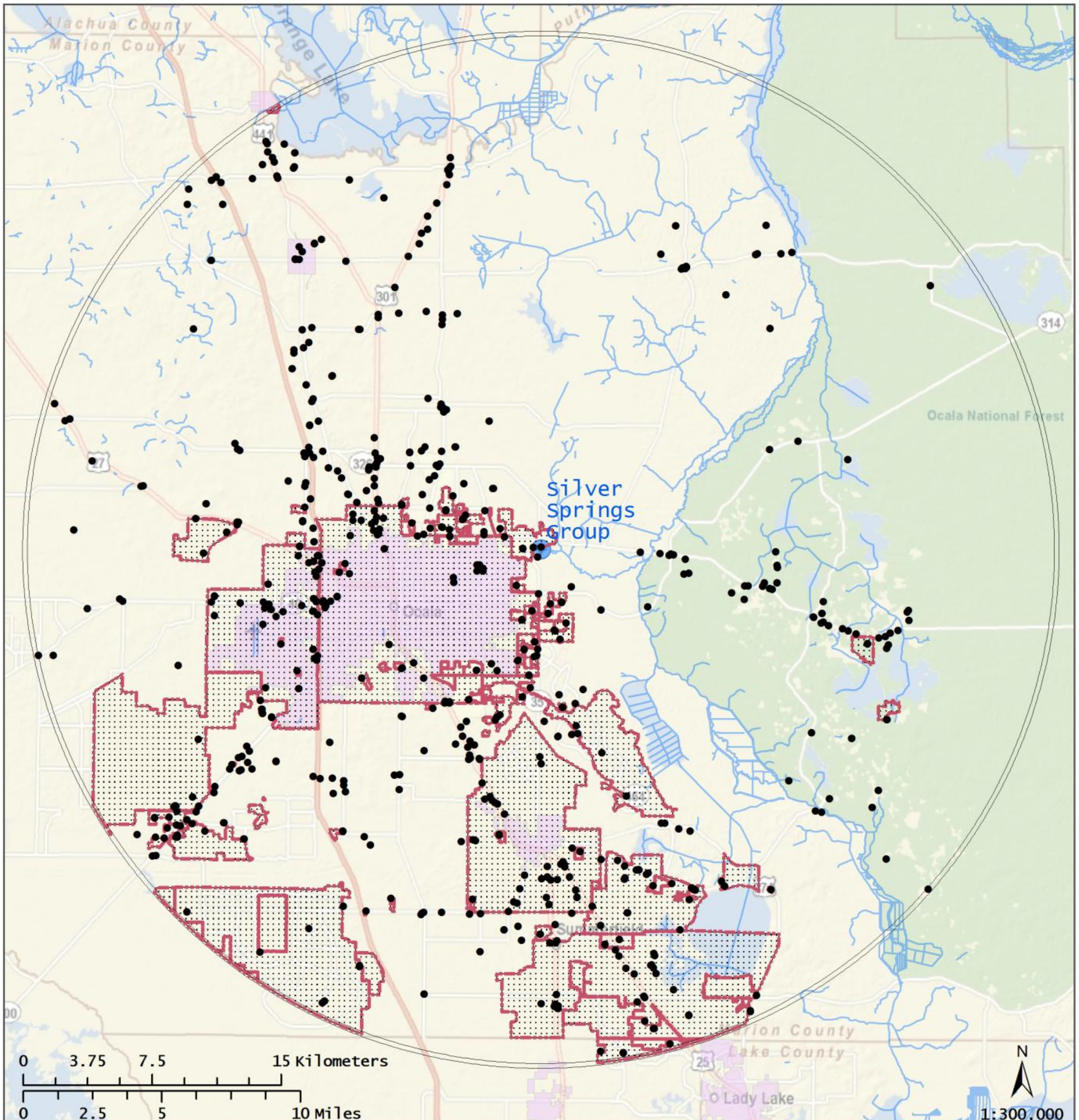


Figure 5: Public Water Supply Facilities Data

FDEP Public Water System Wells

Public Water Supply Service Areas

SSG 30 km Dataset Extent

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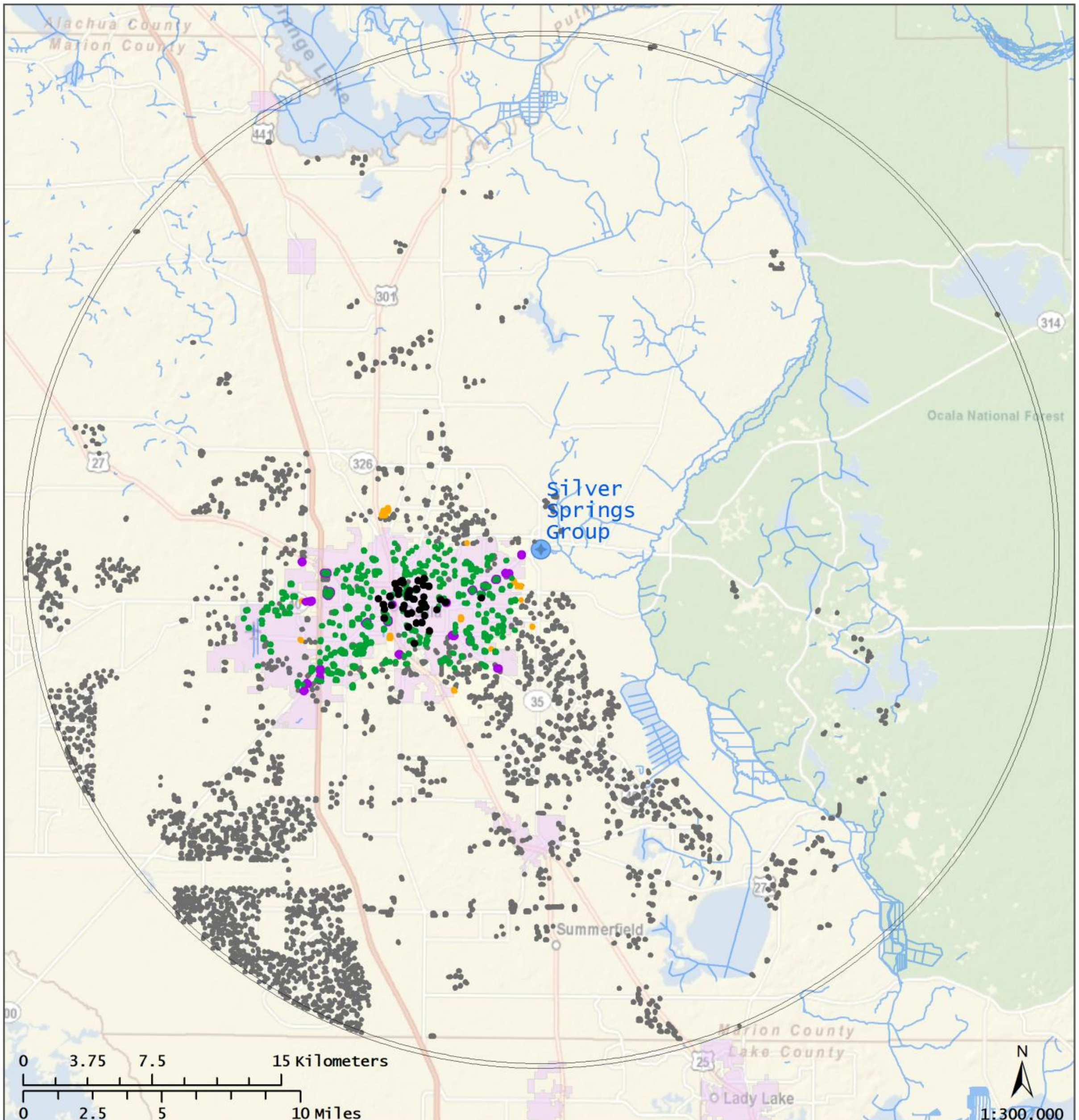

Figure 6: Stormwater Drainage Data

from City Of Ocala
- Drainage Wells (2009)

Drainage Retention Areas
- City
- DOT
- County

from Marion County
- Marion County DRA

from SJRWMD
- SSG 30 km Dataset Extent

Sewered areas within City of Ocala and Marion County's Silver Springs Regional wastewater service areas provide wastewater to four large wastewater treatment plants dozens of additional small "package" wastewater plant (Figure 7). All treated wastewater from the large plants is distributed to reuse water destination areas (sprayfields, golf courses, or other irrigated areas (Figure 8). The City of Ocala's reuse distribution sites are located west and south of the SSG. The County's Silver Springs Regional plant and sprayfield is located approximately one mile north of the SSG (Post, Buckley, Schuh, and Jernigan, Inc 2009). Septic tanks, however, treat wastewater within the non-sewered residential areas that exist throughout the SSG 30 km buffer area (Figure 9). Potential or reported ground water contamination sites also exist throughout the SSG area (Figure 10). These sites are primarily underground storage tank locations.

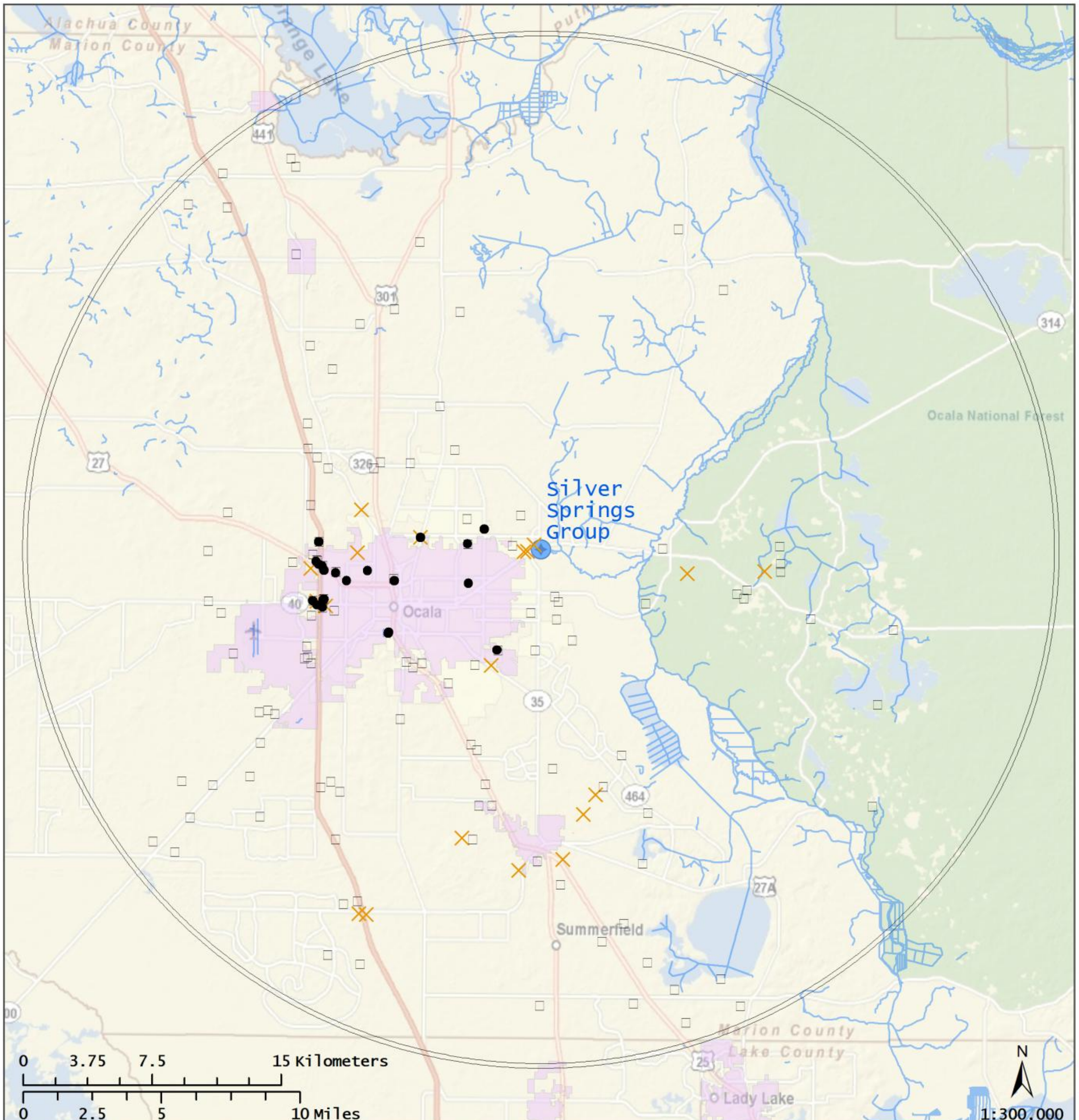

Figure 7: Wastewater Facility Data

Treatment Facilities

- ● FDEP Wastewater Facility Regulation (WAFR) Facilities
- □ Permitted
- × Other Reported Wastewater Treatment Facilities (WWTFs)
- SSG 30 km Dataset Extent

ESRI World Basemap, Copyright:© 2009 ESRI, AND, TANA, ESRI Japan, UNEP-WCMC

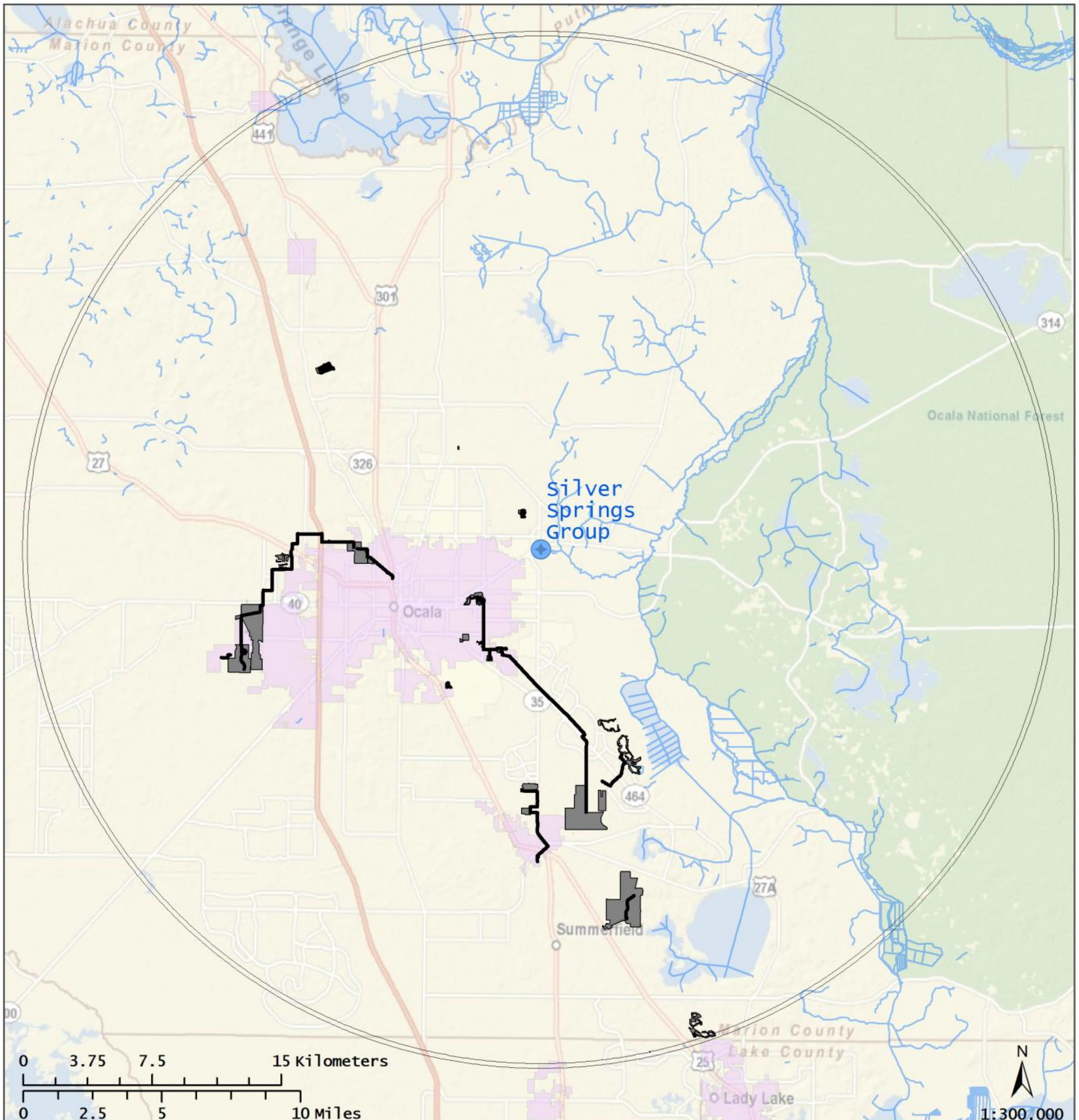

Figure 8: Wastewater Facility Data

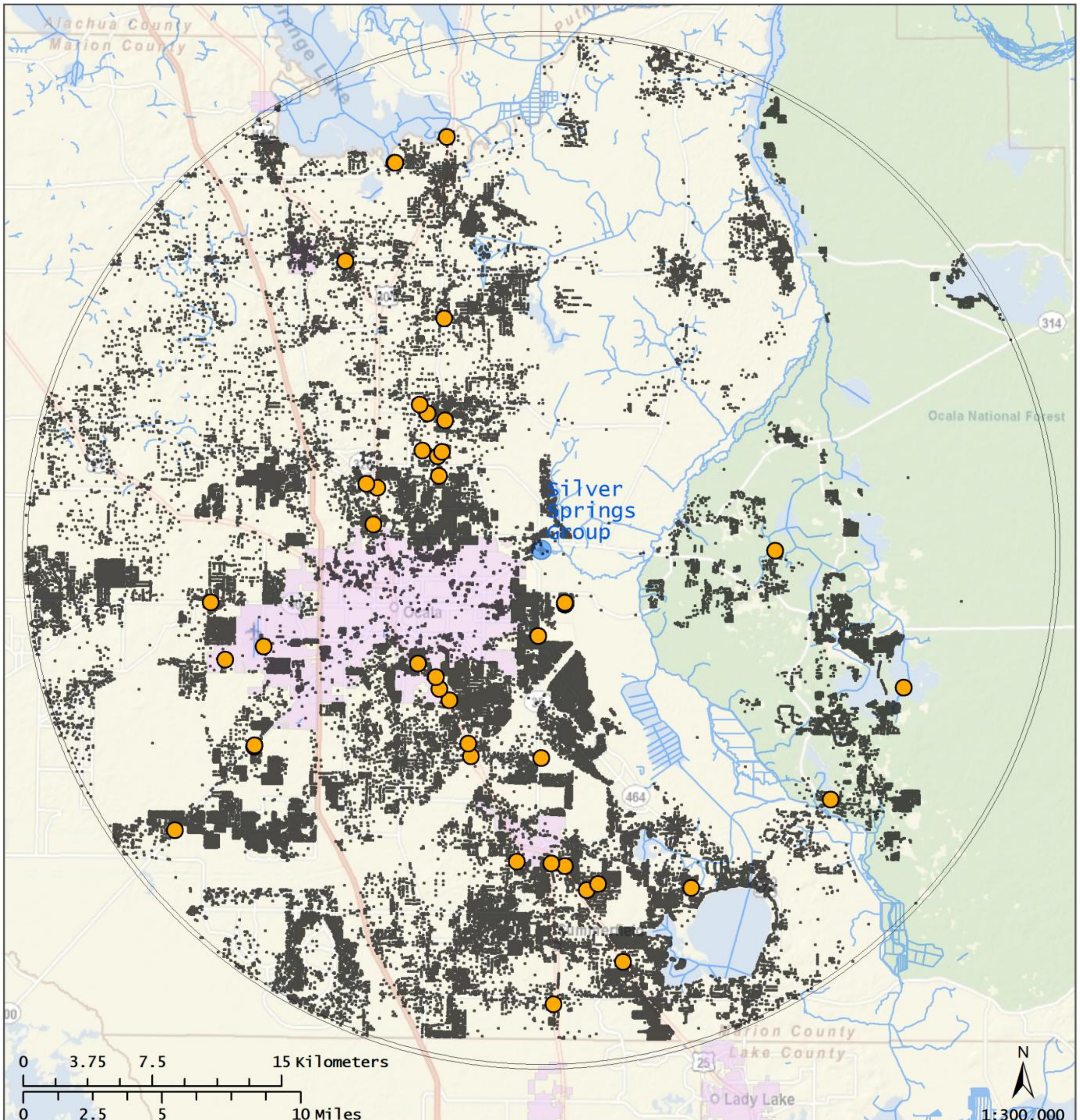

Figure 9: Wastewater Facility Data

Septic Tanks

Domestic Onsite

Commercial Septic

SSG 30 km Dataset Extent

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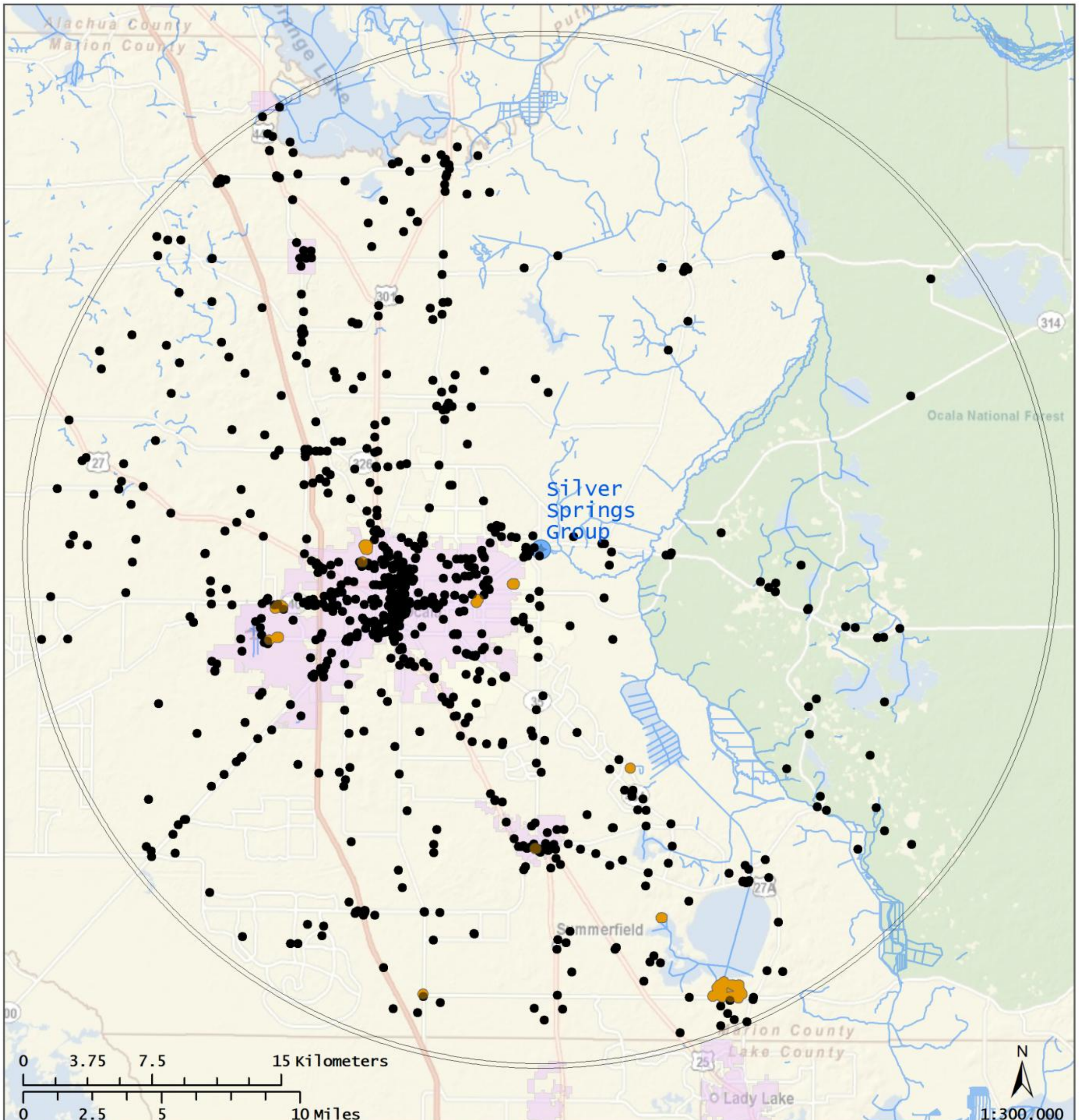

Figure 10: Potential Groundwater Contamination Site Data

- FDEP (Marion County) Storage Tanks
- FDEP Groundwater Contamination Areas
- SSG 30 km Dataset Extent

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Previous dye trace studies

Small-scale dye trace studies have been conducted in the SSG area at several different locations as part of three separate studies. Knochenmus (1967) introduced fluorescein dye into the UFA at Ocala Caverns, which is located approximately 9.5 miles south-southwest of the SSG vents near the M. H. Carr Cross Florida Greenway (Figure 11). The purpose of the injection project was to gain information about the applicability of various ground water tracers for use within the UFA near the proposed Cross Florida Barge Canal. Dye was observed 1.3 miles north at Wolf Sink (now known as Paradise Springs) within 9 days, resulting in an estimated minimum velocity within the UFA of approximately 0.5 ft/minute (720 ft/day) (Knochenmus 1967).

Phelps (1994) conducted local-scale field studies, including ground-based geophysical surveys and dye traces, at three locations within the region. At one site in southwestern Ocala (cluster of centrally located points on Figure 11), Rhodamine WT dye was released in Briar Cave. Monitoring at nearby wells installed for the project yielded no results. Subsequent dye releases at locations southwest of I-75 (at the western edge of the SSG springshed) and northeast at the Appleton Museum property much closer to the SSG) yielded ground water travel times over very short distances (< 200 ft)of 34 ft/day (southwest site) and 300 ft/day (northeast site). Ground-based geophysical surveys conducted at all three of these sites indicated the presence of local-scale fractures or conduits near the top of the UFA.

Jones, Edmunds Associates, Inc (1998) injected fluorescein dye into Indian Lake Sink, located approximately 4 miles north of the SSG vents. Dye detection sampling lasted for 9 weeks subsequent to the injection at SSG vents Mammoth East, Mammoth West, 5 locations in the Silver River, and at 15 wells, but no trace of fluorescein dye was reported.

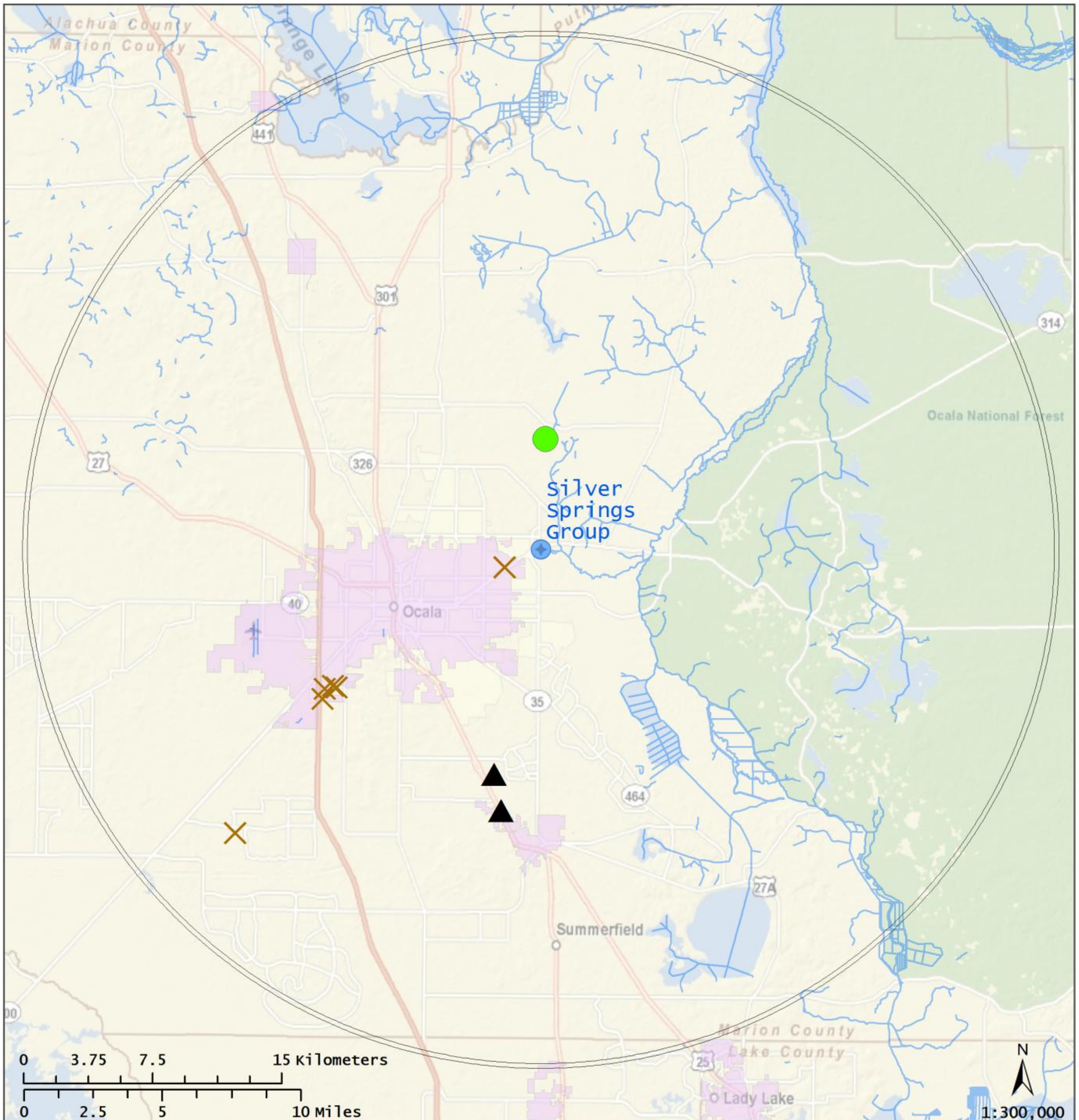

Figure 11: Historic/Published Dye Injection Project Data

- USGS WRI 92-4159 dye trace (Phelps, 1994)
- USGS OFR 67-004 dye trace (Knochenmus, 1967)
- Indian Lake sink dye trace
- SSG 30 km Dataset Extent

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Data Collection for Aquifer Characterization

Field reconnaissance

The available information regarding existing drainage, production, and monitoring wells was surveyed in order to identify wells where borehole logging and/or water level monitoring could be performed. Field reconnaissance was focused upon areas near the SSG and downtown Ocala (the center of the 30 km buffer area) to gain additional data points for a detailed potentiometric map of the UFA. Detailed maps with one-foot contour intervals prepared by Faulkner (1973) for May and September 1968 depicted a shallow trough-like structure in the UFA potentiometric surface extending in a west-northwest direction from the SSG across the northern part of downtown Ocala. This structure may indicate preferential flow paths controlled by subsurface conduits developed from large-scale fracture features (Faulkner 1973, and Phelps 1994). The semi-annual potentiometric maps produced historically by the USGS do not contain enough data points to provide the same detail. The goal was to add enough additional water level monitoring wells to produce a one-foot contour map for the SSG area using September 2009 data.

Reconnaissance of public lands located north and south of the SSG resulted in the identification of 13 previously undocumented wells on the Indian Lake State Forest property north of the SSG (Figure 12 and Appendix 2). Four additional new wells were located within the bounds of the Silver River State Park and the M.H. Carr Cross Florida Greenway property south of the SSG. Six of the wells within the Indian Lake State Forest were found to be blocked or otherwise inaccessible (Appendix 2).

Eight monitoring wells that had been previously monitored during the 1980’s and 1990’s as part of the statewide Very Intensive Study Area (VISA) project were located and evaluated. All but one of these was suitable for either borehole logging or water level monitoring. The City of Ocala Engineering Department assisted with field surveys of drainage wells. Most of the active drainage wells were inaccessible for logging or monitoring because of wellhead configuration or because the well bores were partially or completely blocked. However, five drainage wells were selected for either logging or water level measurements.

The City of Ocala provided access to existing monitoring wells located near the Perry Acres and Ocala #1 sprayfield properties. Five of these wells, plus a backup city production well, were chosen for water-level monitoring. Water level measurements were also made in an existing USGS monitoring well located in the Highway 40 right-of-way west of the SSG. Wolf Sink was visited and a location on the wooden deck that provides access to the sink for recreational divers was selected as a water-level measuring point.

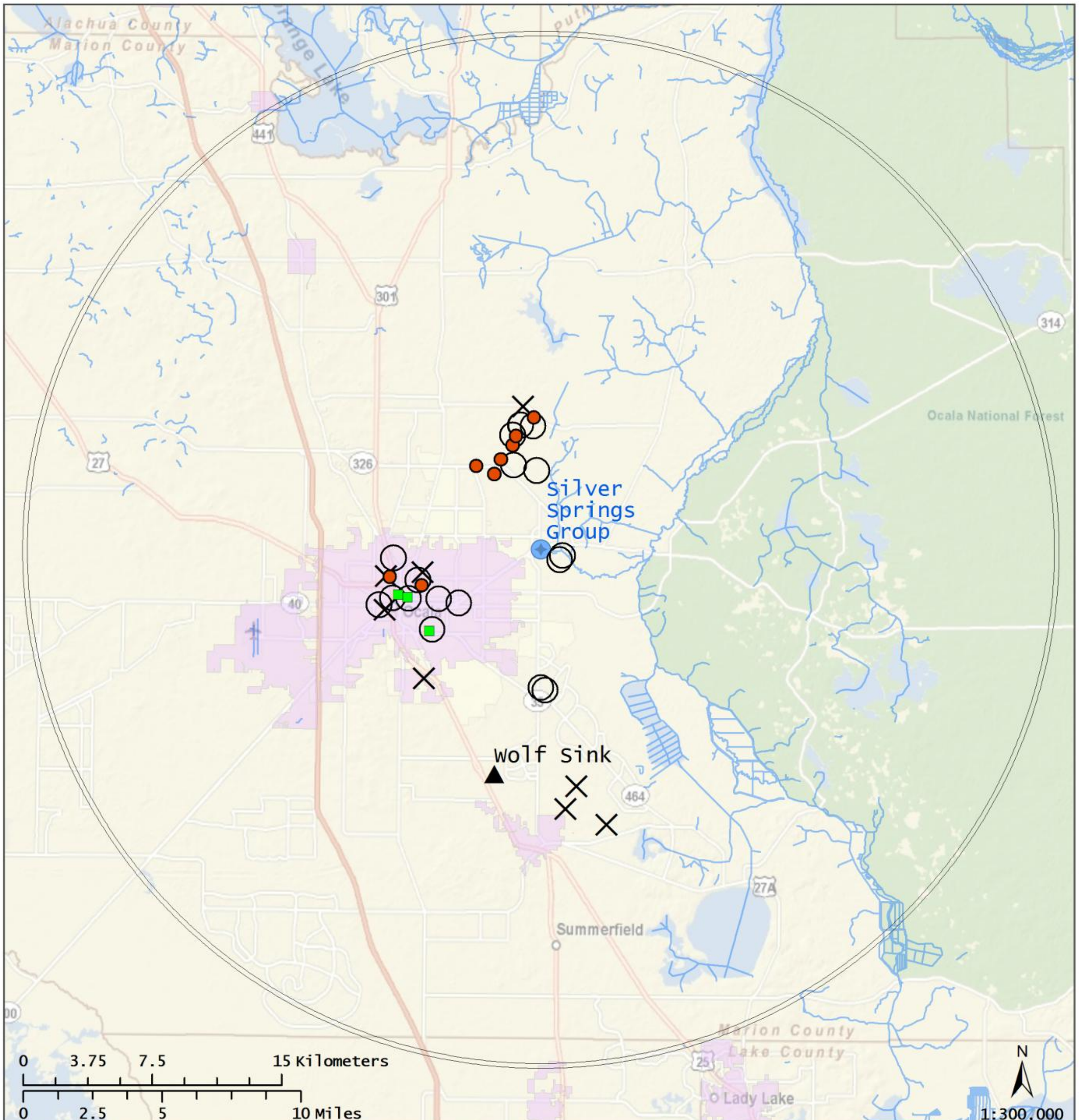

Figure 12: Groundwater Data Collection Points

Well Locations

- ○ Has Both Water Level & Geophysical Log data (17 wells)
- × Water Level Data Only (9)
- ■ Geophysical Log Data Only (3)
- ● No Water Level or Geophysical Log Data (8)

Sink Locations

- ▲ Water Level Data Only (1)

SSG 30 km Dataset Extent

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Borehole geophysical logging and testing

Geophysical borehole logs were collected from 21 wells (Figure 12 and Appendix 2). The VISA wells were constructed at the very top of the UFA to monitor water quality from that zone; thus, their logs provide little information about flow zones at depth within the UFA. Logs collected from the Indian Lake State Forest wells indicate that the top of the UFA is relatively near the surface, which is also indicated by the presence of many shallow, dry sinkholes (Figure 3). Most of the caliper logs (indicating borehole diameter) illustrate the presence of abundant fractures within the top 100 to 200 ft within the UFA. The four sets of logs from the drainage wells suggest the presence of fracture or solution cavity features near the bottom of each borehole. This is particularly true of the logs of well M-0649, which is the main drainage well receiving water from Tuscawilla Lake in the northern part of downtown Ocala. This well is reported to receive water nearly constantly from the lake. A video log of this well indicated that large amounts of water flow downward through the borehole and into the formation near the bottom. However, evaluation of all of the logs collected (caliper, formation and fluid resistivity and temperature, natural gamma) does not indicate the presence of obvious very large conduit-like features that could be correlated between wells. Due to the abundance of apparent small scale fractures present in each well, it was concluded that slug testing would not provide valuable information because a relatively rapid response to a small slug of injected water would occur at all of the wells. Therefore, slug testing was not attempted.

Potentiometric monitoring

Water-level measurements were made at 24 of the newly documented UFA wells, plus Wolf Sink (Appendix 2) during the third week of September 2009 to coincide with the USGS statewide potentiometric mapping project. Measuring points from each site were recorded and passed on to Degrove Surveyors, who completed vertical elevation surveys of each measuring point (Appendix 3). Depth-to-water level values were then subtracted from each measuring point elevation to produce a water level elevation. These water level elevations were then combined with corresponding data from the USGS September 2009 water level data set, plus water level data from the same period collected from SJRWMD and SWFWMD continuous recorder wells within the SSG 30 km buffer area. The data were contoured at a one-foot contour interval to provide a map of the estimated UFA potentiometric surface within the SSG area (Figure 13). A 41 ft NGVD contour interval surrounds the SSG. The 42-ft contour extends outward to the western part of downtown Ocala, with a local high that includes the City of Ocala drainage wells (compare Figure 13 with Figure 6). The 42-ft contour resembles the trough-like feature from Faulkner's 1968 potentiometric surface maps. Its shape, however, is probably controlled by the number and location of data points. For example, there is only one data point in the area directly north of Ocala; more data in this area could result in a more detailed depiction of the potentiometric surface in that area.

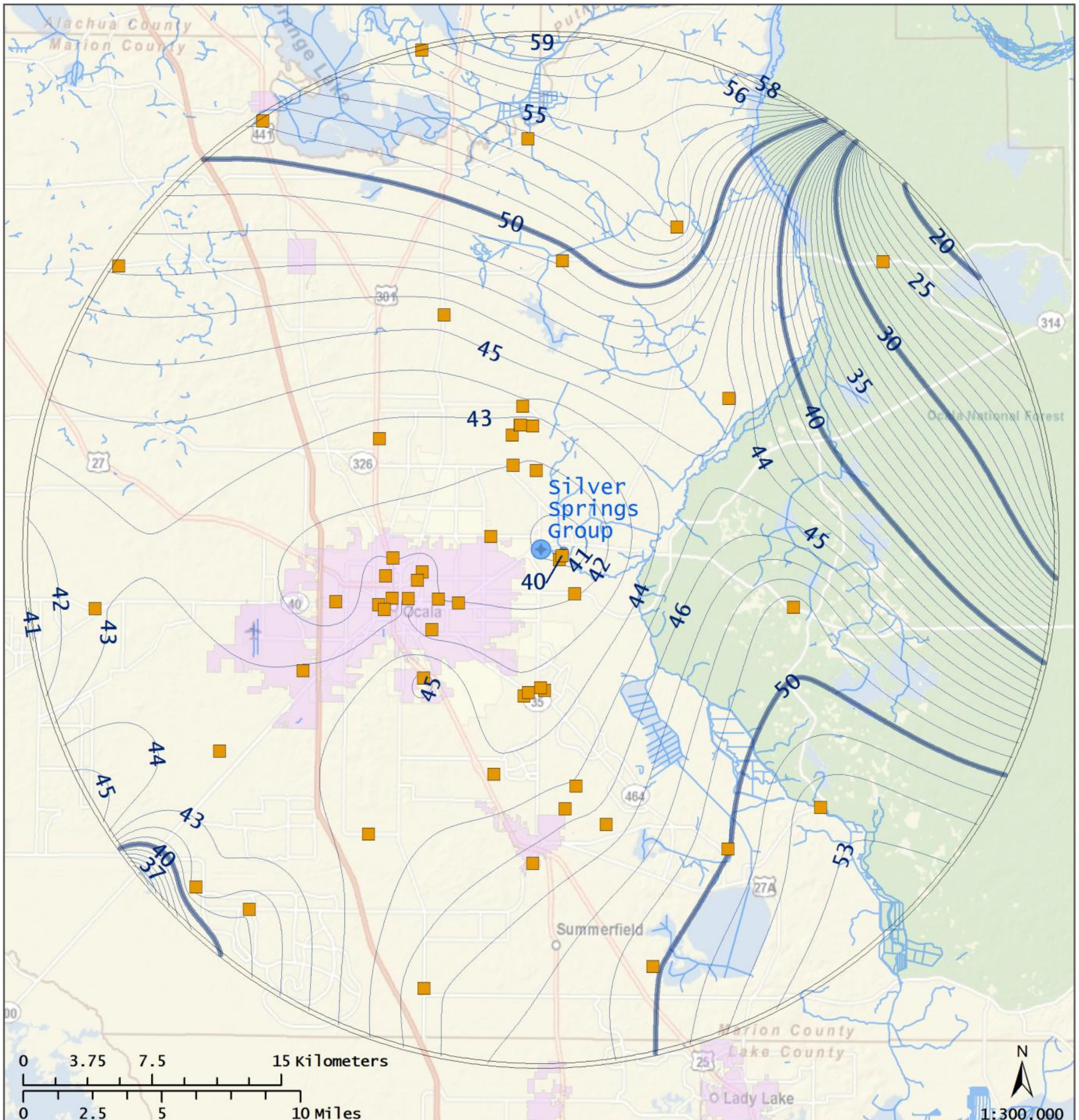

Figure 13: Upper Floridan Aquifer Potentiometric Surface

Upper Floridan Aquifer Water Level (Sept 2009)

UFA Potentiometric Surface (Sept 2009) 1ft contour, NGVD 1929

UFA Potentiometric Surface (Sept 2009) 10ft contour, NGVD 1929

SSG 30 km Dataset Extent

Data Analysis and Review

Review of the data described above indicated that, while abundant sources of nutrient input to the SSG ground water flow system exist upgradient to the north, west and south, most of the natural features that supply direct input of surface water to the UFA are located west of the SSG. These direct inputs include natural swallets that receive streamflow and associated stormwater, karstic sinkhole-related depressions (some of which have been incorporated into stormwater drainage retention areas) and drainage wells. The locations of the sinks and swallets, plus examinations of borehole log data, do not indicate the obvious presence of large-scale conduit systems that are more obvious in other parts of Florida (e.g., Suwannee basin or Woodville Karst Plain). The apparent east-west trending slight depression in the UFA potentiometric surface could be an indication of large-scale conduit features however.

Mapped cave features in the SSG area are limited to areas near the known cave openings. Accessible cave features extend only a few hundred feet from the openings of the Mammoth East and West vents at the SSG. The only other mapped caves in the area are located generally near or west of Rte 27-441 and follow a northwest-southeast trend (Figure 2), rather than toward the SSG. Instead of using the limited available budget for conducting ground-based geophysical surveys to search for a large-scale feature that might connect these two areas, the project team decided upon the following two-prong approach. One group of surveys would be located around the SSG to the north, west, and south to evaluate whether large-scale features extend outward from the mapped cave area toward the SSG recharge area. The other group would be located near selected locations of direct recharge to the UFA upgradient of the SSG. This approach required selection of potential dye injection locations concurrent with selection of locations for ground-based geophysical surveys. Consequently, five locations were selected for dye injection during Task 2 of the project based upon their observed or potential direct input of recharge to the ground water flow system, as well as their accessibility. Ground-based geophysical surveys were planned for locations at or near these direct input sites, in order to determine whether large-scale subsurface features could be detected beneath or adjacent to the recharge sites. Sites were also located that are relatively near the SSG, at intermediate distances, and relatively far from the SSG, but still believed to be within the springshed. Brief descriptions of the five locations (Figure 14), with their approximate distance from the Mammoth vents are:

1. Ocala Civic Theatre property: a small active sinkhole within a DRA approximately 1.5 miles west-southwest (this is next to the Appleton Museum property at which a small scale, short term dye trace was conducted by Phelps (1994).
2. Tuscawilla Park drainage well M-0649: as mentioned above, this well receives nearly constant drainage from Tuscawilla Lake, approximately 5 miles west-southwest
3. Orange Lake Sink: this sink at the edge of Orange Lake receives a large amount of constant surface water inflow; approximately 17 miles northwest
4. Pontiac Pit: a natural sink with a small mapped cave that historically received stormwater input from a nearby developed area along Rte 27-441 in Ocala. It now receives constant flow from a new stormwater treatment pond and wetland system; approximately 6 miles southwest
5. Spanish Palms: a DRA located within a depression; approximately 1.8 miles south

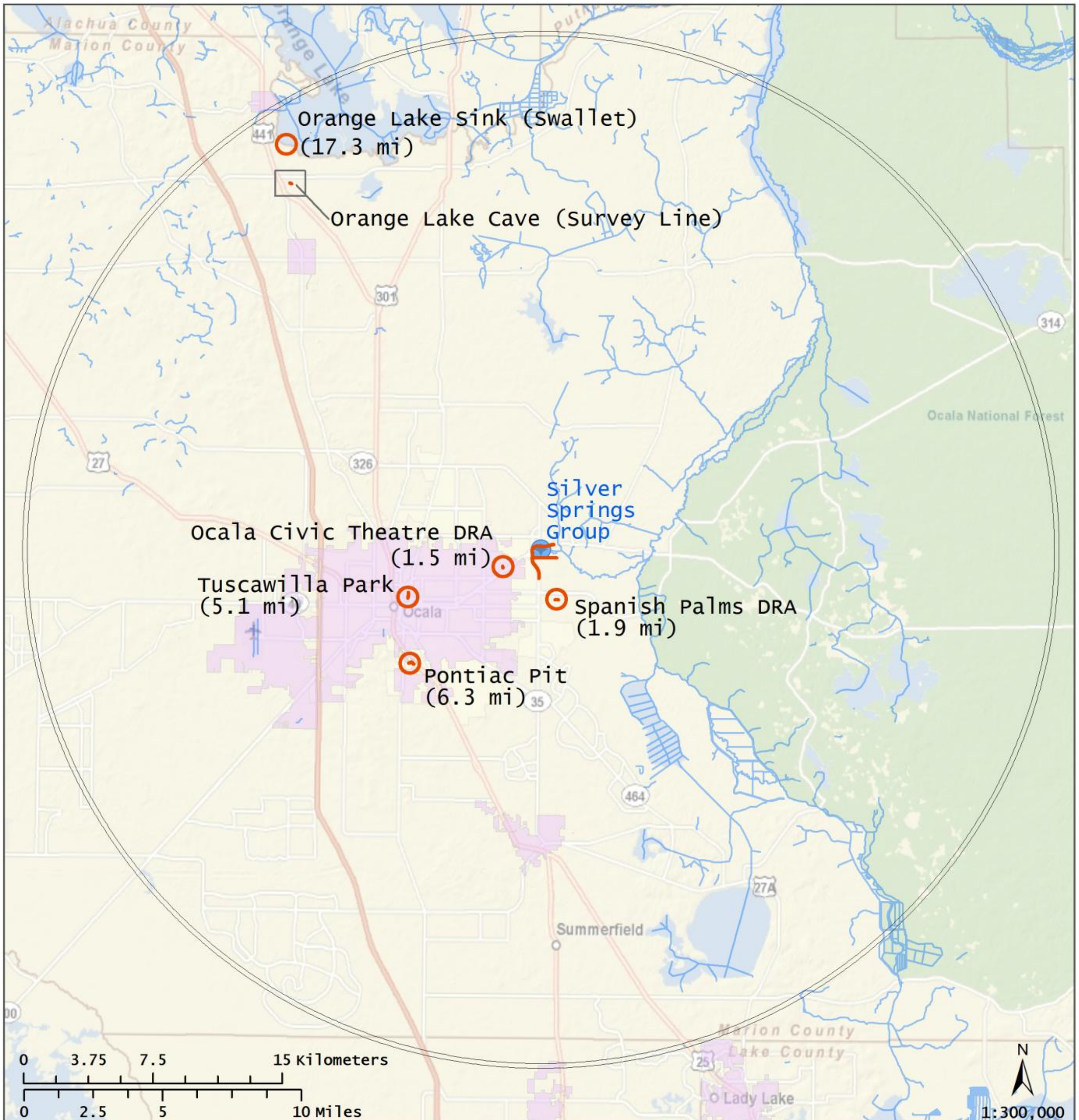

Figure 14: Project Dye Trace Injection Sites and Geophysical Survey Lines

Injection Site location, with distance (miles) from main spring vent

Project Geophysical Survey Lines

SSG 30 km Dataset Extent

Geophysical Surveys

URS Corporation Southern (URS) and their subcontractor (Technos, Inc) conducted detailed ground-based geophysical surveys at the five locations listed above, plus the area around the SSG (Figure 15) during early January 2010. Appendix 4 contains a detailed description of the geophysical surveys, including methods used and results. Production survey lines bounding the SSG on three sides did not indicate the presence of a large-scale conduit system that might be directly connected to the SSG vents.

Figure 15: Project Dye Trace Injection Sites and Geophysical Survey Lines

- Injection Site location, with distance (miles) from main spring vent
- Project Geophysical Survey Lines (feet)
- SSG 30 km Dataset Extent

Identification and Ranking of Potential Nutrient Sources

The spatial information gathered and listed in Appendix 1 was evaluated near the five locations selected for dye introduction using ArcMap 9.3 software (ESRI, 2008). Table 1 lists the number of number of potential nutrient point sources, by type, that are located within approximately one mile of each planned dye injection location. The list includes physical features such as sinks or swallets that could collect rainfall runoff as well as wastewater or storm water point sources. There are a significant number of potential sources of nutrient input to the UFA in the areas around each of the five sites. Two source types stand out: 1) the relatively large number of septic tanks, even around Tuscawilla Park, which is in a currently sewered area near downtown Ocala and is served by the Ocala wastewater system; and 2) the Tuscawilla Park area contains most of the City's drainage wells, plus many underground storage tanks. (Although not typically a source of nutrient input to the groundwater system, underground storage tanks can be considered potential sources of pollution to the subsurface.)

Nutrient Source Type/Physical Drainage Feature	Orange Lake Sink	DRA at Ocala Civic Theatre	Tuscawilla Park Drainage Well M-0649	Pontiac Pit Sink	DRA at Spanish Palms
Drainage Well	0	0	21	1	0
Septic Tank	262	320	91	777	815
Reported Sink or Swallet	2	13	12	8	2
Stormwater Drainage Retention Area (DRA)	1	16	26	37	25
Underground Storage Tank	5	23	147	12	4
Wastewater Reuse Discharge (sprayfield or irrigation area)	0	0	0	0	0
Wastewater Treatment Plant	2	2	1	3	3
DEP Ground Water Contamination Area	0	1	0	0	0

Table 1: Number of reported potential sources of nutrient input to the Upper Floridan aquifer within a one-mile radius of each of the planned Task 2 dye injection sites (DRA = drainage retention area)

The areas around the five planned dye release sites can be ranked in terms of their proximity to the SSG and in terms of the potential for nutrient or pollution input to the UFA (Table 2). However, these rankings cannot take into account the volume or constancy of flow entering the groundwater system. For example, although the Spanish Palms DRA site is relatively close to the SSG in an area of numerous septic tanks, there are few active sinks nearby. Nutrient input in this area may be constant, but diffuse and not necessarily directly into a conduit system. The DRA at the Ocala Civic Theatre contains many small active sinkholes. These, as well as the other nearby sinks, probably recharge abundant storm water directly into the UFA on an intermittent basis. The Pontiac Pit sink is an active swallet that historically received large amounts of untreated storm water runoff. Marion County recently (2009) constructed a pond and wetland treatment system next to the sink and now recharge to the sink is treated and controlled. The Tuscawilla Park drainage well, however, injects water nearly constantly directly into the UFA. Much of this is untreated storm water that collects in Lake Tuscawilla. Orange Lake Sink is normally submerged beneath Orange Lake. This sink probably receives the largest volume of water flowing directly into the UFA of any sink in the SSG springshed.

Planned Injection Site	Approximate Distance from SSG (miles)	Number of Potential Nutrient Sources within a one-mile radius
Ocala Civic Theatre DRA	1.5	375
Spanish Palms DRA	1.8	849
Tuscawilla Park Drainage Well	5	298
Pontiac Pit Sink	6	838
Orange Lake Sink	17	272

Table 2: Distance of planned dye release sites from SSG and total number of nearby potential nutrient sources

Plans for Task 2: Potential Nutrient Pathway Delineation

The URS project team, along with SJRWMD staff, began Task 2 by designing and planning the tracer tests and conducting preliminary background sampling at several of the SSG vents. A sampling network of production wells located between the dye release sites and the SSG is currently being organized. An Operational Summary for the dye traces was recently submitted to the Orlando FDEP Central District Office (Appendix 5). This summary contains details concerning the design of the Task 2 dye traces.

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Appendix 1: Existing spatial data compiled for the SSG Nutrient Pathways project.

General Data Type	Specific Data Type	Data Source(s)	Corresponding Map Figure
Physical Features	Topography	Marion County DEM	2
Physical Features	Caves	CKRI	2
Physical Features	Quarrys & Mines	CKRI	2
Physical Features	Sinkholes/swallets	FDEP, FGS, CKRI	3
Physical Features	Topographic contour depresssions	FGS	3
Physical Features	Surface Hydrologic features	USGS	3
Wells	Consumptive Use Permit wells	SJRWMD, SWFWMD	4
Wells	Water level monitoring wells	SJRWMD, SWFWMD, USGS	4
Wells	Wells with detailed water quality data	FDEP	4
Wells	Well locations with geologic and/or borehole geophysical logs	SJRWMD, SWFWMD	4
Public Water Supply Facilities	Public supply wells	FDEP	5
Public Water Supply Facilities	Public water supply service areas	SJRWMD	5
Stormwater Drainage locations	Drainage wells	City of Ocala	6
Stormwater Drainage locations	Drainage Retention Areas (DRAs)	City of Ocala, Marion County	6
Wastewater Facilities	Wastewater treatment plants	FDEP	7
Wastewater Facilities	Septic tank locations	Marion County	8
Wastewater Facilities	Reuse water transmission lines	SJRWMD	8
Wastewater Facilities	Reuse water destinations	SJRWMD	9
Potential ground water contamination areas	Storage tanks	FDEP	10
Potential ground water contamination areas	Identified ground water contamination areas	FDEP	10
Dye trace locations	Historic Dye trace injection/sampling points	USGS, JEA, Inc	11

APPENDIX 2: SILVER SPRINGS NUTRIENT PATHWAYS PROJECT G-0273 -- WELL DATA

SJRWMD Well Station Name	Local Name/Alias	Casing Dia (in)	Casing Depth (ft)	Total Depth (ft)	Aquifer*	Status	Owner Type	Geophysical Logs Collected[1]	Measuring Point Surveyed	Water Level collected	Water Level Date	MP elev (NGVD)	WL elev (NGVD)	Comments
M-0032	M-0032 USGS UFA CE44 at Ocala	6	33	91	UFA	Inactive	right-of-way	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	105.83	42.01	Long-term USGS monitoring well
M-0058	Wolf Sink aka Paradise Springs	na	na	na	UFA	sink / swallet	private	na	yes	yes	9/24/2009	47.93	44.12	natural sink used for recreational diving
M-0177	VISA well at Toms Park	4	32	42	UFA	Inactive	public	c, g, f, t, s, spr, R, sp	yes	yes	9/21/2009	52.70	41.93	
M-0200	VISA well at Webb Athletic Field	4	28	40	UFA	Inactive	public	c, g, f, t, s, spr, R, sp	yes	yes	9/21/2009	75.93	42.77	
M-0210	VISA well at old city maintainence lot	4	24	34	UFA	Inactive	public	c, g, f, t, s, spr, R, sp	yes	yes	9/21/2009	66.31	42.60	
M-0212	VISA well at Tuscawilla Park	4	58	69	UFA	Inactive	public	c, g, f, t, s, spr, R, sp	yes	yes	9/22/2009	84.47	43.26	
M-0213	VISA well NE 16th St	4	20	30	UFA	Inactive	right-of-way	na	yes	yes	9/21/2009	64.65	42.22	
M-0216	VISA well at NE 3rd St lift station	4	47	57	UFA	inactive	public	c, g, f, t, s, spr, R, sp	yes	yes	9/21/2009	89.40	42.00	
M-0217	VISA well at Clyatt Park	4	50	60	UFA	Inactive	public	na	yes	yes	9/22/2009	92.50	42.50	
M-0239	VISA well 291148082072702	4	65	75	UFA	inactive	public	c, g, f, t, s	no	no	na	na	na	
M-0248	City of Ocala monitor well A-4	2	na	65	UFA	monitoring well	public	na	yes	yes	9/22/2009	60.86	42.56	
M-0621	Indian Lake SF 6 inch	6	na	na	na	unused blocked	public	na	no	no	na	na	na	well blocked near surface
M-0622	Indian Lake SF well with turbine pump	16	na	na	na	unused	public	na	no	no	na	na	na	large turbine pump still on wellhead
M-0623	Indian Lake SF domestic well	2	na	na	na	unused	public	na	no	no	na	na	na	
M-0624	Indian Lake SF domestic well	2	na	na	na	unused	public	na	no	no	na	na	na	
M-0625	Indian Lake State Forest	8	77	197	UFA	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	80.06	42.40	old irrigation well
M-0626	Indian Lake SF irrigation well	na	na	na	na	unused	public	na	no	no	na	na	na	location is approximate
M-0627	Indian Lake SF UF monitor well	6	99	191	UFA	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	73.26	42.49	Monitor well for Avatar PUD
M-0628	Indian Lake SF LF monitor well	12	605	950	**LFA**	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	73.63	47.10	Monitor well for Avatar PUD
M-0629	Indian Lake State Forest	4	na	78	UFA	unused	public	na	yes	yes	9/23/2009	93.00	43.77	old domestic well
M-0630	Indian Lake State Forest	6	36	176	UFA	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/23/2009	65.17	42.48	old irrigation well
M-0631	Indian Lake SF unknown mw	2	na	na	na	unknown	public	na	no	no	na	na	na	monitor well; unsure of owner
M-0632	Indian Lake State Forest	3	40	79	UFA	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/23/2009	76.32	42.02	old irrigation well
M-0634	Silver River SP	8	20	103	UFA	unused	public	c, g, f, t, s, R	yes	yes	9/24/2009	60.34	41.11	
M-0637	Silver River SP	6	54	74	UFA	unused	public	c, g, f, t, s	yes	yes	9/23/2009	60.06	39.75	
M-0639	City of Ocala well 6; CUP well 19735	24	100	250	UFA	backup supply	public	na	yes	yes	9/24/2009	119.04	45.27	emergency backup well
M-0640	City of Ocala Drainage well SW41	8	na	na	UFA	drainage well SW41	public	na	yes	yes	9/21/2009	60.72	42.72	well located within DRA
M-0641	City of Ocala Drainage well NE24	8	43	63	UFA	drainage well NE24	public	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	81.20	41.99	well located within DRA
M-0642	City of Ocala monitor well A-6	2	0	39	UFA	monitoring well	public	na	yes	no	9/22/2009	61.08	na	depth is reported; unsure of aquifer
M-0644	Greenway 8 inch well	8	78	191	UFA	unused	public	c, g, f, t, s, R	yes	yes	9/24/2009	87.62	43.32	M. H. Carr Cross Florida Greenway
M-0647	Greenway 12 inch well	14	49	237	UFA	unused	public	c, g, f, t, s, R	yes	yes	9/24/2009	96.63	42.32	M. H. Carr Cross Florida Greenway
M-0648	City of Ocala Drainage well SE45	8	60	149	UFA	drainage well SE45	public	c, g, f, t, s, spr, R, sp	no	no	na	na	na	

M-0649	City of Ocala Drainage well NE12 at Tuscawilla Park	16	65	214	UFA	drainage well NE12	public	c, g, f, t, s, spr, R, sp	no	no	na	na	na	too much water flowing in borehole for water level measurement
M-0650	Indian Lake SF deep well in old field	12	50	1219	**UFA&LF/**	unused	public	c, g, f, t, s, spr, R, sp	yes	yes	9/24/2009	66.91	46.07	old irrigation well
M-0651	City of Ocala Drainage Well NW18	12	38	93	UFA	unused	public	c, g, f, t, s, spr, R, sp	no	no	na	na	na	well abandoned by City prior to survey
M-0652	City of Ocala Monitoring Well CW4D	4	na	127	UFA	monitoring well	public	na	yes	yes	9/24/2009	67.70	45.76	located at Perry Acres Sprayfield
M-0653	City of Ocala Monitoring Well CW7D	4	na	120	UFA	monitoring well	public	na	yes	yes	9/24/2009	74.32	45.10	located at Perry Acres Sprayfield
M-0654	City of Ocala Monitoring Well BW1D	3	na	119	UFA	monitoring well	public	na	yes	yes	9/25/2009	110.47	46.39	located at Perry Acres Sprayfield

*: UFA = Upper Floridan aquifer;   LFA = Lower Floridan aquifer

key to geophysical log types:

c = caliper
g = natural gamma
f = fluid resistivity
t = temperature
s = specific conductance
spr = single point resistance
R = 16-64 formation resistivity
sp = self-potential
na = not available

DEGROVE
Surveyors Inc.

REPORT OF SURVEY

Degrove Surveyors Inc. Project No.: 2009-347
Type of Survey: Vertical Control Survey
Project Name: Vertical Elevation Surveys to Support Nutrient Groundwater Pathway Delineation
Survey Date: 11/20/2009 – 01/13/2010
Date of Report: January 20, 2010
Certified to: St Johns River Water Management District

Report: Degrove Surveyors, Inc. (Degrove) in compliance with its annual surveying services contract with the St. Johns River Water Management District (District) has performed and completed the above referenced survey under Work Order Authorization – Contract Number 25376, Work Order Number 1. The survey was performed in support of the District's Nutrient Groundwater Pathway Delineation of the Silver Springs Spring Group (SSG). The purpose of this survey was to obtain the elevation of predetermined and District designated water level measuring points and to establish supporting vertical control (benchmarks) at 28 locations within the Ocala/Silver Springs area of Marion County, Florida. One District designated well (M-0651) was removed by the City of Ocala's Storm Water Management Department prior to the commencement of this survey and was subsequently not surveyed.

All elevations were obtained by a methodology of differential leveling using a Leica NA 3003 electronic digital level along with Leica fiberglass barcode leveling rods. All leveling data was post-processed using STARPLUS NA3000 Data Conversion Utility and STARPLUS STAR*LEV Least Squares Level Adjustment program. All elevations are referenced to the National Geodetic Vertical Datum 1929 (NGVD 29) and North American Vertical Datum 1988 (NAVD 88) and are based on Florida Department of Environmental Protection (FDEP), National Geodetic Survey (NGS), and/or St. Johns River Water Management District (SJRWMD) vertical control.

Attached to and being a part of this report is a 3 page spreadsheet, dated January 20, 2010, listing the District Work Order Number, District Well Designation, Measuring Point Elevation NGVD 29, Measuring Point Elevation NAVD 88, Site Benchmark Designation, Site Benchmark Elevation NGVD 29, Site Benchmark Elevation NAVD 88, reference benchmark designations, and reference benchmark source.

Certification: I certify that this survey meets the requirements of the Minimum Technical Standards pursuant to Chapter 61G17-6, F.A.C.

Thomas P. Tracz, PSM #6039
LB #4603

Not valid without the signature and the original raised seal of a Florida Licensed Surveyor and Mapper.

Reference Field Books/Page: 2009-01/Pages 5-75, 2009-02/ Pages 5-13, 2009-03/Pages 5-46, 2009-04/Pages 4-20, 2009-05/Pages 4-29, and 2009-06/Pages 6-58

Vertical Elevation Surveys to Support Nutrient Groundwater Pathway Delineation
Vertical Control Survey - Final Survey Results

Prepared for: St. Johns River Water Management District - Contract No. 25376 - Work Order No. 1
Prepared by: Degrove Surveyors, Inc. - Project No. 2009-347
Date: January 20, 2010

SJRWMD Work Order No.	SJRWMD Well Designation	Measuring Point Elevation (NGVD 1929)	Measuring Point Elevation (NAVD 1988)	Site Benchmark Designation	Site Benchmark Elevation (NGVD 29)	Site Benchmark Elevation (NAVD 88)	Verifying / Reference Vertical Control (Designation & Source)
3620-09	M-0058	47.934	46.964	98-14-036-0	65.187	64.217	36th 88 A02 (FDEP/NGS) E 581 (FDEP/NGS)
3621-09	M-0177	52.702	51.787	09-024-0-02	51.438	50.523	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3622-09	M-0200	75.933	75.049	09-028-0-02	77.571	76.687	S 423 (FDEP/NGS) D 186 (FDEP/NGS)
3623-09	M-0210	66.308	65.424	09-027-0-02	64.128	63.244	S 423 (FDEP/NGS) D 186 (FDEP/NGS)
3624-09	M-0640	60.717	59.833	09-029-0-02	61.268	60.384	S 423 (FDEP/NGS) D 186 (FDEP/NGS)
3625-09	M-0651	Drainage Well Removed	N/A	09-030-0-02	69.983	69.068	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3626-09	M-0634	60.339	59.486	03-059-0-02	60.031	59.178	03-059-0-02 (SJRWMD) 03-060-0-02 (SJRWMD)
3627-09	M-0637	60.056	59.203	09-033-0-02	59.121	58.268	03-059-0-02 (SJRWMD) 03-060-0-02 (SJRWMD)
3627-09	Unknown	60.719	59.866	09-013-0-02	60.590	59.737	03-059-0-02 (SJRWMD) 03-060-0-02 (SJRWMD)

Not valid without accompanying Report of Survey, by Degrove Surveyors, Inc.
Dated: January 20, 2010

SJRWMD Work Order No.	SJRWMD Well Designation	Measuring Point Elevation (NGVD 1929)	Measuring Point Elevation (NAVD 1988)	Site Benchmark Designation	Site Benchmark Elevation (NGVD 29)	Site Benchmark Elevation (NAVD 88)	Verifying / Reference Vertical Control (Designation & Source)
3628-09	M-0248	60.856	59.928	09-026-0-02	58.657	57.729	S 593 (FDEP/NGS) T 593 (FDEP/NGS)
3629-09	M-0642	61.081	60.153	09-025-0-02	59.581	58.653	S 593 (FDEP/NGS) T 593 (FDEP/NGS)
3629-09	M-0242	61.084	60.156	09-025-0-02	59.581	58.653	S 593 (FDEP/NGS) T 593 (FDEP/NGS)
3630-09	M-0213	64.649	63.734	09-023-0-02	64.419	63.504	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3631-09	M-0641	81.195	80.279	09-032-0-02	82.718	81.802	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3632-09	M-0216	89.398	88.591	09-022-0-02	88.420	87.613	X 622 (FDEP/NGS) U 423 (FDEP/NGS)
3633-09	M-0212	84.472	83.557	09-031-0-02	87.112	86.197	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3633-09	M-0211	84.759	83.844	09-031-0-02	87.112	86.197	D 427 (FDEP/NGS) C 427 (FDEP/NGS)
3634-09	M-0217	92.495	91.565	09-021-0-02	85.359	84.428	M 427 (FDEP/NGS) N 427 (FDEP/NGS)
3635-09	M-0639	119.036	118.094	09-020-0-02	117.211	116.269	C 581 (FDEP/NGS) B 581 (FDEP/NGS)
3637-09	M-0627	73.259	72.320	09-007-0-02	70.624	69.685	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3638-09	M-0628	73.627	72.688	09-007-0-02	70.624	69.685	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)

Not valid without accompanying Report of Survey, by Degrove Surveyors, Inc.
Dated: January 20, 2010

SJRWMD Work Order No.	SJRWMD Well Designation	Measuring Point Elevation (NGVD 1929)	Measuring Point Elevation (NAVD 1988)	Site Benchmark Designation	Site Benchmark Elevation (NGVD 29)	Site Benchmark Elevation (NAVD 88)	Verifying / Reference Vertical Control (Designation & Source)
3639-09	M-0629	92.997	92.058	09-008-0-02	93.030	92.091	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3640-09	M-0630	65.172	64.233	09-009-0-02	64.541	63.602	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3641-09	M-0625	80.063	79.124	09-006-0-02	79.636	78.697	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3642-09	M-0632	76.322	75.383	09-005-0-02	75.225	74.286	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3643-09	M-0650	66.910	65.971	09-010-0-02	66.934	65.995	FLGPS 33 AZ MK (FDEP/NGS) FLGPS 33 (FDEP/NGS)
3644-09	M-0644	87.617	86.658	09-011-0-02	88.014	87.055	V 508 (FDEP/NGS) 06-14-082-02 (SJRWMD)
3645-09	M-0647	97.589	96.630	09-012-0-02	97.146	96.187	V 508 (FDEP/NGS) 06-14-082-02 (SJRWMD)
3646-09	M-0653	74.321	73.345	09-018-0-02	71.949	70.973	A 509 (FDEP/NGS) Z 508 (FDEP/NGS)
3647-09	M-0652	67.703	66.727	09-019-0-02	66.001	65.025	A 509 (FDEP/NGS) Z 508 (FDEP/NGS)
3648-09	M-0654	110.471	109.495	09-014-0-02	107.128	106.152	A 509 (FDEP/NGS) Z 508 (FDEP/NGS)

WELLS & STAFF GAUGES

REGION 1

WO No.	JOB	COUNTY	FIELD BOOK	PAGE
3620-09	WELL: M-0058	MARION	2009-02	5-13
3621-09	WELL: M-0177	MARION	2009-06	6, 20-27
3622-09	WELL: M-0200	MARION	2009-06	42, 43, 55-58
3623-09	WELL: M-0210	MARION	2009-06	42, 43, 50-53
3633-09	WELL: M-0212	MARION	2009-06	6-12
3630-09	WELL: M-0213	MARION	2009-05	15-18, 23-29
3632-09	WELL: M-0216	MARION	2009-05	4-10
3634-09	WELL: M-0217	MARION	2009-04	4, 15-20
3628-09	WELL: M-0248	MARION	2009-06	28-35, 39 & 40
3641-09	WELL: M-0625	MARION	2009-03	5-19, 25-27
3637-09	WELL: M-0627	MARION	2009-03	5-19, 28-30
3638-09	WELL: M-0628	MARION	2009-03	5-19, 28-30
3639-09	WELL: M-0629	MARION	2009-03	5-19, 31-34
3640-09	WELL: M-0630	MARION	2009-03	5-19, 35-38
3642-09	WELL: M-0632	MARION	2009-03	5-19, 22-24
3626-09	WELL: M-0634	MARION	2009-01	67, 68, 74, & 75
3627-09	WELL: M-0637	MARION	2009-01	67-72
3635-09	WELL: M-0639	MARION	2009-04	4-13
3624-09	WELL: M-0640	MARION	2009-06	42-46
3631-09	WELL: M-0641	MARION	2009-05	15-22
3629-09	WELL: M-0642	MARION	2009-06	28-37
3644-09	WELL: M-0644	MARION	2009-01	52-59, 63 & 64
3645-09	WELL: M-0647	MARION	2009-01	52-61
3643-09	WELL: M-0650	MARION	2009-03	5-19, 39-46
3625-09	WELL: M-0651	MARION	2009-06	6-11, 14-18
3647-09	WELL: M-0652	MARION	2009-01	5-25, 29-34, 45-50
3646-09	WELL: M-0653	MARION	2009-01	5-25, 29-43
3648-09	WELL: M-0654	MARION	2009-01	5-21, 27 & 28

URS

February 26, 2010

Mr. Brian McGurk, P.G.
St. Johns River Water Management District
SSG Project Manager
4049 Reid Street
Palatka, Florida 32177

RE: Task 1- Interim Status Report
Hydrologic Evaluation to Support Nutrient Groundwater Pathway Delineation
Silver Springs, Marion County, Florida
SJRWMD Contract #25453

Dear Mr. McGurk:

URS Corporation Southern (URS) is pleased to present this Task 1 Interim Status Report (ISR) to the St. Johns River Water Management District (SJRWMD) for the referenced project. Silver Springs has been identified by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients, and specifically by nitrates and/or by nitrates/nitrites. In part, this listing led FDEP and the SJRWMD to authorize the referenced study, commonly referred to as the Silver Springs Nutrient Pathway Characterization Study. The project is funded by FDEP using funds provided by the U. S. Environmental Protection Agency (USEPA) from the American Reinvestment and Recovery Act of 2009 (ARRA).

The Nutrient Pathway Characterization Study has two objectives:

- **Objective 1:** Identification of dominant groundwater pathways and travel times between specific locations and a group of approximately 30 springs, commonly called vents that comprise the Silver Springs Group (SSG).

- **Objective 2:** Identification of potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

Key URS Team members in this study include Karst Environmental Services, Inc. (KES), Ozark Underground Laboratory, Inc. (OUL) and Technos, Inc. (Technos). KES and OUL are providing both professional and technical support with the design and implementation of two, multiple fluorescent dye tracer studies. OUL will be providing all spectrofluorophotometric analytical services for the project. Technos provided professional and technical support with the design and implementation of geophysical surveys used in support of the dye tracer designs.

The following sections provide a summary of activities completed thus far for the project by the URS Team.

URS Corporation
1625 Summit Lake Drive, Suite 200
Tallahassee, FL 32317
Tel: 850.574.3197
Fax: 850.576.3676

Scoping Meetings

A series of two project scoping meeting were held on December 1-2, and December 15-16, 2009 at the Silver River State Park located in Ocala, Florida. Those present included representatives from KES, OUL, SJRWMD, Technos and URS. In part, the purpose of these two meetings was to conduct field reconnaissance to:

- Confirm dye introduction locations for the SSG Nutrient Pathway Characterization Study
- Select the locations for geophysical survey techniques to be used at the potential dye introduction points as well as along production survey lines which would bracket the SSG and head waters of the Silver River on three sides (e.g. the north, west and south).

The group consensus for the five dye introduction locations approved by the SJRWMD was:

Tracer Group	Dye Introduction Point and Trace Name
1	Orange Lake Sink
1	Ocala Civic Theater Drainage Retention Area (DRA)
1	Tuscawilla Park Drainage Well
2	Pontiac Sink
2	Spanish Palms DRA

Locations of the five dye introduction points are depicted on **Figures 1**, **2** and **3**.

Geophysical Study

A three week geophysical study field event both began, and was successfully completed in January, 2010 by Technos. A meeting was held at Silver River State Park on February 16, 2010 to present the draft findings. The Technos ISR is presented as **Attachment A**. It describes the geophysical methodologies used at each location, presents figures that depict production line and dye introduction locations, and the processed data. A figure prepared by Technos and presented at the February 16, 2010 meeting that depicts surface wave data along Production Lines A, B and C is presented in **Attachment B**.

The geophysical data indicated that a conduit system that might be hydraulically connected to the explored portion of the Silver Springs Cave was not readily apparent. Three other observations shared during discussions at the February 16, 2010 meeting were:

- The apparent top of rock for the Floridan Aquifer was slightly shallower along the east/west trending northern production line (Line A) and deeper along the east/west trending southern production line (Line B). Group discussion initiated by David Toth (SJRWMD) noted that geochemical water quality data[1] from the SSG vents suggested a strong north-south gradient for a group of analytes that includes nitrate, sulfate, sodium, chloride, and dissolved oxygen. Concentrations of the aforementioned analytes are highest in the southern group of vents and concentrations generally decrease in the vents farther to the north.

- The geophysical data indicated the southern portion of the Ocala Civic Theatre DRA seemed to be more favorable for introduction of dye. During a February 16, 2010 field visit to this DRA, staff from the Ocala Civic Theatre provided personal information that indicated although small solution features and depressions (approximately 5 feet deep) are currently present in the southern portion of the DRA; two larger features had formed several years prior in the northern portion and had since been filled. They were reportedly large enough to hold several automobiles.

- The geophysical data indicated the western portion of the Spanish Palms DRA appeared to be more favorable for dye introduction. Field observations of the western side-slope of this DRA made during a February 16, 2010 field visit showed small-scale signs of apparent side sloughing. Several team members agreed this might be associated with subtle subsidence in that portion of the DRA. Similar features were absent along the other sloped side walls of the Spanish Palms DRA.

Preliminary Background Sampling

Prior to starting the two week background sampling for the project, six SSG spring vents and one surface water station in the Silver River were selected for four weeks of what has been termed preliminary background sampling. The seven stations are:

- Mammoth East - vent
- Mammoth West - vent
- Catfish Reception Hall - vent
- Christmas Tree - vent
- Catfish Hotel - vent
- Shipwreck Spring - vent
- Silver River at the "1200 Meter Station" – surface water

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[1] Report titled *Multivariate Statistical Analysis of Water Quality Data for Silver Springs, Marion County, Florida* prepared by INTERA, Inc., Niwot, Colorado for the St. Johns River Water Management District and dated May 4, 2007.

The preliminary background sampling effort was conducted to help evaluate for the anthropogenic presence of dyes in the environment or other similar sources of interference. OUL reported that instrument responses for fluorescence on preliminary background samples collected January 18, January 26, and February 1, 2010 were within the acceptable wavelength ranges of the dyes planned for use in the study, and that no dyes or other similar sources of interference were detected.

Path Forward

An FDEP list of potable water supply wells locate between dye introduction locations and SSG sample stations is currently being reviewed to help identify candidate water wells planned for inclusion into the SSG study. Evaluation criteria include strategic location, pumping volume and frequency of use, and well depth. The two week period of background sampling is planned to begin in mid-March, 2010.

Dye introduction for Trace Event 1 is planned for April, 2010. As previously noted, every effort will be made to coordinate dye introduction with a rainfall event, though this will not necessarily be a limiting factor. We are looking forward to the start of Trace Event 1 and the opportunity to continue our support to the SJRWMD on this project. If you have any questions, please contact me.

Sincerely,

Wm. H. Colona III

William H. Colona III, P.G.
Senior Project Geologist

Cc: Tom Aley – OUL
Pete Butt – KES
Jeff Davis – SJRWMD
David Toth – SJRWMD
Lynn Yuhr – Technos

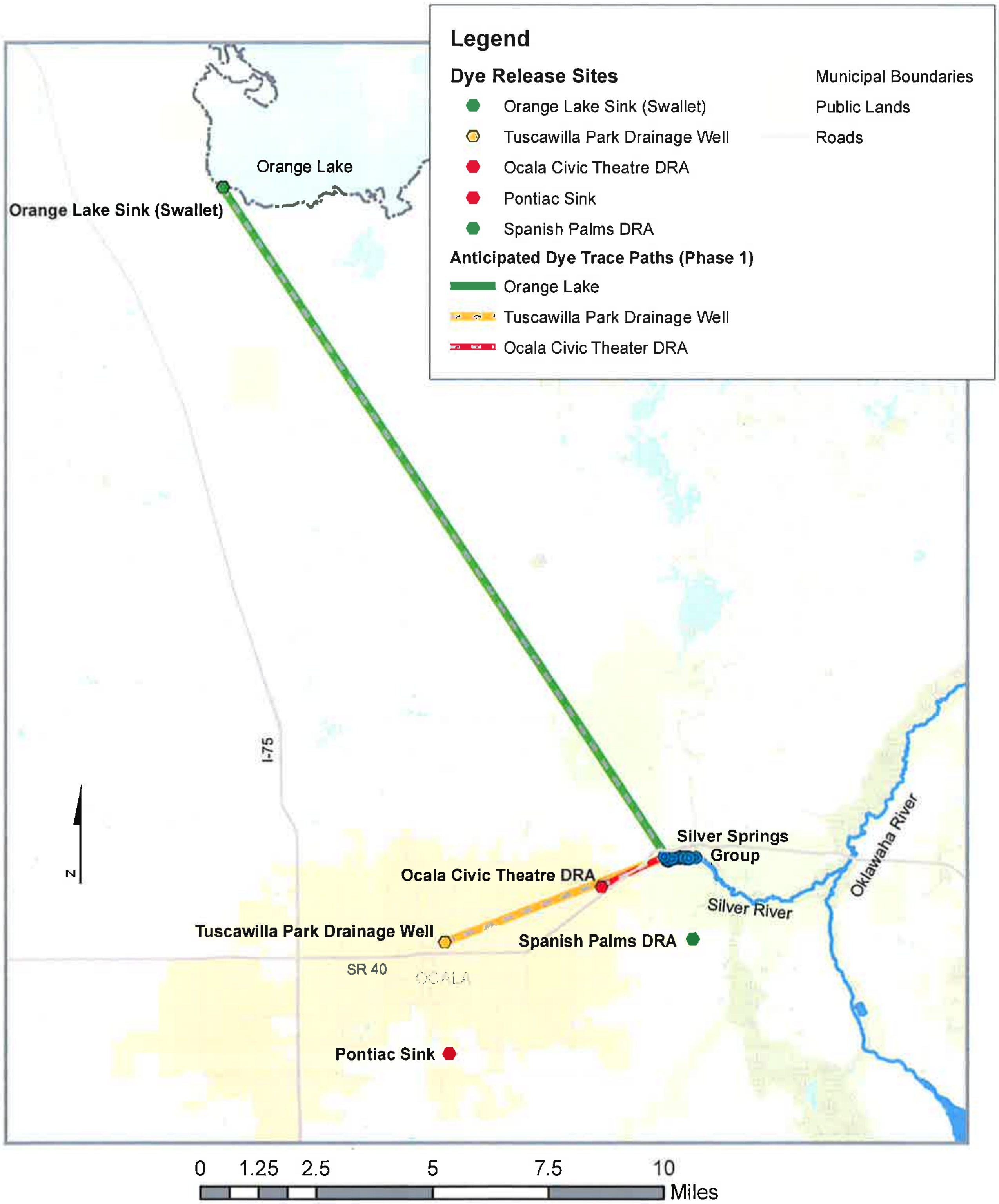
Attachments:

Figure 1 –*Tracer Group 1*, all dye introduction locations
Figure 2 - *Tracer Group 1*, Western two dye introduction locations only
Figure 3 - *Tracer Group 2*, Dye Introduction Locations

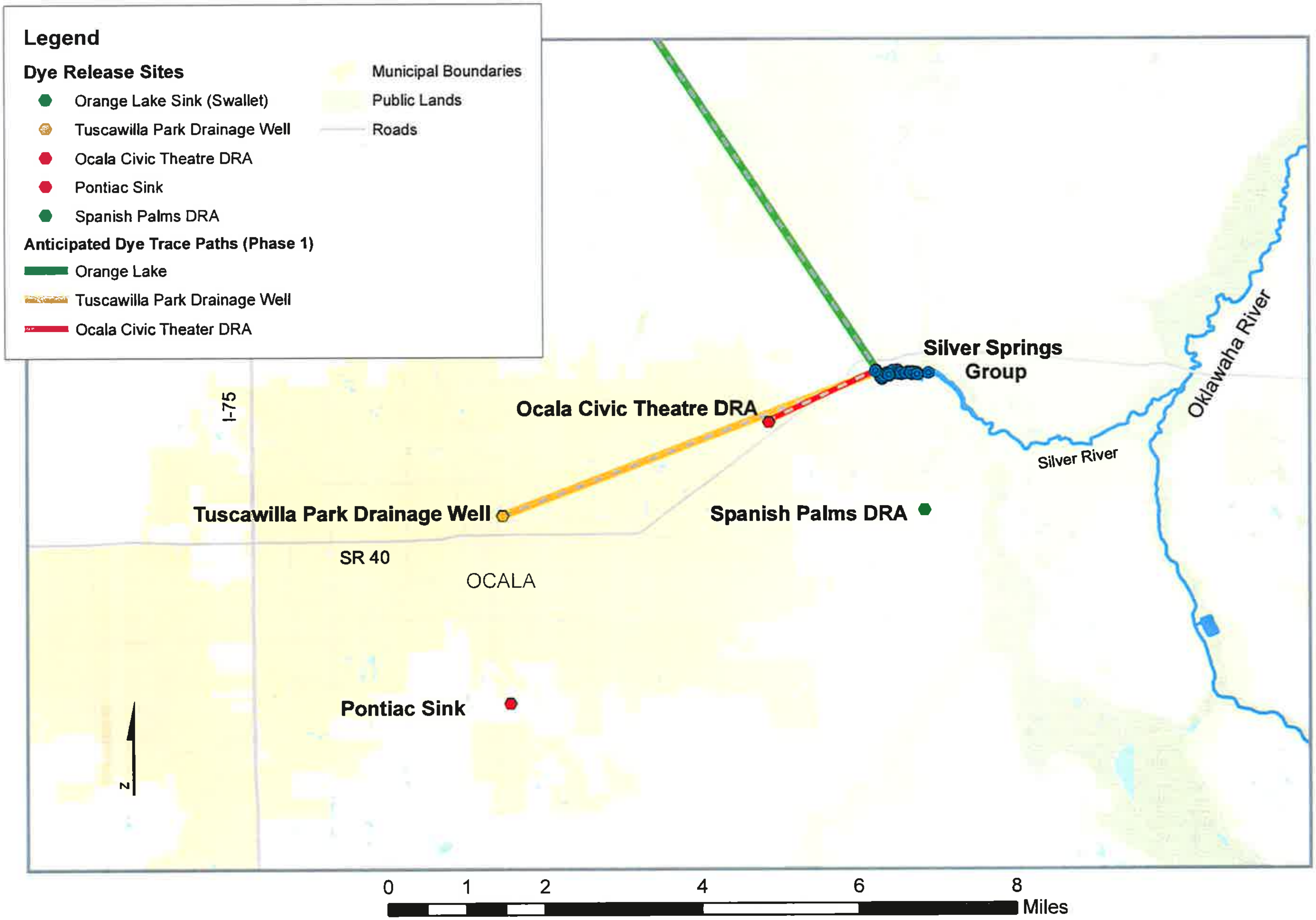
Attachment A – Technos Status Report Surface Geophysical Investigation in and around Silver Springs, Ocala, Florida
Attachment B – Technos Figure of Surface Wave Data Around the SSG Vents and Silver River

FIGURES

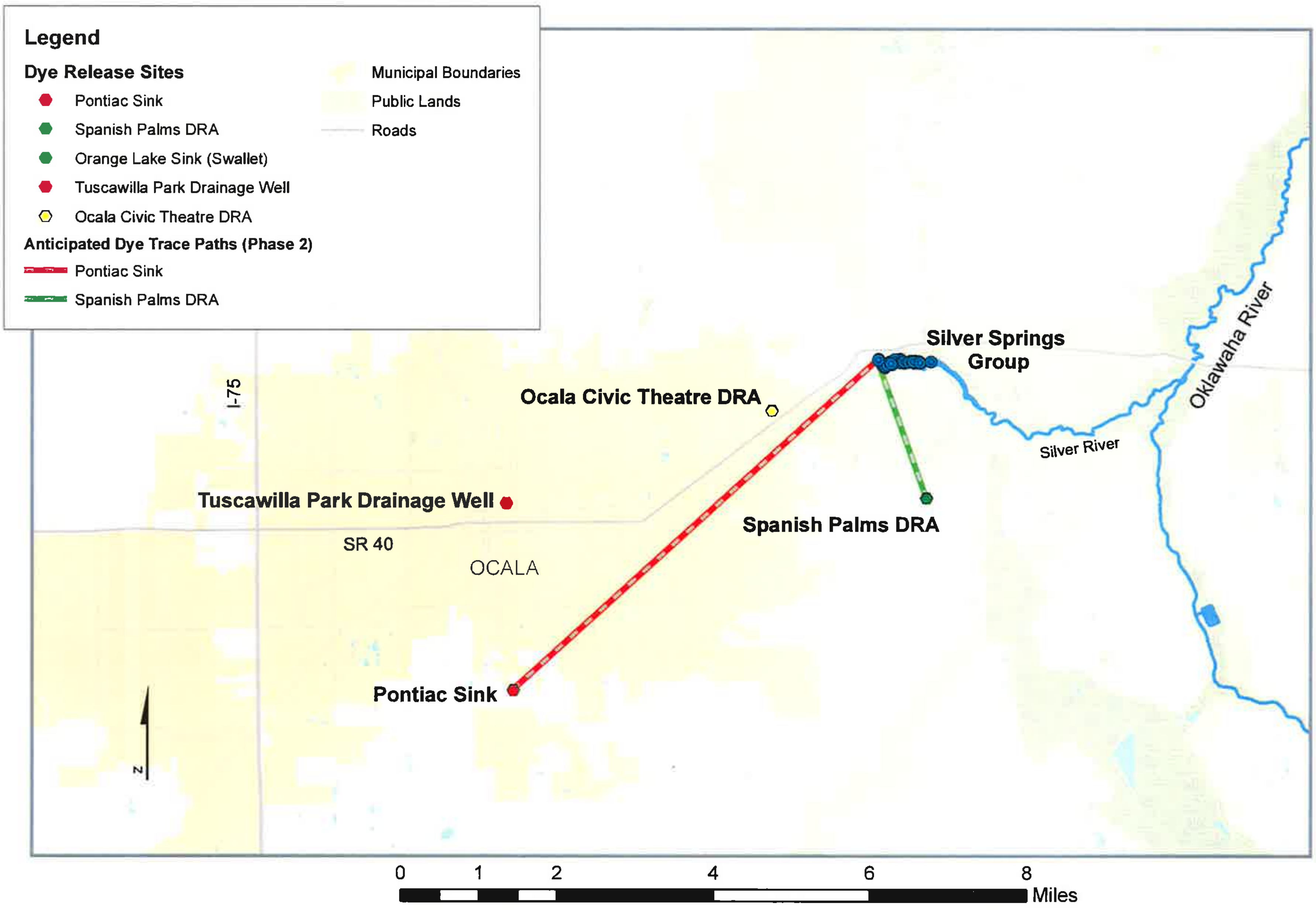
Silver Springs Nutrient Pathway Characterization Study
Figure 1: Phase 1



Silver Springs Nutrient Pathway Characterization Study
Figure 2: Phase 1 Detail View



Silver Springs Nutrient Pathway Characterization Study
Figure 3: Phase 2



ATTACHMENT A

TECHNOS INC.

Technos, Inc.
Consultants in Applied Earth Sciences
Specialists in Site Characterization
10430 Northwest 31st Terrace
Miami, FL 33172-1200

Phone: 305-718-9594
Fax: 305-718-9621
Email: info@Technos-Inc.com
Website: www.Technos-Inc.com

Status Report
Surface Geophysical Investigation in and around Silver Springs, Ocala, Florida

The surface geophysical survey was completed in January 2010. This work included utilizing four different surface geophysical techniques at potential dye injection points (Figure 1) as well as along production survey lines which bound Silver Springs on three sides (Figure 2). The surface geophysical techniques included ground penetrating radar, multi-channel analysis of surface waves, resistivity imaging and microgravity. The distribution of measurement is summarized in Table 1.

Table 1. Summary of Geophysical Work Completed

Site	GPR	MASW	Resistivity	Microgravity
Orange Lake Cave	X	X	X	X
Spanish Palms	X	X	X	
Appleton Museum	X	X	X	
Tuscawilla Park	X	X	X	
Pontiac Pit		X		
Line A		X		
Line B	X	X	2 soundings	1700 feet
Line C	X	X	2 soundings	2300 feet

Orange Lake Cave

Orange Lake Cave is located about 16 miles to the northwest of the springs near the intersection of highways 441 and 318. This is south of a dye injection point at Orange Lake. There are several vertical fissues/dissolutioned enlarged fractures/caves that extend from the quarry wall downward through the quarry floor. A geophysical survey line 440 feet in length was established on the quarry floor that crosses at least one known vertical fissure at station 75. All four surface geophysical methods were run along this survey line to test the response of the vertical cave/fissure. Figure 3 is a composite plot of all data acquired along this survey line.

Spanish Palms
A retention pond in the southern portion of the Spanish Palms residential area will be used for a dye injection point. The pond is located just south of NE 4th Place between NE 65th Court and NE 66 Terrace. This is an open grassy area with some utilities in place. The survey line was located on the south side of the retention pond between the pond and southern property fence and was 550 feet long. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 4 is a composite plot of all data acquired along this survey line.

Appleton Museum
The retention pond in front of the Appleton Museum as experienced many collapse features over time. The pond will be used as a dye injection point. The survey line ran roughly south to north through the pond and was 360 feet long. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 5 is a composite plot of all data acquired along this survey line.

Tuscawilla Park
Tuscawilla Park is located 5 miles west of the springs. Large lakes at the park take surface water runoff from the surrounding residential and industrial areas. Two overflow drainage wells are located at the park. The one to the south was of interest due to the large amount of water it takes and will be used as a dye injection point.

A survey line was established running south to north through the park for 1,100 feet. The drainage well was located about 8 feet west of the survey line at station 170 feet. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 6 is a composite plot of all data acquired along this survey line.

Pontiac Pit
Pontiac Pit is located 6 miles southwest of the springs and consists of a series of retention ponds that have an overflow drainage well into a collapse feature with a cave located at the bottom (the cave entrance has been covered). The construction of the retention ponds and associated subsurface drainage structures has significantly changed the landscape of the area. Therefore, two 600 foot survey lines using MASW only were established at this location. One of the survey lines runs along the eastbound lanes of 32nd Street and the other

survey line runs in a grassy area to the west of 441. Figure 7 shows the MASW data from the two survey lines.

Production Lines

Three production survey lines were selected in relatively close proximity to Silver Springs. They were selected to bound three sides of Silver Springs (north, west and east). Figure 2 shows the survey lines and distribution of the surface geophysical techniques used along these lines.

<u>Line A – Highway 40, North of Silver Springs</u>

Line A extends from Highway 35 eastward for 4200 feet. Due to the traffic and safety concerns, this line was run with one method only, MASW. Figure 8 shows the MASW data from this survey line.

<u>Line B – Employee Entrance Road, South of Silver Springs</u>

Line B extends from Highway 35 eastward for 4600 feet. This was a very quiet place to work with limited traffic. All four methods were used over some portion, if not all, of the survey line. Figure 9 shows the MASW data from this survey line. Figure 10 shows the GPR (250 MHz antenna) data from this survey line. Figure 11 is a composite plot of data between stations 600 and 1800. Figure 12 is a composite plot of data between stations 3250 and 4350.

<u>Line C - Highway 35, West of Silver Springs</u>

Line C extends from Highway 40 south for 5700 feet. All work was completed to the west of the actual roadway in the construction area for the road widening. All four methods were used over some portion, if not all, of the survey line. Figure 13 shows the MASW data from this survey line. Figure 14 shows the GPR (250MHz antenna) data from this survey line. Figure 15 is a composite plot of data between stations 2200 and 4100. Figure 16 is a composite plot of data between stations 4300 to 5600.

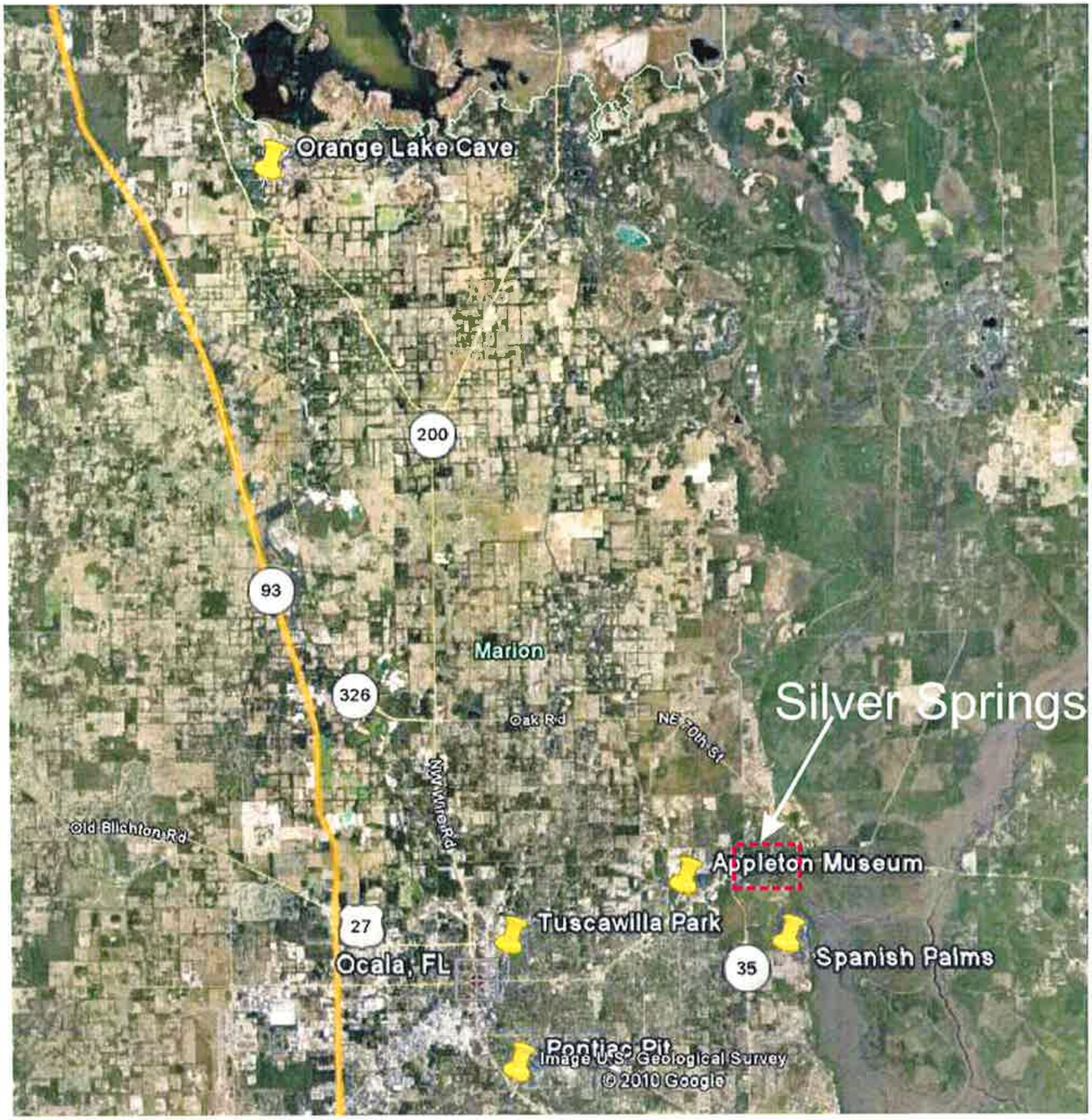
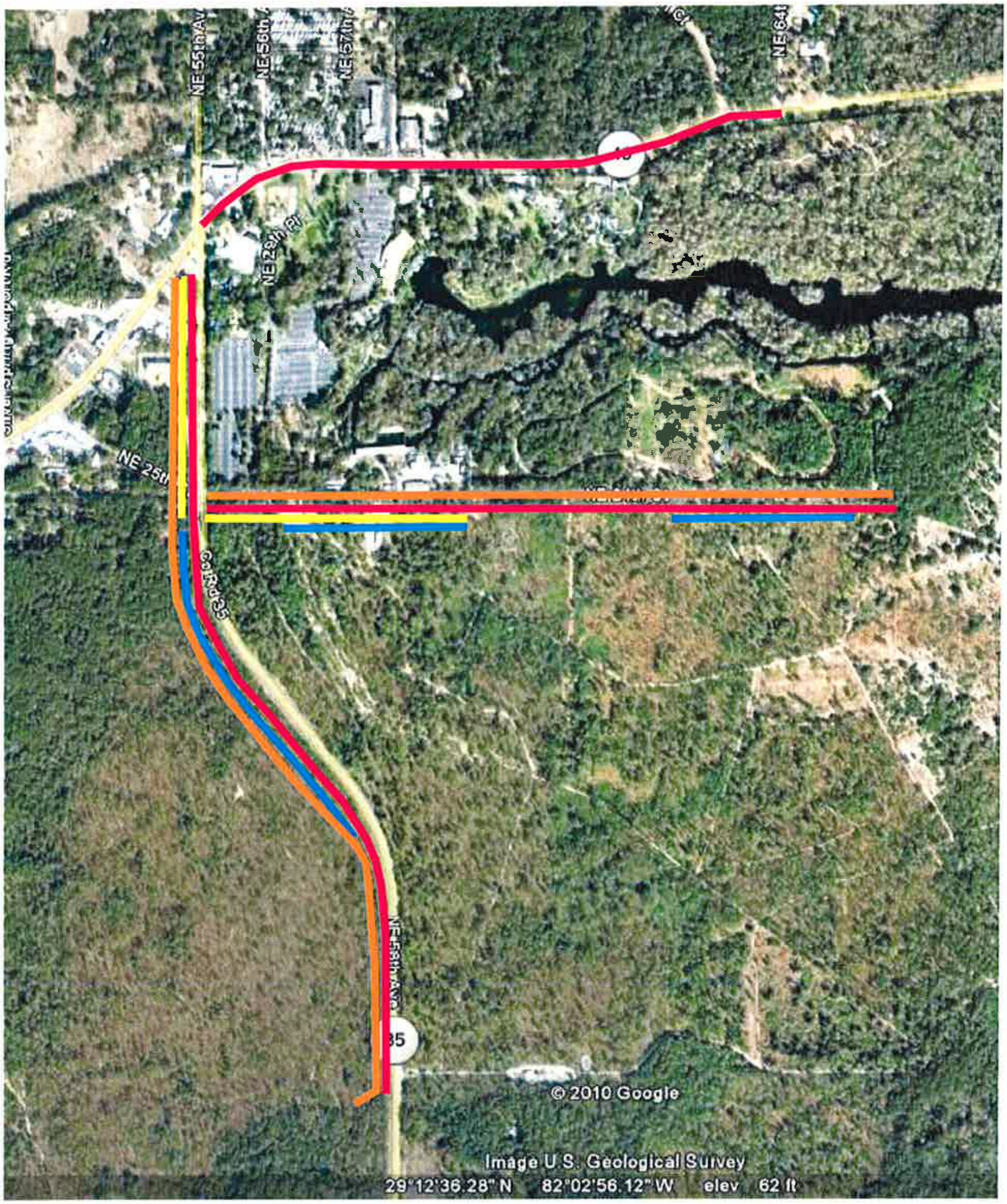


Figure 1
Site map showing
Silver Springs and areas
of detailed geophysics

TECHNOS



MASW
GPR
Microgravity
Resistivity

Figure 2
Site map showing
production geophysics

TECHNOS

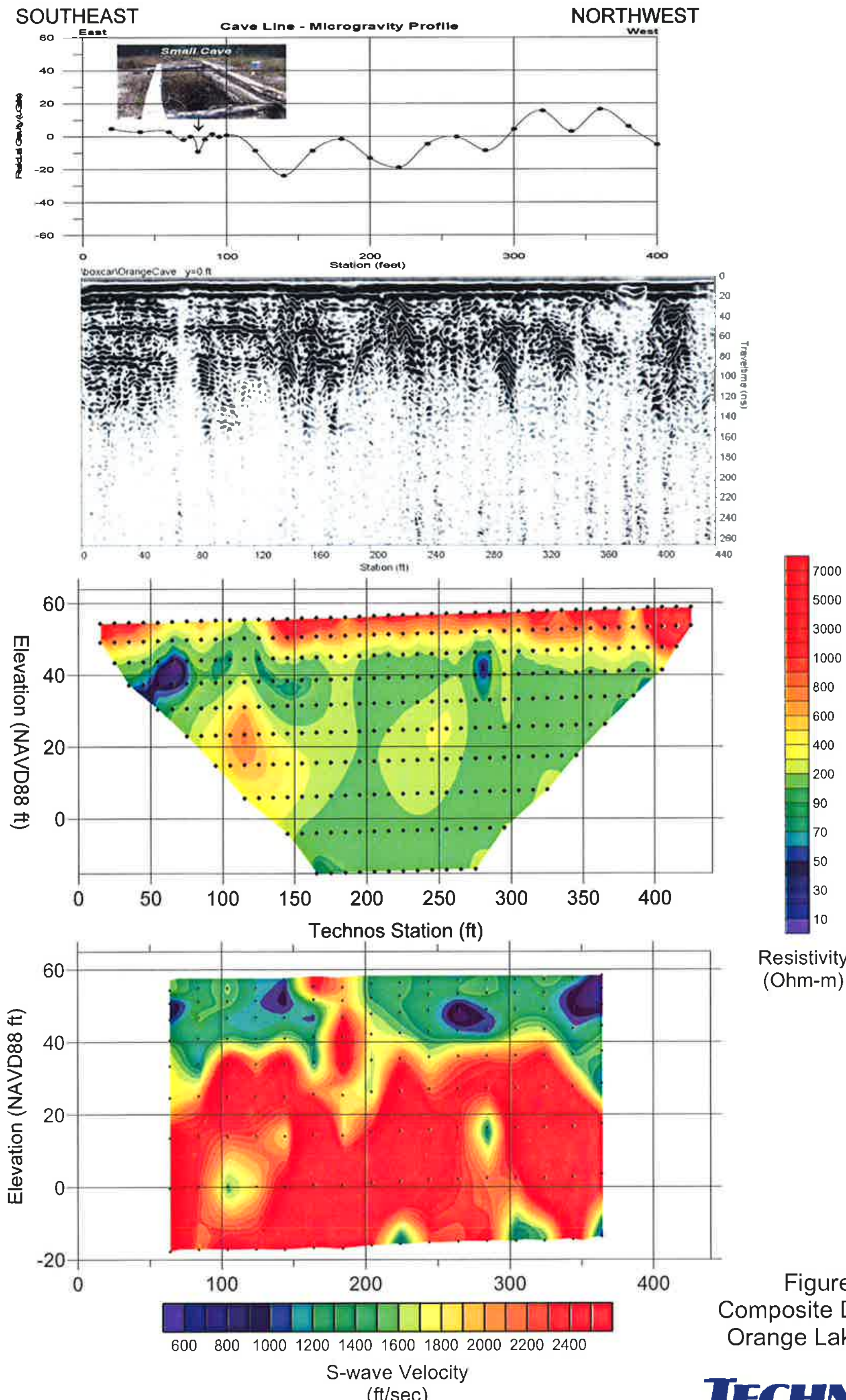


Figure 3
Composite Data Plot
Orange Lake Cave

TECHNOS

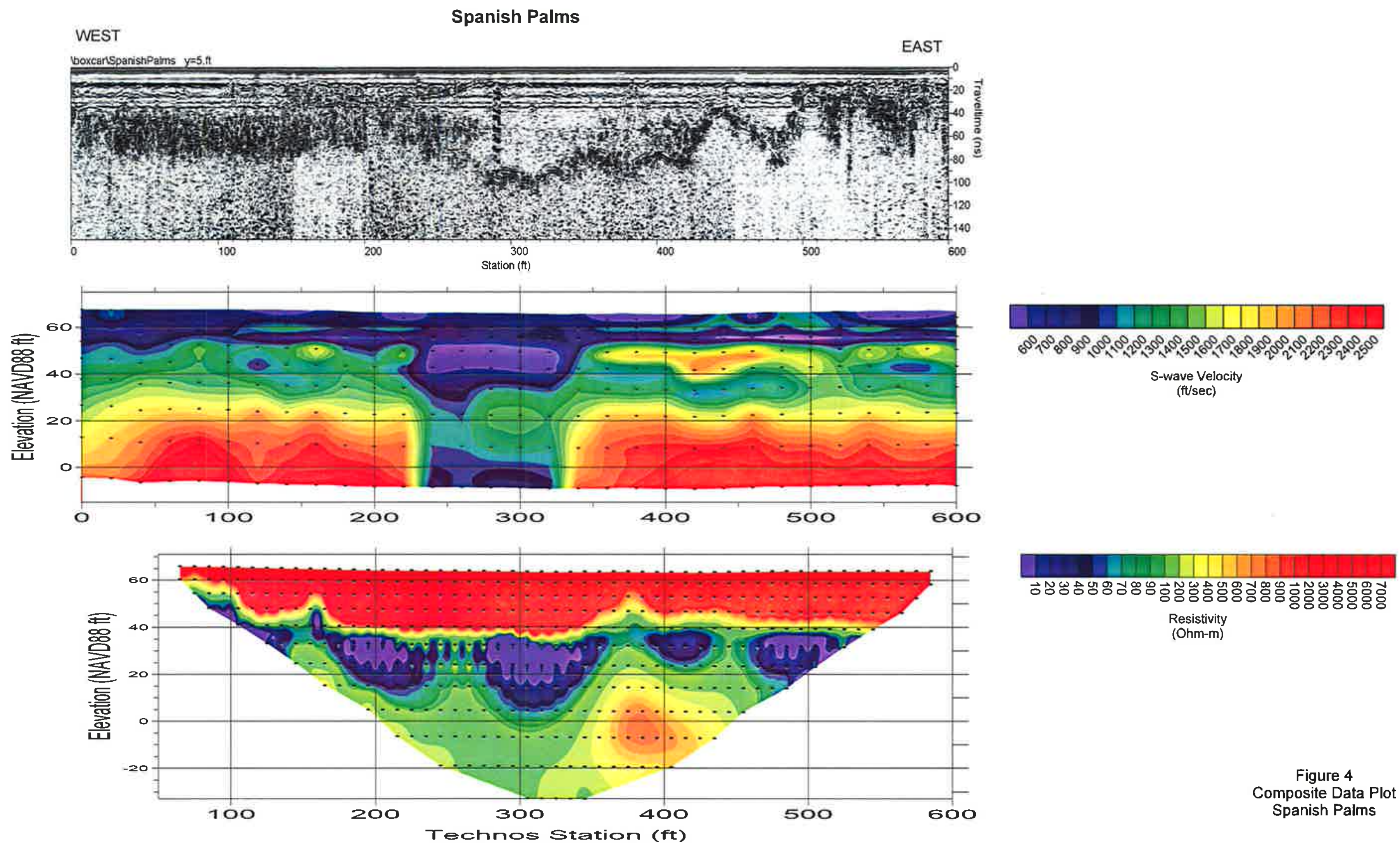


Figure 4
Composite Data Plot
Spanish Palms

TECHNOS

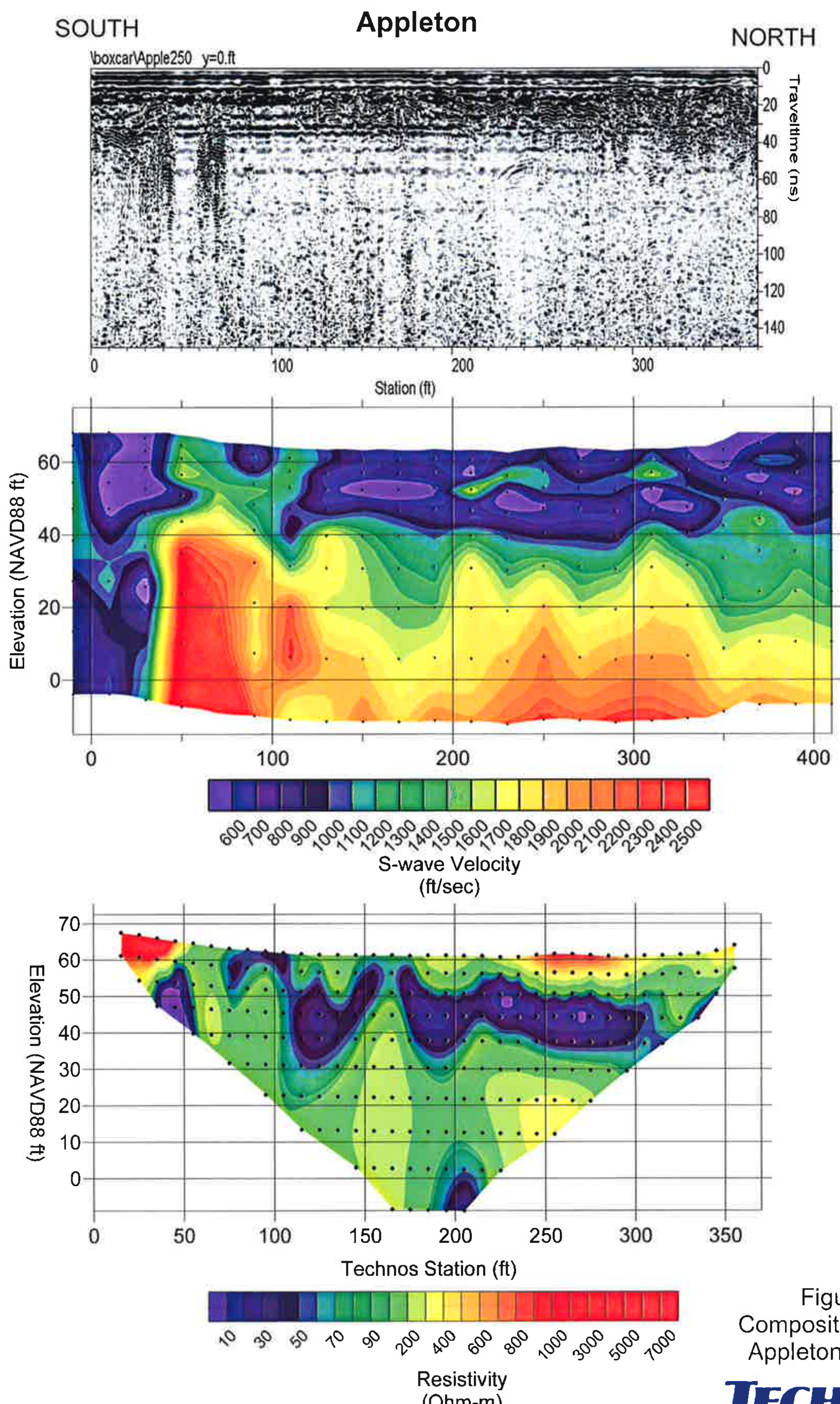


Figure 5
Composite data plot
Appleton Museum

TECHNOS

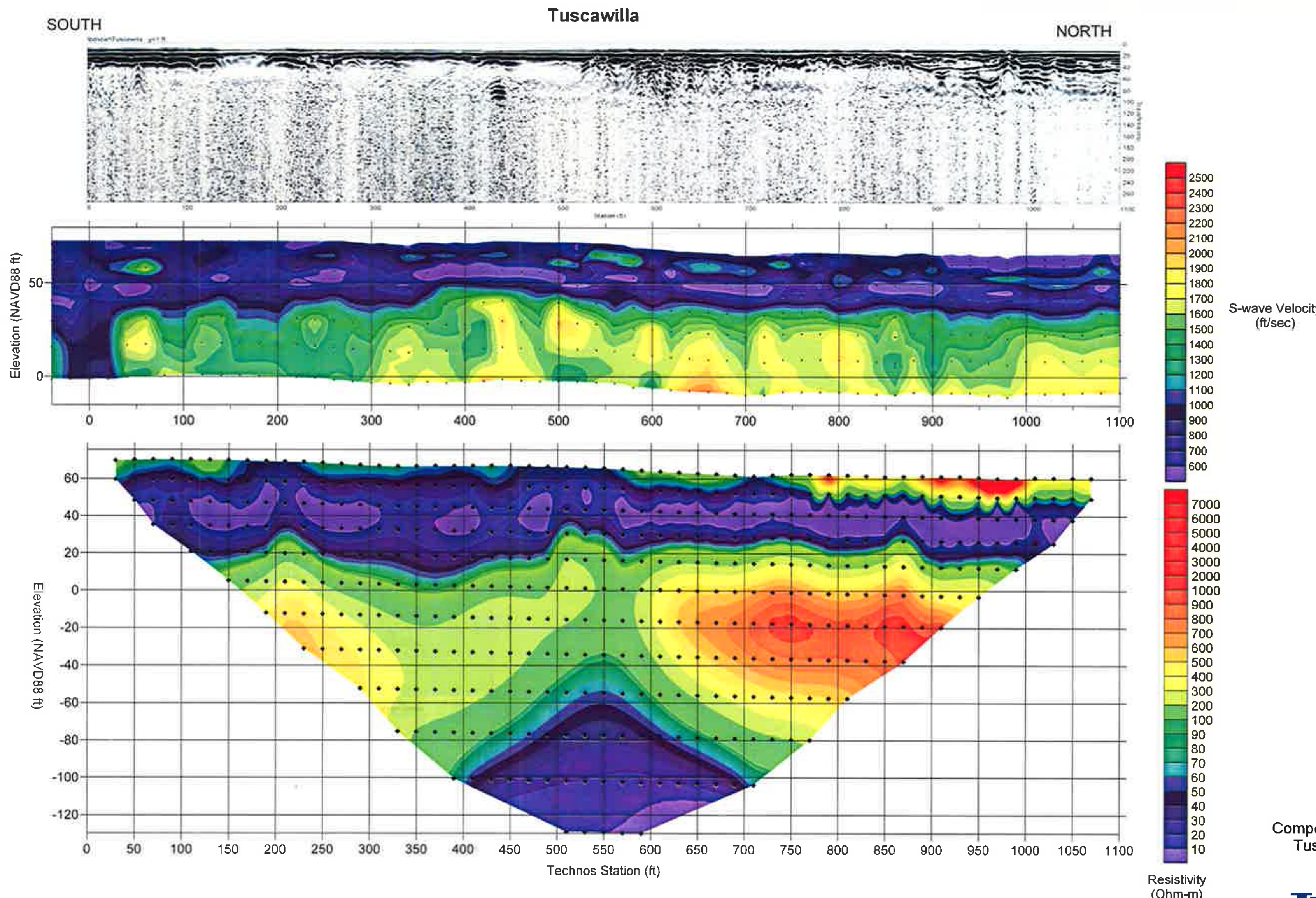


Figure 6
Composite Data Plot
Tuscawill Park

TECHNOS

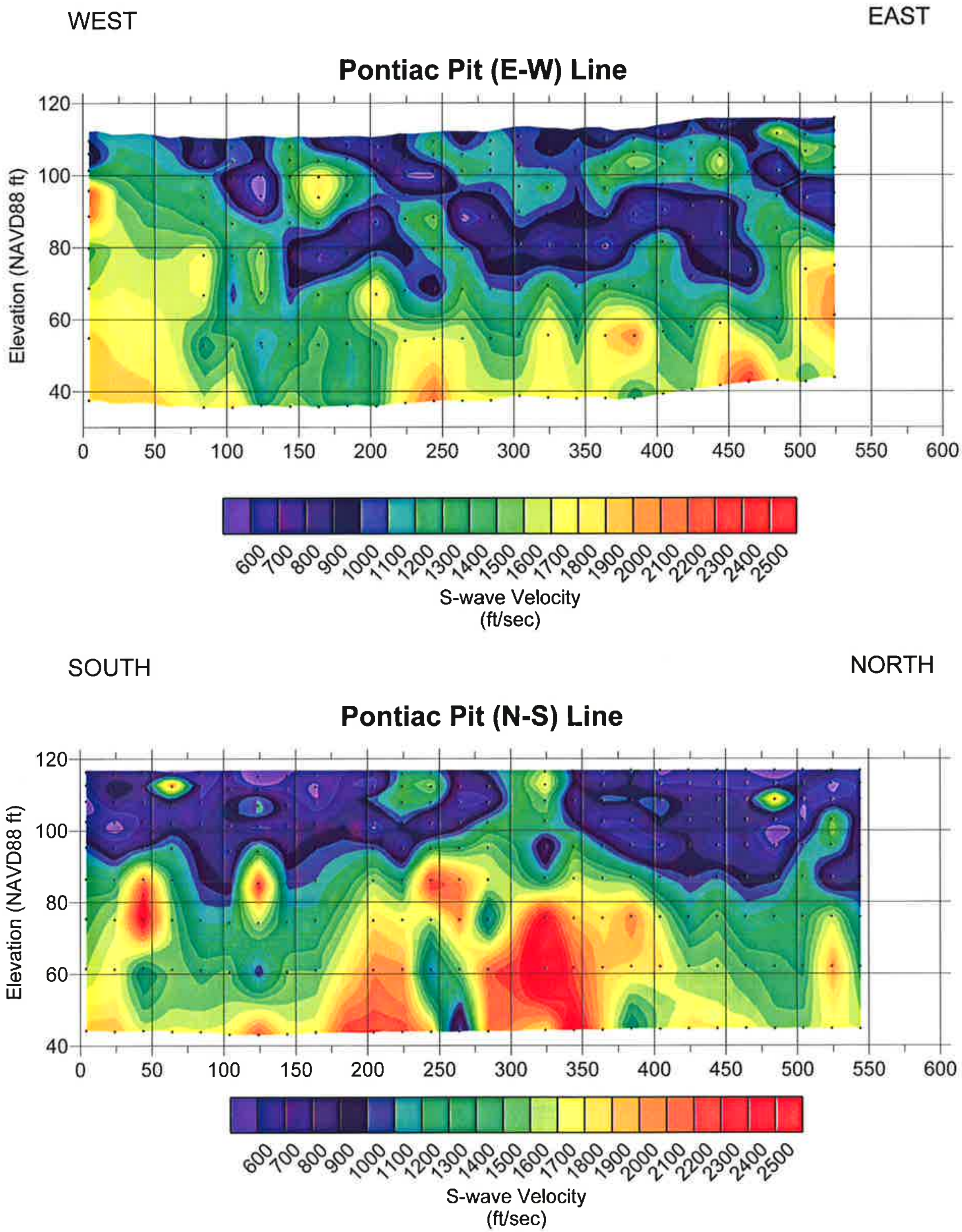


Figure 7
Composite Data Plot
Pontiac Pit

TECHNOS

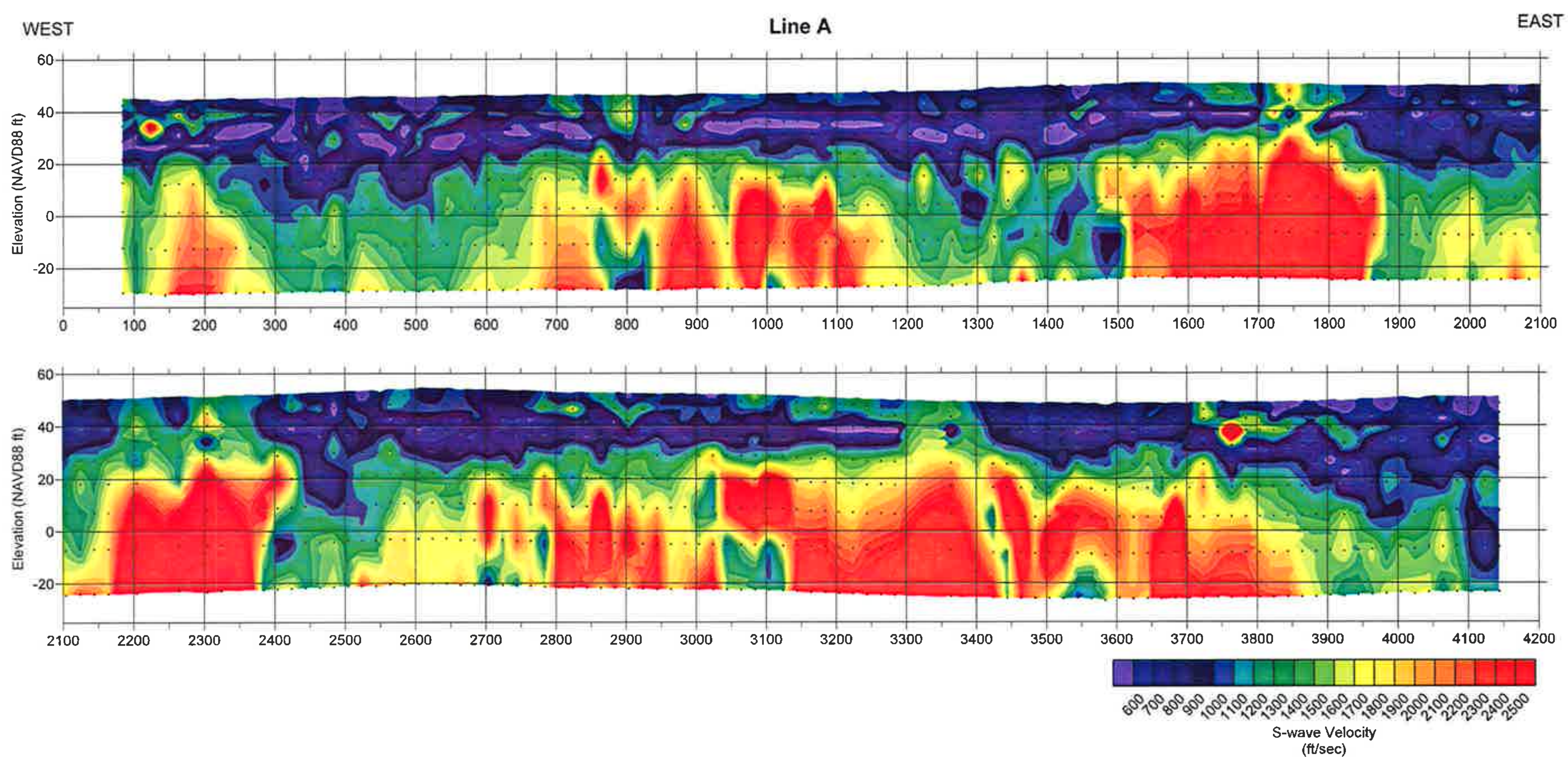


Figure 8
Line A - MASW Data

TECHNOS

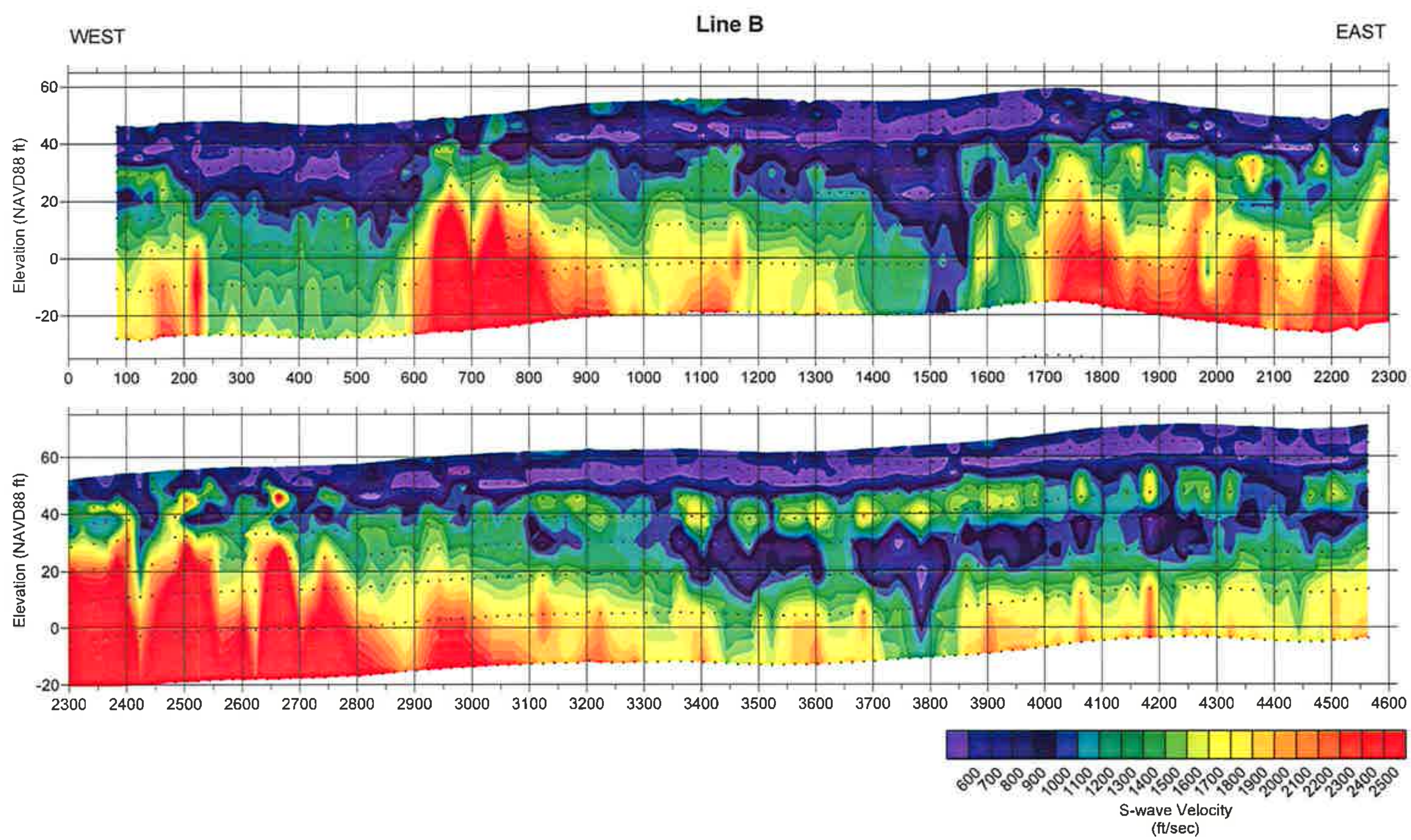


Figure 9
Line B - MASW Data

TECHNOS

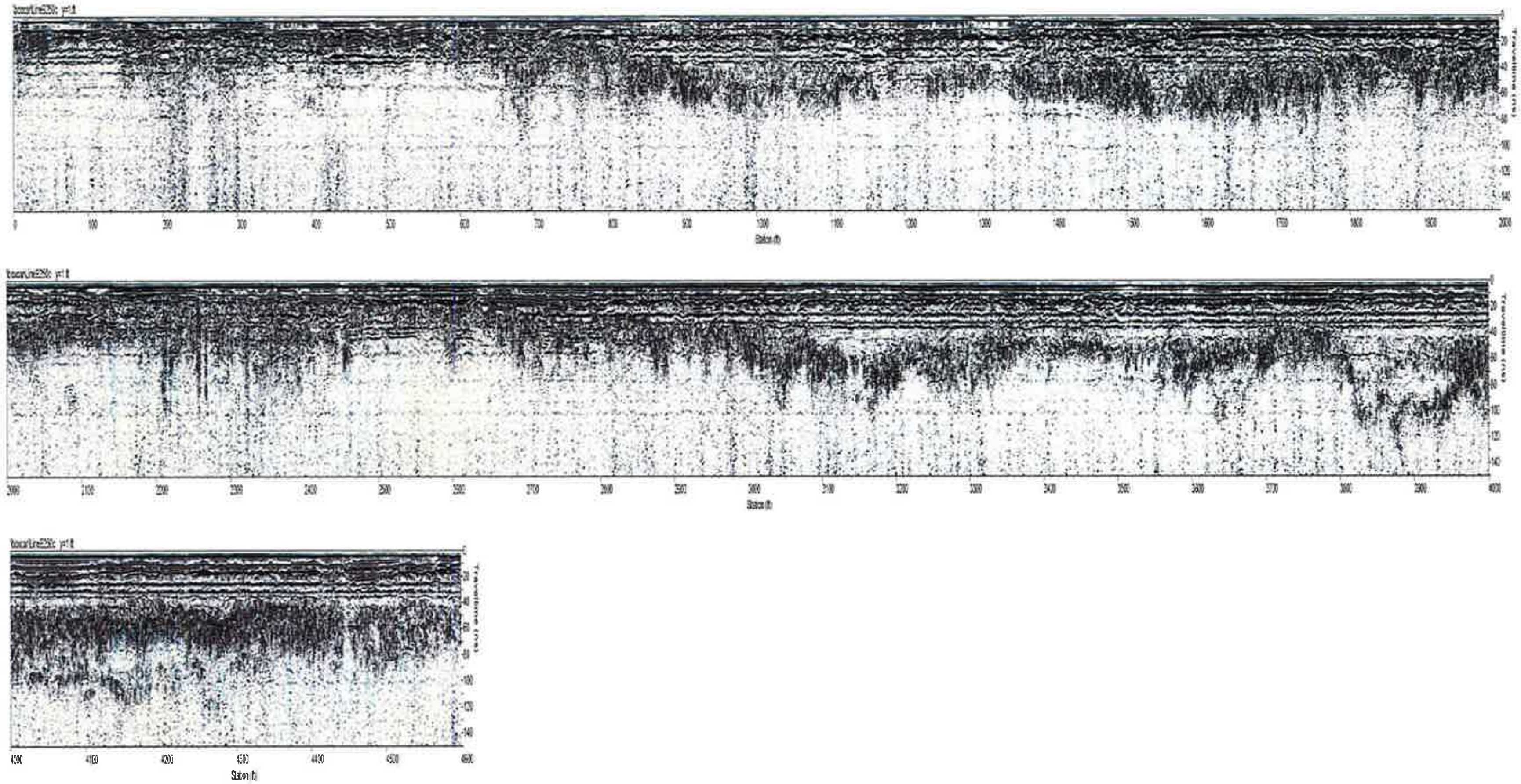


Figure 10
Line B - GPR

TECHNOS

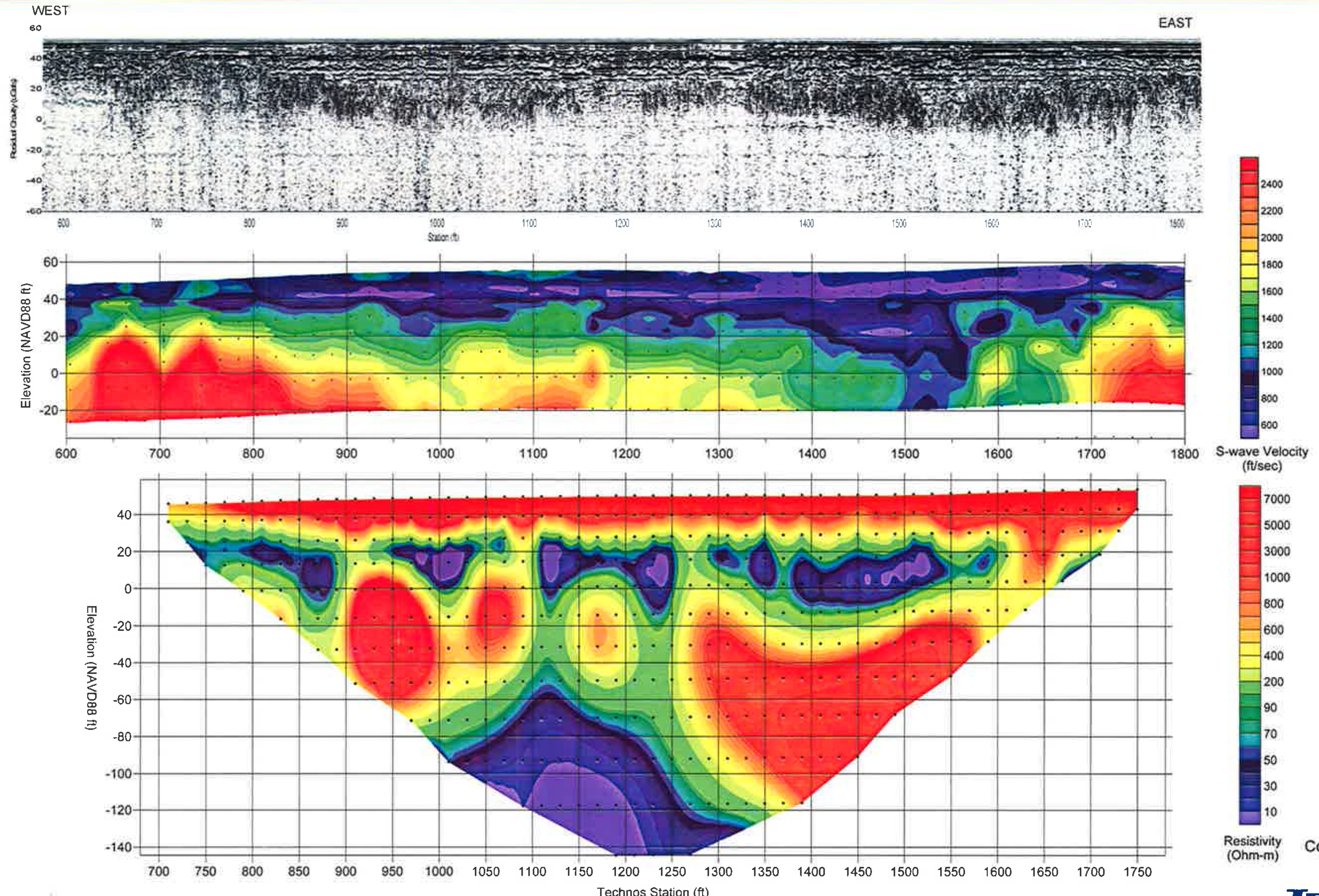


Figure 11
Composite Data Plot
Line B - West

TECHNOS

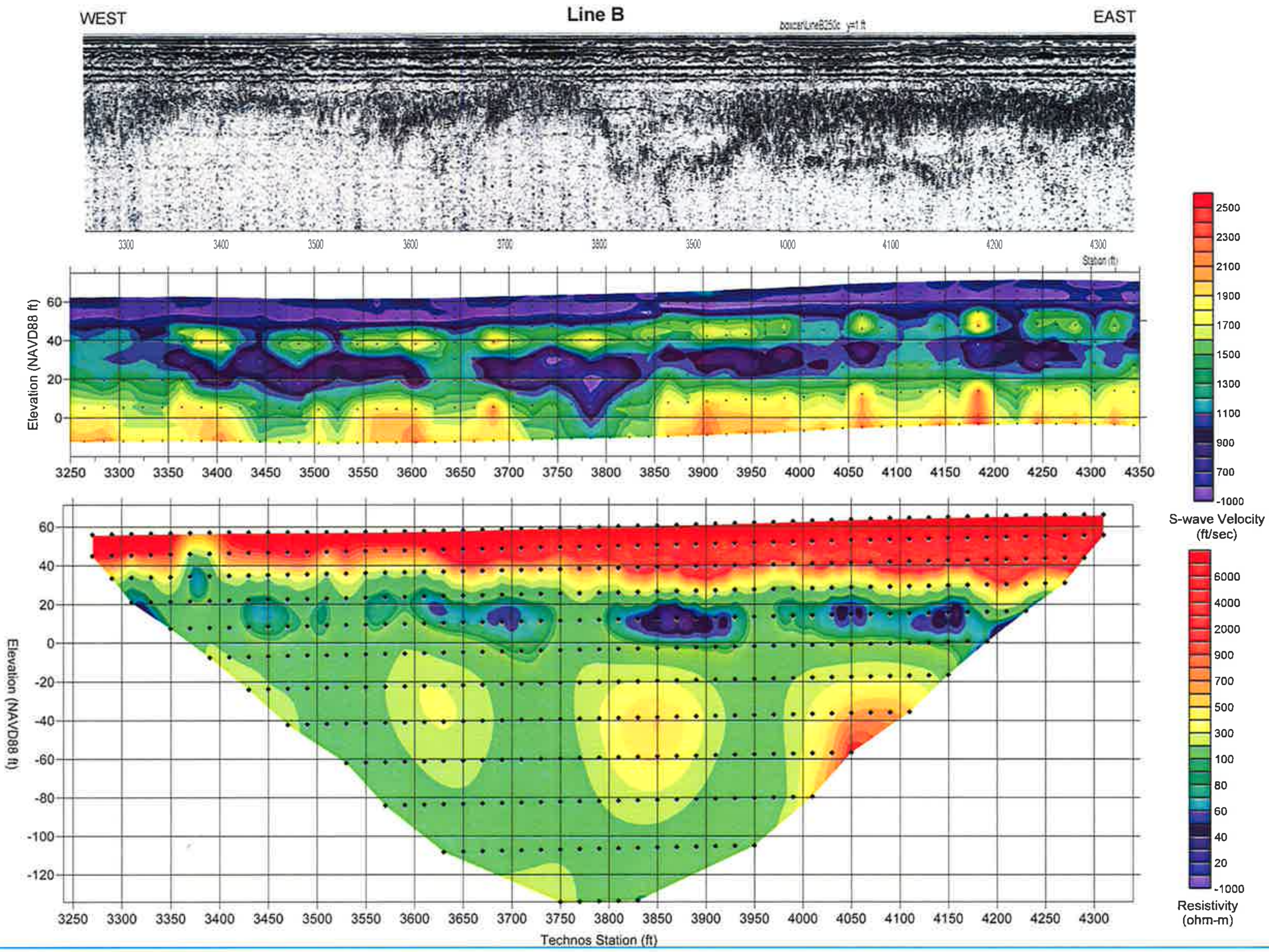


Figure 12
Composite Data Plot
Line B - East

TECHNOS

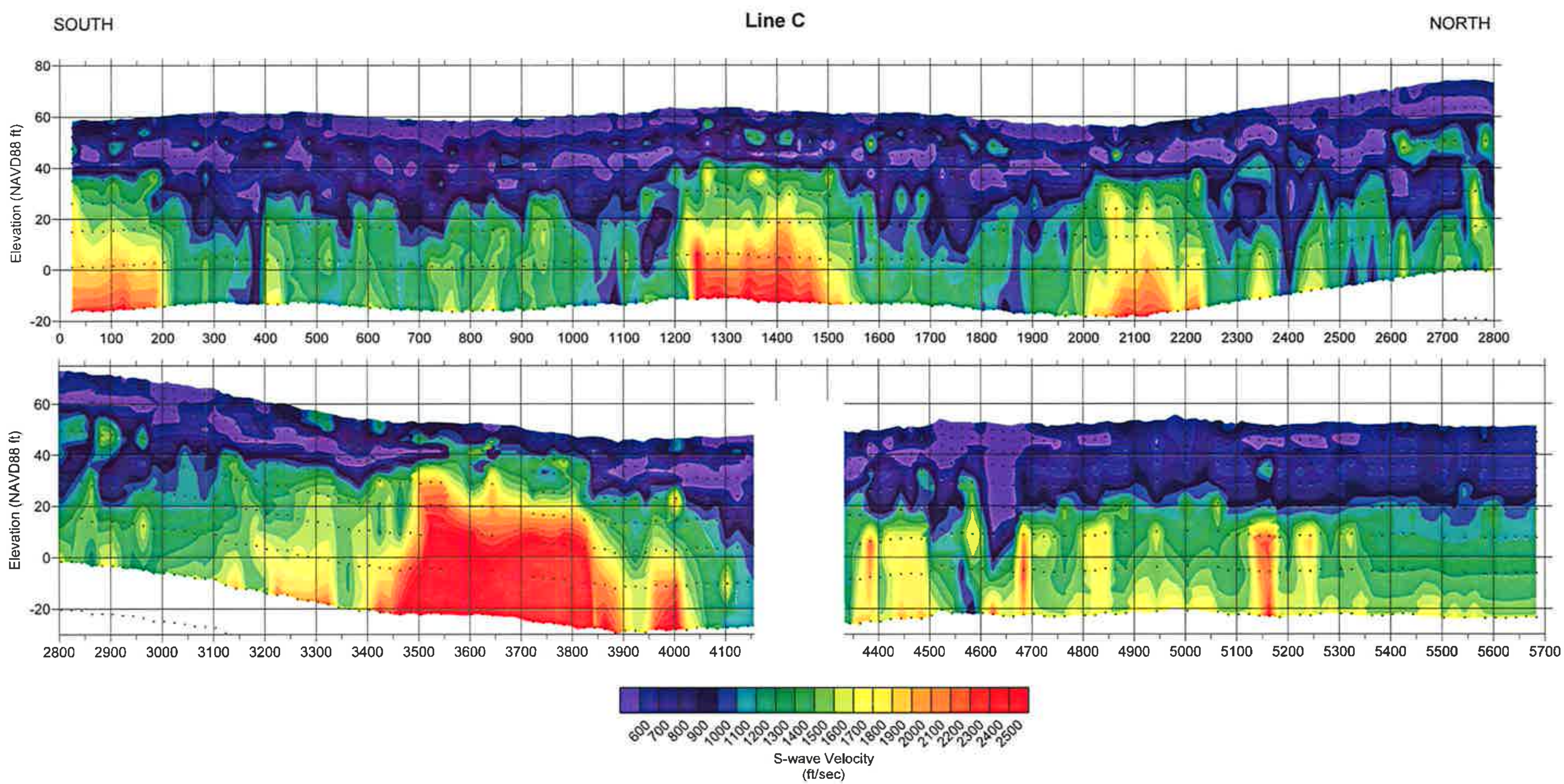


Figure 13
Line C - MASW Data

TECHNOS

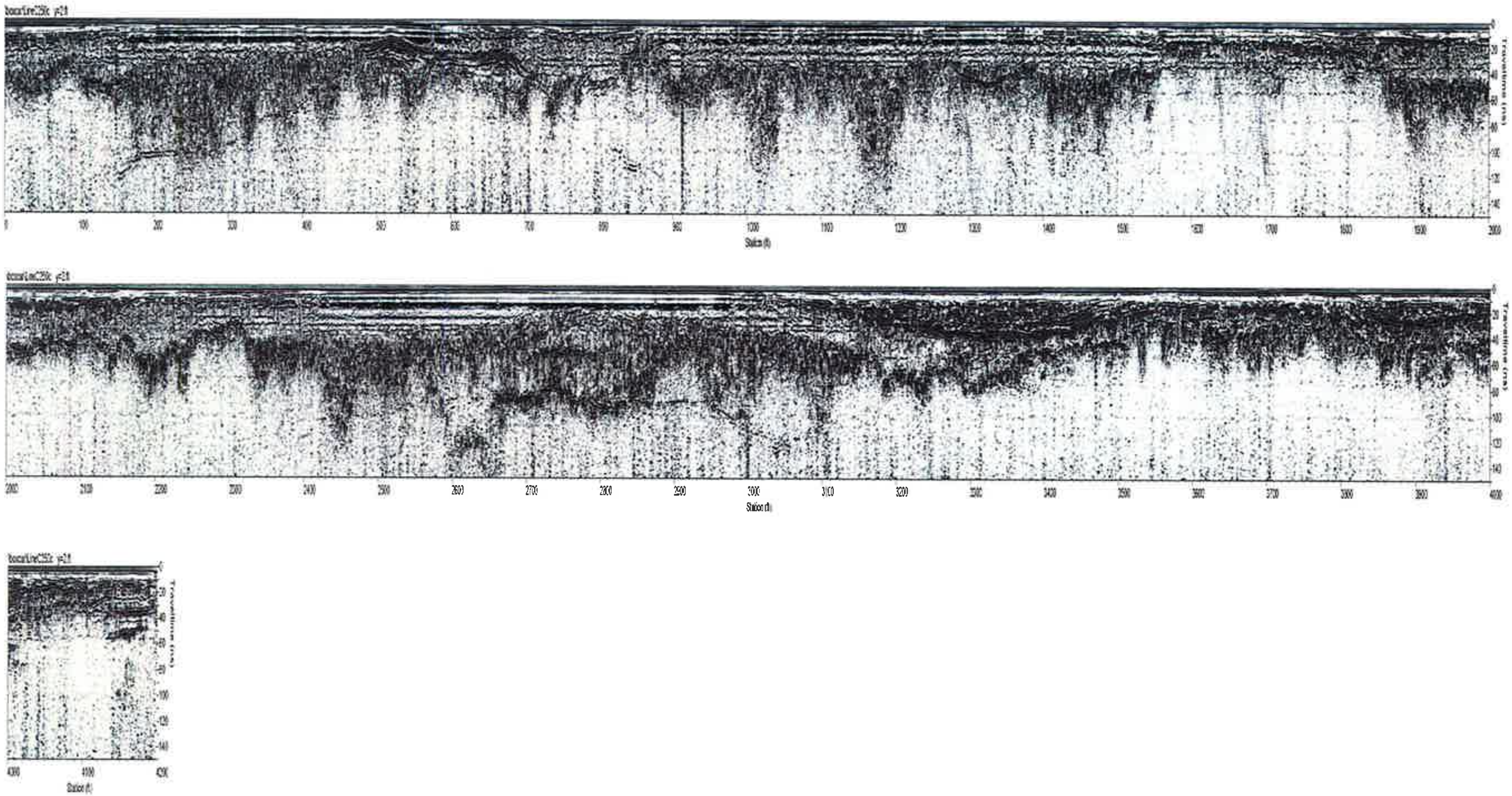


Figure 14
Line C - GPR

TECHNOS

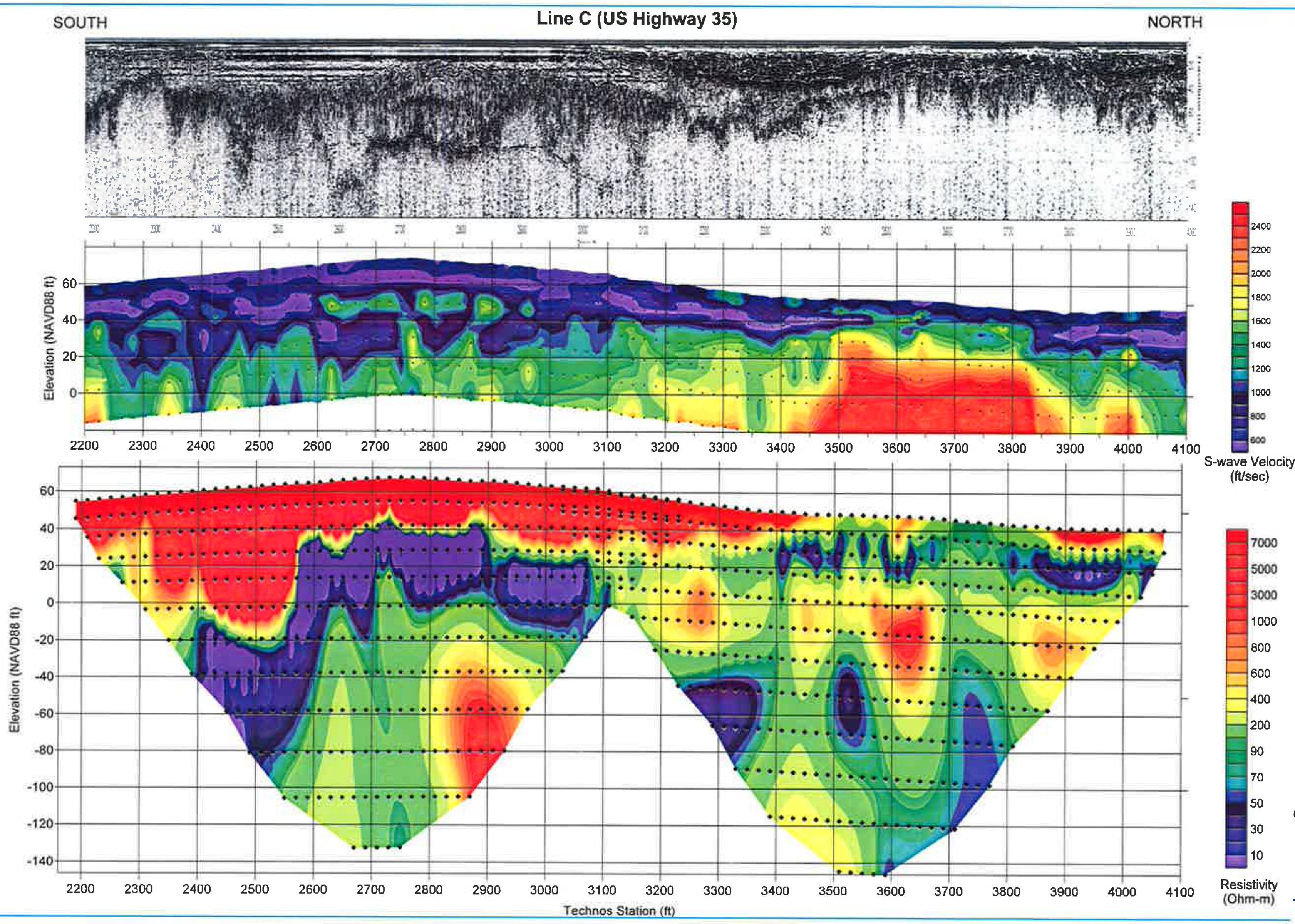


Figure 15
Composite Data Plot
Line C - South

TECHNOS

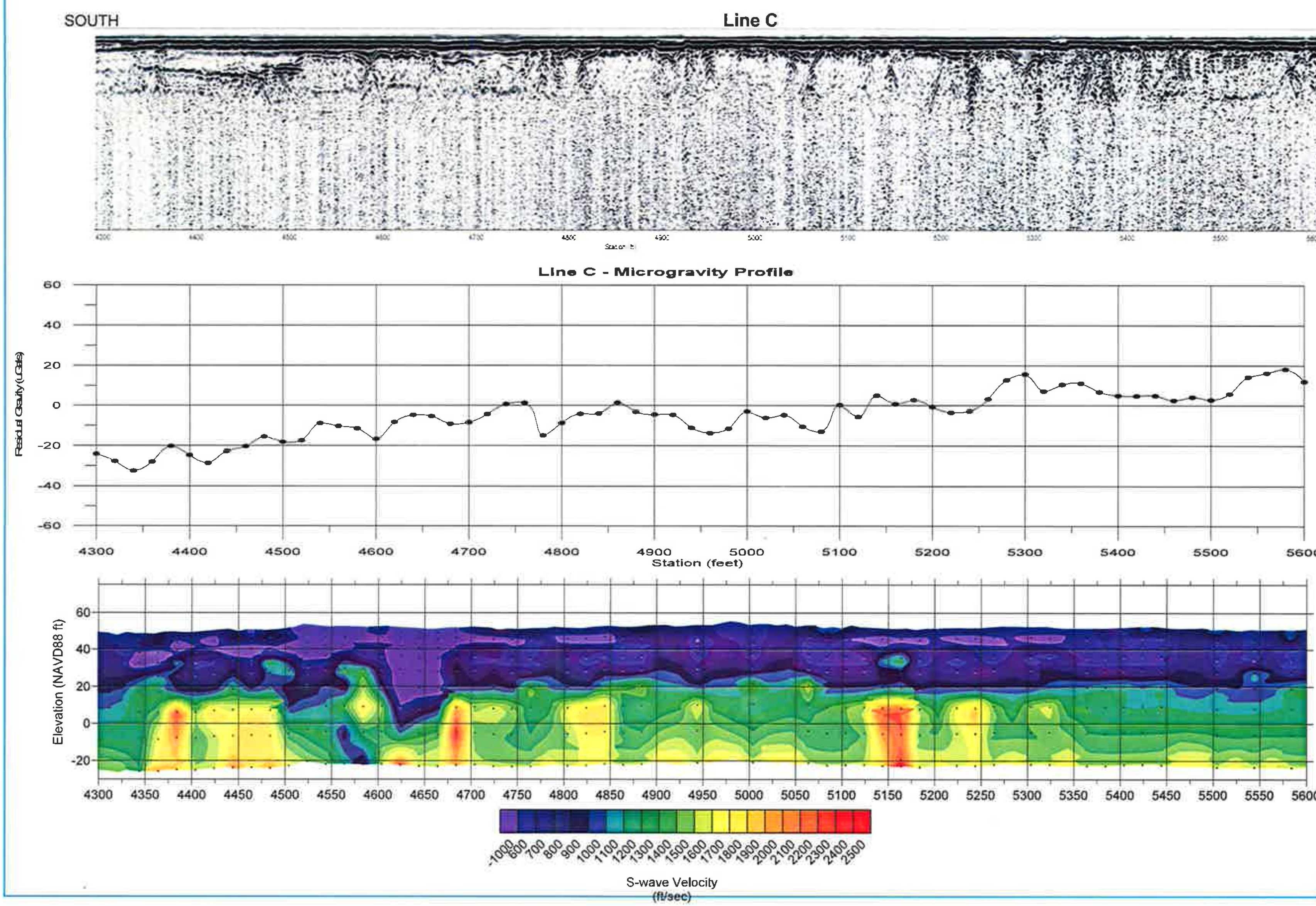


Figure 16
Composite Data Plot
Line C - North

TECHNOS

ATTACHMENT B


Line B
WEST
elev 45 ft

Karst Environmental Services, Inc.

5779 NE County Road 340   High Springs, Florida 32643
(386) 454-3556   (386) 454-3541 FAX   kes@atlantic.net

Mr. Anil Desai, P.G.
FDEP Central District Office
3319 Maguire Boulevard
Suite # 232
Orlando, FL 32803-3767

March 2, 2010

**RE: Operational Plan Summary and Supporting Documentation
Hydrologic Evaluation to Support Nutrient Groundwater Pathway Delineation
Silver Springs, Marion County, Florida**

Dear Mr. Desai,

The St. Johns River Water Management District (SJRWMD) has contracted with URS Corporation Southern (URS) to conduct a qualitative dye trace study in the north and central portion of Marion County. Silver Springs has been identified by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients, and specifically by nitrates and/or by nitrates/nitrites. In part, this listing led the FDEP and the SJRWMD to authorize the referenced study, commonly referred to as the Silver Springs Nutrient Pathway Characterization Study. The project is funded by FDEP using funds provided by the U. S. Environmental Protection Agency (USEPA) from the American Reinvestment and Recovery Act of 2009 (ARRA).

Objective

The Nutrient Pathway Characterization Study has two objectives:

- **Objective 1:** Identification of dominant groundwater pathways and travel times between specific locations and a group of approximately 30 springs, commonly called vents that comprise the Silver Springs Group (SSG).

- **Objective 2:** Identification of potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

Key URS Team members in this study include Karst Environmental Services, Inc. (KES), Ozark Underground Laboratory, Inc. (OUL) and Technos, Inc. (Technos). KES and OUL are providing both professional and technical support with the design and implementation of two, multiple fluorescent dye tracer studies. OUL will be providing all spectrofluorophotometric analytical services for the project. Technos provided professional and technical support with the design and implementation of geophysical surveys used in support of the dye tracer designs.

Operational Summary

The dye traces will focus on the SSG, selected drainage sink points and water wells, and will be conducted in two phases. The primary point of contact with the SJRWMD for this project is Brian McGurk. Operational questions can be directed to Pete Butt, KES Vice President and Bill Colona, URS Senior Project Geologist.

The purpose of this qualitative dye trace is to identify connections from five selected natural and man-made drainage sites within Marion County to the SSG. The five locations approved by the SJRWMD are:

Trace Group	Trace Name
1	Orange Lake Sink
1	Ocala Civic Theater Drainage Retention Area (DRA)
1	Tuscawilla Park Drainage Well
2	Pontiac Sink
2	Spanish Palms DRA

The following table and figures are attached that provide information for the two dye trace events:

- **Figure 1** –*Tracer Event 1*, All dye introduction locations, (e.g. Orange Lake Sink, Tuscawilla Park Drainage Well and Ocala Civic Theatre (DRA).
- **Figure 2** - *Tracer Event 1 Detail*, Western two dye introduction locations only (e.g. Tuscawilla Park Drainage Well and Ocala Civic Theatre DRA).
- **Figure 3** - *Tracer Event 2*, Dye Introduction Locations (e.g. Pontiac Sink and Spanish Palms DRA).
- **Table 1 -** Dye Introduction and Sampling Sites

An evaluation of candidate water wells is currently underway with SJRWMD to identify potential monitoring points for the study. In large part, this study is contingent on coordinating dye introduction with rainfall events in the study area. Background spring vent and surface water sampling is underway to help establish pre-dye release natural baseline conditions.

Anticipated Schedule

The project schedule calls to begin the first phase (Trace Event 1) in late March or early April, 2010. Sampling for Trace Event 1 will last for approximately 91 days (13 weeks) after the introduction of the dyes and will be conducted on a weekly basis. As previously noted, the exact timing of the dye introductions will depend in part on the potential for coordinating the dye release with a rainfall event.

The second phase (Trace Event 2) is anticipated to begin on or before 91 days after the Trace Event 1 dye introductions. Sampling will occur approximately weekly for this group of traces and will last for approximately 25 weeks after the 13 weeks of sampling for the first group of dye introductions. As a result, there will be a total of about 38 weeks of weekly sampling after the first introduction of tracer dyes.

Tracer Dyes

The tracer dyes that we plan to use are sodium fluorescein (also called Uranine C or Acid Yellow 73), eosine (also called Acid Red 87) and rhodamine WT (also called Acid Red 388). These three dyes are non-toxic, and are not persistent in the environment. These dyes are used routinely around the United States for water tracing studies and pose no risk to humans, livestock, or to aquatic life in the concentrations used in groundwater tracing work under the direction of experienced professionals. Rhodamine WT and fluorescein are both certified under ANSI/NSF Standard 60 for use in potable water. Material Safety and Data Sheets (MSDS) for fluorescein, eosine and rhodamine WT are provided as **Attachment A**.

For this project OUL will follow its own established QA/QC procedures. OUL will abide by its procedures and policies document dated December 15, 2008 titled *Procedures and Criteria, Analysis of Fluorescein, Eosine, Rhodamine Wt, Sulforhodamine B, And Pyranine Dyes In Water and Charcoal Samplers* which is presented in **Attachment B**.

Fluorescein and eosine will be supplied by OUL as a powder that will be made into a solution prior to release. Rhodamine WT will be supplied by OUL in liquid form. OUL is a long recognized quality source of dyes used in groundwater tracer studies. These dyes will appear as greenish (fluorescein) or reddish (rhodamine WT and eosine) when present in a sufficient concentration in the water. Dye quantities proposed for use in this study are considered to be conservative and have been selected so that visual detection will not be a public nuisance.

The dyes are highly detectable with analytical instruments at very low concentrations so tracing work is conducted with dye concentrations at detection limits that are orders of magnitude smaller than the visible threshold where the general public might see colored water. As reported by OUL, the difference between the instrumental detection limit for the dyes in water is over 4 orders of magnitude (10,000 times) smaller than the visible threshold for the general public for rhodamine WT. The difference is more than 5 orders of magnitude smaller (100,000 times) for fluorescein and 6 orders of magnitude smaller (1 million times) than the visible threshold for the general public for eosine.

Dye Mixture	Visible Concentration in Water (ppb) General Public	Laboratory Detection Limit in Water (ppb)	Laboratory Detection Limit in Carbon Sampler elutant (ppb)
Eosine	13,500	0.015	0.050
Fluorescein	140	0.002	0.025
Rhodamine WT	2,500	0.015	0.170

Note: OUL instrumental detection limits for three tracer dyes in water and activated carbon sampler elutant. The general public visible detection limit in water is from a 2002 study by Tom Aley (OUL). Units are expressed as parts per billion (ppb) and are based on the as-sold weight of the dye mixtures provided by OUL for this study.

Tracer Event 1 Introduction Points

The present plan is to release dyes into three locations (**Figures 1 and 2**) during the first phase of the study. Fluorescein dye will be released directly into the Orange Lake Sink (also referred to as the Orange Lake Swallet) at the Heagy-Burry Park/Ramp location. We do not anticipate using more than 100 pounds of fluorescein. Dilution will be provided via the lake discharge from Orange Lake that is draining continuously into the sink.

Eosine dye will be released into a City of Ocala drainage well located on the east side of the stormwater ponds in Tuscawilla Park. We do not anticipate using more than 30 pounds of eosine. This drainage well receives virtually constant overflow from the adjacent ponds, and thus always has some flow from that source. This dilution will quickly lower the dye concentration.

Rhodamine WT dye will be released into the Ocala Civic Theater DRA that is located on the south side of the Theater. We do not anticipate using more than 30 pounds of rhodamine WT. We will supply a "chase water" flush to the dye at this location using water from a nearby municipal hydrant and/or use the natural overflow from the adjacent DRA if the timing of the dye release coincides with a rainfall event.

Tracer Event 2 Introduction Points

During the second phase of the study, rhodamine WT dye will be released into a City of Ocala drainage sink located at the Pontiac Pit location in southwest Ocala (**Figure 3**). This natural drainage sink receives overflow from the adjacent municipal DRA. We do not anticipate using more than 40 pounds of rhodamine WT.

Fluorescein dye will be released into the Spanish Palms Subdivision DRA that is located on the south side of that subdivision, and south of the Silver River State Park (**Figure 3**). Water from a nearby potable water line will be used for chase water. We do not anticipate using more than 20 pounds of eosine.

Sampling Stations

The focus for sampling will be within the SSG vents. We will also sample at selected wells to be confirmed by SJRWMD, including those at the City of Ocala municipal wellfield. Charcoal sampler packets and water samples will be collected, and shipped to OUL for analyses.

Supporting Documentation

To further assist you in your review of this project, the following supporting documentation is attached for your use:

- **Attachment C** – The FDEP-approved Grant Work Plan developed by the SJRWMD for this project.
- **Attachment D** – The approved FDEP/DRP Research and Collection Permit for Silver River State Park.

Project Coordination

We will coordinate all project related activities with Brian McGurk and other appropriate SJRWMD personnel. We will also contact the Environmental Health Director of the Marion County Health Department (MCHD) to keep them apprised of our plans. The Marion County Public Works Department has already been contacted and is participating in this study. Also, the City of Ocala Water and Sewer Department have been contacted, and are participating in the study. The SJRWMD, FDEP, City of Ocala and MCHD will be provided with study information, and will be given at least a 48-hour notice prior to tracer release. We will also support the SJRWMD on an as-requested basis, to provide other interested parties with information that will explain the objectives and environmentally safe nature of the study.

We hope that the information enclosed is sufficient. Please let us know if you need more information regarding this dye trace. Pete Butt can be reached at 386-454-3556, 386-454-2147 and 352-339-3380. Bill Colona of URS can be reached at 850-574-3197 or 850-402-6422.

Sincerely,

Peter L. Butt
Vice President,
Karst Environmental Services, Inc.

Wm. H. Colona

William H. Colona III, P.G.
Senior Project Geologist
URS Corporation Southern

cc: Brian McGurk, St. Johns River Water Management District
Jeff Halcomb, City of Ocala Water and Sewer Department
Environmental Health Director, Marion County Health Department

Attachments:

Table 1 - Dye Introduction and Sampling Sites

Figure 1 –*Tracer Event 1*, all dye introduction locations
Figure 2 - *Tracer Event 1Detail*, Western two dye introduction locations only
Figure 3 - *Tracer Event 2*, Dye Introduction Locations

Attachment A – MSDS Sheets
Attachment B – OUL Policies and Procedures
Attachment C – FDEP-approved Grant Work Plan.
Attachment D – Approved FDEP/DRP Research and Collection Permit for Silver River SP

TABLES

Table 1

Dye Introduction and Smapling Sites
Silver Springs Group Nutrient Pathway Study
Silver Springs, Marion County, Florida

SILVER SPRINGS DYE TRACE 2010;													
DYE INTRODUCTION & SAMPLING SITES; LOCATIONS and DISTANCES.													
		GPS Coordinates*											
	Station	DECIMAL MINUTES		Comments	Approximate Distance from:								
INTRO/SAMPLING STATION NAME:	Number	LATITUDE	LONGITUDE	SSG WQ Groups	A	B	C	D	E			Elevation	FOM +/- Ft.
	(Letter)												
Orange Lake Sink (Swallet)	A	N 29° 25.648'	W 82° 12.458'										12
Ocala Civic Theatre DRA	B	N 29° 12.423'	W 82° 04.530'	Low spot N of fill pile									11
Tuscawilla Park Drainage Well	C	N 29° 11.432'	W 82° 07.925'										**
Pontiac Sink	D	N 29° 09.346'	W 82° 07.868'										**
Spanish Palms DRA	E	N 29° 11.414'	W 82° 02.583'	SW corner area of DRA									11.5
SILVER SPRINGS GROUP STATIONS	(1-49)									Position	Depth		
Mammoth East	1	N 29° 12.970	W 82° 03.160	SSG Vent Group 1						Head			
Mammoth West	2	N 29° 12.979	W 82° 03.163	SSG Vent Group 2						Head			
Jacob's Well	3	N 29° 12.903	W 82° 03.113	SSG Vent Group 1						Right bank side			
Catfish Reception Hall	4	N 29° 12.897	W 82° 03.107	SSG Vent Group 1						Right bank side			
Bridal Chamber	5	N 29° 12.887	W 82° 03.092	SSG Vent Group 1						Right bank side			
Oscar	6	N 29° 12.917	W 82° 03.092	SSG Vent Group 1						Center channel			
Devil's Kitchen A	7	N 29° 12.893	W 82° 03.080	SSG Vent Group 1						Right bank side			
Devil's Kitchen B	8	N 29° 12.900	W 82° 03.087	SSG Vent Group 1						Right bank side			
Ladies Parlor	9	N 29° 12.878	W 82° 03.087	SSG Vent Group 1						Right bank side			
Alligator Hole	10	N 29° 12.907	W 82° 03.056	SSG Vent Group 1						Right bank side			
Mastodon Bone	11	N 29° 12.943	W 82° 03.025	SSG Vent Group 2						Center channel			
Geyser	12	N 29° 12.923	W 82° 03.005	SSG Vent Group 1						Right bank side			
Blue Grotto	13	N 29° 12.913	W 82° 02.988	SSG Vent Group 1						Right bank side			
Christmas Tree	14	N 29° 12.972	W 82° 02.955	SSG Vent Group 2						Left bank side			
Garden of Eden	15	N 29° 12.968	W 82° 02.903	SSG Vent Group 2						Left bank side			
Log	16	N 29° 12.976	W 82° 02.888	SSG Vent Group 2						Left bank side			
Lost River	17	N 29° 12.976	W 82° 02.892	SSG Vent Group Outlier (2)						Left bank side			
Indian Cave	18	N 29° 12.935	W 82° 02.880	SSG Vent Group 1						Right bank side			
First Fisherman's Paradise	19	N 29° 12.935	W 82° 02.840	SSG Vent Group 1						Center channel			
No Name Cove	20	N 29° 12.937	W 82° 02.778	SSG Vent Group 1						Right bank side			
Turtle Meadows	21	N 29° 12.953	W 82° 02.753	SSG Vent Group 2						Left bank side			
Second Fisherman's Paradise	22	N 29° 12.940	W 82° 02.720	SSG Vent Group 3						Center channel			
Catfish Hotel	23	N 29° 12.923	W 82° 02.703	SSG Vent Group 3						Center channel			
Turtle Nook	24	N 29° 12.950	W 82° 02.700	SSG Vent Group 2						Left bank side			
Turtle Nook Run	25	N 29° 12.942	W 82° 02.722	SSG Vent Group 3						Left bank side			
Racoon Island	26	N 29° 12.945	W 82° 02.65	SSG Vent Group 2						Left bank side			
Rocky Vent	27	N 29° 12.925	W 82° 02.639	SSG Vent Group 3						Left bank side			
Shipwreck	28	N 29° 12.927	W 82° 02.640	SSG Vent Group 3						Left bank side			
Catfish Convention Hall	29	N 29° 12.927	W 82° 02.632	SSG Vent Group 3						Left bank side			
Timber	30	N 29° 12.938	W 82° 02.497	SSG Vent Group 3						Left bank side			
Silver River @ 1200 m. Station	31	N 29° 12.925'	W 82° 02.456'	Composite all vents						Right bank side			**

Table 1

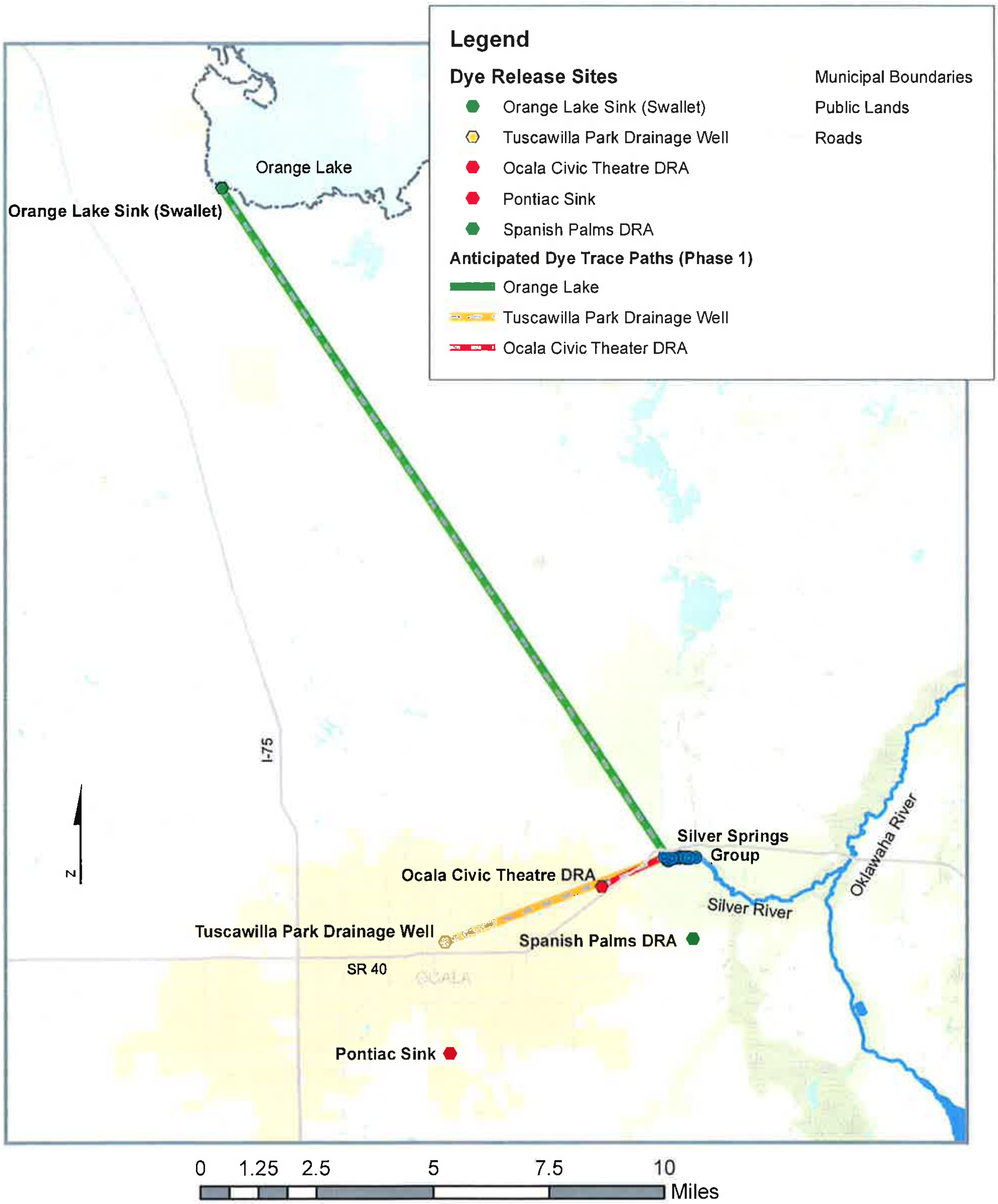
Dye Introduction and Smaplng Sites
Silver Springs Group Nutrient Pathway Study
Silver Springs, Marion County, Florida

		GPS Coordinates*													
	Station	DECIMAL MINUTES		Comments	Approximate Distance from:										
INTRO/SAMPLING STATION NAME:	Number	LATITUDE	LONGITUDE	SSG WQ Groups	A	B	C	D	E				Elevation	FOM +/- Ft.	
To be confirmed by SJRWMD	32														
To be confirmed by SJRWMD	33														
To be confirmed by SJRWMD	34														
To be confirmed by SJRWMD	35														
To be confirmed by SJRWMD	36														
To be confirmed by SJRWMD	37														
To be confirmed by SJRWMD	38														
To be confirmed by SJRWMD	39														
Rainbow Springs 1	40	N 29° 06.150'	W 82° 26.249'											**	
Rainbow Springs 2	41	N 29° 06.150'	W 82° 26.249'											**	
Rainbow Springs 3	42	N 29° 06.150'	W 82° 26.249'											**	
										Reported Well Depth (In Feet)	Casing Depth (In Feet)	Well Diameter (In Inches)			FL DEP System #
PUBLIC SUPPLY WELL STATIONS	(50-)														
Ocala Public Supply Well 1	50	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Well 2	51	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Wells Manifold W	52	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Wells Manifold E	54	N 29° 12.316'	W 82° 05.279'											**	
Jai Lai Fronton Public Supply Well		N 29° 24.864'	W 82° 12.170'											**	
IFAS Public Supply Well															
OTHER/MISCELLANEOUS STATIONS															FL DEP System #

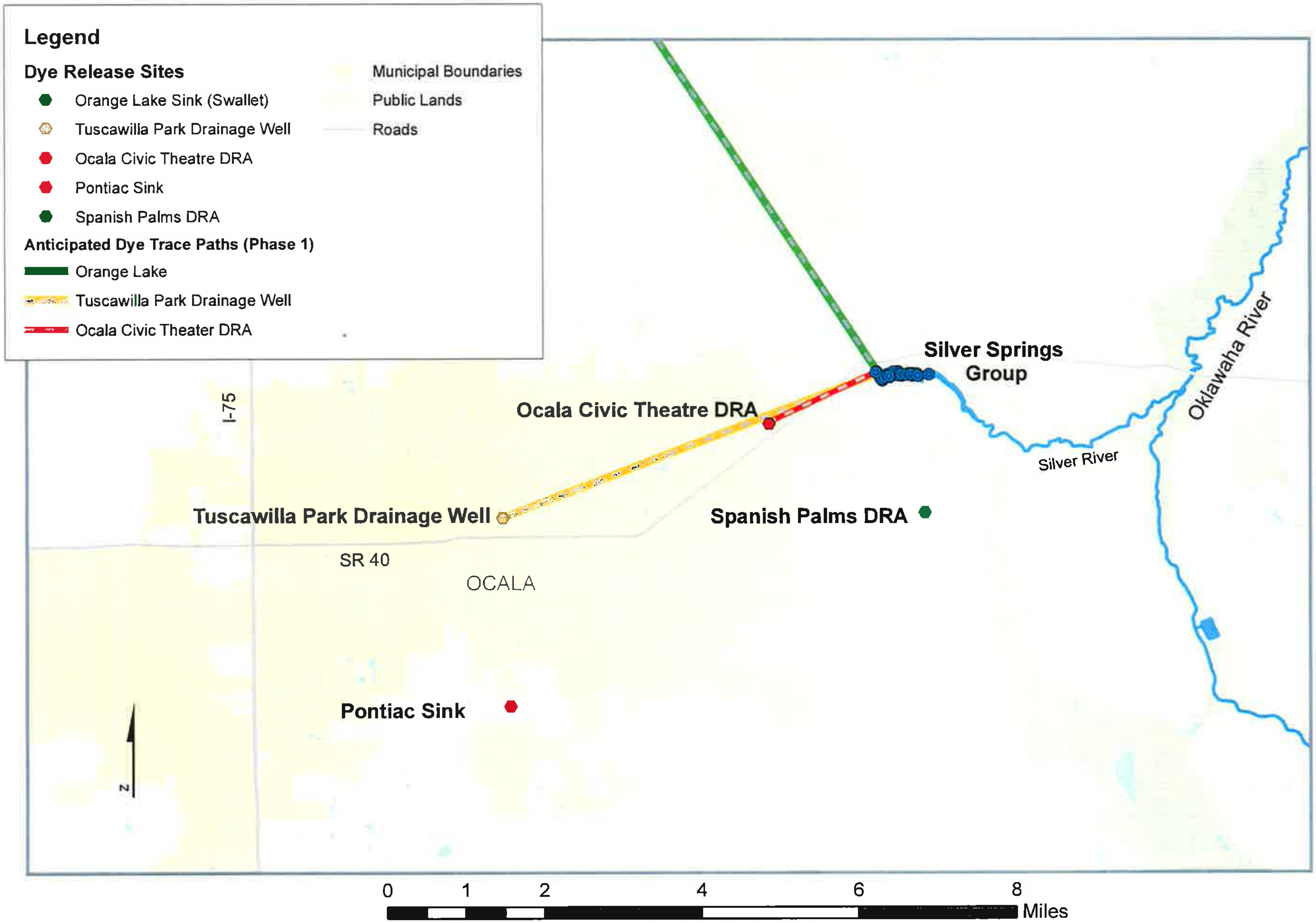
*From hand-held GPS positions taken during this study, WGS 84 Map Datum; distances are estimated from these positions.
** Estimated from TopoQuads or Google Earth.

FIGURES

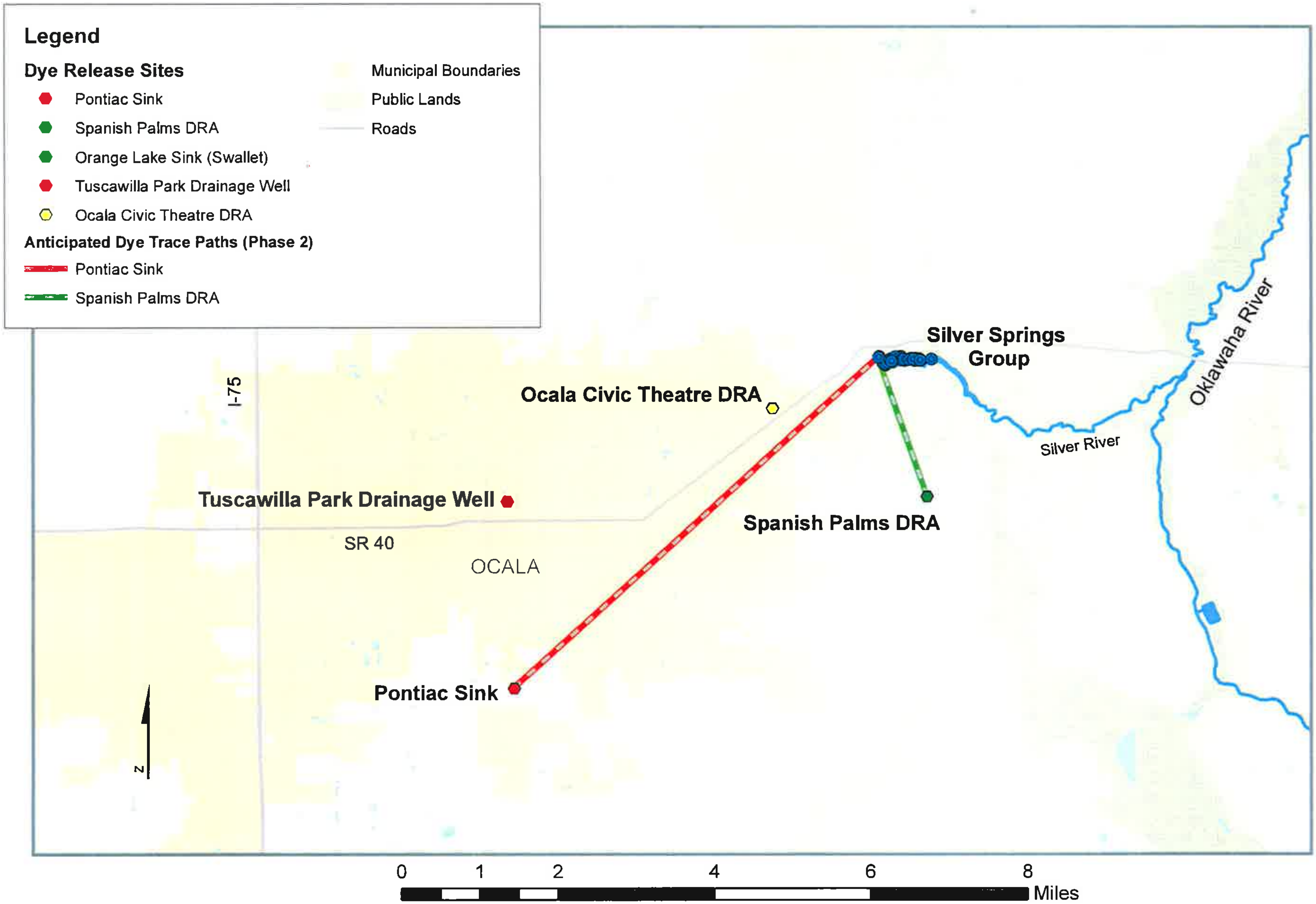
Silver Springs Nutrient Pathway Characterization Study
Figure 1: Phase 1



Silver Springs Nutrient Pathway Characterization Study
Figure 2: Phase 1 Detail View



Silver Springs Nutrient Pathway Characterization Study
Figure 3: Phase 2



ATTACHMENT A

Material Safety Data Sheet

15174 URANINE C

CHEMCENTRAL/Dyes & Pigments 13395 Huron River Drive Romulus, MI 48174	REVISION DATE:........................01/20/2003 CHEMTREC: ....800-424-9300 EMERGENCY:............................734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME:............................ 15174 URANINE C
CHEMICAL NAME: .... Acid Yellow 73
CHEMICAL FAMILY: .... Xanthene
CAS NUMBER:............................ 518-47-8

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
None as per 29CFR part 1910.1200 or Sara Title III			

HMIS HAZARD RATINGS (if applicable):
HEALTH:.. 1
FIRE 0
REACTIVITY 0

SECTION III - PHYSICAL DATA

APPEARANCE: .... Orange powder, no characteristic odor.
BOILING POINT:........................ N/A
MELTING POINT: .... N/A
FREEZING POINT:..................... N/A
VAPOR PRESSURE:................... N/A
VAPOR DENSITY (AIR=1):....... N/A
SPECIFIC GRAVITY:................. Approximately 1
pH: .... N/A
SOLUBILITY IN WATER:......... Moderate
VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT:............................ N/A
EXTINGUISHING MEDIA: .... Water fog, CO2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD:....... Adequate ventilation and clean up must be maintained to minimize dust accumulation. May form explosive dust/air mixture.

Material Safety Data Sheet

15174 URANINE C

SECTION V - REACTIVITY DATA

STABILITY: .... Stable
CONDITIONS TO AVOID: .... N/A
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY: .... Avoid contact with strong oxidizing agents
DECOMPOSITION: .... Carbon monoxide,Carbon dioxide,and oxides of Nitrogen and Sulfur.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE:.. Not Established
OVER EXPOSURE EFFECTS: Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved dust respirator as necessary.
PROTECTIVE GLOVES: .... To prevent skin contact.
EYE PROTECTION: .... Goggles.
ADDITIONAL MEASURES: ...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE: ... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION: .... Local exhaust to control dusts.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL: .... Spills should be contained and placed in suitable containers.
WASTE DISPOSAL: .... Do not discharge into sewers or waterways. Dispose of in accordance with local regulations.

Material Safety Data Sheet

15174 URANINE C

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME: ..... INK MATERIAL
HAZARD CLASS AND LABEL: MFR LABEL ONLY
UN NUMBER: .... N/A
REPORTABLE QUANTITY: ..... N/A

SECTION XI - ADDTIONAL INFORMATION

FOOT NOTES: This information is furnished without warranty, representation, or license of any kind, except that it is accurate to the best of CHEMCENTRAL Corporation's knowledge or obtained from sources believed by CHEMCENTRAL Corporation to be accurate.

The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

Material Safety Data Sheet

15189 Eosine OJ

CHEMCENTRAL/Dyes & Pigments 13395 Huron River Drive Romulus, MI 48174	REVISION DATE: .... 9/4/02 CHEMTREC: .... 800-424-9300 EMERGENCY: 734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME: .... 15189 Eosine OJ
CHEMICAL NAME: .... Acid Red 87 (Color Index Name)
CHEMICAL FAMILY: .... Xanthene
CAS NUMBER: .... Proprietary

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
None as per 29CFR part 1910.1200 or Sara Title III			

HMIS HAZARD RATINGS (if applicable):
HEALTH: 2
FIRE 1
REACTIVITY 0

SECTION III - PHYSICAL DATA

APPEARANCE: .... Brownish Red Powder, No Odor
BOILING POINT: .... N/A
MELTING POINT: .... N/A
FREEZING POINT: .... N/A
VAPOR PRESSURE: .... N/A
VAPOR DENSITY (AIR=1): .... N/A
SPECIFIC GRAVITY: .... Approximately 1
pH: .... N/A
SOLUBILITY IN WATER: .... Complete
VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: .... N/A
EXTINGUISHING MEDIA: .... Water fog, CO2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD: .... Adequate ventilation and clean up must be maintained to minimize dust accumulation. May form explosive dust/air mixture.

Material Safety Data Sheet

15189 Eosine OJ

SECTION V - REACTIVITY DATA

STABILITY: .... Stable
CONDITIONS TO AVOID: .... Avoid contact with strong oidzers, excessive heat, sparks or open flames.
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY: .... Strong oxidizers
DECOMPOSITION: .... Thermal decomposition products may include toxic fumes of bromide and sodium.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE: Causes skin irritation. May be irritating to the respiratory tract and eyes. Oral-Mouse LD50: 2344 MG/KG Intraperitioneal-Rat Ldlo: 500 mg/kg Mutagenic data (RTECS0 Tumorigenic Carcinogen Status: Animal inadequate evidence (IARC GROUP-3)

OVER EXPOSURE EFFECTS: .. Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

**NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.*

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved dust respirator as necessary.
PROTECTIVE GLOVES: .... To prevent skin contact.
EYE PROTECTION: .... Goggles.
ADDITIONAL MEASURES: ...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE: ... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION: .... Local exhaust to control dusts.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL: .... Spills should be contained and placed in suitable containers.

Material Safety Data Sheet

15189 Eosine OJ

WASTE DISPOSAL: Bury or incinerate in approved site or facility in accordance with local, State and Federal Regulations.

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME: ..... INK MATERIAL
HAZARD CLASS AND LABEL: MFR LABEL ONLY
UN NUMBER: .... N/A
REPORTABLE QUANTITY: ..... N/A

SECTION XI - ADDTIONAL INFORMATION

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The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

N/A = Not applicable

Material Safety Data Sheet

16972 Rhodamine WT 20%

CHEMCENTRAL/Dyes & Pigments 13395 Huron River Drive Romulus, MI 48174	**REVISION DATE:** .... 03/19/2003 **CHEMTREC:** .... 800-424-9300 **EMERGENCY:** 734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME:........................... 16972 Rhodamine WT 20%
CHEMICAL NAME: .... Acid Red 388
CHEMICAL FAMILY: .... Xanthene

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
Trimellitic Acid	2.6%	528-44-9	Not Established
Dye Compound			
Sodium Chloride			
Water			
None as per 29CFR part 1910.1200 or Sara Title III			

This Product is not reportable for SARA 313

TSCA: In Compliance

All components of this product are included on the TSCA Inventory and the DSL.

HMIS HAZARD RATINGS (if applicable):
HEALTH: 2
FIRE 1
REACTIVITY 1

SECTION III - PHYSICAL DATA

APPEARANCE: .... Dark red liquid, no odor
BOILING POINT:......................... 100C
MELTING POINT: .... N/A
FREEZING POINT:...................... Not evaluated
VAPOR PRESSURE:.................... Not evaluated
VAPOR DENSITY (AIR=1): .... N/A
SPECIFIC GRAVITY:................. 1.13
pH: 10.5-10.8
SOLUBILITY IN WATER:......... Soluble

Material Safety Data Sheet

16972 Rhodamine WT 20%

VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT:............................ N/A
EXTINGUISHING MEDIA: .... Water fog, CO_2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD:....... Adequate ventilation and clean up must be maintained to minimize fume accumulation.

SECTION V - REACTIVITY DATA

STABILITY: .... Stable
CONDITIONS TO AVOID: .... N/A
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY: .... Unknown
DECOMPOSITION: .... Carbon monoxide,Carbon dioxide,and oxides of Nitrogen.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE:.. Not established
OVER EXPOSURE EFFECTS:.. Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved respirator as necessary.
PROTECTIVE GLOVES: .... To prevent skin contact.
EYE PROTECTION: .... Goggles.

ADDITIONAL MEASURES:...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE:... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION:......................... Local exhaust to control fumes.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL:.. Spills should be contained and placed in suitable containers.
WASTE DISPOSAL:.................. Do not discharge into sewers or waterways. Dispose of in accordance with local regulations.

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME:..... INK MATERIAL
HAZARD CLASS AND LABEL: L - MFR, PROTECT FROM FREEZING
UN NUMBER:.............................. N/A
REPORTABLE QUANTITY:..... N/A

SECTION XI - ADDTIONAL INFORMATION

FOOT NOTES:
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The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

N/A = Not Applicable

ATTACHMENT B

Ozark UNDERGROUND LABORATORY 1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 oul@tri-lakes.net

PROCEDURES AND CRITERIA
ANALYSIS OF FLUORESCEIN, EOSINE, RHODAMINE WT, SULFORHODAMINE B, AND PYRANINE DYES IN WATER AND CHARCOAL SAMPLERS

December 15, 2008

Thomas Aley, PHG 179
President
Ozark Underground Laboratory, Inc.

PROCEDURES

Introduction

This document describes standard procedures and criteria currently in use at the Ozark Underground Laboratory as of the date shown on the title page. Some samples may be subjected to different procedures and criteria because of unique conditions; such non-standard procedures and criteria are identified in reports for those samples. Standard procedures and criteria change as knowledge and experience increases and as equipment is improved or up-graded. The Ozark Underground Laboratory maintains a summary of changes in standard procedures and criteria.

Dye Nomenclature

Fluorescein is C.I. Acid yellow 73, Color Index Number 45350. Rhodamine WT is Acid Red 388; there is no assigned Color Index Number for this dye. Eosine (sometimes called eosin) is Acid Red 87, Color Index Number 45380. Sulforhodamine B is C.I. Acid Red 52, Color Index Number 45100. Pyranine is Solvent Green 7 (also called D&C Green 8), Color Index Number 59040.

Description of the Samplers

The charcoal samplers are packets of fiberglass screening partially filled with approximately 4.25 grams of activated coconut charcoal. The charcoal used by the Ozark Underground Laboratory is Calgon 207C coconut shell carbon, 6 to 12 mesh.

The most commonly used samplers are about 4 inches long by two inches wide. A cigar-shaped sampler is made for use in very small diameter wells (such as 1 inch diameter wells); this is a special order item and should be specifically requested when it is needed. All of the samplers are closed by heat sealing.

Placement of Samplers

Samplers (also called charcoal packets) are placed so as to be exposed to as much water as possible. In springs and streams they are typically attached to a rock or other anchor in a riffle area. Attachment of the packets often uses plastic tie wires. In swifter water galvanized wire (such as electric fence wire) is often used. Other types of anchoring wire can be used. Electrical wire with plastic insulation is also good. Packets are attached so that they extend outward from the anchor rather than being flat against it. Two or more separately anchored packets are typically used for sampling springs and streams. The use of fewer packets is discouraged except when the spring or stream is so small that there is not appropriate space for placing multiple packets.

When pumping wells are being sampled, the samplers are placed in sample holders made of PVC pipe fittings. Brass hose fittings are installed at the end of the sample holders so that the sample holders can be installed on outside hose bibs and water which has run through the samplers can be directed to waste through a connected garden hose. The samplers can be unscrewed in the middle so that charcoal packets can be changed. The middle portions of the samplers consists of 1.5 inch diameter pipe and pipe fitting.

Charcoal packets can also be lowered into monitoring wells for sampling purposes. In general, if the well is screened, samplers should be placed approximately in the middle of the screened interval. Some sort of weight should be added near the charcoal packet to insure that it will not float. The weight should be of such a nature that it will not affect water quality. One common approach is to anchor the packets with a white or uncolored plastic cable tie to the top of a dedicated weighted disposable bailer. We typically run nylon cord from the top of the well to the charcoal packet and its weight. Do not use colored cord. Nylon fishing line should not be used since it can be readily cut by a sharp projection in the well.

In some cases, especially with small diameter wells and appreciable well depths, the weighted disposable bailers sink very slowly or may even fail to sink because of friction and floating of the anchoring cord. In such cases a stainless steel weight may be added to the top of the disposable bailer. We have had good success with two to three ounce segments of stainless steel pipe which have an outside diameter of 1.315 inches and an inside diameter of 1.049 inches; such pipe weighs about 1.7 pounds per linear foot. The weight of the stainless steel is approximately 497 pounds per cubic foot. The pipe segments can be attached over the anchoring cord at the top of the bailer. All weights should be cleaned prior to use; the cleaning approach should comply with decontamination procedures in use at the project site.

Placement of samplers requires adjustment to field conditions. The above placement comments are intended as guidance, not firm requirements.

Rinsing of Charcoal Packets Prior to Sampling

Charcoal packets routinely contain some fine powder that washes off rapidly when they are placed in water. Since such material could remain in monitoring wells, charcoal packets to be placed in such wells are triple rinsed with distilled, demineralized, or reagent water known to be free of tracer dyes. This rinsing is typically done by soaking. With this approach, approximately 25 packets are placed in one gallon of water and soaked for at least 10 minutes. The packets are then removed from the water and excess water is shaken off the packets. The packets are then placed in a second gallon of water and again soaked for at least 10 minutes. After this soaking they are removed from the water and excess water is shaken off the packets. The packets are then placed in a third gallon of water and the procedure is again repeated. Rinsed packets are placed in plastic bags and are placed at sampling stations within three days. Packets can also be rinsed in jets of water for about one minute; this requires more water and is typically difficult to do in the field with water known to be free of tracer dyes.

Collection and Replacement of Samplers

Samplers are routinely collected and replaced from each of the sampling stations. The frequency of sampler collection and replacement is determined by the nature of the study. Collections at one week intervals are common, but shorter or longer collection frequencies are acceptable and sometimes more appropriate. Shorter sampling frequencies are often used in the early phases of a study to better characterize time of travel. As an illustration,

we often collect and change charcoal packets 1, 2, 4, and 7 days after dye injection. Subsequent sampling is then weekly.

Where convenient, the collected samplers should be briefly rinsed in the water being sampled. This is typically not necessary with well samples. The packets are shaken to remove excess water. Next, the packet (or packets) are placed in a plastic bag (Whirl-Pak bags are ideal). The bag is labeled on the outside with a permanent type felt marker pen. Use only pens that have black ink; colored inks may contain fluorescent dyes. The notations include station name or number and the date and time of collection. Labels must not be inserted inside the sample bags.

For most projects the Ozark Underground Laboratory supplies the Whirl-Pak bags. Prior to use, 1% of the new bags are randomly selected. Each bag is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

Collected samplers are kept in the dark to minimize algal growth on the charcoal prior to analysis work. We prefer (and in some studies require) that samples be placed on "blue ice" or ice upon collection and that they be shipped refrigerated with "blue ice" by overnight express. Do not ship samplers packed in ice since this can create a potential for cross contamination when the ice melts. Our experience indicates that it is not essential for samplers to be maintained under refrigeration, yet maintaining them under refrigeration clearly minimizes some potential problems. A product known as "green ice" should not be used for maintaining the samples in a refrigerated condition since this product contains a dye which could contaminate samples if the "green ice" container were to break or leak.

New charcoal samplers are routinely placed when used charcoal packets are collected. The last set of samplers placed at a stream or spring is commonly not collected.

Water samples are often collected. They should be collected in either glass or plastic; the Ozark Underground Laboratory routinely uses 50 ml research grade polypropylene copolymer Perfector Scientific vials (Catalog Number 2650) for such water samples. We need no more than 30 ml of water. The vials should be placed in the dark and refrigerated immediately after collection. They should be refrigerated until shipment. For most projects the Ozark Underground Laboratory supplies the vials. Prior to use, 1% of the new vials are randomly selected. Each vial is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

When water or charcoal samplers are collected for shipment to the Ozark Underground Laboratory they should be shipped promptly. We receive good overnight and second day air service from both UPS and Fed Ex; the Postal Service does not provide next day service to us. DHL works adequately for international shipments.

Each shipment of charcoal samplers or water samples must be accompanied by a sample tracking sheet. These sheets (which bear the title "Samples for Fluorescence Analysis") are provided by the Ozark Underground Laboratory and summarize placement and collection data. These sheets can be augmented by a client's chain of custody forms or any other relevant documentation. Figure 1 is one of our blank sample forms.

Figure 1. Sample Collection Data Sheet

OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project:______________________________Week No:________ Samples Collected By:____________________

Samples Shipped By:____________________Samples Received By:____________________

Date Samples Shipped:___/___/___ Date Samples Received:___/___/___ Time Samples Received:____:____ Return Cooler? Yes________No________

Bill to:______________________________Send Results to: ______________________________

Analyze for: Fluorescein____Eosine____Rhodamine WT____Other__________Ship cooler to: ______________________________

OUL use only		*<u>Please indicate stations where dye was visible in the field</u> for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	

COMMENTS:____

This sheet filled out by OUL staff? Yes________No________Charts for samples on this page proofed by

OUL: ____________________

Page _______ **of** _______

Digital cameras can provide an independent verification of the date and time of sample collection. A digital photo can be taken of each sampling location during each sample collection. The photo file has a date and time created. If the camera's clock is set correctly, the photo provides an independent reference of the date and time the sample was collected. It is critical that the photos be taken in the order of sampling; that is, if one has forgotten to take a photo of the previous station and remembers at the current sampling station, do not go back and take the previous station photo.

When we are using a digital camera for sampling documentation we initially take a high resolution photo of each station that shows its context broadly enough for an observer to distinguish it from other sampling station, but narrow enough not to include another sampling station. Subsequently, we download he high-resolution photos into a reference folder and rename the photos to the station number and name. We also make a copy of the photo to another folder and digitally draw arrows to the exact locations of the samplers. During subsequent sampling events a low-resolution digital photo is taken of each sampling station in the order they are visited. It is best to establish a routine of taking the photo upon arrival at the station. We then download these photos into a folder whose name indicates the dates of the photos. We do not rename these photos.

Some sites do not permit cameras. An alternative is to collect a Global Positioning System (GPS) location during each visit. GPS records the date and time each point (sampling station) is visited. While these files are not as easy to review as photographs, they can be used with a base map to show which locations were visited at which dates and times.

Receipt of Samplers

Samplers shipped to the Ozark Underground Laboratory are refrigerated upon receipt. Prior to cleaning and analysis, samplers are assigned a laboratory identification number. All samples are logged in upon receipt.

It sometimes occurs that there are discrepancies between the chain-of-custody sheets and the actual samples received. When this occurs, a "Discrepancy Sheet" form is completed and sent to the shipper of the sample for resolution. A copy of this form is enclosed as Figure 2. The purpose of the form is to help resolve discrepancies, even when they may be minor.

Cleaning of Samplers

Samplers are cleaned by spraying them with jets of clean water. At the Laboratory we use unchlorinated water for the cleansing to minimize dye deterioration. Effective cleansing cannot generally be accomplished simply by washing in a conventional laboratory sink even if the sink is equipped with a spray unit.

The duration of packet washing depends upon the condition of the sampler. Very clean samplers may require less than a minute of washing; dirtier samplers may require several minutes of washing.

Figure 2. Discrepancy Sheet

OZARK UNDERGROUND LABORATORY, INC.

DISCREPANCIES BETWEEN CHAIN-OF-CUSTODY SHEETS AND ACTUAL SAMPLES RECEIVED   Page ______ of ______

Company & Project Name: Date Rec'd by OUL: Wk # ____________

Lab #	Sta #	Station Name	Date Pulled	Problem	Solution

Comments:

Elution of the Charcoal

There are various eluting solutions that can be used for the recovery of tracer dyes. The solutions typically include an alcohol, some water, and a strong basic solution such as aqueous ammonia.

The standard elution solution now used at the Ozark Underground Laboratory is a mixture of 5% aqua ammonia and 95% isopropyl alcohol solution and sufficient potassium hydroxide flakes to saturate the solution. The isopropyl alcohol solution is 70% alcohol and 30% water. The aqua ammonia solution is 29% ammonia. The potassium hydroxide is added until a super-saturated layer is visible in the bottom of the container. This super-saturated layer is not used for elution. Preparation of eluting solutions uses dedicated glassware which is never used in contact with dyes or dye solutions.

The eluting solution we use will elute fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. It is also suitable for separating fluorescein peaks from peaks of some naturally present materials found in some samplers.

Fifteen ml of the eluting solution is poured over the washed charcoal in a disposable sample beaker. The sample beaker is capped. The sample is allowed to stand for 60 minutes. After this time, the liquid is carefully poured off the charcoal into a new disposable beaker which has been appropriately labeled with the laboratory identification number. A few grains of charcoal may inadvertently pass into the second beaker; no attempt is made to remove these from the second sample beaker. After the pouring, a small amount of the elutant will remain in the initial sample beaker. After the transfer of the elutant to the second sample beaker, the contents of the first sample beaker (the eluted charcoal) are discarded.

Analysis on the Shimadzu RF-5000U or RF-5301

The Laboratory uses two Shimadzu spectrofluorophotometers. One is a model RF-5000U, and the other is a model RF-5301. Both of these instruments are capable of synchronous scanning. The RF-5301 is the primary instrument used; the RF-5000U is primarily used as a back-up instrument except for tracing studies which were begun using this instrument. The OUL also owns a Shimadzu RF-540 spectrofluorometer which is occasionally used for special purposes.

A sample of the elutant is withdrawn from the sample container using a disposable polyethylene pipette. Approximately 3 ml of the elutant is then placed in disposable rectangular polystyrene cuvette. The cuvette has a maximum capacity of 3.5 ml. The cuvette is designed for fluorometric analysis; all four sides and the bottom are clear. The spectral range of the cuvettes is 340 to 800 nm. The pipettes and cuvettes are discarded after one use.

The cuvette is then placed in the RF-5000U or the RF-5301. Both instruments are controlled by a programmable computer. Each instrument is capable of conducting substantial data analysis.

Our instruments are operated and maintained in accordance with the manufacturer's recommendations. On-site installation of the instruments and a training session on the use of spectrofluorophotometers was provided by Delta Instrument Company.

Our typical analysis of an elutant sample where fluorescein, eosine, rhodamine WT, or sulforhodamine B dyes may be present includes synchronous scanning of excitation and emission spectra with a 17 nm separation between excitation and emission wavelengths. For these dyes, the excitation scan is from 443 to 613 nm; the emission scan is from 460 to 630 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is "fast" on the RF-5301. The typical sensitivity setting used on both instruments is "high."

Our typical analysis of an elutant sample where pyranine dye may be present includes a synchronous scanning of excitation and emission spectra with a 35 nm separation between excitation and emission wavelengths. For this dye, the excitation scan is from 360 to 600 nm; the emission scan is from 395 to 635 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is "fast" on the RF-5301. The typical sensitivity setting on both instruments is "high."

Excitation and emission slit width settings vary between the two instruments. The widths vary with the dyes for which we are sampling and for the matrix in which the dyes may be present. Excitation and emission slit width settings are summarized in Table 1.

Table 1. Excitation and emission slit width settings routinely used for dye analysis. Units are nanometers (nm)

Parameter	**RF5000U**	**RF5301**
Excitation slit for Eos, Fl, RWT, and SRB in elutant	5	3
Emission slit for Eos, Fl, RWT, and SRB in elutant	3	1.5
Excitation slit for Eos, Fl, RWT, and SRB in water	5	5
Emission slit for Eos, Fl, RWT, and SRB in water	10	3
Excitation slit for Pyranine in elutant	5	5
Emission slit for Pyranine in elutant	3	3
Excitation slit for Pyranine in pH adjusted water	5	5
Emission slit for Pyranine in pH adjusted water	3	3

Eos = Eosine. Fl = Fluorescein. RWT = Rhodamine WT. SRB = Sulforhodamine B.

The instrument produces a plot of the synchronous scan for each sample; the plot shows emission fluorescence only. The synchronous scans are subjected to computer peak picks; peaks are picked to the nearest 0.1 nm. All samples run on the RF-5000U and

RF-5301 are stored on disk and printed on normal typing paper with a laser printer; sample information is printed on the chart.

All samples analyzed are recorded in a bound journal.

Quantification

We calculate the magnitude of fluorescence peaks for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. Dye quantities are expressed in microgram per liter (parts per billion; ppb). On the RF-5000U and RF-5301 the dye concentrations are calculated by separating fluorescence peaks due to dyes from background fluorescence on the charts, and then calculating the area within the fluorescence peak. This area is proportional to areas obtained from standard solutions.

Where there are multiple fluorescence peaks it is sometimes necessary to calculate dye concentrations based upon the height of the fluorescence peak rather that the area. The heights of the peaks are also proportional to dye concentrations.

We run dye concentration standards each day the machine is used. Ten separate standards are used; the standard or standards appropriate for the analysis work being conducted are selected. All standards are based upon the as-sold weights of the dyes. The standards are as follows:

1) 10 ppb fluorescein and 100 ppb rhodamine WT in well water from the Jefferson City-Cotter Formation
2) 10 ppb eosine in well water from the Jefferson City-Cotter Formation
3) 100 ppb sulforhodamine B in well water from the Jefferson City-Cotter Formation.
4) 10 ppb pyranine in well water from the Jefferson City-Cotter Formation. A sample of the standard is placed for at least two hours in a high ammonia atmosphere to adjust the pH to a value of 9.5 or greater.
5) 10 ppb fluorescein and 100 ppb rhodamine WT in elutant.
6) 10 ppb eosine in elutant.
7) 100 ppb sulforhodamine B in elutant.
8) 10 ppb pyranine in elutant.

Preparation of Standards

Dye standards are prepared as follows:

Step 1. A small sample of the as-sold dye is placed in a pre-weighed sample vial and the vial is again weighed to determine the weight of the dye. We attempt to use a sample weighing between 1 and 5 grams. This sample is then diluted with well water to make a 1% dye solution by weight (based upon the as-sold weight of the dye). The resulting dye solution is allowed to sit for at least four hours to insure that all dye is fully dissolved.

Step 2. One part of each dye solution from Step 1 is placed in a mixing container with 99 parts of well water. Separate mixtures are made for fluorescein,

rhodamine WT, eosine, sulforhodamine B, and pyranine. The resulting solutions contain 100 mg/l dye (100 parts per million dye). The typical prepared volume of this mixture is appropriate for the sample bottles being used; we commonly prepare about 50 ml. of the Step 2 solutions. The dye solution from Step 1 that is used in making the Step 2 solution is withdrawn with a digital Finnpipette which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

The Step 2 solution is called the long term standard. Ozark Underground Laboratory experience indicates that Step 2 solutions, if kept refrigerated, will not deteriorate appreciably over periods of less than a year. Furthermore, these Step 2 solutions may last substantially longer than one year.

<u>Step 3.</u> A series of intermediate-term dye solutions are made. Approximately 45 ml. of each intermediate-term dye solution is made. All volume measurements of less than 5 ml are made with a digital Finnpipette. (see description in Step 2). All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value. The following solutions are made; all concentrations are based on the as-sold weight of the dyes:

1) A solution containing 1 ppm fluorescein dye and 10 ppm rhodamine WT dye.
2) A solution containing 1 ppm eosine.
3) A solution containing 10 ppm sulforhodamine B dye.
4) A solution containing 1 ppm pyranine.

<u>Step 4.</u> A series of eight short-term dye standards are made from solutions in Step 3. These standards were identified earlier in this section. In the experience of the Ozark Underground Laboratory these standards have a useful shelf life in excess of one week. However, in practice, they are kept under refrigeration and new standards are made weekly.

Dilution of Samples

Samples with peaks that have arbitrary fluorescence unit values of 500 or more are diluted a hundred fold to ensure accurate quantification.

Some water samples have high turbidity or color which interferes with accurate detection and measurement of dye concentrations. It is often possible to dilute these samples and then measure the dye concentration in the diluted sample.

The typical dilution is 100 fold. One part of the test sample is combined with 99 parts of water (if the test sample is water) or with 99 parts of the standard elutant (if the test sample is elutant). Typically, 0.300 ml of the test solution is combined with 29.700 ml

of water (or elutant as appropriate) to yield a new test solution. All volume measurements of less than 5 ml are made with a digital Finnpipette. which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value.

The water used for dilution is from a carbonate aquifer. All dilution water is pH adjusted to greater than pH 9.5 by holding it overnight in open containers in a high ammonia concentration chamber.

Quality Control

Laboratory blanks are run for every sample where the last two digits of the laboratory numbers are 00, 20, 40, 60, or 80. A charcoal packet is placed in a pumping well sampler and at least 25 gallons of unchlorinated water is passed through the sampler at a rate of about 2.5 gallons per minute. The sampler is then subjected to the same analytical protocol as all other samplers.

System functioning tests of the analytical instruments are conducted in accordance with the manufacturer's recommendations.

All materials used in sampling and analysis work are routinely analyzed for the presence of any compounds that might create fluorescence peaks in or near the acceptable wavelength ranges for any of the tracer dyes. This testing typically includes approximately 1% of materials used.

Reports

Reports are provided in accordance with the needs of the client. We typically provide copies of the analysis graphs and a listing of stations and samples where dye was detected. The reports indicate dye concentrations.

Work at the Ozark Underground Laboratory is directed by Mr. Thomas Aley. Mr. Aley has 45 years of professional experience in hydrology and hydrogeology. He is certified as a Professional Hydrogeologist (Certificate #179) by the American Institute of Hydrology. Mr. Aley has 40 years of professional experience in groundwater tracing with fluorescent tracing agents.

CRITERIA FOR DETERMINATION OF POSITIVE DYE RECOVERIES

Normal Emission Ranges and Detection Limits

The OUL has established normal emission fluorescence wavelength ranges for each of the five dyes. The normal acceptable range equals mean values plus and minus two standard deviations. These values are derived from actual groundwater tracing studies conducted by the OUL.

The detection limits are based upon concentrations of dye necessary to produce emission fluorescence peaks where the signal to noise ratio is 3. The detection limits are realistic for most field studies since they are based upon results from actual field samples rather than being based upon values from spiked samples in a matrix of reagent water or the elutants from unused activated carbon samplers. In some cases detection limits may be smaller than reported if the water being sampled has very little fluorescent material in it. In some cases detection limits may be greater than reported; this most commonly occurs if the sample is turbid due to suspended material or a coloring agent such as tannic compounds. Turbid samples are typically allowed to settle, centrifuged, or, if these steps are not effective, diluted prior to analysis.

Table 2 provides normal emission wavelength ranges and detection limits for the five dyes when analyzed on the OUL's RF-5000U spectrofluorophotometer. Table 3 provides similar data for the OUL's RF-5301. As indicated earlier in Table 1, the analytical protocols used on the two instruments are somewhat different, especially in regard to the widths of excitation and emission slit settings.

Table 2. RF-5000U Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	533.0 to 539.6	0.035
Eosine in Water	529.6 to 538.4	0.008
Fluorescein in Elutant	510.7 to 515.0	0.010
Fluorescein in Water	505.6 to 510.5	0.0005
Pyranine in Elutant	500.4 to 504.6	0.055
Pyranine in Water*	495.5 to 501.5	0.030
Rhodamine WT in Elutant	561.7 to 568.9	0.275
Rhodamine WT in Water	569.4 to 574.8	0.050
Sulforhodamine B in Elutant	567.5 to 577.5	0.150
Sulforhodamine B in Water	576.2 to 579.7	0.040

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Table 3. RF-5301 Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	538.1 to 543.9	0.050
Eosine in Water	533.4 to 537.9	0.015
Fluorescein in Elutant	514.0 to 518.1	0.025
Fluorescein in Water	508.0 to 511.7	0.002
Pyranine in Elutant	502.1 to 508.1	0.015
Pyranine in Water*	498.4 to 504.4	0.010
Rhodamine WT in Elutant	565.4 to 572.0	0.170
Rhodamine WT in Water	572.7 to 578.0	0.015
Sulforhodamine B in Elutant	572.8 to 579.6	0.080
Sulforhodamine B in Water	580.1 to 583.7	0.008

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Criteria for Determining Positive Dye Recoveries

The following sections identify normal criteria used by the OUL for determining positive dye recoveries. Beginning January 1, 2001, the primary analytical instrument in use at the OUL was the RF-5301; the RF-5000U was the principal backup instrument. Studies which were in progress prior to January 1, 2001 continued to have samples analyzed on the RF-5000U.

Except for pyranine dye, the analytical protocol used for the RF-5301 provides for the use of narrower excitation and/or emission slit settings than the RF-5000U protocol. This enhances our ability to discriminate between dyes and other fluorescent compounds. The protocol which is possible with the RF-5301 (as contrasted with the RF-5000U) also provides for a better balance in the sizes of the fluorescence peaks associated with an equal concentration of all of the dyes.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Eosine Dye Recoveries in Elutants from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 538.1 to 543.9 nm for samples analyzed by the RF-5301. The range must be 533.0 to 539.6 nm for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the eosine detection limit in elutant samples is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb. For the RF-5000U the eosine detection limit in elutant samples is 0.035 ppb, thus this dye concentration limit equals 0.105 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of eosine. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of eosine. In addition, there must be no other factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Eosine Dye Recoveries in Water Samples.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following three criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. The associated charcoal samplers for the station should also contain eosine dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 533.4 to 537.9 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 529.6 to 538.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our eosine detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb. For samples analyzed on the 5000U the detection limit is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Fluorescein</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is often some fluorescence background in the range of fluorescein dye present at some of the stations used in groundwater tracing studies. We routinely conduct background sampling prior to the introduction of any tracer dyes to characterize this background fluorescence and to identify the existence of any tracer dyes which may be present in the area. The fact that a fluorescence peak is identified in our analytical results is <u>not</u> proof that it is fluorescein dye or that it is fluorescein dye from the trace of concern. The following 4 criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye recoveries from our tracing work.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 514.0 to 518.1 nm for samples analyzed by the RF-5301. The range must be 510.7 to 515.0 for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the fluorescein detection limit in elutant samples is 0.025 ppb, thus this dye concentration limit equals 0.075 ppb. For the RF-5000U, the fluorescein detection limit in elutant samples is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of fluorescein. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of fluorescein. In addition, there must be no other factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Fluorescein Dye Recoveries in Water Samples.

There is commonly some fluorescence background in the general range of fluorescein dye at some sampling stations used in groundwater tracing studies. The following criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain fluorescein dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 508.0 to 511.7 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 505.6 to 510.5 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our fluorescein detection limit in water samples analyzed on the RF-5301 is 0.002 ppb, thus this dye concentration limit equals 0.006 ppb. For the RF-5000U the detection limit is 0.0005 ppb, thus this dye concentration limit equals 0.0015 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Rhodamine WT Dye Recoveries in Elutants from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of Rhodamine WT dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT.

Criterion 1. For samples analyzed on the RF-5301, there must be at least one fluorescence peak at the station in question in the range of 565.4 to 572.0 nm. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 561.7 to 568.9 nm.

Criterion 2. The dye concentration associated with the Rhodamine WT peak must be at least 3 times the detection limit. For the RF-5301, the detection limit in elutant samples is 0.170 ppb, thus this dye concentration limit equals 0.510 ppb. For the RF-5000U, the detection limit in elutant samples is 0.275 ppb, thus this dye concentration limit equals 0.825 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of Rhodamine WT. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Rhodamine WT</u> Dye Recoveries <u>in Water</u> Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain Rhodamine WT dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be Rhodamine WT dye from the tracing work under investigation. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 572.7 to 578.0 nm. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 569.4 to 574.8 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our Rhodamine WT detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit is 0.045 ppb. For samples analyzed on the RF-5000U the detection limit is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Sulforhodamine B</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of sulforhodamine B dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 567.5 to 577.5 nm. The acceptable range for samples analyzed on the RF-5301 is 572.8 to 579.6 nm.

Criterion 2. The dye concentration associated with the sulforhodamine B peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.150 ppb, thus this dye concentration limit equals 0.450 ppb. For the RF-5301, the detection limit in elutant samples is 0.080 ppb, thus this dye concentration limit equals 0.240 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of sulforhodamine B. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Sulforhodamine B dye Recoveries in Water Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain sulforhodamine B dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be sulforhodamine B dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 576.2 to 579.7 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 580.1 to 583.7 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.040 ppb, thus this dye concentration limit equals 0.120 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Pyranine Dye Recoveries in Elutants from Charcoal Samplers.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

There is often some detectable fluorescence background encountered in the general range of pyranine dye in groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be pyranine.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 500.4 to 504.6 nm. The acceptable range for samples analyzed on the RF-5301 is 502.1 to 508.1 nm.

Criterion 2. The dye concentration associated with the pyranine dye peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.055 ppb, thus this dye concentration limit equals 0.165 ppb. For the RF-5301, the detection limit in elutant samples is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of pyranine dye. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Pyranine Dye Recoveries in Water Samples.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

The fluorescence of pyranine decreases below a pH of about 9.5. Prior to analysis water samples are placed in a high ammonia atmosphere for at least two hours. A pyranine dye in water standard is placed in the same atmosphere as the samples. Prior to analysis samples are tested to insure that their pH is 9.5 or greater. If pyranine dye concentrations in a sample are so great as to require dilution for quantification of the dye concentration the diluting water used is OUL reagent water which has been pH adjusted in a high ammonia atmosphere.

The following criteria are used to identify fluorescence peaks which are deemed to be pyranine dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain pyranine dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be pyranine dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 495.5 to 501.5 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 498.4 to 504.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.030 ppb, thus this dye concentration limit equals 0.090 ppb.

ATTACHMENT C

ATTACHMENT 2 – DEP'S PROJECT GRANT WORK PLAN (DEP NO. G0273)

Project Title: Silver Springs Nutrient Pathway Characterization

Project Location: Silver Springs

Project Background:

The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River in central Marion County. Discharge from the spring group flows from the Upper Floridan aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large main vents plus 28 smaller vents spread throughout the upper reach of the Silver River. Maps of the karst system supplying water to the SSG are limited to only hundreds of feet from the main vents. However, the extent of the karst conduit system feeding the vents is unknown, but believed to extend a significant distance from the vent openings. Discharge rates, measured periodically by the USGS in the Silver River downstream of the largest vents since the 1930's, varied from approximately 350 cubic feet per second (cfs) to approximately 1290 cfs, with a long-term annual median value of approximately 772 cfs (Munch et al, 2007). An ongoing study conducted by the SJRWMD for the Florida Department of Environmental Protection (FDEP) is aimed at characterizing flow rates and water quality from individual vents (Toth, 2008).

The SSG has recently been listed by the FDEP as impaired by nutrients (specifically nitrates, or nitrates plus nitrites) (Hicks et al, 2009). Water quality at the Silver Springs Group has been monitored quarterly by FDEP since 2001. Over the monitoring period, nitrate+nitrite concentrations in Silver Main Spring have ranged from 0.91 to 1.4 mg/L, with a median concentration of 1.1 mg/L. Over the 7.5-year verified listing period of record the median nitrate+nitrite concentration for Silver Main was 1.1 mg/L and 100 percent of the samples exceeded 0.6 mg/L.

Development of Total Maximum Daily Load (TMDL) rules for the SSG area will require gaining knowledge about the source areas of nutrients that are discharging from the spring vents. To date little detailed research has been conducted regarding the nature and extent of the groundwater flow pathways controlling SSG discharge or their relationship to potential source locations of nutrients.

The objectives of this project are twofold. The first objective is to identify dominant groundwater pathways and travel times between specific locations and the SSG. The second objective is to identify the potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.
This project supports the objectives set forth in Section 205(j)(2) of the Federal Clean Water Act, namely:
(2) Such sums shall be used by the Administrator to make grants to the States to carry out water quality management planning, including, but not limited to—

(A) identifying most cost effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards; *(TMDL/BMAP)*

(B) developing an implementation plan to obtain State and local financial and regulatory commitments to implement measures developed under subparagraph (A);

(C) determining the nature, extent, and causes of water quality problems in various areas of the State and interstate region, and reporting on these annually; Consistent with the requirements.

Specifically, the information from this project will be used to complete the TMDL for Silver Springs and to equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

Project Description: The project area encompasses approximately 300 square miles around the Ocala area in central Marion County, including much of the steady-state springshed for the SSG. Major tasks will include:

1. **Detailed hydrogeologic evaluation** aimed at identifying and ranking locations of potential rapid or direct input to the major subsurface conduit system supplying groundwater flow to the SSG. This task will include a review of available data to determine the locations where potential sources of focused (point-source or relatively concentrated non-point-source) nutrient-enriched recharge occurs to the groundwater flow system. This task also includes borehole logging and detailed potentiometric mapping of the Upper Floridan aquifer (UFA) in order to guide karst pathway assessment. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. The surveyed locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG.

2. **Karst pathway assesssment and groundwater travel time** estimation using dye tracing from the potential groundwater input sites ranked highest in Task 1 to the SSG. An initial dye tracer test will involve tracer injected at sites selected in Task 1 with direct connection to the subsurface (drainage wells and active, direct input sinks). A second test will include tracer injection at shallow monitoring wells or surface sites (e.g. sinks without direct subsurface openings) near the identified conduit pathways where nutrients may seep into the aquifer from surface sources.

3. **Risk assessment,** comparing the delineated pathways and travel times with potential nutrient source types and land use categories.

Project Tasks/Deliverables:

Task 1: Hydrogeologic evaluation and potential nutrient source identification: This task includes a review of available data to determine locations within the project area where focused, nutrient enriched groundwater recharge commonly occurs. Concurrently with this review, a detailed survey of UFA potentiometric elevations will be conducted. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. These locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG. **(6/09 – 2/10)**

1) **Existing data compilation and review (6/09 – 9/09)**

a. Drainage well locations and characteristics ***(SJRWMD staff)***

i) Map and ground truth locations

ii) Obtain well characteristics and any existing geophysical and video logs

iii) Surface drainage characteristics (drainage basins for individual drainage wells)

b. Stormwater retention ponds and their drainage basins ***(SJRWMD staff)***

c. Wastewater disposal/recharge locations ***(SJRWMD staff)***

i) Reclaimed water distribution systems, spray fields & Rapid Infiltration Basins (RIBs)

d. Available source water quality data ***(SJRWMD staff)***

e. Active sinkholes

f. Map and ground truth locations of sinkholes with 1) direct openings and 2) drainage to ground water system through cover material ***(SJRWMD staff)***

g. Monitoring well survey ***(SJRWMD staff)***

i) Evaluate SJRWMD monitoring wells

ii) Locate any other monitoring or unused production wells, and obtain well characteristics and any existing geophysical and video logs

h. Review available ground water vulnerability maps and any existing surface geophysical surveys previously conducted in the area ***(SJRWMD staff)***

i. Evaluate existing data to determine locations for new data collection using GIS-based data overlays ***(SJRWMD staff)***

2) **Data collection for aquifer characterization** **(6/09 – 12/09)**

a. Collect geophysical and video logs at accessible drainage, monitoring, or unused production wells where needed ***(SJRWMD staff)***

b. Conduct slug tests at accessible drainage, monitoring, or other wells in order to assess the potential for direct connection to karst conduit system ***(SJRWMD staff)***

c. Perform water-level monitoring at Upper Floridan aquifer wells in the SSG area to supplement the September 2009 USGS statewide potentiometric survey ***(SJRWMD staff)***

d. Perform vertical elevation surveys of the measuring points of those wells measured as part of subtask I. 2c.. Provide a report to SJRWMD describing and summarizing the surveying of water-level measuring point elevations. ***(Contractor)***

3) **Data analysis and review:** Synthesize the existing and newly collected potentiometric and borehole data and select optimal areas for conducting ground-based geophysical surveys ***(SJRWMD staff)*** **(8/09 – 2/10)**

4) **Geophysical surveys** **(11/09 – 2/10)**

a. Conduct reconnaissance-scale ground-based geophysical surveys near and down gradient from potential direct ground water inputs based upon results of Task 1 c. The specific types of geophysical surveys used may include some or all of the following methodologies:

i) Ground Penetrating Radar (GPR) surveys ***(Contractor)***

ii) Microgravity anomaly surveys ***(Contractor)***

iii) 2D Electrical resistivity imaging (ERI) surveys ***(Contractor)***

iv) Seismic Multichannel analysis of Surface Waves (MASW) ***(Contractor)***

b. Provide a report to SJRWMD summarizing the ground-based geophysical surveys and results. A

part of this subtask may also include presenting the results of the geophysical surveys at meetings. ***(Contractor)***

5) **<u>Identify and rank potential sources of nutrient input to SSG</u>** **(12/09 – 2/10)**

   a. Conduct GIS-based evaluation to document locations with land uses where nutrient producing inputs may intersect with any significant karst solution features identified in Task 1 d. ***(SJRWMD staff)***

   b. Rank the locations based upon proximity to the SSG and magnitude of potential nutrient loading ***(SJRWMD staff)***

6) **<u>Task 1 interim report</u>** **(1/10 – 2/10)**

   a. Prepare draft report (concurrent with other subtasks in Task 1) ***(SJRWMD staff)***

   b. DEP and internal SJRWMD review of draft interim report

   c. Respond to comments and finalize Task 1 interim report ***(SJRWMD staff)***

<u>Task 2: Potential nutrient pathway delineation</u>: In this task the hydrologic connections between the potential source locations ranked highest in Task 1 and the SSG will be assessed by conducting 2 qualitative dye trace studies. For each test, dye will be injected into the UFA and monitoring for dye presence will be conducted at representative SSG spring vents. Discharge rates from the SSG vents will also be measured during each dye trace study. The initial dye trace will focus upon the hydrologic connection between the 2 to 3 highest ranked potential source locations that act as "direct" inputs to the UFA (drainage wells and/or open and active sinks or swallets). The second dye trace will focus upon the hydrologic connection between 1 or 2 additional source locations that provide "indirect" nutrient input to the UFA conduit flow system. Potential indirect sources include sinks or stormwater retention basins without direct openings to the UFA or rapid infiltration basins that recharge reclaimed wastewater. However, if the results of Task 1 indicate that there are more than 3 highly ranked potential source locations with direct input to the UFA, the second dye trace may then focus upon the hydrologic connections between the additional direct inputs and the SSG. **(2/10 – 4/11)**

1) **<u>Design and planning of dye tracer tests:</u>** Plan dye tracer test details based upon results of Task One ***(Contractor)*** **(2/10 – 3/10)**

2) **<u>Background sampling and analysis:</u>** Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)*** **(3/10 – 4/10)**

3) **<u>Initial dye trace test</u>** **(4/10 – 7/10)**

   a. Background sampling and analysis. Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)***

   b. Dye release (using 2 or 3 different dyes) from 2 to 3 direct source locations (e.g., active sinks and/or drainage wells) identified in Task 1, and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 2 – 3 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the U. S. Geological Survey (USGS) ***(Contractor)***

d. Data evaluation and reporting, including preparation and submittal of a technical memorandum describing the dye trace and results ***(Contractor)***

4) **<u>Second dye trace test</u> (7/10 – 3/11)**

a. Review the design for the second dye trace based upon dye trace 1 results; redesign as needed

b. Dye release (using 1 or 2 additional dyes) from 1 - 2 non-direct source locations (e.g., sinks or stormwater retention basins) identified in Task 1and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 4 - 6 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the USGS ***(Contractor)***

d. Data evaluation, including a comparison of results from both dye traces ***(Contractor)***

NOTE: It is recognized that design of the dye trace tests may require staggering of the two tests resulting in overlapping sampling periods. In that case the total length of both tests would approximately span the period from 3/10 through 3/11.

5) **<u>Task 2 Reporting</u> (12/10 – 4/11)**

a. Prepare and draft interim Task 2 report that documents the dye tracer studies and presents the results. A part of.this subtask may also include presenting the results of the dye tracing studies at meetings. ***(Contractor)***

b. DEP and SJRWMD review of draft interim report

c. Respond to comments and prepare final Task 2 interim report ***(Contractor)***

<u>Task 3: Risk Assessment</u>: Compare potential pathways and travel times determined in Task 2 with current and proposed land uses within the project area. **(4/11 – 8/11)**

1) **<u>Compare the potential groundwater flow pathways</u>** and travel times determined by Task 2 and identify areas of risk for nutrient loading to the groundwater flow system and transport to the SSG. If possible, rank the risk areas into low, medium, and high categories. ***(SJRWMD staff)*** **(4/11 – 5/11)**

2) **<u>Final Project Report</u> (5/11 – 8/11)**

a. Prepare a draft Final Report that summarizes the project and incorporates the interim reports that document tasks 1 & 2 ***(SJRWMD staff)***

b. DEP and internal SJRWMD review of draft Final Report

c. Respond to comments and prepare Final Report ***(SJRWMD staff)***

Task No.	Task Title	Start	Complete	Deliverable	Deliverable Due Dates
1	Hydrogeologic evaluation and potential nutrient source identification	June, 2009	February, 2010	Interim report	February 28, 2010
2	Delineation of potential pathways using dye tracer	February 2010	April 2011	Interim report	April 30, 2011
3	Risk assessment, comparing result of task 2 with land uses	April 2011	August 2011	Final report	August 11, 2011

Project Budget Narrative:
Contractual: To complete tasks 1 and 2.

Total Budget by Task:

Task		DEP Funding	Matching Funds and Source	
			Matching Funds	Source of Funds
1	Hydrogeologic evaluation and potential nutrient source identification	190,000	0	
2	Delineation of potential pathways using dye tracer studies and discharge measurements	345,000	0	
3	Final report		0	
	Total:	$535,000		
	Project Total:	$535,000		

Measures of Success:
The outcomes of this project are:

1. identification of dominant groundwater pathways and travel times between specific locations and the Silver Springs Group.

2. Identification of the potential sources of groundwater nutrient contamination that appear to be directly connected to the Silver Spring discharge vents.

Specifically, the information from this project will be presented in a final report and used to complete the TMDL for Silver Springs and equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

ATTACHMENT D

Florida Department of Environmental Protection
Division of Recreation and Parks

Permit Number
11120913a

RESEARCH/COLLECTING PERMIT
This Permit Must Be Carried At All Times While Conducting Research/Collecting Activities

Names of Collectors:	Address, Phone, Fax and Email:	Issue – Expiration Dates
Brian E. McGurk (SJRWMD) Jeffrey Davis, Alan Story, Craig Berninger, David Toth (SJRWMD) SJRWMD contractors: Tom Tracz, Bill Colona, Peter Butt, Tom Aley, Todd Kinkaid, Lynn Yuhr, Mark Dietrich, Kevin Hough, Sid O'Neill, Tom Morris, Mark Long, Matt Hubner, Georgia Shemitz, Wes Skiles, Nathan Skiles, Jill Heinerth, Tom Castow	St. Johns River Water Management District P.O. Box 1429 Palatka, FL 32178-1429 (386) 329-4245 (386) 336-2738 cell (386) 329-4820 FAX bmcgurk@sjrwmd.com	**11/12/09-8/11/11** SJRWMD JAN 19 2010 CENTRAL RECEIVING

Representing: St. Johns River Water Management District

Permitted Activity: Conduct a detailed hydrogeologic evaluation (to include borehole testing, vertical elevation surveys, and ground-based geophysical surveys) and a karst pathway assessment and groundwater travel time estimation (to include dye injection and tracing/sampling)

Permitted Collection: Only data collection is authorized

In the Following Areas: Silver River State Park

Special Conditions or Restrictions:

1. Contact the park manager and district biologist a minimum of one week in advance of visits for coordination and arrangements. Failure to do this may result in denial of park entry.
2. Check in with the park manager upon arrival at and departure from the park.
3. Conduct research activities in the manner indicated in the attached application form or proposal.
4. Collect no state or Federally listed, or rare endemic species or forms, or any parts of these listed or rare endemic species or forms.
5. Research activities shall be conducted in such a manner as not to attract attention or cause damage to the environment. Vehicular traffic shall be limited to park roads; other methods of access must be approved by the park manager. All gates shall be left as found.
6. You are required to GPS the location of all permanent or semi-permanent site markings that you add (e.g., PVC pipes) and submit these coordinates to the park manager and district biologist within 2 weeks of the start of your work. You are required to mark all non-permanent site markings (flagging tape, pin flags, etc.) with your permit number. Site markings must not be detrimental or cause harm to the resources of the park (e.g., no markings may be nailed onto trees). Unless approved in advance by the park manager or district biologist, you will be required to remove all site markings upon completion of your work. Any unauthorized site markings will be removed by FDEP staff.
7. A summary report concerning project data, including species lists, shall be submitted to the park manager and district biologist by **11/12/10 and 8/11/11**. Copies of any other reports, publications, theses, or dissertations that result from this work must also be provided to the district biologist upon their availability. Acknowledgement of FDEP, Florida Park Service will be included in any presentations, posters, reports, publications, or theses that result from this work. Failure to submit a report may result in denial of future research requests.
8. Any other applicable state and Federal permits are the responsibility of the permittee.
9. The permit is non-transferable. It must be in the possession of the permittee(s) or their research associates and assistants when conducting research/collecting activities in the park. At least one named researcher/collector (above) must be present.
10. This permit may be revoked for failure of the permittee to abide by permit conditions and policies of FDEP.
11. The permittee and research associates will not be subject to park day-fees when entering the park for research purposes.
12. The permit may be extended or modified upon submission of the annual report and a letter or email requesting renewal. Contact the issuing office for amendment or extension.
13. Any liabilities incurred to the researcher and/or his/her associates are the sole responsibility of the researcher.
14. The Florida Park Service may request that the researcher give a program in the park or in the local community on their work.

Approved By: (name & title)	Issuing Office:
Alice M. Bard Environmental Specialist II	Bureau of Parks, District 3 1800 Wekiwa Circle Apopka, FL 32712 (407) 884-2000

Attachment: none

cc: Bob LaMont, Silver River State Park

FPS-R010 rev. 8/31/09

Attachment 3:

<u>Task Two Final Report: Potential Nutrient Groundwater Pathway Delineation near Silver Springs, Marion County, Florida</u>

<u>(prepared by URS Corporation)</u>

Final Report with Extended Sampling

St. Johns River Water Management District

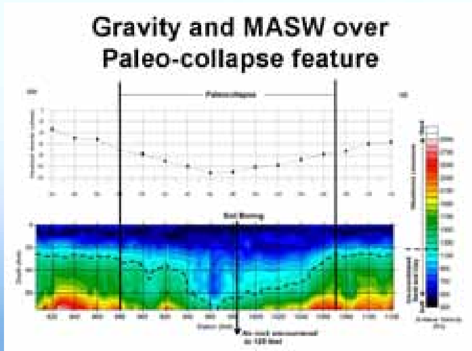
Hydrogeologic Evaluation to Support Nutrient Groundwater Pathway Delineation Near Silver Springs, Marion County, Florida

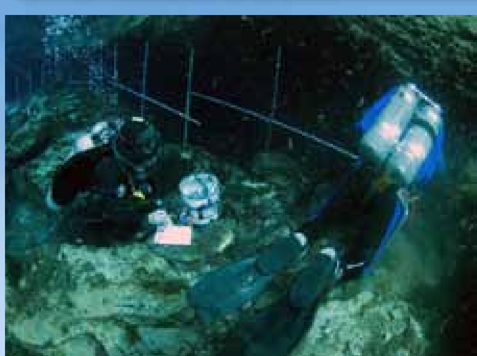
URS

KARST ENVIRONMENTAL SERVICES, INC.

Ozark UNDERGROUND LABORATORY

TECHNOS INC.





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ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

November 10, 2011

Table of Contents

Table of Contents

Table of Contents

Tables

Figures

Photographic Log

Appendices

PROFESSIONAL SEAL

In accordance with Chapter 492, Florida Statutes this report dated November 10, 2011 and titled *Final Report With Extended Sampling, St. Johns River Water Management District, Hydrogeologic Evaluation to Support Nutrient Groundwater Pathway Delineation near Silver Springs, Marion County, Florida* has been reviewed and approved by the undersigned licensed Florida Professional Geologist.

URS has conducted this investigation in accordance with the agreed upon Scope of Services, in a manner consistent with sound geologic practices and that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar circumstances. Information provided to URS by client representatives has been accepted in good faith and is assumed to be accurate.

WILLIAM H. COLONA, III
LICENSE NO.
1107
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Signed: Wm. H. Colona III Date: November 10, 2011

William H. Colona III, P.G.
Licensed Professional Geologist
State of Florida No. 1107

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The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River. The SSG is located just northeast of the City of Ocala, which is located in central Marion County, Florida. The SSG is composed of two large named spring vents and 28 smaller named springs and spring vent clusters spread along the upper 0.75-mile reach of the Silver river. Discharge from the SSG flows from the Upper Floridan Aquifer (UFA), part of the Floridan Aquifer System (FAS).

Silver Springs has been identified by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients, and specifically by nitrates. As a consequence of this designation, the FDEP and the St. Johns River Water Management District (SJRWMD) authorized the Silver Springs Nutrient Pathway Characterization Study (the Study) under SJRWMD Contract No. 25453. This Study was funded by FDEP using funds provided by the U.S. Environmental Protection Agency (USEPA) from the American Reinvestment and Recovery Act of 2009 (ARRA).

The Study had two objectives. Objective One was the identification of dominant groundwater pathways and travel times between specific locations and the group of approximately 30 springs and vent clusters which comprise the SSG and is the topic of this report. Objective Two was the identification of potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG spring vents and was conducted by SJRWMD staff as a separate task.

Two scoping meetings with field reconnaissance events were held by the study team prior to dye introduction. During these scoping meetings the team reviewed a variety of available data to help select candidate dye introduction locations and water wells for monitoring. Information reviewed included various thematic maps and aerial photographs, GIS databases, catalogued natural and man-made features etc. Selection of the candidate dye introduction points also considered their location within the modeled 2-year, 10-year and 100-year capture zones of the Silver Springs springshed. The capture zones were based on a particle track simulation (MODPATH) prepared by the SJRWMD in 2004.

From this review, five candidate dye introduction locations were selected which provided individual examples of the various types of surface to groundwater introduction points that exist throughout Marion County and the City of Ocala; a natural lake sink/swallet, a deep stormwater disposal well, drainage retention areas (DRAs) with observable sinkhole collapses and subsurface anomalies, and a natural sink/cave receiving stormwater runoff.

A geophysical survey program was then conducted that targeted the five candidate dye introduction locations and approximately four miles of geophysical transects which ran along the north, west and east sides of the headspring area of the Silver River. The geophysical surveys were conducted to help assess for the presence of voids or other similar sub-surface anomalies potentially associated with the cave system that feeds groundwater to the 30 SSG vents; no significant sub-surface features were detected.

Four weeks of pre-background sampling at six SSG vents and the Silver River was conducted from January 11 to March 25, 2010. This was followed by two weeks of comprehensive background sampling at 27 SSG and three Rainbow Springs vents, the Silver River, and ten water wells from March 25 to April 9, 2010. No anthropogenic or natural interferences were detected.

The dye tracer study was designed to be implemented in two phases and considered dye-specific characteristics, the distance between the introduction point and SSG springs and vent clusters as well and the distance between individual dye introduction points. A total of 27 springs and vent clusters, 13 water wells and two surface water stations were monitored.

The Trace Group 1 dye release was completed on April 23, 2010. The three dye introduction points were:

1. Heagy-Bury Sink is a natural karst feature located on the southwest shore of Orange Lake where 30 pounds of fluorescein dye was introduced. The introduction point is about 17 miles north of the SSG.
2. The City of Ocala Stormwater Drainage Well NE 9 which drains a stormwater pond in Tuscawilla Park where 30 pounds of eosine was introduced. The drainage well is approximately 5.1 miles west of the SSG.
3. The Ocala Civic Theatre DRA is located about 1.5 miles southwest of the SSG. 20 pounds of rhodamine WT was poured into a small open karst collapse feature within its basin.

The Trace Group 2 dye release was completed on October 5, 2010 and had one dye introduction point, Pontiac Pit, a natural sink and dry cave that receives water from two DRA's. Fifty pounds of sulforhodamine B was released into Pontiac Pit which is located about 6.3 miles southwest of the SSG.

Sampling under SJRWMD Contract No. 25453, (ARRA-funded) continued until June 16, 2011. Three additional months of extended sampling was completed on September 14, 2011 under a separate SJRWMD contract. This resulted in a total study sampling duration of 509 days for Trace 1 and 344 days for Trace 2. Data through the extended sampling period is included in this report.

All four dyes released during the study were detected at one or more sampling stations. Median travel times for dye detections indicate a multiple porosity system is present within the study area consisting of both conduit and macroporous flow. Regardless of the modeled spring shed capture zone boundary, localized groundwater travel times were still faster than porous media model-based estimates. Mid-point time for first arrival of mean dye concentration straight-line travel velocities within the study area ranged from 30 ft per day to about 2,335 ft per day.

Two sets of underwater discharge measurements of Mammoth Spring were also collected during the study. It should be noted that the SSG study area was experiencing semi-drought conditions during the study period. An increase in precipitation within the Silver Springs spring shed would likely have yielded a significantly different conceptual model of flow paths and travel times (i.e., normal rainfall would equal faster travel times).

The design and implementation of groundwater nutrient pathway assessments that utilize dye tracer studies may represent an important tool to help support federal, state and local governmental agencies refine and improve the output of numerical models that are used in both spring shed and surface water management plans and development of total maximum daily loading (TMDL) criteria. Dye tracer studies may also provide a cost and time efficient approach for assessing the effectiveness of existing best management practices within water sheds, springsheds and targeted restoration focus areas related to matters such as agriculture and farming, storm water management, land use planning, and others.

1.1 PURPOSE AND SCOPE

The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River. The SSG is located just northeast of the City of Ocala, which is located in central Marion County, Florida.

Discharge from the SSG flows from the Upper Floridan Aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large named spring vents and 28 smaller named spring vents spread along the upper 0.75-mile reach of the Silver River. Maps constructed from distance, gauge depth and compass bearings measurements recorded by underwater cave divers depict the horizontal and vertical position of explored sections of water-filled conduits and caves which are the most visible part of the karst system supplying water to the SSG. The explored portions of the cave system only extend approximately 400 ft from the two main spring vents that comprise Mammoth Spring. The extent of the karst conduit system and/or zones of macroporosity feeding water to the 30 named SSG vents is unknown, but is believed to extend a significant distance from the 0.75-mile section of the Silver River where the spring vents are clustered, not all of which may be continuously connected or accessible to scuba divers.

Silver Springs has been identified by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients, and specifically by nitrates and/or by nitrates/nitrites. In part, this listing led FDEP and the St. Johns River Water Management District (SJRWMD) to authorize this study, commonly referred to as the Silver Springs Nutrient Pathway Characterization Study. The project is funded by FDEP using funds provided by the U. S. Environmental Protection Agency (USEPA) from the American Reinvestment and Recovery Act of 2009 (ARRA).

The Nutrient Pathway Characterization Study funded by FDEP had two objectives:

> **Objective 1**: Identification of dominant groundwater pathways and travel times between specific locations and a group of approximately 30 springs, commonly called vents, which comprise the Silver Springs Group (SSG).
>
> **Objective 2**: Identification of potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

URS Corporation Southern (URS) was contracted by the SJRWMD to conduct a qualitative dye trace study in the north and central portions of Marion County to help achieve the stated goals of Objective 1. Additional scoped services included conducting approximately four line-miles of ground-based geophysical surveys to help identify potential karst features, an understanding of which would prove useful for dye trace design, and the collection of one set of underwater spring flow discharge measurements from Mammoth Spring, the main SSG spring vent.

Key URS Team members in this study were Karst Environmental Services, Inc. (KES), Ozark Underground Laboratory, Inc. (OUL) and Technos, Inc. (Technos). KES and OUL provided both professional and technical support with the design and implementation of four separate fluorescent dye trace studies. Additionally, OUL provided all spectrofluorophotometric analytical services for the project. Technos provided professional and technical support with the design and implementation of the geophysical surveys used in support of the dye trace designs. SJRWMD staff was responsible for meeting the goals of Objective 2.

URS would like to acknowledge that the SJRWMD staff and URS Team worked in an open and collaborative fashion to the mutual benefit of the project. Each helped support the other in achieving the goals of the project.

1.2 ACKNOWLEDGEMENTS

This study was designed, organized and supervised by URS, OUL and KES. Additional assistance and input with study planning and design were provided by SJRWMD and Technos.

Water well sampling access and sampler set-up, and in-water sampling station set-up was conducted by KES. Charcoal sampler and water sample collection, handling and shipping was conducted by KES. The April 23, 2010 dye releases were conducted by URS and KES. The October 5, 2010 dye release was conducted by URS and KES.

Underwater discharge measurements of the headspring were conducted KES.

This report was prepared by collaboratively by URS, KES and OUL.

The Project Team would like to acknowledge and thank the following individuals and organizations for their support, cooperation and contributions to the success of this study:

- Terry Turner, Mike Young and the staff of Palace Entertainment and the Silver Springs Attraction
- Jeff Halcomb, Water & Sewer Director, John Miller, Will Stanford, Darryl Muse, Nancy Meagher and Bob Bogosta and the staff of the City of Ocala Water & Sewer Department and Water Treatment Plant
- Shane Williams and Tracy Straub, Stormwater Engineers, Marion County Storm Water Management
- Ed Brown and Jayne Ashberger, Marion County Health Department
- Barbara Dean and Tim Fish, Marion County Schools
- Chief Alexander, Chief Devita, Chief Ganner, and Marge Shipp, Ocala Fire & Rescue
- Greg Wiley, Director, Marion County Parks and Recreation
- Mary Britt, Manager, Ocala Civic Theatre
- Keith Seyler, Owner, Blue Skies Trailer Park
- Butch D'Lowry, Windstream Utilities
- Jim Meiner, Manager, Spanish Palms Subdivision
- Edward Griffin, Warden, Lonnie Holmes, Assistant Warden, Phillip Westlake and Tom Shiflett P.E., Marion Correctional Institution
- Sean Flynn, Ken Estes, Wayne Bryant, Ann Bryant and Amanda Hulon, Pro-Tech Water & Wastewater Services, Inc.
- Tim Thompson and Hal McDonald, Marion Utilities
- Jim Boyer and Peter Dubose, University of Florida, Institute of Food and Agricultural Sciences (IFAS) Plant Science Research Unit

- Paul Kelly and Debbie Gonano, Town of McIntosh
- Bob Lamont, Park Manager, Christina Dorrier, Assistant Manager, and the staff of the Silver River State Park
- Joe Smyth, Park Manager, Davey Penuel, Assistant Manager, Jeff Sowards, Biologist, and the staff of the Rainbow Springs State Park
- Lynn Radok, ; Marion County Schools; and Silver River Museum (water sampling)
- Bill Birdsall and Jon Singly, Florida Speleological Society (field reconnaissance assistance)
- Eric Hutcheson, Silver Springs Cave Map and dye release support
- Jim Myles, Robin Halbourg and Greg Owen, Alachua County Environmental Protection Department
- Staff of the FDEP Division of Recreation and Parks, Bureau of Parks, District 2 and District 3
- Anil K. Desai, PG, Program Manager - Groundwater/Underground Injection Control, FDEP Central District Office

2.1 STUDY AREA

The SSG is located within the central portion of the 2,769-square-mile boundary of the Ocklawaha River Basin. The Ocklawaha River Basin is uniquely identified by its U.S. Geological Survey (USGS) hydraulic unit code (HUC) No. 03080102 (**Figure 1)**. The SSG is located in a karst area of central Marion County, Florida, where limestone of the upper Floridan Aquifer System (FAS) is exposed at land surface, or is covered by a thin veneer of sediments. The boundary of the study area, which both the SJRWMD staff and Project Team agreed at the beginning of the project would meet the objectives of the study, lies within a 18.6-mile [30-kilometer (km)] radius of the SSG as depicted on **Figure 2**.

The Ocklawaha River Basin has been subdivided by FDEP into three sub-basins. Oriented from south to north, the direction of flow for the Ocklawaha River, these are the Lower Ocklawaha River, Upper Ocklawaha River and Orange Creek sub-basins. The 18.6 mile study area established for this project encompasses only the Upper Ocklawaha River and Orange Creek sub-basins depicted on **Figure 3** and **Figure 4**, respectively.

2.2 TOPOGRAPHY - PHYSIOGRAPHY

Silver Springs (i.e. the SSG) is located approximately 6 miles northeast of Ocala, Florida. It forms the headwater of the Silver River, a major tributary of the Ocklawaha River (**Photo 1)**. The Silver Springs groundwater basin, as delineated on the basis of the potentiometric surface of the UFA, encompasses about 1,200 square miles in north-central Florida. Fluctuations in the altitude of the potentiometric surface can result in minor variations in the size of the basin, most notably along the western boundary (Faulkner, 1973 and Lane and Hoenstein, 1991).

The Silver Springs Basin is located in the Central Valley geomorphic feature. This feature originates in Alachua County and extends through east-central Marion County and Lake County into Orange County. It is underlain in the near surface by sand with minor amounts of silt and clay. The gently rolling topography results from the combination of karst depressions caused by dissolution of limestone and hills capped with less permeable sediments that retard dissolution. Land-surface altitudes range from about 65 to 180 feet (ft) above national geodetic vertical datum (NGVD) of 1929 (NGVD 29). The area is characterized by an almost complete absence of surface drainage. Most of the drainage is internal, either directly into closed depressions (**Figure 5**) or by seepage into the unconfined limestone of the UFA. Groundwater basins in the area do not coincide with the boundaries of surface water drainage divides. Narrow swamps occur along the Silver and Ocklawaha Rivers. Very poorly drained organic and mineral soils are present in these swamps. The natural vegetation is generally swamp hardwood or grass. In a few places it is hardwood and pine.

2.3 CLIMATE

The climate of the area is humid subtropical, with hot, rainy summers and cool, generally dry winters. Annual rainfall averages about 56 inches per year and the average air temperature is about 71°F. An average of about 55 percent of the annual rainfall occurs during the period June through September. The other 45% is evenly distributed during the rest of the year. Extended dry periods can occur in any season but are most common in spring and fall. Regional average pan-evaporation rates range from 60 to 66 inches per year; 36 to 40 inches during the warm season (May to October) and 24 to 26 inches during the cool season (November to April).

2.4 AREA PRECIPITATION DURING STUDY

For much of the study period, the area surrounding the SSG was experiencing semi-drought conditions. A quarterly summary of rainfall based on "Next-Generation Radar" (NEXRAD) weather data collected within the study area is presented as **Figure 6** through **Figure 9**. Given the lower than normal amount of rainfall one can infer that an increase in precipitation within the Silver Springs spring shed would likely have yielded a significantly different conceptual model of the flow paths and travel times observed during this study.

2.5 POPULATION

Population in Marion County, as in many parts of Florida, has increased significantly. From 1970- 2000, the population increased about 275 percent (**Figure 10**). Marion County has changed from predominantly rural to a mixture of urban-suburban-rural land uses. The growth of Florida as a retirement destination has resulted in the development of numerous subdivisions, many of which include golf courses. Areas that once were thoroughbred horse farms have been redeveloped as retirement communities or shopping areas.

2.6 SURFACE WATER

The Ocklawaha River proper runs a distance of about 96 miles, with its beginning in the Upper Ocklawaha Chain of Lakes (i.e. Lake Griffin) near Leesburg, Florida, south of the study area. The river flows generally north until it enters the southeastern portion of the 18.6 mile study area boundary near the Moss Bluff lock and dam, located on the upstream side of the Ocklawaha River. From this point, the Ocklawaha River flows north, receiving large inputs of groundwater from Silver Springs via the Silver River and surface water from the Orange Creek tributary sub-basin that includes Sweetwater Branch, Tumblin Creek, Hogtown Creek, Hatchett Creek, Alachua Sink, Lochloosa Lake, Orange Lake, and Newnans Lake (FDEP website, accessed April 27, 2011).

The Ocklawaha River continues to flow north into Rodman Reservoir, which is also known as Lake Ocklawaha. At that point the river continues on in an easterly direction as it follows the northern boundary of the Ocala National Forest to near the town of Welaka, where it then enters the St. Johns River.

2.6.1 Silver River and Rainbow River

River stage gauge data measured during the study period for the Silver River (**Photo 2**) and Rainbow River is presented as **Figure 11**. From this figure one can see there is generally good correlation between the gauge heights of both spring fed rivers. This is not surprising given their close proximity and the fact headsprings represent the point of origin for both rivers. The departure from this correlation noted for the August 2010 time period can be explained by the NEXRAD raid data presented in **Figure 12**. From this one can observe that a more localized area of higher rainfall was concentrated west of the SSG spring shed boundary in the Rainbow River spring shed. The response time of river gauge height to rainfall is relatively short, e.g. on the order of days.

2.7 SILVER SPRINGS BASIN AND MODELED SPRING PROTECTION ZONES

It is sometimes assumed that karst aquifers, especially under confined conditions, can be modeled as though they were porous media or, alternately, as fractured rock aquifers. Such an assumption ignores the fact that karst aquifers differ from other types of aquifers in that they are dramatically modified through time by the fluid (water) passing through them. No other type of aquifer has this characteristic. The passing water integrates the karst aquifer into a flow system that has developed to efficiently convey water in a downgradient direction to a point or points of discharge. As a result, karst aquifers are highly anisotropic. Given the large flow rates of the SSG, it is logical to expect that these springs are fed by a large and well-integrated karst flow system that has developed over a substantial amount of time by water dissolving and enlarging bedrock along integrated flow routes. While it is a common notion that a well-developed cave and conduit system is the “natural infrastructure” by which water flows to a spring, high permeability zones that do not necessarily fall into the category of either matrix flow or conduit flow must also be considered.

2.7.1 Silver Springs Basin

Faulkner (1973) and others have constructed maps that depict the drainage area for Silver Springs. While the general boundary is consistent it is noteworthy that the northwestern boundary as shown in **Figure 13** (Lane and Hoenstein 1991) is recognized as transitional where the ground-water drainage divide between Silver and Rainbow Springs appears to shift several miles westward during the change from the low-water to the high-water period.

2.7.2 Modeled Springshed Capture Zones

In 2006, FDEP and the SJRWMD collaborated with the Silver Springs Basin Working Group to produce a depiction of modeled 2-year, 10-year and 100-year capture zones within the Silver Springs basin. Delineation of the capture zones was based on a particle track simulation (MODPATH) prepared by the SJRWMD in 2004 (**Figure 14**). A map depicting the capture zones with the dye introduction locations and water well sample stations is presented as **Figure 15**.

In September 2005 Water Resource Associates, Inc. (WRA) submitted a water resource assessment and management study (WRAMS) to Marion County (WRA, 2005). The report presented an informative and clear description of the geology of Marion County, Florida. As cited in the WRAMS, most of the discussion of the geology, structure, geomorphology, groundwater hydrology, and karst in Marion County presented in the WRAMS was paraphrased from a publication identified as "Faulkner (1970)" with updated information from more recent work incorporated. It is believed the 1970 date should be 1973, the date of Faulkner's report "*Geohydrology of the Cross Florida Barge Canal Area with Special Reference to the Ocala Vicinity*" and this date change is reflected below. With the exception of the first paragraph of the section on lineaments and fracture traces Sections 3.1 and 3.2 describing the structure and stratigraphy of Marion County are excerpted from the 2005 WRAMS.

3.1 STRUCTURE

The geologic characteristics of Marion County are best understood and appreciated by first looking at the overall geologic structure of the state of Florida and the unique position Marion County has in relation to significant structural features deep in the subsurface. These structural features have been relatively stable for millions of years, with only subtle yet significant change occurring in recent geologic time.

To begin, peninsular Florida is the emergent part of a much larger feature called the Florida Platform. This Platform contains submerged areas, called the continental shelves, and the emergent land surface that makes up the State of Florida. The Florida Platform is relatively stable tectonically, and it is composed of a thick accumulation of limestone and dolostone that range in age from Recent (<10,000 years ago) to Cretaceous (65 to 136 million years ago). These rocks were deposited in warm, shallow seas that covered the Peninsular Arch, the principal subsurface structural axis of the Florida Platform. This structural axis lies deep in the subsurface of Marion County and runs generally northwest to southeast through northeastern Marion County.

During late to middle Eocene time (approximately 37 to 54 million years ago), there was a gentle warping of the Florida Platform west of the Peninsular Arch. This younger axis of warping, known as the Ocala Platform, generally runs parallel to the much older Peninsular Arch and is broad and ill defined. Geologically, the Ocala Platform is a gentle, faulted, anticlinal (arch-shaped) structure that can be mapped by use of exposures of middle and upper Eocene limestone and dolostone in the Marion, Levy, and Citrus counties. Geologic cross sections and mapping presented by Faulkner (1973) clearly show these deep structural features and their relationship to Marion County and the now deauthorized Cross Florida Barge Canal. **Figure 16** presents the stratigraphic and hydrostratigraphic units in Marion County.

3.1.1 Lineaments and Fracture Traces

Lineaments are linear surface features that have continuous surface expression for a distance of at least 1.5 km (0.93 miles). Fracture traces are similar features with continuous surface expression of less than 1.5 km (0.93 miles). In karst aquifers lineaments and fracture traces are routinely interpreted as vertical zones of increased weathering, porosity, and permeability development within the bedrock (Parizek, 1976). As a result, they are often desirable targets for higher yield wells. In some areas major springs are often located on or near major lineaments.

Many of the larger springs in the dolomitic rock units of the Ozarks are located on lineaments and in some cases at the intersection of two or more lineaments (Aley 1978). Many of the major losing stream segments in the Ozarks are also along lineaments and fracture traces (Aley 1978).

Stresses resulting from the geological formation of the Ocala Platform and from earth tides have fractured and possibly faulted the rock strata. Faults and fractures are often expressed at the surface in the form of photo-lineaments, which are identified by aligned lakes and sinkholes, linear vegetative or soil patterns, and straight segments of streams and rivers. In fact, lineaments can be recognized through the analysis of aerial photography or satellite imagery. Mapping of photo-lineaments by Vernon (1951) revealed two primary sets of fractures; a northwest-southeast trend, and a secondary set with a northeast-southwest orientation. The two sets intersect at nearly right angles. The northwest-southeast set is parallel or sub-parallel to the axis of the Ocala Platform. The secondary set trends in the direction of the dip of the flanks of the platform. These two sets of fracture trends suggest that tensional (stretching) stresses in the Ocala Platform created these features.

Figure 17 provides a detailed map of faults and fractures in the Ocala vicinity based geo-referenced data depicted on Figure 17 in Faulkner (1973). The fractures and possible faults in the region should not be thought of as discrete, narrow breaks in the rock. While this may be true in some cases, a more accurate conceptualization may be a linear zone of fractured and disrupted strata ranging in length from less than a mile to tens of miles and in width from tens to thousands of feet (Jones and Upchurch, 1991). Fracture zones readily transmit groundwater because permeability in the fractures is significantly higher than the surrounding rock. Therefore, mapping the fracture traces in Marion County can facilitate the delineation of the principal routes of groundwater flow in the Floridan Aquifer. A detailed discussion of fracture zones, their control on water quality in the Floridan Aquifer and Rainbow Springs, and their control on groundwater flow in areas near Rainbow Springs can be found in Jones and others (1996).

3.2 STRATIGRAPHY

Approximately 2,000 to 2,500 ft of early to middle Tertiary marine carbonates (limestone, dolostone) with some evaporates are overlain by a much thinner section of late Tertiary and (sand-, silt-, or clay-rich) in nature. The Tertiary and Quaternary-age sediments were deposited over a thick sequence of Cretaceous-age carbonates. Geologic formations within the 18.6 mile study area are depicted on **Figure 18.**

The oldest stratigraphic unit pertinent to the Marion County's water resources is the Avon Park Formation of middle Eocene age. The Avon Park is present at or near the land surface on the crest of the Ocala Platform in southwestern Marion County and southeastern Levy County. The Avon Park Formation consists of several hundred feet of brown, finely fragmental, highly fossiliferous limestone and dolostone with low to high porosity. Gypsum is present in the formation in small amounts. The Avon Park is separated from the overlying Ocala Limestone by an erosional unconformity (Vernon, 1951).

The Ocala Limestone of late Eocene age overlies the Avon Park Formation throughout the County. There is evidence that the Ocala may be missing from beneath the Brooksville Ridge in western Marion County. The absence of the Ocala in this region is probably due to removal from the crest of the Ocala Platform by erosion. Where the Ocala Limestone is present, it is generally at or near land surface. The lower portion of the Ocala in Marion County generally consists of granular, highly fossiliferous to coquinal (shell-rich), tan and brown limestone. The lowermost portion of this section frequently consists of gray and brown dolostone. The upper portion of the Ocala consists of soft, granular, very fossiliferous, cream to white limestone. In places, both the upper and lower Ocala is cherty. Chert is usually found near the top of the section, but cherty zones may occur at any depth in the unit. Differential erosion of the limestone has caused the formation of pinnacles which has resulted in a wide variation in the altitude of the limestone surface. The presence of limestone at or near land surface has resulted in a mature karst terrain, including rolling hills, numerous sinkhole depressions, caverns, and lack of surface drainage (Phelps, 1994). The top of the Floridan Aquifer is depicted on **Figure 19**.

Sediments of Oligocene age are absent in the study area. The oldest post-Eocene stratigraphic unit to occur is the Miocene Hawthorn Group, which unconformably overlies the Ocala Limestone. Hawthorn sediments have been eroded away in much of central and western Marion County. Where present, they occur as discontinuous outliers capping hills, such as the Brooksville Ridge and the Fairfield and Ocala Hills. Hawthorn Group sediments were deposited in a variety of environments including lacustrine, fluvial, and marine settings. Consisting of sand, silty sand and waxy green clay, the Hawthorn sediments are variably phosphatic with phosphorite pebbles common. Much of the Hawthorn in the Brooksville Ridge area has been highly weathered, complicating recognition of the original depositional facies. Where present, Buono and others, 1979). In upland areas, however, the confining beds can exceed 50 ft in thickness.

In eastern Marion County, a thick accumulation of Hawthorn sediments is present due to faulting and fracturing along the eastern margin of the Ocala Platform. The down faulting of Miocene sediments east of Silver Springs has major implications for groundwater flow in the Floridan Aquifer near the spring (Faulkner, 1973). In very simple terms, the down faulting of Hawthorn sediments east of Silver Springs effectively forms a dam against which groundwater flow in the Floridan is directed upward and out of the aquifer at the spring instead of flowing eastward toward the St. Johns River and points east.

The down faulting of Miocene sediments in eastern Marion County also has significant implications for groundwater recharge, aquifer confinement, and aquifer vulnerability in this region. In central and western Marion County, the Floridan Aquifer is essentially unconfined. In eastern Marion County, however, the Floridan Aquifer is typically confined, except for isolated areas where up-thrown fault blocks are covered by permeable, post-Miocene sands (Faulkner, 1973). For example, while recharge is low along the course of Ocklawaha River, the Mount Dora Ridge is an area of high recharge to the Floridan Aquifer. The vulnerability of the aquifer to contamination is likewise high in the Mount Dora Ridge. Where they occur, confining beds in the eastern region of Marion County may exceed 150 ft in thickness, especially in areas near the Ocklawaha River (Faulkner, 1973; Buono and others, 1979). These confining beds retard the downward recharge of groundwater to the Floridan Aquifer. As a result, the down faulting of Miocene sediments in eastern Marion County have lower recharge in many areas along the flanks of the Mount Dora Ridge and aquifer vulnerabilities in these areas are relatively low.

3.3 AQUIFER RECHARGE

Recharge to the Floridan Aquifer in the study area is influenced by the presence or absence of overlying sediments that prevent or retard water from percolating downward. Some, but not all, portions of the Floridan Aquifer that contribute water to the SSG are overlain by the Hawthorn Group. This geologic unit has a highly variable lithology that includes impermeable massive clay and dolomite units that can prevent the vertical movement of groundwater (Kindinger et al., 1994). In general, the circular study area can be separated from north to south into two roughly equal halves; an eastern half and a western half. The thickness of overlying sediments in the western half ranges from none to approximately 50 ft. The eastern half has sediments that are typically thicker and range from about 50 ft to 150 ft in thickness (**Figure 20)**.

While in some portions of the recharge area for the SSG the Hawthorn Group has been eroded away (predominantly the western), in other areas it has been breached by sinkholes (**Photo 3)** due to solution and collapse in the underlying Ocala Group of carbonates that are mostly limestones (**Figure 21**). As recently as April 2011 evidence of newly formed karst breaches were observed by Florida Wildlife Commission staff in the area of Orange Lake where three new sinkholes were documented (**Figure 22**).

These naturally formed karst solution features have an analogous man-made counterpart in the form of stormwater drainage wells that allow for similar direct recharge into the aquifer.

As of 2008, there were reportedly 27 active stormwater drainage wells in the Ocala area (**Photo 4)**. The drainage wells are located in low-lying areas of the community and are used for flood control; in or adjacent to a drainage retention area (DRA) or a lake, where they are used for lake level control; and in some cases receive overflow from wetland retention areas. These drainage wells represent direct recharge points into the Floridan Aquifer.

3.4 POTENTIOMETRIC SURFACE

Potentiometric surface maps for the upper portion of the Floridan Aquifer in the Silver Springs area were reviewed as part of this study. The oldest potentiometric maps were from May 1968, a low water period and September 1968, a high water period (Faulkner, 1973, Fig. 23 and Fig. 24). Potentiometric surface maps prepared either by the SJRWMD or USGS for the months of May and September, from 2001 through 2008, were also reviewed.

Based upon the potentiometric surface as depicted on these maps it appears that the recharge area for the SSG lays mainly to the north, west, and south of the springs. Based upon these maps, all points where planned dye introductions lie are within the recharge area for the SSG. Faulkner (1973, p. 69) estimated the size of the recharge area for SSG to be 730 square miles and the recharge area for Rainbow Springs to be 645 square miles. Rainbow Springs is located about 25 miles southwest of the SSG.

3.5 NATURE OF HYPOGENIC KARST AQUIFER DEVELOPMENT

Hypogenic karst aquifer development and associated cave passages routinely occur under confined (artesian) conditions where waters are flowing upward toward discharge regions. In contrast, epigenic karst aquifer development is associated with downward moving waters; epigenic karst aquifers seldom contain maze complexes of cave passages. Detailed discussions of hypogenic and epigenic development of karst aquifers is found in Klimchouk, (2009 and 2007) and in many of the papers included in Klimchouk et al. (2000).

Figure 23 is a map of the cave system associated with the Mammoth Vents in the SSG. The map is adapted from the Silver Springs Cave System map prepared by Eric Hutcheson and the Silver Springs Cave Diving Team (1993). This planimetric map depicts a complex maze system of 2,263 feet of explored passages that have both horizontal and vertical complexity. Caves with these types of mazes are characteristic of hypogenic karst development.

When karst waters with different chemistries mix, even if they are individually saturated with calcium carbonate, the resulting mixture is under-saturated. Conditions where waters of different sources mix are clearly present in the SSG group, and are discussed in Section 3.6. These conditions, and the interpretation that some of the waters are derived from deeper flow systems in the Floridan Aquifer, are conducive to the development of maze systems of conduits in the associated aquifer and especially in the vicinity of discharge zones from that aquifer.

As a generalization, hypogenic karst aquifers have an order of magnitude greater cavern porosity than epigenic aquifers and tend to have a larger areal extent (Klimchouk, 2007). As another generalization, hypogenic karst aquifers tend to concurrently enlarge multiple passageways in the aquifer, while single conduits tend to enlarge through piracy at the expense of other potential passageways in epigenic aquifers.

Faulkner (1973, p. 70) clearly envisages that the karst development within the recharge area for SSG is primarily of epigenic origin. He concluded that most of the flow to the SSG is through the upper 100 ft of the Ocala Limestone, and that the base of this flow is between the Ocala Limestone and the Avon Park Limestone.

3.6 GEOCHEMISTRY AND GROUNDWATER DISCHARGE OF SSG VENTS

As a group the SSG springs that form the headwaters of the Silver River represent one of the largest of Florida’s 33 first-magnitude springs. First-magnitude springs have mean flow rates of 100 cubic feet per second (cfs) or more. Discharge rates for the SSG since the 1930s have varied from about 350 cfs to approximately 1,290 cfs, with a median value of approximately 772 cfs.

3.6.1 Geochemistry of the SSG Vents

Water chemistry data were collected from 30 of the SSG vents during September 2006 (INTERA, 2007) and were further discussed in a subsequent summary report to SJRWMD (Butt et al., 2008). This is normally a high flow period of the year (Faulkner, 1973). Some of the 30 vents sampled had multiple vent discharge points that were believed to be part of the same conduit system. The data showed substantial water quality differences among the various vents. Data analysis divided the vents into three groups based upon water quality conditions. These were labeled as Groups 1, 2 and 3. The water quality analysis was comprehensive; however, in general terms, discharge from the spring vents was grouped as follows:

- Group 1 vents had the highest total dissolved solids, dissolved oxygen, calcium, magnesium, bicarbonate, sulfate, nitrate, and phosphorous concentrations.
- Group 2 vents had lower concentrations of most parameters than Group 1 and particularly low dissolved oxygen, sulfate, and phosphorous concentrations.
- Group 3 vents had water quality characteristics intermediate between Groups 1 and 2.

The locations and geochemical grouping of the SSG vents are depicted on **Figure 24**. Values for Group 3 vents are not always intermediate between the values for Groups 1 and 2. This is especially true with respect to alkalinity and total organic carbon. As a result, it is possible that Group 3 vents represent a third type of water source area rather than a mixing of waters from Groups 1 and 2. A graphical depiction of the departure of mean constituent values for the three groups of springs from the values for Group 1 springs is presented as **Figure 25**.

As reported by Butt et al. (2008) the Mammoth East Vent (assigned to Group 1) was 1.4° Celsius (C) warmer than Mammoth West Vent (assigned to Group 2). Rosenau et al. (1977, p. 279) reported a temperature difference between the two vents of 2°C, which they speculated indicated that the warmer water was derived from deeper portions of the aquifer. Faulkner (1973) reported that groundwater temperatures in the Ocala area increase 1° Fahrenheit (F), i.e. 0.56° C, for each 64 ft of depth. Using this relationship, a 1.4°C difference in water temperature would indicate a water source with a mean depth 161 ft deeper and a 2°C difference would indicate a water source with a mean depth 230 ft deeper than the upper source.

The water quality and water temperature data suggest that there are at least two, and possibly three, sources of water for the SSG. One possibility is that the Group 1 vents reflect discharge from deeper portions of the aquifer and Group 2 vents reflect discharge from shallower parts of the aquifer. Group 3 vents could simply represent a mixture of the two types of waters, but these vents could represent waters from a different recharge area or different depth in the aquifer. In the subsequent sections we have organized the data by vent group.

One-time flow rate measurements (**Table 1**) were conducted in September 2006 at 24 of the SSG vents, but this one-time data set is not sufficient to have an accurate picture of the long-term total flow rates from each of the three groups of vents. In a meeting at Silver Springs held in December 2009, representatives of SJRWMD were asked for a best estimate of the allocation of total flow of the SSG into the three groups. A percentage allocation, which is an educated estimate that could be substantially in error, was 70% of total flow from Group 1 vents, 20% from Group 2 vents, and 10% from Group 3 vents.

Based upon sulfate concentrations measured in wells in the Ocala-Silver Springs area and comparing those results with concentrations measured in Silver Springs, Faulkner (1973, p. 76) estimated that deep waters (analogous to Group 1 vents) represent 8 to 14% of the flow of the SSG and that the remainder of the flow represents shallow water sources. This is almost the direct opposite of the distribution estimated above. One possible explanation for the difference is that much of the deep water supplying the vents follows preferential flow routes where sulfate concentrations are substantially less (due to their high solubility and resulting depletion from the flow routes) than the concentrations found in the randomly located wells that seldom intersect preferential flow routes.

3.6.2 Mammoth Spring Discharge Measurements

During the timeframe of this study KES performed two underwater discharge measurements at Mammoth Spring (**Figure 26**). The first measurement was conducted by KES on April 14, 2010 as part of a separately funded, long term discharge monitoring effort by SJRWMD. The purpose of this work is to obtain accurate discharge measurement over time of Mammoth Spring, the headspring and major source of groundwater discharge into the Silver River.

It is important to understand that the vent opening where flow measurements were collected is the point of combined discharge of two distinct spring vents, Mammoth East (Group 1) and Mammoth West (Group 2). The Mammoth east and west vents are each located approximately 40 ft beyond the cave entrance, with the cavern acting as a mixing chamber prior to the point of discharge at the Mammoth Spring vent. The second set of measurements was collected on January 19, 2011 and was scoped as part of this study. This was the 12th set of measurements recorded by KES at Mammoth Spring since March 24, 2005 (Butt, 2011). A summary of the Mammoth Spring discharge measurements collected from March 24, 2005 to January 19, 2011 is presented as **Table 2**.

Mammoth Spring is the largest spring of the SSG and is the headspring of the Silver River. The vent of Mammoth Spring is a wide, oval-shaped opening about 69 ft across, with floor to ceiling heights that vary from under 2 ft to over 6 ft. The depth of this vent ranges between 24 ft and 34 ft. The rock that comprises the ceiling of this vent is solid and self-supported, with the floor beneath composed of a layer of boulders and rubble.

A large cavern with a complex network of cave passages lies inside of this vent. These cave passages supply waters of varying characteristics to the cavern, where some mixing occurs before these waters exit the vent. The inside of the cavern is a complex structure of breakdown boulders, bedding planes, and small passageways. It was determined during prior investigations that discharge measurements of individual water sources within the cavern would be problematic, if not impossible. The outer edge of this spring vent provided the best location for an underwater discharge measurement with an appropriately adapted instrument.

A series of 172 point velocity readings was made just inside the ceiling edge of the vent. At the measurement site, the floor of the vent was 32 ft deep, and the ceiling was at a depth of 24 ft. The processed data for the measurements collected on January 19, 2011, indicate flow from the Mammoth Vent was 211.25 cfs, which is equal to 94,815 gallons per minute (gpm), or 136.534 million gallons per day (MGD). Based on same-day USGS gauge measurements at the 1,200-meter station located on the Silver River, the discharge was approximately 453 cfs. Therefore, on that day flow from Mammoth Springs represented about 47% of Silver River flow. The January 19, 2011 Mammoth Spring discharge measurement report is presented as **Appendix A**.

4.1 TRACER DYES

Four fluorescent tracer dyes were used in this study. These were fluorescein, eosine, rhodamine WT, and sulforhodamine B dye. Fluorescein dye is also known as uranine; its Color Index Name is Acid Yellow 73; its Color Index Number is 45350. Both eosine and fluorescein have D&C numbers, meaning that they are sometimes used in drugs and cosmetics. Eosine dye is also known as D&C Red 22 and as Eosine OJ; its Color Index Name is Acid Red 87; its Color Index Number is 45380. Rhodamine WT has a Color Index Name of Acid Red 388; it has no assigned Color Index Number. Sulforhodamine B is also known as Pontacyl Brilliant Pink B; its Color Index Name is Acid Red 52; its Color Index Number is 45100. The dye mixtures used for this study contained approximately 75% dye equivalent except for the rhodamine WT, which has about a 20% dye equivalent. All dye quantities and dye concentrations were based upon the as-sold weight of the dye mixtures. **Figure 27** shows the chemical structures of the four dyes.

All four of the dyes are commonly used in groundwater tracing work and have a good track record in providing successful traces. They are all environmentally safe (Smart, 1984; Field et al., 1995) and pose no risk to humans, livestock, or to aquatic life in the concentrations used in groundwater tracing work under the direction of experienced professionals. The dyes are highly detectable with analytical instruments at very low concentrations, so tracing work is conducted with dye concentrations at detection sites that are orders of magnitude smaller than the visible threshold where the general public might see colored water.

As reported in Aley (2002), the differences between the instrument detection limit for the dyes in water is over four orders of magnitude (10,000 times) smaller than the visible threshold for the general public for rhodamine WT and sulforhodamine B. The difference is more than five orders of magnitude smaller (100,000 times) for fluorescein and six orders of magnitude smaller (1 million times) than the visible threshold for the general public for eosine. The table below presents OUL instrument detection limits for four tracer dyes in water and activated carbon sampler elutant samples. The general public visible detection limit in water is from Aley (2002). Units are parts per billion (micrograms per liter) and are based on the as-sold weight of the dye mixtures used in this study.

Dye Mixture	Visible detection limit in water, general public	Instrument detection limit in water	Instrument detection limit in carbon sampler elutant.
Eosine	13,500	0.015	0.050
Fluorescein	140	0.002	0.025
Rhodamine WT	2,500	0.015	0.170
Sulforhodamine B	1,000	0.008	0.080

All of the dyes except rhodamine WT are provided as powders that are typically mixed with water prior to introduction. When mixed with water at a rate of one pound of dye to one gallon of water the resulting mixture has a specific gravity of about 1.12. The rhodamine WT solution also has a specific gravity of about 1.12. As a result of the specific gravity values, a dye solution poured into a well will sink through the water column and color most or all of it rapidly (depending in part upon the total depth of the column). All of the dyes are essentially infinitely soluble.

Each of the four dyes has the important characteristic that it can be adsorbed onto activated carbon samplers and then desorbed (eluted) from these samplers in the laboratory. Each of the dyes has different properties and each performs somewhat differently in karst aquifers. Important differences among the dyes are discussed in the following paragraphs. The selection of which dye was used for each introduction gave due consideration to the differences in the properties and performance characteristics of the four dyes as well as characteristics of the dye introduction point.

4.1.1 Fluorescein Dye

Fluorescein dye has the best performance characteristics in karst aquifers of any of the dyes. It has a greater fluorescence intensity than any of the other tracer dyes (Aley, 2002; Leibundgut et al., 2009). It adsorbs readily onto activated carbon samplers, is retained well on such samplers, and then is readily eluted (desorbed) in the laboratory for subsequent analysis. Fluorescein is less subject to sorption onto limestone than either rhodamine WT or sulforhodamine B (Smart and Laidlaw, 1977); these authors did not evaluate eosine dye. Behrens (1986) ranked resistance of the four dyes used in this study to adsorption as fluorescein > eosine > rhodamine WT > sulforhodamine B. Aley (2002 and 2008) concurred with this ranking.

A limitation for the use of fluorescein is a relatively high photodecomposition rate in sunlight. This was not an important consideration in this study since the dye was introduced underwater and rapidly entered the groundwater system such that exposure to sunlight was virtually eliminated. Sampling at the vents at Silver Springs was conducted at the mouth of the vents; and as a result there was negligible fluorescein loss to photodegradation. OUL experience is that photodegradation of fluorescein is minimal once the dye has been adsorbed onto activated carbon.

Another potential limitation for fluorescein is its use in various household products and in vehicle coolant solutions. Background sampling prior to dye introduction demonstrated that fluorescein or compounds with similar fluorescence characteristics were not detectable at any of the selected sampling sites. This dye was also not detectable for one or more sampling periods at all of the sampling stations where the dye from this study was ultimately detected.

4.1.2 Eosine Dye

Eosine dye is sometimes called brominated fluorescein. As indicated by Behrens (1986) and Aley (2002 and 2008), the resistance of eosine to adsorption is second only to fluorescein and is better than either rhodamine WT or sulforhodamine B. Another advantage of eosine is that, while being readily detected instrumentally, it is less visually detectable than any of the other three dyes. This was an important consideration since public water supply wells lie between the dye introduction point (Tuscawilla Park Stormwater Drainage Well) and SSG.

A disadvantage of eosine dye is that, like fluorescein, it is subject to photodegradation. This was not a significant limitation for this study as the dye was directly introduced into the Tuscawilla Park Stormwater Drainage Well. Another limitation of eosine is that it is less readily adsorbed, retained, and then eluted (desorbed) in the laboratory than is fluorescein. OUL experience is that this limitation is most significant when concentrations of eosine in water are very small.

In some long-term groundwater tracing studies conducted by OUL, some degradation of eosine has occurred with a resulting decrease in the peak emission fluorescence wavelength of the resulting compound. It is likely that the degradation is due to the loss of bromide from the structure of eosine, and the resulting compound, while still fluorescent, has a shorter peak emission fluorescence wavelength than non-degraded eosine.

4.1.3 Rhodamine WT Dye

Rhodamine WT was developed by DuPont in cooperation with the USGS as a water tracing dye, which is the reason for the letters "WT" in the name. It has a low photodecomposition rate and is fairly readily adsorbed, retained, and then eluted from activated carbon. It is less strongly bound on the activated carbon than are fluorescein and eosine and, in some waters, can be desorbed from activated carbon by other compounds present in the water. This is seldom a problem in relatively clean waters such as those in the aquifer feeding SSG.

A limitation of rhodamine WT is that it is composed of two isomers with the amount of each isomer being approximately equal. One of the isomers is less conservative than the other and, as a result, Sabatini and Austin (1991) found that the breakthrough curve for rhodamine WT dye through alluvial aquifer sands was non-linear and not of the normal sigmoidal shape. Basically, the rhodamine WT cumulative breakthrough curve leveled off after about half of the dye had passed through the column, and remained level for a number of pore volumes before again increasing.

In karst aquifers where much of the flow is through preferential flow routes, the fact that rhodamine WT is composed of two isomers does not seem to appreciably retard part of the dye pulse. However, in more dispersive flow systems, it has been the experience of OUL that some of the rhodamine WT dye is retarded due to adsorption. When this occurs, OUL has noted that the emission fluorescence peaks of the retarded dye are typically somewhat shorter than dye arrivals attributable to the more mobile isomer. As will be discussed later, the data suggest that some of the rhodamine WT detected at SSG vents has been retarded in the aquifer. It is also possible that the shorter peak emission wavelengths are a result of deaminoalkylation, although it has been the experience of OUL that this is not a problem with rhodamine WT in relatively clean water.

Several, if not all rhodamine group dyes, are subject to deaminoalkylation (Kass, 1998; Leibundgut et al., 2009). This degradation of rhodamine group dyes results in a shifting of the emission fluorescence peak of the dye to shorter wavelengths, with the amount of shifting increasing with time as more deaminoalkylation occurs. As a result, shorter rhodamine WT emission fluorescence peaks as a trace progresses could be the result of deaminoalkylation, the arrival of the second isomer of rhodamine, or a combination of both.

4.1.4 Sulforhodamine B Dye

Sulforhodamine B dye is the least effective of the four dyes used in this study. It is resistant to photodecomposition, but this was not a significant issue in the study area given the method of dye introduction into the subsurface at Pontiac Pit Sink.

One limitation of sulforhodamine B in groundwater tracing programs is that its emission fluorescence peaks are only a few nanometers longer than those for rhodamine WT. As a result, confusion can result if both of these dyes are used concurrently at points where they may be detected at the same sampling stations. Sulforhodamine B suffers greater losses to adsorption on earth materials than any of the other three dyes used in this study.

Leibundgut et al. (2009) noted that sulforhodamine B is not well suited to long duration traces due to its sensitivity to deaminoalkylation. This limitation is generally less significant in clean waters than in contaminated aquifers. However, sulforhodamine B is still a useful tracer if one recognizes that the degraded sulforhodamine B is still a fluorescent compound and can still be adsorbed onto activated carbon and analyzed following the same protocol used for all of the dyes used in this study. If good background sampling has occurred prior to the introduction of sulforhodamine B into the aquifer, and if this sampling shows an absence of emission fluorescence peaks in the range from about 550 to 575 nm, fluorescence peaks in this range can be ascribed to degraded sulforhodamine B if rhodamine WT is absent from the sampling stations in question. This is the approach used for detection sites related to the sulforhodamine B introduced at Pontiac Pit Sink.

4.2 DYE SAMPLING

A detailed discussion of dye sampling is included in the OUL Procedures and Criteria document included as **Appendix B**.

Sampling for the tracer dyes placed primary reliance upon activated carbon samplers and secondary reliance upon grab samples of water. The activated carbon samplers adsorb and retain all of the tracer dyes used and then release them to an eluting solution in the laboratory. The carbon samplers are continuous and accumulating samplers. In general, an activated carbon sampler in place in flowing water for one week will accumulate and then release to the eluting solution a dye concentration approximately 400 times greater than the mean dye concentration in the passing water. Samplers in place for a shorter time accumulate less dye, and samplers in place for longer than one week will accumulate more dye. Samplers are typically changed at approximately one-week intervals to ensure that fresh carbon is always in place and to ensure that, if samplers are lost, there is no excessively long data gap. Longer sampling periods were often used during this study in order to extend the duration of the sampling effort. It is the conclusion of OUL that this did not adversely impact the quality of the sampling effort since the waters being sampled were of good quality.

4.2.1 Sample Collection Methods

Collection of charcoal samplers and water samples required servicing of two types of sampling stations. In-water sample stations (e.g. spring vents and surface water) and flow through samplers installed onto the raw water side of public supply wells. For each charcoal sampler change-out and water sample collected, KES provided a pre-labeled station kit with fresh replacement charcoal packets, a Whirlpak bag and 40 mL vial, all kept in a slide-closure plastic bag (**Photo 6**).

Samples were collected in the field by KES personnel and placed into laboratory-supplied plastic bags, with the date and time of collection recorded on all labels with an indelible marker. The samples were then placed in insulated coolers and shipped under chain-of-custody with Blue Ice® by overnight courier service to OUL for analysis. Upon arrival the samples were refrigerated at 4°C until analysis.

4.2.2 Activated Carbon Samplers

The activated carbon samplers contain 4.25 grams of chemically active coconut shell carbon. The samplers are manufactured by OUL and the activated carbon used is Calgon 207C coconut shell carbon, 6 to 12 mesh. Based upon manufacturer's data, each carbon sampler has over one acre of adsorbing surface area (Aley, 2002).

4.2.2.1 Wellhead Charcoal Samplers

The well sampling apparatus was of a flow-through design, active only when the well pump cycled on. Access into the water system was made at the existing sampling bib, downstream of pump discharge, but upstream of the non-return valve; this prevented exposure from any system chlorine and would not create a continuous flow situation. A few wells varied from the standard installation due to unique features of those systems. A timer was used to control flow to the sampler at the Ocala Water Treatment Plant Accelator system.

A typical apparatus arrangement consisted of a tee added at the sampling port that maintained that bib, a brass gate valve, a non-return valve to protect the system from any contamination, the sampler holder, and a length of garden hose that routed the discharge to sprinkler, soaker hose, or directly onto lawn or vegetation. The pipe and fittings used were galvanized iron and brass, NPT, and either ¾-inch or ½-inch in size. The sampler holder consisted of 2-inch or 1.5-inch PVC pipe fittings that screwed together in the middle, with garden hose end fittings (**Photo 7**).

Once assembled to the well and tested, the flow rate was set with the gate valve, which was then marked and wire-tied in position (**Photo 8**). The PVC sampler holder was unscrewed, two charcoal packets placed inside and re-assembled. Discharge from the apparatus was adjusted and placed so as not to cause a flooding or erosion problem for the well owner.

During the trace, charcoal packets were exchanged and a water sample vial was filled either from the sampling bib if the well was running, or from water remaining in the hose line. The valve setting/flow rate, system integrity and discharge position were checked during each visit.

4.2.2.2 Spring Vent and Surface Water Charcoal Samplers

Underwater charcoal sampler holders consisted of a brick with holes or concrete lawn sprinkler "doughnuts" that were fitted with an arch of heavy copper or steel wire (**Photo 9**). A site identification label was attached. A pair of charcoal samplers was attached to the upper part of the wire arch by large brass-plated safety pins, in a manner that would provide for optimum water flow through them. The sampler holder was then placed or lowered into the selected spring vent. Some holders had a line and float attached to them for easier relocation and recovery. Holders that needed to be serviced from the surface due to wildlife concerns at those sites were fitted with a line and float with a wire loop that could be grabbed with a hook pole from the surface (**Photo 10**). Whether serviced underwater or at the surface, the exposed charcoal packets were removed, secured, and the fresh packets attached. The holders were then placed back into their original positions.

At the Rainbow Springs stations, the sampler holders were tethered to the shore, and recovery consisted of pulling the holder to shore, changing the samplers, and then tossing the holder back into position.

4.2.3 Water Sampling Method

Underwater collection of aqueous samples was accomplished by a diver positioning a 40-mL vial directly in front of the spring vent, removing the vial cap, and purging the vial with compressed air from a nozzle connected to the diver's air supply. After the vial filled with water it was then capped. In the case where the discrete depth water sampler was used, staff operating from the deck of the support boat lowered the sampler the desired depth and position just above the vent, then tugged the cord to pull loose the two fill port stoppers to allow for filling the device. The sampler was then raised to the surface and the water sample was poured into the pre-cleaned vial provided by OUL (**Photo 11**).

A surface water grab sample collected from a support boat was taken by first rinsing the vial, collecting the sample, and then capping and securing the vial. At wellheads, the water sample vial was filled either from the sampling bib if the well was running, or from water remaining in the hose line.

4.3 ANALYTICAL METHODS

A detailed discussion of the analytical methods used in this study is included in OUL's Procedures and Criteria document included as **Appendix B**.

4.3.1 Sample Preparation

Activated carbon samplers were rinsed in strong jets of OUL reagent water to remove any debris that might be present. The activated carbon was then placed into disposable beakers and eluted for one hour in an eluting solution consisting of 5% aqua ammonia and 95% isopropyl alcohol solution and sufficient potassium hydroxide flakes to saturate the solution. The isopropyl alcohol solution is 70% alcohol and 30% water. The aqua ammonia solution is 29% ammonia.

After the one-hour period the eluting solution was poured into a vial in preparation for analysis (**Photo 12**). The analysis was conducted on a Shimadzu RF-5301 spectrofluorophotometer operated under a synchronous scan protocol. Water samples were also analyzed on the same instrument (**Photo 13**). Prior to analysis, the pH of all water samples was adjusted to pH 9.0 or greater by placing uncapped vials of the water in a high ammonia environment for a period of at least 12 hours. This maximizes the fluorescence intensity of any fluorescein dye that may be present.

4.3.2 Laboratory Instrumentation

The Shimadzu RF 5301 spectrofluorophotometer with synchronous scan produces an analytical graph. Using proprietary software emission fluorescence, peaks are separated from background fluorescence in much the same way that a storm pulse is separated from base flow for stream hydrographs. The program calculates the area within the fluorescence peak and calculates the dye concentration based upon daily standards. The analytical graphs are filed on a station-by-station basis. Sample information is compared with chain-of-custody sheets to ensure accuracy. Preliminary results are added to a spreadsheet. At the end of a study, all graphs are again reviewed for accuracy and consistency.

Acceptable emission fluorescence peak wavelengths have been calculated for all four of the dyes used during this study. These values were based upon a selected suite of samples with a high level of confidence by OUL that the fluorescence peaks were due to the specific dyes used for this study. The acceptable wavelength range equals the mean value plus and minus 2 standard deviations. The distribution of values is skewed toward the shorter side of the wavelength range and it is common for low concentrations of dyes to have emission fluorescence peaks that are between 2 and 3 standard deviations shorter than the mean.

During the course of this study OUL placed a new analytical instrument in service. It was the same model (Shimadzu RF 5301) as the previous instrument, but the initial instrument required frequent adjustments to meet minimum signal to noise specifications. The new instrument was put into service on March 30, 2011. Electronic and optical differences cause each instrument to have slightly different acceptable wavelength ranges. Acceptable wavelength ranges for the initial and new instruments are shown in the two tables below:

Acceptable Wavelength Ranges for RF-5301 in use prior to March 30, 2011

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	538.1 to 543.9	0.050
Eosine in Water	533.4 to 537.9	0.015
Fluorescein in Elutant	514.0 to 518.1	0.025
Fluorescein in Water	508.0 to 511.7	0.002
Rhodamine WT in Elutant	565.4 to 572.0	0.170
Rhodamine WT in Water	572.7 to 578.0	0.015
Sulforhodamine B in Elutant	572.8 to 579.6	0.080
Sulforhodamine B in Water	580.1 to 583.7	0.008

Acceptable Wavelength Ranges for RF-5301 in use on and after March 30, 2011

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	540.0 to 545.8	0.050
Eosine in Water	532.8 to 537.3	0.015
Fluorescein in Elutant	514.5 to 519.6	0.025
Fluorescein in Water	506.8 to 510.6	0.002
Rhodamine WT in Elutant	565.2 to 571.8	0.170

Rhodamine WT in Water	572.4 to 577.7	0.015
Sulforhodamine B in Elutant	576.4 to 583.2	0.080
Sulforhodamine B in Water	580.8 to 584.4	0.008

4.3.3 Positive Dye Detection Criteria and Data Qualifiers

OUL procedures establish a four point criteria that must be met for positive dye detection. These are:

- There must be at least one fluorescence peak at the station in question in the acceptable wavelength range for the appropriate dye and matrix.
- The dye concentration must be at least 3 times the detection limit.
- The dye concentration must be at least 10 times greater than any other concentration reflective of background at the station in question.
- The shape of the fluorescence peak must be typical of the dye in question and there must be no other factors which suggest that the fluorescence peak may not be dye from this groundwater tracing work.

Some samples do not fully meet the four criteria specified above for a positive dye result, yet the preponderance of the data indicates that the sample is in fact dye introduced during a study. An example would be a fluorescence peak slightly shorter than the acceptable wavelength range. Samples that do not fully meet the criteria are flagged with the data qualifier (**) if the preponderance of the data indicates that the samples is dye introduced during the study. This footnote is used only if at least one sample at the station fully met the positive dye detection criterion.

If a sample is qualified with a single * it indicates that the preponderance of the data indicates that the sample is dye introduced during the study, but that no samples at the station fully met the positive dye detection criteria.

Samples may be deemed positive for deaminoalkylized sulforhodamine B dye if the emission fluorescence peaks are shorter than the acceptable wavelength range for sulforhodamine B dye and if the preponderance of data support and convince OUL that this dye was detected at the sampling station.

4.4 LABORATORY QUALITY CONTROL

Laboratory blanks are run for every sample where the last two digits of the laboratory numbers are 00, 20, 40, 60, or 80. A charcoal packet is placed in a pumping well sampler and at least 25 gallons of unchlorinated water is passed through the sampler at a rate of about 2.5 gpm. The sampler is then subjected to the same analytical protocol as all other samplers.

System functioning tests of the analytical instruments are conducted in accordance with the manufacturer's recommendations.

All materials used in sampling and analysis work are routinely analyzed for the presence of any compounds that might create fluorescence peaks in or near the acceptable wavelength ranges for any of the tracer dyes. This testing typically includes approximately 1% of materials used.

The decision as to which dye to use for each of the four traces was based upon a consideration of the properties of the four dyes described in **Section 4**, the method of dye introduction and the site-specific characteristics of each dye introduction location. A major challenge was determining how much of each dye to use, and this required a number of assumptions.

5.1 PREVIOUS STUDY CONSIDERATIONS

As part of the literature review for this project one previous dye trace report for a study conducted within the 18.6-mile SSG study boundary was reviewed. The dye trace lasted for nine weeks and was conducted in an area located between Indian Lake and Silver Springs (Jones, Edmunds & Associates, 1998). Indian Lake lies approximately 5 miles north of the SSG.

On November 17, 1997 five pounds of fluorescein were introduced by a scuba diver into the throat of a submerged sinkhole located in Indian Lake. Twelve springs and 15 wells were monitored during the dye trace. The report indicated that the study was conducted under favorable conditions since the lake and aquifer water levels rose during the period following the dye release. No dye was detected during this study and our literature review did not identify any previously successful groundwater traces to SSG; such information would have been helpful in estimating desirable dye quantities needed for the traces. While various equations have been used for estimating dye quantities needed for groundwater tracing, those equations yield estimates that vary by several orders of magnitude and thus are not very useful.

Karst aquifers with very rapid groundwater travel rates along preferential flow routes are common, and are probably more common than dispersive flow systems lacking well-integrated preferential flow routes. Some of these preferential flow routes transport waters at rates up to several miles per day. Water flow through these aquifers can often be traced for substantial distances with relatively small amounts of dye. Alternately, more dispersive karst flow systems are likely to require the use of substantially larger amounts of dye.

5.1.1 SSG Basin Numerical Model

A groundwater basin delineation by particle track simulation (MODPATH) prepared by the SJRWMD in 2004 identified predicted 10-year, 100-year, and 1,000-year capture zones for the SSG. The simulation presumed that this porous media model is credible for use in this karst aquifer. The modeling also suggested that velocities in the aquifer increase as the distance to the SSG decreases. The Orange Lake dye introduction point at Heagy-Burry Sink is located within the 1,000-year capture zone and outside of the 100-year capture zone as shown on this MODPATH map (**Figure 14**). If this model were reasonably correct then efforts at long distance tracing in the aquifer, especially at points remote from SSG, would fail regardless of the amount of dye used.

Prior to the tracing work conducted for the current study, the presence of preferential flow routes in portions of the Floridan Aquifer contributing water to the SSG was suspected, but not known to exist. To the extent reasonable the dye tracing was designed to determine whether or not rapid groundwater flow routes are, or may be, associated with the SSG. Some examples of rapid karst groundwater flow in other karst areas are used to illustrate this possibility and its hydrologic significance.

Fluorescent tracer dyes, including those planned for use in the current study, have been used in many different karst aquifers to trace groundwater to springs for underground travel distances of up to almost 40 miles. A groundwater trace to Big Spring, Missouri (Aley, 1978) traversed a straight-line distance of 38.1 miles and discharged from the spring when the flow rate was approximately 820 cfs. The travel time for the first arrival of dye at Big Spring for this trace was approximately 12 days. Aley (1978) provided data on 17 separate groundwater traces to Big Spring or other large regional springs in the Ozarks that traversed straight-line distances in excess of 14 miles. Twelve of these yielded first-arrival times at the receiving springs of 14 days or less. The other two had first-arrival times of 67 and 82 days, respectively. This demonstrates that even when very rapid conduit flow in a karst aquifer is typical, slower travel rates are sometimes encountered. All of the Ozarks traces were through dolomitic units of Ordovician and Cambrian age, and all were conducted with 15 pounds or less of fluorescein dye mixture.

5.1.2 Barton Springs, Edwards Aquifer in Texas

Extensive groundwater tracing using tracer dyes has been conducted in the Barton Springs portion of the Edwards aquifer in the vicinity of Austin, Texas (Hauwert et al., 2002 and 2004). The OUL has been involved in the design of the tracing studies in the Barton Springs recharge area and in the analysis of the resulting samples. There are important similarities between hydrologic conditions found in the Barton Springs portion of the Edwards aquifer and conditions in the SSG portion of the Floridan Aquifer. As a result, the results from the Barton Springs work provided valuable insight for the design and conduct of tracing work focused on the SSG and warrant a summary of some of the findings from Barton Springs. The following Barton Springs discussion is based upon data in Hauwert et al. (2002 and 2004).

5.1.2.1 Barton Springs

The Barton Springs portion of the Edwards aquifer is composed of Cretaceous-age limestones and is designated as a sole-source aquifer. It supplies water to approximately 44,000 people plus it yields flow to Barton Springs, a popular park and swimming area with an annual paid attendance of 350,000. During the 1996 to 2004 study period the flow rates of the main Barton Spring ranged from about 20 to about 110 cfs with a mean of approximately 53 cfs. According to records of the Barton Springs Edwards Aquifer District, Barton Springs reached a low flow rate of 16.4 cfs on June 25, 1994. Under these conditions groundwater withdrawals from non-agricultural wells were approximately 50% of the Barton Springs discharge. The fact that most wells can produce adequate amounts of water for public water supplies has, in the past, led some to make calculations premised on porous media models and suggest the construction of artificial groundwater recharge basins along losing stream segments within the recharge area for Barton Springs. Subsequent introduction of tracer dyes at some of the proposed recharge basins showed travel rates of only a few days from these locations to Barton Springs and the recharge basin idea was dropped as unworkable.

As of 2004, a total of 20 dye introductions were made within the Barton Springs recharge area. Most of these were made under low to moderate flow rates (defined as less than 35 cfs at Barton Springs). All of the dye introductions made under high flow conditions (35 cfs or more) were detected at one or more springs. 85% of all dye introductions were detected at one or more sampling stations (including wells) and 75% of all dye introductions were detected at one or more springs. All of the dye introductions not detected at any springs were made under low flow conditions.

5.1.2.2 Trace Distance and Detection

Six traces to Barton Springs have involved travel distances in excess of 7 miles, with the longest being 18.6 miles. When the flow rates at Barton Springs have been 35 cfs or more groundwater generally travels about 4 to 7 miles per day along the major groundwater flow routes, but moves at about a mile per day from the western to the eastern side of the recharge area (Hauwert et al., 2004). The longest time between dye introduction and a positive detection at a spring was between 36 and 43 days after dye introduction.

5.1.2.3 Factors for Success

In the Barton Springs studies the amount of tracer dye detected at the receiving springs ranged from 0 to 77% of the introduced quantity, with the mean being 16% and the median being 4.2% (Hauwert et al., 2004). The percentage of introduced dye detected at springs does not correlate well with travel distance.

Factors that appear to have been crucial components of the successful tracing program in the Barton Springs area included:

1. Selection of dye introduction points where substantial volumes of water commonly enter the groundwater system.
2. Introduction of tracer dyes in a high concentration slug followed by at least 10,000 gallons of flush water, and more water if possible.
3. Selection of dye types and quantities based largely upon professional experience with situations that appear similar.
4. Sampling that placed primary reliance upon activated carbon samplers and secondary reliance upon periodic grab samples of water.
5. Sampling of all of the springs in the Barton Springs group. Not all dye introductions were detected at all of the springs even though they are in close proximity to one another. Different springs are related to different flow routes.
6. Careful field and laboratory work.
7. Good characterization of background fluorescence at sampling stations prior to dye introductions.
8. Analysis work that used a high quality laboratory spectrofluorophotometer operated under a synchronous scan protocol.
9. Flexibility in adjusting subsequent dye introductions to results obtained from previous introductions.

To the extent reasonable, similar features were incorporated in conducting the Silver Springs study.

5.1.3 Woodville Karst Plain of Northern Florida

There are ongoing efforts to study the mechanics of karst aquifers in the Woodville Karst Plain (WKP) of North Florida. Groundwater tracing and cave mapping conducted in the WKP have revealed an extensive dendritic network of saturated conduits, more than 70 km in total length, that convey water to Wakulla Spring from the northeast, north, northwest, and south. In some places, the conduits are known to connect to swallets and in others are known to extend upgradient into the aquifer matrix. Two sets of tracer tests were performed in 2005 and 2006 to map groundwater flow pathways between the Ames Sink group of swallets, which receive approximately 60% of the City of Tallahassee's stormwater runoff and the spray field where the City applies its treated effluent, and characterize groundwater velocities along those pathways. The results of these tests revealed that water flows rapidly from both locations to Wakulla Spring. Groundwater velocities through the swimmable portion of the conduit network range from ~1,500 to >2,000 m/day and velocities through the smaller conduit pathways range from 250 to >800 m/day (Kincaid and Werner, 2008).

Other traces conducted in the WKP have yielded similar observations for the lower range of conduit flow rates. One such tracer study involved the introduction of sulfur hexafluoride via wells into subsurface water-filled void spaces in the UFA (FSU Department of Oceanography, 2008). Straight-line travel distances in this study from the point of tracer introduction to the sampling stations ranged from 5 to 6 miles. Another study within the WKP utilized fluorescent dyes introduced near the City of Tallahassee Sprayfield (Hazlett-Kincaid, Inc., 2007.) In this case, the straight-line travel distance was approximately 10 miles. Both of these studies yielded estimated flow velocities that ranged from approximately 100 m/day to 200 m/day, respectively.

There is great variability in karst aquifers, and one should not necessarily assume that the rapid groundwater travel rates encountered in the Big Spring aquifer and other Ozark aquifer segments that supply springs, or in the Barton Springs aquifer, would be reflective of conditions likely to occur in the portions of the Floridan Aquifer supplying SSG. This may or may not be the case. Similarly, while there has been groundwater fluorescent dye traces to Floridan Aquifer springs in north and central Florida that have traveled substantial distances and at rates on the order of one mile per day, this does not necessarily indicate that similar rapid flows typically encountered in conduits exist in the SSG. While cave divers have mapped relatively linear karst conduits feeding Floridan Aquifer springs for many thousands of feet, this does not prove that extensive conduits exist in portions of the aquifer contributing water to the SSG. If they do exist in this aquifer they have not yet been discovered.

5.2 GEOPHYSICAL STUDY

A three-week geophysical study was completed in January 2010 by Technos. A summary of the locations and geophysical methods is presented as **Figure 28**. A meeting was held at Silver River State Park on February 16, 2010 to present the findings to the project team. The Technos Status Report is presented as **Appendix C**. It describes the geophysical methodologies used at each location, presents figures that depict production line and dye introduction locations, and the processed data. A PowerPoint prepared by Technos, which includes a preliminary interpretation of findings presented at the February 16, 2010 meeting, is included in **Appendix C**.

Preliminary interpretation of the geophysical data presented by Technos indicated that a conduit system that might be hydraulically connected to the explored portion of the Silver Springs Cave was not readily apparent. Three other observations shared during discussions at the February 16, 2010 meeting are discussed below:

- The apparent top of rock for the Floridan Aquifer was slightly shallower along the east/west trending northern production line (Line A) and deeper along the east/west trending southern production line (Line B). Group discussion initiated by David Toth (SJRWMD) noted that geochemical water quality data from the SSG vents suggested a strong north-south gradient for a group of analytes that includes nitrate, sulfate, sodium, chloride, and dissolved oxygen. Concentrations of the aforementioned analytes are highest in the southern group of vents and concentrations generally decrease in the vents farther to the north.

- The geophysical data indicated the southern portion of the Ocala Civic Theatre DRA seemed to be more favorable for introduction of dye. During a February 16, 2010 field visit to this DRA, staff from the Ocala Civic Theatre provided information that indicated although small solution features and depressions (approximately 5 ft deep) are currently present in the southern portion of the DRA, two larger features had formed several years prior in the northern portion and had since been filled. They were reportedly large enough to hold several automobiles.

- The geophysical data indicated the western portion of the Spanish Palms DRA appeared to be more favorable for dye introduction (**Photo 14**). Field observations of the western side-slope of this DRA made during a February 16, 2010 field visit showed small-scale signs of apparent side sloughing. Several team members agreed this might be associated with subtle subsidence in that portion of the DRA. Similar features were absent along the other sloped sidewalls of the Spanish Palms DRA.

5.3 SELECTION OF INTRODUCTION POINTS AND DYES

A list of candidate dye introduction locations was assembled from well-known sink and swallet sites, cataloged caves, sinks cataloged on GIS data, and maps showing area DRAs and associated stormwater drainage wells.

Field visits were made to as many sites as possible, including all those ultimately selected. Two area cavers, Bill Birdsall and Jon Singly, associated with the Florida Speleological Society, assisted the study team with field reconnaissance.

The agreed-upon introduction points for Trace Group 1 were Heagy-Burry Sink at Orange Lake, Tuscawilla Park Stormwater Drainage Well NE 9 and the Ocala Civic Theatre DRA. Pontiac Pit Sink and Spanish Palms DRA were selected for Trace Group 2.

The proposed introduction sites included individual examples of the various types of surface to groundwater introduction points that exist throughout Marion County and the City of Ocala; a natural lake swallet, a deep stormwater disposal well, DRAs with observable sinkhole collapses and subsurface anomalies, and a natural sink/cave receiving stormwater runoff. The locations of the selected introduction points are depicted on **Figure 15**.

5.4 HEAGY-BURRY SINK AT ORANGE LAKE - FLUORESCEIN

5.4.1 Background

Orange Lake is located about 17 miles north of Silver Springs (**Photo 15**). Under normal rainfall conditions the areal extent typically varies between approximately 12,550 acres (Florida Fish and Wildlife Conservation Commission [FWC] website) to 16,000 acres (Kindinger et al., 1994). According to the FWC website (accessed April 28, 2011), Orange Lake averages 5.5 ft deep, with a maximum depth of 12 ft. Lake water levels fluctuate an average of 2 ft, annually.

Orange Lake receives inflow along its northern shore from Newman's Lake through River Styx and from Lochloosa Lake through Cross Creek. Cross Creek is navigable to most boats during normal water levels. One point of outflow is controlled by a fixed-crest weir located at Highway 301 at the southeast portion of lake (FWC website, accessed April 28, 2011).

Of notable importance is a less visible Orange Lake discharge point, a sinkhole known as Heagy-Burry Sink. The sinkhole is located at Heagy-Burry Park located on the south shore of Orange Lake (**Photo 16**). Under normal conditions the sink is beneath the lake water elevation and not visible. A photograph of Heagy-Burry sink on the day of dye introduction is presented as **Figure 29**. However, under historical low water level conditions (1956-57 and 1964) the sink was exposed (Davis, 1996). Attempts to plug the sink were made during 1964 by placing 70 automobile bodies, a 13,000-gallon steel storage tank, 3,000 tons of rock, 10,000 cubic yards of "blue gumbo" dirt, approximately 300 tons of concrete riprap and three truckloads of old fence wire in the sink (Davis, 1996).

While these efforts were partly successful, a site visit on December 16, 2009, disclosed a visible current in the channel leading into the sinkhole, indicating that the sinkhole is still conveying a substantial volume of water into the karst aquifer. Based upon estimates of the channel cross section (about 240 square ft) and an estimated mean velocity in the channel of 0.1 ft per second (fps), a crude estimate of flow into the karst groundwater system on December 16, 2009, was about 15.5 million gallons per day (MGD). According to a 1992 estimate, approximately 24.3 MGD of lake water flowed down through the sinkhole into the karst aquifer (Haller and Hoyer, 1992).

5.4.1.1 Dye Selection

The Orange Lake trace was designed to evaluate the possibility that dye could be traced for substantial distances through the Floridan Aquifer to or toward the SSG. Fluorescein was used for the Orange Lake trace because it is the most effective of the four dyes used in the study and has been used for many of the longest groundwater traces conducted to date in the United States. The distance from Heagy-Burry Sink to the middle of the SSG is about 17 miles.

Based upon the distance from Heagy-Burry Sink to the SSG and amounts of dye used for successful long-distances traces in the Ozarks and the Barton Springs portion of the Edwards aquifer a total of 30 pounds of fluorescein dye mixture containing about 75% dye equivalent was used for this introduction. The presence of drinking water wells within a few miles of Heagy-Burry Sink limited the amount of dye that might otherwise have been introduced since the project team did not want to risk creating colored water at one or more of these wells.

5.5 TUSCAWILLA PARK STORMWATER DRAINAGE WELL - EOSINE

5.5.1 Background

The City of Ocala identification number for the stormwater drainage well into which eosine dye was introduced is Drainage Well NE 9 (**Photos 17** and **18**). The SJRWMD geophysical log for this well is M-0649 and is presented as **Figure 30**. The elevation as identified on the SJRWMD geophysical log for the well is 71 ft. The total depth of the well is 214 ft. The well is cased to about 66 ft below ground surface (bgs). From ground surface to about 17 ft bgs the well is cased at 27 inches in diameter. From 17 ft bgs to 66 ft the well has a 15-inch diameter casing. The top of the Floridan Aquifer is at about 44 ft bgs. Below the casing and to the bottom of the well this is an open-hole well with a minimum diameter of about 16 inches. The well extends through the

Ocala Limestone and into the Avon Park Limestone; the depth of the contact is not shown on the well log.

This is one of three drainage wells in Tuscawilla Park. The selected drainage well continually receives water from Tuscawilla Lake which is a DRA with perennial water (**Photo 19**) located west of the well, and a substantial volume of water cascades down the well . It was not possible to make an estimate of the flow rate, but on December 16, 2009, the flow down the well was estimated to be at least 25 gallons per minute (gpm). The lake (and thus the drainage well) receives stormwater runoff water from a large drainage area with industrial and municipal land uses.

This well is approximately 5.1 miles from the SSG. The well is located about 3,750 ft west of the western edge of the 2-year capture zone for the SSG as presently delineated by the SJRWMD.

5.5.2 Dye Selection

Eosine dye was selected for introduction at the Tuscawilla Park Stormwater Drainage Well. The distance from this dye introduction point to the SSG is about 5.1 miles. Thirty pounds of eosine dye mixture containing about 75% dye equivalent was used for this introduction. While the quantity of dye mixture was the same as for the much longer potential distance trace from Orange Lake, this amount of dye was needed because eosine dye is a less effective tracer than fluorescein. The presence of drinking water wells between this dye introduction point and the SSG limited the amount of dye that might otherwise have been introduced. Eosine was a very appropriate dye for this introduction since it is visually much less detectable than any of the other potential dyes.

5.6 OCALA CIVIC THEATRE DRAINAGE RETENTION AREA - RHODAMINE WT

5.6.1 Background

The Ocala Civic Theatre DRA is located in front of the Appleton Center and is approximately 1.5 miles southwest of the SSG. The stormwater retention area has three recently formed sinkhole collapses within the basin plus several soil piping holes and several points where obvious sinkhole repairs have been made (**Photos 20** and **21**). It appears that most of the floor of this DRA is subject to fairly frequent small sinkhole collapses. The existence of such collapses suggests that the Hawthorn Formation is either absent or has been breached by sinkhole collapse and is permitting subsidence and collapse of materials into the underlying Ocala Limestone. No visible evidence was apparent that suggested any sinkholes existed prior to the construction of the DRA.

5.6.2 Dye Selection

Twenty pounds of rhodamine WT dye mixture containing approximately 20% dye equivalent was used for the Ocala Civic Theatre DRA introduction. This was the more appropriate of the two remaining dyes not allocated to other traces. Furthermore, since this dye has a greater adsorption tendency than fluorescein or eosine, its use much closer to the SSG was reasonable. The choice of 20 pounds of this mixture for this introduction was based on previous OUL experience, the desire to ensure that waters in the SSG would not be visually colored, and the need to not reduce the detectability of the other two dyes at sampling points in the SSG.

5.7 PONTIAC PIT SINK - SULFORHODAMINE B

5.7.1 Background

Pontiac Pit Sink is a deep sinkhole in the Ocala Limestone with some connected air-filled cave passages. Access to the cave has been blocked by placing riprap at the cave entrance to prevent entry and a large discharge pipe has been constructed to route storm water runoff from an adjacent constructed wetland retention area located to the east down into the pit (**Photos 22** and **23**). The constructed wetland also receives storm water overflow from a conventional DRA to the west. The topographic area that contributes water to this wetland encompasses approximately 30 to 32 acres. The wetland is designed to always contain water. The shape of the water-filled portion of the wetland is irregular, but is estimated to encompass about 20,000 square ft during times when there is only minimal discharge into the sinkhole. The wetland enhances the quality of the stormwater before it is allowed to enter the karst aquifer.

This sinkhole is approximately 6.3 miles from the SSG. The sinkhole is located in the 10-year capture zone, about 9,100 ft from the western edge of the 2-year capture zone for the SSG as presently delineated by the SJRWMD.

5.7.2 Dye Selection

As designed, the study was to involve two phases of dye introduction. By October 2010 rhodamine WT was still detectable in the SSG, eosine had not yet been detected at any sampling station, and the possibility remained that fluorescein might reach the SSG. This limited the available dyes for a subsequent dye introduction to one dye, sulforhodamine B. Given the similarity of the Ocala Civic Center DRA to the Spanish Palms DRA, the Pontiac Pit Sink, rather than the Spanish Palms DRA was selected as the dye introduction point.

As discussed in **Section 4**, sulforhodamine B is subject to degradation due to deaminoalkylation. This is especially significant if the groundwater traces are of relatively long duration. Results from the rhodamine WT dye introduction at the Ocala Civic Center DRA clearly indicated that the trace from the Pontiac Pit Sink site to or toward SSG could be a relatively long duration trace. Sites closer to the SSG were considered for the fourth trace, yet the Pontiac Pit Sink site was a very desirable site since it was a deep sinkhole and received a substantial amount of stormwater runoff that was treated by passage through a constructed wetland designed to help mitigate impacts from stormwater. A successful groundwater trace from this site would be valuable in demonstrating the importance of treating stormwater runoff prior to allowing it to enter the groundwater system. This site is also representative of many other karst features in the Ocala area that receive storm water

The most important sampling stations for the Pontiac Pit Sink dye introduction were wells located between the sink and the SSG. If the dye reached the SSG it might well be masked by rhodamine WT dye derived from the Ocala Civic Center introduction.

Fifty pounds of sulforhodamine B dye mixture, which contained about 75% dye equivalent, was introduced into the Pontiac Pit Sink.

5.8 SELECTION OF DYE SAMPLING LOCATIONS

The consideration and selection of sampling locations at the various sites for dye introduction and sampling were conducted during two meetings in Marion County on December 1, 2 and 3, and December 15 and 16, 2009. These meetings were attended by SJRWMD, URS, KES, OUL and Technos personnel.

5.8.1 Spring Vents

The study team wanted to include as many of the named spring vents or vent clusters as possible to ensure that vents associated with all three of the geochemically different vent groups were included. Data collected by SJRWMD and KES during previous studies included collecting GPS positions, mapping, sampling, photography and discharge measurements where possible. Based on this level of familiarity by the project team, a list of 35 potential sampling stations was created, targeting individual vents, or more typically, the most prominent vent within a discrete named vent cluster. From that list, 27 SSG vents were selected for sampling, along with one surface water station, a river station at the 1,200 Meter USGS Discharge Monitoring Station.

Spring vent selection was also guided by the statistical cluster analysis of water quality data collected from named vents (INTERA, 2007). For purposes of this study, the project team determined that two spring vents that had not been geochemically grouped (South Boathouse Vent and Gang of Five Vent 3) were to be included as Group 1 vents, consistent with the dominant surrounding vents.

Twelve Group 1 vents were selected for sampling (**Photo 24**). These vents are clustered predominantly to the southeast of Mammoth Springs, the headspring of the Silver River. This group includes the two additional vent clusters that were sampled in the south channel complex and boathouse lagoon. Eight Group 2 vents were sampled (**Photo 25**). These vents are downstream of the headspring and to the east. Four Group Three vents of intermediate water quality to Group 1 and Group 2 were selected (**Photo 26**). These vents are east of and the most downstream of the SSG vents.

Sampled vents were also assessed for suitability for either servicing by a diver or from the water surface due to wildlife considerations and for ease of sample collection. To the greatest extent possible, the charcoal sampler holder was placed within a dominant flow zone of the spring vent.

Because of the proximity and observed transient nature of the spring shed boundary between the SSG and the Rainbow Springs Group (RSG) [Faulkner (1973) and Lane and Hoenstein (1991)] the study team also agreed that it would be prudent to monitor the RSG as a part of the SSG study. The RSG typically has a discharge comparable to, and sometimes greater, than that of the SSG. Three RSG sample station locations (**Photos 27** and **28**) were selected for monitoring on the basis of effectiveness and economy. These included:

- A location on the right bank of the spring run, just downstream of the group of spring vents that comprise the Headspring area
- Bubbling Spring, a significant vent group further downstream on the left bank
- A location along the right bank of the Rainbow River downstream of all of these vents. These sampling sites were set up with tethered sampler holders to allow for servicing from the shore.

5.8.2 Water Wells

Water wells used in this study were selected based primarily on their location along the anticipated axis of travel for the dyes, population served, and construction details. Based on the experiences of sampling wells in prior traces, it was decided that the best wells to use would be active public supply wells with the appropriate screen or open bore interval. Well locations are depicted on **Figure 15** as well as on subsequent figures that depict the straight line dye path travel path.

Active public supply wells, such as those that service municipal entities, subdivisions, schools or other large public water supply operations, typically cycle on and off multiple times during any given day, are metered, and have access ports isolated from the chlorination system (**Photos 29, 30** and **31**). Many thousands of gallons per day may be pumped by them, while a private residential well may only pump a few hundred gallons. Agricultural wells, while capable of delivering large amounts of water, do not operate on a regular cycle due to precipitation and crop status, and often do not provide a good access port for samplers.

Well selection was initiated from GIS maps and well list spreadsheets generated by SJRWMD staff. Candidate wells were selected, and KES staff performed field reconnaissance and established contact with well owners or water system operators. As availability and access to wells was established, the study team made a final decision regarding the inclusion of each candidate well. Once selected, follow-up contact was made with the well owner or system operator, and a sampler holder was installed along with the appropriate control plumbing and discharge dispersal device.

The primary corridor of selected wells for the Trace Group 1 Dye Release was in the area along the axis between Heagy-Burry Sink and the SSG vents. The southern end of this corridor also intersected with the axis between the Tuscawilla Drainage Well and the Silver Springs. The wells selected along these axes included those at three public schools, a state prison, the IFAS Plant Science Research site and City of Ocala municipal supply. A final well at Sherri Oaks subdivision was added to the sampling network at the time of the Trace Group 2 Dye Release, as an additional check for dye from Heagy-Burry Sink. No suitable wells were identified along the axis between the Ocala Civic Theatre DRA and Silver Springs.

Six public supply wells supplying various private subdivisions were selected along the anticipated axis of dye travel between Pontiac Pit Sink and the SSG vents for the Trace Group 2 Dye Trace. One Trace Group 2 well located at the Blue Skies Trailer Park, was intended for use in the Trace Group 1 Dye Trace, but was determined to be unsuitable until plumbing improvements were made at the start of Trace Group 2. A summary of all sample locations, GPS coordinates and known well construction information is presented as **Table 3**.

6.1 REGULATORY AND PUBLIC NOTICE

Two Research and Collecting Permit applications and an Operational Plan/Dye Trace Approval Request were approved by FDEP as part of this dye tracer study. A brief description of these submittals is provided below.

6.1.1 OPERATIONAL APPROVALS

6.1.1.1 Silver Springs Research and Collecting Permit

On November 12, 2009, Research and Collecting Permit #11120913a was issued by FDEP to the SJRWMD and its contractors. This permit authorized a detailed hydrogeologic evaluation including geophysical surveys and dye injection, tracing and sampling at Silver River State Park. A copy of the application and permit is provided in **Appendix D**.

6.1.1.2 Rainbow Springs Research and Collecting Permit

On March 8, 2010, Research and Collecting Permit #03081012 was issued by FDEP. This permit authorized the placement of charcoal samplers and sampling for dye tracing purposes at Rainbow Springs State Park. A copy of the application and permit is provided in **Appendix E**.

6.1.1.3 FDEP Operation Plan Approval

FDEP approved the Operation Plan in an email dated April 20, 2010. A copy of the request and the FDEP approval is provided in **Appendix F**.

6.1.2 Public Notice Prior to Dye Releases

Prior to the release of tracer dyes, the following agencies, companies or individuals were notified several weeks in advance and again at least 48 hours prior to dye introduction. This notification was provided in order that these agencies, companies or individuals would be prepared should they receive calls from members of the general public in the unlikely event that dye was observed in water or wells/systems. Awareness of the dye trace activities by these parties would help manage potential public concern, and allow for project staff to be directed to any such dye observation sites to collect samples.

- Ed Brown, Marion County Health Department
- Jeff Halcomb, City of Ocala Water and Sewer Department
- John Milligan, Marion County Utilities
- Alachua County Environmental Protection Department
- Pro-Tech Water & Wastewater Services, Inc.
- Aqua Pure Laboratories
- Anil Desai, P.G. FDEP Central District
- SJRWMD staff

6.2 BACKGROUND SAMPLING

Background sampling was conducted prior to the introduction of the tracer dyes. The background sampling was designed to identify the presence of any fluorescent tracer dyes or other compounds with similar fluorescent characteristics that might have been present at any of the sampling stations. There were two types of background sampling; Preliminary Background Sampling and, subsequent to it, Comprehensive Background Sampling. Laboratory reports confirmed no positive detections were made regarding the presence of any fluorescent dyes or sources of natural or anthropogenic fluorescent interference during either phase of background sampling. The sampling stations used during the Preliminary Background and Background Sampling are presented in **Table 4**. A complete workbook listing all samples collected and chain-of-custody records is provided in **Appendix G**.

6.2.1 Pre-Background Sampling

Prior to final commitment to the selection of dyes and their introduction sites, four weeks of preliminary or Pre-Background sampling was conducted at six selected spring vents (**Photo 32**). Two vents from each of the three geochemically related vent groups were selected. A seventh preliminary background sampling station was located at the downstream end of the SSG run at the USGS gauging station, also referred to as the 1,200 Meter Station due to its distance downstream from the headspring.

Pre-Background Sampling was started on January 11, 2010, and continued for four approximately one-week intervals until February 9, 2010. Charcoal samplers were then left in place until March 25, 2010, when Comprehensive Background Sampling began. This phase also allowed for the project team to refine sampling techniques, watercraft procedures and further site familiarity.

6.2.2 Comprehensive Background Sampling

Review of the analyses of samples collected during the Pre-Background Sampling phase indicated the absence of potential sources of natural or anthropogenic fluorescence interference. Based on these data, a target date window was set for the Group 1 dye releases and a dedicated, specially equipped KES sampling boat was berthed at the Silver Springs support facilities boathouse. The Comprehensive Background Sampling phase commenced on March 25, 2010, and included establishing sampling stations and sampling at 27 SSG spring vents and the river station selected for the study, along with three stations at Rainbow Springs State Park and 10 initial public supply well stations.

Comprehensive Background Sampling for the spring vents was started on March 25, 2010, and continued for two approximately one-week intervals until April 9, 2010. Charcoal samplers were then left in place until April 22, 2010, the day prior to the Group 1 dye releases. Background sampling was conducted at the ten Group1 public supply wells and the three Rainbow Springs sample stations during this interval. At least two samples were collected with final sampler change-outs two to three days prior to the dye releases.

6.2.3 Field Communications

For any in-water sampling runs, a procedure was established where the team would note activities on a white board in the Silver Springs boathouse and notify Silver Springs Attraction staff of their planned activities prior to departure. A radio, cell phones and a first aid kit were carried on the boat, along with emergency contact information and protocols. The boat was also equipped with all required watercraft safety equipment. A placard identifying the project and its sponsors was also attached to the boat.

6.3 DYE TRACE GROUP 1 INTRODUCTION

Three dye introductions were conducted on April 23, 2010, and are described below. Collectively, these three dye introductions are sometimes referred to as the Trace Group 1, as these were the first dye introductions of the study.

6.3.1 Orange Lake – Fluorescein

In the early morning of April 23, 2010, KES and URS staff, along with SJRWMD personnel arrived at Heagy-Burry County Park located in Marion County on the southern shore of Orange Lake. This location was the first of the three dye releases planned for that day. An assessment of conditions at the site was made and it was visually confirmed that water from Orange Lake was flowing into Heagy-Burry Sink.

Thirty pounds of fluorescein dye supplied by OUL and contained in a total of six plastic carboys was introduced into the Heagy-Burry Sink via a weighted hose and funnel. The powdered dye in the carboys was premixed with water offsite the previous day. The weighted end of the hose was placed into the water from shore as near as possible to the submerged opening of the sink. The opposite end was fitted with a funnel to facilitate pouring of the dye into the hose. The dye introduction team began to pour the dye into the funnel, which then gravity flowed into the submerged discharge hose and into the mouth of the submerged sink (**Photos 33, 34, 35** and **36**).

The initial dye release pour began at 08:52 and was completed at 09:01. At 09:21, rinsing of all carboys was completed. Additional cleanup rinsing by the dye release team continued at the boat ramp, and was finished by 09:45. As the team prepared to leave Orange Lake, it was noted that only a trace amount of fluorescein dye was visible on the surface of the water in the vicinity of the sink. During the dye introduction, visual observations confirmed that the dye was carried down into the karst aquifer as the lake water flowed through the sink.

The dye release team secured the empty carboys in the vehicles dedicated for dye transport, bagged any release-related trash and contaminated items, changed clothes and used a bleach spray as needed for decontamination.

6.3.2 Tuscawilla Park Stormwater Drainage Well - Eosine

In the mid-morning of April 23, 2010, KES and URS staff, along with SJRWMD personnel arrived at Tuscawilla Park in Ocala, Florida to perform the second of the three dye releases planned for that day. The manhole covering the wellhead for the stormwater drainage well was opened, and it was observed that there was a constant flow of water coming into the upper well housing from the control structure on the adjacent stormwater pond, locally known as Tuscawilla Lake. This inflow provided the chase water for the dye.

Thirty pounds of eosine dye from six carboys supplied by OUL was directly poured into the well's open manhole (**Photo 37**). (The dye powder in the carboys was premixed with water offsite the previous day.) The initial pour began at 11:17 hours, and by 11:24, all six carboys had been emptied into the well. At 11:35, rinsing of all carboys was completed. Additional cleanup by the dye release team was finished by 11:41. All dye poured into the manhole was transported down into the well by the incoming pond overflow water.

The dye release team secured the empty carboys in the vehicles dedicated for dye transport, bagged any release-related trash and contaminated items, changed clothes and used a bleach spray as needed for decontamination.

6.3.3 Ocala Civic Theatre DRA – Rhodamine WT

In the late morning of April 23, 2010, KES and URS staff, along with SJRWMD personnel arrived at the Ocala Civic Theatre DRA in Marion County to perform the third of three dye releases planned for that day. The team laid out approximately 700 ft of collapsible 2.5-inch fire hose from the nearest city fire hydrant located on the north side of the Ocala Civic Theatre to the karst collapse feature selected for dye introduction at the south end of the DRA. At the hydrant connection, a city-supplied meter that read in cubic feet of water was used to measure and control the amount of water used. KES was responsible for water supply control and monitoring. Once the supply line was in place, a pre-flush to test the lines and wet the sinkhole began at 11:39 hours. Just over 5,000 gallons was allowed to flow into the sink, with the pre-flush ending at 12:14.

Twenty pounds of rhodamine WT dye from one drum supplied by OUL was directly poured into the sinkhole (**Photo 38**). The initial pour began at 12:20 hours, and by 12:26, the drum had been emptied and rinsed. At 12:27, the chase water was started. The dye was direct-poured into the sinkhole while chase water was running. The chase water effectively flushed the dye into the sinkhole, with only some dye stains left on the sinkhole walls (**Photo 39**). The chase water was continued until 17:47, with just over 70,000 gallons used for the chase operation.

The dye release team secured the empty drum in the vehicle dedicated for dye transport, bagged any release-related trash and contaminated items, changed clothes and used a bleach spray as needed for decontamination.

During the addition of the chase water a small amount of sidewall collapse occurred to the sinkhole. Civic Theatre, Marion County and SJRWMD staff were notified. As a safety precaution, an orange, high-visibility safety fence was erected around the sinkhole (**Photo 40**). The sinkhole was backfilled to land surface with clean fill several weeks after the dye introduction was completed.

6.4 DYE TRACE GROUP 2 INTRODUCTION

6.4.1 Pontiac Pit Sink – Sulforhodamine B

On the morning of October 5, 2010, KES and URS staff, along with SJRWMD personnel, arrived at the Pontiac Pit Sink in Ocala, Marion County, Florida. The Pontiac Pit Sink is located south of SW 32nd Street, at the western end of a constructed stormwater wetland retention area. A conventional stormwater DRA lies hydraulically upgradient and adjacent to the west. Intermittent overflow from the wetland retention area is conveyed into Pontiac Pit Sink through an overflow control structure discharge pipe that is routed to the bottom of the pit.

The team laid out over 1,200 ft of collapsible 2.5-inch fire hose from the nearest city fire hydrant located west of the sink on SE 3rd Avenue. At the hydrant connection, a city-supplied water meter was used to measure and control the amount of pre-wetting and chase water used for the dye introduction. KES was responsible for water supply control and monitoring. Once the supply line was in place, a pre-flush was begun at 10:12 hours to test the lines and pre-wet the bottom of the sinkhole. Just over 2,500 gallons was allowed to flow into the sink with the flow continuing as the dye was mixed and released.

Fifty pounds of sulforhodamine B dye from nine containers supplied by OUL were mixed with chase water on-site (**Photos 41** and **42**). URS provided dye mixing and cleanup support. The dye was delivered as a dry powder from OUL and dissolved in water in a mixing drum on-site at the point of release. The bottom of the drum was fitted with a valve and the dye solution was discharged directly into flowing chase water, which then flowed into the sink and underground. The initial pour began at 10:32 hours, and by 10:39, all nine containers/50 lbs. had been mixed and released into the sink. All container and equipment rinsing was completed by 10:55 (**Photo 43**). The chase water effectively flushed the dye into the sink, with only some dye stains left on the sink floor rubble.

The dye release team secured the empty containers and release equipment in the vehicle dedicated for dye transport, bagged any release-related trash and contaminated items, changed clothes and used a bleach spray as needed for decontamination. The dye handling vehicle and personnel then left the site. The chase water was continued until 08:46 on October 6, 2010, with just over 172,000 gallons used for the chase operation.

6.5 FIELD SAMPLING – DYE TRACE GROUP 1

6.5.1 SSG In-Water Sampling

Charcoal packets were exchanged in the SSG vents on April 22, 2010, one day prior to Trace Group 1 dye release. These stations were then sampled for 10 weeks, with charcoal sampler exchanges occurring at approximately one-week intervals, until June 22, 2010, or at 60 days from the release of the dyes (**Photo 44**). In-water sampling was then paused for 44 days until August 5, 2010, due to issues related to a wildlife attack on one of the sampling personnel. The next sampling interval was on September 2, 2010, after a 28-day interval. A 20-day interval followed, with sampling on September 22, 2010. The final sampling visit for Trace Group 1 was on October 4, 2010. This also marked the start of the Trace Group 2 sampling. Sampling at the in-water stations at Rainbow Springs followed the schedule for well sampling.

6.5.2 Rainbow Springs and Municipal Well Sampling

Charcoal packets were exchanged in Rainbow Springs sample stations on April 20, 2010, and Trace 1 well sampling stations on April 21, 2010, two and three days, respectively, before the Trace Group 1 dye release. These stations were then sampled for 11, approximately one-week intervals until July 8, 2010, 76 days after the release of dyes (**Photos 45** and **46)**). A 13-day interval followed, with sampling conducted on July 21, 2010. At this point, sampling at Rainbow Springs was delayed for 77 days until resuming on October 6, 2010, after the start of the Trace Group 2 dye release. The next sampling interval was on September 1, 2010, after a 42-day interval. This was the final sampling date for the Reddick Elementary School, IFAS and McIntosh wells.

6.5.3 ACEPD Short Duration Sampling Event

Independent of the contracted SSG study between URS and SJRWMD the Alachua County Environmental Protection Department (ACEPD) conducted a short duration sampling event in association with the release of fluorescein at Heagy-Burry sink at Orange Lake. Three water wells located in Alachua County northwest, north and northeast of Heagy-Burry Sink were identified and sampled by ACEPD staff. The wells were selected by ACEPD to help assess for the detectable presence of a northward component of groundwater flow associated with Heagy-Burry sink. The wells monitored were:

- The Town of Micanopy municipal supply well
- Cross Creek Mobile Home Park
- Island Grove Blueberry Farm

Charcoal samplers along with a water sample were collected at each location on roughly a one week interval from March 29, 2010 to June 14, 2010. Five charcoal samplers from each well were sent to the OUL for analysis under contract with ACEPD. The collection date of each sampler was April 12 (background), May 10, May 24, June 14 and June 28, 2010.

6.6 FIELD SAMPLING – DYE TRACE GROUP 2

6.6.1 SSG In-Water Sampling

Immediately prior to the Trace Group 2 dye release, all in-water stations were changed out and water samples collected on October 4, 2010. This and prior samplings acted as de-facto background samplings for this phase. Sampling intervals, which had been spaced farther apart to allow for appropriate coverage, were reset to one-week intervals. Otherwise, in-water sampling procedures continued exactly as during the Group 1 sampling. Sampling at the in-water stations at Rainbow Springs followed the schedule for well sampling as before.

Charcoal packets were sampled for ten, approximately one-week intervals until December, 2010, 64 days from the release of the Trace Group 2 dye. Four more 10 to 14 day sampling intervals conducted to January 1, 2011, for 48 days. Seven 15 to 20 day intervals followed until May 26, 2011. The final interval of 20 days was ended on the final sampling visit of this study on June 15, 2011.

6.6.2 Rainbow Springs and Municipal Well Sampling

On October 4, 5 and 6, 2010, charcoal packets were exchanged in the well sampling stations. Rainbow Springs stations were exchanged on October 6, 2010. The group of selected water wells designated for Trace Group 2 was sampled for 11, approximately one-week intervals until December 16, 2010, 73 days from the second dye release. An 11-day and a 10-day interval followed, with sampling conducted on January 6, 2011. This well group consisted of two City of Ocala municipal wells from the Trace Group 1 and five additional wells relative to the Pontiac Pit Sink area.

A second group of selected wells, designated “Phase 1 Wells” was then sampled for seven, approximately two-week to three-week intervals until January 6, 2011, 93 days from the second dye release. This well group consisted of the Reddick Elementary School Well #5, Marion High

School and Marion Correctional Institute Well 1 from the Trace Group 1 south of Orange Lake and one additional public supply well in that area. Sampling at Rainbow Springs was performed on the same schedule as the Phase 1 Well samplings. The well at Marion Correctional Institution Well 1 was taken out of service on March 14, 2011 and has been abandoned by grouting.

After the January 6, 2011 sampling event the Phase 1 and Phase 2 wells and the Rainbow Springs stations were all sampled on the same schedule, with sampling continuing at 14-day to 20-day intervals. This sampling continued for eight more intervals, for a total of 138 days. The final interval of 21 days was ended on the final sampling visit of this study on June 16, 2011.

6.7 SSG DYE TRACE EXTENDED SAMPLING

At the completion of field activities conducted as part of the SSG study performed under SJRWMD Contract # 23453 analytical results from the June 16-17, 2011 sampling event detected the presence of dye at several sites indicating that dyes were still moving through the groundwater system in the direction of the SSG. At that time there were still two dyes (fluorescein and sulforhodamine B) released during the study that were as yet undetected at SSG. Therefore, SJRWMD authorized KES under a separate contract to continue sampling at 16 stations on a monthly basis for the July through September 2011 time period.

Sampling stations monitored during this extended sampling period included eight spring vents within the SSG, two vents at Rainbow Springs, and six water wells. The SSG spring vents were Mammoth East and West, Ladies Parlor, Blue Grotto, Christmas Tree, Catfish Hotel, Shipwreck and the South Boat House Vents. At Rainbow Springs, the Rainbow Springs Headsprings and Bubbling Springs stations were monitored. The water wells monitored were the City of Ocala Municipal Wells 1 and 2, Blue Skies Well #1, Cedar Hills Wells, Fort King Forest Well, and the Pine Ridge Well. The collection dates for these sampling events were July 22, August 15, and September 14, 2011.

During the July and August 2011 sampling events all other stations used in the SSG were taken out of service. Only the selected sixteen stations remained active until completion of the September 14, 2011 sampling event was completed. During that field event all remaining sampler holders and well devices were removed.

6.8 CARBON SAMPLER AND WATER ANALYTICAL SUMMARY

A total of 1,659 carbon samples (as sampler pairs) were placed and collected during this study and the extended sampling period. Of these, 1,295 were analyzed, along with 58 duplicate samples for quality control. Of the 149 background samples placed, 76 were analyzed.

Of the 1,295 charcoal samplers anlayzed, 286 were positive for rhodamine WT, four were positive for eosine, 23 were positive for fluorescein and 23 were positive for sulforhodamine B. Rhodamine WT detections were observed at 20 springs and vent clusters and one river station, One spring vent yielded positive dye detections for two dyes, rhodamine WT and eosine. Four wells yielded a positive for fluorescein and three wells yielded positive for sulforhodamine B.

A total of 56 water samples were analyzed, however, only twelve water samples collected from three wells yielded a positive for fluorescein.

This section summarizes the results of the four dye introductions made in conjunction with this study. Analytical results are summarized in **Table 5**. Supplemental data for the short duration sampling event conducted by ACEPD is presented in **Appendix H**.

On March 31, 2011, OUL installed a new Shimadzu RF-5301 spectrofluorophotometer. All sample numbers beginning with U7128 were analyzed with this instrument. A discussion of the slight differences in the acceptable wavelength ranges as determined by OUL in accordance with their Procedures and Criteria document is presented in **Section 4** of this report.

Primary sampling reliance in the tracing work was based upon activated carbon samplers. These are accumulating samplers that were left in place for varying lengths of time. In order to normalize the data in some of the following discussions, the dye concentration recovered from the individual samplers have been divided by the number of days the sampler was in place to derive a mean daily dye concentration. Since these are accumulating samplers, the concentrations for multiple samples can be added together for purposes of comparing how total dye concentrations have varied among the various dye detection locations. When there are duplicate samples for the same sampling period, the mean value is used. In the case of spring vents these total dye concentrations could be multiplied by the estimated mean discharge rate of the vent to estimate the percentage of total dye discharge that has been derived from individual vents. Such calculations have not been made in this report.

Important times in dye tracing studies are commonly:

- Time of the first dye arrival at each positive detection station.
- Time of the peak dye concentration arrival at each detection station.
- Time when the dye concentration at each detection station has decreased by at least one order of magnitude from the peak concentration.
- Time when half of the detected dye has reached the sampling station.

Where there are adequate data, these times are included in summary tables.

The initial plan was to analyze water samples where one or more tracer dyes had been detected in the associated activated carbon sampler from that station or if activated carbon samplers had been lost. However, dye concentrations at the SSG vents were found to be below the detection limit for the dyes in water and relatively few water samples from the vents were analyzed. Water samples from some wells were analyzed and fluorescein dye from Heagy-Burry Sink at Orange Lake was detected in three of these wells. **Table 6** presents a summary of all first detections in charcoal samplers for the study.

7.1 ORANGE LAKE TRACE

Heagy-Burry Sink at Orange Lake is 17 miles north of the SSG. On April 23, 2010 (Day 0 for this trace) 30 pounds of fluorescein dye mixture containing approximately 75% dye equivalent and 25% diluent was introduced into water naturally draining into this sink from Orange Lake. The rate of inflow into the sink was approximately 15.5 MGD and this approximate rate continued for at least several months after dye introduction. **Figure 31** shows the straight-line dye trace path for this introduction.

Dye from the Orange Lake Sink introduction was detected at the following four sampling stations:

- Station 54. Reddick Elementary School Well 5. This station is 4.2 miles from the dye introduction point.
- Station 59. IFAS Plant Science Unit Well D. This station is 2.1 miles from the dye introduction point.
- Station 58. IFAS Plant Science Unit Well A. This station is 2.2 miles from the dye introduction point.
- Station 57. Marion Correctional Institution Well 1. This station is 8.5 miles from the dye introduction point.

Graphs that depict the mean fluorescein concentration in activated carbon samplers at Reddick Elementary School Well #5, IFAS Plant Science Unit Well D, IFAS Plant Science Unit Well A, and Marion Correctional Institution Well 1 are presented as **Figures 32, 33**, **34** and **35,** respectively**. Figure 36** depicts the normalized data from these four wells on one graph.

Tabular summaries of data for the four sites are presented below.

Fluorescein Dye Analysis Results from Activated Carbon Samplers at Station 54. Reddick Elementary School Well 5

Day Number	Total Concentration (ppb)	Mean Concentration per day (ppb)	Comments
0-6	ND	0	
6-13	79.1	11.3	First Arrival
13-20	166	23.7	Peak Arrival
20-27	120	17.1	50% Arrival
27-33	67.5	10.4	
33-40	65.3	9.3	
40-48	41.8	5.2	
48-54	26.2	4.4	
54-61	23.9	3.4	
61-68	13.7	2.0	Order of Magnitude Decline
68-89	nsa, est 30	1.4 est	
89-131	16.0	0.4	
Total	644.5		

Detection limit in elutant is 0.025 ppb.
ND = None Detected; nsa = no samples analyzed; est = estimated

Fluorescein Dye Analysis Results from Water Samples at Station 54
Reddick Elementary School Well 5

Day Number	Concentration (ppb)	Comments
13	6.41	First Arrival and Peak Arrival
20	3.43	
27	2.42	Likely that 50% of Dye Arrived by this Date
33	1.90	
40	1.19	
48	0.844	
54	0.688	
61	0.594	Order of Magnitude Decline
68	0.481	

Detection limit in water is 0.002 ppb.
ND = None Detected; nsa = no samples analyzed; est = estimated

Dye Analysis Results from Activated Carbon Samplers at Station 59
IFAS Plant Science Unit Well D

Day Number	Total Concentration (ppb)	Mean Concentration per day (ppb)	Comments
0-6	ND	0	
6-13	26.7	3.81	First Arrival and Peak Arrival
13-20	10.1	1.44	
20-27	ND	0	
27-33	ND	0	
33-40	6.97	1.00	
40-48	ND	0	
48-76	nsa	---	
76-89	2.62	0.20	
89-131	ND	0	
Total	>46.39		

Detection limit in elutant is 0.025 ppb.
ND = None Detected; nsa = no samples analyzed

Fluorescein Dye Analysis Results from Water Samples at Station 59
IFAS Plant Science Unit Well D

Day Number	Concentration (ppb)	Comments
13	0.176	First Arrival and Peak Arrival
20	ND	
27	ND	
40	ND	
89	ND	

Detection limit in water is 0.002 ppb.
ND = None Detected

Fluorescein Dye Analysis Results from Activated Carbon Samplers at Station 58
IFAS Plant Science Unit Well A

Day Number	Total Concentration (ppb)	Mean Concentration per day (ppb)	Comments
0-6	nsa	---	
6-13	ND	0	
13-20	ND	0	
20-27	0.688	0.098	First Arrival
27-33	2.49	0.415	
33-40	nsa	---	
40-48	3.04	0.380	
48-76	nsa	---	
76-89	9.67	0.744	Peak Arrival
89-131	5.29	0.126	
Total	>21.18		

Detection limit in elutant is 0.025 ppb.
ND = None Detected; nsa = no samples analyzed

Fluorescein Dye Analysis Results from Water Samples at Station 58
IFAS Plant Science Unit Well A

Day Number	Concentration (ppb)	Comments
33	ND	
48	0.055	First Arrival and Peak Arrival
89	0.041	

Detection limit in water is 0.002 ppb.
ND = None Detected

Fluorescein Dye Analysis Results from Activated Carbon Samplers at Station 57
Marion Correctional Institution Well 1

Day Number	Total Concentration (ppb)	Mean Concentration per day (ppb)	Comments
165-181	ND	0	
181-194	0.604	0.046	First Dye Arrival
194-208	0.772	0.055	
208-222	0.643	0.046	
222-237	0.868	0.058	
237-259	ND	0	
259-279	ND	0	
279-314	nsa	unknown	
314-330	1.97	0.123	Peak Arrival
Total	>4.86		

Detection limit in elutant 0.025 ppb
ND = None Detected. nsa = no samples analyzed.

Note that no water samples were analyzed for the Marion Correctional Institution Well 1.

7.1.1 ACEPD Short Duration Laboratory Results

The ACEPD short duration sampling event was conducted to help assess for the detectable presence of fluorescein and therefor a northward component of groundwater flow associated with Heagy-Burry sink. Laboratory analyses indicated that no fluorescein dye was present above normal laboratory detection limits in the charcoal samplers collected from the Town of Micanopy municipal supply well, the Cross Creek Mobile Home Park well or the Island Grove Blueberry Farm irrigation well.

7.2 TUSCAWILLA PARK DRAINAGE WELL TRACE

The Tuscawilla Park Drainage Well is located approximately 5.1 miles from the SSG. On April 23, 2010 (Day 0 for this trace) 30 pounds of eosine dye mixture containing approximately 75% dye equivalent and 25% diluent was introduced into water draining into this well. This well receives water from an adjacent large stormwater detention pond, which in turn receives stormwater runoff from a large area with municipal and industrial land uses.

Station 32, South Boathouse Vent in the SSG, was the only sampling station where this dye was detected. The table below provides dye detection results for this sampling station. **Figure 37** shows the straight-line dye trace path for this introduction.

Eosine Dye Analysis Results from Activated Carbon Samplers at Station 32 South Boathouse Vent

Day Number	Total Concentration (ppb)	Concentration per day (ppb)	Comments
264-277	ND	0	
277-295	ND	0	
295-312	0.191 **	0.011	First Arrival
312-329	0.705	0.041	
312-329	1.25 (D)	0.074	Peak Arrival
329-349	ND	0	
349-368	ND	0	
368-384	0.238 **	0.015	
384-400	ND	0	
400-421	0.434	0.021	
421-456	ND	0	Sampler found missing at time of collection for days 456-480
480-509	ND	0	

Detection limit in elutant is 0.050 ppb.
ND = None Detected
(D) = Duplicate sample
** Sample did not meet all the requirements for a positive sample. However, it is the opinion of OUL that this fluorescence peak is due to the eosine introduced at Tuscawilla Park.
Sampler found missing at time of collection for days 456-480

The amount of dye detected from this trace was small, and was detected at only one of the sampling stations in the SSG. However, both the sample and its duplicate for the sampling period from February 28 to March 17, 2011 (Days 312 and 329) were clearly positive for eosine dye and the two footnoted samples shown in the table above are consistent with weathered eosine as would be expected from dye that had been in the ground for periods on the order of 295 to 384 days. A graph that depicts the mean eosine concentration in activated carbon samplers at South Boathouse Vent is presented as **Figure 38**.

The South Boathouse Vent is one of the closest sampling points in the SSG to Tuscawilla Park, so this result is not surprising. Small amounts of eosine dye are not as readily eluted from charcoal samplers as are fluorescein and rhodamine WT dyes. It is thus possible that non-detectable amounts of eosine were adsorbed onto activated carbon samplers at other SSG sampling stations.

7.3 OCALA CIVIC THEATRE DRA TRACE

The dye introduction point for this trace was in the DRA for the Ocala Civic Theatre. This feature is located about 1.5 miles from Silver Springs. On April 23, 2010 (Day 0 for this trace) 20 pounds of rhodamine WT dye mixture containing 20% dye equivalent and 80% diluent was introduced into a sinkhole within this DRA. The dye was flushed into the groundwater system with 70,140 gallons of water. The detection limit for rhodamine WT in elutant is 0.170 ppb.

All dye detections were in spring vents at Silver Springs. There were a total of 26 sampling stations associated with Silver Springs. Twenty-five of the sampling stations were at the mouths of spring vents where samplers were placed and recovered by divers. One sampling station was at the USGS station downstream of all the sampled spring vents.

The following SSG sampling stations had one or more samples that fully met the criteria for positive rhodamine WT detections:

- Station 1. Mammoth East
- Station 2. Mammoth West
- Station 4. Catfish Reception Hall
- Station 5. Bridal Chamber
- Station 6. Oscar
- Station 7. Devil’s Kitchen A
- Station 9. Ladies Parlor
- Station 10. Alligator Hole
- Station 12. Geyser
- Station 19. First Fisherman’s Paradise
- Station 32. South Boathouse Vent
- Station 33. Gang of Five Vent 3

The following SSG stations had one or more samples characteristic of weathered rhodamine WT dye, but no samples that fully met the criteria for positive rhodamine WT detections:

- Station 11. Mastodon Bone
- Station 13. Blue Grotto
- Station 14. Christmas Tree

- Station 18. Indian Cave
- Station 20. No Name Cove
- Station 21. Turtle Meadows
- Station 23. Catfish Hotel
- Station 28. Shipwreck
- Station 31. Silver River @ 1200 m Station.

The following sampling stations within the SSG had no positive detections or any detections characteristic of weathered rhodamine WT dye:

- Station 15. Garden of Eden
- Station 16. Log
- Station 24. Turtle Nook
- Station 26. Raccoon Island
- Station 30. Timber

All of the sampling stations that had at least one sample that fully met the criteria for a positive rhodamine WT detection also had one or more samples that did not fully meet the criteria. The fluorescence characteristics of these samples that did not fully meet the criteria were essentially the same as samples from the nine sampling stations where no samples fully met the criteria. Given this similarity, it is the conclusion of OUL that these nine sampling stations also received rhodamine WT dye from the Ocala Civic Theatre Trace.

Figure 39 shows the straight-line dye trace path for this introduction. Graphs that depict the mean rhodamine WT concentration in activated carbon samplers at Mammoth East (Group 1), Mammoth West (Group 2), Catfish Reception Hall (Group 1) and South Boathouse Vent (presumed Group 1) are presented as **Figures 40, 41**, **42** and **43,** respectively**. Figure 44** depicts the normalized data from these four vents on one graph.

The following four tables summarize dye tracing results from all of the SSG vents that were sampled. There is a separate table for each of the three vent groups plus a fourth table for the two vents that were not assigned to any vent group by Butt et al. (2008). In each table the results are arranged in descending order of the total dye concentration detected. The total dye concentration detected is the sum of all reported dye concentrations, including those that are footnoted as not fully meeting the criteria for positive rhodamine WT dye detections. Where duplicate samples were analyzed, the mean of the two values is used in the calculations. The peak arrival column is based upon the maximum mean daily concentration. The column labeled "Order of Magnitude Decrease" is the period where the mean daily dye concentration first declined to 10% or less of the maximum mean daily concentration value.

Rhodamine WT Results from Sampled Group 1 Vents

Station	Total Dye (ppb)	First Arrival (days)	Peak Arrival (days)	Order of Magnitude Decrease (days)	Arrival of 50% of Dye (days)
1. Mammoth East	348.3	5-10	10-16	60-104	39-45
4. Catfish Reception Hall	282.2	5-10	39-45	152-164	52-60
9. Ladies Parlor	200.3	5-10	32-39	180-185	60-104
7. Devil's Kitchen A	195.3	5-10	16-21	132-152	45-52
5. Bridal Chamber	173.1	10-16	39-45	164-171	52-60
10. Alligator Hole	102.4	16-21	16-21	164-171	60-104
12. Geyser	76.34	16-21	16-21	152-164	45-52
13. Blue Grotto *	53.43	16-21	16-21	**	132-152
6. Oscar	51.26	16-21	16-21	164-171	60-104
18. Indian Cave *	33.73	60-104	238-250	**	238-250
19. First Fisherman's Paradise	11.32	39-45	39-45	**	104-132
20. No Name Cove *	3.97	60-104	60-104	**	60-104
Median	**89.35**	**16-21**	**24-30**	**164-171**	**60-104**

* No samples from this station fully met the criteria for positive detection of rhodamine WT dye, but it is the conclusion of OUL that this is a positive dye detection station.
** Insufficient data to assess.

Rhodamine WT Results from Sampled Group 2 Vents

Station	Total Dye (ppb)	First Arrival (days)	Peak Arrival (days)	Order of Magnitude Decrease (days)	Arrival of 50% of Dye (days)
2. Mammoth West	40.27	10-16	16-21	152-164	45-52
11. Mastodon Bone *	14.04	32-39	32-39	104-132	60-104
21. Turtle Meadow *	13.49	104-132	277-295	**	264-277
14. Christmas Tree *	3.64	277-295	277-295	**	277-295
15. Garden of Eden	ND				
16. Log	ND				
24. Turtle Nook	ND				

26. Raccoon Island	ND				

* No samples from this station fully met the criteria for positive detection of rhodamine WT dye, but it is the conclusion of OUL that this is a positive dye detection station.
** Insufficient data to assess.

Rhodamine WT Results from Sampled Group 3 Vents

Station	Total Dye (ppb)	First Arrival (days)	Peak Arrival (days)	Order of Magnitude Decrease (days)	Arrival of 50% of Dye (days)
23. Catfish Hotel *	13.29	60-104	185-192	**	104-132
28. Shipwreck *	9.32	104-132	132-152	**	104-132
30. Timber	ND				

* No samples from this station fully met the criteria for positive detection of rhodamine WT dye, but it is the conclusion of OUL that this is a positive dye detection station.
** Insufficient data to assess.

Rhodamine WT Results from Vents Not Assigned to Any Group and Presumed to be Group 1

Station	Total Dye (ppb)	First Arrival (days)	Peak Arrival (days)	Order of Magnitude Decrease (days)	Arrival of 50% of Dye (days)
32. South Boathouse	531.6	5-10	21-26	60-104	32-39
33. Gang of Five, Vent 3	200.4	5-10	21-26	152-164	52-60

7.4 PONTIAC PIT SINK TRACE

Pontiac Pit Sink is located approximately 6.3 miles from the SSG. On October 5, 2010 (Day 0 for this trace) 50 pounds of sulforhodamine B dye mixture containing approximately 75% dye equivalent and 25% diluent was introduced into water draining into this large sinkhole. Adjacent to this sinkhole is a large constructed wetland that provides treatment for stormwater runoff from an area of about 30 to 32 acres. The dye was flushed into the groundwater system with just over 172,000 gallons of water from a fire hydrant.

As discussed in **Section 5**, sulforhodamine B dye is viewed as the least effective of the four dyes used in this study. One of the significant limitations of this dye is that it exhibits greater losses to adsorption onto earth materials than is the case for any of the other three dyes used. Additionally, it is subject to deaminoalkylation. This process degrades the dye to other fluorescence compounds with emission fluorescence wavelengths shorter than the normally acceptable wavelength range for unaltered sulforhodamine B dye. Even with these limitations, sulforhodamine B was used for this trace because the other three potential dyes (fluorescein, eosine, and rhodamine WT) were already in use in the study area.

The normally acceptable emission peak wavelength range for sulforhodamine B dye in charcoal elutants was from 572.8 to 579.6 nm on OUL's RF-5301 spectrofluorophotometer in use from the beginning of the study through March 30, 2011. The range for the new instrument for charcoal elutants in use from March 31, 2011 forward was 576.4 to 583.2 nm. All OUL sample numbers of U7128 or greater were analyzed with the new instrument; numbers prior to U7128 were analyzed with the old instrument. OUL laboratory numbers for all samples are shown in the summary of laboratory analyses presented as **Table 5**.

It is the opinion of OUL that deaminoalkylated sulforhodamine B dye was detected at three sampling stations.

- Station 62. Blue Skies Well 1, located 3.5 miles north-northeast of Pontiac Pit Sink.
- Station 63. Cedar Hills Well, located 2.4 miles east of Pontiac Pit Sink
- Station 64. Fort King Forest Well, located 4.4 miles northeast of Pontiac Pit Sink.

For Station 62, Blue Skies Well 1, 16 samples or sample duplicates were analyzed prior to any fluorescence peaks ascribed to deaminoalkylated sulforhodamine B dye. The comparable number of samples for Cedar Hills Well was 8; and it was 16 for Fort King Forest Well. Within the groundwater system of the study area, and especially at wells, emission fluorescence peaks due to compounds other than the dyes introduced for this study are essentially non-existent. As a result, emission fluorescence peaks at three wells between Pontiac Pit Sink and SSG are clearly atypical for the groundwater system.

The peak emission fluorescence wavelengths for the samples for all three wells are similar, thus indicating that the same compound is present at all three sites. No other wells in the study area have similar fluorescence peaks. All three of the wells (Stations 62, 63, and 64) are located between 2.4 and 4.4 miles of Pontiac Pit Sink and lie generally between Pontiac Pit Sink and the SSG. The first detections of the weathered sulforhodamine B dye for the three sampling stations are shown in the table below. The data suggest that the time between dye introduction and the first dye detection at the wells increases as the distance from the sink to the wells increases. This makes good hydrologic sense.

Figure 45 shows the straight-line dye trace path for this introduction. Graphs that depict the mean sulforhodamine B concentration in activated carbon samplers at Blue Skies Well 1, Cedar Hills Well 1 and the Fort King Forest Well are presented as **Figures 46, 47 and 48,** respectively. **Figure 49** depicts the normalized data from these three wells on one graph.

Dye Detection Stations for Pontiac Pit Sink Trace Showing Distances From the Sink and Period of First Dye Detections

Station	Distance from Pontiac Pit Sink (miles)	First Detection
Cedar Hills Well 1	2.4	11/24/10 to 12/1/10 Days 50 to 57
Blue Skies Well 1	3.5	1/6/11 to 1/26/11 Days 93 to 113

Fort King Forest Well	4.4	3/1/11 to 3/18/11 Days 147 to 164

Rhodamine WT dye, used for the Civic Center Theatre Trace, is also subject to deaminoalkylation. However, in the experience of OUL, when this occurs it occurs much more slowly than sulforhodamine B. The fluorescence peaks at the three wells listed in the preceding table cannot be ascribed to rhodamine WT since potentiometric contour maps indicate that the elevation of the potentiometric surface at the Civic Center Theatre dye introduction point is lower in elevation than at any of the three wells. Furthermore, the rhodamine WT has been shown to move toward the northeast and the SSG rather than to the south or west toward the three wells.

The three tables provided below show dye tracing results at Blue Skies Well 1, Cedar Hills Well 1, and Fort King Forest Well, respectively.

Degraded Sulforhodamine B Dye Analysis Results from Activated Carbon Samplers at Station 62. Blue Skies Well 1.

Sample Period	Day Number	Emission Fluorescence Peak (nm)	Concentration as Sulforhodamine B (ppb)
11/10 to 11/17/10	36-43	ND	
11/17 to 11/24/10	43-50	ND	
11/24 to 12/1/10	50-57	ND	
12/1 to 12/9/10	57-65	ND	
12/9 to 12/16/10	65-72	ND	
12/16 to 12/27/10	72-83	ND	
12/27 /10 to 1/6/11	83-93	ND	
1/6/11 to 1/26/11	93-113	566.8	1.59
1/26 to 2/11/11	113-129	ND	
2/11 to 3/2/11	129-148	nsa	
3/2 to 3/18/11	148-164	ND	
3/18/11 to 4/7/11	164-184	ND	
4/7 to 4/26/11	184-203	ND	
4/26 to 5/10/11	203-217	ND	
5/10 to 5/26/11	217-233	559.6	0.935
5/26 to 6/16/11	233-254	560.0	1.29

6/16 to 7/22/11	254-290	559.8	1.59
7/22 to 8/15/11	290-314	559.6	1.72
8/15 to 9/14/11	314-344	ND	

Note: Acceptable wavelength range for sulforhodamine B that has not undergone deaminoalkylation was from 572.8 to 579.6 nm for the instrument used to analyze samples collected on or before March 18, 2011. The range for samples collected after that date was from 576.4 to 583.2. The instrument changeover occurred between sample numbers U7127 and U7128.
ND = None Detected. Detection limit = 0.080 ppb.
nsa = no sample analyzed.

Degraded Sulforhodamine B Dye Analysis Results from Activated Carbon Samplers at Station 63. Cedar Hills Well 1

Sample Period	Day Number	Emission Fluorescence Peak (nm)	Concentration as Sulforhodamine B (ppb)
11/10 to 11/17/10	36-43	ND	
11/17 to 11/24/10	43-50	ND	
11/24 to 12/1/10	50-57	565.6	1.30
11/24 to 12/1/10	50-57 (Duplicate)	566.6	2.97
12/1 to 12/9/10	57-65	ND	
12/9 to 12/16/10	65-72	ND	
12/16 to 12/27/10	72-83	ND	
12/27 /10 to 1/4/11	83-91	ND	
1/4/11 to 1/26/11	91-113	ND	
1/26 to 2/11/11	113-129	ND	
2/11 to 3/1/11	129-147	Nsa	
3/1 to 3/18/11	147-164	ND	
3/18/11 to 4/7/11	164-184	563.0	1.29
4/7 to 4/26/11	184-203	562.4	1.42
4/26 to 5/10/11	203-217	561.6	1.15
5/10 to 5/25/11	217-232	564.0	1.67
5/26 to 6/16/11	233-254	562.6	1.98
6/16 to 7/22/11	254-290	563.2	3.48
7/22 to 8/15/11	290-314	562.4	2.06
8/15 to 9/14/11	314-344	563.2	2.63

Note: Acceptable wavelength range for sulforhodamine B that has not undergone deaminoalkylation was from 572.8 to 579.6 nm for the instrument used to analyze samples collected on or before March 18, 2011. The range for samples collected after that date was from 576.4 to 583.2. The instrument changeover occurred between sample numbers U7127 and U7128.
ND = None Detected. Detection limit = 0.080 ppb.
nsa = no sample analyzed.

Degraded Sulforhodamine B Dye Analysis Results from Activated Carbon Samplers at Station 64. Fort King Forest Well

Sample Period	Day Number	Emission Fluorescence Peak (nm)	Concentration as Sulforhodamine B (ppb)
11/10 to 11/17/10	36-43	ND	
11/17 to 11/24/10	43-50	ND	
11/24 to 12/1/10	50-57	ND	
12/1 to 12/9/10	57-65	ND	
12/9 to 12/16/10	65-72	ND	
12/16 to 12/27/10	72-83	ND	
12/27 /10 to 1/4/11	83-91	ND	
1/4/11 to 1/26/11	91-113	ND	
1/26 to 2/11/11	113-129	ND	
2/11 to 3/1/11	129-147	Nsa	
3/1 to 3/18/11	147-164	564.6	0.822
3/18/11 to 4/7/11	164-184	564.6	1.05
4/7 to 4/26/11	184-203	562.4	0.975
4/26 to 5/10/11	203-217	562.8	0.920
5/10 to 5/25/11	217-232	565.2	0.800
5/26 to 6/16/11	233-254	563.6	1.16
6/16 to 7/22/11	254-290	563.8	1.71
7/22 to 8/15/11	290-314	564.2	1.31
8/15 to 9/14/11	314-344	565.2	1.77

Note: Acceptable wavelength range for sulforhodamine B that has not undergone deaminoalkylation was from 572.8 to 579.6 nm for the instrument used to analyze samples collected on or before March 15, 2011. The range for samples collected after that date was from 576.4 to 583.2. The instrument changeover occurred between sample numbers U7127 and U7128.
ND = None Detected. Detection limit = 0.080 ppb.
nsa = no sample analyzed.

7.5 RELATIVE PERCENT DIFFERENCE VALUES

Duplicate samples were collected and analyzed for about 5% of total samples. Duplicate samples are indicated in the dye analysis results tables by the letter “D” following the sample number.

Samples and their duplicates were compared. There were a total of 58 activated carbon samples and their duplicates analyzed. If one or more of the tracer dyes used in this study was detected in a pair of samples, the Relative Percent Difference (RPD) value was calculated. The RPD values for dye concentrations equals the difference between the two values divided by the mean of the two values. Results were as follows:

- Total activated carbon samplers where duplicate samples were analyzed = 58.
- Number of sample pairs where no dyes were detected = 32.
- Number of sample pairs where eosine was detected in one or both of a pair of samples = 1. RPD value = 55%.
- Number of sample pairs where fluorescein was detected in one or both of a pair of samples = 1. RPD value = 18%.
- Number of sample pairs where rhodamine WT was detected in one or both of a pair of samples = 19. Mean RPD value = 71%.
- Number of sample pairs where weathered sulforhodamine B was detected in one or both of a pair of samples = 1. RPD value = 78%.
- In the sample pairs where rhodamine WT was detected in both samples the mean difference between the peak wavelengths was 1.4 nm.

It has been the experience of OUL that if an activated carbon sampler has detectable amounts of any of the four tracer dyes, the duplicate sampler will also contain the dye. The only general exception to this has been when the dye concentration in one sample is only slightly greater than the detection limit and the other sampler does not have a fluorescence peak of sufficient size to qualify as a detection.

In the Silver Springs study, 5 of 19 sample sets from sampling stations in the SSG had detectable dye in only one of the samples. All of these were for rhodamine WT dye.

These were the following samples:

Station	Sample Number	Sampling Period	Rhodamine WT Dye Concentrations
4. Catfish Reception Hall	T7951	4/28 to 5/3/10	10.2 ND
7. Devil’s Kitchen A	T7953	4/28 to 5/3/10	7.56 ND
9. Ladies Parlor	T7954	4/28 to 5/3/10	6.69 ND

31. Silver River @ 1200 Meter Station	T8277	5/3 to 5/9/10	7.92 ND
32. South Boathouse Vent	T9379	4/28 to 5/3/10	ND 11.6

Four of the five pairs of samples were collected during the sampling period of April 28 to May 3, 2010, and the other pair was collected during the next sampling period. The analysis graphs were reviewed and indicate that increased fluorescence interference was present in the samples where fluorescence peaks could not be detected. The nature of this material is unknown. If the five pairs of samples where dye was detectable in only one of the samples are dropped, the mean RPD value for rhodamine WT in carbon sampler elutants was 25%. It is the opinion of OUL that this is a more realistic estimate of the precision of the activated carbon samplers in the detection of rhodamine WT dye.

7.6 EXTENDED SAMPLING ANALYTICAL RESULTS

The extended sampling period of June 16 through September 14, 2011 provided an additional three months of data to the project. This resulted in a total study sampling duration of 509 days for Trace Group 1 and 344 days for Trace Group 2.

No fluorescein (Heagy-Burry Sink/Orange Lake trace) or eosine (Tuscawilla Park trace) was detected in the charcoal samplers collected during the extended three month sampling period.

Rhodamine WT (Ocala Civic Theatre trace) was reported in four vents with concentrations ranging from approximately 2 ppb to 6 ppm. Rhodamine WT was detected at Mammoth East and Ladies Parlor (Group 1 vents) and South Boathouse Vent. The South Boathouse Vent was not geochemically grouped during the 2007 study (INTERA, 2007) but is thought likely to be a Group 1 vent by the study group as well. Mammoth East and Catfish Hotel had reported detections for the samplers retrieved only on July 22, 2011. Ladies Parlor and South Boathouse Vent had detections for samplers collected on July 22 and September 14, 2011, but not August 15, 2011.

Catfish Hotel which is a Group 3 vent also had one reported detection of rhodamine WT for the sampler retrieved only on July 22, 2011.

Sulforhodamine B (Pontiac Pit trace) was reported in three wells with dye concentrations ranging from approximately 1.5 ppb to 3.5 ppm. Dye was detected in samplers collected from Blue Skies Well 1 on July 22 and August 15, 2011. The Cedar Hills and Fort King wells had dye detected on July 22, August 15 and September 14, 2011.

The Pine Ridge well did not have any sulforhodamine B dye detections during the study, and none was detected over the extended three month sampling period.

Data collected during the SSG groundwater nutrient pathway delineation study support the following conclusions:

- A developed conduit network likely extends south from Orange Lake for at least 4 miles.
- The short dye travel times observed closer to SSG suggest conduit flow or a macroporous system.
- Regardless of the overall modeled spring shed capture zone boundary, localized groundwater travel times may still be faster than porous media model-based estimates.
- A “Multiple Porosity” System is present in the study area.
- The SSG study area was experiencing semi-drought conditions during the study period. An increase in precipitation within the Silver Springs spring shed would likely have yielded a significantly different conceptual model of flow paths and travel times (i.e., normal rainfall would equal faster travel times).

Trace specific findings are presented in the following sections.

8.1 ORANGE LAKE DYE TRACE

- Groundwater flow velocities from Heagy-Burry Sink are more rapid than suggested by previous groundwater modeling. The furthest distance trace was from the sinkhole to the Marion Correctional Institution Well 1, a straight-line distance of approximately 8.5 miles. Based upon the mid-point time for first arrival of dye at this well (187.5 days after dye introduction), the mean straight-line travel velocity was about 245 ft per day.
- The most rapid groundwater movement detected in this trace was from Heagy-Burry Sink to Reddick Elementary School Well 5, a straight-line distance of 4.2 miles. Based upon the mid-point time for first arrival of dye at this well (9.5 days after dye introduction), the mean straight-line travel velocity was about 2,335 ft per day.
- Dye detections demonstrated that water from Heagy-Burry Sink moves southward toward the SSG. The trace to the Marion Correctional Institution Well 1 traversed approximately half the distance between the sink and the SSG. Given this finding, if concentrations of mobile nutrients are elevated in Orange Lake they could contribute to increased nutrient concentrations in the SSG and water wells that lie in the area between.

8.2 TUSCAWILLA PARK STORMWATER DRAINAGE WELL DYE TRACE

- Using a travel distance of 5.1 miles and a first arrival time of 303.5 days (midpoint of the first arrival period), the mean groundwater travel rate for the first arrival of the dye at the South Boathouse Vent was 90 ft per day.
- This trace has demonstrated that the large volumes of stormwater runoff introduced into this drainage well ultimately discharge to at least one spring in the SSG.

8.3 OCALA CIVIC THEATRE DYE TRACE

- All of the dye detection locations were in SSG vents.

- Vents in the SSG have been divided into three groups based upon water quality conditions. Rhodamine WT dye was detected at 12 of the Group 1 vents, four of the Group 2 vents, 2 of the Group 3 vents, and at 2 vents that had not been assigned to any group.
- The most rapid travel rates were to Group 1 vents or the two vents not assigned to any group. These have been considered by the study team to likely be Group 1 vents.
- Dye first arrived at the vents that discharged the highest concentrations of dye.
- The sampling periods when maximum dye concentrations were detected varied among the sampling stations. The period of peak dye arrival at the seven vents that discharged the largest total concentrations of dye ranged from 10 to 16 days after dye introduction at Mammoth East to 39 to 45 days after dye introduction at the Bridal Chamber. The median time of peak dye arrival at these seven stations was 21 to 26 days after dye introduction.
- Mean daily dye concentrations discharging from the seven vents that discharged the largest total concentrations of dye decreased by an order of magnitude for periods ranging from 60 to 104 days after dye introduction at Mammoth East to 180 to 185 days after dye introduction at Ladies Parlor. The median time for the order of magnitude decline in dye concentration was 152 to 164 days; this occurred at Catfish Reception Hall and at the Gang of Five, Vent 3.
- For the seven vents that discharged the largest total concentrations of dye, the estimated time after dye introduction until half of the detected dye had discharged from vents ranged from 32 to 39 days at South Boathouse to 60 to 104 days at Ladies Parlor. The median period was 52 to 60 days; this occurred at Catfish Reception Hall, Bridal Chamber, and Gang of Five, Vent 3. Using a travel distance of 1.5 miles and a median travel time of 56 days (mid-point for the median values), about half of the detected dye traveled at mean rates equal to or greater than 140 ft per day.
- Using a travel distance of 1.5 miles and a time of first dye arrival of 7.5 days (mid-point for the first positive sampling period of 5 to 10 days), the maximum mean straight-line travel rate demonstrated by this trace was 1,055 ft per day.

8.4 PONTIAC PIT SINK DYE TRACE

- Groundwater introduced into the sinkhole flows generally toward the SSG. The Cedar Hills Well is located east of the sinkhole, the Fort King Forest Well is located northeast of the sink, and the Blue Skies Well 1 is north-northeast of the sink. The groundwater flow directions observed demonstrate that Pontiac Pit Sink contributes recharge water to the SSG.
- Mean straight-line groundwater velocities based upon the mid-point of the first dye arrival periods ranged from 150 ft per day to the Fort King Forest Well to 235 ft per day to the Cedar Hills Well.
- A constructed wetland provides water quality treatment for stormwater that ultimately discharges into Pontiac Pit Sink. The tracing work demonstrates that this treatment is

important in protecting groundwater quality for water supply wells and ultimately for Silver Springs.

8.5 MEAN GROUNDWATER VELOCITIES

The groundwater tracing studies provide data from which mean straight-line groundwater velocities can be calculated. The table below summarizes calculated mean groundwater velocities resulting from the successful groundwater traces. The velocities are based upon the time of first dye arrival at the particular sampling station. Since the tracing relied upon cumulative samplers in place for several days, the time selected for first dye arrival was the mid-point in days of the sampling period when dye was first detected. As shown by data included for the Civic Center Theatre DRA Trace, peak dye concentrations typically lag behind the time of first dye arrival. This may not be the case for results from the Tuscawilla and Pontiac Pit Sink Traces because of low dye concentrations at the detection stations. Because of the general proximity of the 27 SSG springs and vent clusters monitored an aggregate typical distance between the Civic Center Theatre DRA and SSG of 1.5 miles (7,920 ft) was assumed.

Mean Groundwater Velocities in the Study Area Based upon the Mid-Point of First Arrival Times of Tracer Dyes

Introduction Location	Detection Station (Table 3 lists name and number)	Distance (ft)	Travel Time (days)	Mean Velocity (ft/day)
Heagy-Burry Sink	54 Reddick Elementary School Well 5	22,180	9.5	2,335
Heagy-Burry Sink	57 Marion Correctional Institution Well 1	44,880	187.5	245
Heagy-Burry Sink	58 IFAS Well A	11,620	23.5	495
Heagy-Burry Sink	59 IFAS Well D	11,090	9.5	1,165
Civic Theatre	SSG Stations 1, 4, 7, 9, 32, & 33	7,920	7.5	1,055
Civic Theatre	SSG Stations 2 & 5	7,920	13	610
Civic Theatre	SSG Stations 6, 10, 12, & 13	7,920	18.5	430
Civic Theatre	SSG Station 11	7,920	35.5	225
Civic Theatre	SSG Station 19	7,920	42	190
Civic Theatre	SSG Stations 18, 20, 23	7,920	82	95
Civic Theatre	SSG Stations 21 & 28	7,920	118	65
Civic Theatre	SSG Station 14	7,920	286	30
Tuscawilla	32 South Boathouse Vent	26,930	303.5	90
Pontiac Pit Sink	62 Blue Skies Well 1	18,480	103	180
Pontiac Pit Sink	63 Cedar Hills Well	12,670	53.5	235

Introduction Location	Detection Station (Table 3 lists name and number)	Distance (ft)	Travel Time (days)	Mean Velocity (ft/day)
Pontiac Pit Sink	64 Fort King Forest Well	23,230	155.5	150

FDEP is responsible for development of Basin Management Action Plans (BMAPs) which are intended to reduce pollutant loadings that will meet allowable loadings established in a Total Maximum Daily Load (TMDL). The design and implementation of groundwater nutrient pathway assessments that utilize dye tracer studies may represent an important tool to help support federal, state and local governmental agencies refine and improve the output of numerical models that are used in the BMAP and TMDL process. Improvement of numerical models will enhance the ability of policy makers to make more informed decisions and better plan and meet the increasingly complex current and future needs of communities. In turn, governmental agencies will be able to leverage increasingly limited available resources to maximize efforts for continuous improvement of the BMAPs and the TMDL process.

URS recommends the use of tracer studies to more rapidly evaluate the effectiveness for existing Basin Management Plans (BMP) and industry related best management practices. They can provide additional support for potential policy or technical adjustments as noted below:

- Adaptive Management Strategy – Dye tracer studies can provide a cost and time efficient approach to FDEP, the Florida Department of Agriculture and Consumer Services (FDACS) and other entities to help evaluate monitoring efforts within Restoration Focus Areas (RFAs) intended to assess BMP effectiveness.
- Evaluate the information collected to help direct and refocus BMP and RFA efforts to achieve maximum restoration value in the shortest time period.
- Conduct dye traces to more fully understand the effects of stormwater drainage and recharge (both naturally occurring and engineered), agriculture practices, land use etc. in areas of greater karst vulnerability.

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TABLES

Table 1
Summary of September 2006 Vent Discharge Measurements
Silver Springs Grop
Ocala, Marion County, Florida

Spring/Vent Name	Abbrev.	Number of Vents	Depth (in feet)	Method	Date	Time	Discharge CFS	Discharge MGD	Discharge GPM	Number of PV Stations	X-sectional Area	Highest PV Reading	Lowest PV Reading	Negative PV Stations	Number of VDCD Msmnts	Multiplier Used?
Mammoth	**ME, MW**	1	40	Grid XSec	9/19/2006	13:40-17:50	**240.07**	**155.16**	**107750**	138	308.16	1.16	-0.39	8	n/a	n/a
Jacobs Well	**JW**	1	22	Grid XSec	9/21/2006	18:01-18:39	**2.57**	**1.661**	**1153**	26	8.831	0.94	0.16	none	n/a	n/a
Catfish Reception Hall	**CR**	3	27-33	Grid XSec	9/21/2006	14:17-17:29	**36.43**	**23.543**	**16349**	62	59.54	1.29	0.13	none	n/a	n/a
Bridal Chamber	**BC**	1	25	Grid XSec	9/22/2006	12:18-13:10	**4.61**	**2.98**	**2069**	31	12.72	1.25	-0.03	3	n/a	n/a
Oscar	**OS**	3	15-17	VDCD	9/28/2006	14:30-14:41	**0.46**	**0.295**	**205**	n/a	n/a	0.5	0.28	n/a	3	yes
Devils Kitchen B	**DK-2**	1	15-17	VDCD	9/28/2006	15:58-16:08	**0.24**	**0.157**	**109**	n/a	n/a	1.02	0.23	n/a	2	no
Ladies Parlor	**LP**	4	20-22	Grid XSec	9/22/2006	14:32-16:03	**9.56**	**6.18**	**4292**	35	13.7	1.54	-0.016	4	n/a	n/a
Devils Kitchen A	**DK-1**	4	20	Grid XSec	9/28/2006	15:21-15:55	**1.51**	**0.976**	**678**	17	3.16	1.81	-0.04	1	n/a	n/a
Alligator Hole	**AH**	2	15-18	VDCD	9/28/2006	16:35-17:00	**0.77**	**0.498**	**346**	n/a	n/a	1.85	0.93	n/a	3	no
Mastodon Bone	**MB**	1	13	Grid XSec	9/28/2006	13:51-14:11	**1.448**	**0.936**	**650**	13	2.755	1.21	-0.01	1	n/a	n/a
Geyser	**GY**	5	18-21	Grid XSec	9/30/2006	11:03-12:40	**5.36**	**3.467**	**2408**	52	21.25	1.06	-0.53	1	n/a	n/a
		3	15-18	VDCD	9/29/2006	16:09-16:28	**0.7**	**0.456**	**316**	n/a	n/a	1.13	0.24	n/a	3	yes
Blue Grotto	**BG**	2	26	Grid XSec	9/29/2006	14:34-15:51	**6.28**	**4.058**	**2818**	40	8.95	1.87	-0.1	3	n/a	n/a
Christmas Tree	**CT**	5	18	VDCD	9/29/2006	12:42-13:20	**4.18**	**2.705**	**1878**	n/a	n/a	1.51	0.47	n/a	6	yes
Garden of Eden	**GE**	3	16	VDCD	9/29/2006	11:04-12:25	**2.559**	**1.654**	**1149**	n/a	n/a	1.12	0.25	n/a	12	yes
Indian Cave	**IC**	4	15-17	Grid XSec	9/28/2006	11:43-12:40	**4.31**	**2.786**	**1934**	34	11.64	0.8	0.11	none	n/a	n/a
		1	11	VDCD						n/a	n/a	0.89	0.85	n/a	1	no
First Fishermans Paradise	**FP-1**	5	18	No Discharge Measurement Performed Due to Absence of Suitable Cross-sections.												
No Name Cove	**NN**	3	15-18	VDCD	9/29/2006	16:53-17:11	**0.24**	**0.153**	**106**	n/a	n/a	*0.07*	*0.41*	n/a	3	yes
Turtle Meadows	**TM**	3	15	No Discharge Measurement Performed Due to Absence of Suitable Cross-sections.												
Second Fishermans Paradise	**FP-2**	1	24	Grid XSec	9/22/2006	17:01-17:24	**0.56**	**0.365**	**253**	14	1.205	1.09	-0.07	2	n/a	n/a
Catfish Hotel	**CH**	3	29	No Discharge Measurement Performed Due to Absence of Suitable Cross-sections.												
Turtle Nook	**TN**	2	15-18	VDCD	9/30/2006	13:15-13:26	**0.63**	**0.408**	**283**	n/a	n/a	0.79	1.05	n/a	2	yes
Turtle Nook Run	**TR**	3	15-18	VDCD	9/29/2006	17:24-17:42	**0.64**	**0.186**	**287**	n/a	n/a	0.33	0.67	n/a	3	yes
Raccoon Island	**RI**	3	10-14	VDCD	9/28/2006	17:12-17:35	**0.52**	**0.338**	**235**	n/a	n/a	0.5	0.31	n/a	3	yes
Rocky vent	**RV**	1	21	No Discharge Measurement Performed Due to Absence of Suitable Cross-sections.												
Shipwreck	**SW**	5	17-20	VDCD	9/30/2006	15:17-16:00	**0.9**	**0.582**	**404**	n/a	n/a	1.61	0.15	n/a	5	yes
Catfish Convention Hall	**CC**	2	19	VDCD	9/30/2006	15:00-15:16	**0.32**	**0.204**	**142**	n/a	n/a	0.75	0.42	n/a	3	no
Timber	**TB**	6	14	VDCD	9/30/2006	15:47-18:16	**2.33**	**1.508**	**1047**	n/a	n/a	1.02	0.25	n/a	6	no
Total Measured Discharge:		81					**327.197**	**211.256**	**146861**							
		Total Vents					**Discharge CFS**	**Discharge MGD**	**Discharge GPM**							

Table 2

Summary of Mammoth Spring Discharge Measurements
Silver Springs Group
Ocala, Marion County, Florida

MAMMOTH SPRING (SILVER SPRINGS GROUP) | **Marion County, Florida**

Performed by Karst Environmental Services, Inc., High Springs, Florida

DATE	DISCHARGE (CFS)	INSTR. USED	CALC. METHOD	NUMBER STATIONS	X-SECTION AREA (sq.feet)	Avg. Station Point Velocity (fps)	High Msmt. (fps)	Low Msmt. (fps)	TIME START:	TIME FINISH:	Depth (feet)	Neg. PV's	Blanking Used?	NOTES:
3/24/2005	**300.29**	MMB 2000 FM	Surfer 8	115	323.06	0.96	1.33	-0.14	14:00	17:50	25-34	3	yes	
9/19/2006	**240.07**	MMB 2000 FM	Surfer 8	138	308.16	0.71	1.16	-0.39	13:40	17:50	26-32	8	yes	
9/10/2007	**207.78**	MMB 2000 FM	Surfer 8	132	321.36	0.61	0.96	-0.06	12:50	16:42	26-34	2	yes	
7/16/2008	**199.68**	MMB 2000 FM	Surfer 8	138	309.78	0.60	0.93	-0.06	11:44	13:48	25-33	1	yes	
10/17/2008	**315.77**	MMB 2000 FM	Surfer 8	136	319.18	0.94	1.48	-0.19	11:28	13:31	25-33	1	yes	
1/14/2009	**247.87**	MMB 2000 FM	Surfer 8	149	308.2	0.73	1.13	-0.15	12:40	14:43	25-33	4	yes	
4/15/2009	**193.26**	MMB 2000 FM	Surfer 8	168	308.07	0.61	0.92	-0.1	12:40	15:02	24-32	2	yes	
7/22/2009	**247.39**	MMB 2000 FM	Surfer 8	169	309.60	0.78	1.15	-0.02	11:48	14:41	25-34	1	yes	
10/14/2009	**249.43**	MMB 2000 FM	Surfer 9	175	313.16	0.80	1.15	0	11:57	14:15	25-33	none	yes	Upgrade to Surfer 9
1/13/2010	**234.11**	MMB 2000 FM	Surfer 9	189	315.22	0.70	1.07	-0.09	12:34	15:17	24-32	5	yes	
4/14/2010	**330.02**	MMB 2000 FM	Surfer 9	172	315.90	1.04	1.52	-0.12	11:54	14:24	25-33	3	yes	
1/19/2011	**211.25**	MMB 2000 FM	Surfer 10	168	314.82	0.67	1.02	-0.13	11:58	14:10	24-32	3	yes	Upgrade to Surfer 10

Table 3
Dye Sample Station Locations

Silver Springs Nutrient Pathway Assessment
Marion County, Florida

Site Name	Station No.	Type	Latitude	Longitude
Mammoth East	1	SSG Vent - Group 1	N 29° 12.970	W 82° 03.160
Mammoth West	2	SSG Vent - Group 2	N 29° 12.979	W 82° 03.163
Jacob's Well	3	SSG Vent - Group 1	N 29° 12.903	W 82° 03.113
Catfish Reception Hall	4	SSG Vent - Group 1	N 29° 12.897	W 82° 03.107
Bridal Chamber	5	SSG Vent - Group 1	N 29° 12.887	W 82° 03.092
Oscar	6	SSG Vent - Group 1	N 29° 12.917	W 82° 03.092
Devil's Kitchen A (1)	7	SSG Vent - Group 1	N 29° 12.893	W 82° 03.080
Devil's Kitchen B (2)	8	SSG Vent - Group 1	N 29° 12.900	W 82° 03.087
Ladies Parlor	9	SSG Vent - Group 1	N 29° 12.878	W 82° 03.087
Alligator Hole	10	SSG Vent - Group 1	N 29° 12.907	W 82° 03.056
Mastodon Bone	11	SSG Vent - Group 2	N 29° 12.943	W 82° 03.025
Geyser	12	SSG Vent - Group 1	N 29° 12.923	W 82° 03.005
Blue Grotto	13	SSG Vent - Group 1	N 29° 12.913	W 82° 02.988
Christmas Tree	14	SSG Vent - Group 2	N 29° 12.972	W 82° 02.955
Garden of Eden	15	SSG Vent - Group 2	N 29° 12.968	W 82° 02.903
Log	16	SSG Vent - Group 2	N 29° 12.976	W 82° 02.888
Lost River	17	SSG Vent - Group 2	N 29° 12.976	W 82° 02.892
Indian Cave	18	SSG Vent - Group 1	N 29° 12.935	W 82° 02.880
First Fisherman's Paradise	19	SSG Vent - Group 1	N 29° 12.935	W 82° 02.840
No Name Cove	20	SSG Vent - Group 1	N 29° 12.937	W 82° 02.778
Turtle Meadows	21	SSG Vent - Group 2	N 29° 12.953	W 82° 02.753
Second Fisherman's Paradise	22	SSG Vent - Group 3	N 29° 12.940	W 82° 02.720
Catfish Hotel	23	SSG Vent - Group 3	N 29° 12.923	W 82° 02.703
Turtle Nook	24	SSG Vent - Group 2	N 29° 12.950	W 82° 02.700
Turtle Nook Run	25	SSG Vent - Group 2	N 29° 12.942	W 82° 02.722
Racoon Island	26	SSG Vent - Group 2	N 29° 12.945	W 82° 02.65
Rocky Vent	27	SSG Vent - Group 3	N 29° 12.925	W 82° 02.639
Shipwreck	28	SSG Vent - Group 3	N 29° 12.927	W 82° 02.640
Catfish Convention Hall	29	SSG Vent - Group 3	N 29° 12.927	W 82° 02.632
Timber	30	SSG Vent - Group 3	N 29° 12.938	W 82° 02.497
Silver River @ 1200 m. Station	31	Silver River	N 29° 12.925'	W 82° 02.456'
South Boat House Vent	32	SSG Vent - Group 1 [1]	N 29° 12.771	W 82° 03.223
Gang of Five Vent 3	33	SSG Vent - Group 1 [1]	N 29° 12.819	W 82° 03.184
Silver Springs Landing Vent 2	34	SSG Vent - Group ND	N 29° 12.904	W 82° 02.805
Sandboil Vent	35	SSG Vent - Group ND	N 29° 12.846	W 82° 03.091
Rainbow Springs Headsprings	40	Rainbow Springs Vent	N 29° 06.093'	W 82° 26.227'
Rainbow Springs Bubbling Springs	41	Rainbow Springs Vent	N 29° 06.078'	W 82° 26.092'
Rainbow Springs Rainbow River	42	Rainbow River	N 29° 05.961'	W 82° 26.203'
Ocala Public Supply Well 1	50	public supply well	N 29° 12.373'	W 82° 05.227'
Ocala Public Supply Well 2	51	public supply well	N 29° 12.284'	W 82° 05.226'
Ocala Public Supply Wells West Accelatc	52	public supply manifold	N 29° 12.316'	W 82° 05.280'
Ocala Public Supply Wells East Acceletoı	53	public supply manifold	N 29° 12.311'	W 82° 05.245'
Reddick Elementary Well #5	54	public supply well	N 29° 22.026'	W 82° 12.092'
North Marion High School West Well	55	public supply well	N 29° 20.367'	W 82° 08.346'
Ocala Springs Elementary East Well	56	public supply well	N 29° 14.890'	W 82° 04.872'
Marion Correctional Institute Well 1	57	public supply well	N 29° 18.376'	W 82° 10.719'
IFAS Plant Science Unit Well A	58	irrigation well	N 29° 24.408'	W 82° 10.608'
IFAS Plant Science Unit Well D	59	irrigation well	N 29° 24.425'	W 82° 09.884'
McIntosh Public Supply Well 2	60	public supply well	N 29° 26.982'	W 82° 13.625'
Windstream Well #2	61	public supply well	N 29° 09.210	W 82° 08.095'
Blue Skies Well 1	62	public supply well	N 29° 11.938'	W 82° 06.263'
Cedar Hills Well #3	63	public supply well	N 29° 09.163'	W 82° 05.424'
Fort King Forest Well	64	public supply well	N 29° 10.754'	W 82° 03.819'
Pine Ridge Well	65	public supply well	N 29° 11.841'	W 82° 04.029'

Geochemical spring vent grouping based on INTERA 2007 Cluster analysis report
1 = Presumed to be a Group 1 vent by study team
* GPS position taken from Google Earth

Table 3 Continued
Well Sampling Station Construction Details
Silver Springs Nutrient PAthway Assessment
Ocala, MArion County, Florida

			Well	Reported Well	Reported	Approximate	Open Hole	Approximate	Approximate	
	Well Location		Diameter	Depth	Casing	Land Elev	Interval	Top of Open Hole	Bottom of Open Hole	FLUW ID
PUBLIC SUPPLY WELL STATIONS	**Latitude**	**Longitude**	**(In Inches)**	**(In Feet)**	**(In Feet)**	**Feet MSL***	**Feet**	**Feet MSL***	**Feet MSL***	**FL DEP System #**
Ocala Public Supply Well 1	N 29° 12.373'	W 82° 05.227'	24	240	85	76	155	-9	-164	AAE0112
Ocala Public Supply Well 2	N 29° 12.284'	W 82° 05.226'	24	265	85	77	180	-8	-188	AAE0113
Reddick Elementary Well #5	N 29° 22.026'	W 82° 12.092'	4	120	70	100	50	30	-20	AAK5536
North Marion High School West Well (#2)	N 29° 20.367'	W 82° 08.346'	4	100	NA	88	NA	NA	-12	AAG958? (?= 5 or 7)
Ocala Springs Elementary East Well #1)	N 29° 14.890'	W 82° 04.872'	4	220	132	75	88	-57	-145	AAG9515
Marion CI Well 1	N 29° 18.376'	W 82° 10.719'	6	260	NA	96	NA	NA	-164	AAG9371
IFAS Plant Science Unit Well A	N 29° 24.408'	W 82° 10.608'	10	NA	NA	74	NA	NA	NA	NA
IFAS Plant Science Unit Well D	N 29° 24.425'	W 82° 09.884'	12	319	222	61	97	-161	-258	NA
McIntosh Public Supply Well 2	N 29° 26.982'	W 82° 13.625'	14	255	68	142	187	74	-113	NA
Town of Micanopy Municipal Well (ACEPD)	N 29° 30.258'	W 82° 17.188'	14	255	68	116	187	48	-139	NA
Windstream Well #2 (#1?)	N 29° 09.210	W 82° 08.095'	6	98	NA	129	NA	NA	31	AAC0040
Blue Skies Well #1	N 29° 11.938'	W 82° 06.263'	4	123	60	80	63	20	-43	AAG9572
Cedar Hills Well #3	N 29° 09.163'	W 82° 05.424'	8	255	NA	78	NA	NA	-177	AAC9507
Fort King Forest Well #1	N 29° 10.754'	W 82° 03.819'	6	150	84	97	66	13	-53	AAC9564
Pine Ridge Well #2	N 29° 11.841'	W 82° 04.029'	4	154	NA	73	NA	NA	-81	AAG9568
Sheri Oaks Well #1	N 29° 20.034'	W 82° 06.779'	4	125	90	88	35	-2	-37	NA
Cross Creek trailer park well (ACEPD)	N 29° 29.620'	W 82° 10.257'	4	NA	NA	65	NA	NA	NA	NA
Island Grove blueberry farm well (ACEPD)	N 29° 27.155'	W 82° 6.481'	4	NA	NA	71	NA	NA	NA	NA

NOTES:
GPS positions recorded during this study.
* = Land Surface elevation estimated from Google Earth. The Google Earth vertical component (altitude) is measured from the vertical datum, which is the WGS84 EGM96 Geoid and can be thought of as local Mean Sea Level
NA = not available

Table 4

Pre-Background and Background Sampling Stations
Silver Springs Nutrient Pathway Assessment

	4 Week Pre-Background Sampling		Geochemical	Discharge	2 Week Comprehensive Background Sampling		Geochemical	Discharge
Type	Station #	Station Name	Group	CFS*	Station #	Station Name	Group	CFS*
Vents	1	Mammoth East	1	240.04	1	Mammoth East	1	240.07
	2	Mammoth West	2		2	Mammoth West	2	
	4	Catfish Reception Hall	1	36.43	4	Catfish Reception Hall	1	36.43
	14	Christmas Tree	2	4.18	6	Oscar	1	0.46
	23	Catfish Hotel	3	ND	7	Devil's Kitchen A	1	1.51
	28	Shipwreck	3	0.9	9	Ladies Parlor	1	9.56
					10	Alligator Hole	1	0.77
					11	Mastodon Bone	2	1.45
					12	Geyser	1	5.36
					13	Blue Grotto	1	6.28
					14	Christmas Tree	2	4.18
					15	Garden of Eden	2	2.6
					16	Log	2	ND
					18	Indian Cave	1	4.31
					19	First Fisherman's Paradise	1	ND
					20	No Name Cove	1	0.24
					21	Turtle Meadows	2	ND
					23	Catfish Hotel	3	ND
					24	Turtle Nook	2	0.63
					26	Raccoon Island	2	0.52
					28	Shipwreck	3	0.9
					30	Timber	3	2.33
Surface Water	31	1200 Meter Station		NA	31	Silver River @ 1200 Meter Station		
Wells					50	City of Ocala Well #1		
					52	City of Ocala West Accelator		

Pre-background sampling was conducted from 01/11/2010 to 02/09/2010
Background Sampling was conducted from 3/25/10 to 04/09/2010
Geochemical Group based on 2007 Intera Report
CFS = cubic feet per second as measured in September 2006 by KES and SJRWMD
NA = Not applicable.
ND = Not determined due to absence of suitable cross section.
* = Discharge as measured in September 2006

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

Results for charcoal samplers analyzed for the presence of fluorescein, eosine, rhodamine WT (RWT), and sulforhodamine B (SRB) dyes.

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T5116	**1**	**Mammoth East**	**1/11/10 1558**	**1/18/10 1343**	**ND**		**ND**		**ND**		**ND**	
T5124	1	Mammoth East	1/18/10 1343	1/26/10 1438	ND		ND		ND		ND	
T5131	1	Mammoth East	1/26/10 1438	2/1/10 1545	ND		ND		ND		ND	
T5416	1	Mammoth East	2/1/10 1545	2/9/10 1525	ND		ND		ND		ND	
	1	Mammoth East	2/9/10 1525	3/25/10 1753	nsa		nsa		nsa		nsa	
T6961	1	Mammoth East	3/25/10 1753	4/1/10 1256	ND		ND		ND		ND	
T7187	1	Mammoth East	4/1/10 1256	4/9/10 1311	ND		ND		ND		ND	
	1	Mammoth East	4/9/10 1311	4/22/10 1214	nsa		nsa		nsa		nsa	
T8109	1	Mammoth East	4/22/10 1214	4/28/10 1356	ND		ND		ND		ND	
T7949	1	Mammoth East	4/28/10 1356	5/3/10 1315	ND		ND		568.6	10.9	ND	
T7949D	1	Mammoth East	4/28/10 1356	5/3/10 1315	ND		ND		568.0	15.2	ND	
T8254	1	Mammoth East	5/3/10 1315	5/9/10 1257	ND		ND		568.0	52.5	ND	
T8254D	1	Mammoth East	5/3/10 1315	5/9/10 1257	ND		ND		567.6	32.7	ND	
T8721	1	Mammoth East	5/9/10 1257	5/14/10 1244	ND		ND		567.4	30.3	ND	
T9143	1	Mammoth East	5/14/10 1244	5/19/10 1229	ND		ND		568.4	24.5	ND	
T9170	1	Mammoth East	5/19/10 1229	5/25/10 1415	ND		ND		568.2	34.0	ND	
T9350	1	Mammoth East	5/25/10 1415	6/1/10 1418	ND		ND		568.2	23.7	ND	
T9598	1	Mammoth East	6/1/10 1418	6/7/10 1447	ND		ND		568.2	18.8	ND	
T9626	1	Mammoth East	6/7/10 1447	6/14/10 1402	ND		ND		568.8	19.7	ND	
U0535	1	Mammoth East	6/14/10 1402	6/22/10 1351	ND		ND		567.8	15.3	ND	
U0782	1	Mammoth East	6/22/10 1351	8/5/10 1154	ND		ND		567.6	31.2	ND	
U1322	1	Mammoth East	8/5/10 1154	9/2/10 1347	ND		ND		567.8	19.4	ND	
U1430	1	Mammoth East	9/2/10 1347	9/22/10 1254	ND		ND		569.0	8.60	ND	
U1835	1	Mammoth East	9/22/10 1254	10/4/10 1336	ND		ND		569.4	4.22	ND	
U2012	1	Mammoth East	10/4/10 1336	10/11/10 1456	ND		ND		570.6 **	4.46	ND	
U2012D	1	Mammoth East	10/4/10 1336	10/11/10 1456	ND		ND		571.6 **	3.06	ND	
U2570	1	Mammoth East	10/11/10 1456	10/15/10 1234	ND		ND		568.6 **	1.96	ND	
U2597	1	Mammoth East	10/15/10 1234	10/20/10 1249	ND		ND		569.0 **	3.61	ND	
U2625	1	Mammoth East	10/20/10 1249	10/25/10 1328	ND		ND		570.8 **	3.13	ND	
U2902	1	Mammoth East	10/25/10 1328	11/1/10 1404	ND		ND		567.2	3.52	ND	
U3227	1	Mammoth East	11/1/10 1404	11/8/10 1243	ND		ND		571.2 **	2.66	ND	
U3555	1	Mammoth East	11/8/10 1243	11/15/10 1249	ND		ND		567.2 **	2.99	ND	
U4222	1	Mammoth East	11/15/10 1249	11/22/10 1228	ND		ND		568.6 **	4.49	ND	
U4249	1	Mammoth East	11/22/10 1228	11/29/10 1252	ND		ND		571.2 **	3.07	ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U4538	1	Mammoth East	11/29/10 1252	12/7/10 1220	ND		ND		568.0 **	3.14	ND	
U4742	1	Mammoth East	12/7/10 1220	12/17/10 1308	ND		ND		568.2 **	4.29	ND	
U5069	1	Mammoth East	12/17/10 1308	12/28/10 1248	ND		ND		569.2	3.63	ND	
U5434	1	Mammoth East	12/28/10 1248	1/11/11 1307	ND		ND		570.2 **	2.14	ND	
U5699	1	Mammoth East	1/11/11 1307	1/24/11 1252	ND		ND		566.2 **	3.40	ND	
U5699D	1	Mammoth East	1/11/11 1307	1/24/11 1252	ND		ND		566.6 **	2.94	ND	
U6292	1	Mammoth East	1/24/11 1252	2/11/11 1232	ND		ND		568.0 **	6.19	ND	
	1	Mammoth East	2/11/11 1232	2/28/11 1331	nsa		nsa		nsa		nsa	
U7443	1	Mammoth East	2/28/11 1331	3/17/11 1320	ND		ND		562.6 **	2.61	ND	
U8174	1	Mammoth East	3/17/11 1320	4/6/11 1338	ND		ND		563.2 **	3.38	ND	
U8605	1	Mammoth East	4/6/11 1338	4/25/11 1347	ND		ND		563.2 **	2.98	ND	
U9848	1	Mammoth East	4/25/11 1347	5/11/11 0902	ND		ND		562.2 **	2.17	ND	
V0329	1	Mammoth East	5/11/11 0902	5/26/11 1350	ND		ND		ND		ND	
V0747	1	Mammoth East	5/26/11 1350	6/15/11 1323	ND		ND		562.8 **	1.33	ND	
V1415	1	Mammoth East	6/15/11 1323	7/22/11 1329	ND		ND		561.6 **	2.41	ND	
V1728	1	Mammoth East	7/22/11 1329	8/15/11 1406	ND		ND		ND		ND	
V2051	1	Mammoth East	8/15/11 1406	9/14/11 1423	ND		ND		ND		ND	
T5117	**2**	**Mammoth West**	**1/11/10 1554**	**1/18/10 1355**	**ND**		**ND**		**ND**		**ND**	
T5125	2	Mammoth West	1/18/10 1355	1/26/10 1440	ND		ND		ND		ND	
T5132	2	Mammoth West	1/26/10 1440	2/1/10 1552	ND		ND		ND		ND	
T5417	2	Mammoth West	2/1/10 1552	3/25/10 1749	ND		ND		ND		ND	
T6962	2	Mammoth West	3/25/10 1749	4/1/10 1252	ND		ND		ND		ND	
T7188	2	Mammoth West	4/1/10 1252	4/9/10 1319	ND		ND		ND		ND	
	2	Mammoth West	4/9/10 1319	4/22/10 1212	nsa		nsa		nsa		nsa	
T8110	2	Mammoth West	4/22/10 1212	4/28/10 1400	ND		ND		ND		ND	
T7950	2	Mammoth West	4/28/10 1400	5/3/10 1320	ND		ND		ND		ND	
T8255	2	Mammoth West	5/3/10 1320	5/9/10 1303	ND		ND		568.0 **	4.51	ND	
T8255D	2	Mammoth West	5/3/10 1320	5/9/10 1303	ND		ND		573.6 **	5.58	ND	
T8722	2	Mammoth West	5/9/10 1303	5/14/10 1248	ND		ND		571.0 **	5.78	ND	
T8722D	2	Mammoth West	5/9/10 1303	5/14/10 1248	ND		ND		569.8 **	6.06	ND	
T9144	2	Mammoth West	5/14/10 1248	5/19/10 1236	ND		ND		ND		ND	
T9171	2	Mammoth West	5/19/10 1236	5/25/10 1419	ND		ND		ND		ND	
T9351	2	Mammoth West	5/25/10 1419	6/1/10 1422	ND		ND		569.4 **	4.21	ND	
T9599	2	Mammoth West	6/1/10 1422	6/7/10 1451	ND		ND		571.2 **	3.43	ND	
T9599D	2	Mammoth West	6/1/10 1422	6/7/10 1451	ND		ND		568.8 **	3.74	ND	
T9627	2	Mammoth West	6/7/10 1451	6/14/10 1405	ND		ND		570.2 **	3.18	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U0536	2	Mammoth West	6/14/10 1405	6/22/10 1355	ND		ND		570.0 **	3.50	ND	
U0783	2	Mammoth West	6/22/10 1355	8/5/10 1202	ND		ND		567.0	6.15	ND	
U1323	2	Mammoth West	8/5/10 1202	9/2/10 1356	ND		ND		567.6	3.46	ND	
U1431	2	Mammoth West	9/2/10 1356	9/22/10 1306	ND		ND		569.0 **	2.88	ND	
U1836	2	Mammoth West	9/22/10 1306	10/4/10 1346	ND		ND		ND		ND	
U2013	2	Mammoth West	10/4/10 1346	10/11/10 1503	ND		ND		ND		ND	
U2571	2	Mammoth West	10/11/10 1503	10/15/10 1236	ND		ND		ND		ND	
U2598	2	Mammoth West	10/15/10 1236	10/20/10 1301	ND		ND		ND		ND	
U2626	2	Mammoth West	10/20/10 1301	10/25/10 1335	ND		ND		ND		ND	
U2903	2	Mammoth West	10/25/10 1335	11/1/10 1407	ND		ND		ND		ND	
U3228	2	Mammoth West	11/1/10 1407	11/8/10 1246	ND		ND		ND		ND	
U3556	2	Mammoth West	11/8/10 1246	11/15/10 1254	ND		ND		ND		ND	
U4223	2	Mammoth West	11/15/10 1254	11/22/10 1231	ND		ND		ND		ND	
U4250	2	Mammoth West	11/22/10 1231	11/29/10 1259	ND		ND		ND		ND	
U4539	2	Mammoth West	11/29/10 1259	12/7/10 1224	ND		ND		ND		ND	
U4539D	2	Mammoth West	11/29/10 1259	12/7/10 1224	ND		ND		ND		ND	
U4743	2	Mammoth West	12/7/10 1224	12/17/10 1312	ND		ND		ND		ND	
U5070	2	Mammoth West	12/17/10 1312	12/28/10 1252	ND		ND		ND		ND	
U5435	2	Mammoth West	12/28/10 1252	1/11/11 1312	ND		ND		ND		ND	
U5701	2	Mammoth West	1/11/11 1312	1/24/11 1256	ND		ND		ND		ND	
U6293	2	Mammoth West	1/24/11 1256	2/11/11 1235	ND		ND		ND		ND	
	2	Mammoth West	2/11/11 1235	2/28/11 1334	nsa		nsa		nsa		nsa	
U7444	2	Mammoth West	2/28/11 1334	3/17/11 1327	ND		ND		ND		ND	
U8175	2	Mammoth West	3/17/11 1327	4/6/11 1344	ND		ND		ND		ND	
U8606	2	Mammoth West	4/6/11 1344	4/25/11 1351	ND		ND		ND		ND	
U9849	2	Mammoth West	4/25/11 1351	5/11/11 0906	ND		ND		564.0 **	2.33	ND	
V0330	2	Mammoth West	5/11/11 0906	5/26/11 1355	ND		ND		ND		ND	
V0748	2	Mammoth West	5/26/11 1355	6/15/11 1345	ND		ND		ND		ND	
V1416	2	Mammoth West	6/15/11 1345	7/22/11 1336	ND		ND		ND		ND	
V1729	2	Mammoth West	7/22/11 1336	8/15/11 1409	ND		ND		ND		ND	
V2052	2	Mammoth West	8/15/11 1409	9/14/11 1440	ND		ND		ND		ND	
T5118	**4**	**Catfish Reception Hall**	**1/11/10 1650**	**1/18/10 1408**	**ND**		**ND**		**ND**		**ND**	
T5126	4	Catfish Reception Hall	1/18/10 1408	1/26/10 1427	ND		ND		ND		ND	
T5133	4	Catfish Reception Hall	1/26/10 1427	2/1/10 1531	ND		ND		ND		ND	
T5418	4	Catfish Reception Hall	2/1/10 1531	2/9/10 1513	ND		ND		ND		ND	
	4	Catfish Reception Hall	2/9/10 1513	3/25/10 1731	nsa		nsa		nsa		nsa	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T6963	4	Catfish Reception Hall	3/25/10 1731	4/1/10 1303	ND		ND		ND		ND	
T7189	4	Catfish Reception Hall	4/1/10 1303	4/9/10 1334	ND		ND		ND		ND	
	4	Catfish Reception Hall	4/9/10 1334	4/22/10 1222	nsa		nsa		nsa		nsa	
T8111	4	Catfish Reception Hall	4/22/10 1222	4/28/10 1407	ND		ND		ND		ND	
T7951	4	Catfish Reception Hall	4/28/10 1407	5/3/10 1330	ND		ND		567.0	10.2	ND	
T7951D	4	Catfish Reception Hall	4/28/10 1407	5/3/10 1330	ND		ND		ND		ND	
T8256	4	Catfish Reception Hall	5/3/10 1330	5/9/10 1312	ND		ND		ND		ND	
T8723	4	Catfish Reception Hall	5/9/10 1312	5/14/10 1258	ND		ND		568.6	19.6	ND	
T9145	4	Catfish Reception Hall	5/14/10 1258	5/19/10 1256	ND		ND		568.8	14.9	ND	
T9172	4	Catfish Reception Hall	5/19/10 1256	5/25/10 1426	ND		ND		568.4	21.3	ND	
T9352	4	Catfish Reception Hall	5/25/10 1426	6/1/10 1431	ND		ND		568.4	31.0	ND	
T9601	4	Catfish Reception Hall	6/1/10 1431	6/7/10 1500	ND		ND		568.6	27.3	ND	
T9628	4	Catfish Reception Hall	6/7/10 1500	6/14/10 1414	ND		ND		569.0	19.5	ND	
U0537	4	Catfish Reception Hall	6/14/10 1414	6/22/10 1405	ND		ND		568.2	13.6	ND	
U0784	4	Catfish Reception Hall	6/22/10 1405	8/5/10 1222	ND		ND		567.8	27.9	ND	
U1324	4	Catfish Reception Hall	8/5/10 1222	9/2/10 1436	ND		ND		567.6	16.4	ND	
U1432	4	Catfish Reception Hall	9/2/10 1436	9/22/10 1333	ND		ND		567.2	12.2	ND	
U1837	4	Catfish Reception Hall	9/22/10 1333	10/4/10 1402	ND		ND		568.6 **	4.21	ND	
U2014	4	Catfish Reception Hall	10/4/10 1402	10/11/10 1511	ND		ND		ND		ND	
U2572	4	Catfish Reception Hall	10/11/10 1511	10/15/10 1245	ND		ND		ND		ND	
U2599	4	Catfish Reception Hall	10/15/10 1245	10/20/10 1312	ND		ND		ND		ND	
U2599D	4	Catfish Reception Hall	10/15/10 1245	10/20/10 1312	ND		ND		ND		ND	
U2627	4	Catfish Reception Hall	10/20/10 1312	10/25/10 1346	ND		ND		568.4	3.80	ND	
U2904	4	Catfish Reception Hall	10/25/10 1346	11/1/10 1416	ND		ND		569.4 **	3.11	ND	
U3229	4	Catfish Reception Hall	11/1/10 1416	11/8/10 1255	ND		ND		571.2 **	2.32	ND	
U3557	4	Catfish Reception Hall	11/8/10 1255	11/15/10 1305	ND		ND		568.4 **	3.51	ND	
U4224	4	Catfish Reception Hall	11/15/10 1305	11/22/10 1242	ND		ND		568.2 **	3.86	ND	
U4251	4	Catfish Reception Hall	11/22/10 1242	11/29/10 1308	ND		ND		567.6 **	3.40	ND	
U4541	4	Catfish Reception Hall	11/29/10 1308	12/7/10 1231	ND		ND		567.6 **	3.51	ND	
U4744	4	Catfish Reception Hall	12/7/10 1231	12/17/10 1320	ND		ND		568.2 **	3.76	ND	
U5071	4	Catfish Reception Hall	12/17/10 1320	12/28/10 1302	ND		ND		568.2	6.13	ND	
U5436	4	Catfish Reception Hall	12/28/10 1302	1/11/11 1322	ND		ND		568.0 **	3.70	ND	
U5702	4	Catfish Reception Hall	1/11/11 1322	1/24/11 1301	ND		ND		566.6	6.47	ND	
U6294	4	Catfish Reception Hall	1/24/11 1301	2/11/11 1242	ND		ND		569.8	7.04	ND	
	4	Catfish Reception Hall	2/11/11 1242	2/28/11 1342	nsa		nsa		nsa		nsa	
U7445	4	Catfish Reception Hall	2/28/11 1342	3/17/11 1338	ND		ND		565.4	3.95	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U8176	4	Catfish Reception Hall	3/17/11 1338	4/6/11 1355	ND		ND		565.2	4.89	ND	
U8607	4	Catfish Reception Hall	4/6/11 1355	4/25/11 1400	ND		ND		563.2 **	3.73	ND	
U9850	4	Catfish Reception Hall	4/25/11 1400	5/11/11 0915	ND		ND		563.8 **	2.65	ND	
V0331	4	Catfish Reception Hall	5/11/11 0915	5/26/11 1403	ND		ND		562.8 **	3.34	ND	
V0749	4	Catfish Reception Hall	5/26/11 1403	6/15/11 1415	ND		ND		564.6 **	2.27	ND	
T8748	**5**	**Bridal Chamber**	**4/22/10 1231**	**4/28/10 1414**	**ND**		**ND**		**ND**		**ND**	
T8749	5	Bridal Chamber	4/28/10 1414	5/3/10 1335	ND		ND		ND		ND	
T8750	5	Bridal Chamber	5/3/10 1335	5/9/10 1323	ND		ND		568.4	10.1	ND	
T8724	5	Bridal Chamber	5/9/10 1323	5/14/10 1302	ND		ND		568.4	9.96	ND	
T9146	5	Bridal Chamber	5/14/10 1302	5/19/10 1304	ND		ND		567.6	8.61	ND	
T9173	5	Bridal Chamber	5/19/10 1304	5/25/10 1431	ND		ND		568.2	11.7	ND	
T9353	5	Bridal Chamber	5/25/10 1431	6/1/10 1435	ND		ND		568.4	13.1	ND	
T9602	5	Bridal Chamber	6/1/10 1435	6/7/10 1505	ND		ND		567.8	14.4	ND	
T9629	5	Bridal Chamber	6/7/10 1505	6/14/10 1420	ND		ND		569.0	15.5	ND	
U0538	5	Bridal Chamber	6/14/10 1420	6/22/10 1407	ND		ND		569.2	9.54	ND	
U0785	5	Bridal Chamber	6/22/10 1407	8/5/10 1233	ND		ND		567.8	23.3	ND	
U1325	5	Bridal Chamber	8/5/10 1233	9/2/10 1443	ND		ND		567.4	12.6	ND	
U1433	5	Bridal Chamber	9/2/10 1443	9/22/10 1341	ND		ND		567.8	8.72	ND	
U1838	5	Bridal Chamber	9/22/10 1341	10/4/10 1407	ND		ND		570.0 **	5.61	ND	
U2015	5	Bridal Chamber	10/4/10 1407	10/11/10 1516	ND		ND		ND		ND	
U2573	5	Bridal Chamber	10/11/10 1516	10/15/10 1252	ND		ND		570.2 **	3.29	ND	
U2601	5	Bridal Chamber	10/15/10 1252	10/20/10 1316	ND		ND		ND		ND	
U2628	5	Bridal Chamber	10/20/10 1316	10/25/10 1352	ND		ND		ND		ND	
U2905	5	Bridal Chamber	10/25/10 1352	11/1/10 1423	ND		ND		567.2	2.90	ND	
U3230	5	Bridal Chamber	11/1/10 1423	11/8/10 1301	ND		ND		569.6	3.91	ND	
U3558	5	Bridal Chamber	11/8/10 1301	11/15/10 1310	ND		ND		569.0	4.49	ND	
U4225	5	Bridal Chamber	11/15/10 1310	11/22/10 1249	ND		ND		ND		ND	
U4252	5	Bridal Chamber	11/22/10 1249	11/29/10 1315	ND		ND		ND		ND	
U4542	5	Bridal Chamber	11/29/10 1315	12/7/10 1236	ND		ND		ND		ND	
U4745	5	Bridal Chamber	12/7/10 1236	12/17/10 1325	ND		ND		ND		ND	
U5072	5	Bridal Chamber	12/17/10 1325	12/28/10 1309	ND		ND		567.0	3.92	ND	
U5437	5	Bridal Chamber	12/28/10 1309	1/11/11 1328	ND		ND		569.2 **	1.52	ND	
U5703	5	Bridal Chamber	1/11/11 1328	1/24/11 1308	ND		ND		566.0 **	3.80	ND	
U6295	5	Bridal Chamber	1/24/11 1308	2/11/11 1246	ND		ND		568.2 **	6.13	ND	
T6964	**6**	**Oscar**	**3/25/10 1742**	**4/1/10 1326**	**ND**		**ND**		**ND**		**ND**	
T7190	6	Oscar	4/1/10 1326	4/9/10 1356	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
	6	Oscar	4/9/10 1356	4/22/10 1245	nsa		nsa		nsa		nsa	
T8112	6	Oscar	4/22/10 1245	4/28/10 1433	ND		ND		ND		ND	
T7952	6	Oscar	4/28/10 1433	5/3/10 1357	ND		ND		ND		ND	
T8257	6	Oscar	5/3/10 1357	5/9/10 1352	ND		ND		ND		ND	
T8725	6	Oscar	5/9/10 1352	5/14/10 1321	ND		ND		570.4	4.76	ND	
T9147	6	Oscar	5/14/10 1321	5/19/10 1337	ND		ND		ND		ND	
T9174	6	Oscar	5/19/10 1337	5/25/10 1451	ND		ND		ND		ND	
T9354	6	Oscar	5/25/10 1451	6/1/10 1451	ND		ND		569.4	5.58	ND	
T9603	6	Oscar	6/1/10 1451	6/7/10 1523	ND		ND		ND		ND	
T9630	6	Oscar	6/7/10 1523	6/14/10 1438	ND		ND		ND		ND	
U0539	6	Oscar	6/14/10 1438	6/22/10 1429	ND		ND		570.8 **	5.35	ND	
U0786	6	Oscar	6/22/10 1429	8/5/10 1257	ND		ND		567.2	11.3	ND	
U1326	6	Oscar	8/5/10 1257	9/2/10 1505	ND		ND		566.2	7.36	ND	
U1434	6	Oscar	9/2/10 1505	9/22/10 1403	ND		ND		568.8	2.07	ND	
U1839	6	Oscar	9/22/10 1403	10/4/10 1427	ND		ND		567.2 **	3.37	ND	
U2016	6	Oscar	10/4/10 1427	10/11/10 1532	ND		ND		ND		ND	
U2574	6	Oscar	10/11/10 1532	10/15/10 1311	ND		ND		ND		ND	
U2602	6	Oscar	10/15/10 1311	10/20/10 1339	ND		ND		ND		ND	
U2629	6	Oscar	10/20/10 1339	10/25/10 1417	ND		ND		ND		ND	
U2906	6	Oscar	10/25/10 1417	11/1/10 1444	ND		ND		ND		ND	
U3231	6	Oscar	11/1/10 1444	11/8/10 1323	ND		ND		ND		ND	
U3559	6	Oscar	11/8/10 1323	11/15/10 1332	ND		ND		ND		ND	
U3559D	6	Oscar	11/8/10 1323	11/15/10 1332	ND		ND		ND		ND	
U4226	6	Oscar	11/15/10 1332	11/22/10 1310	ND		ND		ND		ND	
U4253	6	Oscar	11/22/10 1310	11/29/10 1336	ND		ND		ND		ND	
U4543	6	Oscar	11/29/10 1336	12/7/10 1255	ND		ND		ND		ND	
U4746	6	Oscar	12/7/10 1255	12/17/10 1345	ND		ND		ND		ND	
U5073	6	Oscar	12/17/10 1345	12/28/10 1333	ND		ND		567.8 **	2.36	ND	
U5438	6	Oscar	12/28/10 1333	1/11/11 1350	ND		ND		568.0 **	1.88	ND	
U5704	6	Oscar	1/11/11 1350	1/24/11 1328	ND		ND		ND		ND	
U6296	6	Oscar	1/24/11 1328	2/11/11 1304	ND		ND		567.8 **	7.23	ND	
T6965	**7**	**Devil's Kitchen A**	**3/25/10 1715**	**4/1/10 1317**	**ND**		**ND**		**ND**		**ND**	
T7191	7	Devil's Kitchen A	4/1/10 1317	4/9/10 1347	ND		ND		ND		ND	
	7	Devil's Kitchen A	4/9/10 1347	4/22/10 1235	nsa		nsa		nsa		nsa	
T8113	7	Devil's Kitchen A	4/22/10 1235	4/28/10 1424	ND		ND		ND		ND	
T7953	7	Devil's Kitchen A	4/28/10 1424	5/3/10 1345	ND		ND		566.6	7.56	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T7953D	7	Devil's Kitchen A	4/28/10 1424	5/3/10 1345	ND		ND		ND		ND	
T8258	7	Devil's Kitchen A	5/3/10 1345	5/9/10 1335	ND		ND		568.0	18.7	ND	
T8258D	7	Devil's Kitchen A	5/3/10 1345	5/9/10 1335	ND		ND		568.8	11.8	ND	
T8726	7	Devil's Kitchen A	5/9/10 1335	5/14/10 1310	ND		ND		568.4	17.3	ND	
T9148	7	Devil's Kitchen A	5/14/10 1310	5/19/10 1317	ND		ND		569.2	12.6	ND	
T9175	7	Devil's Kitchen A	5/19/10 1317	5/25/10 1439	ND		ND		568.8	11.7	ND	
T9355	7	Devil's Kitchen A	5/25/10 1439	6/1/10 1441	ND		ND		568.2	15.6	ND	
T9604	7	Devil's Kitchen A	6/1/10 1441	6/7/10 1512	ND		ND		568.4	11.9	ND	
T9631	7	Devil's Kitchen A	6/7/10 1512	6/14/10 1428	ND		ND		568.4	17.5	ND	
U0541	7	Devil's Kitchen A	6/14/10 1428	6/22/10 1415	ND		ND		568.6	7.62	ND	
U0787	7	Devil's Kitchen A	6/22/10 1415	8/5/10 1244	ND		ND		566.8	15.9	ND	
U1327	7	Devil's Kitchen A	8/5/10 1244	9/2/10 1455	ND		ND		567.0	11.7	ND	
U1435	7	Devil's Kitchen A	9/2/10 1455	9/22/10 1350	ND		ND		569.8	6.13	ND	
U1841	7	Devil's Kitchen A	9/22/10 1350	10/4/10 1416	ND		ND		568.6 **	6.28	ND	
U2017	7	Devil's Kitchen A	10/4/10 1416	10/11/10 1523	ND		ND		ND		ND	
U2575	7	Devil's Kitchen A	10/11/10 1523	10/15/10 1301	ND		ND		570.6 **	2.20	ND	
U2603	7	Devil's Kitchen A	10/15/10 1301	10/20/10 1326	ND		ND		568.2 **	2.19	ND	
U2630	7	Devil's Kitchen A	10/20/10 1326	10/25/10 1405	ND		ND		570.0	2.64	ND	
U2907	7	Devil's Kitchen A	10/25/10 1405	11/1/10 1433	ND		ND		567.0	3.74	ND	
U3232	7	Devil's Kitchen A	11/1/10 1433	11/8/10 1311	ND		ND		568.2 **	2.72	ND	
U3561	7	Devil's Kitchen A	11/8/10 1311	11/15/10 1321	ND		ND		568.6 **	4.76	ND	
U4227	7	Devil's Kitchen A	11/15/10 1321	11/22/10 1300	ND		ND		ND		ND	
U4254	7	Devil's Kitchen A	11/22/10 1300	11/29/10 1325	ND		ND		569.6 **	3.35	ND	
U4544	7	Devil's Kitchen A	11/29/10 1325	12/7/10 1246	ND		ND		ND		ND	
U4747	7	Devil's Kitchen A	12/7/10 1246	12/17/10 1334	ND		ND		568.0	3.60	ND	
U5074	7	Devil's Kitchen A	12/17/10 1334	12/28/10 1320	ND		ND		567.0 **	4.25	ND	
U5439	7	Devil's Kitchen A	12/28/10 1320	1/11/11 1339	ND		ND		568.2 **	2.76	ND	
U5439D	7	Devil's Kitchen A	12/28/10 1320	1/11/11 1339	ND		ND		571.0 **	2.83	ND	
U5705	7	Devil's Kitchen A	1/11/11 1339	1/24/11 1315	ND		ND		567.0	4.44	ND	
U6297	7	Devil's Kitchen A	1/24/11 1315	2/11/11 1259	ND		ND		569.0 **	5.38	ND	
T6966	**9**	**Ladies Parlor**	**3/25/10 1718**	**4/1/10 1313**	**ND**		**ND**		**ND**		**ND**	
T7192	9	Ladies Parlor	4/1/10 1313	4/9/10 1343	ND		ND		ND		ND	
	9	Ladies Parlor	4/9/10 1343	4/22/10 1230	nsa		nsa		nsa		nsa	
T8114	9	Ladies Parlor	4/22/10 1230	4/28/10 1418	ND		ND		ND		ND	
T7954	9	Ladies Parlor	4/28/10 1418	5/3/10 1340	ND		ND		569.6 **	6.69	ND	
T7954D	9	Ladies Parlor	4/28/10 1418	5/3/10 1340	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T8259	9	Ladies Parlor	5/3/10 1340	5/9/10 1328	ND		ND		568.2	12.2	ND	
T8259D	9	Ladies Parlor	5/3/10 1340	5/9/10 1328	ND		ND		568.0	13.9	ND	
T8727	9	Ladies Parlor	5/9/10 1328	5/14/10 1307	ND		ND		569.0	12.8	ND	
T9149	9	Ladies Parlor	5/14/10 1307	5/19/10 1309	ND		ND		569.2	8.15	ND	
T9176	9	Ladies Parlor	5/19/10 1309	5/25/10 1436	ND		ND		568.0	9.89	ND	
T9356	9	Ladies Parlor	5/25/10 1436	6/1/10 1438	ND		ND		568.2	16.9	ND	
T9605	9	Ladies Parlor	6/1/10 1438	6/7/10 1508	ND		ND		569.2	9.54	ND	
T9632	9	Ladies Parlor	6/7/10 1508	6/14/10 1424	ND		ND		569.6	6.71	ND	
U0542	9	Ladies Parlor	6/14/10 1424	6/22/10 1412	ND		ND		568.8	9.74	ND	
U0788	9	Ladies Parlor	6/22/10 1412	8/5/10 1237	ND		ND		567.2	21.7	ND	
U1328	9	Ladies Parlor	8/5/10 1237	9/2/10 1448	ND		ND		568.0	15.6	ND	
U1436	9	Ladies Parlor	9/2/10 1448	9/22/10 1345	ND		ND		568.6	6.33	ND	
U1842	9	Ladies Parlor	9/22/10 1345	10/4/10 1411	ND		ND		568.6 **	2.85	ND	
U2018	9	Ladies Parlor	10/4/10 1411	10/11/10 1520	ND		ND		569.2	3.56	ND	
U2576	9	Ladies Parlor	10/11/10 1520	10/15/10 1255	ND		ND		567.8	2.44	ND	
U2604	9	Ladies Parlor	10/15/10 1255	10/20/10 1322	ND		ND		568.6 **	3.19	ND	
U2631	9	Ladies Parlor	10/20/10 1322	10/25/10 1356	ND		ND		ND		ND	
U2908	9	Ladies Parlor	10/25/10 1356	11/1/10 1428	ND		ND		566.4 **	2.56	ND	
U3233	9	Ladies Parlor	11/1/10 1428	11/8/10 1306	ND		ND		568.4 **	2.66	ND	
U3562	9	Ladies Parlor	11/8/10 1306	11/15/10 1316	ND		ND		572.0 **	2.21	ND	
U4228	9	Ladies Parlor	11/15/10 1316	11/22/10 1254	ND		ND		ND		ND	
U4255	9	Ladies Parlor	11/22/10 1254	11/29/10 1319	ND		ND		ND		ND	
U4545	9	Ladies Parlor	11/29/10 1319	12/7/10 1242	ND		ND		567.6	3.03	ND	
U4748	9	Ladies Parlor	12/7/10 1242	12/17/10 1330	ND		ND		568.0 **	2.55	ND	
U5075	9	Ladies Parlor	12/17/10 1330	12/28/10 1315	ND		ND		567.2	4.16	ND	
U5441	9	Ladies Parlor	12/28/10 1315	1/11/11 1334	ND		ND		568.2 **	3.58	ND	
U5706	9	Ladies Parlor	1/11/11 1334	1/24/11 1311	ND		ND		565.6	6.06	ND	
U6298	9	Ladies Parlor	1/24/11 1311	2/11/11 1251	ND		ND		568.0	10.4	ND	
	9	Ladies Parlor	2/11/11 1251	2/28/11 1348	nsa		nsa		nsa		nsa	
U7446	9	Ladies Parlor	2/28/11 1348	3/17/11 1347	ND		ND		564.2 **	3.62	ND	
U8177	9	Ladies Parlor	3/17/11 1347	4/6/11 1407	ND		ND		564.0 **	4.06	ND	
U8608	9	Ladies Parlor	4/6/11 1407	4/25/11 1410	ND		ND		564.4 **	3.66	ND	
U9851	9	Ladies Parlor	4/25/11 1410	5/11/11 0926	ND		ND		564.8 **	3.23	ND	
V0332	9	Ladies Parlor	5/11/11 0926	5/26/11 1412	ND		ND		563.2 **	2.70	ND	
V0750	9	Ladies Parlor	5/26/11 1412	6/15/11 1425	ND		ND		562.2 **	1.19	ND	
V1417	9	Ladies Parlor	6/15/11 1425	7/22/11 1352	ND		ND		563.0 **	4.85	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
V1730	9	Ladies Parlor	7/22/11 1352	8/15/11 1420	ND		ND		ND		ND	
V2053	9	Ladies Parlor	8/15/11 1420	9/14/11 1458	ND		ND		559.2 **	4.30	ND	
T6967	**10**	**Alligator Hole**	**3/25/10 1709**	**4/1/10 1324**	**ND**		**ND**		**ND**		**ND**	
T7193	10	Alligator Hole	4/1/10 1324	4/9/10 1352	ND		ND		ND		ND	
	10	Alligator Hole	4/9/10 1352	4/22/10 1239	nsa		nsa		nsa		nsa	
T8115	10	Alligator Hole	4/22/10 1239	4/28/10 1428	ND		ND		ND		ND	
T7955	10	Alligator Hole	4/28/10 1428	5/3/10 1350	ND		ND		ND		ND	
T8261	10	Alligator Hole	5/3/10 1350	5/9/10 1344	ND		ND		ND		ND	
T8728	10	Alligator Hole	5/9/10 1344	5/14/10 1310	ND		ND		567.6	8.14	ND	
T9150	10	Alligator Hole	5/14/10 1310	5/19/10 1326	ND		ND		569.4	4.76	ND	
T9177	10	Alligator Hole	5/19/10 1326	5/25/10 1446	ND		ND		570.8	5.76	ND	
T9357	10	Alligator Hole	5/25/10 1446	6/1/10 1446	ND		ND		569.8	3.85	ND	
T9606	10	Alligator Hole	6/1/10 1446	6/7/10 1517	ND		ND		568.2	5.19	ND	
T9633	10	Alligator Hole	6/7/10 1517	6/14/10 1433	ND		ND		568.6	9.65	ND	
U0543	10	Alligator Hole	6/14/10 1433	6/22/10 1421	ND		ND		568.6	7.84	ND	
U0789	10	Alligator Hole	6/22/10 1421	8/5/10 1249	ND		ND		566.4	10.4	ND	
U1329	10	Alligator Hole	8/5/10 1249	9/2/10 1459	ND		ND		566.6	10.6	ND	
U1437	10	Alligator Hole	9/2/10 1459	9/22/10 1356	ND		ND		568.8	6.08	ND	
U1843	10	Alligator Hole	9/22/10 1356	10/4/10 1422	ND		ND		568.8	2.82	ND	
U2019	10	Alligator Hole	10/4/10 1422	10/11/10 1528	ND		ND		ND		ND	
U2019D	10	Alligator Hole	10/4/10 1422	10/11/10 1528	ND		ND		ND		ND	
U2577	10	Alligator Hole	10/11/10 1528	10/15/10 1307	ND		ND		ND		ND	
U2605	10	Alligator Hole	10/15/10 1307	10/20/10 1333	ND		ND		ND		ND	
U2632	10	Alligator Hole	10/20/10 1333	10/25/10 1411	ND		ND		ND		ND	
U2909	10	Alligator Hole	10/25/10 1411	11/1/10 1438	ND		ND		568.0 **	1.96	ND	
U3234	10	Alligator Hole	11/1/10 1438	11/8/10 1317	ND		ND		ND		ND	
U3563	10	Alligator Hole	11/8/10 1317	11/15/10 1326	ND		ND		ND		ND	
U4229	10	Alligator Hole	11/15/10 1326	11/22/10 1305	ND		ND		ND		ND	
U4256	10	Alligator Hole	11/22/10 1305	11/29/10 1331	ND		ND		ND		ND	
U4546	10	Alligator Hole	11/29/10 1331	12/7/10 1250	ND		ND		ND		ND	
U4749	10	Alligator Hole	12/7/10 1250	12/17/10 1339	ND		ND		567.0 **	2.70	ND	
U5076	10	Alligator Hole	12/17/10 1339	12/28/10 1325	ND		ND		566.4	3.38	ND	
U5442	10	Alligator Hole	12/28/10 1325	1/11/11 1344	ND		ND		569.6 **	1.95	ND	
U5707	10	Alligator Hole	1/11/11 1344	1/24/11 1320	ND		ND		565.6	3.38	ND	
U6299	10	Alligator Hole	1/24/11 1320	2/11/11 1254	ND		ND		ND		ND	
U6299D	10	Alligator Hole	1/24/11 1320	2/11/11 1254	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
	10	Alligator Hole	2/11/11 1254	2/28/11 1359	nsa		nsa		nsa		nsa	
U7447	10	Alligator Hole	2/28/11 1359	3/17/11 1357	ND		ND		563.4 **	2.40	ND	
U8178	10	Alligator Hole	3/17/11 1357	4/6/11 1417	ND		ND		563.6 **	3.84	ND	
U8609	10	Alligator Hole	4/6/11 1417	4/25/11 1419	ND		ND		561.2 **	4.75	ND	
U9852	10	Alligator Hole	4/25/11 1419	5/11/11 0937	ND		ND		562.2 **	2.90	ND	
V0333	10	Alligator Hole	5/11/11 0937	5/26/11 1421	ND		ND		ND		ND	
V0751	10	Alligator Hole	5/26/11 1421	6/15/11 1433	ND		ND		562.2 **	1.84	ND	
T6968	**11**	**Mastodon Bone**	**3/25/10 1658**	**4/1/10 1331**	**ND**		**ND**		**ND**		**ND**	
T7194	11	Mastodon Bone	4/1/10 1331	4/9/10 1400	ND		ND		ND		ND	
	11	Mastodon Bone	4/9/10 1400	4/22/10 1256	nsa		nsa		nsa		nsa	
T8116	11	Mastodon Bone	4/22/10 1256	4/28/10 1438	ND		ND		ND		ND	
T7956	11	Mastodon Bone	4/28/10 1438	5/3/10 1405	ND		ND		ND		ND	
T8262	11	Mastodon Bone	5/3/10 1405	5/9/10 1401	ND		ND		ND		ND	
T8729	11	Mastodon Bone	5/9/10 1401	5/14/10 1329	ND		ND		ND		ND	
T9151	11	Mastodon Bone	5/14/10 1329	5/19/10 1344	ND		ND		ND		ND	
T9178	11	Mastodon Bone	5/19/10 1344	5/25/10 1456	ND		ND		ND		ND	
T9358	11	Mastodon Bone	5/25/10 1456	6/1/10 1454	ND		ND		567.4 *	3.85	ND	
T9607	11	Mastodon Bone	6/1/10 1454	6/7/10 1526	ND		ND		ND		ND	
T9634	11	Mastodon Bone	6/7/10 1526	6/14/10 1443	ND		ND		570.6 *	3.12	ND	
U0544	11	Mastodon Bone	6/14/10 1443	6/22/10 1433	ND		ND		ND		ND	
U0790	11	Mastodon Bone	6/22/10 1433	8/5/10 1308	ND		ND		569.2 *	3.15	ND	
U1330	11	Mastodon Bone	8/5/10 1308	9/2/10 1512	ND		ND		ND		ND	
U1438	11	Mastodon Bone	9/2/10 1512	9/22/10 1409	ND		ND		ND		ND	
U1844	11	Mastodon Bone	9/22/10 1409	10/4/10 1434	ND		ND		ND		ND	
U2021	11	Mastodon Bone	10/4/10 1434	10/11/10 1536	ND		ND		ND		ND	
U2578	11	Mastodon Bone	10/11/10 1536	10/15/10 1316	ND		ND		ND		ND	
U2606	11	Mastodon Bone	10/15/10 1316	10/20/10 1344	ND		ND		ND		ND	
U2633	11	Mastodon Bone	10/20/10 1344	10/25/10 1423	ND		ND		ND		ND	
U2910	11	Mastodon Bone	10/25/10 1423	11/1/10 1448	ND		ND		ND		ND	
U3235	11	Mastodon Bone	11/1/10 1448	11/8/10 1327	ND		ND		ND		ND	
U3564	11	Mastodon Bone	11/8/10 1327	11/15/10 1337	ND		ND		ND		ND	
U4230	11	Mastodon Bone	11/15/10 1337	11/22/10 1318	ND		ND		ND		ND	
U4257	11	Mastodon Bone	11/22/10 1318	11/29/10 1342	ND		ND		ND		ND	
U4547	11	Mastodon Bone	11/29/10 1342	12/7/10 1300	ND		ND		ND		ND	
U4750	11	Mastodon Bone	12/7/10 1300	12/17/10 1349	ND		ND		ND		ND	
U5077	11	Mastodon Bone	12/17/10 1349	12/28/10 1338	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U5443	11	Mastodon Bone	12/28/10 1338	1/11/11 1356	ND		ND		ND		ND	
U5708	11	Mastodon Bone	1/11/11 1356	1/24/11 1334	ND		ND		ND		ND	
U6301	11	Mastodon Bone	1/24/11 1334	2/11/11 1308	ND		ND		570.2 *	3.92	ND	
T6969	**12**	**Geyser**	**3/25/10 1651**	**4/1/10 1339**	**ND**		**ND**		**ND**		**ND**	
T7195	12	Geyser	4/1/10 1339	4/9/10 1404	ND		ND		ND		ND	
	12	Geyser	4/9/10 1404	4/22/10 1302	nsa		nsa		nsa		nsa	
T8117	12	Geyser	4/22/10 1302	4/28/10 1441	ND		ND		ND		ND	
T7957	12	Geyser	4/28/10 1441	5/3/10 1410	ND		ND		ND		ND	
T8263	12	Geyser	5/3/10 1410	5/9/10 1408	ND		ND		ND		ND	
T8730	12	Geyser	5/9/10 1408	5/14/10 1333	ND		ND		568.4 **	5.91	ND	
T9152	12	Geyser	5/14/10 1333	5/19/10 1355	ND		ND		569.0	4.28	ND	
T9179	12	Geyser	5/19/10 1355	5/25/10 1500	ND		ND		568.6	5.79	ND	
T9179D	12	Geyser	5/19/10 1355	5/25/10 1500	ND		ND		568.6 **	3.65	ND	
T9359	12	Geyser	5/25/10 1500	6/1/10 1458	ND		ND		566.8	7.41	ND	
T9359D	12	Geyser	5/25/10 1500	6/1/10 1458	ND		ND		568.6	5.86	ND	
T9608	12	Geyser	6/1/10 1458	6/7/10 1531	ND		ND		568.6	4.06	ND	
T9635	12	Geyser	6/7/10 1531	6/14/10 1447	ND		ND		568.2	6.24	ND	
U0545	12	Geyser	6/14/10 1447	6/22/10 1437	ND		ND		567.0	3.76	ND	
U0791	12	Geyser	6/22/10 1437	8/5/10 1315	ND		ND		567.6	6.09	ND	
U1331	12	Geyser	8/5/10 1315	9/2/10 1517	ND		ND		567.0	3.92	ND	
U1439	12	Geyser	9/2/10 1517	9/22/10 1416	ND		ND		565.4	5.23	ND	
U1439D	12	Geyser	9/2/10 1517	9/22/10 1416	ND		ND		567.0 **	6.89	ND	
U1845	12	Geyser	9/22/10 1416	10/4/10 1439	ND		ND		ND		ND	
U2022	12	Geyser	10/4/10 1439	10/11/10 1540	ND		ND		ND		ND	
U2579	12	Geyser	10/11/10 1540	10/15/10 1320	ND		ND		ND		ND	
U2579D	12	Geyser	10/11/10 1540	10/15/10 1320	ND		ND		ND		ND	
U2607	12	Geyser	10/15/10 1320	10/20/10 1349	ND		ND		ND		ND	
U2634	12	Geyser	10/20/10 1349	10/25/10 1427	ND		ND		ND		ND	
U2911	12	Geyser	10/25/10 1427	11/1/10 1453	ND		ND		ND		ND	
U3236	12	Geyser	11/1/10 1453	11/8/10 1333	ND		ND		ND		ND	
U3565	12	Geyser	11/8/10 1333	11/15/10 1343	ND		ND		ND		ND	
U4231	12	Geyser	11/15/10 1343	11/22/10 1323	ND		ND		ND		ND	
U4258	12	Geyser	11/22/10 1323	11/29/10 1346	ND		ND		ND		ND	
U4548	12	Geyser	11/29/10 1346	12/7/10 1305	ND		ND		ND		ND	
U4751	12	Geyser	12/7/10 1305	12/17/10 1354	ND		ND		ND		ND	
U5078	12	Geyser	12/17/10 1354	12/28/10 1343	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U5444	12	Geyser	12/28/10 1343	1/11/11 1400	ND		ND		ND		ND	
U5709	12	Geyser	1/11/11 1400	1/24/11 1338	ND		ND		ND		ND	
U6302	12	Geyser	1/24/11 1338	2/11/11 1312	ND		ND		567.0 **	7.25	ND	
	12	Geyser	2/11/11 1312	2/28/11 1412	nsa		nsa		nsa		nsa	
U7448	12	Geyser	2/28/11 1412	3/17/11 1415	ND		ND		ND		ND	
U8179	12	Geyser	3/17/11 1415	4/6/11 1433	ND		ND		ND		ND	
U8610	12	Geyser	4/6/11 1433	4/25/11 1435	ND		ND		ND		ND	
U9853	12	Geyser	4/25/11 1435	5/11/11 0952	ND		ND		ND		ND	
V0334	12	Geyser	5/11/11 0952	5/26/11 1438	ND		ND		ND		ND	
V0752	12	Geyser	5/26/11 1438	6/15/11 1447	ND		ND		ND		ND	
T6970	**13**	**Blue Grotto**	**3/25/10 1645**	**4/1/10 1343**	**ND**		**ND**		**ND**		**ND**	
T7196	13	Blue Grotto	4/1/10 1343	4/9/10 1409	ND		ND		ND		ND	
	13	Blue Grotto	4/9/10 1409	4/22/10 1306	nsa		nsa		nsa		nsa	
T8118	13	Blue Grotto	4/22/10 1306	4/28/10 1446	ND		ND		ND		ND	
T7958	13	Blue Grotto	4/28/10 1446	5/3/10 1420	ND		ND		ND		ND	
T8264	13	Blue Grotto	5/3/10 1420	5/9/10 1417	ND		ND		ND		ND	
T8731	13	Blue Grotto	5/9/10 1417	5/14/10 1338	ND		ND		568.4 *	6.79	ND	
T9153	13	Blue Grotto	5/14/10 1338	5/19/10 1406	ND		ND		ND		ND	
T9181	13	Blue Grotto	5/19/10 1406	5/25/10 1504	ND		ND		567.6 *	2.96	ND	
T9361	13	Blue Grotto	5/25/10 1504	6/1/10 1502	ND		ND		ND		ND	
T9609	13	Blue Grotto	6/1/10 1502	6/7/10 1536	ND		ND		ND		ND	
T9636	13	Blue Grotto	6/7/10 1536	6/14/10 1452	ND		ND		567.4 *	4.58	ND	
U0546	13	Blue Grotto	6/14/10 1452	6/22/10 1443	ND		ND		567.6 *	3.09	ND	
U0792	13	Blue Grotto	6/22/10 1443	8/5/10 1321	ND		ND		569.2 *	2.78	ND	
U1332	13	Blue Grotto	8/5/10 1321	9/2/10 1523	ND		ND		567.6 *	3.36	ND	
U1441	13	Blue Grotto	9/2/10 1523	9/22/10 1423	ND		ND		566.4 *	5.77	ND	
U1846	13	Blue Grotto	9/22/10 1423	10/4/10 1446	ND		ND		ND		ND	
U2023	13	Blue Grotto	10/4/10 1446	10/11/10 1544	ND		ND		ND		ND	
U2581	13	Blue Grotto	10/11/10 1544	10/15/10 1325	ND		ND		ND		ND	
U2608	13	Blue Grotto	10/15/10 1325	10/20/10 1354	ND		ND		ND		ND	
U2635	13	Blue Grotto	10/20/10 1354	10/25/10 1432	ND		ND		ND		ND	
U2912	13	Blue Grotto	10/25/10 1432	11/1/10 1458	ND		ND		567.6 *	2.26	ND	
U3237	13	Blue Grotto	11/1/10 1458	11/8/10 1337	ND		ND		ND		ND	
U3566	13	Blue Grotto	11/8/10 1337	11/15/10 1349	ND		ND		ND		ND	
U4232	13	Blue Grotto	11/15/10 1349	11/22/10 1328	ND		ND		ND		ND	
U4259	13	Blue Grotto	11/22/10 1328	11/29/10 1353	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U4259D	13	Blue Grotto	11/22/10 1328	11/29/10 1353	ND		ND		ND		ND	
U4549	13	Blue Grotto	11/29/10 1353	12/7/10 1309	ND		ND		ND		ND	
U4752	13	Blue Grotto	12/7/10 1309	12/17/10 1400	ND		ND		570.0 *	2.01	ND	
U5079	13	Blue Grotto	12/17/10 1400	12/28/10 1347	ND		ND		566.6 *	2.71	ND	
U5445	13	Blue Grotto	12/28/10 1347	1/11/11 1404	ND		ND		566.2 *	1.98	ND	
U5710	13	Blue Grotto	1/11/11 1404	1/24/11 1343	ND		ND		565.6 *	4.68	ND	
U6303	13	Blue Grotto	1/24/11 1343	2/11/11 1315	ND		ND		565.6 *	6.48	ND	
	13	Blue Grotto	2/11/11 1315	2/28/11 1416	nsa		nsa		nsa		nsa	
U8181	13	Blue Grotto	2/28/11 1416	4/6/11 1438	ND		ND		562.6 *	3.98	ND	
U8611	13	Blue Grotto	4/6/11 1438	4/25/11 1438	ND		ND		ND		ND	
U9854	13	Blue Grotto	4/25/11 1438	5/11/11 0957	ND		ND		ND		ND	
V0335	13	Blue Grotto	5/11/11 0957	5/26/11 1443	ND		ND		ND		ND	
V0753	13	Blue Grotto	5/26/11 1443	6/15/11 1451	ND		ND		ND		ND	
V1418	13	Blue Grotto	6/15/11 1451	7/22/11 1401	ND		ND		ND		ND	
V1731	13	Blue Grotto	7/22/11 1401	8/15/11 1538	ND		ND		ND		ND	
V2054	13	Blue Grotto	8/15/11 1538	9/14/11 1538	ND		ND		ND		ND	
T5119	**14**	**Christmas Tree**	**1/11/10 1700**	**1/18/10 1423**	**ND**		**ND**		**ND**		**ND**	
T5127	14	Christmas Tree	1/18/10 1423	1/26/10 1414	ND		ND		ND		ND	
T5134	14	Christmas Tree	1/26/10 1414	2/1/10 1515	ND		ND		ND		ND	
T5419	14	Christmas Tree	2/1/10 1515	2/9/10 1501	ND		ND		ND		ND	
	14	Christmas Tree	2/9/10 1501	3/25/10 1639	nsa		nsa		nsa		nsa	
T6971	14	Christmas Tree	3/25/10 1639	4/1/10 1352	ND		ND		ND		ND	
T7197	14	Christmas Tree	4/1/10 1352	4/9/10 1416	ND		ND		ND		ND	
	14	Christmas Tree	4/9/10 1416	4/22/10 1316	nsa		nsa		nsa		nsa	
T8119	14	Christmas Tree	4/22/10 1316	4/28/10 1453	ND		ND		ND		ND	
T7959	14	Christmas Tree	4/28/10 1453	5/3/10 1428	ND		ND		ND		ND	
T8265	14	Christmas Tree	5/3/10 1428	5/9/10 1425	ND		ND		ND		ND	
T8732	14	Christmas Tree	5/9/10 1425	5/14/10 1345	ND		ND		ND		ND	
T9154	14	Christmas Tree	5/14/10 1345	5/19/10 1415	ND		ND		ND		ND	
T9182	14	Christmas Tree	5/19/10 1415	5/25/10 1513	ND		ND		ND		ND	
T9362	14	Christmas Tree	5/25/10 1513	6/1/10 1509	ND		ND		ND		ND	
T9610	14	Christmas Tree	6/1/10 1509	6/7/10 1542	ND		ND		ND		ND	
T9637	14	Christmas Tree	6/7/10 1542	6/14/10 1456	ND		ND		ND		ND	
U0547	14	Christmas Tree	6/14/10 1456	6/22/10 1447	ND		ND		ND		ND	
	14	Christmas Tree	6/22/10 1447	8/5/10 1443	nsa		nsa		nsa		nsa	
U1333	14	Christmas Tree	8/5/10 1443	9/2/10 1529	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U1442	14	Christmas Tree	9/2/10 1529	9/22/10 1432	ND		ND		ND		ND	
U1847	14	Christmas Tree	9/22/10 1432	10/4/10 1453	ND		ND		ND		ND	
U2024	14	Christmas Tree	10/4/10 1453	10/11/10 1550	ND		ND		ND		ND	
U2582	14	Christmas Tree	10/11/10 1550	10/15/10 1335	ND		ND		ND		ND	
U2609	14	Christmas Tree	10/15/10 1335	10/20/10 1402	ND		ND		ND		ND	
U2636	14	Christmas Tree	10/20/10 1402	10/25/10 1441	ND		ND		ND		ND	
U2913	14	Christmas Tree	10/25/10 1441	11/1/10 1506	ND		ND		ND		ND	
U3238	14	Christmas Tree	11/1/10 1506	11/8/10 1344	ND		ND		ND		ND	
U3567	14	Christmas Tree	11/8/10 1344	11/15/10 1356	ND		ND		ND		ND	
U4233	14	Christmas Tree	11/15/10 1356	11/22/10 1333	ND		ND		ND		ND	
U4261	14	Christmas Tree	11/22/10 1333	11/29/10 1402	ND		ND		ND		ND	
U4550	14	Christmas Tree	11/29/10 1402	12/7/10 1315	ND		ND		ND		ND	
U4753	14	Christmas Tree	12/7/10 1315	12/17/10 1407	ND		ND		ND		ND	
U5081	14	Christmas Tree	12/17/10 1407	12/28/10 1355	ND		ND		ND		ND	
U5446	14	Christmas Tree	12/28/10 1355	1/11/11 1413	ND		ND		ND		ND	
U5711	14	Christmas Tree	1/11/11 1413	1/24/11 1349	ND		ND		ND		ND	
U6304	14	Christmas Tree	1/24/11 1349	2/11/11 1321	ND		ND		569.0 *	3.64	ND	
	14	Christmas Tree	2/11/11 1321	2/28/11 1422	nsa		nsa		nsa		nsa	
U7449	14	Christmas Tree	2/28/11 1422	3/17/11 1425	ND		ND		ND		ND	
U8182	14	Christmas Tree	3/17/11 1425	4/6/11 1445	ND		ND		ND		ND	
U8612	14	Christmas Tree	4/6/11 1445	4/25/11 1445	ND		ND		ND		ND	
U9855	14	Christmas Tree	4/25/11 1445	5/11/11 1003	ND		ND		ND		ND	
V0336	14	Christmas Tree	5/11/11 1003	5/26/11 1450	ND		ND		ND		ND	
V0754	14	Christmas Tree	5/26/11 1450	6/15/11 1456	ND		ND		ND		ND	
V1419	14	Christmas Tree	6/15/11 1456	7/22/11 1407	ND		ND		ND		ND	
V1732	14	Christmas Tree	7/22/11 1407	8/15/11 1531	ND		ND		ND		ND	
V2055	14	Christmas Tree	8/15/11 1531	9/14/11 1504	ND		ND		ND		ND	
T6972	**15**	**Garden of Eden**	**3/25/10 1622**	**4/1/10 1403**	**ND**		**ND**		**ND**		**ND**	
T7198	15	Garden of Eden	4/1/10 1403	4/9/10 1420	ND		ND		ND		ND	
	15	Garden of Eden	4/9/10 1420	4/22/10 1323	nsa		nsa		nsa		nsa	
T8121	15	Garden of Eden	4/22/10 1323	4/28/10 1457	ND		ND		ND		ND	
T7961	15	Garden of Eden	4/28/10 1457	5/3/10 1433	ND		ND		ND		ND	
T8266	15	Garden of Eden	5/3/10 1433	5/9/10 1436	ND		ND		ND		ND	
T8733	15	Garden of Eden	5/9/10 1436	5/14/10 1350	ND		ND		ND		ND	
T9155	15	Garden of Eden	5/14/10 1350	5/19/10 1427	ND		ND		ND		ND	
T9183	15	Garden of Eden	5/19/10 1427	5/25/10 1518	ND		ND		ND		ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T9363	15	Garden of Eden	5/25/10 1518	6/1/10 1515	ND		ND		ND		ND	
T9611	15	Garden of Eden	6/1/10 1515	6/7/10 1548	ND		ND		ND		ND	
T9638	15	Garden of Eden	6/7/10 1548	6/14/10 1503	ND		ND		ND		ND	
U0548	15	Garden of Eden	6/14/10 1503	6/22/10 1453	ND		ND		ND		ND	
U0793	15	Garden of Eden	6/22/10 1453	8/5/10 1347	ND		ND		ND		ND	
U1334	15	Garden of Eden	8/5/10 1347	9/2/10 1537	ND		ND		ND		ND	
U1443	15	Garden of Eden	9/2/10 1537	9/22/10 1439	ND		ND		ND		ND	
U1848	15	Garden of Eden	9/22/10 1439	10/4/10 1501	ND		ND		ND		ND	
U2025	15	Garden of Eden	10/4/10 1501	10/11/10 1556	ND		ND		ND		ND	
U2583	15	Garden of Eden	10/11/10 1556	10/15/10 1342	ND		ND		ND		ND	
U2610	15	Garden of Eden	10/15/10 1342	10/20/10 1409	ND		ND		ND		ND	
U2637	15	Garden of Eden	10/20/10 1409	10/25/10 1447	ND		ND		ND		ND	
U2914	15	Garden of Eden	10/25/10 1447	11/1/10 1513	ND		ND		ND		ND	
U3239	15	Garden of Eden	11/1/10 1513	11/8/10 1356	ND		ND		ND		ND	
U3239D	15	Garden of Eden	11/1/10 1513	11/8/10 1356	ND		ND		ND		ND	
U3568	15	Garden of Eden	11/8/10 1356	11/15/10 1403	ND		ND		ND		ND	
U4234	15	Garden of Eden	11/15/10 1403	11/22/10 1339	ND		ND		ND		ND	
U4262	15	Garden of Eden	11/22/10 1339	11/29/10 1411	ND		ND		ND		ND	
U4551	15	Garden of Eden	11/29/10 1411	12/7/10 1323	ND		ND		ND		ND	
U4754	15	Garden of Eden	12/7/10 1323	12/17/10 1413	ND		ND		ND		ND	
U5082	15	Garden of Eden	12/17/10 1413	12/28/10 1400	ND		ND		ND		ND	
U5447	15	Garden of Eden	12/28/10 1400	1/11/11 1420	ND		ND		ND		ND	
U5712	15	Garden of Eden	1/11/11 1420	1/24/11 1355	ND		ND		ND		ND	
U6305	15	Garden of Eden	1/24/11 1355	2/11/11 1326	ND		ND		ND		ND	
	15	Garden of Eden	2/11/11 1326	2/28/11 1429	nsa		nsa		nsa		nsa	
U7450	15	Garden of Eden	2/28/11 1429	3/17/11 1431	ND		ND		ND		ND	
U8183	15	Garden of Eden	3/17/11 1431	4/6/11 1451	ND		ND		ND		ND	
U8613	15	Garden of Eden	4/6/11 1451	4/25/11 1452	ND		ND		ND		ND	
U9856	15	Garden of Eden	4/25/11 1452	5/11/11 1008	ND		ND		ND		ND	
V0337	15	Garden of Eden	5/11/11 1008	5/26/11 1457	ND		ND		ND		ND	
V0755	15	Garden of Eden	5/26/11 1457	6/15/11 1501	ND		ND		ND		ND	
T6973	**16**	**Log**	**3/25/10 1629**	**4/1/10 1408**	**ND**		**ND**		**ND**		**ND**	
T7199	16	Log	4/1/10 1408	4/9/10 1417	ND		ND		ND		ND	
T7199D	16	Log	4/1/10 1408	4/9/10 1417	ND		ND		ND		ND	
	16	Log	4/9/10 1417	4/22/10 1324	nsa		nsa		nsa		nsa	
T8122	16	Log	4/22/10 1324	4/28/10 1459	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T7962	16	Log	4/28/10 1459	5/3/10 1434	ND		ND		ND		ND	
T8267	16	Log	5/3/10 1434	5/9/10 1439	ND		ND		ND		ND	
T8734	16	Log	5/9/10 1439	5/14/10 1349	ND		ND		ND		ND	
T9156	16	Log	5/14/10 1349	5/19/10 1425	ND		ND		ND		ND	
T9184	16	Log	5/19/10 1425	5/25/10 1520	ND		ND		ND		ND	
T9364	16	Log	5/25/10 1520	6/1/10 1516	ND		ND		ND		ND	
T9612	16	Log	6/1/10 1516	6/7/10 1549	ND		ND		ND		ND	
T9639	16	Log	6/7/10 1549	6/14/10 1504	ND		ND		ND		ND	
T9639D	16	Log	6/7/10 1549	6/14/10 1504	ND		ND		ND		ND	
U0549	16	Log	6/14/10 1504	6/22/10 1454	ND		ND		ND		ND	
U0794	16	Log	6/22/10 1454	8/5/10 1348	ND		ND		ND		ND	
U1335	16	Log	8/5/10 1348	9/2/10 1538	ND		ND		ND		ND	
U1444	16	Log	9/2/10 1538	9/22/10 1441	ND		ND		ND		ND	
U1849	16	Log	9/22/10 1441	10/4/10 1502	ND		ND		ND		ND	
U2026	16	Log	10/4/10 1502	10/11/10 1558	ND		ND		ND		ND	
U2584	16	Log	10/11/10 1558	10/15/10 1345	ND		ND		ND		ND	
U2611	16	Log	10/15/10 1345	10/20/10 1413	ND		ND		ND		ND	
U2638	16	Log	10/20/10 1413	10/25/10 1449	ND		ND		ND		ND	
U2915	16	Log	10/25/10 1449	11/1/10 1517	ND		ND		ND		ND	
U3241	16	Log	11/1/10 1517	11/8/10 1358	ND		ND		ND		ND	
U3569	16	Log	11/8/10 1358	11/15/10 1406	ND		ND		ND		ND	
U4235	16	Log	11/15/10 1406	11/22/10 1341	ND		ND		ND		ND	
U4263	16	Log	11/22/10 1341	11/29/10 1412	ND		ND		ND		ND	
U4552	16	Log	11/29/10 1412	12/7/10 1225	ND		ND		ND		ND	
U4755	16	Log	12/7/10 1225	12/17/10 1548	ND		ND		ND		ND	
U5083	16	Log	12/17/10 1548	12/28/10 1403	ND		ND		ND		ND	
U5448	16	Log	12/28/10 1403	1/11/11 1422	ND		ND		ND		ND	
U5713	16	Log	1/11/11 1422	1/24/11 1357	ND		ND		ND		ND	
U6306	16	Log	1/24/11 1357	2/11/11 1328	ND		ND		ND		ND	
T6974	**18**	**Indian Cave**	**3/25/10 1613**	**4/1/10 1417**	**ND**		**ND**		**ND**		**ND**	
T7201	18	Indian Cave	4/1/10 1417	4/9/10 1432	ND		ND		ND		ND	
	18	Indian Cave	4/9/10 1432	4/22/10 1447	nsa		nsa		nsa		nsa	
T8123	18	Indian Cave	4/22/10 1447	4/28/10 1647	ND		ND		ND		ND	
T7963	18	Indian Cave	4/28/10 1647	5/3/10 1626	ND		ND		ND		ND	
T8268	18	Indian Cave	5/3/10 1626	5/9/10 1640	ND		ND		ND		ND	
T8735	18	Indian Cave	5/9/10 1640	5/14/10 1558	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T9157	18	Indian Cave	5/14/10 1558	5/19/10 1439	ND		ND		ND		ND	
T9185	18	Indian Cave	5/19/10 1439	5/25/10 1645	ND		ND		ND		ND	
T9365	18	Indian Cave	5/25/10 1645	6/1/10 1645	ND		ND		ND		ND	
T9613	18	Indian Cave	6/1/10 1645	6/7/10 1709	ND		ND		ND		ND	
T9641	18	Indian Cave	6/7/10 1709	6/14/10 1616	ND		ND		ND		ND	
U0550	18	Indian Cave	6/14/10 1616	6/22/10 1501	ND		ND		ND		ND	
U0795	18	Indian Cave	6/22/10 1501	8/5/10 1608	ND		ND		566.4 *	5.05	ND	
U1336	18	Indian Cave	8/5/10 1608	9/2/10 1712	ND		ND		563.8 *	4.56	ND	
U1445	18	Indian Cave	9/2/10 1712	9/22/10 1629	ND		ND		565.0 *	3.21	ND	
U1850	18	Indian Cave	9/22/10 1629	10/4/10 1520	ND		ND		ND		ND	
U2027	18	Indian Cave	10/4/10 1520	10/11/10 1607	ND		ND		ND		ND	
U2585	18	Indian Cave	10/11/10 1607	10/15/10 1531	ND		ND		ND		ND	
U2612	18	Indian Cave	10/15/10 1531	10/20/10 1421	ND		ND		ND		ND	
U2639	18	Indian Cave	10/20/10 1421	10/25/10 1501	ND		ND		ND		ND	
U2639D	18	Indian Cave	10/20/10 1421	10/25/10 1501	ND		ND		ND		ND	
U2916	18	Indian Cave	10/25/10 1501	11/1/10 1529	ND		ND		ND		ND	
U3242	18	Indian Cave	11/1/10 1529	11/8/10 1408	ND		ND		ND		ND	
U3570	18	Indian Cave	11/8/10 1408	11/15/10 1416	ND		ND		ND		ND	
U4236	18	Indian Cave	11/15/10 1416	11/22/10 1350	ND		ND		ND		ND	
U4264	18	Indian Cave	11/22/10 1350	11/29/10 1426	ND		ND		ND		ND	
U4553	18	Indian Cave	11/29/10 1426	12/7/10 1336	ND		ND		ND		ND	
U4756	18	Indian Cave	12/7/10 1336	12/17/10 1418	ND		ND		ND		ND	
U5084	18	Indian Cave	12/17/10 1418	12/28/10 1412	ND		ND		566.0 *	5.08	ND	
U5449	18	Indian Cave	12/28/10 1412	1/11/11 1433	ND		ND		565.6 *	2.67	ND	
U5714	18	Indian Cave	1/11/11 1433	1/24/11 1406	ND		ND		ND		ND	
U6307	18	Indian Cave	1/24/11 1406	2/11/11 1338	ND		ND		567.6 *	7.15	ND	
	18	Indian Cave	2/11/11 1338	2/28/11 1442	nsa		nsa		nsa		nsa	
U7451	18	Indian Cave	2/28/11 1442	3/17/11 1442	ND		ND		ND		ND	
U8184	18	Indian Cave	3/17/11 1442	4/6/11 1503	ND		ND		562.0 *	2.75	ND	
U8614	18	Indian Cave	4/6/11 1503	4/25/11 1524	ND		ND		561.2 *	3.26	ND	
U9857	18	Indian Cave	4/25/11 1524	5/11/11 1020	ND		ND		ND		ND	
V0338	18	Indian Cave	5/11/11 1020	5/26/11 1515	ND		ND		ND		ND	
V0756	18	Indian Cave	5/26/11 1515	6/15/11 1515	ND		ND		ND		ND	
T6975	**19**	**First Fisherman's Paradise**	**3/25/10 1604**	**4/1/10 1423**	**ND**		**ND**		**ND**		**ND**	
T7202	19	First Fisherman's Paradise	4/1/10 1423	4/9/10 1448	ND		ND		ND		ND	
	19	First Fisherman's Paradise	4/9/10 1448	4/22/10 1332	nsa							

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T8124	19	First Fisherman's Paradise	4/22/10 1332	4/28/10 1507	ND		ND		ND		ND	
T7964	19	First Fisherman's Paradise	4/28/10 1507	5/3/10 1442	ND		ND		ND		ND	
T8269	19	First Fisherman's Paradise	5/3/10 1442	5/9/10 1453	ND		ND		ND		ND	
T8736	19	First Fisherman's Paradise	5/9/10 1453	5/14/10 1402	ND		ND		ND		ND	
T9158	19	First Fisherman's Paradise	5/14/10 1402	5/19/10 1452	ND		ND		ND		ND	
T9186	19	First Fisherman's Paradise	5/19/10 1452	5/25/10 1529	ND		ND		ND		ND	
T9366	19	First Fisherman's Paradise	5/19/10 1452	5/25/10 1529	ND		ND		ND		ND	
	19	First Fisherman's Paradise	5/25/10 1529	6/1/10 1525	nsa		nsa		nsa		nsa	
T9614	19	First Fisherman's Paradise	6/1/10 1525	6/7/10 1557	ND		ND		567.0 **	2.35	ND	
T9642	19	First Fisherman's Paradise	6/7/10 1557	6/14/10 1513	ND		ND		ND		ND	
U0551	19	First Fisherman's Paradise	6/14/10 1513	6/22/10 1505	ND		ND		ND		ND	
U0796	19	First Fisherman's Paradise	6/22/10 1505	8/5/10 1404	ND		ND		ND		ND	
U1457	19	First Fisherman's Paradise	8/5/10 1404	9/2/10 1548	ND		ND		567.6 **	3.35	ND	
U1446	19	First Fisherman's Paradise	9/2/10 1548	9/22/10 1456	ND		ND		566.2	3.73	ND	
U1851	19	First Fisherman's Paradise	9/22/10 1456	10/4/10 1525	ND		ND		ND		ND	
U2028	19	First Fisherman's Paradise	10/4/10 1525	10/11/10 1611	ND		ND		ND		ND	
U2586	19	First Fisherman's Paradise	10/11/10 1611	10/15/10 1354	ND		ND		ND		ND	
U2613	19	First Fisherman's Paradise	10/15/10 1354	10/20/10 1426	ND		ND		ND		ND	
U2641	19	First Fisherman's Paradise	10/20/10 1426	10/25/10 1507	ND		ND		ND		ND	
U2917	19	First Fisherman's Paradise	10/25/10 1507	11/1/10 1534	ND		ND		ND		ND	
U3243	19	First Fisherman's Paradise	11/1/10 1534	11/8/10 1415	ND		ND		ND		ND	
U3571	19	First Fisherman's Paradise	11/8/10 1415	11/15/10 1422	ND		ND		ND		ND	
U4237	19	First Fisherman's Paradise	11/15/10 1422	11/22/10 1354	ND		ND		ND		ND	
U4265	19	First Fisherman's Paradise	11/22/10 1354	11/29/10 1433	ND		ND		ND		ND	
U4554	19	First Fisherman's Paradise	11/29/10 1433	12/7/10 1340	ND		ND		ND		ND	
U4757	19	First Fisherman's Paradise	12/7/10 1340	12/17/10 1424	ND		ND		566.0 **	1.89	ND	
U5085	19	First Fisherman's Paradise	12/17/10 1424	12/28/10 1416	ND		ND		ND		ND	
U5450	19	First Fisherman's Paradise	12/28/10 1416	1/11/11 1437	ND		ND		ND		ND	
U5715	19	First Fisherman's Paradise	1/11/11 1437	1/24/11 1410	ND		ND		ND		ND	
U6308	19	First Fisherman's Paradise	1/24/11 1410	2/11/11 1341	ND		ND		ND		ND	
T6976	**20**	**No Name Cove**	**3/25/10 1550**	**4/1/10 1433**	**ND**		**ND**		**ND**		**ND**	
T7203	20	No Name Cove	4/1/10 1433	4/9/10 1458	ND		ND		ND		ND	
	20	No Name Cove	4/9/10 1458	4/22/10 1441	nsa		nsa		nsa		nsa	
T8125	20	No Name Cove	4/22/10 1441	4/28/10 1639	ND		ND		ND		ND	
T7965	20	No Name Cove	4/28/10 1639	5/3/10 1617	ND		ND		ND		ND	
T8270	20	No Name Cove	5/3/10 1617	5/9/10 1630	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T8737	20	No Name Cove	5/9/10 1630	5/14/10 1548	ND		ND		ND		ND	
T9159	20	No Name Cove	5/14/10 1548	5/19/10 1638	ND		ND		ND		ND	
T9159D	20	No Name Cove	5/14/10 1548	5/19/10 1638	ND		ND		ND		ND	
T9187	20	No Name Cove	5/19/10 1638	5/25/10 1638	ND		ND		ND		ND	
T9367	20	No Name Cove	5/25/10 1638	6/1/10 1635	ND		ND		ND		ND	
T9615	20	No Name Cove	6/1/10 1635	6/7/10 1701	ND		ND		ND		ND	
T9643	20	No Name Cove	6/7/10 1701	6/14/10 1610	ND		ND		ND		ND	
U0552	20	No Name Cove	6/14/10 1610	6/22/10 1512	ND		ND		ND		ND	
U0797	20	No Name Cove	6/22/10 1512	8/5/10 1555	ND		ND		567.6 *	3.97	ND	
U1337	20	No Name Cove	8/5/10 1555	9/2/10 1704	ND		ND		ND		ND	
U1447	20	No Name Cove	9/2/10 1704	9/22/10 1615	ND		ND		ND		ND	
U1852	20	No Name Cove	9/22/10 1615	10/4/10 1648	ND		ND		ND		ND	
U2029	20	No Name Cove	10/4/10 1648	10/11/10 1618	ND		ND		ND		ND	
U2587	20	No Name Cove	10/11/10 1618	10/15/10 1519	ND		ND		ND		ND	
U2614	20	No Name Cove	10/15/10 1519	10/20/10 1433	ND		ND		ND		ND	
U2642	20	No Name Cove	10/20/10 1433	10/25/10 1514	ND		ND		ND		ND	
U2918	20	No Name Cove	10/25/10 1514	11/1/10 1543	ND		ND		ND		ND	
U3244	20	No Name Cove	11/1/10 1543	11/8/10 1421	ND		ND		ND		ND	
U3572	20	No Name Cove	11/8/10 1421	11/15/10 1430	ND		ND		ND		ND	
U4238	20	No Name Cove	11/15/10 1430	11/22/10 1455	ND		ND		ND		ND	
U4266	20	No Name Cove	11/22/10 1455	11/29/10 1441	ND		ND		ND		ND	
U4555	20	No Name Cove	11/29/10 1441	12/7/10 1446	ND		ND		ND		ND	
U4758	20	No Name Cove	12/7/10 1446	12/17/10 1430	ND		ND		ND		ND	
U5086	20	No Name Cove	12/17/10 1430	12/28/10 1522	ND		ND		ND		ND	
U5451	20	No Name Cove	12/28/10 1522	1/11/11 1542	ND		ND		ND		ND	
U5716	20	No Name Cove	1/11/11 1542	1/24/11 1416	ND		ND		ND		ND	
	20	No Name Cove	2/11/11 1347	2/28/11 1454	nsa		nsa		nsa		nsa	
U7452	20	No Name Cove	2/28/11 1454	3/17/11 1549	ND		ND		ND		ND	
U8185	20	No Name Cove	3/17/11 1549	4/6/11 1615	ND		ND		ND		ND	
U8615	20	No Name Cove	4/6/11 1615	4/25/11 1625	ND		ND		ND		ND	
U9858	20	No Name Cove	4/25/11 1625	5/11/11 1127	ND		ND		ND		ND	
V0339	20	No Name Cove	5/11/11 1127	5/27/11 1527	ND		ND		ND		ND	
V0339D	20	No Name Cove	5/11/11 1127	5/27/11 1527	ND		ND		ND		ND	
V0757	20	No Name Cove	5/27/11 1527	6/17/11 1621	ND		ND		ND		ND	
U6309	20	No Name Cove	1/24/11 1416	2/11/11 1347	ND		ND		ND		ND	
T6977	**21**	**Turtle Meadows**	**3/25/10 1540**	**4/1/10 1447**	**ND**		**ND**		**ND**		**ND**	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T7204	21	Turtle Meadows	4/1/10 1447	4/9/10 1503	ND		ND		ND		ND	
	21	Turtle Meadows	4/9/10 1503	4/22/10 1339	nsa		nsa		nsa		nsa	
T8126	21	Turtle Meadows	4/22/10 1339	4/28/10 1516	ND		ND		ND		ND	
T7966	21	Turtle Meadows	4/28/10 1516	5/3/10 1449	ND		ND		ND		ND	
T8271	21	Turtle Meadows	5/3/10 1449	5/9/10 1503	ND		ND		ND		ND	
T8738	21	Turtle Meadows	5/9/10 1503	5/14/10 1410	ND		ND		ND		ND	
T9161	21	Turtle Meadows	5/14/10 1410	5/19/10 1503	ND		ND		ND		ND	
T9188	21	Turtle Meadows	5/19/10 1503	5/25/10 1535	ND		ND		ND		ND	
T9368	21	Turtle Meadows	5/25/10 1535	6/1/10 1532	ND		ND		ND		ND	
T9616	21	Turtle Meadows	6/1/10 1532	6/7/10 1603	ND		ND		ND		ND	
T9644	21	Turtle Meadows	6/7/10 1603	6/14/10 1519	ND		ND		ND		ND	
U0553	21	Turtle Meadows	6/14/10 1519	6/22/10 1518	ND		ND		ND		ND	
U0798	21	Turtle Meadows	6/22/10 1518	8/5/10 1413	ND		ND		ND		ND	
U1338	21	Turtle Meadows	8/5/10 1413	9/2/10 1555	ND		ND		566.6 *	3.85	ND	
U1448	21	Turtle Meadows	9/2/10 1555	9/22/10 1505	ND		ND		ND		ND	
U1853	21	Turtle Meadows	9/22/10 1505	10/4/10 1535	ND		ND		ND		ND	
U2030	21	Turtle Meadows	10/4/10 1535	10/11/10 1624	ND		ND		ND		ND	
U2588	21	Turtle Meadows	10/11/10 1624	10/15/10 1408	ND		ND		ND		ND	
U2615	21	Turtle Meadows	10/15/10 1408	10/20/10 1440	ND		ND		ND		ND	
U2643	21	Turtle Meadows	10/20/10 1440	10/25/10 1519	ND		ND		ND		ND	
U2919	21	Turtle Meadows	10/25/10 1519	11/1/10 1548	ND		ND		ND		ND	
U2919D	21	Turtle Meadows	10/25/10 1519	11/1/10 1548	ND		ND		ND		ND	
U3245	21	Turtle Meadows	11/1/10 1548	11/8/10 1426	ND		ND		ND		ND	
U3573	21	Turtle Meadows	11/8/10 1426	11/15/10 1435	ND		ND		ND		ND	
U4239	21	Turtle Meadows	11/15/10 1435	11/22/10 1401	ND		ND		ND		ND	
U4239D	21	Turtle Meadows	11/15/10 1435	11/22/10 1401	ND		ND		ND		ND	
U4267	21	Turtle Meadows	11/22/10 1401	11/29/10 1446	ND		ND		ND		ND	
U4556	21	Turtle Meadows	11/29/10 1446	12/7/10 1348	ND		ND		ND		ND	
U4759	21	Turtle Meadows	12/7/10 1348	12/17/10 1436	ND		ND		565.6 *	2.09	ND	
U4759D	21	Turtle Meadows	12/7/10 1348	12/17/10 1436	ND		ND		566.2 *	2.83	ND	
U5087	21	Turtle Meadows	12/17/10 1436	12/28/10 1425	ND		ND		ND		ND	
U5452	21	Turtle Meadows	12/28/10 1425	1/11/11 1445	ND		ND		ND		ND	
U5717	21	Turtle Meadows	1/11/11 1445	1/24/11 1421	ND		ND		566.6 *	2.86	ND	
U6310	21	Turtle Meadows	1/24/11 1421	2/11/11 1352	ND		ND		566.2 *	4.32	ND	
	21	Turtle Meadows	2/11/11 1352	2/28/11 1459	nsa		nsa		nsa		nsa	
U7453	21	Turtle Meadows	2/28/11 1459	3/17/11 1453	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U8186	21	Turtle Meadows	3/17/11 1453	4/6/11 1516	ND		ND		ND		ND	
U8616	21	Turtle Meadows	4/6/11 1516	4/25/11 1534	ND		ND		ND		ND	
U9859	21	Turtle Meadows	4/25/11 1534	5/11/11 1032	ND		ND		ND		ND	
V0341	21	Turtle Meadows	5/11/11 1032	5/27/11 1533	ND		ND		ND		ND	
V0758	21	Turtle Meadows	5/27/11 1533	6/17/11 1523	ND		ND		ND		ND	
T5121	**23**	**Catfish Hotel**	**1/11/10 1719**	**1/18/10 1435**	**ND**		**ND**		**ND**		**ND**	
T5128	23	Catfish Hotel	1/18/10 1435	1/26/10 1404	ND		ND		ND		ND	
T5135	23	Catfish Hotel	1/26/10 1404	2/1/10 1457	ND		ND		ND		ND	
T5421	23	Catfish Hotel	2/1/10 1457	2/9/10 1450	ND		ND		ND		ND	
	23	Catfish Hotel	2/9/10 1450	3/25/10 1525	nsa							
T6978	23	Catfish Hotel	3/25/10 1525	4/1/10 1457	ND		ND		ND		ND	
T7205	23	Catfish Hotel	4/1/10 1457	4/9/10 1515	ND		ND		ND		ND	
	23	Catfish Hotel	4/9/10 1515	4/22/10 1348	nsa		nsa		nsa		nsa	
T8127	23	Catfish Hotel	4/22/10 1348	4/28/10 1527	ND		ND		ND		ND	
T7967	23	Catfish Hotel	4/28/10 1527	5/3/10 1459	ND		ND		ND		ND	
T8272	23	Catfish Hotel	5/3/10 1459	5/9/10 1518	ND		ND		ND		ND	
T8739	23	Catfish Hotel	5/9/10 1518	5/14/10 1421	ND		ND		ND		ND	
T8739D	23	Catfish Hotel	5/9/10 1518	5/14/10 1421	ND		ND		ND		ND	
T9162	23	Catfish Hotel	5/14/10 1421	5/19/10 1521	ND		ND		ND		ND	
T9189	23	Catfish Hotel	5/19/10 1521	5/25/10 1545	ND		ND		ND		ND	
T9369	23	Catfish Hotel	5/25/10 1545	6/1/10 1544	ND		ND		ND		ND	
T9617	23	Catfish Hotel	6/1/10 1544	6/7/10 1612	ND		ND		ND		ND	
T9645	23	Catfish Hotel	6/7/10 1612	6/14/10 1527	ND		ND		ND		ND	
U0554	23	Catfish Hotel	6/14/10 1527	6/22/10 1529	ND		ND		ND		ND	
U0799	23	Catfish Hotel	6/22/10 1529	8/5/10 1427	ND		ND		565.8 *	3.15	ND	
U1339	23	Catfish Hotel	8/5/10 1427	9/2/10 1600	ND		ND		565.0 *	3.81	ND	
U1449	23	Catfish Hotel	9/2/10 1600	9/22/10 1514	ND		ND		ND		ND	
U1854	23	Catfish Hotel	9/22/10 1514	10/4/10 1546	ND		ND		ND		ND	
U2031	23	Catfish Hotel	10/4/10 1546	10/11/10 1634	ND		ND		ND		ND	
U2589	23	Catfish Hotel	10/11/10 1634	10/15/10 1418	ND		ND		ND		ND	
U2616	23	Catfish Hotel	10/15/10 1418	10/20/10 1452	ND		ND		ND		ND	
U2644	23	Catfish Hotel	10/20/10 1452	10/25/10 1530	ND		ND		ND		ND	
U2921	23	Catfish Hotel	10/25/10 1530	11/1/10 1607	ND		ND		565.4 *	2.00	ND	
U3246	23	Catfish Hotel	11/1/10 1607	11/8/10 1445	ND		ND		ND		ND	
U3574	23	Catfish Hotel	11/8/10 1445	11/15/10 1453	ND		ND		ND		ND	
U4241	23	Catfish Hotel	11/15/10 1453	11/22/10 1409	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U4268	23	Catfish Hotel	11/22/10 1409	11/29/10 1504	ND		ND		ND		ND	
U4557	23	Catfish Hotel	11/29/10 1504	12/7/10 1358	ND		ND		ND		ND	
U4761	23	Catfish Hotel	12/7/10 1358	12/17/10 1449	ND		ND		ND		ND	
U5088	23	Catfish Hotel	12/17/10 1449	12/28/10 1434	ND		ND		ND		ND	
U5453	23	Catfish Hotel	12/28/10 1434	1/11/11 1455	ND		ND		ND		ND	
U5718	23	Catfish Hotel	1/11/11 1455	1/24/11 1429	ND		ND		ND		ND	
U6311	23	Catfish Hotel	1/24/11 1429	2/11/11 1359	ND		ND		ND		ND	
	23	Catfish Hotel	2/11/11 1359	2/28/11 1510	nsa		nsa		nsa		nsa	
U7454	23	Catfish Hotel	2/28/11 1510	3/17/11 1503	ND		ND		ND		ND	
U8187	23	Catfish Hotel	3/17/11 1503	4/6/11 1525	ND		ND		562.0 *	3.42	ND	
U8617	23	Catfish Hotel	4/6/11 1525	4/25/11 1541	ND		ND		ND		ND	
U9861	23	Catfish Hotel	4/25/11 1541	5/11/11 1042	ND		ND		ND		ND	
U9861D	23	Catfish Hotel	4/25/11 1541	5/11/11 1042	ND		ND		ND		ND	
V0342	23	Catfish Hotel	5/11/11 1042	5/27/11 1550	ND		ND		562.6 *	0.908	ND	
V0759	23	Catfish Hotel	5/27/11 1550	6/17/11 1532	ND		ND		ND		ND	
V0759D	23	Catfish Hotel	5/27/11 1550	6/17/11 1532	ND		ND		ND		ND	
V1421	23	Catfish Hotel	6/17/11 1532	7/22/11 1424	ND		ND		561.2 *	2.79	ND	
V1733	23	Catfish Hotel	7/22/11 1424	8/15/11 1558	ND		ND		ND		ND	
V2056	23	Catfish Hotel	8/15/11 1558	9/14/11 1514	ND		ND		ND		ND	
T6979	**24**	**Turtle Nook**	**3/25/10 1518**	**4/1/10 1505**	**ND**		**ND**		**ND**		**ND**	
T7206	24	Turtle Nook	4/1/10 1505	4/9/10 1620	ND		ND		ND		ND	
	24	Turtle Nook	4/9/10 1620	4/22/10 1423	nsa		nsa		nsa		nsa	
T8128	24	Turtle Nook	4/22/10 1423	4/28/10 1629	ND		ND		ND		ND	
T7968	24	Turtle Nook	4/28/10 1629	5/3/10 1608	ND		ND		ND		ND	
T8273	24	Turtle Nook	5/3/10 1608	5/9/10 1611	ND		ND		ND		ND	
T8741	24	Turtle Nook	5/9/10 1611	5/14/10 1509	ND		ND		ND		ND	
T9163	24	Turtle Nook	5/14/10 1509	5/19/10 1622	ND		ND		ND		ND	
T9190	24	Turtle Nook	5/19/10 1622	5/25/10 1628	ND		ND		ND		ND	
T9370	24	Turtle Nook	5/25/10 1628	6/1/10 1627	ND		ND		ND		ND	
T9618	24	Turtle Nook	6/1/10 1627	6/7/10 1654	ND		ND		ND		ND	
T9646	24	Turtle Nook	6/7/10 1654	6/14/10 1604	ND		ND		ND		ND	
U0555	24	Turtle Nook	6/14/10 1604	6/22/10 1532	ND		ND		ND		ND	
U0801	24	Turtle Nook	6/22/10 1532	8/5/10 1435	ND		ND		ND		ND	
U1341	24	Turtle Nook	8/5/10 1435	9/2/10 1656	ND		ND		ND		ND	
U1450	24	Turtle Nook	9/2/10 1656	9/22/10 1605	ND		ND		ND		ND	
U1855	24	Turtle Nook	9/22/10 1605	10/4/10 1551	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U2032	24	Turtle Nook	10/4/10 1551	10/11/10 1639	ND		ND		ND		ND	
U2590	24	Turtle Nook	10/11/10 1639	10/15/10 1426	ND		ND		ND		ND	
U2617	24	Turtle Nook	10/15/10 1426	10/20/10 1543	ND		ND		ND		ND	
U2645	24	Turtle Nook	10/20/10 1543	10/25/10 1535	ND		ND		ND		ND	
U2922	24	Turtle Nook	10/25/10 1535	11/1/10 1602	ND		ND		ND		ND	
U3247	24	Turtle Nook	11/1/10 1602	11/8/10 1440	ND		ND		ND		ND	
U3575	24	Turtle Nook	11/8/10 1440	11/15/10 1448	ND		ND		ND		ND	
U4242	24	Turtle Nook	11/15/10 1448	11/22/10 1447	ND		ND		ND		ND	
U4269	24	Turtle Nook	11/22/10 1447	11/29/10 1459	ND		ND		ND		ND	
U4558	24	Turtle Nook	11/29/10 1459	12/7/10 1438	ND		ND		ND		ND	
U4762	24	Turtle Nook	12/7/10 1438	12/17/10 1445	ND		ND		ND		ND	
U5089	24	Turtle Nook	12/17/10 1445	12/28/10 1514	ND		ND		ND		ND	
U5454	24	Turtle Nook	12/28/10 1514	1/11/11 1535	ND		ND		ND		ND	
U5719	24	Turtle Nook	1/11/11 1535	1/24/11 1435	ND		ND		ND		ND	
U5719D	24	Turtle Nook	1/11/11 1535	1/24/11 1435	ND		ND		ND		ND	
U6312	24	Turtle Nook	1/24/11 1435	2/11/11 1403	ND		ND		ND		ND	
T6981	**26**	**Raccoon Island**	**3/25/10 1512**	**4/1/10 1520**	**ND**		**ND**		**ND**		**ND**	
T7207	26	Raccoon Island	4/1/10 1520	4/9/10 1610	ND		ND		ND		ND	
	26	Raccoon Island	4/9/10 1610	4/22/10 1431	nsa		nsa		nsa		nsa	
T8129	26	Raccoon Island	4/22/10 1431	4/28/10 1621	ND		ND		ND		ND	
T7969	26	Raccoon Island	4/28/10 1621	5/3/10 1553	ND		ND		ND		ND	
T8274	26	Raccoon Island	5/3/10 1553	5/9/10 1603	ND		ND		ND		ND	
T8742	26	Raccoon Island	5/9/10 1603	5/14/10 1434	ND		ND		ND		ND	
T9164	26	Raccoon Island	5/14/10 1434	5/19/10 1550	ND		ND		ND		ND	
T9191	26	Raccoon Island	5/19/10 1550	5/25/10 1558	ND		ND		ND		ND	
T9371	26	Raccoon Island	5/25/10 1558	6/1/10 1601	ND		ND		ND		ND	
T9619	26	Raccoon Island	6/1/10 1601	6/7/10 1647	ND		ND		ND		ND	
T9619D	26	Raccoon Island	6/1/10 1601	6/7/10 1647	ND		ND		ND		ND	
T9647	26	Raccoon Island	6/7/10 1647	6/14/10 1541	ND		ND		ND		ND	
U0556	26	Raccoon Island	6/14/10 1541	6/22/10 1537	ND		ND		ND		ND	
U0802	26	Raccoon Island	6/22/10 1537	8/5/10 1446	ND		ND		ND		ND	
U1342	26	Raccoon Island	8/5/10 1446	9/2/10 1650	ND		ND		ND		ND	
U1451	26	Raccoon Island	9/2/10 1650	9/22/10 1531	ND		ND		ND		ND	
U1856	26	Raccoon Island	9/22/10 1531	10/4/10 1607	ND		ND		ND		ND	
U2033	26	Raccoon Island	10/4/10 1607	10/11/10 1659	ND		ND		ND		ND	
U2591	26	Raccoon Island	10/11/10 1659	10/15/10 1437	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results Peak nm	Fluorescein Results Conc. ppb	Eosine Results Peak nm	Eosine Results Conc. ppb	RWT Results Peak nm	RWT Results Conc. ppb	SRB Results Peak nm	SRB Results Conc. ppb
U2618	26	Raccoon Island	10/15/10 1437	10/20/10 1504	ND		ND		ND		ND	
U2646	26	Raccoon Island	10/20/10 1504	10/25/10 1550	ND		ND		ND		ND	
U2923	26	Raccoon Island	10/25/10 1550	11/1/10 1622	ND		ND		ND		ND	
U3248	26	Raccoon Island	11/1/10 1622	11/8/10 1459	ND		ND		ND		ND	
U3576	26	Raccoon Island	11/8/10 1459	11/15/10 1506	ND		ND		ND		ND	
U4243	26	Raccoon Island	11/15/10 1506	11/22/10 1442	ND		ND		ND		ND	
U4270	26	Raccoon Island	11/22/10 1442	11/29/10 1523	ND		ND		ND		ND	
U4559	26	Raccoon Island	11/29/10 1523	12/7/10 1433	ND		ND		ND		ND	
U4559D	26	Raccoon Island	11/29/10 1523	12/7/10 1433	ND		ND		ND		ND	
U4763	26	Raccoon Island	12/7/10 1433	12/17/10 1501	ND		ND		ND		ND	
U5090	26	Raccoon Island	12/17/10 1501	12/28/10 1507	ND		ND		ND		ND	
U5455	26	Raccoon Island	12/28/10 1507	1/11/11 1527	ND		ND		ND		ND	
U5721	26	Raccoon Island	1/11/11 1527	1/24/11 1439	ND		ND		ND		ND	
U6313	26	Raccoon Island	1/24/11 1439	2/11/11 1408	ND		ND		ND		ND	
T5122	**28**	**Shipwreck**	**1/11/10 1724**	**1/18/10 1446**	**ND**		**ND**		**ND**		**ND**	
T5129	28	Shipwreck	1/18/10 1446	1/26/10 1356	ND		ND		ND		ND	
T5136	28	Shipwreck	1/26/10 1356	2/1/10 1437	ND		ND		ND		ND	
T6982	28	Shipwreck	3/25/10 1509	4/1/10 1529	ND		ND		ND		ND	
T7208	28	Shipwreck	4/1/10 1529	4/9/10 1523	ND		ND		ND		ND	
	28	Shipwreck	4/9/10 1523	4/22/10 1355	nsa		nsa		nsa		nsa	
T8130	28	Shipwreck	4/22/10 1355	4/28/10 1535	ND		ND		ND		ND	
T7970	28	Shipwreck	4/28/10 1535	5/3/10 1505	ND		ND		ND		ND	
T8275	28	Shipwreck	5/3/10 1505	5/9/10 1528	ND		ND		ND		ND	
T8743	28	Shipwreck	5/9/10 1528	5/14/10 1428	ND		ND		ND		ND	
T9165	28	Shipwreck	5/14/10 1428	5/19/10 1540	ND		ND		ND		ND	
T9192	28	Shipwreck	5/19/10 1540	5/25/10 1551	ND		ND		ND		ND	
T9372	28	Shipwreck	5/25/10 1551	6/1/10 1550	ND		ND		ND		ND	
T9621	28	Shipwreck	6/1/10 1550	6/7/10 1620	ND		ND		ND		ND	
T9648	28	Shipwreck	6/7/10 1620	6/14/10 1533	ND		ND		ND		ND	
U0557	28	Shipwreck	6/14/10 1533	6/22/10 1541	ND		ND		ND		ND	
U0803	28	Shipwreck	6/22/10 1541	8/5/10 1453	ND		ND		ND		ND	
U1343	28	Shipwreck	8/5/10 1453	9/2/10 1611	ND		ND		565.8 *	4.71	ND	
U1452	28	Shipwreck	9/2/10 1611	9/22/10 1524	ND		ND		567.4 *	4.61	ND	
U1857	28	Shipwreck	9/22/10 1524	10/4/10 1559	ND		ND		ND		ND	
U2034	28	Shipwreck	10/4/10 1559	10/11/10 1652	ND		ND		ND		ND	
U2592	28	Shipwreck	10/11/10 1652	10/15/10 1431	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U2619	28	Shipwreck	10/15/10 1431	10/20/10 1458	ND		ND		ND		ND	
U2619D	28	Shipwreck	10/15/10 1431	10/20/10 1458	ND		ND		ND		ND	
U2647	28	Shipwreck	10/20/10 1458	10/25/10 1543	ND		ND		ND		ND	
U2924	28	Shipwreck	10/25/10 1543	11/1/10 1613	ND		ND		ND		ND	
U3249	28	Shipwreck	11/1/10 1613	11/8/10 1452	ND		ND		ND		ND	
U3577	28	Shipwreck	11/8/10 1452	11/15/10 1501	ND		ND		ND		ND	
U4244	28	Shipwreck	11/15/10 1501	11/22/10 1415	ND		ND		ND		ND	
U4271	28	Shipwreck	11/22/10 1415	11/29/10 1517	ND		ND		ND		ND	
U4561	28	Shipwreck	11/29/10 1517	12/7/10 1404	ND		ND		ND		ND	
U4764	28	Shipwreck	12/7/10 1404	12/17/10 1455	ND		ND		ND		ND	
U5091	28	Shipwreck	12/17/10 1455	12/28/10 1442	ND		ND		ND		ND	
U5456	28	Shipwreck	12/28/10 1442	1/11/11 1503	ND		ND		ND		ND	
U5722	28	Shipwreck	1/11/11 1503	1/24/11 1443	ND		ND		ND		ND	
U6314	28	Shipwreck	1/24/11 1443	2/11/11 1412	ND		ND		ND		ND	
	28	Shipwreck	2/11/11 1412	2/28/11 1525	nsa		nsa		nsa		nsa	
U7455	28	Shipwreck	2/28/11 1525	3/17/11 1511	ND		ND		ND		ND	
U8188	28	Shipwreck	3/17/11 1511	4/6/11 1532	ND		ND		ND		ND	
U8618	28	Shipwreck	4/6/11 1532	4/25/11 1547	ND		ND		ND		ND	
U9862	28	Shipwreck	4/25/11 1547	5/11/11 1050	ND		ND		ND		ND	
V0343	28	Shipwreck	5/11/11 1050	5/27/11 1605	ND		ND		ND		ND	
V0761	28	Shipwreck	5/27/11 1605	6/17/11 1538	ND		ND		ND		ND	
T5422	28	Shipwreck	2/1/10 1437	2/9/10 1439	ND		ND		ND		ND	
V1422	28	Shipwreck	6/17/11 1538	7/22/11 1430	ND		ND		ND		ND	
V1734	28	Shipwreck	7/22/11 1430	8/15/11 1608	ND		ND		ND		ND	
V2057	28	Shipwreck	8/15/11 1608	9/14/11 1518	ND		ND		ND		ND	
T6983	**30**	**Timber**	**3/25/10 1455**	**4/1/10 1540**	**ND**		**ND**		**ND**		**ND**	
T7209	30	Timber	4/1/10 1540	4/9/10 1535	ND		ND		ND		ND	
	30	Timber	4/9/10 1535	4/22/10 1403	nsa		nsa		nsa		nsa	
T8131	30	Timber	4/22/10 1403	4/28/10 1604	ND		ND		ND		ND	
T7971	30	Timber	4/28/10 1604	5/3/10 1537	ND		ND		ND		ND	
T8276	30	Timber	5/3/10 1537	5/9/10 1542	ND		ND		ND		ND	
T8744	30	Timber	5/9/10 1542	5/14/10 1447	ND		ND		ND		ND	
T9166	30	Timber	5/14/10 1447	5/19/10 1602	ND		ND		ND		ND	
T9193	30	Timber	5/19/10 1602	5/25/10 1609	ND		ND		ND		ND	
T9373	30	Timber	5/25/10 1609	6/1/10 1609	ND		ND		ND		ND	
T9622	30	Timber	6/1/10 1609	6/7/10 1635	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T9649	30	Timber	6/7/10 1635	6/14/10 1552	ND		ND		ND		ND	
U0558	30	Timber	6/14/10 1552	6/22/10 1548	ND		ND		ND		ND	
U0804	30	Timber	6/22/10 1548	8/5/10 1510	ND		ND		ND		ND	
	30	Timber	8/5/10 1510	9/2/10 1634	nsa		nsa		nsa		nsa	
U1453	30	Timber	9/2/10 1634	9/22/10 1540	ND		ND		ND		ND	
U1858	30	Timber	9/22/10 1540	10/4/10 1618	ND		ND		ND		ND	
U2035	30	Timber	10/4/10 1618	10/11/10 1712	ND		ND		ND		ND	
U2593	30	Timber	10/11/10 1712	10/15/10 1459	ND		ND		ND		ND	
U2621	30	Timber	10/15/10 1459	10/20/10 1516	ND		ND		ND		ND	
U2648	30	Timber	10/20/10 1516	10/25/10 1604	ND		ND		ND		ND	
U2925	30	Timber	10/25/10 1604	11/1/10 1634	ND		ND		ND		ND	
U3250	30	Timber	11/1/10 1634	11/8/10 1516	ND		ND		ND		ND	
U3578	30	Timber	11/8/10 1516	11/15/10 1522	ND		ND		ND		ND	
U4245	30	Timber	11/15/10 1522	11/22/10 1423	ND		ND		ND		ND	
U4272	30	Timber	11/22/10 1423	11/29/10 1534	ND		ND		ND		ND	
U4562	30	Timber	11/29/10 1534	12/7/10 1411	ND		ND		ND		ND	
U4765	30	Timber	12/7/10 1411	12/17/10 1516	ND		ND		ND		ND	
U5092	30	Timber	12/17/10 1516	12/28/10 1452	ND		ND		ND		ND	
U5457	30	Timber	12/28/10 1452	1/11/11 1512	ND		ND		ND		ND	
U5723	30	Timber	1/11/11 1512	1/24/11 1451	ND		ND		ND		ND	
U6315	30	Timber	1/24/11 1451	2/11/11 1421	ND		ND		ND		ND	
	30	Timber	2/11/11 1421	2/28/11 1534	nsa		nsa		nsa		nsa	
U7456	30	Timber	2/28/11 1534	3/17/11 1520	ND		ND		ND		ND	
U8189	30	Timber	3/17/11 1520	4/6/11 1541	ND		ND		ND		ND	
U8619	30	Timber	4/6/11 1541	4/25/11 1556	ND		ND		ND		ND	
U9863	30	Timber	4/25/11 1556	5/11/11 1059	ND		ND		ND		ND	
V0344	30	Timber	5/11/11 1059	5/27/11 1613	ND		ND		ND		ND	
V0762	30	Timber	5/27/11 1613	6/17/11 1547	ND		ND		ND		ND	
T5123	**31**	**Silver River @ 1200 Meter Station**	**1/11/10 1734**	**1/18/10 1457**	**ND**		**ND**		**ND**		**ND**	
T5130	31	Silver River @ 1200 Meter Station	1/18/10 1457	1/26/10 1338	ND		ND		ND		ND	
T5137	31	Silver River @ 1200 Meter Station	1/26/10 1338	2/1/10 1414	ND		ND		ND		ND	
T5423	31	Silver River @ 1200 Meter Station	2/1/10 1414	2/9/10 1427	ND		ND		ND		ND	
	31	Silver River @ 1200 Meter Station	2/9/10 1427	3/25/10 1431	nsa		nsa		nsa		nsa	
T6984	31	Silver River @ 1200 Meter Station	3/25/10 1431	4/1/10 1550	ND		ND		ND		ND	
T7210	31	Silver River @ 1200 Meter Station	4/1/10 1550	4/9/10 1551	ND		ND		ND		ND	
	31	Silver River @ 1200 Meter Station	4/9/10 1551	4/22/10 1409	nsa		nsa		nsa		nsa	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T8132	31	Silver River @ 1200 Meter Station	4/22/10 1409	4/28/10 1610	ND		ND		ND		ND	
T7972	31	Silver River @ 1200 Meter Station	4/28/10 1610	5/3/10 1541	ND		ND		ND		ND	
T8277	31	Silver River @ 1200 Meter Station	5/3/10 1541	5/9/10 1553	ND		ND		570.2 *	7.92	ND	
T8277D	31	Silver River @ 1200 Meter Station	5/3/10 1541	5/9/10 1553	ND		ND		ND		ND	
T8745	31	Silver River @ 1200 Meter Station	5/9/10 1553	5/14/10 1452	ND		ND		568.4 *	7.98	ND	
T9167	31	Silver River @ 1200 Meter Station	5/14/10 1452	5/19/10 1610	ND		ND		ND		ND	
T9194	31	Silver River @ 1200 Meter Station	5/19/10 1610	5/25/10 1614	ND		ND		ND		ND	
T9374	31	Silver River @ 1200 Meter Station	5/25/10 1614	6/1/10 1613	ND		ND		ND		ND	
T9623	31	Silver River @ 1200 Meter Station	6/1/10 1613	6/7/10 1640	ND		ND		ND		ND	
T9650	31	Silver River @ 1200 Meter Station	6/7/10 1640	6/14/10 1555	ND		ND		ND		ND	
U0559	31	Silver River @ 1200 Meter Station	6/14/10 1555	6/22/10 1552	ND		ND		ND		ND	
U0805	31	Silver River @ 1200 Meter Station	6/22/10 1552	8/5/10 1527	ND		ND		ND		ND	
U1344	31	Silver River @ 1200 Meter Station	8/5/10 1527	9/2/10 1641	ND		ND		565.6 *	5.62	ND	
U1454	31	Silver River @ 1200 Meter Station	9/2/10 1641	9/22/10 1546	ND		ND		ND		ND	
U1859	31	Silver River @ 1200 Meter Station	9/22/10 1546	10/4/10 1627	ND		ND		ND		ND	
U2036	31	Silver River @ 1200 Meter Station	10/4/10 1627	10/11/10 1718	ND		ND		ND		ND	
U2594	31	Silver River @ 1200 Meter Station	10/11/10 1718	10/15/10 1452	ND		ND		ND		ND	
U2622	31	Silver River @ 1200 Meter Station	10/15/10 1452	10/20/10 1524	ND		ND		ND		ND	
U2649	31	Silver River @ 1200 Meter Station	10/20/10 1524	10/25/10 1611	ND		ND		ND		ND	
U2926	31	Silver River @ 1200 Meter Station	10/25/10 1611	11/1/10 1652	ND		ND		ND		ND	
U3251	31	Silver River @ 1200 Meter Station	11/1/10 1652	11/8/10 1523	ND		ND		ND		ND	
U3579	31	Silver River @ 1200 Meter Station	11/8/10 1523	11/15/10 1532	ND		ND		ND		ND	
U3579D	31	Silver River @ 1200 Meter Station	11/8/10 1523	11/15/10 1532	ND		ND		ND		ND	
U4246	31	Silver River @ 1200 Meter Station	11/15/10 1532	11/22/10 1431	ND		ND		ND		ND	
U4273	31	Silver River @ 1200 Meter Station	11/22/10 1431	11/29/10 1540	ND		ND		ND		ND	
U4563	31	Silver River @ 1200 Meter Station	11/29/10 1540	12/7/10 1419	ND		ND		ND		ND	
U4766	31	Silver River @ 1200 Meter Station	12/7/10 1419	12/17/10 1524	ND		ND		ND		ND	
U5093	31	Silver River @ 1200 Meter Station	12/17/10 1524	12/28/10 1459	ND		ND		ND		ND	
U5458	31	Silver River @ 1200 Meter Station	12/28/10 1459	1/11/11 1520	ND		ND		ND		ND	
U5724	31	Silver River @ 1200 Meter Station	1/11/11 1520	1/24/11 1456	ND		ND		ND		ND	
U6316	31	Silver River @ 1200 Meter Station	1/24/11 1456	2/11/11 1425	ND		ND		ND		ND	
T9377	**32**	**South Boathouse Vent**	**4/22/10 1533**	**4/28/10 1728**	**ND**		**ND**		**ND**		**ND**	
T9379	32	South Boathouse Vent	4/28/10 1728	5/3/10 1648	ND		ND		ND		ND	
T9379D	32	South Boathouse Vent	4/28/10 1728	5/3/10 1648	ND		ND		568.6	11.6	ND	
T9382	32	South Boathouse Vent	5/3/10 1648	5/9/10 1723	ND		ND		568.2	16.0	ND	
T8746	32	South Boathouse Vent	5/9/10 1723	5/14/10 1725	ND		ND		568.1	69.6	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results Peak nm	Fluorescein Results Conc. ppb	Eosine Results Peak nm	Eosine Results Conc. ppb	RWT Results Peak nm	RWT Results Conc. ppb	SRB Results Peak nm	SRB Results Conc. ppb
T9168	32	South Boathouse Vent	5/14/10 1725	5/19/10 1725	ND		ND		568.9	92.3	ND	
T9195	32	South Boathouse Vent	5/19/10 1725	5/25/10 1724	ND		ND		568.2	44.1	ND	
T9375	32	South Boathouse Vent	5/25/10 1724	6/1/10 1739	ND		ND		567.8	59.1	ND	
T9624	32	South Boathouse Vent	6/1/10 1739	6/7/10 1739	ND		ND		569.0	42.5	ND	
T9651	32	South Boathouse Vent	6/7/10 1739	6/14/10 1648	ND		ND		569.6	22.1	ND	
U0561	32	South Boathouse Vent	6/14/10 1648	6/22/10 1639	ND		ND		568.6	30.8	ND	
U0806	32	South Boathouse Vent	6/22/10 1639	8/5/10 1724	ND		ND		567.4	44.3	ND	
U1345	32	South Boathouse Vent	8/5/10 1724	9/2/10 1754	ND		ND		568.6	31.7	ND	
U1455	32	South Boathouse Vent	9/2/10 1754	9/22/10 1720	ND		ND		569.0	25.8	ND	
U1861	32	South Boathouse Vent	9/22/10 1720	10/4/10 1748	ND		ND		569.2	4.98	ND	
U2037	32	South Boathouse Vent	10/4/10 1748	10/11/10 1807	ND		ND		570.8	3.98	ND	
U2595	32	South Boathouse Vent	10/11/10 1807	10/15/10 1611	ND		ND		ND		ND	
U2623	32	South Boathouse Vent	10/15/10 1611	10/20/10 1625	ND		ND		ND		ND	
U2650	32	South Boathouse Vent	10/20/10 1625	10/25/10 1717	ND		ND		ND		ND	
U2927	32	South Boathouse Vent	10/25/10 1717	11/1/10 1756	ND		ND		ND		ND	
U3252	32	South Boathouse Vent	11/1/10 1756	11/8/10 1614	ND		ND		ND		ND	
U3581	32	South Boathouse Vent	11/8/10 1614	11/15/10 1646	ND		ND		ND		ND	
U4247	32	South Boathouse Vent	11/15/10 1646	11/22/10 1546	ND		ND		ND		ND	
U4274	32	South Boathouse Vent	11/22/10 1546	11/29/10 1639	ND		ND		569.2	2.56	ND	
U4564	32	South Boathouse Vent	11/29/10 1639	12/7/10 1526	ND		ND		ND		ND	
U4767	32	South Boathouse Vent	12/7/10 1526	12/17/10 1629	ND		ND		567.0	8.84	ND	
U5094	32	South Boathouse Vent	12/17/10 1629	12/28/10 1603	ND		ND		ND		ND	
U5459	32	South Boathouse Vent	12/28/10 1603	1/11/11 1624	ND		ND		568.4	5.42	ND	
U5459D	32	South Boathouse Vent	12/28/10 1603	1/11/11 1624	ND		ND		568.0	7.43	ND	
U5725	32	South Boathouse Vent	1/11/11 1624	1/24/11 1549	ND		ND		568.0	4.63	ND	
U6317	32	South Boathouse Vent	1/24/11 1549	2/11/11 1540	ND		ND		569.4 **	3.68	ND	
U7786	32	South Boathouse Vent	1/11/11 1540	2/28/11 1647	ND		546.4 *	0.191	565.6	2.74	ND	
U7457	32	South Boathouse Vent	2/28/11 1647	3/17/11 1652	ND		542.6	0.705	ND		ND	
U7457D	32	South Boathouse Vent	2/28/11 1647	3/17/11 1652	ND		543.6	1.25	ND		ND	
U8190	32	South Boathouse Vent	3/17/11 1652	4/6/11 1659	ND		ND		ND		ND	
U8621	32	South Boathouse Vent	4/6/11 1659	4/25/11 1658	ND		ND		566.0	3.82	ND	
U9864	32	South Boathouse Vent	4/25/11 1658	5/11/11 1230	ND		544.2 **	0.238	565.0 **	1.76	ND	
V0345	32	South Boathouse Vent	5/11/11 1230	5/27/11 1730	ND		ND		566.4	4.03	ND	
V0763	32	South Boathouse Vent	5/27/11 1730	6/17/11 1710	ND		544.0 **	0.434	ND		ND	
V1423	32	South Boathouse Vent	6/17/11 1710	7/22/11 1501	ND		ND		563.8 **	6.13	ND	
V2058	32	South Boathouse Vent	8/15/11 1730	9/14/11 1550	ND		ND		563.0 **	2.81	ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T9378	**33**	**Gang of Five Vent 3**	**4/22/10 1520**	**4/28/10 1722**	**ND**		**ND**		**ND**		**ND**	
T9381	33	Gang of Five Vent 3	4/28/10 1722	5/3/10 1642	ND		ND		569.0	6.06	ND	
T9383	33	Gang of Five Vent 3	5/3/10 1642	5/9/10 1715	ND		ND		569.8	6.95	ND	
T8747	33	Gang of Five Vent 3	5/9/10 1715	5/14/10 1634	ND		ND		568.8	12.3	ND	
T9169	33	Gang of Five Vent 3	5/14/10 1634	5/19/10 1716	ND		ND		567.6	16.8	ND	
T9196	33	Gang of Five Vent 3	5/19/10 1716	5/25/10 1717	ND		ND		569.6	9.78	ND	
T9376	33	Gang of Five Vent 3	5/25/10 1717	6/1/10 1703	ND		ND		569.6	12.8	ND	
T9625	33	Gang of Five Vent 3	6/1/10 1703	6/7/10 1733	ND		ND		568.4	20.2	ND	
T9652	33	Gang of Five Vent 3	6/7/10 1733	6/14/10 1640	ND		ND		569.4	9.54	ND	
U0562	33	Gang of Five Vent 3	6/14/10 1640	6/22/10 1631	ND		ND		567.8	20.5	ND	
U0807	33	Gang of Five Vent 3	6/22/10 1631	8/5/10 1705	ND		ND		568.0	23.6	ND	
U1346	33	Gang of Five Vent 3	8/5/10 1705	9/2/10 1743	ND		ND		568.0	17.0	ND	
U1456	33	Gang of Five Vent 3	9/2/10 1743	9/22/10 1712	ND		ND		569.6	6.64	ND	
U1862	33	Gang of Five Vent 3	9/22/10 1712	10/4/10 1742	ND		ND		ND		ND	
U2038	33	Gang of Five Vent 3	10/4/10 1742	10/11/10 1758	ND		ND		ND		ND	
U2596	33	Gang of Five Vent 3	10/11/10 1758	10/15/10 1602	ND		ND		ND		ND	
U2624	33	Gang of Five Vent 3	10/15/10 1602	10/20/10 1617	ND		ND		ND		ND	
U2651	33	Gang of Five Vent 3	10/20/10 1617	10/25/10 1710	ND		ND		ND		ND	
U2928	33	Gang of Five Vent 3	10/25/10 1710	11/1/10 1748	ND		ND		568.8	6.53	ND	
U3253	33	Gang of Five Vent 3	11/1/10 1748	11/8/10 1606	ND		ND		ND		ND	
U3582	33	Gang of Five Vent 3	11/8/10 1606	11/15/10 1639	ND		ND		ND		ND	
U4248	33	Gang of Five Vent 3	11/15/10 1639	11/22/10 1538	ND		ND		570.0	3.75	ND	
U4275	33	Gang of Five Vent 3	11/22/10 1538	11/29/10 1633	ND		ND		569.4	3.74	ND	
U4565	33	Gang of Five Vent 3	11/29/10 1633	12/7/10 1519	ND		ND		ND		ND	
U4768	33	Gang of Five Vent 3	12/7/10 1519	12/17/10 1605	ND		ND		568.0 **	4.23	ND	
U5095	33	Gang of Five Vent 3	12/17/10 1605	12/28/10 1557	ND		ND		569.2 **	4.04	ND	
U5461	33	Gang of Five Vent 3	12/28/10 1557	1/11/11 1617	ND		ND		ND		ND	
U5726	33	Gang of Five Vent 3	1/11/11 1617	1/24/11 1538	ND		ND		568.8	7.30	ND	
U6318	33	Gang of Five Vent 3	1/24/11 1538	2/11/11 1521	ND		ND		567.6 **	7.30	ND	
	33	Gang of Five Vent 3	2/11/11 1521	2/28/11 1617	nsa		nsa		nsa		nsa	
U8001	33	Gang of Five Vent 3	2/28/11 1617	3/17/11 1645	ND		ND		564.6 **	1.32	ND	
V1735	33	Gang of Five Vent 3	6/15/11 1501	8/15/11 1711	ND		ND		ND		ND	
U0827	**40**	**Rainbow Springs Headsprings**	**6/16/10 1224**	**6/23/10 1558**	**ND**		**ND**		**ND**		**ND**	
U0828	40	Rainbow Springs Headsprings	6/23/10 1558	6/30/10 1140	ND		ND		ND		ND	
U0829	40	Rainbow Springs Headsprings	6/30/10 1140	7/8/10 1138	ND		ND		ND		ND	
U0830	40	Rainbow Springs Headsprings	7/8/10 1138	7/21/10 1249	ND		ND		ND		ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U1869	40	Rainbow Springs Headsprings	7/21/10 1249	10/6/10 1630	ND		ND		ND		ND	
U2671	40	Rainbow Springs Headsprings	10/6/10 1630	10/21/10 1221	ND		ND		ND		ND	
U2948	40	Rainbow Springs Headsprings	10/21/10 1221	11/3/10 1142	ND		ND		ND		ND	
U3594	40	Rainbow Springs Headsprings	11/3/10 1142	11/17/10 1114	ND		ND		ND		ND	
U4295	40	Rainbow Springs Headsprings	11/17/10 1114	12/1/10 1200	ND		ND		ND		ND	
U4781	40	Rainbow Springs Headsprings	12/1/10 1200	12/16/10 1228	ND		ND		ND		ND	
U5473	40	Rainbow Springs Headsprings	12/16/10 1228	1/6/11 1214	ND		ND		ND		ND	
U5738	40	Rainbow Springs Headsprings	1/6/11 1214	1/26/11 1215	ND		ND		ND		ND	
U6330	40	Rainbow Springs Headsprings	1/26/11 1215	2/11/11 1229	ND		ND		ND		ND	
	40	Rainbow Springs Headsprings	2/11/11 1229	3/2/11 1239	nsa		nsa		nsa		nsa	
U7468	40	Rainbow Springs Headsprings	3/2/11 1239	3/18/11 1237	ND		ND		ND		ND	
U8199	40	Rainbow Springs Headsprings	3/18/11 1237	4/7/11 1229	ND		ND		ND		ND	
U8630	40	Rainbow Springs Headsprings	4/7/11 1229	4/26/11 1221	ND		ND		ND		ND	
V0354	40	Rainbow Springs Headsprings	5/10/11 1130	5/25/11 1218	ND		ND		ND		ND	
V0772	40	Rainbow Springs Headsprings	5/25/11 1218	6/16/11 1230	ND		ND		ND		ND	
V1424	40	Rainbow Springs Headsprings	6/16/11 1230	7/22/11 1036	ND		ND		ND		ND	
V1736	40	Rainbow Springs Headsprings	7/22/11 1036	8/15/11 1145	ND		ND		ND		ND	
V2059	40	Rainbow Springs Headsprings	8/15/11 1145	9/14/11 1036	ND		ND		ND		ND	
U0839	**41**	**Rainbow Springs Bubbling Spring**	**6/16/10 1257**	**6/23/10 1541**	**ND**		**ND**		**ND**		**ND**	
U0841	41	Rainbow Springs Bubbling Spring	6/23/10 1541	6/30/10 1215	ND		ND		ND		ND	
U0842	41	Rainbow Springs Bubbling Spring	6/30/10 1215	7/8/10 1221	ND		ND		ND		ND	
U0843	41	Rainbow Springs Bubbling Spring	7/8/10 1221	7/21/10 1326	ND		ND		ND		ND	
U1870	41	Rainbow Springs Bubbling Spring	7/21/10 1326	10/6/10 1540	ND		ND		ND		ND	
U2672	41	Rainbow Springs Bubbling Spring	10/6/10 1540	10/21/10 1301	ND		ND		ND		ND	
U2949	41	Rainbow Springs Bubbling Spring	10/21/10 1301	11/3/10 1209	ND		ND		ND		ND	
U3595	41	Rainbow Springs Bubbling Spring	11/3/10 1209	11/17/10 1205	ND		ND		ND		ND	
U4296	41	Rainbow Springs Bubbling Spring	11/17/10 1205	12/1/10 1238	ND		ND		ND		ND	
U4782	41	Rainbow Springs Bubbling Spring	12/1/10 1238	12/16/10 1258	ND		ND		ND		ND	
U5474	41	Rainbow Springs Bubbling Spring	12/16/10 1258	1/6/11 1249	ND		ND		ND		ND	
U5739	41	Rainbow Springs Bubbling Spring	1/6/11 1249	1/26/11 1251	ND		ND		ND		ND	
U5739D	41	Rainbow Springs Bubbling Spring	1/6/11 1249	1/26/11 1251	ND		ND		ND		ND	
U6331	41	Rainbow Springs Bubbling Spring	1/26/11 1251	2/11/11 1258	ND		ND		ND		ND	
	41	Rainbow Springs Bubbling Spring	2/11/11 1258	3/2/11 1309	nsa		nsa		nsa		nsa	
U7469	41	Rainbow Springs Bubbling Spring	3/2/11 1309	3/18/11 1310	ND		ND		ND		ND	
U8201	41	Rainbow Springs Bubbling Spring	3/18/11 1310	4/7/11 1302	ND		ND		ND		ND	
U8631	41	Rainbow Springs Bubbling Spring	4/7/11 1302	4/26/11 1252	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U9873	41	Rainbow Springs Bubbling Spring	4/26/11 1252	5/10/11 1211	ND		ND		ND		ND	
V0355	41	Rainbow Springs Bubbling Spring	5/10/11 1211	5/25/11 1257	ND		ND		ND		ND	
V0773	41	Rainbow Springs Bubbling Spring	5/25/11 1257	6/16/11 1303	ND		ND		ND		ND	
V1425	41	Rainbow Springs Bubbling Spring	6/16/11 1303	7/22/11 1054	ND		ND		ND		ND	
V1737	41	Rainbow Springs Bubbling Spring	7/22/11 1054	8/15/11 1127	ND		ND		ND		ND	
V2061	41	Rainbow Springs Bubbling Spring	8/15/11 1127	9/14/11 1053	ND		ND		ND		ND	
U0852	**42**	**Rainbow Springs Rainbow River**	**6/16/10 1237**	**6/23/10 1408**	**ND**		**ND**		**ND**		**ND**	
U0853	42	Rainbow Springs Rainbow River	6/23/10 1408	6/30/10 1153	ND		ND		ND		ND	
U0854	42	Rainbow Springs Rainbow River	6/30/10 1153	7/8/10 1152	ND		ND		ND		ND	
U0855	42	Rainbow Springs Rainbow River	7/8/10 1152	7/21/10 1258	ND		ND		ND		ND	
U1871	42	Rainbow Springs Rainbow River	7/21/10 1258	10/6/10 1605	ND		ND		ND		ND	
U2673	42	Rainbow Springs Rainbow River	10/6/10 1605	10/21/10 1236	ND		ND		ND		ND	
U2950	42	Rainbow Springs Rainbow River	10/21/10 1236	11/3/10 1150	ND		ND		ND		ND	
U3596	42	Rainbow Springs Rainbow River	11/3/10 1150	11/17/10 1125	ND		ND		ND		ND	
U4297	42	Rainbow Springs Rainbow River	11/17/10 1125	12/1/10 1213	ND		ND		ND		ND	
U4783	42	Rainbow Springs Rainbow River	12/1/10 1213	12/16/10 1237	ND		ND		ND		ND	
U5475	42	Rainbow Springs Rainbow River	12/16/10 1237	1/6/11 1225	ND		ND		ND		ND	
U5741	42	Rainbow Springs Rainbow River	1/6/11 1225	1/26/11 1230	ND		ND		ND		ND	
U6332	42	Rainbow Springs Rainbow River	1/26/11 1230	2/11/11 1238	ND		ND		ND		ND	
U7788	42	Rainbow Springs Rainbow River	2/11/11 1238	3/2/11 1250	ND		ND		ND		ND	
U7470	42	Rainbow Springs Rainbow River	3/2/11 1250	3/18/11 1248	ND		ND		ND		ND	
U7470D	42	Rainbow Springs Rainbow River	3/2/11 1250	3/18/11 1248	ND		ND		ND		ND	
U8202	42	Rainbow Springs Rainbow River	3/18/11 1248	4/7/11 1239	ND		ND		ND		ND	
U8632	42	Rainbow Springs Rainbow River	4/7/11 1239	4/26/11 1231	ND		ND		ND		ND	
U9874	42	Rainbow Springs Rainbow River	4/26/11 1231	5/10/11 1138	ND		ND		ND		ND	
V0356	42	Rainbow Springs Rainbow River	5/10/11 1138	5/25/11 1230	ND		ND		ND		ND	
V0774	42	Rainbow Springs Rainbow River	5/25/11 1230	6/16/11 1244	ND		ND		ND		ND	
T6985	**50**	**City of Ocala Well #1**	**3/25/10 1245**	**4/1/10 1140**	**ND**		**ND**		**ND**		**ND**	
	50	City of Ocala Well #1	4/1/10 1140	4/21/10 1244	nsa							
U0568	50	City of Ocala Well #1	4/21/10 1244	4/29/10 1345	ND		ND		ND		ND	
U0569	50	City of Ocala Well #1	4/29/10 1345	5/6/10 1322	ND		ND		ND		ND	
T9384	50	City of Ocala Well #1	5/6/10 1322	5/13/10 1109	ND		ND		ND		ND	
U0570	50	City of Ocala Well #1	5/13/10 1109	5/20/10 1722	ND		ND		ND		ND	
T9392	50	City of Ocala Well #1	5/20/10 1722	5/26/10 1340	ND		ND		ND		ND	
	50	City of Ocala Well #1	5/26/10 1340	7/8/10 1323	nsa		nsa		nsa		nsa	
U0808	50	City of Ocala Well #1	7/8/10 1323	7/21/10 1426	ND		ND		ND		ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U1347	50	City of Ocala Well #1	7/21/10 1426	9/1/10 1637	ND		ND		ND		ND	
U1458	50	City of Ocala Well #1	9/1/10 1637	9/17/10 1707	ND		ND		ND		ND	
U1863	50	City of Ocala Well #1	9/17/10 1707	10/4/10 1221	ND		ND		ND		ND	
U2039	50	City of Ocala Well #1	10/4/10 1221	10/9/10 1408	ND		ND		ND		ND	
U2039D	50	City of Ocala Well #1	10/4/10 1221	10/9/10 1408	ND		ND		ND		ND	
U2652	50	City of Ocala Well #1	10/9/10 1408	10/14/10 1515	ND		ND		ND		ND	
U2659	50	City of Ocala Well #1	10/14/10 1515	10/21/10 1525	ND		ND		ND		ND	
U2659D	50	City of Ocala Well #1	10/14/10 1515	10/21/10 1525	ND		ND		ND		ND	
U2929	50	City of Ocala Well #1	10/21/10 1525	10/27/10 1522	ND		ND		ND		ND	
U2936	50	City of Ocala Well #1	10/27/10 1522	11/3/10 1438	ND		ND		ND		ND	
U3254	50	City of Ocala Well #1	11/3/10 1438	11/10/10 1350	ND		ND		ND		ND	
U3583	50	City of Ocala Well #1	11/10/10 1350	11/17/10 1403	ND		ND		ND		ND	
U4276	50	City of Ocala Well #1	11/17/10 1403	11/24/10 1349	ND		ND		ND		ND	
U4284	50	City of Ocala Well #1	11/24/10 1349	12/1/10 1529	ND		ND		ND		ND	
U4566	50	City of Ocala Well #1	12/1/10 1529	12/9/10 1350	ND		ND		ND		ND	
U4769	50	City of Ocala Well #1	12/9/10 1350	12/16/10 1511	ND		ND		ND		ND	
U5096	50	City of Ocala Well #1	12/16/10 1511	12/27/10 1259	ND		ND		ND		ND	
U5462	50	City of Ocala Well #1	12/27/10 1259	1/6/11 1535	ND		ND		ND		ND	
U5727	50	City of Ocala Well #1	1/6/11 1535	1/26/11 1501	ND		ND		ND		ND	
U6319	50	City of Ocala Well #1	1/26/11 1501	2/11/11 1549	ND		ND		ND		ND	
U6319D	50	City of Ocala Well #1	1/26/11 1501	2/11/11 1549	ND		ND		ND		ND	
	50	City of Ocala Well #1	2/11/11 1549	3/2/11 1538	nsa		nsa		nsa		nsa	
U7458	50	City of Ocala Well #1	3/2/11 1538	3/18/11 1526	ND		ND		ND		ND	
U8191	50	City of Ocala Well #1	3/18/11 1526	4/7/11 1325	ND		ND		ND		ND	
U8622	50	City of Ocala Well #1	4/7/11 1525	4/26/11 1511	ND		ND		ND		ND	
U9865	50	City of Ocala Well #1	4/26/11 1511	5/10/11 1737	ND		ND		ND		ND	
V0346	50	City of Ocala Well #1	5/10/11 1737	5/25/11 1531	ND		ND		ND		ND	
V0764	50	City of Ocala Well #1	5/25/11 1531	6/16/11 1600	ND		ND		ND		ND	
V1426	50	City of Ocala Well #1	6/16/11 1600	7/22/11 1616	ND		ND		ND		ND	
V1738	50	City of Ocala Well #1	7/22/11 1616	8/15/11 1156	ND		ND		ND		ND	
V2062	50	City of Ocala Well #1	8/15/11 1156	9/14/11 1314	ND		ND		ND		ND	
U0571	**51**	**City of Ocala Well #2**	**4/21/10 1250**	**4/29/10 1351**	**ND**		**ND**		**ND**		**ND**	
U0572	51	City of Ocala Well #2	4/29/10 1351	5/6/10 1311	ND		ND		ND		ND	
T9385	51	City of Ocala Well #2	5/6/10 1311	5/13/10 1113	ND		ND		ND		ND	
U0573	51	City of Ocala Well #2	5/13/10 1113	5/20/10 1728	ND		ND		ND		ND	
T9393	51	City of Ocala Well #2	5/20/10 1728	5/26/10 1345	ND		ND		ND		ND	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results Peak nm	Fluorescein Results Conc. ppb	Eosine Results Peak nm	Eosine Results Conc. ppb	RWT Results Peak nm	RWT Results Conc. ppb	SRB Results Peak nm	SRB Results Conc. ppb
	51	City of Ocala Well #2	5/26/10 1345	7/8/10 1327	nsa		nsa		nsa		nsa	
U0809	51	City of Ocala Well #2	7/8/10 1327	7/21/10 1430	ND		ND		ND		ND	
U1348	51	City of Ocala Well #2	7/21/10 1430	9/1/10 1644	ND		ND		ND		ND	
U1459	51	City of Ocala Well #2	9/1/10 1644	9/17/10 1709	ND		ND		ND		ND	
U1459D	51	City of Ocala Well #2	9/1/10 1644	9/17/10 1709	ND		ND		ND		ND	
U1864	51	City of Ocala Well #2	9/17/10 1709	10/4/10 1226	ND		ND		ND		ND	
U2041	51	City of Ocala Well #2	10/4/10 1226	10/9/10 1414	ND		ND		ND		ND	
U2653	51	City of Ocala Well #2	10/9/10 1414	10/14/10 1521	ND		ND		ND		ND	
U2661	51	City of Ocala Well #2	10/14/10 1521	10/21/10 1533	ND		ND		ND		ND	
U2930	51	City of Ocala Well #2	10/21/10 1533	10/27/10 1528	ND		ND		ND		ND	
U2937	51	City of Ocala Well #2	10/27/10 1528	11/3/10 1440	ND		ND		ND		ND	
U3255	51	City of Ocala Well #2	11/3/10 1440	11/10/10 1354	ND		ND		ND		ND	
U3584	51	City of Ocala Well #2	11/10/10 1354	11/17/10 1407	ND		ND		ND		ND	
U4277	51	City of Ocala Well #2	11/17/10 1407	11/24/10 1354	ND		ND		ND		ND	
U4285	51	City of Ocala Well #2	11/24/10 1354	12/1/10 1533	ND		ND		ND		ND	
U4567	51	City of Ocala Well #2	12/1/10 1533	12/9/10 1354	ND		ND		ND		ND	
U4770	51	City of Ocala Well #2	12/9/10 1354	12/16/10 1516	ND		ND		ND		ND	
U5097	51	City of Ocala Well #2	12/16/10 1516	12/27/10 1308	ND		ND		ND		ND	
U5463	51	City of Ocala Well #2	12/27/10 1308	1/6/11 1540	ND		ND		ND		ND	
U5728	51	City of Ocala Well #2	1/6/11 1540	1/26/11 1507	ND		ND		ND		ND	
U6321	51	City of Ocala Well #2	1/26/11 1507	2/11/11 1553	ND		ND		ND		ND	
	51	City of Ocala Well #2	2/11/11 1553	3/2/11 1543	nsa		nsa		nsa		nsa	
U7459	51	City of Ocala Well #2	3/2/11 1543	3/18/11 1532	ND		ND		ND		ND	
U7459D	51	City of Ocala Well #2	3/2/11 1543	3/18/11 1532	ND		ND		ND		ND	
U8192	51	City of Ocala Well #2	3/18/11 1532	4/7/11 1330	ND		ND		ND		ND	
U8623	51	City of Ocala Well #2	4/7/11 1530	4/26/11 1519	ND		ND		ND		ND	
U9866	51	City of Ocala Well #2	4/26/11 1519	5/10/11 1740	ND		ND		ND		ND	
V0347	51	City of Ocala Well #2	5/10/11 1740	5/25/11 1538	ND		ND		ND		ND	
V0765	51	City of Ocala Well #2	5/25/11 1538	6/16/11 1606	ND		ND		ND		ND	
V1427	51	City of Ocala Well #2	6/16/11 1606	7/22/11 1615	ND		ND		ND		ND	
V1739	51	City of Ocala Well #2	7/22/11 1615	8/15/11 1146	ND		ND		ND		ND	
V2063	51	City of Ocala Well #2	8/15/11 1146	9/14/11 1321	ND		ND		ND		ND	
T6986	**52**	**City of Ocala West Accelator**	**3/25/10 1300**	**4/1/10 1145**	**ND**		**ND**		**ND**		**ND**	
	52	City of Ocala West Accelator	4/1/10 1145	5/6/10 1315	nsa		nsa		nsa		nsa	
T9386	52	City of Ocala West Accelator	5/6/10 1315	5/13/10 1116	ND		ND		ND		ND	
	52	City of Ocala West Accelator	5/13/10 1116	5/20/10 1733	nsa		nsa		nsa		nsa	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
T9394	52	City of Ocala West Accelator	5/20/10 1733	5/26/10 1349	ND		ND		ND		ND	
	52	City of Ocala West Accelator	5/26/10 1349	7/21/10 1434	nsa		nsa		nsa		nsa	
U1349	52	City of Ocala West Accelator	7/21/10 1434	9/1/10 1650	ND		ND		ND		ND	
U1461	52	City of Ocala West Accelator	9/1/10 1650	9/17/10 1712	ND		ND		ND		ND	
U1865	52	City of Ocala West Accelator	9/17/10 1712	10/4/10 1232	ND		ND		ND		ND	
T9756	**54**	**Reddick Elementary Well #5**	**4/21/10 1125**	**4/29/10 1657**	**ND**		**ND**		**ND**		**ND**	
T9757	54	Reddick Elementary Well #5	4/29/10 1657	5/6/10 1501	515.3	79.1	ND		ND		ND	
T9387	54	Reddick Elementary Well #5	5/6/10 1501	5/13/10 1246	515.5	166	ND		ND		ND	
T9758	54	Reddick Elementary Well #5	5/13/10 1246	5/20/10 1555	515.3	120	ND		ND		ND	
T9759	54	Reddick Elementary Well #5	5/20/10 1555	5/26/10 1530	515.2	73.5	ND		ND		ND	
T9759D	54	Reddick Elementary Well #5	5/20/10 1555	5/26/10 1530	515.4	61.5	ND		ND		ND	
T9761	54	Reddick Elementary Well #5	5/26/10 1530	6/2/10 1600	515.4	65.3	ND		ND		ND	
T9762	54	Reddick Elementary Well #5	6/2/10 1600	6/10/10 1532	515.3	41.8	ND		ND		ND	
T9763	54	Reddick Elementary Well #5	6/10/10 1532	6/16/10 1556	515.3	26.2	ND		ND		ND	
U0563	54	Reddick Elementary Well #5	6/16/10 1125	6/23/10 1949	515.1	23.9	ND		ND		ND	
U0564	54	Reddick Elementary Well #5	6/23/10 1949	6/30/10 1450	515.3	13.7	ND		ND		ND	
	54	Reddick Elementary Well #5	6/30/10 1450	7/21/10 1526	nsa		nsa		nsa		nsa	
U1350	54	Reddick Elementary Well #5	7/21/10 1526	9/1/10 1438	515.3	16.0	ND		ND		ND	
T9388	**55**	**North Marion High School West Well**	**5/6/10 1442**	**5/13/10 1232**	**ND**		**ND**		**ND**		**ND**	
U0525	55	North Marion High School West Well	5/13/10 1232	5/20/10 1637	ND		ND		ND		ND	
U0526	55	North Marion High School West Well	5/20/10 1637	5/26/10 1501	ND		ND		ND		ND	
U0527	55	North Marion High School West Well	5/26/10 1501	6/2/10 1539	ND		ND		ND		ND	
U0528	55	North Marion High School West Well	6/2/10 1539	6/10/10 1501	ND		ND		ND		ND	
	55	North Marion High School West Well	6/10/10 1501	7/8/10 1431	nsa		nsa		nsa		nsa	
U0812	55	North Marion High School West Well	7/8/10 1431	7/21/10 1541	ND		ND		ND		ND	
U1351	55	North Marion High School West Well	7/21/10 1541	9/1/10 1515	ND		ND		ND		ND	
U1462	55	North Marion High School West Well	9/1/10 1515	9/17/10 1736	ND		ND		ND		ND	
U1866	55	North Marion High School West Well	9/17/10 1736	10/5/10 1658	ND		ND		ND		ND	
U2667	55	North Marion High School West Well	10/5/10 1658	10/21/10 1632	ND		ND		ND		ND	
U2944	55	North Marion High School West Well	10/21/10 1632	11/3/10 1551	ND		ND		ND		ND	
U3590	55	North Marion High School West Well	11/3/10 1551	11/17/10 1455	ND		ND		ND		ND	
U4291	55	North Marion High School West Well	11/17/10 1455	12/1/10 1626	ND		ND		ND		ND	
U4776	55	North Marion High School West Well	12/1/10 1626	12/16/10 1601	ND		ND		ND		ND	
U5469	55	North Marion High School West Well	12/16/10 1601	1/6/11 1635	ND		ND		ND		ND	
U5734	55	North Marion High School West Well	1/6/11 1635	1/26/11 1557	ND		ND		ND		ND	
U6327	55	North Marion High School West Well	1/26/11 1557	2/11/11 1640	ND		ND		ND		ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
	55	North Marion High School West Well	2/11/11 1640	3/2/11 1629	nsa		nsa		nsa		nsa	
U7465	55	North Marion High School West Well	3/2/11 1629	3/18/11 1627	ND		ND		ND		ND	
U8197	55	North Marion High School West Well	3/18/11 1627	4/7/11 1622	ND		ND		ND		ND	
U8628	55	North Marion High School West Well	4/7/11 1622	4/26/11 1620	ND		ND		ND		ND	
U9871	55	North Marion High School West Well	4/26/11 1620	5/10/11 1654	ND		ND		ND		ND	
V0352	55	North Marion High School West Well	5/10/11 1654	5/25/11 1651	ND		ND		ND		ND	
V0770	55	North Marion High School West Well	5/25/11 1651	6/16/11 1708	ND		ND		ND		ND	
U0574	**56**	**Ocala Springs Elementary School East Well**	**5/13/10 1133**	**5/20/10 1700**	**ND**		**ND**		**ND**		**ND**	
U0565	56	Ocala Springs Elementary School East Well	5/20/10 1700	5/26/10 1407	ND		ND		ND		ND	
U0566	56	Ocala Springs Elementary School East Well	5/26/10 1407	6/2/10 1435	ND		ND		ND		ND	
U0567	56	Ocala Springs Elementary School East Well	6/2/10 1435	6/10/10 1404	ND		ND		ND		ND	
	56	Ocala Springs Elementary School East Well	6/10/10 1404	7/8/10 1344	nsa		nsa		nsa		nsa	
U0813	56	Ocala Springs Elementary School East Well	7/8/10 1344	7/21/10 1446	ND		ND		ND		ND	
U1352	56	Ocala Springs Elementary School East Well	7/21/10 1446	9/1/10 1621	ND		ND		ND		ND	
U1463	56	Ocala Springs Elementary School East Well	9/1/10 1621	9/17/10 1757	ND		ND		ND		ND	
U1867	56	Ocala Springs Elementary School East Well	9/17/10 1757	10/5/10 1722	ND		ND		ND		ND	
U2668	56	Ocala Springs Elementary School East Well	10/5/10 1722	10/21/10 1556	ND		ND		ND		ND	
U2945	56	Ocala Springs Elementary School East Well	10/21/10 1556	11/3/10 1452	ND		ND		ND		ND	
U3591	56	Ocala Springs Elementary School East Well	11/3/10 1452	11/17/10 1421	ND		ND		ND		ND	
U4292	56	Ocala Springs Elementary School East Well	11/17/10 1421	12/1/10 1556	ND		ND		ND		ND	
U4777	56	Ocala Springs Elementary School East Well	12/1/10 1556	12/16/10 1531	ND		ND		ND		ND	
U5470	56	Ocala Springs Elementary School East Well	12/16/10 1531	1/6/11 1558	ND		ND		ND		ND	
U5735	56	Ocala Springs Elementary School East Well	1/6/11 1558	1/26/11 1524	ND		ND		ND		ND	
U6328	56	Ocala Springs Elementary School East Well	1/26/11 1524	2/11/11 1610	ND		ND		ND		ND	
U7787	56	Ocala Springs Elementary School East Well	2/11/11 1610	3/2/11 1558	ND		ND		ND		ND	
U7466	56	Ocala Springs Elementary School East Well	3/2/11 1558	3/18/11 1552	ND		ND		ND		ND	
U7466D	56	Ocala Springs Elementary School East Well	3/2/11 1558	3/18/11 1552	ND		ND		ND		ND	
U8198	56	Ocala Springs Elementary School East Well	3/18/11 1552	4/7/11 1547	ND		ND		ND		ND	
U8629	56	Ocala Springs Elementary School East Well	4/7/11 1547	4/26/11 1534	ND		ND		ND		ND	
U9872	56	Ocala Springs Elementary School East Well	4/26/11 1534	5/10/11 1724	ND		ND		ND		ND	
V0353	56	Ocala Springs Elementary School East Well	5/10/11 1724	5/25/11 1605	ND		ND		ND		ND	
V0771	56	Ocala Springs Elementary School East Well	5/25/11 1605	6/16/11 1628	ND		ND		ND		ND	
U0529	**57**	**Marion Correctional Institution Well 1**	**5/6/10 1414**	**5/13/10 1205**	**ND**		**ND**		**ND**		**ND**	
U0530	57	Marion Correctional Institution Well 1	5/13/10 1205	5/20/10 1615	ND		ND		ND		ND	
U0531	57	Marion Correctional Institution Well 1	5/20/10 1615	5/26/10 1439	ND		ND		ND		ND	
U0532	57	Marion Correctional Institution Well 1	5/26/10 1439	6/2/10 1505	ND		ND		ND		ND	

Ozark Underground Laboratory

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U0533	57	Marion Correctional Institution Well 1	6/2/10 1505	6/10/10 1441	ND		ND		ND		ND	
U0534	57	Marion Correctional Institution Well 1	6/10/10 1441	6/16/10 1455	ND		ND		ND		ND	
	57	Marion Correctional Institution Well 1	6/16/10 1455	7/8/10 1408	nsa		nsa		nsa		nsa	
U0814	57	Marion Correctional Institution Well 1	7/8/10 1408	7/21/10 1511	ND		ND		ND		ND	
U1353	57	Marion Correctional Institution Well 1	7/21/10 1511	9/1/10 1552	ND		ND		ND		ND	
U1464	57	Marion Correctional Institution Well 1	9/1/10 1552	9/17/10 1255	ND		ND		ND		ND	
U1868	57	Marion Correctional Institution Well 1	9/17/10 1255	10/5/10 1620	ND		ND		ND		ND	
U2669	57	Marion Correctional Institution Well 1	10/5/10 1620	10/21/10 1655	ND		ND		ND		ND	
U2946	57	Marion Correctional Institution Well 1	10/21/10 1655	11/3/10 1613	514.8	0.604	ND		ND		ND	
U3592	57	Marion Correctional Institution Well 1	11/3/10 1613	11/17/10 1525	515.0	0.772	ND		ND		ND	
U4293	57	Marion Correctional Institution Well 1	11/17/10 1525	12/1/10 1659	514.6	0.643	ND		ND		ND	
U4778	57	Marion Correctional Institution Well 1	12/1/10 1659	12/16/10 1634	514.8	0.868	ND		ND		ND	
U5471	57	Marion Correctional Institution Well 1	12/16/10 1634	1/6/11 1657	ND		ND		ND		ND	
U5736	57	Marion Correctional Institution Well 1	1/6/11 1657	1/26/11 1629	ND		ND		ND		ND	
	57	Marion Correctional Institution Well 1	1/26/11 1629	3/2/11 1655	nsa		nsa		nsa		nsa	
U7467	57	Marion Correctional Institution Well 1	3/2/11 1655	3/18/11 1651	516.4	1.97	ND		ND		ND	
U0521	**58**	**IFAS Plant Science Unit Well A**	**4/29/10 1611**	**5/6/10 1523**	**ND**		**ND**		**ND**		**ND**	
T9389	58	IFAS Plant Science Unit Well A	5/6/10 1523	5/13/10 1308	ND		ND		ND		ND	
U0522	58	IFAS Plant Science Unit Well A	5/13/10 1308	5/20/10 1522	515.2 **	0.688	ND		ND		ND	
U0523	58	IFAS Plant Science Unit Well A	5/20/10 1522	5/26/10 1554	515.2	2.49	ND		ND		ND	
	58	IFAS Plant Science Unit Well A	5/26/10 1554	6/2/10 1628	nsa	nsa			nsa		nsa	
U0524	58	IFAS Plant Science Unit Well A	6/2/10 1628	6/10/10 1555	515.0	3.04	ND		ND		ND	
	58	IFAS Plant Science Unit Well A	6/10/10 1555	7/8/10 1519	nsa		nsa		nsa		nsa	
U0815	58	IFAS Plant Science Unit Well A	7/8/10 1519	7/21/10 1620	514.0	9.67	ND		ND		ND	
U1354	58	IFAS Plant Science Unit Well A	7/21/10 1620	9/1/10 1345	514.8	5.29	ND		ND		ND	
T9765	**59**	**IFAS Plant Science Unit Well D**	**4/21/10 1642**	**4/29/10 1629**	**ND**		**ND**		**ND**		**ND**	
T9766	59	IFAS Plant Science Unit Well D	4/29/10 1629	5/6/10 1541	515.1	26.7	ND		ND		ND	
T9390	59	IFAS Plant Science Unit Well D	5/6/10 1541	5/13/10 1317	515.4	10.1	ND		ND		ND	
T9767	59	IFAS Plant Science Unit Well D	5/13/10 1317	5/20/10 1533	ND		ND		ND		ND	
T9768	59	IFAS Plant Science Unit Well D	5/20/10 1533	5/26/10 1612	ND		ND		ND		ND	
T9769	59	IFAS Plant Science Unit Well D	5/26/10 1612	6/2/10 1654	515.6	6.97	ND		ND		ND	
T9770	59	IFAS Plant Science Unit Well D	6/2/10 1654	6/10/10 1608	ND		ND		ND		ND	
	59	IFAS Plant Science Unit Well D	6/10/10 1608	7/8/10 1534	nsa		nsa		nsa		nsa	
U0816	59	IFAS Plant Science Unit Well D	7/8/10 1534	7/21/10 1629	515.2	2.62	ND		ND		ND	
U1355	59	IFAS Plant Science Unit Well D	7/21/10 1629	9/1/10 1410	ND		ND		ND		ND	
T9391	**60**	**McIntosh PS Well 2**	**5/6/10 1626**	**5/13/10 1350**	**ND**		**ND**		**ND**		**ND**	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
	60	McIntosh PS Well 2	5/13/10 1350	7/21/10 1645	nsa		nsa		nsa		nsa	
U1356	60	McIntosh PS Well 2	7/21/10 1645	9/1/10 1259	ND		ND		ND		ND	
U2042	**61**	**Windstream Well #2**	**10/5/10 1306**	**10/9/10 1229**	**ND**		**ND**		**ND**		**ND**	
U2654	61	Windstream Well #2	10/9/10 1229	10/14/10 1350	ND		ND		ND		ND	
U2662	61	Windstream Well #2	10/14/10 1350	10/21/10 1404	ND		ND		ND		ND	
U2931	61	Windstream Well #2	10/21/10 1404	10/27/10 1347	ND		ND		ND		ND	
U2938	61	Windstream Well #2	10/27/10 1347	11/3/10 1326	ND		ND		ND		ND	
U3256	61	Windstream Well #2	11/3/10 1326	11/10/10 1235	ND		ND		ND		ND	
U3585	61	Windstream Well #2	11/10/10 1235	11/17/10 1255	ND		ND		ND		ND	
U4278	61	Windstream Well #2	11/17/10 1255	11/24/10 1220	ND		ND		ND		ND	
U4286	61	Windstream Well #2	11/24/10 1220	12/1/10 1328	ND		ND		ND		ND	
U4568	61	Windstream Well #2	12/1/10 1328	12/9/10 1226	ND		ND		ND		ND	
U4771	61	Windstream Well #2	12/9/10 1226	12/16/10 1344	ND		ND		ND		ND	
U5098	61	Windstream Well #2	12/16/10 1344	12/27/10 1554	ND		ND		ND		ND	
U5464	61	Windstream Well #2	12/27/10 1554	1/6/11 1353	ND		ND		ND		ND	
U5729	61	Windstream Well #2	1/6/11 1353	1/26/11 1340	ND		ND		ND		ND	
U6322	61	Windstream Well #2	1/26/11 1340	2/11/11 1351	ND		ND		ND		ND	
U2043	**62**	**Blue Skies Well 1**	**10/4/10 1130**	**10/9/10 1433**	**ND**		**ND**		**ND**		**ND**	
U2655	62	Blue Skies Well 1	10/9/10 1433	10/14/10 1536	ND		ND		ND		ND	
U2663	62	Blue Skies Well 1	10/14/10 1536	10/21/10 1511	ND		ND		ND		ND	
U2932	62	Blue Skies Well 1	10/21/10 1511	10/27/10 1545	ND		ND		ND		ND	
U2939	62	Blue Skies Well 1	10/27/10 1545	11/3/10 1427	ND		ND		ND		ND	
U2939D	62	Blue Skies Well 1	10/27/10 1545	11/3/10 1427	ND		ND		ND		ND	
U3257	62	Blue Skies Well 1	11/3/10 1427	11/10/10 1409	ND		ND		ND		ND	
U3586	62	Blue Skies Well 1	11/10/10 1409	11/17/10 1347	ND		ND		ND		ND	
U4279	62	Blue Skies Well 1	11/17/10 1347	11/24/10 1407	ND		ND		ND		ND	
U4279D	62	Blue Skies Well 1	11/17/10 1347	11/24/10 1407	ND		ND		ND		ND	
U4287	62	Blue Skies Well 1	11/24/10 1407	12/1/10 1517	ND		ND		ND		ND	
U4569	62	Blue Skies Well 1	12/1/10 1517	12/9/10 1405	ND		ND		ND		ND	
U4772	62	Blue Skies Well 1	12/9/10 1405	12/16/10 1449	ND		ND		ND		ND	
U5099	62	Blue Skies Well 1	12/16/10 1449	12/27/10 1332	ND		ND		ND		ND	
U5099D	62	Blue Skies Well 1	12/16/10 1449	12/27/10 1332	ND		ND		ND		ND	
U5465	62	Blue Skies Well 1	12/27/10 1332	1/6/11 1520	ND		ND		ND		ND	
U5730	62	Blue Skies Well 1	1/6/11 1520	1/26/11 1442	ND		ND		ND		566.8 (2)	1.59
U6323	62	Blue Skies Well 1	1/26/11 1442	2/11/11 1532	ND		ND		ND		ND	
	62	Blue Skies Well 1	2/11/11 1532	3/2/11 1521	nsa		nsa		nsa		nsa	

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U7461	62	Blue Skies Well 1	3/2/11 1521	3/18/11 1510	ND		ND		ND		ND	
U8193	62	Blue Skies Well 1	3/18/11 1510	4/7/11 1511	ND		ND		ND		ND	
U8624	62	Blue Skies Well 1	4/7/11 1511	4/26/11 1455	ND		ND		ND		ND	
U9867	62	Blue Skies Well 1	4/26/11 1455	5/10/11 1551	ND		ND		ND		ND	
V0348	62	Blue Skies Well 1	5/10/11 1551	5/26/11 1215	ND		ND		ND		559.6 (2)	0.935
V0766	62	Blue Skies Well 1	5/26/11 1215	6/16/11 1541	ND		ND		ND		560.0 (2)	1.29
V1428	62	Blue Skies Well 1	6/16/11 1541	7/22/11 1601	ND		ND		ND		559.8 (2)	1.59
V1741	62	Blue Skies Well 1	7/22/11 1601	8/15/11 1215	ND		ND		ND		559.6 (2)	1.72
V2064	62	Blue Skies Well 1	8/15/11 1215	9/14/11 1256	ND		ND		ND		ND	
U2044	**63**	**Cedar Hills Well**	**10/6/10 0932**	**10/9/10 1249**	**ND**		**ND**		**ND**		**ND**	
U2656	63	Cedar Hills Well	10/9/10 1249	10/14/10 1410	ND		ND		ND		ND	
U2664	63	Cedar Hills Well	10/14/10 1410	10/21/10 1418	ND		ND		ND		ND	
U2933	63	Cedar Hills Well	10/21/10 1418	10/27/10 1501	ND		ND		ND		ND	
U2941	63	Cedar Hills Well	10/27/10 1501	11/1/10 1200	ND (3)		ND		ND		ND	
	63	Cedar Hills Well	11/1/10 1200	11/3/10 1346	nsa		nsa		nsa		nsa	
U3258	63	Cedar Hills Well	11/3/10 1346	11/10/10 1256	ND		ND		ND		ND	
U3587	63	Cedar Hills Well	11/10/10 1256	11/17/10 1308	ND		ND		ND		ND	
U4281	63	Cedar Hills Well	11/17/10 1308	11/24/10 1237	ND		ND		ND		ND	
U4288	63	Cedar Hills Well	11/24/10 1237	12/1/10 1346	ND		ND		ND		565.6 (2)	1.30
U4288D	63	Cedar Hills Well	11/24/10 1237	12/1/10 1346	ND		ND		ND		566.6 (2)	2.97
U4570	63	Cedar Hills Well	12/1/10 1346	12/9/10 1243	ND		ND		ND		ND	
U4773	63	Cedar Hills Well	12/9/10 1243	12/16/10 1404	ND		ND		ND		ND	
U5101	63	Cedar Hills Well	12/16/10 1404	12/27/10 1542	ND		ND		ND		ND	
U5466	63	Cedar Hills Well	12/27/10 1542	1/4/11 1200	ND (1)		ND		ND		ND	
U5731	63	Cedar Hills Well	1/4/11 1410	1/26/11 1355	ND		ND		ND		ND	
U6324	63	Cedar Hills Well	1/26/11 1355	2/11/11 1415	ND		ND		ND		ND	
	63	Cedar Hills Well	2/11/11 1415	3/1/11 1420	nsa		nsa		nsa		nsa	
U7462	63	Cedar Hills Well	3/1/11 1420	3/18/11 1418	ND		ND		ND		ND	
U8194	63	Cedar Hills Well	3/18/11 1418	4/7/11 1415	ND		ND		ND		563.0 (2)	1.29
U8625	63	Cedar Hills Well	4/7/11 1415	4/26/11 1405	ND		ND		ND		562.4 (2)	1.42
U9868	63	Cedar Hills Well	4/26/11 1405	5/10/11 1320	ND		ND		ND		561.6 (2)	1.15
V0349	63	Cedar Hills Well	5/10/11 1320	5/25/11 1415	ND		ND		ND		564.0 (2)	1.67
V0767	63	Cedar Hills Well	5/25/11 1415	6/16/11 1427	ND		ND		ND		562.6 (2)	1.98
V1429	63	Cedar Hills Well	6/16/11 1427	7/22/11 1205	ND		ND		ND		563.2 (2)	3.48
V1742	63	Cedar Hills Well	7/22/11 1205	8/15/11 1245	ND		ND		ND		562.4 (2)	2.06
V2065	63	Cedar Hills Well	8/15/11 1245	9/14/11 1159	ND		ND		ND		563.2 (2)	2.63

Table 5

Laboratory Results for Charcoal Samplers Analyzed for the Presence of Fluorescein, Eosine, Rhodamine WT (RWT), and Sulforhodamine B (SRB) dyes

OUL #	Station #	Station Name	Date/Time Placed	Date/Time Recovered	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
					Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb	Peak nm	Conc. ppb
U2045	**64**	**Fort King Forest Well**	**10/6/10 1034**	**10/9/10 1315**	**ND**		**ND**		**ND**		**ND**	
U2657	64	Fort King Forest Well	10/9/10 1315	10/14/10 1439	ND		ND		ND		ND	
U2665	64	Fort King Forest Well	10/14/10 1434	10/21/10 1440	ND		ND		ND		ND	
U2934	64	Fort King Forest Well	10/21/10 1440	10/27/10 1422	ND		ND		ND		ND	
U2942	64	Fort King Forest Well	10/27/10 1422	11/1/10 1200	ND (3)		ND		ND		ND	
	64	Fort King Forest Well	11/1/10 1200	11/3/10 1359	nsa		nsa		nsa		nsa	
U3259	64	Fort King Forest Well	11/3/10 1359	11/10/10 1319	ND		ND		ND		ND	
U3259D	64	Fort King Forest Well	11/3/10 1359	11/10/10 1319	ND		ND		ND		ND	
U3588	64	Fort King Forest Well	11/10/10 1319	11/17/10 1323	ND		ND		ND		ND	
U4282	64	Fort King Forest Well	11/17/10 1323	11/24/10 1320	ND		ND		ND		ND	
U4289	64	Fort King Forest Well	11/24/10 1320	12/1/10 1410	ND		ND		ND		ND	
U4571	64	Fort King Forest Well	12/1/10 1410	12/9/10 1313	ND		ND		ND		ND	
U4774	64	Fort King Forest Well	12/9/10 1313	12/16/10 1418	ND		ND		ND		ND	
U5102	64	Fort King Forest Well	12/16/10 1418	12/27/10 1510	ND		ND		ND		ND	
U5467	64	Fort King Forest Well	12/27/10 1510	1/4/11 1200	ND (1)		ND		ND		ND	
U5732	64	Fort King Forest Well	1/4/11 1428	1/26/11 1411	ND		ND		ND		ND	
U6325	64	Fort King Forest Well	1/26/11 1411	2/11/11 1434	ND		ND		ND		ND	
	64	Fort King Forest Well	2/11/11 1434	3/1/11 1438	nsa		nsa		nsa		nsa	
U7463	64	Fort King Forest Well	3/1/11 1438	3/18/11 1438	ND		ND		ND		564.6 (2)	0.822
U8195	64	Fort King Forest Well	3/18/11 1438	4/7/11 1432	ND		ND		ND		564.6 (2)	1.05
U8626	64	Fort King Forest Well	4/7/11 1432	4/26/11 1420	ND		ND		ND		562.4 (2)	0.975
U9869	64	Fort King Forest Well	4/26/11 1420	5/10/11 1337	ND		ND		ND		562.8 (2)	0.920
V0350	64	Fort King Forest Well	5/10/11 1337	5/25/11 1433	ND		ND		ND		565.2 (2)	0.800
V0768	64	Fort King Forest Well	5/25/11 1433	6/16/11 1443	ND		ND		ND		563.6 (2)	1.16
V1430	64	Fort King Forest Well	6/16/11 1443	7/22/11 1217	ND		ND		ND		563.8 (2)	1.71
V1743	64	Fort King Forest Well	7/22/11 1217	8/15/11 1258	ND		ND		ND		564.2 (2)	1.31
V2066	64	Fort King Forest Well	8/15/11 1258	9/14/11 1213	ND		ND		ND		565.2 (2)	1.77
U2046	**65**	**Pine Ridge Well**	**10/6/10 1120**	**10/9/10 1341**	**ND**		**ND**		**ND**		**ND**	
U2658	65	Pine Ridge Well	10/9/10 1341	10/14/10 1453	ND		ND		ND		ND	
U2666	65	Pine Ridge Well	10/14/10 1453	10/21/10 1452	ND		ND		ND		ND	
U2935	65	Pine Ridge Well	10/21/10 1452	10/27/10 1435	ND		ND		ND		ND	

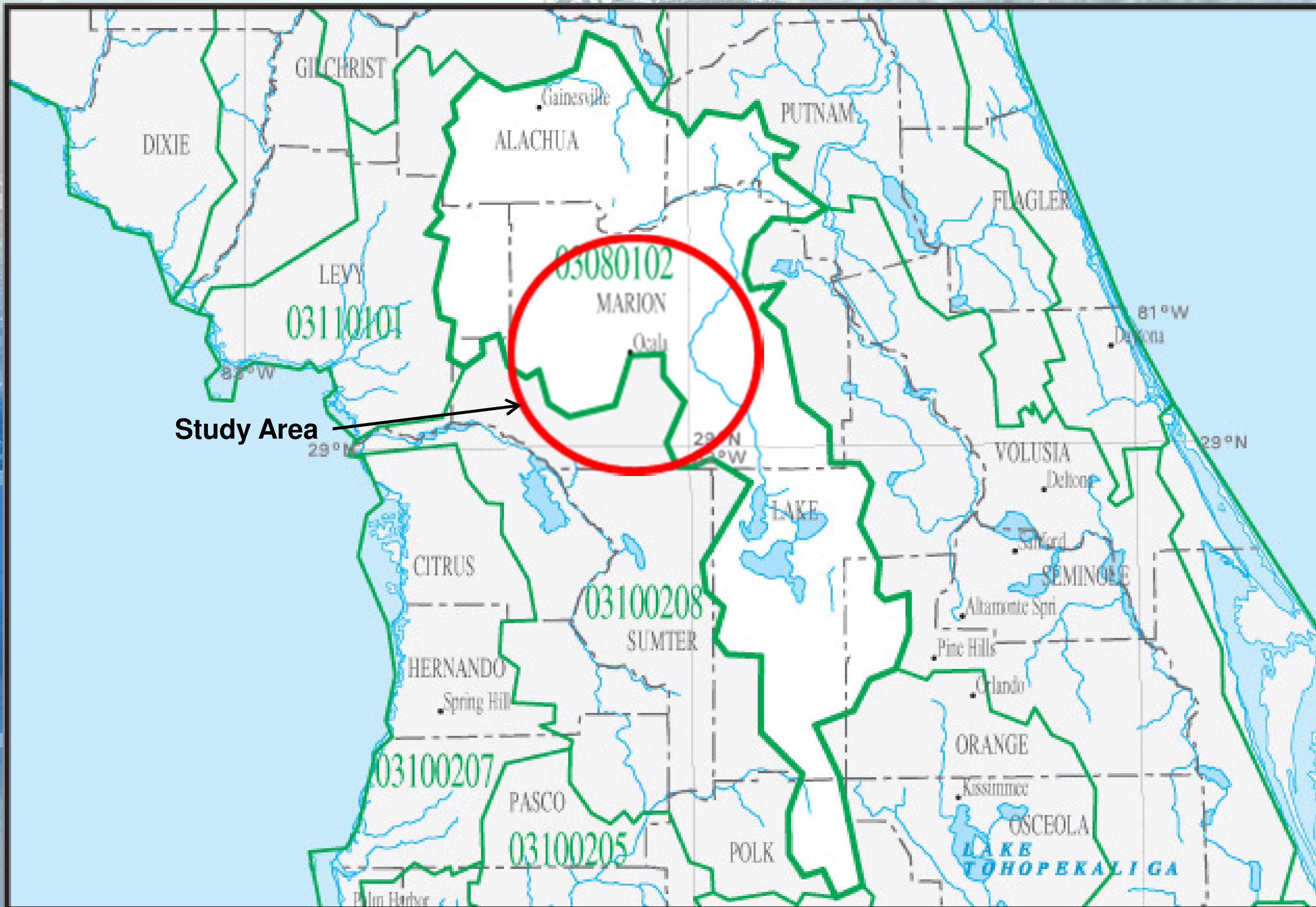
Table 6
First Detection of Dye in Charcoal Samplers
SSG Dye Tracer Group 1 and 2
Ocala, Marion County, Florida

Water Quality Group	Station Name	Peak nm	Conc. ppb	Days to First Detection
1	Mammoth East	568.6	10.9	**5 to 10**
1	Catfish Reception Hall	567.0	10.2	**5 to 10**
1	Devil's Kitchen A	566.6	7.56	**5 to 10**
1	Ladies Parlor	569.6 **	6.69	**5 to 10**
Not Determined	South Boathouse Vent	568.6	11.6	**5 to 10**
Not Determined	Gang of Five Vent 3	569.0	6.06	**5 to 10**
Water Well	Reddick Elementary Well #5	515.3	79.1	**6 to 13**
Water Well	IFAS Plant Science Unit Well D	515.1	26.7	**6 to 13**
1	Bridal Chamber	568.4	10.1	**10 to 16**
2	Mammoth West	568.0 **	4.51	**10 to 16**
SW	1200 Meter Station	570.2 *	7.92	**10 to 16**
1	Oscar	570.4	4.76	**16 to 21**
1	Alligator Hole	567.6	8.14	**16 to 21**
1	Geyser	568.4 **	5.91	**16 to 21**
1	Blue Grotto	568.4 *	6.79	**16 to 21**
Water Well	IFAS Plant Science Unit Well A	515.2 *	0.688	**20 to 27**
2	Mastodon Bone	567.4 *	3.85	**32 to 39**
1	First Fisherman's Paradise	567.0 *	2.35	**39 to 45**
Water Well	Cedar Hills Well	565.6 (2)	1.30	**50 to 57**
1	Indian Cave	566.4 *	5.05	**60 to 104**
1	No Name Cove	567.6 *	3.97	**60 to 104**
3	Catfish Hotel	565.8 *	3.15	**60 to 104**
Water Well	Blue Skyies Well 1	566.8 (2)	1.59	**93 to 113**
2	Turtle Meadows	566.6 *	3.85	**104 to 132**
3	Shipwreck	565.8 *	4.71	**104 to 132**
Water Well	Fort King Forrest Well	564.6 (2)	0.822	**147 to 164**
Water Well	Marion Correctional Institution Well 1	514.8	0.604	**181 to 194**
2	Christmas Tree	569.0 *	3.64	**276 to 294**
Not Determined	South Boathouse Vent	546.4 *	0.191	**294 to 311**

Rhodamine WT
Fluorescein
Eosine
Sulforhodamine B

FIGURES

Figure 1 - Ocklawaha River Basin



Source: http://water.usgs.gov/wsc/cat/03080102.html

Figure 2 - SSG Study Area with 18.6 mile (30 km) Buffer

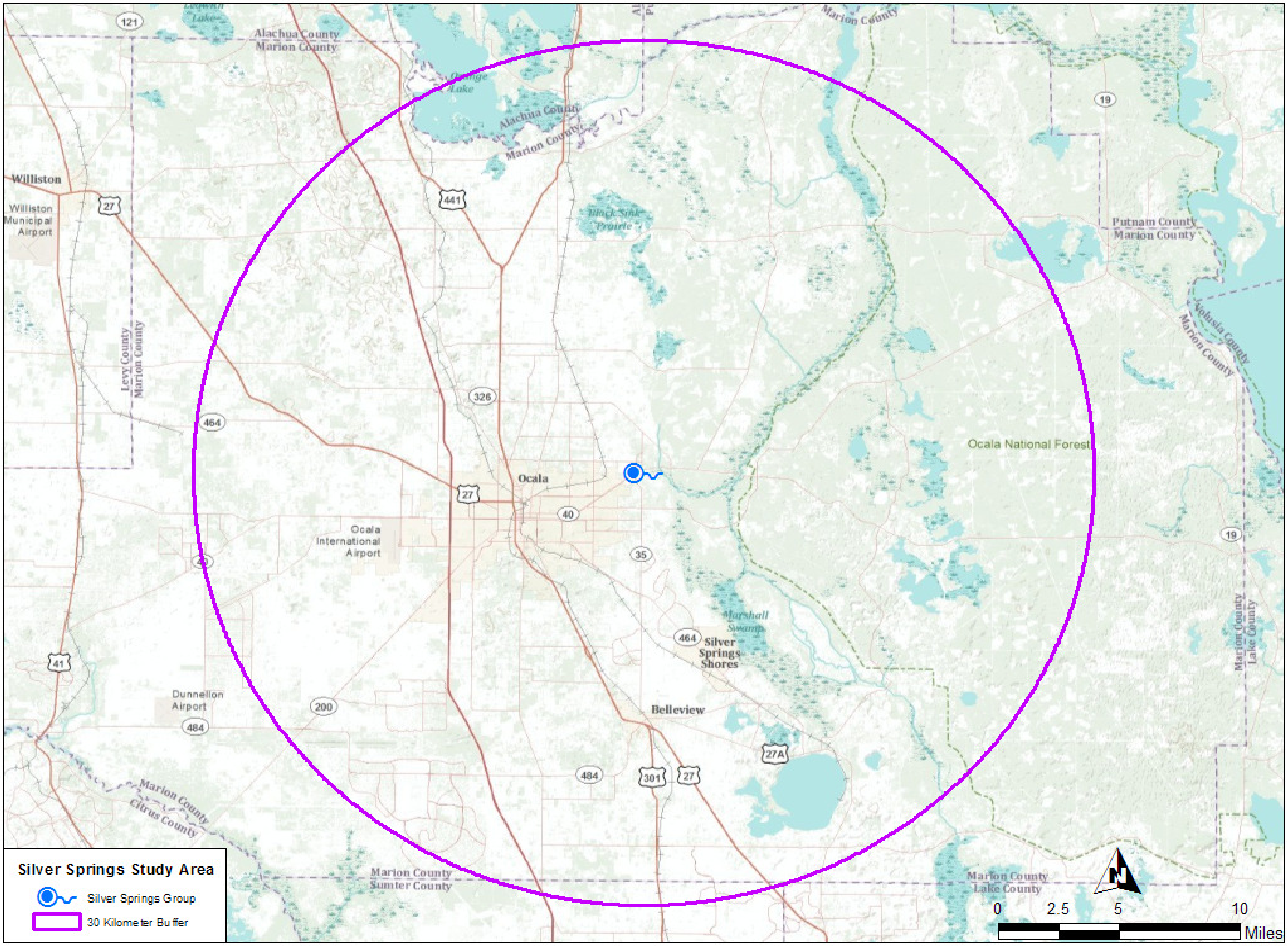
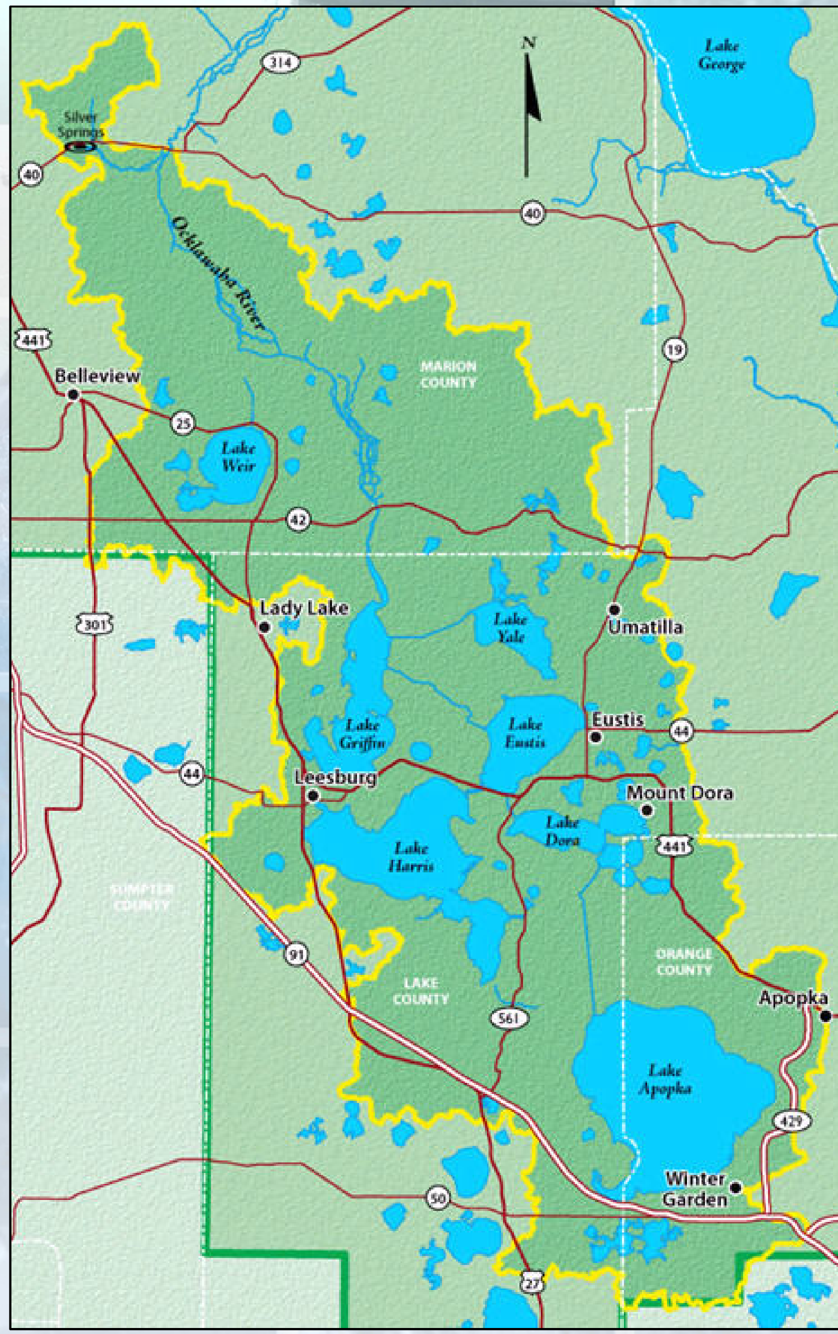
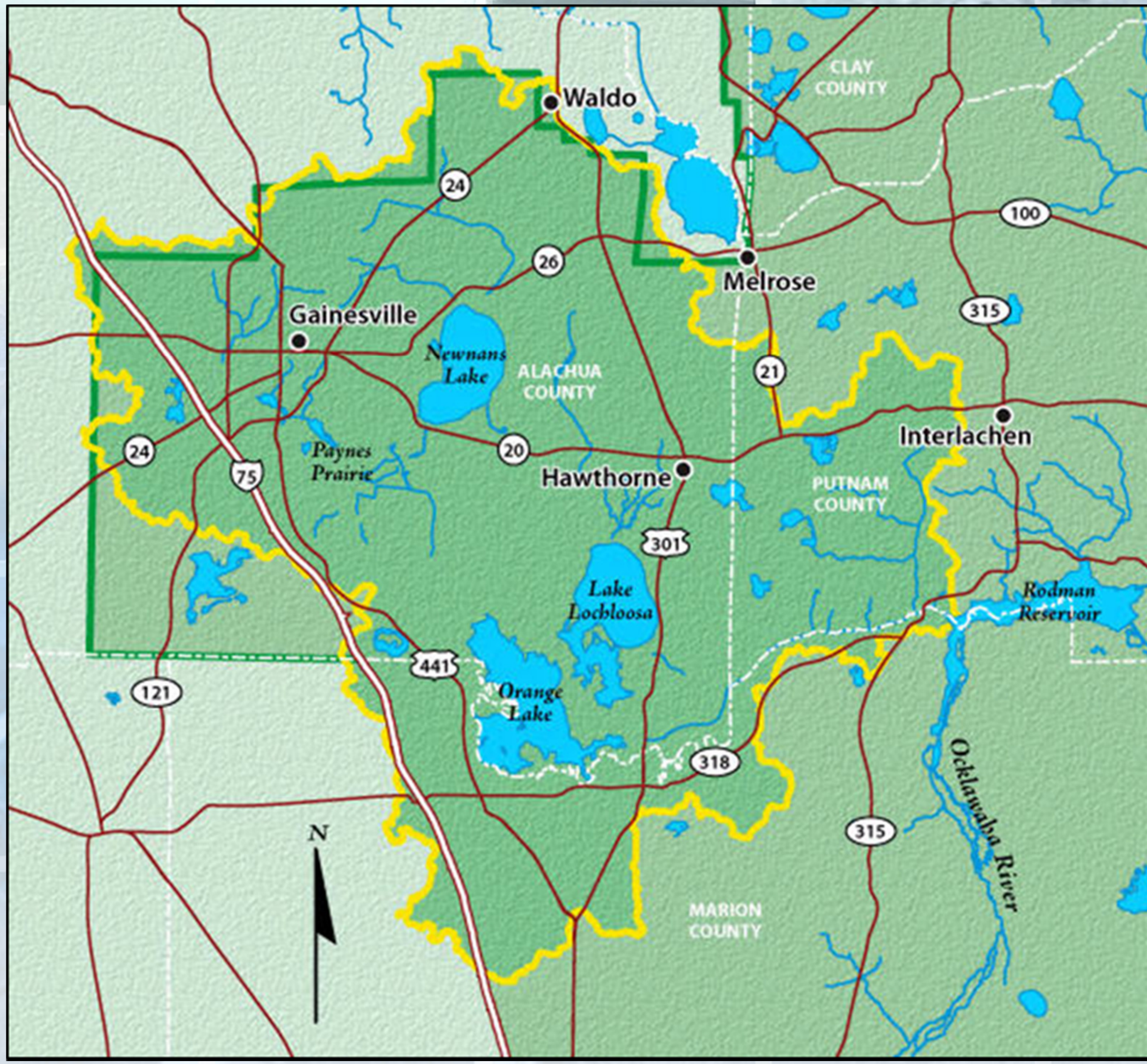


Figure 3 – Upper Ocklawaha River Sub-Basin



Source: http://www.sjrwmd.com/

Figure 4 – Orange Creek Sub-Basin



Source: http://www.sjrwmd.com/

Figure 5 - Closed Topographic Depressions

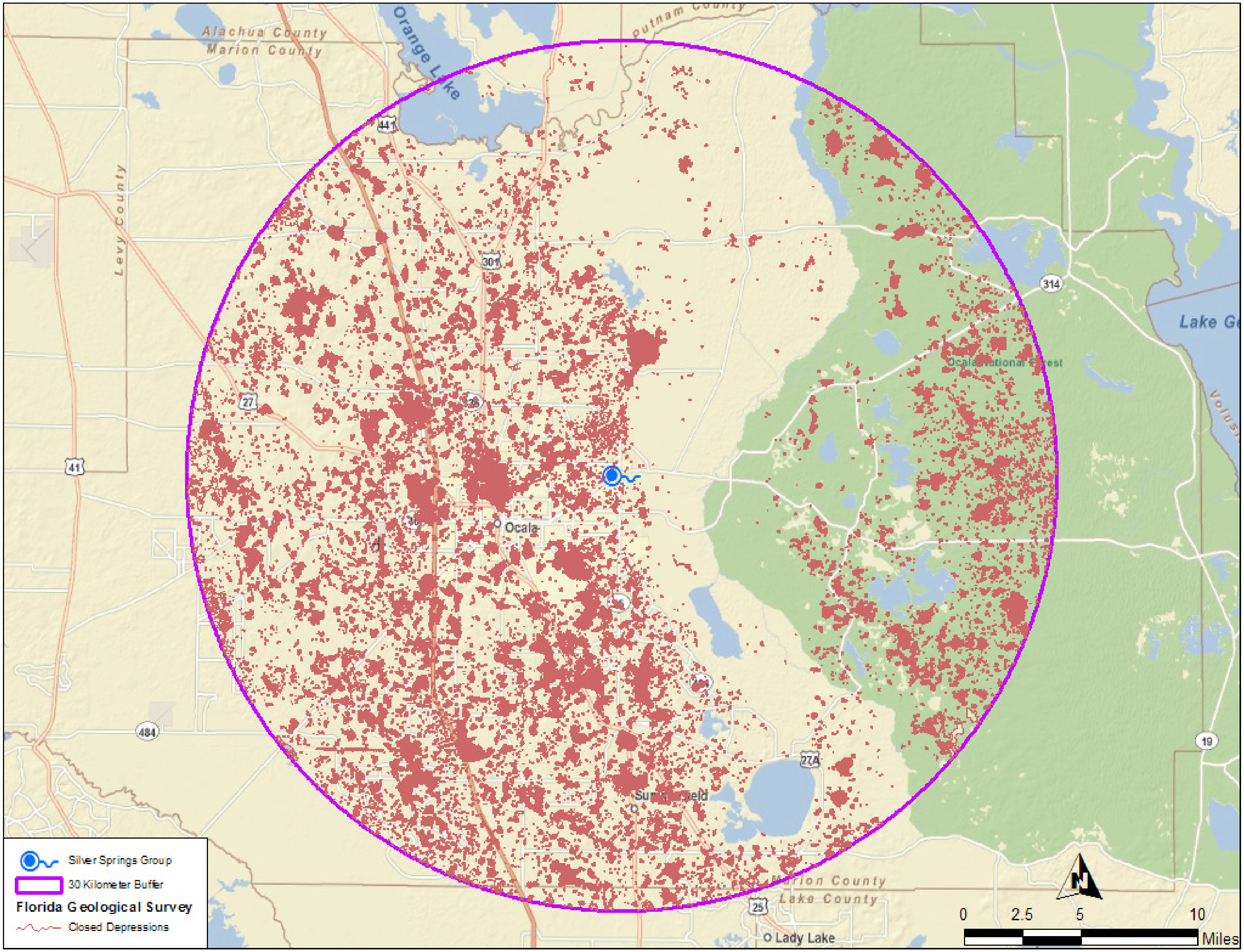


Figure 6 - NEXRAD Rainfall January-March 2010

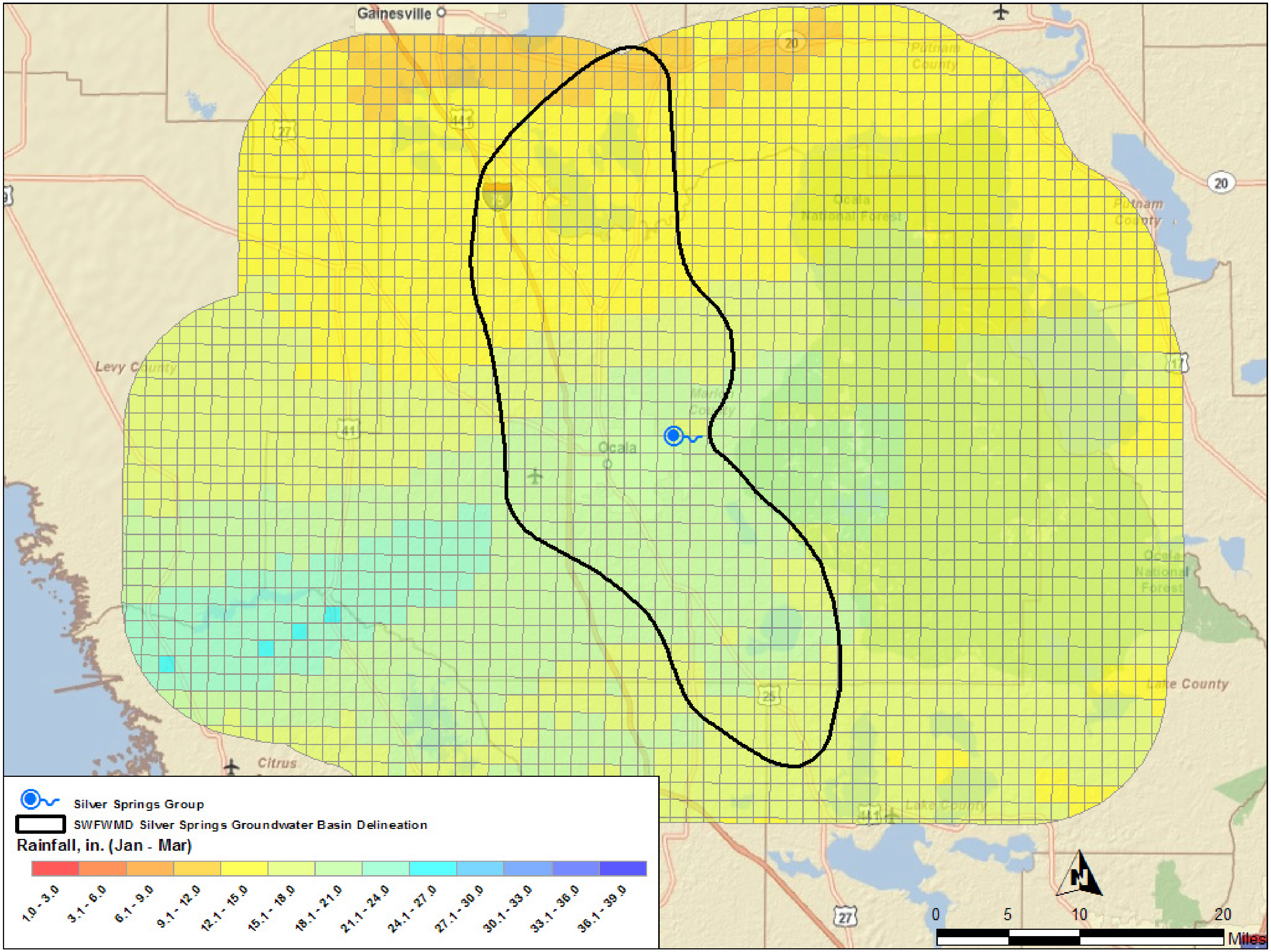


Figure 7 - NEXRAD Rainfall April- June 2010

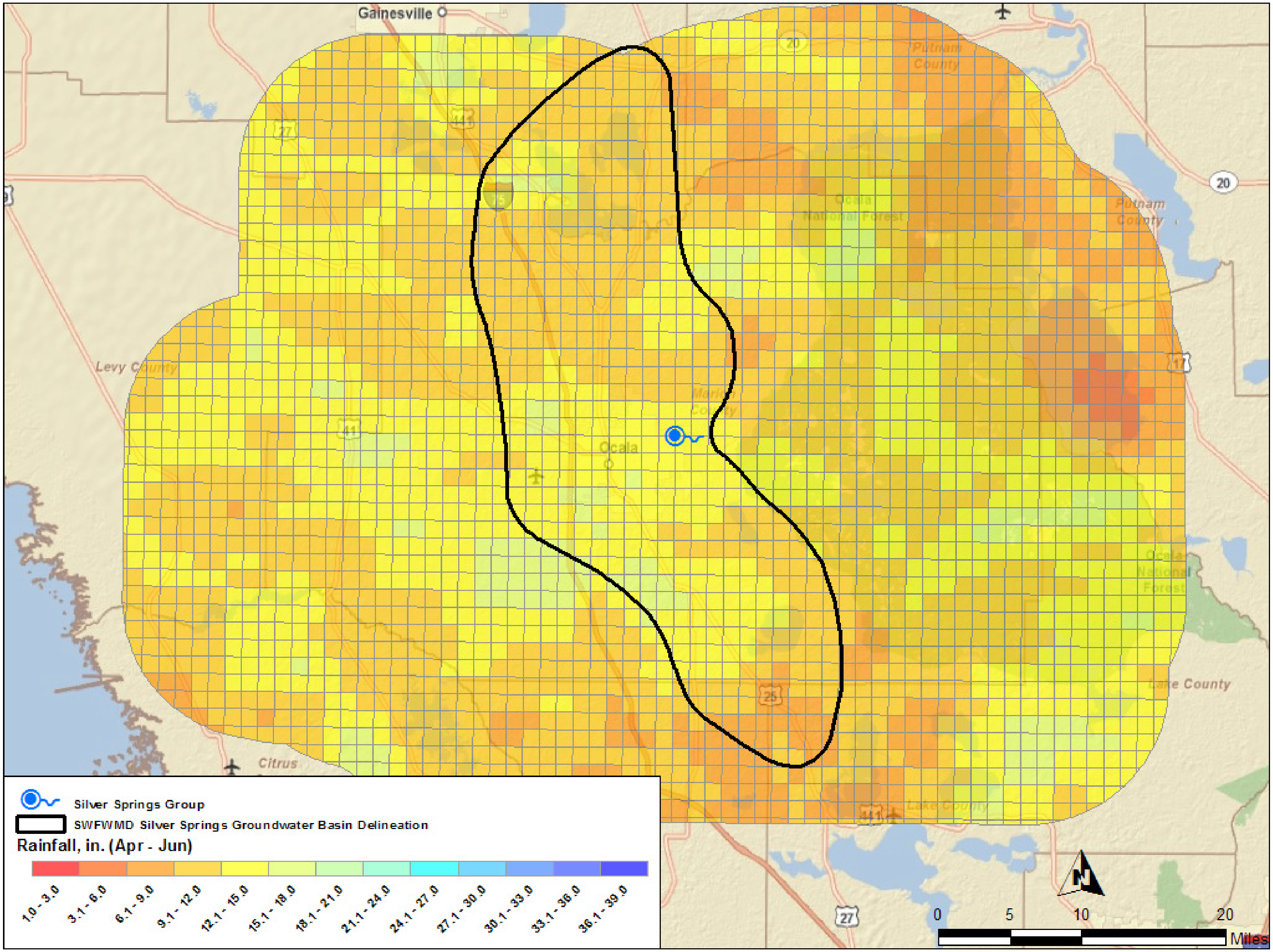


Figure 8 - NEXRAD Rainfall July–Sept 2010

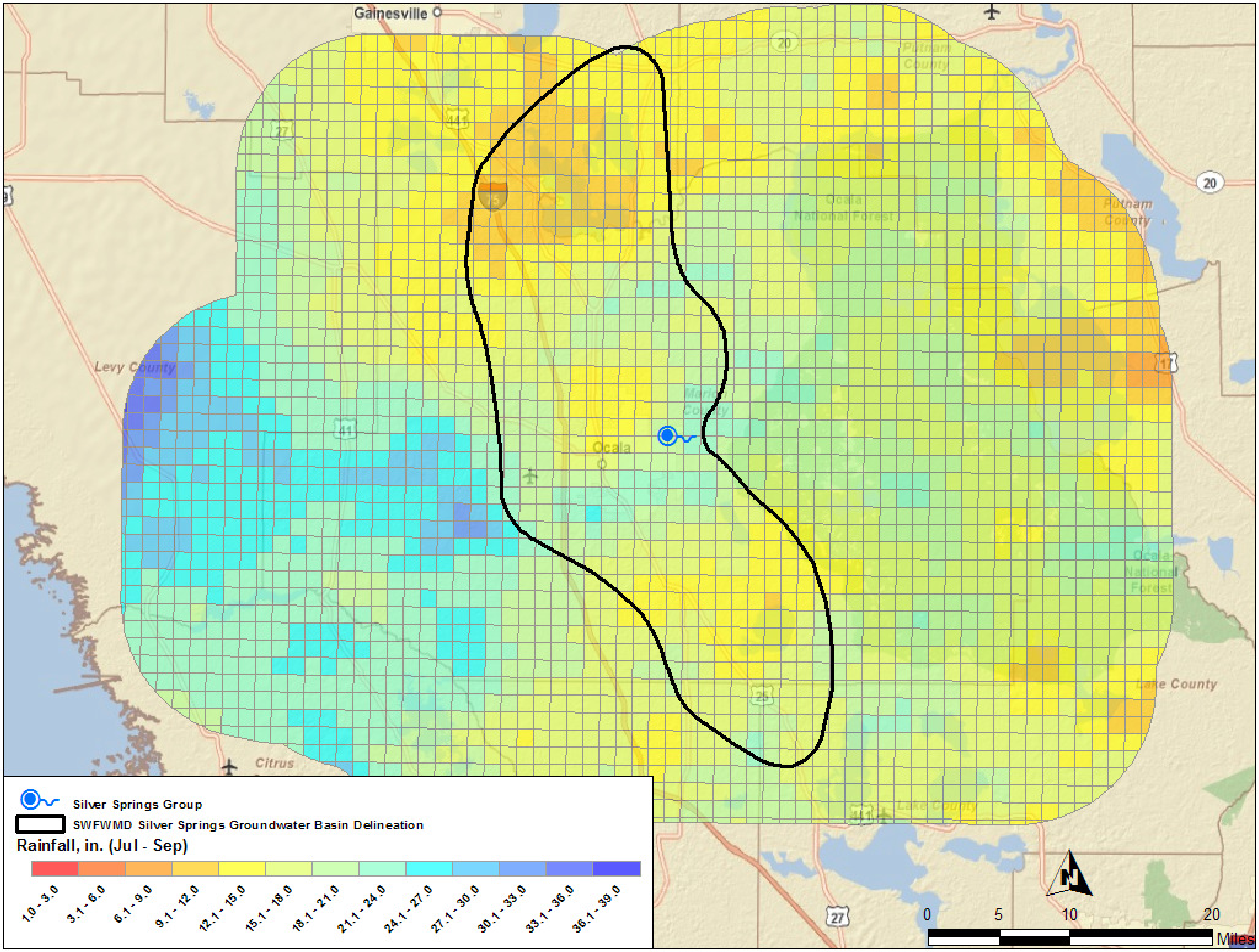


Figure 9 - NEXRAD Rainfall October-December 2010

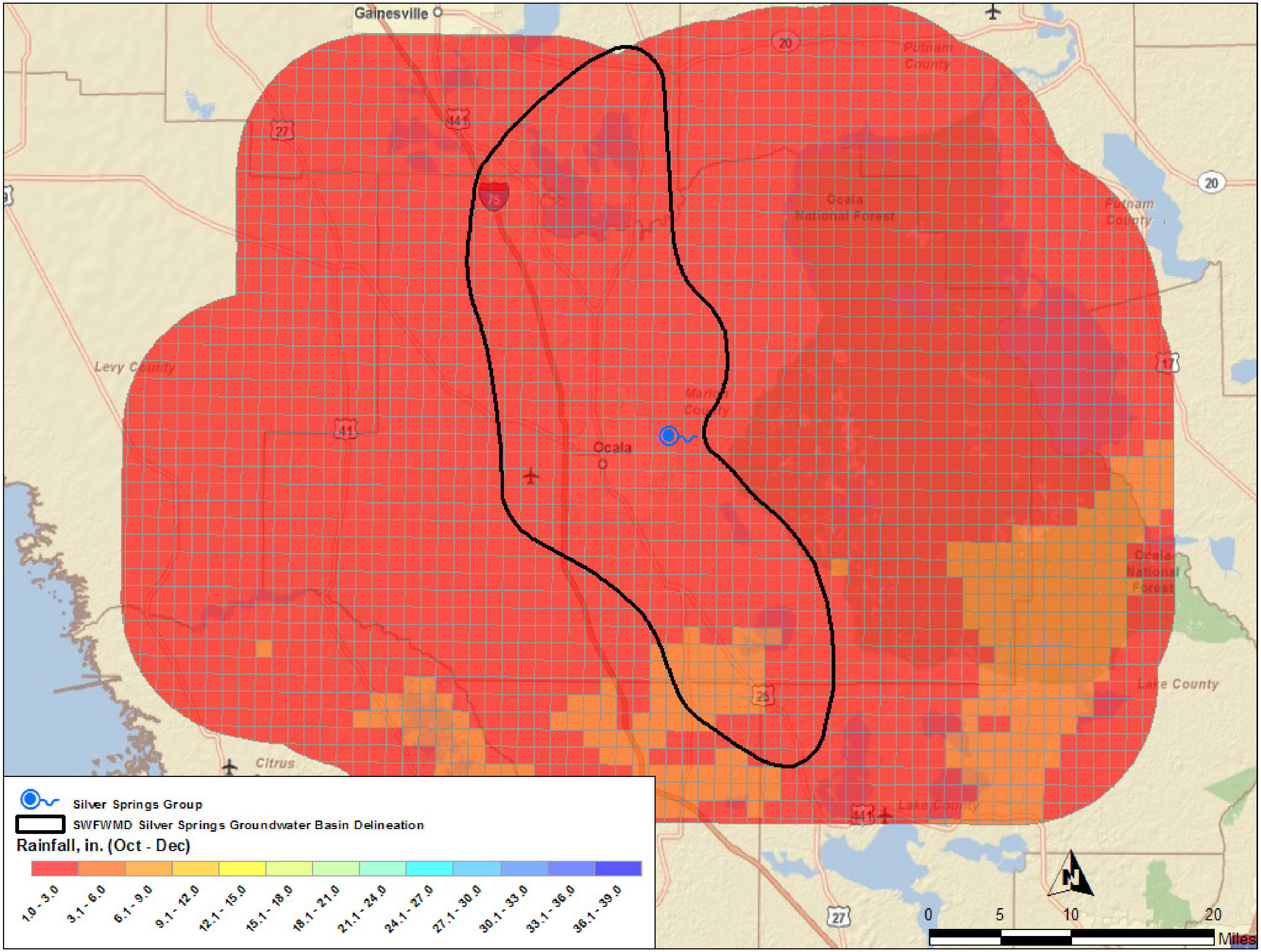


Figure 10 – Marion County, Florida Population

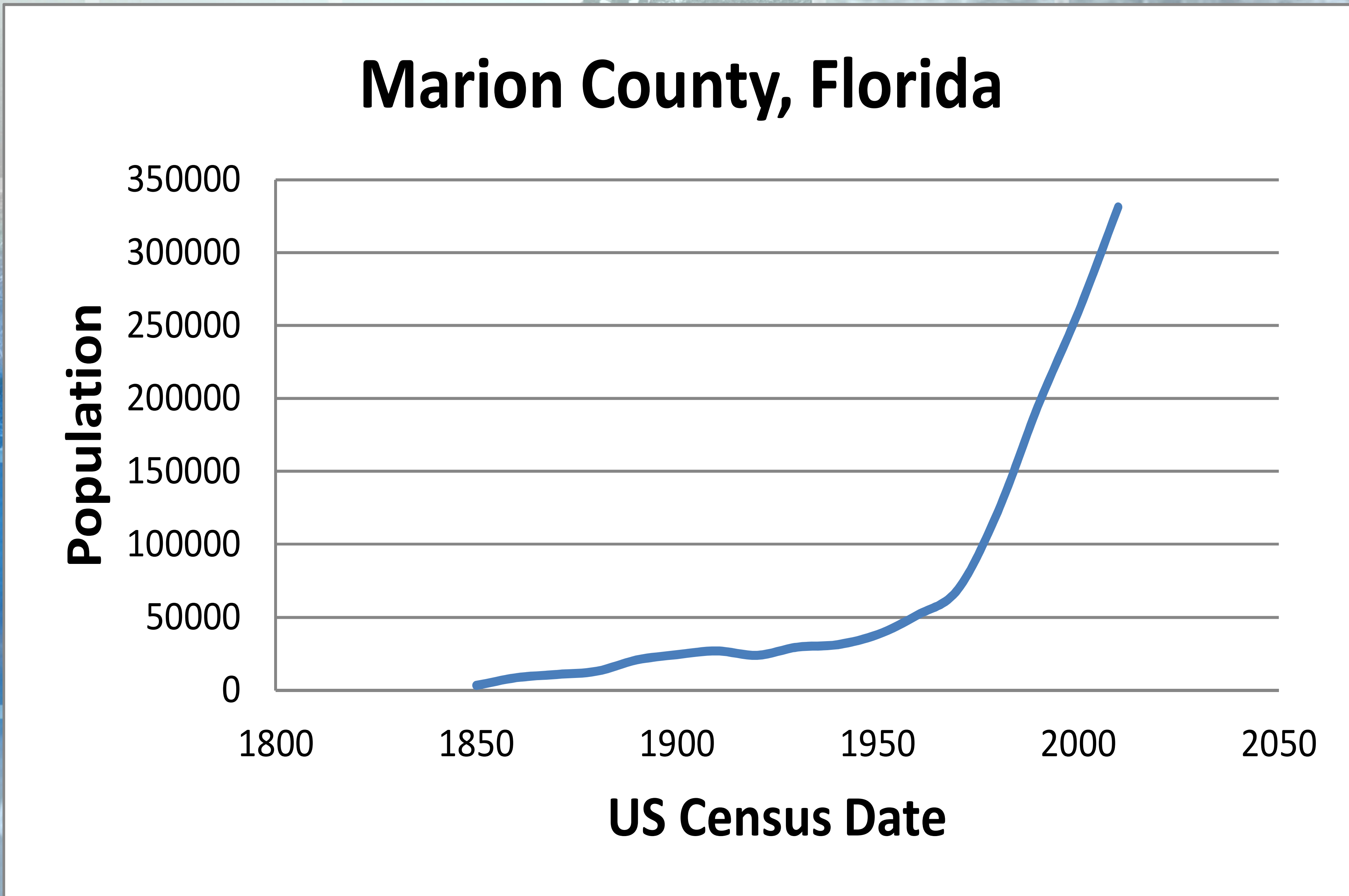


Figure 11 - Discharge of Silver & Rainbow Rivers

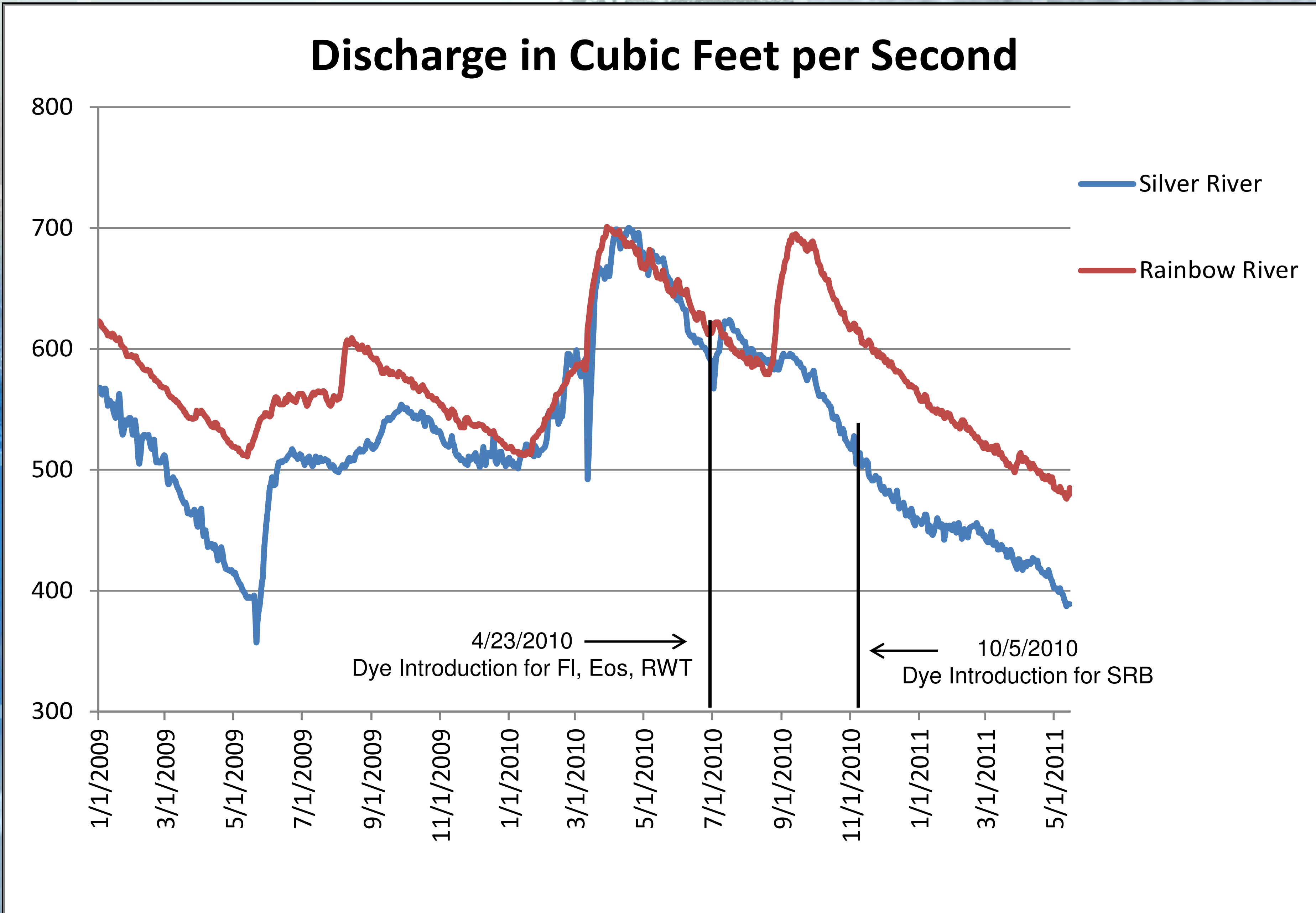


Figure 12 - NEXRAD Rainfall – August 2010

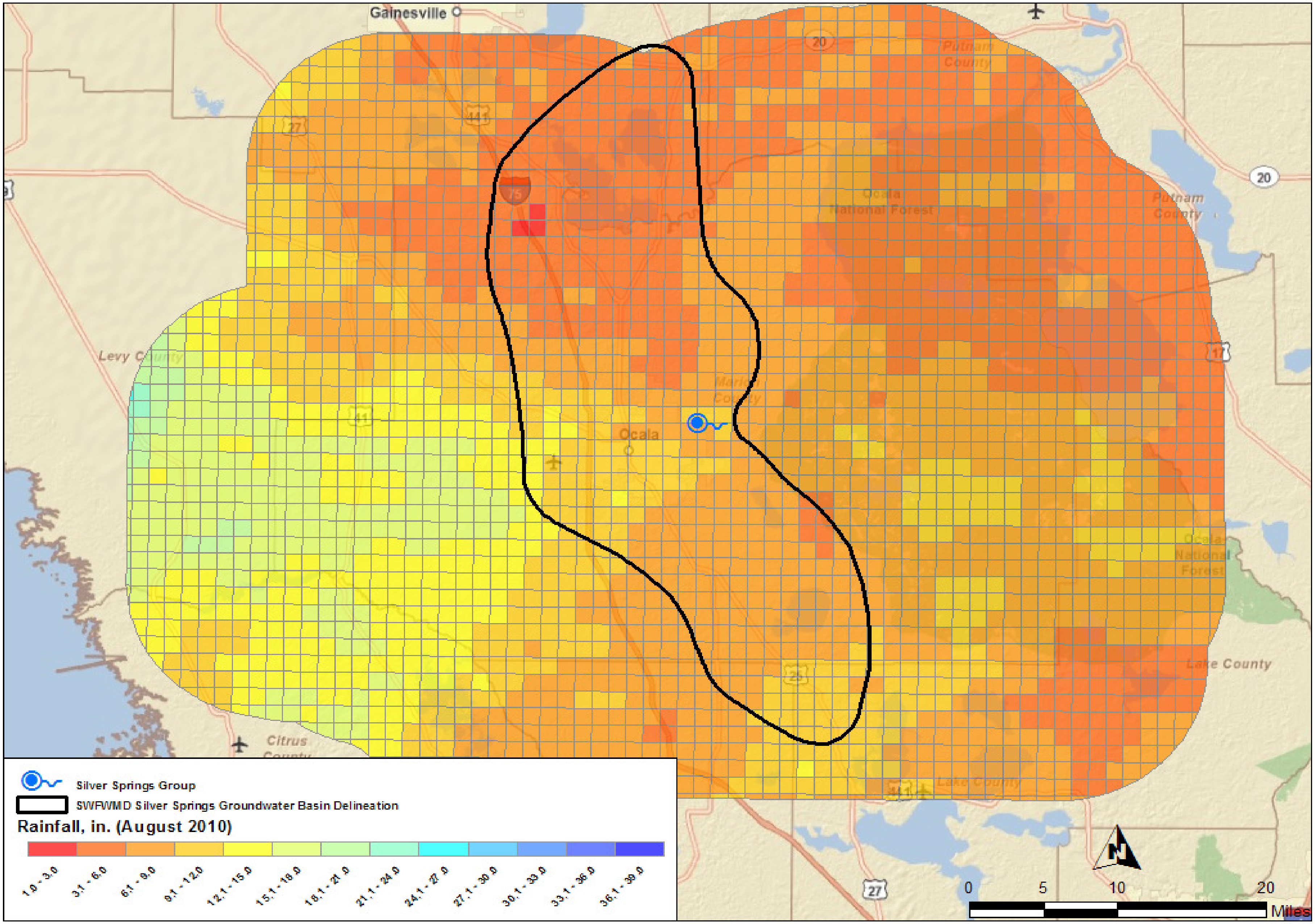


Figure 13 - Silver Springs Springshed – FGS SP 31

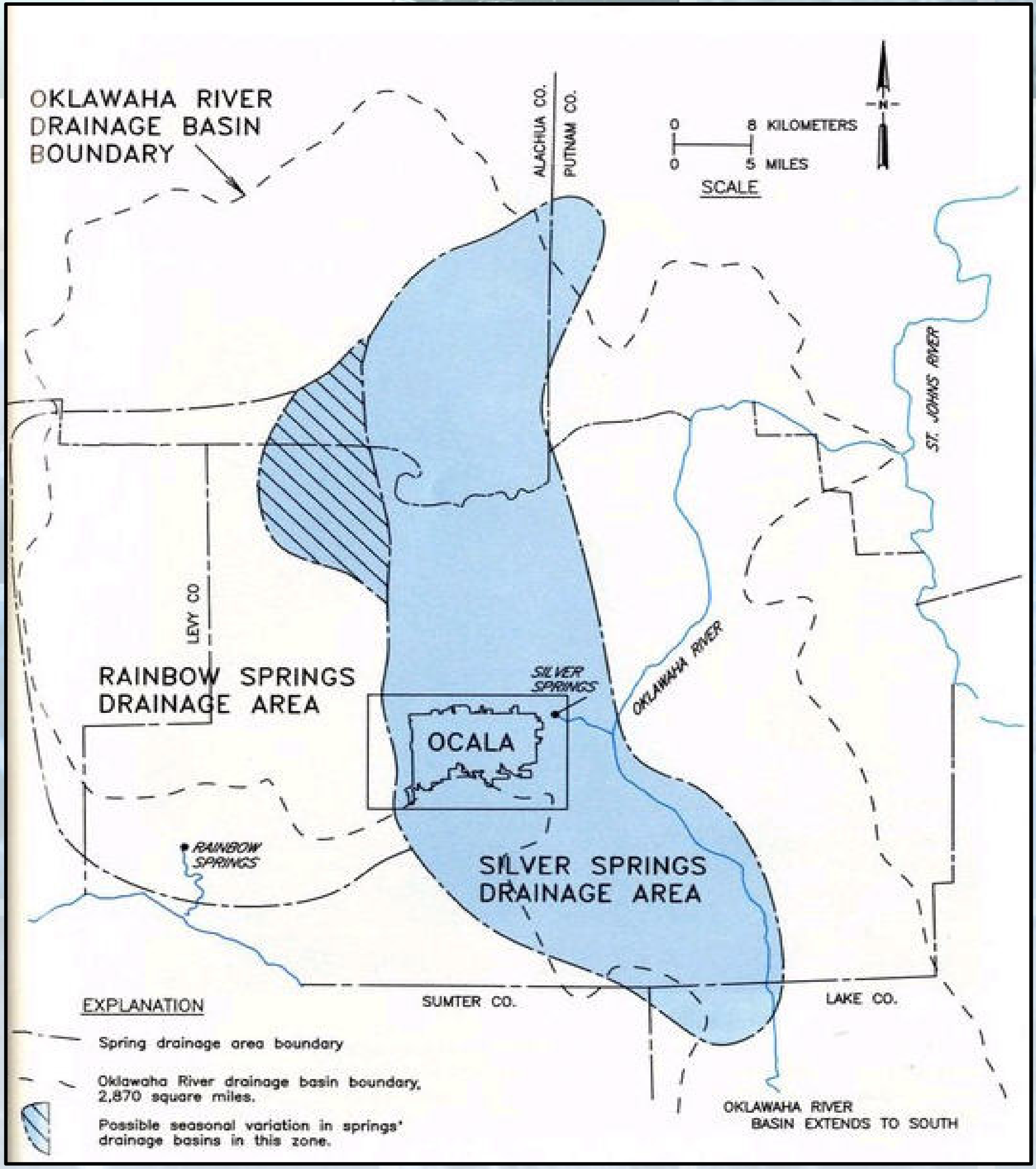


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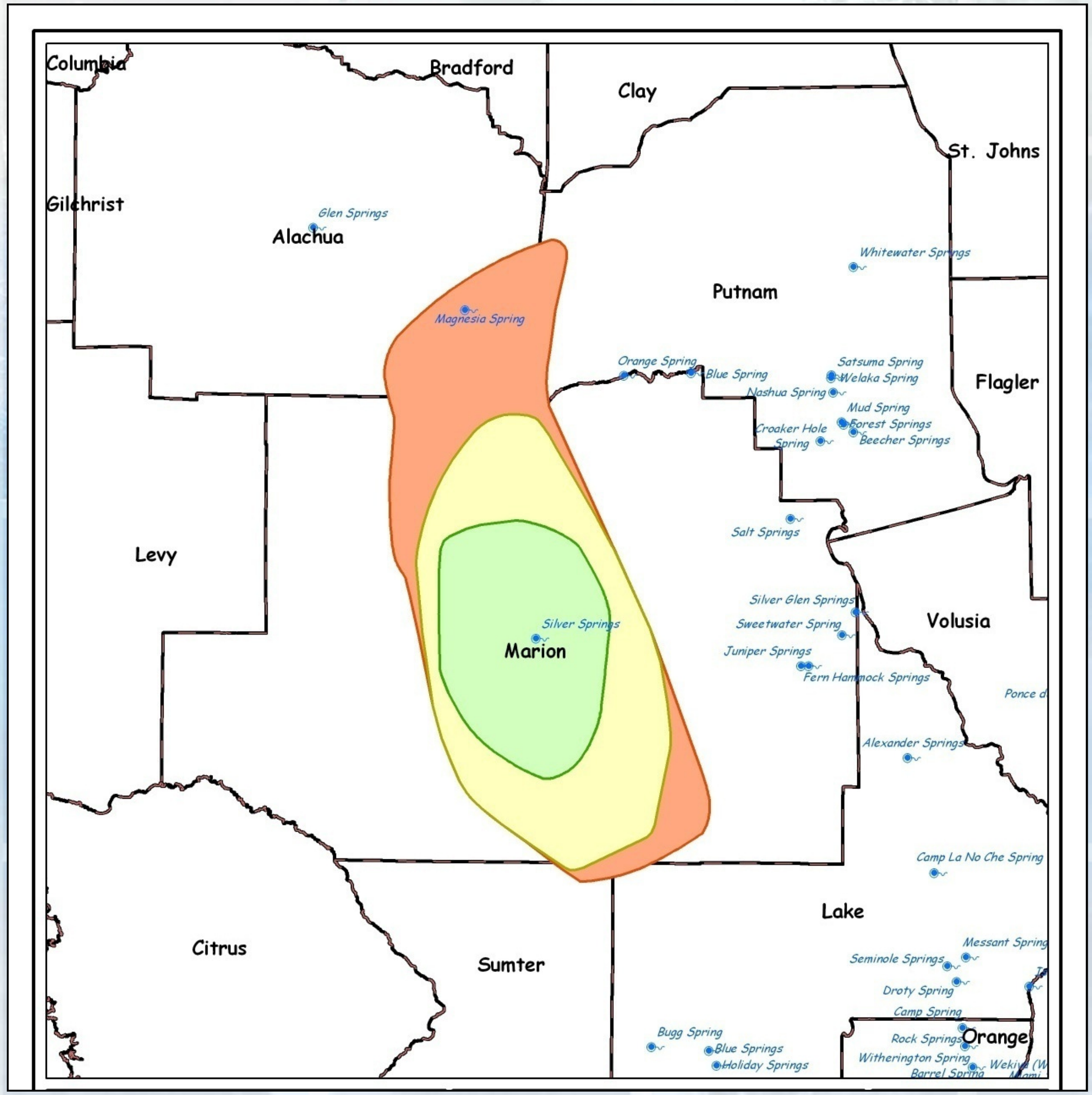
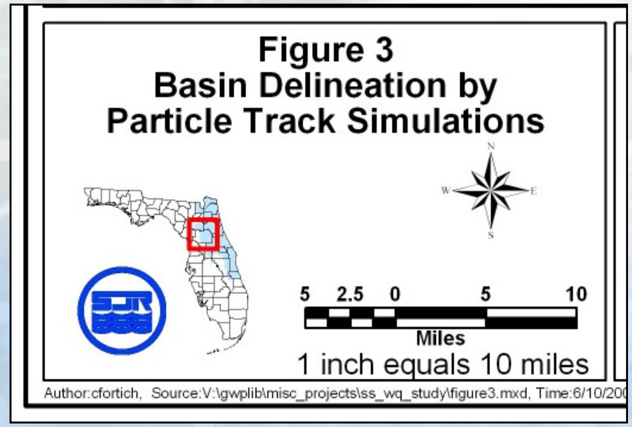
Figure 14 - SSG MODPATH Spring Capture Area





MODPATH Simulations
Spring Capture Areas By Travel Time:

- 10 Year Capture Zone [214 sq. mi.]
- 100 Year Capture Zone [491 sq. mi.]
- 1000 Year Capture Zone [726 sq. mi.]

- Springs
- County Boundaries

Source: Munch et. al. 2007

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Figure 15 - Dye Introduction & Well Sample Locations

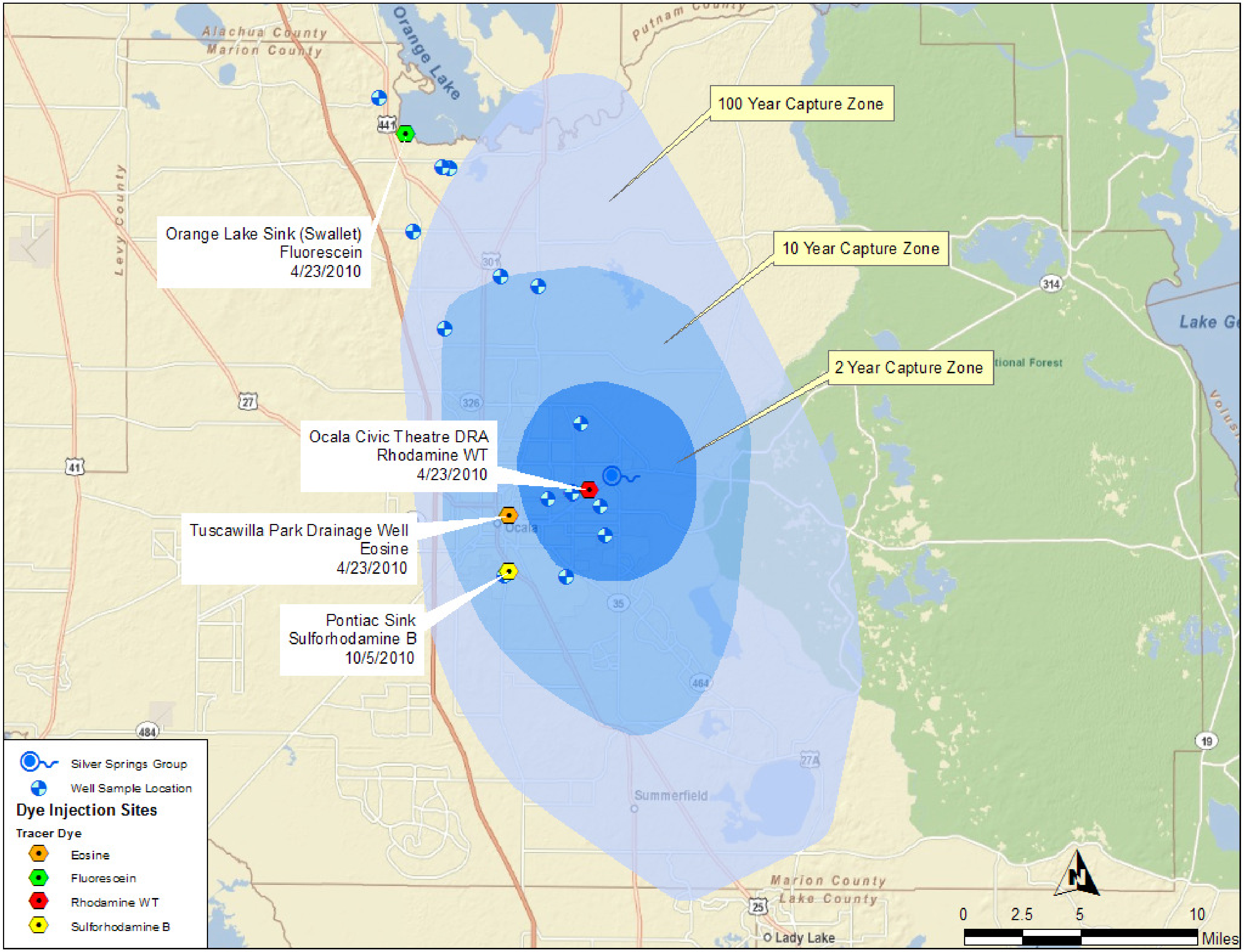


Figure 16 - Stratigraphy – Hydrostratigraphy Ocala Area, Florida

SPECIAL PUBLICATION NO. 31

SYSTEM	SERIES	FORMATION
QUATERNARY	Holocene	Undifferentiated Sands and Clays
	Pleistocene	
TERTIARY	Pliocene	Cypresshead Formation
	Miocene	Hawthorn Group
	Oligocene	absent
	Eocene	Ocala Group
		Avon Park Formation

HYDRO-STRATIGRAPHIC UNIT	GEOLOGIC UNIT	SERIES
SURFICIAL AQUIFER SYSTEM	UNDIFFERENTIATED TERRACE MARINE AND FLUVIAL DEPOSITS	POST-MIOCENE
INTERMEDIATE AQUIFER SYSTEM AND INTERMEDIATE CONFINING UNIT	HAWTHORN GROUP	MIOCENE
FLORIDAN AQUIFER SYSTEM	OCALA GROUP	EOCENE
	AVON PARK FORMATION	

FLORIDA GEOLOGICAL SURVEY

FGS010291

Source: Florida Geological Survey Special Publication 31

Figure 17 - Faults and Fractures in the SSG Study Area (Faulkner 1973)

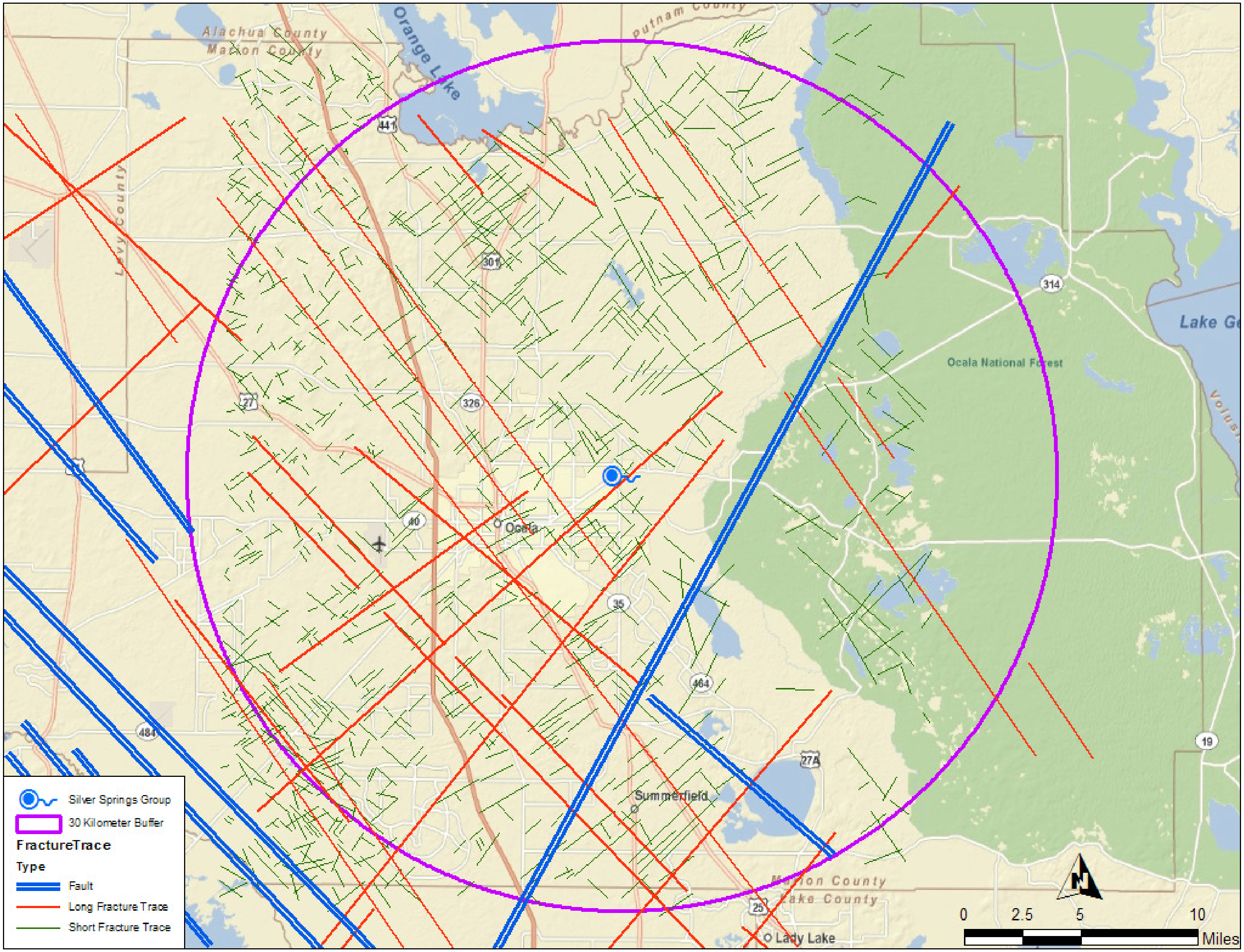


Figure 18 - Geologic Formations in the SSG Study Area

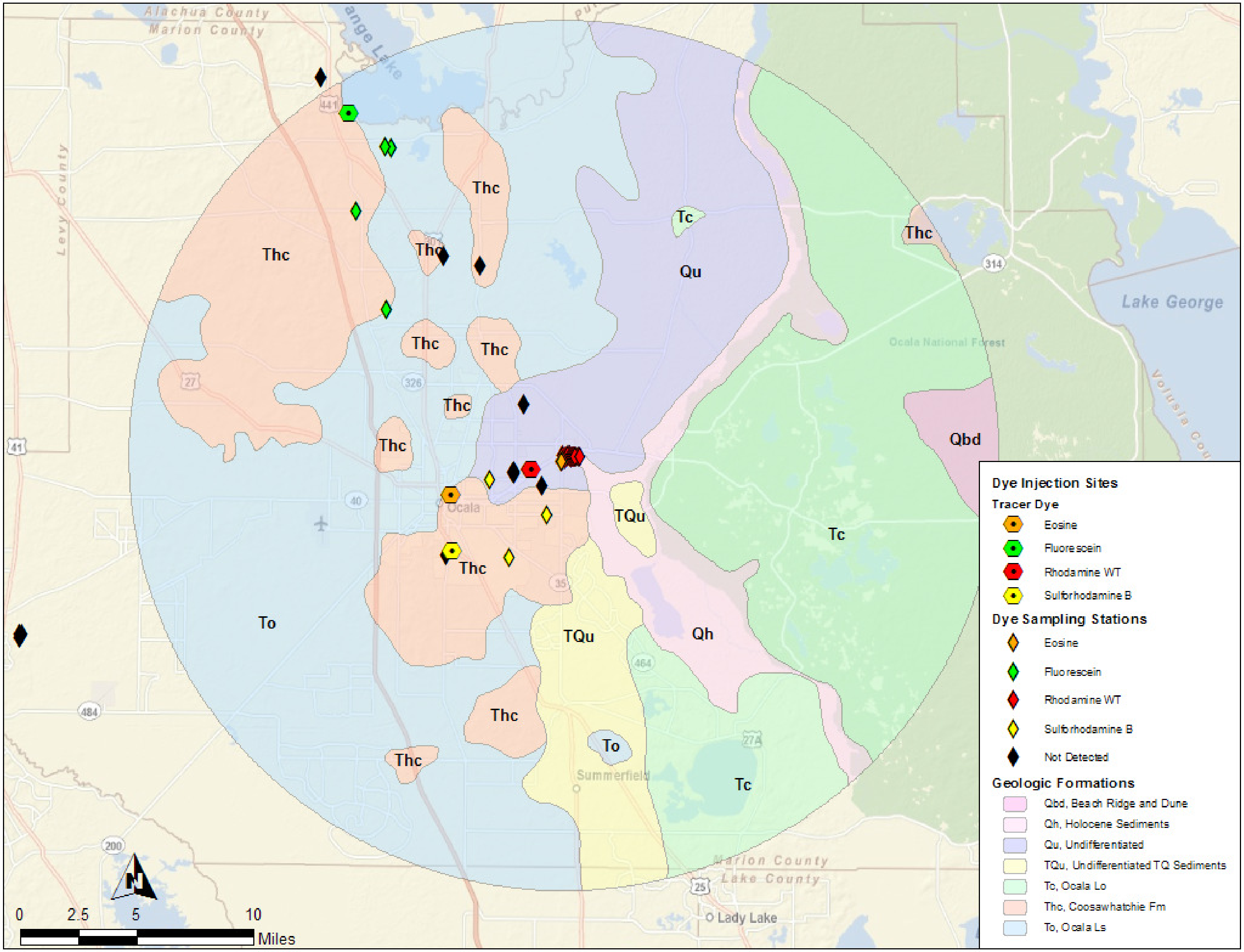


Figure 19 - Top of the Floridan Aquifer System in the SSG Study Area

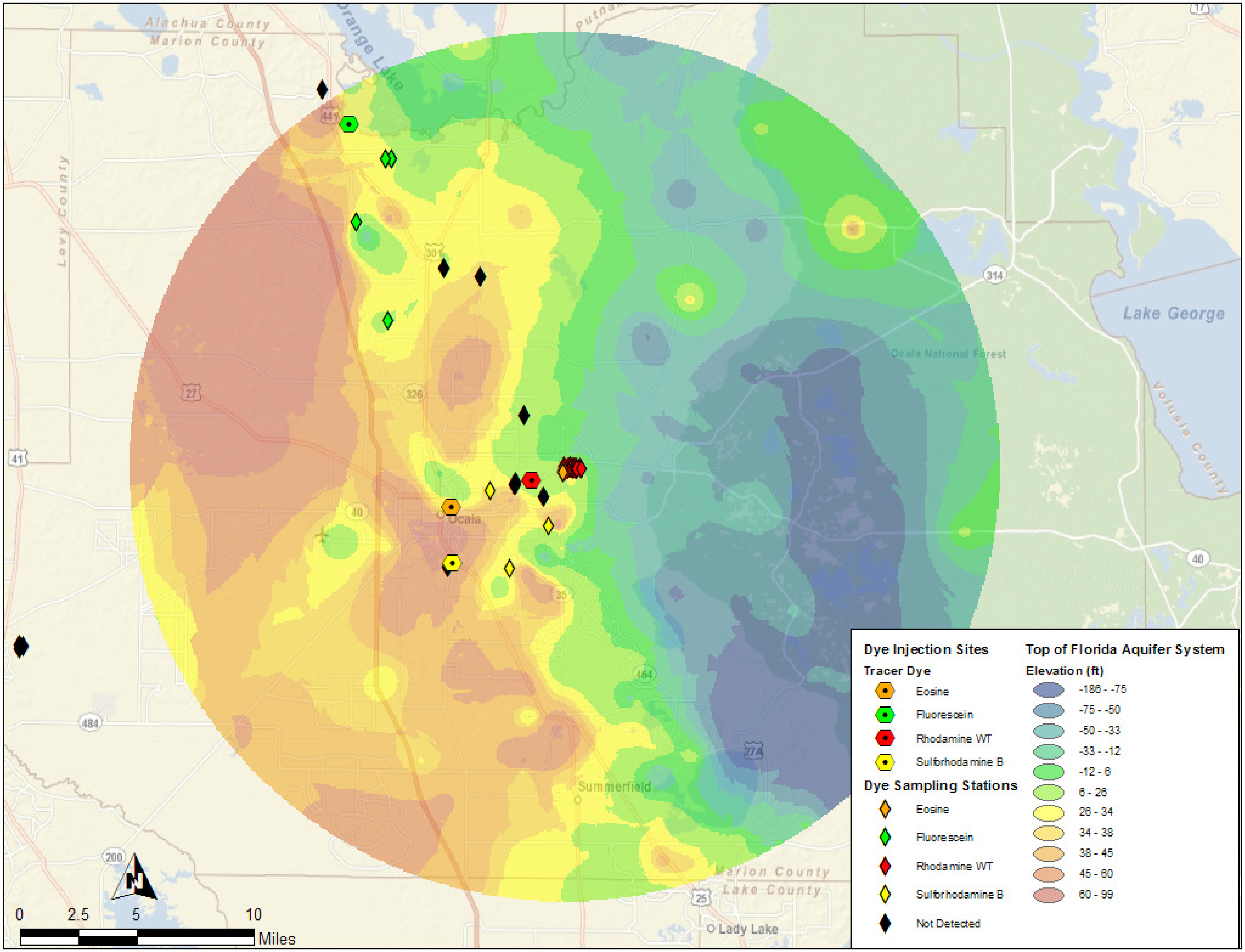


Figure 20 - Thickness of Intermediate Confining Unit in the SSG Study Area

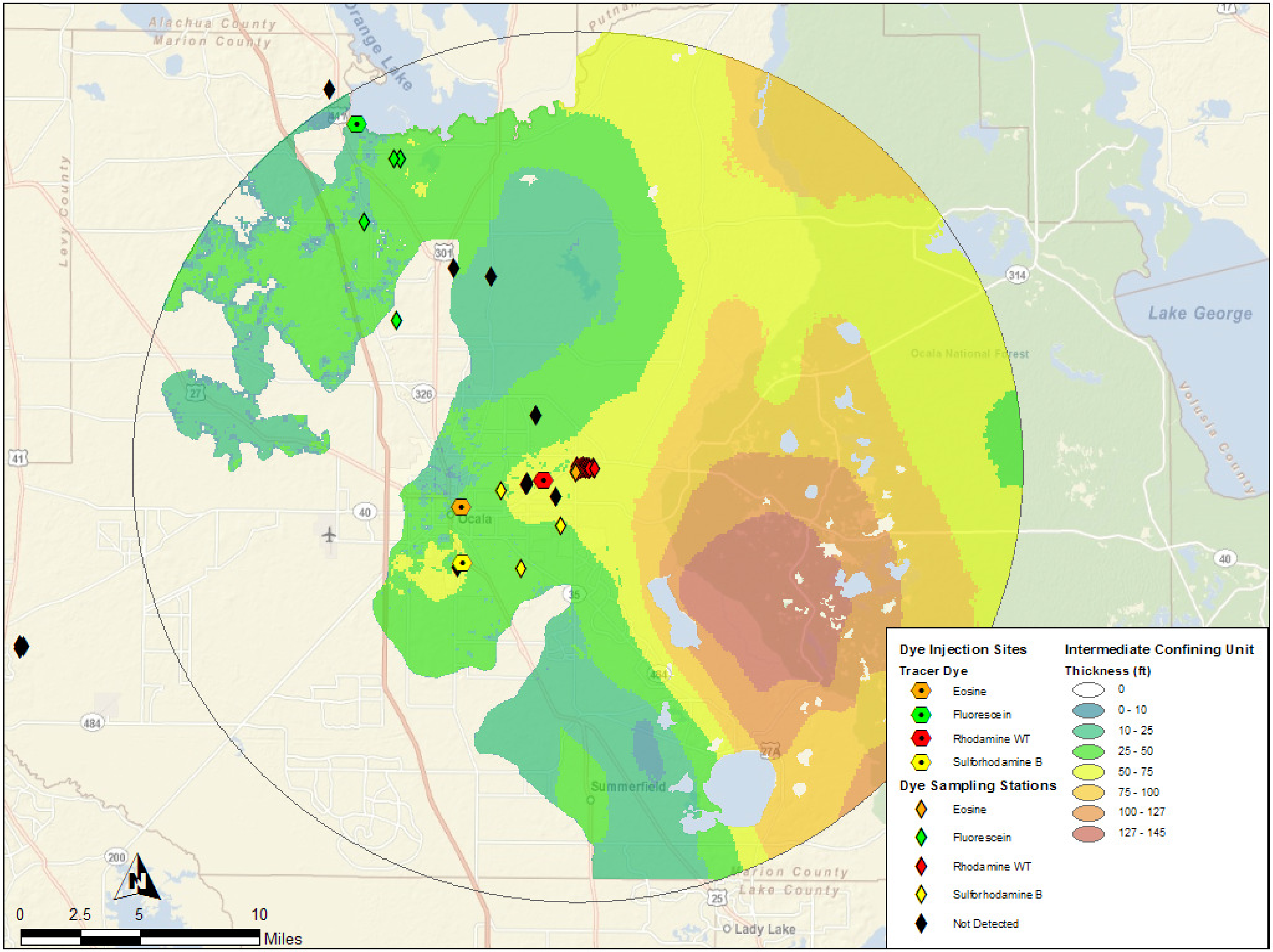
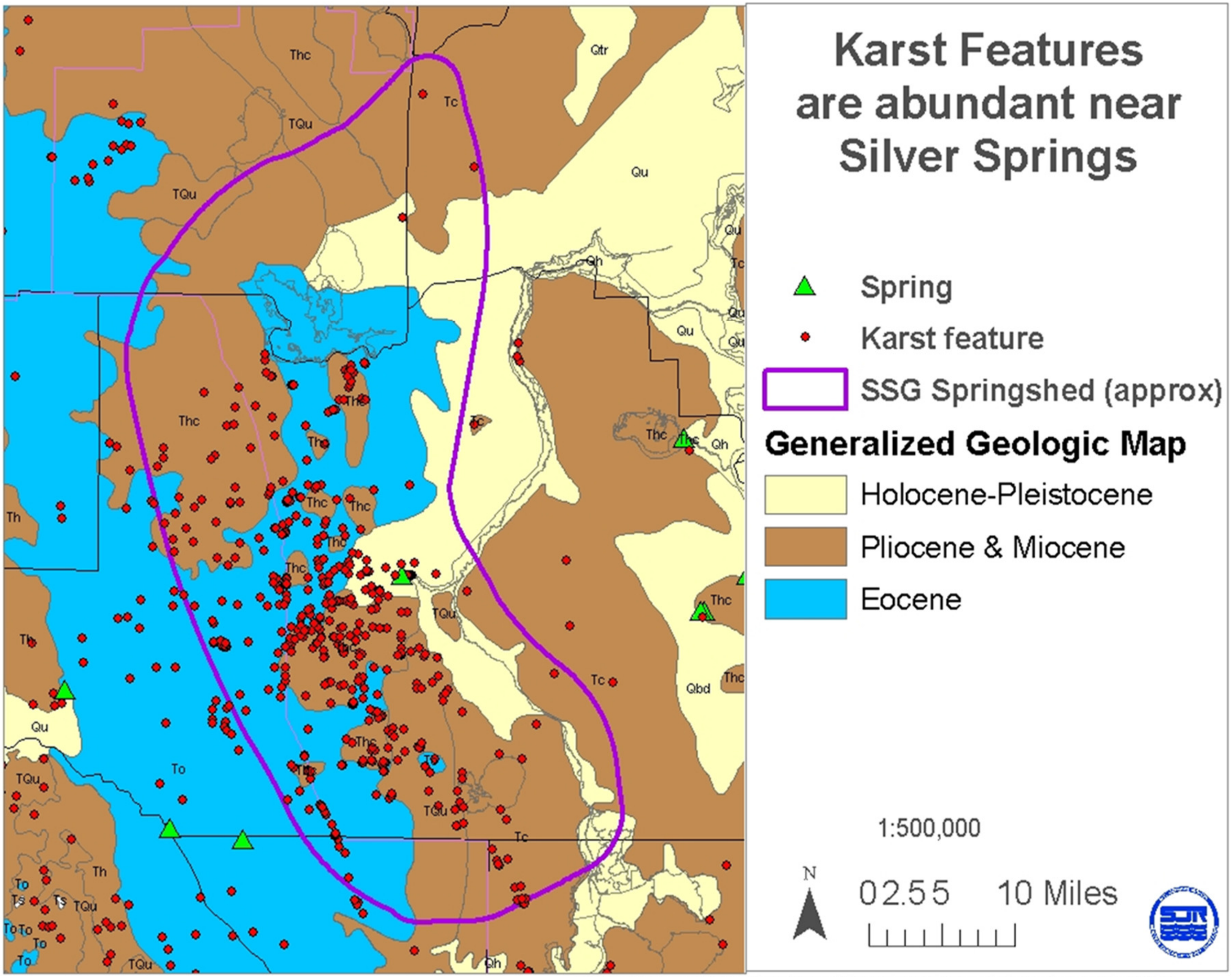


Figure 21 - Closed Topographic Depressions in the SS Study Area



Map Creator: bmcgurk@sjrwmd.com; Source: SSGgeokarst.mxd, 8.5" x 11"; Datasets current as of 5/2011.

Figure 22 - Three Sinkholes in the P-G Run Portion of Eastern Orange Lake
April 2011

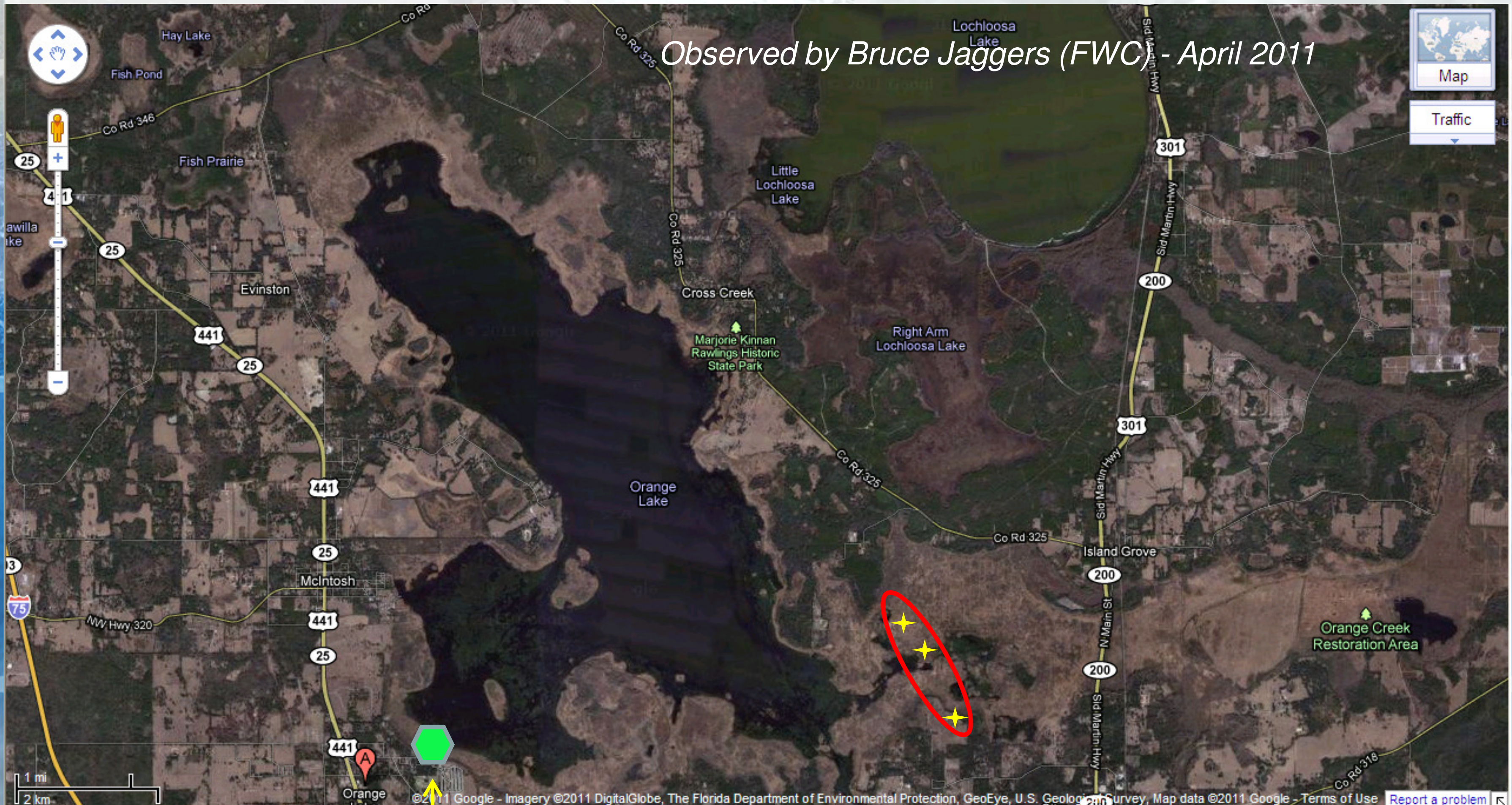


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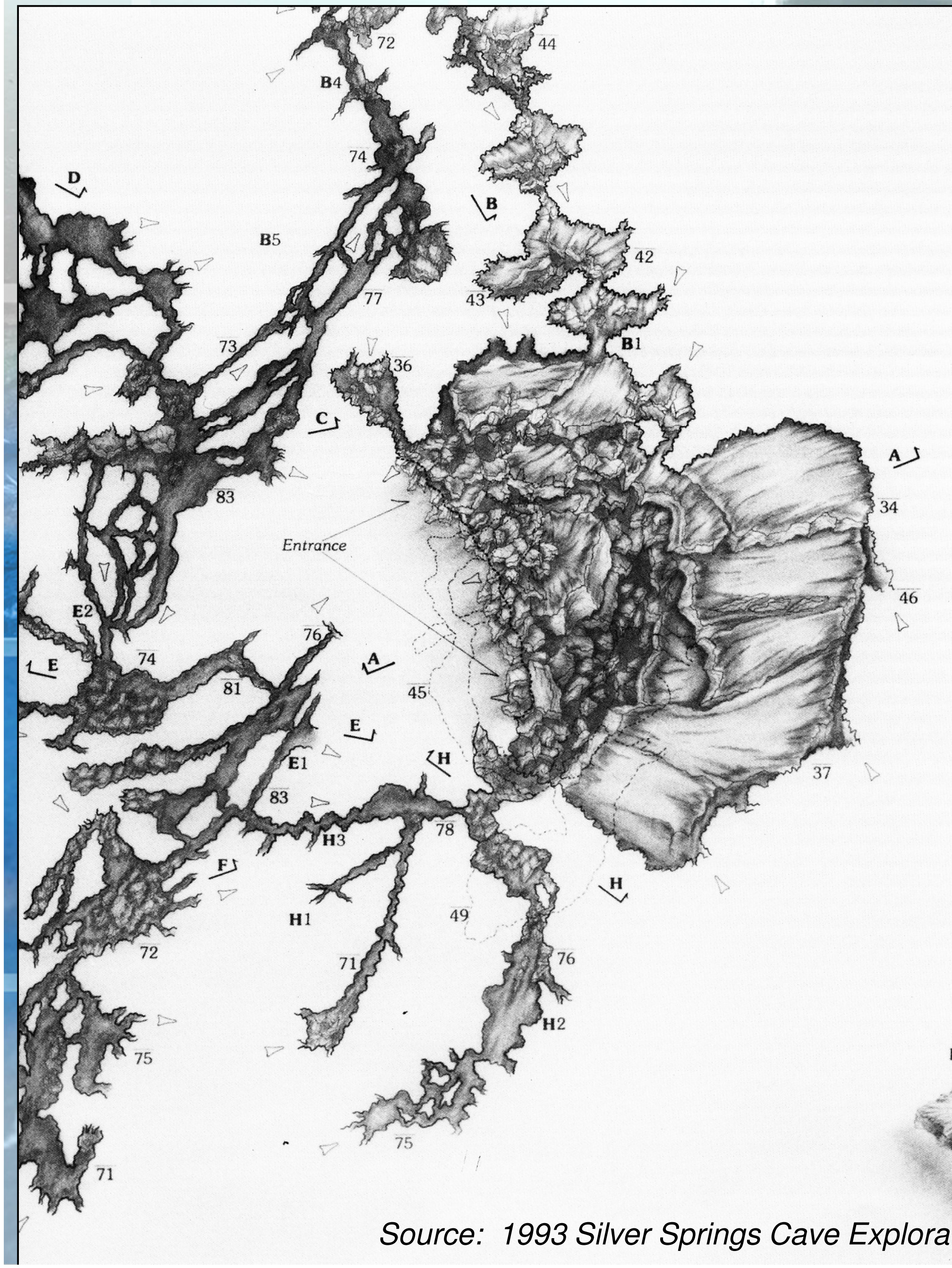
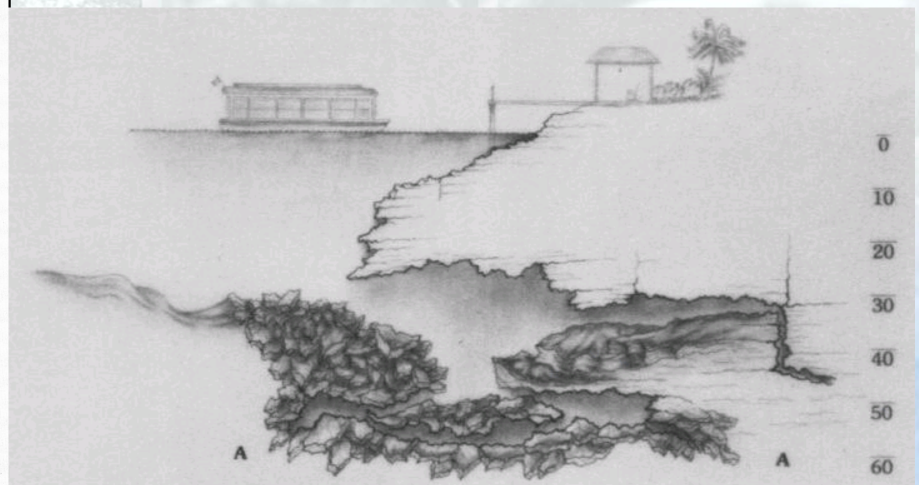
Figure 23 - SSG Partial Map of Cave System





Source: 1993 Silver Springs Cave Exploration - Cartography by Eric Hutcheson

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Figure 24 - SSG Vents by Geochemistry

Silver Springs Nutrient Pathway Characterization Study
Silver Springs Group

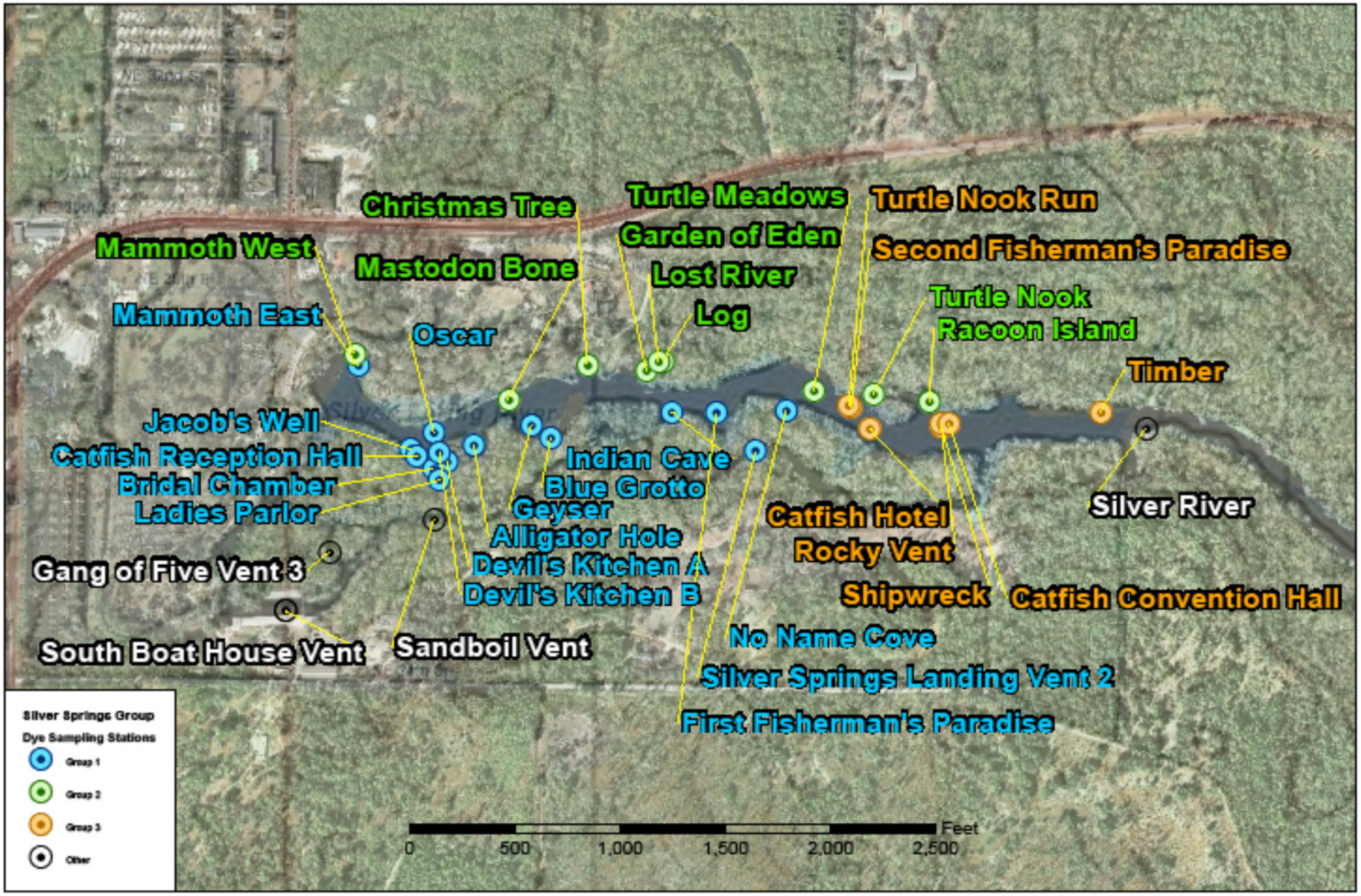
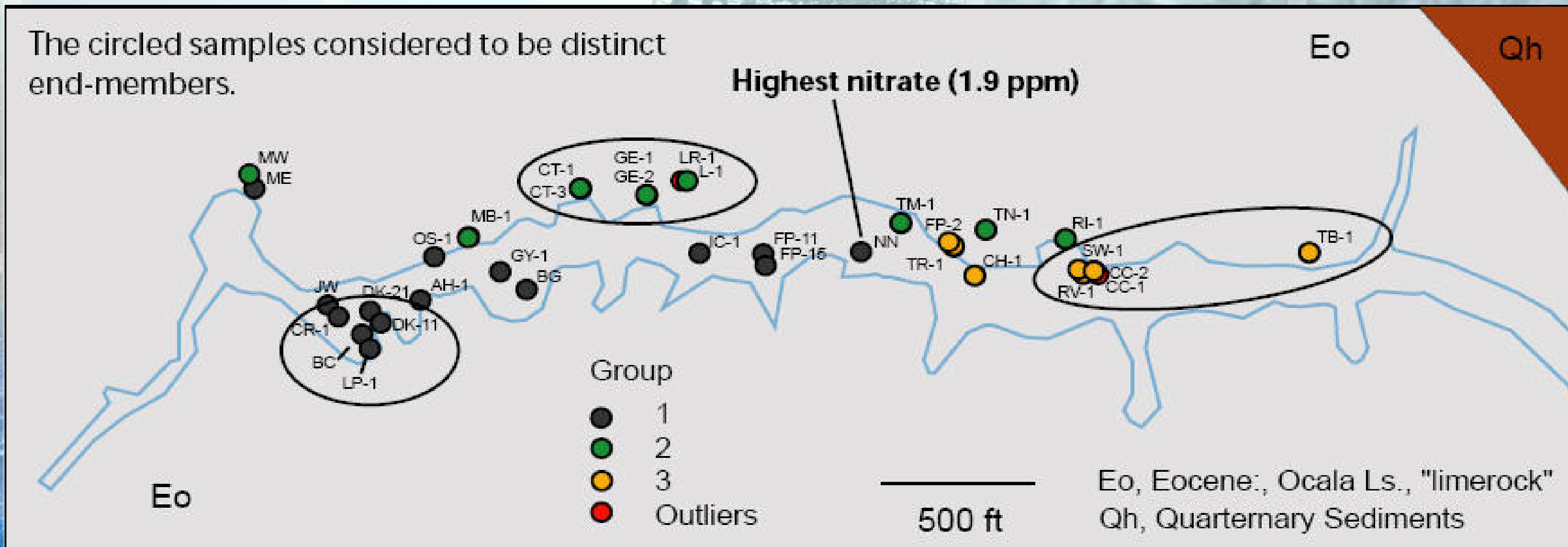
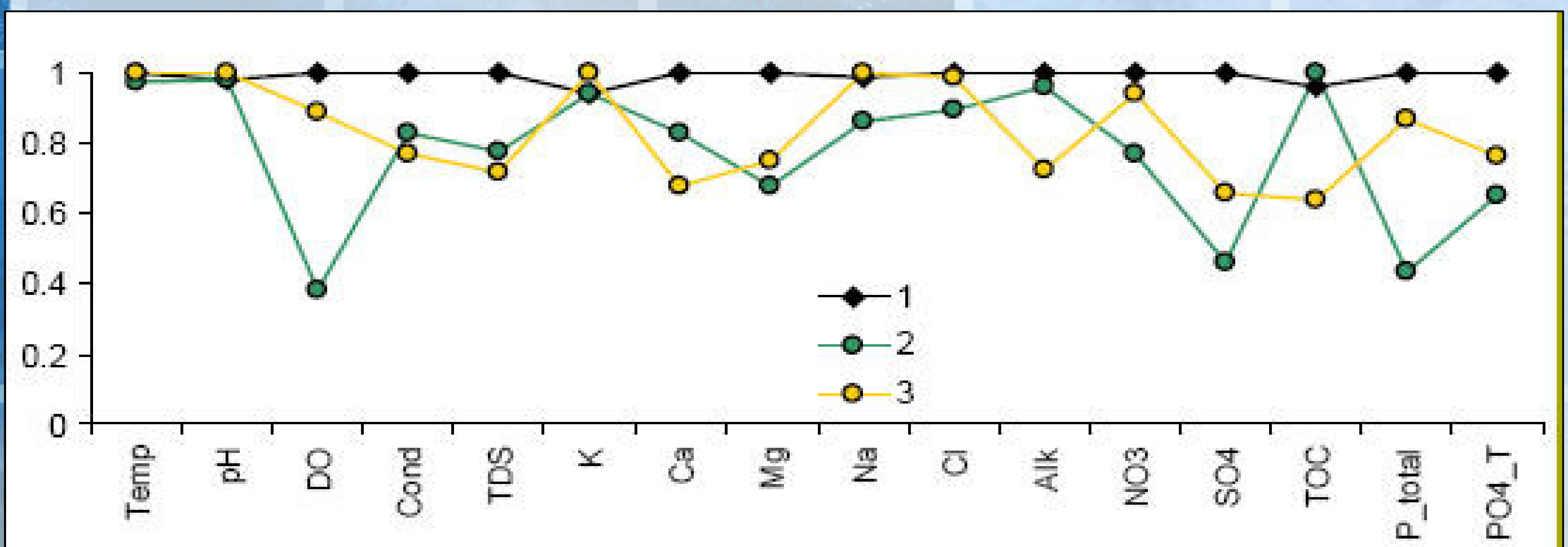


Figure 25 - SSG Vent by Geochemical Grouping





Constituent mean concentrations by group, normalized to the highest concentration in each group.

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Source: Intera 2007, Multivariate Statistical Analysis of Water Quality Data for Silver Springs, Marion County, Florida

Figure 26 - Mammoth Vent Discharge Measurement

Figure 27 – Chemical Structure of Four Fluorescent Dyes Used in SSG Study

Dye	Color Index Name	Color Index Number	APPROXIMATE PERCENT DYE IN "AS SOLD" MIXTURES	
			O U L Mixtures	Market Range
Eosine	Acid Red 87	45380	75%	2 to 75%
Fluorescein	Acid Yellow 73	45350	75%	2 to 80%
Rhodamine WT	Acid Red 388	Not Assigned	20%	3 to 20%
Sulforhodamine B	Acid Red 52	45100	75%	3 to 75%
Pyranine	D&C Green 8	59040	77%	Unknown

Source: Ozark Underground Laboratory; Groundwater Tracing Handbook, 2002

Figure 28 - Summary of Geophysical Methods

Site	GPR	MASW	Resis	Grav
Orange Lake Cave	X	X	X	X
Appleton Museum	X	X	X	
Spanish Palms	X	X	X	
Tuscawilla Park	X	X	X	
Pontiac Pit		X		
Line A		X		
Line B	X	X	2 soundings	1700 ft
Line C	X	X	2 soundings	2300 ft

Figure 29 - Heagy – Burry Sink (Underwater) on April 23, 2010

Figure 30 - Well Log M-649 from SJRWMD

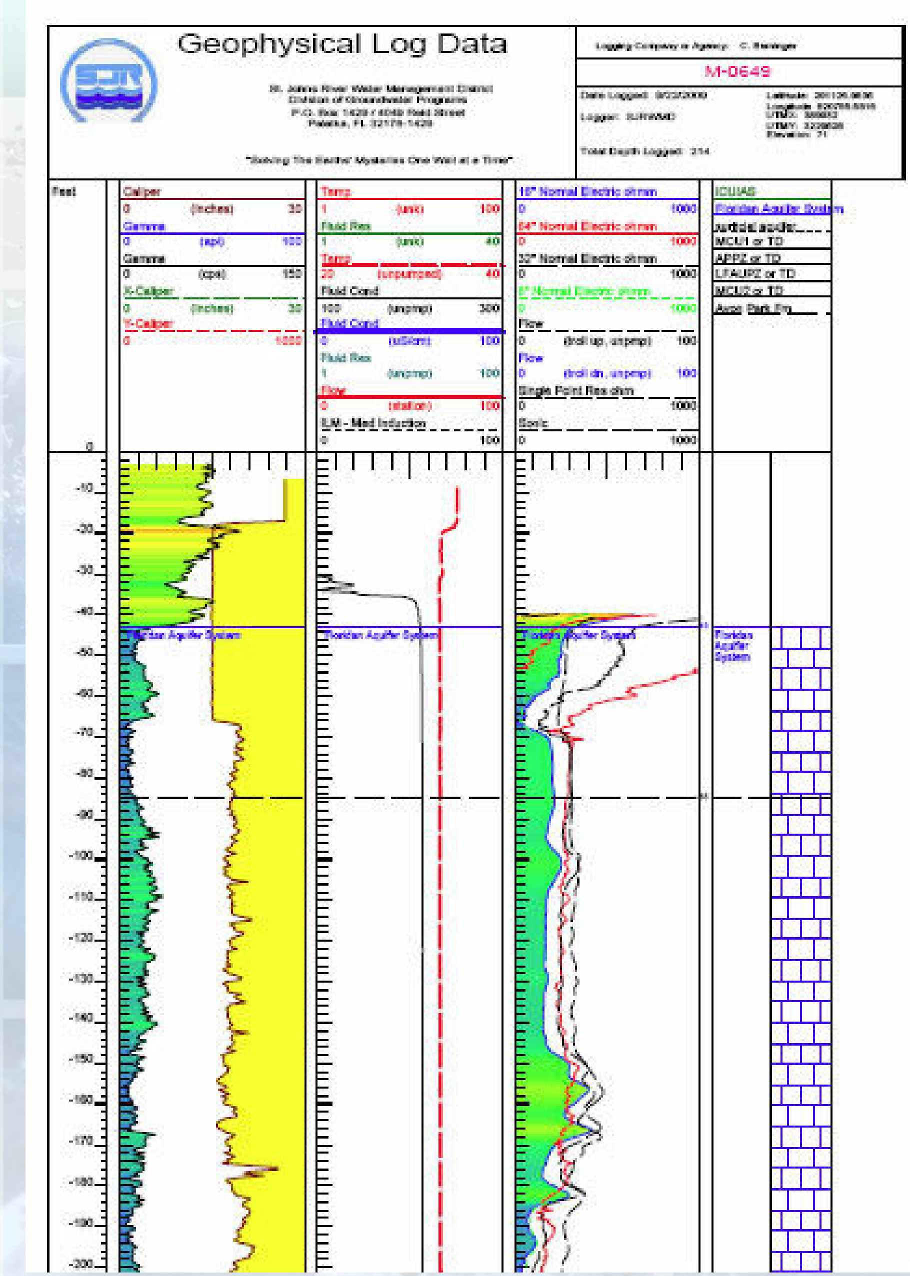

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Figure 31 - Straight Line Dye Trace Path – Fluorescein in Charcoal Samplers

Figure 32 – Fluorescein in Charcoal Samplers at Reddick Elementary School Well #5

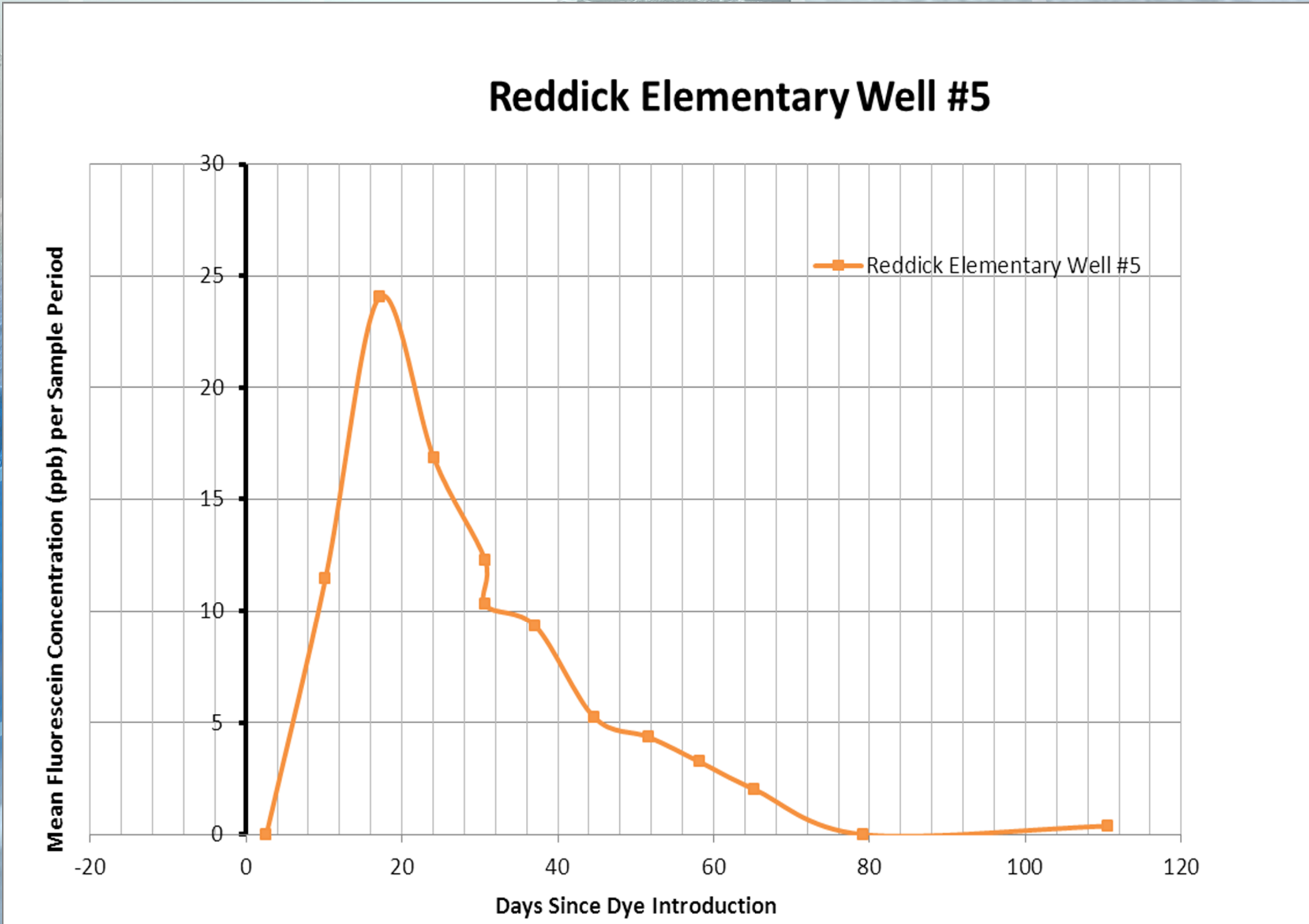


Figure 33 – Fluorescein in Charcoal Samplers at IFAS Well D

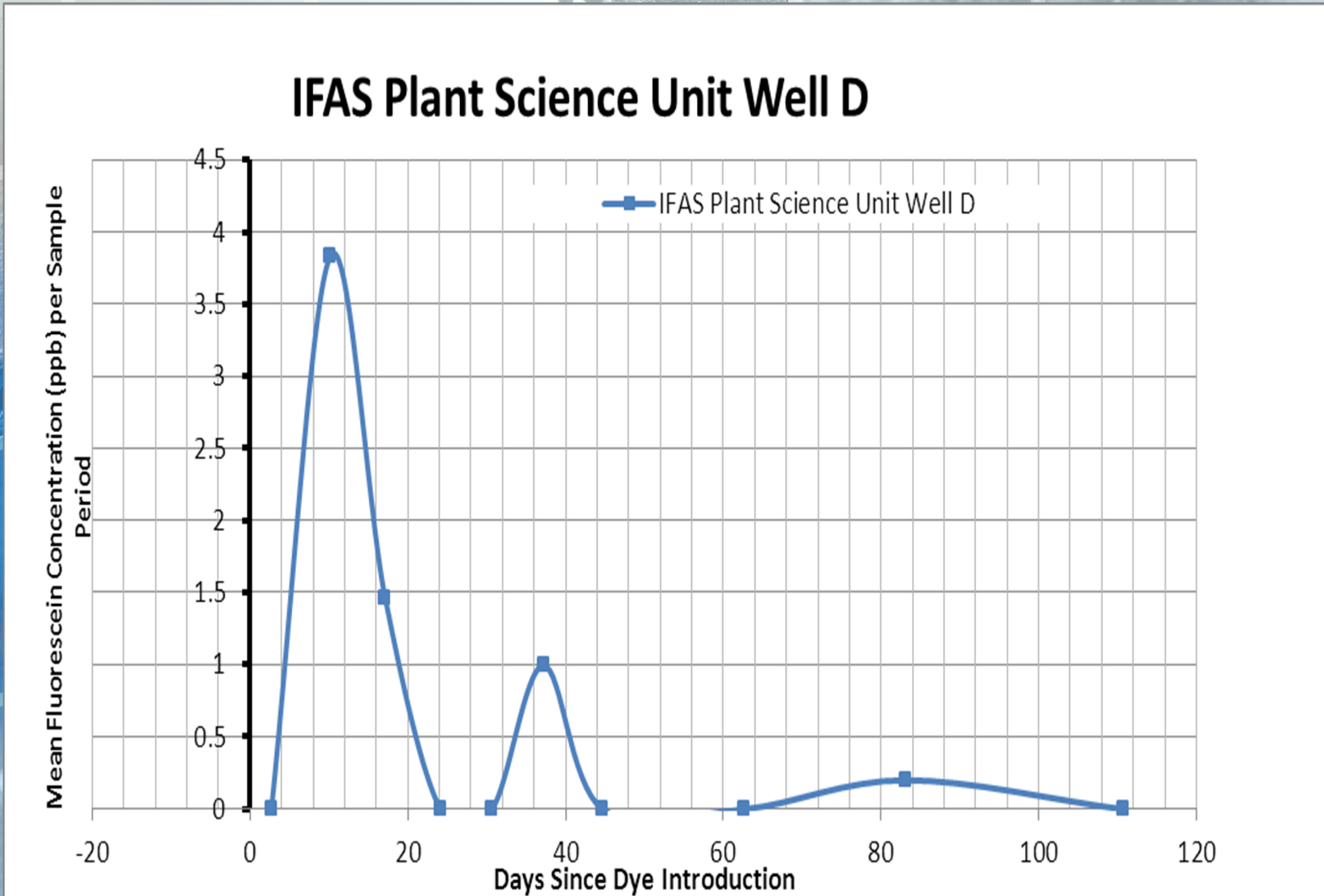


Figure 34 – Fluorescein in Charcoal Samplers at IFAS Well A

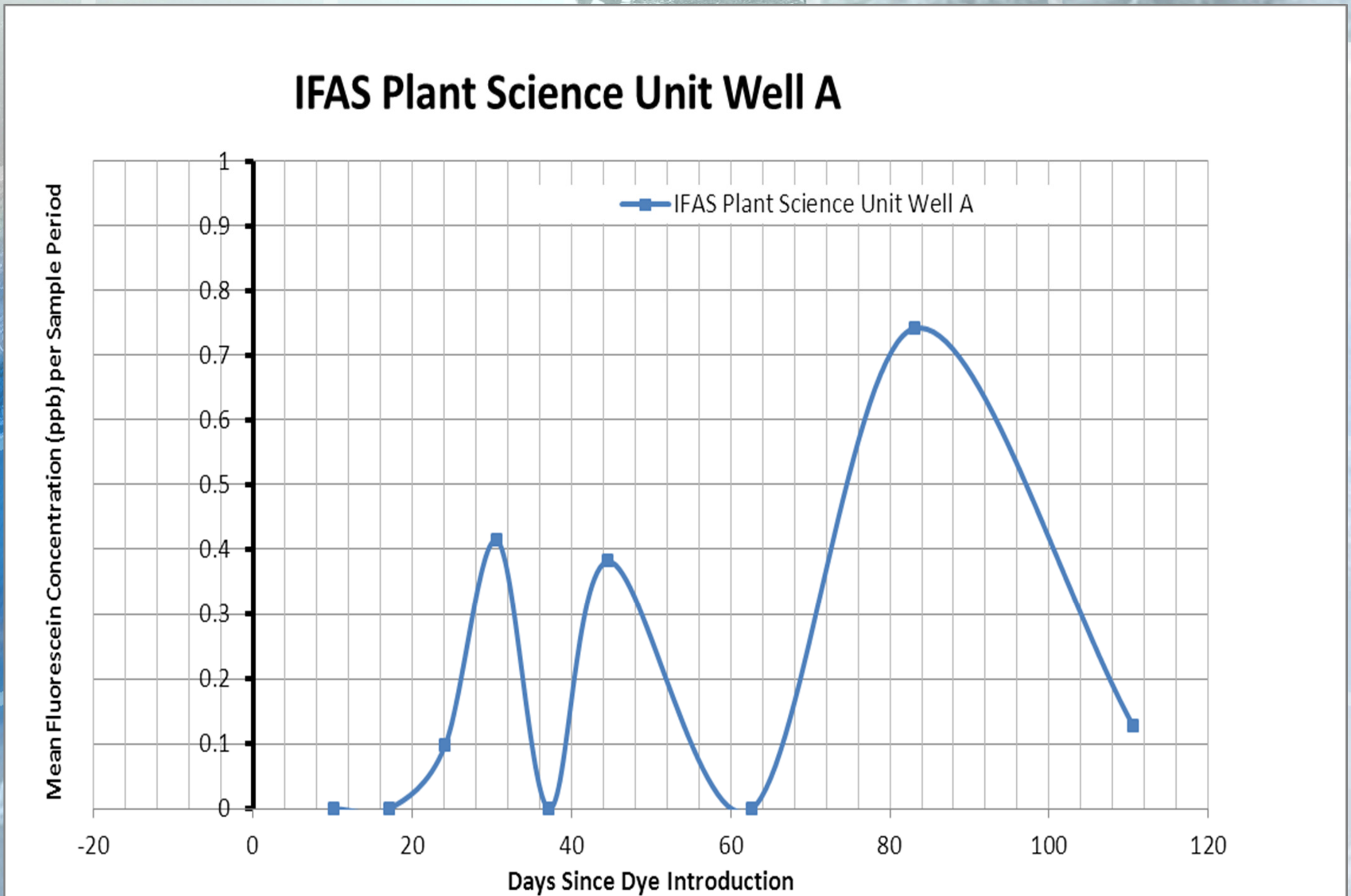


Figure 35 – Fluorescein in Charcoal Samplers at Marion Correctional Well 1

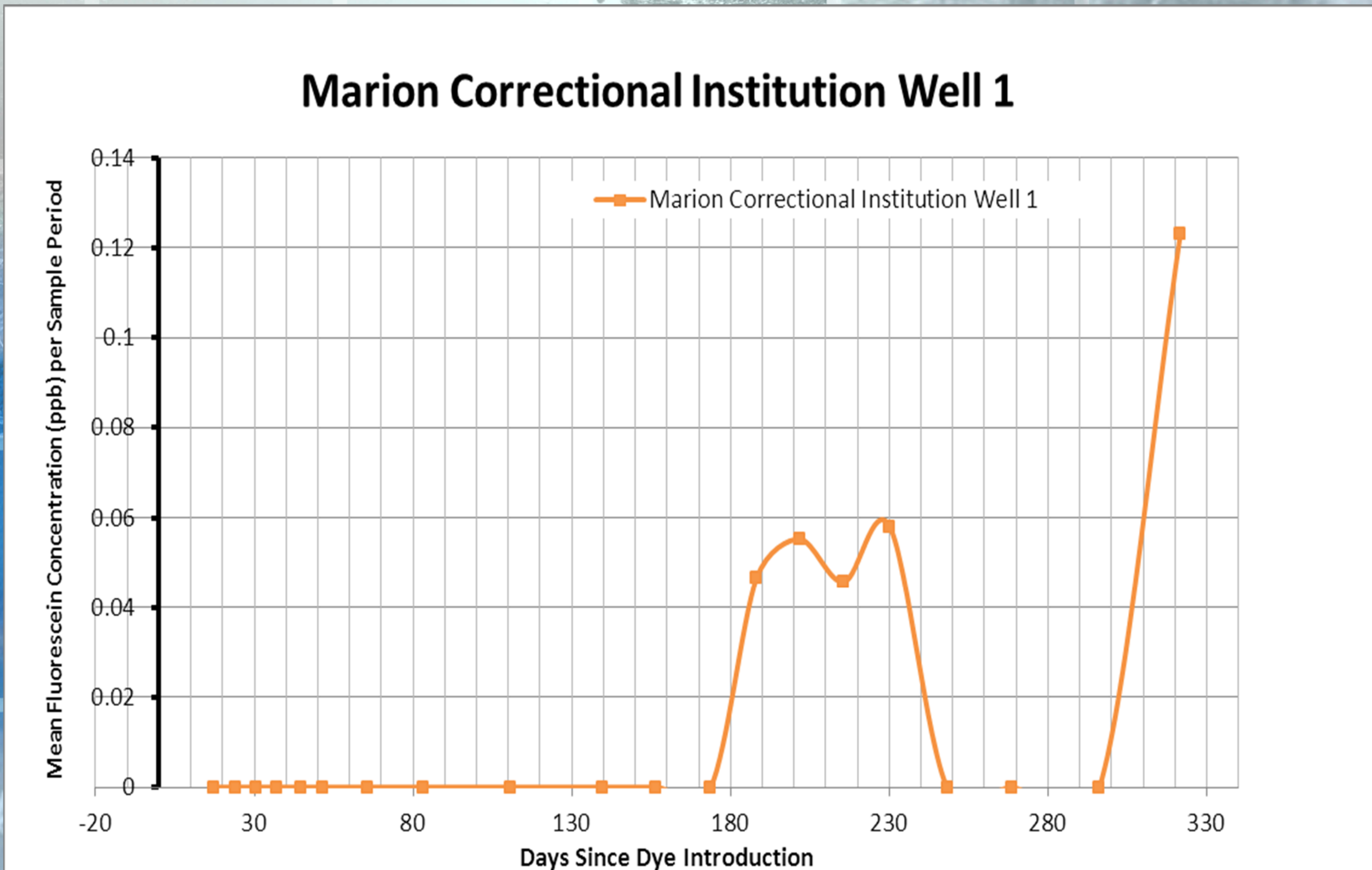


Figure 36 – Fluoresce in Charcoal Samplers in Four Wells

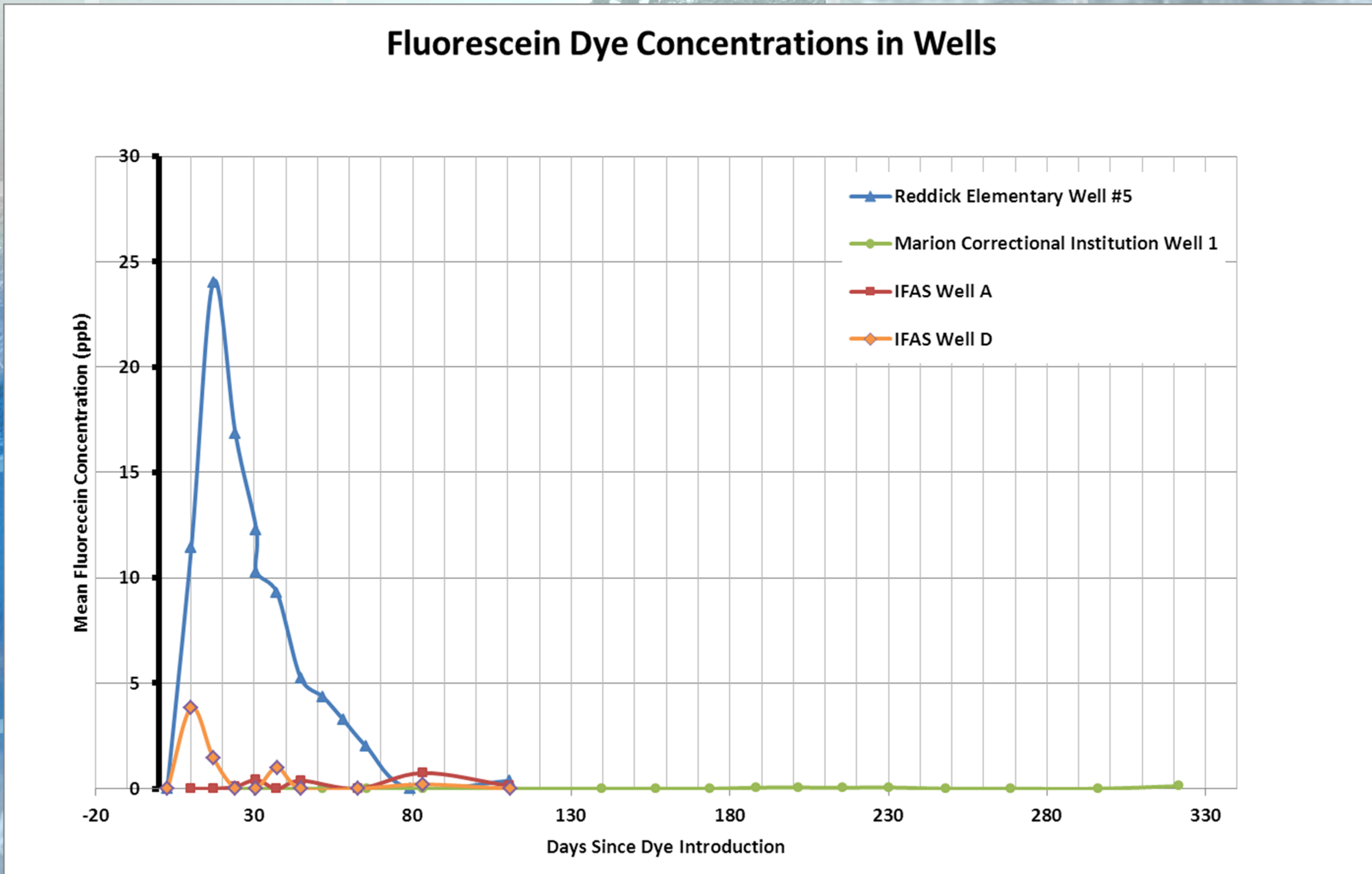


Figure 37 - Straight Line Dye Trace Path - Eosine in Charcoal Samplers

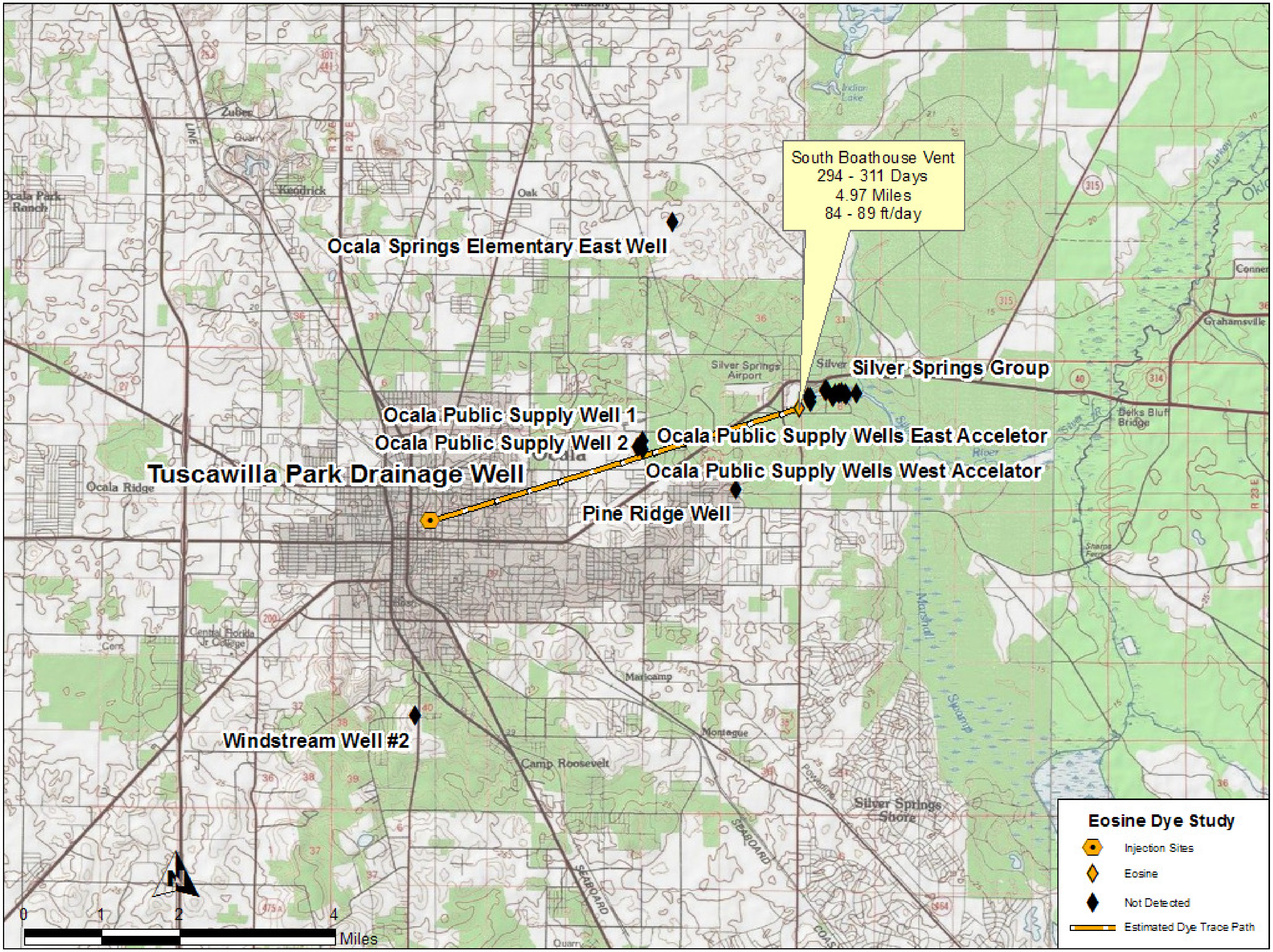


Figure 38 – Eosine in Charcoal Samplers at South Boathouse Vent

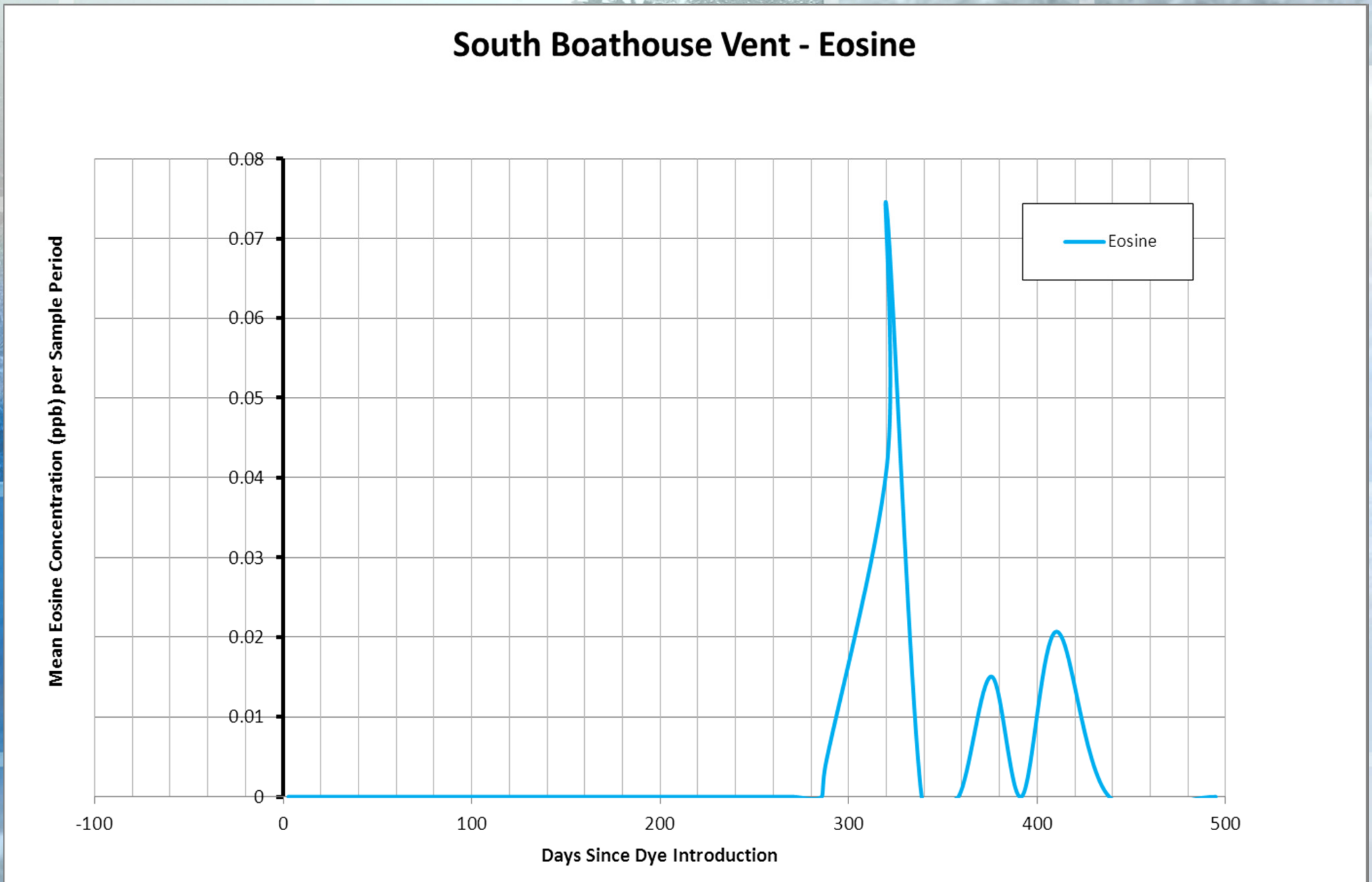


Figure 39 - Straight Line Dye Trace Path – Rhodamine WT in Charcoal Samplers

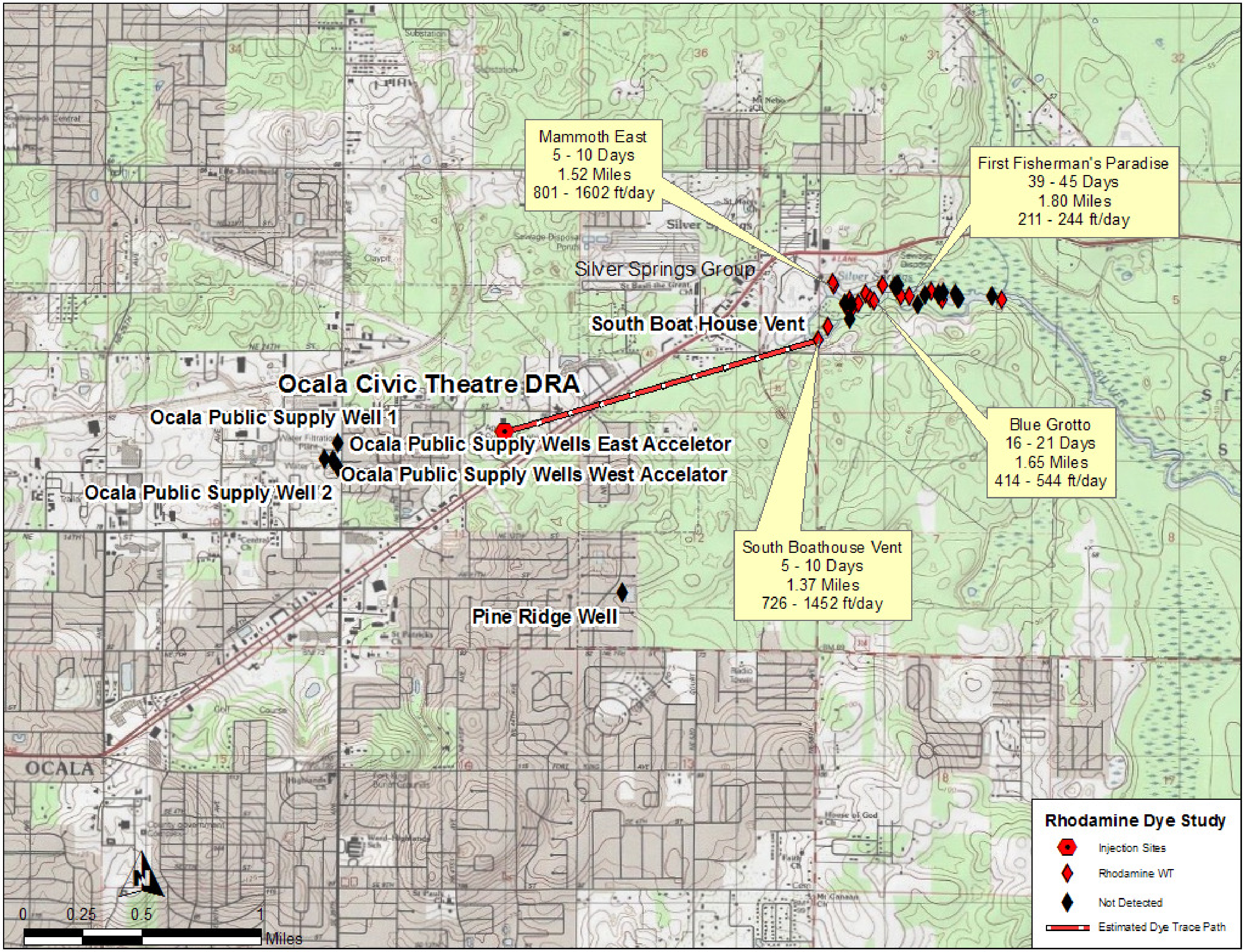


Figure 40 – Rhodamine WT in Charcoal Samplers at Mammoth East

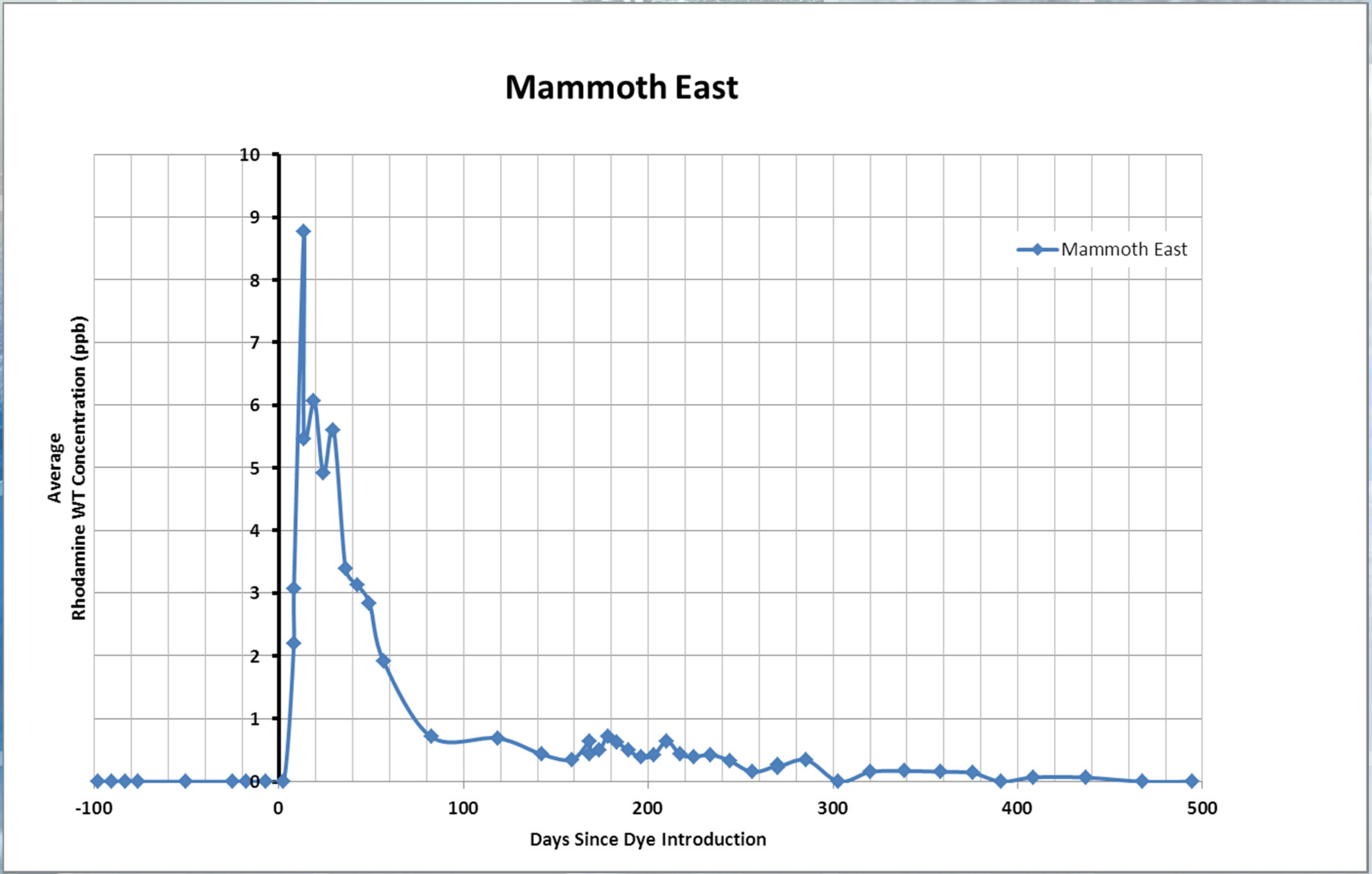
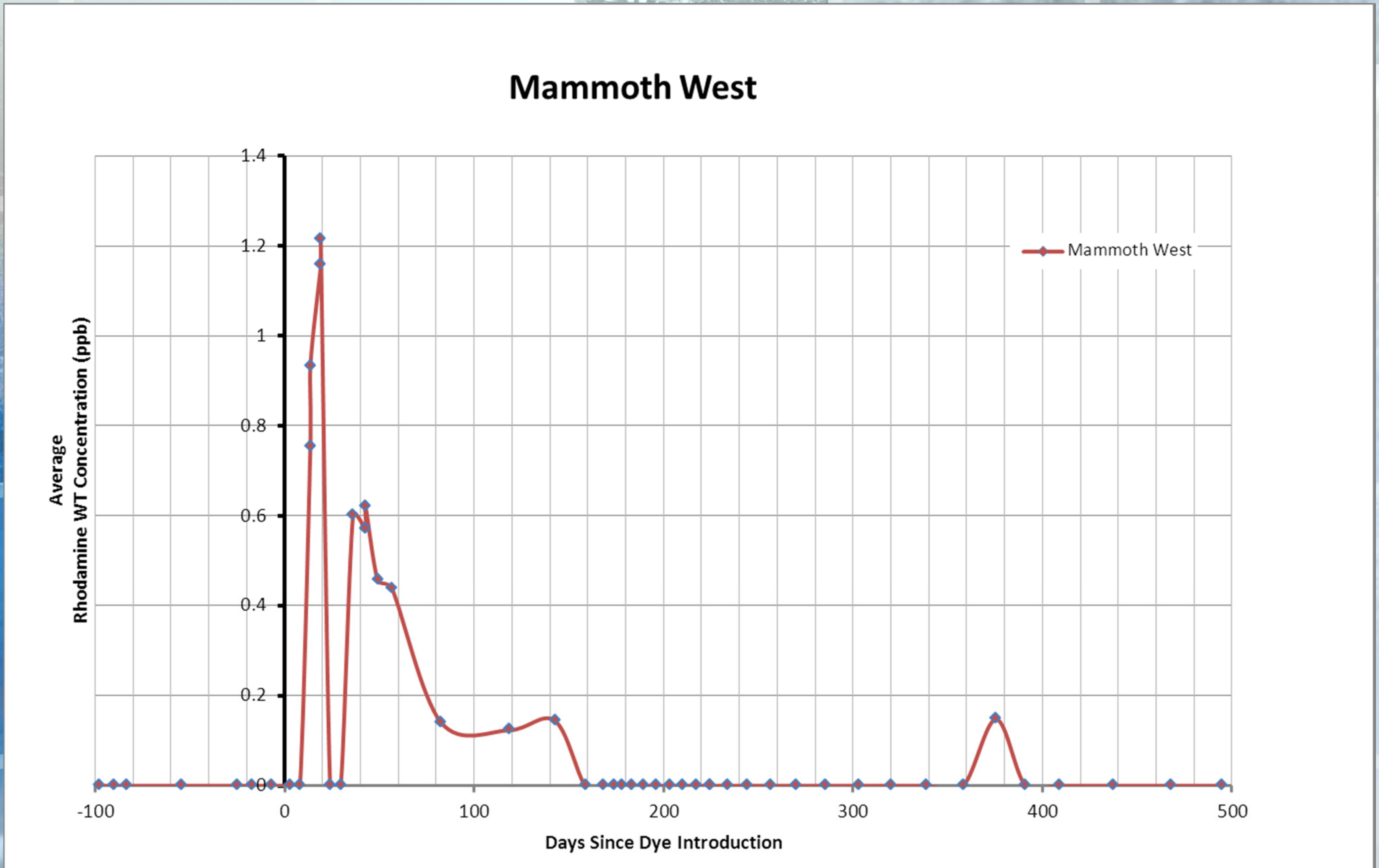
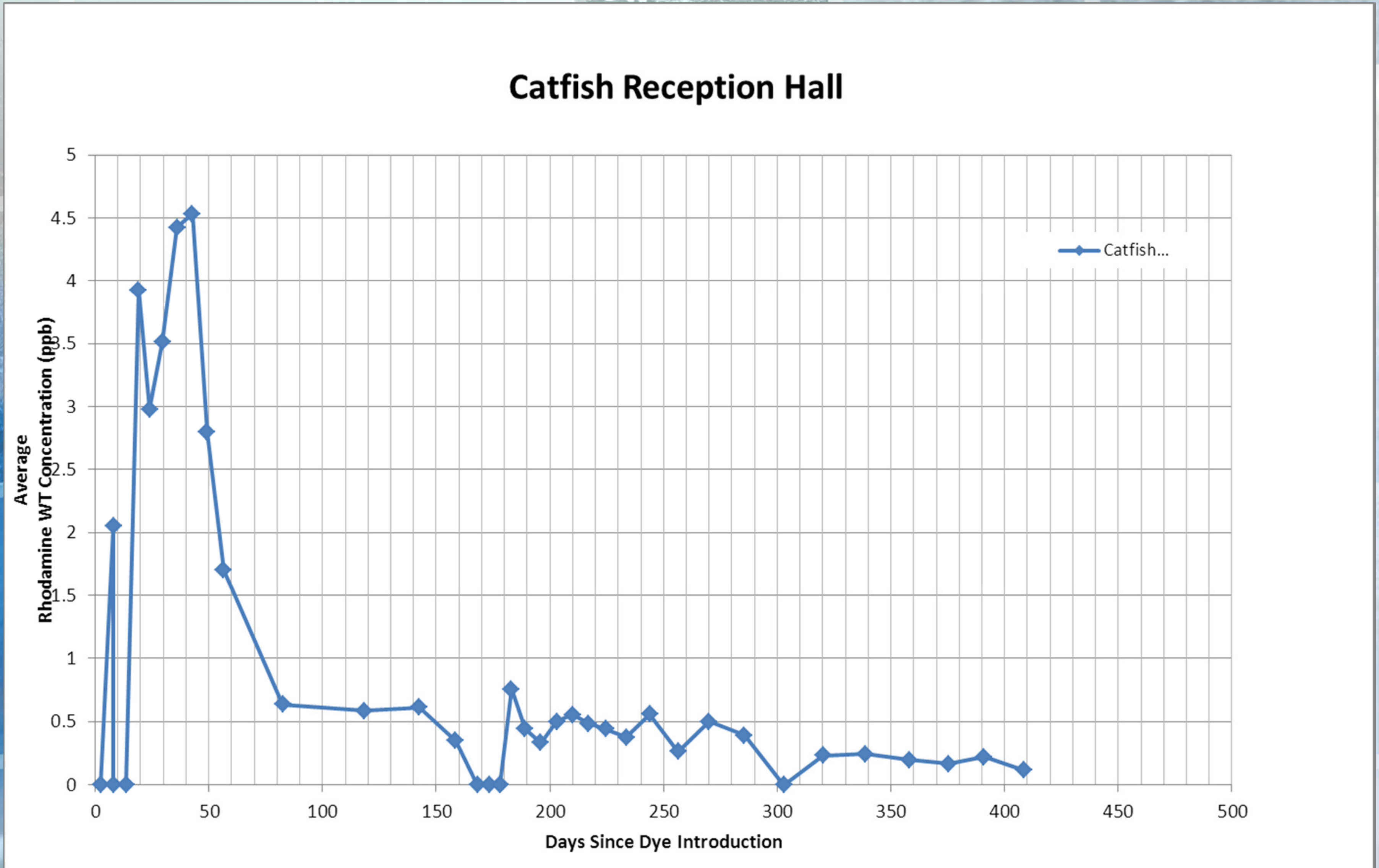


Figure 41 – Rhodamine WT in Charcoal Samplers at Mammoth West



URS

Figure 42 – Rhodamine WT in Charcoal Samplers at Catfish Reception Hall



URS

Figure 43 – Rhodamine WT in Charcoal Samplers at South Boathouse Vent

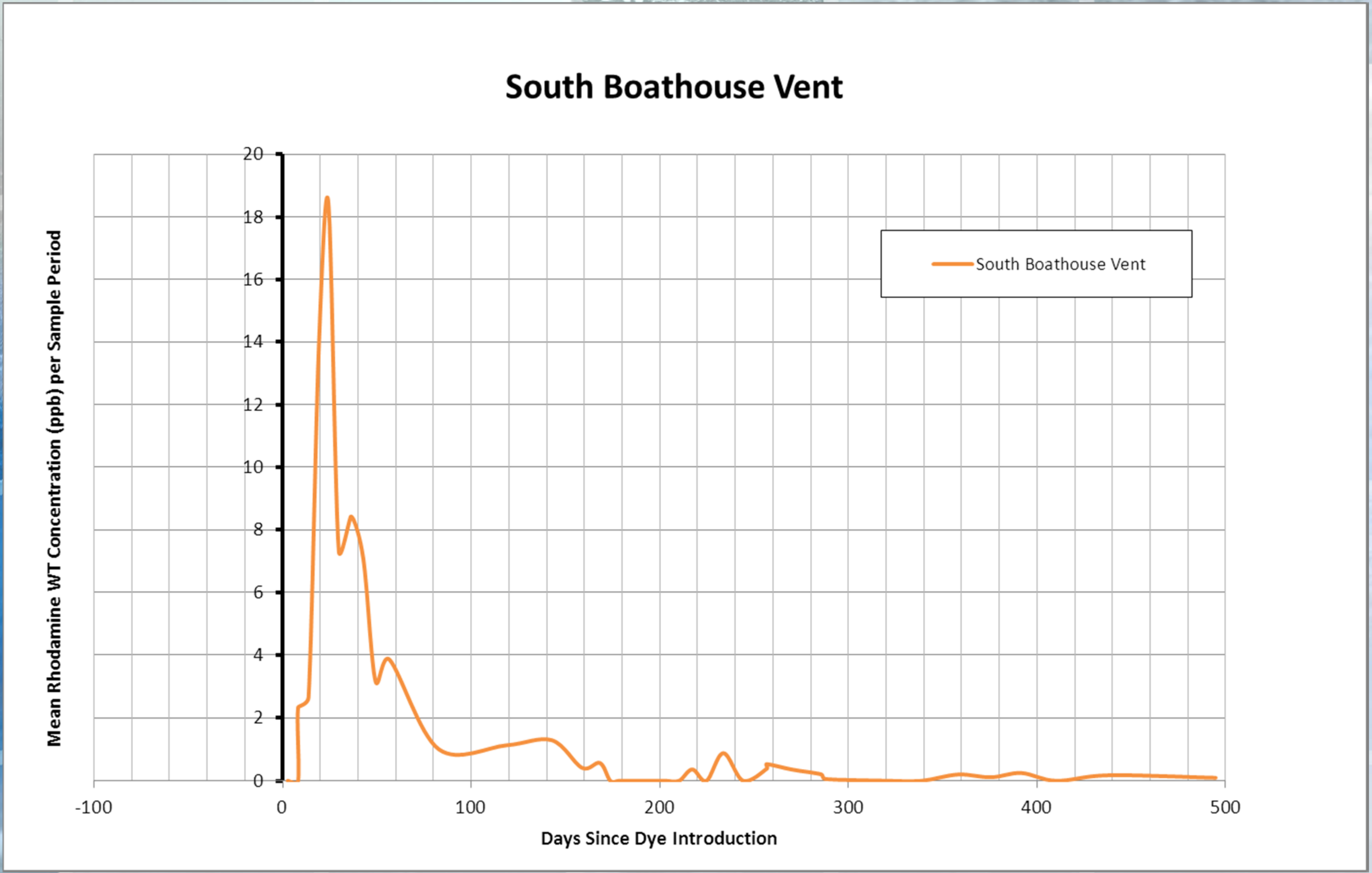
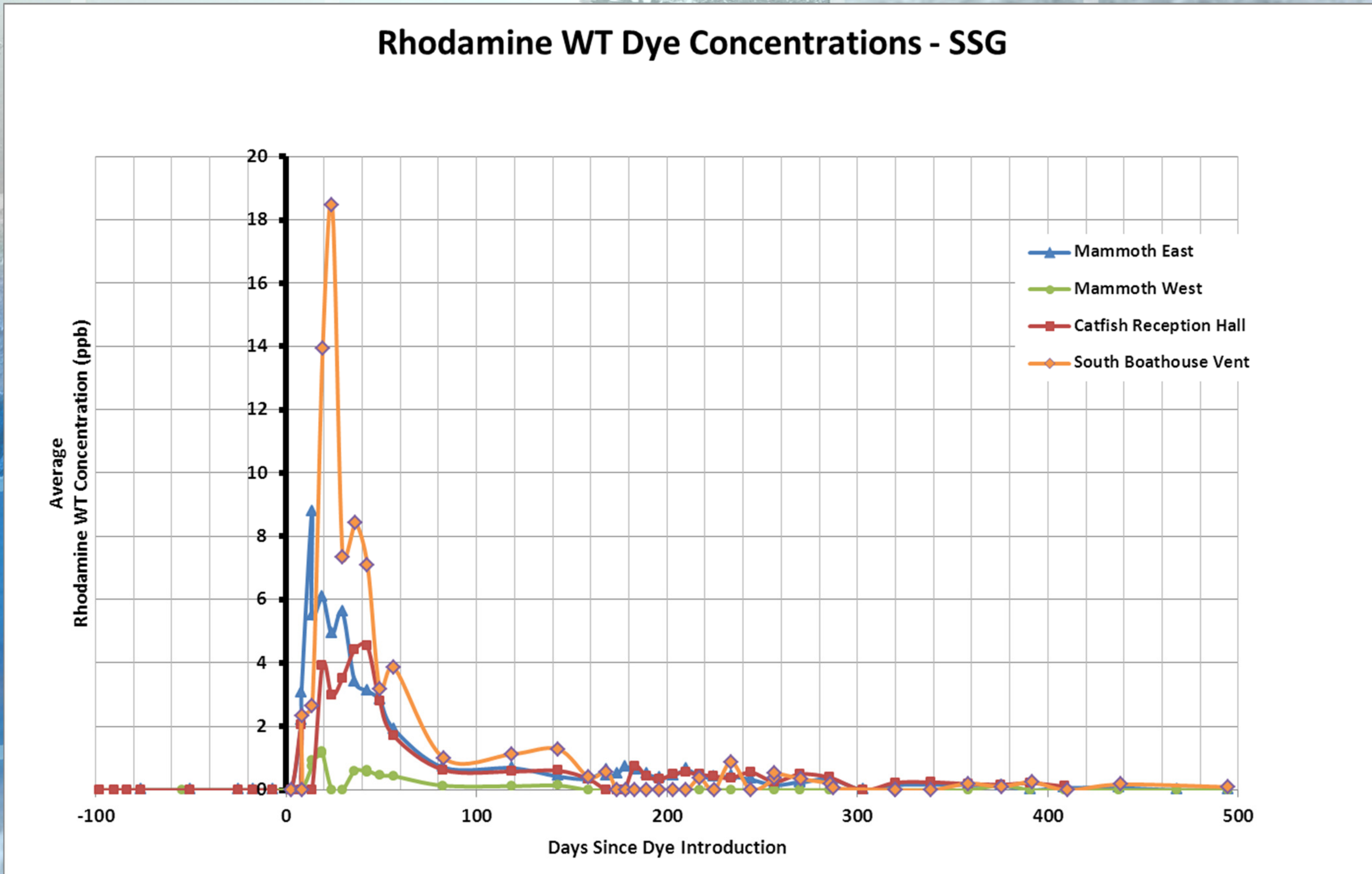


Figure 44 – Combined Rhodamine WT in Charcoal Samplers at Four Vents



URS

Figure 45 - Straight Line Dye Trace Path – Sulforhodamine B in Charcoal Samplers

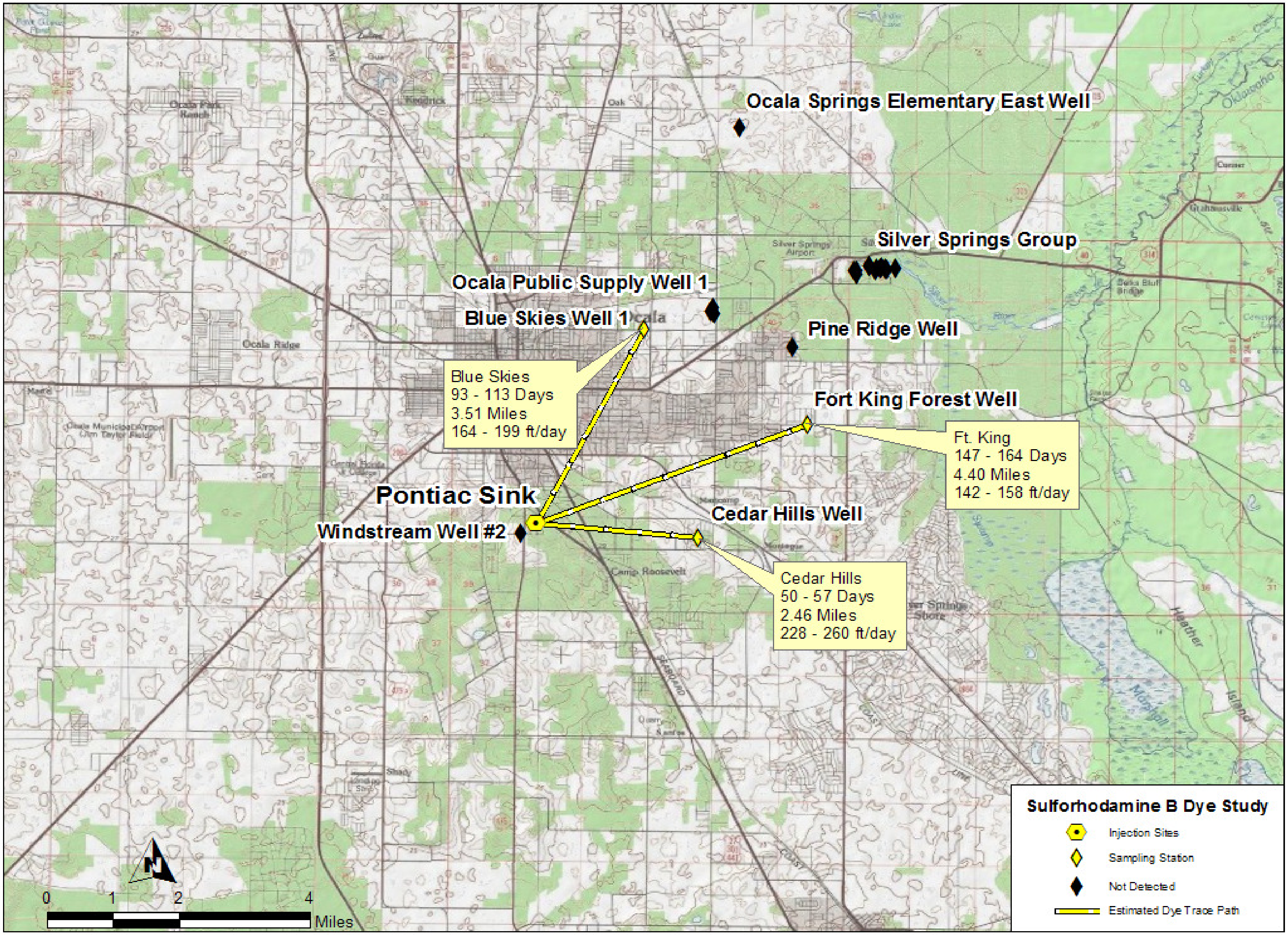


Figure 46 - Sulforhodamine B in Charcoal Samplers at Blue Skies Well 1

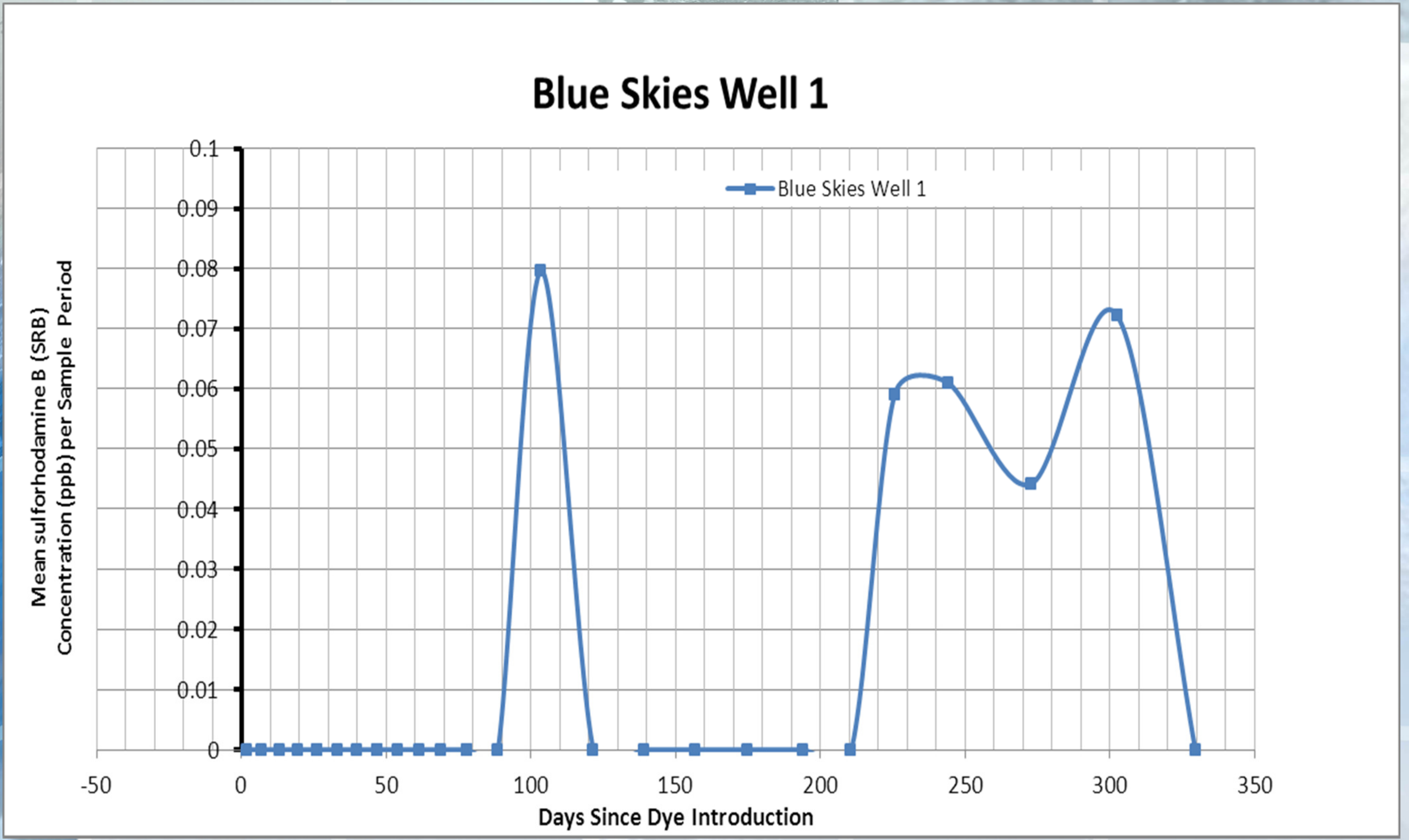
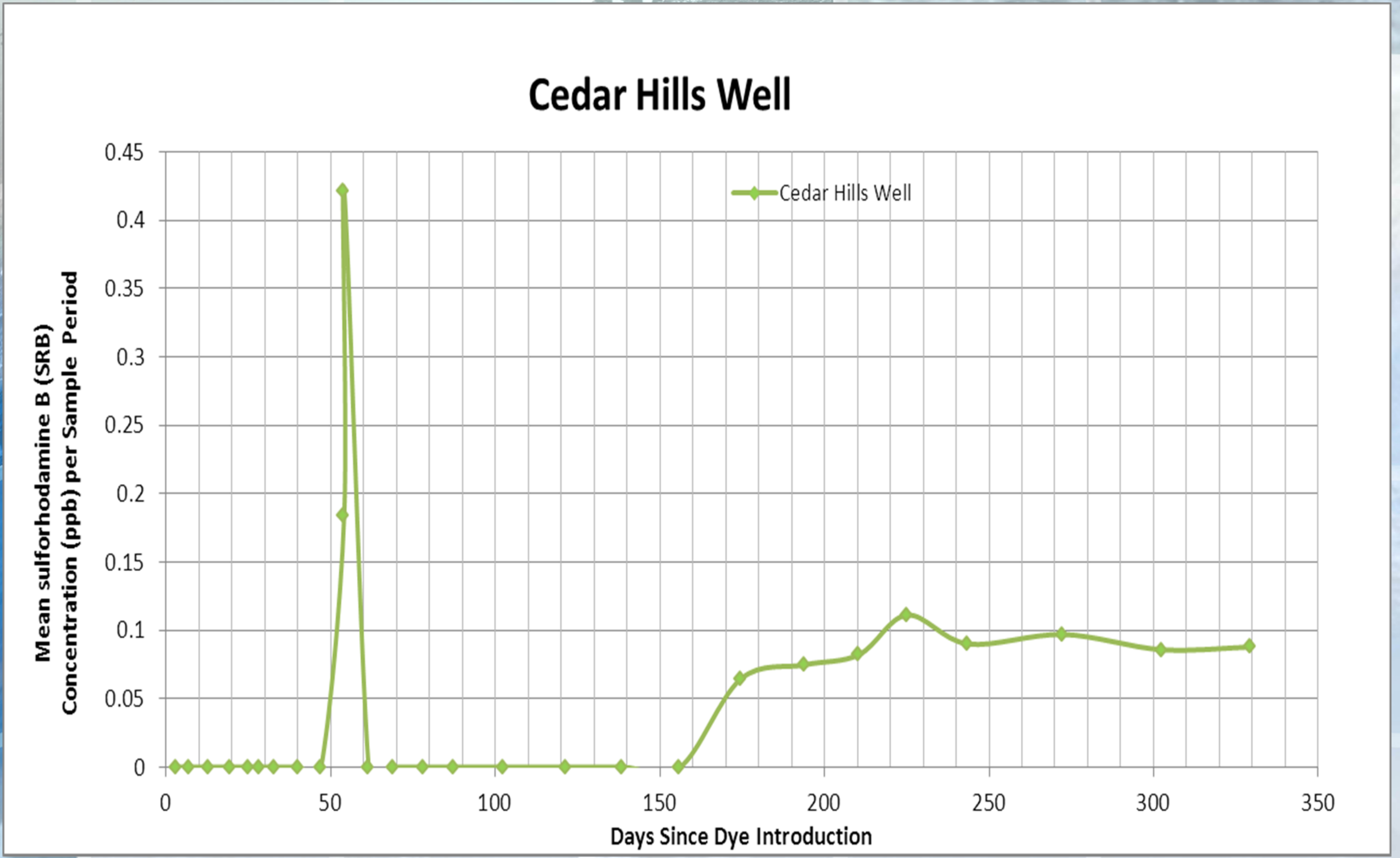


Figure 47 - Sulforhodamine B in Charcoal Samplers at Cedar Hills Well 1



URS

Figure 48 - Sulforhodamine B in Charcoal Samplers at Fort King Forest

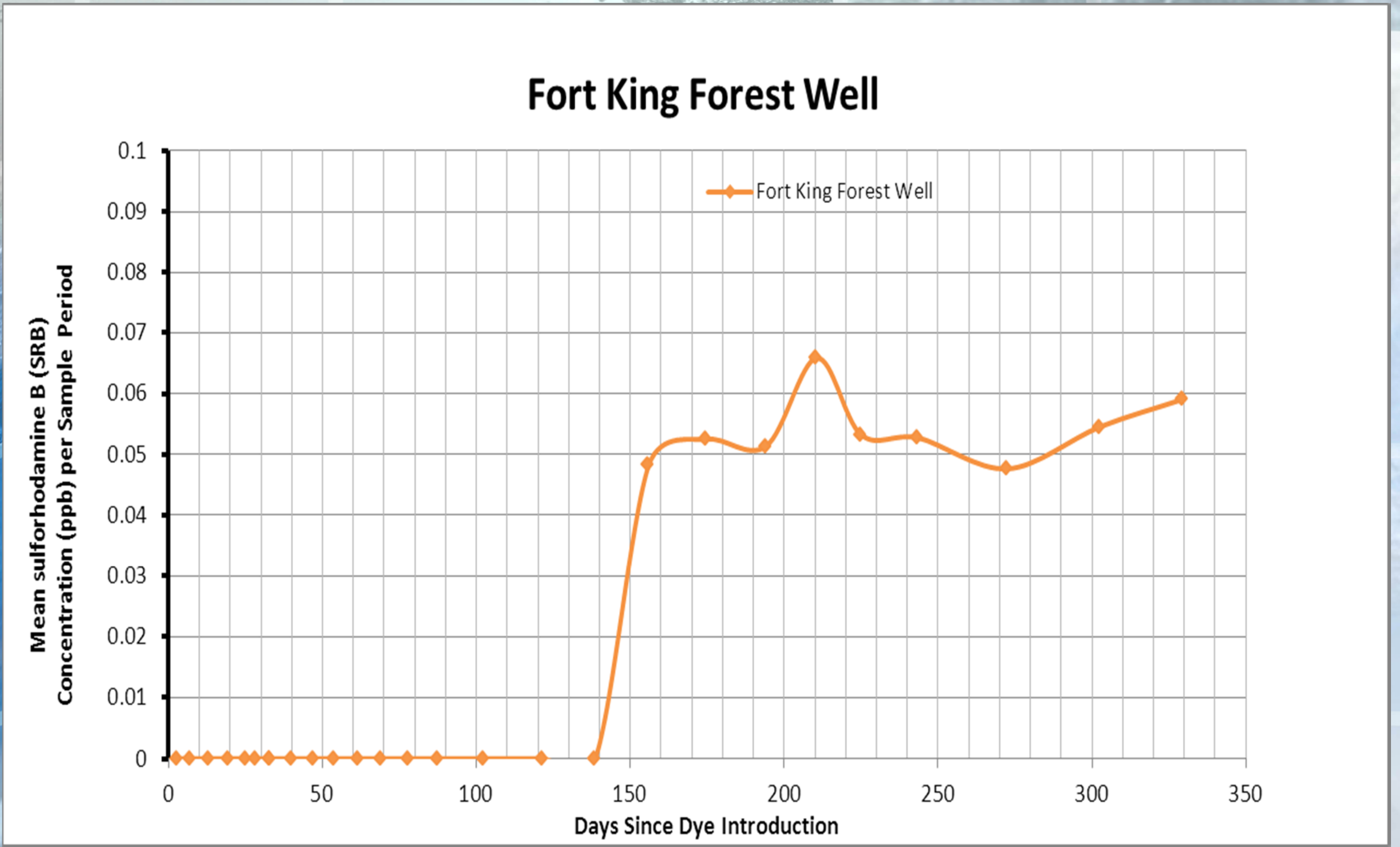
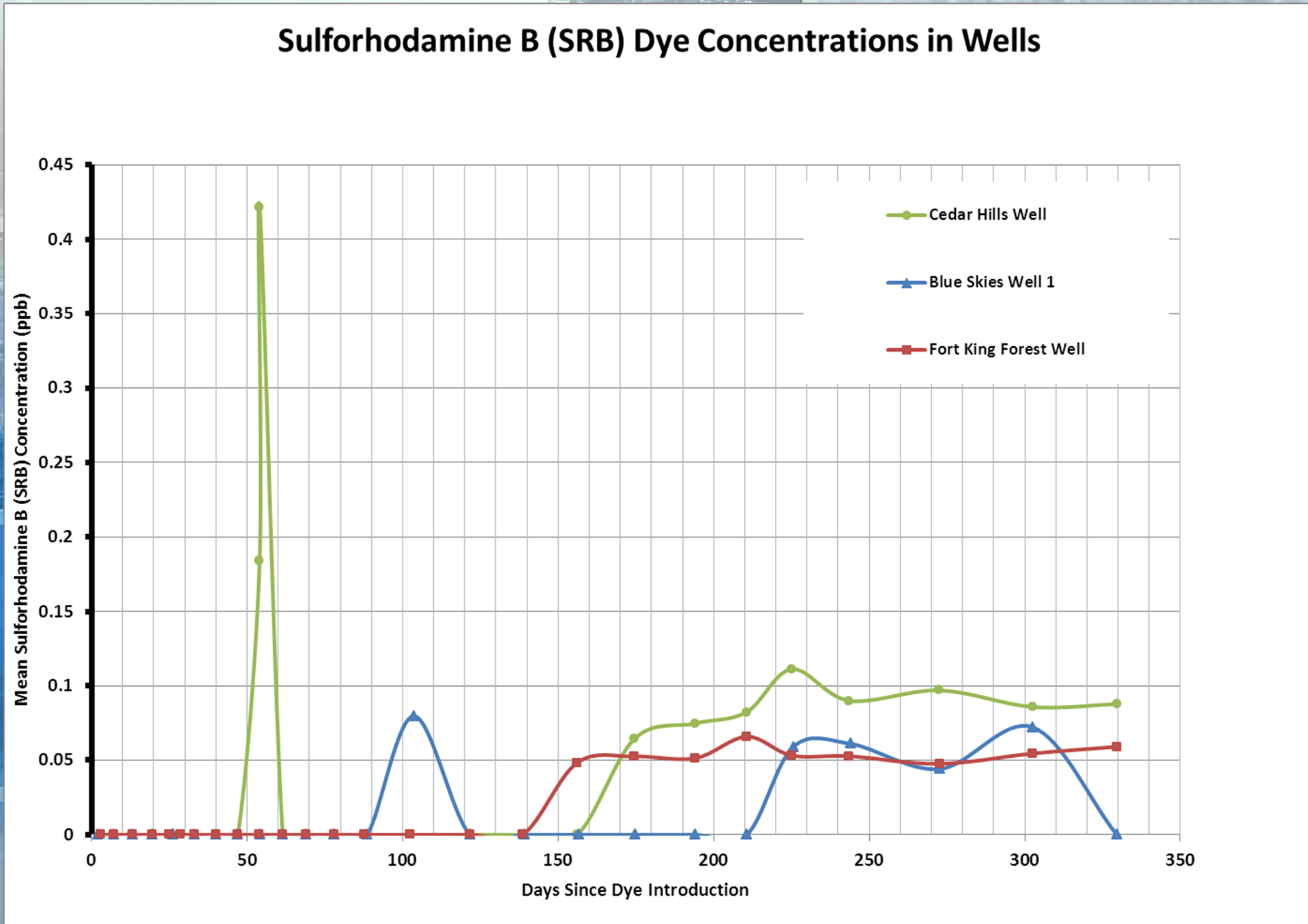


Figure 49 - Sulforhodamine B in Charcoal Samplers at Three Wells



URS

PHOTOGRAPHIC LOG

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 1	**Date:** 2/24/2011

Direction Photo Taken:
View to northwest and upstream.

Description:

View of the Silver Springs Group (SSG) Headspring, aka Mammoth Spring. The east Vent area is located to the stern of the KES workboat and the West Vent area in front of its bow.

Photo No. 2	**Date:** 2/24/2011

Direction Photo Taken:
View to west and upstream.

Description:

View of the Silver River and the USGS 1200 Meter gauging station located near the right (south) bank.

URS

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 3	**Date:** 12/3/2010

Direction Photo Taken:
View to north.

Description:

One of the many deep sinks breaching the Hawthorn Group that exist throughout Ocala and the study area.

Photo No. 4	**Date:** 12/3/2010

Direction Photo Taken:

N/A

Description:

An example of one of the many stormwater drainage wells located throughout the City of Ocala. This view shows the upper drainage control receiving structure and the well casing that drains the water into the Floridan Aquifer.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
St. Johns River Water Management District	Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	12805768

Photo No. 5

Date: 9/19/2006

Direction Photo Taken:

West

Description:

Divers performing an underwater discharge measurement along the cross-section of the Mammoth Spring vent. The diver on the left operates the flow meter while the diver on the right positions the point velocity sensor and takes measurements.

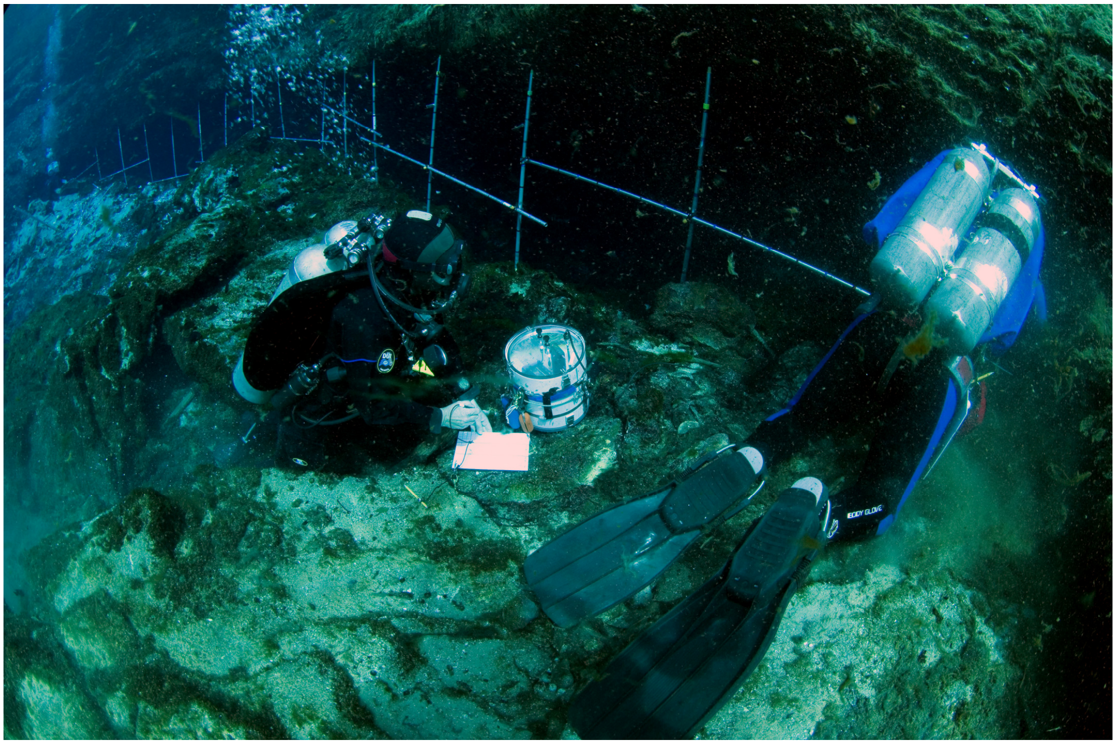


Photo No. 6

Date: 2/24/11

Direction Photo Taken:

N/A

Description:

KES sampling team member placing pre-labeled 40 ml water sample vial and pre-labeled Whirl-Pak bag containing collected charcoal packets into pre-labeled slide-lock plastic bag.

PHOTOGRAPHIC LOG

Client Name:
St. Johns River Water Management District

Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida

Project No.
12805768

Photo No. 7

Date: KES stock

Direction Photo Taken:

N/A

Description:

Flow-through well sampling apparatus with PVC charcoal sampler packet holder. Note non-return valve and gate valve to control flow rate.

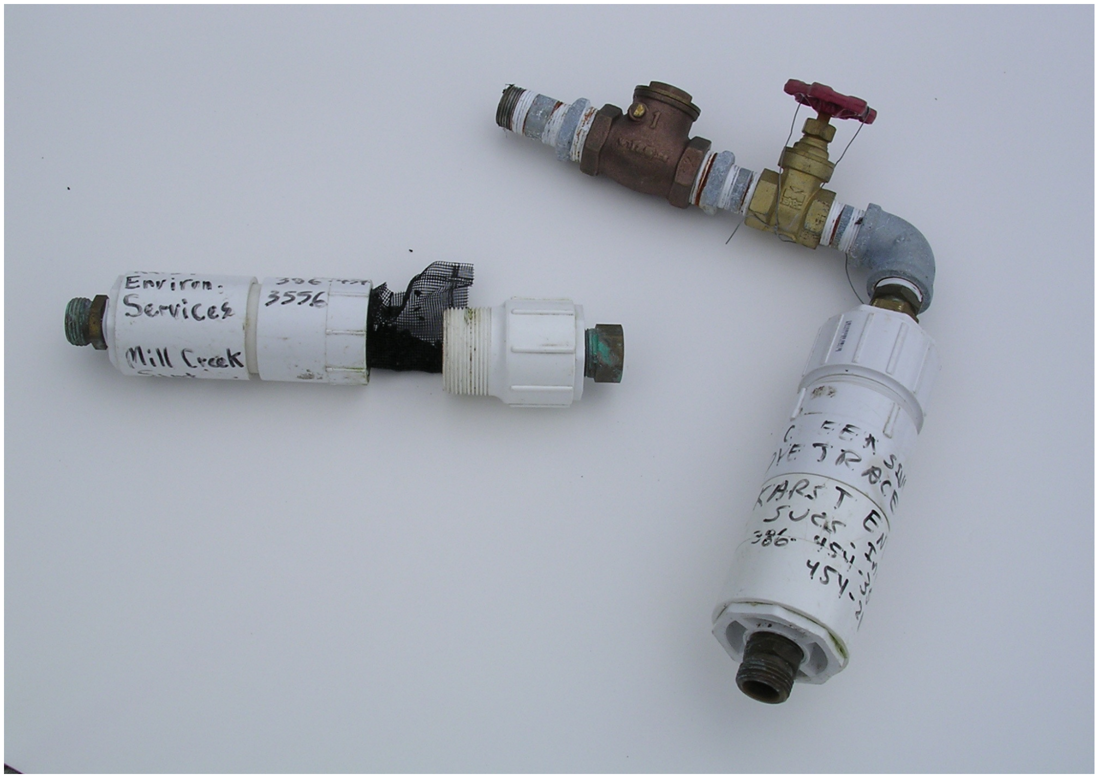


Photo No. 8

Date: 3/24/2010

Direction Photo Taken:

N/A

Description:

Flow-through well sampling apparatus with PVC charcoal sampler packet holder. Note non-return valve and gate valve to control flow rate.

URS

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 9

Date: 2/24/2011

Direction Photo Taken:

N/A

Description:

Example of underwater charcoal sampler packet holder in place with ID tag, in a diver-serviced site. Note the movement of the charcoal packets in the flow from the vent.

Photo No. 10

Date: 2/24/2011

Direction Photo Taken:

West

Description:

Example of charcoal sampler packet holder recovery at a surface-serviced site. Note the riser float with wire recovery loop.

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area**,** Marion County, Florida	**Project No.** 12805768

Photo No. 11	**Date:** 2/24/11

Direction Photo Taken:

West

Description:

Water sample being taken at surface-supported site using discrete depth water sampler. KES sampling team member is decanting sample into 40 ml sample vial.

Photo No. 12	**Date:** OUL Stock

Direction Photo Taken:

N/A

Description:

Charcoal samplers being processed at OUL. The lab technician is adding the eluting solution to disposable beakers containing the exposed charcoal.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
St. Johns River Water Management District	Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	12805768

Photo No. 13

Date: OUL Stock

Direction Photo Taken:

N/A

Description:

Spectrofluorophoto-metric analysis of charcoal sample at OUL. The lab technician is placing the vial containing the prepared eluting solution into the spectrofluorophoto-meter.

Photo No. 14

Date: 12/2/2009

Direction Photo Taken:

Southwest

Description:

Spanish Palms Subdivision DRA. Although this site was selected for Trace Group 2 dye introduction and geophysical work was performed here, no dye was released here.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
St. Johns River Water Management District	Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	12805768

Photo No.	Date:
15	1/27/2010

Direction Photo Taken:

North

Description:

Orange Lake as viewed from the bank at Heagy Burry Park directly above Heagy-Burry Sink. Note the accumulation of debris over the sink area. A portion of the fishing pier is visible on the right of the photo.

Photo No.	Date:
16	1/27/2010

Direction Photo Taken:

West

Description:

Heagy-Burry Sink as viewed from fishing pier at Heagy Burry Park. The sink is directly in front of the area of collapsing bank and riprap. Note the accumulation of debris over the sink area.

URS

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 17

Date: 12/3/2009

Direction Photo Taken:

West

Description:

Tuscawilla Park - Manhole is actually the top of the City of Ocala storm water Drainage Well NE 9 (SJRWMD Geophysical Log ID# M-0649). Overflow control structure is located just beyond the two people standing near the bank.

Photo No. 18

Date: 12/3/2009

Direction Photo Taken:

N/A

Description:

Looking down the manhole of City of Ocala storm water Drainage Well NE 9 at Tuscawilla Park. The circular object at the center is the top of the 17-in casing of the well.

URS

PHOTOGRAPHIC LOG

Client Name:
St. Johns River Water Management District

Site Location: Silver Springs Hydrogeologic Evaluation Study Area**,** Marion County, Florida

Project No.
12805768

Photo No. **19**

Date: 12/3/2009

Direction Photo Taken:

West

Description:

Tuscawilla Park DRA a.k.a. Tuscawilla Lake. Overflow control structure is where lake water discharges into pipe then into drainage well.

Photo No. **20**

Date: 12/3/2009

Direction Photo Taken:

North

Description:

Ocala Civic Center DRA with collapse feature located at its southern end. This sink was chosen as the introduction point for rhodamine WT. The people at the northeast side are standing near another sink, and the pile of fill in the DRA's center covers an earlier one.

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	Project No. 12805768

Photo No. 21 | **Date:** 12/3/2009

Direction Photo Taken:

N/A

Description:

The sink located in the southern portion of the Ocala Civic Center DRA into which rhodamine WT was introduced. When this photo was taken, the sink was about 8 feet deep and about 6 feet wide.

Photo No. 22 | **Date:** 12/3/2009

Direction Photo Taken:

West

Description:

View of Pontiac Pit Sink. Note the large black pipe at the center of the photo which is the discharge pipe from the storm water drainage pond and engineered wetlands that routes overflow into the bottom of Pontiac Pit Sink.

URS

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 23	**Date:** 12/3/2009

Direction Photo Taken:

East

Description:

View into Pontiac Pit Sink from the west rim. The large black pipe that runs to the sink bottom is the discharge pipe from the storm water drainage pond/engineered wetlands.

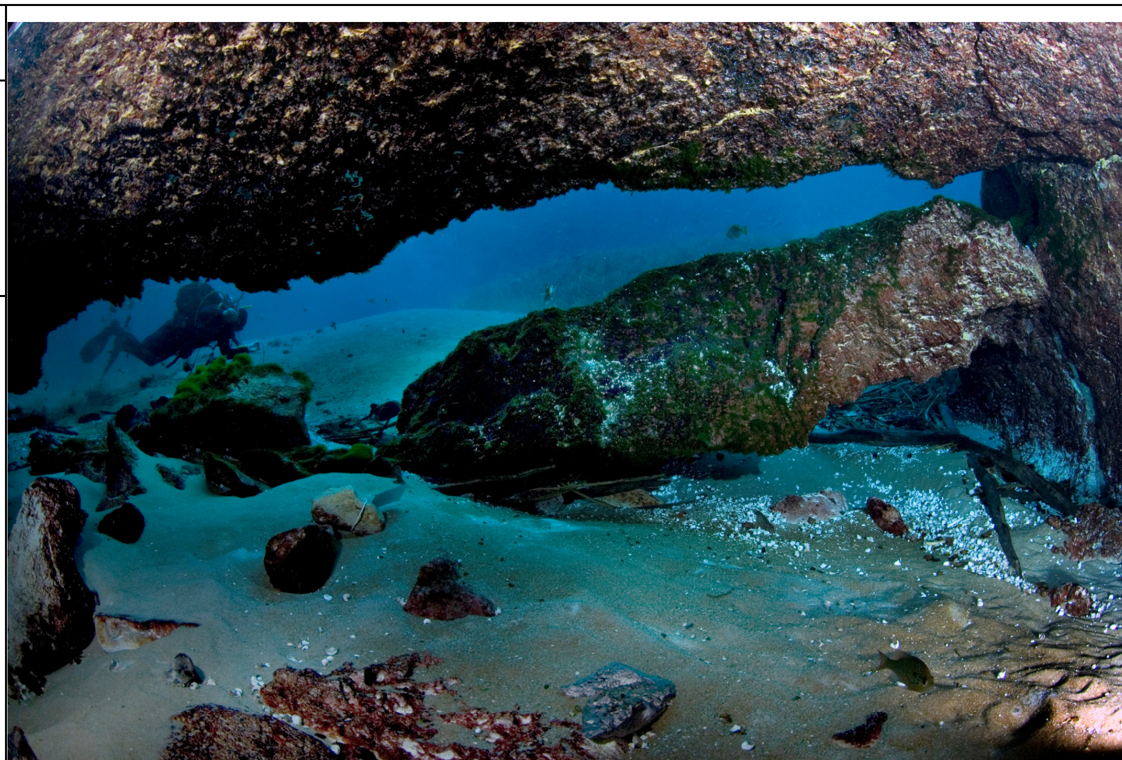
Photo No. 24	**Date:** 9/12/2006

Direction Photo Taken:

North

Description:

View from inside the cavern at Catfish Reception Hall looking out. This spring vent is a major Group One vent.



PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	Project No. 12805768

Photo No. 25	Date: 9/12/2006

Direction Photo Taken:

Southwest

Description:

View of the basin at Christmas Tree Spring. The dominant vents are in the densely vegetated areas located along the bottom and left side of the photo. This spring vent is a major Group Two vent cluster.

Photo No. 26	Date: 9/12/2006

Direction Photo Taken:

North

Description:

View of the large breakdown blocks that cover the vents at Catfish Hotel Spring. This spring vent is a major Group Three vent cluster.

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	Project No. 12805768

Photo No.	Date:
27	5/10/11

Direction Photo Taken:

Northwest

Description:

Location of Rainbow Springs Headspring sampler holder upstream of canoe landing. Holder was tethered to the landing rail.

Photo No.	Date:
28	3/31/2010

Direction Photo Taken:

East

Description:

Rainbow Springs Bubbling Springs tethered sampler holder being tossed out into one of the main vents there.

PHOTOGRAPHIC LOG

Client Name:
St. Johns River Water Management District

Site Location: Silver Springs Hydrogeologic Evaluation Study Area**,** Marion County, Florida

Project No.
12805768

Photo No. **29**

Date: 3/12/2010

Direction Photo Taken:

East

Description:

Example of municipal public supply well monitored for the duration of the trace.

Photo No. **30**

Date: 3/24/2010

Direction Photo Taken:

East

Description:

Example of public facility public supply well monitored during the Trace Group One dye release.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
St. Johns River Water Management District	Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	12805768

Photo No. 31

Date: 5/10/2011

Direction Photo Taken:

West

Description:

Example of private utility public supply well monitored during the Trace Group Two dye release.

Photo No. 32

Date: 2/24/2011

Direction Photo Taken:

East

Description:

Four rounds of Pre-background and two rounds of Comprehensive Background Sampling were performed prior to the dye release.

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	Project No. 12805768

Photo No. 33

Date: 1/27/10

Direction Photo Taken:

North

Description:

View of Orange Lake from Heagy-Burry Park and Boat Ramp. Heagy-Burry Sink is under the water at the shoreline just beyond the wooden fence.

Photo No. 34

Date: 4/23/2010

Direction Photo Taken:

Southwest

Description:

Fluorescein dye introduction.
A red plastic funnel was attached onto flexible black plastic tubing with a heavy weight attached to the submerged end. The weighted end was tossed into the water and sank to the bottom at the location of the Heagy-Burry Sink.

URS

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 35	**Date:** 4/23/2010

Direction Photo Taken:

Southwest

Description:

Pouring fluorescein dye into the funnel which flows into Heagy-Burry Sink in Orange Lake.

Photo No. 36	**Date:** 4/23/2010

Direction Photo Taken:

North

Description:

Pouring fluorescein dye into the funnel which flows into Heagy-Burry Sink in Orange Lake. Note the absence of any visible sign of the dye at the water surface indicating that all water in the area is draining into the karst aquifer. The small amount of green color below the funnel is the result of just several drops of dye that spilled.

PHOTOGRAPHIC LOG

Client Name:
St. Johns River Water Management District

Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida

Project No.
12805768

Photo No. 37

Date: 4/23/2010

Direction Photo Taken:

Southwest

Description:

Introduction of eosine dye into the City of Ocala Storm Water Drainage Well NE 9 at Tuscawilla Park.

Photo No. 38

Date: 4/23/2010

Direction Photo Taken:

West

Description:

Pouring of the rhodamine WT dye into the Ocala Civic Center DRA sink after pre-wetting.

PHOTOGRAPHIC LOG

Client Name: St. Johns River Water Management District	**Site Location:** Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	**Project No.** 12805768

Photo No. 39	**Date:** 4/23/2010

Direction Photo Taken:

West

Description:

Ocala Civic Center DRA sink after dye release and during chase. Note that some collapse was induced by the direct application of chase water.

Photo No. 40	**Date:** 4/23/2010

Direction Photo Taken:

South

Description:

Ocala Civic Center DRA sink has been surrounded by orange safety fence at the completion of dye introduction because of some collapse and soil sapping that occurred during introduction of chase water after dye introduction. A second preexisting sink feature is visible indicating karst activity within the DRA.

URS **PHOTOGRAPHIC LOG**

Client Name: St. Johns River Water Management District	Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	Project No. 12805768

Photo No. 41 **Date:** 10/5/2010

Direction Photo Taken:

West

Description:

Pontiac Pit Sink. Man at the center of the photo with blue shirt and khaki pants is standing on the end of the black discharge pipe. The entrance to the sink and caves has been blocked with limestone boulders and broken concrete slabs.

Photo No. 42 **Date:** 10/5/2010

Direction Photo Taken:

West

Description:

Mixing and releasing dye in the bottom of Pontiac Pit Sink. Sulforhodamine B dye powder is being mixed in barrel and released through a spigot near the barrel bottom. Dye solution is carried by the flowing chase water stream into the sink.

URS

PHOTOGRAPHIC LOG

Client Name:
St. Johns River Water Management District

Site Location: Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida

Project No.
12805768

Photo No. **43**

Date: 10/5/10

Direction Photo Taken:

West

Description:

Final rinsing and flushing of sulforhodamine B dye Containers and equipment at Pontiac Pit Sink.

Photo No. **44**

Date: 2/24/11

Direction Photo Taken:

North

Description:

Routing spring vent sampler exchange and water sample collection was carried out during both Dye Trace Groups One and Two.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
St. Johns River Water Management District	Silver Springs Hydrogeologic Evaluation Study Area, Marion County, Florida	12805768

Photo No. 45

Date: 2/24/11

Direction Photo Taken:

South

Description:

Routing well sampler exchange and water sample collection was carried out during both Dye Trace Groups One and Two.

Photo No. 46

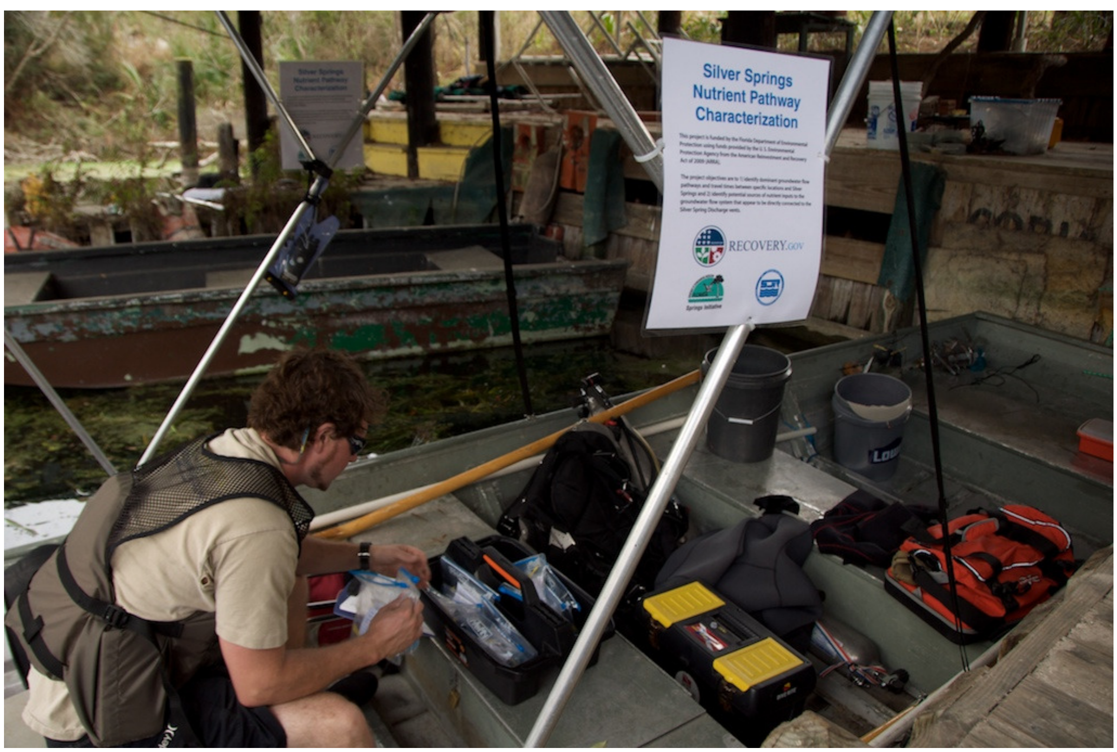
Date: 2/24/11

Direction Photo Taken:

N/A

Description:

Placards displaying the project name and description, along with the ARRA and project sponsors logos were always displayed during any sampling and related project activities.



APPENDIX A

Discharge Measurement: Mammoth Spring, Silver Springs Group, Marion County, Florida; January 19, 2011

Prepared for:

St. Johns River Water Management District

4049 Reid Street, Palatka, Florida 32177

Prepared by:

Karst Environmental Services, Inc.

5779 NE County Road 340, High Springs, Florida 32643

(386) 454-3556 (386) 454-3541 FAX kes@atlantic.net

Discharge Measurement: Mammoth Spring, Silver Springs Group, Marion County, Florida; January 19, 2011

LIST OF CONTENTS

Results of Discharge Measurements of Mammoth Spring, Marion County, Florida; January 19, 2011

INTRODUCTION

Karst Environmental Services, Inc. (KES) performed a discharge measurement at Mammoth Spring, the headspring of the Silver Springs Group in Marion County, Florida on January 19, 2011. This measurement was part of the "Silver Springs Nutrient Pathway Characterization" project, a major study of the Silver Springs Group using tracer dyes. This project is being conducted by the URS Corporation for the St. Johns River Water Management District (SJRWMD), and funded by the Florida Department of Environmental Protection using funds provided by the U.S. Environmental Protection Agency from the American Reinvestment and Recovery Act of 2009 (ARRA). This report documents the results of the measurement made at the site on January 19, 2011. A summary of the results and collected data for that measurement are presented in Table 1.

PURPOSE and SCOPE OF WORK

The purpose of this work was to obtain accurate discharge measurements of the Mammoth Spring, the headspring and major source of groundwater discharge into the Silver River. A discharge measurement was to be made at the vent of Mammoth Spring during early 2011.

SITE DESCRIPTION

Mammoth Spring is the largest spring of the Silver Springs Group, and is the headspring of the Silver River. The spring lies within a spring pool surrounded by the Silver Springs theme park. Mammoth Spring's vent is a wide, oval-shaped opening about 69 feet across, with floor to ceiling heights that vary from under 2 to over 6 feet. The depth of this vent ranges between 24 and 34 feet deep. The rock that comprises the ceiling of this vent is solid and self-supported, with the floor beneath composed of a layer of boulders and rubble. See Figure 1.

A large cavern with a complex network of cave passages lies inside of this vent. These cave passages supply waters of varying characteristics to the cavern, where some mixing occurs before these waters exit the vent. The inside of the cavern is a complex structure of breakdown boulders, bedding planes, and small passageways. It was determined during prior investigations that discharge measurements of individual water sources within the cavern would be problematic, if not impossible. The outer edge of this spring vent provided the best location for an underwater discharge measurement with an appropriately adapted instrument.

PERSONNEL

Fieldwork for this discharge measurement was performed by KES personnel Peter Butt, Mark Long, Matt Hubner and Tom Morris. Data management and report preparation was performed by Peter Butt and Georgia Shemitz. Data processing using Surfer 10 contouring software was performed by W. Bruce Lafrenz, P.G., of Tetra Tech of Orlando, Florida.

METHODS

Instrumentation

The instruments used for this discharge measurement were Marsh-McBirney Model 2000 Flo-Mate electronic flowmeters, Serial Numbers 2002679 and 2006103, that have been adapted for fully submersible use. In order to operate and read the meter at depth, the unit has been placed within an underwater housing with a transparent lid. The sensor wire is routed through a sealing gland on the housing lid. There are two housing controls that allow for direct operation of the flow meter. One operates the on/off/reset buttons, and the other operates the time interval selector buttons that control the measurement period.

The flowmeters used were factory calibrated while in their underwater housing in the method normally used for these units on August 31, 2010 (2006103) and November 18, 2010 (2002679). Copies of the Calibration Certificates are included with this report.

Field Operations

Velocity measurements were taken just inside the ceiling edge of the vent. At the measurement site, the floor of the vent was 32 feet deep, and the ceiling was 24 feet deep.

A positioning grid of telescoping aluminum poles with 0.1, 0.25, 0.5 and one-foot interval markings that provided support for the sensor was set up by Pete Butt and Matt Hubner on January 18, 2011. Butt also recorded measurements of the grid and surrounding walls. Seventeen poles (labeled A to Q) were positioned vertically to provide the primary positioning grid for velocity measurements. Eight horizontal poles were used as a spacing reference, and fastened to the vertical poles for support. Conduit dimensions around the grid were measured with a collapsible steel tape. As all sensor-support poles were positioned at roughly right angles to the main flow path, no angle coefficient corrections for velocity readings were made. The flowmeter sensor was attached to the poles with a low-profile metal spring clamp. Most measurement stations were set using one-foot intervals on the vertical poles. Velocity stations and boundary points are identified with alpha-numeric labels, based on the letter assigned to identify each vertical pole. See Figure 2.

Pete Butt and Tom Morris positioned the sensors and recorded positional data. Matt Hubner and Mark Long took the velocity readings after taking reset cues from Butt and Morris, and also recorded positional data. During all measurements, the sensor handlers were able to move away from the measurement cross-section, and remove themselves from the cross section of the flow. The meter operators were also positioned downstream and away from the cross-section. This minimized or eliminated the possibility of interference with flow while the measurements were taken. The flowmeters were operated in the "Fixed Point Averaging" mode. Fixed Point Averaging is an average of velocities over a fixed period of time. Averaging periods of 60 seconds were used. The flowmeters were reset between each station. One-hundred and sixty-eight (168) station readings were made. Meter S/N 2006103 was operated from Pole A to Pole I, and meter S/N 2002679 was operated from Pole Q to Pole J.

Data Processing

Field measurements of the velocity measurement stations and measured vent boundary points were plotted on grid paper and assigned X- and Y-axis values. Boundary filler points were generated for the measured boundary points. See Figure 1. Values for the Z-axis were the point velocities, and zero values were assigned to the cross-section boundary points. See Table 3. The X, Y and Z data was processed using the Surfer v.10 (by Golden Software, Inc.) contouring program. The gridding method used was point Kriging with linear drift, an anisotropy ratio of 3 at an angle of 0°, and a variogram slope of 1.0. The anisotropy ratio used was selected due to the extremely elongated horizontal aspect of the measurement cross-section. The results of the contour processing are illustrated in Figures 3 and 4.

During this measurement, three negative velocities were measured. When present, negative velocity stations typically represent slight back eddies near walls. In order to incorporate these negative values, calculations were made using a Surfer 10 “blanking file” operation to define the measurement cross-section boundary. The blanking file operation also assists in the elimination of artifacts present in the contouring process that would create inaccuracies in the flow calculations.

The total discharge is shown on Table 2 as the **Net Volume (Cut-Fill)**, and has been calculated as the Positive Volume (Cut) less that portion of the Negative Volume (Fill) lying within the measurement cross-section boundary walls that define the plane of measurement.

The software also calculates the total cross-sectional area of the measurement location within the passage, and is presented on page 1 of Table 2 as the **Operational Planar Area**. The Operational Planar Area is the sum of the Positive (Cut) and that portion of the Negative (Fill) Planar areas lying within the measurement cross-section boundary walls that define the plane of measurement.

RESULTS AND DISCUSSION

This measurement is the twelfth one performed at Mammoth Spring applying the method and data processing used at other spring sites by KES. This measurement site also represents the largest cross-section and amount of discharge measured by KES. Based on KES’ experience at other springs, the estimate of discharge for this measurement should be considered to be a minimum value. Due to the extremely elongated cross-section, a high anisotropy ratio setting was used to minimize a “bull’s eye” or “curtain” effect that occurs in the contouring and has the unwanted effect of lowering the actual discharge value.

The estimated discharge of Mammoth Spring on January 19, 2011 was 211.25 CFS (cubic feet per second). This result is also expressed as 94815 GPM (gallons per minute) or 136.534 MGD (million gallons per day), see Table 1. One-hundred and seventy-two (172) readings were made, see Figures 2, 3 and 4. The point velocity readings ranged from -0.13 to 1.02 feet per second (fps), with an overall average station reading of 0.67 fps. The total cross-sectional area was calculated as 314.82 square feet. Individual point velocity measurement periods of 60 seconds were used. The measurements commenced at about 11:58 hours and were completed by 14:10 hours.

KES supported SJRWMD water sampling activities at Mammoth Spring and Catfish Hotel Spring during the morning of January 18, 2011.

UNDERWATER DISCHARGE MEASUREMENT							
Location:	**MAMMOTH SPRING (Silver Springs Group)**				Marion County, Florida		
Personnel:	Peter Butt, Mark Long, Matt Hubner, Tom Morris						
Method:	Grid within irregular conduit/cross-section						
Instrument:	2 x MMB2000 FLO-MATEs in U/W cases, sensors on support poles						
Analysis Method: Surfer 10 with kriging							
Mammoth Spring Total Discharge:			**Date:**	**January 19, 2011**			
CFS	**211.25**		Time Start:	11:58			
MGD	**136.534**		Time End:	14:10			
GPM	**94815**						
Total Cross-sectional Area:		314.82	square feet	Msmt. Periods:			
Avg. Station Point Velocity:		0.67	feet/second	60 seconds			
Cross-section Depth:		24-32	feet deep				
Velocity Reading by Station:		(All velocity readings in feet per second.)					

Station #	Point Velocity	Station #	Point Velocity	Station #	Point Velocity	Station #	Point Velocity
AH1	0.12	E4	0.87	I8	0.79	M6	0.84
A1	0.27	E5	0.94	IJ1	0.85	M7	0.91
A2	0.21	E6	0.84	IJ2	0.88	M8	0.49
A3	0.15	EF1	0.93	IJ3	0.95	MN1	0.9
A4	0.12	EF2	0.94	J1	0.21	MN2	0.87
A5	0.14	EF3	1.01	J2	0.47	MN3	0.9
A6	0.22	F1	-0.06	J3	0.77	N1	0
A7	0.05	F2	0.48	J4	0.77	N2	0.22
AB1	0.2	F3	0.99	J5	0.93	N3	0.75
AB2	0.27	F4	0.89	J6	0.91	N4	0.78
AB3	0.27	F5	0.88	J7	0.91	N5	0.79
B1	0.08	F6	0.39	J8	0.82	N6	0.9
B2	0.37	FG1	0.96	JK1	0.84	N7	0.76
B3	0.5	FG2	0.93	JK2	0.86	NO1	0.88
B4	0.35	FG3	0.87	JK3	0.87	NO2	0.88
B5	0.59	G1	-0.03	K1	0.43	NO3	0.84
B6	0.4	G2	0.5	K2	0.73	O1	0.4
B7	-0.13	G3	0.82	K3	0.76	O2	0.64
BC1	0.65	G4	0.88	K4	0.78	O3	0.83
BC2	0.79	G5	0.81	K5	0.84	O4	0.84
BC3	0.85	G6	0.65	K6	0.93	O5	0.9
C1	0.69	GH1	0.91	K7	0.92	O6	0.79
C2	0.85	GH2	0.92	K8	0.62	OP1	0.84
C3	0.77	GH3	0.8	KL1	0.88	OP2	0.84
C4	0.85	H1	0.09	KL2	0.9	OP3	0.89
C5	0.89	H2	0.66	KL3	0.91	P1	0.31
C6	0.6	H3	0.77	L1	0.28	P2	0.74
CD1	0.79	H4	0.81	L2	0.63	P3	0.81
CD2	0.79	H5	0.9	L3	0.76	P4	0.79
CD3	0.8	H6	0.91	L4	0.85	P5	0.72
D1	0.74	H7	0.91	L5	0.85	P6	0.69
D2	0.9	H8	0.75	L6	0.89	PQ1	0.4
D3	0.9	HI1	0.85	L7	0.93	PQ2	0.37
D4	0.97	HI2	0.85	L8	0.94	PQ3	0.46
D5	1.02	HI3	0.93	LM1	0.85	Q1	0.08
D6	0.47	I1	0.02	LM2	0.84	Q2	0.13
DE1	0.85	I2	0.43	LM3	0.88	Q3	0.14
DE2	0.9	I3	0.86	M1	0.39	Q4	0.29
DE3	0.89	I4	0.79	M2	0.6	Q5	0.29
E1	0.25	I5	0.87	M3	0.61	Q6	0.24
E2	0.68	I6	0.89	M4	0.77	QH2	0.32
E3	0.84	I7	0.87	M5	0.77	QH1	0.23

Table 1. Discharge of Mammoth Spring, Silver Springs Group, Marion County, Florida on January 19, 2011. Data record and calculation of discharge measurement.

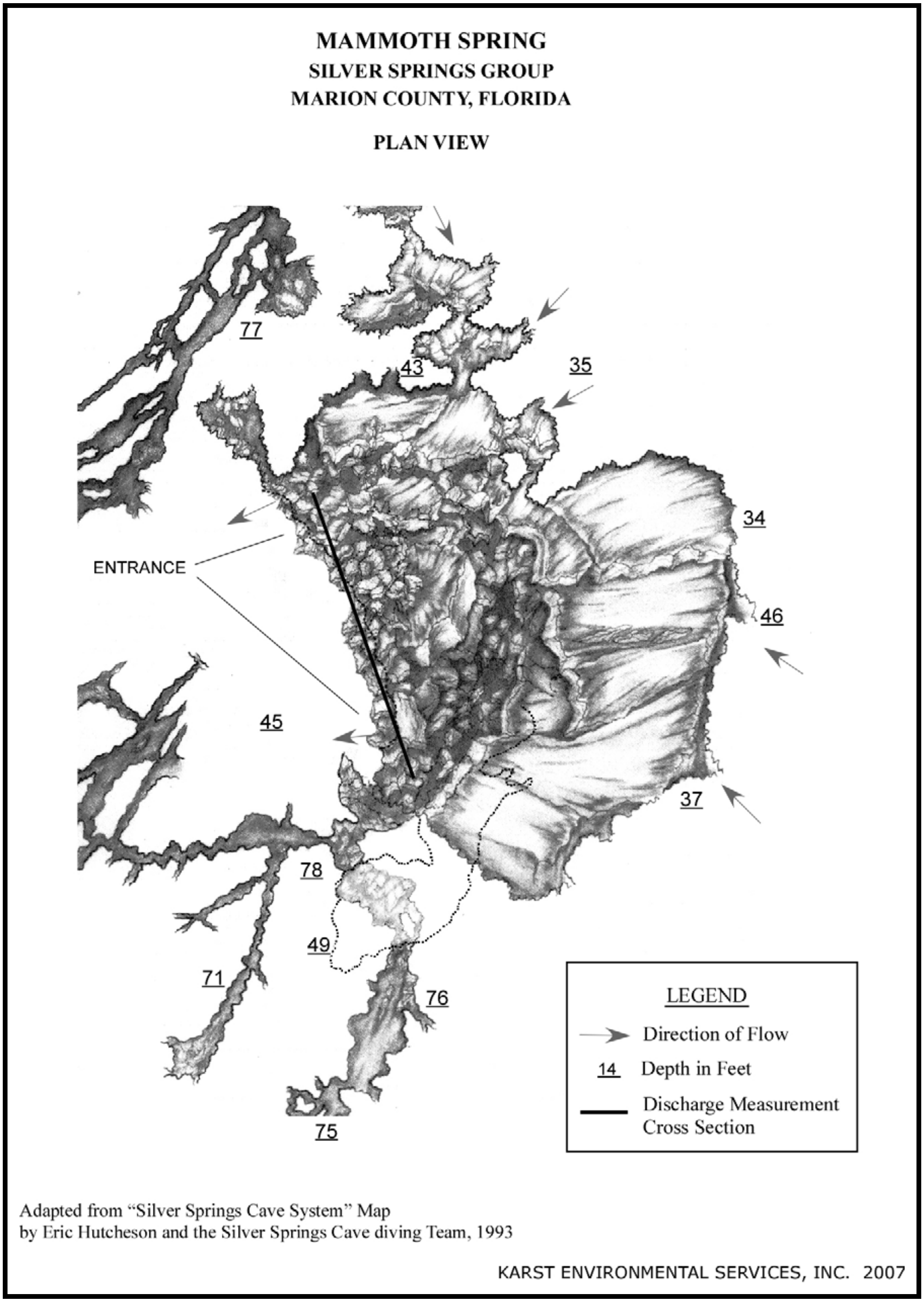


Figure 1. Map of Mammoth Spring, Silver Springs Group, Marion County, Florida.

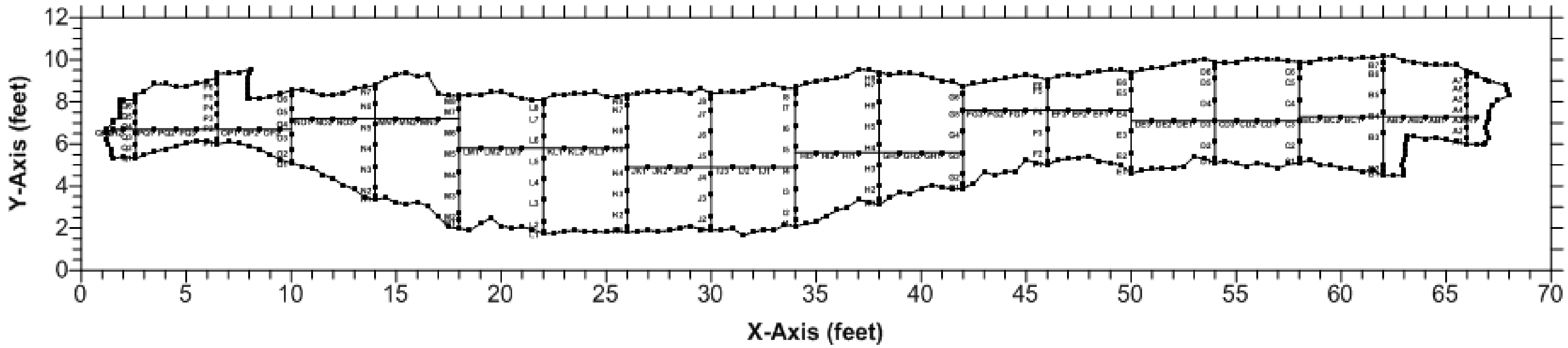


Figure 2. Discharge measurement cross-section; Mammoth Spring, Marion County, Florida, January 19, 2011 measurement. Cross-section is viewed to the upstream of observer, and is located between the 24- and 32-foot depth levels. Support poles are represented by dashed lines. Velocity measurement stations are shown as points along the support poles. See Table 1 for station velocities. Boundary wall of the cross section is shown as the perimeter ring of connected points. X- and Y-axis scales are shown in feet.

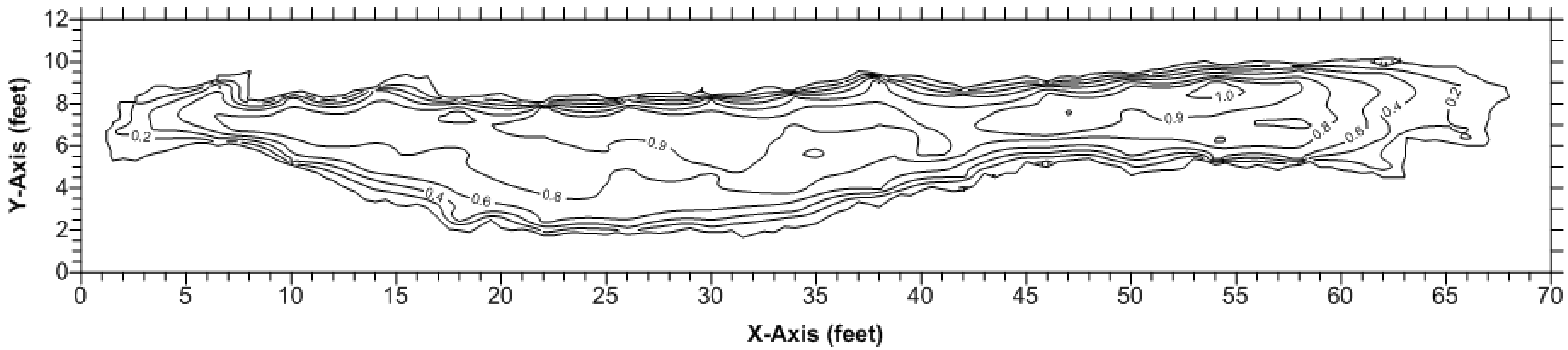


Figure 3. Discharge measurement cross-section; Mammoth Spring, Marion County, Florida, January 19, 2011 measurement. Flow contour velocities are shown in feet per second. Areas with negative velocities (reverse flow) are shaded and delineated by hatched lines. Outer boundary of cross section represents the zero-value contour. X- and Y-axis scales are shown in feet.

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TABLE 2. MAMMOTH SPRING, JANUARY 19, 2011.
SURFER 10 GRID VOLUME COMPUTATIONS AND GRIDDING REPORT

UPPER SURFACE

Grid File Name:	L:\ORLANDO\Hydro\KES\Mammoth\2011\ Mammoth 01-13-10\Mammoth 1-19-11.bln.grd
Grid Size:	61 rows x 356 columns
X Minimum:	0
X Maximum:	71
X Spacing:	0.2
Y Minimum:	0
Y Maximum:	12
Y Spacing:	0.2
Z Minimum:	-0.066046672858951
Z Maximum:	1.0371282168184

LOWER SURFACE
Level Surface defined by Z = 0

VOLUMES
Z Scale Factor: 1
Total Volumes by:

Trapezoidal Rule:	211.25001951434
Simpson's Rule:	211.28599350005
Simpson's 3/8 Rule:	211.24505825848

CUT & FILL VOLUMES
Positive Volume [Cut]: 211.26162215223
Negative Volume [Fill]: 0.011602637884243
Net Volume [Cut-Fill]: 211.25001951434<<<<<<Total Discharge in CFS
(The Net Volume value is used due to the presence of negative velocity values.
Positive Vol. Cut - Negative Vol. Fill = Net Volume. Please refer to report text.)

AREAS
Planar Areas
Operational Planar Area: 314.82<<<<Total Cross-section Area in Square Feet
(Calculated using blanking file due to the presence of negative velocity values;
Operational Planar Area = [P.P.A.Cut + N.P.A.Fill] = [Total Planar Area - Blanked Planar Area].
Please refer to report text.)
Positive Planar Area [Cut]: 314.63772586284
Negative Planar Area [Fill]: 0.18227413716407
Blanked Planar Area: 537.18
Total Planar Area: 852

Surface Areas
Positive Surface Area [Cut]: 347.07394240546
Negative Surface Area [Fill]: 0.19863008251323

GRIDDING REPORT

Data Source

Source Data File Name:	L:\ORLANDO\Hydro\KES\Mammoth\2011\Mammoth 01-13-10\Mammoth 1-19-11 SURFER XYZ T3 All PointsBLF.xls (sheet 'Mammoth Spring 1-19-11')
X Column:	A
Y Column:	B
Z Column:	C

Data Counts

Active Data:	750
Original Data:	750
Excluded Data:	0
Deleted Duplicates:	0
Retained Duplicates:	0
Artificial Data:	0
Superseded Data:	0

Exclusion Filtering

Exclusion Filter String:	Not In Use

Duplicate Filtering

Duplicate Points to Keep:	First
X Duplicate Tolerance:	7.9E-006
Y Duplicate Tolerance:	1E-006

No duplicate data were found.

Breakline Filtering

Breakline Filtering:	Not In Use

Data Counts

Active Data:	750

Univariate Statistics

	X	Y	Z
Count:	750	750	750
1%%-tile:	1.5	1.8	0
5%%-tile:	3.5	1.925	0
10%%-tile:	6.75	2.35	0
25%%-tile:	17.25	4.85	0
50%%-tile:	34	6.8	0
75%%-tile:	52	8.725	0
90%%-tile:	62.75	9.45	0.82
95%%-tile:	66	9.9	0.89
99%%-tile:	67.125	10.075	0.94
Minimum:	1.2	1.65	-0.13
Maximum:	68	10.15	1.02

Mean:	34.56573332	6.56486933333	0.149666666667
Median:	34	6.825	0
Geometric Mean:	25.960909721	5.94260904418	N/A
Harmonic Mean:	14.4327328432	5.16574031369	N/A
Root Mean Square:	39.9549283389	7.02468644234	0.343838140215
Trim Mean (10%%):	34.5318147852	6.6293362963	0.114681481481
Interquartile Mean:	34.4199998133	6.85013864	0
Midrange:	34.6	5.9	0.445
Winsorized Mean:	34.59836664	6.56310266667	0.14292
TriMean:	34.3125	6.79375	0
Variance:	402.142568705	6.25705298676	0.0959524922118
Standard Deviation:	20.053492681	2.50141019962	0.309761992846
Interquartile Range:	34.75	3.875	0
Range:	66.8	8.5	1.15
Mean Difference:	23.1669685816	2.84661505467	0.248655273698
Median Abs. Deviation:	17.5	1.945835	0
Average Abs. Deviation:	17.3883332133	2.17153069333	0.150253333333
Quartile Dispersion:	0.501805054152	0.285451197053	N/A
Relative Mean Diff.:	0.67022933861	0.433613360774	N/A
Standard Error:	0.732250019875	0.091338586127	0.0113109087293
Coef. of Variation:	0.580155279661	0.381029701066	N/A
Skewness:	0.00962111824689	-0.405734958377	1.73654597618
Kurtosis:	1.76079757762	1.98287211974	4.23320886623
Sum:	25924.29999	4923.652	112.25
Sum Absolute:	25924.29999	4923.652	112.69
Sum Squares:	1197297.22392	37009.6647099	88.6685
Mean Square:	1596.39629856	49.3462196132	0.118224666667

Inter-Variable Covariance

	X	Y	Z
X:	402.14257	7.5262261	-0.2557631
Y:	7.5262261	6.257053	-0.0014139955
Z:	-0.2557631	-0.0014139955	0.095952492

Inter-Variable Correlation

	X	Y	Z
X:	1.000	0.150	-0.041
Y:	0.150	1.000	-0.002
Z:	-0.041	-0.002	1.000

Inter-Variable Rank Correlation

	X	Y	Z
X:	1.000	0.167	-0.035
Y:	0.167	1.000	-0.062
Z:	-0.035	-0.062	1.000

Principal Component Analysis

	PC1	PC2	PC3
X:	-0.0190004480156	-0.0190004480156	0.000646642968915
Y:	0.999819311235	0.999819311235	-0.00056040214429
Z:	0.000572587601658	0.000572587601658	-0.00056040214429
Lambda:	402.285761622	6.11402466546	0.0957878971446

Planar Regression: Z = AX+BY+C

Fitted Parameters

	A	B	C
Parameter Value:	-0.000646321374059	0.000551436157212	0.168387132604
Standard Error:	0.000571148876418	0.00457882909997	0.0352605199524

Inter-Parameter Correlations

	A	B	C
A:	1.000	-0.150	-0.432
B:	-0.150	1.000	-0.768
C:	-0.432	-0.768	1.000

ANOVA Table

Source	df	Sum of Squares	Mean Square	F
Regression:	2	0.123229549148	0.0616147745742	0.641523682022
Residual:	747	71.7451871175	0.0960444271988	
Total:	749	71.8684166667		

Coefficient of Multiple Determination (R^2): 0.00171465512758

Table 2. Mammoth Spring, January 19, 2011.

Nearest Neighbor Statistics

	Separation	|Delta Z|
1%%-tile:	0.1	0
5%%-tile:	0.15	0
10%%-tile:	0.206155281281	0
25%%-tile:	0.25	0
50%%-tile:	0.25495097568	0
75%%-tile:	0.269258240357	0
90%%-tile:	1	0.16
95%%-tile:	1	0.41
99%%-tile:	1	0.79
Minimum:	0.05	0
Maximum:	1	0.94
Mean:	0.346489829284	0.0538666666667
Median:	0.25495097568	0
Geometric Mean:	0.293958143437	N/A
Harmonic Mean:	0.260319832008	N/A
Root Mean Square:	0.424703549784	0.165311826558
Trim Mean (10%%):	0.322845139241	0.0232148148148
Interquartile Mean:	0.255161774878	0
Midrange:	0.525	0.47
Winsorized Mean:	0.352371310638	0.0231333333333
TriMean:	0.257290047929	0
Variance:	0.0603984346479	0.0244589942145
Standard Deviation:	0.245760929865	0.156393715393
Interquartile Range:	0.0192582403567	0
Range:	0.95	0.94
Mean Difference:	0.199941958537	0.0970116955941
Median Abs. Deviation:	0.00495097567964	0
Average Abs. Deviation:	0.117520581171	0.0538666666667
Quartile Dispersion:	0.0370879821637	N/A
Relative Mean Diff.:	0.577050007357	1.80095969544
Standard Error:	0.00897392033602	0.00571069105153
Coef. of Variation:	0.709287572372	2.90334867686
Skewness:	2.02350391755	3.54832421788
Kurtosis:	5.61041947734	15.5674582159
Sum:	259.867371963	40.4
Sum Absolute:	259.867371963	40.4
Sum Squares:	135.279828899	20.496
Mean Square:	0.180373105199	0.027328

Table 2. Mammoth Spring, January 19, 2011.

Complete Spatial Randomness

Lambda:	1.32088763649
Clark and Evans:	0.79644066132
Skellam:	1122.73894853

Gridding Rules

Gridding Method:	Kriging
Kriging Type:	Point
Polynomial Drift Order:	1
Kriging std. deviation grid:	no

Semi-Variogram Model

Component Type:	Linear
Anisotropy Angle:	0
Anisotropy Ratio:	3
Variogram Slope:	1

Search Parameters

No Search (use all data):	true

Output Grid

Grid File Name:	L:\ORLANDO\Hydro\KES\Mammoth\2011\Mammoth 01-13-10\Mammoth 1-19-11.grd
Grid Size:	61 rows x 356 columns
Total Nodes:	21716
Filled Nodes:	21716
Blanked Nodes:	0
Blank Value:	1.70141E+038

Grid Geometry

X Minimum:	0
X Maximum:	71
X Spacing:	0.2
Y Minimum:	0
Y Maximum:	12
Y Spacing:	0.2

Univariate Grid Statistics

	Z
Count:	21716
1%%-tile:	-0.882291826601
5%%-tile:	-0.693550135355
10%%-tile:	-0.549868630669
25%%-tile:	-0.427704482243
50%%-tile:	-0.179373667332
75%%-tile:	0.591204549725
90%%-tile:	0.868522234901
95%%-tile:	0.909625789259
99%%-tile:	0.95894848024

Minimum:	-0.944794165749
Maximum:	1.03712821682
Mean:	0.0095083312423
Median:	-0.179360979607
Geometric Mean:	N/A
Harmonic Mean:	N/A
Root Mean Square:	0.550031398181
Trim Mean (10%%):	0.00322320316945
Interquartile Mean:	-0.109151178128
Midrange:	0.0461670255348
Winsorized Mean:	0.0205185856625
TriMean:	-0.0488118167953
Variance:	0.302458058512
Standard Deviation:	0.549961870053
Interquartile Range:	1.01890903197
Range:	1.98192238257
Mean Difference:	0.614163819458
Median Abs. Deviation:	0.315659079864
Average Abs. Deviation:	0.453598984304
Quartile Dispersion:	N/A
Relative Mean Diff.:	N/A
Standard Error:	0.00373200883794
Coef. of Variation:	N/A
Skewness:	0.486005781683
Kurtosis:	1.83512486976
Sum:	206.482921258
Sum Absolute:	10356.8914135
Sum Squares:	6569.8400486
Mean Square:	0.302534538985

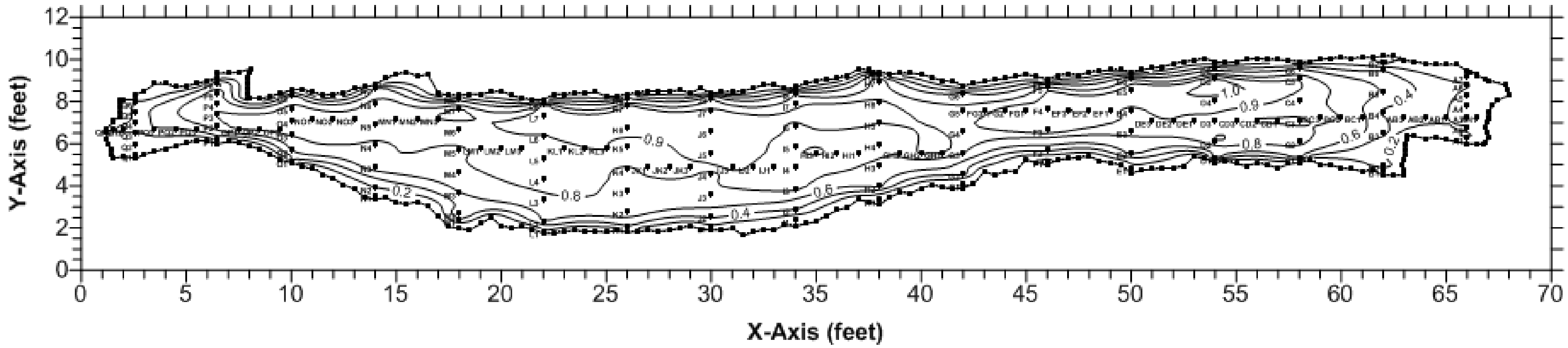

Figure 4. Discharge measurement cross-section; Mammoth Spring, Marion County, Florida, January 19, 2011 measurement. Relationship of flow contours (velocities shown in feet per second) and velocity measurement stations (labeled points) are shown. Areas with negative velocities (reverse flow) are shaded and delineated by hatched lines. Boundary wall of the cross section is shown as the perimeter ring of connected points. X- and Y-axis scales are shown in feet.

Table 3. Mammoth Springs XYZ Grid Data, January 19, 2011.					
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
66.5	7.3	0.12	AH1	665	73
66	6.3	0.27	A1	660	63
66	6.8	0.21	A2	660	68
66	7.3	0.15	A3	660	73
66	7.8	0.12	A4	660	78
66	8.3	0.14	A5	660	83
66	8.8	0.22	A6	660	88
66	9.2	0.05	A7	660	92
65	7.3	0.2	AB1	650	73
64	7.3	0.27	AB2	640	73
63	7.3	0.27	AB3	630	73
62	4.75	0.08	B1	620	47.5
62	5	0.37	B2	620	50
62	6.5	0.5	B3	620	65
62	7.5	0.35	B4	620	75
62	8.5	0.59	B5	620	85
62	9.5	0.4	B6	620	95
62	9.9	-0.13	B7	620	99
61	7.3	0.65	BC1	610	73
60	7.3	0.79	BC2	600	73
59	7.3	0.85	BC3	590	73
58	5.35	0.69	C1	580	53.5
58	6.1	0.85	C2	580	61
58	7.1	0.77	C3	580	71
58	8.1	0.85	C4	580	81
58	9.1	0.89	C5	580	91
58	9.6	0.6	C6	580	96
57	7.1	0.79	CD1	570	71
56	7.1	0.79	CD2	560	71
55	7.1	0.8	CD3	550	71
54	5.35	0.74	D1	540	53.5
54	6.1	0.9	D2	540	61
54	7.1	0.9	D3	540	71
54	8.1	0.97	D4	540	81
54	9.1	1.02	D5	540	91
54	9.6	0.47	D6	540	96
53	7.1	0.85	DE1	530	71

52	7.1	0.9	DE2	520	71
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
51	7.1	0.89	DE3	510	71
50	4.85	0.25	E1	500	48.5
50	5.6	0.68	E2	500	56
50	6.6	0.84	E3	500	66
50	7.6	0.87	E4	500	76
50	8.6	0.94	E5	500	86
50	9.1	0.84	E6	500	91
49	7.6	0.93	EF1	490	76
48	7.6	0.94	EF2	480	76
47	7.6	1.01	EF3	470	76
46	5.2	-0.06	F1	460	52
46	5.7	0.48	F2	460	57
46	6.7	0.99	F3	460	67
46	7.7	0.89	F4	460	77
46	8.7	0.88	F5	460	87
46	8.95	0.39	F6	460	89.5
45	7.6	0.96	FG1	450	76
44	7.6	0.93	FG2	440	76
43	7.6	0.87	FG3	430	76
42	4.1	-0.03	G1	420	41
42	4.6	0.5	G2	420	46
42	5.6	0.82	G3	420	56
42	6.6	0.88	G4	420	66
42	7.6	0.81	G5	420	76
42	8.4	0.65	G6	420	84
41	5.6	0.91	GH1	410	56
40	5.6	0.92	GH2	400	56
39	5.6	0.8	GH3	390	56
38	3.35	0.09	H1	380	33.5
38	4	0.66	H2	380	40
38	5	0.77	H3	380	50
38	6	0.81	H4	380	60
38	7	0.9	H5	380	70
38	8	0.91	H6	380	80
38	9	0.91	H7	380	90
38	9.3	0.75	H8	380	93
37	5.6	0.85	HI1	370	56
36	5.6	0.85	HI2	360	56

35	**5.6**	**0.93**	**HI3**	**350**	**56**
X	**Y**	**Z (Velocity)**	**Station Name**	**X Plot**	**Y Plot**
34	**2.4**	**0.02**	**I1**	**340**	**24**
34	**2.9**	**0.43**	**I2**	**340**	**29**
34	**3.9**	**0.86**	**I3**	**340**	**39**
34	**4.9**	**0.79**	**I4**	**340**	**49**
34	**5.9**	**0.87**	**I5**	**340**	**59**
34	**6.9**	**0.89**	**I6**	**340**	**69**
34	**7.9**	**0.87**	**I7**	**340**	**79**
34	**8.4**	**0.79**	**I8**	**340**	**84**
33	**4.9**	**0.85**	**IJ1**	**330**	**49**
32	**4.9**	**0.88**	**IJ2**	**320**	**49**
31	**4.9**	**0.95**	**IJ3**	**310**	**49**
30	**2.1**	**0.21**	**J1**	**300**	**21**
30	**2.6**	**0.47**	**J2**	**300**	**26**
30	**3.6**	**0.77**	**J3**	**300**	**36**
30	**4.6**	**0.77**	**J4**	**300**	**46**
30	**5.6**	**0.93**	**J5**	**300**	**56**
30	**6.6**	**0.91**	**J6**	**300**	**66**
30	**7.6**	**0.91**	**J7**	**300**	**76**
30	**8.2**	**0.82**	**J8**	**300**	**82**
27	**4.9**	**0.84**	**JK1**	**270**	**49**
28	**4.9**	**0.86**	**JK2**	**280**	**49**
29	**4.9**	**0.87**	**JK3**	**290**	**49**
26	**2.05**	**0.43**	**K1**	**260**	**20.5**
26	**2.8**	**0.73**	**K2**	**260**	**28**
26	**3.8**	**0.76**	**K3**	**260**	**38**
26	**4.8**	**0.78**	**K4**	**260**	**48**
26	**5.9**	**0.84**	**K5**	**260**	**59**
26	**6.8**	**0.93**	**K6**	**260**	**68**
26	**7.8**	**0.92**	**K7**	**260**	**78**
26	**8.2**	**0.62**	**K8**	**260**	**82**
23	**5.8**	**0.88**	**KL1**	**230**	**58**
24	**5.8**	**0.9**	**KL2**	**240**	**58**
25	**5.8**	**0.91**	**KL3**	**250**	**58**
22	**1.85**	**0.28**	**L1**	**220**	**18.5**
22	**2.35**	**0.63**	**L2**	**220**	**23.5**
22	**3.35**	**0.76**	**L3**	**220**	**33.5**
22	**4.35**	**0.85**	**L4**	**220**	**43.5**
22	**5.35**	**0.85**	**L5**	**220**	**53.5**
22	**6.35**	**0.89**	**L6**	**220**	**63.5**
22	**7.35**	**0.93**	**L7**	**220**	**73.5**
22	**7.9**	**0.94**	**L8**	**220**	**79**

19	5.8	0.85	LM1	190	58
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
20	5.8	0.84	LM2	200	58
21	5.8	0.88	LM3	210	58
18	2.4	0.39	M1	180	24
18	2.7	0.6	M2	180	27
18	3.7	0.61	M3	180	37
18	4.7	0.77	M4	180	47
18	5.7	0.77	M5	180	57
18	6.7	0.84	M6	180	67
18	7.7	0.91	M7	180	77
18	8.2	0.49	M8	180	82
15	7.2	0.9	MN1	150	72
16	7.2	0.87	MN2	160	72
17	7.2	0.9	MN3	170	72
14	3.55	0	N1	140	35.5
14	3.95	0.22	N2	140	39.5
14	4.95	0.75	N3	140	49.5
14	5.95	0.78	N4	140	59.5
14	6.95	0.79	N5	140	69.5
14	7.95	0.9	N6	140	79.5
14	8.65	0.76	N7	140	86.5
11	7.2	0.88	NO1	110	72
12	7.2	0.88	NO2	120	72
13	7.2	0.84	NO3	130	72
10	5.2	0.4	O1	100	52
10	5.7	0.64	O2	100	57
10	6.45	0.83	O3	100	64.5
10	7.1	0.84	O4	100	71
10	7.7	0.9	O5	100	77
10	8.3	0.79	O6	100	83
7.5	6.7	0.84	OP1	75	67
8.5	6.7	0.84	OP2	85	67
9.5	6.7	0.89	OP3	95	67
6.5	6.2	0.31	P1	65	62
6.5	6.9	0.74	P2	65	69
6.5	7.4	0.81	P3	65	74
6.5	7.9	0.79	P4	65	79
6.5	8.4	0.72	P5	65	84
6.5	8.9	0.69	P6	65	89

3.5	6.7	0.4	PQ1	35	67
4.5	6.7	0.37	PQ2	45	67
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
5.5	6.7	0.46	PQ3	55	67
2.6	5.5	0.08	Q1	26	55
2.6	6	0.13	Q2	26	60
2.6	6.5	0.14	Q3	26	65
2.6	7	0.29	Q4	26	70
2.6	7.5	0.29	Q5	26	75
2.6	8	0.24	Q6	26	80
2	6.7	0.32	QH2	20	67
1.5	6.7	0.23	QH1	15	67
67.05	7.3	0	AE	670.5	73
66	9.45	0	AT	660	94.5
66	6	0	AS	660	60
62	10.15	0	BT	620	101.5
62	4.5	0	BS	620	45
58	9.9	0	CT	580	99
58	5.1	0	CS	580	51
54	9.9	0	DT	540	99
54	5.1	0	DS	540	51
50	9.4	0	ET	500	94
50	4.6	0	ES	500	46
46	9.05	0	FT	460	90.5
46	5	0	FS	460	50
42	8.75	0	GT	420	87.5
42	3.9	0	GS	420	39
38	9.4	0	HT	380	94
38	3.1	0	HS	380	31
34	8.7	0	IT	340	87
34	8.65	0	ITX	340	86.5
34	2.1	0	IS	340	21
30	8.4	0	JT	300	84
30	1.9	0	JS	300	19
26	8.35	0	KT	260	83.5
26	1.8	0	KS	260	18
22	8.1	0	LT	220	81
22	1.75	0	LS	220	17.5
18	8.3	0	MT	180	83
18	2	0	MS	180	20
14	8.8	0	NT	140	88
14	3.35	0	NS	140	33.5
10	8.55	0	OT	100	85.5
10	5.1	0	OS	100	51
6.5	9.35	0	PT	65	93.5

6.5	9.15	0	PTX	65	91.5
6.5	6	0	PS	65	60
2.6	8.35	0	QT	26	83.5
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
2.6	8.1	0	QTX	26	81
2.6	5.3	0	QS	26	53
1.2	6.7	0	QE	12	67
67.05	7.55	0	AETA	670.5	75.5
67.2	7.8	0	AETB	672	78
67.4	8.05	0	AETC	674	80.5
68	8.3	0	AETD	680	83
67.9	8.55	0	AETE	679	85.5
67.8	8.8	0	AETF	678	88
67	9	0	AETG	670	90
66.85	9.05	0	AETH	668.5	90.5
66.5	9.25	0	AETI	665	92.5
66.5	9.3	0	AETJ	665	93
66.1	9.4	0	AETK	661	94
67	7.2	0	AESA	670	72
66.95	7.05	0	AESB	669.5	70.5
66.85	6.8	0	AESC	668.5	68
66.95	6.55	0	AESD	669.5	65.5
67.05	6.3	0	AESE	670.5	63
66.9	6.05	0	AESF	669	60.5
66.8	6	0	AESG	668	60
66.5	6	0	AESH	665	60
65.5	9.75	0	ATA	655	97.5
65	9.75	0	ATB	650	97.5
64.5	9.75	0	ATC	645	97.5
64	9.8	0	ATD	640	98
63.5	9.9	0	ATE	635	99
63	9.95	0	ATF	630	99.5
62.5	10.15	0	ATG	625	101.5
65.5	6.1	0	ASA	655	61
65	6.2	0	ASB	650	62
64.5	6.3	0	ASC	645	63
64	6.25	0	ASD	640	62.5
63.5	6.35	0	ASE	635	63.5
63.1	6.4	0	ASF	631	64
63.1	6.25	0	ASG	631	62.5
63.05	6	0	ASH	630.5	60
63.05	5.75	0	ASI	630.5	57.5
63.05	5.5	0	ASJ	630.5	55
62.95	5.25	0	ASK	629.5	52.5

62.9	5	0	ASL	629	50
62.95	4.75	0	ASM	629.5	47.5
63	4.65	0	ASN	630	46.5
63	4.5	0	ASO	630	45
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
62.5	4.5	0	ASP	625	45
61.5	10.1	0	BTA	615	101
61	10.1	0	BTB	610	101
60.5	10.05	0	BTC	605	100.5
60	10.1	0	BTD	600	101
59.5	10.05	0	BTE	595	100.5
59	10	0	BTF	590	100
58.5	9.9	0	BTG	585	99
61.5	4.75	0	BSA	615	47.5
61	4.7	0	BSB	610	47
60.5	4.8	0	BSC	605	48
60	4.85	0	BSD	600	48.5
59.5	5	0	BSE	595	50
59	5	0	BSF	590	50
58.5	5.25	0	BSG	585	52.5
57.5	9.95	0	CTA	575	99.5
57	10	0	CTB	570	100
56.5	10	0	CTC	565	100
56	10.05	0	CTD	560	100.5
55.5	10	0	CTE	555	100
55	9.9	0	CTF	550	99
54.5	9.85	0	CTG	545	98.5
57.5	5.05	0	CSA	575	50.5
57	4.85	0	CSB	570	48.5
56.5	5	0	CSC	565	50
56	5.1	0	CSD	560	51
55.5	4.95	0	CSE	555	49.5
55	5.05	0	CSF	550	50.5
54.5	5.2	0	CSG	545	52
53.5	10.05	0	DTA	535	100.5
53	9.95	0	DTB	530	99.5
52.5	9.9	0	DTC	525	99
52	9.8	0	DTD	520	98
51.5	9.65	0	DTE	515	96.5
51	9.6	0	DTF	510	96
50.5	9.5	0	DTG	505	95
53.5	5.3	0	DSA	535	53
53	5.4	0	DSB	530	54
52.5	4.95	0	DSC	525	49.5
52	4.85	0	DSD	520	48.5

51.5	**4.85**	**0**	**DSE**	**515**	**48.5**
51	**4.8**	**0**	**DSF**	**510**	**48**
50.5	**4.75**	**0**	**DSG**	**505**	**47.5**
X	**Y**	**Z (Velocity)**	**Station Name**	**X Plot**	**Y Plot**
49.5	**9.5**	**0**	**ETA**	**495**	**95**
49	**9.5**	**0**	**ETB**	**490**	**95**
48.5	**9.45**	**0**	**ETC**	**485**	**94.5**
48	**9.4**	**0**	**ETD**	**480**	**94**
47.5	**9.25**	**0**	**ETE**	**475**	**92.5**
47	**9.3**	**0**	**ETF**	**470**	**93**
46.5	**9.25**	**0**	**ETG**	**465**	**92.5**
49.5	**5**	**0**	**ESA**	**495**	**50**
49	**5.1**	**0**	**ESB**	**490**	**51**
48.5	**5.2**	**0**	**ESC**	**485**	**52**
48	**5.4**	**0**	**ESD**	**480**	**54**
47.5	**5.35**	**0**	**ESE**	**475**	**53.5**
47	**5.3**	**0**	**ESF**	**470**	**53**
46.5	**5.25**	**0**	**ESG**	**465**	**52.5**
45.5	**9.2**	**0**	**FTA**	**455**	**92**
45	**9.3**	**0**	**FTB**	**450**	**93**
44.5	**9.2**	**0**	**FTC**	**445**	**92**
44	**9.1**	**0**	**FTD**	**440**	**91**
43.5	**9.05**	**0**	**FTE**	**435**	**90.5**
43	**8.95**	**0**	**FTF**	**430**	**89.5**
42.5	**8.85**	**0**	**FTG**	**425**	**88.5**
45.5	**5.1**	**0**	**FSA**	**455**	**51**
45	**5.25**	**0**	**FSB**	**450**	**52.5**
44.5	**4.7**	**0**	**FSC**	**445**	**47**
44	**4.7**	**0**	**FSD**	**440**	**47**
43.5	**4.5**	**0**	**FSE**	**435**	**45**
43	**4.7**	**0**	**FSF**	**430**	**47**
42.5	**4.1**	**0**	**FSG**	**425**	**41**
41.5	**8.95**	**0**	**GTA**	**415**	**89.5**
41	**9**	**0**	**GTB**	**410**	**90**
40.5	**9.15**	**0**	**GTC**	**405**	**91.5**
40	**9.3**	**0**	**GTD**	**400**	**93**
39.5	**9.35**	**0**	**GTE**	**395**	**93.5**
39	**9.35**	**0**	**GTF**	**390**	**93.5**
38.5	**9.3**	**0**	**GTG**	**385**	**93**
41.5	**3.85**	**0**	**GSA**	**415**	**38.5**
41	**3.95**	**0**	**GSB**	**410**	**39.5**
40.5	**4.05**	**0**	**GSC**	**405**	**40.5**
40	**3.9**	**0**	**GSD**	**400**	**39**
39.5	**3.65**	**0**	**GSE**	**395**	**36.5**
39	**3.7**	**0**	**GSF**	**390**	**37**

38.5	3.45	0	GSG	385	34.5
37.5	9.5	0	HTA	375	95
37	9.55	0	HTB	370	95.5
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
36.5	9.25	0	HTC	365	92.5
36	9.1	0	HTD	360	91
35.5	9.05	0	HTE	355	90.5
35	9	0	HTF	350	90
34.5	8.85	0	HTG	345	88.5
37.5	3.25	0	HSA	375	32.5
37	3.35	0	HSB	370	33.5
36.5	3	0	HSC	365	30
36	2.85	0	HSD	360	28.5
35.5	2.6	0	HSE	355	26
35	2.3	0	HSF	350	23
34.5	2.2	0	HSG	345	22
33.5	8.65	0	ITA	335	86.5
33	8.8	0	ITB	330	88
32.5	8.8	0	ITC	325	88
32	8.65	0	ITD	320	86.5
31.5	8.5	0	ITE	315	85
31	8.45	0	ITF	310	84.5
30.5	8.45	0	ITG	305	84.5
33.5	2.15	0	ISA	335	21.5
33	1.9	0	ISB	330	19
32.5	1.95	0	ISC	325	19.5
32	1.8	0	ISD	320	18
31.5	1.65	0	ISE	315	16.5
31	2	0	ISF	310	20
30.5	1.9	0	ISG	305	19
	0				
29.5	8.65	0	JTA	295	86.5
29	8.4	0	JTB	290	84
28.5	8.55	0	JTC	285	85.5
28	8.5	0	JTD	280	85
27.5	8.5	0	JTE	275	85
27	8.5	0	JTF	270	85
26.5	8.4	0	JTG	265	84
29.5	1.95	0	JSA	295	19.5
29	2.1	0	JSB	290	21
28.5	2	0	JSC	285	20
28	1.9	0	JSD	280	19
27.5	1.85	0	JSE	275	18.5
27	1.9	0	JSF	270	19
26.5	1.85	0	JSG	265	18.5

25.5	8.25	0	KTA	255	82.5
25	8.25	0	KTB	250	82.5
24.5	8.45	0	KTC	245	84.5
24	8.4	0	KTD	240	84
23.5	8.4	0	KTE	235	84
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
23	8.35	0	KTF	230	83.5
22.5	8.35	0	KTG	225	83.5
25.5	1.9	0	KSA	255	19
25	1.8	0	KSB	250	18
24.5	1.85	0	KSC	245	18.5
24	1.85	0	KSD	240	18.5
23.5	1.9	0	KSE	235	19
23	1.85	0	KSF	230	18.5
22.5	1.75	0	KSG	225	17.5
21.5	8.1	0	LTA	215	81
21	8.15	0	LTB	210	81.5
20.5	8.3	0	LTC	205	83
20	8.5	0	LTD	200	85
19.5	8.45	0	LTE	195	84.5
19	8.35	0	LTF	190	83.5
18.5	8.35	0	LTG	185	83.5
21.5	1.95	0	LSA	215	19.5
21	2.05	0	LSB	210	20.5
20.5	2	0	LSC	205	20
20	2.1	0	LSD	200	21
19.5	2.5	0	LSE	195	25
19	2.2	0	LSF	190	22
18.5	1.9	0	LSG	185	19
17.5	8.3	0	MTA	175	83
17	8.4	0	MTB	170	84
16.5	9.3	0	MTC	165	93
16	9.2	0	MTD	160	92
15.5	9.4	0	MTE	155	94
15	9.3	0	MTF	150	93
14.5	9.1	0	MTG	145	91
17.5	2.05	0	MSA	175	20.5
17	2.55	0	MSB	170	25.5
16.5	3.05	0	MSC	165	30.5
16	3.25	0	MSD	160	32.5
15.5	3.15	0	MSE	155	31.5
15	3.2	0	MSF	150	32
14.5	3.45	0	MSG	145	34.5
13.5	8.7	0	NTA	135	87
13	8.65	0	NTB	130	86.5

12.5	8.4	0	NTC	125	84
12	8.35	0	NTD	120	83.5
11.5	8.3	0	NTE	115	83
11	8.45	0	NTF	110	84.5
10.5	8.6	0	NTG	105	86
13.5	3.45	0	NSA	135	34.5
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
13	3.85	0	NSB	130	38.5
12.5	4.05	0	NSC	125	40.5
12	4.35	0	NSD	120	43.5
11.5	4.55	0	NSE	115	45.5
11	4.8	0	NSF	110	48
10.5	4.95	0	NSG	105	49.5
9.5	8.4	0	OTA	95	84
9	8.25	0	OTB	90	82.5
8.5	8.15	0	OTC	85	81.5
8	8.2	0	OTD	80	82
7.9	8.2	0	OTE	79	82
7.95	8.4	0	OTF	79.5	84
7.95	8.65	0	OTG	79.5	86.5
7.95	8.9	0	OTH	79.5	89
7.95	9.15	0	OTI	79.5	91.5
8	9.35	0	OTJ	80	93.5
8.05	9.55	0	OTK	80.5	95.5
7.5	9.4	0	OTL	75	94
7	9.35	0	OTM	70	93.5
9.5	5.25	0	OSA	95	52.5
9	5.5	0	OSB	90	55
8.5	5.75	0	OSC	85	57.5
8	5.9	0	OSD	80	59
7.5	6.05	0	OSE	75	60.5
7	6.1	0	OSF	70	61
6	9	0	PTA	60	90
5.5	8.85	0	PTB	55	88.5
5	8.75	0	PTC	50	87.5
4.5	8.7	0	PTD	45	87
4	8.85	0	PTE	40	88.5
3.5	8.85	0	PTF	35	88.5
3	8.5	0	PTG	30	85
6	6.15	0	PSA	60	61.5
5.5	6.15	0	PSB	55	61.5
5	6.05	0	PSC	50	60.5
4.5	5.9	0	PSD	45	59
4	5.75	0	PSE	40	57.5
3.5	5.65	0	PSF	35	56.5
3	5.5	0	PSG	30	55

1.5	7	0	QETA	15	70
1.5	7.1	0	QETB	15	71
1.8	7.25	0	QETC	18	72.5
1.85	7.5	0	QETD	18.5	75
1.8	7.75	0	QETE	18	77.5
1.8	8	0	QETF	18	80
X	**Y**	**Z (Velocity)**	**Station Name**	**X Plot**	**Y Plot**
1.85	8.1	0	QETG	18.5	81
2	8.1	0	QETH	20	81
1.2	6.5	0	QESA	12	65
1.2	6.25	0	QESB	12	62.5
1.3	6	0	QESC	13	60
1.4	5.75	0	QESD	14	57.5
1.4	5.5	0	QESE	14	55
1.5	5.3	0	QESF	15	53
2	5.4	0	QESG	20	54
67.125	7.675	0	AETA1	671.25	76.75
67.7	8.175	0	AETC1	677	81.75
67.5333	8.86667	0	AETF1	675.3334	88.6667
67.2667	8.93334	0	AETF2	672.6667	89.3334
66.675	9.15	0	AETH1	666.75	91.5
66.3	9.35	0	AETJ1	663	93.5
66.975	6.175	0	AESE1	669.75	61.75
66.65	6	0	AESG1	666.5	60
66.25	6	0	AESH1	662.5	60
65.75	9.6	0	AT1	657.5	96
65.25	9.75	0	ATA1	652.5	97.5
64.75	9.75	0	ATB1	647.5	97.5
64.25	9.775	0	ATC1	642.5	97.75
63.75	9.85	0	ATD1	637.5	98.5
63.25	9.925	0	ATE1	632.5	99.25
62.75	10.05	0	ATF1	627.5	100.5
62.25	10.15	0	ATG1	622.5	101.5
65.75	6.05	0	AS1	657.5	60.5
65.25	6.15	0	ASA1	652.5	61.5
64.75	6.25	0	ASB1	647.5	62.5
64.25	6.275	0	ASC1	642.5	62.75
63.75	6.3	0	ASD1	637.5	63
63.3	6.375	0	ASE1	633	63.75
62.75	4.5	0	ASO1	627.5	45
62.25	4.5	0	ASP1	622.5	45
61.75	10.125	0	BT1	617.5	101.25
61.25	10.1	0	BTA1	612.5	101

60.75	10.075	0	BTB1	607.5	100.75
60.25	10.075	0	BTC1	602.5	100.75
59.75	10.075	0	BTD1	597.5	100.75
59.25	10.025	0	BTE1	592.5	100.25
58.25	9.9	0	BTG1	582.5	99
61.75	4.625	0	BS1	617.5	46.25
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
61.25	4.725	0	BSA1	612.5	47.25
60.75	4.75	0	BSB1	607.5	47.5
60.25	4.825	0	BSC1	602.5	48.25
59.75	4.925	0	BSD1	597.5	49.25
59.25	5	0	BSE1	592.5	50
58.75	5.125	0	BSF1	587.5	51.25
58.25	5.175	0	BSG1	582.5	51.75
57.75	9.925	0	CT1	577.5	99.25
57.25	9.975	0	CTA1	572.5	99.75
56.75	10	0	CTB1	567.5	100
56.25	10.025	0	CTC1	562.5	100.25
55.75	10.025	0	CTD1	557.5	100.25
55.25	9.95	0	CTE1	552.5	99.5
54.75	9.875	0	CTF1	547.5	98.75
54.25	9.875	0	CTG1	542.5	98.75
57.75	5.075	0	CS1	577.5	50.75
57.25	4.95	0	CSA1	572.5	49.5
56.75	4.925	0	CSB1	567.5	49.25
56.25	5.05	0	CSC1	562.5	50.5
55.75	5.025	0	CSD1	557.5	50.25
55.25	5	0	CSE1	552.5	50
54.75	5.125	0	CSF1	547.5	51.25
54.25	5.15	0	CSG1	542.5	51.5
53.75	9.975	0	DT1	537.5	99.75
53.25	10	0	DTA1	532.5	100
52.75	9.925	0	DTB1	527.5	99.25
52.25	9.85	0	DTC1	522.5	98.5
51.75	9.725	0	DTD1	517.5	97.25
51.25	9.625	0	DTE1	512.5	96.25
50.75	9.55	0	DTF1	507.5	95.5
50.25	9.45	0	DTG1	502.5	94.5
53.75	5.2	0	DS1	537.5	52
53.25	5.35	0	DSA1	532.5	53.5
52.8333	5.25	0	DSB1	528.3334	52.5
52.6667	5.1	0	DSB2	526.6667	51
52.25	4.9	0	DSC1	522.5	49

51.75	4.85	0	DSD1	517.5	48.5
51.25	4.825	0	DSE1	512.5	48.25
50.75	4.775	0	DSF1	507.5	47.75
50.25	4.675	0	DSG1	502.5	46.75
49.75	9.45	0	ET1	497.5	94.5
49.25	9.5	0	ETA1	492.5	95
48.75	9.475	0	ETB1	487.5	94.75
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
48.25	9.425	0	ETC1	482.5	94.25
47.75	9.325	0	ETD1	477.5	93.25
47.25	9.275	0	ETE1	472.5	92.75
46.75	9.275	0	ETF1	467.5	92.75
46.25	9.15	0	ETG1	462.5	91.5
49.75	4.8	0	ES1	497.5	48
49.25	5.05	0	ESA1	492.5	50.5
48.75	5.15	0	ESB1	487.5	51.5
48.25	5.3	0	ESC1	482.5	53
47.75	5.375	0	ESD1	477.5	53.75
47.25	5.325	0	ESE1	472.5	53.25
46.75	5.275	0	ESF1	467.5	52.75
46.25	5.152	0	ESG1	462.5	51.52
45.75	9.125	0	FT1	457.5	91.25
45.25	9.25	0	FTA1	452.5	92.5
44.75	9.25	0	FTB1	447.5	92.5
44.25	9.15	0	FTC1	442.5	91.5
43.75	9.075	0	FTD1	437.5	90.75
43.25	9	0	FTE1	432.5	90
42.75	8.9	0	FTF1	427.5	89
42.25	8.8	0	FTG1	422.5	88
45.75	5.05	0	FS1	457.5	50.5
45.25	5.175	0	FSA1	452.5	51.75
44.8333	5.06666	0	FSB1	448.3334	50.6666
44.6667	4.88333	0	FSB2	446.6667	48.8333
44.25	4.7	0	FSC1	442.5	47
43.75	4.6	0	FSD1	437.5	46
43.25	4.6	0	FSE1	432.5	46
42.8333	4.5	0	FSF1	428.3332	45
42.6666	4.3	0	FSF2	426.666	43
42.25	4	0	FSG1	422.5	40
41.75	8.85	0	GT1	417.5	88.5
41.25	8.975	0	GTA1	412.5	89.75
40.75	9.075	0	GTB1	407.5	90.75
40.25	9.225	0	GTC1	402.5	92.25

39.75	9.325	0	GTD1	397.5	93.25
39.25	9.35	0	GTE1	392.5	93.5
38.75	9.325	0	GTF1	387.5	93.25
38.25	9.35	0	GTG1	382.5	93.5
41.75	3.875	0	GS1	417.5	38.75
41.25	3.9	0	GSA1	412.5	39
40.75	4	0	GSB1	407.5	40
40.25	3.975	0	GSC1	402.5	39.75
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
39.75	3.775	0	GSD1	397.5	37.75
39.25	3.675	0	GSE1	392.5	36.75
38.75	3.575	0	GSF1	387.5	35.75
38.25	3.275	0	GSG1	382.5	32.75
37.75	9.45	0	HT1	377.5	94.5
37.25	9.525	0	HTA1	372.5	95.25
36.75	9.4	0	HTB1	367.5	94
36.25	9.175	0	HTC1	362.5	91.75
35.75	9.075	0	HTD1	357.5	90.75
35.25	9.025	0	HTE1	352.5	90.25
34.75	8.925	0	HTF1	347.5	89.25
34.25	8.775	0	HTG1	342.5	87.75
37.75	3.175	0	HS1	377.5	31.75
37.25	3.3	0	HSA1	372.5	33
36.75	3.175	0	HSB1	367.5	31.75
36.25	2.925	0	HSC1	362.5	29.25
35.75	2.725	0	HSD1	357.5	27.25
35.25	2.45	0	HSE1	352.5	24.5
34.75	2.25	0	HSF1	347.5	22.5
34.25	2.15	0	HSG1	342.5	21.5
33.75	8.65	0	IT1	337.5	86.5
33.25	8.725	0	ITA1	332.5	87.25
32.75	8.8	0	ITB1	327.5	88
32.25	8.725	0	ITC1	322.5	87.25
31.75	8.575	0	ITD1	317.5	85.75
31.25	8.475	0	ITE1	312.5	84.75
30.75	8.45	0	ITF1	307.5	84.5
30.25	8.425	0	ITG1	302.5	84.25
33.75	2.125	0	IS1	337.5	21.25
33.25	2.025	0	ISA1	332.5	20.25
32.75	1.925	0	ISB1	327.5	19.25
32.25	1.875	0	ISC1	322.5	18.75
31.75	1.725	0	ISD1	317.5	17.25
31.25	1.825	0	ISE1	312.5	18.25

30.75	1.95	0	ISF1	307.5	19.5
30.25	1.9	0	ISG1	302.5	19
29.75	8.525	0	JT1	297.5	85.25
29.25	8.525	0	JTA1	292.5	85.25
28.75	8.475	0	JTB1	287.5	84.75
28.25	8.525	0	JTC1	282.5	85.25
27.75	8.5	0	JTD1	277.5	85
27.25	8.5	0	JTE1	272.5	85
26.75	8.45	0	JTF1	267.5	84.5
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
26.25	8.375	0	JTG1	262.5	83.75
29.75	1.925	0	JS1	297.5	19.25
29.25	2.025	0	JSA1	292.5	20.25
28.75	2.05	0	JSB1	287.5	20.5
28.25	1.95	0	JSC1	282.5	19.5
27.75	1.875	0	JSD1	277.5	18.75
27.25	1.875	0	JSE1	272.5	18.75
26.75	1.875	0	JSF1	267.5	18.75
26.25	1.825	0	JSG1	262.5	18.25
25.75	8.3	0	KT1	257.5	83
25.25	8.25	0	KTA1	252.5	82.5
24.75	8.35	0	KTB1	247.5	83.5
24.25	8.425	0	KTC1	242.5	84.25
23.75	8.4	0	KTD1	237.5	84
23.25	8.375	0	KTE1	232.5	83.75
22.75	8.35	0	KTF1	227.5	83.5
22.25	8.225	0	KTG1	222.5	82.25
25.75	1.85	0	KS1	257.5	18.5
25.25	1.85	0	KSA1	252.5	18.5
24.75	1.825	0	KSB1	247.5	18.25
24.25	1.85	0	KSC1	242.5	18.5
23.75	1.875	0	KSD1	237.5	18.75
23.25	1.875	0	KSE1	232.5	18.75
22.75	1.8	0	KSF1	227.5	18
22.25	1.75	0	KSG1	222.5	17.5
21.75	8.1	0	LT1	217.5	81
21.25	8.125	0	LTA1	212.5	81.25
20.75	8.225	0	LTB1	207.5	82.25
20.25	8.4	0	LTC1	202.5	84
19.75	8.475	0	LTD1	197.5	84.75
19.25	8.4	0	LTE1	192.5	84
18.75	8.35	0	LTF1	187.5	83.5
18.25	8.325	0	LTG1	182.5	83.25

21.75	1.85	0	LS1	217.5	18.5
21.25	2	0	LSA1	212.5	20
20.75	2.025	0	LSB1	207.5	20.25
20.25	2.05	0	LSC1	202.5	20.5
19.75	2.3	0	LSD1	197.5	23
19.25	2.35	0	LSE1	192.5	23.5
18.75	2.05	0	LSF1	187.5	20.5
18.25	1.95	0	LSG1	182.5	19.5
17.75	8.3	0	MT1	177.5	83
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
17.25	8.35	0	MTA1	172.5	83.5
16.8334	8.7	0	MTB1	166.6668	87
16.6667	9	0	MTB2	168.3336	90
16.25	9.25	0	MTC1	162.5	92.5
15.75	9.3	0	MTD1	157.5	93
15.25	9.35	0	MTE1	152.5	93.5
14.75	9.2	0	MTF1	147.5	92
14.25	8.95	0	MTG1	142.5	89.5
17.75	2.025	0	MS1	177.5	20.25
17.25	2.3	0	MSA1	172.5	23
16.75	2.8	0	MSB1	167.5	28
16.25	3.15	0	MSC1	162.5	31.5
15.75	3.2	0	MSD1	157.5	32
15.25	3.175	0	MSE1	152.5	31.75
14.75	3.325	0	MSF1	147.5	33.25
14.25	3.4	0	MSG1	142.5	34
13.75	8.75	0	NT1	137.5	87.5
13.25	8.675	0	NTA1	132.5	86.75
12.75	8.525	0	NTB1	127.5	85.25
12.25	8.375	0	NTC1	122.5	83.75
11.75	8.325	0	NTD1	117.5	83.25
11.25	8.375	0	NTE1	112.5	83.75
10.75	8.525	0	NTF1	107.5	85.25
10.25	8.575	0	NTG1	102.5	85.75
13.75	3.4	0	NS1	137.5	34
13.25	3.65	0	NSA1	132.5	36.5
12.75	3.95	0	NSB1	127.5	39.5
12.25	4.2	0	NSC1	122.5	42
11.75	4.45	0	NSD1	117.5	44.5
11.25	4.725	0	NSE1	112.5	47.25
10.75	4.875	0	NSF1	107.5	48.75
10.25	5.025	0	NSG1	102.5	50.25

9.75	8.475	0	OT1	97.5	84.75
9.25	8.325	0	OTA1	92.5	83.25
8.75	8.2	0	OTB1	87.5	82
8.25	8.175	0	OTC1	82.5	81.75
7.775	9.475	0	OTK1	77.75	94.75
7.25	9.375	0	OTL1	72.5	93.75
6.75	9.35	0	OTM1	67.5	93.5
9.75	5.175	0	OS1	97.5	51.75
9.25	5.375	0	OSA1	92.5	53.75
8.75	5.625	0	OSB1	87.5	56.25
8.25	5.825	0	OSC1	82.5	58.25
X	Y	Z (Velocity)	Station Name	X Plot	Y Plot
7.75	5.975	0	OSD1	77.5	59.75
7.25	6.075	0	OSE1	72.5	60.75
6.75	6.05	0	OSF1	67.5	60.5
6.25	9.075	0	PT1	62.5	90.75
5.75	8.925	0	PTA1	57.5	89.25
5.25	8.8	0	PTB1	52.5	88
4.75	8.725	0	PTC1	47.5	87.25
4.25	8.775	0	PTD1	42.5	87.75
3.75	8.85	0	PTE1	37.5	88.5
3.25	8.675	0	PTF1	32.5	86.75
2.8	8.425	0	PTG1	28	84.25
6.25	6.075	0	PS1	62.5	60.75
5.75	6.15	0	PSA1	57.5	61.5
5.25	6.1	0	PSB1	52.5	61
4.75	5.975	0	PSC1	47.5	59.75
4.25	5.825	0	PSD1	42.5	58.25
3.75	5.7	0	PSE1	37.5	57
3.25	5.575	0	PSF1	32.5	55.75
2.8	5.4	0	PSG1	28	54
1.35	6.85	0	QET1	13.5	68.5
2.3	8.1	0	QETH1	23	81
1.75	5.35	0	QESF1	17.5	53.5
2.3	5.35	0	QESG1	23	53.5

OPEN CHANNEL
CALIBRATION CERTIFICATE

Model: 2000 Serial Number: 2006103

Sensor #: 2974

Type of Reading

Velocity: FPS

Level:
☐ IN
☒ N/A

	Static Velocity	Dynamic Velocity	Level
Standard:	Zero	2.04	N/A
Measured:	0.00	2.04	N/A
Tolerance:	±0.05 FPS	±2%	±0.4 in.

Calibration Technician: 4221 Date: 8/31/10

Calibration is traceable to the National Institute of Standards and Technology (NIST), Gaithersburg, MD. For Product information, service, or calibration, please contact the Customer Service Department.

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P/N 101001301

Flowmeter Calibration Certificate.

OPEN CHANNEL
CALIBRATION CERTIFICATE

Model: 2000 Serial Number: 2002679

Sensor #: 5232

Type of Reading

Velocity: FPS

Level:
☐ IN
☒ N/A

	Static Velocity	Dynamic Velocity	Level
Standard:	Zero	1.99	N/A
Measured:	0.00	1.99	N/A
Tolerance:	±0.05 FPS	± 2%	± 0.4 in.

Calibration Technician: 4221 Date: 11/18/10

Calibration is traceable to the National Institute of Standards and Technology (NIST), Gaithersburg, MD. For Product information, service, or calibration, please contact the Customer Service Department.

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P/N 101001301

Flowmeter Calibration Certificate.

SUMMARY OF DISCHARGE MEASUREMENT ACTIVITIES														
MAMMOTH SPRING (SILVER SPRINGS GROUP)					Marion County, Florida									
Performed by Karst Environmental Services, Inc., High Springs, Florida														
DATE	DISCHARGE (CFS)	INSTR. USED	CALC. METHOD	NUMBER STATIONS	X-SECTION AREA (sq.feet)	Avg. Station Point Velocity (fps)	High Msmt. (fps)	Low Msmt. (fps)	TIME START:	TIME FINISH:	Depth (feet)	Neg. PV's	Blanking Used?	NOTES:
3/24/2005	300.29	MMB 2000 FM	Surfer 8	115	323.06	0.96	1.33	-0.14	14:00	17:50	25-34	3	yes	
9/19/2006	240.07	MMB 2000 FM	Surfer 8	138	308.16	0.71	1.16	-0.39	13:40	17:50	26-32	8	yes	
9/10/2007	207.78	MMB 2000 FM	Surfer 8	132	321.36	0.61	0.96	-0.06	12:50	16:42	26-34	2	yes	
7/16/2008	199.68	MMB 2000 FM	Surfer 8	138	309.78	0.60	0.93	-0.06	11:44	13:48	25-33	1	yes	
10/17/2008	315.77	MMB 2000 FM	Surfer 8	136	319.18	0.94	1.48	-0.19	11:28	13:31	25-33	1	yes	
1/14/2009	247.87	MMB 2000 FM	Surfer 8	149	308.2	0.73	1.13	-0.15	12:40	14:43	25-33	4	yes	
4/15/2009	193.26	MMB 2000 FM	Surfer 8	168	308.07	0.61	0.92	-0.1	12:40	15:02	24-32	2	yes	
7/22/2009	247.39	MMB 2000 FM	Surfer 8	169	309.60	0.78	1.15	-0.02	11:48	14:41	25-34	1	yes	
10/14/2009	249.43	MMB 2000 FM	Surfer 9	175	313.16	0.80	1.15	0	11:57	14:15	25-33	none	yes	Upgrade to Surfer 9
1/13/2010	234.11	MMB 2000 FM	Surfer 9	189	315.22	0.70	1.07	-0.09	12:34	15:17	24-32	5	yes	
4/14/2010	330.02	MMB 2000 FM	Surfer 9	172	315.90	1.04	1.52	-0.12	11:54	14:24	25-33	3	yes	
1/19/2011	211.25	MMB 2000 FM	Surfer 10	168	314.82	0.67	1.02	-0.13	11:58	14:10	24-32	3	yes	Upgrade to Surfer 10

Table 4. Summary of Discharge Measurement Activities; Mammoth Spring, Marion County, Florida.

APPENDIX B

Ozark UNDERGROUND LABORATORY
1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 oul@tri-lakes.net

PROCEDURES AND CRITERIA
ANALYSIS OF FLUORESCEIN, EOSINE, RHODAMINE WT, SULFORHODAMINE B, AND PYRANINE DYES IN WATER AND CHARCOAL SAMPLERS

December 15, 2008

Thomas Aley, PHG 179
President
Ozark Underground Laboratory, Inc.

PROCEDURES

Introduction

This document describes standard procedures and criteria currently in use at the Ozark Underground Laboratory as of the date shown on the title page. Some samples may be subjected to different procedures and criteria because of unique conditions; such non-standard procedures and criteria are identified in reports for those samples. Standard procedures and criteria change as knowledge and experience increases and as equipment is improved or up-graded. The Ozark Underground Laboratory maintains a summary of changes in standard procedures and criteria.

Dye Nomenclature

Fluorescein is C.I. Acid yellow 73, Color Index Number 45350. Rhodamine WT is Acid Red 388; there is no assigned Color Index Number for this dye. Eosine (sometimes called eosin) is Acid Red 87, Color Index Number 45380. Sulforhodamine B is C.I. Acid Red 52, Color Index Number 45100. Pyranine is Solvent Green 7 (also called D&C Green 8), Color Index Number 59040.

Description of the Samplers

The charcoal samplers are packets of fiberglass screening partially filled with approximately 4.25 grams of activated coconut charcoal. The charcoal used by the Ozark Underground Laboratory is Calgon 207C coconut shell carbon, 6 to 12 mesh.

The most commonly used samplers are about 4 inches long by two inches wide. A cigar-shaped sampler is made for use in very small diameter wells (such as 1 inch diameter wells); this is a special order item and should be specifically requested when it is needed. All of the samplers are closed by heat sealing.

Placement of Samplers

Samplers (also called charcoal packets) are placed so as to be exposed to as much water as possible. In springs and streams they are typically attached to a rock or other anchor in a riffle area. Attachment of the packets often uses plastic tie wires. In swifter water galvanized wire (such as electric fence wire) is often used. Other types of anchoring wire can be used. Electrical wire with plastic insulation is also good. Packets are attached so that they extend outward from the anchor rather than being flat against it. Two or more separately anchored packets are typically used for sampling springs and streams. The use of fewer packets is discouraged except when the spring or stream is so small that there is not appropriate space for placing multiple packets.

When pumping wells are being sampled, the samplers are placed in sample holders made of PVC pipe fittings. Brass hose fittings are installed at the end of the sample holders so that the sample holders can be installed on outside hose bibs and water which has run through the samplers can be directed to waste through a connected garden hose. The samplers can be unscrewed in the middle so that charcoal packets can be changed. The middle portions of the samplers consists of 1.5 inch diameter pipe and pipe fitting.

Charcoal packets can also be lowered into monitoring wells for sampling purposes. In general, if the well is screened, samplers should be placed approximately in the middle of the screened interval. Some sort of weight should be added near the charcoal packet to insure that it will not float. The weight should be of such a nature that it will not affect water quality. One common approach is to anchor the packets with a white or uncolored plastic cable tie to the top of a dedicated weighted disposable bailer. We typically run nylon cord from the top of the well to the charcoal packet and its weight. Do not use colored cord. Nylon fishing line should not be used since it can be readily cut by a sharp projection in the well.

In some cases, especially with small diameter wells and appreciable well depths, the weighted disposable bailers sink very slowly or may even fail to sink because of friction and floating of the anchoring cord. In such cases a stainless steel weight may be added to the top of the disposable bailer. We have had good success with two to three ounce segments of stainless steel pipe which have an outside diameter of 1.315 inches and an inside diameter of 1.049 inches; such pipe weighs about 1.7 pounds per linear foot. The weight of the stainless steel is approximately 497 pounds per cubic foot. The pipe segments can be attached over the anchoring cord at the top of the bailer. All weights should be cleaned prior to use; the cleaning approach should comply with decontamination procedures in use at the project site.

Placement of samplers requires adjustment to field conditions. The above placement comments are intended as guidance, not firm requirements.

Rinsing of Charcoal Packets Prior to Sampling

Charcoal packets routinely contain some fine powder that washes off rapidly when they are placed in water. Since such material could remain in monitoring wells, charcoal packets to be placed in such wells are triple rinsed with distilled, demineralized, or reagent water known to be free of tracer dyes. This rinsing is typically done by soaking. With this approach, approximately 25 packets are placed in one gallon of water and soaked for at least 10 minutes. The packets are then removed from the water and excess water is shaken off the packets. The packets are then placed in a second gallon of water and again soaked for at least 10 minutes. After this soaking they are removed from the water and excess water is shaken off the packets. The packets are then placed in a third gallon of water and the procedure is again repeated. Rinsed packets are placed in plastic bags and are placed at sampling stations within three days. Packets can also be rinsed in jets of water for about one minute; this requires more water and is typically difficult to do in the field with water known to be free of tracer dyes.

Collection and Replacement of Samplers

Samplers are routinely collected and replaced from each of the sampling stations. The frequency of sampler collection and replacement is determined by the nature of the study. Collections at one week intervals are common, but shorter or longer collection frequencies are acceptable and sometimes more appropriate. Shorter sampling frequencies are often used in the early phases of a study to better characterize time of travel. As an illustration,

we often collect and change charcoal packets 1, 2, 4, and 7 days after dye injection. Subsequent sampling is then weekly.

Where convenient, the collected samplers should be briefly rinsed in the water being sampled. This is typically not necessary with well samples. The packets are shaken to remove excess water. Next, the packet (or packets) are placed in a plastic bag (Whirl-Pak bags are ideal). The bag is labeled on the outside with a permanent type felt marker pen. Use only pens that have black ink; colored inks may contain fluorescent dyes. The notations include station name or number and the date and time of collection. Labels must not be inserted inside the sample bags.

For most projects the Ozark Underground Laboratory supplies the Whirl-Pak bags. Prior to use, 1% of the new bags are randomly selected. Each bag is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

Collected samplers are kept in the dark to minimize algal growth on the charcoal prior to analysis work. We prefer (and in some studies require) that samples be placed on "blue ice" or ice upon collection and that they be shipped refrigerated with "blue ice" by overnight express. Do not ship samplers packed in ice since this can create a potential for cross contamination when the ice melts. Our experience indicates that it is not essential for samplers to be maintained under refrigeration, yet maintaining them under refrigeration clearly minimizes some potential problems. A product known as "green ice" should not be used for maintaining the samples in a refrigerated condition since this product contains a dye which could contaminate samples if the "green ice" container were to break or leak.

New charcoal samplers are routinely placed when used charcoal packets are collected. The last set of samplers placed at a stream or spring is commonly not collected.

Water samples are often collected. They should be collected in either glass or plastic; the Ozark Underground Laboratory routinely uses 50 ml research grade polypropylene copolymer Perfector Scientific vials (Catalog Number 2650) for such water samples. We need no more than 30 ml of water. The vials should be placed in the dark and refrigerated immediately after collection. They should be refrigerated until shipment. For most projects the Ozark Underground Laboratory supplies the vials. Prior to use, 1% of the new vials are randomly selected. Each vial is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

When water or charcoal samplers are collected for shipment to the Ozark Underground Laboratory they should be shipped promptly. We receive good overnight and second day air service from both UPS and Fed Ex; the Postal Service does not provide next day service to us. DHL works adequately for international shipments.

Each shipment of charcoal samplers or water samples must be accompanied by a sample tracking sheet. These sheets (which bear the title "Samples for Fluorescence Analysis") are provided by the Ozark Underground Laboratory and summarize placement and collection data. These sheets can be augmented by a client's chain of custody forms or any other relevant documentation. Figure 1 is one of our blank sample forms.

Figure 1. Sample Collection Data Sheet

OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project:____Week No:__________ Samples Collected By:_______________________________

Samples Shipped By:__________________________________Samples Received By:____

Date Samples Shipped:____/____/____ Date Samples Received:____/____/____ Time Samples Received:_____:_____ Return Cooler? Yes____________No_____________

Bill to:____Send Results to: ____

Analyze for: Fluorescein_____Eosine_____Rhodamine WT_____Other______________Ship cooler to: ____

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED**		**COLLECTED**		**# WATER REC'D**
				DATE	**TIME**	**DATE**	**TIME**	

COMMENTS:____

This sheet filled out by OUL staff? Yes_________________No_________________Charts for samples on this page proofed by

OUL:____   **Page _________ of _________**

Digital cameras can provide an independent verification of the date and time of sample collection. A digital photo can be taken of each sampling location during each sample collection. The photo file has a date and time created. If the camera's clock is set correctly, the photo provides an independent reference of the date and time the sample was collected. It is critical that the photos be taken in the order of sampling; that is, if one has forgotten to take a photo of the previous station and remembers at the current sampling station, do not go back and take the previous station photo.

When we are using a digital camera for sampling documentation we initially take a high resolution photo of each station that shows its context broadly enough for an observer to distinguish it from other sampling station, but narrow enough not to include another sampling station. Subsequently, we download he high-resolution photos into a reference folder and rename the photos to the station number and name. We also make a copy of the photo to another folder and digitally draw arrows to the exact locations of the samplers. During subsequent sampling events a low-resolution digital photo is taken of each sampling station in the order they are visited. It is best to establish a routine of taking the photo upon arrival at the station. We then download these photos into a folder whose name indicates the dates of the photos. We do not rename these photos.

Some sites do not permit cameras. An alternative is to collect a Global Positioning System (GPS) location during each visit. GPS records the date and time each point (sampling station) is visited. While these files are not as easy to review as photographs, they can be used with a base map to show which locations were visited at which dates and times.

Receipt of Samplers

Samplers shipped to the Ozark Underground Laboratory are refrigerated upon receipt. Prior to cleaning and analysis, samplers are assigned a laboratory identification number. All samples are logged in upon receipt.

It sometimes occurs that there are discrepancies between the chain-of-custody sheets and the actual samples received. When this occurs, a "Discrepancy Sheet" form is completed and sent to the shipper of the sample for resolution. A copy of this form is enclosed as Figure 2. The purpose of the form is to help resolve discrepancies, even when they may be minor.

Cleaning of Samplers

Samplers are cleaned by spraying them with jets of clean water. At the Laboratory we use unchlorinated water for the cleansing to minimize dye deterioration. Effective cleansing cannot generally be accomplished simply by washing in a conventional laboratory sink even if the sink is equipped with a spray unit.

The duration of packet washing depends upon the condition of the sampler. Very clean samplers may require less than a minute of washing; dirtier samplers may require several minutes of washing.

Figure 2. Discrepancy Sheet

OZARK UNDERGROUND LABORATORY, INC.					
DISCREPANCIES BETWEEN CHAIN-OF-CUSTODY SHEETS AND ACTUAL SAMPLES RECEIVED					**Page ______ of ______**
Company & Project Name:				**Date Rec'd by OUL:**	**Wk # ______________**
Lab #	**Sta #**	**Station Name**	**Date Pulled**	**Problem**	**Solution**
Comments:					

Elution of the Charcoal

There are various eluting solutions that can be used for the recovery of tracer dyes. The solutions typically include an alcohol, some water, and a strong basic solution such as aqueous ammonia.

The standard elution solution now used at the Ozark Underground Laboratory is a mixture of 5% aqua ammonia and 95% isopropyl alcohol solution and sufficient potassium hydroxide flakes to saturate the solution. The isopropyl alcohol solution is 70% alcohol and 30% water. The aqua ammonia solution is 29% ammonia. The potassium hydroxide is added until a super-saturated layer is visible in the bottom of the container. This super-saturated layer is not used for elution. Preparation of eluting solutions uses dedicated glassware which is never used in contact with dyes or dye solutions.

The eluting solution we use will elute fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. It is also suitable for separating fluorescein peaks from peaks of some naturally present materials found in some samplers.

Fifteen ml of the eluting solution is poured over the washed charcoal in a disposable sample beaker. The sample beaker is capped. The sample is allowed to stand for 60 minutes. After this time, the liquid is carefully poured off the charcoal into a new disposable beaker which has been appropriately labeled with the laboratory identification number. A few grains of charcoal may inadvertently pass into the second beaker; no attempt is made to remove these from the second sample beaker. After the pouring, a small amount of the elutant will remain in the initial sample beaker. After the transfer of the elutant to the second sample beaker, the contents of the first sample beaker (the eluted charcoal) are discarded.

Analysis on the Shimadzu RF-5000U or RF-5301

The Laboratory uses two Shimadzu spectrofluorophotometers. One is a model RF-5000U, and the other is a model RF-5301. Both of these instruments are capable of synchronous scanning. The RF-5301 is the primary instrument used; the RF-5000U is primarily used as a back-up instrument except for tracing studies which were begun using this instrument. The OUL also owns a Shimadzu RF-540 spectrofluorometer which is occasionally used for special purposes.

A sample of the elutant is withdrawn from the sample container using a disposable polyethylene pipette. Approximately 3 ml of the elutant is then placed in disposable rectangular polystyrene cuvette. The cuvette has a maximum capacity of 3.5 ml. The cuvette is designed for fluorometric analysis; all four sides and the bottom are clear. The spectral range of the cuvettes is 340 to 800 nm. The pipettes and cuvettes are discarded after one use.

The cuvette is then placed in the RF-5000U or the RF-5301. Both instruments are controlled by a programmable computer. Each instrument is capable of conducting substantial data analysis.

Our instruments are operated and maintained in accordance with the manufacturer's recommendations. On-site installation of the instruments and a training session on the use of spectrofluorophotometers was provided by Delta Instrument Company.

Our typical analysis of an elutant sample where fluorescein, eosine, rhodamine WT, or sulforhodamine B dyes may be present includes synchronous scanning of excitation and emission spectra with a 17 nm separation between excitation and emission wavelengths. For these dyes, the excitation scan is from 443 to 613 nm; the emission scan is from 460 to 630 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is “fast” on the RF-5301. The typical sensitivity setting used on both instruments is "high."

Our typical analysis of an elutant sample where pyranine dye may be present includes a synchronous scanning of excitation and emission spectra with a 35 nm separation between excitation and emission wavelengths. For this dye, the excitation scan is from 360 to 600 nm; the emission scan is from 395 to 635 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is “fast” on the RF-5301. The typical sensitivity setting on both instruments is "high."

Excitation and emission slit width settings vary between the two instruments. The widths vary with the dyes for which we are sampling and for the matrix in which the dyes may be present. Excitation and emission slit width settings are summarized in Table 1.

Table 1. Excitation and emission slit width settings routinely used for dye analysis. Units are nanometers (nm)

Parameter	**RF5000U**	**RF5301**
Excitation slit for Eos, Fl, RWT, and SRB in elutant	5	3
Emission slit for Eos, Fl, RWT, and SRB in elutant	3	1.5
Excitation slit for Eos, Fl, RWT, and SRB in water	5	5
Emission slit for Eos, Fl, RWT, and SRB in water	10	3
Excitation slit for Pyranine in elutant	5	5
Emission slit for Pyranine in elutant	3	3
Excitation slit for Pyranine in pH adjusted water	5	5
Emission slit for Pyranine in pH adjusted water	3	3

Eos = Eosine. Fl = Fluorescein. RWT = Rhodamine WT. SRB = Sulforhodamine B.

The instrument produces a plot of the synchronous scan for each sample; the plot shows emission fluorescence only. The synchronous scans are subjected to computer peak picks; peaks are picked to the nearest 0.1 nm. All samples run on the RF-5000U and

RF-5301 are stored on disk and printed on normal typing paper with a laser printer; sample information is printed on the chart.

All samples analyzed are recorded in a bound journal.

Quantification

We calculate the magnitude of fluorescence peaks for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. Dye quantities are expressed in microgram per liter (parts per billion; ppb). On the RF-5000U and RF-5301 the dye concentrations are calculated by separating fluorescence peaks due to dyes from background fluorescence on the charts, and then calculating the area within the fluorescence peak. This area is proportional to areas obtained from standard solutions.

Where there are multiple fluorescence peaks it is sometimes necessary to calculate dye concentrations based upon the height of the fluorescence peak rather that the area. The heights of the peaks are also proportional to dye concentrations.

We run dye concentration standards each day the machine is used. Ten separate standards are used; the standard or standards appropriate for the analysis work being conducted are selected. All standards are based upon the as-sold weights of the dyes. The standards are as follows:

1) 10 ppb fluorescein and 100 ppb rhodamine WT in well water from the Jefferson City-Cotter Formation
2) 10 ppb eosine in well water from the Jefferson City-Cotter Formation
3) 100 ppb sulforhodamine B in well water from the Jefferson City-Cotter Formation.
4) 10 ppb pyranine in well water from the Jefferson City-Cotter Formation. A sample of the standard is placed for at least two hours in a high ammonia atmosphere to adjust the pH to a value of 9.5 or greater.
5) 10 ppb fluorescein and 100 ppb rhodamine WT in elutant.
6) 10 ppb eosine in elutant.
7) 100 ppb sulforhodamine B in elutant.
8) 10 ppb pyranine in elutant.

Preparation of Standards

Dye standards are prepared as follows:

Step 1. A small sample of the as-sold dye is placed in a pre-weighed sample vial and the vial is again weighed to determine the weight of the dye. We attempt to use a sample weighing between 1 and 5 grams. This sample is then diluted with well water to make a 1% dye solution by weight (based upon the as-sold weight of the dye). The resulting dye solution is allowed to sit for at least four hours to insure that all dye is fully dissolved.

Step 2. One part of each dye solution from Step 1 is placed in a mixing container with 99 parts of well water. Separate mixtures are made for fluorescein,

rhodamine WT, eosine, sulforhodamine B, and pyranine. The resulting solutions contain 100 mg/l dye (100 parts per million dye). The typical prepared volume of this mixture is appropriate for the sample bottles being used; we commonly prepare about 50 ml. of the Step 2 solutions. The dye solution from Step 1 that is used in making the Step 2 solution is withdrawn with a digital Finnpipette which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

The Step 2 solution is called the long term standard. Ozark Underground Laboratory experience indicates that Step 2 solutions, if kept refrigerated, will not deteriorate appreciably over periods of less than a year. Furthermore, these Step 2 solutions may last substantially longer than one year.

Step 3. A series of intermediate-term dye solutions are made. Approximately 45 ml. of each intermediate-term dye solution is made. All volume measurements of less than 5 ml are made with a digital Finnpipette. (see description in Step 2). All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value. The following solutions are made; all concentrations are based on the as-sold weight of the dyes:

1) A solution containing 1 ppm fluorescein dye and 10 ppm rhodamine WT dye.

2) A solution containing 1 ppm eosine.

3) A solution containing 10 ppm sulforhodamine B dye.

4) A solution containing 1 ppm pyranine.

Step 4. A series of eight short-term dye standards are made from solutions in Step 3. These standards were identified earlier in this section. In the experience of the Ozark Underground Laboratory these standards have a useful shelf life in excess of one week. However, in practice, they are kept under refrigeration and new standards are made weekly.

Dilution of Samples

Samples with peaks that have arbitrary fluorescence unit values of 500 or more are diluted a hundred fold to ensure accurate quantification.

Some water samples have high turbidity or color which interferes with accurate detection and measurement of dye concentrations. It is often possible to dilute these samples and then measure the dye concentration in the diluted sample.

The typical dilution is 100 fold. One part of the test sample is combined with 99 parts of water (if the test sample is water) or with 99 parts of the standard elutant (if the test sample is elutant). Typically, 0.300 ml of the test solution is combined with 29.700 ml

of water (or elutant as appropriate) to yield a new test solution. All volume measurements of less than 5 ml are made with a digital Finnpipette. which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value.

The water used for dilution is from a carbonate aquifer. All dilution water is pH adjusted to greater than pH 9.5 by holding it overnight in open containers in a high ammonia concentration chamber.

Quality Control

Laboratory blanks are run for every sample where the last two digits of the laboratory numbers are 00, 20, 40, 60, or 80. A charcoal packet is placed in a pumping well sampler and at least 25 gallons of unchlorinated water is passed through the sampler at a rate of about 2.5 gallons per minute. The sampler is then subjected to the same analytical protocol as all other samplers.

System functioning tests of the analytical instruments are conducted in accordance with the manufacturer's recommendations.

All materials used in sampling and analysis work are routinely analyzed for the presence of any compounds that might create fluorescence peaks in or near the acceptable wavelength ranges for any of the tracer dyes. This testing typically includes approximately 1% of materials used.

Reports

Reports are provided in accordance with the needs of the client. We typically provide copies of the analysis graphs and a listing of stations and samples where dye was detected. The reports indicate dye concentrations.

Work at the Ozark Underground Laboratory is directed by Mr. Thomas Aley. Mr. Aley has 45 years of professional experience in hydrology and hydrogeology. He is certified as a Professional Hydrogeologist (Certificate #179) by the American Institute of Hydrology. Mr. Aley has 40 years of professional experience in groundwater tracing with fluorescent tracing agents.

CRITERIA FOR DETERMINATION OF POSITIVE DYE RECOVERIES

Normal Emission Ranges and Detection Limits

The OUL has established normal emission fluorescence wavelength ranges for each of the five dyes. The normal acceptable range equals mean values plus and minus two standard deviations. These values are derived from actual groundwater tracing studies conducted by the OUL.

The detection limits are based upon concentrations of dye necessary to produce emission fluorescence peaks where the signal to noise ratio is 3. The detection limits are realistic for most field studies since they are based upon results from actual field samples rather than being based upon values from spiked samples in a matrix of reagent water or the elutants from unused activated carbon samplers. In some cases detection limits may be smaller than reported if the water being sampled has very little fluorescent material in it. In some cases detection limits may be greater than reported; this most commonly occurs if the sample is turbid due to suspended material or a coloring agent such as tannic compounds. Turbid samples are typically allowed to settle, centrifuged, or, if these steps are not effective, diluted prior to analysis.

Table 2 provides normal emission wavelength ranges and detection limits for the five dyes when analyzed on the OUL’s RF-5000U spectrofluorophotometer. Table 3 provides similar data for the OUL’s RF-5301. As indicated earlier in Table 1, the analytical protocols used on the two instruments are somewhat different, especially in regard to the widths of excitation and emission slit settings.

Table 2. RF-5000U Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	533.0 to 539.6	0.035
Eosine in Water	529.6 to 538.4	0.008
Fluorescein in Elutant	510.7 to 515.0	0.010
Fluorescein in Water	505.6 to 510.5	0.0005
Pyranine in Elutant	500.4 to 504.6	0.055
Pyranine in Water*	495.5 to 501.5	0.030
Rhodamine WT in Elutant	561.7 to 568.9	0.275
Rhodamine WT in Water	569.4 to 574.8	0.050
Sulforhodamine B in Elutant	567.5 to 577.5	0.150
Sulforhodamine B in Water	576.2 to 579.7	0.040

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Table 3. RF-5301 Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	538.1 to 543.9	0.050
Eosine in Water	533.4 to 537.9	0.015
Fluorescein in Elutant	514.0 to 518.1	0.025
Fluorescein in Water	508.0 to 511.7	0.002
Pyranine in Elutant	502.1 to 508.1	0.015
Pyranine in Water*	498.4 to 504.4	0.010
Rhodamine WT in Elutant	565.4 to 572.0	0.170
Rhodamine WT in Water	572.7 to 578.0	0.015
Sulforhodamine B in Elutant	572.8 to 579.6	0.080
Sulforhodamine B in Water	580.1 to 583.7	0.008

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Criteria for Determining Positive Dye Recoveries

The following sections identify normal criteria used by the OUL for determining positive dye recoveries. Beginning January 1, 2001, the primary analytical instrument in use at the OUL was the RF-5301; the RF-5000U was the principal backup instrument. Studies which were in progress prior to January 1, 2001 continued to have samples analyzed on the RF-5000U.

Except for pyranine dye, the analytical protocol used for the RF-5301 provides for the use of narrower excitation and/or emission slit settings than the RF-5000U protocol. This enhances our ability to discriminate between dyes and other fluorescent compounds. The protocol which is possible with the RF-5301 (as contrasted with the RF-5000U) also provides for a better balance in the sizes of the fluorescence peaks associated with an equal concentration of all of the dyes.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Eosine</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 538.1 to 543.9 nm for samples analyzed by the RF-5301. The range must be 533.0 to 539.6 nm for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the eosine detection limit in elutant samples is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb. For the RF-5000U the eosine detection limit in elutant samples is 0.035 ppb, thus this dye concentration limit equals 0.105 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of eosine. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of eosine. In addition, there must be no other factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Eosine</u> Dye Recoveries <u>in Water</u> Samples.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following three criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. The associated charcoal samplers for the station should also contain eosine dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 533.4 to 537.9 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 529.6 to 538.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our eosine detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb. For samples analyzed on the 5000U the detection limit is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Fluorescein</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is often some fluorescence background in the range of fluorescein dye present at some of the stations used in groundwater tracing studies. We routinely conduct background sampling prior to the introduction of any tracer dyes to characterize this background fluorescence and to identify the existence of any tracer dyes which may be present in the area. The fact that a fluorescence peak is identified in our analytical results is <u>not</u> proof that it is fluorescein dye or that it is fluorescein dye from the trace of concern. The following 4 criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye recoveries from our tracing work.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 514.0 to 518.1 nm for samples analyzed by the RF-5301. The range must be 510.7 to 515.0 for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the fluorescein detection limit in elutant samples is 0.025 ppb, thus this dye concentration limit equals 0.075 ppb. For the RF-5000U, the fluorescein detection limit in elutant samples is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of fluorescein. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of fluorescein. In addition, there must be no other factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Fluorescein Dye Recoveries in Water Samples.

There is commonly some fluorescence background in the general range of fluorescein dye at some sampling stations used in groundwater tracing studies. The following criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain fluorescein dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 508.0 to 511.7 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 505.6 to 510.5 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our fluorescein detection limit in water samples analyzed on the RF-5301 is 0.002 ppb, thus this dye concentration limit equals 0.006 ppb. For the RF-5000U the detection limit is 0.0005 ppb, thus this dye concentration limit equals 0.0015 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Rhodamine WT Dye Recoveries in Elutants from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of Rhodamine WT dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT.

Criterion 1. For samples analyzed on the RF-5301, there must be at least one fluorescence peak at the station in question in the range of 565.4 to 572.0 nm. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 561.7 to 568.9 nm.

Criterion 2. The dye concentration associated with the Rhodamine WT peak must be at least 3 times the detection limit. For the RF-5301, the detection limit in elutant samples is 0.170 ppb, thus this dye concentration limit equals 0.510 ppb. For the RF-5000U, the detection limit in elutant samples is 0.275 ppb, thus this dye concentration limit equals 0.825 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of Rhodamine WT. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Rhodamine WT</u> Dye Recoveries <u>in Water</u> Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain Rhodamine WT dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be Rhodamine WT dye from the tracing work under investigation. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 572.7 to 578.0 nm. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 569.4 to 574.8 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our Rhodamine WT detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit is 0.045 ppb. For samples analyzed on the RF-5000U the detection limit is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Sulforhodamine B</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of sulforhodamine B dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 567.5 to 577.5 nm. The acceptable range for samples analyzed on the RF-5301 is 572.8 to 579.6 nm.

Criterion 2. The dye concentration associated with the sulforhodamine B peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.150 ppb, thus this dye concentration limit equals 0.450 ppb. For the RF-5301, the detection limit in elutant samples is 0.080 ppb, thus this dye concentration limit equals 0.240 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of sulforhodamine B. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Sulforhodamine B dye Recoveries in Water Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain sulforhodamine B dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be sulforhodamine B dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 576.2 to 579.7 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 580.1 to 583.7 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.040 ppb, thus this dye concentration limit equals 0.120 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Pyranine Dye Recoveries in Elutants from Charcoal Samplers.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

There is often some detectable fluorescence background encountered in the general range of pyranine dye in groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be pyranine.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 500.4 to 504.6 nm. The acceptable range for samples analyzed on the RF-5301 is 502.1 to 508.1 nm.

Criterion 2. The dye concentration associated with the pyranine dye peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.055 ppb, thus this dye concentration limit equals 0.165 ppb. For the RF-5301, the detection limit in elutant samples is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of pyranine dye. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Pyranine</u> Dye Recoveries <u>in Water Samples</u>.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

The fluorescence of pyranine decreases below a pH of about 9.5. Prior to analysis water samples are placed in a high ammonia atmosphere for at least two hours. A pyranine dye in water standard is placed in the same atmosphere as the samples. Prior to analysis samples are tested to insure that their pH is 9.5 or greater. If pyranine dye concentrations in a sample are so great as to require dilution for quantification of the dye concentration the diluting water used is OUL reagent water which has been pH adjusted in a high ammonia atmosphere.

The following criteria are used to identify fluorescence peaks which are deemed to be pyranine dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain pyranine dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be pyranine dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 495.5 to 501.5 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 498.4 to 504.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.030 ppb, thus this dye concentration limit equals 0.090 ppb.

APPENDIX C

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Status Report
Surface Geophysical Investigation in and around Silver Springs, Ocala, Florida

The surface geophysical survey was completed in January 2010. This work included utilizing four different surface geophysical techniques at potential dye injection points (Figure 1) as well as along production survey lines which bound Silver Springs on three sides (Figure 2). The surface geophysical techniques included ground penetrating radar, multi-channel analysis of surface waves, resistivity imaging and microgravity. The distribution of measurement is summarized in Table 1.

Table 1. Summary of Geophysical Work Completed

Site	GPR	MASW	Resistivity	Microgravity
Orange Lake Cave	X	X	X	X
Spanish Palms	X	X	X	
Appleton Museum	X	X	X	
Tuscawilla Park	X	X	X	
Pontiac Pit		X		
Line A		X		
Line B	X	X	2 soundings	1700 feet
Line C	X	X	2 soundings	2300 feet

Orange Lake Cave

Orange Lake Cave is located about 16 miles to the northwest of the springs near the intersection of highways 441 and 318. This is south of a dye injection point at Orange Lake. There are several vertical fissues/dissolutioned enlarged fractures/caves that extend from the quarry wall downward through the quarry floor. A geophysical survey line 440 feet in length was established on the quarry floor that crosses at least one known vertical fissure at station 75. All four surface geophysical methods were run along this survey line to test the response of the vertical cave/fissure. Figure 3 is a composite plot of all data acquired along this survey line.

Spanish Palms
A retention pond in the southern portion of the Spanish Palms residential area will be used for a dye injection point. The pond is located just south of NE 4th Place between NE 65th Court and NE 66 Terrace. This is an open grassy area with some utilities in place. The survey line was located on the south side of the retention pond between the pond and southern property fence and was 550 feet long. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 4 is a composite plot of all data acquired along this survey line.

Appleton Museum
The retention pond in front of the Appleton Museum as experienced many collapse features over time. The pond will be used as a dye injection point. The survey line ran roughly south to north through the pond and was 360 feet long. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 5 is a composite plot of all data acquired along this survey line.

Tuscawilla Park
Tuscawilla Park is located 5 miles west of the springs. Large lakes at the park take surface water runoff from the surrounding residential and industrial areas. Two overflow drainage wells are located at the park. The one to the south was of interest due to the large amount of water it takes and will be used as a dye injection point.

A survey line was established running south to north through the park for 1,100 feet. The drainage well was located about 8 feet west of the survey line at station 170 feet. Three surface geophysical methods were acquired along this survey line and include ground penetrating radar, MASW and resistivity imaging. No microgravity data was acquired at this site. Figure 6 is a composite plot of all data acquired along this survey line.

Pontiac Pit
Pontiac Pit is located 6 miles southwest of the springs and consists of a series of retention ponds that have an overflow drainage well into a collapse feature with a cave located at the bottom (the cave entrance has been covered). The construction of the retention ponds and associated subsurface drainage structures has significantly changed the landscape of the area. Therefore, two 600 foot survey lines using MASW only were established at this location. One of the survey lines runs along the eastbound lanes of 32nd Street and the other

survey line runs in a grassy area to the west of 441. Figure 7 shows the MASW data from the two survey lines.

Production Lines

Three production survey lines were selected in relatively close proximity to Silver Springs. They were selected to bound three sides of Silver Springs (north, west and east). Figure 2 shows the survey lines and distribution of the surface geophysical techniques used along these lines.

Line A – Highway 40, North of Silver Springs

Line A extends from Highway 35 eastward for 4200 feet. Due to the traffic and safety concerns, this line was run with one method only, MASW. Figure 8 shows the MASW data from this survey line.

Line B – Employee Entrance Road, South of Silver Springs

Line B extends from Highway 35 eastward for 4600 feet. This was a very quiet place to work with limited traffic. All four methods were used over some portion, if not all, of the survey line. Figure 9 shows the MASW data from this survey line. Figure 10 shows the GPR (250 MHz antenna) data from this survey line. Figure 11 is a composite plot of data between stations 600 and 1800. Figure 12 is a composite plot of data between stations 3250 and 4350.

Line C - Highway 35, West of Silver Springs

Line C extends from Highway 40 south for 5700 feet. All work was completed to the west of the actual roadway in the construction area for the road widening. All four methods were used over some portion, if not all, of the survey line. Figure 13 shows the MASW data from this survey line. Figure 14 shows the GPR (250MHz antenna) data from this survey line. Figure 15 is a composite plot of data between stations 2200 and 4100. Figure 16 is a composite plot of data between stations 4300 to 5600.

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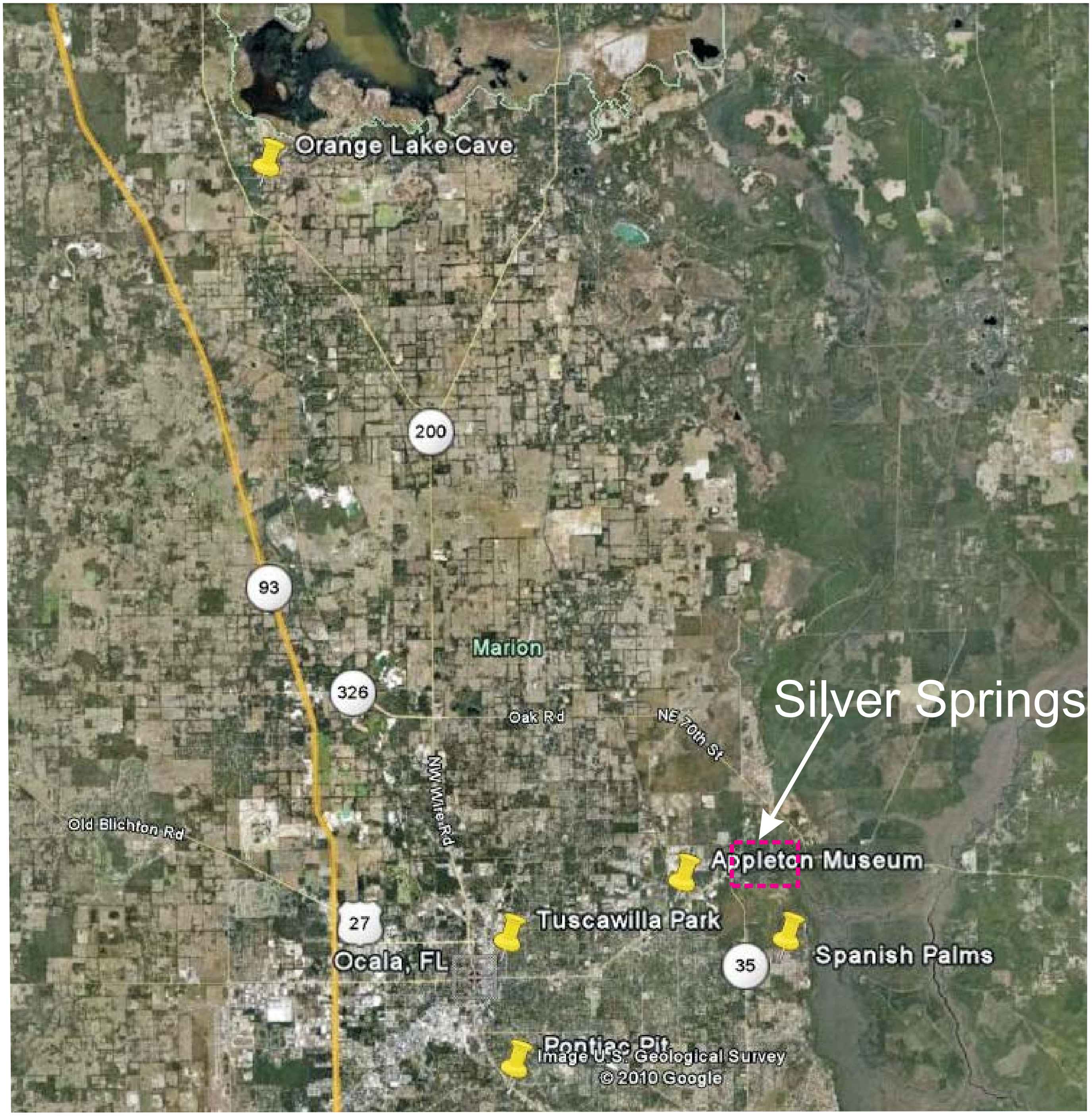

Figure 1
Site map showing
Silver Springs and areas
of detailed geophysics

TECHNOS

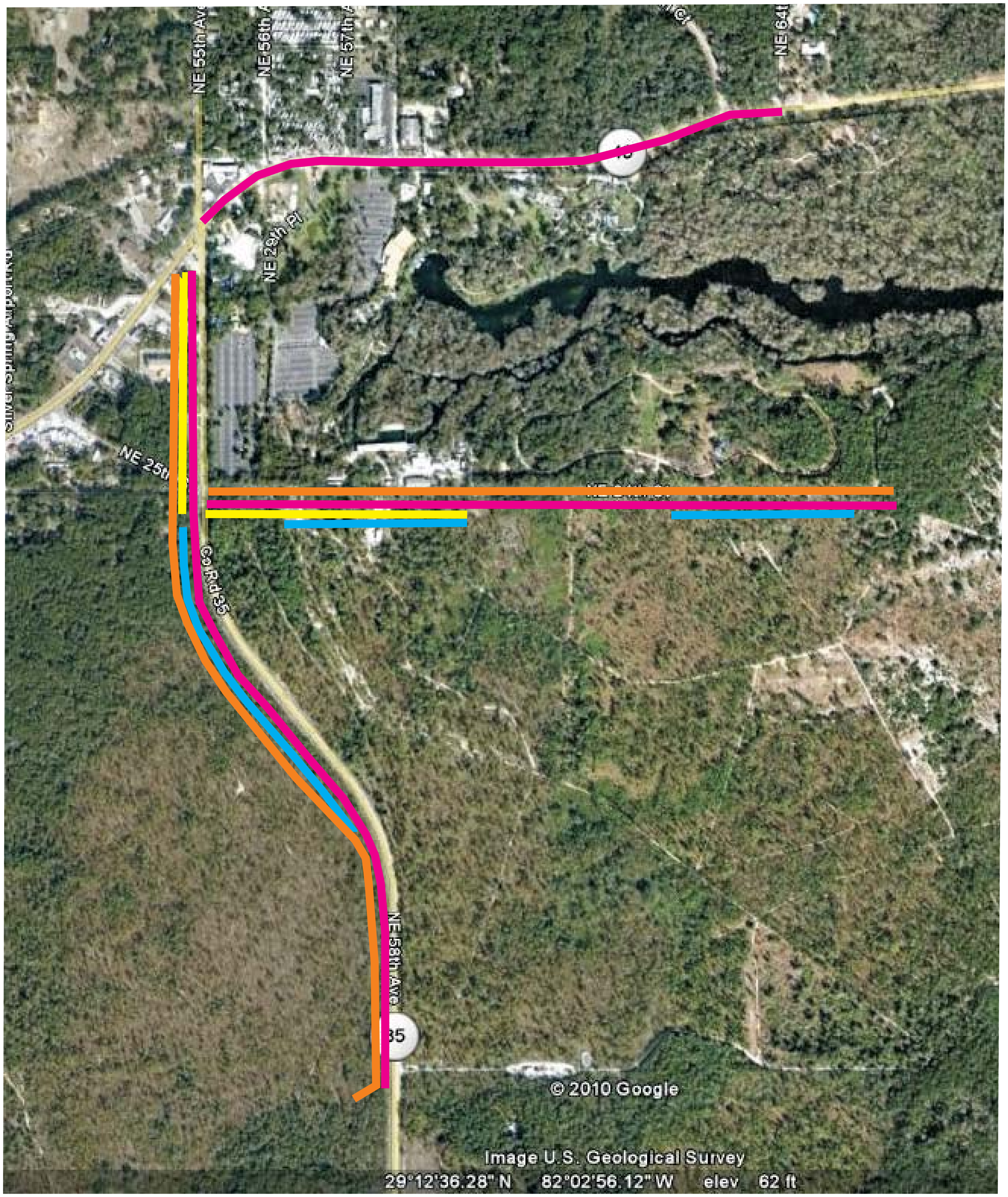

Figure 2
Site map showing
production geophysics

TECHNOS

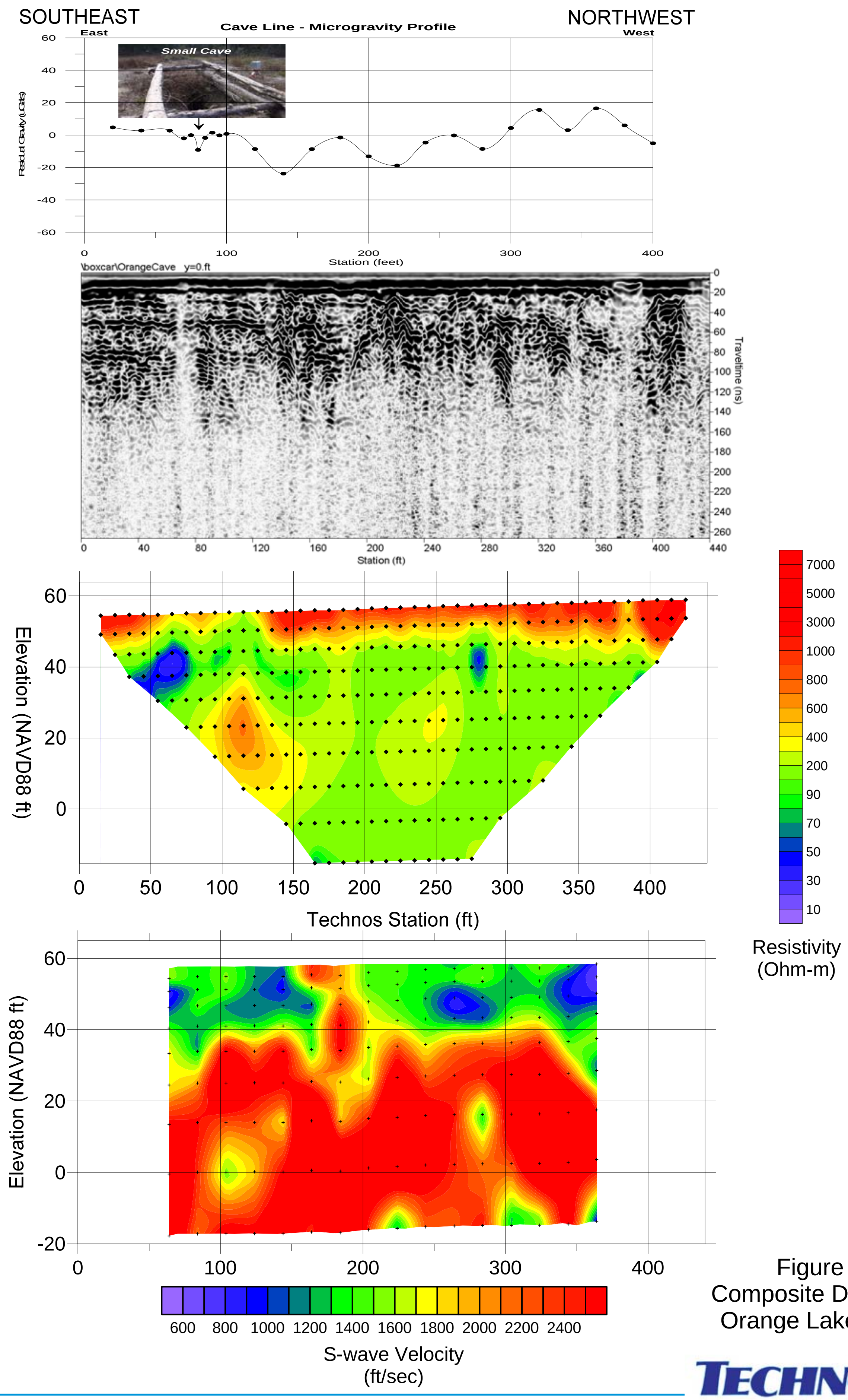

Figure 3
Composite Data Plot
Orange Lake Cave

TECHNOS

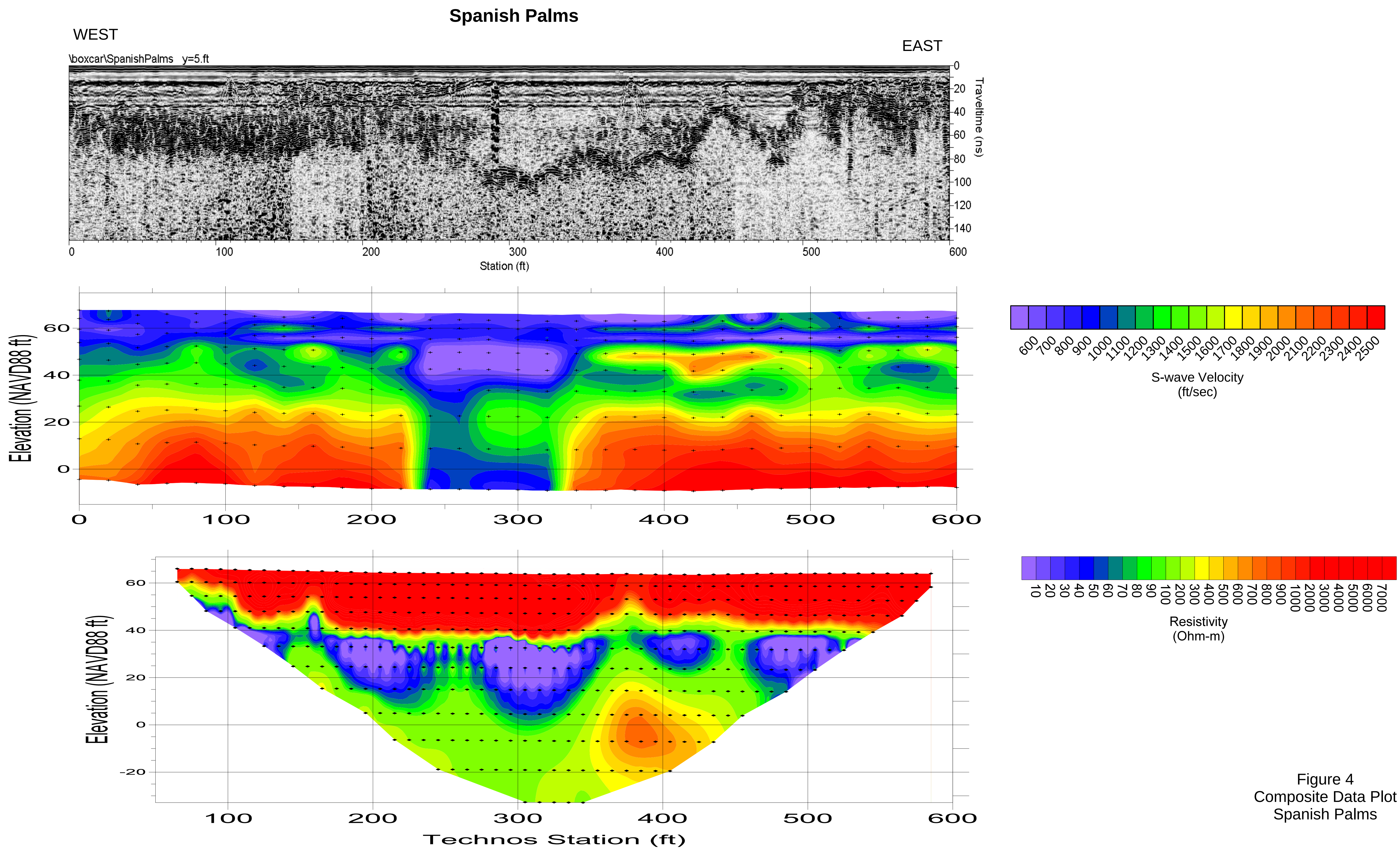

Figure 4
Composite Data Plot
Spanish Palms

TECHNOS

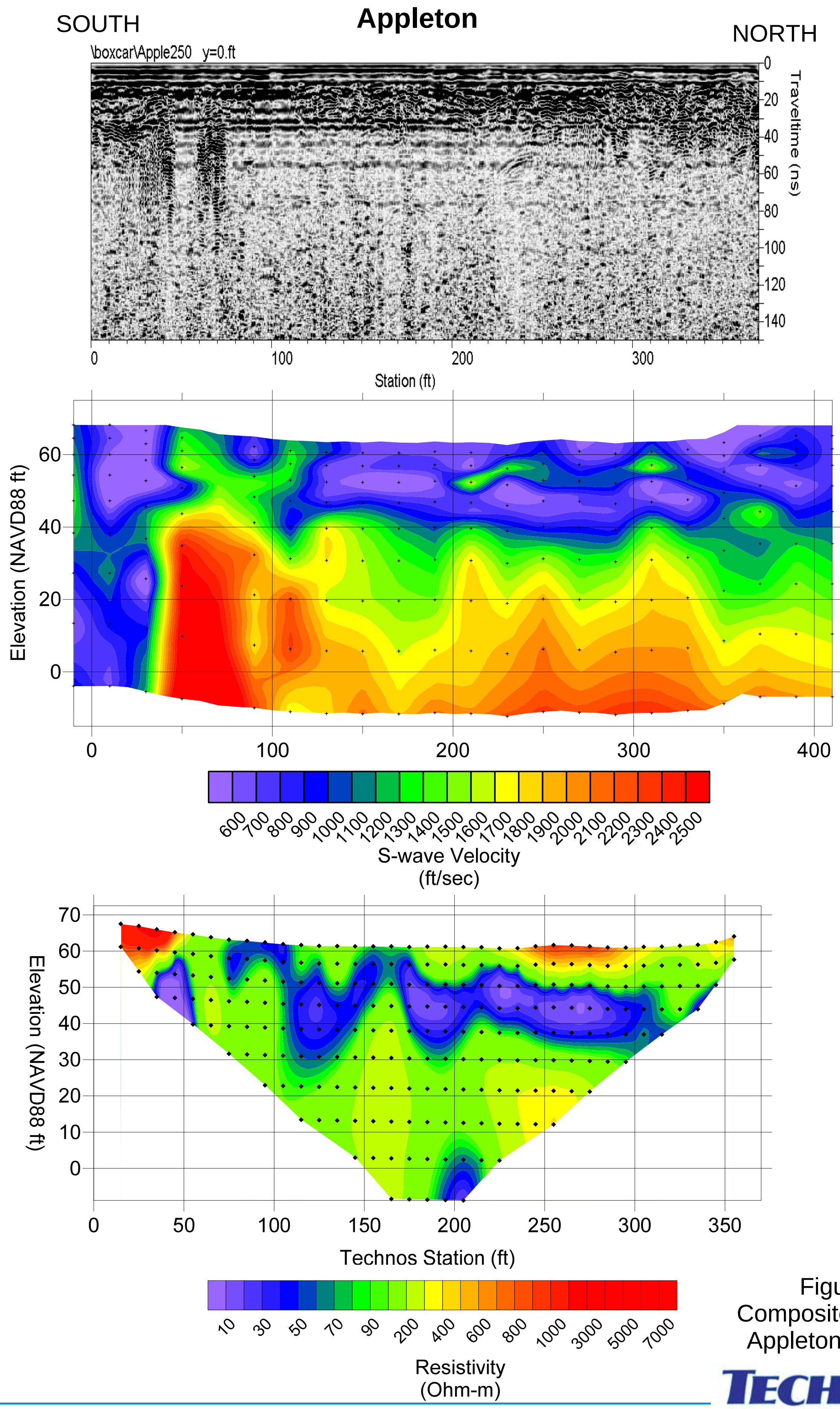

Figure 5
Composite data plot
Appleton Museum

TECHNOS

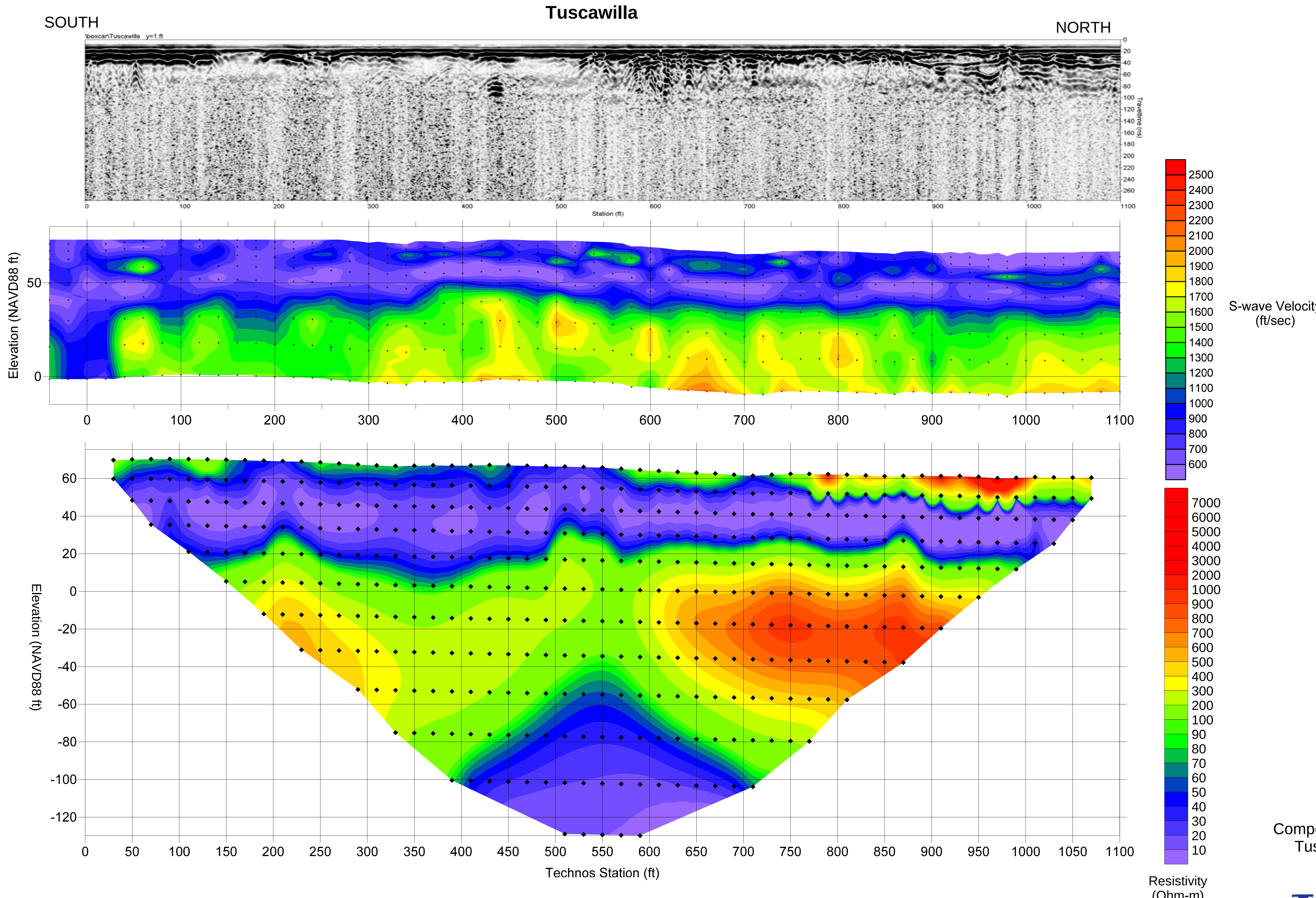

Figure 6
Composite Data Plot
Tuscawill Park

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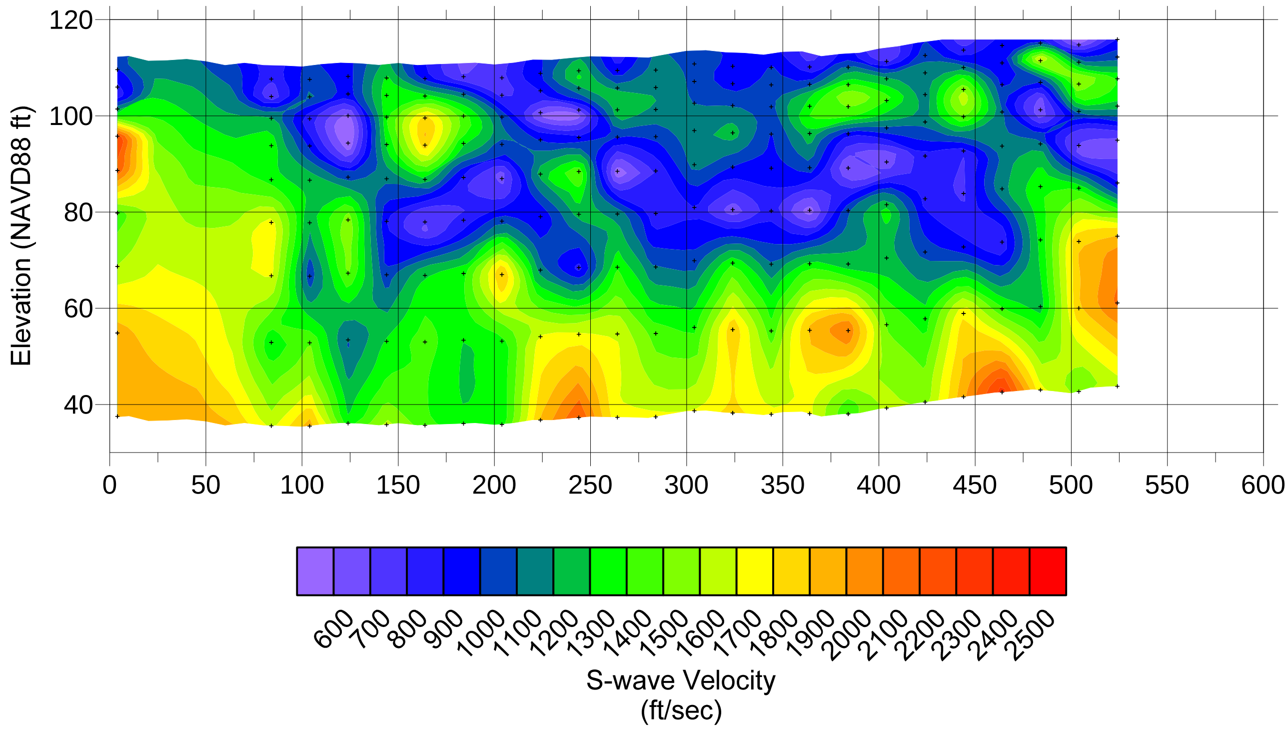
WEST EAST

Pontiac Pit (E-W) Line



SOUTH NORTH

Pontiac Pit (N-S) Line

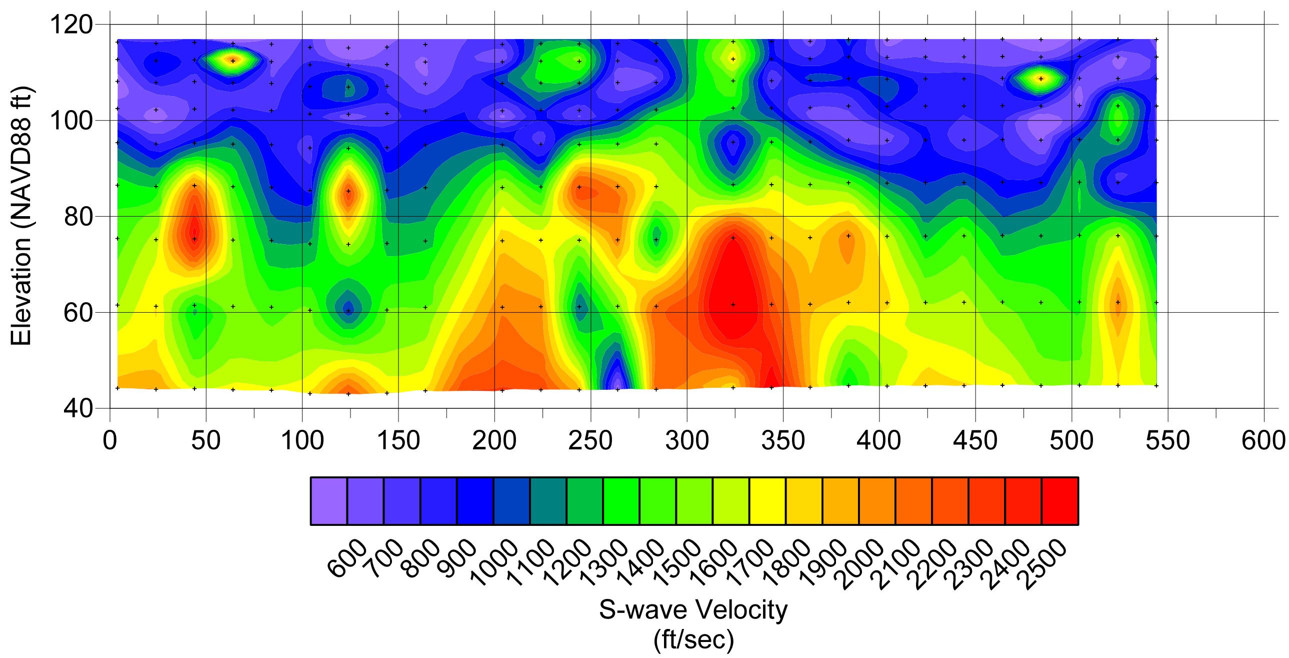


Figure 7
Composite Data Plot
Pontiac Pit

TECHNOS

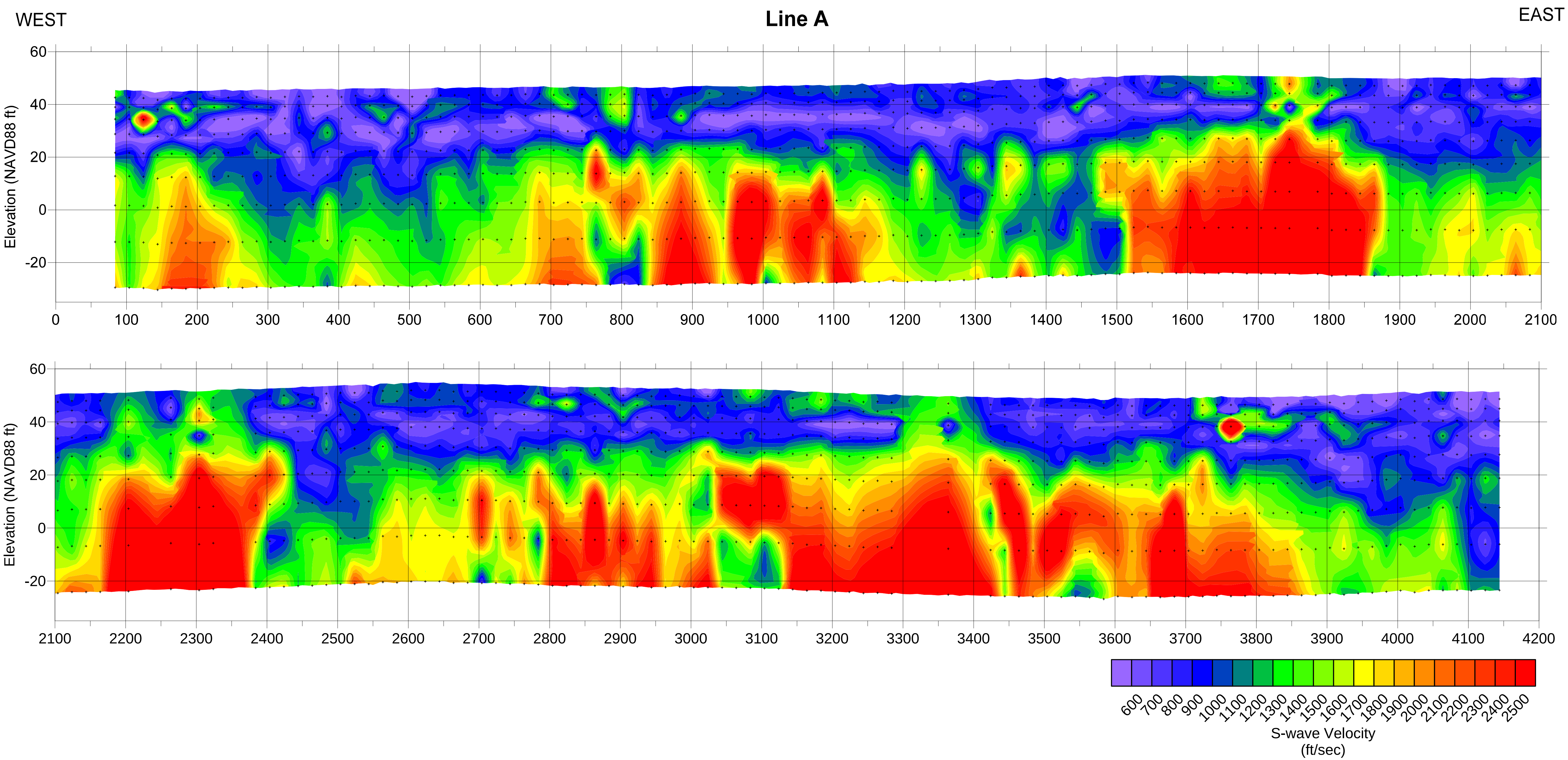


Figure 8
Line A - MASW Data

TECHNOS

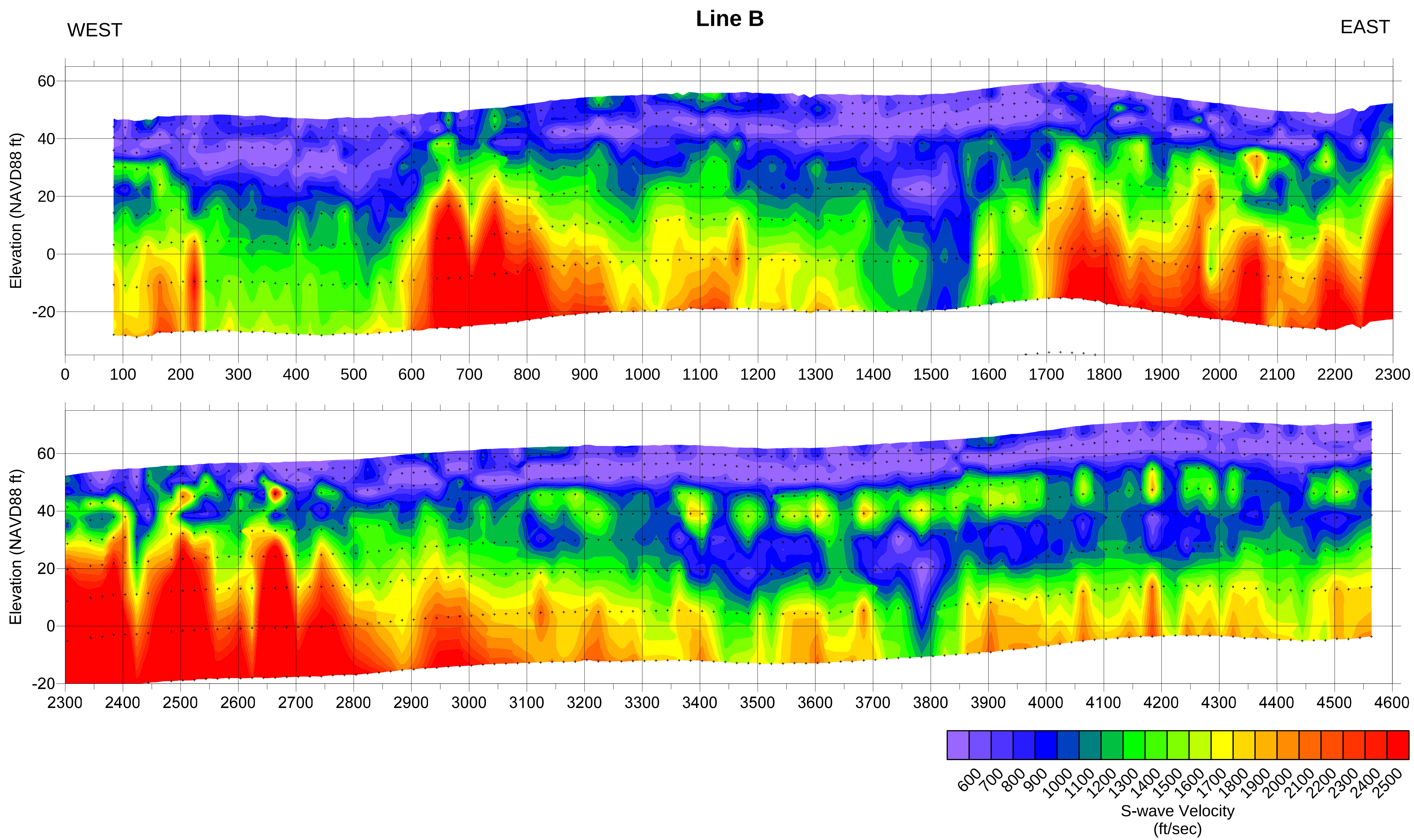


Figure 9
Line B - MASW Data

TECHNOS

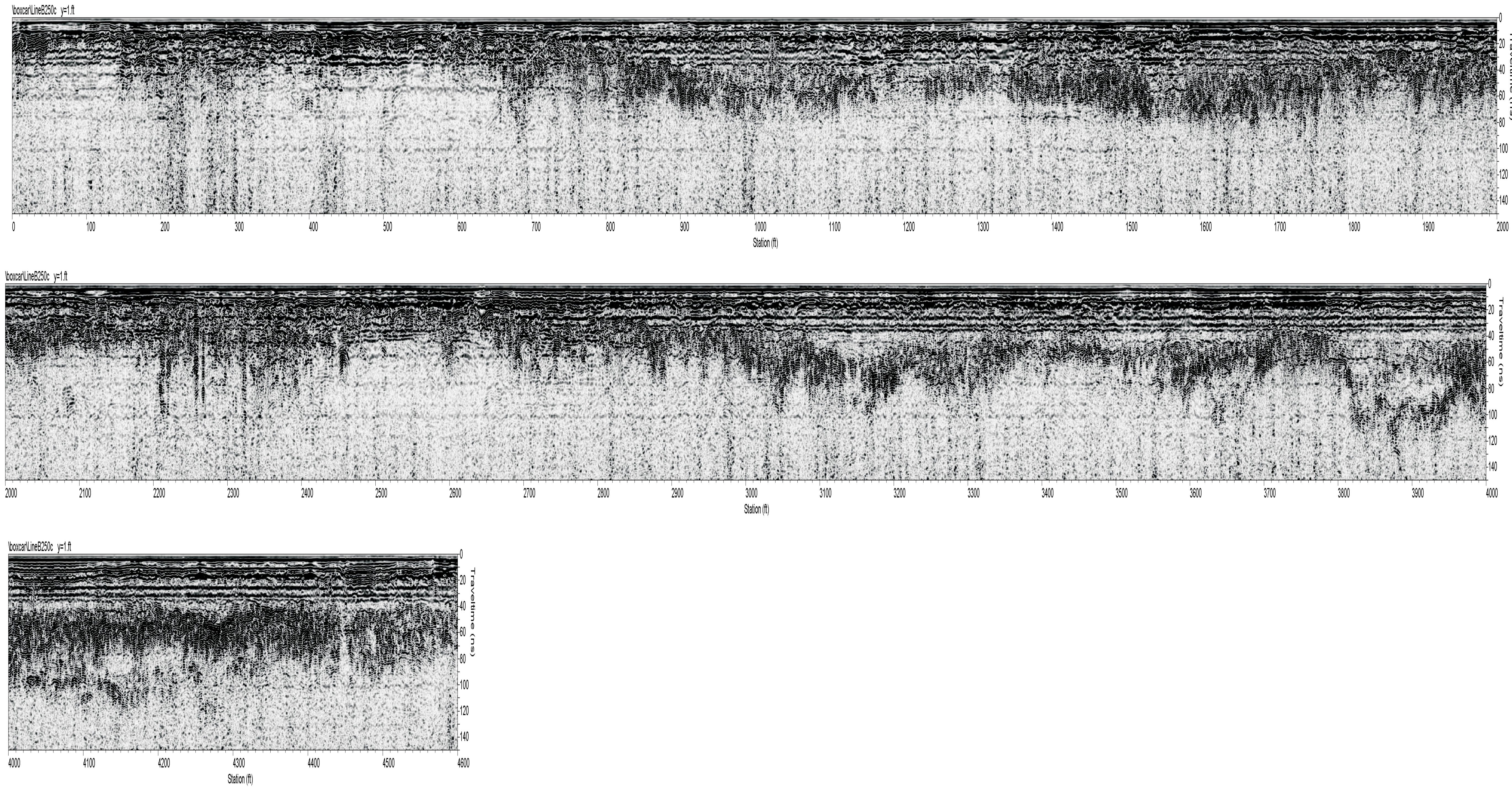


Figure 10
Line B - GPR

TECHNOS

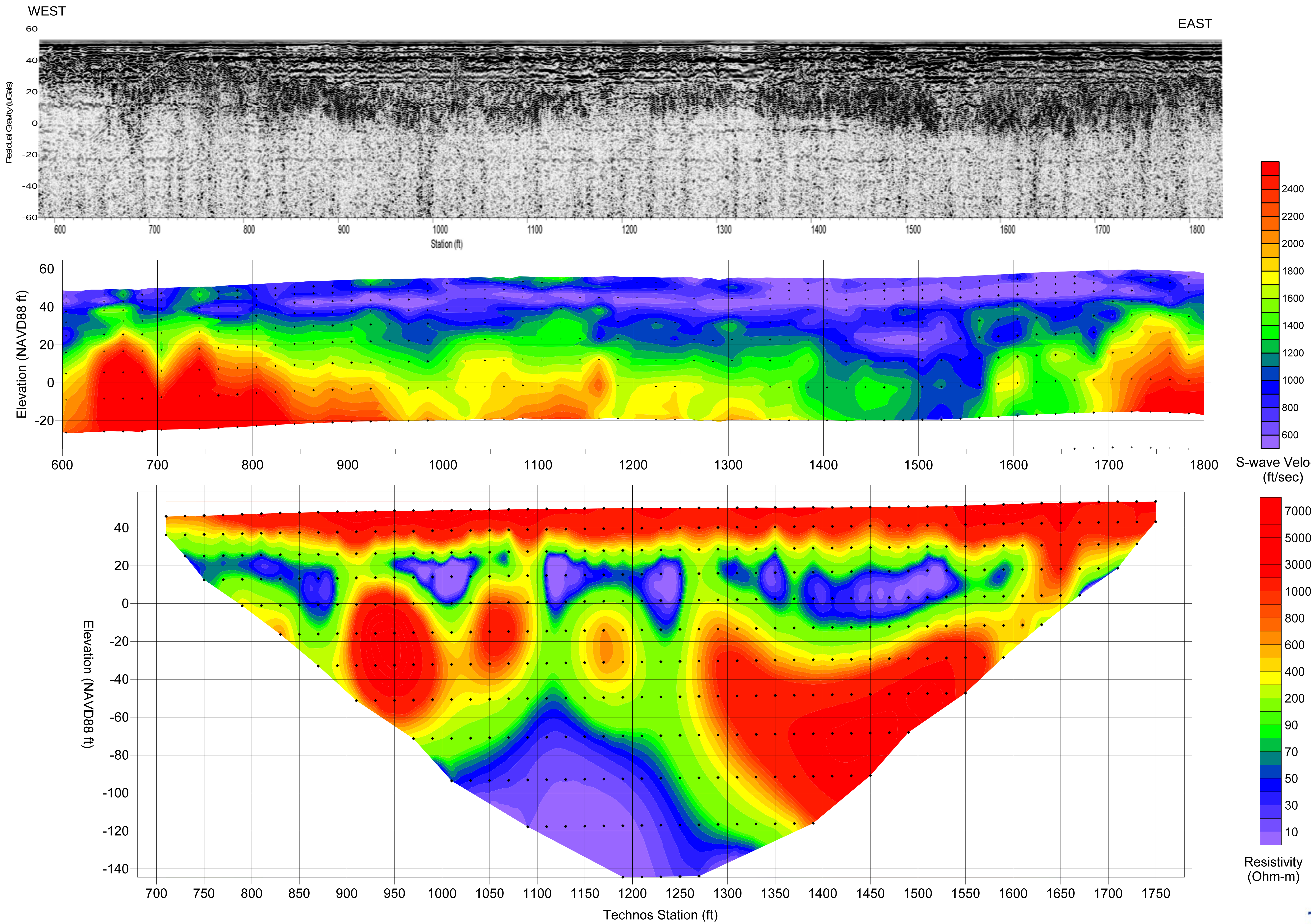


Figure 11
Composite Data Plot
Line B - West

TECHNOS

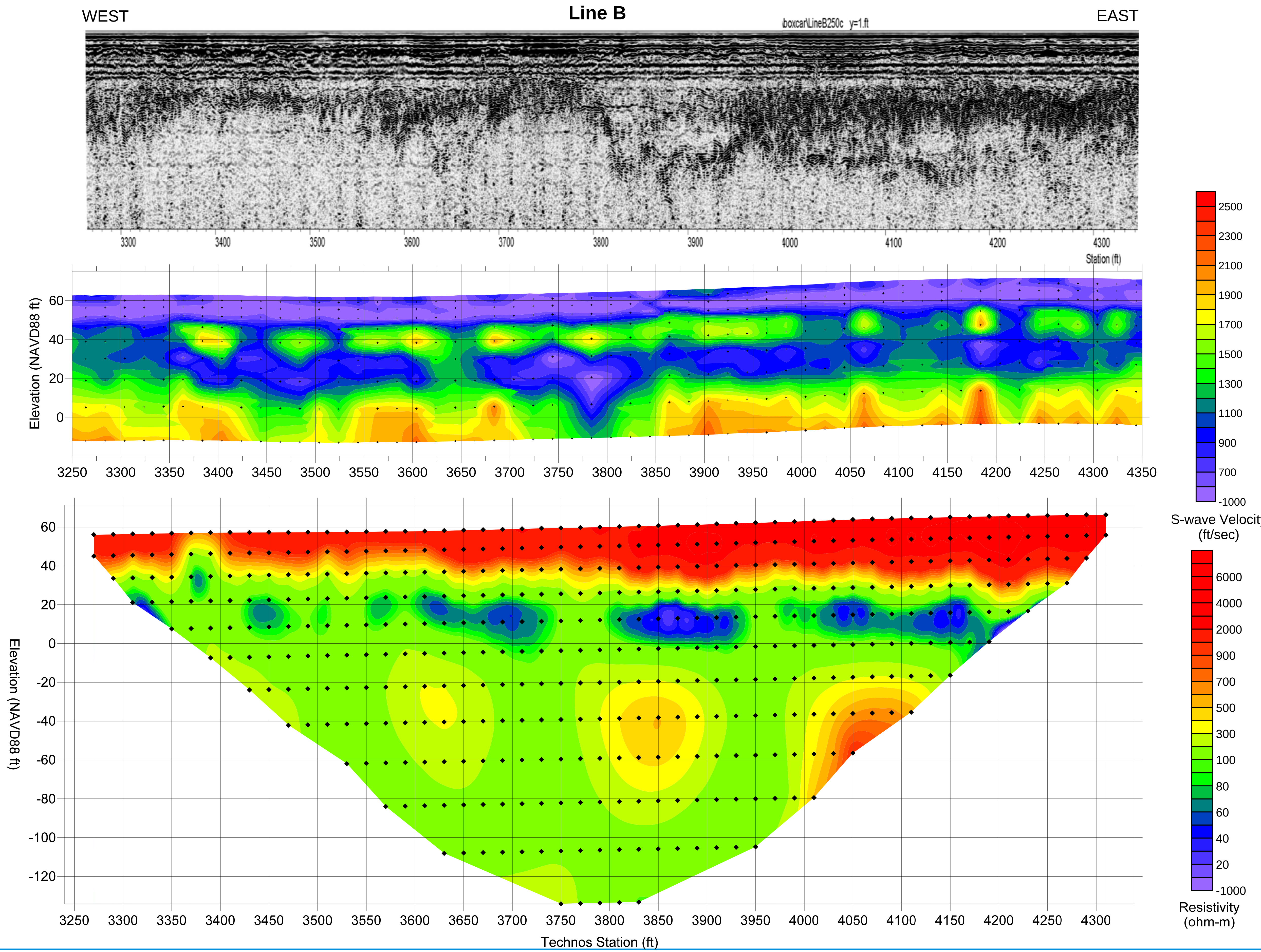


Figure 12
Composite Data Plot
Line B - East

TECHNOS

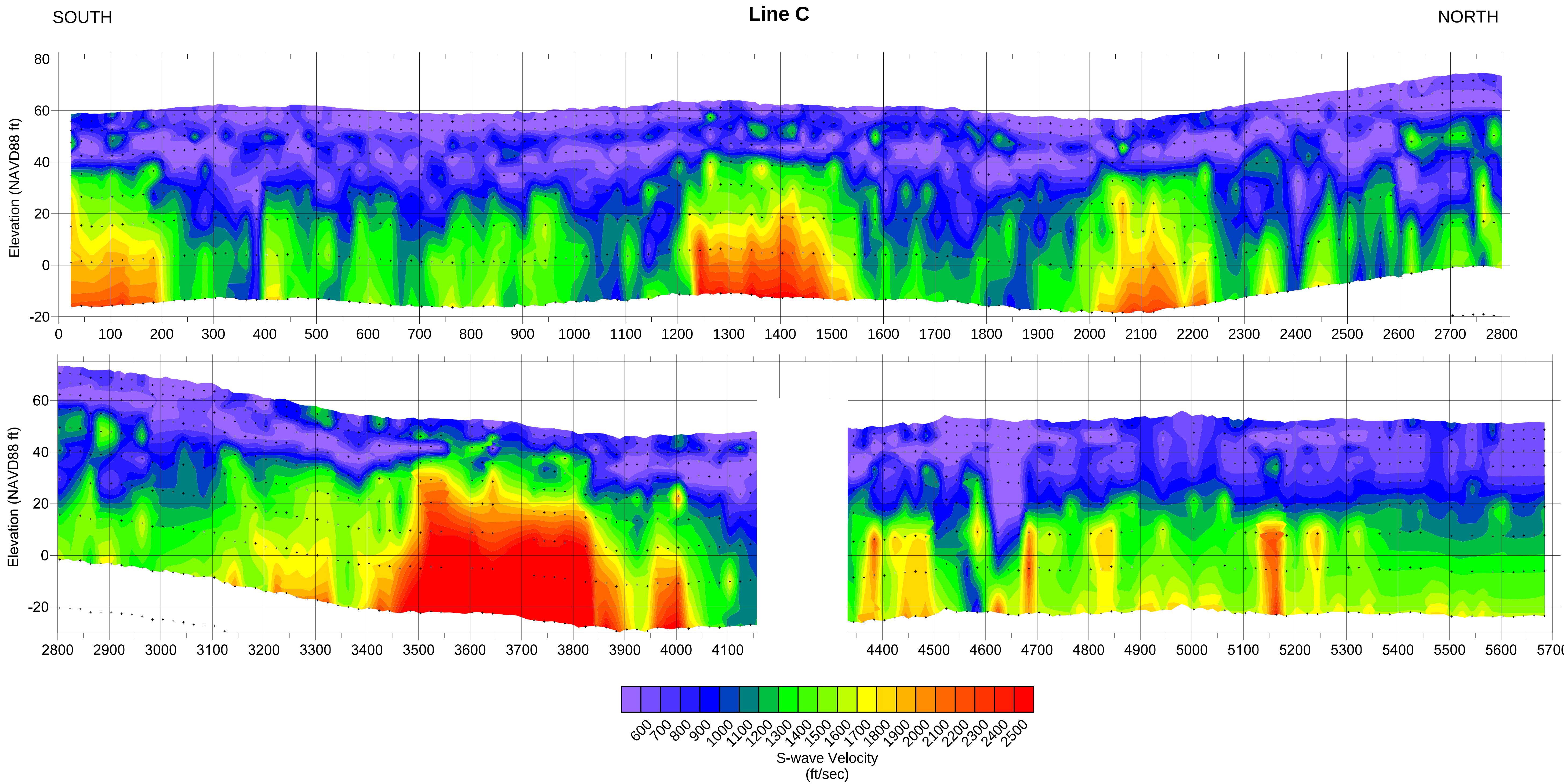
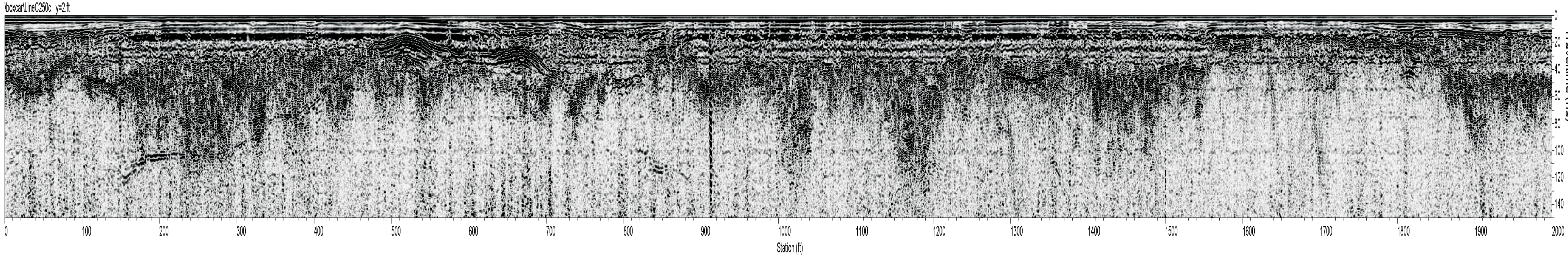
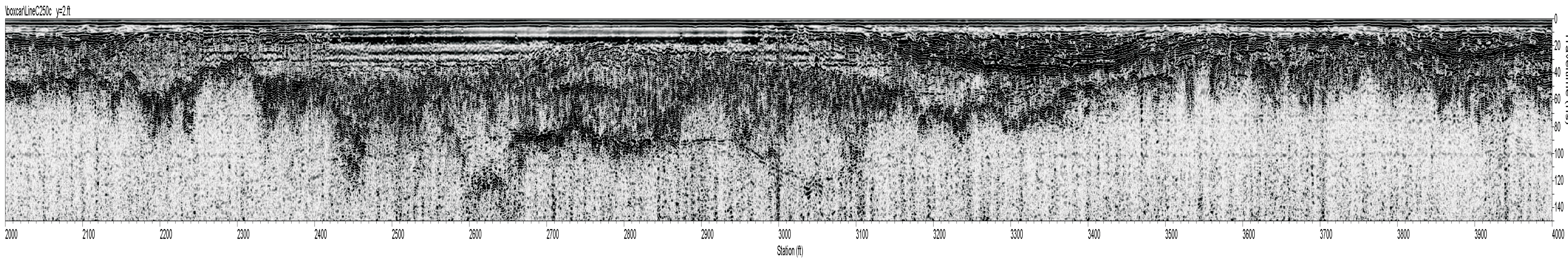


Figure 13
Line C - MASW Data

TECHNOS





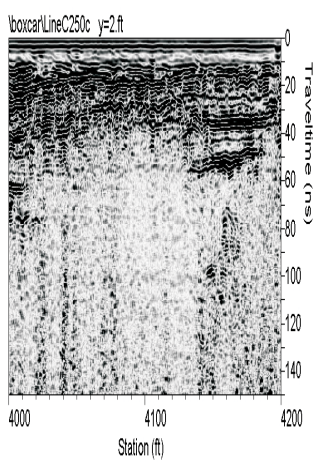


Figure 14
Line C - GPR

TECHNOS

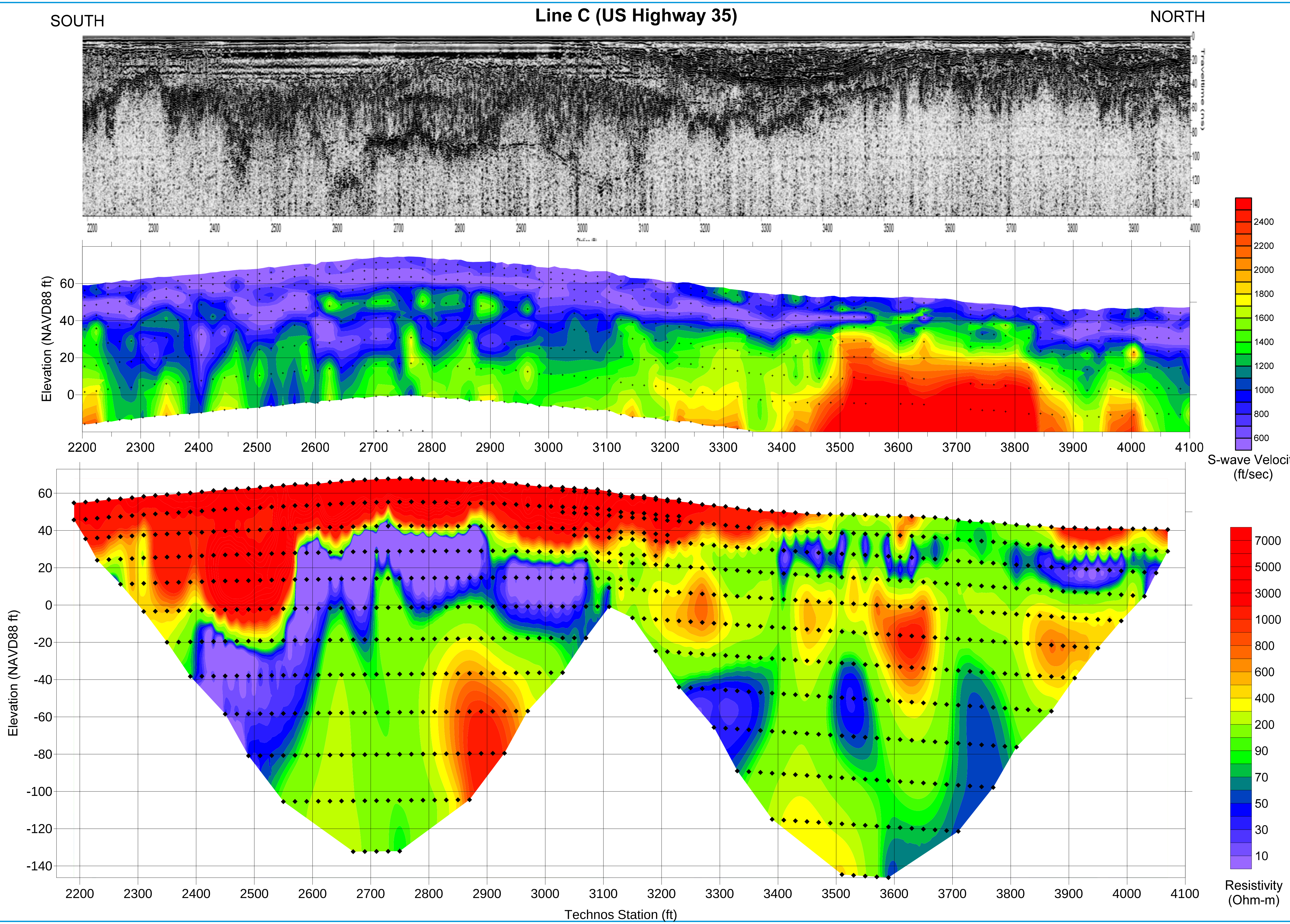


Figure 15
Composite Data Plot
Line C - South

TECHNOS

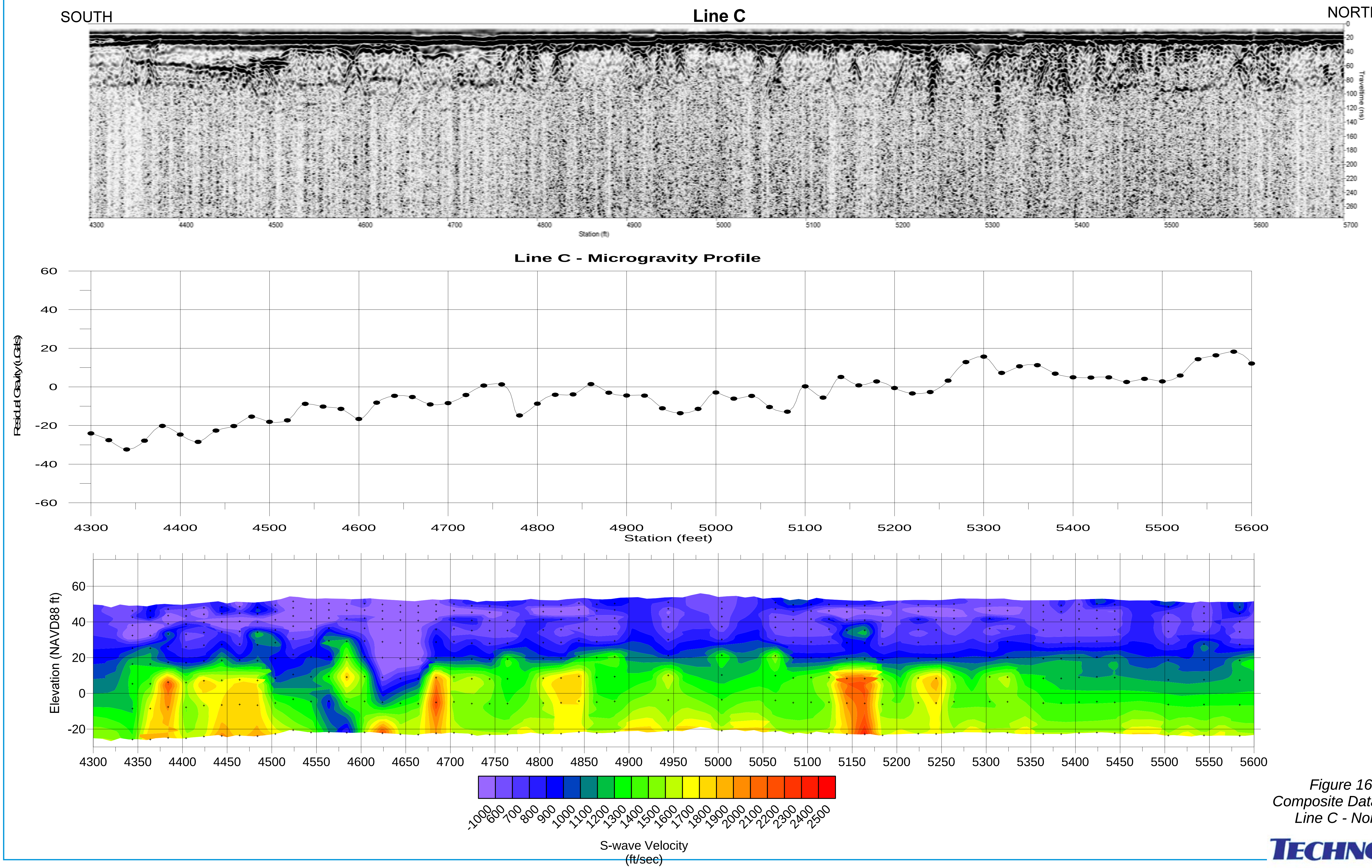


Figure 16
Composite Data Plot
Line C - North

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Surface Geophysical Focus

- utilize about 3 line miles for run along three sides of the Silver Springs
- utilize remaining line mile to run detailed data at each of the five injection points

Objective: to help characterize geologic conditions and identify potential subsurface dissolution features

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Surface Methods Identified for this project

- Ground Penetrating Radar
- Resistivity
- Microgravity
- Multi-channel Analysis of Surface Waves

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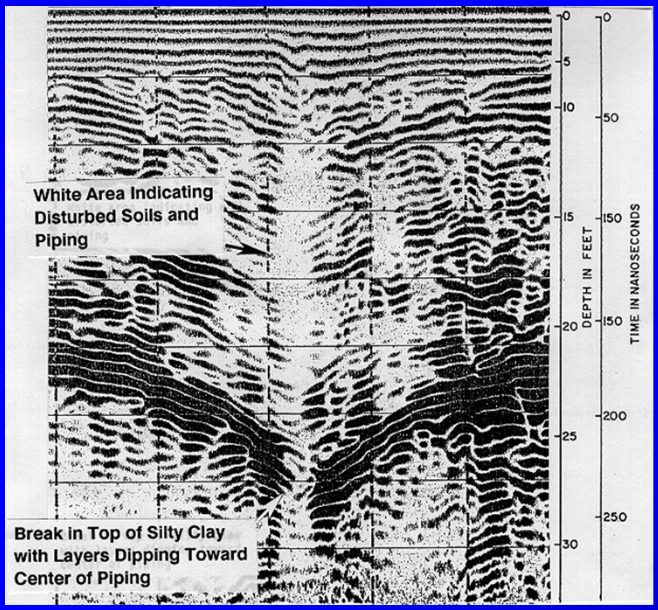
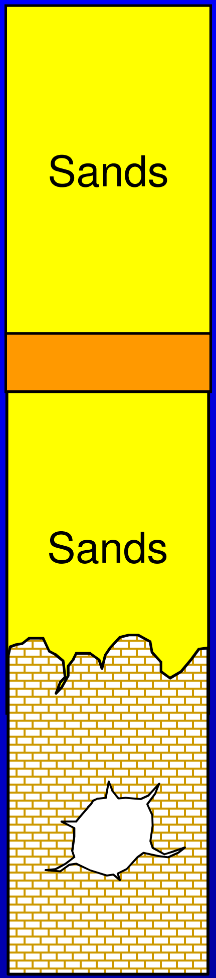
Ground Penetrating Radar

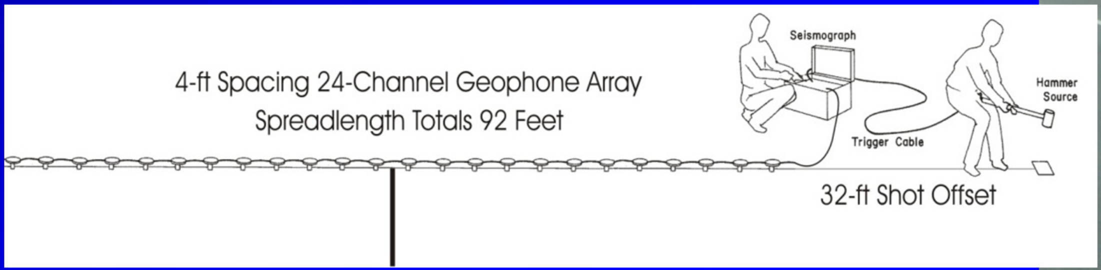


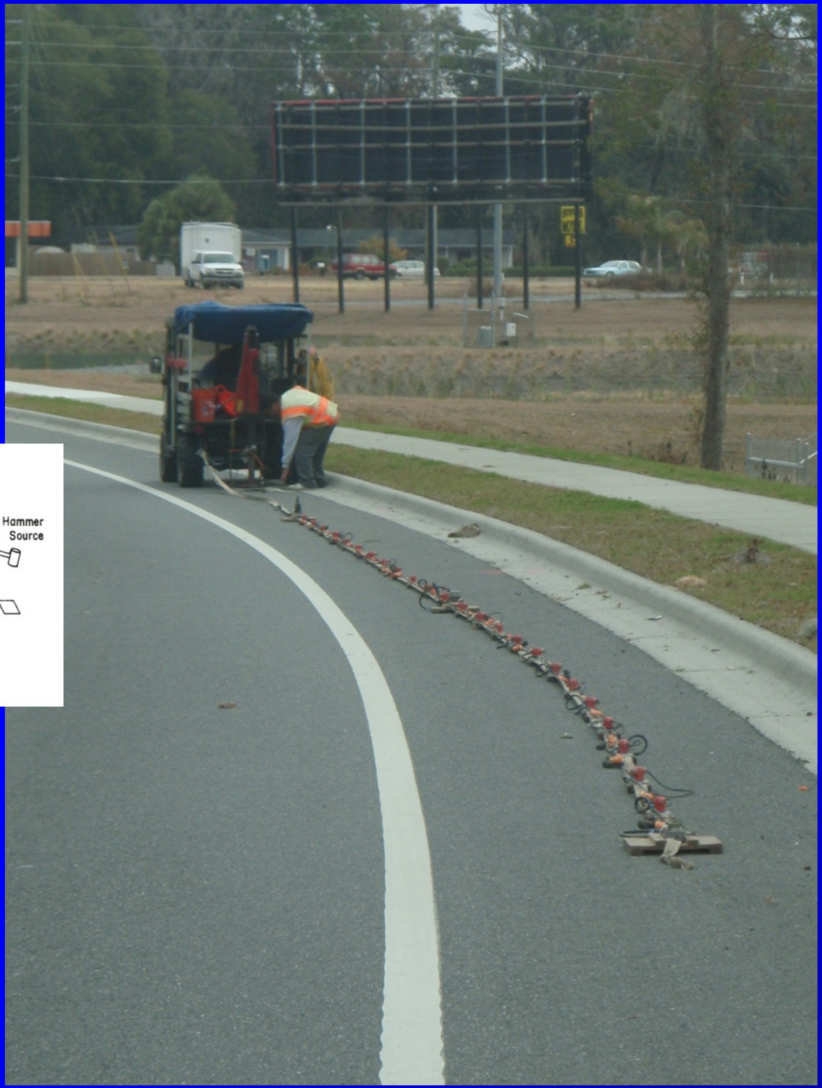


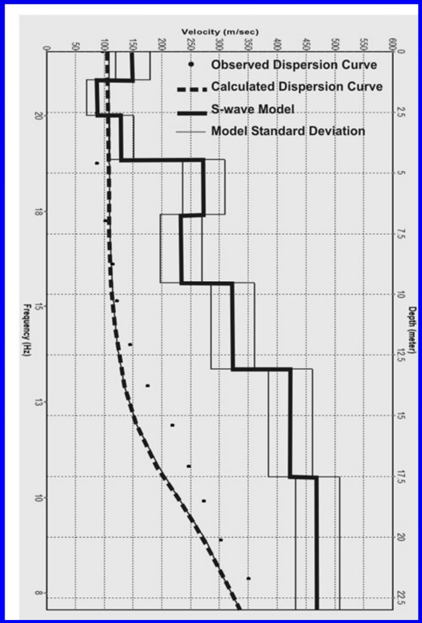
Radar use to identify near surface indicators of deeper features

TECHNOS

MASW



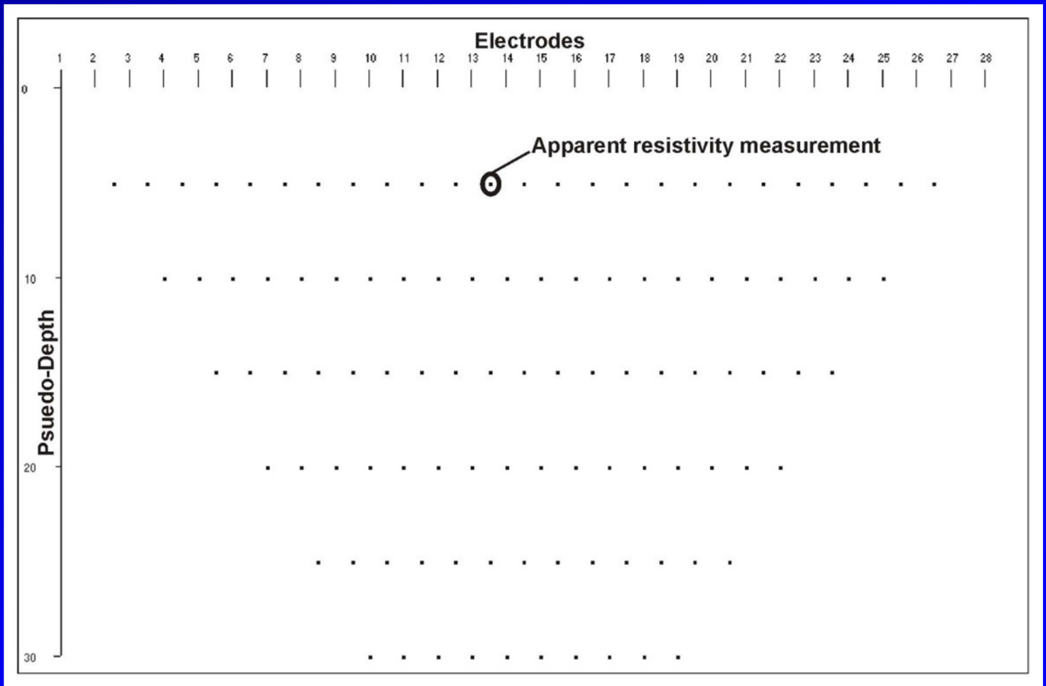




1D Model of Shear-Wave Velocity with Depth (represents the entire 92-foot spread)

TECHNOS

Resistivity



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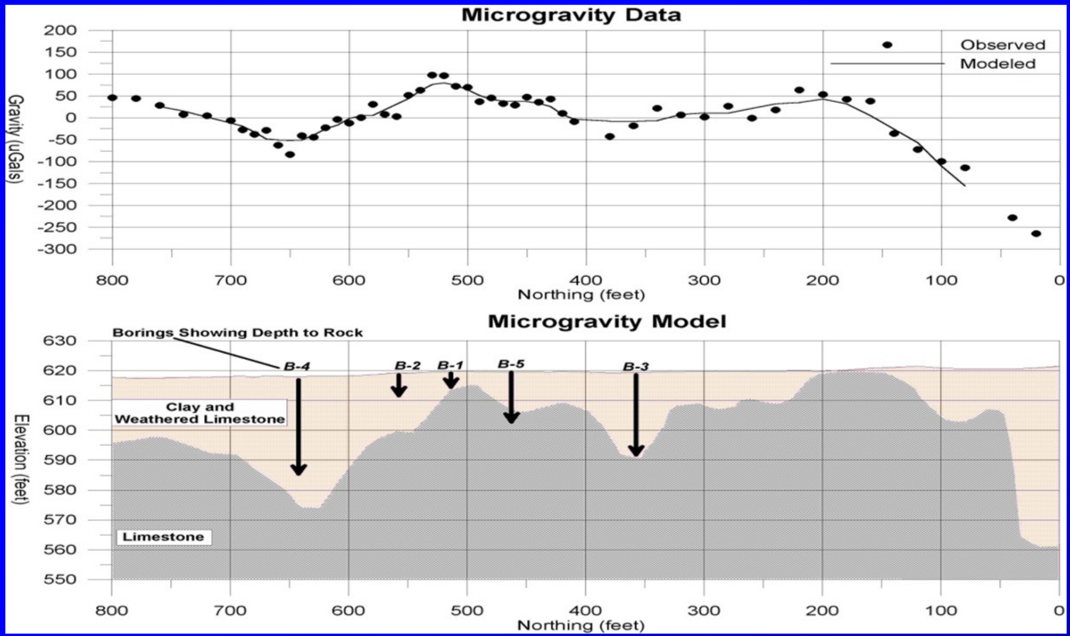
Gravity



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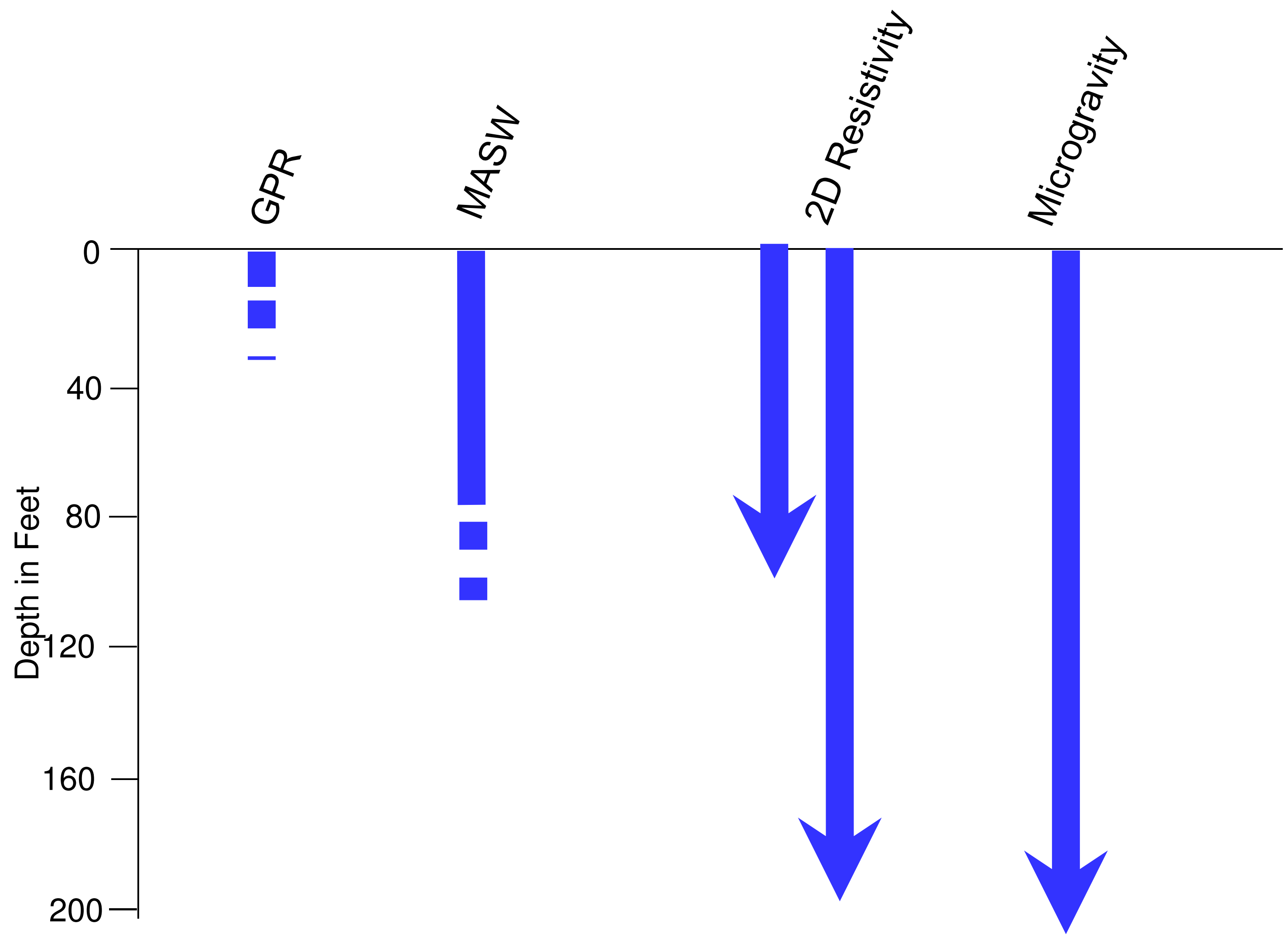
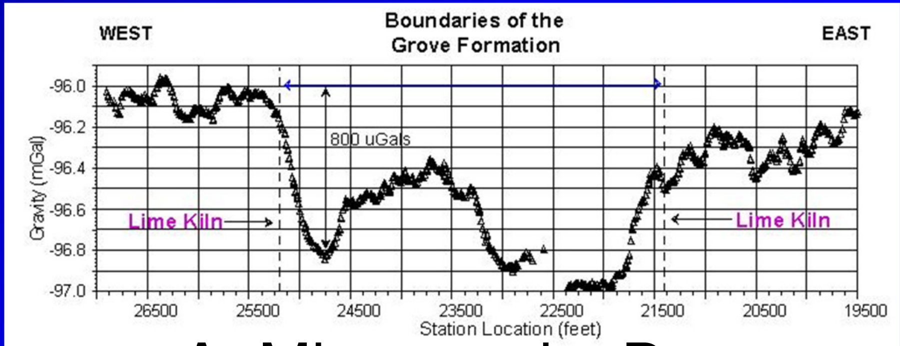
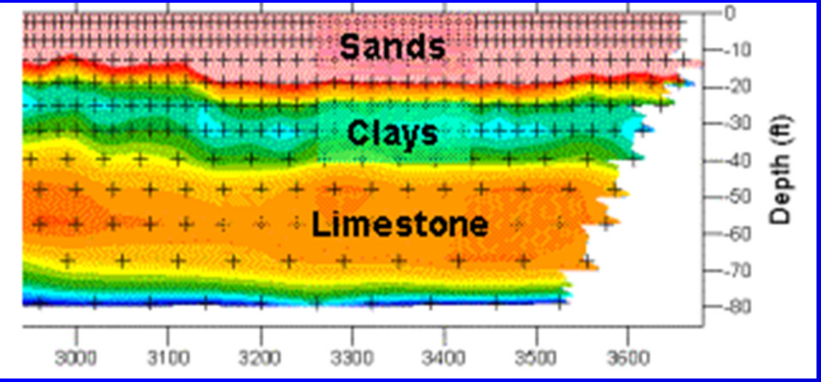
The Four Methods Have Very Different Depths of Measurement



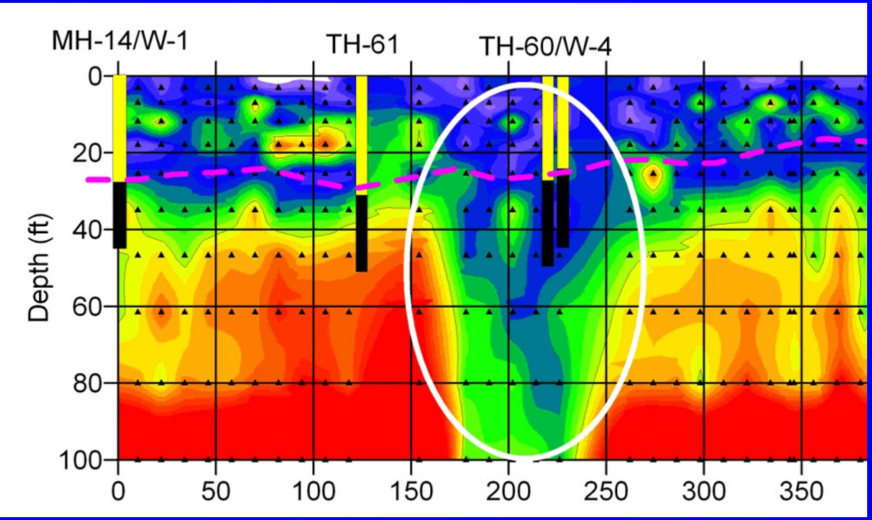
The Four Methods Have Variations in Data Resolution



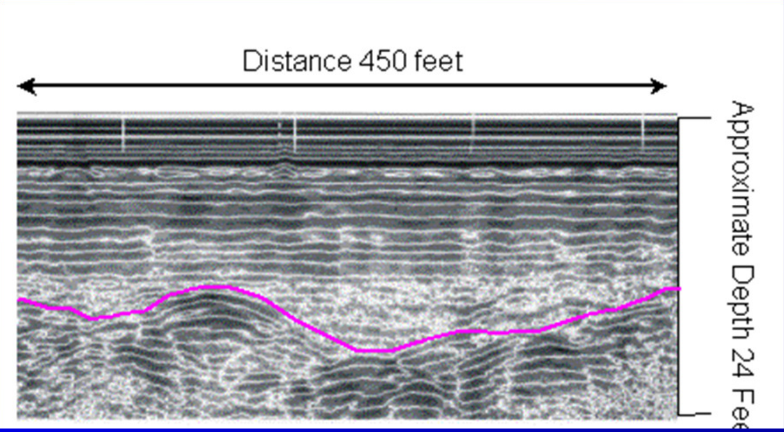
A. Microgravity Data



B. 2D Resistivity Imaging Data

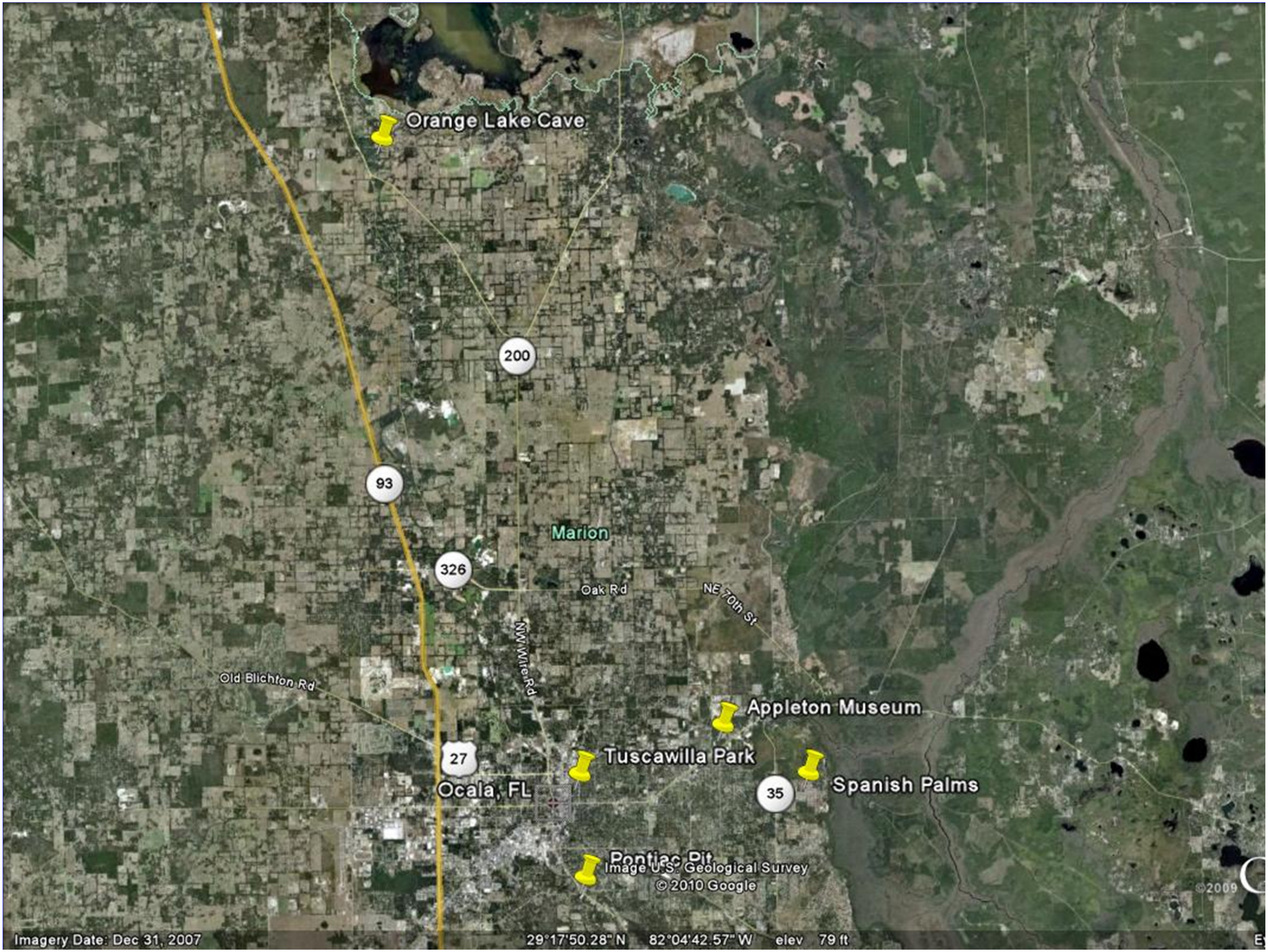


C. MASW 1D Data

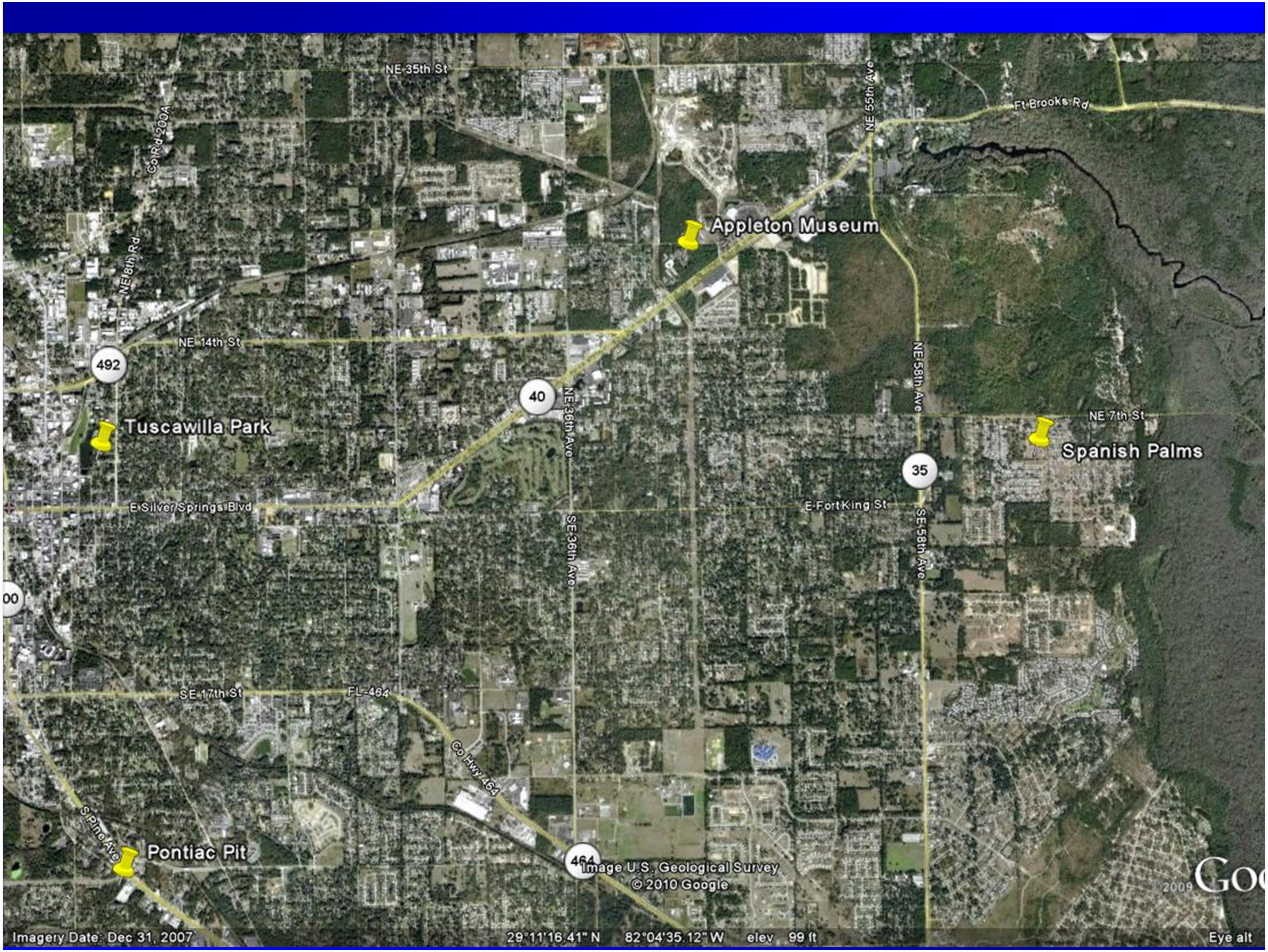


D. Ground Penetrating Radar

TECHNOS



Orange Lake Cave
200
93
Marion
326
Oak Rd
NE 70th St
NW Wire Rd
Old Blichton Rd
Appleton Museum
27
Tuscawilla Park
Spanish Palms
Ocala, FL
35
Pontiac Pit
Image U.S. Geological Survey
© 2010 Google
©2009
Imagery Date: Dec 31, 2007
29°17'50.28" N
82°04'42.57" W
elev 79 ft



NE 35th St
Ft Brooks Rd
NE 55th Ave
Co Rd 200A
Appleton Museum
NE 8th Rd
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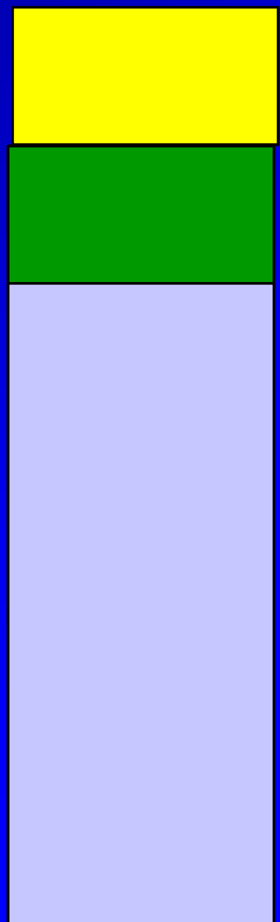
492
40
NE 36th Ave
NE 58th Ave
NE 7th St
Tuscawilla Park
Spanish Palms
35
E Silver Springs Blvd
E Fort King St
SE 36th Ave
SE 58th Ave
SE 17th St
FL-464
Co Hwy 464
S Pine Ave
Pontiac Pit
464
Image U.S. Geological Survey
© 2010 Google
Imagery Date: Dec 31, 2007
29°11'16.41" N
82°04'35.12" W
elev 99 ft
Eye alt

Scope of Geophysical Work

Site	GPR	MASW	Resis	Grav
Orange Lake Cave	X	X	X	X
Appleton Museum	X	X	X	
Spanish Palms	X	X	X	
Tuscawilla Park	X	X	X	
Pontiac Pit		X		
Line A		X		
Line B	X	X	2 soundings	1700 ft
Line C	X	X	2 soundings	2300 ft

TECHNOS

Generic Geology



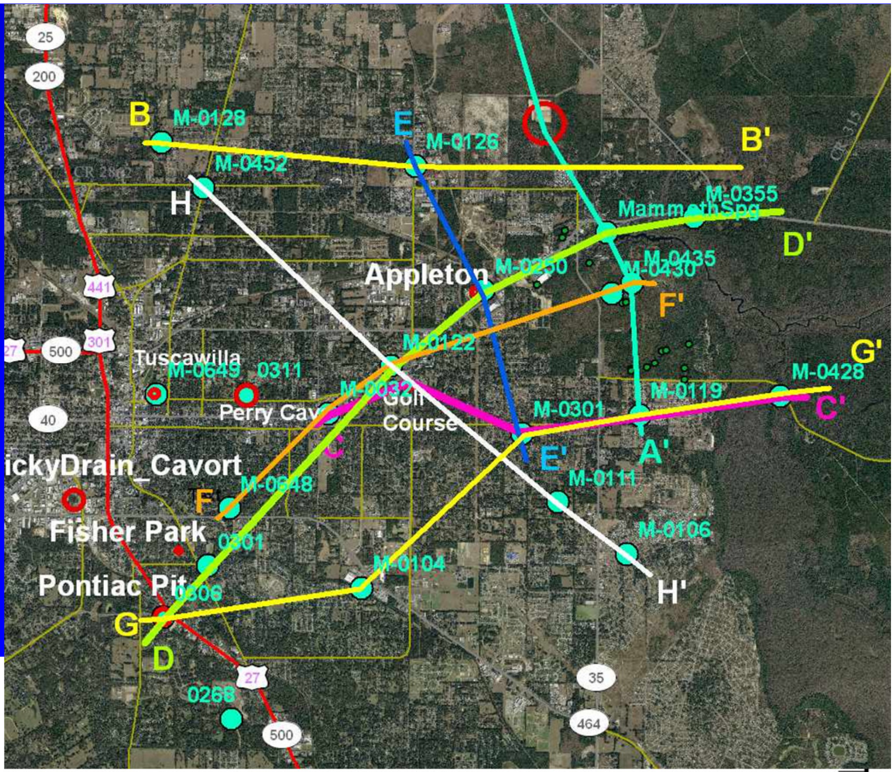
Surface Aquifer: sands to clays

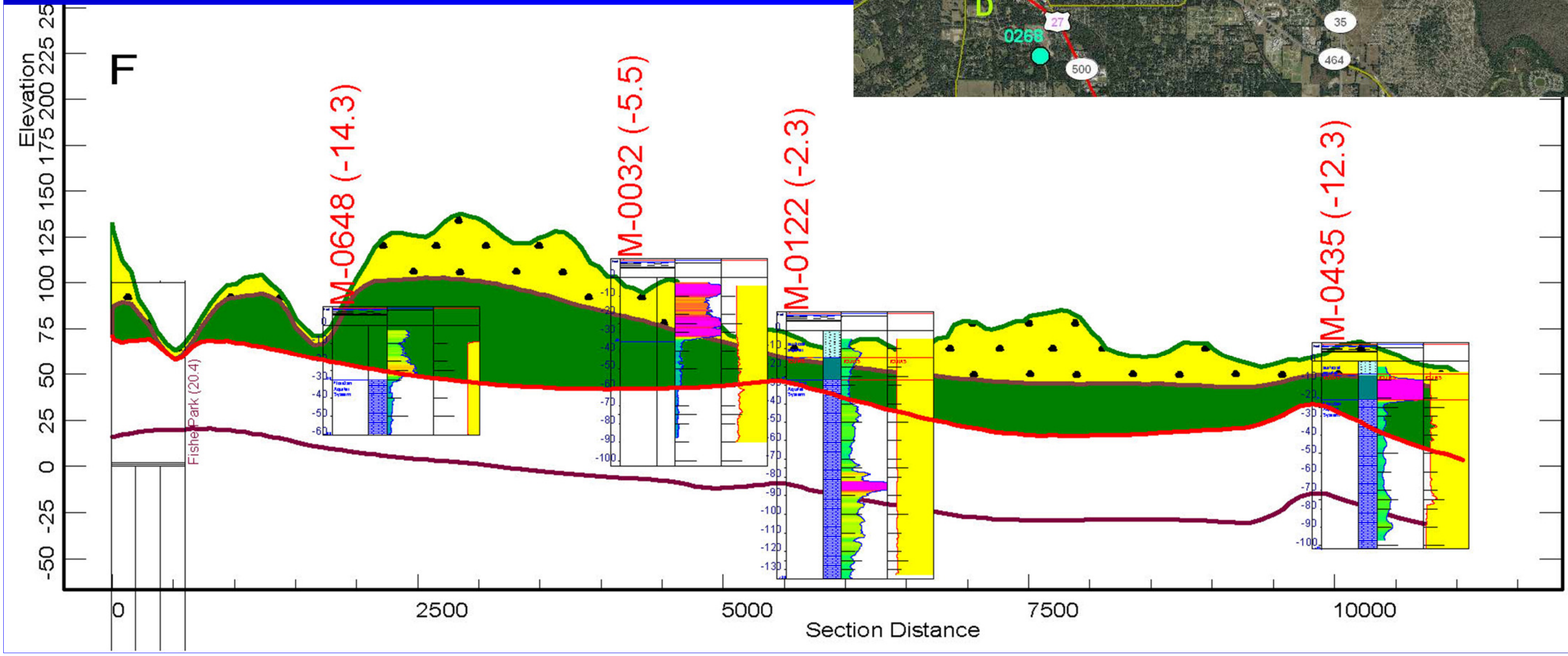
Intermediate Confining Unit: sands to clays

Floridan Aquifer System: limestones with interbedded sands and clays

TECHNOS

Geologic Cross-Sections





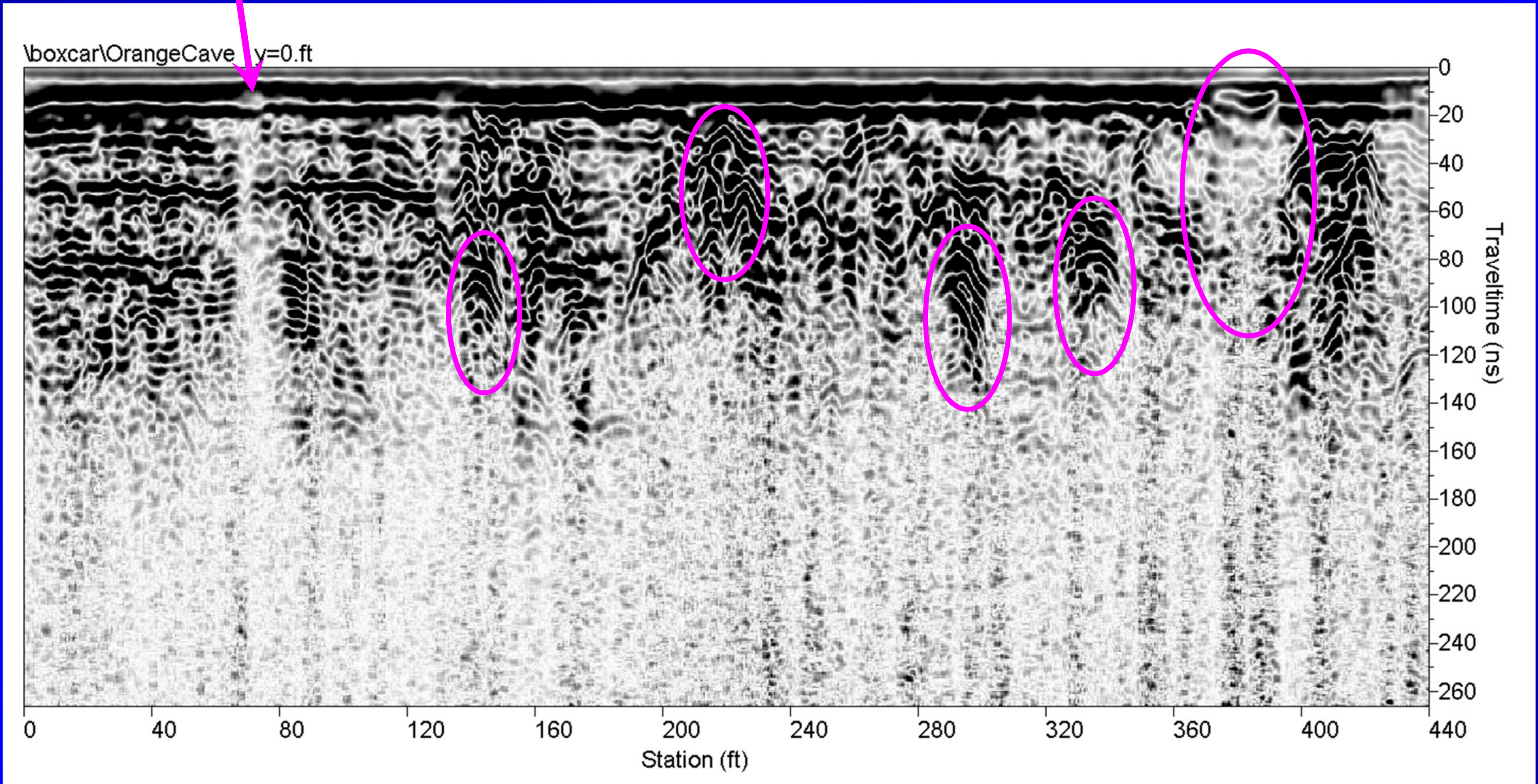
Orange Lake Cave

- used as test site over known "cave"
- all four methods used

TECHNOS

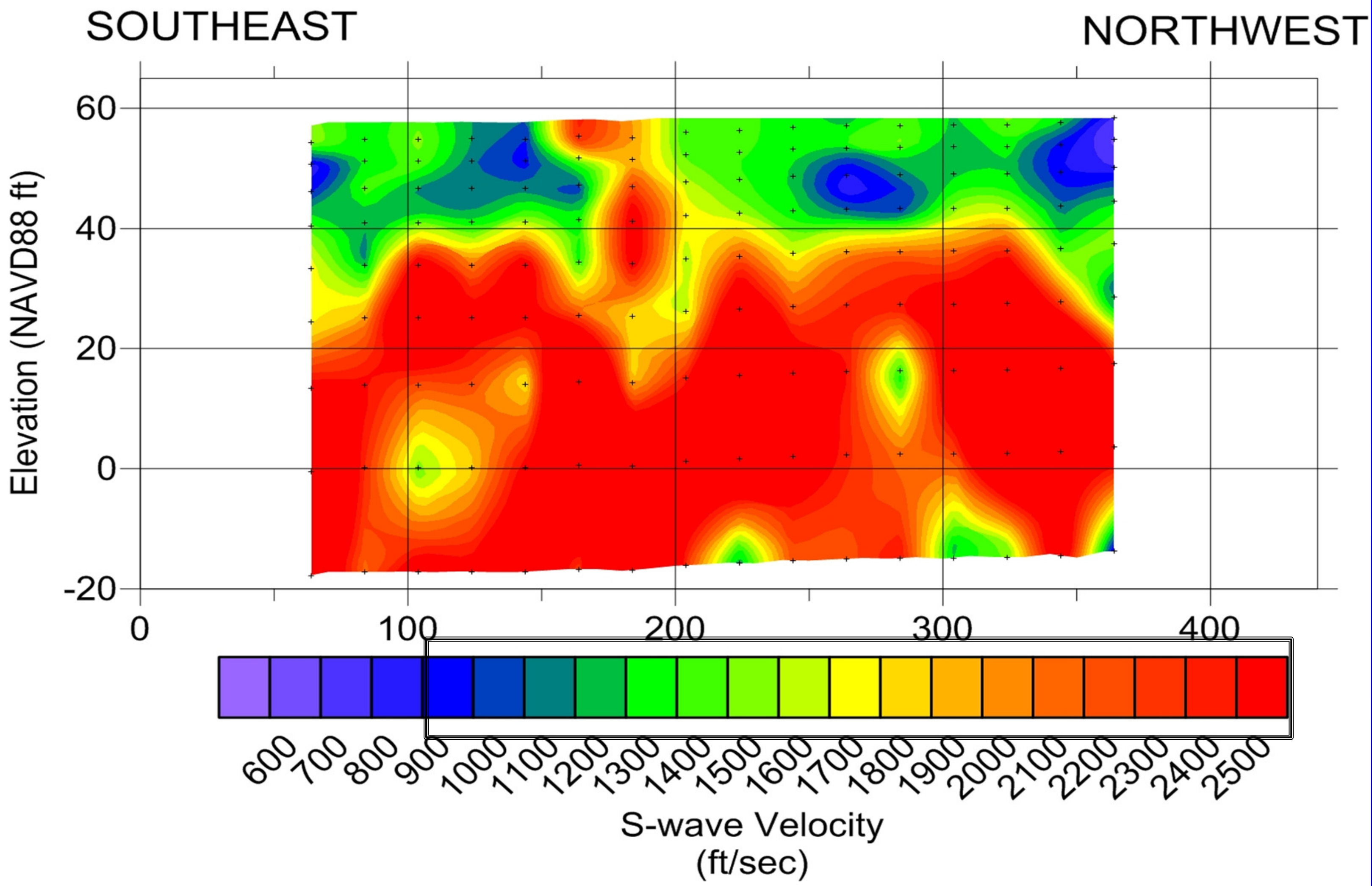
Ground Penetrating Radar

Known
Fracture/
Cave



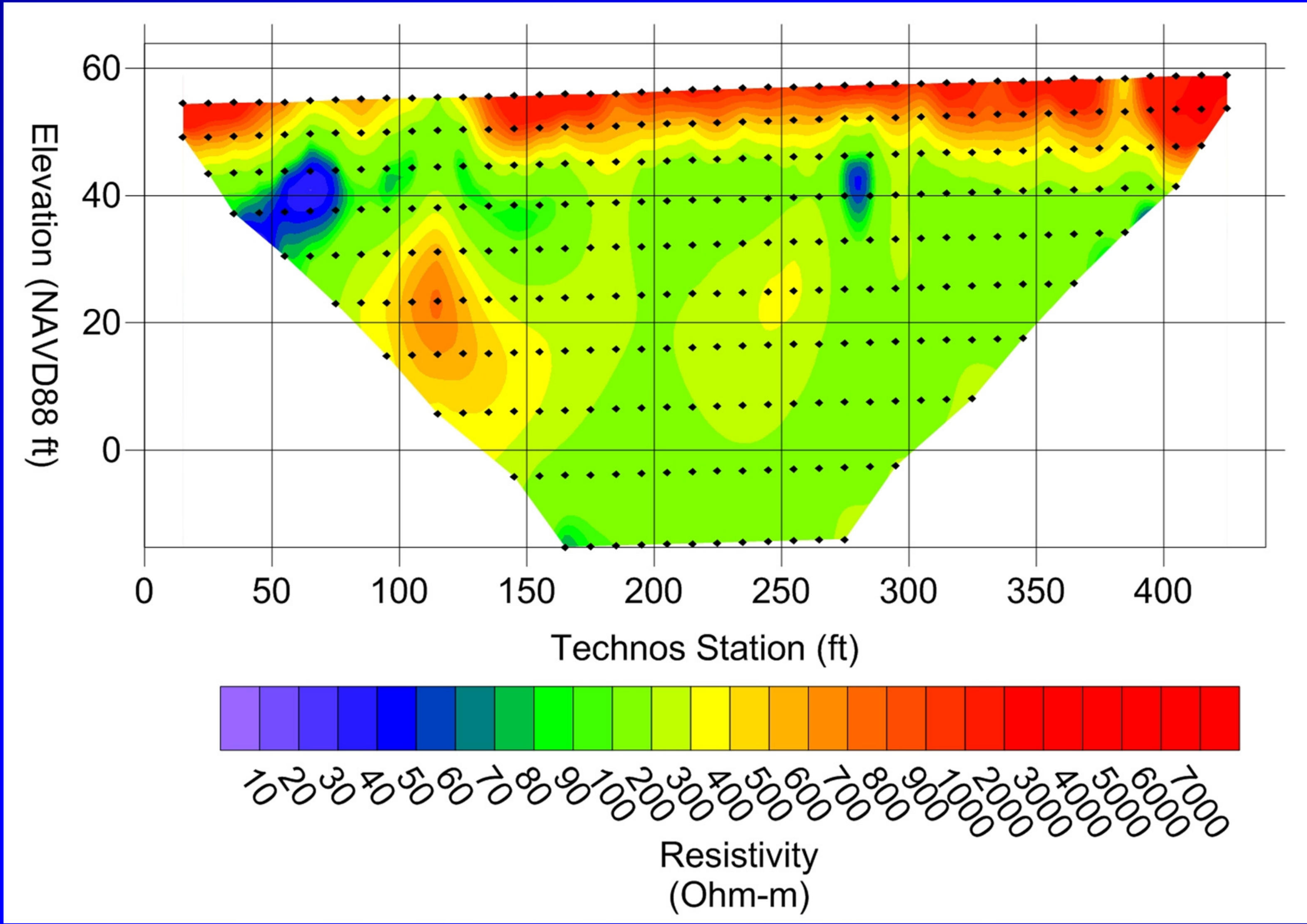
TECHNOS

MASW



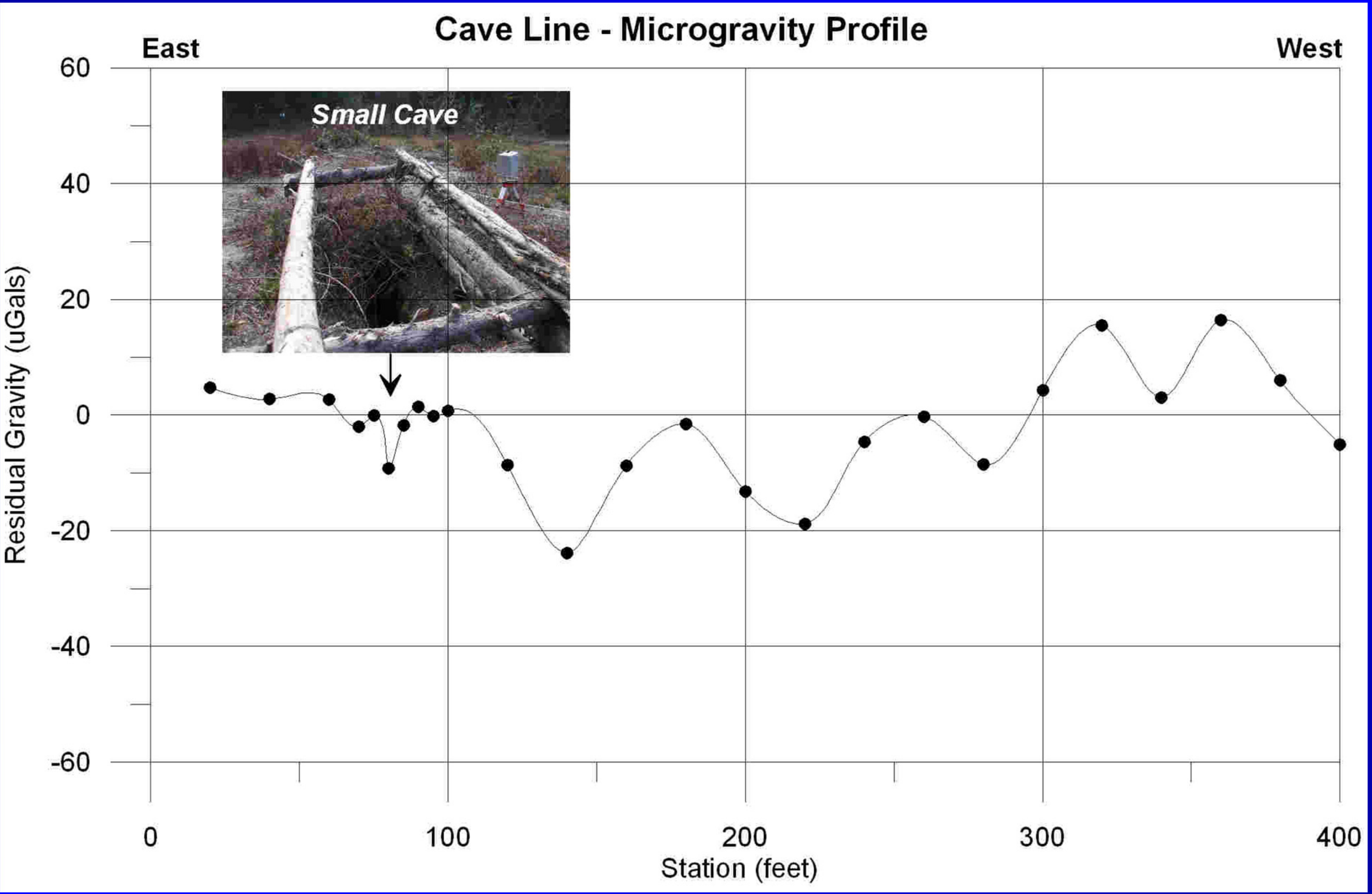
TECHNOS

Resistivity

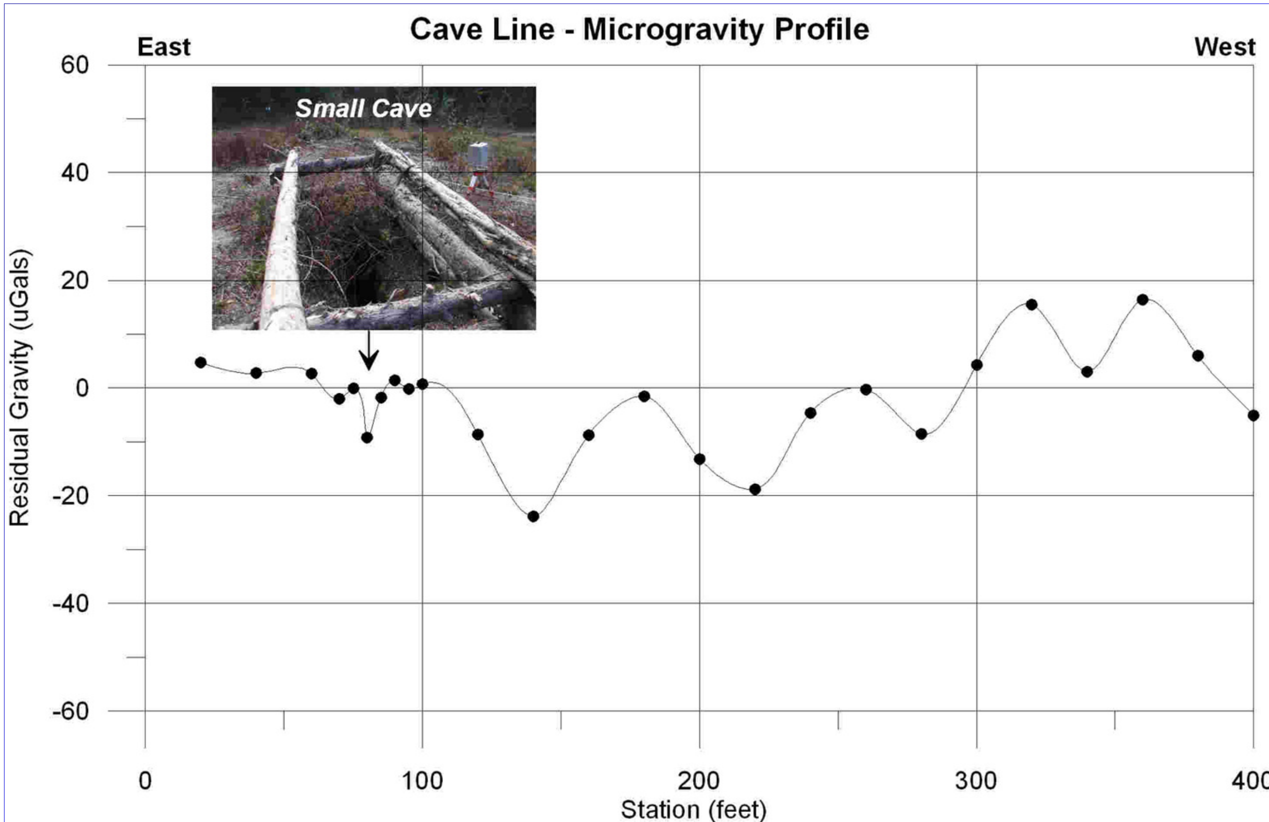


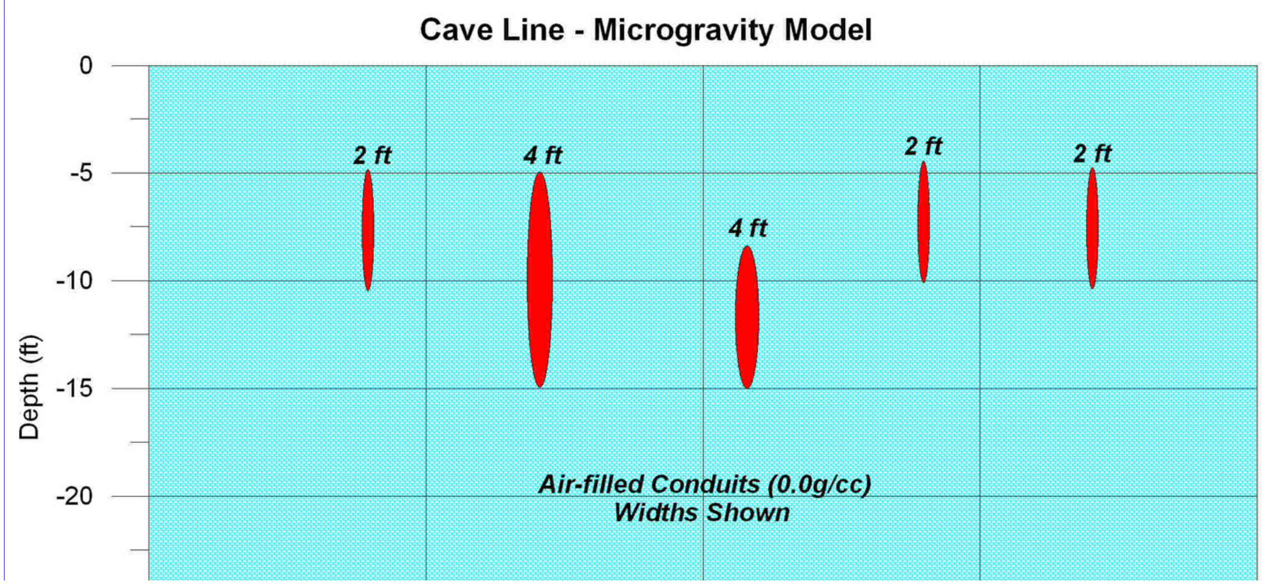
TECHNOS

Microgravity

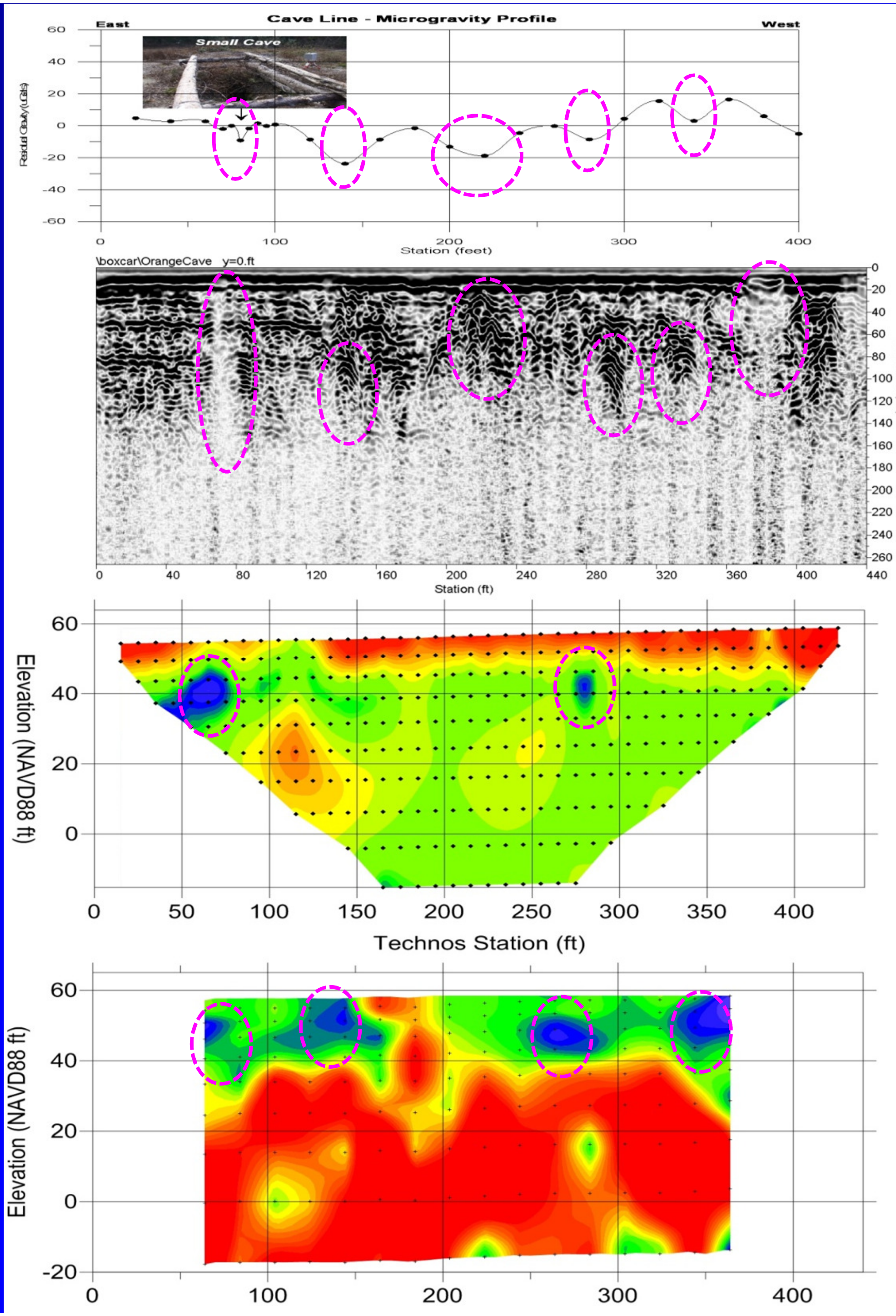


TECHNOS





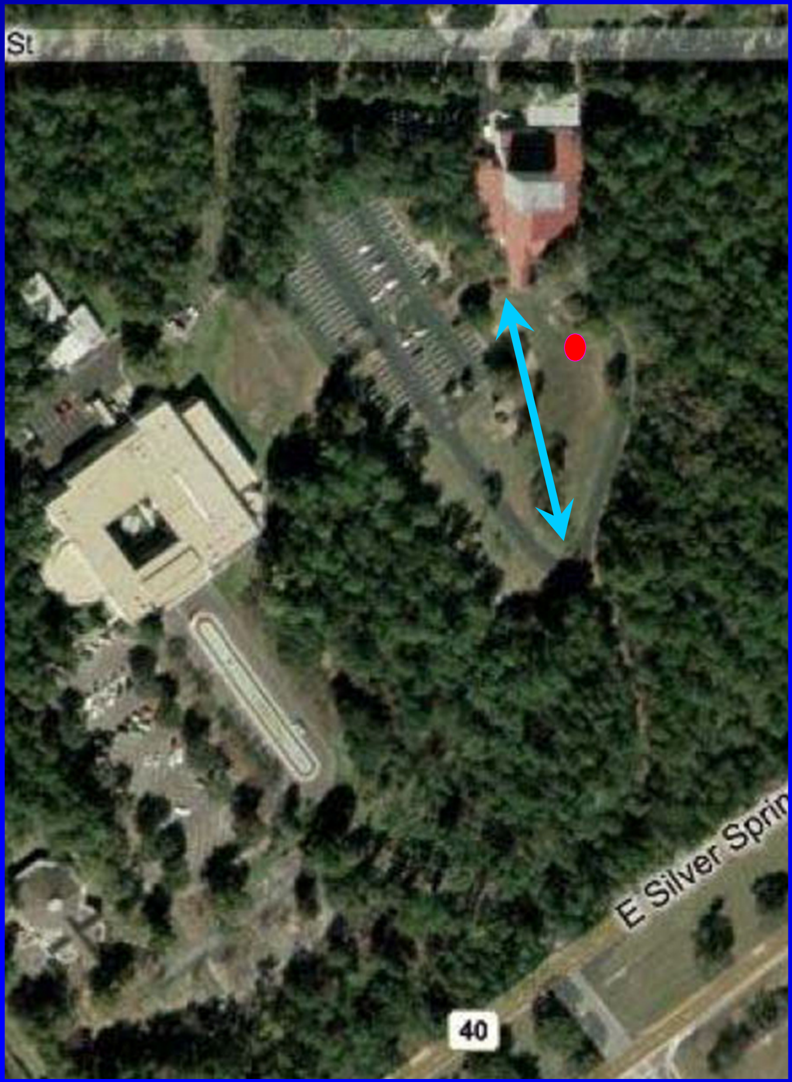
Modeled Microgravity Data

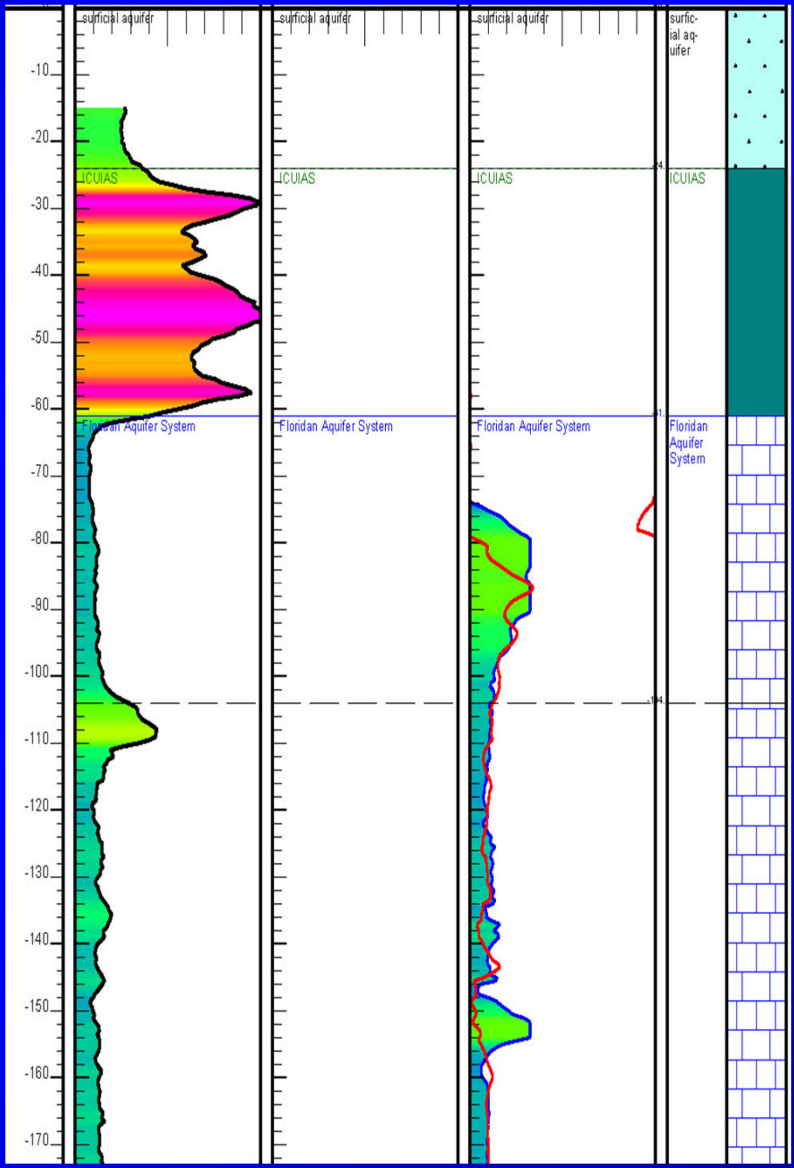


Detailed look at spatial correlation

TECHNOS

Appleton Museum



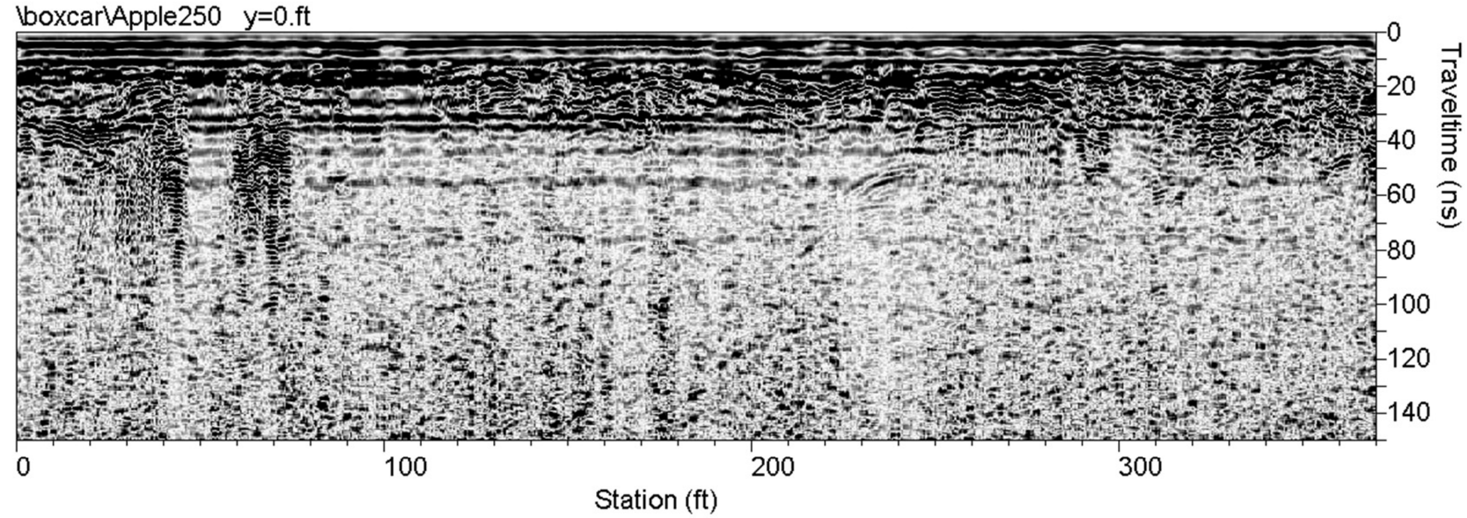


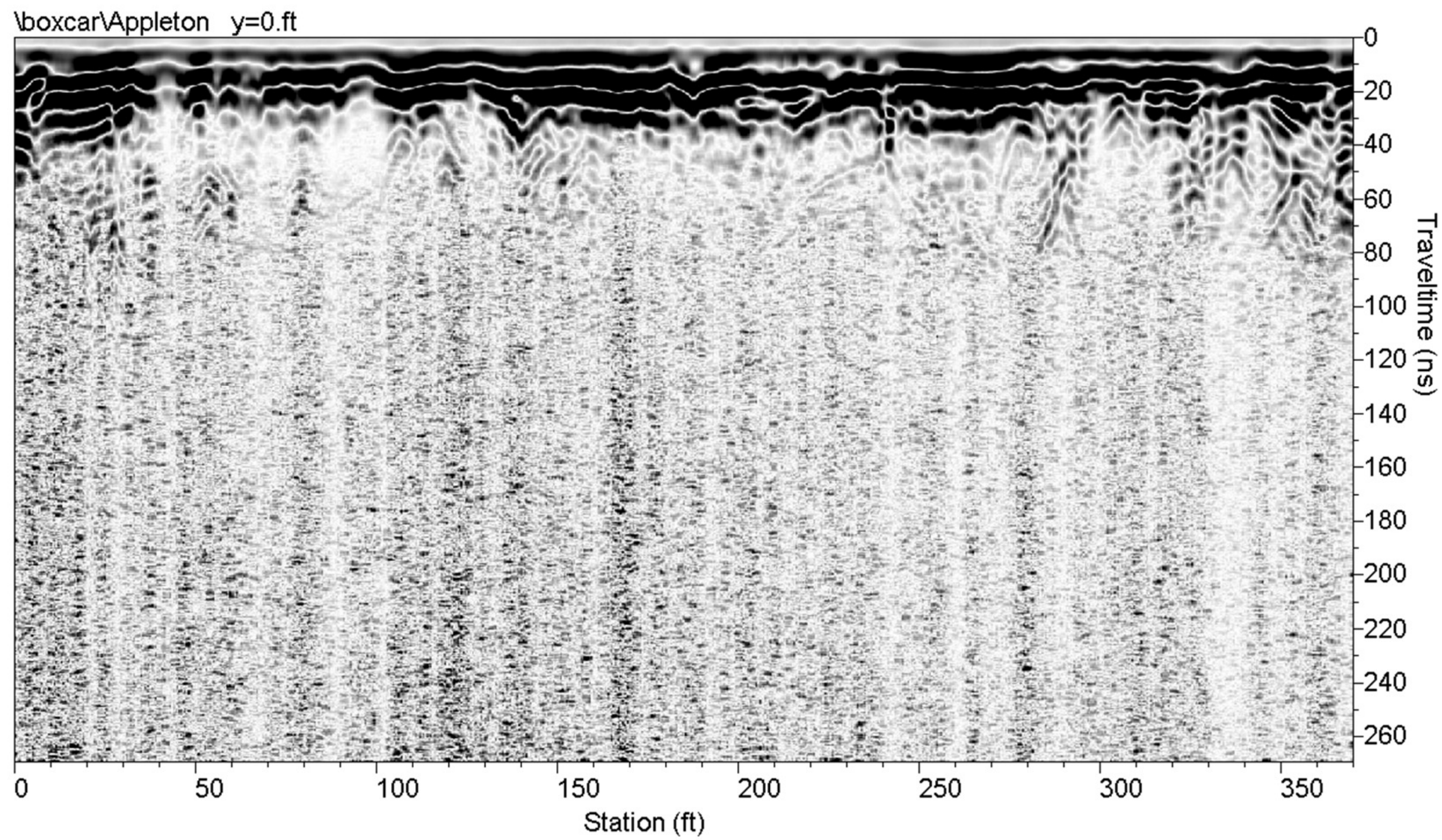
Not sure of exact well location

TECHNOS

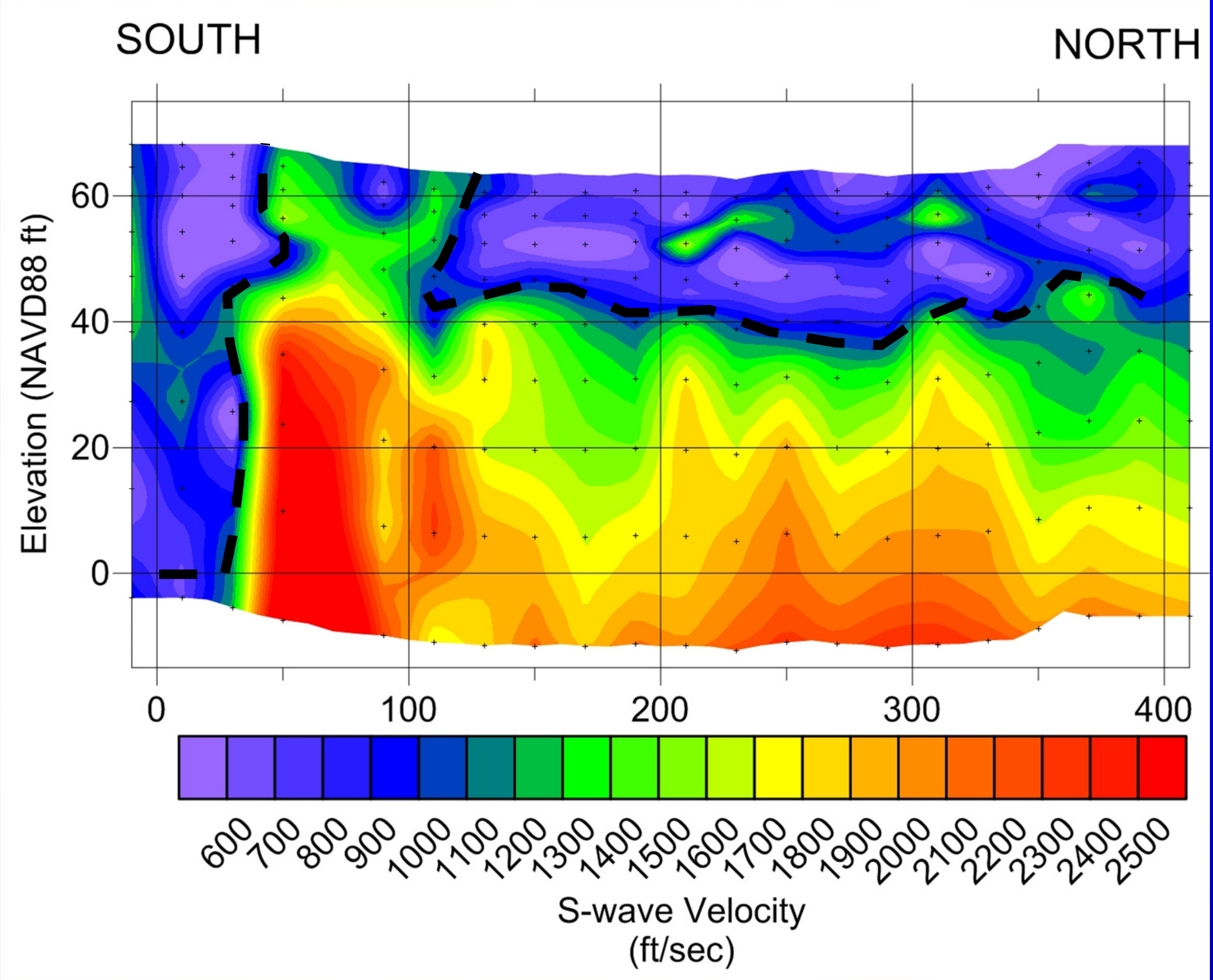
Ground Penetrating Radar

Both 250 Mhz and 100 MHz were acquired



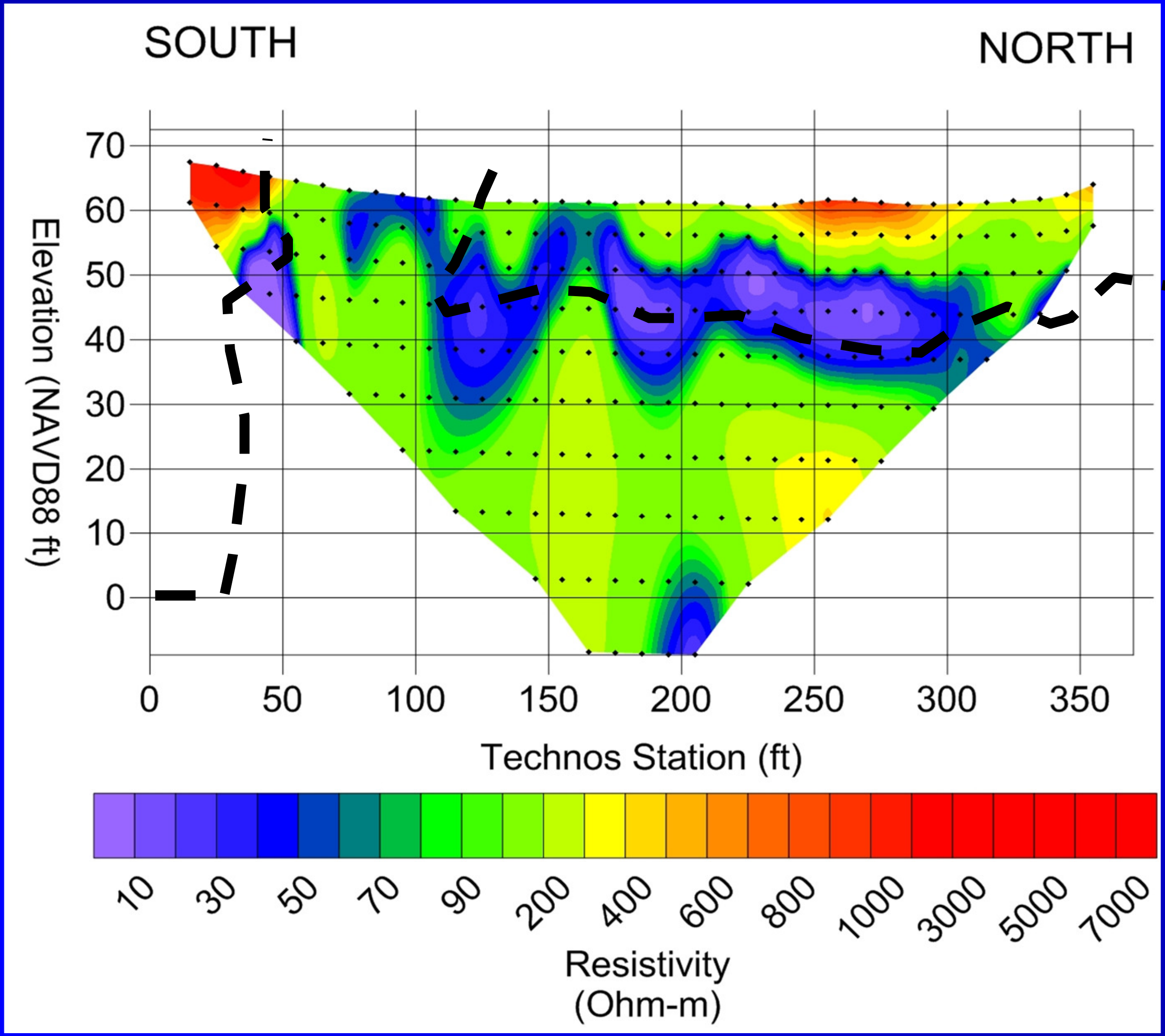


MASW



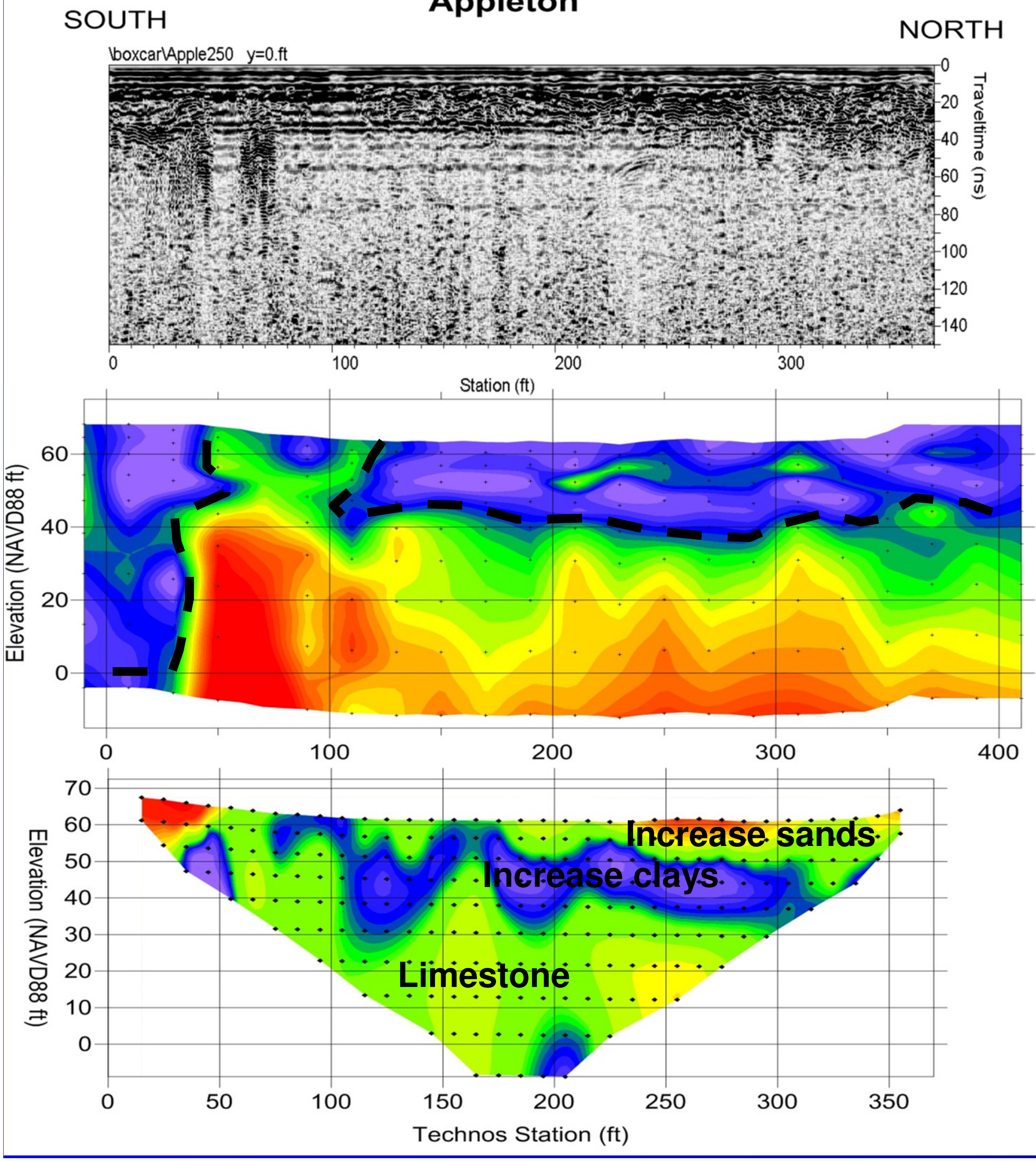
TECHNOS

Resistivity



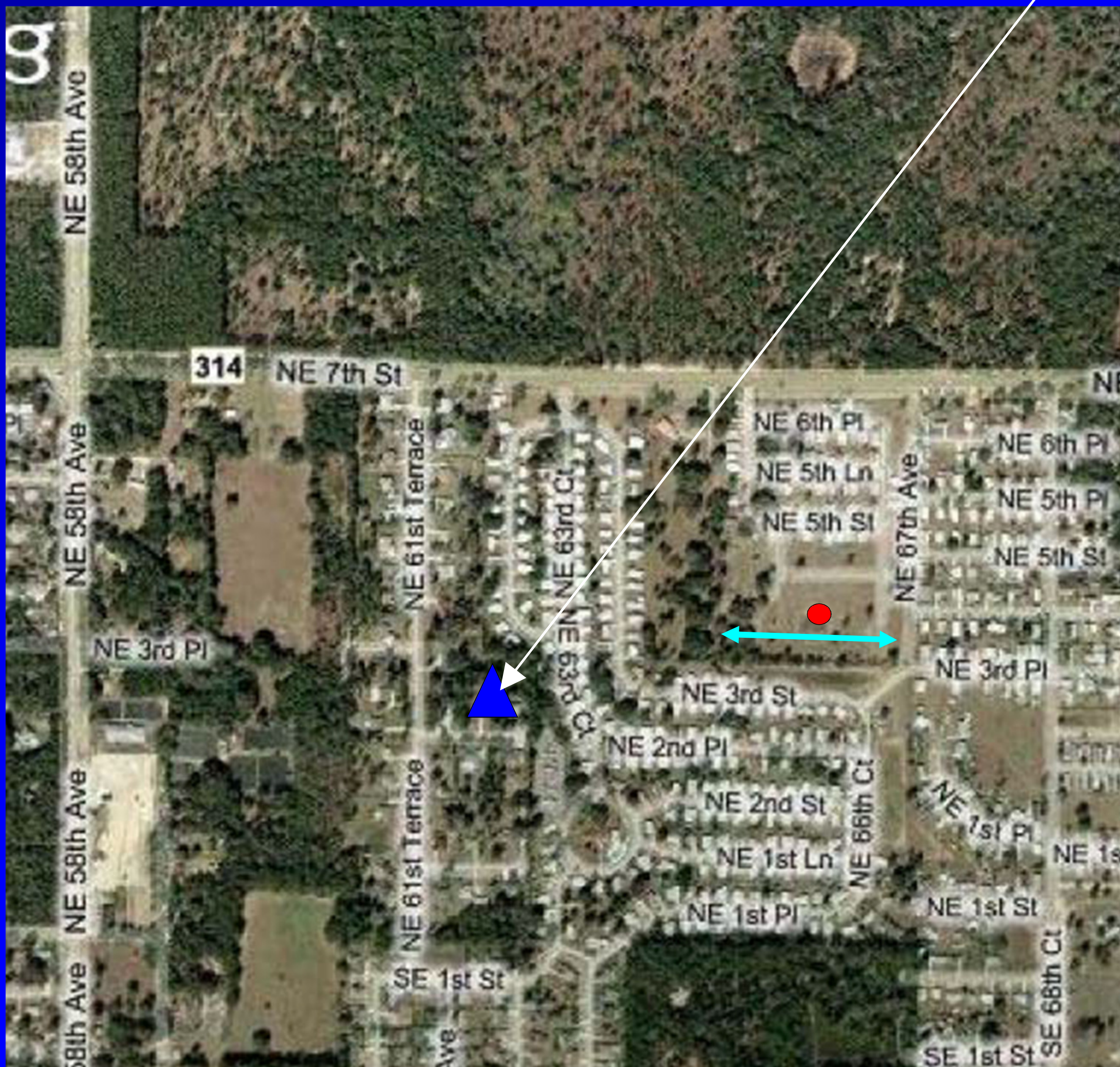
TECHNOS

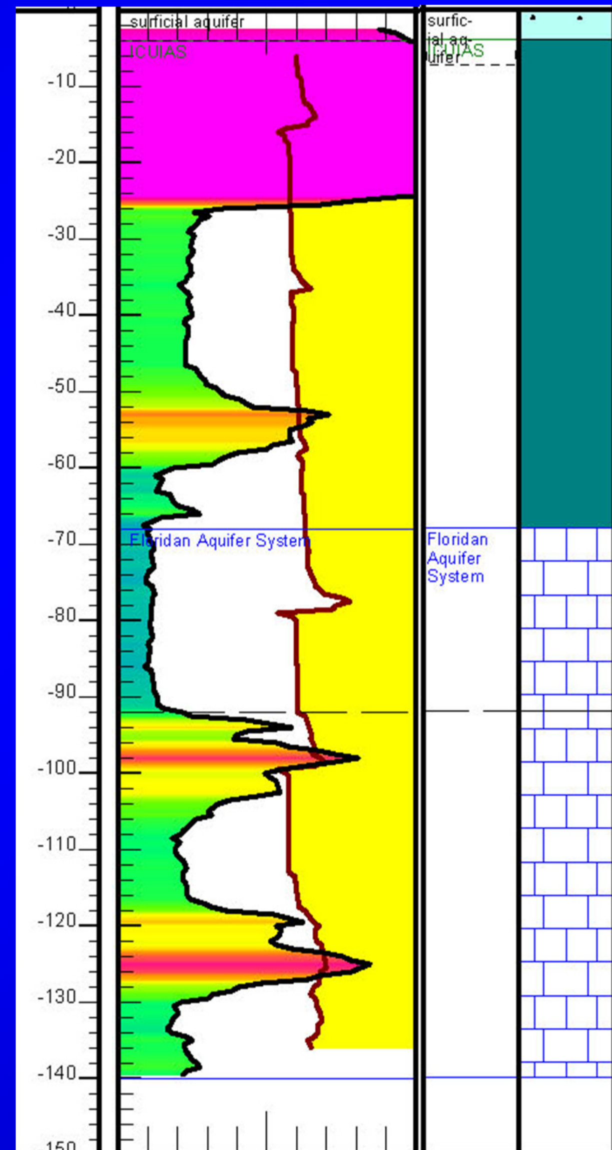
Appleton



TECHNOS

Spanish Palms DRA

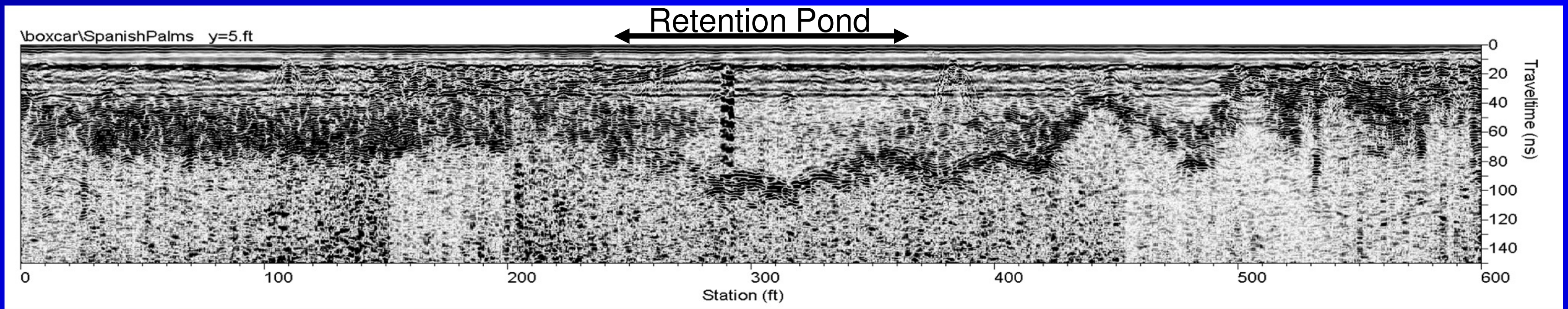


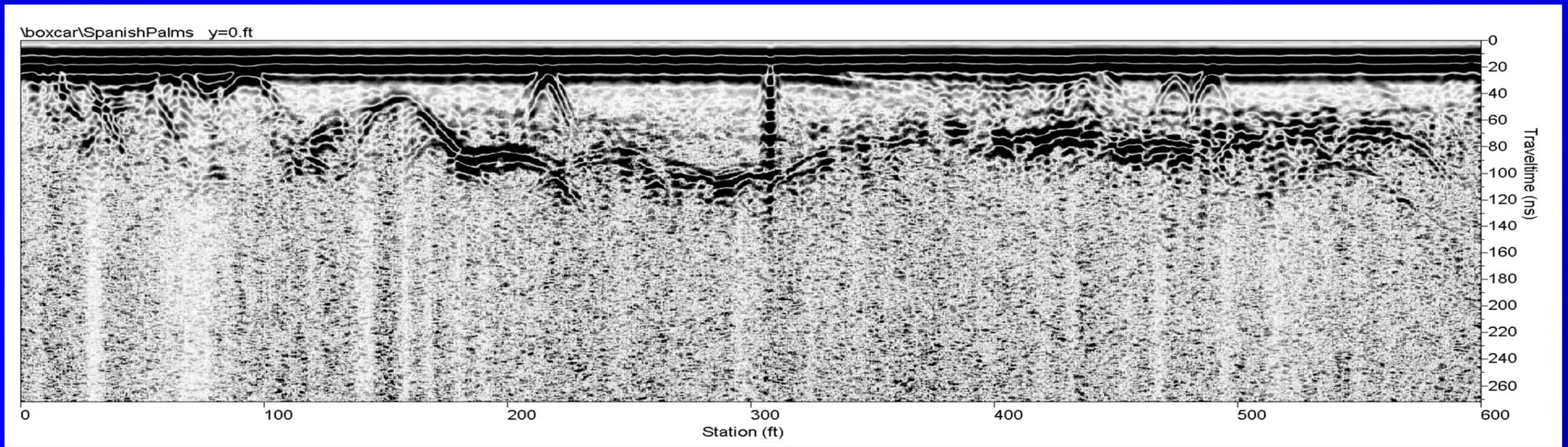


Note: surface elevation 103 ft

TECHNOS

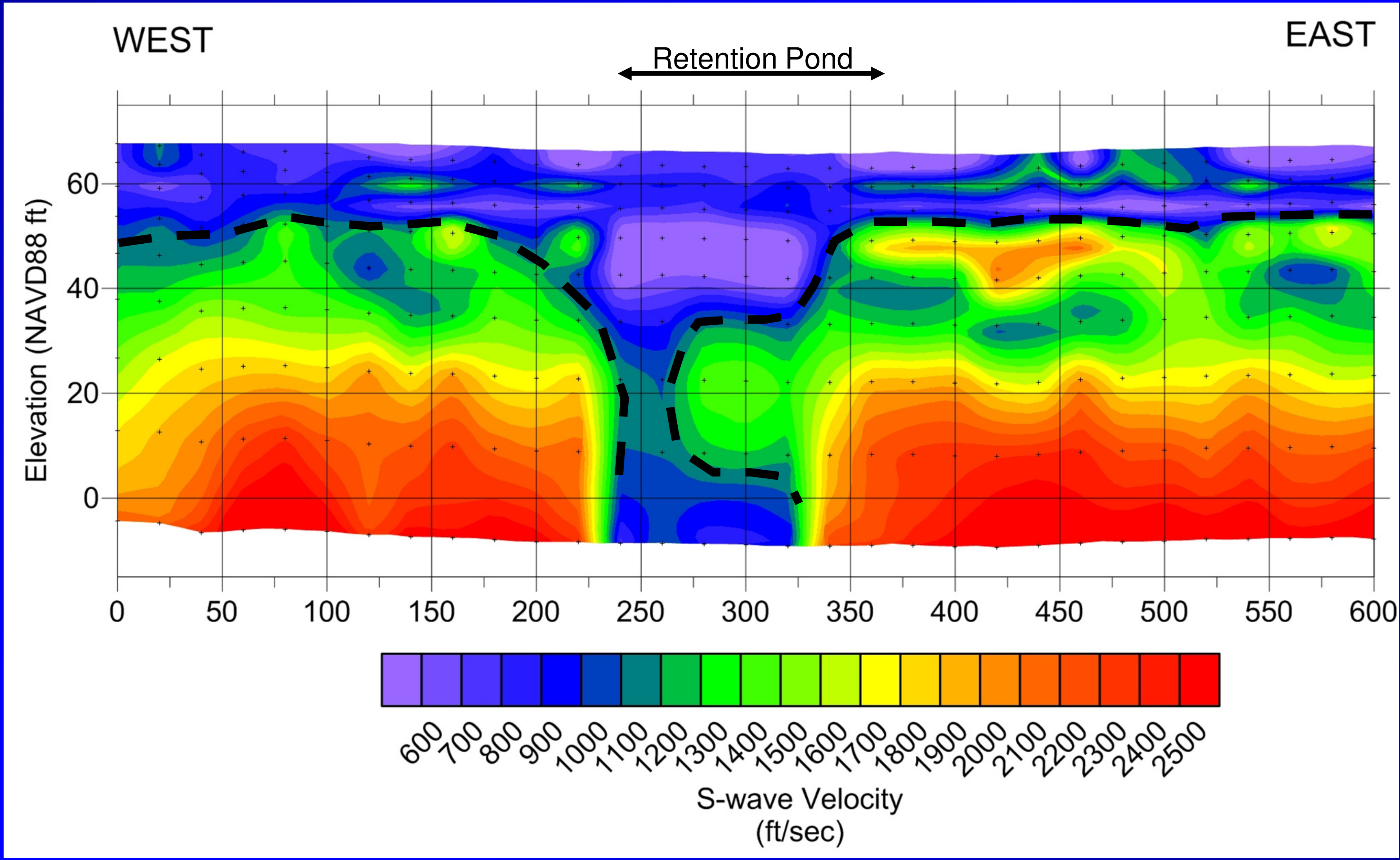
Ground Penetrating Radar Data 250MHz (150nS) & 100MHz (270nS)





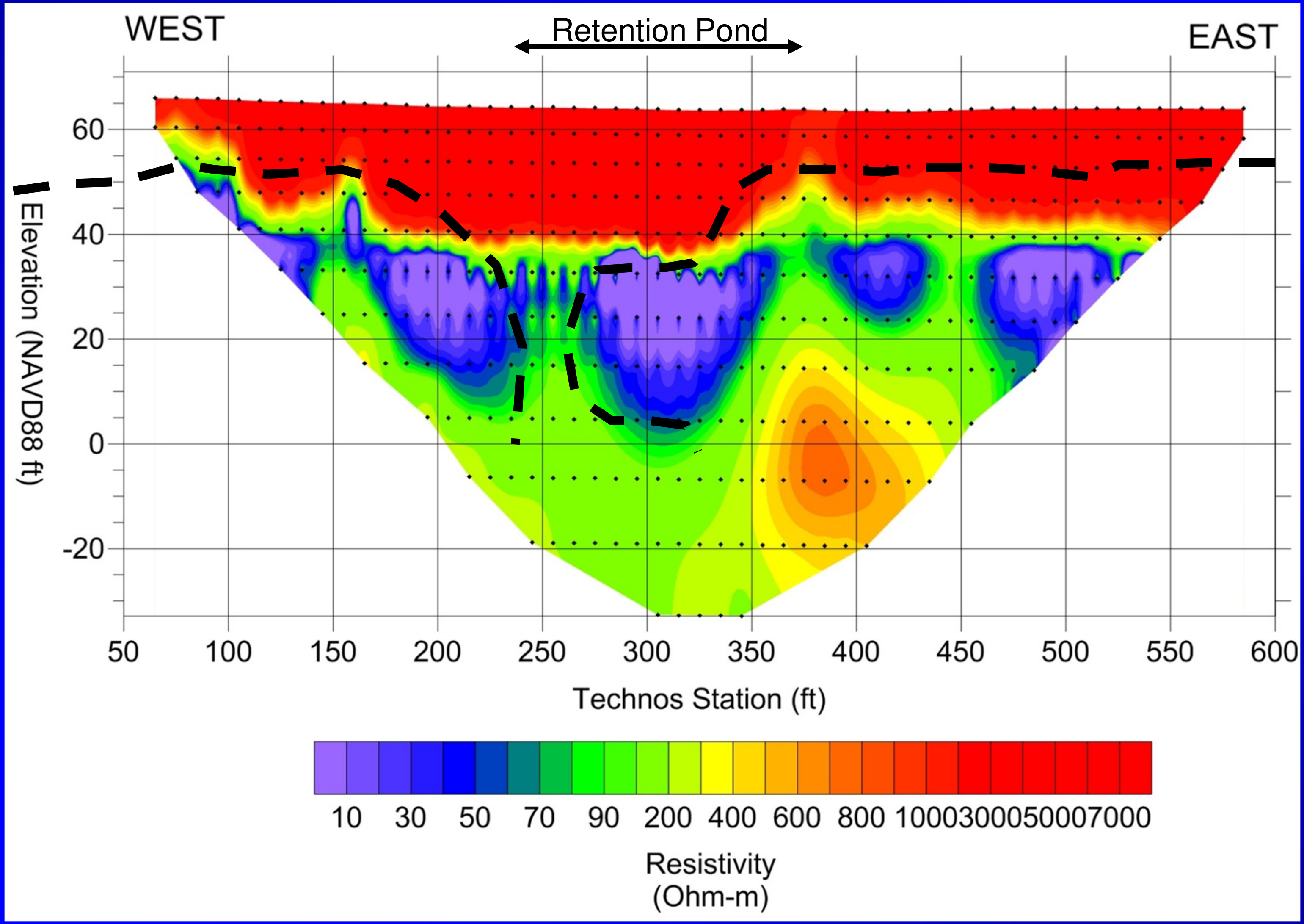
TECHNOS

MASW

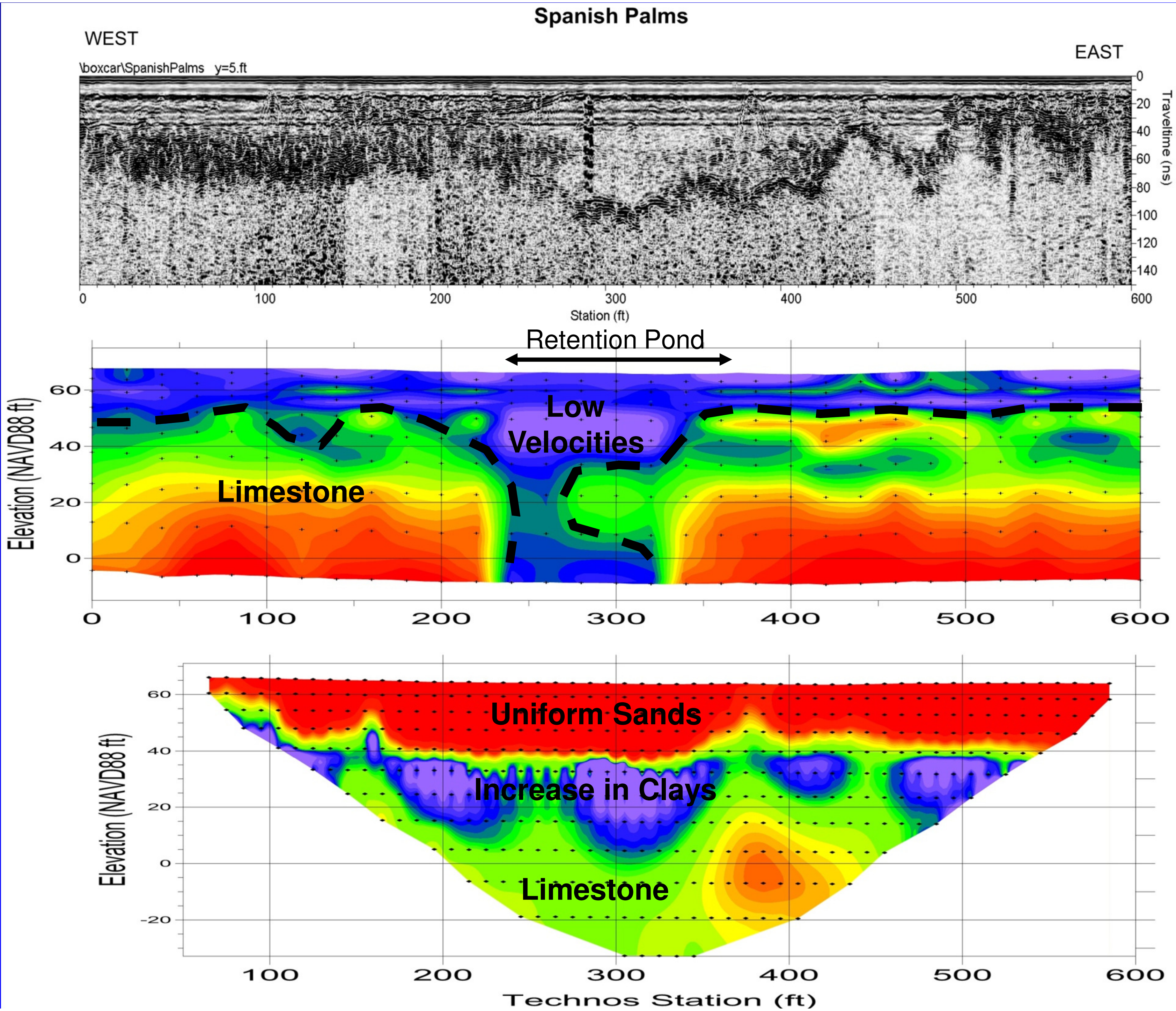


TECHNOS

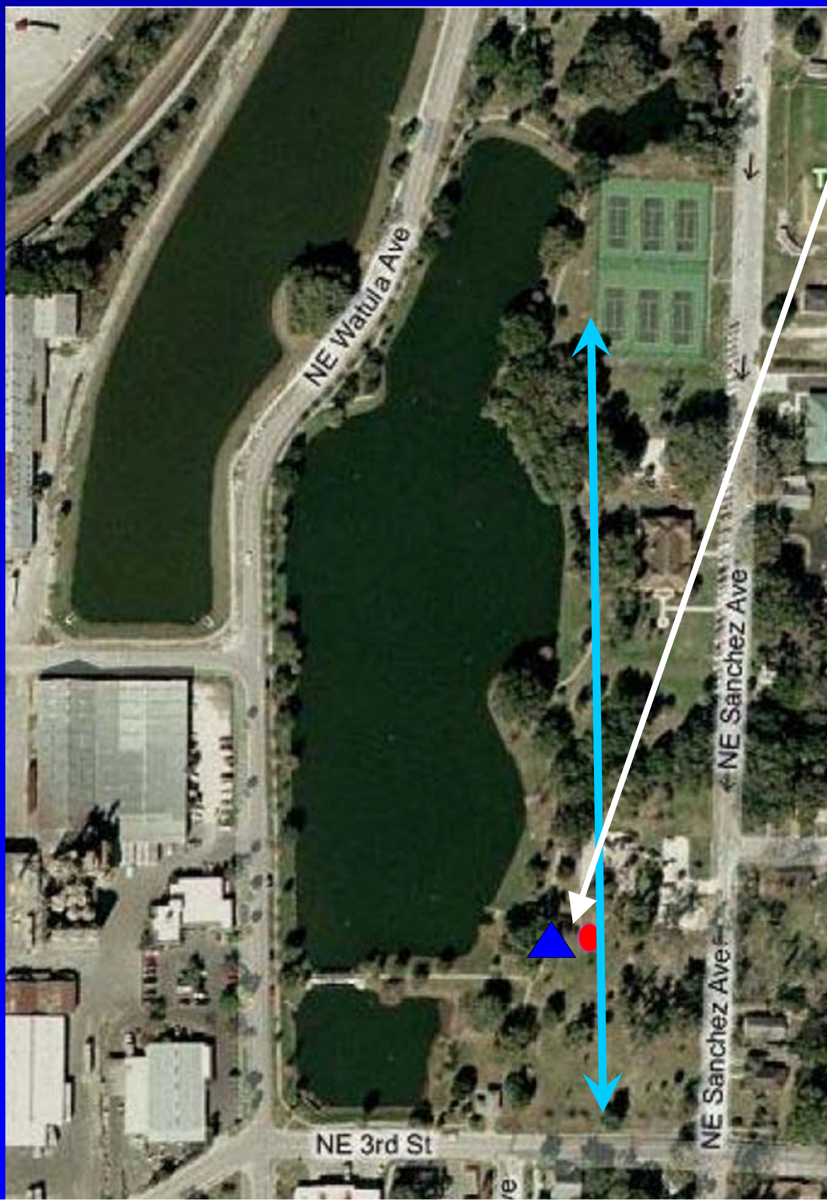
Resistivity

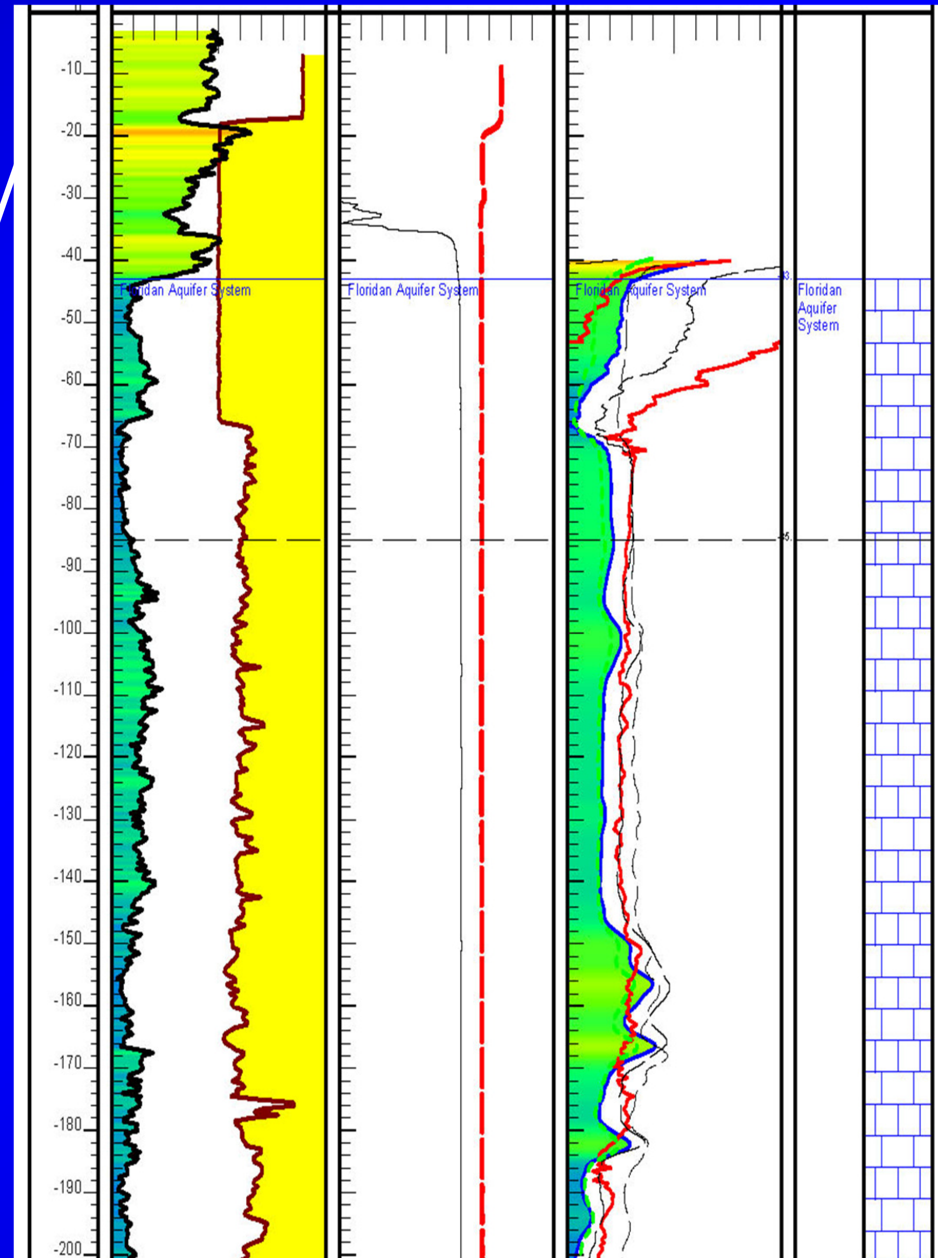


TECHNOS


Spanish Palms
WEST
EAST
\boxcar\SpanishPalms y=5.ft
Traveltime (ns)
0
20
40
60
80
100
120
140
0
100
200
300
400
500
600
Station (ft)
Retention Pond
Low Velocities
Limestone
Elevation (NAVD88 ft)
60
40
20
0
0
100
200
300
400
500
600
Uniform Sands
Increase in Clays
Limestone
Elevation (NAVD88 ft)
60
40
20
0
-20
100
200
300
400
500
600
Technos Station (ft)

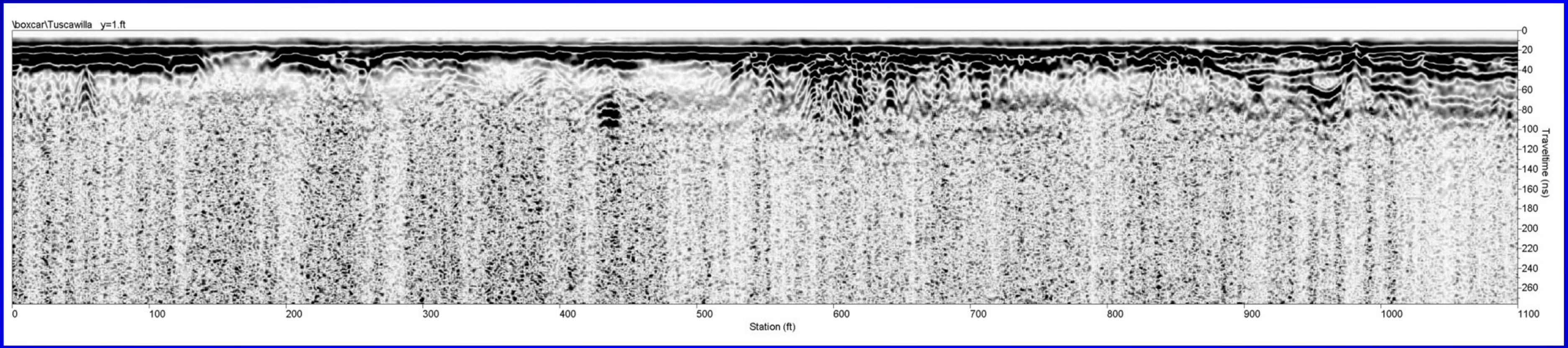
Tuscawilla Park





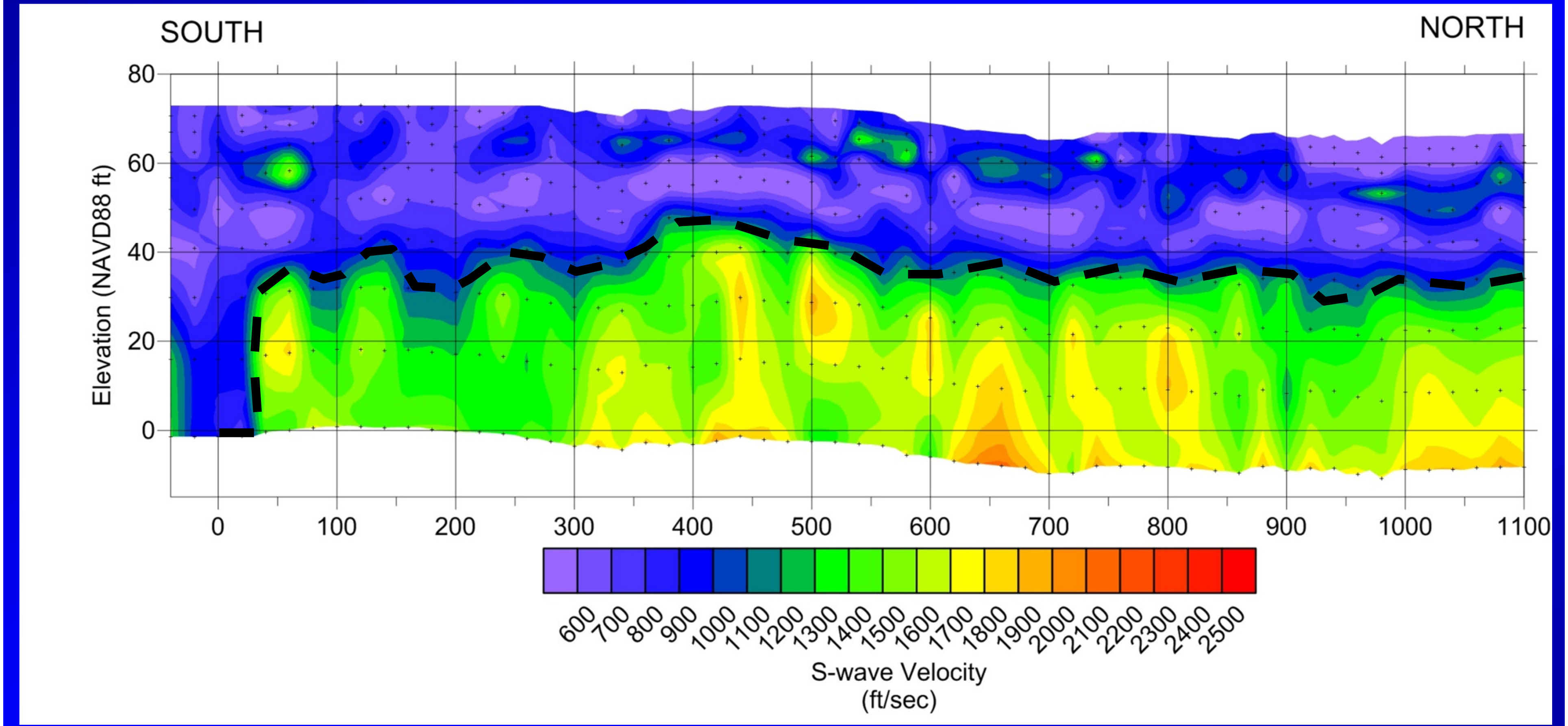
TECHNOS

Ground Penetrating Radar



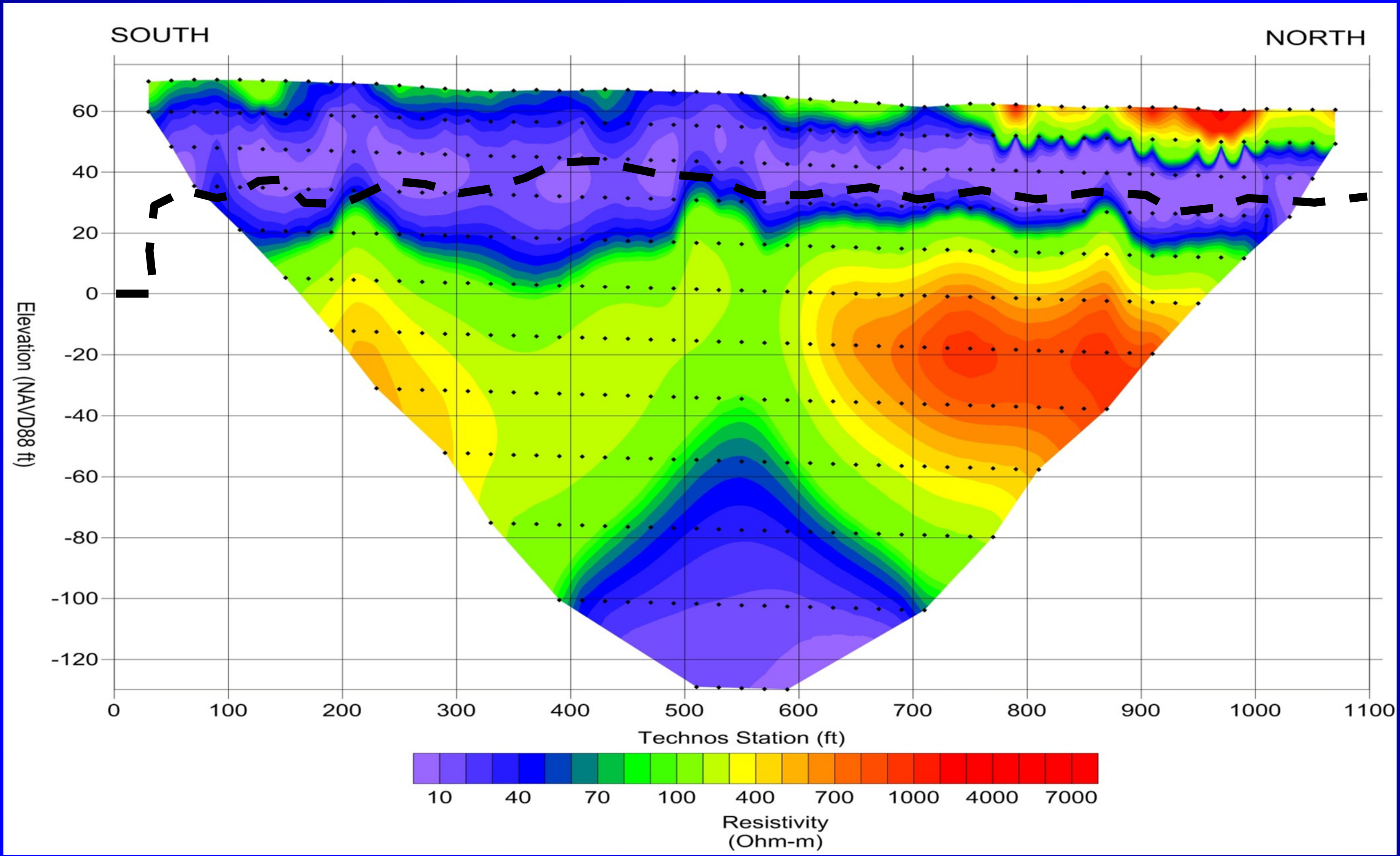
TECHNOS

MASW

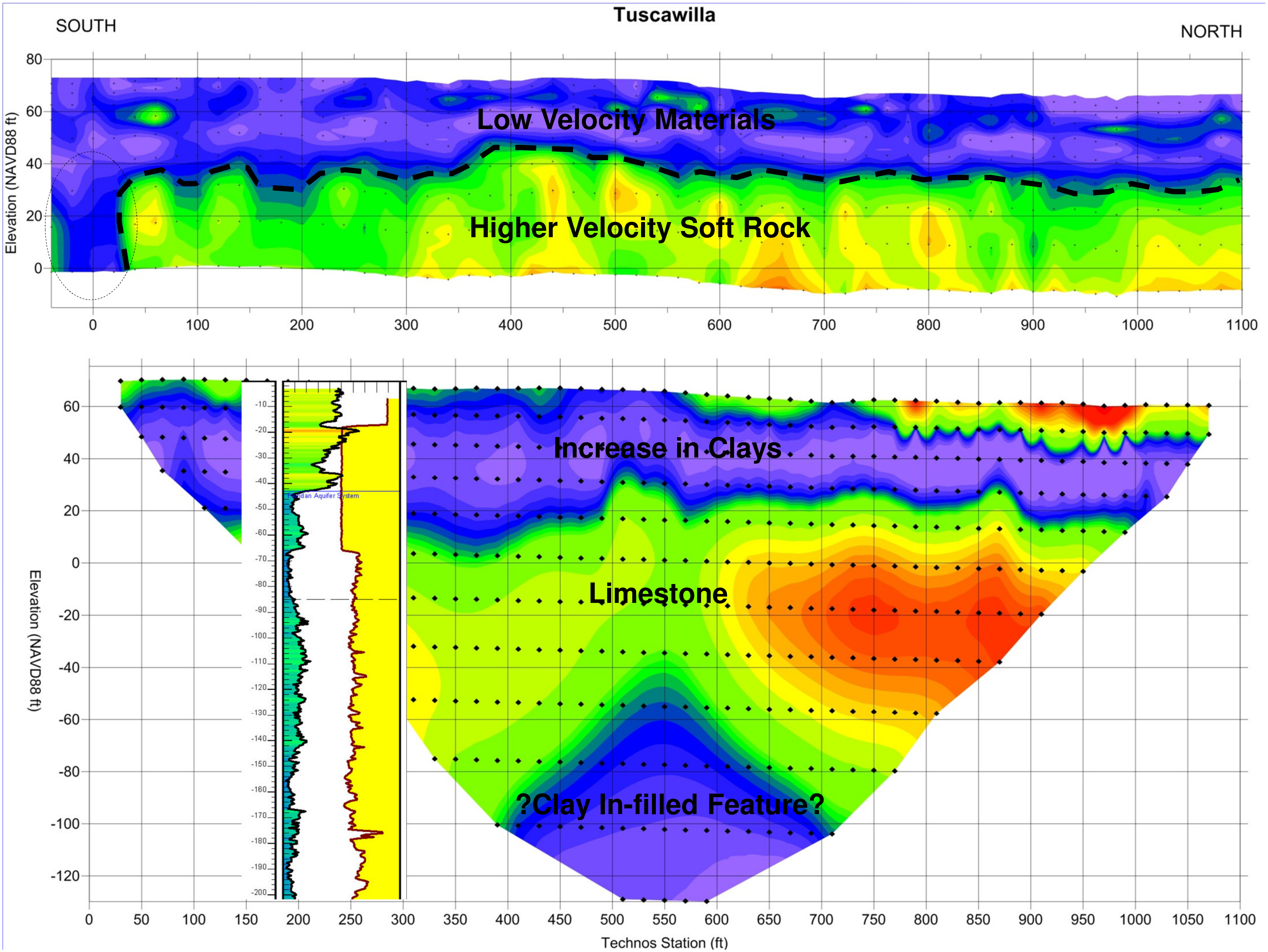


TECHNOS

Resistivity

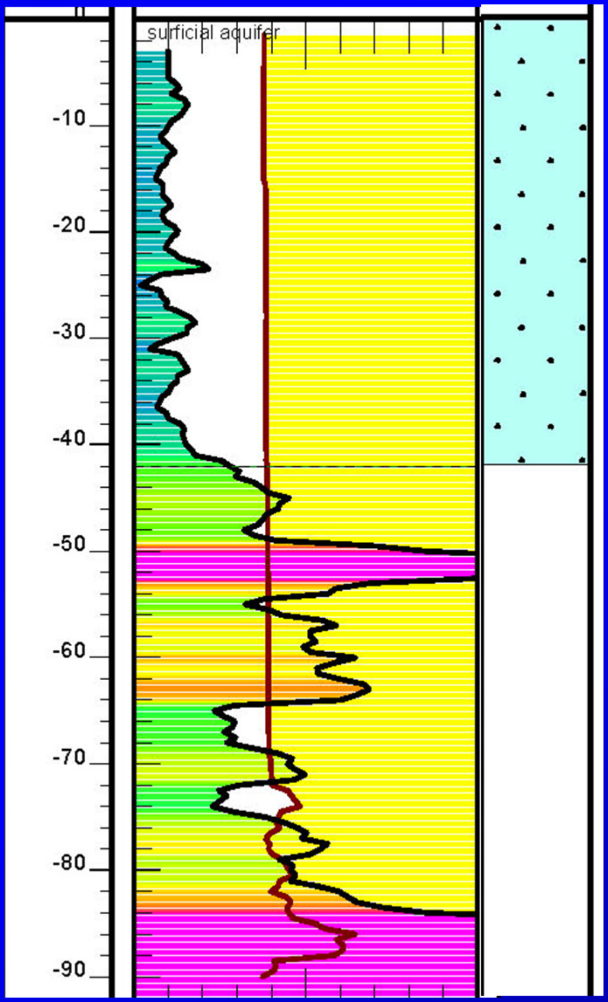


TECHNOS



Tuscawilla
SOUTH
NORTH
Elevation (NAVD88 ft)
Low Velocity Materials
Higher Velocity Soft Rock
Increase in Clays
Limestone
?Clay In-filled Feature?
Elevation (NAVD88 ft)
Technos Station (ft)

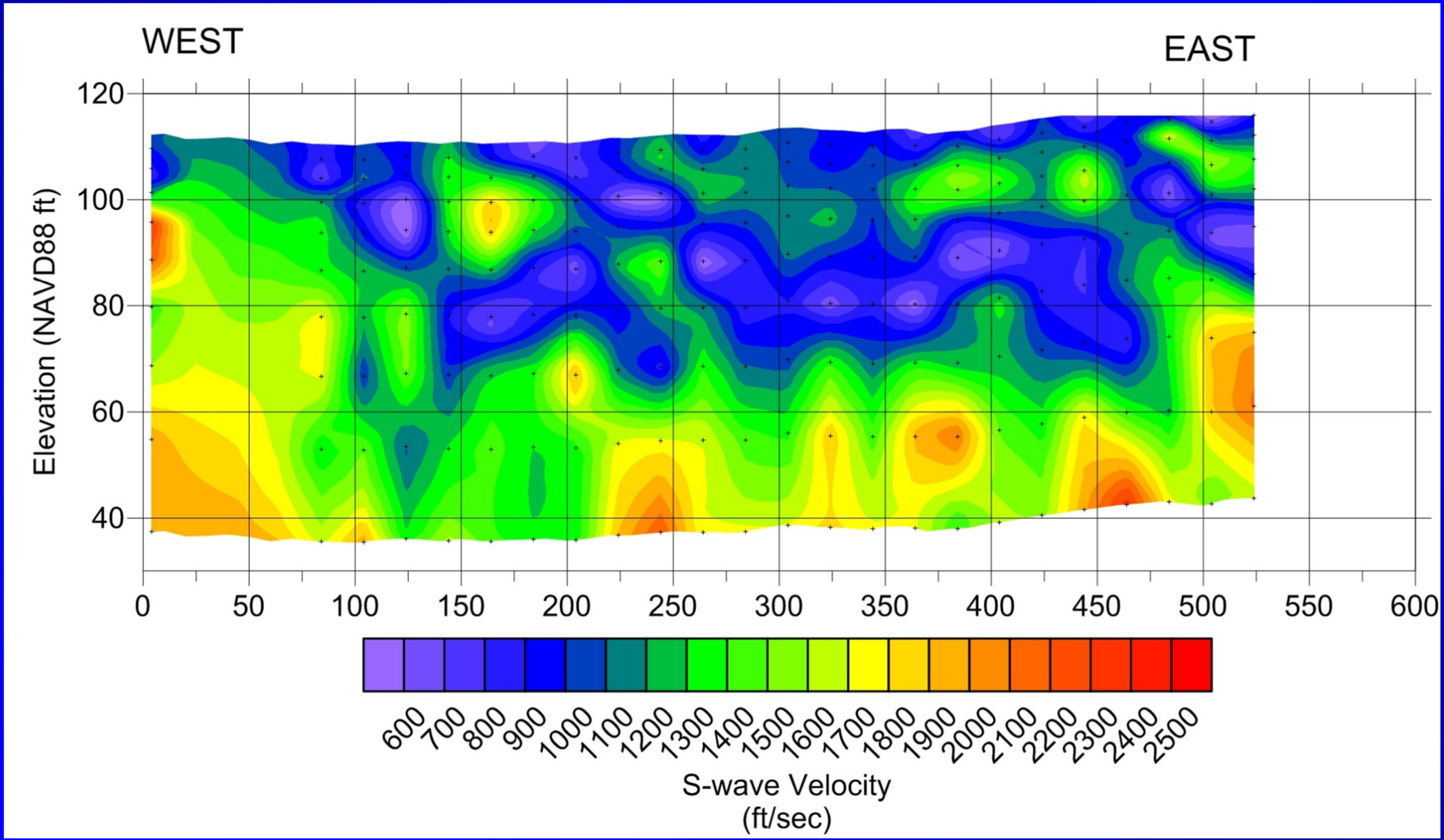
Pontiac Pit



Well to NE of site - Elev. 40
Shane indicated
10 to 13.5 ft bls TOR

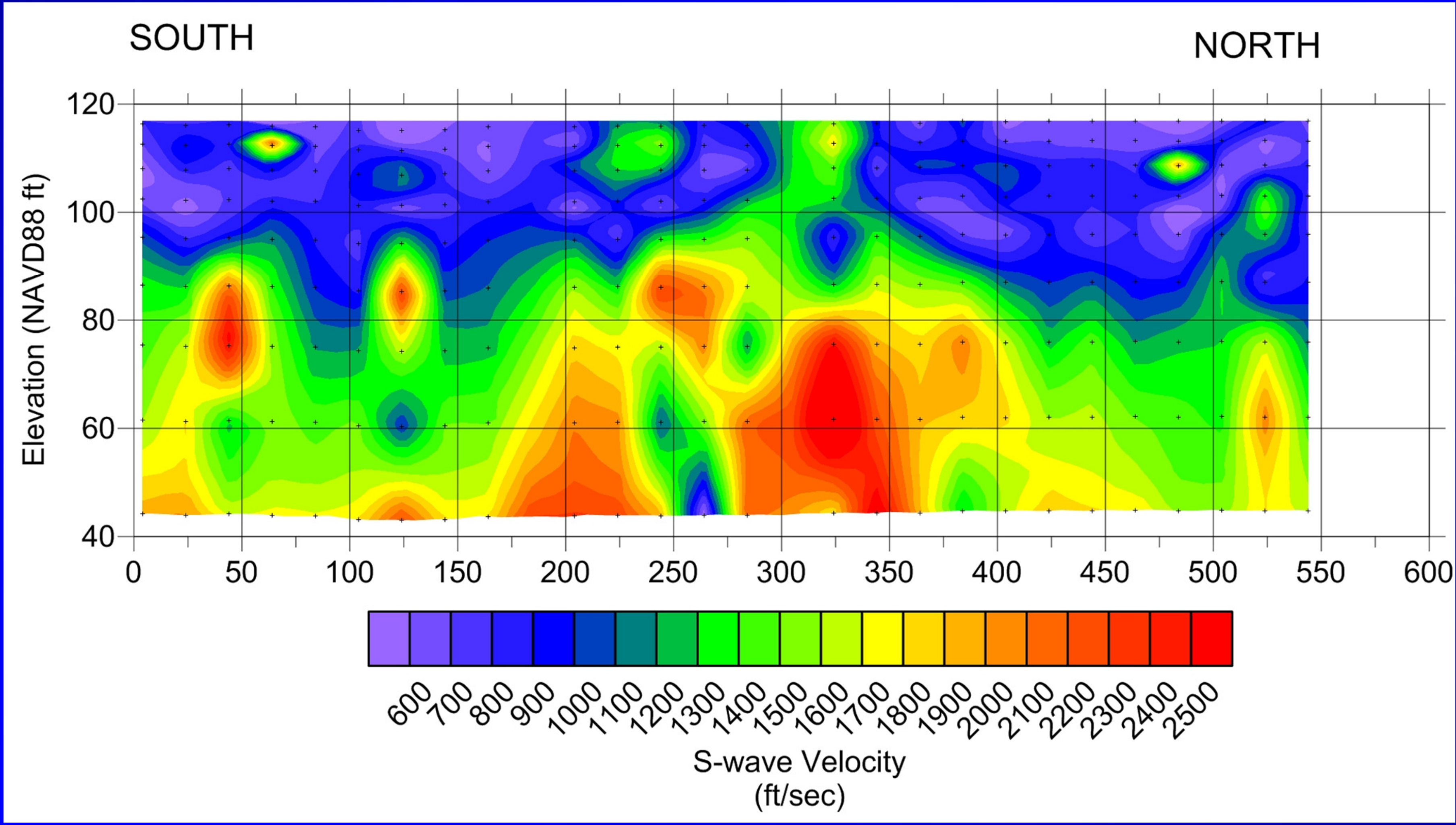
TECHNOS

Pontiac Pit – Along 32nd St (W-E)

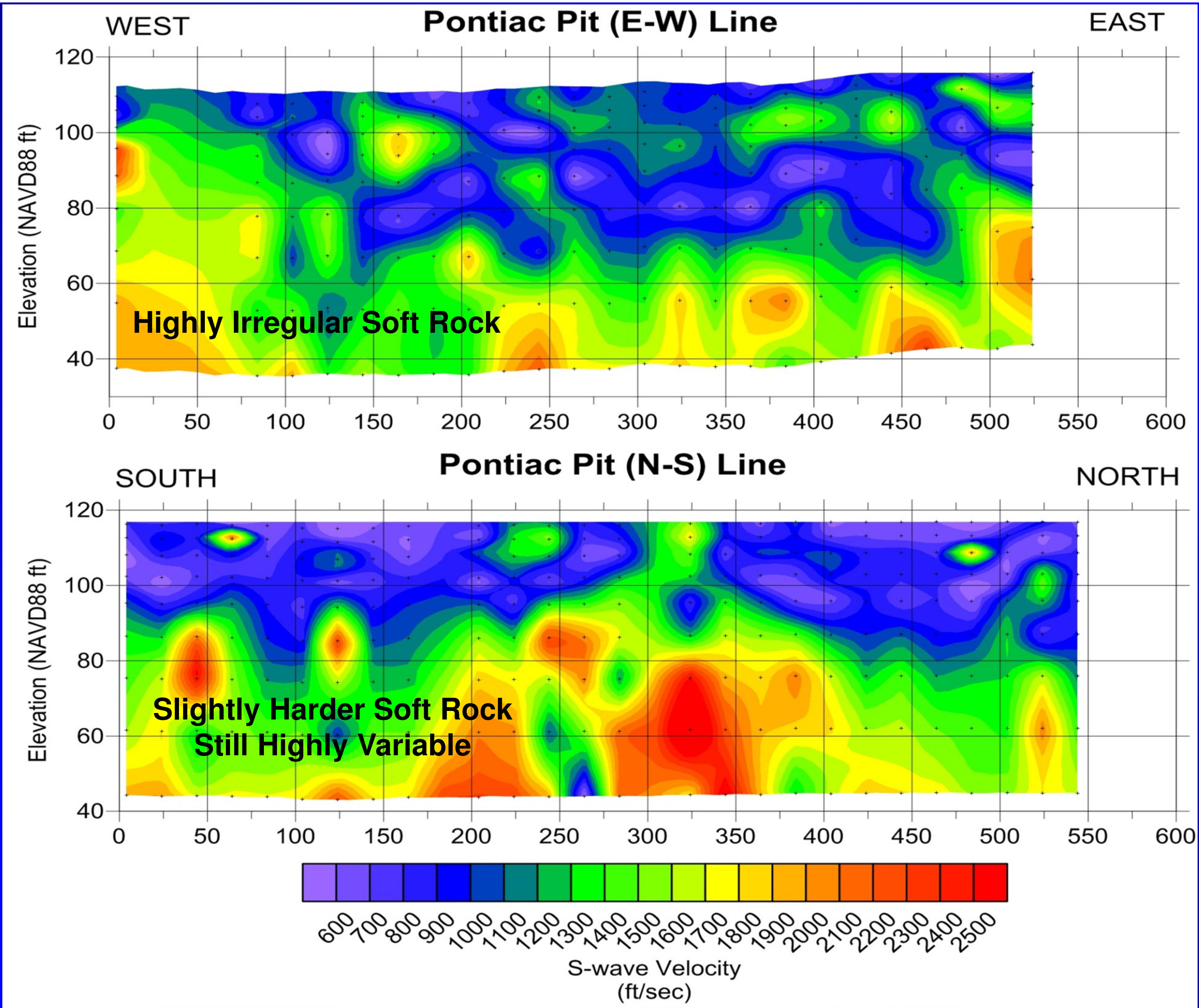


TECHNOS

Pontiac Pit – Along 441 (S-N)

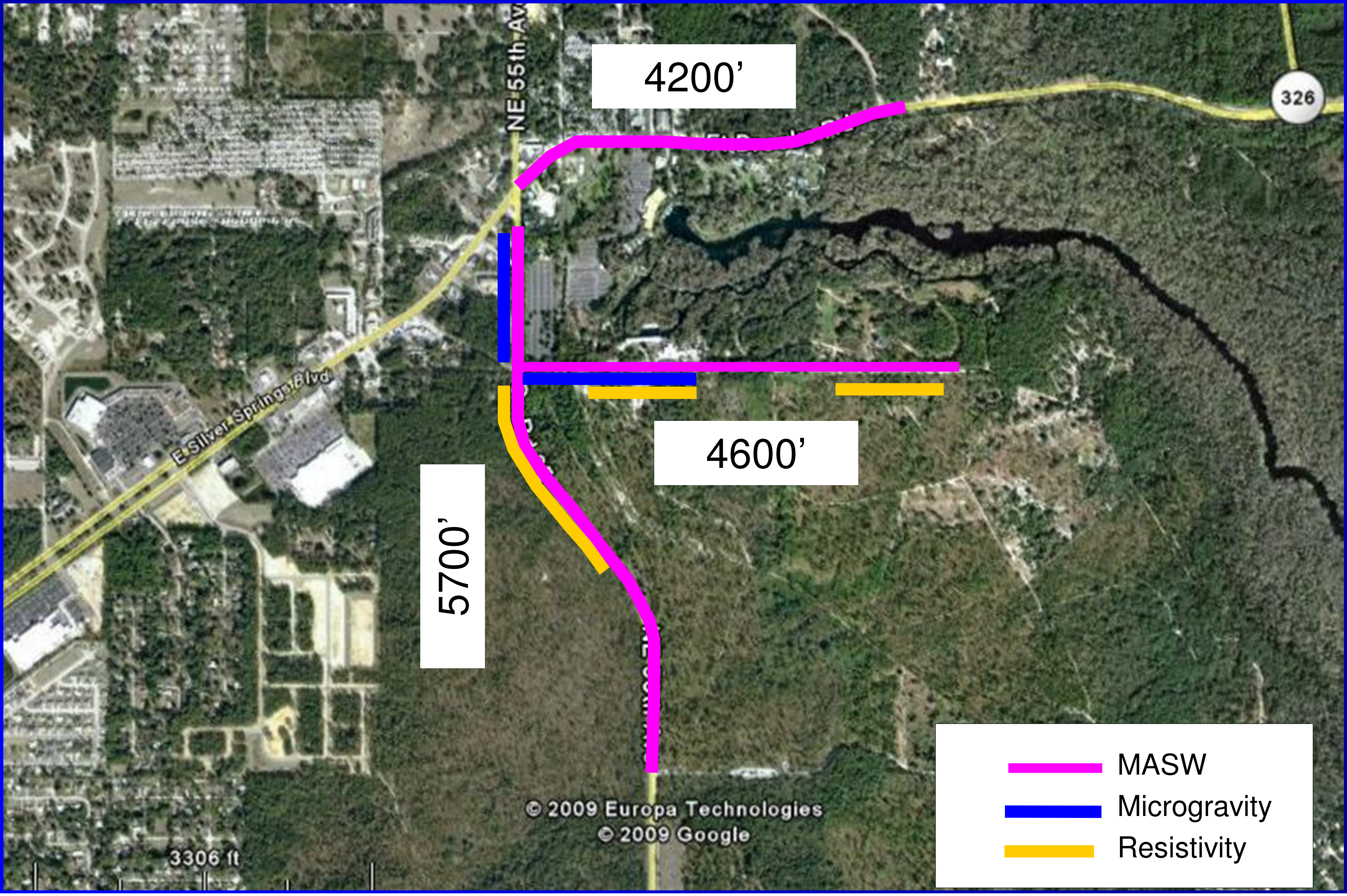


TECHNOS

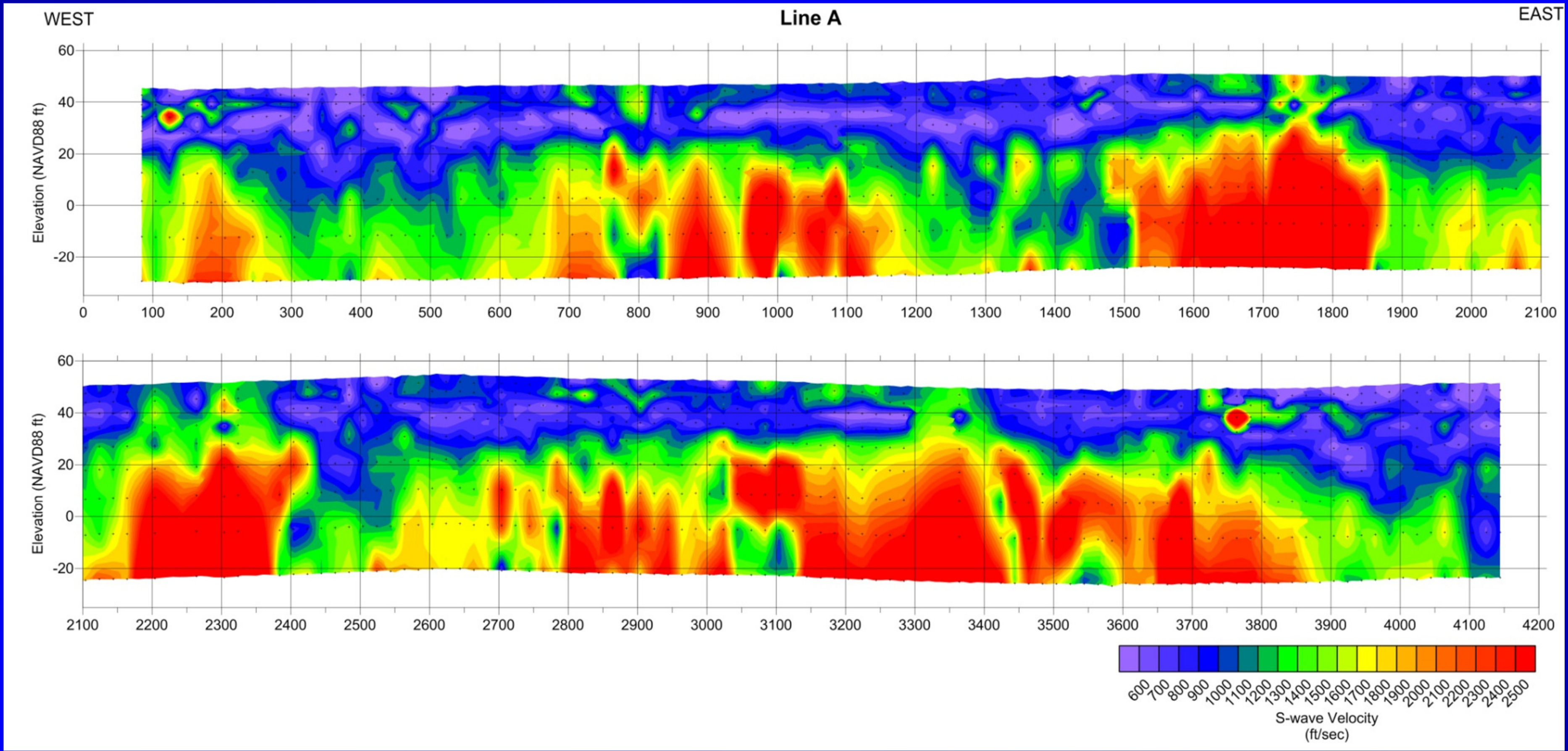


Pontiac Pit (E-W) Line
WEST
EAST
Elevation (NAVD88 ft)
120
100
80
60
40
0
50
100
150
200
250
300
350
400
450
500
550
600
Highly Irregular Soft Rock
Pontiac Pit (N-S) Line
SOUTH
NORTH
Elevation (NAVD88 ft)
120
100
80
60
40
0
50
100
150
200
250
300
350
400
450
500
550
600
Slightly Harder Soft Rock
Still Highly Variable
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
S-wave Velocity
(ft/sec)

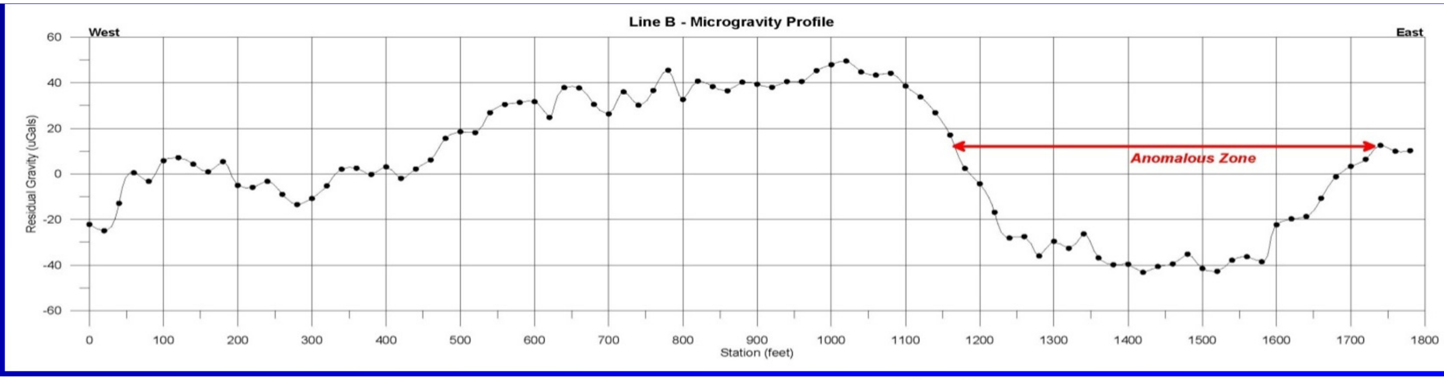
Production Lines

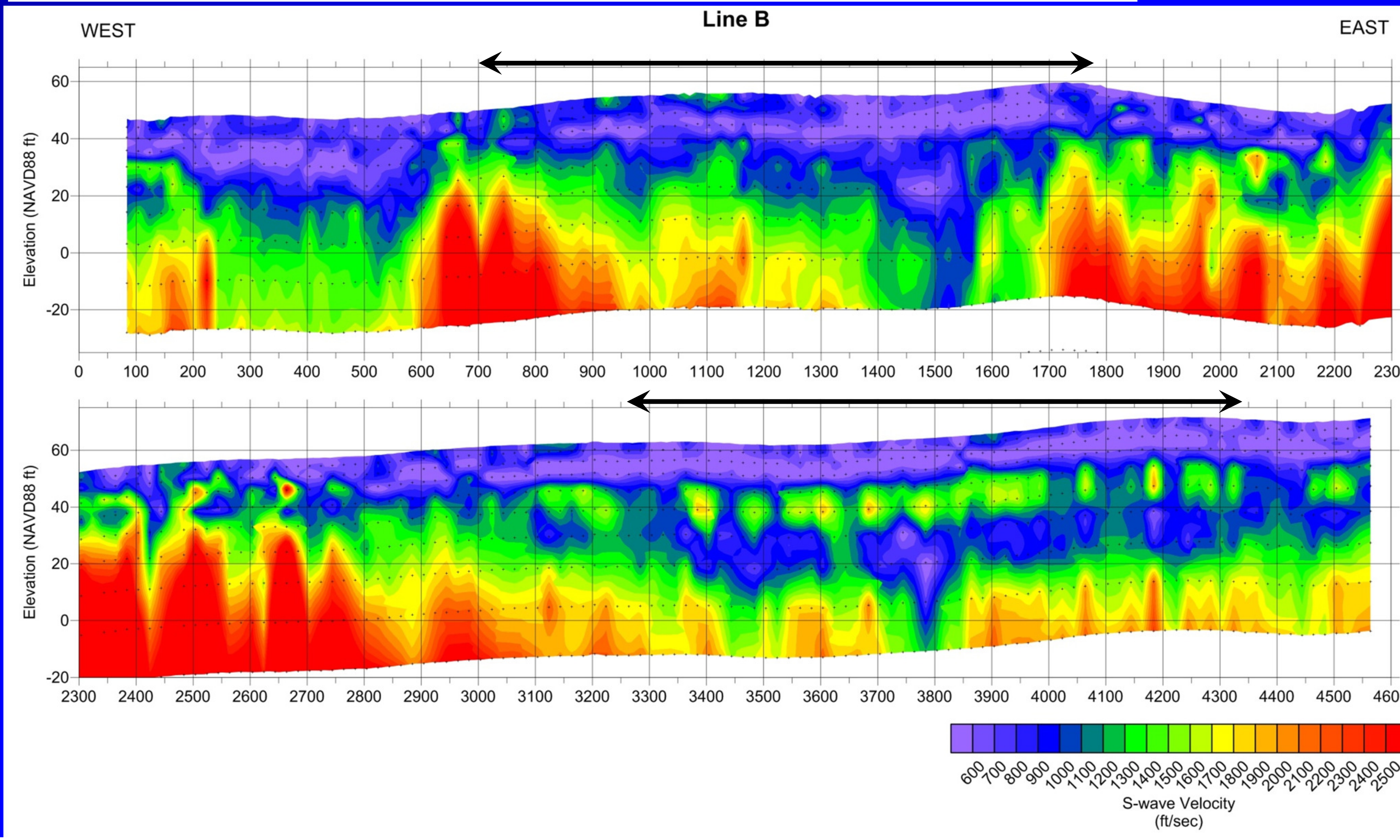


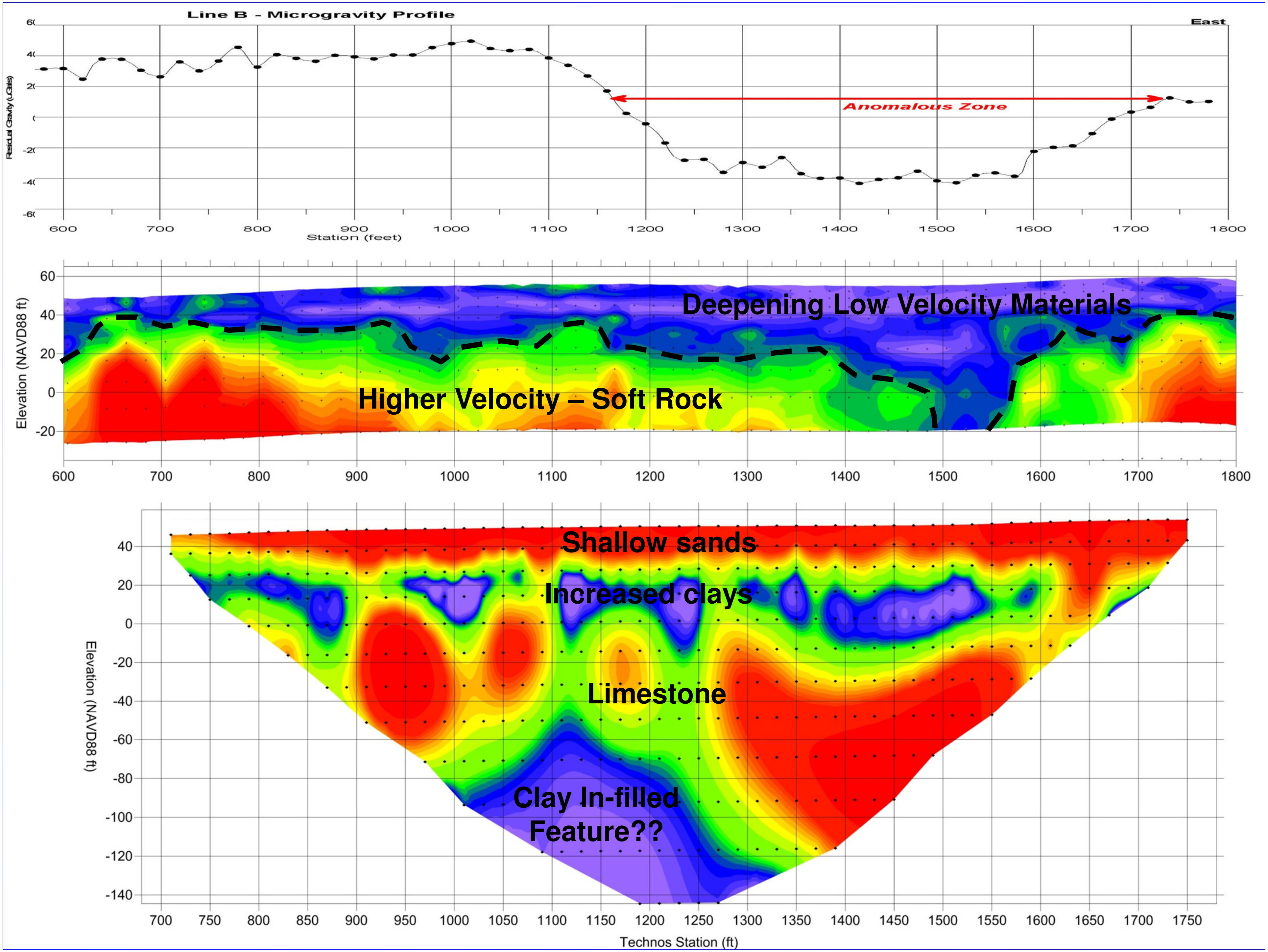
Line A



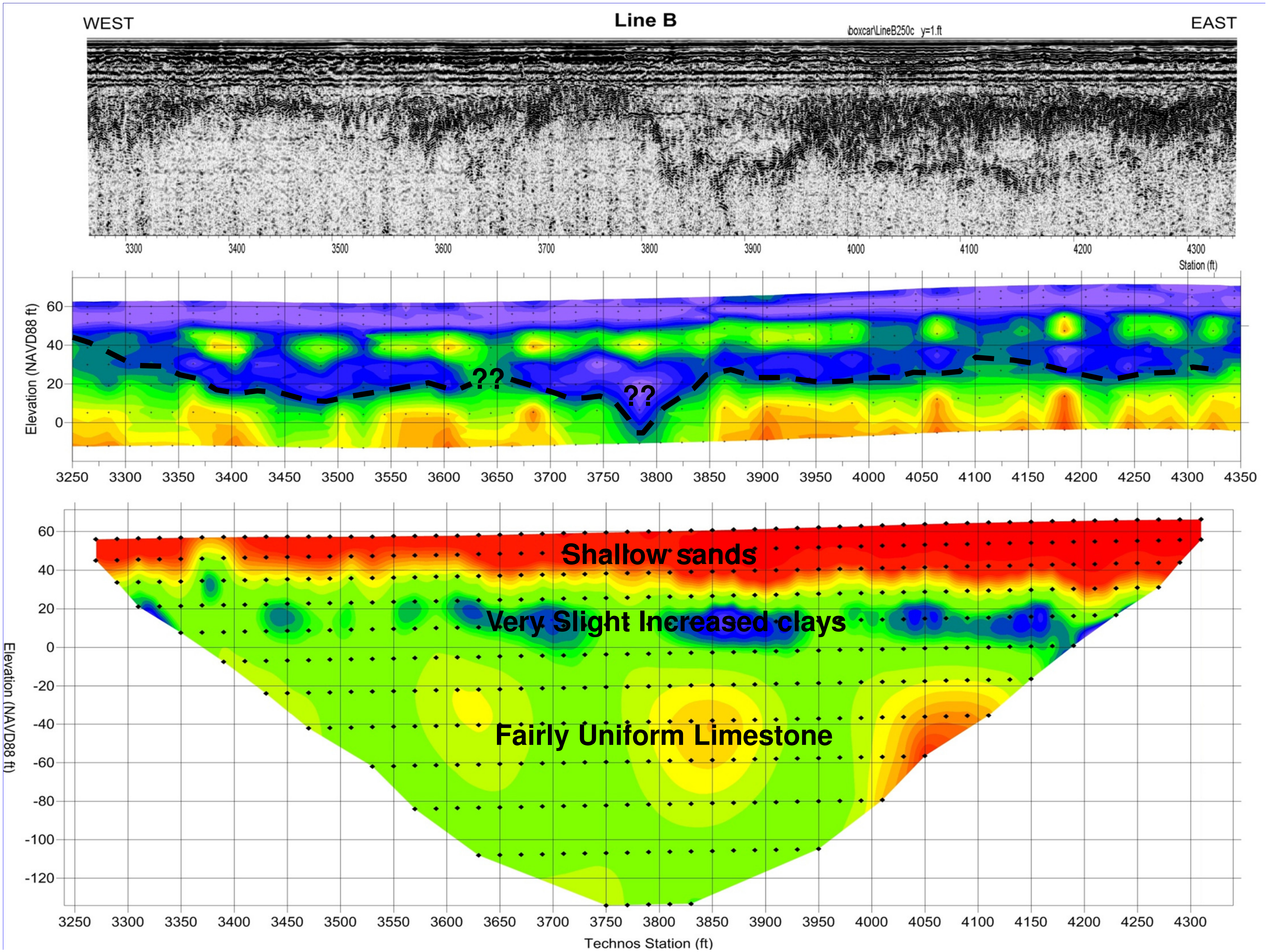
TECHNOS


Line B - Microgravity Profile
West
East
Residual Gravity (uGals)
60
40
20
0
-20
-40
-60
Anomalous Zone
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Station (feet)


Line B
WEST
EAST
Elevation (NAVD88 ft)
60
40
20
0
-20
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
Elevation (NAVD88 ft)
60
40
20
0
-20
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
4100
4200
4300
4400
4500
4600
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
S-wave Velocity
(ft/sec)

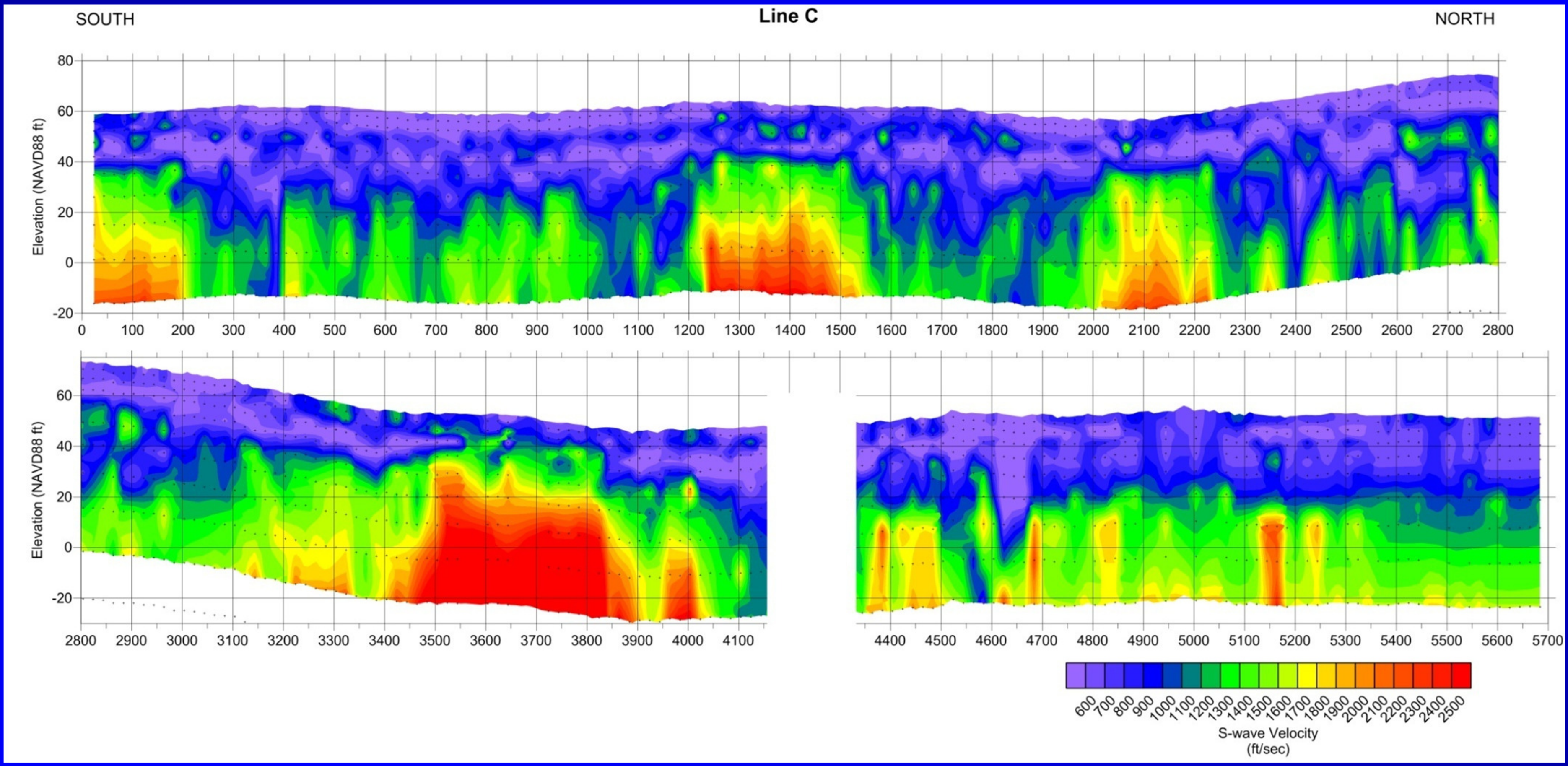


Line B - Microgravity Profile
East
Anomalous Zone
Station (feet)
Elevation (NAVD88 ft)
Deepening Low Velocity Materials
Higher Velocity – Soft Rock
Shallow sands
Increased clays
Limestone
Clay In-filled
Feature??
Elevation (NAVD88 ft)
Technos Station (ft)

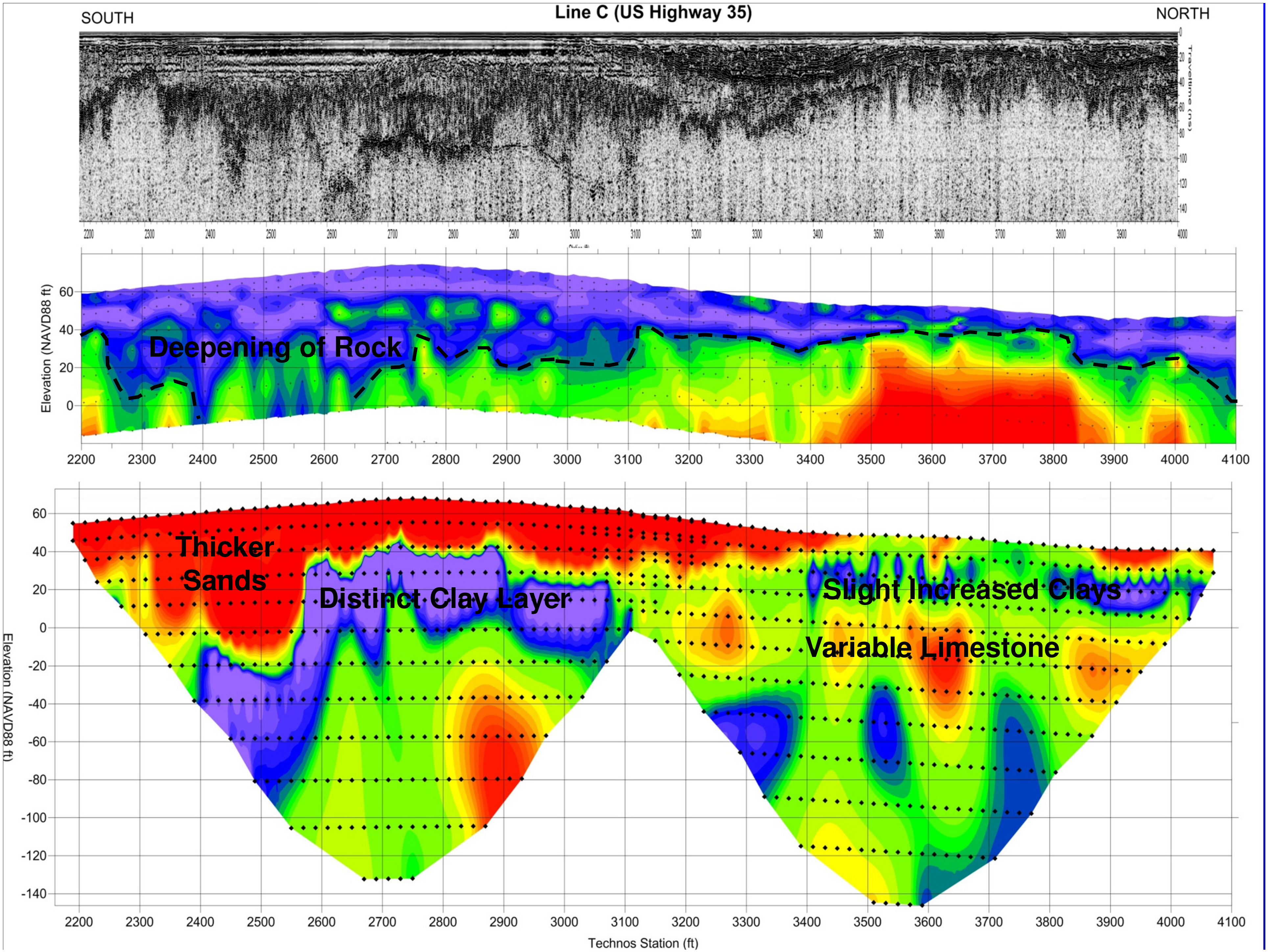


WEST
Line B
EAST
boxcar\LineB250c y=1.ft
Station (ft)
Elevation (NAVD88 ft)
??
??
Shallow sands
Very Slight Increased clays
Fairly Uniform Limestone
Technos Station (ft)

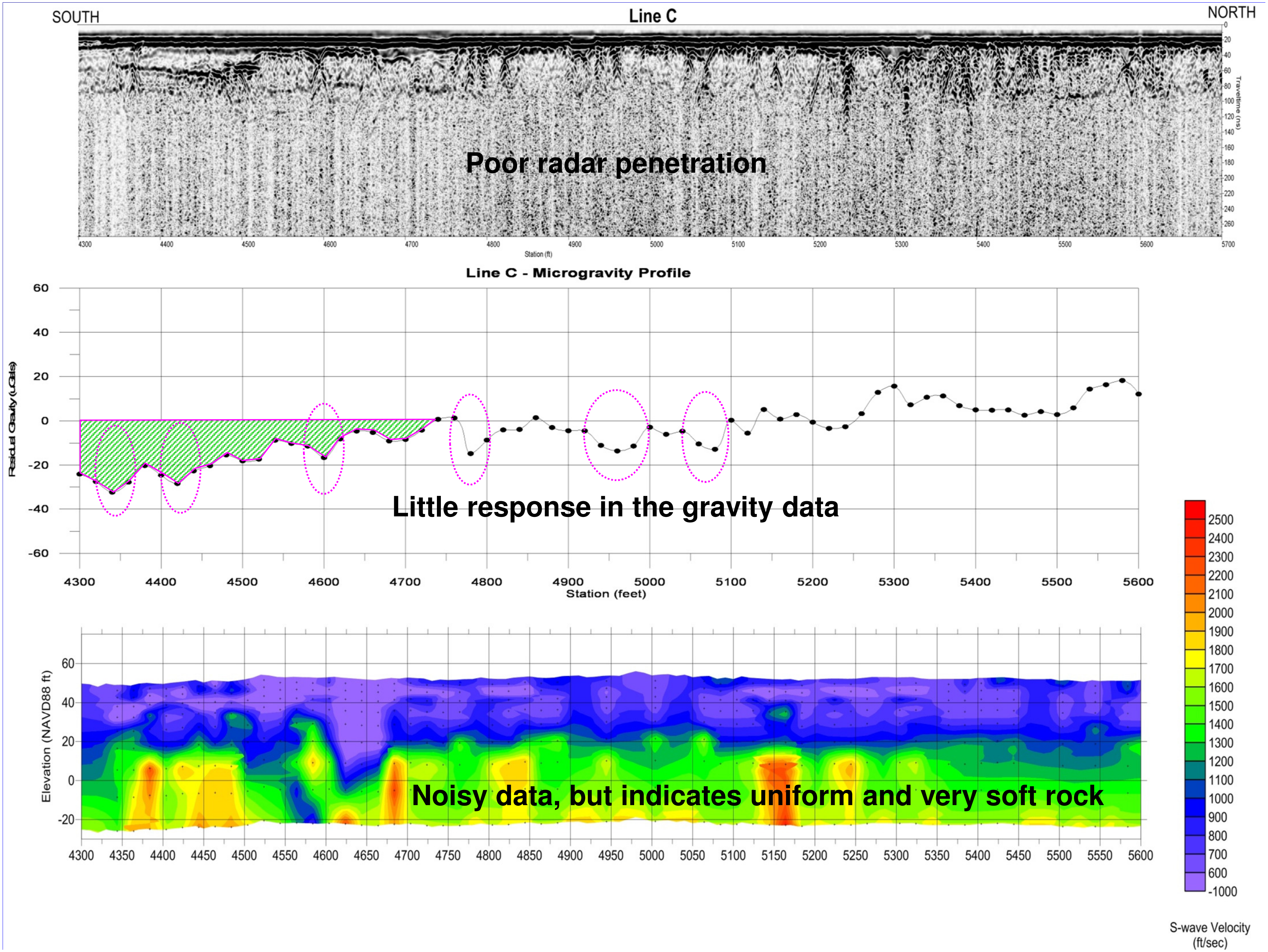
Line C



TECHNOS



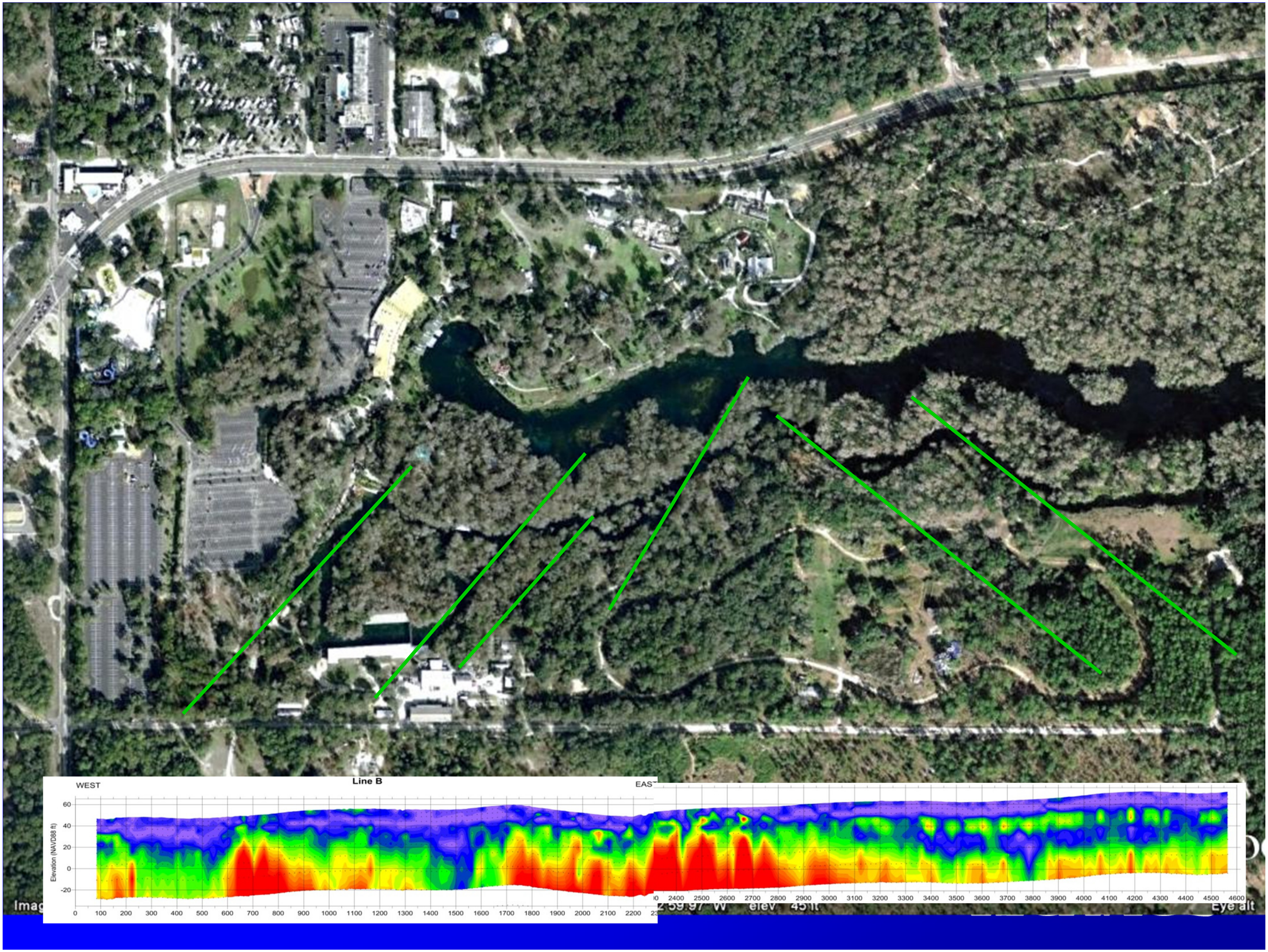
SOUTH
Line C (US Highway 35)
NORTH
Traveltime (ns)
Elevation (NAVD88 ft)
Deepening of Rock
Thicker Sands
Distinct Clay Layer
Slight Increased Clays
Variable Limestone
Technos Station (ft)

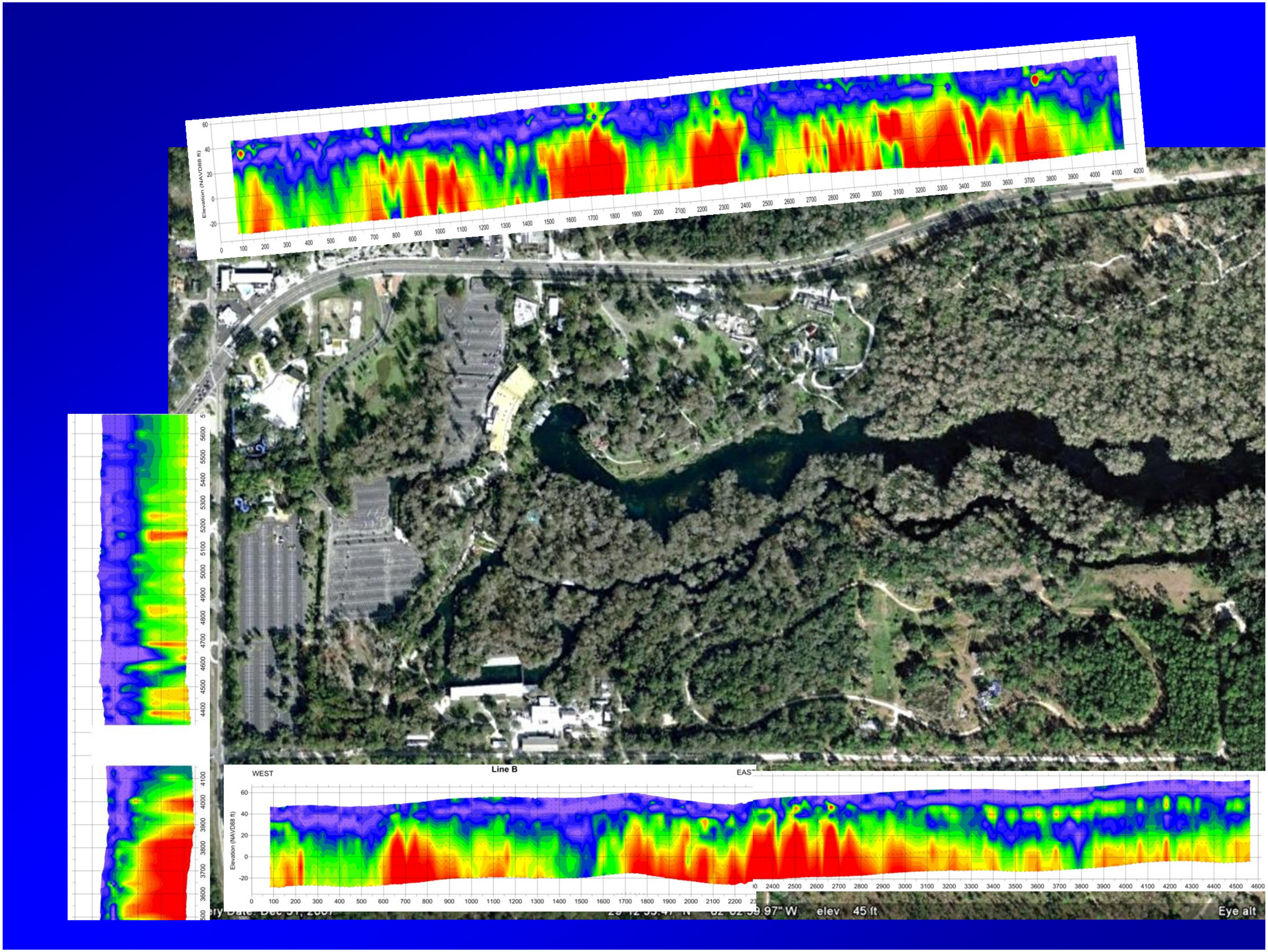

SOUTH
Line C
NORTH
Traveltime (ns)
Station (ft)
Poor radar penetration
Line C - Microgravity Profile
Residual Gravity (uGals)
Station (feet)
Little response in the gravity data
Elevation (NAVD88 ft)
Noisy data, but indicates uniform and very soft rock
S-wave Velocity (ft/sec)

Conclusions

- no one method provide all information
- still need additional geologic information
  - add local lineaments in and around the springs
  - add strike of features mapped by Pete (extending outward toward the survey lines)
  - any closer borings

TECHNOS


Line B
WEST
EAST
Elevation (NAVD88 ft)
60
40
20
0
-20
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200
2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100 4200 4300 4400 4500 4600
elev 45 ft
Eye alt



Line B
WEST
EAST
Elevation (NAVD88 ft)
Eye alt

APPENDIX D

Florida Department of Environmental Protection

Bureau of Parks District 2
4801 Camp Ranch Road
Gainesville, Florida 32641-9299

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

March 8, 2010

Pete Butt
5779 NE CR 340
High Springs, FL 32643

Dear Mr. Butt,

Enclosed is Research & Collecting Permit #03081012 authorizing your dye trace study at Rainbow Springs State Park. This permit must be attached to your original application and carried with you at all times while conducting research in the park.

Please communicate with the Park Manager before your visits. For your convenience, his name and phone number are located on the permit.

Florida State Parks are popular research sites. Although the parks are eager to accommodate your project, please note that Park Staff may not always be available to physically assist you during your study.

In exchange for the privilege of working in our parks, please continue to submit to us any field reports and species lists, including incidental observations of other flora or fauna, following your study period. As always, we appreciate your previous work and providing your valuable research to the Florida Park Service.

If you have any questions, or if I can be of further assistance, please call me at (352) 955-2135.

Sincerely,

Carol Wooley

Carol Wooley
OPS Biologist
Florida Park Service
District 2 Administration
Margarette.Wooley@dep.state.fl.us

MCW/mcw

Enclosure

cc: Park Manager
District Files, District Biologists

APPENDIX E

Florida Department of Environmental Protection
Division of Recreation and Parks

Butt

Permit Number:
03081012

RESEARCH/COLLECTING PERMIT

This Permit Must Be Carried At All Times While Researching/Collecting

Primary Holder:
Butt, Peter

Karst Env. Serv., URS Corp. & St. Johns River WMD

5779 NE County Road 340
High Springs, FL 32643
(386) 454-3556 kes@atlantic.net

Issue: 3/8/2010
Expiration: 3/8/2011

Additional Permittees:
Long, Mark
Morris, Tom
Hubner, Matt
Shemitz, Georgia
Long, Annette
Colona, Bill
Dietrich, Mark
Hough, Kevin
O'Neil, Sid
McGurk, Brian
Davis, Jeff
Toth, David

To Research/ Collect:

Dye trace study and the placement of charcoal samplers for water collection to determine the presence or absence of dye.

In the Following Parks:

Rainbow Springs State Park

Standard Conditions:

1. Contact the Park Manager and Biologist (if listed below) in advance of project start (2 weeks notice when possible), for coordination and arrangements. Due to the increasing popularity of research within state parks and their other duties and responsibilities, the park staff may not be available to physically assist with project activities but will provide guidance and direction.

   Rainbow (352) 465-8555 Park Manager: Joseph E. Smyth

2. Check in upon arrival at and departure from the park. Collected material is subject to inspection.
3. Collect only materials as stated above, in the quantities and manner indicated in the attached application form.
4. Any other applicable state and federal permits are the responsibility of the permittee.
5. Collected objects may not be sold, bartered, or traded.
6. Collect no state or federally listed, or rare endemic species or forms, unless otherwise stated in permit.
7. Research shall be conducted in such a manner as not to attract attention or cause damage to the environment.
8. Remove all flagging and project markings upon project completion.
9. The permit is non-transferable. At least one named collector (above) must be present.
10. The permittee and research associates will not be subject to park day-fees.
11. The permit is revocable.
12. The permit may be renewed upon written request. Consideration for renewal will be contingent up on submission of an interim progress report.
13. A final report, including species lists, museum voucher numbers, incidental observations, and any research reports concerning project data shall be submitted to the district biologist and the parks within one month of permit expiration. The report is the responsibility of the primary permit holder. Failure to submit a report may result in denial of future research requests.

Special Conditions and Restrictions:

1 All divers must possess current certification and dive within their certification limits.

Approved:

William Cottitt

FOR Donald V. Forgione

Chief, Bureau of Parks District 2
Division of Recreation and Parks
District 2 Administration
4801 Camp Ranch Road
Gainesville, FL 32641-9299

Phone: (352) 955-2135
Suncom: 625-2135
FAX: (352) 955-2139

cc: District Biologist, Park Manager(s), Park Biologist(s)

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Recreation and Parks (DRP)

APPLICATION FOR RESEARCH/COLLECTING PERMIT

(Please Print or Type)

Applicant's Name Peter L. Butt, Karst Environmental Services, Inc. Date of Application 2/2/10

Applicant's Signature [signature] Occupation Project Manager

Affiliation Karst Environmental Services, Inc. (KES) and URS Corporation for and with the St. Johns River Water Management District (SJRWMD)

Address 5779 NE County Road 340 High Springs, FL 32643

Phones	(386) 454-3556	(386) 454-2147	(386) 454-3541	kes@atlantic.net
	Business	***Home***	***FAX***	**Email**

Additional Persons to be Authorized Under Permit:

Name	Mark Long, Tom Morris, Matt Hubner	Affiliation	KES Staff
Name	Georgia Shemitz, Annette Long	Affiliation	KES Staff
Name	Bill Colona (URS contact), Mark Dietrich	Affiliation	URS Staff
Name	Kevin Hough, Sid O'Neil	Affiliation	URS Staff
Name	Brian McGurk (SJRWMD Contact)	Affiliation	SJRWMD Staff
Name	Jeff Davis, David Toth	Affiliation	SJRWMD Staff

Do you have a federal or other state agency permit for the proposed activity? Yes No* if Yes, please attach a copy.
* FDEP Central District will be informed of the dye trace, and we will obtain approval prior to any dye release (as with past dye traces). This is also an FDEP authorized and funded project.
Have you previously had a DRP research/collecting permit? Yes No if Yes, give permit number. 10230913, 02250622, numerous others.

Project name and description: Silver Springs Nutrient Pathway Characterization. The project objectives are: 1) identify dominant groundwater pathways and travel times between specific locations and Silver Springs and 2) identify potential sources of nutrient inputs to the groundwater flow system that appears to be directly connected to the Silver Spring discharge vents. This is a SJRWMD authorized project and is funded by the FDEP Springs Initiative using funds provided by the USEPA from the American Reinvestment and Recovery Act of 2009 (ARRA).

List parks to be included in permit.
Rainbow Springs State Park, Marion County, Florida.

Why is a state park/preserve proposed for this project?
We would like to monitor Rainbow Springs as there exists the potential that the tracer dye we plan to release at the Orange Lake Sink (at Heagy-Burry Park) could make it to Rainbow Springs. Monitoring Rainbow Springs has been determined to be geographically prudent, and is part of due diligence of our sampling plan.

Describe/propose benefits to state park/preserve.
As the goal of this qualitative dye trace is to determine the hydrogeologic connections of selected drainage/sinking points in Marion County with the Silver Springs Group, and other selected springs, the study will provide information on travel times between the sinks and springs and will provide the State of Florida and others with information needed to enhance the protection of surface and ground waters flowing to the Silver Springs Group and any other springs that are monitored during this study.

Project Start Date: 12/09 (planning/prep and pre-background sampling underway) **Project End Date:** 8/31/11 We will contact you for any renewals or extensions as needed/appropriate; specific weather and water conditions may be needed for dye release and monitoring, and this may cause delays.

Describe research/collecting needs and objectives (attach additional page if necessary). Append a copy of a research proposal if available.
Charcoal samplers would be placed/collected and water samples collected from spring pools and runs and analyzed to determine the presence/absence of dye.

Species/samples to be collected/studied (if taking is necessary, specify numbers requested and justify need for sample size).
No animals or plants will be collected. Water samples will typically be collected in vials of less than 250 ml in volume. The only other sampling will be with the use of charcoal packets attached to anchors/holders.

Methodology (describe collecting/trapping/marking methods)
Background conditions will be checked with charcoal sampler packets and water samples. After release of the dye, packets and water samples will be collected at scheduled intervals as are appropriate for the duration of the study. The duration of the project is anticipated to be at least 16 weeks. Charcoal samplers will be changed out weekly. Sampling visits will be unobtrusive, and will not interfere with any park activities. Sample analysis will be performed with a spectrofluorophotometer at Ozark Underground Laboratory.

Proposed disposition of collected specimens n/a

Return to: **District 2 Administration, 4801 SE 17th Street, Gainesville, FL 32641-9299.**
Phone (352) 955-2135 FAX (352) 955-2139

OFFICE USE ONLY:
Date Application Received 2/5/10 **30 Day Review Due** 3/5/10

Biologist Recommendation: Approved ✓ **Denied** ________

Issue Date 3/8/10 **Permit No.** 03081012

Biologist Reviewer
Carol Wooley

Notification Method: mailed / phoned / FAXed / e-mailed

FPS-R009 rev. 02/95
2/04

Florida Department of Environmental Protection
Division of Recreation and Parks

Permit Number
11120913a

RESEARCH/COLLECTING PERMIT

This Permit Must Be Carried At All Times While Conducting Research/Collecting Activities

Names of Collectors:	Address, Phone, Fax and Email:	Issue – Expiration Dates
Brian E. McGurk (SJRWMD) Jeffrey Davis, Alan Story, Craig Berninger, David Toth (SJRWMD) SJRWMD contractors: Tom Tracz, Bill Colona, Peter Butt, Tom Aley, Todd Kinkaid, Lynn Yuhr, Mark Dietrich, Kevin Hough, Sid O'Neill, Tom Morris, Mark Long, Matt Hubner, Georgia Shemitz, Wes Skiles, Nathan Skiles, Jill Heinerth, Tom Castow	St. Johns River Water Management District P.O. Box 1429 Palatka, FL 32178-1429 (386) 329-4245 (386) 336-2738 cell (386) 329-4820 FAX bmcgurk@sjrwmd.com	**11/12/09-8/11/11** SJRWMD JAN 19 2010 CENTRAL RECEIVING

Representing: St. Johns River Water Management District

Permitted Activity: Conduct a detailed hydrogeologic evaluation (to include borehole testing, vertical elevation surveys, and ground-based geophysical surveys) and a karst pathway assessment and groundwater travel time estimation (to include dye injection and tracing/sampling)

Permitted Collection: Only data collection is authorized

In the Following Areas: Silver River State Park

Special Conditions or Restrictions:

1. Contact the park manager and district biologist a minimum of one week in advance of visits for coordination and arrangements. Failure to do this may result in denial of park entry.
2. Check in with the park manager upon arrival at and departure from the park.
3. Conduct research activities in the manner indicated in the attached application form or proposal.
4. Collect no state or Federally listed, or rare endemic species or forms, or any parts of these listed or rare endemic species or forms.
5. Research activities shall be conducted in such a manner as not to attract attention or cause damage to the environment. Vehicular traffic shall be limited to park roads; other methods of access must be approved by the park manager. All gates shall be left as found.
6. You are required to GPS the location of all permanent or semi-permanent site markings that you add (e.g., PVC pipes) and submit these coordinates to the park manager and district biologist within 2 weeks of the start of your work. You are required to mark all non-permanent site markings (flagging tape, pin flags, etc.) with your permit number. Site markings must not be detrimental or cause harm to the resources of the park (e.g., no markings may be nailed onto trees). Unless approved in advance by the park manager or district biologist, you will be required to remove all site markings upon completion of your work. Any unauthorized site markings will be removed by FDEP staff.
7. A summary report concerning project data, including species lists, shall be submitted to the park manager and district biologist by **11/12/10 and 8/11/11**. Copies of any other reports, publications, theses, or dissertations that result from this work must also be provided to the district biologist upon their availability. Acknowledgement of FDEP, Florida Park Service will be included in any presentations, posters, reports, publications, or theses that result from this work. Failure to submit a report may result in denial of future research requests.
8. Any other applicable state and Federal permits are the responsibility of the permittee.
9. The permit is non-transferable. It must be in the possession of the permittee(s) or their research associates and assistants when conducting research/collecting activities in the park. At least one named researcher/collector (above) must be present.
10. This permit may be revoked for failure of the permittee to abide by permit conditions and policies of FDEP.
11. The permittee and research associates will not be subject to park day-fees when entering the park for research purposes.
12. The permit may be extended or modified upon submission of the annual report and a letter or email requesting renewal. Contact the issuing office for amendment or extension.
13. Any liabilities incurred to the researcher and/or his/her associates are the sole responsibility of the researcher.
14. The Florida Park Service may request that the researcher give a program in the park or in the local community on their work.

Approved By: (name & title)	Issuing Office:
Alice M. Bard Environmental Specialist II	Bureau of Parks, District 3 1800 Wekiwa Circle Apopka, FL 32712 (407) 884-2000

Attachment: none
cc: Bob LaMont, Silver River State Park

FPS-R010 rev. 8/31/09

APPENDIX F

"Desai, Anil" <Anil.Desai@dep.state.fl.us>
04/20/2010 09:58 AM

Files Attached: 0
Total Email Size: 45 kb
Click here to refresh values or press 'F9' on your keyboard
To
"William_Colona@URSCorp.com" <William_Colona@URSCorp.com>
cc
"BMcGurk@sjrwmd.com" <BMcGurk@sjrwmd.com>, "kes@atlantic.net" <kes@atlantic.net>, "Ferraro, Chris" <Chris.Ferraro@dep.state.fl.us>, "Warren, Kalina" <Kalina.Warren@dep.state.fl.us>, "Hicks, Richard W." <Richard.W.Hicks@dep.state.fl.us>
bcc

Subject
RE: Silver Springs Operational Plan Summary

History:
This message has been replied to.

This message has been archived.

Hi Bill,

I have reviewed the scope of work associated with the tracer study to be conducted at the Silver Spring basin and concur with the proposed plan. I definitely wanted to see that key private/public wells are sampled during the course of the study for assessing the adverse impact(s), if any. I have received this information from you already and I have no further comments.

Please keep me abreast with the progress and findings of the project.

Good luck and thanks!

Anil K. Desai, P.G.
Program Manager - Groundwater/Underground Injection Control
FL. Dept. of Environmental Protection
3319 Maguire Boulevard, # 232
Orlando, FL 32803-3767
TEL: (407) 893-3305
EFAX: (850) 412-0472
EMAIL: Anil.Desai@dep.state.fl.us

assessing and improving the level and quality of services provided to you.
Please take a few minutes to comment on the quality of service you received. Simply click on this link to the DEP Customer Survey. Thank you in advance for completing the survey.
From: William_Colona@URSCorp.com [mailto:William_Colona@URSCorp.com]
Sent: Monday, April 12, 2010 3:25 PM
To: Desai, Anil
Cc: BMcGurk@sjrwmd.com; kes@atlantic.net
Subject: RE: Silver Springs Operational Plan Summary

Hi Anil:

Attached is the map I referenced in my e-mail to you earlier today. If there are questions, please call me.

Bill

(See attached file: SSDT_well_stations 12APR2010_.pdf)

Bill Colona, P.G.
Sr. Project Geologist
URS Corporation
1625 Summit Lake Drive
Suite 200
Tallahassee, FL 32317
Tel: 850-574-3197
Fax: 850-402-6490
william_colona@urscorp.com

William Colona/Tallahassee/URSCorp

William Colona/Tallahassee/URSCorp
04/12/2010 12:16 PM

To

"Desai, Anil" <Anil.Desai@dep.state.fl.us>

cc

"kes@atlantic.net" <kes@atlantic.net>, BMcGurk@sjrwmd.com

Subject

RE: Silver Springs Operational Plan Summary

Hi Anil:

Attached is the list of wells that we have been given permission to include in the Silver Springs Study. A map is being developed and I will forward it to you when it is completed. Please call me or e-mail if you have questions, or need any additional information.
Thanks - Bill

(See attached file: Anil Desai Wells 12APR2010.xls)

Bill Colona, P.G.
Sr. Project Geologist
URS Corporation
1625 Summit Lake Drive
Suite 200
Tallahassee, FL 32317
Tel: 850-574-3197
Fax: 850-402-6490
william_colona@urscorp.com

"Desai, Anil" <Anil.Desai@dep.state.fl.us>

"Desai, Anil" <Anil.Desai@dep.state.fl.us>
04/09/2010 12:04 PM

To

"'William_Colona@URSCorp.com'" <William_Colona@URSCorp.com>

cc

"kes@atlantic.net" <kes@atlantic.net>

Subject

RE: Silver Springs Operational Plan Summary

Hi Bill,

As indicated before, I would be interested in looking at your final Ground
Water Monitoring Plan (GWMP) that would involve sampling some private/public drinking water wells during the tracer study. I don’t remember if this GWMP was already given to me.

Thanks,

Anil K. Desai, P.G.
Program Manager - Groundwater/Underground Injection Control
FL. Dept. of Environmental Protection
3319 Maguire Boulevard, # 232
Orlando, FL 32803-3767
TEL: (407) 893-3305
EFAX: (850) 412-0472
EMAIL: Anil.Desai@dep.state.fl.us

From: William_Colona@URSCorp.com [mailto:William_Colona@URSCorp.com]
Sent: Monday, March 29, 2010 11:47 AM
To: Desai, Anil
Cc: kes@atlantic.net
Subject: Silver Springs Operational Plan Summary
Good Morning Anil:

Pete Butt and I were talking briefly this morning regarding the Silver Springs Study and it made me think of you. We are continuing with our preparations, and I thought I would touch base with you to see how your review of the Operational Plan Summary is proceeding? Please feel free to contact me if you need any additional information or assistance.

Thanks - Bill

Bill Colona, P.G.
Sr. Project Geologist
URS Corporation
1625 Summit Lake Drive
Suite 200
Tallahassee, FL 32317
Tel: 850-574-3197
Fax: 850-402-6490
william_colona@urscorp.com

Karst Environmental Services, Inc.

5779 NE County Road 340 High Springs, Florida 32643
(386) 454-3556 (386) 454-3541 FAX kes@atlantic.net

Mr. Anil Desai, P.G.
FDEP Central District Office
3319 Maguire Boulevard
Suite # 232
Orlando, FL 32803-3767

March 2, 2010

**RE: Operational Plan Summary and Supporting Documentation
Hydrologic Evaluation to Support Nutrient Groundwater Pathway Delineation
Silver Springs, Marion County, Florida**

Dear Mr. Desai,

The St. Johns River Water Management District (SJRWMD) has contracted with URS Corporation Southern (URS) to conduct a qualitative dye trace study in the north and central portion of Marion County. Silver Springs has been identified by the Florida Department of Environmental Protection (FDEP) as impaired by nutrients, and specifically by nitrates and/or by nitrates/nitrites. In part, this listing led the FDEP and the SJRWMD to authorize the referenced study, commonly referred to as the Silver Springs Nutrient Pathway Characterization Study. The project is funded by FDEP using funds provided by the U. S. Environmental Protection Agency (USEPA) from the American Reinvestment and Recovery Act of 2009 (ARRA).

Objective

The Nutrient Pathway Characterization Study has two objectives:

- **Objective 1:** Identification of dominant groundwater pathways and travel times between specific locations and a group of approximately 30 springs, commonly called vents that comprise the Silver Springs Group (SSG).

- **Objective 2:** Identification of potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.

Key URS Team members in this study include Karst Environmental Services, Inc. (KES), Ozark Underground Laboratory, Inc. (OUL) and Technos, Inc. (Technos). KES and OUL are providing both professional and technical support with the design and implementation of two, multiple fluorescent dye tracer studies. OUL will be providing all spectrofluorophotometric analytical services for the project. Technos provided professional and technical support with the design and implementation of geophysical surveys used in support of the dye tracer designs.

Operational Summary

The dye traces will focus on the SSG, selected drainage sink points and water wells, and will be conducted in two phases. The primary point of contact with the SJRWMD for this project is Brian McGurk. Operational questions can be directed to Pete Butt, KES Vice President and Bill Colona, URS Senior Project Geologist.

The purpose of this qualitative dye trace is to identify connections from five selected natural and man-made drainage sites within Marion County to the SSG. The five locations approved by the SJRWMD are:

Trace Group	Trace Name
1	Orange Lake Sink
1	Ocala Civic Theater Drainage Retention Area (DRA)
1	Tuscawilla Park Drainage Well
2	Pontiac Sink
2	Spanish Palms DRA

The following table and figures are attached that provide information for the two dye trace events:

- **Figure 1** –*Tracer Event 1*, All dye introduction locations, (e.g. Orange Lake Sink, Tuscawilla Park Drainage Well and Ocala Civic Theatre (DRA).
- **Figure 2** - *Tracer Event 1 Detail*, Western two dye introduction locations only (e.g. Tuscawilla Park Drainage Well and Ocala Civic Theatre DRA).
- **Figure 3** - *Tracer Event 2*, Dye Introduction Locations (e.g. Pontiac Sink and Spanish Palms DRA).
- **Table 1 -** Dye Introduction and Sampling Sites

An evaluation of candidate water wells is currently underway with SJRWMD to identify potential monitoring points for the study. In large part, this study is contingent on coordinating dye introduction with rainfall events in the study area. Background spring vent and surface water sampling is underway to help establish pre-dye release natural baseline conditions.

Anticipated Schedule

The project schedule calls to begin the first phase (Trace Event 1) in late March or early April, 2010. Sampling for Trace Event 1 will last for approximately 91 days (13 weeks) after the introduction of the dyes and will be conducted on a weekly basis. As previously noted, the exact timing of the dye introductions will depend in part on the potential for coordinating the dye release with a rainfall event.

The second phase (Trace Event 2) is anticipated to begin on or before 91 days after the Trace Event 1 dye introductions. Sampling will occur approximately weekly for this group of traces and will last for approximately 25 weeks after the 13 weeks of sampling for the first group of dye introductions. As a result, there will be a total of about 38 weeks of weekly sampling after the first introduction of tracer dyes.

Tracer Dyes

The tracer dyes that we plan to use are sodium fluorescein (also called Uranine C or Acid Yellow 73), eosine (also called Acid Red 87) and rhodamine WT (also called Acid Red 388). These three dyes are non-toxic, and are not persistent in the environment. These dyes are used routinely around the United States for water tracing studies and pose no risk to humans, livestock, or to aquatic life in the concentrations used in groundwater tracing work under the direction of experienced professionals. Rhodamine WT and fluorescein are both certified under ANSI/NSF Standard 60 for use in potable water. Material Safety and Data Sheets (MSDS) for fluorescein, eosine and rhodamine WT are provided as **Attachment A**.

For this project OUL will follow its own established QA/QC procedures. OUL will abide by its procedures and policies document dated December 15, 2008 titled *Procedures and Criteria, Analysis of Fluorescein, Eosine, Rhodamine Wt, Sulforhodamine B, And Pyranine Dyes In Water and Charcoal Samplers* which is presented in **Attachment B**.

Fluorescein and eosine will be supplied by OUL as a powder that will be made into a solution prior to release. Rhodamine WT will be supplied by OUL in liquid form. OUL is a long recognized quality source of dyes used in groundwater tracer studies. These dyes will appear as greenish (fluorescein) or reddish (rhodamine WT and eosine) when present in a sufficient concentration in the water. Dye quantities proposed for use in this study are considered to be conservative and have been selected so that visual detection will not be a public nuisance.

The dyes are highly detectable with analytical instruments at very low concentrations so tracing work is conducted with dye concentrations at detection limits that are orders of magnitude smaller than the visible threshold where the general public might see colored water. As reported by OUL, the difference between the instrumental detection limit for the dyes in water is over 4 orders of magnitude (10,000 times) smaller than the visible threshold for the general public for rhodamine WT. The difference is more than 5 orders of magnitude smaller (100,000 times) for fluorescein and 6 orders of magnitude smaller (1 million times) than the visible threshold for the general public for eosine.

Dye Mixture	Visible Concentration in Water (ppb) General Public	Laboratory Detection Limit in Water (ppb)	Laboratory Detection Limit in Carbon Sampler elutant (ppb)
Eosine	13,500	0.015	0.050
Fluorescein	140	0.002	0.025
Rhodamine WT	2,500	0.015	0.170

Note: OUL instrumental detection limits for three tracer dyes in water and activated carbon sampler elutant. The general public visible detection limit in water is from a 2002 study by Tom Aley (OUL). Units are expressed as parts per billion (ppb) and are based on the as-sold weight of the dye mixtures provided by OUL for this study.

Tracer Event 1 Introduction Points

The present plan is to release dyes into three locations (**Figures 1 and 2**) during the first phase of the study. Fluorescein dye will be released directly into the Orange Lake Sink (also referred to as the Orange Lake Swallet) at the Heagy-Burry Park/Ramp location. We do not anticipate using more than 100 pounds of fluorescein. Dilution will be provided via the lake discharge from Orange Lake that is draining continuously into the sink.

Eosine dye will be released into a City of Ocala drainage well located on the east side of the stormwater ponds in Tuscawilla Park. We do not anticipate using more than 30 pounds of eosine. This drainage well receives virtually constant overflow from the adjacent ponds, and thus always has some flow from that source. This dilution will quickly lower the dye concentration.

Rhodamine WT dye will be released into the Ocala Civic Theater DRA that is located on the south side of the Theater. We do not anticipate using more than 30 pounds of rhodamine WT. We will supply a "chase water" flush to the dye at this location using water from a nearby municipal hydrant and/or use the natural overflow from the adjacent DRA if the timing of the dye release coincides with a rainfall event.

Tracer Event 2 Introduction Points

During the second phase of the study, rhodamine WT dye will be released into a City of Ocala drainage sink located at the Pontiac Pit location in southwest Ocala (**Figure 3**). This natural drainage sink receives overflow from the adjacent municipal DRA. We do not anticipate using more than 40 pounds of rhodamine WT.

Fluorescein dye will be released into the Spanish Palms Subdivision DRA that is located on the south side of that subdivision, and south of the Silver River State Park (**Figure 3**). Water from a nearby potable water line will be used for chase water. We do not anticipate using more than 20 pounds of eosine.

Sampling Stations

The focus for sampling will be within the SSG vents. We will also sample at selected wells to be confirmed by SJRWMD, including those at the City of Ocala municipal wellfield. Charcoal sampler packets and water samples will be collected, and shipped to OUL for analyses.

Supporting Documentation

To further assist you in your review of this project, the following supporting documentation is attached for your use:

- **Attachment C** – The FDEP-approved Grant Work Plan developed by the SJRWMD for this project.
- **Attachment D** – The approved FDEP/DRP Research and Collection Permit for Silver River State Park.

Project Coordination

We will coordinate all project related activities with Brian McGurk and other appropriate SJRWMD personnel. We will also contact the Environmental Health Director of the Marion County Health Department (MCHD) to keep them apprised of our plans. The Marion County Public Works Department has already been contacted and is participating in this study. Also, the City of Ocala Water and Sewer Department have been contacted, and are participating in the study. The SJRWMD, FDEP, City of Ocala and MCHD will be provided with study information, and will be given at least a 48-hour notice prior to tracer release. We will also support the SJRWMD on an as-requested basis, to provide other interested parties with information that will explain the objectives and environmentally safe nature of the study.

We hope that the information enclosed is sufficient. Please let us know if you need more information regarding this dye trace. Pete Butt can be reached at 386-454-3556, 386-454-2147 and 352-339-3380. Bill Colona of URS can be reached at 850-574-3197 or 850-402-6422.

Sincerely,

Wm. H. Colona

Peter L. Butt
Vice President,
Karst Environmental Services, Inc.

William H. Colona III, P.G.
Senior Project Geologist
URS Corporation Southern

cc: Brian McGurk, St. Johns River Water Management District
Jeff Halcomb, City of Ocala Water and Sewer Department
Environmental Health Director, Marion County Health Department

Attachments:

Table 1 - Dye Introduction and Sampling Sites

Figure 1 –*Tracer Event 1*, all dye introduction locations
Figure 2 - *Tracer Event 1Detail*, Western two dye introduction locations only
Figure 3 - *Tracer Event 2*, Dye Introduction Locations

Attachment A – MSDS Sheets
Attachment B – OUL Policies and Procedures
Attachment C – FDEP-approved Grant Work Plan.
Attachment D – Approved FDEP/DRP Research and Collection Permit for Silver River SP

TABLES

Table 1

Dye Introduction and Smapling Sites
Silver Springs Group Nutrient Pathway Study
Silver Springs, Marion County, Florida

SILVER SPRINGS DYE TRACE 2010;													
DYE INTRODUCTION & SAMPLING SITES; LOCATIONS and DISTANCES.													
		GPS Coordinates*											
	Station	DECIMAL MINUTES		Comments	Approximate Distance from:								
INTRO/SAMPLING STATION NAME:	Number	LATITUDE	LONGITUDE	SSG WQ Groups	A	B	C	D	E			Elevation	FOM +/- Ft.
	(Letter)												
Orange Lake Sink (Swallet)	A	N 29° 25.648'	W 82° 12.458'										12
Ocala Civic Theatre DRA	B	N 29° 12.423'	W 82° 04.530'	Low spot N of fill pile									11
Tuscawilla Park Drainage Well	C	*N 29° 11.432'*	*W 82° 07.925'*										**
Pontiac Sink	D	*N 29° 09.346'*	*W 82° 07.868'*										**
Spanish Palms DRA	E	N 29° 11.414'	W 82° 02.583'	SW corner area of DRA									11.5
SILVER SPRINGS GROUP STATIONS	(1-49)									Position	Depth		
Mammoth East	1	N 29° 12.970	W 82° 03.160	SSG Vent Group 1						Head			
Mammoth West	2	N 29° 12.979	W 82° 03.163	SSG Vent Group 2						Head			
Jacob's Well	3	N 29° 12.903	W 82° 03.113	SSG Vent Group 1						Right bank side			
Catfish Reception Hall	4	N 29° 12.897	W 82° 03.107	SSG Vent Group 1						Right bank side			
Bridal Chamber	5	N 29° 12.887	W 82° 03.092	SSG Vent Group 1						Right bank side			
Oscar	6	N 29° 12.917	W 82° 03.092	SSG Vent Group 1						Center channel			
Devil's Kitchen A	7	N 29° 12.893	W 82° 03.080	SSG Vent Group 1						Right bank side			
Devil's Kitchen B	8	N 29° 12.900	W 82° 03.087	SSG Vent Group 1						Right bank side			
Ladies Parlor	9	N 29° 12.878	W 82° 03.087	SSG Vent Group 1						Right bank side			
Alligator Hole	10	N 29° 12.907	W 82° 03.056	SSG Vent Group 1						Right bank side			
Mastodon Bone	11	N 29° 12.943	W 82° 03.025	SSG Vent Group 2						Center channel			
Geyser	12	N 29° 12.923	W 82° 03.005	SSG Vent Group 1						Right bank side			
Blue Grotto	13	N 29° 12.913	W 82° 02.988	SSG Vent Group 1						Right bank side			
Christmas Tree	14	N 29° 12.972	W 82° 02.955	SSG Vent Group 2						Left bank side			
Garden of Eden	15	N 29° 12.968	W 82° 02.903	SSG Vent Group 2						Left bank side			
Log	16	N 29° 12.976	W 82° 02.888	SSG Vent Group 2						Left bank side			
Lost River	17	N 29° 12.976	W 82° 02.892	SSG Vent Group Outlier (2)						Left bank side			
Indian Cave	18	N 29° 12.935	W 82° 02.880	SSG Vent Group 1						Right bank side			
First Fisherman's Paradise	19	N 29° 12.935	W 82° 02.840	SSG Vent Group 1						Center channel			
No Name Cove	20	N 29° 12.937	W 82° 02.778	SSG Vent Group 1						Right bank side			
Turtle Meadows	21	N 29° 12.953	W 82° 02.753	SSG Vent Group 2						Left bank side			
Second Fisherman's Paradise	22	N 29° 12.940	W 82° 02.720	SSG Vent Group 3						Center channel			
Catfish Hotel	23	N 29° 12.923	W 82° 02.703	SSG Vent Group 3						Center channel			
Turtle Nook	24	N 29° 12.950	W 82° 02.700	SSG Vent Group 2						Left bank side			
Turtle Nook Run	25	N 29° 12.942	W 82° 02.722	SSG Vent Group 3						Left bank side			
Racoon Island	26	N 29° 12.945	W 82° 02.65	SSG Vent Group 2						Left bank side			
Rocky Vent	27	N 29° 12.925	W 82° 02.639	SSG Vent Group 3						Left bank side			
Shipwreck	28	N 29° 12.927	W 82° 02.640	SSG Vent Group 3						Left bank side			
Catfish Convention Hall	29	N 29° 12.927	W 82° 02.632	SSG Vent Group 3						Left bank side			
Timber	30	N 29° 12.938	W 82° 02.497	SSG Vent Group 3						Left bank side			
Silver River @ 1200 m. Station	31	*N 29° 12.925'*	*W 82° 02.456'*	Composite all vents						Right bank side			**

Table 1

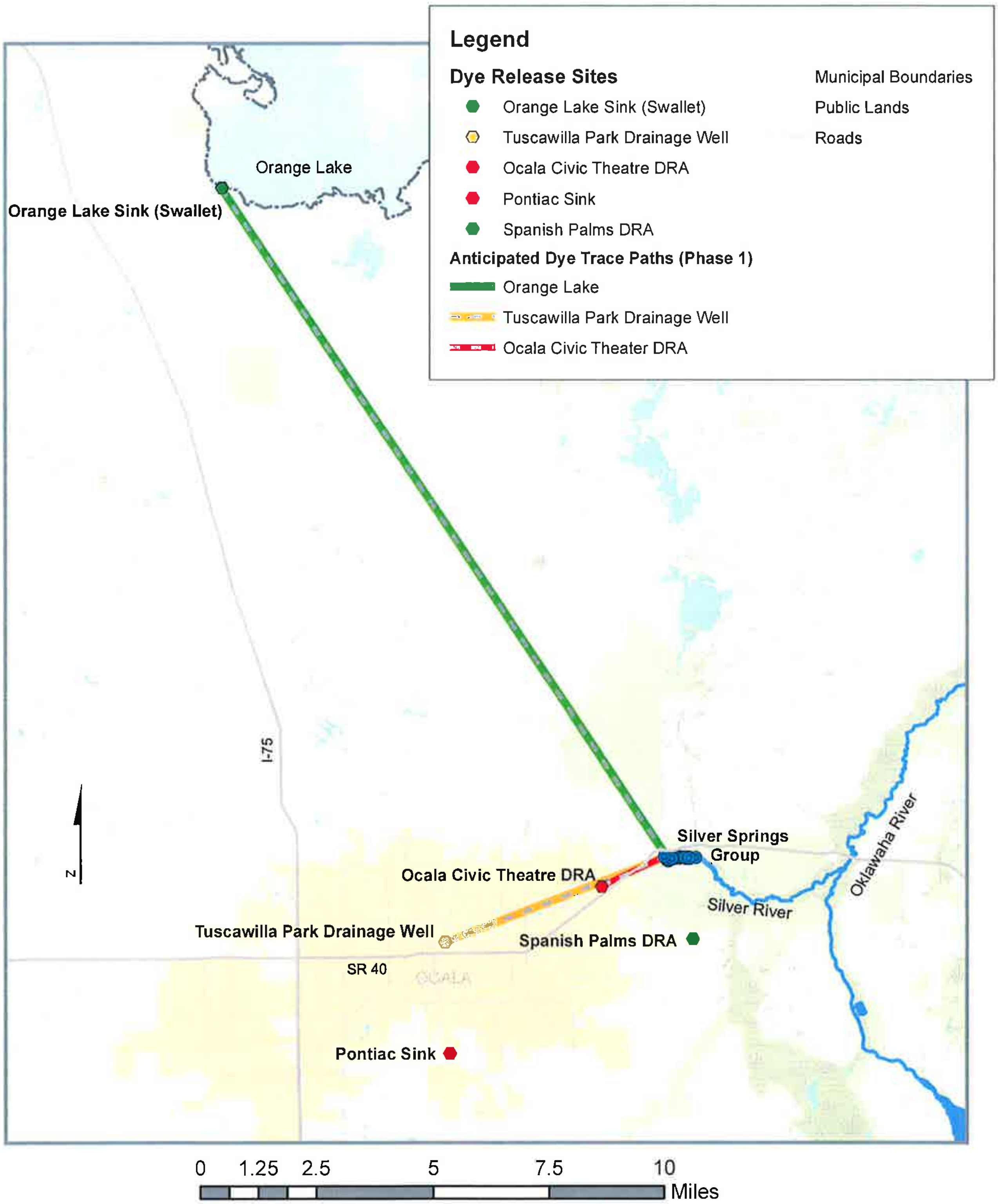
Dye Introduction and Smapling Sites
Silver Springs Group Nutrient Pathway Study
Silver Springs, Marion County, Florida

	Station	GPS Coordinates* DECIMAL MINUTES		Comments	Approximate Distance from:										
INTRO/SAMPLING STATION NAME:	Number	LATITUDE	LONGITUDE	SSG WQ Groups	A	B	C	D	E				Elevation	FOM +/- Ft.	
To be confirmed by SJRWMD	32														
To be confirmed by SJRWMD	33														
To be confirmed by SJRWMD	34														
To be confirmed by SJRWMD	35														
To be confirmed by SJRWMD	36														
To be confirmed by SJRWMD	37														
To be confirmed by SJRWMD	38														
To be confirmed by SJRWMD	39														
Rainbow Springs 1	40	N 29° 06.150'	W 82° 26.249'											**	
Rainbow Springs 2	41	N 29° 06.150'	W 82° 26.249'											**	
Rainbow Springs 3	42	N 29° 06.150'	W 82° 26.249'											**	
										Reported Well Depth (In Feet)	Casing Depth (In Feet)	Well Diameter (In Inches)			
PUBLIC SUPPLY WELL STATIONS	(50-)														FL DEP System #
Ocala Public Supply Well 1	50	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Well 2	51	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Wells Manifold W	52	N 29° 12.316'	W 82° 05.279'											**	
Ocala Public Supply Wells Manifold E	54	N 29° 12.316'	W 82° 05.279'											**	
Jai Lai Fronton Public Supply Well		N 29° 24.864'	W 82° 12.170'											**	
IFAS Public Supply Well															
OTHER/MISCELLANEOUS STATIONS															FL DEP System #

*From hand-held GPS positions taken during this study, WGS 84 Map Datum; distances are estimated from these positions.
** Estimated from TopoQuads or Google Earth.

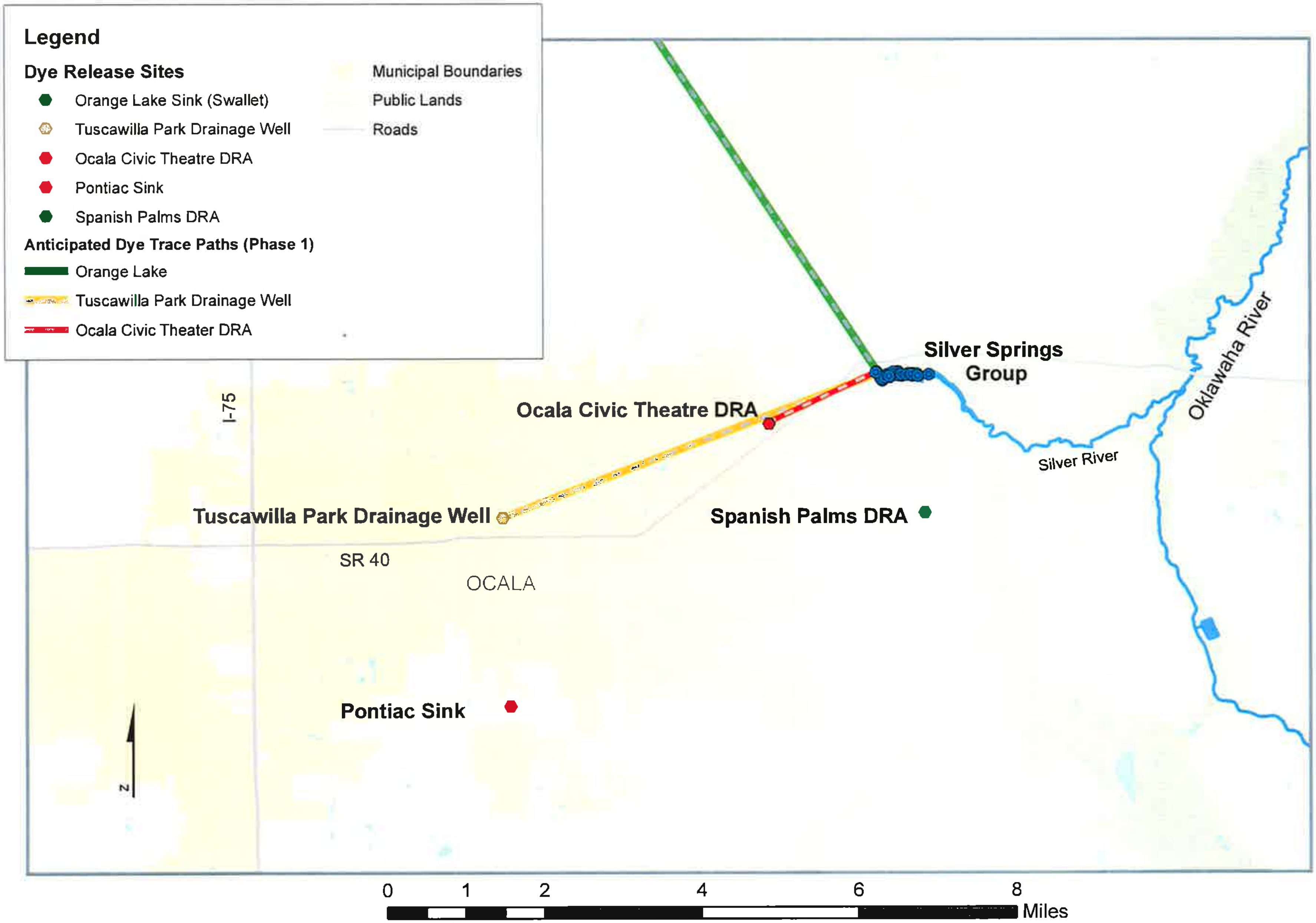
FIGURES

Silver Springs Nutrient Pathway Characterization Study
Figure 1: Phase 1

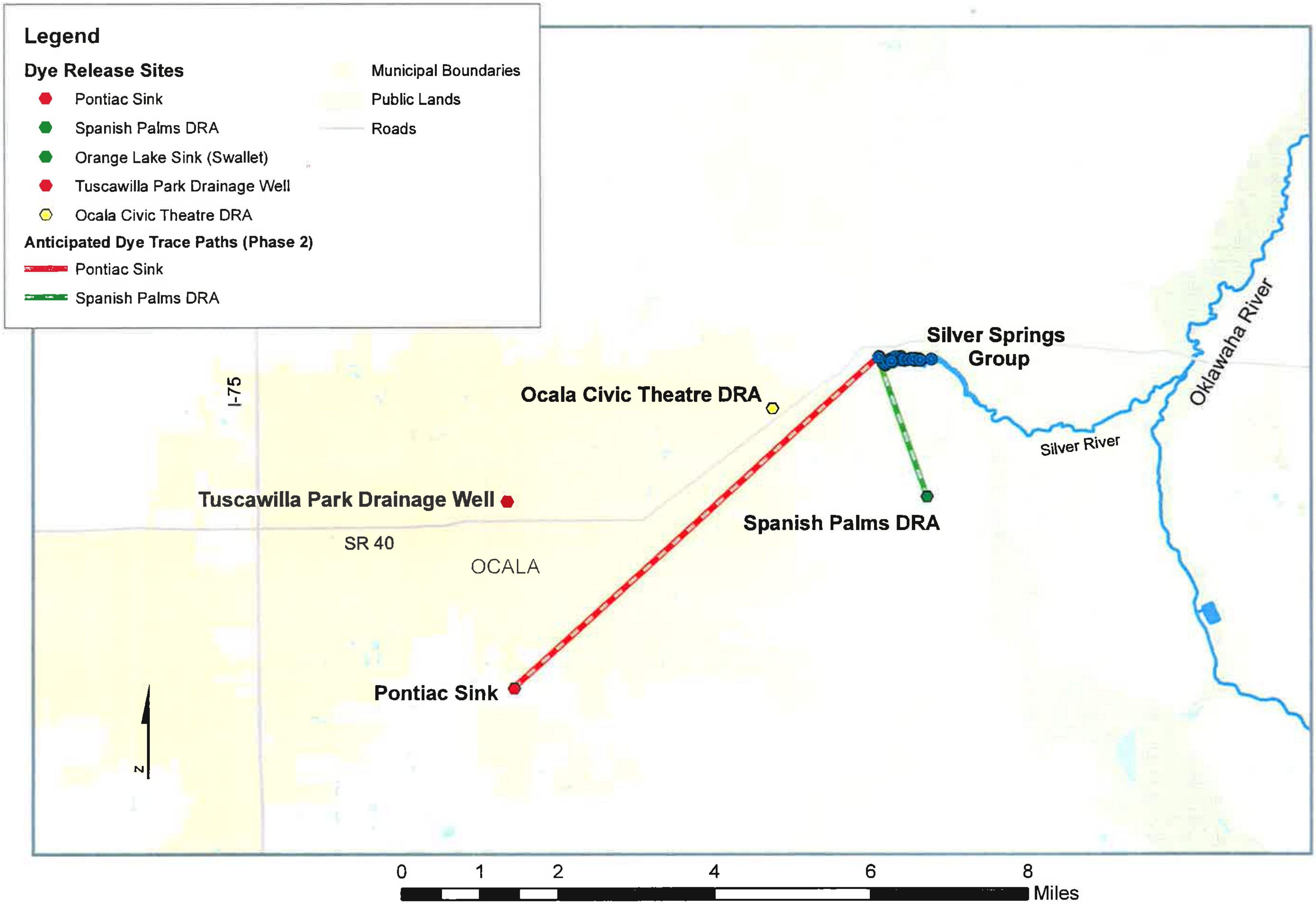


Silver Springs Nutrient Pathway Characterization Study

Figure 2: Phase 1 Detail View



Silver Springs Nutrient Pathway Characterization Study
Figure 3: Phase 2



ATTACHMENT A

Material Safety Data Sheet

15174 URANINE C

CHEMCENTRAL/Dyes & Pigments
13395 Huron River Drive
Romulus, MI 48174

REVISION DATE: 01/20/2003
CHEMTREC: 800-424-9300
EMERGENCY: 734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME: .... 15174 URANINE C
CHEMICAL NAME: .... Acid Yellow 73
CHEMICAL FAMILY: .... Xanthene
CAS NUMBER: 518-47-8

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
None as per 29CFR part 1910.1200 or Sara Title III			

HMIS HAZARD RATINGS (if applicable):
HEALTH: 1
FIRE 0
REACTIVITY 0

SECTION III - PHYSICAL DATA

APPEARANCE: .... Orange powder, no characteristic odor.
BOILING POINT: .... N/A
MELTING POINT: .... N/A
FREEZING POINT: .... N/A
VAPOR PRESSURE: .... N/A
VAPOR DENSITY (AIR=1): .... N/A
SPECIFIC GRAVITY: .... Approximately 1
pH: .... N/A
SOLUBILITY IN WATER: .... Moderate
VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: .... N/A
EXTINGUISHING MEDIA: .... Water fog, CO_2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD: .... Adequate ventilation and clean up must be maintained to minimize dust accumulation. May form explosive dust/air mixture.

Material Safety Data Sheet

15174 URANINE C

SECTION V - REACTIVITY DATA

STABILITY:.................................. Stable
CONDITIONS TO AVOID: .... N/A
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY:................. Avoid contact with strong oxidizing agents
DECOMPOSITION:.................... Carbon monoxide,Carbon dioxide,and oxides of Nitrogen and Sulfur.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE:.. Not Established
OVER EXPOSURE EFFECTS: Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved dust respirator as necessary.
PROTECTIVE GLOVES:........... To prevent skin contact.
EYE PROTECTION:................... Goggles.
ADDITIONAL MEASURES:...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE:... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION:........................... Local exhaust to control dusts.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL: .... Spills should be contained and placed in suitable containers.
WASTE DISPOSAL:.................... Do not discharge into sewers or waterways. Dispose of in accordance with local regulations.

Material Safety Data Sheet

15174 URANINE C

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME: ..... INK MATERIAL
HAZARD CLASS AND LABEL: MFR LABEL ONLY
UN NUMBER: .... N/A
REPORTABLE QUANTITY: ..... N/A

SECTION XI - ADDTIONAL INFORMATION

FOOT NOTES: This information is furnished without warranty, representation, or license of any kind, except that it is accurate to the best of CHEMCENTRAL Corporation's knowledge or obtained from sources believed by CHEMCENTRAL Corporation to be accurate.

The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

Material Safety Data Sheet

15189 Eosine OJ

CHEMCENTRAL/Dyes & Pigments	REVISION DATE: 9/4/02
13395 Huron River Drive	CHEMTREC: 800-424-9300
Romulus, MI 48174	EMERGENCY: 734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME:............................ 15189 Eosine OJ
CHEMICAL NAME: .... Acid Red 87 (Color Index Name)
CHEMICAL FAMILY: .... Xanthene
CAS NUMBER: .... Proprietary

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
None as per 29CFR part 1910.1200 or Sara Title III			

HMIS HAZARD RATINGS (if applicable):
HEALTH: 2
FIRE 1
REACTIVITY 0

SECTION III - PHYSICAL DATA

APPEARANCE: .... Brownish Red Powder, No Odor
BOILING POINT:........................ N/A
MELTING POINT: .... N/A
FREEZING POINT:..................... N/A
VAPOR PRESSURE:................... N/A
VAPOR DENSITY (AIR=1): .... N/A
SPECIFIC GRAVITY:................ Approximately 1
pH: .... N/A
SOLUBILITY IN WATER:......... Complete
VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT:............................ N/A
EXTINGUISHING MEDIA: .... Water fog, CO2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD:....... Adequate ventilation and clean up must be maintained to minimize dust accumulation. May form explosive dust/air mixture.

Material Safety Data Sheet

15189 Eosine OJ

SECTION V - REACTIVITY DATA

STABILITY: .... Stable
CONDITIONS TO AVOID: .... Avoid contact with strong oidzers, excessive heat, sparks or open flames.
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY: .... Strong oxidizers
DECOMPOSITION: .... Thermal decomposition products may include toxic fumes of bromide and sodium.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE: Causes skin irritation. May be irritating to the respiratory tract and eyes. Oral-Mouse LD50: 2344 MG/KG Intraperitioneal-Rat Ldlo: 500 mg/kg Mutagenic data (RTECS0 Tumorigenic Carcinogen Status: Animal inadequate evidence (IARC GROUP-3)

OVER EXPOSURE EFFECTS: .. Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

**NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.*

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved dust respirator as necessary.
PROTECTIVE GLOVES: .... To prevent skin contact.
EYE PROTECTION: .... Goggles.
ADDITIONAL MEASURES: ...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE: ... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION: .... Local exhaust to control dusts.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL: .... Spills should be contained and placed in suitable containers.

Material Safety Data Sheet

15189 Eosine OJ

WASTE DISPOSAL: Bury or incinerate in approved site or facility in accordance with local, State and Federal Regulations.

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME: ..... INK MATERIAL
HAZARD CLASS AND LABEL: MFR LABEL ONLY
UN NUMBER: .... N/A
REPORTABLE QUANTITY: ..... N/A

SECTION XI - ADDTIONAL INFORMATION

FOOT NOTES: This information is furnished without warranty, representation, or license of any kind, except that it is accurate to the best of CHEMCENTRAL Corporation's knowledge or obtained from sources believed by CHEMCENTRAL Corporation to be accurate.

The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

N/A = Not applicable

Material Safety Data Sheet

16972 Rhodamine WT 20%

CHEMCENTRAL/Dyes & Pigments
13395 Huron River Drive
Romulus, MI 48174

REVISION DATE: 03/19/2003
CHEMTREC: 800-424-9300
EMERGENCY: 734-941-8235

SECTION I - IDENTIFICATION

TRADE NAME: .... 16972 Rhodamine WT 20%
CHEMICAL NAME: .... Acid Red 388
CHEMICAL FAMILY: .... Xanthene

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER	PEL
Trimellitic Acid	2.6%	528-44-9	Not Established
Dye Compound			
Sodium Chloride			
Water			
None as per 29CFR part 1910.1200 or Sara Title III			

This Product is not reportable for SARA 313

TSCA: In Compliance

All components of this product are included on the TSCA Inventory and the DSL.

HMIS HAZARD RATINGS (if applicable):
HEALTH: 2
FIRE 1
REACTIVITY 1

SECTION III - PHYSICAL DATA

APPEARANCE: .... Dark red liquid, no odor
BOILING POINT: 100C
MELTING POINT: .... N/A
FREEZING POINT: .... Not evaluated
VAPOR PRESSURE: .... Not evaluated
VAPOR DENSITY (AIR=1): .... N/A
SPECIFIC GRAVITY: 1.13
pH: 10.5-10.8
SOLUBILITY IN WATER: .... Soluble

Material Safety Data Sheet

16972 Rhodamine WT 20%

VOLATILITY: .... N/A

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: .... N/A
EXTINGUISHING MEDIA: .... Water fog, CO_2, or Dry chemical.
FIRE FIGHT PROCEDURES: ... Fire fighters should be equipped with self contained breathing apparatus and turnout gear.
UNUSUAL FIRE HAZARD: .... Adequate ventilation and clean up must be maintained to minimize fume accumulation.

SECTION V - REACTIVITY DATA

STABILITY: .... Stable
CONDITIONS TO AVOID: .... N/A
HAZARDOUS POLYMERIZATION: Does not occur
POLYMERIZATION TO AVOID: N/A
INCOMPATIBILITY: .... Unknown
DECOMPOSITION: .... Carbon monoxide,Carbon dioxide,and oxides of Nitrogen.

SECTION VI - HEALTH DATA

THRESHOLD LIMIT VALUE:.. Not established
OVER EXPOSURE EFFECTS:.. Contact with eyes may result in severe irritation. Contact with skin may result in irritation. Ingestion may result in gastric disturbances. Inhalation of dust may irritate respiratory tract.

SECTION VII FIRST AID

FIRST AID PROCEDURES: Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. Wash affected skin areas thoroughly with soap and water. If irritation develops, consult a physician. Remove and launder contaminated clothing before reuse.

If swallowed, dilute with water and induce vomiting. Get immediate medical attention. If inhaled, move to fresh air. Aid in breathing, if necessary, and get medical attention.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.

SECTION VIII EMPLOYEE PROTECTION

RESPIRATORY PROTECTION: NIOSH/OSHA approved respirator as necessary.
PROTECTIVE GLOVES: .... To prevent skin contact.
EYE PROTECTION: .... Goggles.

ADDITIONAL MEASURES:...... Eye wash fountains should be easily accessible.
HANDLING AND STORAGE:... Keep away from excessive heat and moisture. Keep containers closed.
VENTILATION:........................ Local exhaust to control fumes.

SECTION IX - SPILL AND DISPOSAL DATA

SPILL: .... Spills should be contained and placed in suitable containers.
WASTE DISPOSAL:................... Do not discharge into sewers or waterways. Dispose of in accordance with local regulations.

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME:..... INK MATERIAL
HAZARD CLASS AND LABEL: L - MFR, PROTECT FROM FREEZING
UN NUMBER: .... N/A
REPORTABLE QUANTITY:..... N/A

SECTION XI - ADDTIONAL INFORMATION

FOOT NOTES:
This information is furnished without warranty, representation, or license of any kind, except that it is accurate to the best of CHEMCENTRAL Corporation's knowledge or obtained from sources believed by CHEMCENTRAL Corporation to be accurate.

The CHEMCENTRAL Corporation does not assume any legal responsibility for use or reliance upon same. Customers are encouraged to conduct their own tests. Before using any product, read its label.

N/A = Not Applicable

ATTACHMENT B

Ozark UNDERGROUND LABORATORY 1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 oul@tri-lakes.net

PROCEDURES AND CRITERIA ANALYSIS OF FLUORESCEIN, EOSINE, RHODAMINE WT, SULFORHODAMINE B, AND PYRANINE DYES IN WATER AND CHARCOAL SAMPLERS

December 15, 2008

Thomas Aley, PHG 179
President
Ozark Underground Laboratory, Inc.

PROCEDURES

Introduction

This document describes standard procedures and criteria currently in use at the Ozark Underground Laboratory as of the date shown on the title page. Some samples may be subjected to different procedures and criteria because of unique conditions; such non-standard procedures and criteria are identified in reports for those samples. Standard procedures and criteria change as knowledge and experience increases and as equipment is improved or up-graded. The Ozark Underground Laboratory maintains a summary of changes in standard procedures and criteria.

Dye Nomenclature

Fluorescein is C.I. Acid yellow 73, Color Index Number 45350. Rhodamine WT is Acid Red 388; there is no assigned Color Index Number for this dye. Eosine (sometimes called eosin) is Acid Red 87, Color Index Number 45380. Sulforhodamine B is C.I. Acid Red 52, Color Index Number 45100. Pyranine is Solvent Green 7 (also called D&C Green 8), Color Index Number 59040.

Description of the Samplers

The charcoal samplers are packets of fiberglass screening partially filled with approximately 4.25 grams of activated coconut charcoal. The charcoal used by the Ozark Underground Laboratory is Calgon 207C coconut shell carbon, 6 to 12 mesh.

The most commonly used samplers are about 4 inches long by two inches wide. A cigar-shaped sampler is made for use in very small diameter wells (such as 1 inch diameter wells); this is a special order item and should be specifically requested when it is needed. All of the samplers are closed by heat sealing.

Placement of Samplers

Samplers (also called charcoal packets) are placed so as to be exposed to as much water as possible. In springs and streams they are typically attached to a rock or other anchor in a riffle area. Attachment of the packets often uses plastic tie wires. In swifter water galvanized wire (such as electric fence wire) is often used. Other types of anchoring wire can be used. Electrical wire with plastic insulation is also good. Packets are attached so that they extend outward from the anchor rather than being flat against it. Two or more separately anchored packets are typically used for sampling springs and streams. The use of fewer packets is discouraged except when the spring or stream is so small that there is not appropriate space for placing multiple packets.

When pumping wells are being sampled, the samplers are placed in sample holders made of PVC pipe fittings. Brass hose fittings are installed at the end of the sample holders so that the sample holders can be installed on outside hose bibs and water which has run through the samplers can be directed to waste through a connected garden hose. The samplers can be unscrewed in the middle so that charcoal packets can be changed. The middle portions of the samplers consists of 1.5 inch diameter pipe and pipe fitting.

Charcoal packets can also be lowered into monitoring wells for sampling purposes. In general, if the well is screened, samplers should be placed approximately in the middle of the screened interval. Some sort of weight should be added near the charcoal packet to insure that it will not float. The weight should be of such a nature that it will not affect water quality. One common approach is to anchor the packets with a white or uncolored plastic cable tie to the top of a dedicated weighted disposable bailer. We typically run nylon cord from the top of the well to the charcoal packet and its weight. Do not use colored cord. Nylon fishing line should not be used since it can be readily cut by a sharp projection in the well.

In some cases, especially with small diameter wells and appreciable well depths, the weighted disposable bailers sink very slowly or may even fail to sink because of friction and floating of the anchoring cord. In such cases a stainless steel weight may be added to the top of the disposable bailer. We have had good success with two to three ounce segments of stainless steel pipe which have an outside diameter of 1.315 inches and an inside diameter of 1.049 inches; such pipe weighs about 1.7 pounds per linear foot. The weight of the stainless steel is approximately 497 pounds per cubic foot. The pipe segments can be attached over the anchoring cord at the top of the bailer. All weights should be cleaned prior to use; the cleaning approach should comply with decontamination procedures in use at the project site.

Placement of samplers requires adjustment to field conditions. The above placement comments are intended as guidance, not firm requirements.

Rinsing of Charcoal Packets Prior to Sampling

Charcoal packets routinely contain some fine powder that washes off rapidly when they are placed in water. Since such material could remain in monitoring wells, charcoal packets to be placed in such wells are triple rinsed with distilled, demineralized, or reagent water known to be free of tracer dyes. This rinsing is typically done by soaking. With this approach, approximately 25 packets are placed in one gallon of water and soaked for at least 10 minutes. The packets are then removed from the water and excess water is shaken off the packets. The packets are then placed in a second gallon of water and again soaked for at least 10 minutes. After this soaking they are removed from the water and excess water is shaken off the packets. The packets are then placed in a third gallon of water and the procedure is again repeated. Rinsed packets are placed in plastic bags and are placed at sampling stations within three days. Packets can also be rinsed in jets of water for about one minute; this requires more water and is typically difficult to do in the field with water known to be free of tracer dyes.

Collection and Replacement of Samplers

Samplers are routinely collected and replaced from each of the sampling stations. The frequency of sampler collection and replacement is determined by the nature of the study. Collections at one week intervals are common, but shorter or longer collection frequencies are acceptable and sometimes more appropriate. Shorter sampling frequencies are often used in the early phases of a study to better characterize time of travel. As an illustration,

we often collect and change charcoal packets 1, 2, 4, and 7 days after dye injection. Subsequent sampling is then weekly.

Where convenient, the collected samplers should be briefly rinsed in the water being sampled. This is typically not necessary with well samples. The packets are shaken to remove excess water. Next, the packet (or packets) are placed in a plastic bag (Whirl-Pak bags are ideal). The bag is labeled on the outside with a permanent type felt marker pen. Use only pens that have black ink; colored inks may contain fluorescent dyes. The notations include station name or number and the date and time of collection. Labels must not be inserted inside the sample bags.

For most projects the Ozark Underground Laboratory supplies the Whirl-Pak bags. Prior to use, 1% of the new bags are randomly selected. Each bag is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

Collected samplers are kept in the dark to minimize algal growth on the charcoal prior to analysis work. We prefer (and in some studies require) that samples be placed on "blue ice" or ice upon collection and that they be shipped refrigerated with "blue ice" by overnight express. Do not ship samplers packed in ice since this can create a potential for cross contamination when the ice melts. Our experience indicates that it is not essential for samplers to be maintained under refrigeration, yet maintaining them under refrigeration clearly minimizes some potential problems. A product known as "green ice" should not be used for maintaining the samples in a refrigerated condition since this product contains a dye which could contaminate samples if the "green ice" container were to break or leak.

New charcoal samplers are routinely placed when used charcoal packets are collected. The last set of samplers placed at a stream or spring is commonly not collected.

Water samples are often collected. They should be collected in either glass or plastic; the Ozark Underground Laboratory routinely uses 50 ml research grade polypropylene copolymer Perfector Scientific vials (Catalog Number 2650) for such water samples. We need no more than 30 ml of water. The vials should be placed in the dark and refrigerated immediately after collection. They should be refrigerated until shipment. For most projects the Ozark Underground Laboratory supplies the vials. Prior to use, 1% of the new vials are randomly selected. Each vial is soaked in the standard eluting solution and then analyzed for the presence of any of the tracer dyes being used.

When water or charcoal samplers are collected for shipment to the Ozark Underground Laboratory they should be shipped promptly. We receive good overnight and second day air service from both UPS and Fed Ex; the Postal Service does not provide next day service to us. DHL works adequately for international shipments.

Each shipment of charcoal samplers or water samples must be accompanied by a sample tracking sheet. These sheets (which bear the title "Samples for Fluorescence Analysis") are provided by the Ozark Underground Laboratory and summarize placement and collection data. These sheets can be augmented by a client's chain of custody forms or any other relevant documentation. Figure 1 is one of our blank sample forms.

Figure 1. Sample Collection Data Sheet

OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project:____________________________________Week No:________ Samples Collected By:__________________________

Samples Shipped By:____________________________Samples Received By:____________________________

Date Samples Shipped:___/___/___ Date Samples Received:___/___/___ Time Samples Received:____:____ Return Cooler? Yes__________No__________

Bill to:____Send Results to:____________________________________

Analyze for: Fluorescein_____Eosine_____Rhodamine WT_____Other____________Ship cooler to:____________________________________

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	

COMMENTS:____

This sheet filled out by OUL staff? Yes____________No____________Charts for samples on this page proofed by

OUL:____________________

Page ______ of ______

Digital cameras can provide an independent verification of the date and time of sample collection. A digital photo can be taken of each sampling location during each sample collection. The photo file has a date and time created. If the camera's clock is set correctly, the photo provides an independent reference of the date and time the sample was collected. It is critical that the photos be taken in the order of sampling; that is, if one has forgotten to take a photo of the previous station and remembers at the current sampling station, do not go back and take the previous station photo.

When we are using a digital camera for sampling documentation we initially take a high resolution photo of each station that shows its context broadly enough for an observer to distinguish it from other sampling station, but narrow enough not to include another sampling station. Subsequently, we download he high-resolution photos into a reference folder and rename the photos to the station number and name. We also make a copy of the photo to another folder and digitally draw arrows to the exact locations of the samplers. During subsequent sampling events a low-resolution digital photo is taken of each sampling station in the order they are visited. It is best to establish a routine of taking the photo upon arrival at the station. We then download these photos into a folder whose name indicates the dates of the photos. We do not rename these photos.

Some sites do not permit cameras. An alternative is to collect a Global Positioning System (GPS) location during each visit. GPS records the date and time each point (sampling station) is visited. While these files are not as easy to review as photographs, they can be used with a base map to show which locations were visited at which dates and times.

Receipt of Samplers

Samplers shipped to the Ozark Underground Laboratory are refrigerated upon receipt. Prior to cleaning and analysis, samplers are assigned a laboratory identification number. All samples are logged in upon receipt.

It sometimes occurs that there are discrepancies between the chain-of-custody sheets and the actual samples received. When this occurs, a "Discrepancy Sheet" form is completed and sent to the shipper of the sample for resolution. A copy of this form is enclosed as Figure 2. The purpose of the form is to help resolve discrepancies, even when they may be minor.

Cleaning of Samplers

Samplers are cleaned by spraying them with jets of clean water. At the Laboratory we use unchlorinated water for the cleansing to minimize dye deterioration. Effective cleansing cannot generally be accomplished simply by washing in a conventional laboratory sink even if the sink is equipped with a spray unit.

The duration of packet washing depends upon the condition of the sampler. Very clean samplers may require less than a minute of washing; dirtier samplers may require several minutes of washing.

Figure 2. Discrepancy Sheet

OZARK UNDERGROUND LABORATORY, INC.

DISCREPANCIES BETWEEN CHAIN-OF-CUSTODY SHEETS AND ACTUAL SAMPLES RECEIVED   Page ______ of ______

Company & Project Name: Date Rec'd by OUL: Wk # ____________

Lab #	Sta #	Station Name	Date Pulled	Problem	Solution

Comments:

Elution of the Charcoal

There are various eluting solutions that can be used for the recovery of tracer dyes. The solutions typically include an alcohol, some water, and a strong basic solution such as aqueous ammonia.

The standard elution solution now used at the Ozark Underground Laboratory is a mixture of 5% aqua ammonia and 95% isopropyl alcohol solution and sufficient potassium hydroxide flakes to saturate the solution. The isopropyl alcohol solution is 70% alcohol and 30% water. The aqua ammonia solution is 29% ammonia. The potassium hydroxide is added until a super-saturated layer is visible in the bottom of the container. This super-saturated layer is not used for elution. Preparation of eluting solutions uses dedicated glassware which is never used in contact with dyes or dye solutions.

The eluting solution we use will elute fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. It is also suitable for separating fluorescein peaks from peaks of some naturally present materials found in some samplers.

Fifteen ml of the eluting solution is poured over the washed charcoal in a disposable sample beaker. The sample beaker is capped. The sample is allowed to stand for 60 minutes. After this time, the liquid is carefully poured off the charcoal into a new disposable beaker which has been appropriately labeled with the laboratory identification number. A few grains of charcoal may inadvertently pass into the second beaker; no attempt is made to remove these from the second sample beaker. After the pouring, a small amount of the elutant will remain in the initial sample beaker. After the transfer of the elutant to the second sample beaker, the contents of the first sample beaker (the eluted charcoal) are discarded.

Analysis on the Shimadzu RF-5000U or RF-5301

The Laboratory uses two Shimadzu spectrofluorophotometers. One is a model RF-5000U, and the other is a model RF-5301. Both of these instruments are capable of synchronous scanning. The RF-5301 is the primary instrument used; the RF-5000U is primarily used as a back-up instrument except for tracing studies which were begun using this instrument. The OUL also owns a Shimadzu RF-540 spectrofluorometer which is occasionally used for special purposes.

A sample of the elutant is withdrawn from the sample container using a disposable polyethylene pipette. Approximately 3 ml of the elutant is then placed in disposable rectangular polystyrene cuvette. The cuvette has a maximum capacity of 3.5 ml. The cuvette is designed for fluorometric analysis; all four sides and the bottom are clear. The spectral range of the cuvettes is 340 to 800 nm. The pipettes and cuvettes are discarded after one use.

The cuvette is then placed in the RF-5000U or the RF-5301. Both instruments are controlled by a programmable computer. Each instrument is capable of conducting substantial data analysis.

Our instruments are operated and maintained in accordance with the manufacturer's recommendations. On-site installation of the instruments and a training session on the use of spectrofluorophotometers was provided by Delta Instrument Company.

Our typical analysis of an elutant sample where fluorescein, eosine, rhodamine WT, or sulforhodamine B dyes may be present includes synchronous scanning of excitation and emission spectra with a 17 nm separation between excitation and emission wavelengths. For these dyes, the excitation scan is from 443 to 613 nm; the emission scan is from 460 to 630 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is "fast" on the RF-5301. The typical sensitivity setting used on both instruments is "high."

Our typical analysis of an elutant sample where pyranine dye may be present includes a synchronous scanning of excitation and emission spectra with a 35 nm separation between excitation and emission wavelengths. For this dye, the excitation scan is from 360 to 600 nm; the emission scan is from 395 to 635 nm. The emission fluorescence from the scan is plotted on a graph. The typical scan speed setting is "very fast" on the RF-5000U; it is "fast" on the RF-5301. The typical sensitivity setting on both instruments is "high."

Excitation and emission slit width settings vary between the two instruments. The widths vary with the dyes for which we are sampling and for the matrix in which the dyes may be present. Excitation and emission slit width settings are summarized in Table 1.

Table 1. Excitation and emission slit width settings routinely used for dye analysis. Units are nanometers (nm)

Parameter	**RF5000U**	**RF5301**
Excitation slit for Eos, Fl, RWT, and SRB in elutant	5	3
Emission slit for Eos, Fl, RWT, and SRB in elutant	3	1.5
Excitation slit for Eos, Fl, RWT, and SRB in water	5	5
Emission slit for Eos, Fl, RWT, and SRB in water	10	3
Excitation slit for Pyranine in elutant	5	5
Emission slit for Pyranine in elutant	3	3
Excitation slit for Pyranine in pH adjusted water	5	5
Emission slit for Pyranine in pH adjusted water	3	3

Eos = Eosine. Fl = Fluorescein. RWT = Rhodamine WT. SRB = Sulforhodamine B.

The instrument produces a plot of the synchronous scan for each sample; the plot shows emission fluorescence only. The synchronous scans are subjected to computer peak picks; peaks are picked to the nearest 0.1 nm. All samples run on the RF-5000U and

RF-5301 are stored on disk and printed on normal typing paper with a laser printer; sample information is printed on the chart.

All samples analyzed are recorded in a bound journal.

Quantification

We calculate the magnitude of fluorescence peaks for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes. Dye quantities are expressed in microgram per liter (parts per billion; ppb). On the RF-5000U and RF-5301 the dye concentrations are calculated by separating fluorescence peaks due to dyes from background fluorescence on the charts, and then calculating the area within the fluorescence peak. This area is proportional to areas obtained from standard solutions.

Where there are multiple fluorescence peaks it is sometimes necessary to calculate dye concentrations based upon the height of the fluorescence peak rather that the area. The heights of the peaks are also proportional to dye concentrations.

We run dye concentration standards each day the machine is used. Ten separate standards are used; the standard or standards appropriate for the analysis work being conducted are selected. All standards are based upon the as-sold weights of the dyes. The standards are as follows:

1) 10 ppb fluorescein and 100 ppb rhodamine WT in well water from the Jefferson City-Cotter Formation
2) 10 ppb eosine in well water from the Jefferson City-Cotter Formation
3) 100 ppb sulforhodamine B in well water from the Jefferson City-Cotter Formation.
4) 10 ppb pyranine in well water from the Jefferson City-Cotter Formation. A sample of the standard is placed for at least two hours in a high ammonia atmosphere to adjust the pH to a value of 9.5 or greater.
5) 10 ppb fluorescein and 100 ppb rhodamine WT in elutant.
6) 10 ppb eosine in elutant.
7) 100 ppb sulforhodamine B in elutant.
8) 10 ppb pyranine in elutant.

Preparation of Standards

Dye standards are prepared as follows:

Step 1. A small sample of the as-sold dye is placed in a pre-weighed sample vial and the vial is again weighed to determine the weight of the dye. We attempt to use a sample weighing between 1 and 5 grams. This sample is then diluted with well water to make a 1% dye solution by weight (based upon the as-sold weight of the dye). The resulting dye solution is allowed to sit for at least four hours to insure that all dye is fully dissolved.

Step 2. One part of each dye solution from Step 1 is placed in a mixing container with 99 parts of well water. Separate mixtures are made for fluorescein,

rhodamine WT, eosine, sulforhodamine B, and pyranine. The resulting solutions contain 100 mg/l dye (100 parts per million dye). The typical prepared volume of this mixture is appropriate for the sample bottles being used; we commonly prepare about 50 ml. of the Step 2 solutions. The dye solution from Step 1 that is used in making the Step 2 solution is withdrawn with a digital Finnpipette which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

The Step 2 solution is called the long term standard. Ozark Underground Laboratory experience indicates that Step 2 solutions, if kept refrigerated, will not deteriorate appreciably over periods of less than a year. Furthermore, these Step 2 solutions may last substantially longer than one year.

Step 3. A series of intermediate-term dye solutions are made. Approximately 45 ml. of each intermediate-term dye solution is made. All volume measurements of less than 5 ml are made with a digital Finnpipette. (see description in Step 2). All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value. The following solutions are made; all concentrations are based on the as-sold weight of the dyes:

1) A solution containing 1 ppm fluorescein dye and 10 ppm rhodamine WT dye.
2) A solution containing 1 ppm eosine.
3) A solution containing 10 ppm sulforhodamine B dye.
4) A solution containing 1 ppm pyranine.

Step 4. A series of eight short-term dye standards are made from solutions in Step 3. These standards were identified earlier in this section. In the experience of the Ozark Underground Laboratory these standards have a useful shelf life in excess of one week. However, in practice, they are kept under refrigeration and new standards are made weekly.

Dilution of Samples

Samples with peaks that have arbitrary fluorescence unit values of 500 or more are diluted a hundred fold to ensure accurate quantification.

Some water samples have high turbidity or color which interferes with accurate detection and measurement of dye concentrations. It is often possible to dilute these samples and then measure the dye concentration in the diluted sample.

The typical dilution is 100 fold. One part of the test sample is combined with 99 parts of water (if the test sample is water) or with 99 parts of the standard elutant (if the test sample is elutant). Typically, 0.300 ml of the test solution is combined with 29.700 ml

of water (or elutant as appropriate) to yield a new test solution. All volume measurements of less than 5 ml are made with a digital Finnpipette. which is capable of measuring volumes between 0.200 and 1.000 ml at intervals of 0.005 ml. The calibration certificate with this instrument indicates that the accuracy (in percent) is as follows:

At 0.200 ml, 0.90%

At 0.300 ml, 0.28%

At 1.000 ml, 0.30%

All other volume measurements are made with Rheinland Kohn Geprufte Sicherheit 50 ml. capacity pump dispenser which will pump within plus or minus 1% of the set value.

The water used for dilution is from a carbonate aquifer. All dilution water is pH adjusted to greater than pH 9.5 by holding it overnight in open containers in a high ammonia concentration chamber.

Quality Control

Laboratory blanks are run for every sample where the last two digits of the laboratory numbers are 00, 20, 40, 60, or 80. A charcoal packet is placed in a pumping well sampler and at least 25 gallons of unchlorinated water is passed through the sampler at a rate of about 2.5 gallons per minute. The sampler is then subjected to the same analytical protocol as all other samplers.

System functioning tests of the analytical instruments are conducted in accordance with the manufacturer's recommendations.

All materials used in sampling and analysis work are routinely analyzed for the presence of any compounds that might create fluorescence peaks in or near the acceptable wavelength ranges for any of the tracer dyes. This testing typically includes approximately 1% of materials used.

Reports

Reports are provided in accordance with the needs of the client. We typically provide copies of the analysis graphs and a listing of stations and samples where dye was detected. The reports indicate dye concentrations.

Work at the Ozark Underground Laboratory is directed by Mr. Thomas Aley. Mr. Aley has 45 years of professional experience in hydrology and hydrogeology. He is certified as a Professional Hydrogeologist (Certificate #179) by the American Institute of Hydrology. Mr. Aley has 40 years of professional experience in groundwater tracing with fluorescent tracing agents.

CRITERIA FOR DETERMINATION OF POSITIVE DYE RECOVERIES

Normal Emission Ranges and Detection Limits

The OUL has established normal emission fluorescence wavelength ranges for each of the five dyes. The normal acceptable range equals mean values plus and minus two standard deviations. These values are derived from actual groundwater tracing studies conducted by the OUL.

The detection limits are based upon concentrations of dye necessary to produce emission fluorescence peaks where the signal to noise ratio is 3. The detection limits are realistic for most field studies since they are based upon results from actual field samples rather than being based upon values from spiked samples in a matrix of reagent water or the elutants from unused activated carbon samplers. In some cases detection limits may be smaller than reported if the water being sampled has very little fluorescent material in it. In some cases detection limits may be greater than reported; this most commonly occurs if the sample is turbid due to suspended material or a coloring agent such as tannic compounds. Turbid samples are typically allowed to settle, centrifuged, or, if these steps are not effective, diluted prior to analysis.

Table 2 provides normal emission wavelength ranges and detection limits for the five dyes when analyzed on the OUL's RF-5000U spectrofluorophotometer. Table 3 provides similar data for the OUL's RF-5301. As indicated earlier in Table 1, the analytical protocols used on the two instruments are somewhat different, especially in regard to the widths of excitation and emission slit settings.

Table 2. RF-5000U Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	533.0 to 539.6	0.035
Eosine in Water	529.6 to 538.4	0.008
Fluorescein in Elutant	510.7 to 515.0	0.010
Fluorescein in Water	505.6 to 510.5	0.0005
Pyranine in Elutant	500.4 to 504.6	0.055
Pyranine in Water*	495.5 to 501.5	0.030
Rhodamine WT in Elutant	561.7 to 568.9	0.275
Rhodamine WT in Water	569.4 to 574.8	0.050
Sulforhodamine B in Elutant	567.5 to 577.5	0.150
Sulforhodamine B in Water	576.2 to 579.7	0.040

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Table 3. RF-5301 Spectrofluorophotometer. Normal emission wavelength ranges and detection limits for fluorescein, eosine, rhodamine WT, sulforhodamine B, and pyranine dyes in water and elutant samples. Detection limits are based upon the as-sold weight of the dye mixtures normally used by the OUL.

Dye and Matrix	Normal Acceptable Emission Wavelength Range (nm)	Detection Limit (ppb)
Eosine in Elutant	538.1 to 543.9	0.050
Eosine in Water	533.4 to 537.9	0.015
Fluorescein in Elutant	514.0 to 518.1	0.025
Fluorescein in Water	508.0 to 511.7	0.002
Pyranine in Elutant	502.1 to 508.1	0.015
Pyranine in Water*	498.4 to 504.4	0.010
Rhodamine WT in Elutant	565.4 to 572.0	0.170
Rhodamine WT in Water	572.7 to 578.0	0.015
Sulforhodamine B in Elutant	572.8 to 579.6	0.080
Sulforhodamine B in Water	580.1 to 583.7	0.008

* pH adjusted water with pH of 9.5 or greater.

Note: The protocols for the analysis of pyranine dye are substantially different than those for the other dyes. As a result, there is less potential interference between pyranine and fluorescein than might otherwise be indicated by the emission wavelength values shown in the table.

Criteria for Determining Positive Dye Recoveries

The following sections identify normal criteria used by the OUL for determining positive dye recoveries. Beginning January 1, 2001, the primary analytical instrument in use at the OUL was the RF-5301; the RF-5000U was the principal backup instrument. Studies which were in progress prior to January 1, 2001 continued to have samples analyzed on the RF-5000U.

Except for pyranine dye, the analytical protocol used for the RF-5301 provides for the use of narrower excitation and/or emission slit settings than the RF-5000U protocol. This enhances our ability to discriminate between dyes and other fluorescent compounds. The protocol which is possible with the RF-5301 (as contrasted with the RF-5000U) also provides for a better balance in the sizes of the fluorescence peaks associated with an equal concentration of all of the dyes.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Eosine Dye Recoveries in Elutants from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 538.1 to 543.9 nm for samples analyzed by the RF-5301. The range must be 533.0 to 539.6 nm for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the eosine detection limit in elutant samples is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb. For the RF-5000U the eosine detection limit in elutant samples is 0.035 ppb, thus this dye concentration limit equals 0.105 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of eosine. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of eosine. In addition, there must be no other factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Eosine Dye Recoveries in Water Samples.

There is generally little or no detectable fluorescence background in the general range of eosine dye encountered in most groundwater tracing studies. The following three criteria are used to identify fluorescence peaks which are deemed to be eosine dye.

Criterion 1. The associated charcoal samplers for the station should also contain eosine dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be eosine dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 533.4 to 537.9 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 529.6 to 538.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our eosine detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb. For samples analyzed on the 5000U the detection limit is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Fluorescein Dye Recoveries in Elutants from Charcoal Samplers.

There is often some fluorescence background in the range of fluorescein dye present at some of the stations used in groundwater tracing studies. We routinely conduct background sampling prior to the introduction of any tracer dyes to characterize this background fluorescence and to identify the existence of any tracer dyes which may be present in the area. The fact that a fluorescence peak is identified in our analytical results is not proof that it is fluorescein dye or that it is fluorescein dye from the trace of concern. The following 4 criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye recoveries from our tracing work.

Criterion 1. There must be at least one fluorescence peak at the station in question in the range of 514.0 to 518.1 nm for samples analyzed by the RF-5301. The range must be 510.7 to 515.0 for samples analyzed by the RF-5000U.

Criterion 2. The dye concentration associated with the fluorescence peak must be at least 3 times the detection limit. For the RF-5301, the fluorescein detection limit in elutant samples is 0.025 ppb, thus this dye concentration limit equals 0.075 ppb. For the RF-5000U, the fluorescein detection limit in elutant samples is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of fluorescein. Much background fluorescence yields low, broad, and asymmetrical fluorescence peaks rather than the more narrow and symmetrical fluorescence peaks typical of fluorescein. In addition, there must be no other factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Fluorescein</u> Dye Recoveries <u>in Water</u> Samples.

There is commonly some fluorescence background in the general range of fluorescein dye at some sampling stations used in groundwater tracing studies. The following criteria are used to identify fluorescence peaks which are deemed to be fluorescein dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain fluorescein dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be fluorescein dye from our groundwater tracing work. For samples analyzed on the RF-5301, the fluorescence peak should generally be in the range of 508.0 to 511.7 nm. For samples analyzed on the RF-5000U, the fluorescence peak should generally be in the range of 505.6 to 510.5 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our fluorescein detection limit in water samples analyzed on the RF-5301 is 0.002 ppb, thus this dye concentration limit equals 0.006 ppb. For the RF-5000U the detection limit is 0.0005 ppb, thus this dye concentration limit equals 0.0015 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Rhodamine WT</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of Rhodamine WT dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT.

Criterion 1. For samples analyzed on the RF-5301, there must be at least one fluorescence peak at the station in question in the range of 565.4 to 572.0 nm. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 561.7 to 568.9 nm.

Criterion 2. The dye concentration associated with the Rhodamine WT peak must be at least 3 times the detection limit. For the RF-5301, the detection limit in elutant samples is 0.170 ppb, thus this dye concentration limit equals 0.510 ppb. For the RF-5000U, the detection limit in elutant samples is 0.275 ppb, thus this dye concentration limit equals 0.825 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of Rhodamine WT. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Rhodamine WT Dye Recoveries in Water Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be Rhodamine WT dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain Rhodamine WT dye in accordance with the criteria listed above. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be Rhodamine WT dye from the tracing work under investigation. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 572.7 to 578.0 nm. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 569.4 to 574.8 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. Our Rhodamine WT detection limit in water samples analyzed on the RF-5301 is 0.015 ppb, thus this dye concentration limit is 0.045 ppb. For samples analyzed on the RF-5000U the detection limit is 0.050 ppb, thus this dye concentration limit equals 0.150 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive Sulforhodamine B Dye Recoveries in Elutants from Charcoal Samplers.

There is generally little or no detectable fluorescence background in the general range of sulforhodamine B dye encountered in most groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 567.5 to 577.5 nm. The acceptable range for samples analyzed on the RF-5301 is 572.8 to 579.6 nm.

Criterion 2. The dye concentration associated with the sulforhodamine B peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.150 ppb, thus this dye concentration limit equals 0.450 ppb. For the RF-5301, the detection limit in elutant samples is 0.080 ppb, thus this dye concentration limit equals 0.240 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of sulforhodamine B. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Sulforhodamine B</u> dye Recoveries <u>in Water</u> Samples.

The following criteria are used to identify fluorescence peaks which are deemed to be sulforhodamine B dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain sulforhodamine B dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be sulforhodamine B dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 576.2 to 579.7 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 580.1 to 583.7 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.008 ppb, thus this dye concentration limit equals 0.024 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.040 ppb, thus this dye concentration limit equals 0.120 ppb.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Pyranine</u> Dye Recoveries <u>in Elutants</u> from Charcoal Samplers.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

There is often some detectable fluorescence background encountered in the general range of pyranine dye in groundwater tracing studies. The following four criteria are used to identify fluorescence peaks which are deemed to be pyranine.

Criterion 1. For samples analyzed on the RF-5000U, there must be at least one fluorescence peak at the station in question in the range of 500.4 to 504.6 nm. The acceptable range for samples analyzed on the RF-5301 is 502.1 to 508.1 nm.

Criterion 2. The dye concentration associated with the pyranine dye peak must be at least 3 times the detection limit. For the RF-5000U, the detection limit in elutant samples is 0.055 ppb, thus this dye concentration limit equals 0.165 ppb. For the RF-5301, the detection limit in elutant samples is 0.015 ppb, thus this dye concentration limit equals 0.045 ppb.

Criterion 3. The dye concentration must be at least 10 times greater than any other concentration reflective of background at the sampling station in question.

Criterion 4. The shape of the fluorescence peak must be typical of pyranine dye. In addition, there must be no other factors which suggest that the fluorescence peak may not be dye from the groundwater tracing work under investigation.

Normal Criteria Used by the Ozark Underground Laboratory for Determining Positive <u>Pyranine</u> Dye Recoveries <u>in Water Samples</u>.

It must be remembered that the analysis protocol for pyranine dye is different than the protocol for the other four dyes discussed in this document. If the other dyes are present in a sample analyzed for pyranine dye their emission fluorescence peaks (if any) will be appreciably different than the values presented above. Because of this, there is very little analytical interference between fluorescein and pyranine dyes when both are present in a sample.

The fluorescence of pyranine decreases below a pH of about 9.5. Prior to analysis water samples are placed in a high ammonia atmosphere for at least two hours. A pyranine dye in water standard is placed in the same atmosphere as the samples. Prior to analysis samples are tested to insure that their pH is 9.5 or greater. If pyranine dye concentrations in a sample are so great as to require dilution for quantification of the dye concentration the diluting water used is OUL reagent water which has been pH adjusted in a high ammonia atmosphere.

The following criteria are used to identify fluorescence peaks which are deemed to be pyranine dye in water.

Criterion 1. The associated charcoal samplers for the station should also contain pyranine dye in accordance with the criteria listed earlier. These criteria may be waived if no charcoal sampler exists.

Criterion 2. There must be no factors which suggest that the fluorescence peak may not be pyranine dye from the tracing work under investigation. For samples analyzed with the RF-5000U, the fluorescence peak should generally be in the range of 495.5 to 501.5 nm. For samples analyzed with the RF-5301, the fluorescence peak should generally be in the range of 498.4 to 504.4 nm.

Criterion 3. The dye concentration associated with the fluorescence peak must be at least three times the detection limit. For samples analyzed on the RF-5301 the detection limit in water is 0.010 ppb, thus this dye concentration limit equals 0.030 ppb. For samples analyzed on the RF-5000U the detection limit in water samples is 0.030 ppb, thus this dye concentration limit equals 0.090 ppb.

ATTACHMENT C

ATTACHMENT 2 – DEP'S PROJECT GRANT WORK PLAN (DEP NO. G0273)

Project Title: Silver Springs Nutrient Pathway Characterization

Project Location: Silver Springs

Project Background:

The Silver Springs spring group (SSG), one of Florida's 33 first-magnitude springs, forms the headwaters of the Silver River in central Marion County. Discharge from the spring group flows from the Upper Floridan aquifer (UFA), part of the Floridan Aquifer System (FAS). The SSG is composed of two large main vents plus 28 smaller vents spread throughout the upper reach of the Silver River. Maps of the karst system supplying water to the SSG are limited to only hundreds of feet from the main vents. However, the extent of the karst conduit system feeding the vents is unknown, but believed to extend a significant distance from the vent openings. Discharge rates, measured periodically by the USGS in the Silver River downstream of the largest vents since the 1930's, varied from approximately 350 cubic feet per second (cfs) to approximately 1290 cfs, with a long-term annual median value of approximately 772 cfs (Munch et al, 2007). An ongoing study conducted by the SJRWMD for the Florida Department of Environmental Protection (FDEP) is aimed at characterizing flow rates and water quality from individual vents (Toth, 2008).

The SSG has recently been listed by the FDEP as impaired by nutrients (specifically nitrates, or nitrates plus nitrites) (Hicks et al, 2009). Water quality at the Silver Springs Group has been monitored quarterly by FDEP since 2001. Over the monitoring period, nitrate+nitrite concentrations in Silver Main Spring have ranged from 0.91 to 1.4 mg/L, with a median concentration of 1.1 mg/L. Over the 7.5-year verified listing period of record the median nitrate+nitrite concentration for Silver Main was 1.1 mg/L and 100 percent of the samples exceeded 0.6 mg/L.

Development of Total Maximum Daily Load (TMDL) rules for the SSG area will require gaining knowledge about the source areas of nutrients that are discharging from the spring vents. To date little detailed research has been conducted regarding the nature and extent of the groundwater flow pathways controlling SSG discharge or their relationship to potential source locations of nutrients.

The objectives of this project are twofold. The first objective is to identify dominant groundwater pathways and travel times between specific locations and the SSG. The second objective is to identify the potential sources of groundwater nutrient contamination that appear to be directly connected to the SSG discharge vents.
This project supports the objectives set forth in Section 205(j)(2) of the Federal Clean Water Act, namely:
(2) Such sums shall be used by the Administrator to make grants to the States to carry out water quality management planning, including, but not limited to—

(A) identifying most cost effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards; *(TMDL/BMAP)*

(B) developing an implementation plan to obtain State and local financial and regulatory commitments to implement measures developed under subparagraph (A);

(C) determining the nature, extent, and causes of water quality problems in various areas of the State and interstate region, and reporting on these annually; Consistent with the requirements.

Specifically, the information from this project will be used to complete the TMDL for Silver Springs and to equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

Project Description: The project area encompasses approximately 300 square miles around the Ocala area in central Marion County, including much of the steady-state springshed for the SSG. Major tasks will include:

1. **Detailed hydrogeologic evaluation** aimed at identifying and ranking locations of potential rapid or direct input to the major subsurface conduit system supplying groundwater flow to the SSG. This task will include a review of available data to determine the locations where potential sources of focused (point-source or relatively concentrated non-point-source) nutrient-enriched recharge occurs to the groundwater flow system. This task also includes borehole logging and detailed potentiometric mapping of the Upper Floridan aquifer (UFA) in order to guide karst pathway assessment. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. The surveyed locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG.

2. **Karst pathway assesssment and groundwater travel time** estimation using dye tracing from the potential groundwater input sites ranked highest in Task 1 to the SSG. An initial dye tracer test will involve tracer injected at sites selected in Task 1 with direct connection to the subsurface (drainage wells and active, direct input sinks). A second test will include tracer injection at shallow monitoring wells or surface sites (e.g. sinks without direct subsurface openings) near the identified conduit pathways where nutrients may seep into the aquifer from surface sources.

3. **Risk assessment,** comparing the delineated pathways and travel times with potential nutrient source types and land use categories.

Project Tasks/Deliverables:

Task 1: Hydrogeologic evaluation and potential nutrient source identification: This task includes a review of available data to determine locations within the project area where focused, nutrient enriched groundwater recharge commonly occurs. Concurrently with this review, a detailed survey of UFA potentiometric elevations will be conducted. Ground-based geophysical surveys will then be conducted at several locations selected during the data evaluation. These locations will subsequently be ranked according to their potential to act as nutrient inputs to the solution conduit system supplying groundwater to the SSG. **(6/09 – 2/10)**

1) **Existing data compilation and review (6/09 – 9/09)**

   a. Drainage well locations and characteristics ***(SJRWMD staff)***

      i) Map and ground truth locations

      ii) Obtain well characteristics and any existing geophysical and video logs

      iii) Surface drainage characteristics (drainage basins for individual drainage wells)

   b. Stormwater retention ponds and their drainage basins ***(SJRWMD staff)***

   c. Wastewater disposal/recharge locations ***(SJRWMD staff)***

      i) Reclaimed water distribution systems, spray fields & Rapid Infiltration Basins (RIBs)

d. Available source water quality data ***(SJRWMD staff)***

e. Active sinkholes

f. Map and ground truth locations of sinkholes with 1) direct openings and 2) drainage to ground water system through cover material ***(SJRWMD staff)***

g. Monitoring well survey ***(SJRWMD staff)***

i) Evaluate SJRWMD monitoring wells

ii) Locate any other monitoring or unused production wells, and obtain well characteristics and any existing geophysical and video logs

h. Review available ground water vulnerability maps and any existing surface geophysical surveys previously conducted in the area ***(SJRWMD staff)***

i. Evaluate existing data to determine locations for new data collection using GIS-based data overlays ***(SJRWMD staff)***

2) **<u>Data collection for aquifer characterization</u>** **(6/09 – 12/09)**

a. Collect geophysical and video logs at accessible drainage, monitoring, or unused production wells where needed ***(SJRWMD staff)***

b. Conduct slug tests at accessible drainage, monitoring, or other wells in order to assess the potential for direct connection to karst conduit system ***(SJRWMD staff)***

c. Perform water-level monitoring at Upper Floridan aquifer wells in the SSG area to supplement the September 2009 USGS statewide potentiometric survey (***SJRWMD staff***)

d. Perform vertical elevation surveys of the measuring points of those wells measured as part of subtask I. 2c.. Provide a report to SJRWMD describing and summarizing the surveying of water-level measuring point elevations. ***(Contractor)***

3) **<u>Data analysis and review:</u>** Synthesize the existing and newly collected potentiometric and borehole data and select optimal areas for conducting ground-based geophysical surveys ***(SJRWMD staff)*** **(8/09 – 2/10)**

4) **<u>Geophysical surveys</u>** **(11/09 – 2/10)**

a. Conduct reconnaissance-scale ground-based geophysical surveys near and down gradient from potential direct ground water inputs based upon results of Task 1 c. The specific types of geophysical surveys used may include some or all of the following methodologies:

i) Ground Penetrating Radar (GPR) surveys ***(Contractor)***

ii) Microgravity anomaly surveys ***(Contractor)***

iii) 2D Electrical resistivity imaging (ERI) surveys ***(Contractor)***

iv) Seismic Multichannel analysis of Surface Waves (MASW) ***(Contractor)***

b. Provide a report to SJRWMD summarizing the ground-based geophysical surveys and results. A

part of this subtask may also include presenting the results of the geophysical surveys at meetings. ***(Contractor)***

5) **Identify and rank potential sources of nutrient input to SSG** **(12/09 – 2/10)**

a. Conduct GIS-based evaluation to document locations with land uses where nutrient producing inputs may intersect with any significant karst solution features identified in Task 1 d. ***(SJRWMD staff)***

b. Rank the locations based upon proximity to the SSG and magnitude of potential nutrient loading ***(SJRWMD staff)***

6) **Task 1 interim report** **(1/10 – 2/10)**

a. Prepare draft report (concurrent with other subtasks in Task 1) ***(SJRWMD staff)***

b. DEP and internal SJRWMD review of draft interim report

c. Respond to comments and finalize Task 1 interim report ***(SJRWMD staff)***

Task 2: Potential nutrient pathway delineation: In this task the hydrologic connections between the potential source locations ranked highest in Task 1 and the SSG will be assessed by conducting 2 qualitative dye trace studies. For each test, dye will be injected into the UFA and monitoring for dye presence will be conducted at representative SSG spring vents. Discharge rates from the SSG vents will also be measured during each dye trace study. The initial dye trace will focus upon the hydrologic connection between the 2 to 3 highest ranked potential source locations that act as "direct" inputs to the UFA (drainage wells and/or open and active sinks or swallets). The second dye trace will focus upon the hydrologic connection between 1 or 2 additional source locations that provide "indirect" nutrient input to the UFA conduit flow system. Potential indirect sources include sinks or stormwater retention basins without direct openings to the UFA or rapid infiltration basins that recharge reclaimed wastewater. However, if the results of Task 1 indicate that there are more than 3 highly ranked potential source locations with direct input to the UFA, the second dye trace may then focus upon the hydrologic connections between the additional direct inputs and the SSG. **(2/10 – 4/11)**

1) **Design and planning of dye tracer tests:** Plan dye tracer test details based upon results of Task One ***(Contractor)*** **(2/10 – 3/10)**

2) **Background sampling and analysis:** Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)*** **(3/10 – 4/10)**

3) **Initial dye trace test** **(4/10 – 7/10)**

a. Background sampling and analysis. Perform two rounds of background sampling (using both activated carbon samplers and "grab" water samples) to measure for background concentrations of the selected dyes ***(Contractor)***

b. Dye release (using 2 or 3 different dyes) from 2 to 3 direct source locations (e.g., active sinks and/or drainage wells) identified in Task 1, and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 2 – 3 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the U. S. Geological Survey (USGS) ***(Contractor)***

d. Data evaluation and reporting, including preparation and submittal of a technical memorandum describing the dye trace and results ***(Contractor)***

4) **<u>Second dye trace test</u>** **(7/10 – 3/11)**

a. Review the design for the second dye trace based upon dye trace 1 results; redesign as needed

b. Dye release (using 1 or 2 additional dyes) from 1 - 2 non-direct source locations (e.g., sinks or stormwater retention basins) identified in Task 1and weekly sampling and analysis (using both activated carbon samplers and "grab" water samples) at representative SSG vents for 4 - 6 months ***(Contractor)***

c. Spring vent discharge measurements conducted concurrently (or near concurrently) with periodic Silver River discharge measurements made by the USGS ***(Contractor)***

d. Data evaluation, including a comparison of results from both dye traces ***(Contractor)***

NOTE: It is recognized that design of the dye trace tests may require staggering of the two tests resulting in overlapping sampling periods. In that case the total length of both tests would approximately span the period from 3/10 through 3/11.

5) **<u>Task 2 Reporting</u>** **(12/10 – 4/11)**

a. Prepare and draft interim Task 2 report that documents the dye tracer studies and presents the results. A part of.this subtask may also include presenting the results of the dye tracing studies at meetings. ***(Contractor)***

b. DEP and SJRWMD review of draft interim report

c. Respond to comments and prepare final Task 2 interim report ***(Contractor)***

<u>Task 3: Risk Assessment</u>: Compare potential pathways and travel times determined in Task 2 with current and proposed land uses within the project area. **(4/11 – 8/11)**

1) **<u>Compare the potential groundwater flow pathways</u>** and travel times determined by Task 2 and identify areas of risk for nutrient loading to the groundwater flow system and transport to the SSG. If possible, rank the risk areas into low, medium, and high categories. ***(SJRWMD staff)*** **(4/11 – 5/11)**

2) **<u>Final Project Report</u>** **(5/11 – 8/11)**

a. Prepare a draft Final Report that summarizes the project and incorporates the interim reports that document tasks 1 & 2 ***(SJRWMD staff)***

b. DEP and internal SJRWMD review of draft Final Report

c. Respond to comments and prepare Final Report ***(SJRWMD staff)***

Task No.	Task Title	Start	Complete	Deliverable	Deliverable Due Dates
1	Hydrogeologic evaluation and potential nutrient source identification	June, 2009	February, 2010	Interim report	February 28, 2010
2	Delineation of potential pathways using dye tracer	February 2010	April 2011	Interim report	April 30, 2011
3	Risk assessment, comparing result of task 2 with land uses	April 2011	August 2011	Final report	August 11, 2011

Project Budget Narrative:
Contractual: To complete tasks 1 and 2.

Total Budget by Task:

Task		DEP Funding	Matching Funds and Source	
			Matching Funds	Source of Funds
1	Hydrogeologic evaluation and potential nutrient source identification	190,000	0	
2	Delineation of potential pathways using dye tracer studies and discharge measurements	345,000	0	
3	Final report		0	
	Total:	$535,000		
	Project Total:	$535,000		

Measures of Success:
The outcomes of this project are:

1. identification of dominant groundwater pathways and travel times between specific locations and the Silver Springs Group.

2. Identification of the potential sources of groundwater nutrient contamination that appear to be directly connected to the Silver Spring discharge vents.

Specifically, the information from this project will be presented in a final report and used to complete the TMDL for Silver Springs and equitably allocate load reductions in the Basin Management Action Plan, which is Florida's version of a TMDL implementation plan.

ATTACHMENT D

Florida Department of Environmental Protection
Division of Recreation and Parks

Permit Number
11120913a

RESEARCH/COLLECTING PERMIT

This Permit Must Be Carried At All Times While Conducting Research/Collecting Activities

Names of Collectors:	Address, Phone, Fax and Email:	Issue – Expiration Dates
Brian E. McGurk (SJRWMD) Jeffrey Davis, Alan Story, Craig Berninger, David Toth (SJRWMD) SJRWMD contractors: Tom Tracz, Bill Colona, Peter Butt, Tom Aley, Todd Kinkaid, Lynn Yuhr, Mark Dietrich, Kevin Hough, Sid O'Neill, Tom Morris, Mark Long, Matt Hubner, Georgia Shemitz, Wes Skiles, Nathan Skiles, Jill Heinerth, Tom Castow	St. Johns River Water Management District P.O. Box 1429 Palatka, FL 32178-1429 (386) 329-4245 (386) 336-2738 cell (386) 329-4820 FAX bmcgurk@sjrwmd.com	**11/12/09-8/11/11** SJRWMD JAN 19 2010 CENTRAL RECEIVING

Representing: St. Johns River Water Management District

Permitted Activity: Conduct a detailed hydrogeologic evaluation (to include borehole testing, vertical elevation surveys, and ground-based geophysical surveys) and a karst pathway assessment and groundwater travel time estimation (to include dye injection and tracing/sampling)

Permitted Collection: Only data collection is authorized

In the Following Areas: Silver River State Park

Special Conditions or Restrictions:

1. Contact the park manager and district biologist a minimum of one week in advance of visits for coordination and arrangements. Failure to do this may result in denial of park entry.
2. Check in with the park manager upon arrival at and departure from the park.
3. Conduct research activities in the manner indicated in the attached application form or proposal.
4. Collect no state or Federally listed, or rare endemic species or forms, or any parts of these listed or rare endemic species or forms.
5. Research activities shall be conducted in such a manner as not to attract attention or cause damage to the environment. Vehicular traffic shall be limited to park roads; other methods of access must be approved by the park manager. All gates shall be left as found.
6. You are required to GPS the location of all permanent or semi-permanent site markings that you add (e.g., PVC pipes) and submit these coordinates to the park manager and district biologist within 2 weeks of the start of your work. You are required to mark all non-permanent site markings (flagging tape, pin flags, etc.) with your permit number. Site markings must not be detrimental or cause harm to the resources of the park (e.g., no markings may be nailed onto trees). Unless approved in advance by the park manager or district biologist, you will be required to remove all site markings upon completion of your work. Any unauthorized site markings will be removed by FDEP staff.
7. A summary report concerning project data, including species lists, shall be submitted to the park manager and district biologist by **11/12/10 and 8/11/11**. Copies of any other reports, publications, theses, or dissertations that result from this work must also be provided to the district biologist upon their availability. Acknowledgement of FDEP, Florida Park Service will be included in any presentations, posters, reports, publications, or theses that result from this work. Failure to submit a report may result in denial of future research requests.
8. Any other applicable state and Federal permits are the responsibility of the permittee.
9. The permit is non-transferable. It must be in the possession of the permittee(s) or their research associates and assistants when conducting research/collecting activities in the park. At least one named researcher/collector (above) must be present.
10. This permit may be revoked for failure of the permittee to abide by permit conditions and policies of FDEP.
11. The permittee and research associates will not be subject to park day-fees when entering the park for research purposes.
12. The permit may be extended or modified upon submission of the annual report and a letter or email requesting renewal. Contact the issuing office for amendment or extension.
13. Any liabilities incurred to the researcher and/or his/her associates are the sole responsibility of the researcher.
14. The Florida Park Service may request that the researcher give a program in the park or in the local community on their work.

Approved By: (name & title)	Issuing Office:
Alice M. Bard Environmental Specialist II	Bureau of Parks, District 3 1800 Wekiwa Circle Apopka, FL 32712 (407) 884-2000

Attachment: none

cc: Bob LaMont, Silver River State Park

FPS-R010 rev. 8/31/09

APPENDIX G

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 1

Station Name: Mammoth East

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluor.	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Pre-Background														
1/11/2010	15:58	1/18/2010	13:43			7		**ND**	**ND**	**ND**	**ND**	T5116		2/2/2010
1/18/2010	13:43	1/26/2010	14:38			8		**ND**	**ND**	**ND**	**ND**	T5124		2/2/2010
1/26/2010	14:38	2/1/2010	15:45			6		**ND**	**ND**	**ND**	**ND**	T5131		2/2/2010
2/1/2010	15:45	2/9/2010	15:25			8		**ND**	**ND**	**ND**	**ND**	T5416		2/10/2010
2/9/2010	15:25	3/25/2010	17:53											
Comprehensive Background														
3/25/2010	17:53	4/1/2010	12:56			7		**ND**	**ND**	**ND**	**ND**	T6961		4/5/2010
4/1/2010	12:56	4/9/2010	13:11			8		**ND**	**ND**	**ND**	**ND**	T7187		4/12/2010
4/9/2010	13:11	4/22/2010	12:14			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:14	4/28/2010	13:56	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8109		5/3/2010
4/28/2010	13:56	5/3/2010	13:15	5	10	5	**X**	**ND/ND**	**ND/ND**	**10.9/15.2**	**ND/ND**	T7949/D		5/3/2010
5/3/2010	13:15	5/9/2010	12:57	10	16	6	**X**	**ND/ND**	**ND/ND**	**52.50/32.70**	**ND/ND**	T8254/D		5/11/2010
5/9/2010	12:57	5/14/2010	12:44	16	21	5		**ND**	**ND**	**30.30**	**ND**	T8721		5/17/2010
5/14/2010	12:44	5/19/2010	12:29	21	26	5		**ND**	**ND**	**24.50**	**ND**	T9143		6/1/2010
5/19/2010	12:29	5/25/2010	14:15	26	32	6		**ND**	**ND**	**34.00**	**ND**	T9170		6/1/2010
5/25/2010	14:15	6/1/2010	14:18	32	39	7		**ND**	**ND**	**23.70**	**ND**	T9350		6/7/2010
6/1/2010	14:18	6/7/2010	14:47	39	45	6		**ND**	**ND**	**18.80**	**ND**	T9598		6/16/2010
6/7/2010	14:47	6/14/2010	14:02	45	52	7		**ND**	**ND**	**19.70**	**ND**	T9626		6/16/2010
6/14/2010	14:02	6/22/2010	13:51	52	60	8		**ND**	**ND**	**15.30**	**ND**	U0535		7/13/2010
6/22/2010	13:51	8/5/2010	11:54	60	105	44		**ND**	**ND**	**31.20**	**ND**	U0782		8/9/2010
8/5/2010	11:54	9/2/2010	13:47	105	133	28		**ND**	**ND**	**19.40**	**ND**	U1322		9/8/2010
9/2/2010	13:47	9/22/2010	12:54	133	153	20		**ND**	**ND**	**8.60**	**ND**	U1430		9/27/2010
9/22/2010	12:54	10/4/2010	13:36	153	165	12		**ND**	**ND**	**4.22**	**ND**	U1835		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	13:36	10/11/2010	14:56	165/-1	172/6	7	**X**	**ND/ND**	**ND/ND**	**4.46/3.06**	**ND/ND**	U2012/D	**/**	10/14/2010
10/11/2010	14:56	10/15/2010	12:34	172/6	176/10	4		**ND**	**ND**	**1.96**	**ND**	U2570	**	10/26/2010
10/15/2010	12:34	10/20/2010	12:49	176/10	181/18	5		**ND**	**ND**	**3.61**	**ND**	U2597	**	10/26/2010
10/20/2010	12:49	10/25/2010	13:28	181/18	186/20	5		**ND**	**ND**	**3.13**	**ND**	U2625	**	10/26/2010
10/25/2010	13:28	11/1/2010	14:04	186/20	193/27	7		**ND**	**ND**	**3.52**	**ND**	U2902		11/5/2010
11/1/2010	14:04	11/8/2010	12:43	193/27	200/34	7		**ND**	**ND**	**2.66**	**ND**	U3227	**	11/12/2010
11/8/2010	12:43	11/15/2010	12:49	200/34	207/41	7		**ND**	**ND**	**2.99**	**ND**	U3555	**	11/19/2010
11/15/2010	12:49	11/22/2010	12:28	207/41	214/48	7		**ND**	**ND**	**4.49**	**ND**	U4222	**	12/2/2010
11/22/2010	12:28	11/29/2010	12:52	214/48	221/55	7		**ND**	**ND**	**3.07**	**ND**	U4249	**	12/2/2010
11/29/2010	12:52	12/7/2010	12:20	221/55	229/63	8		**ND**	**ND**	**3.14**	**ND**	U4538	**	12/13/2010
12/7/2010	12:20	12/17/2010	13:08	229/63	239/73	10		**ND**	**ND**	**4.29**	**ND**	U4742	**	12/20/2010
12/17/2010	13:08	12/28/2010	12:48	239/73	250/84	11		**ND**	**ND**	**3.63**	**ND**	U5069		12/30/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**1**												
Station Name:		**Mammoth East**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluor.**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
12/28/2010	12:48	1/11/2011	13:07	250/84	264/98	14		**ND**	**ND**	**2.14**	**ND**	U5434	**	1/12/2011
1/11/2011	13:07	1/24/2011	12:52	264/98	277/111	13	**X**	**ND/ND**	**ND/ND**	**3.40/2.94**	**ND/ND**	U5699/D	**/**	1/27/2011
1/24/2011	12:52	2/11/2011	12:32	277/111	295/129	18		**ND**	**ND**	**6.19**	**ND**	U6292	**	2/17/2011
2/11/2011	12:32	2/28/2011	13:31	295/129	312/147	17								3/22/2011
2/28/2011	13:31	3/17/2011	13:20	312/147	329/164	17		**ND**	**ND**	**2.61**	**ND**	U7443	**	3/22/2011
3/17/2011	13:20	4/6/2011	13:38	329/164	349/183	20		**ND**	**ND**	**3.38**	**ND**	U8174	**	4/15/2011
4/6/2011	13:38	4/25/2011	13:47	349/183	368/202	19		**ND**	**ND**	**2.98**	**ND**	U8605	**	4/27/2011
4/25/2011	13:47	5/11/2011	9:02	368/202	384/218	16		**ND**	**ND**	**2.17**	**ND**	U9848	**	5/12/2011
5/11/2011	9:02	5/26/2011	13:50	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0329		5/27/2011
5/26/2011	13:50	6/15/2011	13:23	399/233	419/253	20		**ND**	**ND**	**1.33**	**ND**	V0747	**	6/17/2011
6/15/2011	13:23	7/22/2011	13:29	419/253	456/290	37		**ND**	**ND**	**2.41**	**ND**	V1415	**	7/26/2011
7/22/2011	13:29	8/15/2011	14:06	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1728		8/16/2011
8/15/2011	14:06	9/14/2011	14:23	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2051	**FINAL**	9/15/2011
# BG Samples Collected:			8											
# BG Samples Shipped:			6											
# BG Samples Analyzed:			6											
# Samples Collected:			39											
# Samples Shipped:			39											
# Samples Analyzed:			38											
# Dupes Analyzed			4											
Total # Samples Collected:			**47**											
Total # Samples Shipped:			45											
Total # Samples Analyzed:			**44**											
Total # Dupes Analyzed:			4											
# Samples FL pos:			0											
# Samples EO pos:			0											
# Samples RWT pos:			**34**	**+4**	**Dupes**									
# Samples SRB pos:			0											

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 2

Station Name: Mammoth West

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Pre-Background														
1/11/2010	15:54	1/18/2010	13:55			7		**ND**	**ND**	**ND**	**ND**	T5117		2/2/2010
1/18/2010	13:55	1/26/2010	14:40			8		**ND**	**ND**	**ND**	**ND**	T5125		2/2/2010
1/26/2010	14:40	2/1/2010	15:52			6		**ND**	**ND**	**ND**	**ND**	T5132		2/2/2010
2/1/2010	15:52	2/9/2010	15:28			8		**ND**	**ND**	**ND**	**ND**	T5417		2/10/2010
2/9/2010	15:28	3/25/2010	17:49											
Comprehensive Background														
3/25/2010	17:49	4/1/2010	12:52			7		**ND**	**ND**	**ND**	**ND**	T6962		4/5/2010
4/1/2010	12:52	4/9/2010	13:19			8		**ND**	**ND**	**ND**	**ND**	T7188		4/12/2010
4/9/2010	13:19	4/22/2010	12:12			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:12	4/28/2010	14:00	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8110		5/3/2010
4/28/2010	14:00	5/3/2010	13:20	5	10	5		**ND**	**ND**	**ND**	**ND**	T7950		5/3/2010
5/3/2010	13:20	5/9/2010	13:03	10	16	6	**X**	**ND/ND**	**ND/ND**	**4.51/5.58**	**ND/ND**	T8255/D	**/**	5/11/2010
5/9/2010	13:03	5/14/2010	12:48	16	21	5	**X**	**ND/ND**	**ND/ND**	**5.78/6.06**	**ND/ND**	T8722/D	**/**	5/17/2010
5/14/2010	12:48	5/19/2010	12:36	21	26	5		**ND**	**ND**	**ND**	**ND**	T9144		6/1/2010
5/19/2010	12:36	5/25/2010	14:19	26	32	6		**ND**	**ND**	**ND**	**ND**	T9171		6/1/2010
5/25/2010	14:19	6/1/2010	14:22	32	39	7		**ND**	**ND**	**4.21**	**ND**	T9351	**	6/7/2010
6/1/2010	14:22	6/7/2010	14:51	39	45	6	**X**	**ND/ND**	**ND/ND**	**3.43/3.74**	**ND/ND**	T9599/D	**/**	6/16/2010
6/7/2010	14:51	6/14/2010	14:05	45	52	7		**ND**	**ND**	**3.18**	**ND**	T9627	**	6/16/2010
6/14/2010	14:05	6/22/2010	13:55	52	60	8		**ND**	**ND**	**3.5**	**ND**	U0536	**	7/13/2010
6/22/2010	13:55	8/5/2010	12:02	60	105	44		**ND**	**ND**	**6.15**	**ND**	U0783		8/9/2010
8/5/2010	12:02	9/2/2010	13:56	105	133	28		**ND**	**ND**	**3.46**	**ND**	U1323		9/8/2010
9/2/2010	13:56	9/22/2010	13:06	133	153	20		**ND**	**ND**	**2.88**	**ND**	U1431	**	9/27/2010
9/22/2010	13:06	10/4/2010	13:46	153	165	12		**ND**	**ND**	**ND**	**ND**	U1836		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	13:46	10/11/2010	15:03	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2013		10/14/2010
10/11/2010	15:03	10/15/2010	12:36	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2571		10/26/2010
10/15/2010	12:36	10/20/2010	13:01	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2598		10/26/2010
10/20/2010	13:01	10/25/2010	13:35	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2626		10/26/2010
10/25/2010	13:35	11/1/2010	14:07	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2903		11/5/2010
11/1/2010	14:07	11/8/2010	12:46	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3228		11/12/2010
11/8/2010	12:46	11/15/2010	12:54	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3556		11/19/2010
11/15/2010	12:54	11/22/2010	12:31	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4223		12/2/2010
11/22/2010	12:31	11/29/2010	12:59	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4250		12/2/2010
11/29/2010	12:59	12/7/2010	12:24	221/55	229/63	8	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U4539/D		12/13/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **2**

Station Name: **Mammoth West**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
12/7/2010	12:24	12/17/2010	13:12	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4743		12/20/2010
12/17/2010	13:12	12/28/2010	12:52	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5070		12/30/2010
12/28/2010	12:52	1/11/2011	13:12	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5435		1/12/2011
1/11/2011	13:12	1/24/2011	12:56	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5701		1/27/2011
1/24/2011	12:56	2/11/2011	12:35	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6293		2/17/2011
2/11/2011	12:35	2/28/2011	13:34	295/129	312/147	17								3/22/2011
2/28/2011	13:34	3/17/2011	13:27	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7444		3/22/2011
3/17/2011	13:27	4/6/2011	13:44	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8175		4/15/2011
4/6/2011	13:44	4/25/2011	13:51	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8606		4/27/2011
4/25/2011	13:51	5/11/2011	9:06	368/202	384/218	16		**ND**	**ND**	**2.33**	**ND**	U9849	**	5/12/2011
5/11/2011	9:06	5/26/2011	13:55	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0330		5/27/2011
5/26/2011	13:55	6/15/2011	13:45	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0748		6/17/2011
6/15/2011	13:45	7/22/2011	13:36	419/253	456/290	37		**ND**	**ND**	**ND**	**ND**	V1416		7/26/2011
7/22/2011	13:36	8/15/2011	14:09	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1729		8/16/2011
8/15/2011	14:09	9/14/2011	14:40	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2052	**FINAL**	9/15/2011

# BG Samples Collected:	8		
# BG Samples Shipped:	6		
# BG Samples Analyzed:	6		
# Samples Collected:	39		
# Samples Shipped:	39		
# Samples Analyzed:	38		
# Dupes Analyzed	4		
Total # Samples Collected:	**47**		
Total # Samples Shipped:	45		
Total # Samples Analyzed:	**44**		
Total # Dupes Analyzed:	4		
# Samples FL pos:	0		
# Samples EO pos:	0		
# Samples RWT pos:	**10**	**+3**	**Dupes**
# Samples SRB pos:	0		

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**4**												
Station Name:		**Catfish Reception Hall**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Pre-Background														
1/11/2010	16:50	1/18/2010	14:08			**7**		**ND**	**ND**	**ND**	**ND**	T5118		2/2/2010
1/18/2010	14:08	1/26/2010	14:27			**8**		**ND**	**ND**	**ND**	**ND**	T5126		2/2/2010
1/26/2010	14:27	2/1/2010	15:31			**6**		**ND**	**ND**	**ND**	**ND**	T5133		2/2/2010
2/1/2010	15:31	2/9/2010	15:13			**8**		**ND**	**ND**	**ND**	**ND**	T5418		2/10/2010
2/9/2010	15:13	3/25/2010	17:31											
Comprehensive Background														
3/25/2010	17:31	4/1/2010	13:03			7		**ND**	**ND**	**ND**	**ND**	T6963		4/5/2010
4/1/2010	13:03	4/9/2010	13:34			8		**ND**	**ND**	**ND**	**ND**	T7189		4/12/2010
4/9/2010	13:34	4/22/2010	12:22			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:22	4/28/2010	14:07	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8111		5/3/2010
4/28/2010	14:07	5/3/2010	13:30	5	10	5	**X**	**ND/ND**	**ND/ND**	**10.2/ND**	**ND/ND**	T7951/D		5/3/2010
5/3/2010	13:30	5/9/2010	13:12	10	16	6		**ND**	**ND**	**ND**	**ND**	T8256		5/11/2010
5/9/2010	13:12	5/14/2010	12:58	16	21	5		**ND**	**ND**	**19.60**	**ND**	T8723		5/17/2010
5/14/2010	12:58	5/19/2010	12:56	21	26	5		**ND**	**ND**	**14.90**	**ND**	T9145		6/1/2010
5/19/2010	12:56	5/25/2010	14:26	26	32	6		**ND**	**ND**	**21.30**	**ND**	T9172		6/1/2010
5/25/2010	14:26	6/1/2010	14:31	32	39	7		**ND**	**ND**	**31.00**	**ND**	T9352		6/7/2010
6/1/2010	14:31	6/7/2010	15:00	39	45	6		**ND**	**ND**	**27.30**	**ND**	T9601		6/16/2010
6/7/2010	15:00	6/14/2010	14:14	45	52	7		**ND**	**ND**	**19.50**	**ND**	T9628		6/16/2010
6/14/2010	14:14	6/22/2010	14:05	52	60	8		**ND**	**ND**	**13.60**	**ND**	U0537		7/13/2010
6/22/2010	14:05	8/5/2010	12:22	60	105	44		**ND**	**ND**	**27.90**	**ND**	U0784		8/9/2010
8/5/2010	12:22	9/2/2010	14:36	105	133	28		**ND**	**ND**	**16.40**	**ND**	U1324		9/8/2010
9/2/2010	14:36	9/22/2010	13:33	133	153	20		**ND**	**ND**	**12.20**	**ND**	U1432		9/27/2010
9/22/2010	13:33	10/4/2010	14:02	153	165	12		**ND**	**ND**	**4.21**	**ND**	U1837	**	10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:02	10/11/2010	15:11	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2014		10/14/2010
10/11/2010	15:11	10/15/2010	12:45	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2572		10/26/2010
10/15/2010	12:45	10/20/2010	13:12	176/10	181/18	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2599/D		10/26/2010
10/20/2010	13:12	10/25/2010	13:46	181/18	186/20	5		**ND**	**ND**	**3.80**	**ND**	U2627		10/26/2010
10/25/2010	13:46	11/1/2010	14:16	186/20	193/27	7		**ND**	**ND**	**3.11**	**ND**	U2904	**	11/5/2010
11/1/2010	14:16	11/8/2010	12:55	193/27	200/34	7		**ND**	**ND**	**2.32**	**ND**	U3229	**	11/12/2010
11/8/2010	12:55	11/15/2010	13:05	200/34	207/41	7		**ND**	**ND**	**3.51**	**ND**	U3557	**	11/19/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**4**												
Station Name:		**Catfish Reception Hall**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
11/15/2010	13:05	11/22/2010	12:42	207/41	214/48	7		**ND**	**ND**	**3.86**	**ND**	U4224	**	12/2/2010
11/22/2010	12:42	11/29/2010	13:08	214/48	221/55	7		**ND**	**ND**	**3.40**	**ND**	U4251	**	12/2/2010
11/29/2010	13:08	12/7/2010	12:31	221/55	229/63	8		**ND**	**ND**	**3.51**	**ND**	U4541	**	12/13/2010
12/7/2010	12:31	12/17/2010	13:20	229/63	239/73	10		**ND**	**ND**	**3.76**	**ND**	U4744	**	12/20/2010
12/17/2010	13:20	12/28/2010	13:02	239/73	250/84	11		**ND**	**ND**	**6.13**	**ND**	U5071		12/30/2010
12/28/2010	13:02	1/11/2011	13:22	250/84	264/98	14		**ND**	**ND**	**3.70**	**ND**	U5436	**	1/12/2011
1/11/2011	13:22	1/24/2011	13:01	264/98	277/111	13		**ND**	**ND**	**6.47**	**ND**	U5702		1/27/2011
1/24/2011	13:01	2/11/2011	12:42	277/111	295/129	18		**ND**	**ND**	**7.04**	**ND**	U6294		2/17/2011
2/11/2011	12:42	2/28/2011	13:42	295/129	312/147	17								3/22/2011
2/28/2011	13:42	3/17/2011	13:38	312/147	329/164	17		**ND**	**ND**	**3.95**	**ND**	U7445		3/22/2011
3/17/2011	13:38	4/6/2011	13:55	329/164	349/183	20		**ND**	**ND**	**4.89**	**ND**	U8176		4/15/2011
4/6/2011	13:55	4/25/2011	14:00	349/183	368/202	19		**ND**	**ND**	**3.73**	**ND**	U8607	**	4/27/2011
4/25/2011	14:00	5/11/2011	9:15	368/202	384/218	16		**ND**	**ND**	**2.65**	**ND**	U9850	**	5/12/2011
5/11/2011	9:15	5/26/2011	14:03	384/218	399/233	15		**ND**	**ND**	**3.34**	**ND**	V0331	**	5/27/2011
5/26/2011	14:03	6/15/2011	14:15	399/233	419/253	20		**ND**	**ND**	**2.27**	**ND**	V0749	**	6/17/2011
6/15/2011	14:15	8/15/2011	14:09	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		8												
# BG Samples Shipped:		6												
# BG Samples Analyzed:		6												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		2												
Total # Samples Collected:		**45**												
Total # Samples Shipped:		42												
Total # Samples Analyzed:		**41**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**30**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**5**												
Station Name:		**Bridal Chamber**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	17:25	4/1/2010	13:08			7								
4/1/2010	13:08	4/9/2010	13:39			8								
4/9/2010	13:39	4/22/2010	12:31			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:31	4/28/2010	14:14	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8748		5/17/2010
4/28/2010	14:14	5/3/2010	13:35	5	10	5		**ND**	**ND**	**ND**	**ND**	T8749		5/17/2010
5/3/2010	13:35	5/9/2010	13:23	10	16	6		**ND**	**ND**	**10.1**	**ND**	T8750		5/17/2010
5/9/2010	13:23	5/14/2010	13:02	16	21	5		**ND**	**ND**	**9.96**	**ND**	T8724		5/17/2010
5/14/2010	13:02	5/19/2010	13:04	21	26	5		**ND**	**ND**	**8.61**	**ND**	T9146		6/1/2010
5/19/2010	13:04	5/25/2010	14:31	26	32	6		**ND**	**ND**	**11.7**	**ND**	T9173		6/1/2010
5/25/2010	14:31	6/1/2010	14:35	32	39	7		**ND**	**ND**	**13.1**	**ND**	T9353		6/7/2010
6/1/2010	14:35	6/7/2010	15:05	39	45	6		**ND**	**ND**	**14.4**	**ND**	T9602		6/16/2010
6/7/2010	15:05	6/14/2010	14:20	45	52	7		**ND**	**ND**	**15.5**	**ND**	T9629		6/16/2010
6/14/2010	14:20	6/22/2010	14:07	52	60	8		**ND**	**ND**	**9.54**	**ND**	U0538		7/13/2010
6/22/2010	14:07	8/5/2010	12:33	60	105	44		**ND**	**ND**	**23.3**	**ND**	U0785		8/9/2010
8/5/2010	12:33	9/2/2010	14:43	105	133	28		**ND**	**ND**	**12.6**	**ND**	U1325		9/8/2010
9/2/2010	14:43	9/22/2010	13:41	133	153	20		**ND**	**ND**	**8.72**	**ND**	U1433		9/27/2010
9/22/2010	13:41	10/4/2010	14:07	153	165	12		**ND**	**ND**	**5.61**	**ND**	U1838	**	10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:07	10/11/2010	15:16	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2015		10/14/2010
10/11/2010	15:16	10/15/2010	12:52	172/6	176/10	4		**ND**	**ND**	**3.29**	**ND**	U2573	**	10/26/2010
10/15/2010	12:52	10/20/2010	13:16	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2601		10/26/2010
10/20/2010	13:16	10/25/2010	13:52	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2628		10/26/2010
10/25/2010	13:52	11/1/2010	14:23	186/20	193/27	7		**ND**	**ND**	**2.9**	**ND**	U2905		11/5/2010
11/1/2010	14:23	11/8/2010	13:01	193/27	200/34	7		**ND**	**ND**	**3.91**	**ND**	U3230		11/12/2010
11/8/2010	13:01	11/15/2010	13:10	200/34	207/41	7		**ND**	**ND**	**4.49**	**ND**	U3558		11/19/2010
11/15/2010	13:10	11/22/2010	12:49	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4225		12/2/2010
11/22/2010	12:49	11/29/2010	13:15	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4252		12/2/2010
11/29/2010	13:15	12/7/2010	12:36	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4542		12/13/2010
12/7/2010	12:36	12/17/2010	13:25	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4745		12/20/2010
12/17/2010	13:25	12/28/2010	13:09	239/73	250/84	11		**ND**	**ND**	**3.92**	**ND**	U5072		12/30/2010
12/28/2010	13:09	1/11/2011	13:28	250/84	264/98	14		**ND**	**ND**	**1.52**	**ND**	U5437	**	1/12/2011
1/11/2011	13:28	1/24/2011	13:08	264/98	277/111	13		**ND**	**ND**	**3.8**	**ND**	U5703	**	1/27/2011
1/24/2011	13:08	2/11/2011	12:46	277/111	295/129	18		**ND**	**ND**	**6.13**	**ND**	U6295	**	2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**5**												
Station Name:		**Bridal Chamber**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	12:46	2/28/2011	13:45	295/129	312/147	17								3/22/2011
2/28/2011	13:45	3/17/2011	13:42	312/147	329/164	17								3/22/2011
3/17/2011	13:42	4/6/2011	14:01	329/164	349/183	20								4/15/2011
4/6/2011	14:01	4/25/2011	14:06	349/183	368/202	19								4/27/2011
4/25/2011	14:06	5/11/2011	9:21	368/202	384/218	16								5/12/2011
5/11/2011	9:21	5/26/2011	14:08	384/218	399/233	15								5/27/2011
5/26/2011	14:08	6/15/2011	14:20	399/233	419/253	20								6/17/2011
6/15/2011	14:20	7/22/2011	13:48	419/253	456/290	37							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		29												
# Dupes Analyzed		0												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		36												
Total # Samples Analyzed:		**29**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**20**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**6**												
Station Name:		**Oscar**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	17:42	4/1/2010	13:26			7		**ND**	**ND**	**ND**	**ND**	T6964		4/5/2010
4/1/2010	13:26	4/9/2010	13:56			8		**ND**	**ND**	**ND**	**ND**	T7190		4/12/2010
4/9/2010	13:56	4/22/2010	12:45			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:45	4/28/2010	14:33	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8112		5/3/2010
4/28/2010	14:33	5/3/2010	13:57	5	10	5		**ND**	**ND**	**ND**	**ND**	T7952		5/3/2010
5/3/2010	13:57	5/9/2010	13:52	10	16	6		**ND**	**ND**	**ND**	**ND**	T8257		5/11/2010
5/9/2010	13:52	5/14/2010	13:21	16	21	5		**ND**	**ND**	**4.76**	**ND**	T8725		5/17/2010
5/14/2010	13:21	5/19/2010	13:37	21	26	5		**ND**	**ND**	**ND**	**ND**	T9147		6/1/2010
5/19/2010	13:37	5/25/2010	14:51	26	32	6		**ND**	**ND**	**ND**	**ND**	T9174		6/1/2010
5/25/2010	14:51	6/1/2010	14:51	32	39	7		**ND**	**ND**	**5.58**	**ND**	T9354		6/7/2010
6/1/2010	14:51	6/7/2010	15:23	39	45	6		**ND**	**ND**	**ND**	**ND**	T9603		6/16/2010
6/7/2010	15:23	6/14/2010	14:38	45	52	7		**ND**	**ND**	**ND**	**ND**	T9630		6/16/2010
6/14/2010	14:38	6/22/2010	14:29	52	60	8		**ND**	**ND**	**5.35**	**ND**	U0539	**	7/13/2010
6/22/2010	14:29	8/5/2010	12:57	60	105	44		**ND**	**ND**	**11.3**	**ND**	U0786		8/9/2010
8/5/2010	12:57	9/2/2010	15:05	105	133	28		**ND**	**ND**	**7.36**	**ND**	U1326		9/8/2010
9/2/2010	15:05	9/22/2010	14:03	133	153	20		**ND**	**ND**	**2.07**	**ND**	U1434		9/27/2010
9/22/2010	14:03	10/4/2010	14:27	153	165	12		**ND**	**ND**	**3.37**	**ND**	U1839	**	10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:27	10/11/2010	15:32	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2016		10/14/2010
10/11/2010	15:32	10/15/2010	13:11	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2574		10/26/2010
10/15/2010	13:11	10/20/2010	13:39	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2602		10/26/2010
10/20/2010	13:39	10/25/2010	14:17	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2629		10/26/2010
10/25/2010	14:17	11/1/2010	14:44	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2906		11/5/2010
11/1/2010	14:44	11/8/2010	13:23	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3231		11/12/2010
11/8/2010	13:23	11/15/2010	13:32	200/34	207/41	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U3559/D		11/19/2010
11/15/2010	13:32	11/22/2010	13:10	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4226		12/2/2010
11/22/2010	13:10	11/29/2010	13:36	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4253		12/2/2010
11/29/2010	13:36	12/7/2010	12:55	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4543		12/13/2010
12/7/2010	12:55	12/17/2010	13:45	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4746		12/20/2010
12/17/2010	13:45	12/28/2010	13:33	239/73	250/84	11		**ND**	**ND**	**2.36**	**ND**	U5073	**	12/30/2010
12/28/2010	13:33	1/11/2011	13:50	250/84	264/98	14		**ND**	**ND**	**1.88**	**ND**	U5438	**	1/12/2011
1/11/2011	13:50	1/24/2011	13:28	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5704		1/27/2011
1/24/2011	13:28	2/11/2011	13:04	277/111	295/129	18		**ND**	**ND**	**7.23**	**ND**	U6296	**	2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **6**

Station Name: **Oscar**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	13:04	2/28/2011	14:04	295/129	312/147	17								3/22/2011
2/28/2011	14:04	3/17/2011	14:04	312/147	329/164	17								3/22/2011
3/17/2011	14:04	4/6/2011	14:23	329/164	349/184	20								4/15/2011
4/6/2011	14:23	4/25/2011	14:25	349/183	368/202	19								4/27/2011
4/25/2011	14:25	5/11/2011	9:43	368/202	384/218	16								5/12/2011
5/11/2011	9:43	5/26/2011	14:26	384/218	399/233	15								5/27/2011
5/26/2011	14:26	6/15/2011	14:38	399/233	419/253	20								6/17/2011
6/15/2011	14:38	8/15/2011	16:35	419/253	480/314	61							**FINAL**	

# BG Samples Collected:	3
# BG Samples Shipped:	2
# BG Samples Analyzed:	2
# Samples Collected:	37
# Samples Shipped:	36
# Samples Analyzed:	29
# Dupes Analyzed	1
Total # Samples Collected:	**40**
Total # Samples Shipped:	38
Total # Samples Analyzed:	**31**
Total # Dupes Analyzed:	1
# Samples FL pos:	0
# Samples EO pos:	0
# Samples RWT pos:	**10**
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		7												
Station Name:		Devil's Kitchen A (1)												
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	17:15	4/1/2010	13:17			7		**ND**	**ND**	**ND**	**ND**	T6965		4/5/2010
4/1/2010	13:17	4/9/2010	13:47			8		**ND**	**ND**	**ND**	**ND**	T7191		4/12/2010
4/9/2010	13:47	4/22/2010	12:35			13								
Dye Trace 1	4/23/10 = Day 0													
4/22/2010	12:35	4/28/2010	14:24	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8113		5/3/2010
4/28/2010	14:24	5/3/2010	13:45	5	10	5	X	**ND/ND**	**ND/ND**	**7.56/ND**	**ND/ND**	T7953/D		5/3/2010
5/3/2010	13:45	5/9/2010	13:35	10	16	6	X	**ND/ND**	**ND/ND**	**18.7/11.8**	**ND/ND**	T8258/D		5/11/2010
5/9/2010	13:35	5/14/2010	13:10	16	21	5		**ND**	**ND**	**17.3**	**ND**	T8726		5/17/2010
5/14/2010	13:10	5/19/2010	13:17	21	26	5		**ND**	**ND**	**12.6**	**ND**	T9148		6/1/2010
5/19/2010	13:17	5/25/2010	14:39	26	32	6		**ND**	**ND**	**11.7**	**ND**	T9175		6/1/2010
5/25/2010	14:39	6/1/2010	14:41	32	39	7		**ND**	**ND**	**15.6**	**ND**	T9355		6/7/2010
6/1/2010	14:41	6/7/2010	15:12	39	45	6		**ND**	**ND**	**11.9**	**ND**	T9604		6/16/2010
6/7/2010	15:12	6/14/2010	14:28	45	52	7		**ND**	**ND**	**17.5**	**ND**	T9631		6/16/2010
6/14/2010	14:28	6/22/2010	14:15	52	60	8		**ND**	**ND**	**7.62**	**ND**	U0541		7/13/2010
6/22/2010	14:15	8/5/2010	12:44	60	105	44		**ND**	**ND**	**15.9**	**ND**	U0787		8/9/2010
8/5/2010	12:44	9/2/2010	14:55	105	133	28		**ND**	**ND**	**11.7**	**ND**	U1327		9/8/2010
9/2/2010	14:55	9/22/2010	13:50	133	153	20		**ND**	**ND**	**6.13**	**ND**	U1435		9/27/2010
9/22/2010	13:50	10/4/2010	14:16	153	165	12		**ND**	**ND**	**6.28**	**ND**	U1841	**	10/11/2010
Dye Trace 2	10/5/10 = Day 0													
10/4/2010	14:16	10/11/2010	15:23	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2017		10/14/2010
10/11/2010	15:23	10/15/2010	13:01	172/6	176/10	4		**ND**	**ND**	**2.2**	**ND**	U2575	**	10/26/2010
10/15/2010	13:01	10/20/2010	13:26	176/10	181/18	5		**ND**	**ND**	**2.19**	**ND**	U2603	**	10/26/2010
10/20/2010	13:26	10/25/2010	14:05	181/18	186/20	5		**ND**	**ND**	**2.64**	**ND**	U2630		10/26/2010
10/25/2010	14:05	11/1/2010	14:33	186/20	193/27	7		**ND**	**ND**	**3.74**	**ND**	U2907		11/5/2010
11/1/2010	14:33	11/8/2010	13:11	193/27	200/34	7		**ND**	**ND**	**2.72**	**ND**	U3232	**	11/12/2010
11/8/2010	13:11	11/15/2010	13:21	200/34	207/41	7		**ND**	**ND**	**4.76**	**ND**	U3561	**	11/19/2010
11/15/2010	13:21	11/22/2010	13:00	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4227		12/2/2010
11/22/2010	13:00	11/29/2010	13:25	214/48	221/55	7		**ND**	**ND**	**3.35**	**ND**	U4254	**	12/2/2010
11/29/2010	13:25	12/7/2010	12:46	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4544		12/13/2010
12/7/2010	12:46	12/17/2010	13:34	229/63	239/73	10		**ND**	**ND**	**3.6**	**ND**	U4747		12/20/2010
12/17/2010	13:34	12/28/2010	13:20	239/73	250/84	11		**ND**	**ND**	**4.25**	**ND**	U5074	**	12/30/2010
12/28/2010	13:20	1/11/2011	13:39	250/84	264/98	14	X	**ND/ND**	**ND/ND**	**2.76/2.83**	**ND/ND**	U5439/D	**/**	1/12/2011
1/11/2011	13:39	1/24/2011	13:15	264/98	277/111	13		**ND**	**ND**	**4.44**	**ND**	U5705		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**7**												
Station Name:		**Devil's Kitchen A (1)**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	13:15	2/11/2011	12:59	277/111	295/129	18		**ND**	**ND**	**5.38**	**ND**	U6297	**	2/17/2011
2/11/2011	12:59	2/28/2011	13:53	295/129	312/147	17								3/22/2011
2/28/2011	13:53	3/17/2011	13:51	312/147	329/164	17								3/22/2011
3/17/2011	13:51	4/6/2011	14:12	329/164	349/183	20								4/15/2011
4/6/2011	14:12	4/25/2011	14:15	349/183	368/202	19								4/27/2011
4/25/2011	14:15	5/11/2011	9:32	368/202	384/218	16								5/12/2011
5/11/2011	9:32	5/26/2011	14:16	384/218	399/233	15								5/27/2011
5/26/2011	14:16	6/15/2011	14:28	399/233	419/253	20								6/17/2011
6/15/2011	14:28	8/15/2011	14:23	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		29												
# Dupes Analyzed		3												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**31**												
Total # Dupes Analyzed:		3												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**25**	**+2**	**Dupes**										
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		9												
Station Name:		Ladies Parlor												
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	17:18	4/1/2010	13:13			7		ND	ND	ND	ND	T6966		4/5/2010
4/1/2010	13:13	4/9/2010	13:43			8		ND	ND	ND	ND	T7192		4/12/2010
4/9/2010	13:43	4/22/2010	12:30			13								
Dye Trace 1	4/23/10 = Day 0													
4/22/2010	12:30	4/28/2010	14:18	-1	5	5+1		ND	ND	ND	ND	T8114		5/3/2010
4/28/2010	14:18	5/3/2010	13:40	5	10	5	X	ND/ND	ND/ND	6.69/ND	ND/ND	T7954/D	**/	5/3/2010
5/3/2010	13:40	5/9/2010	13:28	10	16	6	X	ND/ND	ND/ND	12.2/13.9	ND/ND	T8259/D		5/11/2010
5/9/2010	13:28	5/14/2010	13:07	16	21	5		ND	ND	12.8	ND	T8727		5/17/2010
5/14/2010	13:07	5/19/2010	13:17	21	26	5		ND	ND	8.15	ND	T9149		6/1/2010
5/19/2010	13:17	5/25/2010	14:36	26	32	6		ND	ND	9.89	ND	T9176		6/1/2010
5/25/2010	14:36	6/1/2010	14:38	32	39	7		ND	ND	16.9	ND	T9356		6/7/2010
6/1/2010	14:38	6/7/2010	15:08	39	45	6		ND	ND	9.54	ND	T9605		6/16/2010
6/7/2010	15:08	6/14/2010	14:24	45	52	7		ND	ND	6.71	ND	T9632		6/16/2010
6/14/2010	14:24	6/22/2010	14:12	52	60	8		ND	ND	9.74	ND	U0542		7/13/2010
6/22/2010	14:12	8/5/2010	12:37	60	105	44		ND	ND	21.7	ND	U0788		8/9/2010
8/5/2010	12:37	9/2/2010	14:48	105	133	28		ND	ND	15.6	ND	U1328		9/8/2010
9/2/2010	14:48	9/22/2010	13:45	133	153	20		ND	ND	6.33	ND	U1436		9/27/2010
9/22/2010	13:45	10/4/2010	14:11	153	165	12		ND	ND	2.85	ND	U1842	**	10/11/2010
Dye Trace 2	10/5/10 = Day 0													
10/4/2010	14:11	10/11/2010	15:20	165/-1	172/6	7		ND	ND	3.56	ND	U2018		10/14/2010
10/11/2010	15:20	10/15/2010	12:55	172/6	176/10	4		ND	ND	2.44	ND	U2576		10/26/2010
10/15/2010	12:55	10/20/2010	13:22	176/10	181/18	5		ND	ND	3.19	ND	U2604	**	10/26/2010
10/20/2010	13:22	10/25/2010	13:56	181/18	186/20	5		ND	ND	ND	ND	U2631		10/26/2010
10/25/2010	13:56	11/1/2010	14:28	186/20	193/27	7		ND	ND	2.56	ND	U2908	**	11/5/2010
11/1/2010	14:28	11/8/2010	13:06	193/27	200/34	7		ND	ND	2.66	ND	U3233	**	11/12/2010
11/8/2010	13:06	11/15/2010	13:16	200/34	207/41	7		ND	ND	2.21	ND	U3562	**	11/19/2010
11/15/2010	13:16	11/22/2010	12:54	207/41	214/48	7		ND	ND	ND	ND	U4228		12/2/2010
11/22/2010	12:54	11/29/2010	13:19	214/48	221/55	7		ND	ND	ND	ND	U4255		12/2/2010
11/29/2010	13:19	12/7/2010	12:42	221/55	229/63	8		ND	ND	3.03	ND	U4545		12/13/2010
12/7/2010	12:42	12/17/2010	13:30	229/63	239/73	10		ND	ND	2.55	ND	U4748	**	12/20/2010
12/17/2010	13:30	12/28/2010	13:15	239/73	250/84	11		ND	ND	4.16	ND	U5075		12/30/2010
12/28/2010	13:15	1/11/2011	13:34	250/84	264/98	14		ND	ND	3.58	ND	U5441	**	1/12/2011
1/11/2011	13:34	1/24/2011	13:11	264/98	277/111	13		ND	ND	6.06	ND	U5706		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**9**												
Station Name:		**Ladies Parlor**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	13:11	2/11/2011	12:51	277/111	295/129	18		**ND**	**ND**	**10.4**	**ND**	U6298		2/17/2011
2/11/2011	12:51	2/28/2011	13:48	295/129	312/147	17								3/22/2011
2/28/2011	13:48	3/17/2011	13:47	312/147	329/164	17		**ND**	**ND**	**3.62**	**ND**	U7446	**	3/22/2011
3/17/2011	13:47	4/6/2011	14:07	329/164	349/183	20		**ND**	**ND**	**4.06**	**ND**	U8177	**	4/15/2011
4/6/2011	14:07	4/25/2011	14:10	349/183	368/202	19		**ND**	**ND**	**3.66**	**ND**	U8608	**	4/27/2011
4/25/2011	14:10	5/11/2011	9:26	368/202	384/218	16		**ND**	**ND**	**3.23**	**ND**	U9851	**	5/12/2011
5/11/2011	9:26	5/26/2011	14:12	384/218	399/233	15		**ND**	**ND**	**2.70**	**ND**	V0332	**	5/27/2011
5/26/2011	14:12	6/15/2011	14:25	399/233	419/253	20		**ND**	**ND**	**1.19**	**ND**	V0750	**	6/17/2011
6/15/2011	14:25	7/22/2011	13:52	419/253	456/290	37		**ND**	**ND**	**4.85**	**ND**	V1417	**	7/26/2011
7/22/2011	13:52	8/15/2011	14:20	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1730		8/16/2011
8/15/2011	14:20	9/14/2011	14:58	480/314	510/344	30		**ND**	**ND**	**4.3**	**ND**	V2053	**FINAL/****	9/15/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		39												
# Samples Shipped:		39												
# Samples Analyzed:		38												
# Dupes Analyzed		2												
Total # Samples Collected:		**42**												
Total # Samples Shipped:		41												
Total # Samples Analyzed:		**40**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**33**	**+1**	**Dupes**										
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 10

Station Name: Alligator Hole

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	17:09	4/1/2010	13:24			7		ND	ND	ND	ND	T6967		4/5/2010
4/1/2010	13:24	4/9/2010	13:52			8		ND	ND	ND	ND	T7193		4/12/2010
4/9/2010	13:52	4/22/2010	12:39			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:39	4/28/2010	14:28	-1	5	5+1		ND	ND	ND	ND	T8115		5/3/2010
4/28/2010	14:28	5/3/2010	13:50	5	10	5		ND	ND	ND	ND	T7955		5/3/2010
5/3/2010	13:50	5/9/2010	13:44	10	16	6		ND	ND	ND	ND	T8261		5/11/2010
5/9/2010	13:44	5/14/2010	13:10	16	21	5		ND	ND	8.14	ND	T8728		5/17/2010
5/14/2010	13:10	5/19/2010	13:26	21	26	5		ND	ND	4.76	ND	T9150		6/1/2010
5/19/2010	13:26	5/25/2010	14:46	26	32	6		ND	ND	5.76	ND	T9177		6/1/2010
5/25/2010	14:46	6/1/2010	14:46	32	39	7		ND	ND	3.85	ND	T9357		6/7/2010
6/1/2010	14:46	6/7/2010	15:17	39	45	6		ND	ND	5.19	ND	T9606		6/16/2010
6/7/2010	15:17	6/14/2010	14:33	45	52	7		ND	ND	9.65	ND	T9633		6/16/2010
6/14/2010	14:33	6/22/2010	14:21	52	60	8		ND	ND	7.84	ND	U0543		7/13/2010
6/22/2010	14:21	8/5/2010	12:49	60	105	44		ND	ND	10.4	ND	U0789		8/9/2010
8/5/2010	12:49	9/2/2010	14:59	105	133	28		ND	ND	10.6	ND	U1329		9/8/2010
9/2/2010	14:59	9/22/2010	13:56	133	153	20		ND	ND	6.08	ND	U1437		9/27/2010
9/22/2010	13:56	10/4/2010	14:22	153	165	12		ND	ND	2.82	ND	U1843		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:22	10/11/2010	15:28	165/-1	172/6	7	X	ND/ND	ND/ND	ND/ND	ND/ND	U2019/D		10/14/2010
10/11/2010	15:28	10/15/2010	13:07	172/6	176/10	4		ND	ND	ND	ND	U2577		10/26/2010
10/15/2010	13:07	10/20/2010	13:33	176/10	181/18	5		ND	ND	ND	ND	U2605		10/26/2010
10/20/2010	13:33	10/25/2010	14:11	181/18	186/20	5		ND	ND	ND	ND	U2632		10/26/2010
10/25/2010	14:11	11/1/2010	14:38	186/20	193/27	7		ND	ND	1.96	ND	U2909	**	11/5/2010
11/1/2010	14:38	11/8/2010	13:17	193/27	200/34	7		ND	ND	ND	ND	U3234		11/12/2010
11/8/2010	13:17	11/15/2010	13:26	200/34	207/41	7		ND	ND	ND	ND	U3563		11/19/2010
11/15/2010	13:26	11/22/2010	13:05	207/41	214/48	7		ND	ND	ND	ND	U4229		12/2/2010
11/22/2010	13:05	11/29/2010	13:31	214/48	221/55	7		ND	ND	ND	ND	U4256		12/2/2010
11/29/2010	13:31	12/7/2010	12:50	221/55	229/63	8		ND	ND	ND	ND	U4546		12/13/2010
12/7/2010	12:50	12/17/2010	13:39	229/63	239/73	10		ND	ND	2.7	ND	U4749	**	12/20/2010
12/17/2010	13:39	12/28/2010	13:25	239/73	250/84	11		ND	ND	3.38	ND	U5076		12/30/2010
12/28/2010	13:25	1/11/2011	13:44	250/84	264/98	14		ND	ND	1.95	ND	U5442	**	1/12/2011
1/11/2011	13:44	1/24/2011	13:20	264/98	277/111	13		ND	ND	3.38	ND	U5707		1/27/2011
1/24/2011	13:20	2/11/2011	12:54	277/111	295/129	18	X	ND/ND	ND/ND	ND/ND	ND/ND	U6299/D		2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**10**												
Station Name:		**Alligator Hole**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	12:54	2/28/2011	13:59	295/129	312/147	17								3/22/2011
2/28/2011	13:59	3/17/2011	13:57	312/147	329/164	17		**ND**	**ND**	**2.4**	**ND**	U7447	**	3/22/2011
3/17/2011	13:57	4/6/2011	14:17	329/164	349/183	20		**ND**	**ND**	**3.84**	**ND**	U8178	**	4/15/2011
4/6/2011	14:17	4/25/2011	14:19	349/183	368/202	19		**ND**	**ND**	**4.75**	**ND**	U8609	**	4/27/2011
4/25/2011	14:19	5/11/2011	9:37	368/202	384/218	16		**ND**	**ND**	**2.90**	**ND**	U9852	**	5/12/2011
5/11/2011	9:37	5/26/2011	14:21	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0333	**	5/27/2011
5/26/2011	14:21	6/15/2011	14:33	399/233	419/253	20		**ND**	**ND**	**1.84**	**ND**	V0751	**	6/17/2011
6/15/2011	14:33	8/15/2011	14:25	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		2												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**37**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**21**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**11**												
Station Name:		**Mastodon Bone**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	16:58	4/1/2010	13:31			7		**ND**	**ND**	**ND**	**ND**	T6968		4/5/2010
4/1/2010	13:31	4/9/2010	14:00			8		**ND**	**ND**	**ND**	**ND**	T7194		4/12/2010
4/9/2010	14:00	4/22/2010	12:56			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	12:56	4/28/2010	14:38	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8116		5/3/2010
4/28/2010	14:38	5/3/2010	14:05	5	10	5		**ND**	**ND**	**ND**	**ND**	T7956		5/3/2010
5/3/2010	14:05	5/9/2010	14:01	10	16	6		**ND**	**ND**	**ND**	**ND**	T8262		5/11/2010
5/9/2010	14:01	5/14/2010	13:29	16	21	5		**ND**	**ND**	**ND**	**ND**	T8729		5/17/2010
5/14/2010	13:29	5/19/2010	13:44	21	26	5		**ND**	**ND**	**ND**	**ND**	T9151		6/1/2010
5/19/2010	13:44	5/25/2010	14:56	26	32	6		**ND**	**ND**	**ND**	**ND**	T9178		6/1/2010
5/25/2010	14:56	6/1/2010	14:54	32	39	7		**ND**	**ND**	**3.85**	**ND**	T9358	*	6/7/2010
6/1/2010	14:54	6/7/2010	15:26	39	45	6		**ND**	**ND**	**ND**	**ND**	T9607		6/16/2010
6/7/2010	15:26	6/14/2010	14:43	45	52	7		**ND**	**ND**	**3.12**	**ND**	T9634	*	6/16/2010
6/14/2010	14:43	6/22/2010	14:33	52	60	8		**ND**	**ND**	**ND**	**ND**	U0544		7/13/2010
6/22/2010	14:33	8/5/2010	13:08	60	105	44		**ND**	**ND**	**3.15**	**ND**	U0790	*	8/9/2010
8/5/2010	13:08	9/2/2010	15:12	105	133	28		**ND**	**ND**	**ND**	**ND**	U1330		9/8/2010
9/2/2010	15:12	9/22/2010	14:09	133	153	20		**ND**	**ND**	**ND**	**ND**	U1438		9/27/2010
9/22/2010	14:09	10/4/2010	14:34	153	165	12		**ND**	**ND**	**ND**	**ND**	U1844		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:34	10/11/2010	15:36	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2021		10/14/2010
10/11/2010	15:36	10/15/2010	13:16	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2578		10/26/2010
10/15/2010	13:16	10/20/2010	13:44	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2606		10/26/2010
10/20/2010	13:44	10/25/2010	14:23	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2633		10/26/2010
10/25/2010	14:23	11/1/2010	14:48	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2910		11/5/2010
11/1/2010	14:48	11/8/2010	13:27	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3235		11/12/2010
11/8/2010	13:27	11/15/2010	13:37	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3564		11/19/2010
11/15/2010	13:37	11/22/2010	13:18	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4230		12/2/2010
11/22/2010	13:18	11/29/2010	13:42	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4257		12/2/2010
11/29/2010	13:42	12/7/2010	13:00	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4547		12/13/2010
12/7/2010	13:00	12/17/2010	13:49	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4750		12/20/2010
12/17/2010	13:49	12/28/2010	13:38	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5077		12/30/2010
12/28/2010	13:38	1/11/2011	13:56	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5443		1/12/2011
1/11/2011	13:56	1/24/2011	13:34	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5708		1/27/2011
1/24/2011	13:34	2/11/2011	13:08	277/111	295/129	18		**ND**	**ND**	**3.92**	**ND**	U6301	*	2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**11**												
Station Name:		**Mastodon Bone**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	13:08	2/28/2011	14:07	295/129	312/147	17								3/22/2011
2/28/2011	14:07	3/17/2011	14:10	312/147	329/164	17								3/22/2011
3/17/2011	14:10	4/6/2011	14:28	329/164	349/183	20								4/15/2011
4/6/2011	14:28	4/25/2011	14:29	349/183	368/202	19								4/27/2011
4/25/2011	14:29	5/11/2011	9:49	368/202	384/218	16								5/12/2011
5/11/2011	9:49	5/26/2011	14:31	384/218	399/233	15								5/27/2011
5/26/2011	14:31	6/15/2011	14:43	399/233	419/253	20								6/17/2011
6/15/2011	14:43	8/15/2011	16:38	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		29												
# Samples Analyzed:		29												
# Dupes Analyzed		0												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		31												
Total # Samples Analyzed:		**31**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**4**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**12**												
Station Name:		**Geyser**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	16:51	4/1/2010	13:39			7		ND	ND	ND	ND	T6969		4/5/2010
4/1/2010	13:39	4/9/2010	14:04			8		ND	ND	ND	ND	T7195		4/12/2010
4/9/2010	14:04	4/22/2010	13:02			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:02	4/28/2010	14:41	-1	5	5+1		ND	ND	ND	ND	T8117		5/3/2010
4/28/2010	14:41	5/3/2010	14:10	5	10	5		ND	ND	ND	ND	T7957		5/3/2010
5/3/2010	14:10	5/9/2010	14:08	10	16	6		ND	ND	ND	ND	T8263		5/11/2010
5/9/2010	14:08	5/14/2010	13:33	16	21	5		ND	ND	5.91	ND	T8730	**	5/17/2010
5/14/2010	13:33	5/19/2010	13:55	21	26	5		ND	ND	4.28	ND	T9152		6/1/2010
5/19/2010	13:55	5/25/2010	15:00	26	32	6	X	ND/ND	ND/ND	5.79/3.65	ND/ND	T9179/D	/**	6/1/2010
5/25/2010	15:00	6/1/2010	14:58	32	39	7	X	ND/ND	ND/ND	7.41/5.86	ND/ND	T9359/D		6/7/2010
6/1/2010	14:58	6/7/2010	15:31	39	45	6		ND	ND	4.06	ND	T9608		6/16/2010
6/7/2010	15:31	6/14/2010	14:47	45	52	7		ND	ND	6.24	ND	T9635		6/16/2010
6/14/2010	14:47	6/22/2010	14:37	52	60	8		ND	ND	3.76	ND	U0545		7/13/2010
6/22/2010	14:37	8/5/2010	13:15	60	105	44		ND	ND	6.09	ND	U0791		8/9/2010
8/5/2010	13:15	9/2/2010	15:17	105	133	28		ND	ND	3.92	ND	U1331		9/8/2010
9/2/2010	15:17	9/22/2010	14:16	133	153	20		ND	ND	5.23/6.89	ND	U1439/D	/**	9/27/2010
9/22/2010	14:16	10/4/2010	14:39	153	165	12		ND	ND	ND	ND	U1845		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:39	10/11/2010	15:40	165/-1	172/6	7		ND	ND	ND	ND	U2022		10/14/2010
10/11/2010	15:40	10/15/2010	13:20	172/6	176/10	4	X	ND/ND	ND/ND	ND/ND	ND/ND	U2579/D		10/26/2010
10/15/2010	13:20	10/20/2010	13:49	176/10	181/18	5		ND	ND	ND	ND	U2607		10/26/2010
10/20/2010	13:49	10/25/2010	14:27	181/18	186/20	5		ND	ND	ND	ND	U2634		10/26/2010
10/25/2010	14:27	11/1/2010	14:53	186/20	193/27	7		ND	ND	ND	ND	U2911		11/5/2010
11/1/2010	14:53	11/8/2010	13:33	193/27	200/34	7		ND	ND	ND	ND	U3236		11/12/2010
11/8/2010	13:33	11/15/2010	13:43	200/34	207/41	7		ND	ND	ND	ND	U3565		11/19/2010
11/15/2010	13:43	11/22/2010	13:23	207/41	214/48	7		ND	ND	ND	ND	U4231		12/2/2010
11/22/2010	13:23	11/29/2010	13:46	214/48	221/55	7		ND	ND	ND	ND	U4258		12/2/2010
11/29/2010	13:46	12/7/2010	13:05	221/55	229/63	8		ND	ND	ND	ND	U4548		12/13/2010
12/7/2010	13:05	12/17/2010	13:54	229/63	239/73	10		ND	ND	ND	ND	U4751		12/20/2010
12/17/2010	13:54	12/28/2010	13:43	239/73	250/84	11		ND	ND	ND	ND	U5078		12/30/2010
12/28/2010	13:43	1/11/2011	14:00	250/84	264/98	14		ND	ND	ND	ND	U5444		1/12/2011
1/11/2011	14:00	1/24/2011	13:38	264/98	277/111	13		ND	ND	ND	ND	U5709		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 12

Station Name: Geyser

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	13:38	2/11/2011	13:12	277/111	295/129	18		**ND**	**ND**	**7.25**	**ND**	U6302	**	2/17/2011
2/11/2011	13:12	2/28/2011	14:12	295/129	312/147	17								3/22/2011
2/28/2011	14:12	3/17/2011	14:15	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7448		3/22/2011
3/17/2011	14:15	4/6/2011	14:33	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8179		4/15/2011
4/6/2011	14:33	4/25/2011	14:35	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8610		4/27/2011
4/25/2011	14:35	5/11/2011	9:52	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9853		5/12/2011
5/11/2011	9:52	5/26/2011	14:38	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0334		5/27/2011
5/26/2011	14:38	6/15/2011	14:47	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0752		6/17/2011
6/15/2011	14:47	8/15/2011	16:40	419/253	480/314	61							**FINAL**	

# BG Samples Collected:	3		
# BG Samples Shipped:	2		
# BG Samples Analyzed:	2		
# Samples Collected:	37		
# Samples Shipped:	36		
# Samples Analyzed:	35		
# Dupes Analyzed	3		
Total # Samples Collected:	40		
Total # Samples Shipped:	38		
Total # Samples Analyzed:	37		
Total # Dupes Analyzed:	3		
# Samples FL pos:	0		
# Samples EO pos:	0		
# Samples RWT pos:	**11**	**+2**	**Dupes**
# Samples SRB pos:	0		

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		13												
Station Name:		Blue Grotto												
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	16:45	4/1/2010	13:43			7		ND	ND	ND	ND	T6970		4/5/2010
4/1/2010	13:43	4/9/2010	14:09			8		ND	ND	ND	ND	T7196		4/12/2010
4/9/2010	14:09	4/22/2010	13:06			13								
Dye Trace 1	4/23/10 = Day 0													
4/22/2010	13:06	4/28/2010	14:46	-1	5	5+1		ND	ND	ND	ND	T8118		5/3/2010
4/28/2010	14:46	5/3/2010	14:20	5	10	5		ND	ND	ND	ND	T7958		5/3/2010
5/3/2010	14:20	5/9/2010	14:17	10	16	6		ND	ND	ND	ND	T8264		5/11/2010
5/9/2010	14:17	5/14/2010	13:38	16	21	5		ND	ND	6.79	ND	T8731	*	5/17/2010
5/14/2010	13:38	5/19/2010	14:06	21	26	5		ND	ND	ND	ND	T9153		6/1/2010
5/19/2010	14:06	5/25/2010	15:04	26	32	6		ND	ND	2.96	ND	T9181	*	6/1/2010
5/25/2010	15:04	6/1/2010	15:02	32	39	7		ND	ND	ND	ND	T9361		6/7/2010
6/1/2010	15:02	6/7/2010	15:36	39	45	6		ND	ND	ND	ND	T9609		6/16/2010
6/7/2010	15:36	6/14/2010	14:52	45	52	7		ND	ND	4.58	ND	T9636	*	6/16/2010
6/14/2010	14:52	6/22/2010	14:43	52	60	8		ND	ND	3.09	ND	U0546	*	7/13/2010
6/22/2010	14:43	8/5/2010	13:21	60	105	44		ND	ND	2.78	ND	U0792	*	8/9/2010
8/5/2010	13:21	9/2/2010	15:23	105	133	28		ND	ND	3.36	ND	U1332	*	9/8/2010
9/2/2010	15:23	9/22/2010	14:23	133	153	20		ND	ND	5.77	ND	U1441	*	9/27/2010
9/22/2010	14:23	10/4/2010	14:46	153	165	12		ND	ND	ND	ND	U1846		10/11/2010
Dye Trace 2	10/5/10 = Day 0													
10/4/2010	14:46	10/11/2010	15;44	165/-1	172/6	7		ND	ND	ND	ND	U2023		10/14/2010
10/11/2010	15:44	10/15/2010	13:25	172/6	176/10	4		ND	ND	ND	ND	U2581		10/26/2010
10/15/2010	13:25	10/20/2010	13:54	176/10	181/18	5		ND	ND	ND	ND	U2608		10/26/2010
10/20/2010	13:54	10/25/2010	14:32	181/18	186/20	5		ND	ND	ND	ND	U2635		10/26/2010
10/25/2010	14:32	11/1/2010	14:58	186/20	193/27	7		ND	ND	2.26	ND	U2912	*	11/5/2010
11/1/2010	14:58	11/8/2010	13:37	193/27	200/34	7		ND	ND	ND	ND	U3237		11/12/2010
11/8/2010	13:37	11/15/2010	13:49	200/34	207/41	7		ND	ND	ND	ND	U3566		11/19/2010
11/15/2010	13:49	11/22/2010	13:28	207/41	214/48	7		ND	ND	ND	ND	U4232		12/2/2010
11/22/2010	13:28	11/29/2010	13:53	214/48	221/55	7	X	ND/ND	ND/ND	ND/ND	ND/ND	U4259/D		12/2/2010
11/29/2010	13:53	12/7/2010	13:09	221/55	229/63	8		ND	ND	ND	ND	U4549		12/13/2010
12/7/2010	13:09	12/17/2010	14:00	229/63	239/73	10		ND	ND	2.01	ND	U4752	*	12/20/2010
12/17/2010	14:00	12/28/2010	13:47	239/73	250/84	11		ND	ND	2.71	ND	U5709	*	12/30/2010
12/28/2010	13:47	1/11/2011	14:04	250/84	264/98	14		ND	ND	1.98	ND	U5445	*	1/12/2011
1/11/2011	14:04	1/24/2011	13:43	264/98	277/111	13		ND	ND	4.68	ND	U5710	*	1/27/2011
1/24/2011	13:43	2/11/2011	13:15	277/111	295/129	18		ND	ND	6.48	ND	U6303	*	2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**13**												
Station Name:		**Blue Grotto**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	13:15	2/28/2011	14:16	295/129	312/147	17								3/22/2011
2/28/2011	14:16	4/6/2011	14:38	312/147	349/183	37		**ND**	**ND**	**3.98**	**ND**	U8181	*	4/15/2011
4/6/2011	14:38	4/25/2011	14:38	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8611		4/27/2011
4/25/2011	14:38	5/11/2011	9:57	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9854		5/12/2011
5/11/2011	9:57	5/26/2011	14:43	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0335		5/27/2011
5/26/2011	14:43	6/15/2011	14:51	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0753		6/17/2011
6/15/2011	14:51	7/22/2011	14:01	419/253	456/290	37		**ND**	**ND**	**ND**	**ND**	V1418		7/26/2011
7/22/2011	14:01	8/15/2011	15:38	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1731		8/16/2011
8/15/2011	15:38	9/14/2011	15:38	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2054	**FINAL**	9/15/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		39												
# Samples Shipped:		39												
# Samples Analyzed:		38												
# Dupes Analyzed		1												
Total # Samples Collected:		**42**												
Total # Samples Shipped:		41												
Total # Samples Analyzed:		**40**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**14**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 14

Station Name: Christmas Tree

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Pre-Background														
1/11/2010	17:00	1/18/2010	14:23			**7**		**ND**	**ND**	**ND**	**ND**	T5119		2/2/2010
1/18/2010	14:23	1/26/2010	14:14			**8**		**ND**	**ND**	**ND**	**ND**	T5127		2/2/2010
1/26/2010	14:14	2/1/2010	15:15			**6**		**ND**	**ND**	**ND**	**ND**	T5134		2/2/2010
2/1/2010	15:15	2/9/2010	15:01			**8**		**ND**	**ND**	**ND**	**ND**	T5419		2/10/2010
2/9/2010	15:01	3/25/2010	16:39											
Comprehensive Background														
3/25/2010	16:39	4/1/2010	13:52			7		**ND**	**ND**	**ND**	**ND**	T6971		4/5/2010
4/1/2010	13:52	4/9/2010	14:16			8		**ND**	**ND**	**ND**	**ND**	T7197		4/12/2010
4/9/2010	14:16	4/22/2010	13:16			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:16	4/28/2010	14:53	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8119		5/3/2010
4/28/2010	14:53	5/3/2010	14:28	5	10	5		**ND**	**ND**	**ND**	**ND**	T7959		5/3/2010
5/3/2010	14:28	5/9/2010	14:25	10	16	6		**ND**	**ND**	**ND**	**ND**	T8265		5/11/2010
5/9/2010	14:25	5/14/2010	13:45	16	21	5		**ND**	**ND**	**ND**	**ND**	T8732		5/17/2010
5/14/2010	13:45	5/19/2010	14:15	21	26	5		**ND**	**ND**	**ND**	**ND**	T9154		6/1/2010
5/19/2010	14:15	5/25/2010	15:13	26	32	6		**ND**	**ND**	**ND**	**ND**	T9182		6/1/2010
5/25/2010	15:13	6/1/2010	15:09	32	39	7		**ND**	**ND**	**ND**	**ND**	T9362		6/7/2010
6/1/2010	15:09	6/7/2010	15:42	39	45	6		**ND**	**ND**	**ND**	**ND**	T9610		6/16/2010
6/7/2010	15:42	6/14/2010	14:56	45	52	7		**ND**	**ND**	**ND**	**ND**	T9637		6/16/2010
6/14/2010	14:56	6/22/2010	14:47	52	60	8		**ND**	**ND**	**ND**	**ND**	U0547		7/13/2010
6/22/2010	14:47	8/5/2010	13:34	60	105	44				Packets missing, pins had corroded away				8/9/2010
8/5/2010	13:34	9/2/2010	15:29	105	133	28		**ND**	**ND**	**ND**	**ND**	U1333		9/8/2010
9/2/2010	15:29	9/22/2010	14:32	133	153	20		**ND**	**ND**	**ND**	**ND**	U1442		9/27/2010
9/22/2010	14:32	10/4/2010	14:53	153	165	12		**ND**	**ND**	**ND**	**ND**	U1847		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	14:53	10/11/2010	15:50	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2024		10/14/2010
10/11/2010	15:50	10/15/2010	13:35	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2582		10/26/2010
10/15/2010	13:35	10/20/2010	14:02	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2609		10/26/2010
10/20/2010	14:02	10/25/2010	14:41	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2636		10/26/2010
10/25/2010	14:41	11/1/2010	15:06	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2913		11/5/2010
11/1/2010	15:06	11/8/2010	13:44	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3238		11/12/2010
11/8/2010	13:44	11/15/2010	13:56	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3567		11/19/2010
11/15/2010	13:56	11/22/2010	13:33	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4233		12/2/2010
11/22/2010	13:33	11/29/2010	14:02	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4261		12/2/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**14**												
Station Name:		**Christmas Tree**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
11/29/2010	14:02	12/7/2010	13:15	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4550		12/13/2010
12/7/2010	13:15	12/17/2010	14:07	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4753		12/20/2010
12/17/2010	14:07	12/28/2010	13:55	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5081		12/30/2010
12/28/2010	13:55	1/11/2011	14:13	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5446		1/12/2011
1/11/2011	14:13	1/24/2011	13:49	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5711		1/27/2011
1/24/2011	13:49	2/11/2011	13:21	277/111	295/129	18		**ND**	**ND**	**3.64**	**ND**	U6304	*	2/17/2011
2/11/2011	13:21	2/28/2011	14:22	295/129	312/147	17								3/22/2011
2/28/2011	14:22	3/17/2011	14:25	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7449		3/22/2011
3/17/2011	14:25	4/6/2011	14:45	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8182		4/15/2011
4/6/2011	14:45	4/25/2011	14:45	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8612		4/27/2011
4/25/2011	14:45	5/11/2011	10:03	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9855		5/12/2011
5/11/2011	10:03	5/26/2011	14:50	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0336		5/27/2011
5/26/2011	14:50	6/15/2011	14:56	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0754		6/17/2011
6/15/2011	14:56	7/22/2011	14:07	419/253	456/290	37		**ND**	**ND**	**ND**	**ND**	V1419		7/26/2011
7/22/2011	14:07	8/15/2011	15:31	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1732		8/16/2011
8/15/2011	15:31	9/14/2011	15:04	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2055	**FINAL**	9/15/2011
# BG Samples Collected:		8												
# BG Samples Shipped:		6												
# BG Samples Analyzed:		6												
# Samples Collected:		38												
# Samples Shipped:		38												
# Samples Analyzed:		37												
# Dupes Analyzed		0												
Total # Samples Collected:		**46**												
Total # Samples Shipped:		44												
Total # Samples Analyzed:		**43**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**1**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**15**												
Station Name:		**Garden of Eden**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	16:22	4/1/2010	14:03			7		**ND**	**ND**	**ND**	**ND**	T6972		4/5/2010
4/1/2010	14:03	4/9/2010	14:20			8		**ND**	**ND**	**ND**	**ND**	T7198		4/12/2010
4/9/2010	14:20	4/22/2010	13:23			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:23	4/28/2010	14:57	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8121		5/3/2010
4/28/2010	14:57	5/3/2010	14:33	5	10	5		**ND**	**ND**	**ND**	**ND**	T7961		5/3/2010
5/3/2010	14:33	5/9/2010	14:36	10	16	6		**ND**	**ND**	**ND**	**ND**	T8266		5/11/2010
5/9/2010	14:36	5/14/2010	13:50	16	21	5		**ND**	**ND**	**ND**	**ND**	T8733		5/17/2010
5/14/2010	13:50	5/19/2010	14:27	21	26	5		**ND**	**ND**	**ND**	**ND**	T9155		6/1/2010
5/19/2010	14:27	5/25/2010	15:18	26	32	6		**ND**	**ND**	**ND**	**ND**	T9183		6/1/2010
5/25/2010	15:18	6/1/2010	15:15	32	39	7		**ND**	**ND**	**ND**	**ND**	T9363		6/7/2010
6/1/2010	15:15	6/7/2010	15:48	39	45	6		**ND**	**ND**	**ND**	**ND**	T9611		6/16/2010
6/7/2010	15:48	6/14/2010	15:03	45	52	7		**ND**	**ND**	**ND**	**ND**	T9638		6/16/2010
6/14/2010	15:03	6/22/2010	14:53	52	60	8		**ND**	**ND**	**ND**	**ND**	U0548		7/13/2010
6/22/2010	14:53	8/5/2010	13:47	60	105	44		**ND**	**ND**	**ND**	**ND**	U0793		8/9/2010
8/5/2010	13:47	9/2/2010	15:37	105	133	28		**ND**	**ND**	**ND**	**ND**	U1334		9/8/2010
9/2/2010	15:37	9/22/2010	14:39	133	153	20		**ND**	**ND**	**ND**	**ND**	U1443		9/27/2010
9/22/2010	14:39	10/4/2010	15:01	153	165	12		**ND**	**ND**	**ND**	**ND**	U1848		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:01	10/11/2010	15:56	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2025		10/14/2010
10/11/2010	15:56	10/15/2010	13:42	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2583		10/26/2010
10/15/2010	13:42	10/20/2010	14:09	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2610		10/26/2010
10/20/2010	14:09	10/25/2010	14:47	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2637		10/26/2010
10/25/2010	14:47	11/1/2010	15:13	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2914		11/5/2010
11/1/2010	15:13	11/8/2010	13:56	193/27	200/34	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U3239/D		11/12/2010
11/8/2010	13:56	11/15/2010	14:03	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3568		11/19/2010
11/15/2010	14:03	11/22/2010	13:39	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4234		12/2/2010
11/22/2010	13:39	11/29/2010	14:11	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4262		12/2/2010
11/29/2010	14:11	12/7/2010	13:23	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4551		12/13/2010
12/7/2010	13:23	12/17/2010	14:13	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4754		12/20/2010
12/17/2010	14:13	12/28/2010	14:00	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5082		12/30/2010
12/28/2010	14:00	1/11/2011	14:20	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5447		1/12/2011
1/11/2011	14:20	1/24/2011	13:55	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5712		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**15**												
Station Name:		**Garden of Eden**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	13:55	2/11/2011	13:26	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6305		2/17/2011
2/11/2011	13:26	2/28/2011	14:29	295/129	312/147	17								3/22/2011
2/28/2011	14:29	3/17/2011	14:31	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7450		3/22/2011
3/17/2011	14:31	4/6/2011	14:51	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8183		4/15/2011
4/6/2011	14:51	4/25/2011	14:52	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8613		4/27/2011
4/25/2011	14:52	5/11/2011	10:08	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9856		5/12/2011
5/11/2011	10:08	5/26/2011	14:57	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0337		5/27/2011
5/26/2011	14:57	6/15/2011	15:01	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0755		6/17/2011
6/15/2011	15:01	8/15/2011	14:35	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		1												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**37**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 1 of 2
Station Number:		**16**													
Station Name:		**Log**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**	
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**	
Comprehensive Background															
3/25/2010	16:29	4/1/2010	14:08			7		**ND**	**ND**	**ND**	**ND**	T6973		4/5/2010	
4/1/2010	14:08	4/9/2010	14:17			8	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	T7199/D		4/12/2010	
4/9/2010	14:17	4/22/2010	13:24			13									
Dye Trace 1	**4/23/10 = Day 0**														
4/22/2010	13:24	4/28/2010	14:59	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8122		5/3/2010	
4/28/2010	14:59	5/3/2010	14:34	5	10	5		**ND**	**ND**	**ND**	**ND**	T7962		5/3/2010	
5/3/2010	14:34	5/9/2010	14:39	10	16	6		**ND**	**ND**	**ND**	**ND**	T8267		5/11/2010	
5/9/2010	14:39	5/14/2010	13:49	16	21	5		**ND**	**ND**	**ND**	**ND**	T8734		5/17/2010	
5/14/2010	13:49	5/19/2010	14:25	21	26	5		**ND**	**ND**	**ND**	**ND**	T9156		6/1/2010	
5/19/2010	14:25	5/25/2010	15:20	26	32	6		**ND**	**ND**	**ND**	**ND**	T9184		6/1/2010	
5/25/2010	15:20	6/1/2010	15:16	32	39	7		**ND**	**ND**	**ND**	**ND**	T9364		6/7/2010	
6/1/2010	15:16	6/7/2010	15:49	39	45	6		**ND**	**ND**	**ND**	**ND**	T9612		6/16/2010	
6/7/2010	15:49	6/14/2010	15:04	45	52	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	T9639/D		6/16/2010	
6/14/2010	15:04	6/22/2010	14:54	52	60	8		**ND**	**ND**	**ND**	**ND**	U0549		7/13/2010	
6/22/2010	14:54	8/5/2010	13:48	60	105	44		**ND**	**ND**	**ND**	**ND**	U0794		8/9/2010	
8/5/2010	13:48	9/2/2010	15:38	105	133	28		**ND**	**ND**	**ND**	**ND**	U1335		9/8/2010	
9/2/2010	15:38	9/22/2010	14:41	133	153	20		**ND**	**ND**	**ND**	**ND**	U1444		9/27/2010	
9/22/2010	14:41	10/4/2010	15:02	153	165	12		**ND**	**ND**	**ND**	**ND**	U1849		10/11/2010	
Dye Trace 2	**10/5/10 = Day 0**														
10/4/2010	15:02	10/11/2010	15:58	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2026		10/14/2010	
10/11/2010	15:58	10/15/2010	13:45	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2584		10/26/2010	
10/15/2010	13:45	10/20/2010	14:13	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2611		10/26/2010	
10/20/2010	14:13	10/25/2010	14:49	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2638		10/26/2010	
10/25/2010	14:49	11/1/2010	15:17	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2915		11/5/2010	
11/1/2010	15:17	11/8/2010	13:58	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3241		11/12/2010	
11/8/2010	13:58	11/15/2010	14:06	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3569		11/19/2010	
11/15/2010	14:06	11/22/2010	13:41	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4235		12/2/2010	
11/22/2010	13:41	11/29/2010	14:12	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4263		12/2/2010	
11/29/2010	14:12	12/7/2010	12:25	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4552		12/13/2010	
12/7/2010	12:25	12/17/2010	15:48	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4755		12/20/2010	
12/17/2010	15:48	12/28/2010	14:03	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5083		12/30/2010	
12/28/2010	14:03	1/11/2011	14:22	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5448		1/12/2011	
1/11/2011	14:22	1/24/2011	13:57	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5713		1/27/2011	

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **16**

Station Name: **Log**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	13:57	2/11/2011	13:28	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6306		2/17/2011
2/11/2011	13:28	2/28/2011	14:30	295/129	312/147	17								3/22/2011
2/28/2011	14:30	3/17/2011	14:33	312/147	329/164	17								3/22/2011
3/17/2011	14:33	4/6/2011	14:54	329/164	349/183	20								4/15/2011
4/6/2011	14:54	4/25/2011	14:56	349/183	368/202	19								4/27/2011
4/25/2011	14:56	5/11/2011	10:11	368/202	384/218	16								5/12/2011
5/11/2011	10:11	5/26/2011	14:59	384/218	399/233	15								5/27/2011
5/26/2011	14:59	6/15/2011	15:06	399/233	419/253	20								6/17/2011
6/15/2011	15:06	8/15/2011	15:24	419/253	480/314	61							**FINAL**	

# BG Samples Collected:	3
# BG Samples Shipped:	2
# BG Samples Analyzed:	2
# BG Dupes Analyzed	1
# Samples Collected:	37
# Samples Shipped:	36
# Samples Analyzed:	29
# Dupes Analyzed	1
Total # Samples Collected:	**40**
Total # Samples Shipped:	38
Total # Samples Analyzed:	**31**
Total # Dupes Analyzed:	2
# Samples FL pos:	0
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 18

Station Name: Indian Cave

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	16:13	4/1/2010	14:17			7		**ND**	**ND**	**ND**	**ND**	T6974		4/5/2010
4/1/2010	14:17	4/9/2010	14:32			8		**ND**	**ND**	**ND**	**ND**	T7201		4/12/2010
4/9/2010	14:32	4/22/2010	14:47			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	14:47	4/28/2010	16:47	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8123		5/3/2010
4/28/2010	16:47	5/3/2010	16:26	5	10	5		**ND**	**ND**	**ND**	**ND**	T7963		5/3/2010
5/3/2010	16:26	5/9/2010	16:40	10	16	6		**ND**	**ND**	**ND**	**ND**	T8268		5/11/2010
5/9/2010	16:40	5/14/2010	15:58	16	21	5		**ND**	**ND**	**ND**	**ND**	T8735		5/17/2010
5/14/2010	15:58	5/19/2010	14:39	21	26	5		**ND**	**ND**	**ND**	**ND**	T9157		6/1/2010
5/19/2010	14:39	5/25/2010	16:45	26	32	6		**ND**	**ND**	**ND**	**ND**	T9185		6/1/2010
5/25/2010	16:45	6/1/2010	16:45	32	39	7		**ND**	**ND**	**ND**	**ND**	T9365		6/7/2010
6/1/2010	16:45	6/7/2010	17:09	39	45	6		**ND**	**ND**	**ND**	**ND**	T9613		6/16/2010
6/7/2010	17:09	6/14/2010	16:16	45	52	7		**ND**	**ND**	**ND**	**ND**	T9641		6/16/2010
6/14/2010	16:16	6/22/2010	15:01	52	60	8		**ND**	**ND**	**ND**	**ND**	U0550		7/13/2010
6/22/2010	15:01	8/5/2010	16:08	60	105	44		**ND**	**ND**	**5.05**	**ND**	U0795	*	8/9/2010
8/5/2010	16:08	9/2/2010	17:12	105	133	28		**ND**	**ND**	**4.56**	**ND**	U1336	*	9/8/2010
9/2/2010	17:12	9/22/2010	16:29	133	153	20		**ND**	**ND**	**3.21**	**ND**	U1445	*	9/27/2010
9/22/2010	16:29	10/4/2010	15:20	153	165	12		**ND**	**ND**	**ND**	**ND**	U1850		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:20	10/11/2010	16:07	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2027		10/14/2010
10/11/2010	16:07	10/15/2010	15:31	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2585		10/26/2010
10/15/2010	15:31	10/20/2010	14:21	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2612		10/26/2010
10/20/2010	14:21	10/25/2010	15:01	181/18	186/20	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2639/D		10/26/2010
10/25/2010	15:01	11/1/2010	15:29	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2916		11/5/2010
11/1/2010	15:29	11/8/2010	14:08	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3242		11/12/2010
11/8/2010	14:08	11/15/2010	14:16	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3570		11/19/2010
11/15/2010	14:16	11/22/2010	13:50	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4236		12/2/2010
11/22/2010	13:50	11/29/2010	14:26	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4264		12/2/2010
11/29/2010	14:26	12/7/2010	13:36	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4553		12/13/2010
12/7/2010	13:36	12/17/2010	14:18	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4756		12/20/2010
12/17/2010	14:18	12/28/2010	14:12	239/73	250/84	11		**ND**	**ND**	**5.08**	**ND**	U5084	*	12/30/2010
12/28/2010	14:12	1/11/2011	14:33	250/84	264/98	14		**ND**	**ND**	**2.67**	**ND**	U5449	*	1/12/2011
1/11/2011	14:33	1/24/2011	14:06	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5714		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**18**												
Station Name:		**Indian Cave**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	14:06	2/11/2011	13:38	277/111	295/129	18		**ND**	**ND**	**7.15**	**ND**	U6307	*	2/17/2011
2/11/2011	13:38	2/28/2011	14:42	295/129	312/147	17								3/22/2011
2/28/2011	14:42	3/17/2011	14:42	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7451		3/22/2011
3/17/2011	14:42	4/6/2011	15:03	329/164	349/183	20		**ND**	**ND**	**2.75**	**ND**	U8184	**	4/15/2011
4/6/2011	15:03	4/25/2011	15:24	349/183	368/202	19		**ND**	**ND**	**3.26**	**ND**	U8614	**	4/27/2011
4/25/2011	15:24	5/11/2011	10:20	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9857		5/12/2011
5/11/2011	10:20	5/26/2011	15:15	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0338		5/27/2011
5/26/2011	15:15	6/15/2011	15:15	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0756		6/17/2011
6/15/2011	15:15	8/15/2011	15:44	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		1												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**37**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**8**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**19**												
Station Name:		**First Fisherman's Paradise**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	16:04	4/1/2010	14:23			7		**ND**	**ND**	**ND**	**ND**	T6975		4/5/2010
4/1/2010	14:23	4/9/2010	14:48			8		**ND**	**ND**	**ND**	**ND**	T7202		4/12/2010
4/9/2010	14:48	4/22/2010	13:32			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:32	4/28/2010	15:07	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8124		5/3/2010
4/28/2010	15:07	5/3/2010	14:42	5	10	5		**ND**	**ND**	**ND**	**ND**	T7964		5/3/2010
5/3/2010	14:42	5/9/2010	14:53	10	16	6		**ND**	**ND**	**ND**	**ND**	T8269		5/11/2010
5/9/2010	14:53	5/14/2010	14:02	16	21	5		**ND**	**ND**	**ND**	**ND**	T8736		5/17/2010
5/14/2010	14:02	5/19/2010	14:52	21	26	5		**ND**	**ND**	**ND**	**ND**	T9158		6/1/2010
5/19/2010	14:52	5/25/2010	15:29	26	32	6		**ND**	**ND**	**ND**	**ND**	T9186		6/1/2010
5/25/2010	15:29	6/1/2010	15:25	32	39	7		**ND**	**ND**	**ND**	**ND**	T9366		6/7/2010
6/1/2010	15:25	6/7/2010	15:57	39	45	6		**ND**	**ND**	**2.35**	**ND**	T9614	*	6/16/2010
6/7/2010	15:57	6/14/2010	15:13	45	52	7		**ND**	**ND**	**ND**	**ND**	T9642		6/16/2010
6/14/2010	15:13	6/22/2010	15:05	52	60	8		**ND**	**ND**	**ND**	**ND**	U0551		7/13/2010
6/22/2010	15:05	8/5/2010	14:04	60	105	44		**ND**	**ND**	**ND**	**ND**	U0796		8/9/2010
8/5/2010	14:04	9/2/2010	15:48	105	133	28		**ND**	**ND**	**3.35**	**ND**	U1457	**	9/8/2010
9/2/2010	15:48	9/22/2010	14:56	133	153	20		**ND**	**ND**	**3.73**	**ND**	U1446		9/27/2010
9/22/2010	14:56	10/4/2010	15:25	153	165	12		**ND**	**ND**	**ND**	**ND**	U1851		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:25	10/11/2010	16:11	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2028		10/14/2010
10/11/2010	16:11	10/15/2010	13:54	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2586		10/26/2010
10/15/2010	13:54	10/20/2010	14:26	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2613		10/26/2010
10/20/2010	14:26	10/25/2010	15:07	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2641		10/26/2010
10/25/2010	15:07	11/1/2010	15:34	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2917		11/5/2010
11/1/2010	15:34	11/8/2010	14:15	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3243		11/12/2010
11/8/2010	14:15	11/15/2010	14:22	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3571		11/19/2010
11/15/2010	14:22	11/22/2010	13:54	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4237		12/2/2010
11/22/2010	13:54	11/29/2010	14:33	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4265		12/2/2010
11/29/2010	14:33	12/7/2010	13:40	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4554		12/13/2010
12/7/2010	13:40	12/17/2010	14:24	229/63	239/73	10		**ND**	**ND**	**1.89**	**ND**	U4757	*	12/20/2010
12/17/2010	14:24	12/28/2010	14:16	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5085		12/30/2010
12/28/2010	14:16	1/11/2011	14:37	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5450		1/12/2011
1/11/2011	14:37	1/24/2011	14:10	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5715		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**19**												
Station Name:		**First Fisherman's Paradise**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	14:10	2/11/2011	13:41	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6308		2/17/2011
2/11/2011	13:41	2/28/2011	14:45	295/129	312/147	17								3/22/2011
2/28/2011	14:45	3/17/2011	14:46	312/147	329/164	17								3/22/2011
3/17/2011	14:46	4/6/2011	15:08	329/164	349/183	20								4/15/2011
4/6/2011	15:08	4/25/2011	15:27	349/183	368/202	19								4/27/2011
4/25/2011	15:27	5/11/2011	10:25	368/202	384/218	16								5/12/2011
5/11/2011	10:25	5/26/2011	15:20	384/218	399/233	15								5/27/2011
5/26/2011	15:20	6/15/2011	15:18	399/233	419/253	20								6/17/2011
6/15/2011	15:18	7/22/2011	14:14	419/253	456/290	37							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		29												
# Dupes Analyzed		0												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**31**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**4**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		20												
Station Name:		No Name Cove												
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	15:50	4/1/2010	14:33			7		**ND**	**ND**	**ND**	**ND**	T6976		4/5/2010
4/1/2010	14:33	4/9/2010	14:58			8		**ND**	**ND**	**ND**	**ND**	T7203		4/12/2010
4/9/2010	14:58	4/22/2010	14:41			13								
Dye Trace 1	4/23/10 = Day 0													
4/22/2010	14:41	4/28/2010	16:39	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8125		5/3/2010
4/28/2010	16:39	5/3/2010	16:17	5	10	5		**ND**	**ND**	**ND**	**ND**	T7965		5/3/2010
5/3/2010	16:17	5/9/2010	16:30	10	16	6		**ND**	**ND**	**ND**	**ND**	T8270		5/11/2010
5/9/2010	16:30	5/14/2010	15:48	16	21	5		**ND**	**ND**	**ND**	**ND**	T8737		5/17/2010
5/14/2010	15:48	5/19/2010	16:38	21	26	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	T9159/D		6/1/2010
5/19/2010	16:38	5/25/2010	16:38	26	32	6		**ND**	**ND**	**ND**	**ND**	T9187		6/1/2010
5/25/2010	16:38	6/1/2010	16:35	32	39	7		**ND**	**ND**	**ND**	**ND**	T9367		6/7/2010
6/1/2010	16:35	6/7/2010	17:01	39	45	6		**ND**	**ND**	**ND**	**ND**	T9615		6/16/2010
6/7/2010	17:01	6/14/2010	16:10	45	52	7		**ND**	**ND**	**ND**	**ND**	T9643		6/16/2010
6/14/2010	16:10	6/22/2010	15:12	52	60	8		**ND**	**ND**	**ND**	**ND**	U0552		7/13/2010
6/22/2010	15:12	8/5/2010	15:55	60	105	44		**ND**	**ND**	**3.97**	**ND**	U0797	*	8/9/2010
8/5/2010	15:55	9/2/2010	17:04	105	133	28		**ND**	**ND**	**ND**	**ND**	U1337		9/8/2010
9/2/2010	17:04	9/22/2010	16:15	133	153	20		**ND**	**ND**	**ND**	**ND**	U1447		9/27/2010
9/22/2010	16:15	10/4/2010	16:48	153	165	12		**ND**	**ND**	**ND**	**ND**	U1852		10/11/2010
Dye Trace 2	10/5/10 = Day 0													
10/4/2010	16:48	10/11/2010	16:18	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2029		10/14/2010
10/11/2010	16:18	10/15/2010	15:19	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2587		10/26/2010
10/15/2010	15:19	10/20/2010	14:33	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2614		10/26/2010
10/20/2010	14:33	10/25/2010	15:14	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2642		10/26/2010
10/25/2010	15:14	11/1/2010	15:43	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2918		11/5/2010
11/1/2010	15:43	11/8/2010	14:21	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3244		11/12/2010
11/8/2010	14:21	11/15/2010	14:30	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3572		11/19/2010
11/15/2010	14:30	11/22/2010	14:55	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4238		12/2/2010
11/22/2010	14:55	11/29/2010	14:41	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4266		12/2/2010
11/29/2010	14:41	12/7/2010	14:46	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4555		12/13/2010
12/7/2010	14:46	12/17/2010	14:30	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4758		12/20/2010
12/17/2010	14:30	12/28/2010	15:22	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5086		12/30/2010
12/28/2010	15:22	1/11/2011	15:42	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5451		1/12/2011
1/11/2011	15:42	1/24/2011	14:16	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5716		1/27/2011
1/24/2011	14:16	2/11/2011	13:47	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6309		2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**20**												
Station Name:		**No Name Cove**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	13:47	2/28/2011	14:54	295/129	312/147	17								3/22/2011
2/28/2011	14:54	3/17/2011	15:49	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7452		3/22/2011
3/17/2011	15:49	4/6/2011	16:15	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8185		4/15/2011
4/6/2011	16:15	4/25/2011	16:25	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8615		4/27/2011
4/25/2011	16:25	5/11/2011	11:27	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9858		5/12/2011
5/11/2011	11:27	5/26/2011	15:27	384/218	399/233	15	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	V0339/D		5/27/2011
5/26/2011	15:27	6/15/2011	16:21	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0757		6/17/2011
6/15/2011	16:21	8/15/2011	15:49	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		2												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**37**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**1**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 21

Station Name: Turtle Meadows

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	15:40	4/1/2010	14:47			7		**ND**	**ND**	**ND**	**ND**	T6977		4/5/2010
4/1/2010	14:47	4/9/2010	15:03			8		**ND**	**ND**	**ND**	**ND**	T7204		4/12/2010
4/9/2010	15:03	4/22/2010	13:39			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:39	4/28/2010	15:16	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8126		5/3/2010
4/28/2010	15:16	5/3/2010	14:49	5	10	5		**ND**	**ND**	**ND**	**ND**	T7966		5/3/2010
5/3/2010	14:49	5/9/2010	15:03	10	16	6		**ND**	**ND**	**ND**	**ND**	T8271		5/11/2010
5/9/2010	15:03	5/14/2010	14:10	16	21	5		**ND**	**ND**	**ND**	**ND**	T8738		5/17/2010
5/14/2010	14:10	5/19/2010	15:03	21	26	5		**ND**	**ND**	**ND**	**ND**	T9161		6/1/2010
5/19/2010	15:03	5/25/2010	15:35	26	32	6		**ND**	**ND**	**ND**	**ND**	T9188		6/1/2010
5/25/2010	15:35	6/1/2010	15:32	32	39	7		**ND**	**ND**	**ND**	**ND**	T9368		6/7/2010
6/1/2010	15:32	6/7/2010	16:03	39	45	6		**ND**	**ND**	**ND**	**ND**	T9616		6/16/2010
6/7/2010	16:03	6/14/2010	15:19	45	52	7		**ND**	**ND**	**ND**	**ND**	T9644		6/16/2010
6/14/2010	15:19	6/22/2010	15:18	52	60	8		**ND**	**ND**	**ND**	**ND**	U0553		7/13/2010
6/22/2010	15:18	8/5/2010	14:13	60	105	44		**ND**	**ND**	**ND**	**ND**	U0798		8/9/2010
8/5/2010	14:13	9/2/2010	15:55	105	133	28		**ND**	**ND**	**3.85**	**ND**	U1338	*	9/8/2010
9/2/2010	15:55	9/22/2010	15:05	133	153	20		**ND**	**ND**	**ND**	**ND**	U1448		9/27/2010
9/22/2010	15:05	10/4/2010	15:35	153	165	12		**ND**	**ND**	**ND**	**ND**	U1853		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:35	10/11/2010	16:24	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2030		10/14/2010
10/11/2010	16:24	10/15/2010	14:08	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2588		10/26/2010
10/15/2010	14:08	10/20/2010	14:40	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2615		10/26/2010
10/20/2010	14:40	10/25/2010	15:19	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2643		10/26/2010
10/25/2010	15:19	11/1/2010	15:48	186/20	193/27	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2919/D		11/5/2010
11/1/2010	15:48	11/8/2010	14:26	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3245		11/12/2010
11/8/2010	14:26	11/15/2010	14:35	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3573		11/19/2010
11/15/2010	14:35	11/22/2010	14:01	207/41	214/48	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U4239/D		12/2/2010
11/22/2010	14:01	11/29/2010	14:46	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4267		12/2/2010
11/29/2010	14:46	12/7/2010	13:48	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4556		12/13/2010
12/7/2010	13:48	12/17/2010	14:36	229/63	239/73	10	**X**	**ND/ND**	**ND/ND**	**2.09/2.83**	**ND/ND**	U4759/D	*/*	12/20/2010
12/17/2010	14:36	12/28/2010	14:25	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5087		12/30/2010
12/28/2010	14:25	1/11/2011	14:45	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5452		1/12/2011
1/11/2011	14:45	1/24/2011	14:21	264/98	277/111	13		**ND**	**ND**	**2.86**	**ND**	U5717	*	1/27/2011
1/24/2011	14:21	2/11/2011	13:52	277/111	295/129	18		**ND**	**ND**	**4.32**	**ND**	U6310	*	2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 21

Station Name: Turtle Meadows

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
2/11/2011	13:52	2/28/2011	14:59	295/129	312/147	17								3/22/2011
2/28/2011	14:59	3/17/2011	14:53	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7453		3/22/2011
3/17/2011	14:53	4/6/2011	15:16	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8186		4/15/2011
4/6/2011	15:16	4/25/2011	15:34	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8616		4/27/2011
4/25/2011	15:34	5/11/2011	10:32	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9859		5/12/2011
5/11/2011	10:32	5/26/2011	15:33	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0341		5/27/2011
5/26/2011	15:33	6/15/2011	15:23	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0758		6/17/2011
6/15/2011	15:23	8/15/2011	15:55	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		35												
# Dupes Analyzed		3												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**37**												
Total # Dupes Analyzed:		3												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**4**	**+1**	**Dupe**										
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**22**												
Station Name:		**Second Fisherman's Paradise**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	15:36	4/1/2010	14:53			7								
4/1/2010	14:53	4/9/2010	15:10			8								
4/9/2010	15:10	4/22/2010	13:43			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:43	4/28/2010	15:23	-1	5	5+1								
4/28/2010	15:23	5/3/2010	14:54	5	10	5								
5/3/2010	14:54	5/9/2010	15:10	10	16	6								
5/9/2010	15:10	5/14/2010	14:16	16	21	5								
5/14/2010	14:16	5/19/2010	15:13	21	26	5								
5/19/2010	15:13	5/25/2010	15:39	26	32	6								
5/25/2010	15:39	6/1/2010	15:40	32	39	7								
6/1/2010	15:40	6/7/2010	16:08	39	45	6								
6/7/2010	16:08	6/14/2010	15:23	45	52	7								
6/14/2010	15:23	6/22/2010	15:25	52	60	8								
6/22/2010	15:25	8/5/2010	14:20	60	105	44								
8/5/2010	14:20	9/2/2010	16:00	105	133	28								
9/2/2010	16:00	9/22/2010	15:10	133	153	20								
9/22/2010	15:10	10/4/2010	15:40	153	165	12								
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:40	10/11/2010	16:29	165/-1	172/6	7								
10/11/2010	16:29	10/15/2010	14:13	172/6	176/10	4								
10/15/2010	14:13	10/20/2010	14:46	176/10	181/18	5								
10/20/2010	14:46	10/25/2010	15:25	181/18	186/20	5								
10/25/2010	15:25	11/1/2010	15:56	186/20	193/27	7								
11/1/2010	15:56	11/8/2010	14:33	193/27	200/34	7								
11/8/2010	14:33	11/15/2010	14:33	200/34	207/41	7								
11/15/2010	14:33	11/22/2010	14:04	207/41	214/48	7								
11/22/2010	14:04	11/29/2010	14:52	214/48	221/55	7								
11/29/2010	14:52	12/7/2010	13:53	221/55	229/63	8								
12/7/2010	13:53	12/17/2010	14:40	229/63	239/73	10								
12/17/2010	14:40	12/28/2010	14:29	239/73	250/84	11								
12/28/2010	14:29	1/11/2011	14:50	250/84	264/98	14								
1/11/2011	14:50	1/24/2011	14:24	264/98	277/111	13								

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**22**												
Station Name:		**Second Fisherman's Paradise**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	14:24	2/11/2011	13:56	277/111	295/129	18								
2/11/2011	13:56	2/28/2011	15:04	295/129	312/147	17								
2/28/2011	15:04	3/17/2011	14:59	312/147	329/164	17								
3/17/2011	14:59	4/6/2011	15:21	329/164	349/183	20								
4/6/2011	15:21	4/25/2011	15:38	349/183	368/202	19								
4/25/2011	15:38	5/11/2011	10:38	368/202	384/218	16								
5/11/2011	10:38	5/26/2011	15:40	384/218	399/233	15								
5/26/2011	15:40	6/15/2011	15:28	399/233	419/253	20								
6/15/2011	15:28	7/22/2011	14:20	419/253	456/290	37							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		37												
# Samples Shipped:		0												
# Samples Analyzed:		0												
# Dupes Analyzed		0												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		0												
Total # Samples Analyzed:		**0**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 23

Station Name: Catfish Hotel

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Pre-Background														
1/11/2010	17:29	1/18/2010	14:35			7		**ND**	**ND**	**ND**	**ND**	T5121		2/2/2010
1/18/2010	14:35	1/26/2010	14:04			8		**ND**	**ND**	**ND**	**ND**	T5128		2/2/2010
1/26/2010	14:04	2/1/2010	14:57			6		**ND**	**ND**	**ND**	**ND**	T5135		2/2/2010
2/1/2010	14:57	2/9/2010	14:50			8		**ND**	**ND**	**ND**	**ND**	T5421		2/10/2010
2/9/2010	14:50	3/25/2010	15:25											
Comprehensive Background														
3/25/2010	15:25	4/1/2010	14:57			7		**ND**	**ND**	**ND**	**ND**	T6978		4/5/2010
4/1/2010	14:57	4/9/2010	15:15			8		**ND**	**ND**	**ND**	**ND**	T7205		4/12/2010
4/9/2010	15:15	4/22/2010	13:48			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:48	4/28/2010	15:27	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8127		5/3/2010
4/28/2010	15:27	5/3/2010	14:59	5	10	5		**ND**	**ND**	**ND**	**ND**	T7967		5/3/2010
5/3/2010	14:59	5/9/2010	15:18	10	16	6		**ND**	**ND**	**ND**	**ND**	T8272		5/11/2010
5/9/2010	15:18	5/14/2010	14:21	16	21	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	T8739/D		5/17/2010
5/14/2010	14:21	5/19/2010	15:21	21	26	5		**ND**	**ND**	**ND**	**ND**	T9162		6/1/2010
5/19/2010	15:21	5/25/2010	15:45	26	32	6		**ND**	**ND**	**ND**	**ND**	T9189		6/1/2010
5/25/2010	15:45	6/1/2010	15:44	32	39	7		**ND**	**ND**	**ND**	**ND**	T9369		6/7/2010
6/1/2010	15:44	6/7/2010	16:12	39	45	6		**ND**	**ND**	**ND**	**ND**	T9617		6/16/2010
6/7/2010	16:12	6/14/2010	15:27	45	52	7		**ND**	**ND**	**ND**	**ND**	T9645		6/16/2010
6/14/2010	15:27	6/22/2010	15:29	52	60	8		**ND**	**ND**	**ND**	**ND**	U0554		7/13/2010
6/22/2010	15:29	8/5/2010	14:27	60	105	44		**ND**	**ND**	**3.15**	**ND**	U0799	*	8/9/2010
8/5/2010	14:27	9/2/2010	16:05	105	133	28		**ND**	**ND**	**3.81**	**ND**	U1339	*	9/8/2010
9/2/2010	16:05	9/22/2010	15:14	133	153	20		**ND**	**ND**	**ND**	**ND**	U1449		9/27/2010
9/22/2010	15:14	10/4/2010	15:46	153	165	12		**ND**	**ND**	**ND**	**ND**	U1854		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:46	10/11/2010	16:43	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2031		10/14/2010
10/11/2010	16:34	10/15/2010	14:18	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2589		10/26/2010
10/15/2010	14:18	10/20/2010	14:52	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2616		10/26/2010
10/20/2010	14:52	10/25/2010	15:30	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2644		10/26/2010
10/25/2010	15:30	11/1/2010	16:07	186/20	193/27	7		**ND**	**ND**	**2.00**	**ND**	U2921	*	11/5/2010
11/1/2010	16:07	11/8/2010	14:45	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3246		11/12/2010
11/8/2010	14:45	11/15/2010	14:53	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3574		11/19/2010
11/15/2010	14:53	11/22/2010	14:09	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4241		12/2/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**23**												
Station Name:		**Catfish Hotel**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
11/22/2010	14:09	11/29/2010	15:04	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4268		12/2/2010
11/29/2010	15:04	12/7/2010	13:58	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4557		12/13/2010
12/7/2010	13:58	12/17/2010	14:49	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4761		12/20/2010
12/17/2010	14:49	12/28/2010	14:34	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5088		12/30/2010
12/28/2010	14:34	1/11/2011	14:55	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5453		1/12/2011
1/11/2011	14:55	1/24/2011	14:29	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5718		1/27/2011
1/24/2011	14:29	2/11/2011	13:59	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6311		2/17/2011
2/11/2011	13:59	2/28/2011	15:10	295/129	312/147	17								3/22/2011
2/28/2011	15:10	3/17/2011	15:03	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7454		3/22/2011
3/17/2011	15:03	4/6/2011	15:25	329/164	349/183	20		**ND**	**ND**	**3.42**	**ND**	U8187	*	4/15/2011
4/6/2011	15:25	4/25/2011	15:41	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8617		4/27/2011
4/25/2011	15:41	5/11/2011	10:42	368/202	384/218	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U9861/D		5/12/2011
5/11/2011	10:42	5/26/2011	15:50	384/218	399/233	15		**ND**	**ND**	**0.908**	**ND**	V0342	*	5/27/2011
5/26/2011	15:50	6/15/2011	15:32	399/233	419/253	20	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	V0759/D		6/17/2011
6/15/2011	15:32	7/22/2011	14:24	419/253	456/290	37		**ND**	**ND**	**2.79**	**ND**	V1421	*	7/26/2011
7/22/2011	14:24	8/15/2011	15:58	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1733		8/16/2011
8/15/2011	15:58	9/14/2011	15:14	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2056	**FINAL**	9/15/2011
# BG Samples Collected:		8												
# BG Samples Shipped:		6												
# BG Samples Analyzed:		6												
# Samples Collected:		39												
# Samples Shipped:		39												
# Samples Analyzed:		38												
# Dupes Analyzed		3												
Total # Samples Collected:		**47**												
Total # Samples Shipped:		45												
Total # Samples Analyzed:		**44**												
Total # Dupes Analyzed:		3												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**6**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**24**												
Station Name:		**Turtle Nook**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	15:18	4/1/2010	15:05			7		**ND**	**ND**	**ND**	**ND**	T6979		4/5/2010
4/1/2010	15:05	4/9/2010	16:20			8		**ND**	**ND**	**ND**	**ND**	T7206		4/12/2010
4/9/2010	16:20	4/22/2010	14:23			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	14:23	4/28/2010	16:29	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8128		5/3/2010
4/28/2010	16:29	5/3/2010	16:08	5	10	5		**ND**	**ND**	**ND**	**ND**	T7968		5/3/2010
5/3/2010	16:08	5/9/2010	16:11	10	16	6		**ND**	**ND**	**ND**	**ND**	T8273		5/11/2010
5/9/2010	16:11	5/14/2010	15:09	16	21	5		**ND**	**ND**	**ND**	**ND**	T8741		5/17/2010
5/14/2010	15:09	5/19/2010	16:22	21	26	5		**ND**	**ND**	**ND**	**ND**	T9163		6/1/2010
5/19/2010	16:22	5/25/2010	16:28	26	32	6		**ND**	**ND**	**ND**	**ND**	T9190		6/1/2010
5/25/2010	16:28	6/1/2010	16:27	32	39	7		**ND**	**ND**	**ND**	**ND**	T9370		6/7/2010
6/1/2010	16:27	6/7/2010	16:54	39	45	6		**ND**	**ND**	**ND**	**ND**	T9618		6/16/2010
6/7/2010	16:54	6/14/2010	16:04	45	52	7		**ND**	**ND**	**ND**	**ND**	T9646		6/16/2010
6/14/2010	16:04	6/22/2010	15:32	52	60	8		**ND**	**ND**	**ND**	**ND**	U0555		7/13/2010
6/22/2010	15:32	8/5/2010	14:35	60	105	44		**ND**	**ND**	**ND**	**ND**	U0801		8/9/2010
8/5/2010	14:35	9/2/2010	16:56	105	133	28		**ND**	**ND**	**ND**	**ND**	U1341		9/8/2010
9/2/2010	16:56	9/22/2010	16:05	133	153	20		**ND**	**ND**	**ND**	**ND**	U1450		9/27/2010
9/22/2010	16:05	10/4/2010	15:51	153	165	12		**ND**	**ND**	**ND**	**ND**	U1855		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:51	10/11/2010	16:39	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2032		10/14/2010
10/11/2010	16:39	10/15/2010	14:26	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2590		10/26/2010
10/15/2010	14:26	10/20/2010	15:43	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2617		10/26/2010
10/20/2010	15:43	10/25/2010	15:35	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2645		10/26/2010
10/25/2010	15:35	11/1/2010	16:02	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2922		11/5/2010
11/1/2010	16:02	11/8/2010	14:40	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3247		11/12/2010
11/8/2010	14:40	11/15/2010	14:48	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3575		11/19/2010
11/15/2010	14:48	11/22/2010	14:47	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4242		12/2/2010
11/22/2010	14:47	11/29/2010	14:59	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4269		12/2/2010
11/29/2010	14:59	12/7/2010	14:38	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4558		12/13/2010
12/7/2010	14:38	12/17/2010	14:45	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4762		12/20/2010
12/17/2010	14:45	12/28/2010	15:14	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5089		12/30/2010
12/28/2010	15:14	1/11/2011	15:35	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5454		1/12/2011
1/11/2011	15:35	1/24/2011	14:35	264/98	277/111	13	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U5719D		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **24**

Station Name: **Turtle Nook**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	14:35	2/11/2011	14:03	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6312		2/17/2011
2/11/2011	14:03	2/28/2011	15:14	295/129	312/147	17								3/22/2011
2/28/2011	15:14	3/17/2011	15:41	312/147	329/164	17								3/22/2011
3/17/2011	15:41	4/6/2011	16:05	329/164	349/183	20								4/15/2011
4/6/2011	16:05	4/25/2011	16:18	349/183	368/202	19								4/27/2011
4/25/2011	16:18	5/11/2011	11:20	368/202	384/218	16								5/12/2011
5/11/2011	11:20	5/26/2011	15:56	384/218	399/233	15								5/27/2011
5/26/2011	15:56	6/15/2011	16:14	399/233	419/253	20								6/17/2011
6/15/2011	16:14	8/15/2011	16:03	419/253	480/314	61							**FINAL**	

# BG Samples Collected:	3
# BG Samples Shipped:	2
# BG Samples Analyzed:	2
# Samples Collected:	37
# Samples Shipped:	36
# Samples Analyzed:	29
# Dupes Analyzed	1
Total # Samples Collected:	**40**
Total # Samples Shipped:	38
Total # Samples Analyzed:	**31**
Total # Dupes Analyzed:	1
# Samples FL pos:	0
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		26												
Station Name:		Raccoon Island												
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	15:12	4/1/2010	15:20			7		**ND**	**ND**	**ND**	**ND**	T6981		4/5/2010
4/1/2010	15:20	4/9/2010	16:10			8		**ND**	**ND**	**ND**	**ND**	T7207		4/12/2010
4/9/2010	16:10	4/22/2010	14:31			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	14:31	4/28/2010	16:21	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8129		5/3/2010
4/28/2010	16:21	5/3/2010	15:53	5	10	5		**ND**	**ND**	**ND**	**ND**	T7969		5/3/2010
5/3/2010	15:53	5/9/2010	16:03	10	16	6		**ND**	**ND**	**ND**	**ND**	T8274		5/11/2010
5/9/2010	16:03	5/14/2010	14:34	16	21	5		**ND**	**ND**	**ND**	**ND**	T8742		5/17/2010
5/14/2010	14:34	5/19/2010	15:50	21	26	5		**ND**	**ND**	**ND**	**ND**	T9164		6/1/2010
5/19/2010	15:50	5/25/2010	15:58	26	32	6		**ND**	**ND**	**ND**	**ND**	T9191		6/1/2010
5/25/2010	15:58	6/1/2010	16:01	32	39	7		**ND**	**ND**	**ND**	**ND**	T9371		6/7/2010
6/1/2010	16:01	6/7/2010	16:47	39	45	6	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	T9619/D		6/16/2010
6/7/2010	16:47	6/14/2010	15:41	45	52	7		**ND**	**ND**	**ND**	**ND**	T9647		6/16/2010
6/14/2010	15:41	6/22/2010	15:37	52	60	8		**ND**	**ND**	**ND**	**ND**	U0556		7/13/2010
6/22/2010	15:37	8/5/2010	14:46	60	105	44		**ND**	**ND**	**ND**	**ND**	U0802		8/9/2010
8/5/2010	14:46	9/2/2010	16:50	105	133	28		**ND**	**ND**	**ND**	**ND**	U1342		9/8/2010
9/2/2010	16:50	9/22/2010	15:31	133	153	20		**ND**	**ND**	**ND**	**ND**	U1451		9/27/2010
9/22/2010	15:31	10/4/2010	16:07	153	165	12		**ND**	**ND**	**ND**	**ND**	U1856		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	16:07	10/11/2010	16:59	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2033		10/14/2010
10/11/2010	16:59	10/15/2010	14:37	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2591		10/26/2010
10/15/2010	14:37	10/20/2010	15:04	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2618		10/26/2010
10/20/2010	15:04	10/25/2010	15:50	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2646		10/26/2010
10/25/2010	15:50	11/1/2010	16:22	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2923		11/5/2010
11/1/2010	16:22	11/8/2010	14:59	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3248		11/12/2010
11/8/2010	14:59	11/15/2010	15:06	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3576		11/19/2010
11/15/2010	15:06	11/22/2010	14:42	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4243		12/2/2010
11/22/2010	14:42	11/29/2010	15:23	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4270		12/2/2010
11/29/2010	15:23	12/7/2010	14:33	221/55	229/63	8	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U4559/D		12/13/2010
12/7/2010	14:33	12/17/2010	15:01	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4763		12/20/2010
12/17/2010	15:01	12/28/2010	15:07	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5090		12/30/2010
12/28/2010	15:07	1/11/2011	15:27	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5455		1/12/2011
1/11/2011	15:27	1/24/2011	14:39	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5721		1/27/2011
1/24/2011	14:39	2/11/2011	14:08	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6313		2/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**26**												
Station Name:		**Raccoon Island**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
2/11/2011	14:08	2/28/2011	15:20	295/129	312/147	17								3/22/2011
2/28/2011	15:20	3/17/2011	15:36	312/147	329/164	17								3/22/2011
3/17/2011	15:36	4/6/2011	15:57	329/164	349/183	20								4/15/2011
4/6/2011	15:57	4/25/2011	16:12	349/183	368/202	19								4/27/2011
4/25/2011	16:12	5/11/2011	11:14	368/202	384/218	16								5/12/2011
5/11/2011	11:14	5/26/2011	16:01	384/218	399/233	15								5/27/2011
5/26/2011	16:01	6/15/2011	16:08	399/233	419/253	20								6/17/2011
6/15/2011	16:08	7/22/2011	14:42	419/253	456/290	37							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		29												
# Dupes Analyzed		2												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		**31**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 1 of 2
Station Number:		28													
Station Name:		ShipWreck													
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Pre-Background														
1/11/2010	17:24	1/18/2010	14:46			7		**ND**	**ND**	**ND**	**ND**	T5122		2/2/2010
1/18/2010	14:46	1/26/2010	13:56			8		**ND**	**ND**	**ND**	**ND**	T5129		2/2/2010
1/26/2010	13:56	2/1/2010	14:37			6		**ND**	**ND**	**ND**	**ND**	T5136		2/2/2010
2/1/2010	14:37	2/9/2010	14:39			8		**ND**	**ND**	**ND**	**ND**	T5422		2/10/2010
2/9/2010	14:39	3/25/2010	15:09											
Comprehensive Background														
3/25/2010	15:09	4/1/2010	15:29			7		**ND**	**ND**	**ND**	**ND**	T6982		4/5/2010
4/1/2010	15:29	4/9/2010	15:23			8		**ND**	**ND**	**ND**	**ND**	T7208		4/12/2010
4/9/2010	15:23	4/22/2010	13:55			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	13:55	4/28/2010	15:35	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8130		5/3/2010
4/28/2010	15:35	5/3/2010	15:05	5	10	5		**ND**	**ND**	**ND**	**ND**	T7970		5/3/2010
5/3/2010	15:05	5/9/2010	15:28	10	16	6		**ND**	**ND**	**ND**	**ND**	T8275		5/11/2010
5/9/2010	15:28	5/14/2010	14:28	16	21	5		**ND**	**ND**	**ND**	**ND**	T8743		5/17/2010
5/14/2010	14:28	5/19/2010	15:40	21	26	5		**ND**	**ND**	**ND**	**ND**	T9165		6/1/2010
5/19/2010	15:40	5/25/2010	15:51	26	32	6		**ND**	**ND**	**ND**	**ND**	T9192		6/1/2010
5/25/2010	15:51	6/1/2010	15:50	32	39	7		**ND**	**ND**	**ND**	**ND**	T9372		6/7/2010
6/1/2010	15:50	6/7/2010	16:20	39	45	6		**ND**	**ND**	**ND**	**ND**	T9621		6/16/2010
6/7/2010	16:20	6/14/2010	15:33	45	52	7		**ND**	**ND**	**ND**	**ND**	T9648		6/16/2010
6/14/2010	15:33	6/22/2010	15:41	52	60	8		**ND**	**ND**	**ND**	**ND**	U0557		7/13/2010
6/22/2010	15:41	8/5/2010	14:53	60	105	44		**ND**	**ND**	**ND**	**ND**	U0803		8/9/2010
8/5/2010	14:53	9/2/2010	16:11	105	133	28		**ND**	**ND**	**4.71**	**ND**	U1343	*	9/8/2010
9/2/2010	16:11	9/22/2010	15:24	133	153	20		**ND**	**ND**	**4.61**	**ND**	U1452	*	9/27/2010
9/22/2010	15:24	10/4/2010	15:59	153	165	12		**ND**	**ND**	**ND**	**ND**	U1857		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	15:59	10/11/2010	16:52	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2034		10/14/2010
10/11/2010	16:52	10/15/2010	14:31	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2592		10/26/2010
10/15/2010	14:31	10/20/2010	14:58	176/10	181/18	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2619/D		10/26/2010
10/20/2010	14:58	10/25/2010	15:43	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2647		10/26/2010
10/25/2010	15:43	11/1/2010	16:13	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2924		11/5/2010
11/1/2010	16:13	11/8/2010	14:52	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3249		11/12/2010
11/8/2010	14:52	11/15/2010	15:01	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3577		11/19/2010
11/15/2010	15:01	11/22/2010	14:15	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4244		12/2/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2of 2
Station Number:		**28**												
Station Name:		**ShipWreck**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
11/22/2010	14:15	11/29/2010	15:17	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4271		12/2/2010
11/29/2010	15:17	12/7/2010	14:04	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4561		12/13/2010
12/7/2010	14:04	12/17/2010	14:55	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4764		12/20/2010
12/17/2010	14:55	12/28/2010	14:42	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5091		12/30/2010
12/28/2010	14:42	1/11/2011	15:03	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5456		1/12/2011
1/11/2011	15:03	1/24/2011	14:43	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5722		1/27/2011
1/24/2011	14:43	2/11/2011	14:12	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6314		2/17/2011
2/11/2011	14:12	2/28/2011	15:25	295/129	312/147	17								3/22/2011
2/28/2011	15:25	3/17/2011	15:11	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7455		3/22/2011
3/17/2011	15:11	4/6/2011	15:32	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8188		4/15/2011
4/6/2011	15:32	4/25/2011	15:47	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8618		4/27/2011
4/25/2011	15:47	5/11/2011	10:50	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9862		5/12/2011
5/11/2011	10:50	5/26/2011	16:05	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0343		5/27/2011
5/26/2011	16:05	6/15/2011	15:38	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0761		6/17/2011
6/15/2011	15:38	7/22/2011	14:30	419/253	456/290	37		**ND**	**ND**	**ND**	**ND**	V1422		7/26/2011
7/22/2011	14:30	8/15/2011	16:08	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1734		8/16/2011
8/15/2011	16:08	9/14/2011	15:50	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2057	**FINAL**	9/15/2011
# BG Samples Collected:		8												
# BG Samples Shipped:		6												
# BG Samples Analyzed:		6												
# Samples Collected:		39												
# Samples Shipped:		39												
# Samples Analyzed:		38												
# Dupes Analyzed		1												
Total # Samples Collected:		**47**												
Total # Samples Shipped:		45												
Total # Samples Analyzed:		**44**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**2**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**30**												
Station Name:		**Timber**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	14:55	4/1/2010	15:40			7		**ND**	**ND**	**ND**	**ND**	T6983		4/5/2010
4/1/2010	15:40	4/9/2010	15:35			8		**ND**	**ND**	**ND**	**ND**	T7209		4/12/2010
4/9/2010	15:35	4/22/2010	14:03			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	14:03	4/28/2010	16:04	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8131		5/3/2010
4/28/2010	16:04	5/3/2010	15:37	5	10	5		**ND**	**ND**	**ND**	**ND**	T7971		5/3/2010
5/3/2010	15:37	5/9/2010	15:42	10	16	6		**ND**	**ND**	**ND**	**ND**	T8276		5/11/2010
5/9/2010	15:42	5/14/2010	14:47	16	21	5		**ND**	**ND**	**ND**	**ND**	T8744		5/17/2010
5/14/2010	14:47	5/19/2010	16:02	21	26	5		**ND**	**ND**	**ND**	**ND**	T9166		6/1/2010
5/19/2010	16:02	5/25/2010	16:09	26	32	6		**ND**	**ND**	**ND**	**ND**	T9193		6/1/2010
5/25/2010	16:09	6/1/2010	16:09	32	39	7		**ND**	**ND**	**ND**	**ND**	T9373		6/7/2010
6/1/2010	16:09	6/7/2010	16:35	39	45	6		**ND**	**ND**	**ND**	**ND**	T9622		6/16/2010
6/7/2010	16:35	6/14/2010	15:52	45	52	7		**ND**	**ND**	**ND**	**ND**	T9649		6/16/2010
6/14/2010	15:52	6/22/2010	15:48	52	60	8		**ND**	**ND**	**ND**	**ND**	U0558		7/13/2010
6/22/2010	15:48	8/5/2010	15:10	60	105	44		**ND**	**ND**	**ND**	**ND**	U0804		8/9/2010
8/5/2010	15:10	9/2/2010	16:34	105	133	28					**Samplers and holder missing**			
9/2/2010	16:34	9/22/2010	15:40	133	153	20		**ND**	**ND**	**ND**	**ND**	U1453		9/27/2010
9/22/2010	15:40	10/4/2010	16:18	153	165	12		**ND**	**ND**	**ND**	**ND**	U1858		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	16:18	10/11/2010	17:12	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2035		10/14/2010
10/11/2010	17:12	10/15/2010	14:59	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2593		10/26/2010
10/15/2010	14:59	10/20/2010	15:16	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2621		10/26/2010
10/20/2010	15:16	10/25/2010	16:04	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2648		10/26/2010
10/25/2010	16:04	11/1/2010	16:34	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2925		11/5/2010
11/1/2010	16:34	11/8/2010	15:16	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3250		11/12/2010
11/8/2010	15:16	11/15/2010	15:22	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3578		11/19/2010
11/15/2010	15:22	11/22/2010	14:23	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4245		12/2/2010
11/22/2010	14:23	11/29/2010	15:34	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4272		12/2/2010
11/29/2010	15:34	12/7/2010	14:11	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4562		12/13/2010
12/7/2010	14:11	12/17/2010	15:16	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4765		12/20/2010
12/17/2010	15:16	12/28/2010	14:52	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5092		12/30/2010
12/28/2010	14:52	1/11/2011	15:12	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5457		1/12/2011
1/11/2011	15:12	1/24/2011	14:51	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5723		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**30**												
Station Name:		**Timber**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	14:51	2/11/2011	14:21	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6315		2/17/2011
2/11/2011	14:21	2/28/2011	15:34	295/129	312/147	17								3/22/2011
2/28/2011	15:34	3/17/2011	15:20	312/147	329/164	17		**ND**	**ND**	**ND**	**ND**	U7456		3/22/2011
3/17/2011	15:20	4/6/2011	15:41	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8189		4/15/2011
4/6/2011	15:41	4/25/2011	15:56	349/183	368/202	19		**ND**	**ND**	**ND**	**ND**	U8619		4/27/2011
4/25/2011	15:56	5/11/2011	10:59	368/202	384/218	16		**ND**	**ND**	**ND**	**ND**	U9863		5/12/2011
5/11/2011	10:59	5/26/2011	16:13	384/218	399/233	15		**ND**	**ND**	**ND**	**ND**	V0344		5/27/2011
5/26/2011	16:13	6/15/2011	15:47	399/233	419/253	20		**ND**	**ND**	**ND**	**ND**	V0762		6/17/2011
6/15/2011	15:47	8/15/2011	16:15	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		2												
# BG Samples Analyzed:		2												
# Samples Collected:		36												
# Samples Shipped:		35												
# Samples Analyzed:		34												
# Dupes Analyzed		0												
Total # Samples Collected:		**39**												
Total # Samples Shipped:		37												
Total # Samples Analyzed:		**36**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**31**												
Station Name:		**Silver River @ 1200 meter Station**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Pre-Background														
1/11/2010	]17:34	1/18/2010	14:57			7		**ND**	**ND**	**ND**	**ND**	T5123		2/2/2010
1/18/2010	14:57	1/26/2010	13:38			8		**ND**	**ND**	**ND**	**ND**	T5130		2/2/2010
1/26/2010	13:38	2/1/2010	14:14			6		**ND**	**ND**	**ND**	**ND**	T5137		2/2/2010
2/1/2010	14:14	2/9/2010	14:27			8		**ND**	**ND**	**ND**	**ND**	T5423		2/10/2010
2/9/2010	14:27	3/25/2010	14:31											
Comprehensive Background														
3/25/2010	14:31	4/1/2010	15:50			7		**ND**	**ND**	**ND**	**ND**	T6984		4/5/2010
4/1/2010	15:50	4/9/2010	15:51			8		**ND**	**ND**	**ND**	**ND**	T7210		4/12/2010
4/9/2010	15:51	4/22/2010	14:09			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	14:09	4/28/2010	16:10	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T8132		5/3/2010
4/28/2010	16:10	5/3/2010	15:41	5	10	5		**ND**	**ND**	**ND**	**ND**	T7972		5/3/2010
5/3/2010	15:41	5/9/2010	15:53	10	16	6	**X**	**ND/ND**	**ND/ND**	**7.92/ND**	**ND/ND**	T8277/D	*/	5/11/2010
5/9/2010	15:53	5/14/2010	14:52	16	21	5		**ND**	**ND**	**7.98**	**ND**	T8745	*	5/17/2010
5/14/2010	14:52	5/19/2010	16:10	21	26	5		**ND**	**ND**	**ND**	**ND**	T9167		6/1/2010
5/19/2010	16:10	5/25/2010	16:14	26	32	6		**ND**	**ND**	**ND**	**ND**	T9194		6/1/2010
5/25/2010	16:14	6/1/2010	16:13	32	39	7		**ND**	**ND**	**ND**	**ND**	T9374		6/7/2010
6/1/2010	16:13	6/7/2010	16:40	39	45	6		**ND**	**ND**	**ND**	**ND**	T9623		6/16/2010
6/7/2010	16:40	6/14/2010	15:55	45	52	7		**ND**	**ND**	**ND**	**ND**	T9650		6/16/2010
6/14/2010	15:55	6/22/2010	15:52	52	60	8		**ND**	**ND**	**ND**	**ND**	U0559		7/13/2010
6/22/2010	15:52	8/5/2010	15:27	60	105	44		**ND**	**ND**	**ND**	**ND**	U0805		8/9/2010
8/5/2010	15:27	9/2/2010	16:41	105	133	28		**ND**	**ND**	**5.62**	**ND**	U1344	*	9/8/2010
9/2/2010	16:41	9/22/2010	15:46	133	153	20		**ND**	**ND**	**ND**	**ND**	U1454		9/27/2010
9/22/2010	15:46	10/4/2010	16:27	153	165	12		**ND**	**ND**	**ND**	**ND**	U1859		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	16:27	10/11/2010	17:18	165/-1	172/6	7		**ND**	**ND**	**ND**	**ND**	U2036		10/14/2010
10/11/2010	17:18	10/15/2010	14:52	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2594		10/26/2010
10/15/2010	14:52	10/20/2010	15:24	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2622		10/26/2010
10/20/2010	15:24	10/25/2010	16:11	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2649		10/26/2010
10/25/2010	16:11	11/1/2010	16:52	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2926		11/5/2010
11/1/2010	16:52	11/8/2010	15:23	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3251		11/12/2010

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 2 of 2
Station Number:		**31**													
Station Name:		**Silver River @ 1200 meter Station**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
11/8/2010	15:23	11/15/2010	15:32	200/34	207/41	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U3579/D		11/19/2010
11/15/2010	15:32	11/22/2010	14:31	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4246		12/2/2010
11/22/2010	14:31	11/29/2010	15:40	214/48	221/55	7		**ND**	**ND**	**ND**	**ND**	U4273		12/2/2010
11/29/2010	15:40	12/7/2010	14:19	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4563		12/13/2010
12/7/2010	14:19	12/17/2010	15:24	229/63	239/73	10		**ND**	**ND**	**ND**	**ND**	U4766		12/20/2010
12/17/2010	15:24	12/28/2010	14:59	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5093		12/30/2010
12/28/2010	14:59	1/11/2011	15:20	250/84	264/98	14		**ND**	**ND**	**ND**	**ND**	U5458		1/12/2011
1/11/2011	15:20	1/24/2011	14:56	264/98	277/111	13		**ND**	**ND**	**ND**	**ND**	U5724		1/27/2011
1/24/2011	14:56	2/11/2011	14:25	277/111	295/129	18		**ND**	**ND**	**ND**	**ND**	U6316		2/17/2011
2/11/2011	14:25	2/28/2011	15:41	295/129	312/147	17								3/22/2011
2/28/2011	15:41	3/17/2011	15:27	312/147	329/164	17								3/22/2011
3/17/2011	15:27	4/6/2011	15:48	329/164	349/183	20								4/15/2011
4/6/2011	15:48	4/25/2011	16:04	349/183	368/202	19								4/27/2011
4/25/2011	16:04	5/11/2011	11:05	368/202	384/218	16								5/12/2011
5/11/2011	11:05	5/26/2011	16:25	384/218	399/233	15								5/27/2011
5/26/2011	16:25	6/15/2011	15:52	399/233	419/253	20								6/17/2011
6/15/2011	15:52	8/15/2011	16:20	419/253	480/314	61							**FINAL**	
# BG Samples Collected:		8												
# BG Samples Shipped:		6												
# BG Samples Analyzed:		6												
# Samples Collected:		37												
# Samples Shipped:		36												
# Samples Analyzed:		29												
# Dupes Analyzed		2												
Total # Samples Collected:		**45**												
Total # Samples Shipped:		42												
Total # Samples Analyzed:		**35**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**3**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**32**												
Station Name:		**South Boat House Vent**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	18:28	4/1/2010	16:47			7								
4/1/2010	16:47	4/9/2010	17:22			8								
4/9/2010	17:22	4/22/2010	15:33			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	15:33	4/28/2010	17:28	-1	5	5+1		**ND**	**ND**	**ND**	**ND**	T9377		6/7/2010
4/28/2010	17:28	5/3/2010	16:48	5	10	5	**X**	**ND/ND**	**ND/ND**	**ND/11.6**	**ND/ND**	T9379/D		6/7/2010
5/3/2010	16:48	5/9/2010	17:23	10	16	6		**ND**	**ND**	**16**	**ND**	T9382		6/7/2010
5/9/2010	17:23	5/14/2010	17:25	16	21	5		**ND**	**ND**	**69.6**	**ND**	T8746		5/17/2010
5/14/2010	17:25	5/19/2010	17:25	21	26	5		**ND**	**ND**	**92.3**	**ND**	T9168		6/1/2010
5/19/2010	17:25	5/25/2010	17:24	26	32	6		**ND**	**ND**	**44.1**	**ND**	T9195		6/1/2010
5/25/2010	17:24	6/1/2010	17:39	32	39	7		**ND**	**ND**	**59.1**	**ND**	T9375		6/7/2010
6/1/2010	17:39	6/7/2010	17:39	39	45	6		**ND**	**ND**	**42.5**	**ND**	T9624		6/16/2010
6/7/2010	17:39	6/14/2010	16:48	45	52	7		**ND**	**ND**	**22.1**	**ND**	T9651		6/16/2010
6/14/2010	16:48	6/22/2010	16:39	52	60	8		**ND**	**ND**	**30.8**	**ND**	U0561		7/13/2010
6/22/2010	16:39	8/5/2010	17:24	60	105	44		**ND**	**ND**	**44.3**	**ND**	U0806		8/9/2010
8/5/2010	17:24	9/2/2010	17:54	105	133	28		**ND**	**ND**	**31.7**	**ND**	U1345		9/8/2010
9/2/2010	17:54	9/22/2010	17:20	133	153	20		**ND**	**ND**	**25.8**	**ND**	U1455		9/27/2010
9/22/2010	17:20	10/4/2010	17:48	153	165	12		**ND**	**ND**	**4.98**	**ND**	U1861		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	17:48	10/11/2010	18:07	165/-1	172/6	7		**ND**	**ND**	**3.89**	**ND**	U2037		10/14/2010
10/11/2010	18:07	10/15/2010	16:11	172/6	176/10	4		**ND**	**ND**	**ND**	**ND**	U2595		10/26/2010
10/15/2010	16:11	10/20/2010	16:25	176/10	181/18	5		**ND**	**ND**	**ND**	**ND**	U2623		10/26/2010
10/20/2010	16:25	10/25/2010	17:17	181/18	186/20	5		**ND**	**ND**	**ND**	**ND**	U2650		10/26/2010
10/25/2010	17:17	11/1/2010	17:56	186/20	193/27	7		**ND**	**ND**	**ND**	**ND**	U2927		11/5/2010
11/1/2010	17:56	11/8/2010	16:14	193/27	200/34	7		**ND**	**ND**	**ND**	**ND**	U3252		11/12/2010
11/8/2010	16:14	11/15/2010	16:46	200/34	207/41	7		**ND**	**ND**	**ND**	**ND**	U3581		11/19/2010
11/15/2010	16:46	11/22/2010	15:46	207/41	214/48	7		**ND**	**ND**	**ND**	**ND**	U4247		12/2/2010
11/22/2010	15:46	11/29/2010	16:39	214/48	221/55	7		**ND**	**ND**	**2.56**	**ND**	U4274		12/2/2010
11/29/2010	16:39	12/7/2010	15:26	221/55	229/63	8		**ND**	**ND**	**ND**	**ND**	U4564		12/13/2010
12/7/2010	15:26	12/17/2010	16:29	229/63	239/73	10		**ND**	**ND**	**8.84**	**ND**	U4767		12/20/2010
12/17/2010	16:29	12/28/2010	16:03	239/73	250/84	11		**ND**	**ND**	**ND**	**ND**	U5094		12/30/2010
12/28/2010	16:03	1/11/2011	16:24	250/84	264/98	14	**X**	**ND/ND**	**ND/ND**	**5.42/7.43**	**ND/ND**	U5459/D		1/12/2011
1/11/2011	16:24	1/24/2011	15:49	264/98	277/111	13		**ND**	**ND**	**4.63**	**ND**	U5725		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**32**												
Station Name:		**South Boat House Vent**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	15:49	2/11/2011	15:40	277/111	295/129	18		**ND**	**ND**	**3.68**	**ND**	U6317	**	2/17/2011
2/11/2011	15:40	2/28/2011	16:47	295/129	312/147	17		**ND**	**0.191**	**2.74**	**ND**	U7786	*/	3/22/2011
2/28/2011	16:47	3/17/2011	16:52	312/147	329/164	17	**X**	**ND/ND**	**0.705/1.25**	**ND/ND**	**ND/ND**	U7457/D		3/22/2011
3/17/2011	16:52	4/6/2011	16:59	329/164	349/183	20		**ND**	**ND**	**ND**	**ND**	U8190		4/15/2011
4/6/2011	16:59	4/25/2011	16:58	349/183	368/202	19		**ND**	**ND**	**3.82**	**ND**	U8621		4/27/2011
4/25/2011	16:58	5/11/2011	12:30	368/202	384/218	16		**ND**	**0.238**	**1.76**	**ND**	U9864	**/**	5/12/2011
5/11/2011	12:30	5/26/2011	17:30	384/218	399/233	15		**ND**	**ND**	**4.03**	**ND**	V0345		5/27/2011
5/26/2011	17:30	6/15/2011	17:10	399/233	419/253	20		**ND**	**0.434**	**ND**	**ND**	V0763	**	6/17/2011
6/15/2011	17:10	7/22/2011	15:01	419/253	456/290	37		**ND**	**ND**	**6.13**	**ND**	V1423	**	7/26/2011
7/22/2011	15:01	8/15/2011	17:30	456/290	480/314	24							**Samplers missing**	
8/15/2011	17:30	9/14/2011	15:50	480/314	510/344	30		**ND**	**ND**	**2.81**	**ND**	V2058	**FINAL/****	9/15/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		38												
# Samples Shipped:		38												
# Samples Analyzed:		38												
# Dupes Analyzed		3												
Total # Samples Collected:		41												
Total # Samples Shipped:		38												
Total # Samples Analyzed:		38												
Total # Dupes Analyzed:		3												
# Samples FL pos:		0												
# Samples EO pos:		**4**	**+1**	**Dupe**										
# Samples RWT pos:		**25**	**+1**	**Dupe**										
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 33

Station Name: Gang of Five Vent 3

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	18:22	4/1/2010	16:15			7								
4/1/2010	16:15	4/9/2010	16:46			8								
4/9/2010	16:46	4/22/2010	15:20			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	15:20	4/28/2010	17:22	-1	5	5+1		ND	ND	ND	ND	T9378		6/7/2010
4/28/2010	17:22	5/3/2010	16:42	5	10	5		ND	ND	6.06	ND	T9381		6/7/2010
5/3/2010	16:42	5/9/2010	17:15	10	16	6		ND	ND	6.95	ND	T9383		6/7/2010
5/9/2010	17:15	5/14/2010	16:34	16	21	5		ND	ND	12.30	ND	T8747		5/17/2010
5/14/2010	16:34	5/19/2010	17:16	21	26	5		ND	ND	16.80	ND	T9169		6/1/2010
5/19/2010	17:16	5/25/2010	17:17	26	32	6		ND	ND	9.78	ND	T9196		6/1/2010
5/25/2010	17:17	6/1/2010	17:03	32	39	7		ND	ND	12.80	ND	T9376		6/7/2010
6/1/2010	17:03	6/7/2010	17:33	39	45	6		ND	ND	20.20	ND	T9625		6/16/2010
6/7/2010	17:33	6/14/2010	16:40	45	52	7		ND	ND	9.54	ND	T9652		6/16/2010
6/14/2010	16:40	6/22/2010	16:31	52	60	8		ND	ND	20.50	ND	U0562		7/13/2010
6/22/2010	16:31	8/5/2010	17:05	60	105	44		ND	ND	23.60	ND	U0807		8/9/2010
8/5/2010	17:05	9/2/2010	17:43	105	133	28		ND	ND	17.00	ND	U1346		9/8/2010
9/2/2010	17:43	9/22/2010	17:12	133	153	20		ND	ND	6.64	ND	U1456		9/27/2010
9/22/2010	17:12	10/4/2010	17:42	153	165	12		ND	ND	ND	ND	U1862		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	17:42	10/11/2010	17:58	165/-1	172/6	7		ND	ND	ND	ND	U2038		10/14/2010
10/11/2010	17:58	10/15/2010	16:02	172/6	176/10	4		ND	ND	ND	ND	U2596		10/26/2010
10/15/2010	16:02	10/20/2010	16:17	176/10	181/18	5		ND	ND	ND	ND	U2624		10/26/2010
10/20/2010	16:17	10/25/2010	17:10	181/18	186/20	5		ND	ND	ND	ND	U2651		10/26/2010
10/25/2010	17:10	11/1/2010	17:48	186/20	193/27	7		ND	ND	6.53	ND	U2928		11/5/2010
11/1/2010	17:48	11/8/2010	16:06	193/27	200/34	7		ND	ND	ND	ND	U3253		11/12/2010
11/8/2010	16:06	11/15/2010	16:39	200/34	207/41	7		ND	ND	ND	ND	U3582		11/19/2010
11/15/2010	16:39	11/22/2010	15:38	207/41	214/48	7		ND	ND	3.75	ND	U4248		12/2/2010
11/22/2010	15:38	11/29/2010	16:33	214/48	221/55	7		ND	ND	3.74	ND	U4275		12/2/2010
11/29/2010	16:33	12/7/2010	15:19	221/55	229/63	8		ND	ND	ND	ND	U4565		12/13/2010
12/7/2010	15:19	12/17/2010	16:05	229/63	239/73	10		ND	ND	4.23	ND	U4768	**	12/20/2010
12/17/2010	16:05	12/28/2010	15:57	239/73	250/84	11		ND	ND	4.04	ND	U5095	**	12/30/2010
12/28/2010	15:57	1/11/2011	16:17	250/84	264/98	14		ND	ND	ND	ND	U5461		1/12/2011
1/11/2011	16:17	1/24/2011	15:38	264/98	277/111	13		ND	ND	7.30	ND	U5726		1/27/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 2 of 2
Station Number:		**33**													
Station Name:		**Gang of Five Vent 3**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/24/2011	15:38	2/11/2011	15:21	277/111	295/129	18		**ND**	**ND**	**7.30**	**ND**	U6318	**	2/17/2011
2/11/2011	15:21	2/28/2011	16:17	295/129	312/147	17								3/22/2011
2/28/2011	16:17	3/17/2011	16:45	312/147	329/164	17		**ND**	**ND**	**1.32**	**ND**	U8001	**	3/22/2011
3/17/2011	16:45	4/6/2011	16:51	329/164	349/183	20								4/15/2011
4/6/2011	16:51	4/25/2011	16:52	349/183	368/202	19								4/27/2011
4/25/2011	16:52	5/11/2011	11:46	368/202	384/218	16								5/12/2011
5/11/2011	11:46	5/26/2011	17:07	384/218	399/233	15								5/27/2011
5/26/2011	17:07	6/15/2011	17:02	399/233	419/253	20								6/17/2011
6/15/2011	17:02	8/15/2011	17:11	419/253	480/314	61		**ND**	**ND**	**ND**	**ND**	V1735	**FINAL**	8/16/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		37												
# Samples Shipped:		37												
# Samples Analyzed:		31												
# Dupes Analyzed		0												
Total # Samples Collected:		**40**												
Total # Samples Shipped:		37												
Total # Samples Analyzed:		**31**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		**20**												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 34

Station Name: Silver Springs Landing Vent 2

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	18:11	4/1/2010	16:28			7								
4/1/2010	16:28	4/9/2010	16:59			8								
4/9/2010	16:59	4/22/2010	15:08			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/22/2010	15:08	4/28/2010	17:11	-1	5	5+1								
4/28/2010	17:11	5/3/2010	17:04	5	10	5								
5/3/2010	17:04	5/9/2010	17:02	10	16	6								
5/9/2010	17:02	5/14/2010	16:20	16	21	5								
5/14/2010	16:20	5/19/2010	17:04	21	26	5								
5/19/2010	17:04	5/25/2010	17:02	26	32	6								
5/25/2010	17:02	6/1/2010	17:16	32	39	7								
6/1/2010	17:16	6/7/2010	17:24	39	45	6								
6/7/2010	17:24	6/14/2010	16:31	45	52	7								
6/14/2010	16:31	6/22/2010	16:19	52	60	8								
6/22/2010	16:19	8/5/2010	16:48	60	105	44								
8/5/2010	16:48	9/2/2010	17:33	105	133	28								
9/2/2010	17:33	9/22/2010	17:01	133	153	20								
9/22/2010	17:01	10/4/2010	17:31	153	165	12								
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	17:31	10/11/2010	17:50	165/-1	172/6	7								
10/11/2010	17:50	10/15/2010	15:51	172/6	176/10	4								
10/15/2010	15:51	10/20/2010	16:06	176/10	181/18	5								
10/20/2010	16:06	10/25/2010	16:59	181/18	186/20	5								
10/25/2010	16:59	11/1/2010	17:32	186/20	193/27	7								
11/1/2010	17:32	11/8/2010	15:58	193/27	200/34	7								
11/8/2010	15:58	11/15/2010	16:26	200/34	207/41	7								
11/15/2010	16:26	11/22/2010	15:26	207/41	214/48	7								
11/22/2010	15:26	11/29/2010	16:25	214/48	221/55	7								
11/29/2010	16:25	12/7/2010	15:06	221/55	229/63	8								
12/7/2010	15:06	12/17/2010	16:17	229/63	239/73	10								
12/17/2010	16:17	12/28/2010	15:45	239/73	250/84	11								
12/28/2010	15:45	1/11/2011	16:02	250/84	264/98	14								
1/11/2011	16:02	1/24/2011	15:24	264/98	277/111	13								

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **34**

Station Name: **Silver Springs Landing Vent 2**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
1/24/2011	15:24	2/11/2011	15:05	277/111	295/129	18								
2/11/2011	15:05	2/28/2011	16:32	295/129	312/147	17								
2/28/2011	16:32	3/17/2011	16:32	312/147	329/164	17								
3/17/2011	16:32	4/6/2011	16:40	329/164	349/183	20								
4/6/2011	16:40	4/25/2011	16:43	349/183	368/202	19								
4/25/2011	16:43	5/11/2011	12:10	368/202	384/218	16								
5/11/2011	12:10	5/26/2011	17:17	384/218	399/233	15								
5/26/2011	17:17	6/15/2011	16:52	399/233	419/253	20								
6/15/2011	16:52	8/15/2011	17:04	419/253	480/314	61							**FINAL**	

# BG Samples Collected:	3
# BG Samples Shipped:	0
# BG Samples Analyzed:	0
# Samples Collected:	37
# Samples Shipped:	0
# Samples Analyzed:	0
# Dupes Analyzed	0
Total # Samples Collected:	**40**
Total # Samples Shipped:	0
Total # Samples Analyzed:	**0**
Total # Dupes Analyzed:	0
# Samples FL pos:	0
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**40**												
Station Name:		**Rainbow Springs Headsprings**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/31/2010	13:52	4/7/2010	16:09			7								
4/7/2010	16:09	4/20/2010	18:08			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/20/2010	18:08	4/29/2010	11:52	-3	6	6+3								8/9/2010
4/29/2010	11:52	5/6/2010	11:40	6	13	7								8/9/2010
5/6/2010	11:40	5/13/2010	9:56	13	20	7								8/9/2010
5/13/2010	9:56	5/20/2010	13:50	20	27	7								8/9/2010
5/20/2010	13:50	5/26/2010	11:54	27	33	6								8/9/2010
5/26/2010	11:54	6/2/2010	12:16	33	40	7								8/9/2010
6/2/2010	12:16	6/10/2010	12:03	40	48	8								8/9/2010
6/10/2010	12:03	6/16/2010	12:24	48	54	6								8/9/2010
6/16/2010	12:24	6/23/2010	15:58	54	61	7		**ND**	**ND**	**ND**	**ND**	U0827		8/9/2010
6/23/2010	15:58	6/30/2010	11:40	61	68	7		**ND**	**ND**	**ND**	**ND**	U0828		8/9/2010
6/30/2010	11:40	7/8/2010	11:38	68	76	8		**ND**	**ND**	**ND**	**ND**	U0829		8/9/2010
7/8/2010	11:38	7/21/2010	12:49	76	90	13		**ND**	**ND**	**ND**	**ND**	U0830		8/9/2010
7/21/2010	12:49	10/6/2010	16:30	90	167/1	77		**ND**	**ND**	**ND**	**ND**	U1869		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	16:30	10/21/2010	12:21	167/1	182/16	15		**ND**	**ND**	**ND**	**ND**	U2671		10/26/2010
10/21/2010	12:21	11/3/2010	11:42	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2948		11/5/2010
11/3/2010	11:42	11/17/2010	11:14	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3594		11/19/1010
11/17/2010	11:14	12/1/2010	12:00	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4295		12/2/2010
12/1/2010	12:00	12/16/2010	12:28	223/57	238/72	15		**ND**	**ND**	**ND**	**ND**	U4781		12/20/2010
12/16/2010	12:28	1/6/2011	12:14	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5473		1/12/2011
1/6/2011	12:14	1/26/2011	12:15	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5738		1/27/2011
1/26/2011	12:15	2/11/2011	12:29	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6330		2/17/2011
2/11/2011	12:29	3/2/2011	12:39	295/129	314/148	19								3/22/2011
3/2/2011	12:39	3/18/2011	12:37	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7468		3/22/2011
3/18/2011	12:37	4/7/2011	12:29	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8199		4/15/2011
4/7/2011	12:29	4/26/2011	12:21	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8630		4/27/2011
4/26/2011	12:21	5/10/2011	?	369/203	?	?					**Samplers and holder missing**			
5/10/2011	11:30	5/25/2011	12:18	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0354		5/27/2011
5/25/2011	12:18	6/16/2011	12:30	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0772		6/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 2 of 2
Station Number:		**40**												
Station Name:		**Rainbow Springs Headsprings**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
6/16/2011	12:30	7/22/2011	10:36	420/254	456/290	36		**ND**	**ND**	**ND**	**ND**	V1424		7/26/2011
7/22/2011	10:36	8/15/2011	11:45	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1736		8/16/2011
8/15/2011	11:45	9/14/2011	10:36	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2059	**FINAL**	9/15/2011
# BG Samples Collected:		2												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		30												
# Samples Shipped:		30												
# Samples Analyzed:		21												
# Dupes Analyzed		0												
Total # Samples Collected:		**32**												
Total # Samples Shipped:		30												
Total # Samples Analyzed:		**21**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**41**												
Station Name:		**Rainbow Springs Bubbling Spring**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/31/2010	13:35	4/7/2010	15:45			7								
4/7/2010	15:45	4/20/2010	17:54			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/20/2010	17:54	4/29/2010	11:33	-3	6	6+3								8/9/2010
4/29/2010	11:33	5/6/2010	11:14	6	13	7								8/9/2010
5/6/2010	11:14	5/13/2010	9:39	13	20	7								8/9/2010
5/13/2010	9:39	5/20/2010	13:20	20	27	7								8/9/2010
5/20/2010	13:20	5/26/2010	12:32	27	33	6								8/9/2010
5/26/2010	12:32	6/2/2010	12:54	33	40	7								8/9/2010
6/2/2010	12:54	6/10/2010	12:32	40	48	8								8/9/2010
6/10/2010	12:32	6/16/2010	12:57	48	54	6								8/9/2010
6/16/2010	12:57	6/23/2010	15:41	54	61	7		**ND**	**ND**	**ND**	**ND**	U0839		8/9/2010
6/23/2010	15:41	6/30/2010	12:15	61	68	7		**ND**	**ND**	**ND**	**ND**	U0841		8/9/2010
6/30/2010	12:15	7/8/2010	12:21	68	76	8		**ND**	**ND**	**ND**	**ND**	U0842		8/9/2010
7/8/2010	12:21	7/21/2010	13:26	76	90	13		**ND**	**ND**	**ND**	**ND**	U0843		8/9/2010
7/21/2010	13:26	10/6/2010	15:40	90	167	77		**ND**	**ND**	**ND**	**ND**	U1870		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	15:40	10/21/2010	13:01	167/1	182/16	15		**ND**	**ND**	**ND**	**ND**	U2672		10/26/2010
10/21/2010	13:01	11/3/2010	12:09	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2949		11/5/2010
11/3/2010	12:09	11/17/2010	12:05	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3595		11/19/1010
11/17/2010	12:05	12/1/2010	12:38	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4296		12/2/2010
12/1/2010	12:38	12/16/2010	12:58	223/57	238/72	15		**ND**	**ND**	**ND**	**ND**	U4782		12/20/2010
12/16/2010	12:58	1/6/2011	12:49	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5474		1/12/2011
1/6/2011	12:49	1/26/2011	12:51	259/93	279/113	20	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U5739/D		1/27/2011
1/26/2011	12:51	2/11/2011	12:58	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6331		2/17/2011
2/11/2011	12:58	3/2/2011	13:09	295/129	314/148	19								3/22/2011
3/2/2011	13:09	3/18/2011	13:10	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7469		3/22/2011
3/18/2011	13:10	4/7/2011	13:02	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8201		4/15/2011
4/7/2011	13:02	4/26/2011	12:52	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8631		4/27/2011
4/26/2011	12:52	5/10/2011	12:11	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9873		5/12/2011
5/10/2011	12:11	5/25/2011	12:57	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0355		5/27/2011
5/25/2011	12:57	6/16/2011	13:03	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0773		6/17/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 2 of 2
Station Number:		**41**													
Station Name:		**Rainbow Springs Bubbling Spring**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
6/16/2011	13:03	7/22/2011	10:54	420/254	456/290	36		**ND**	**ND**	**ND**	**ND**	V1425		7/26/2011
7/22/2011	10:54	8/15/2011	11:27	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1737	**Note 1**	8/16/2011
8/15/2011	11:27	9/14/2011	10:53	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2060	**FINAL**	9/15/2011
										Note 1: Sampler found out of water				
# BG Samples Collected:		2												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		31												
# Samples Shipped:		31												
# Samples Analyzed:		22												
# Dupes Analyzed		1												
Total # Samples Collected:		**33**												
Total # Samples Shipped:		31												
Total # Samples Analyzed:		**22**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: **42**

Station Name: **Rainbow Springs Rainbow River**

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/31/2010	14:06	4/7/2010	16:17			7								
4/7/2010	16:17	4/20/2010	18:18			13								
Dye Trace 1	**4/23/10 = Day 0**													
4/20/2010	18:18	4/29/2010	12:03	-3	6	6+3								8/9/2010
4/29/2010	12:03	5/6/2010	11:50	6	13	7								8/9/2010
5/6/2010	11:50	5/13/2010	10:05	13	20	7								8/9/2010
5/13/2010	10:05	5/20/2010	14:10	20	27	7								8/9/2010
5/20/2010	14:10	5/26/2010	12:02	27	33	6								8/9/2010
5/26/2010	12:02	6/2/2010	12:28	33	40	7								8/9/2010
6/2/2010	12:28	6/10/2010	12:13	40	48	8								8/9/2010
6/10/2010	12:13	6/16/2010	12:37	48	54	6								8/9/2010
6/16/2010	12:37	6/23/2010	14:08	54	61	7		**ND**	**ND**	**ND**	**ND**	U0852		8/9/2010
6/23/2010	14:08	6/30/2010	11:53	61	68	7		**ND**	**ND**	**ND**	**ND**	U0853		8/9/2010
6/30/2010	11:53	7/8/2010	11:52	68	76	8		**ND**	**ND**	**ND**	**ND**	U0854		8/9/2010
7/8/2010	11:52	7/21/2010	12:58	76	90	13		**ND**	**ND**	**ND**	**ND**	U0855		8/9/2010
7/21/2010	12:58	10/6/2010	16:05	90	167	77		**ND**	**ND**	**ND**	**ND**	U1871		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	16:05	10/21/2010	12:36	167/1	182/16	15		**ND**	**ND**	**ND**	**ND**	U2673		10/26/2010
10/21/2010	12:36	11/3/2010	11:50	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2950		11/5/2010
11/3/2010	11:50	11/17/2010	11:25	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3596		11/19/1010
11/17/2010	11:25	12/1/2010	12;13	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4297		12/2/2010
12/1/2010	12:13	12/16/2010	12:37	223/57	238/72	15		**ND**	**ND**	**ND**	**ND**	U4783		12/20/2010
12/16/2010	12:37	1/6/2011	12:25	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5475		1/12/2011
1/6/2011	12:25	1/26/2011	12:30	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5741		1/27/2011
1/26/2011	12:30	2/11/2011	12:38	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6332		2/17/2011
2/11/2011	12:38	3/2/2011	12:50	295/129	314/148	19		**ND**	**ND**	**ND**	**ND**	U7788		3/22/2011
3/2/2011	12:50	3/18/2011	13:10	314/148	330/164	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U7470/D	*/*	3/22/2011
3/18/2011	13:10	4/7/2011	12:39	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8202		4/15/2011
4/7/2011	12:39	4/26/2011	12:31	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8632		4/27/2011
4/26/2011	12:31	5/10/2011	11:38	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9874		5/12/2011
5/10/2011	11:38	5/25/2011	12:30	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0356		5/27/2011
5/25/2011	12:30	6/16/2011	12:44	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0774		6/17/2011
6/16/2011	12:44	7/22/2011	10:33	420/254	456/290	36							**FINAL**	

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number:	**42**
Station Name:	**Rainbow Springs Rainbow River**
# BG Samples Collected:	2
# BG Samples Shipped:	0
# BG Samples Analyzed:	0
# Samples Collected:	29
# Samples Shipped:	28
# Samples Analyzed:	20
# Dupes Analyzed	1
Total # Samples Collected:	**31**
Total # Samples Shipped:	28
Total # Samples Analyzed:	**20**
Total # Dupes Analyzed:	1
# Samples FL pos:	0
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 50

Station Name: Ocala Public Supply Well 1

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	12:45	4/1/2010	11:40			7		**ND**	**ND**	**ND**	**ND**	T6985		4/5/2010
4/1/2010	11:40	4/7/2010	11:03			6								
4/7/2010	11:03	4/21/2010	12:44			14								
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	12:44	4/29/2010	13:45	-2	6	6+2		**ND**	**ND**	**ND**	**ND**	U0568		7/15/2010
4/29/2010	13:45	5/6/2010	13:22	6	13	7		**ND**	**ND**	**ND**	**ND**	U0569		7/15/2010
5/6/2010	13:22	5/13/2010	11:09	13	20	7		**ND**	**ND**	**ND**	**ND**	T9384		6/7/2010
5/13/2010	11:09	5/20/2010	17:22	20	27	7		**ND**	**ND**	**ND**	**ND**	U0570		7/15/2010
5/20/2010	17:22	5/26/2010	13:40	27	33	6		**ND**	**ND**	**ND**	**ND**	T9392		6/7/2010
5/26/2010	13:40	6/2/2010	14:05	33	40	7								7/13/2010
6/2/2010	14:05	6/10/2010	13:36	40	48	8								7/13/2010
6/10/2010	13:36	6/16/2010	13:59	48	54	6								7/13/2010
6/16/2010	13:59	6/23/2010	17:20	54	61	7								7/13/2010
6/23/2010	17:20	6/30/2010	13:18	61	68	7								7/13/2010
6/30/2010	13:18	7/8/2010	13:23	68	76	8								7/13/2010
7/8/2010	13:23	7/21/2010	14:26	76	90	13		**ND**	**ND**	**ND**	**ND**	U0808		8/9/2010
7/21/2010	14:26	9/1/2010	16:37	90	132	42		**ND**	**ND**	**ND**	**ND**	U1347		9/8/2010
9/1/2010	16:37	9/17/2010	17:07	132	148	16		**ND**	**ND**	**ND**	**ND**	U1458		9/27/2010
9/17/2010	17:07	10/4/2010	12:21	148	165/-1	17		**ND**	**ND**	**ND**	**ND**	U1863		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	12:21	10/9/2010	14:08	165/-1	170/4	5	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2039/D		10/14/2010
10/9/2010	14:08	10/14/2010	15:15	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2652		10/26/2010
10/14/2010	15:15	10/21/2010	15:25	175/9	182/16	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2659/D		10/26/2010
10/21/2010	15:25	10/27/2010	15:22	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2929		11/5/2010
10/27/2010	15:22	11/3/2010	14:38	188/22	195/29	7		**ND**	**ND**	**ND**	**ND**	U2936		11/5/2010
11/3/2010	14:38	11/10/2010	13:50	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3254		11/12/2010
11/10/2010	13:50	11/17/2010	14:03	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3583		11/19/1010
11/17/2010	14:03	11/24/2010	13:49	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4276		12/2/2010
11/24/2010	13:49	12/1/2010	15:29	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4284		12/2/2010
12/1/2010	15:29	12/9/2010	13:50	223/57	231/65	8		**ND**	**ND**	**ND**	**ND**	U4566		12/13/2010
12/9/2010	13:50	12/16/2010	15:11	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4769		12/20/2010
12/16/2010	15:11	12/27/2010	12:59	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5096		12/30/2010
12/27/2010	12:59	1/6/2011	15:35	249/83	259/93	10		**ND**	**ND**	**ND**	**ND**	U5462		1/12/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**50**												
Station Name:		**Ocala Public Supply Well 1**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/6/2011	15:35	1/26/2011	15:01	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5727		1/27/2011
1/26/2011	15:01	2/11/2011	15:49	279/113	295/129	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U6319/D		2/17/2011
2/11/2011	15:49	3/2/2011	15:38	295/129	314/148	19								3/22/2011
3/2/2011	15:38	3/18/2011	15:26	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7458		3/22/2011
3/18/2011	15:26	4/7/2011	15:25	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8191		4/15/2011
4/7/2011	15:25	4/26/2011	15:11	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8622		4/27/2011
4/26/2011	15:11	5/10/2011	17:37	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9865		5/12/2011
5/10/2011	17:37	5/25/2011	15:31	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0346		5/27/2011
5/25/2011	15:31	6/16/2011	16:00	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0764		6/17/2011
6/16/2011	16:00	7/22/2011	16:16	420/254	456/290	36		**ND**	**ND**	**ND**	**ND**	V1426		7/26/2011
7/22/2011	16:16	8/15/2011	11:56	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1738		8/16/2011
8/15/2011	11:56	9/14/2011	13:14	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2062	**FINAL**	9/15/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		1												
# BG Samples Analyzed:		1												
# Samples Collected:		40												
# Samples Shipped:		40												
# Samples Analyzed:		33												
# Dupes Analyzed		3												
Total # Samples Collected:		**43**												
Total # Samples Shipped:		41												
Total # Samples Analyzed:		**34**												
Total # Dupes Analyzed:		3												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number: 51

Station Name: Ocala Public Supply Well 2

PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:	Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #		Shipped:
Comprehensive Background														
3/25/2010	12:52	4/1/2010	11:42			7								
4/1/2010	11:42	4/7/2010	11:04			6								
4/7/2010	11:04	4/21/2010	12:50			14								
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	12:50	4/29/2010	13:51	-2	6	6+2		**ND**	**ND**	**ND**	**ND**	U0571		7/15/2010
4/29/2010	13:51	5/6/2010	13:11	6	13	7		**ND**	**ND**	**ND**	**ND**	U0572		7/15/2010
5/6/2010	13:11	5/13/2010	11:13	13	20	7		**ND**	**ND**	**ND**	**ND**	T9385		6/7/2010
5/13/2010	11:13	5/20/2010	17:28	20	27	7		**ND**	**ND**	**ND**	**ND**	U0573		7/15/2010
5/20/2010	17:28	5/26/2010	13:45	27	33	6		**ND**	**ND**	**ND**	**ND**	T9393		6/7/2010
5/26/2010	13:45	6/2/2010	14:11	33	40	7								7/13/2010
6/2/2010	14:11	6/10/2010	13:42	40	48	8								7/13/2010
6/10/2010	13:42	6/16/2010	14:04	48	54	6								7/13/2010
6/16/2010	14:04	6/23/2010	17:24	54	61	7								7/13/2010
6/23/2010	17:24	6/30/2010	13:23	61	68	7								7/13/2010
6/30/2010	13:23	7/8/2010	13:27	68	76	8								7/13/2010
7/8/2010	13:27	7/21/2010	14:30	76	90	13		**ND**	**ND**	**ND**	**ND**	U0809		8/9/2010
7/21/2010	14:30	9/1/2010	16:44	90	132	42		**ND**	**ND**	**ND**	**ND**	U1348		9/8/2010
9/1/2010	16:44	9/17/2010	17:09	132	148	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U1459/D		9/27/2010
9/17/2010	17:09	10/4/2010	12:26	148	165/-1	17		**ND**	**ND**	**ND**	**ND**	U1864		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	12:26	10/9/2010	14:14	165/-1	170/4	5		**ND**	**ND**	**ND**	**ND**	U2041		10/14/2010
10/9/2010	14:14	10/14/2010	15:21	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2653		10/26/2010
10/14/2010	15:21	10/21/2010	15:33	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2661		10/26/2010
10/21/2010	15:33	10/27/2010	15:28	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2930		11/5/2010
10/27/2010	15:28	11/3/2010	14:40	188/22	195/29	7		**ND**	**ND**	**ND**	**ND**	U2937		11/5/2010
11/3/2010	14:40	11/10/2010	13:54	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3255		11/12/2010
11/10/2010	13:54	11/17/2010	14:07	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3584		11/19/1010
11/17/2010	14:07	11/24/2010	13:54	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4277		12/2/2010
11/24/2010	13:54	12/1/2010	15:33	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4285		12/2/2010
12/1/2010	15:33	12/9/2010	13:54	223/57	231/65	8		**ND**	**ND**	**ND**	**ND**	U4567		12/13/2010
12/9/2010	13:54	12/16/2010	15:16	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4770		12/20/2010
12/16/2010	15:16	12/27/2010	13:08	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5097		12/30/2010
12/27/2010	13:08	1/6/2011	15:40	249/83	259/93	10		**ND**	**ND**	**ND**	**ND**	U5463		1/12/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**51**												
Station Name:		**Ocala Public Supply Well 2**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
1/6/2011	15:40	1/26/2011	15:07	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5728		1/27/2011
1/26/2011	15:07	2/11/2011	15:53	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6321		2/17/2011
2/11/2011	15:53	3/2/2011	15:43	295/129	314/148	19								3/22/2011
3/2/2011	15:43	3/18/2011	15:26	314/148	330/164	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U7459/D		3/22/2011
3/18/2011	15:26	4/7/2011	15:30	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8192		4/15/2011
4/7/2011	15:30	4/26/2011	15:11	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8623		4/27/2011
4/26/2011	15:19	5/10/2011	17:40	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9866		5/12/2011
5/10/2011	17:40	5/25/2011	15:38	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0347		5/27/2011
5/25/2011	15:38	6/16/2011	16:06	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0765		6/17/2011
6/16/2011	16:06	7/22/2011	16:15	420/254	456/290	36		**ND**	**ND**	**ND**	**ND**	V1427		7/26/2011
7/22/2011	16:15	8/15/2011	11:46	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1739		8/16/2011
8/15/2011	11:46	9/14/2011	13:21	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2063	**FINAL**	9/15/2011
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		40												
# Samples Shipped:		40												
# Samples Analyzed:		33												
# Dupes Analyzed		2												
Total # Samples Collected:		**43**												
Total # Samples Shipped:		40												
Total # Samples Analyzed:		**33**												
Total # Dupes Analyzed:		2												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**52**												
Station Name:		**Ocala Public Supply Wells West Acceletor**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/25/2010	13:00	4/1/2010	11:45			7		**ND**	**ND**	**ND**	**ND**	T6986		4/5/2010
4/1/2010	11:45	4/7/2010	11:08			6								
4/7/2010	11:08	4/21/2010	12:57			14								
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	12:57	4/29/2010	13:55	-2	6	6+2								
4/29/2010	13:55	5/6/2010	13:15	6	13	7								
5/6/2010	13:15	5/13/2010	11:16	13	20	7		**ND**	**ND**	**ND**	**ND**	T9386		6/7/2010
5/13/2010	11:16	5/20/2010	17:33	20	27	7								
5/20/2010	17:33	5/26/2010	13:49	27	33	6		**ND**	**ND**	**ND**	**ND**	T9394		6/7/2010
5/26/2010	13:49	6/2/2010	14:14	33	40	7								7/13/2010
6/2/2010	14:14	6/10/2010	13:46	40	48	8								7/13/2010
6/10/2010	13:46	6/16/2010	14:10	48	54	6								7/13/2010
6/16/2010	14:10	6/23/2010	17:28	54	61	7								7/13/2010
6/23/2010	17:28	6/30/2010	13:27	61	68	7								7/13/2010
6/30/2010	13:27	7/8/2010	13:31	68	76	8								7/13/2010
7/8/2010	13:31	7/21/2010	14:34	76	90	13								8/9/2010
7/21/2010	14:34	9/1/2010	16:50	90	132	42		**ND**	**ND**	**ND**	**ND**	U1349		9/8/2010
9/1/2010	16:50	9/17/2010	17:12	132	148	16		**ND**	**ND**	**ND**	**ND**	U1461		9/27/2010
9/17/2010	17:12	10/4/2010	12:32	148	165	17		**ND**	**ND**	**ND**	**ND**	U1865	**FINAL**	10/11/2010
Dye Trace 2	**10/5/10 = Day 0**												**Accelator out of service.**	
# BG Samples Collected:		3												
# BG Samples Shipped:		1												
# BG Samples Analyzed:		1												
# Samples Collected:		15												
# Samples Shipped:		12												
# Samples Analyzed:		4												
# Dupes Analyzed		0												
Total # Samples Collected:		**18**		# Samples FL pos:			0							
Total # Samples Shipped:		13		# Samples EO pos:			0							
Total # Samples Analyzed:		**5**		# Samples RWT pos:			0							
Total # Dupes Analyzed:		0		# Samples SRB pos:			0							

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**54**												
Station Name:		**Reddick Collier Elementary School Well #5**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/24/2010	9:23	3/31/2010	17:43			7								
3/31/2010	17:43	4/7/2010	13:22			7								
4/7/2010	13:22	4/21/2010	11:25			14								6/21/2010
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	11:25	4/29/2010	16:57	-2	6	6+2		**ND**	**ND**	**ND**	**ND**	T9756		6/21/2010
4/29/2010	16:57	5/6/2010	15:01	6	13	7		**79.1**	**ND**	**ND**	**ND**	T9757		6/21/2010
5/6/2010	15:01	5/13/2010	12:46	13	20	7		**166**	**ND**	**ND**	**ND**	T9387		6/7/2010
5/13/2010	12:46	5/20/2010	15:55	20	27	7		**120**	**ND**	**ND**	**ND**	T9758		6/21/2010
5/20/2010	15:55	5/26/2010	15:30	27	33	6	**X**	**73.5/61.5**	**ND/ND**	**ND/ND**	**ND/ND**	T9759/D		6/21/2010
5/26/2010	15:30	6/2/2010	16:00	33	40	7		**65.3**	**ND**	**ND**	**ND**	T9761		6/21/2010
6/2/2010	16:00	6/10/2010	15:32	40	48	8		**41.8**	**ND**	**ND**	**ND**	T9762		6/21/2010
6/10/2010	15:32	6/16/2010	15:56	48	54	6		**26.2**	**ND**	**ND**	**ND**	T9763		6/21/2010
6/16/2010	15:56	6/23/2010	19:49	54	61	7		**23.9**	**ND**	**ND**	**ND**	U0563		7/13/2010
6/23/2010	19:49	6/30/2010	14:50	61	68	7		**13.7**	**ND**	**ND**	**ND**	U0564		7/13/2010
6/30/2010	14:50	7/8/2010	15:56	68	76	8								7/13/2010
7/8/2010	15:56	7/21/2010	15:26	76	90	13								8/9/2010
7/21/2010	15:26	9/1/2010	14:38	90	132	42		**16**	**ND**	**ND**	**ND**	U1350	**FINAL**	9/8/2010
Dye Trace 2	**10/5/10 = Day 0**													
# BG Samples Collected:		3												
# BG Samples Shipped:		1												
# BG Samples Analyzed:		0												
# Samples Collected:		13												
# Samples Shipped:		13												
# Samples Analyzed:		11												
# Dupes Analyzed		1												
Total # Samples Collected:		**16**		**# Samples FL pos:**			**9**	**+1**	**Dupe**					
Total # Samples Shipped:		14		# Samples EO pos:			0							
Total # Samples Analyzed:		**11**		# Samples RWT pos:			0							
Total # Dupes Analyzed:		1		# Samples SRB pos:			0							

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**55**												
Station Name:		**North Marion High School West Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/24/2010	11:01	3/31/2010	17:20			7								
3/31/2010	17:20	4/7/2010	12:23			7								
4/7/2010	12:23	4/21/2010	15:47			14								6/21/2010
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	15:47	4/29/2010	15:23	-2	6	6+2								6/21/2010
4/29/2010	15:23	5/6/2010	14:42	6	13	7								6/21/2010
5/6/2010	14:42	5/13/2010	12:32	13	20	7		**ND**	**ND**	**ND**	**ND**	T9388		6/7/2010
5/13/2010	12:32	5/20/2010	16:37	20	27	7		**ND**	**ND**	**ND**	**ND**	U0525		6/21/2010
5/20/2010	16:37	5/26/2010	15:01	27	33	6		**ND**	**ND**	**ND**	**ND**	U0526		6/21/2010
5/26/2010	15:01	6/2/2010	15:39	33	40	7		**ND**	**ND**	**ND**	**ND**	U0527		6/21/2010
6/2/2010	15:39	6/10/2010	15:01	40	48	8		**ND**	**ND**	**ND**	**ND**	U0528		6/21/2010
6/10/2010	15:01	6/16/2010	15:27	48	54	6								6/21/2010
6/16/2010	15:27	6/23/2010	18:51	54	61	7								7/13/2010
6/23/2010	18:51	6/30/2010	14:33	61	68	7								7/13/2010
6/30/2010	14:33	7/8/2010	14:31	68	76	8								7/13/2010
7/8/2010	14:31	7/21/2010	15:41	76	90	13		**ND**	**ND**	**ND**	**ND**	U0812		8/9/2010
7/21/2010	15:41	9/1/2010	15:15	90	132	42		**ND**	**ND**	**ND**	**ND**	U1351		9/8/2010
9/1/2010	15:15	9/17/2010	17:36	132	148	16		**ND**	**ND**	**ND**	**ND**	U1462		9/27/2010
9/17/2010	17:36	10/5/2010	16:58	148	166	18		**ND**	**ND**	**ND**	**ND**	U1866		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/5/2010	16:58	10/21/2010	16:32	166/0	182/16	16		**ND**	**ND**	**ND**	**ND**	U2667		10/26/2010
10/21/2010	16:32	11/3/2010	15:51	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2944		11/5/2010
11/3/2010	15:51	11/17/2010	14:55	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3590		11/19/1010
11/17/2010	14:55	12/1/2010	16:26	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4291		12/2/2010
12/1/2010	16:26	12/16/2010	16:01	223/57	238/72	15		**ND**	**ND**	**ND**	**ND**	U4776		12/20/2010
12/16/2010	16:01	1/6/2011	16:35	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5469		1/12/2011
1/6/2011	16:35	1/26/2011	15:57	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5734		1/27/2011
1/26/2011	15:57	2/11/2011	16:40	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6327		2/17/2011
2/11/2011	16:40	3/2/2011	16:29	295/129	314/148	19								3/22/2011
3/2/2011	16:29	3/18/2011	16:27	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7465		3/22/2011
3/18/2011	16:27	4/7/2011	16:22	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8197		4/15/2011
4/7/2011	16:22	4/26/2011	16:20	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8628		4/27/2011
4/26/2011	16:20	5/10/2011	16:54	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9871		5/12/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 2 of 2
Station Number:		**55**													
Station Name:		**North Marion High School West Well**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**	
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**	
5/10/2011	16:54	5/25/2011	16:51	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0352		5/27/2011	
5/25/2011	16:51	6/16/2011	17:08	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0770		6/17/2011	
6/16/2011	17:08	7/22/2011	17:05	420/254	456/290	36							**FINAL**		
# BG Samples Collected:		3													
# BG Samples Shipped:		1													
# BG Samples Analyzed:		0													
# Samples Collected:		31													
# Samples Shipped:		30													
# Samples Analyzed:		23													
# Dupes Analyzed		0													
Total # Samples Collected:		**34**													
Total # Samples Shipped:		31													
Total # Samples Analyzed:		**23**													
Total # Dupes Analyzed:		0													
# Samples FL pos:		0													
# Samples EO pos:		0													
# Samples RWT pos:		0													
# Samples SRB pos:		0													

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**56**												
Station Name:		**Ocala Springs Elementary School East Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/24/2010	11:53	3/31/2010	16:43			7								
3/31/2010	16:43	4/7/2010	11:59			7								
4/7/2010	11:59	4/21/2010	15:07			14								
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	15:07	4/29/2010	14:19	-2	6	6+2								
4/29/2010	14:19	5/6/2010	13:42	6	13	7								
5/6/2010	13:42	5/13/2010	11:33	13	20	7								
5/13/2010	11:33	5/20/2010	17:00	20	27	7		**ND**	**ND**	**ND**	**ND**	U0574		7/15/2010
5/20/2010	17:00	5/26/2010	14:07	27	33	6		**ND**	**ND**	**ND**	**ND**	U0565		7/13/2010
5/26/2010	14:07	6/2/2010	14:35	33	40	7		**ND**	**ND**	**ND**	**ND**	U0566		7/13/2010
6/2/2010	14:35	6/10/2010	14:04	40	48	8		**ND**	**ND**	**ND**	**ND**	U0567		7/13/2010
6/10/2010	14:04	6/16/2010	14:24	48	54	6								7/13/2010
6/16/2010	14:24	6/23/2010	17:47	54	61	7								7/13/2010
6/23/2010	17:47	6/30/2010	13:41	61	68	7								7/13/2010
6/30/2010	13:41	7/8/2010	13:44	68	76	8								7/13/2010
7/8/2010	13:44	7/21/2010	14:46	76	90	13		**ND**	**ND**	**ND**	**ND**	U0813		8/9/2010
7/21/2010	14:46	9/1/2010	16:21	90	132	42		**ND**	**ND**	**ND**	**ND**	U1352		9/8/2010
9/1/2010	16:21	9/17/2010	17:57	132	148	16		**ND**	**ND**	**ND**	**ND**	U1463		9/27/2010
9/17/2010	17:57	10/5/2010	17:22	148	166	18		**ND**	**ND**	**ND**	**ND**	U1867		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/5/2010	17:22	10/21/2010	15:56	166/0	182/16	16		**ND**	**ND**	**ND**	**ND**	U2668		10/26/2010
10/21/2010	15:56	11/3/2010	14:52	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2945		11/5/2010
11/3/2010	14:52	11/17/2010	14:21	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3591		11/19/1010
11/17/2010	14:21	12/1/2010	15:56	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4292		12/2/2010
12/1/2010	15:56	12/16/2010	15:31	223/57	238/72	15		**ND**	**ND**	**ND**	**ND**	U4777		12/20/2010
12/16/2010	15:31	1/6/2011	15:58	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5470		1/12/2011
1/6/2011	15:58	1/26/2011	15:24	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5735		1/27/2011
1/26/2011	15:24	2/11/2011	16:10	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6328		2/17/2011
2/11/2011	16:10	3/2/2011	15:58	295/129	314/148	19		**ND**	**ND**	**ND**	**ND**	U7787		3/22/2011
3/2/2011	15:58	3/18/2011	15:52	314/148	330/164	16	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U7466/D		3/22/2011
3/18/2011	15:52	4/7/2011	15:47	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8198		4/15/2011
4/7/2011	15:47	4/26/2011	15:34	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8629		4/27/2011
4/26/2011	15:34	5/10/2011	17:24	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9872		5/12/2011

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														
Station Number:		**56**												
Station Name:		**Ocala Springs Elementary School East Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
5/10/2011	17:24	5/25/2011	16:05	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0353		5/27/2011
5/25/2011	16:05	6/16/2011	16:28	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0771		6/17/2011
6/16/2011	16:28	7/22/2011	16:35	420/254	456/290	36							**FINAL**	
# BG Samples Collected:		3												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		31												
# Samples Shipped:		27												
# Samples Analyzed:		23												
# Dupes Analyzed		1												
Total # Samples Collected:		**34**												
Total # Samples Shipped:		27												
Total # Samples Analyzed:		**23**												
Total # Dupes Analyzed:		1												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 2
Station Number:		**57**												
Station Name:		**Marion Correctional Institution Well 1**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/30/2010	10:30	4/7/2010	13:39			8								
4/7/2010	13:39	4/21/2010	11:51			14								
Dye Trace 1	**4/23/10 = Day 0**													
4/21/2010	11:51	4/29/2010	14:53	-2	6	6+2								6/21/2010
4/29/2010	14:53	5/6/2010	14:14	6	13	7								6/21/2010
5/6/2010	14:14	5/13/2010	12:05	13	20	7		**ND**	**ND**	**ND**	**ND**	U0529		6/21/2010
5/13/2010	12:05	5/20/2010	16:15	20	27	7		**ND**	**ND**	**ND**	**ND**	U0530		6/21/2010
5/20/2010	16:15	5/26/2010	14:39	27	33	6		**ND**	**ND**	**ND**	**ND**	U0531		6/21/2010
5/26/2010	14:39	6/2/2010	15:05	33	40	7		**ND**	**ND**	**ND**	**ND**	U0532		6/21/2010
6/2/2010	15:05	6/10/2010	14:41	40	48	8		**ND**	**ND**	**ND**	**ND**	U0533		6/21/2010
6/10/2010	14:41	6/16/2010	14:55	48	54	6		**ND**	**ND**	**ND**	**ND**	U0534		6/21/2010
6/16/2010	14:55	6/23/2010	18:21	54	61	7								7/13/2010
6/23/2010	18:21	6/30/2010	14:05	61	68	7								7/13/2010
6/30/2010	14:05	7/8/2010	14:08	68	76	8								7/13/2010
7/8/2010	14:08	7/21/2010	15:11	76	90	13		**ND**	**ND**	**ND**	**ND**	U0814		8/9/2010
7/21/2010	15:11	9/1/2010	15:52	90	132	42		**ND**	**ND**	**ND**	**ND**	U1353		9/8/2010
9/1/2010	15:52	9/17/2010	12:55	132	148	16		**ND**	**ND**	**ND**	**ND**	U1464		9/27/2010
9/17/2010	12:55	10/5/2010	16:20	148	166	18		**ND**	**ND**	**ND**	**ND**	U1868		10/11/2010
Dye Trace 2	**10/5/10 = Day 0**													
10/5/2010	16:20	10/21/2010	16:55	166/0	182/16	16		**ND**	**ND**	**ND**	**ND**	U2669		10/26/2010
10/21/2010	16:55	11/3/2010	16:13	182/16	195/29	13		**ND**	**ND**	**0.604**	**ND**	U2946		11/5/2010
11/3/2010	16:13	11/17/2010	15:25	195/29	209/43	14		**ND**	**ND**	**0.772**	**ND**	U3592		11/19/1010
11/17/2010	15:25	12/1/2010	16:59	209/43	223/57	14		**ND**	**ND**	**0.643**	**ND**	U4293		12/2/2010
12/1/2010	16:59	12/16/2010	16:34	223/57	238/72	15		**ND**	**ND**	**0.868**	**ND**	U4778		12/20/2010
12/16/2010	16:34	1/6/2011	16:57	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5471		1/12/2011
1/6/2011	16:57	1/26/2011	16:29	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5736		1/27/2011
1/26/2011	16:29	2/11/2011	17:04	279/113	295/129	16							**Non-return valve stuck; may not have flowed during interval.**	
2/11/2011	17:04	3/2/2011	16:55	295/129	314/148	19								3/22/2011
3/2/2011	16:55	**3/14/2011**	**10:00**	314/148	326/160	**12***		**ND**	**ND**	**1.97**	**ND**	U7467	**FINAL**	3/22/2011
3/18/2011	16:51	4/7/2011		330/164	350/184	20							***Well shut down March 14, 2011 @ 10:00.**	
													Sampler dismantled, packets unused.	
													Well grouted as of 4/10/11	

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

Station Number:	**57**
Station Name:	**Marion Correctional Institution Well 1**
# BG Samples Collected:	2
# BG Samples Shipped:	0
# BG Samples Analyzed:	0
# Samples Collected:	26
# Samples Shipped:	24
# Samples Analyzed:	18
# Dupes Analyzed	0
Total # Samples Collected:	**28**
Total # Samples Shipped:	24
Total # Samples Analyzed:	**18**
Total # Dupes Analyzed:	0
# Samples FL pos:	**5**
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**58**												
Station Name:		**IFAS Plant Science Unit Well A**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Comprehensive Background														
3/30/2010	16:30	4/7/2010	12:51			8							**Hose had blown off**	
4/7/2010	12:51	4/21/2010	16:11			14								6/21/2010
Dye Trace	**4/23/10 = Day 0**													
4/21/2010	16:11	4/29/2010	16:11	-2	6	6+2								6/21/2010
4/29/2010	16:11	5/6/2010	15:23	6	13	7		**ND**	**ND**	**ND**	**ND**	U0521		6/21/2010
5/6/2010	15:23	5/13/2010	13:08	13	20	7		**ND**	**ND**	**ND**	**ND**	T9389		6/7/2010
5/13/2010	13:08	5/20/2010	15:22	20	27	7		**0.688**	**ND**	**ND**	**ND**	U0522	**	6/21/2010
5/20/2010	15:22	5/26/2010	15:54	27	33	6		**2.49**	**ND**	**ND**	**ND**	U0523		6/21/2010
5/26/2010	15:54	6/2/2010	16:28	33	40	7								6/21/2010
6/2/2010	16:28	6/10/2010	15:55	40	48	8		**3.04**	**ND**	**ND**	**ND**	U0524	**6/14/10 hose blew**	6/21/2010
6/10/2010	15:55	6/23/2010	14:00	48	61	13							**6/16/10 Lightning, 6/17/10 replaced hose**	7/13/2010
6/23/2010	14:00	6/30/2010	16:28	61	68	7								7/13/2010
6/30/2010	16:28	7/8/2010	15:19	68	76	8								7/13/2010
7/8/2010	15:19	7/21/2010	16:20	76	90	13		**9.67**	**ND**	**ND**	**ND**	U0815		8/9/2010
7/21/2010	16:20	9/1/2010	13:45	90	132	42		**5.29**	**ND**	**ND**	**ND**	U1354	**FINAL**	9/8/2010
# BG Samples Collected:		2												
# BG Samples Shipped:		1												
# BG Samples Analyzed:		0												
# Samples Collected:		12												
# Samples Shipped:		12												
# Samples Analyzed:		7												
# Dupes Analyzed		0												
Total # Samples Collected:		**14**												
Total # Samples Shipped:		13												
Total # Samples Analyzed:		**7**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		**5**												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 1 of 1
Station Number:		**59**													
Station Name:		**IFAS Plant Science Unit Well D**													
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**	
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**	
Comprehensive Background															
3/30/2010	16:46	4/7/2010	13:02			8									
4/7/2010	13:02	4/21/2010	16:42			14								6/21/2010	
Dye Trace	**4/23/10 = Day 0**														
4/21/2010	16:42	4/29/2010	16:29	-2	6	6+2		**ND**	**ND**	**ND**	**ND**	T9765		6/21/2010	
4/29/2010	16:29	5/6/2010	15:41	6	13	7		**26.7**	**ND**	**ND**	**ND**	T9766		6/21/2010	
5/6/2010	15:41	5/13/2010	13:17	13	20	7		**10.1**	**ND**	**ND**	**ND**	T9390		6/7/2010	
5/13/2010	13:17	5/20/2010	15:33	20	27	7		**ND**	**ND**	**ND**	**ND**	T9767		6/21/2010	
5/20/2010	15:33	5/26/2010	16:12	27	33	6		**ND**	**ND**	**ND**	**ND**	T9768		6/21/2010	
5/26/2010	16:12	6/2/2010	16:54	33	40	7		**6.97**	**ND**	**ND**	**ND**	T9769		6/21/2010	
6/2/2010	16:54	6/10/2010	16:08	40	48	8		**ND**	**ND**	**ND**	**ND**	T9770		6/21/2010	
6/10/2010	16:08	6/23/2010	14:15	48	61	13							**6/16/10 Lightning**	7/13/2010	
6/23/2010	14:15	6/30/2010	16:39	61	68	7								7/13/2010	
6/30/2010	16:39	7/8/2010	15:34	68	76	8								7/13/2010	
7/8/2010	15:34	7/21/2010	16:29	76	90	13		**2.62**	**ND**	**ND**	**ND**	U0816		8/9/2010	
7/21/2010	16:29	9/1/2010	14:10	90	132	42		**ND**	**ND**	**ND**	**ND**	U1355	**FINAL**	9/8/2010	
# BG Samples Collected:		2													
# BG Samples Shipped:		1													
# BG Samples Analyzed:		0													
# Samples Collected:		12													
# Samples Shipped:		12													
# Samples Analyzed:		9													
# Dupes Analyzed		0													
Total # Samples Collected:		**14**													
Total # Samples Shipped:		13													
Total # Samples Analyzed:		**9**													
Total # Dupes Analyzed:		0													
# Samples FL pos:		**4**													
# Samples EO pos:		0													
# Samples RWT pos:		0													
# Samples SRB pos:		0													

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**60**												
Station Name:		**McIntosh Public Supply Well 2**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**													
4/28/2010	11:54	5/6/2010	16:26	5	13	8								6/21/2010
5/6/2010	16:26	5/13/2010	13:50	13	20	7		**ND**	**ND**	**ND**	**ND**	T9391		6/7/2010
5/13/2010	13:50	5/20/2010	18:17	20	27	7								6/21/2010
5/20/2010	18:17	5/26/2010	16:45	27	33	6								6/21/2010
5/26/2010	16:45	6/2/2010	17:14	33	40	7								6/21/2010
6/2/2010	17:14	6/10/2010	16:30	40	48	8								6/21/2010
6/10/2010	16:30	6/16/2010	17:36	48	54	6								6/21/2010
6/16/2010	17:36	6/23/2010	21:05	48	61	13								7/13/2010
6/23/2010	21:05	6/30/2010	16:57	61	68	7								7/13/2010
6/30/2010	16:57	7/8/2010	15:56	68	76	8								7/13/2010
7/8/2010	15:56	7/21/2010	16:45	76	90	13								8/9/2010
7/21/2010	16:45	9/1/2010	12:59	90	132	42		**ND**	**ND**	**ND**	**ND**	U1356	**FINAL**	9/8/2010
# BG Samples Collected:		0												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		12												
# Samples Shipped:		12												
# Samples Analyzed:		2												
# Dupes Analyzed		0												
Total # Samples Collected:		**12**												
Total # Samples Shipped:		12												
Total # Samples Analyzed:		**2**												
Total # Dupes Analyzed:		0												
# Samples FL pos:		0												
# Samples EO pos:		0												
# Samples RWT pos:		0												
# Samples SRB pos:		0												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**61**												
Station Name:		**Windstream Well #2**			**6"**									
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace 1	**4/23/10 = Day 0**													
Dye Trace 2	**10/5/10 = Day 0**													
10/5/2010	13:06	10/9/2010	12:29	166/0	170/4	4		**ND**	**ND**	**ND**	**ND**	U2042		10/14/2010
10/9/2010	12:29	10/14/2010	13:50	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2654		10/26/2010
10/14/2010	13:50	10/21/2010	14:04	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2662		10/26/2010
10/21/2010	14:04	10/27/2010	13:47	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2931		11/5/2010
10/27/2010	13:47	11/3/2010	13:26	188/22	195/29	7		**ND**	**ND**	**ND**	**ND**	U2938		11/5/2010
11/3/2010	13:26	11/10/2010	12:35	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3256		11/12/2010
11/10/2010	12:35	11/17/2010	12:55	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3585		11/19/1010
11/17/2010	12:55	11/24/2010	12:20	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4278		12/2/2010
11/24/2010	12:20	12/1/2010	13:28	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4286		12/2/2010
12/1/2010	13:28	12/9/2010	12:26	223/57	231/65	8		**ND**	**ND**	**ND**	**ND**	U4568		12/13/2010
12/9/2010	12:26	12/16/2010	13:44	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4771		12/20/2010
12/16/2010	13:44	12/27/2010	15:54	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5098		12/30/2010
12/27/2010	15:54	1/6/2011	13:53	249/83	259/93	10		**ND**	**ND**	**ND**	**ND**	U5464		1/12/2011
1/6/2011	13:53	1/26/2011	13:40	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5729		1/27/2011
1/26/2011	13:40	2/11/2011	13:51	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6322		2/17/2011
2/11/2011	13:51	3/2/2011	14:04	295/129	314/148	19								3/22/2011
3/2/2011	14:04	3/18/2011	14:03	314/148	330/164	16								3/22/2011
3/18/2011	14:03	4/7/2011	13:57	330/164	350/184	20								4/15/2011
4/7/2011	13:57	4/26/2011	13:45	350/184	369/203	19								4/27/2011
4/26/2011	13:45	5/10/2011	13:06	369/203	383/217	14								5/12/2011
5/10/2011	13:06	5/25/2011	13:56	384/218	398/232	14								5/27/2011
5/25/2011	13:56	6/16/2011	14:11	398/232	420/254	22								6/17/2011
6/16/2011	14:11	7/22/2011	11:51	420/254	456/290	36							**FINAL**	
# BG Samples Collected:		0												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		23		Total # Samples Collected:			**23**		# Samples FL pos:		0			
# Samples Shipped:		22		Total # Samples Shipped:			22		# Samples EO pos:		0			
# Samples Analyzed:		15		Total # Samples Analyzed:			**15**		# Samples RWT pos:		0			
# Dupes Analyzed		0		Total # Dupes Analyzed:			0		# Samples SRB pos:		0			

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**62**												
Station Name:		**Blue Skies Well 1**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace 1	**4/23/10 = Day 0**													
Dye Trace 2	**10/5/10 = Day 0**													
10/4/2010	11:30	10/9/2010	14:33	165/-1	170/4	5		**ND**	**ND**	**ND**	**ND**	U2043		10/14/2010
10/9/2010	14:33	10/14/2010	15:36	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2655		10/26/2010
10/14/2010	15:36	10/21/2010	15:11	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2663		10/26/2010
10/21/2010	15:11	10/27/2010	15:45	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2932		11/5/2010
10/27/2010	15:45	11/3/2010	14:27	188/22	195/29	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U2939/D		11/5/2010
11/3/2010	14:27	11/10/2010	14:09	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3257		11/12/2010
11/10/2010	14:09	11/17/2010	13:47	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3586		11/19/1010
11/17/2010	13:47	11/24/2010	14:07	209/43	216/50	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U4279/D		12/2/2010
11/24/2010	14:07	12/1/2010	15:17	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4287		12/2/2010
12/1/2010	15:17	12/9/2010	14:05	223/57	231/65	8		**ND**	**ND**	**ND**	**ND**	U4569		12/13/2010
12/9/2010	14:05	12/16/2010	14:49	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4772		12/20/2010
12/16/2010	14:49	12/27/2010	13:32	238/72	249/83	11	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U5099/D		12/30/2010
12/27/2010	13:32	1/6/2011	15:20	249/83	259/93	10		**ND**	**ND**	**ND**	**ND**	U5465		1/12/2011
1/6/2011	15:20	1/26/2011	14:42	259/93	279/113	20		**ND**	**ND**	**ND**	**1.59**	U5730	(2)	1/27/2011
1/26/2011	14:42	2/11/2011	15:32	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6323		2/17/2011
2/11/2011	15:32	3/2/2011	15:21	295/129	314/148	19								3/22/2011
3/2/2011	15:21	3/18/2011	15:10	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7461		3/22/2011
3/18/2011	15:10	4/7/2011	15:11	330/164	350/184	20		**ND**	**ND**	**ND**	**ND**	U8193		4/15/2011
4/7/2011	15:11	4/26/2011	14:55	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8624		4/27/2011
4/26/2011	14:55	5/10/2011	15:51	369/203	383/217	14		**ND**	**ND**	**ND**	**ND**	U9867		5/12/2011
5/10/2011	15:51	5/26/2011	12:15	384/218	399/233	15		**ND**	**ND**	**ND**	**0.935**	V0348	(2)	5/27/2011
5/26/2011	12:15	6/16/2011	15:41	398/232	420/254	22		**ND**	**ND**	**ND**	**1.29**	V0766	(2)	6/17/2011
6/16/2011	15:41	7/22/2011	16:01	420/254	456/290	36		**ND**	**ND**	**ND**	**1.59**	V1428	(2)	7/26/2011
7/22/2011	16:01	8/15/2011	12:15	456/290	480/314	24		**ND**	**ND**	**ND**	**1.72**	V1741	(2)	8/16/2011
8/15/2011	12:15	9/14/2011	12:56	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2064	**FINAL**	9/15/2011
# BG Samples Collected:		0	# Samples Collected:			25	Total # Samples Collected:			**25**	# Samples FL pos:			0
# BG Samples Shipped:		0	# Samples Shipped:			25	Total # Samples Shipped:			25	# Samples EO pos:			0
# BG Samples Analyzed:		0	# Samples Analyzed:			24	Total # Samples Analyzed:			**24**	# Samples RWT pos:			0
			# Dupes Analyzed			3	Total # Dupes Analyzed:			3	**# Samples SRB pos:**			**5**

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**63**												
Station Name:		**Cedar Hills Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace 1	**4/23/10 = Day 0**													
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	9:32	10/9/2010	12:49	167/1	170/4	3		**ND**	**ND**	**ND**	**ND**	U2044		10/14/2010
10/9/2010	12:49	10/14/2010	14:10	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2656		10/26/2010
10/14/2010	14:10	10/21/2010	14:18	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2664		10/26/2010
10/21/2010	14:18	10/27/2010	15:01	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2933		11/5/2010
10/27/2010	15:01	11/1/2010	12:00	188/22	193/27	5		**ND**	**ND**	**ND**	**ND**	U2941	Monthly Service cut-off	11/5/2010
11/3/2010	12:00	11/10/2010	12:56	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3258		11/12/2010
11/10/2010	12:56	11/17/2010	13:08	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3587		11/19/1010
11/17/2010	13:08	11/24/2010	12:37	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4281		12/2/2010
11/24/2010	12:37	12/1/2010	13:46	216/50	223/57	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**1.30/2.97**	U4288/D	(2)/(2)	12/2/2010
12/1/2010	13:46	12/7/2010	12:00	223/57	229/63	6		**ND**	**ND**	**ND**	**ND**	U4570	Monthly Service cut-off	12/13/2010
12/9/2010	12:43	12/16/2010	14:04	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4773		12/20/2010
12/16/2010	14:04	12/27/2010	15:42	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5101		12/30/2010
12/27/2010	15:42	1/4/2011	12:00	249/83	257/91	10		**ND**	**ND**	**ND**	**ND**	U5466	Monthly Service cut-off	1/12/2011
1/6/2011	14:10	1/26/2011	13:55	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5731		1/27/2011
1/26/2011	14:55	1/31/2011	12:00	279/113	284/118	16		**ND**	**ND**	**ND**	**ND**	U6324	Monthly Service cut-off	2/17/2011
2/11/2011	14:15	3/1/2011	12:00	295/129	313/147	19							Monthly Service cut-off	3/22/2011
3/2/2011	14:20	3/18/2011	14:18	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7462		3/22/2011
3/18/2011	14:18	4/4/2011	12:00	330/164	347/181	20		**ND**	**ND**	**ND**	**1.29**	U8194	(2) Monthly Service cut-off	4/15/2011
4/7/2011	14:15	4/26/2011	14:05	350/184	369/203	19		**ND**	**ND**	**ND**	**1.42**	U8625	(2)	4/27/2011
4/26/2011	14:05	5/2or3/2011	12:00	369/203	?	6 or 7		**ND**	**ND**	**ND**	**1.15**	U9868	(2) Monthly Service cut-off	5/12/2011
5/10/2011	13:20	5/25/2011	14:15	384/218	398/232	14		**ND**	**ND**	**ND**	**1.67**	V0349	(2)	5/27/2011
5/25/2011	14:15	6/16/2011	14:27	398/232	420/254	22		**ND**	**ND**	**ND**	**1.98**	V0767	(2)	6/17/2011
6/16/2011	14:27	7/22/2011	12:05	420/254	456/290	36		**ND**	**ND**	**ND**	**3.48**	V1429	(2)	7/26/2011
7/22/2011	12:05	8/15/2011	12:45	456/290	480/314	24		**ND**	**ND**	**ND**	**2.06**	V1742	(2)	8/16/2011
8/15/2011	12:45	9/14/2011	11:59	480/314	510/344	30		**ND**	**ND**	**ND**	**2.63**	V2065	**FINAL/(2)**	9/15/2011
# BG Samples Collected:		0												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		25		Total # Samples Collected:			**25**		# Samples FL pos:			0		
# Samples Shipped:		25		Total # Samples Shipped:			25		# Samples EO pos:			0		
# Samples Analyzed:		24		Total # Samples Analyzed:			**24**		# Samples RWT pos:			0		
# Dupes Analyzed		1		Total # Dupes Analyzed:			1		**# Samples SRB pos:**			**9**	**+1**	**Dupe**

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**64**												
Station Name:		**Fort King Forest Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace 1	**4/23/10 = Day 0**													
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	10:34	10/9/2010	13:15	167/1	170/4	3		**ND**	**ND**	**ND**	**ND**	U2045		10/14/2010
10/9/2010	13:15	10/14/2010	14:39	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2657		10/26/2010
10/14/2010	14:39	10/21/2010	14:40	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2665		10/26/2010
10/21/2010	14:40	10/27/2010	14:22	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2934		11/5/2010
10/27/2010	14:22	11/1/2011	12:00	188/22	193/27	5		**ND**	**ND**	**ND**	**ND**	U2942	Monthly Service cut-off	11/5/2010
11/3/2010	13:59	11/10/2010	13:19	195/29	202/36	7	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U3259/D		11/12/2010
11/10/2010	13:19	11/17/2010	13:23	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3588		11/19/1010
11/17/2010	13:23	11/24/2010	13:20	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4282		12/2/2010
11/24/2010	13:20	12/1/2010	14:10	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4289		12/2/2010
12/1/2010	14:10	12/7/2010	12:00	223/57	229/63	6		**ND**	**ND**	**ND**	**ND**	U4571	Monthly Service cut-off	12/13/2010
12/9/2010	13;13	12/16/2010	14:18	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4774		12/20/2010
12/16/2010	14:18	12/27/2010	15:10	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5102		12/30/2010
12/27/2010	15:10	1/4/2011	12:00	249/83	257/91	10		**ND**	**ND**	**ND**	**ND**	U5467	Monthly Service cut-off	1/12/2011
1/6/2011	14:28	1/26/2011	14:11	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5732		1/27/2011
1/26/2011	14:11	1/31/2011	12:00	279/113	284/118	16		**ND**	**ND**	**ND**	**ND**	U6325	Monthly Service cut-off	2/17/2011
2/11/2011	14:34	3/1/2011	12:00	295/129	313/147	19							Monthly Service cut-off	3/22/2011
3/2/2011	14:38	3/18/2011	14:38	314/148	330/164	16		**ND**	**ND**	**ND**	**0.822**	U7463	(2)	3/22/2011
3/18/2011	14:38	4/4/2011	12:00	330/164	347/181	20		**ND**	**ND**	**ND**	**1.05**	U8195	(2) Monthly Service cut-off	4/15/2011
4/7/2011	14:32	4/26/2011	14:20	350/184	369/203	19		**ND**	**ND**	**ND**	**0.975**	U8626	(2)	4/27/2011
4/26/2011	14:20	5/2or3/2011	12:00	369/203	?	6 or 7		**ND**	**ND**	**ND**	**0.920**	U9869	(2) Monthly Service cut-off	5/12/2011
5/10/2011	13:37	5/25/2011	14:33	384/218	398/232	14		**ND**	**ND**	**ND**	**0.800**	V0350	(2)	5/27/2011
5/25/2011	14:33	6/16/2011	14:43	398/232	420/254	22		**ND**	**ND**	**ND**	**1.160**	V0768	(2)	6/17/2011
6/16/2011	14:43	7/22/2011	12:17	420/254	456/290	36		**ND**	**ND**	**ND**	**1.71**	V1430	(2)	7/26/2011
7/22/2011	12:17	8/15/2011	12:58	456/290	480/314	24		**ND**	**ND**	**ND**	**1.31**	V1743	(2)	8/16/2011
8/15/2011	12:58	9/14/2011	12:13	480/314	510/344	30		**ND**	**ND**	**ND**	**1.77**	V2066	**FINAL/(2)**	9/15/2011
# BG Samples Collected:		0												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		25		Total # Samples Collected:			**25**		# Samples FL pos:			0		
# Samples Shipped:		25		Total # Samples Shipped:			25		# Samples EO pos:			0		
# Samples Analyzed:		24		Total # Samples Analyzed:			**24**		# Samples RWT pos:			0		
# Dupes Analyzed		1		Total # Dupes Analyzed:			1		**# Samples SRB pos:**			**9**		

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record															Page 1 of 1
Station Number:		65													
Station Name:		Pine Ridge Well													
PLACED:		COLLECTED:		Day Number:		Duration	Dupe	ANALYSES RESULTS (ppb)				OUL	Notes:		Date
Date:	Time:	Date:	Time:	In:	Out:	(days)		Fluorescein	Eosine	Rhod WT	SRhodB	Lab #			Shipped:
Dye Trace 1	4/23/10 = Day 0														
Dye Trace 2	10/5/10 = Day 0														
10/6/2010	11:20	10/9/2010	13:41	167/1	170/4	3		**ND**	**ND**	**ND**	**ND**	U2406			10/14/2010
10/9/2010	13:41	10/14/2010	14:53	170/4	175/9	5		**ND**	**ND**	**ND**	**ND**	U2658			10/26/2010
10/14/2010	14:53	10/21/2010	14:52	175/9	182/16	7		**ND**	**ND**	**ND**	**ND**	U2666			10/26/2010
10/21/2010	14:52	10/27/2010	14:35	182/16	188/22	6		**ND**	**ND**	**ND**	**ND**	U2935			11/5/2010
10/27/2010	14:35	11/1/2010	12:00	188/22	193/27	5		**ND**	**ND**	**ND**	**ND**	U2943	Monthly Service cut-off		11/5/2010
11/3/2010	14:11	11/10/2010	13:32	195/29	202/36	7		**ND**	**ND**	**ND**	**ND**	U3261			11/12/2010
11/10/2010	13:32	11/17/2010	13;33	202/36	209/43	7		**ND**	**ND**	**ND**	**ND**	U3589			11/19/1010
11/17/2010	13:33	11/24/2010	13:31	209/43	216/50	7		**ND**	**ND**	**ND**	**ND**	U4283			12/2/2010
11/24/2010	13:31	12/1/2010	14:56	216/50	223/57	7		**ND**	**ND**	**ND**	**ND**	U4290			12/2/2010
12/1/2010	14:56	12/7/2010	12:00	223/57	229/63	6		**ND**	**ND**	**ND**	**ND**	U4572	Monthly Service cut-off		12/13/2010
12/9/2010	13:25	12/16/2010	14:32	231/65	238/72	7		**ND**	**ND**	**ND**	**ND**	U4775			12/20/2010
12/16/2010	14:32	12/27/2010	14:30	238/72	249/83	11		**ND**	**ND**	**ND**	**ND**	U5103			12/30/2010
12/27/2010	14:30	1/4/2011	12:00	249/83	257/91	10		**ND**	**ND**	**ND**	**ND**	U5468	Monthly Service cut-off		1/12/2011
1/6/2011	14:43	1/26/2011	14:24	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5733			1/27/2011
1/26/2011	14:24	1/31/2011	12:00	279/113	284/118	16		**ND**	**ND**	**ND**	**ND**	U6326	Monthly Service cut-off		2/17/2011
2/11/2011	14:52	3/1/2011	12:00	295/129	313/147	19							Monthly Service cut-off		3/22/2011
3/2/2011	14:55	3/18/2011	14:53	314/148	330/164	16		**ND**	**ND**	**ND**	**ND**	U7464			3/22/2011
3/18/2011	14:53	4/4/2011	12:00	330/164	347/181	20		**ND**	**ND**	**ND**	**ND**	U8196	Monthly Service cut-off		4/15/2011
4/7/2011	14:46	4/26/2011	14:33	350/184	369/203	19		**ND**	**ND**	**ND**	**ND**	U8627			4/27/2011
4/26/2011	14:33	5/2or3/2011	12:00	369/203	?	6 or 7		**ND**	**ND**	**ND**	**ND**	U9870	Monthly Service cut-off		5/12/2011
5/10/2011	13:49	5/25/2011	14:50	384/218	398/232	14		**ND**	**ND**	**ND**	**ND**	V0351			5/27/2011
5/25/2011	14:50	6/16/2011	15:20	398/232	420/254	22		**ND**	**ND**	**ND**	**ND**	V0769			6/17/2011
6/16/2011	15:20	7/22/2011	12:25	420/254	456/290	36		**ND**	**ND**	**ND**	**ND**	V1431			7/26/2011
7/22/2011	12:25	8/15/2011	13:07	456/290	480/314	24		**ND**	**ND**	**ND**	**ND**	V1744			8/16/2011
8/15/2011	13:07	9/14/2011	12:27	480/314	510/344	30		**ND**	**ND**	**ND**	**ND**	V2067	**FINAL**		9/15/2011
# BG Samples Collected:		0													
# BG Samples Shipped:		0													
# BG Samples Analyzed:		0													
# Samples Collected:		25		Total # Samples Collected:			**25**		# Samples FL pos:		0				
# Samples Shipped:		25		Total # Samples Shipped:			25		# Samples EO pos:		0				
# Samples Analyzed:		24		Total # Samples Analyzed:			**24**		# Samples RWT pos:		0				
# Dupes Analyzed		0		Total # Dupes Analyzed:			0		# Samples SRB pos:		0				

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record														Page 1 of 1
Station Number:		**66**												
Station Name:		**Sheri Oaks Well**												
PLACED:		**COLLECTED:**		**Day Number:**		**Duration**	**Dupe**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Date:**	**Time:**	**In:**	**Out:**	**(days)**		**Fluorescein**	**Eosine**	**Rhod WT**	**SRhodB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**													
Dye Trace 2	**10/5/10 = Day 0**													
10/6/2010	12:18	10/21/2010	16:18	167/1	182/16	15		**ND**	**ND**	**ND**	**ND**	U2670		10/26/2010
10/21/2010	16:18	11/3/2010	15:39	182/16	195/29	13		**ND**	**ND**	**ND**	**ND**	U2947		11/5/2010
11/3/2010	15:39	11/17/2010	14:39	195/29	209/43	14		**ND**	**ND**	**ND**	**ND**	U3593		11/19/1010
11/17/2010	14:39	12/1/2010	16:12	209/43	223/57	14		**ND**	**ND**	**ND**	**ND**	U4294		12/2/2010
12/1/2010	16:12	12/16/2010	15:49	223/57	238/72	15	**X**	**ND/ND**	**ND/ND**	**ND/ND**	**ND/ND**	U4779/D		12/20/2010
12/16/2010	15:49	1/6/2011	16:22	238/72	259/93	21		**ND**	**ND**	**ND**	**ND**	U5472		1/12/2011
1/6/2011	16:22	1/26/2011	15:43	259/93	279/113	20		**ND**	**ND**	**ND**	**ND**	U5737		1/27/2011
1/26/2011	15:43	2/11/2011	16:27	279/113	295/129	16		**ND**	**ND**	**ND**	**ND**	U6329		2/17/2011
2/11/2011	16:27	3/2/2011	16:16	295/129	314/148	19								3/22/2011
3/2/2011	16:16	3/18/2011	16:13	314/148	330/164	16								3/22/2011
3/18/2011	16:13	4/7/2011	16:09	330/164	350/184	20								4/15/2011
4/7/2011	16:09	4/26/2011	16:06	350/184	369/203	19								4/27/2011
4/26/2011	16:06	5/10/2011	17:05	369/203	383/217	14								5/12/2011
5/10/2011	17:05	5/25/2011	16:31	384/218	398/232	14								5/27/2011
5/25/2011	16:31	6/16/2011	16:49	398/232	420/254	22								6/17/2011
6/16/2011	16:49	7/22/2011	16:54	420/254	456/290	36							**FINAL**	
# BG Samples Collected:		0												
# BG Samples Shipped:		0												
# BG Samples Analyzed:		0												
# Samples Collected:		16												
# Samples Shipped:		15												
# Samples Analyzed:		8												
# Dupes Analyzed		1												
Total # Samples Collected:		**16**		# Samples FL pos:			0							
Total # Samples Shipped:		15		# Samples EO pos:			0							
Total # Samples Analyzed:		**8**		# Samples RWT pos:			0							
Total # Dupes Analyzed:		1		# Samples SRB pos:			0							

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

SAMPLER TALLY

SITE	1 ME	2 MW	4 CRH	5 BC	6 OS	7 DK-A	9 LP	10 AH	11 MB	12 GY	13 BG	14 CT
# BG Samples Collected:	8	8	8	3	3	3	3	3	3	3	3	8
# BG Samples Shipped:	6	6	6	0	2	2	2	2	2	2	2	6
# BG Samples Analyzed:	6	6	6	0	2	2	2	2	2	2	2	6
# Samples Collected:	39	39	37	37	37	37	39	37	37	37	39	38
# Samples Shipped:	39	39	36	36	36	36	39	36	29	36	39	38
# Samples Analyzed:	38	38	35	29	29	29	38	35	29	35	38	37
# Dupes Analyzed	4	4	2	0	1	3	2	2	0	3	1	0
Total # Samples Collected:	**47**	**47**	**45**	**40**	**40**	**40**	**42**	**40**	**40**	**40**	**42**	**46**
Total # Samples Shipped:	45	45	42	36	38	38	41	38	31	38	41	44
Total # Samples Analyzed:	**44**	**44**	**41**	**29**	**31**	**31**	**40**	**37**	**31**	**37**	**40**	**43**
Total # Dupes Analyzed:	4	4	2	0	1	3	2	2	0	3	1	0
# Samples FL pos:	0	0	0	0	0	0	0	0	0	0	0	0
# Samples EO pos:	0	0	0	0	0	0	0	0	0	0	0	0
# Samples RWT pos:	**34**	**10**	**30**	**20**	**10**	**25**	**33**	**21**	**4**	**11**	**14**	**1**
# Samples SRB pos:	0	0	0	0	0	0	0	0	0	0	0	0
Dye Positive Dupes:												
# Samples FL pos:												
# Samples EO pos:												
# Samples RWT pos:	**4**	**3**				**2**	**1**			**2**		
# Samples SRB pos:												
# BG Dupes Analyzed												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

SAMPLER TALLY

SITE	**15 GE**	**16 LG**	**18 IC**	**19 FP-1**	**20 NN**	**21 TM**	**22 FP-2**	**23 CH**	**24 TN**	**26 RI**	**28 SW**	**30 TB**
# BG Samples Collected:	3	3	3	3	3	3	3	8	3	3	8	3
# BG Samples Shipped:	2	2	2	2	2	2	0	6	2	2	6	2
# BG Samples Analyzed:	2	2	2	2	2	2	0	6	2	2	6	2
# Samples Collected:	37	37	37	37	37	37	37	39	37	37	39	36
# Samples Shipped:	36	36	36	36	36	36	0	39	36	36	39	35
# Samples Analyzed:	35	29	35	29	35	35	0	38	29	29	38	34
# Dupes Analyzed	1	1	1	0	2	3	0	3	1	2	1	0
Total # Samples Collected:	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**47**	**40**	**40**	**47**	**39**
Total # Samples Shipped:	38	38	38	38	38	38	0	45	38	38	45	37
Total # Samples Analyzed:	**37**	**31**	**37**	**31**	**37**	**37**	**0**	**44**	**31**	**31**	**44**	**36**
Total # Dupes Analyzed:	1	2	1	0	2	3	0	3	1	2	1	0
# Samples FL pos:	0	0	0	0	0	0	0	0	0	0	0	0
# Samples EO pos:	0	0	0	0	0	0	0	0	0	0	0	0
# Samples RWT pos:	0	0	**8**	**4**	**1**	**4**	0	**6**	0	0	**2**	0
# Samples SRB pos:	0	0	0	0	0	0	0	0	0	0	0	0
Dye Positive Dupes:												
# Samples FL pos:												
# Samples EO pos:												
# Samples RWT pos:						**1**						
# Samples SRB pos:												
# BG Dupes Analyzed		1										

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

SAMPLER TALLY

SITE	**31 SR**	**32 SBHV**	**33 GFV**	**34 SSL**	**40 RSHS**	**41 RSBS**	**42 RSRR**	**50 OPSW1**	**51 OPSW2**	**52 OPSWA**	**54 RCESW5**	**55 NMHSSWW**
# BG Samples Collected:	8	3	3	3	2	2	2	3	3	3	3	3
# BG Samples Shipped:	6	0	0	0	0	0	0	1	0	1	1	1
# BG Samples Analyzed:	6	0	0	0	0	0	0	1	0	1	0	0
# Samples Collected:	37	38	37	37	30	31	29	40	40	15	13	31
# Samples Shipped:	36	38	37	0	30	31	28	40	40	12	13	30
# Samples Analyzed:	29	38	31	0	21	22	20	33	33	4	11	23
# Dupes Analyzed	2	3	0	0	0	1	1	3	2	0	1	0
Total # Samples Collected:	**45**	**41**	**40**	**40**	**32**	**33**	**31**	**43**	**43**	**18**	**16**	**34**
Total # Samples Shipped:	42	38	37	0	30	31	28	41	40	13	14	31
Total # Samples Analyzed:	**35**	**38**	**31**	**0**	**21**	**22**	**20**	**34**	**33**	**5**	**11**	**23**
Total # Dupes Analyzed:	2	3	0	0	0	1	1	3	2	0	1	0
# Samples FL pos:	0	0	0	0	0	0	0	0	0	0	**9**	0
# Samples EO pos:	0	**4**	0	0	0	0	0	0	0	0	0	0
# Samples RWT pos:	**3**	**25**	**20**	0	0	0	0	0	0	0	0	0
# Samples SRB pos:	0	0	0	0	0	0	0	0	0	0	0	0
Dye Positive Dupes:												
# Samples FL pos:											**1**	
# Samples EO pos:		**1**										
# Samples RWT pos:		**1**										
# Samples SRB pos:												
# BG Dupes Analyzed												

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

SAMPLER TALLY

SITE	**56 OSESEW**	**57 MCI 1**	**58 IFAS A**	**59 IFAS D**	**60 MIW2**	**61 WSW2**	**62 BSW1**	**63 CHW**	**64 FKFW**	**65 PRW**	**66 SOW**
# BG Samples Collected:	3	2	2	2	0	0	0	0	0	0	0
# BG Samples Shipped:	0	0	1	1	0	0	0	0	0	0	0
# BG Samples Analyzed:	0	0	0	0	0	0	0	0	0	0	0
# Samples Collected:	31	26	12	12	12	23	25	25	25	25	16
# Samples Shipped:	27	24	12	12	12	22	25	25	25	25	15
# Samples Analyzed:	23	18	7	9	2	15	24	24	24	24	8
# Dupes Analyzed	1	0	0	0	0	0	3	1	1	0	1
Total # Samples Collected:	**34**	**28**	**14**	**14**	**12**	**23**	**25**	**25**	**25**	**25**	**16**
Total # Samples Shipped:	27	24	13	13	12	22	25	25	25	25	15
Total # Samples Analyzed:	**23**	**18**	**7**	**9**	**2**	**15**	**24**	**24**	**24**	**24**	**8**
Total # Dupes Analyzed:	1	0	0	0	0	0	3	1	1	0	1
# Samples FL pos:	0	**5**	**5**	**4**	0	0	0	0	0	0	0
# Samples EO pos:	0	0	0	0	0	0	0	0	0	0	0
# Samples RWT pos:	0	0	0	0	0	0	0	0	0	0	0
# Samples SRB pos:	0	0	0	0	0	0	**5**	**9**	**9**	0	0
Dye Positive Dupes:											
# Samples FL pos:											
# Samples EO pos:											
# Samples RWT pos:											
# Samples SRB pos:								**1**			
# BG Dupes Analyzed											

Silver Springs Dye Trace 2010-11 Station Sampler Tracking Record

SAMPLER TALLY	
SAMPLER TOTALS	
# BG Samples Collected:	149
# BG Samples Shipped:	80
# BG Samples Analyzed:	76
# Samples Collected:	1510
# Samples Shipped:	1399
# Samples Analyzed:	1219
# Dupes Analyzed	57
Total # Samples Collected:	**1659**
Total # Samples Shipped:	1479
Total # Samples Analyzed:	**1295**
Total # Dupes Analyzed:	58
# Samples FL pos:	**23**
# Samples EO pos:	**4**
# Samples RWT pos:	**286**
# Samples SRB pos:	**23**
Dye Positive Dupes:	
# Samples FL pos:	1
# Samples EO pos:	1
# Samples RWT pos:	14
# Samples SRB pos:	1
# BG Dupes Analyzed	1

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**1**							
Station Name:		**Mammoth East**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/3/2010	13:15	10	**ND**	**ND**	**ND**	**ND**	T8016		5/4/2010
5/9/2010	12:57	16	**ND**	**ND**	**ND**	**ND**	T8514		5/11/2010
5/14/2010	12:44	21	**ND**	**ND**	**ND**	**ND**	T8861		5/17/2010
# Samples Analyzed:		**3**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**2**							
Station Name:		**Mammoth West**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	12:48	21	**ND**	**ND**	**ND**	**ND**	T8862		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**4**							
Station Name:		**Catfish Reception Hall**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Pre-Background									
Dye Trace	**4/23/10 = Day 0**								
5/3/2010	13:30	10	**ND**	**ND**	**ND**	**ND**	T8017		5/4/2010
5/14/2010	12:58	21	**ND**	**ND**	**ND**	**ND**	T8863		5/17/2010
# Samples Analyzed:		**2**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010 -11 Station Water Sample Tracking Record									
Station Number:		**5**							
Station Name:		**Bridal Chamber**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/9/2010	13:23	16	**ND**	**ND**	**ND**	**ND**	T8875		5/17/2010
5/14/2010	13:02	21	**ND**	**ND**	**ND**	**ND**	T8864		5/17/2010
# Samples Analyzed:		**2**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**6**							
Station Name:		**Oscar**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	13:21	21	**ND**	**ND**	**ND**	**ND**	T8865		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**7**							
Station Name:		**Devil's Kitchen A (1)**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/3/2010	13:45	10	**ND**	**ND**	**ND**	**ND**	T8018		5/4/2010
5/9/2010	13:35	16	**ND**	**ND**	**ND**	**ND**	T8515		5/11/2010
5/14/2010	13:10	21	**ND**	**ND**	**ND**	**ND**	T8866		5/17/2010
# Samples Analyzed:		**3**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**9**							
Station Name:		**Ladies Parlor**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/3/2010	13:40	10	**ND**	**ND**	**ND**	**ND**	T8019		5/4/2010
5/9/2010	13:28	16	**ND**	**ND**	**ND**	**ND**	T8516		5/11/2010
5/14/2010	13:07	21	**ND**	**ND**	**ND**	**ND**	T8867		5/17/2010
# Samples Analyzed:		**3**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**10**							
Station Name:		**Alligator Hole**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	13:10	21	**ND**	**ND**	**ND**	**ND**	T8868		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**12**							
Station Name:		**Geyser**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	13:33	21	**ND**	**ND**	**ND**	**ND**	T8869		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**13**							
Station Name:		**Blue Grotto**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	13:38	21	**ND**	**ND**	**ND**	**ND**	T8870		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**32**							
Station Name:		**South Boat House Vent**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	17:25	21	**ND**	**ND**	**ND**	**ND**	T8871		5/17/2010
5/19/2010	17:25	26	**ND**	**ND**	**ND**	**ND**	T9348		6/1/2010
5/25/2010	17:24	32	**ND**	**ND**	**ND**	**ND**	T9349		6/1/2010
6/1/2010	17:39	39	**ND**	**ND**	**ND**	**ND**	T9565		6/7/2010
6/7/2010	17:39	45	**ND**	**ND**	**ND**	**ND**	T9732		6/16/2010
8/5/2010	17:24	60	**ND**	**ND**	**ND**	**ND**	U0868		8/9/2010
# Samples Analyzed:		**6**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**33**							
Station Name:		**Gang of Five Vent 3**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/14/2010	16:34	21	**ND**	**ND**	**ND**	**ND**	T8872		5/17/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**36**							
Station Name:		**Mammoth Headpool Water (Grab Sample)**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
4/29/2010	13:25	6	**ND**	**ND**	**ND**	**ND**	T8278		5/4/2010
4/30/2010	13:20	7	**ND**	**ND**	**ND**	**ND**	T8279		5/4/2010
5/6/2010	13:15	13	**ND**	**ND**	**ND**	**ND**	T8517		5/11/2010
5/7/2010	13:15	14	**ND**	**ND**	**ND**	**ND**	T8518		5/11/2010
5/12/2010	13:00	19	**ND**	**ND**	**ND**	**ND**	T8873		5/17/2010
5/13/2010	13:20	20	**ND**	**ND**	**ND**	**ND**	T8874		5/17/2010
5/20/2010	13:20	27	**ND**	**ND**	**ND**	**ND**	T9478		6/1/2010
5/21/2010	12:45	28	**ND**	**ND**	**ND**	**ND**	T9479		6/1/2010
5/26/2010	11:30	33	**ND**	**ND**	**ND**	**ND**	T9566		6/7/2010
5/28/2010	13:15	35	**ND**	**ND**	**ND**	**ND**	T9567		6/7/2010
# Samples Analyzed:		**10**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**54**							
Station Name:		**Reddick Elementary Well #5**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/6/2010	15:01	13	**ND**	**6.41**	**ND**	**ND**	T9807		6/21/2010
5/13/2010	12:46	20	**ND**	**3.43**	**ND**	**ND**	T9568		6/7/2010
5/20/2010	15:55	27	**ND**	**2.42**	**ND**	**ND**	T9808		6/21/2010
5/26/2010	15:30	33	**ND**	**1.9**	**ND**	**ND**	T9809		6/21/2010
6/2/2010	16:00	40	**ND**	**1.19**	**ND**	**ND**	T9810		6/21/2010
6/10/2010	15:32	48	**ND**	**0.844**	**ND**	**ND**	T9811		6/21/2010
6/16/2010	15:56	54	**ND**	**0.688**	**ND**	**ND**	T9812		6/21/2010
6/23/2010	19:49	61	**ND**	**0.594**	**ND**	**ND**	U0592		7/13/2010
6/30/2010	14:50	68	**ND**	**0.481**	**ND**	**ND**	U0593		7/13/2010
# Samples Analyzed:		**9**							
# Samples FL pos:		**9**							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**58**							
Station Name:		**IFAS Plant Science Unit Well A**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/26/2010	15:54	33	**ND**	**ND**	**ND**	**ND**	U0590		6/21/2010
6/10/2010	15:55	48	**ND**	**0.055**	**ND**	**ND**	U0591		7/13/2010
7/21/2020	16:20	90	**ND**	**0.041**	**ND**	**ND**	U0981		9/8/2010
# Samples Analyzed:		**3**							
# Samples FL pos:		**2**							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**59**							
Station Name:		**IFAS Plant Science Unit Well D**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
5/6/2010	15:41	13	**ND**	**0.176**	**ND**	**ND**	T9813		6/7/2010
5/13/2010	13:17	20	**ND**	**ND**	**ND**	**ND**	T9578		6/21/2010
5/20/2010	15:33	27	**ND**	**ND**	**ND**	**ND**	T9814		6/21/2010
6/2/2010	16:54	40	**ND**	**ND**	**ND**	**ND**	T9815		6/21/2010
7/21/2010	16:29	90	**ND**	**ND**	**ND**	**ND**	U0982		8/9/2010
# Samples Analyzed:		**5**							
# Samples FL pos:		**1**							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record									
Station Number:		**63**							
Station Name:		**Cedar Hills Well**							
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
Dye Trace	**10/5/10 = Day 0**								
11/24/2010	12:37	216/50	**ND**	**ND**	**ND**	**ND**	U5234		12/2/2010
11/24/2010	13:46	223/57	**ND**	**ND**	**ND**	**ND**	U5235		12/2/2010
11/24/2010	12:43	231/65	**ND**	**ND**	**ND**	**ND**	U5236		12/13/2010
# Samples Analyzed:		**3**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record										
Station Number:		**67**								
Station Name:		**City of Ocala Pine Avenue Well #6**								
COLLECTED:		**Day**	**ANALYSES RESULTS (ppb)**				**OUL**	**Notes:**	**Date**
Date:	**Time:**	**Number:**	**Rhod WT**	**Fluor.**	**Eosine**	**SRB**	**Lab #**		**Shipped:**
Dye Trace	**4/23/10 = Day 0**								
Dye Trace	**10/5/10 = Day 0**								
12/14/2010	10:30	236/70	**ND**	**ND**	**ND**	**ND**	U4784		12/20/2010
# Samples Analyzed:		**1**							
# Samples FL pos:		0							
# Samples EO pos:		0							
# Samples RWT pos:		0							
# Samples SRB pos:		0							

Silver Springs Dye Trace 2010-11 Station Water Sample Tracking Record

WATER SAMPLE TALLY

Station Number:	**1 ME**	**2 MW**	**4 CRH**	**5 BC**	**6 OS**	**7 DK-A**	**9 LP**	**10 AH**	**12 GY**	**13 BG**
# Samples Analyzed:	3	1	2	2	1	3	3	1	1	1
# Samples FL pos:	0	0	0	0	0	0	0	0	0	0
# Samples EO pos:	0	0	0	0	0	0	0	0	0	0
# Samples RWT pos:	0	0	0	0	0	0	0	0	0	0
# Samples SRB pos:	0	0	0	0	0	0	0	0	0	0

Station Number:	**32 SBHV**	**33 GFV**	**36 MHW**	**54 RCESW5**	**58 IFAS A**	**59 IFAS D**	**63 CHW**	**67 PA6**
# Samples Analyzed:	6	1	10	9	3	5	3	1
# Samples FL pos:	0	0	0	**9**	**2**	**1**	0	0
# Samples EO pos:	0	0	0	0	0	0	0	0
# Samples RWT pos:	0	0	0	0	0	0	0	0
# Samples SRB pos:	0	0	0	0	0	0	0	0

SAMPLER TOTALS

# Samples Analyzed:	**56**
# Samples FL pos:	**12**
# Samples EO pos:	0
# Samples RWT pos:	0
# Samples SRB pos:	0

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1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 1 **Samples Collected By:** Pete Butt, Matt Hubner,
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ricliriger - OUL
Date Samples Shipped: 5 / 4 / 10 **Date Samples Received:** 5 / 6 / 10 **Time Samples Received:** 15 : 38 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		1	Mammoth East	4/22/10	12:14	4/28/10	13:56	
		2	Mammoth West	4/22/10	12:12	4/28/10	14:00	
		4	Catfish Reception Hall	4/22/10	12:22	4/28/10	14:07	
		6	Oscar	4/22/10	12:45	4/28/10	14:33	
		7	Devil's Kitchen A	4/22/10	12:35	4/28/10	14:24	
		9	Ladies Parlor	4/22/10	12:30	4/28/10	14:18	
		10	Alligator Hole	4/22/10	12:39	4/28/10	14:28	
		11	Mastodon Bone	4/22/10	12:56	4/28/10	14:38	
		12	Geyser	4/22/10	13:02	4/28/10	14:41	
		13	Blue Grotto	4/22/10	13:06	4/28/10	14:46	
		14	Christmas Tree	4/22/10	13:16	4/28/10	14:53	
		15	Garden of Eden	4/22/10	13:23	4/28/10	14:57	
		16	Log	4/22/10	13:24	4/28/10	14:59	
		18	Indian Cave	4/22/10	14:47	4/28/10	16:47	
		19	First Fisherman's Paradise	4/22/10	13:32	4/28/10	15:07	

COMMENTS: Hold pending results of analysis of Week 2 charcoal samplers.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 1 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridlinger ~oul

Date Samples Shipped: 5 / 4 / 10 **Date Samples Received:** 5 / 6 / 10 **Time Samples Received:** 15 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* / *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		20	No Name Cove	4/22/10	14:41	4/28/10	16:39	
		21	Turtle Meadows	4/22/10	13:39	4/28/10	15:16	
		23	Catfish Hotel	4/22/10	13:48	4/28/10	15:27	
		24	Turtle Nook	4/22/10	14:23	4/28/10	16:29	
		26	Raccoon Island	4/22/10	14:31	4/28/10	16:21	
		28	Shipwreck	4/22/10	13:55	4/28/10	15:35	
		30	Timber	4/22/10	14:03	4/28/10	16:04	
		31	Silver River @ 1200 Meter Station	4/22/10	14:09	4/28/10	16:10	
		36	Mammoth Headpool Water			4/29/10	13:25	
		36	Mammoth Headpool Water			4/30/10	13:20	

COMMENTS: Hold pending results of analysis of Week 2 charcoal samplers.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 2 Samples Collected By: Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Margaret Ridlinger -OUL

Date Samples Shipped: 5 / 4 / 10 Date Samples Received: 5 / 6 / 10 Time Samples Received: 15 : 30 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other__ Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		1	Mammoth East	4/28/10	13:56	5/3/10	13:15	
		2	Mammoth West	4/28/10	14:00	5/3/10	13:20	
		4	Catfish Reception Hall	4/28/10	14:07	5/3/10	13:30	
		6	Oscar	4/28/10	14:33	5/3/10	`13:57	
		7	Devil's Kitchen A	4/28/10	14:24	5/3/10	13:45	
		9	Ladies Parlor	4/28/10	14:18	5/3/10	13:40	
		10	Alligator Hole	4/28/10	14:28	5/3/10	13:50	
		11	Mastodon Bone	4/28/10	14:38	5/3/10	14:05	
		12	Geyser	4/28/10	14:41	5/3/10	14:10	
		13	Blue Grotto	4/28/10	14:46	5/3/10	14:20	
		14	Christmas Tree	4/28/10	14:53	5/3/10	14:28	
		15	Garden of Eden	4/28/10	14:57	5/3/10	14:33	
		16	Log	4/28/10	14:59	5/3/10	14:34	
		18	Indian Cave	4/28/10	16:47	5/3/10	16:26	
		19	First Fisherman's Paradise	4/28/10	15:07	5/3/10	14:42	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes__ No X Charts for samples on this page proofed by OUL:__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 2 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridlinger -OUL

Date Samples Shipped: 5 / 4 / 10 **Date Samples Received:** 5 / 6 / 10 **Time Samples Received:** 15 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		20	No Name Cove	4/28/10	16:39	5/3/10	16:17	
		21	Turtle Meadows	4/28/10	15:16	5/3/10	14:49	
		23	Catfish Hotel	4/28/10	15:27	5/3/10	14:59	
		24	Turtle Nook	4/28/10	16:29	5/3/10	16:08	
		26	Raccoon Island	4/28/10	16:21	5/3/10	15:53	
		28	Shipwreck	4/28/10	15:35	5/3/10	15:05	
		30	Timber	4/28/10	16:04	5/3/10	15:37	
		31	Silver River @ 1200 Meter Station	4/28/10	16:10	5/3/10	15:41	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSQ Week 3 **Samples Collected By:** Matt Hubner, Mark Long
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott /OUL
Date Samples Shipped: 5 / 11 / 10 **Date Samples Received:** 5/13/10 **Time Samples Received:** 15 : 00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 10)		(Day 16)		
		1	Mammoth East	5/3/10	13:15	5/9/10	12:57	
		2	Mammoth West	5/3/10	13:20	5/9/10	13:03	
		4	Catfish Reception Hall	5/3/10	13:30	5/9/10	13:12	
		6	Oscar	5/3/10	13:57	5/9/10	13:52	
		7	Devil's Kitchen A	5/3/10	13:45	5/9/10	13:35	
		9	Ladies Parlor	5/3/10	13:40	5/9/10	13:28	
		10	Alligator Hole	5/3/10	13:50	5/9/10	13:44	
		11	Mastodon Bone	5/3/10	14:05	5/9/10	14:01	
		12	Geyser	5/3/10	14:10	5/9/10	14:08	
		13	Blue Grotto	5/3/10	14:20	5/9/10	14:17	
		14	Christmas Tree	5/3/10	14:28	5/9/10	14:25	
		15	Garden of Eden	5/3/10	14:33	5/9/10	14:36	
		16	Log	5/3/10	14:34	5/9/10	14:39	
		18	Indian Cave	5/3/10	16:26	5/9/10	16:40	
		19	First Fishermans Paradise	5/3/10	14:42	5/9/10	14:53	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC Week 3 **Samples Collected By:** Matt Hubner, Mark Long
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca, Scott / OUL
Date Samples Shipped: 5 / 11 / 10 **Date Samples Received:** 5/13/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

Please indicate stations where dye was visible in the field
for field technician use - use black ink only

OUL use only				PLACED		*COLLECTED*		OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	DATE	TIME	DATE	TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 10)		(Day 16)		
		20	No Name Cove	5/3/10	16:17	5/9/10	16:30	
		21	Turtle Meadows	5/3/10	14:49	5/9/10	15:03	
		23	Catfish Hotel	5/3/10	14:59	5/9/10	15:18	
		24	Turtle Nook	5/3/10	16:08	5/9/10	16:11	
		26	Raccoon Island	5/3/10	15:53	5/9/10	16:03	
		28	Shipwreck	5/3/10	15:05	5/9/10	15:28	
		30	Timber	5/3/10	15:37	5/9/10	15:42	
		31	Silver River @ 1200 Meter Station	5/3/10	15:41	5/9/10	15:53	
		36	Mammoth Headpool Water (Day 13)			5/6/10	13:15	
		36	Mammoth Headpool Water (Day 14)			5/7/10	13:15	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 4 Samples Collected By: Pete Butt, Mark Long

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott / OUL

Date Samples Shipped: 5 / 17 / 10 Date Samples Received: 5/18/10 Time Samples Received: 15:00 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other__ Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 16)		(Day 21)		
		1	Mammoth East	5/9/10	12:57	5/14/10	12:44	
		2	Mammoth West	5/9/10	13:03	5/14/10	12:48	
		4	Catfish Reception Hall	5/9/10	13:12	5/14/10	12:58	
		5	Bridal Chamber	5/9/10	13:23	5/14/10	13:02	
		6	Oscar	5/9/10	13:52	5/14/10	13:21	
		7	Devil's Kitchen A	5/9/10	13:35	5/14/10	13:10	
		9	Ladies Parlor	5/9/10	13:28	5/14/10	13:07	
		10	Alligator Hole	5/9/10	13:44	5/14/10	13:10	
		11	Mastodon Bone	5/9/10	14:01	5/14/10	13:29	
		12	Geyser	5/9/10	14:08	5/14/10	13:33	
		13	Blue Grotto	5/9/10	14:17	5/14/10	13:38	
		14	Christmas Tree	5/9/10	14:25	5/14/10	13:45	
		15	Garden of Eden	5/9/10	14:36	5/14/10	13:50	
		16	Log	5/9/10	14:39	5/14/10	13:49	
		18	Indian Cave	5/9/10	16:40	5/14/10	15:58	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes__ No X Charts for samples on this page proofed by OUL:__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 4 **Samples Collected By:** Pete Butt, Mark Long
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/RL
Date Samples Shipped: 5 / 17 / 10 **Date Samples Received:** 5/19/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 16)		(Day 21)		
		19	First Fisherman's Paradise	5/9/10	14:53	5/14/10	14:02	
		20	No Name Cove	5/9/10	16:30	5/14/10	15:48	
		21	Turtle Meadows	5/9/10	15:03	5/14/10	14:10	
		23	Catfish Hotel	5/9/10	15:18	5/14/10	14:21	
		24	Turtle Nook	5/9/10	16:11	5/14/10	15:09	
		26	Raccoon Island	5/9/10	16:03	5/14/10	14:34	
		28	Shipwreck	5/9/10	15:28	5/14/10	14:28	
		30	Timber	5/9/10	15:42	5/14/10	14:47	
		31	Silver River @ 1200 Meter Station	5/9/10	15:53	5/14/10	14:52	
		32	South Boathouse Vent	5/9/10	17:23	5/14/10	17:25	
		33	Gang of Five Vent 3	5/9/10	17:15	5/14/10	16:34	
		36	Mammoth Headpool Water (Day 19)			5/12/10	13:00	
		36	Mammoth Headpool Water (Day 20)			5/13/10	13:20	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Weeks X. Samples Collected By: Pete Butt, Matt Hubner, Mark Long

Samples Shipped By: KES via FedEx Samples Received By: Rebecca, Scott/OUL

Date Samples Shipped: 5 / 17 / 10 Date Samples Received: 5/19/10 Time Samples Received: 15:00 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -1)		(Day 5)		
		5	Bridal Chamber	5/22/10	12:31	5/28/10	14:14	
				(Day 5)		(Day 10)		
		5	Bridal Chamber	5/28/10	14:14	5/3/10	13:35	
				(Day 10)		(Day 16)		
		5	Bridal Chamber	5/3/10	13:35	5/9/10	13:23	

COMMENTS: Analyze latest sampler first, then previous samplers if positive for dye. Analyze any corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC/Week 5 **Samples Collected By:** Mark Long, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 1 / 10 **Date Samples Received:** 6/3/10 **Time Samples Received:** 15:00 **Return Cooler?** Yes___ No X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 21)		(Day 26)		
		1	Mammoth East	5/14/10	12:44	5/19/10	12:29	
		2	Mammoth West	5/14/10	12:48	5/19/10	12:36	
		4	Catfish Reception Hall	5/14/10	12:58	5/19/10	12:56	
		5	Bridal Chamber	5/14/10	13:02	5/19/10	13:04	
		6	Oscar	5/14/10	13:21	5/19/10	13:37	
		7	Devil's Kitchen A	5/14/10	13:10	5/19/10	13:17	
		9	Ladies Parlor	5/14/10	13:07	5/19/10	13:09	
		10	Alligator Hole	5/14/10	13:10	5/19/10	13:26	
		11	Mastodon Bone	5/14/10	13:29	5/19/10	13:44	
		12	Geyser	5/14/10	13:33	5/19/10	13:55	
		13	Blue Grotto	5/14/10	13:38	5/19/10	14:06	
		14	Christmas Tree	5/14/10	13:45	5/19/10	14:15	
		15	Garden of Eden	5/14/10	13:50	5/19/10	14:27	
		16	Log	5/14/10	13:49	5/19/10	14:25	
		18	Indian Cave	5/14/10	15:58	5/19/10	14:39	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ No X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSQ Week 5 **Samples Collected ~~By~~::** Mark Long, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL
Date Samples Shipped: 6 / 1 / 10 **Date Samples Received:** 6/3/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* / *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 21)		(Day 26)		
		19	First Fisherman's Paradise	5/14/10	14:02	5/19/10	14:52	
		20	No Name Cove	5/14/10	15:48	5/19/10	16:38	
		21	Turtle Meadows	5/14/10	14:10	5/19/10	15:03	
		23	Catfish Hotel	5/14/10	14:21	5/19/10	15:21	
		24	Turtle Nook	5/14/10	15:09	5/19/10	16:22	
		26	Raccoon Island	5/14/10	14:34	5/19/10	15:50	
		28	Shipwreck	5/14/10	14:28	5/19/10	15:40	
		30	Timber	5/14/10	14:47	5/19/10	16:02	
		31	Silver River @ 1200 Meter Station	5/14/10	14:52	5/19/10	16:10	
		32	South Boathouse Vent	5/14/10	17:25	5/19/10	17:25	
		33	Gang of Five Vent 3	5/14/10	16:34	5/19/10	17:16	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC Week 6 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 1 / 10 **Date Samples Received:** 6/3/10 **Time Samples Received:** 15 : 00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 26)		(Day 32)		
		1	Mammoth East	5/19/10	12:29	5/25/10	14:15	
		2	Mammoth West	5/19/10	12:36	5/25/10	14:19	
		4	Catfish Reception Hall	5/19/10	12:56	5/25/10	14:26	
		5	Bridal Chamber	5/19/10	13:04	5/25/10	14:31	
		6	Oscar	5/19/10	13:37	5/25/10	14:51	
		7	Devil's Kitchen A	5/19/10	13:17	5/25/10	14:39	
		9	Ladies Parlor	5/19/10	13:09	5/25/10	14:36	
		10	Alligator Hole	5/19/10	13:26	5/25/10	14:46	
		11	Mastodon Bone	5/19/10	13:44	5/25/10	14:56	
		12	Geyser	5/19/10	13:55	5/25/10	15:00	
		13	Blue Grotto	5/19/10	14:06	5/25/10	15:04	
		14	Christmas Tree	5/19/10	14:15	5/25/10	15:13	
		15	Garden of Eden	5/19/10	14:27	5/25/10	15:18	
		16	Log	5/19/10	14:25	5/25/10	15:20	
		18	Indian Cave	5/19/10	14:39	5/25/10	16:45	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 6 **Samples Collected By::** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca, Scott /OUL

Date Samples Shipped: 6 / 1 / 10 **Date Samples Received:** 6/3/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	***COLLECTED* DATE**	***COLLECTED* TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 26)		(Day 32)		
		19	First Fisherman's Paradise	5/19/10	14:52	5/25/10	15:29	
		20	No Name Cove	5/19/10	16:38	5/25/10	16:38	
		21	Turtle Meadows	5/19/10	15:03	5/25/10	15:35	
		23	Catfish Hotel	5/19/10	15:21	5/25/10	15:45	
		24	Turtle Nook	5/19/10	16:22	5/25/10	16:28	
		26	Raccoon Island	5/19/10	15:50	5/25/10	15:58	
		28	Shipwreck	5/19/10	15:40	5/25/10	15:51	
		30	Timber	5/19/10	16:02	5/25/10	16:09	
		31	Silver River @ 1200 Meter Station	5/19/10	16:10	5/25/10	16:14	
		32	South Boathouse Vent	5/19/10	17:25	5/25/10	17:24	
		33	Gang of Five Vent 3	5/19/10	17:16	5/25/10	17:17	
			Water Samples.					
		36	Mammoth Headpool Water			5/20/10	13:20	
		36	Mammoth Headpool Water			5/21/10	12:45	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive. (For Station 36 reference Stations 1 & 2)

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSQ Week 7 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Riclinger -oul

Date Samples Shipped: 6 / 7 / 10 **Date Samples Received:** 6 / 9 / 10 **Time Samples Received:** 14 : 38 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 32)		(Day 39)		
		1	Mammoth East	5/25/10	14:15	6/1/10	14:18	
		2	Mammoth West	5/25/10	14:19	6/1/10	14:22	
		4	Catfish Reception Hall	5/25/10	14:26	6/1/10	14:31	
		5	Bridal Chamber	5/25/10	14:31	6/1/10	14:35	
		6	Oscar	5/25/10	14:51	6/1/10	14:51	
		7	Devil's Kitchen A	5/25/10	14:39	6/1/10	14:41	
		9	Ladies Parlor	5/25/10	14:36	6/1/10	14:38	
		10	Alligator Hole	5/25/10	14:46	6/1/10	14:46	
		11	Mastodon Bone	5/25/10	14:56	6/1/10	14:54	
		12	Geyser	5/25/10	15:00	6/1/10	14:58	
		13	Blue Grotto	5/25/10	15:04	6/1/10	15:02	
		14	Christmas Tree	5/25/10	15:13	6/1/10	15:09	
		15	Garden of Eden	5/25/10	15:18	6/1/10	15:15	
		16	Log	5/25/10	15:20	6/1/10	15:16	
		18	Indian Cave	5/25/10	16:45	6/1/10	16:45	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 7 Samples Collected By: Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Margaret Rickinger-[illegible]

Date Samples Shipped: 6 / 7 / 10 Date Samples Received: 6 / 9 / 10 Time Samples Received: 14 : 30 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other____ Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 32)		(Day 39)		
		19	First Fisherman's Paradise	5/19/10	14:52	5/25/10	15:29	
		20	No Name Cove	5/25/10	16:38	6/1/10	16:35	
		21	Turtle Meadows	5/25/10	15:35	6/1/10	15:32	
		23	Catfish Hotel	5/25/10	15:45	6/1/10	15:44	
		24	Turtle Nook	5/25/10	16:28	6/1/10	16:27	
		26	Raccoon Island	5/25/10	15:58	6/1/10	16:01	
		28	Shipwreck	5/25/10	15:51	6/1/10	15:50	
		30	Timber	5/25/10	16:09	6/1/10	16:09	
		31	Silver River @ 1200 Meter Station	5/25/10	16:14	6/1/10	16:13	
		32	South Boathouse Vent	5/25/10	17:24	6/1/10	17:39	
		33	Gang of Five Vent 3	5/25/10	17:17	6/1/10	17:03	
			Water Samples.					
		36	Mammoth Headpool Water			5/26/10	11:30	
		36	Mammoth Headpool Water			5/28/10	13:15	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive. (For Station 36 reference Stations 1 & 2)

This sheet filled out by OUL staff? Yes____ No X Charts for samples on this page proofed by OUL:____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Selected samples **Samples Collected By:** Pete Butt, Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Richmeier - oul
Date Samples Shipped: 6 / 7 / 10 **Date Samples Received:** 6/9/10 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 0)		(Day 5)		
		32	South Boathouse Vent	4/22/10	15:33	4/28/10	17:28	
		33	Gang of Five Vent 3	4/22/10	15:20	4/28/10	17:22	
				(Day 5)		(Day 10)		
		32	South Boathouse Vent	4/28/10	17:28	5/3/10	16:48	
		33	Gang of Five Vent 3	4/28/10	17:22	5/3/10	16:42	
				(Day 10)		(Day 16)		
		32	South Boathouse Vent	5/3/10	16:48	5/9/10	17:23	
		33	Gang of Five Vent 3	5/3/10	16:42	5/9/10	17:15	

COMMENTS: Analyze most recent (Day 10-16) charcoal samples (and corresponding water samples if charcoal is dye positive), and analyze previous sample if positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells Selected **Samples Collected By::** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Redinger -OK
Date Samples Shipped: 6 / 7 / 10 Date Samples Received: 6 / 9 / 10 Time Samples Received: 14 : 30 Return Cooler? Yes ___ No X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 13)		(Day 20)		
		50	City of Ocala Well #1	5/6/10	13:22	5/13/10	11:09	
		51	City of Ocala Well #2	5/6/10	13:11	5/13/10	11:13	
		52	City of Ocala West Accelator	5/6/10	13:15	5/13/10	11:16	
		54	Reddick Elementary Well #5	5/6/10	15:01	5/13/10	12:46	
		55	North Marion High School West Well	5/6/10	14:42	5/13/10	12:32	
		58	IFAS Plant Science Unit Well A	5/6/10	15:23	5/13/10	13:08	
		59	IFAS Plant Science Unit Well D	5/6/10	15:41	5/13/10	13:17	
		60	McIntosh PS Well 2	5/6/10	16:26	5/13/10	13:50	
				(Day 27)		(Day 33)		
		50	City of Ocala Well #1	5/20/10	17:22	5/26/10	13:40	
		51	City of Ocala Well #2	5/20/10	17:28	5/26/10	13:45	
		52	City of Ocala West Accelator	5/20/10	17:33	5/26/10	13:49	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 8 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 16 / 10 **Date Samples Received:** 6 / 18 / 10 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ **Ship cooler to:** n/a

OUL use only			***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 39)		(Day 45)		
		1	Mammoth East	6/1/10	14:18	6/7/10	14:47	
		2	Mammoth West	6/1/10	14:22	6/7/10	14:51	
		4	Catfish Reception Hall	6/1/10	14:31	6/7/10	15:00	
		5	Bridal Chamber	6/1/10	14:35	6/7/10	15:05	
		6	Oscar	6/1/10	14:51	6/7/10	15:23	
		7	Devil's Kitchen A	6/1/10	14:41	6/7/10	15:12	
		9	Ladies Parlor	6/1/10	14:38	6/7/10	15:08	
		10	Alligator Hole	6/1/10	14:46	6/7/10	15:17	
		11	Mastodon Bone	6/1/10	14:54	6/7/10	15:26	
		12	Geyser	6/1/10	14:58	6/7/10	15:31	
		13	Blue Grotto	6/1/10	15:02	6/7/10	15:36	
		14	Christmas Tree	6/1/10	15:09	6/7/10	15:42	
		15	Garden of Eden	6/1/10	15:15	6/7/10	15:48	
		16	Log	6/1/10	15:16	6/7/10	15:49	
		18	Indian Cave	6/1/10	16:45	6/7/10	17:09	

COMMENTS:

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 8 **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 16 / 10 **Date Samples Received:** 6/18/10 **Time Samples Received:** 13:36 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 39)		(Day 45)		
		19	First Fisherman's Paradise	6/1/10	15:25	6/7/10	15:57	
		20	No Name Cove	6/1/10	16:35	6/7/10	17:01	
		21	Turtle Meadows	6/1/10	15:32	6/7/10	16:03	
		23	Catfish Hotel	6/1/10	15:44	6/7/10	16:12	
		24	Turtle Nook	6/1/10	16:27	6/7/10	16:54	
		26	Raccoon Island	6/1/10	16:01	6/7/10	16:47	
		28	Shipwreck	6/1/10	15:50	6/7/10	16:20	
		30	Timber	6/1/10	16:09	6/7/10	16:35	
		31	Silver River @ 1200 Meter Station	6/1/10	16:13	6/7/10	16:40	
		32	South Boathouse Vent	6/1/10	17:39	6/7/10	17:39	
		33	Gang of Five Vent 3	6/1/10	17:03	6/7/10	17:33	

COMMENTS:

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC/Week 9 **Samples Collected By:** Pete Butt, Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL
Date Samples Shipped: 6 / 16 / 10 **Date Samples Received:** 6 / 18 / 10 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 45)		(Day 52)		
		1	Mammoth East	6/7/10	14:47	6/14/10	14:02	
		2	Mammoth West	6/7/10	14:51	6/14/10	14:05	
		4	Catfish Reception Hall	6/7/10	15:00	6/14/10	14:14	
		5	Bridal Chamber	6/7/10	15:05	6/14/10	14:20	
		6	Oscar	6/7/10	15:23	6/14/10	14:38	
		7	Devil's Kitchen A	6/7/10	15:12	6/14/10	14:28	
		9	Ladies Parlor	6/7/10	15:08	6/14/10	14:24	
		10	Alligator Hole	6/7/10	15:17	6/14/10	14:33	
		11	Mastodon Bone	6/7/10	15:26	6/14/10	14:43	
		12	Geyser	6/7/10	15:31	6/14/10	14:47	
		13	Blue Grotto	6/7/10	15:36	6/14/10	14:52	
		14	Christmas Tree	6/7/10	15:42	6/14/10	14:56	
		15	Garden of Eden	6/7/10	15:48	6/14/10	15:03	
		16	Log	6/7/10	15:49	6/14/10	15:04	
		18	Indian Cave	6/7/10	17:09	6/14/10	16:16	

COMMENTS:

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 9 **Samples Collected By:** Pete Butt, Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 6 / 16 / 10 **Date Samples Received:** 6/18/10 **Time Samples Received:** 13:30 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 45)		(Day 52)		
		19	First Fisherman's Paradise	6/7/10	15:57	6/14/10	15:13	
		20	No Name Cove	6/7/10	17:01	6/14/10	16:10	
		21	Turtle Meadows	6/7/10	16:03	6/14/10	15:19	
		23	Catfish Hotel	6/7/10	16:12	6/14/10	15:27	
		24	Turtle Nook	6/7/10	16:54	6/14/10	16:04	
		26	Raccoon Island	6/7/10	16:47	6/14/10	15:41	
		28	Shipwreck	6/7/10	16:20	6/14/10	15:33	
		30	Timber	6/7/10	16:35	6/14/10	15:52	
		31	Silver River @ 1200 Meter Station	6/7/10	16:40	6/14/10	15:55	
		32	South Boathouse Vent	6/7/10	17:39	6/14/10	16:48	
		33	Gang of Five Vent 3	6/7/10	17:33	6/14/10	16:40	

COMMENTS:

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Wells-Stn. 54 Reddick Elem Well 5 Samples Collected By:: Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 6 / 21 / 10 Date Samples Received: 6/23/10 Time Samples Received: 13:00 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ______ Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -2)		(Day 6)		
		54	Reddick Elementary Well #5	4/21/10	11:25	4/29/10	16:57	
				(Day 6)		(Day 13)		
		54	Reddick Elementary Well #5	4/29/10	16:57	5/6/10	15:01	
				(Day 20)		(Day 27)		
		54	Reddick Elementary Well #5	5/13/10	12:46	5/20/10	15:55	
				(Day 27)		(Day 33)		
		54	Reddick Elementary Well #5	5/20/10	15:55	5/26/10	15:30	
				(Day 33)		(Day 40)		
		54	Reddick Elementary Well #5	5/26/10	15:30	6/2/10	16:00	
				(Day 40)		(Day 48)		
		54	Reddick Elementary Well #5	6/2/10	16:00	6/10/10	15:32	
				(Day 48)		(Day 54)		
		54	Reddick Elementary Well #5	6/10/10	15:32	6/16/10	15:56	
			Background Sampler; analyze if Day -2 to Day 6 is positive:					
		54	Reddick Elementary Well #5 Background	4/7/10	13:22	4/21/10	11:25	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive, except for instruction re Background sample.

This sheet filled out by OUL staff? Yes______ No X Charts for samples on this page proofed by OUL:______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Wells-Stn. 59 IFAS Well D Samples Collected By:: Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 6 / 21 / 10 Date Samples Received: 6/23/10 Time Samples Received: 15 : 00 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other___ Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -2)		(Day 6)		
		59	IFAS Plant Science Unit Well D	4/21/10	16:42	4/29/10	16:29	
				(Day 6)		(Day 13)		
		59	IFAS Plant Science Unit Well D	4/29/10	16:29	5/6/10	15:41	
				(Day 20)		(Day 27)		
		59	IFAS Plant Science Unit Well D	5/13/10	13:17	5/20/10	15:33	
				(Day 27)		(Day 33)		
		59	IFAS Plant Science Unit Well D	5/20/10	15:33	5/26/10	16:12	
				(Day 33)		(Day 40)		
		59	IFAS Plant Science Unit Well D	5/26/10	16:12	6/2/10	16:54	
				(Day 40)		(Day 48)		
		59	IFAS Plant Science Unit Well D	6/2/10	16:54	6/10/10	16:08	
			Background Sampler; analyze if Day -2 to Day 6 is positive:					
		59	IFAS Plant Science Unit Well D Background	4/7/10	13:02	4/21/10	16:42	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive, except for instruction re Background sample.

This sheet filled out by OUL staff? Yes___ No X Charts for samples on this page proofed by OUL:___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Wells-Stn. 58 IFAS Well A Samples Collected By:: Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 6 / 21 / 10 Date Samples Received: 6/23/10 Time Samples Received: 15:00 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other___ Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -2)		(Day 6)		
		58	IFAS Plant Science Unit Well A	4/21/10	16:11	4/29/10	16:11	
				(Day 6)		(Day 13)		
		58	IFAS Plant Science Unit Well A	4/29/10	16:11	5/6/10	15:23	
				(Day 20)		(Day 27)		
		58	IFAS Plant Science Unit Well A	5/13/10	13:08	5/20/10	15:22	
				(Day 27)		(Day 33)		
		58	IFAS Plant Science Unit Well A	5/20/10	15:22	5/26/10	14:54	
				(Day 33)		(Day 40)		
		58	IFAS Plant Science Unit Well A	5/26/10	14:54	6/2/10	16:28	
				(Day 40)		(Day 48)		
		58	IFAS Plant Science Unit Well A	6/2/10	16:28	6/10/10	15:55	
			Background Sampler; analyze if Day -2 to Day 6 is positive:					
		58	IFAS Plant Science Unit Well A Background	4/7/10	12:51	4/21/10	16:11	

COMMENTS: Hold pending analyses and review of results for Well Stations Samples 54/Reddick Elem 5 (Page 1) and 59/IFAS D (Page 2).

This sheet filled out by OUL staff? Yes___ No X Charts for samples on this page proofed by OUL:___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 55 NMHS West Well **Samples Collected By::** Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 21 / 10 **Date Samples Received:** 6/23/10 **Time Samples Received:** 15 : 00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -2)		(Day 6)		
		55	North Marion High School West Well	4/21/10	15:47	4/29/10	15:23	
				(Day 6)		(Day 13)		
		55	North Marion High School West Well	4/29/10	15:23	5/6/10	14:42	
				(Day 20)		(Day 27)		
		55	North Marion High School West Well	5/13/10	12:32	5/20/10	16:37	
				(Day 27)		(Day 33)		
		55	North Marion High School West Well	5/20/10	16:37	5/26/10	15:01	
				(Day 33)		(Day 40)		
		55	North Marion High School West Well	5/26/10	15:01	6/2/10	15:39	
				(Day 40)		(Day 48)		
		55	North Marion High School West Well	6/2/10	15:39	6/10/10	15:01	
				(Day 48)		(Day 54)		
		55	North Marion High School West Well	6/10/10	15:01	6/16/10	15:27	
			Background Sampler; analyze if Day -2 to Day 6 is positive:					
		55	North Marion High School West Well Background	4/7/10	12:23	4/21/10	15:47	

COMMENTS: Hold pending analyses and review of results for Well Stations Samples 54/Reddick Elem 5 (Page 1) and 59/IFAS D (Page 2).

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Wells-Stn. 57 Marion CI Well Samples Collected By:: Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott / OUL

Date Samples Shipped: 6 / 21 / 10 Date Samples Received: 6/23/10 Time Samples Received: 15 : 00 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day -2)		(Day 6)		
		57	Marion Correctional Institution Well 1	4/21/10	11:51	4/29/10	14:53	
				(Day 6)		(Day 13)		
		57	Marion Correctional Institution Well 1	4/29/10	14:53	5/6/10	14:14	
				(Day 13)		(Day 20)		
		57	Marion Correctional Institution Well 1	5/6/10	14:14	5/13/10	12:05	
				(Day 20)		(Day 27)		
		57	Marion Correctional Institution Well 1	5/13/10	12:05	5/20/10	16:15	
				(Day 27)		(Day 33)		
		57	Marion Correctional Institution Well 1	5/20/10	16:15	5/26/10	14:39	
				(Day 33)		(Day 40)		
		57	Marion Correctional Institution Well 1	5/26/10	14:39	6/2/10	15:05	
				(Day 40)		(Day 48)		
		57	Marion Correctional Institution Well 1	6/2/10	15:05	6/10/10	14:41	
				(Day 48)		(Day 54)		
		57	Marion Correctional Institution Well 1	6/10/10	14:41	6/16/10	15:54	

COMMENTS: Hold pending analyses and review of results for Well Stations Samples 54/Reddick Elem 5 (Page 1) and 59/IFAS D (Page 2).

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 60 McIntosh PS Well 2 **Samples Collected By::** Matt Hubner, Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 6 / 21 / 10 **Date Samples Received:** 6/23/10 **Time Samples Received:** 15:00 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other______ **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 5)		(Day 13)		
		60	McIntosh Public Supply Well 2	4/28/10	11:54	5/6/10	16:26	
				(Day 20)		(Day 27)		
		60	McIntosh Public Supply Well 2	5/13/10	13:50	5/20/10	18:17	
				(Day 27)		(Day 33)		
		60	McIntosh Public Supply Well 2	5/20/10	18:17	5/26/10	16:45	
				(Day 33)		(Day 40)		
		60	McIntosh Public Supply Well 2	5/26/10	16:45	6/2/10	17:14	
				(Day 40)		(Day 48)		
		60	McIntosh Public Supply Well 2	6/2/10	17:14	6/10/10	16:30	
				(Day 48)		(Day 54)		
		60	McIntosh Public Supply Well 2	6/10/10	16:30	6/16/10	17:36	

COMMENTS: Hold pending analyses and review of results for Well Stations Samples 54/Reddick Elem 5 (Page 1) and 59/IFAS D (Page 2).

This sheet filled out by OUL staff? Yes______ **No** X **Charts for samples on this page proofed by OUL:**______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 10 Samples Collected By: Pete Butt, Tom Morris
Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL
Date Samples Shipped: 7 / 13 / 10 Date Samples Received: 7/15/10 Time Samples Received: 13:15 Return Cooler? Yes__ No X
Bill to: URS Corp. Send Results to: URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other____ Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 52)		(Day 60)		
		1	Mammoth East	6/14/10	14:02	6/22/10	13:51	
		2	Mammoth West	6/14/10	14:05	6/22/10	13:55	
		4	Catfish Reception Hall	6/14/10	14:14	6/22/10	14:05	
		5	Bridal Chamber	6/14/10	14:20	6/22/10	14:07	
		6	Oscar	6/14/10	14:38	6/22/10	14:29	
		7	Devil's Kitchen A	6/14/10	14:28	6/22/10	14:15	
		9	Ladies Parlor	6/14/10	14:24	6/22/10	14:12	
		10	Alligator Hole	6/14/10	14:33	6/22/10	14:21	
		11	Mastodon Bone	6/14/10	14:43	6/22/10	14:33	
		12	Geyser	6/14/10	14:47	6/22/10	14:37	
		13	Blue Grotto	6/14/10	14:52	6/22/10	14:43	
		14	Christmas Tree	6/14/10	14:56	6/22/10	14:47	
		15	Garden of Eden	6/14/10	15:03	6/22/10	14:53	
		16	Log	6/14/10	15:04	6/22/10	14:54	
		18	Indian Cave	6/14/10	16:16	6/22/10	15:01	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes____ No X Charts for samples on this page proofed by OUL:____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 10 **Samples Collected By:** Pete Butt, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13 : 15 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other**___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 52)		(Day 60)		
		19	First Fisherman's Paradise	6/14/10	15:13	6/22/10	15:05	
		20	No Name Cove	6/14/10	16:10	6/22/10	15:12	
		21	Turtle Meadows	6/14/10	15:19	6/22/10	15:18	
		23	Catfish Hotel	6/14/10	15:27	6/22/10	15:29	
		24	Turtle Nook	6/14/10	16:04	6/22/10	15:32	
		26	Raccoon Island	6/14/10	15:41	6/22/10	15:37	
		28	Shipwreck	6/14/10	15:33	6/22/10	15:41	
		30	Timber	6/14/10	15:52	6/22/10	15:48	
		31	Silver River @ 1200 Meter Station	6/14/10	15:55	6/22/10	15:52	
		32	South Boathouse Vent	6/14/10	16:48	6/22/10	16:39	
		33	Gang of Five Vent 3	6/14/10	16:40	6/22/10	16:31	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 54 Reddick Well 5 & 60 McIntosh PSW2 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes**__ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other**__ **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 54)		(Day 61)		
		54	Reddick Elementary Well #5	6/16/10	11:25	6/23/10	19:49	
				(Day 61)		(Day 68)		
		54	Reddick Elementary Well #5	6/23/10	19:49	6/30/10	14:50	
				(Day 68)		(Day 76)		
		54	Reddick Elementary Well #5	6/30/10	14:50	7/8/10	14:55	
				(Day 54)		(Day 61)		
		60	McIntosh Public Supply Well 2	6/16/10	17:36	6/23/10	21:05	
				(Day 61)		(Day 68)		
		60	McIntosh Public Supply Well 2	6/23/10	21:05	6/30/10	16:57	
				(Day 68)		(Day 76)		
		60	McIntosh Public Supply Well 2	6/30/10	16:57	7/8/10	15:56	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes__ **No** X **Charts for samples on this page proofed by OUL:**__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 58 & 59 IFAS Wells A & D **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 48)		(Day 61)		
		58	IFAS Plant Science Unit Well A	6/10/10	15:55	6/23/10	14:00	
				(Day 61)		(Day 68)		
		58	IFAS Plant Science Unit Well A	6/23/10	14:00	6/30/10	16:28	
				(Day 68)		(Day 76)		
		58	IFAS Plant Science Unit Well A	6/30/10	16:28	7/8/10	15:19	
				(Day 48)		(Day 61)		
		59	IFAS Plant Science Unit Well D	6/10/10	16:08	6/23/10	14:15	
				(Day 61)		(Day 68)		
		59	IFAS Plant Science Unit Well D	6/23/10	14:15	6/30/10	16:39	
				(Day 68)		(Day 76)		
		59	IFAS Plant Science Unit Well D	6/30/10	16:39	7/8/10	15:34	

COMMENTS: Please hold for analyses pending instructions.

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~Wells-~~Stn. 55 NMHS WWell & 57 MCI Well 1 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 54)		(Day 61)		
		55	North Marion High School West Well	6/16/10	15:27	6/23/10	18:51	
				(Day 61)		(Day 68)		
		55	North Marion High School West Well	6/23/10	18:51	6/30/10	14:33	
				(Day 68)		(Day 76)		
		55	North Marion High School West Well	6/30/10	14:33	7/8/10	14:31	
				(Day 54)		(Day 61)		
		57	Marion CI Well 1	6/16/10	14:55	6/23/10	18:21	
				(Day 61)		(Day 68)		
		57	Marion CI Well 1	6/23/10	18:21	6/30/10	14:05	
				(Day 68)		(Day 76)		
		57	Marion CI Well 1	6/30/10	14:05	7/8/10	14:08	

COMMENTS: Please hold for analyses pending instructions.

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Wells-Stn. 50 Ocala PS Well 1 Samples Collected By: Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 Date Samples Received: 7/15/10 Time Samples Received: 13:15 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other______ Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field*						*OUL use only*
		for field technician use - use black ink only						
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 33)		(Day 40)		
		50	Ocala Public Supply Well 1	5/26/10	13:40	6/2/10	14:05	
				(Day 40)		(Day 48)		
		50	Ocala Public Supply Well 1	6/2/10	14:05	6/10/10	13:36	
				(Day 48)		(Day 76)		
		50	Ocala Public Supply Well 1	6/10/10	13:36	6/16/10	13:59	
				(Day 54)		(Day 61)		
		50	Ocala Public Supply Well 1	6/16/10	13:59	6/23/10	17:20	
				(Day 61)		(Day 68)		
		50	Ocala Public Supply Well 1	6/23/10	17:20	6/30/10	13:18	
				(Day 68)		(Day 76)		
		50	Ocala Public Supply Well 1	6/30/10	13:18	7/8/10	13:23	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes______ No X Charts for samples on this page proofed by OUL:______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 51 Ocala PS Well 2 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 33)		(Day 40)		
		51	Ocala Public Supply Well 2	5/26/10	13:45	6/2/10	14:11	
				(Day 40)		(Day 48)		
		51	Ocala Public Supply Well 2	6/2/10	14:11	6/10/10	13:42	
				(Day 48)		(Day 76)		
		51	Ocala Public Supply Well 2	6/10/10	13:42	6/16/10	14:04	
				(Day 54)		(Day 61)		
		51	Ocala Public Supply Well 2	6/16/10	14:04	6/23/10	17:24	
				(Day 61)		(Day 68)		
		51	Ocala Public Supply Well 2	6/23/10	17:24	6/30/10	13:23	
				(Day 68)		(Day 76)		
		51	Ocala Public Supply Well 2	6/30/10	13:23	7/8/10	13:27	

COMMENTS: Please hold for analyses pending instructions.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 52 Ocala PS Wells West Accelator **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / DK

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes**__ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other**__ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 33)		(Day 40)		
		52	Ocala Public Supply Wells West Accelator	5/26/10	13:49	6/2/10	14:14	
				(Day 40)		(Day 48)		
		52	Ocala Public Supply Wells West Accelator	6/2/10	14:14	6/10/10	13:46	
				(Day 48)		(Day 76)		
		52	Ocala Public Supply Wells West Accelator	6/10/10	13:46	6/16/10	14:10	
				(Day 54)		(Day 61)		
		52	Ocala Public Supply Wells West Accelator	6/16/10	14:10	6/23/10	17:28	
				(Day 61)		(Day 68)		
		52	Ocala Public Supply Wells West Accelator	6/23/10	17:28	6/30/10	13:27	
				(Day 68)		(Day 76)		
		52	Ocala Public Supply Wells West Accelator	6/30/10	13:27	7/8/10	13:31	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes__ **No** X **Charts for samples on this page proofed by OUL:**__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Wells-Stn. 56 Ocala Springs Elem. East Well **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 7 / 13 / 10 **Date Samples Received:** 7/15/10 **Time Samples Received:** 13:15 **Return Cooler? Yes** __ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** __ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 27)		(Day 33)		
		56	Ocala Springs Elementary School East Well	5/20/10	17:00	5/26/10	14:07	
				(Day 33)		(Day 40)		
		56	Ocala Springs Elementary School East Well	5/26/10	14:07	6/2/10	14:35	
				(Day 40)		(Day 48)		
		56	Ocala Springs Elementary School East Well	6/2/10	14:35	6/10/10	14:04	
				(Day 48)		(Day 76)		
		56	Ocala Springs Elementary School East Well	6/10/10	14:04	6/16/10	14:24	
				(Day 54)		(Day 61)		
		56	Ocala Springs Elementary School East Well	6/16/10	14:24	6/23/10	17:47	
				(Day 61)		(Day 68)		
		56	Ocala Springs Elementary School East Well	6/23/10	17:47	6/30/10	13:41	
				(Day 68)		(Day 76)		
		56	Ocala Springs Elementary School East Well	6/30/10	13:41	7/8/10	13:44	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 11 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette /OUL
Date Samples Shipped: 8 / 9 / 10 **Date Samples Received:** 8 / 11 / 10 **Time Samples Received:** 15 : 00 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other**___ **Ship cooler to:** n/a

Please indicate stations where dye was visible in the field
for field technician use - use black ink only

OUL use only								OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 60)		(Day105)		
		1	Mammoth East	6/22/10	13:51	8/5/10	11:54	
		2	Mammoth West	6/22/10	13:55	8/5/10	12:02	
		4	Catfish Reception Hall	6/22/10	14:05	8/5/10	12:22	
		5	Bridal Chamber	6/22/10	14:07	8/5/10	12:33	
		6	Oscar	6/22/10	14:29	8/5/10	12:57	
		7	Devil's Kitchen A	6/22/10	14:15	8/5/10	12:44	
		9	Ladies Parlor	6/22/10	14:12	8/5/10	12:37	
		10	Alligator Hole	6/22/10	14:21	8/5/10	12:49	
		11	Mastodon Bone	6/22/10	14:33	8/5/10	13:08	
		12	Geyser	6/22/10	14:37	8/5/10	13:15	
		13	Blue Grotto	6/22/10	14:43	8/5/10	13:21	
		15	Garden of Eden	6/22/10	14:53	8/5/10	13:47	
		16	Log	6/22/10	14:54	8/5/10	13:48	
		18	Indian Cave	6/22/10	15:01	8/5/10	16:08	
		19	First Fisherman's Paradise	6/22/10	15:05	8/5/10	14:04	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 11 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette / OUL

Date Samples Shipped: 8 / 9 / 10 **Date Samples Received:** 8 / 11 / 10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only			***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 60)		(Day105)		
		20	No Name Cove	6/22/10	15:12	8/5/10	15:55	
		21	Turtle Meadows	6/22/10	15:18	8/5/10	14:13	
		23	Catfish Hotel	6/22/10	15:29	8/5/10	14:27	
		24	Turtle Nook	6/22/10	15:32	8/5/10	14:35	
		26	Raccoon Island	6/22/10	15:37	8/5/10	14:46	
		28	Shipwreck	6/22/10	15:41	8/5/10	14:53	
		30	Timber	6/22/10	15:48	8/5/10	15:10	
		31	Silver River @ 1200 Meter Station	6/22/10	15:52	8/5/10	15:27	
		32	South Boathouse Vent	6/22/10	16:39	8/5/10	17:24	
		33	Gang of Five Vent 3	6/22/10	16:31	8/5/10	17:05	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

OZARK UNDERGROUND LABORATORY, INC.

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Wells Week 12 Samples Collected By: Pete Butt

Samples Shipped By: KES via FedEx Samples Received By: Lisa Goyette /OUL

Date Samples Shipped: 8 / 9 / 10 Date Samples Received: 8/11/10 Time Samples Received: 15:00 Return Cooler? Yes__ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other____ Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field* / *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED			# WATER REC'D
				DATE	TIME	DATE	TIME		
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 76)		(Day 90)			
		50	City of Ocala Well #1	7/8/10	13:23	7/21/10	14:26		
		51	City of Ocala Well #2	7/8/10	13:27	7/21/10	14:30		
		52	City of Ocala West Accelator	7/8/10	13:31	7/21/10	14:34		
		54	Reddick Elementary Well #5	7/8/10	14:55	7/21/10	15:26		
		55	North Marion High School West Well	7/8/10	14:31	7/21/10	15:41		
		56	Ocala Springs Elementary East Well	7/8/10	13:44	7/21/10	14:46		
		57	Marion CI Well 1	7/8/10	14:08	7/21/10	15:11		
		58	IFAS Plant Science Unit Well A	7/8/10	15:19	7/21/10	16:20		
		59	IFAS Plant Science Unit Well D	7/8/10	15:34	7/21/10	16:29		
		60	McIntosh PS Well 2	7/8/10	15:56	7/21/10	16:45		

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes____ No X Charts for samples on this page proofed by OUL:____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** Rainbow Springs Head Springs Station 40 **Samples Collected By:** KES
Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette / OUL
Date Samples Shipped: 8 / 9 / 10 **Date Samples Received:** 8 / 11 / 10 **Time Samples Received:** 15 :00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	*COLLECTED* DATE	*COLLECTED* TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		40	Rainbow Springs Headsprings	4/20/10	18:08	4/29/10	11:52	
		40	Rainbow Springs Headsprings	4/29/10	11:52	5/6/10	11:40	
		40	Rainbow Springs Headsprings	5/6/10	11:40	5/13/10	9:56	
		40	Rainbow Springs Headsprings	5/13/10	9:56	5/20/10	13:50	
		40	Rainbow Springs Headsprings	5/20/10	13:50	5/26/10	11:54	
		40	Rainbow Springs Headsprings	5/26/10	11:54	6/2/10	12:16	
		40	Rainbow Springs Headsprings	6/2/10	12:16	6/10/10	12:03	
		40	Rainbow Springs Headsprings	6/10/10	12:03	6/16/10	12:24	
		40	Rainbow Springs Headsprings	6/16/10	12:24	6/23/10	15:58	
		40	Rainbow Springs Headsprings	6/23/10	15:58	6/30/10	11:40	
		40	Rainbow Springs Headsprings	6/30/10	11:40	7/8/10	11:38	
		40	Rainbow Springs Headsprings	7/8/10	11:38	7/21/10	12:49	

COMMENTS: Please hold for analyses pending instructions.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Rainbow Springs Bubbling Springs Station 41 Samples Collected By KES

Samples Shipped By: KES via FedEx Samples Received By: Lisa Goyette / OUL

Date Samples Shipped: 8 / 9 / 10 Date Samples Received: 8/11/10 Time Samples Received: 15:00 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ Ship cooler to: n/a

OUL use only			***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		41	Rainbow Springs Bubbling Spring	4/20/10	17:54	4/29/10	11:33	
		41	Rainbow Springs Bubbling Spring	4/29/10	11:33	5/6/10	11:14	
		41	Rainbow Springs Bubbling Spring	5/6/10	11:14	5/13/10	9:39	
		41	Rainbow Springs Bubbling Spring	5/13/10	9:39	5/20/10	13:20	
		41	Rainbow Springs Bubbling Spring	5/20/10	13:20	5/26/10	12:32	
		41	Rainbow Springs Bubbling Spring	5/26/10	12:32	6/2/10	12:54	
		41	Rainbow Springs Bubbling Spring	6/2/10	12:54	6/10/10	12:32	
		41	Rainbow Springs Bubbling Spring	6/10/10	12:32	6/16/10	12:57	
		41	Rainbow Springs Bubbling Spring	6/16/10	12:57	6/23/10	15:41	
		41	Rainbow Springs Bubbling Spring	6/23/10	15:41	6/30/10	12:15	
		41	Rainbow Springs Bubbling Spring	6/30/10	12:15	7/8/10	12:21	
		41	Rainbow Springs Bubbling Spring	7/8/10	12:21	7/21/10	13:26	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: Rainbow Springs Rainbow River Station 42 Samples Collected By: KES

Samples Shipped By: KES via FedEx Samples Received By: Lisa Gayette / OUL

Date Samples Shipped: 8 / 9 / 10 Date Samples Received: 8 / 11 / 10 Time Samples Received: 15:00 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		*COLLECTED*		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		42	Rainbow Springs Rainbow River	4/20/10	18:18	4/29/10	12:03	
		42	Rainbow Springs Rainbow River	4/29/10	12:03	5/6/10	11:50	
		42	Rainbow Springs Rainbow River	5/6/10	11:50	5/13/10	10:05	
		42	Rainbow Springs Rainbow River	5/13/10	10:05	5/20/10	14:10	
		42	Rainbow Springs Rainbow River	5/20/10	14:10	5/26/10	12:02	
		42	Rainbow Springs Rainbow River	5/26/10	12:02	6/2/10	12:28	
		42	Rainbow Springs Rainbow River	6/2/10	12:28	6/10/10	12:13	
		42	Rainbow Springs Rainbow River	6/10/10	12:13	6/16/10	12:37	
		42	Rainbow Springs Rainbow River	6/16/10	12:37	6/23/10	14:08	
		42	Rainbow Springs Rainbow River	6/23/10	14:08	6/30/10	11:53	
		42	Rainbow Springs Rainbow River	6/30/10	11:53	7/8/10	11:52	
		42	Rainbow Springs Rainbow River	7/8/10	11:52	7/21/10	12:58	

COMMENTS: Please hold for analyses pending instructions.

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSG~~ Week 12 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 9 / 8 / 10 **Date Samples Received:** 9/10/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day105)		(Day133)		
		1	Mammoth East	8/5/10	13:51	9/2/10	13:47	
		2	Mammoth West	8/5/10	13:55	9/2/10	13:56	
		4	Catfish Reception Hall	8/5/10	14:05	9/2/10	14:36	
		5	Bridal Chamber	8/5/10	14:07	9/2/10	14:43	
		6	Oscar	8/5/10	14:29	9/2/10	15:05	
		7	Devil's Kitchen A	8/5/10	14:15	9/2/10	14:55	
		9	Ladies Parlor	8/5/10	14:12	9/2/10	14:48	
		10	Alligator Hole	8/5/10	14:21	9/2/10	14:59	
		11	Mastodon Bone	8/5/10	14:33	9/2/10	15:12	
		12	Geyser	8/5/10	14:37	9/2/10	15:17	
		13	Blue Grotto	8/5/10	14:43	9/2/10	15:23	
		14	Christmas Tree	8/5/10	14:43	9/2/10	15:29	
		15	Garden of Eden	8/5/10	14:53	9/2/10	15:37	
		16	Log	8/5/10	14:54	9/2/10	15:38	
		18	Indian Cave	8/5/10	15:01	9/2/10	17:12	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: ~~SSC~~ Week 12 Samples Collected By: Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx Samples Received By: C. Aley / OUL

Date Samples Shipped: 9 / 8 / 10 Date Samples Received: 9 / 10 / 10 Time Samples Received: 15:00 Return Cooler? Yes __ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other ___ Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day105)		(Day133)		
		19	First Fisherman's Paradise	8/5/10	15:05	9/2/10	15:48	
		20	No Name Cove	8/5/10	15:55	9/2/10	17:04	
		21	Turtle Meadows	8/5/10	14:13	9/2/10	15:55	
		23	Catfish Hotel	8/5/10	14:27	9/2/10	16:00	
		24	Turtle Nook	8/5/10	14:35	9/2/10	16:56	
		26	Raccoon Island	8/5/10	14:46	9/2/10	16:50	
		28	Shipwreck	8/5/10	14:53	9/2/10	16:11	
		31	Silver River @ 1200 Meter Station	8/5/10	15:27	9/2/10	16:41	
		32	South Boathouse Vent	8/5/10	17:24	9/2/10	17:43	
		33	Gang of Five Vent 3	8/5/10	17:05	9/2/10	17:33	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Wells Week 13 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 9 / 8 / 10 **Date Samples Received:** 9/10/10 **Time Samples Received:** 15:00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day 90)		(Day132)		
		50	City of Ocala Well #1	7/21/10	14:26	9/1/10	16:37	
		51	City of Ocala Well #2	7/21/10	14:30	9/1/10	16:44	
		52	City of Ocala West Accelator	7/21/10	14:34	9/1/10	16:50	
		54	Reddick Elementary Well #5 (FINAL SAMPLE)	7/21/10	15:26	9/1/10	14:38	
		55	North Marion High School West Well	7/21/10	15:41	9/1/10	15:15	
		56	Ocala Springs Elementary East Well	7/21/10	14:46	9/1/10	16:21	
		57	Marion CI Well 1	7/21/10	15:11	9/1/10	15:52	
		58	IFAS Plant Science Unit Well A (FINAL SAMPLE)	7/21/10	16:20	9/1/10	13:45	
		59	IFAS Plant Science Unit Well D (FINAL SAMPLE)	7/21/10	16:29	9/1/10	14:10	
		60	McIntosh PS Well 2 (FINAL SAMPLE)	7/21/10	16:45	9/1/10	15:59	

COMMENTS: Please hold for analyses pending instructions.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSC~~ Week 13 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 9 / 27 / 10 **Date Samples Received:** 9 29 / 10 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** __ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** __ **Ship cooler to:** n/a

Please indicate stations where dye was visible in the field
for field technician use - use black ink only

OUL use only				PLACED		COLLECTED		OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	DATE	TIME	DATE	TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day133)		(Day153)		
		1	Mammoth East	9/2/10	13:47	9/22/10	12:54	
		2	Mammoth West	9/2/10	13:56	9/22/10	13:06	
		4	Catfish Reception Hall	9/2/10	14:36	9/22/10	13:33	
		5	Bridal Chamber	9/2/10	14:43	9/22/10	13:41	
		6	Oscar	9/2/10	15:05	9/22/10	14:03	
		7	Devil's Kitchen A	9/2/10	14:55	9/22/10	13:50	
		9	Ladies Parlor	9/2/10	14:48	9/22/10	13:45	
		10	Alligator Hole	9/2/10	14:59	9/22/10	13:56	
		11	Mastodon Bone	9/2/10	15:12	9/22/10	14:09	
		12	Geyser	9/2/10	15:17	9/22/10	14:16	
		13	Blue Grotto	9/2/10	15:23	9/22/10	14:23	
		14	Christmas Tree	9/2/10	15:29	9/22/10	14:32	
		15	Garden of Eden	9/2/10	15:37	9/22/10	14:39	
		16	Log	9/2/10	15:38	9/22/10	14:41	
		18	Indian Cave	9/2/10	17:12	9/22/10	16:29	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSG~~ Week 13 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 9 / 27 / 10 **Date Samples Received:** 9/29/10 **Time Samples Received:** 13:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day133)		(Day153)		
		19	First Fisherman's Paradise	9/2/10	15:48	9/22/10	14:56	
		20	No Name Cove	9/2/10	17:04	9/22/10	16:15	
		21	Turtle Meadows	9/2/10	15:55	9/22/10	15:05	
		23	Catfish Hotel	9/2/10	16:00	9/22/10	15:14	
		24	Turtle Nook	9/2/10	16:56	9/22/10	16;05	
		26	Raccoon Island	9/2/10	16:50	9/22/10	15:31	
		28	Shipwreck	9/2/10	16:11	9/22/10	15:24	
		30	Timber	9/2/10	16:34	9/22/10	15:40	
		31	Silver River @ 1200 Meter Station	9/2/10	16:41	9/22/10	15:46	
		32	South Boathouse Vent	9/2/10	17:54	9/22/10	17:20	
		33	Gang of Five Vent 3	9/2/10	17:43	9/22/10	17:12	
		19	First Fisherman's Paradise	8/5/10	14:04	9/2/10	15:48	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Wells Week 14 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott OUL
Date Samples Shipped: 9 / 27 / 10 **Date Samples Received:** 9 29 / 10 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** ___ **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day132)		(Day148)		
		50	City of Ocala Well #1	9/1/10	16:37	9/17/10	17:07	
		51	City of Ocala Well #2	9/1/10	16:44	9/17/10	17:09	
		52	City of Ocala West Accelator	9/1/10	16:50	9/17/10	17:12	
		55	North Marion High School West Well	9/1/10	15:15	9/17/10	17:36	
		56	Ocala Springs Elementary East Well	9/1/10	16:21	9/17/10	17:57	
		57	Marion CI Well 1	9/1/10	15:52	9/17/10	12:55	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 14 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridenger -OUL

Date Samples Shipped: 10 / 11 / 10 **Date Samples Received:** 10 / 14 / 10 **Time Samples Received:** 12:30 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day153)		(Day165)		
		1	Mammoth East	9/22/10	12:54	10/4/10	13:36	
		2	Mammoth West	9/22/10	13:06	10/4/10	13:46	
		4	Catfish Reception Hall	9/22/10	13:33	10/4/10	14:02	
		5	Bridal Chamber	9/22/10	13:41	10/4/10	14:07	
		6	Oscar	9/22/10	14:03	10/4/10	14:27	
		7	Devil's Kitchen A	9/22/10	13:50	10/4/10	14:16	
		9	Ladies Parlor	9/22/10	13:45	10/4/10	14:11	
		10	Alligator Hole	9/22/10	13:56	10/4/10	14:22	
		11	Mastodon Bone	9/22/10	14:09	10/4/10	14:34	
		12	Geyser	9/22/10	14:16	10/4/10	14:39	
		13	Blue Grotto	9/22/10	14:23	10/4/10	14:46	
		14	Christmas Tree	9/22/10	14:32	10/4/10	14:53	
		15	Garden of Eden	9/22/10	14:39	10/4/10	15:01	
		16	Log	9/22/10	14:41	10/4/10	15:02	
		18	Indian Cave	9/22/10	16:29	10/4/10	15:20	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 14 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridlinger-OUL

Date Samples Shipped: 10 / 11 / 10 **Date Samples Received:** 10 / 14 / 10 **Time Samples Received:** 12 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day153)		(Day165)		
		19	First Fisherman's Paradise	9/22/10	14:56	10/4/10	15:25	
		20	No Name Cove	9/22/10	16:15	10/4/10	16:48	
		21	Turtle Meadows	9/22/10	15:05	10/4/10	15:35	
		23	Catfish Hotel	9/22/10	15:14	10/4/10	15:46	
		24	Turtle Nook	9/22/10	16:05	10/4/10	15:51	
		26	Raccoon Island	9/22/10	15:31	10/4/10	16:07	
		28	Shipwreck	9/22/10	15:24	10/4/10	15:59	
		30	Timber	9/22/10	15:40	10/4/10	16:18	
		31	Silver River @ 1200 Meter Station	9/22/10	15:46	10/4/10	16:27	
		32	South Boathouse Vent	9/22/10	17:20	10/4/10	17:48	
		33	Gang of Five Vent 3	9/22/10	17:12	10/4/10	17:42	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Wells & RBS Week 15 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Rickinger-OUL

Date Samples Shipped: 10 / 11 / 10 **Date Samples Received:** 10 / 14 / 10 **Time Samples Received:** 12 :30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	**COLLECTED DATE**	**COLLECTED TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day148)		(Day165/6)		
		50	City of Ocala Well #1	9/17/10	17:07	10/4/10	12:21	
		51	City of Ocala Well #2	9/17/10	17:09	10/4/10	12:26	
		52	City of Ocala West Accelator (No Water)	9/17/10	17:12	10/4/10	12:32	
		55	North Marion High School West Well	9/17/10	17:36	10/5/10	16:58	
		56	Ocala Springs Elementary East Well	9/17/10	17:57	10/5/10	17:22	
		57	Marion CI Well 1	9/17/10	12:55	10/5/10	16:20	
				(Day 90)		(Day166)		
		40	Rainbow Springs Headsprings	7/21/10	12:49	10/6/10	16:30	
		41	Rainbow Springs Bubbling Spring	7/21/10	13:26	10/6/10	15:40	
		42	Rainbow Springs Rainbow River	7/21/10	12:58	10/6/10	16:05	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSG Week 15~~ **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 10 / 14 / 10 **Date Samples Received:** 10/18/10 **Time Samples Received:** 12:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day165)		Day		
		1	Mammoth East	10/4/10	13:36	10/11/10	14:56	
		2	Mammoth West	10/4/10	13:46	10/11/10	15:03	
		4	Catfish Reception Hall	10/4/10	14:02	10/11/10	15:11	
		5	Bridal Chamber	10/4/10	14:07	10/11/10	15:16	
		6	Oscar	10/4/10	14:27	10/11/10	15:32	
		7	Devil's Kitchen A	10/4/10	14:16	10/11/10	15:23	
		9	Ladies Parlor	10/4/10	14:11	10/11/10	15:20	
		10	Alligator Hole	10/4/10	14:22	10/11/10	15:28	
		11	Mastodon Bone	10/4/10	14:34	10/11/10	15:36	
		12	Geyser	10/4/10	14:39	10/11/10	15:46	
		13	Blue Grotto	10/4/10	14:46	10/11/10	15:44	
		14	Christmas Tree	10/4/10	14:53	10/11/10	15:50	
		15	Garden of Eden	10/4/10	15:01	10/11/10	15:56	
		16	Log	10/4/10	15:02	10/11/10	15:58	
		18	Indian Cave	10/4/10	15:20	10/11/10	16:07	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 15 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 10/14/10 **Date Samples Received:** 10/18/10 **Time Samples Received:** 12:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day165)		Day		
		19	First Fisherman's Paradise	10/4/10	15:25	10/11/10	16:11	
		20	No Name Cove	10/4/10	16:48	10/11/10	16:18	
		21	Turtle Meadows	10/4/10	15:35	10/11/10	16:24	
		23	Catfish Hotel	10/4/10	15:46	10/11/10	16:34	
		24	Turtle Nook	10/4/10	15:51	10/11/10	16:39	
		26	Raccoon Island	10/4/10	16:07	10/11/10	16:59	
		28	Shipwreck	10/4/10	15:59	10/11/10	16:52	
		30	Timber	10/4/10	16:18	10/11/10	17:12	
		31	Silver River @ 1200 Meter Station	10/4/10	16:27	10/11/10	17:18	
		32	South Boathouse Vent	10/4/10	17:48	10/11/10	18:07	
		33	Gang of Five Vent 3	10/4/10	17:42	10/11/10	17:58	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 2 Wells Week 1 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 10 / 14 / 10 Date Samples Received: 10 / 18 / 10 Time Samples Received: 12 : 30 Return Cooler? Yes __ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	10/4/10	12:21	10/9/10	14:08	
		51	City of Ocala Well #2	10/4/10	12:26	10/9/10	14:14	
		61	Windstream Well #2	10/5/10	13:06	10/9/10	12:29	
		62	Blue Skies Well 1	10/4/10	11:30	10/9/10	14:33	
		63	Cedar Hills Well	10/6/10	9:32	10/9/10	12:49	
		64	Fort King Forest Well	10/6/10	10:34	10/9/10	13:15	
		65	Pine Ridge Well	10/6/10	11:20	10/9/10	13:41	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 16 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridlinger -OUL
Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 / 28 / 10 **Time Samples Received:** 11 : 45 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day172)		(Day176)		
		1	Mammoth East	10/11/10	14:56	10/15/10	12:34	
		2	Mammoth West	10/11/10	15:03	10/15/10	12:36	
		4	Catfish Reception Hall	10/11/10	15:11	10/15/10	12:45	
		5	Bridal Chamber	10/11/10	15:16	10/15/10	12:52	
		6	Oscar	10/11/10	15:32	10/15/10	13:11	
		7	Devil's Kitchen A	10/11/10	15:23	10/15/10	13:01	
		9	Ladies Parlor	10/11/10	15:20	10/15/10	12:55	
		10	Alligator Hole	10/11/10	15:28	10/15/10	13:07	
		11	Mastodon Bone	10/11/10	15:36	10/15/10	13:16	
		12	Geyser	10/11/10	15:40	10/15/10	13:20	
		13	Blue Grotto	10/11/10	15:44	10/15/10	13:25	
		14	Christmas Tree	10/11/10	15:50	10/15/10	13:35	
		15	Garden of Eden	10/11/10	15:56	10/15/10	13:42	
		16	Log	10/11/10	15:58	10/15/10	13:45	
		18	Indian Cave	10/11/10	16:07	10/15/10	15:31	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 16 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger - OUL

Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 / 28 / 10 **Time Samples Received:** 11 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	**COLLECTED DATE**	**COLLECTED TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day172)		(Day176)		
		19	First Fisherman's Paradise	10/11/10	16:11	10/15/10	13:54	
		20	No Name Cove	10/11/10	16:18	10/15/10	15:19	
		21	Turtle Meadows	10/11/10	16:24	10/15/10	14:08	
		23	Catfish Hotel	10/11/10	16:34	10/15/10	14:18	
		24	Turtle Nook	10/11/10	16:39	10/15/10	14:26	
		26	Raccoon Island	10/11/10	16:59	10/15/10	14:37	
		28	Shipwreck	10/11/10	16:52	10/15/10	14:31	
		30	Timber	10/11/10	17:12	10/15/10	14:59	
		31	Silver River @ 1200 Meter Station	10/11/10	17:18	10/15/10	14:52	
		32	South Boathouse Vent	10/11/10	18:07	10/15/10	16:11	
		33	Gang of Five Vent 3	10/11/10	17:58	10/15/10	16:02	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 17 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Richinger - OUL

Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 / 28 / 10 **Time Samples Received:** 11 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day176)		(Day181)		
		1	Mammoth East	10/15/10	12:34	10/20/10	12:49	
		2	Mammoth West	10/15/10	12:36	10/20/10	13:01	
		4	Catfish Reception Hall	10/15/10	12:45	10/20/10	13:12	
		5	Bridal Chamber	10/15/10	12:52	10/20/10	13:16	
		6	Oscar	10/15/10	13:11	10/20/10	13:39	
		7	Devil's Kitchen A	10/15/10	13:01	10/20/10	13:26	
		9	Ladies Parlor	10/15/10	12:55	10/20/10	13:22	
		10	Alligator Hole	10/15/10	13:07	10/20/10	13:33	
		11	Mastodon Bone	10/15/10	13:16	10/20/10	13:44	
		12	Geyser	10/15/10	13:20	10/20/10	13:49	
		13	Blue Grotto	10/15/10	13:25	10/20/10	13:54	
		14	Christmas Tree	10/15/10	13:35	10/20/10	14:02	
		15	Garden of Eden	10/15/10	13:42	10/20/10	14:09	
		16	Log	10/15/10	13:45	10/20/10	14:13	
		18	Indian Cave	10/15/10	15:31	10/20/10	14:21	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG/Week 17 Samples Collected By: Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By:

Date Samples Shipped: 10 / 26 / 10 Date Samples Received: __/__/__ Time Samples Received: __:__ Return Cooler? Yes __ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED			# WATER REC'D
				DATE	TIME	DATE	TIME		
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day176)		(Day181)			
		19	First Fisherman's Paradise	10/15/10	13:54	10/20/10	14:26		
		20	No Name Cove	10/15/10	15:19	10/20/10	14:33		
		21	Turtle Meadows	10/15/10	14:08	10/20/10	14:40		
		23	Catfish Hotel	10/15/10	14:18	10/20/10	14:52		
		24	Turtle Nook	10/15/10	14:26	10/20/10	15:43		
		26	Raccoon Island	10/15/10	14:37	10/20/10	15:04		
		28	Shipwreck	10/15/10	14:31	10/20/10	14:58		
		30	Timber	10/15/10	14:59	10/20/10	15:16		
		31	Silver River @ 1200 Meter Station	10/15/10	14:52	10/20/10	15:24		
		32	South Boathouse Vent	10/15/10	16:11	10/20/10	16:25		
		33	Gang of Five Vent 3	10/15/10	16:02	10/20/10	16:17		

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL:

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 18 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -OUL
Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 / 28 / 10 **Time Samples Received:** 11 : 45 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: **Fluorescein** X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day181)		(Day186)		
		1	Mammoth East	10/20/10	12:49	10/25/10	13:28	
		2	Mammoth West	10/20/10	13:01	10/25/10	13:35	
		4	Catfish Reception Hall	10/20/10	13:12	10/25/10	13:46	
		5	Bridal Chamber	10/20/10	13:16	10/25/10	13:52	
		6	Oscar	10/20/10	13:39	10/25/10	14:17	
		7	Devil's Kitchen A	10/20/10	13:26	10/25/10	14:05	
		9	Ladies Parlor	10/20/10	13:22	10/25/10	13:56	
		10	Alligator Hole	10/20/10	13:33	10/25/10	14:11	
		11	Mastodon Bone	10/20/10	13:44	10/25/10	14:23	
		12	Geyser	10/20/10	13:49	10/25/10	14:27	
		13	Blue Grotto	10/20/10	13:54	10/25/10	14:32	
		14	Christmas Tree	10/20/10	14:02	10/25/10	14:41	
		15	Garden of Eden	10/20/10	14:09	10/25/10	14:47	
		16	Log	10/20/10	14:13	10/25/10	14:49	
		18	Indian Cave	10/20/10	14:21	10/25/10	15:01	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 18 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger - OUL

Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10/28/10 **Time Samples Received:** 11:45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field / for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day181)		(Day186)		
		19	First Fisherman's Paradise	10/20/10	14:26	10/25/10	15:07	
		20	No Name Cove	10/20/10	14:33	10/25/10	15:14	
		21	Turtle Meadows	10/20/10	14:40	10/25/10	15:19	
		23	Catfish Hotel	10/20/10	14:52	10/25/10	15:30	
		24	Turtle Nook	10/20/10	15:43	10/25/10	15:35	
		26	Raccoon Island	10/20/10	15:04	10/25/10	15:50	
		28	Shipwreck	10/20/10	14:58	10/25/10	15:43	
		30	Timber	10/20/10	15:16	10/25/10	16:04	
		31	Silver River @ 1200 Meter Station	10/20/10	15:24	10/25/10	16:11	
		32	South Boathouse Vent	10/20/10	16:25	10/25/10	17:17	
		33	Gang of Five Vent 3	10/20/10	16:17	10/25/10	17:10	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 2 & 3 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger-OUL

Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 / 28 / 10 **Time Samples Received:** 11 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only			***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	10/ 9/10	14:08	10/14/10	15:15	
		51	City of Ocala Well #2	10/ 9/10	14:14	10/14/10	15:21	
		61	Windstream Well #2	10/ 9/10	12:29	10/14/10	13:50	
		62	Blue Skies Well 1	10/ 9/10	14:33	10/14/10	15:36	
		63	Cedar Hills Well	10/ 9/10	12:49	10/14/10	14:10	
		64	Fort King Forest Well	10/ 9/10	13:15	10/14/10	14:39	
		65	Pine Ridge Well	10/ 9/10	13:41	10/14/10	14:53	
		50	City of Ocala Well #1	10/14/10	15:15	10/21/10	15:25	
		51	City of Ocala Well #2	10/14/10	15:21	10/21/10	15:33	
		61	Windstream Well #2	10/14/10	13:50	10/21/10	14:04	
		62	Blue Skies Well 1	10/14/10	15:36	10/21/10	15:11	
		63	Cedar Hills Well	10/14/10	14:10	10/21/10	14:18	
		64	Fort King Forest Well	10/14/10	14:34	10/21/10	14:40	
		65	Pine Ridge Well	10/14/10	14:53	10/21/10	14:52	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT/Phase 1 Wells/RBS Week 16 **Samples Collected By:** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger - OUL
Date Samples Shipped: 10 / 26 / 10 **Date Samples Received:** 10 /28 / 10 **Time Samples Received:** 11 :45 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	10/5/10	16:58	10/21/10	16:32	
		56	Ocala Springs Elementary East Well	10/5/10	17:22	10/21/10	15:56	
		57	Marion CI Well 1	10/5/10	16:20	10/21/10	16:55	
		66	Sheri Oaks Well	10/6/10	12:18	10/21/10	16:18	
		40	Rainbow Springs Headsprings	10/6/10	16:30	10/21/10	12:21	
		41	Rainbow Springs Bubbling Spring	10/6/10	15:40	10/21/10	13:01	
		42	Rainbow Springs Rainbow River	10/6/10	16:05	10/21/10	12:36	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 19 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL
Date Samples Shipped: 11 / 5 / 10 **Date Samples Received:** 11 / 8 / 10 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day186)		(Day193)		
		1	Mammoth East	10/25/10	13:28	11/1/10	14:04	
		2	Mammoth West	10/25/10	13:35	11/1/10	14:07	
		4	Catfish Reception Hall	10/25/10	13:46	11/1/10	14:16	
		5	Bridal Chamber	10/25/10	13:52	11/1/10	14:23	
		6	Oscar	10/25/10	14:17	11/1/10	14:44	
		7	Devil's Kitchen A	10/25/10	14:05	11/1/10	14:33	
		9	Ladies Parlor	10/25/10	13:56	11/1/10	14:28	
		10	Alligator Hole	10/25/10	14:11	11/1/10	14:38	
		11	Mastodon Bone	10/25/10	14:23	11/1/10	14:48	
		12	Geyser	10/25/10	14:27	11/1/10	14:53	
		13	Blue Grotto	10/25/10	14:32	11/1/10	14:58	
		14	Christmas Tree	10/25/10	14:41	11/1/10	15:06	
		15	Garden of Eden	10/25/10	14:47	11/1/10	15:13	
		16	Log	10/25/10	14:49	11/1/10	15:17	
		18	Indian Cave	10/25/10	15:01	11/1/10	15:29	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 19 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley/OUL
Date Samples Shipped: 11 / 5 / 10 **Date Samples Received:** 11/8/10 **Time Samples Received:** 14:30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day186)		(Day193)		
		19	First Fisherman's Paradise	10/25/10	15:07	11/1/10	15:34	
		20	No Name Cove	10/25/10	15:14	11/1/10	15:43	
		21	Turtle Meadows	10/25/10	15:19	11/1/10	15:48	
		23	Catfish Hotel	10/25/10	15:30	11/1/10	16:07	
		24	Turtle Nook	10/25/10	15:35	11/1/10	16:02	
		26	Raccoon Island	10/25/10	15:50	11/1/10	16:22	
		28	Shipwreck	10/25/10	15:43	11/1/10	16:13	
		30	Timber	10/25/10	16:04	11/1/10	16:34	
		31	Silver River @ 1200 Meter Station	10/25/10	16:11	11/1/10	16:52	
		32	South Boathouse Vent	10/25/10	17:17	11/1/10	17:56	
		33	Gang of Five Vent 3	10/25/10	17:10	11/1/10	17:48	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 4 & 5 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 11 / 5 / 10 **Date Samples Received:** 11 / 8 / 10 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

Please indicate stations where dye was visible in the field

for field technician use - use black ink only

# CHAR REC'D (OUL use only)	LAB NUMBER (OUL use only)	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D (OUL use only)
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	10/21/10	15:25	10/27/10	15:22	
		51	City of Ocala Well #2	10/21/10	15:33	10/27/10	15:28	
		61	Windstream Well #2	10/21/10	14:04	10/27/10	13:47	
		62	Blue Skies Well 1	10/21/10	15:11	10/27/10	15:45	
		63	Cedar Hills Well	10/21/10	14:18	10/27/10	15:01	
		64	Fort King Forest Well	10/21/10	14:40	10/27/10	14:22	
		65	Pine Ridge Well	10/21/10	14:52	10/27/10	14:35	
		50	City of Ocala Well #1	10/27/10	15:22	11/3/10	14:38	
		51	City of Ocala Well #2	10/27/10	15:28	11/3/10	14:40	
		61	Windstream Well #2	10/27/10	13:47	11/3/10	13:26	
		62	Blue Skies Well 1	10/27/10	15:45	11/3/10	14:27	
		63	Cedar Hills Well (Sampler valve shut on 11/1/10 for well disinfection.)	10/27/10	15:01	11/1/10	12:00	
		64	Fort King Forest Well (Sampler valve shut on 11/1/10 for well disinfection.)	10/27/10	14:22	11/1/10	12:00	
		65	Pine Ridge Well (Sampler valve shut on 11/1/10 for well disinfection.)	10/27/10	14:35	11/1/10	12:00	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 17 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 11 / 5 / 10 **Date Samples Received:** 11 / 8 / 10 **Time Samples Received:** 14:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	10/21/10	16:32	11/3/10	15:51	
		56	Ocala Springs Elementary East Well	10/21/10	15:56	11/3/10	14:52	
		57	Marion CI Well 1	10/21/10	16:55	11/3/10	16:13	
		66	Sheri Oaks Well	10/21/10	16:18	11/3/10	15:39	
		40	Rainbow Springs Headsprings	10/21/10	12:21	11/3/10	11:42	
		41	Rainbow Springs Bubbling Spring	10/21/10	13:01	11/3/10	12:09	
		42	Rainbow Springs Rainbow River	10/21/10	12:36	11/3/10	11:50	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 20 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL
Date Samples Shipped: 11 / 12 / 10 **Date Samples Received:** 11/15/10 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day193)		(Day200)		
		1	Mammoth East	11/1/10	14:04	11/8/10	12:43	
		2	Mammoth West	11/1/10	14:07	11/8/10	12:46	
		4	Catfish Reception Hall	11/1/10	14:16	11/8/10	12:55	
		5	Bridal Chamber	11/1/10	14:23	11/8/10	13:01	
		6	Oscar	11/1/10	14:44	11/8/10	13:23	
		7	Devil's Kitchen A	11/1/10	14:33	11/8/10	13:11	
		9	Ladies Parlor	11/1/10	14:28	11/8/10	13:06	
		10	Alligator Hole	11/1/10	14:38	11/8/10	13:17	
		11	Mastodon Bone	11/1/10	14:48	11/8/10	13:27	
		12	Geyser	11/1/10	14:53	11/8/10	13:33	
		13	Blue Grotto	11/1/10	14:58	11/8/10	13:37	
		14	Christmas Tree	11/1/10	15:06	11/8/10	13:44	
		15	Garden of Eden	11/1/10	15:13	11/8/10	13:56	
		16	Log	11/1/10	15:17	11/8/10	13:58	
		18	Indian Cave	11/1/10	15:29	11/8/10	14:08	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 20 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 11 / 12 / 10 **Date Samples Received:** 11/15/10 **Time Samples Received:** 13:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only: # CHAR REC'D	OUL use only: LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME (*Please indicate stations where dye was visible in the field* — for field technician use - use black ink only)	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	OUL use only: # WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day193)		(Day200)		
		19	First Fisherman's Paradise	11/1/10	15:34	11/8/10	14:15	
		20	No Name Cove	11/1/10	15:43	11/8/10	14:21	
		21	Turtle Meadows	11/1/10	15:48	11/8/10	14:26	
		23	Catfish Hotel	11/1/10	16:07	11/8/10	14:45	
		24	Turtle Nook	11/1/10	16:02	11/8/10	14:40	
		26	Raccoon Island	11/1/10	16:22	11/8/10	14:59	
		28	Shipwreck	11/1/10	16:13	11/8/10	14:52	
		30	Timber	11/1/10	16:34	11/8/10	15:16	
		31	Silver River @ 1200 Meter Station	11/1/10	16:52	11/8/10	15:23	
		32	South Boathouse Vent	11/1/10	17:56	11/8/10	16:14	
		33	Gang of Five Vent 3	11/1/10	17:48	11/8/10	16:06	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 2 Wells Week 6 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 11 / 12 / 10 Date Samples Received: 11 / 15/ 10 Time Samples Received: 13 :30 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	11/3/10	14:38	11/10/10	13:50	
		51	City of Ocala Well #2	11/3/10	14:40	11/10/10	13:54	
		61	Windstream Well #2	11/3/10	13:26	11/10/10	12:35	
		62	Blue Skies Well 1	11/3/10	14:27	11/10/10	14:09	
		63	Cedar Hills Well	11/3/10	13:46	11/10/10	12:56	
		64	Fort King Forest Well	11/3/10	13:59	11/10/10	13:19	
		65	Pine Ridge Well	11/3/10	14:11	11/10/10	13:32	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 21 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 11 / 19 / 10 **Date Samples Received:** 11 /22/10 **Time Samples Received:** 12 : 15 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day200)		(Day207)		
		1	Mammoth East	11/8/10	12:43	11/15/10	12:49	
		2	Mammoth West	11/8/10	12:46	11/15/10	12:54	
		4	Catfish Reception Hall	11/8/10	12:55	11/15/10	13:05	
		5	Bridal Chamber	11/8/10	13:01	11/15/10	13:10	
		6	Oscar	11/8/10	13:23	11/15/10	13:32	
		7	Devil's Kitchen A	11/8/10	13:11	11/15/10	13:21	
		9	Ladies Parlor	11/8/10	13:06	11/15/10	13:16	
		10	Alligator Hole	11/8/10	13:17	11/15/10	13:26	
		11	Mastodon Bone	11/8/10	13:27	11/15/10	13:37	
		12	Geyser	11/8/10	13:33	11/15/10	13:43	
		13	Blue Grotto	11/8/10	13:37	11/15/10	13:49	
		14	Christmas Tree	11/8/10	13:44	11/15/10	13:56	
		15	Garden of Eden	11/8/10	13:56	11/15/10	14:03	
		16	Log	11/8/10	13:58	11/15/10	14:06	
		18	Indian Cave	11/8/10	14:08	11/15/10	14:16	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 21 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 11 / 19 / 10 **Date Samples Received:** 11 /22/10 **Time Samples Received:** 12:15 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day200)		(Day207)		
		19	First Fisherman's Paradise	11/8/10	14:15	11/15/10	14:22	
		20	No Name Cove	11/8/10	14:21	11/15/10	14:30	
		21	Turtle Meadows	11/8/10	14:26	11/15/10	14:35	
		23	Catfish Hotel	11/8/10	14:45	11/15/10	14:53	
		24	Turtle Nook	11/8/10	14:40	11/15/10	14:48	
		26	Raccoon Island	11/8/10	14:59	11/15/10	15:06	
		28	Shipwreck	11/8/10	14:52	11/15/10	15:01	
		30	Timber	11/8/10	15:16	11/15/10	15:22	
		31	Silver River @ 1200 Meter Station	11/8/10	15:23	11/15/10	15:32	
		32	South Boathouse Vent	11/8/10	16:14	11/15/10	16:46	
		33	Gang of Five Vent 3	11/8/10	16:06	11/15/10	16:39	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 2 Wells Week 7 Samples Collected By: Matt Hubner
Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL
Date Samples Shipped: 11 / 19 / 10 Date Samples Received: 11 / 22 / 10 Time Samples Received: 12 : 15 Return Cooler? Yes ___ No X
Bill to: URS Corp. Send Results to: URS/KES
Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	11/10/10	13:50	11/17/10	14:03	
		51	City of Ocala Well #2	11/10/10	13:54	11/17/10	14:07	
		61	Windstream Well #2	11/10/10	12:35	11/17/10	12:55	
		62	Blue Skies Well 1	11/10/10	14:09	11/17/10	13:47	
		63	Cedar Hills Well	11/10/10	12:56	11/17/10	13:08	
		64	Fort King Forest Well	11/10/10	13:19	11/17/10	13:23	
		65	Pine Ridge Well	11/10/10	13:32	11/17/10	13:33	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 1 Wells/RBS Week 18 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott / OUL

Date Samples Shipped: 11 / 19 / 10 Date Samples Received: 11/22/10 Time Samples Received: 12:15 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	11/3/10	15:51	11/17/10	14:55	
		56	Ocala Springs Elementary East Well	11/3/10	14:52	11/17/10	14:21	
		57	Marion CI Well 1	11/3/10	16:13	11/17/10	15:25	
		66	Sheri Oaks Well	11/3/10	15:39	11/17/10	14:39	
		40	Rainbow Springs Headsprings	11/3/10	11:42	11/17/10	11:14	
		41	Rainbow Springs Bubbling Spring	11/3/10	12:09	11/17/10	12:05	
		42	Rainbow Springs Rainbow River	11/3/10	11:50	11/17/10	11:25	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes_______ No X Charts for samples on this page proofed by OUL:_______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 22 Samples Collected By: Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OL

Date Samples Shipped: 12 / 2 / 10 Date Samples Received: 12/6/10 Time Samples Received: 12 : 45 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day207)		(Day214)		
		1	Mammoth East	11/15/10	12:49	11/22/10	12:28	
		2	Mammoth West	11/15/10	12:54	11/22/10	12:31	
		4	Catfish Reception Hall	11/15/10	13:05	11/22/10	12:42	
		5	Bridal Chamber	11/15/10	13:10	11/22/10	12:49	
		6	Oscar	11/15/10	13:32	11/22/10	13:10	
		7	Devil's Kitchen A	11/15/10	13:21	11/22/10	13:00	
		9	Ladies Parlor	11/15/10	13:16	11/22/10	12:54	
		10	Alligator Hole	11/15/10	13:26	11/22/10	13:05	
		11	Mastodon Bone	11/15/10	13:37	11/22/10	13:18	
		12	Geyser	11/15/10	13:43	11/22/10	13:23	
		13	Blue Grotto	11/15/10	13:49	11/22/10	13:28	
		14	Christmas Tree	11/15/10	13:56	11/22/10	13:33	
		15	Garden of Eden	11/15/10	14:03	11/22/10	13:39	
		16	Log	11/15/10	14:06	11/22/10	13:41	
		18	Indian Cave	11/15/10	14:16	11/22/10	13:50	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ No X Charts for samples on this page proofed by OUL:___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 22 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 12 / 2 / 10 **Date Samples Received:** 12/6/10 **Time Samples Received:** 12:45 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day207)		(Day214)		
		19	First Fisherman's Paradise	11/15/10	14:22	11/22/10	13:54	
		20	No Name Cove	11/15/10	14:30	11/22/10	14:55	
		21	Turtle Meadows	11/15/10	14:35	11/22/10	14:01	
		23	Catfish Hotel	11/15/10	14:53	11/22/10	14:09	
		24	Turtle Nook	11/15/10	14:48	11/22/10	14:47	
		26	Raccoon Island	11/15/10	15:06	11/22/10	14:42	
		28	Shipwreck	11/15/10	15:01	11/22/10	14:15	
		30	Timber	11/15/10	15:22	11/22/10	14:23	
		31	Silver River @ 1200 Meter Station	11/15/10	15:32	11/22/10	14:31	
		32	South Boathouse Vent	11/15/10	16:46	11/22/10	15:46	
		33	Gang of Five Vent 3	11/15/10	16:39	11/22/10	15:38	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 23 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/ OUL

Date Samples Shipped: 12 / 2 / 10 **Date Samples Received:** 12/6/10 **Time Samples Received:** 12:45 **Return Cooler? Yes**__ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day214)		(Day221)		
		1	Mammoth East	11/22/10	12:28	11/29/10	12:52	
		2	Mammoth West	11/22/10	12:31	11/29/10	12:59	
		4	Catfish Reception Hall	11/22/10	12:42	11/29/10	13:08	
		5	Bridal Chamber	11/22/10	12:49	11/29/10	13:15	
		6	Oscar	11/22/10	13:10	11/29/10	13:36	
		7	Devil's Kitchen A	11/22/10	13:00	11/29/10	13:25	
		9	Ladies Parlor	11/22/10	12:54	11/29/10	13:19	
		10	Alligator Hole	11/22/10	13:05	11/29/10	13:31	
		11	Mastodon Bone	11/22/10	13:18	11/29/10	13:42	
		12	Geyser	11/22/10	13:23	11/29/10	13:46	
		13	Blue Grotto	11/22/10	13:28	11/29/10	13:53	
		14	Christmas Tree	11/22/10	13:33	11/29/10	14:02	
		15	Garden of Eden	11/22/10	13:39	11/29/10	14:11	
		16	Log	11/22/10	13:41	11/29/10	14:12	
		18	Indian Cave	11/22/10	13:50	11/29/10	14:26	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes__ **No** X **Charts for samples on this page proofed by OUL:**__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 23 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 12 / 2 / 10 **Date Samples Received:** 12/6/10 **Time Samples Received:** 12:45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER** 1-4 Numbers	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	**COLLECTED DATE**	**COLLECTED TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day214)		(Day221)		
		19	First Fisherman's Paradise	11/22/10	13:54	11/29/10	14:33	
		20	No Name Cove	11/22/10	14:55	11/29/10	14:41	
		21	Turtle Meadows	11/22/10	14:01	11/29/10	14:46	
		23	Catfish Hotel	11/22/10	14:09	11/29/10	15:04	
		24	Turtle Nook	11/22/10	14:47	11/29/10	14:59	
		26	Raccoon Island	11/22/10	14:42	11/29/10	15:23	
		28	Shipwreck	11/22/10	14:15	11/29/10	15:17	
		30	Timber	11/22/10	14:23	11/29/10	15:34	
		31	Silver River @ 1200 Meter Station	11/22/10	14:31	11/29/10	15:40	
		32	South Boathouse Vent	11/22/10	15:46	11/29/10	16:39	
		33	Gang of Five Vent 3	11/22/10	15:38	11/29/10	16:33	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 8 & 9 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OL

Date Samples Shipped: 12 / 2 / 10 **Date Samples Received:** 12 / 6 / 10 **Time Samples Received:** 12 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	11/17/10	14:03	11/24/10	13:49	
		51	City of Ocala Well #2	11/17/10	14:07	11/24/10	13:54	
		61	Windstream Well #2	11/17/10	12:55	11/24/10	12:20	
		62	Blue Skies Well 1	11/17/10	13:47	11/24/10	14:07	
		63	Cedar Hills Well	11/17/10	13:08	11/24/10	12:37	
		64	Fort King Forest Well	11/17/10	13:23	11/24/10	13:20	
		65	Pine Ridge Well	11/17/10	13:33	11/24/10	13:31	
		50	City of Ocala Well #1	11/24/10	13:49	12/1/10	15:29	
		51	City of Ocala Well #2	11/24/10	13:54	12/1/10	15:33	
		61	Windstream Well #2	11/24/10	12:20	12/1/10	13:28	
		62	Blue Skies Well 1	11/24/10	14:07	12/1/10	15:17	
		63	Cedar Hills Well	11/24/10	12:37	12/1/10	13:46	
		64	Fort King Forest Well	11/24/10	13:20	12/1/10	14:10	
		65	Pine Ridge Well	11/24/10	13:31	12/1/10	14:56	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 19 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott RL

Date Samples Shipped: 12 / 2 / 10 **Date Samples Received:** 12/6/10 **Time Samples Received:** 12 : 45 **Return Cooler? Yes** __ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	11/17/10	14:55	12/1/10	16:26	
		56	Ocala Springs Elementary East Well	11/17/10	14:21	12/1/10	15:56	
		57	Marion CI Well 1	11/17/10	15:25	12/1/10	16:59	
		66	Sheri Oaks Well	11/17/10	14:39	12/1/10	16:12	
		40	Rainbow Springs Headsprings	11/17/10	11:14	12/1/10	12:00	
		41	Rainbow Springs Bubbling Spring	11/17/10	12:05	12/1/10	12:38	
		42	Rainbow Springs Rainbow River	11/17/10	11:25	12/1/10	12:13	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 24 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL
Date Samples Shipped: 12 / 13 / 10 **Date Samples Received:** 12/15/10 **Time Samples Received:** 15:45 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day221		(Day229)		
		1	Mammoth East	11/29/10	12:52	12/7/10	12:20	
		2	Mammoth West	11/29/10	12:59	12/7/10	12:24	
		4	Catfish Reception Hall	11/29/10	13:08	12/7/10	12:31	
		5	Bridal Chamber	11/29/10	13:15	12/7/10	12:36	
		6	Oscar	11/29/10	13:36	12/7/10	12:55	
		7	Devil's Kitchen A	11/29/10	13:25	12/7/10	12:46	
		9	Ladies Parlor	11/29/10	13:19	12/7/10	12:42	
		10	Alligator Hole	11/29/10	13:31	12/7/10	12:50	
		11	Mastodon Bone	11/29/10	13:42	12/7/10	13:00	
		12	Geyser	11/29/10	13:46	12/7/10	13:05	
		13	Blue Grotto	11/29/10	13:53	12/7/10	13:09	
		14	Christmas Tree	11/29/10	14:02	12/7/10	13:15	
		15	Garden of Eden	11/29/10	14:11	12/7/10	13:23	
		16	Log	11/29/10	14:12	12/7/10	12:25	
		18	Indian Cave	11/29/10	14:26	12/7/10	13:36	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 24 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** ______

Date Samples Shipped: 12 / 13 / 10 **Date Samples Received:** __/__/__ **Time Samples Received:** __:__ **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day221)		(Day229)		
		19	First Fisherman's Paradise	11/29/10	14:33	12/7/10	13:40	
		20	No Name Cove	11/29/10	14:41	12/7/10	14:46	
		21	Turtle Meadows	11/29/10	14:46	12/7/10	13:48	
		23	Catfish Hotel	11/29/10	15:04	12/7/10	13:58	
		24	Turtle Nook	11/29/10	14:59	12/7/10	14:38	
		26	Raccoon Island	11/29/10	15:23	12/7/10	14:33	
		28	Shipwreck	11/29/10	15:17	12/7/10	14:04	
		30	Timber	11/29/10	15:34	12/7/10	14:11	
		31	Silver River @ 1200 Meter Station	11/29/10	15:40	12/7/10	14:19	
		32	South Boathouse Vent	11/29/10	16:39	12/7/10	15:26	
		33	Gang of Five Vent 3	11/29/10	16:33	12/7/10	15:19	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 10 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:**

Date Samples Shipped: 12 / 13 / 10 **Date Samples Received:** / / **Time Samples Received:** : **Return Cooler? Yes** **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	12/1/10	15:29	12/9/10	13:50	
		51	City of Ocala Well #2	12/1/10	15:33	12/9/10	13:54	
		61	Windstream Well #2	12/1/10	13:28	12/9/10	12:26	
		62	Blue Skies Well 1	12/1/10	15:17	12/9/10	14:05	
		63	Cedar Hills Well	12/1/10	13:46	12/9/10	12:43	
		64	Fort King Forest Well	12/1/10	14:10	12/9/10	13:13	
		65	Pine Ridge Well	12/1/10	14:56	12/9/10	13:25	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes **No** X **Charts for samples on this page proofed by OUL:**

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 25 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL
Date Samples Shipped: 12 / 20 / 10 **Date Samples Received:** 12 / 22 / 10 **Time Samples Received:** 17:00 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day229)		(Day239)		
		1	Mammoth East	12/7/10	12:20	12/17/10	13:08	
		2	Mammoth West	12/7/10	12:24	12/17/10	13:12	
		4	Catfish Reception Hall	12/7/10	12:31	12/17/10	13:20	
		5	Bridal Chamber	12/7/10	12:36	12/17/10	13:25	
		6	Oscar	12/7/10	12:55	12/17/10	13:45	
		7	Devil's Kitchen A	12/7/10	12:46	12/17/10	13:34	
		9	Ladies Parlor	12/7/10	12:42	12/17/10	13:30	
		10	Alligator Hole	12/7/10	12:50	12/17/10	13:39	
		11	Mastodon Bone	12/7/10	13:00	12/17/10	13:49	
		12	Geyser	12/7/10	13:05	12/17/10	13:54	
		13	Blue Grotto	12/7/10	13:09	12/17/10	14:00	
		14	Christmas Tree	12/7/10	13:15	12/17/10	14:07	
		15	Garden of Eden	12/7/10	13:23	12/17/10	14:13	
		16	Log	12/7/10	12:25	12/17/10	15:48	
		18	Indian Cave	12/7/10	13:36	12/17/10	14:18	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 25 **Samples Collected By:** Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 12 / 20 / 10 **Date Samples Received:** 12/22/10 **Time Samples Received:** 17 : 00 **Return Cooler? Yes**__ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* / *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day229)		(Day239)		
		19	First Fisherman's Paradise	12/7/10	13:40	12/17/10	14:24	
		20	No Name Cove	12/7/10	14:46	12/17/10	14:30	
		21	Turtle Meadows	12/7/10	13:48	12/17/10	14:36	
		23	Catfish Hotel	12/7/10	13:58	12/17/10	14:49	
		24	Turtle Nook	12/7/10	14:38	12/17/10	14:45	
		26	Raccoon Island	12/7/10	14:33	12/17/10	15:01	
		28	Shipwreck	12/7/10	14:04	12/17/10	14:55	
		30	Timber	12/7/10	14:11	12/17/10	15:16	
		31	Silver River @ 1200 Meter Station	12/7/10	14:19	12/17/10	15:24	
		32	South Boathouse Vent	12/7/10	15:26	12/17/10	16:29	
		33	Gang of Five Vent 3	12/7/10	15:19	12/17/10	16:05	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes__ **No** X **Charts for samples on this page proofed by OUL:**__

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT/Phase 2 Wells Week 11 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 12 / 20 / 10 **Date Samples Received:** 12/ 22/ 10 **Time Samples Received:** 17 : 00 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	12/9/10	13:50	12/16/10	15:11	
		51	City of Ocala Well #2	12/9/10	13:54	12/16/10	15:16	
		61	Windstream Well #2	12/9/10	12:26	12/16/10	13:44	
		62	Blue Skies Well 1	12/9/10	14:05	12/16/10	14:49	
		63	Cedar Hills Well	12/9/10	12:43	12/16/10	14:04	
		64	Fort King Forest Well	12/9/10	13:13	12/16/10	14:18	
		65	Pine Ridge Well	12/9/10	13:25	12/16/10	14:32	
			Water Sample Only:					
		67	City of Ocala Pine Avenue Well #6			12/14/10	10:30	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 20 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 12 / 20 / 10 **Date Samples Received:** 12/22/10 **Time Samples Received:** 17 : 00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	12/1/10	16:26	12/16/10	16:01	
		56	Ocala Springs Elementary East Well	12/1/10	15:56	12/16/10	15:31	
		57	Marion CI Well 1	12/1/10	16:59	12/16/10	16:34	
		66	Sheri Oaks Well	12/1/10	16:12	12/16/10	15:49	
		40	Rainbow Springs Headsprings	12/1/10	12:00	12/16/10	12:28	
		41	Rainbow Springs Bubbling Spring	12/1/10	12:38	12/16/10	12:58	
		42	Rainbow Springs Rainbow River	12/1/10	12:13	12/16/10	12:37	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 26 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -OUL

Date Samples Shipped: 12 / 30 / 10 **Date Samples Received:** 1 / 3 / 11 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day239)		(Day250)		
		1	Mammoth East	12/17/10	13:08	12/28/10	12:48	
		2	Mammoth West	12/17/10	13:12	12/28/10	12:52	
		4	Catfish Reception Hall	12/17/10	13:20	12/28/10	13:02	
		5	Bridal Chamber	12/17/10	13:25	12/28/10	13:09	
		6	Oscar	12/17/10	13:45	12/28/10	13:33	
		7	Devil's Kitchen A	12/17/10	13:34	12/28/10	13:20	
		9	Ladies Parlor	12/17/10	13:30	12/28/10	13:15	
		10	Alligator Hole	12/17/10	13:39	12/28/10	13:25	
		11	Mastodon Bone	12/17/10	13:49	12/28/10	13:38	
		12	Geyser	12/17/10	13:54	12/28/10	13:43	
		13	Blue Grotto	12/17/10	14:00	12/28/10	13:47	
		14	Christmas Tree	12/17/10	14:07	12/28/10	13:55	
		15	Garden of Eden	12/17/10	14:13	12/28/10	14:00	
		16	Log	12/17/10	15:48	12/28/10	14:03	
		18	Indian Cave	12/17/10	14:18	12/28/10	14:12	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 26 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ricklinger - OUL
Date Samples Shipped: 12 / 30 / 10 **Date Samples Received:** 1 / 3 / 11 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day239)		(Day250)		
		19	First Fisherman's Paradise	12/17/10	14:24	12/28/10	14:16	
		20	No Name Cove	12/17/10	14:30	12/28/10	15:22	
		21	Turtle Meadows	12/17/10	14:36	12/28/10	14:25	
		23	Catfish Hotel	12/17/10	14:49	12/28/10	14:34	
		24	Turtle Nook	12/17/10	14:45	12/28/10	15:14	
		26	Raccoon Island	12/17/10	15:01	12/28/10	15:07	
		28	Shipwreck	12/17/10	14:55	12/28/10	14:42	
		30	Timber	12/17/10	15:16	12/28/10	14:52	
		31	Silver River @ 1200 Meter Station	12/17/10	15:24	12/28/10	14:59	
		32	South Boathouse Vent	12/17/10	16:29	12/28/10	16:03	
		33	Gang of Five Vent 3	12/17/10	16:05	12/28/10	15:57	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 12 **Samples Collected By:** Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger-OUL
Date Samples Shipped: 12 / 30 / 10 **Date Samples Received:** 1 / 3 / 11 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	12/16/10	15:11	12/27/10	12:59	
		51	City of Ocala Well #2	12/16/10	15:16	12/27/10	13:08	
		61	Windstream Well #2	12/16/10	13:44	12/27/10	15:54	
		62	Blue Skies Well 1	12/16/10	14:49	12/27/10	13:32	
		63	Cedar Hills Well	12/16/10	14:04	12/27/10	15:42	
		64	Fort King Forest Well	12/16/10	14:18	12/27/10	15:10	
		65	Pine Ridge Well	12/16/10	14:32	12/27/10	14:30	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSG~~ Week 27 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL
Date Samples Shipped: 1 / 12 / 11 **Date Samples Received:** 1 / 14 / 11 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day250)		(Day264)		
		1	Mammoth East	12/28/10	12:48	1/11/11	13:07	
		2	Mammoth West	12/28/10	12:52	1/11/11	13:12	
		4	Catfish Reception Hall	12/28/10	13:02	1/11/11	13:22	
		5	Bridal Chamber	12/28/10	13:09	1/11/11	13:28	
		6	Oscar	12/28/10	13:33	1/11/11	13:50	
		7	Devil's Kitchen A	12/28/10	13:20	1/11/11	13:39	
		9	Ladies Parlor	12/28/10	13:15	1/11/11	13:34	
		10	Alligator Hole	12/28/10	13:25	1/11/11	13:44	
		11	Mastodon Bone	12/28/10	13:38	1/11/11	13:56	
		12	Geyser	12/28/10	13:43	1/11/11	14:00	
		13	Blue Grotto	12/28/10	13:47	1/11/11	14:04	
		14	Christmas Tree	12/28/10	13:55	1/11/11	14:13	
		15	Garden of Eden	12/28/10	14:00	1/11/11	14:20	
		16	Log	12/28/10	14:03	1/11/11	14:22	
		18	Indian Cave	12/28/10	14:12	1/11/11	14:33	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSG Week 27 Samples Collected By: Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx Samples Received By: C. Aley / OUL

Date Samples Shipped: 1 / 12 / 11 Date Samples Received: 1 / 14 / 11 Time Samples Received: 14 : 30 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day250)		(Day264)		
		19	First Fisherman's Paradise	12/28/10	14:16	1/11/11	14:37	
		20	No Name Cove	12/28/10	15:22	1/11/11	15:42	
		21	Turtle Meadows	12/28/10	14:25	1/11/11	14:45	
		23	Catfish Hotel	12/28/10	14:34	1/11/11	14:55	
		24	Turtle Nook	12/28/10	15:14	1/11/11	15:35	
		26	Raccoon Island	12/28/10	15:07	1/11/11	15:27	
		28	Shipwreck	12/28/10	14:42	1/11/11	15:03	
		30	Timber	12/28/10	14:52	1/11/11	15:12	
		31	Silver River @ 1200 Meter Station	12/28/10	14:59	1/11/11	15:20	
		32	South Boathouse Vent	12/28/10	16:03	1/11/11	16:24	
		33	Gang of Five Vent 3	12/28/10	15:57	1/11/11	16:17	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes_____ No X Charts for samples on this page proofed by OUL:_____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 13 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 1 / 12 / 11 **Date Samples Received:** 1 / 14 / 11 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	12/27/10	12:59	1/6/11	15:35	
		51	City of Ocala Well #2	12/27/10	13:08	1/6/11	15:40	
		61	Windstream Well #2	12/27/10	15:54	1/6/11	13:53	
		62	Blue Skies Well 1	12/27/10	13:32	1/6/11	15:20	
		63	Cedar Hills Well (Actual collection was on 1/6/11 @ 14:10**)	12/27/10	15:42	1/4/11*	12:00*	
		64	Fort King Forest Well (Actual collection was on 1/6/11 @ 14:28**)	12/27/10	15:10	1/4/11*	12:00*	
		65	Pine Ridge Well (Actual collection was on 1/6/11 @ 14:43**)	12/27/10	14:30	1/4/11*	12:00*	
			*Reflects approximate sampler cut-off time for monthly servicing.					
			** Water sample collected at on this date/time.					

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 1 Wells/RBS Week 21 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: C. Aley / OUL

Date Samples Shipped: 1 / 12 / 11 Date Samples Received: 1 / 14 / 11 Time Samples Received: 14 : 30 Return Cooler? Yes __ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	12/16/10	16:01	1/6/11	16:35	
		56	Ocala Springs Elementary East Well	12/16/10	15:31	1/6/11	15:58	
		57	Marion CI Well 1	12/16/10	16:34	1/6/11	16:57	
		66	Sheri Oaks Well	12/16/10	15:49	1/6/11	16:22	
		40	Rainbow Springs Headsprings	12/16/10	12:28	1/6/11	12:14	
		41	Rainbow Springs Bubbling Spring	12/16/10	12:58	1/6/11	12:49	
		42	Rainbow Springs Rainbow River	12/16/10	12:37	1/6/11	12:25	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes __ No X Charts for samples on this page proofed by OUL: __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 28 **Samples Collected By:** Tom Morris, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger - oul

Date Samples Shipped: 1 / 27 / 11 **Date Samples Received:** 1 / 31 / 11 **Time Samples Received:** 15:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day264)		(Day277)		
		1	Mammoth East	1/11/11	13:07	1/24/11	12:52	
		2	Mammoth West	1/11/11	13:12	1/24/11	12:56	
		4	Catfish Reception Hall	1/11/11	13:22	1/24/11	13:01	
		5	Bridal Chamber	1/11/11	13:28	1/24/11	13:08	
		6	Oscar	1/11/11	13:50	1/24/11	13:28	
		7	Devil's Kitchen A	1/11/11	13:39	1/24/11	13:15	
		9	Ladies Parlor	1/11/11	13:34	1/24/11	13:11	
		10	Alligator Hole	1/11/11	13:44	1/24/11	13:20	
		11	Mastodon Bone	1/11/11	13:56	1/24/11	13:34	
		12	Geyser	1/11/11	14:00	1/24/11	13:38	
		13	Blue Grotto	1/11/11	14:04	1/24/11	13:43	
		14	Christmas Tree	1/11/11	14:13	1/24/11	13:49	
		15	Garden of Eden	1/11/11	14:20	1/24/11	13:55	
		16	Log	1/11/11	14:22	1/24/11	13:57	
		18	Indian Cave	1/11/11	14:33	1/24/11	14:06	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 28 **Samples Collected By:** Tom Morris, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger - oul
Date Samples Shipped: 1 / 27 / 11 **Date Samples Received:** 1 / 31 / 11 **Time Samples Received:** 15 : 30 **Return Cooler? Yes** __ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day264)		(Day277)		
		19	First Fisherman's Paradise	1/11/11	14:37	1/24/11	14:10	
		20	No Name Cove	1/11/11	15:42	1/24/11	14:16	
		21	Turtle Meadows	1/11/11	14:45	1/24/11	14:21	
		23	Catfish Hotel	1/11/11	14:55	1/24/11	14:29	
		24	Turtle Nook	1/11/11	15:35	1/24/11	14:35	
		26	Raccoon Island	1/11/11	15:27	1/24/11	14:39	
		28	Shipwreck	1/11/11	15:03	1/24/11	14:43	
		30	Timber	1/11/11	15:12	1/24/11	14:51	
		31	Silver River @ 1200 Meter Station	1/11/11	15:20	1/24/11	14:56	
		32	South Boathouse Vent	1/11/11	16:24	1/24/11	15:49	
		33	Gang of Five Vent 3	1/11/11	16:17	1/24/11	15:38	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 14 **Samples Collected By:** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -OUL
Date Samples Shipped: 1 / 27 / 11 **Date Samples Received:** 1 / 31 / 11 **Time Samples Received:** 15 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	1/6/11	15:35	1/26/11	15:01	
		51	City of Ocala Well #2	1/6/11	15:40	1/26/11	15:07	
		61	Windstream Well #2	1/6/11	13:53	1/26/11	13:40	
		62	Blue Skies Well 1	1/6/11	15:20	1/26/11	14:42	
		63	Cedar Hills Well	1/4/11	14:10	1/26/11	13:55	
		64	Fort King Forest Well	1/4/11	14:28	1/26/11	14:11	
		65	Pine Ridge Well	1/4/11	14:43	1/26/11	14:24	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver-Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 22 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Rickinger OUL

Date Samples Shipped: 1 / 27 / 11 **Date Samples Received:** 1/31/11 **Time Samples Received:** 15:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	1/6/11	16:35	1/26/11	15:57	
		56	Ocala Springs Elementary East Well	1/6/11	15:58	1/26/11	15:24	
		57	Marion CI Well 1	1/6/11	16:57	1/26/11	16:29	
		66	Sheri Oaks Well	1/6/11	16:22	1/26/11	15:43	
		40	Rainbow Springs Headsprings	1/6/11	12:14	1/26/11	12:15	
		41	Rainbow Springs Bubbling Spring	1/6/11	12:49	1/26/11	12:51	
		42	Rainbow Springs Rainbow River	1/6/11	12:25	1/26/11	12:30	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 29 **Samples Collected By:** Tom Morris, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 2 / 17 / 11 **Date Samples Received:** 2 / 21 / 11 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** __ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day277)		(Day295)		
		1	Mammoth East	1/24/11	12:52	2/11/11	12:32	
		2	Mammoth West	1/24/11	12:56	2/11/11	12:35	
		4	Catfish Reception Hall	1/24/11	13:01	2/11/11	12:42	
		5	Bridal Chamber	1/24/11	13:08	2/11/11	12:46	
		6	Oscar	1/24/11	13:28	2/11/11	13:04	
		7	Devil's Kitchen A	1/24/11	13:15	2/11/11	12:59	
		9	Ladies Parlor	1/24/11	13:11	2/11/11	12:51	
		10	Alligator Hole	1/24/11	13:20	2/11/11	12:54	
		11	Mastodon Bone	1/24/11	13:34	2/11/11	13:08	
		12	Geyser	1/24/11	13:38	2/11/11	13:12	
		13	Blue Grotto	1/24/11	13:43	2/11/11	13:15	
		14	Christmas Tree	1/24/11	13:49	2/11/11	13:21	
		15	Garden of Eden	1/24/11	13:55	2/11/11	13:26	
		16	Log	1/24/11	13:57	2/11/11	13:28	
		18	Indian Cave	1/24/11	14:06	2/11/11	13:38	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 29 **Samples Collected By:** Tom Morris, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/QK

Date Samples Shipped: 2 / 17 / 11 **Date Samples Received:** 2 / 24 / 11 **Time Samples Received:** 13 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day277)		(Day295)		
		19	First Fisherman's Paradise	1/24/11	14:10	2/11/11	13:41	
		20	No Name Cove	1/24/11	14:16	1/11/11	13:47	
		21	Turtle Meadows	1/24/11	14:21	1/11/11	13:52	
		23	Catfish Hotel	1/24/11	14:29	1/11/11	13:59	
		24	Turtle Nook	1/24/11	14:35	1/11/11	14:03	
		26	Raccoon Island	1/24/11	14:39	1/11/11	14:08	
		28	Shipwreck	1/24/11	14:43	1/11/11	14:12	
		30	Timber	1/24/11	14:51	1/11/11	14:21	
		31	Silver River @ 1200 Meter Station	1/24/11	14:56	1/11/11	14:25	
		32	South Boathouse Vent	1/24/11	15:49	1/11/11	15:40	
		33	Gang of Five Vent 3	1/24/11	15:38	2/11/11	15:21	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 2 Wells Week 15 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 2 / 17 / 11 Date Samples Received: 2 / 21 / 11 Time Samples Received: 13 : 30 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

Please indicate stations where dye was visible in the field

for field technician use - use black ink only

OUL use only								OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	1/26/11	15:01	2/11/11	15:49	
		51	City of Ocala Well #2	1/26/11	15:07	2/11/11	15:53	
		61	Windstream Well #2	1/26/11	13:40	2/11/11	13:51	
		62	Blue Skies Well 1	1/26/11	14:42	2/11/11	15:32	
		63	Cedar Hills Well	1/26/11	13:55	2/11/11	14:15	
		64	Fort King Forest Well	1/26/11	14:11	2/11/11	14:34	
		65	Pine Ridge Well	1/26/11	14:24	2/11/11	14:52	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes_____ No X Charts for samples on this page proofed by OUL:

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 23 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 2 / 17 / 11 **Date Samples Received:** 2 /21 / 11 **Time Samples Received:** 13 :30 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	**COLLECTED DATE**	**COLLECTED TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	1/26/11	15:57	2/11/11	16;40	
		56	Ocala Springs Elementary East Well	1/26/11	15:24	2/11/11	16:10	
		66	Sheri Oaks Well	1/26/11	15:43	2/11/11	16:27	
		40	Rainbow Springs Headsprings	1/26/11	12:15	2/11/11	12:29	
		41	Rainbow Springs Bubbling Spring	1/26/11	12:51	2/11/11	12:58	
		42	Rainbow Springs Rainbow River	1/26/11	12:30	2/11/11	12:38	

COMMENTS: Analyze all charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 30 **Samples Collected By:** Tom Morris, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Richinger -OUL
Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3/24/11 **Time Samples Received:** 12:30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day295)		(Day312)		
		1	Mammoth East	2/11/11	12:32	2/28/11	13:31	
		2	Mammoth West	2/11/11	12:35	2/28/11	13:34	
		4	Catfish Reception Hall	2/11/11	12:42	2/28/11	13:42	
		5	Bridal Chamber	2/11/11	12:46	2/28/11	13:45	
		6	Oscar	2/11/11	13:04	2/28/11	14:04	
		7	Devil's Kitchen A	2/11/11	12:59	2/28/11	13:53	
		9	Ladies Parlor	2/11/11	12:51	2/28/11	13:48	
		10	Alligator Hole	2/11/11	12:54	2/28/11	13:59	
		11	Mastodon Bone	2/11/11	13:08	2/28/11	14:07	
		12	Geyser	2/11/11	13:12	2/28/11	14:12	
		13	Blue Grotto	2/11/11	13:15	2/28/11	14:16	
		14	Christmas Tree	2/11/11	13:21	2/28/11	14:22	
		15	Garden of Eden	2/11/11	13:26	2/28/11	14:29	
		16	Log	2/11/11	13:28	2/28/11	14:30	
		18	Indian Cave	2/11/11	13:38	2/28/11	14:42	

COMMENTS: Please HOLD these samples pending analyses results from selected Week 31 samples.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** ~~SSC~~ Week 30 **Samples Collected By:** Tom Morris, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -OUL

Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3 / 24 / 11 **Time Samples Received:** 12:30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day295)		(Day312)		
		19	First Fisherman's Paradise	1/11/11	13:41	2/28/11	14:45	
		20	No Name Cove	1/11/11	13:47	2/28/11	14:54	
		21	Turtle Meadows	1/11/11	13:52	2/28/11	14:59	
		23	Catfish Hotel	1/11/11	13:59	2/28/11	15:10	
		24	Turtle Nook	1/11/11	14:03	2/28/11	15:14	
		26	Raccoon Island	1/11/11	14:08	2/28/11	15:20	
		28	Shipwreck	1/11/11	14:12	2/28/11	15:25	
		30	Timber	1/11/11	14:21	2/28/11	15:34	
		31	Silver River @ 1200 Meter Station	1/11/11	14:25	2/28/11	15:41	
		32	South Boathouse Vent	1/11/11	15:40	2/28/11	16:47	
		33	Gang of Five Vent 3	1/11/11	15:21	2/28/11	16:17	

COMMENTS: Please HOLD these samples pending analyses results from selected Week 31 samples.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 16 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Richinger - OUL

Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3 / 24 / 11 **Time Samples Received:** 12 : 30 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1	2/11/11	15:49	3/2/11	15:38	
		51	City of Ocala Well #2	2/11/11	15:53	3/2/11	15:43	
		61	Windstream Well #2	2/11/11	13:51	3/2/11	14:04	
		62	Blue Skies Well 1	2/11/11	15:32	3/2/11	15:21	
		63	Cedar Hills Well (Actual collection was on 3/2/11 @ 14:20**)	2/11/11	14:15	3/1/11*	12:00*	
		64	Fort King Forest Well (Actual collection was on 3/2/11 @ 14:38**)	2/11/11	14:34	3/1/11*	12:00*	
		65	Pine Ridge Well (Actual collection was on 3/2/11 @ 14:55**)	2/11/11	14:52	3/1/11*	12:00*	
			*Reflects approximate sampler cut-off time for monthly servicing.					
			** Water sample collected at on this date/time.					

COMMENTS: Please HOLD these samples pending analyses results from selected Week 17 samples.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 24 **Samples Collected By:** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Richinger -oul
Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3 /24/ 11 **Time Samples Received:** 12 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well	2/11/11	16:40	3/2/11	16:29	
		56	Ocala Springs Elementary East Well	2/11/11	16:10	3/2/11	15:58	
		57	Marion CI Well 1	2/11/11	17:04	3/2/11	16:55	
		66	Sheri Oaks Well	2/11/11	16:27	3/2/11	16:16	
		40	Rainbow Springs Headsprings	2/11/11	12:29	3/2/11	12:39	
		41	Rainbow Springs Bubbling Spring	2/11/11	12:58	3/2/11	13:09	
		42	Rainbow Springs Rainbow River	2/11/11	12:38	3/2/11	12:50	

COMMENTS: Please HOLD these samples pending analyses results from selected Week 25 samples.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 31 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -OUL

Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3/24/11 **Time Samples Received:** 12:38 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day312)		(Day329)		
		1	Mammoth East ANALYZE	2/28/11	13:31	3/17/11	13:20	
		2	Mammoth West ANALYZE	2/28/11	13:34	3/17/11	13:27	
		4	Catfish Reception Hall ANALYZE	2/28/11	13:42	3/17/11	13:38	
		5	Bridal Chamber HOLD	2/28/11	13:45	3/17/11	13:42	
		6	Oscar HOLD	2/28/11	14:04	3/17/11	14:04	
		7	Devil's Kitchen A HOLD	2/28/11	13:53	3/17/11	13:51	
		9	Ladies Parlor ANALYZE	2/28/11	13:48	3/17/11	13:47	
		10	Alligator Hole ANALYZE	2/28/11	13:59	3/17/11	13:57	
		11	Mastodon Bone HOLD	2/28/11	14:07	3/17/11	14:10	
		12	Geyser ANALYZE	2/28/11	14:12	3/17/11	14:15	
			(No Sta. 13 Blue Grotto sampler this sampling cycle due to alligator presence.)					
		14	Christmas Tree ANALYZE	2/28/11	14:22	3/17/11	14:25	
		15	Garden of Eden ANALYZE	2/28/11	14:29	3/17/11	14:31	
		16	Log HOLD	2/28/11	14:30	3/17/11	14:33	
		18	Indian Cave ANALYZE	2/28/11	14:42	3/17/11	14:42	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 31 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger -oul
Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3/24/11 **Time Samples Received:** 12:30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME		PLACED		COLLECTED		# WATER REC'D
					DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.		(Day312)		(Day329)		
		19	First Fisherman's Paradise	HOLD	2/28/11	14:45	3/17/11	14:46	
		20	No Name Cove	ANALYZE	2/28/11	14:54	3/17/11	15:49	
		21	Turtle Meadows	ANALYZE	2/28/11	14:59	3/17/11	14:53	
		23	Catfish Hotel	ANALYZE	2/28/11	15:10	3/17/11	15:03	
		24	Turtle Nook	HOLD	2/28/11	15:14	3/17/11	15:41	
		26	Raccoon Island	HOLD	2/28/11	15:20	3/17/11	15:36	
		28	Shipwreck	ANALYZE	2/28/11	15:25	3/17/11	15:11	
		30	Timber	ANALYZE	2/28/11	15:34	3/17/11	15:20	
		31	Silver River @ 1200 Meter Station	HOLD	2/28/11	15:41	3/17/11	15:27	
		32	South Boathouse Vent	ANALYZE	2/28/11	16:47	3/17/11	16:52	
		33	Gang of Five Vent 3	HOLD	2/28/11	16:17	3/17/11	16:45	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 17 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger

Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3 /24/ 11 **Time Samples Received:** 12 :38 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED			# WATER REC'D
				DATE	TIME	DATE	TIME		
			Charcoal Samplers and *Water Sample Vial* in labeled bag.						
		50	City of Ocala Well #1 ANALYZE	3/2/11	15:38	3/18/11	15:26		
		51	City of Ocala Well #2 ANALYZE	3/2/11	15:43	3/18/11	15:32		
		61	Windstream Well #2 HOLD	3/2/11	14:04	3/18/11	14:03		
		62	Blue Skies Well 1 ANALYZE	3/2/11	15:21	3/18/11	15:10		
		63	Cedar Hills Well ANALYZE	3/1/11	14:20	3/18/11	14:18		
		64	Fort King Forest Well ANALYZE	3/1/11	14:38	3/18/11	14:38		
		65	Pine Ridge Well ANALYZE	3/1/11	14:55	3/18/11	14:53		

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 25 **Samples Collected By:** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Margaret Ridinger
Date Samples Shipped: 3 / 22 / 11 **Date Samples Received:** 3/24/11 **Time Samples Received:** 12:38 **Return Cooler? Yes**__ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well ANALYZE	3/2/11	16:29	3/18/11	16:27	
		56	Ocala Springs Elementary East Well ANALYZE	3/2/11	15:58	3/18/11	15:52	
		57	Marion CI Well 1 ANALYZE	3/2/11	16:55	3/18/11	16:51	
		66	Sheri Oaks Well HOLD	3/2/11	16:16	3/18/11	16:13	
		40	Rainbow Springs Headsprings ANALYZE	3/2/11	12:39	3/18/11	12:37	
		41	Rainbow Springs Bubbling Spring ANALYZE	3/2/11	13:09	3/18/11	13:10	
		42	Rainbow Springs Rainbow River ANALYZE	3/2/11	12:50	3/18/11	12:48	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 32 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette /OUL
Date Samples Shipped: 4 / 15 / 11 **Date Samples Received:** 4 / 19 / 11 **Time Samples Received:** 13 00 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day329)		(Day349)		
		1	Mammoth East ANALYZE	3/17/11	13:20	4/6/11	13:38	
		2	Mammoth West ANALYZE	3/17/11	13:27	4/6/11	13:44	
		4	Catfish Reception Hall ANALYZE	3/17/11	13:38	4/6/11	13:55	
		5	Bridal Chamber HOLD	3/17/11	13:42	4/6/11	14:01	
		6	Oscar HOLD	3/17/11	14:04	4/6/11	14:23	
		7	Devil's Kitchen A HOLD	3/17/11	13:51	4/6/11	14:12	
		9	Ladies Parlor ANALYZE	3/17/11	13:47	4/6/11	14:07	
		10	Alligator Hole ANALYZE	3/17/11	13:57	4/6/11	14:17	
		11	Mastodon Bone HOLD	3/17/11	14:10	4/6/11	14:28	
		12	Geyser ANALYZE	3/17/11	14:15	4/6/11	14:33	
		13	Blue Grotto ANALYZE	2/28/11	14:16	4/6/11	14:38	
		14	Christmas Tree ANALYZE	3/17/11	14:25	4/6/11	14:45	
		15	Garden of Eden ANALYZE	3/17/11	14:31	4/6/11	14:51	
		16	Log HOLD	3/17/11	14:33	4/6/11	14:54	
		18	Indian Cave ANALYZE	3/17/11	14:42	4/6/11	15:03	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC/Week 32 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette

Date Samples Shipped: 4 / 15 / 11 **Date Samples Received:** 4 / 19 / 11 **Time Samples Received:** 13 :00 **Return Cooler? Yes** __ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day329)		(Day349)		
		19	First Fisherman's Paradise HOLD	3/17/11	14:46	4/6/11	15:08	
		20	No Name Cove ANALYZE	3/17/11	15:49	4/6/11	16:15	
		21	Turtle Meadows ANALYZE	3/17/11	14:53	4/6/11	15:16	
		23	Catfish Hotel ANALYZE	3/17/11	15:03	4/6/11	15:25	
		24	Turtle Nook HOLD	3/17/11	15:41	4/6/11	16:05	
		26	Raccoon Island HOLD	3/17/11	15:36	4/6/11	15:57	
		28	Shipwreck ANALYZE	3/17/11	15:11	4/6/11	15:32	
		30	Timber ANALYZE	3/17/11	15:20	4/6/11	15:41	
		31	Silver River @ 1200 Meter Station HOLD	3/17/11	15:27	4/6/11	15:48	
		32	South Boathouse Vent ANALYZE	3/17/11	16:52	4/6/11	16:59	
		33	Gang of Five Vent 3 HOLD	3/17/11	16:45	4/6/11	16:51	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ____ **No** X **Charts for samples on this page proofed by OUL:** ____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 18 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette / OUL

Date Samples Shipped: 4 / 15 / 11 **Date Samples Received:** 4 / 19 / 11 **Time Samples Received:** 13 : 00 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only			***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1 ANALYZE	3/18/11	15:26	4/7/11	13:25	
		51	City of Ocala Well #2 ANALYZE	3/18/11	15:32	4/7/11	13:30	
		61	Windstream Well #2 HOLD	3/18/11	14:03	4/7/11	13:57	
		62	Blue Skies Well 1 ANALYZE	3/18/11	15:10	4/7/11	15:11	
		63	Cedar Hills Well ANALYZE	3/18/11	14:18	4/7/11	14:15	
		64	Fort King Forest Well ANALYZE	3/18/11	14:38	4/7/11	14:32	
		65	Pine Ridge Well ANALYZE	3/18/11	14:53	4/7/11	14:46	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 26 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Lisa Goyette / OUL

Date Samples Shipped: 4 / 15 / 11 **Date Samples Received:** 4 / 19 / 11 **Time Samples Received:** 13 :00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well ANALYZE (no water sample)	3/18/11	16:27	4/7/11	16:22	
		56	Ocala Springs Elementary East Well ANALYZE	3/18/11	15:52	4/7/11	15:47	
		66	Sheri Oaks Well HOLD	3/18/11	16:13	4/7/11	16:09	
		40	Rainbow Springs Headsprings ANALYZE	3/18/11	12:37	4/7/11	12:29	
		41	Rainbow Springs Bubbling Spring ANALYZE	3/18/11	13:10	4/7/11	13:02	
		42	Rainbow Springs Rainbow River ANALYZE	3/18/11	12:48	4/7/11	12:39	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 33 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 4 / 27 / 11 **Date Samples Received:** 4 29 / 11 **Time Samples Received:** 12 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME		PLACED		COLLECTED		# WATER REC'D
					DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.		(Day349)		(Day368)		
		1	Mammoth East	ANALYZE	4/6/11	13:38	4/25/11	13:47	
		2	Mammoth West	ANALYZE	4/6/11	13:44	4/25/11	13:51	
		4	Catfish Reception Hall	ANALYZE	4/6/11	13:55	4/25/11	14:00	
		5	Bridal Chamber	HOLD	4/6/11	14:01	4/25/11	14:06	
		6	Oscar	HOLD	4/6/11	14:23	4/25/11	14:25	
		7	Devil's Kitchen A	HOLD	4/6/11	14:12	4/25/11	14:15	
		9	Ladies Parlor	ANALYZE	4/6/11	14:07	4/25/11	14:10	
		10	Alligator Hole	ANALYZE	4/6/11	14:17	4/25/11	14:19	
		11	Mastodon Bone	HOLD	4/6/11	14:28	4/25/11	14:29	
		12	Geyser	ANALYZE	4/6/11	14:33	4/25/11	14:35	
		13	Blue Grotto	ANALYZE	4/6/11	14:38	4/25/11	14:38	
		14	Christmas Tree	ANALYZE	4/6/11	14:45	4/25/11	14:45	
		15	Garden of Eden	ANALYZE	4/6/11	14:51	4/25/11	14:52	
		16	Log	HOLD	4/6/11	14:54	4/25/11	14:56	
		18	Indian Cave	ANALYZE	4/6/11	15:03	4/25/11	15:24	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG/Week 33 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 4 / 27 / 11 **Date Samples Received:** 4/29/11 **Time Samples Received:** 12 : 45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day349)		(Day368)		
		19	First Fisherman's Paradise HOLD	4/6/11	15:08	4/25/11	15:27	
		20	No Name Cove ANALYZE	4/6/11	16:15	4/25/11	16:25	
		21	Turtle Meadows ANALYZE	4/6/11	15:16	4/25/11	15:34	
		23	Catfish Hotel ANALYZE	4/6/11	15:25	4/25/11	15:41	
		24	Turtle Nook HOLD	4/6/11	16:05	4/25/11	16:18	
		26	Raccoon Island HOLD	4/6/11	15:57	4/25/11	16:12	
		28	Shipwreck ANALYZE	4/6/11	15:32	4/25/11	15:47	
		30	Timber ANALYZE	4/6/11	15:41	4/25/11	15:56	
		31	Silver River @ 1200 Meter Station HOLD	4/6/11	15:48	4/25/11	16:04	
		32	South Boathouse Vent ANALYZE	4/6/11	16:59	4/25/11	16:58	
		33	Gang of Five Vent 3 HOLD	4/6/11	16:51	4/25/11	16:52	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 19 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 4 / 27 / 11 **Date Samples Received:** 4 /29 / 11 **Time Samples Received:** 12:45 **Return Cooler? Yes**___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* / *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1 ANALYZE	4/7/11	15:25	4/26/11	15:11	
		51	City of Ocala Well #2 ANALYZE	4/7/11	15:30	4/26/11	15:19	
		61	Windstream Well #2 HOLD	4/7/11	13:57	4/26/11	13:45	
		62	Blue Skies Well 1 ANALYZE	4/7/11	15:11	4/26/11	14:55	
		63	Cedar Hills Well ANALYZE	4/7/11	14:15	4/26/11	14:05	
		64	Fort King Forest Well ANALYZE	4/7/11	14:32	4/26/11	14:20	
		65	Pine Ridge Well ANALYZE	4/7/11	14:46	4/26/11	14:33	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT/Phase 1 Wells/RBS Week 27 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL

Date Samples Shipped: 4 / 27 / 11 **Date Samples Received:** 4 / 29 / 11 **Time Samples Received:** 12:45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well ANALYZE	4/7/11	16:22	4/26/11	16:20	
		56	Ocala Springs Elementary East Well ANALYZE	4/7/11	15:47	4/26/11	15:34	
		66	Sheri Oaks Well HOLD	4/7/11	16:09	4/26/11	16:06	
		40	Rainbow Springs Headsprings ANALYZE	4/7/11	12:29	4/26/11	12:21	
		41	Rainbow Springs Bubbling Spring ANALYZE	4/7/11	13:02	4/26/11	12:52	
		42	Rainbow Springs Rainbow River ANALYZE	4/7/11	12:39	4/26/11	12:31	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 34 **Samples Collected By:** Matt Hubner, Pete Butt, Bill Colona
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OU
Date Samples Shipped: 5 / 12 / 11 **Date Samples Received:** 5/16/11 **Time Samples Received:** 13:00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		Please indicate stations where dye was visible in the field *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME		PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.		(Day368)		(Day384)		
		1	Mammoth East	ANALYZE	4/25/11	13:47	5/11/11	09:02	
		2	Mammoth West	ANALYZE	4/25/11	13:51	5/11/11	09:06	
		4	Catfish Reception Hall	ANALYZE	4/25/11	14:00	5/11/11	09:15	
		5	Bridal Chamber	HOLD	4/25/11	14:06	5/11/11	09:21	
		6	Oscar	HOLD	4/25/11	14:25	5/11/11	09:43	
		7	Devil's Kitchen A	HOLD	4/25/11	14:15	5/11/11	09:32	
		9	Ladies Parlor	ANALYZE	4/25/11	14:10	5/11/11	09:26	
		10	Alligator Hole	ANALYZE	4/25/11	14:19	5/11/11	09:37	
		11	Mastodon Bone	HOLD	4/25/11	14:29	5/11/11	09:49	
		12	Geyser	ANALYZE	4/25/11	14:35	5/11/11	09:52	
		13	Blue Grotto	ANALYZE	4/25/11	14:38	5/11/11	09:57	
		14	Christmas Tree	ANALYZE	4/25/11	14:45	5/11/11	10:03	
		15	Garden of Eden	ANALYZE	4/25/11	14:52	5/11/11	10:08	
		16	Log	HOLD	4/25/11	14:56	5/11/11	10:11	
		18	Indian Cave	ANALYZE	4/25/11	15:24	5/11/11	10:20	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSC Week 34 **Samples Collected By:** Matt Hubner, Pete Butt, Bill Colona
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL
Date Samples Shipped: 5 / 12 / 11 **Date Samples Received:** 5 / 16 / 11 **Time Samples Received:** 13 : 00 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL *use only*		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL *use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day368)		(Day384)		
		19	First Fisherman's Paradise HOLD	4/25/11	15:27	5/11/11	10:25	
		20	No Name Cove ANALYZE	4/25/11	16:25	5/11/11	11:27	
		21	Turtle Meadows ANALYZE	4/25/11	15:34	5/11/11	10:32	
		23	Catfish Hotel ANALYZE	4/25/11	15:41	5/11/11	10:42	
		24	Turtle Nook HOLD	4/25/11	16:18	5/11/11	11:20	
		26	Raccoon Island HOLD	4/25/11	16:12	5/11/11	11:14	
		28	Shipwreck ANALYZE	4/25/11	15:47	5/11/11	10:50	
		30	Timber ANALYZE	4/25/11	15:56	5/11/11	10:59	
		31	Silver River @ 1200 Meter Station HOLD	4/25/11	16:04	5/11/11	11:05	
		32	South Boathouse Vent ANALYZE	4/25/11	16:58	5/11/11	12:30	
		33	Gang of Five Vent 3 HOLD	4/25/11	16:52	5/11/11	11:46	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 20 **Samples Collected By:** Matt Hubner, Pete Butt, Bill Colona
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / OUL
Date Samples Shipped: 5 / 12 / 11 **Date Samples Received:** 5/16/11 **Time Samples Received:** 13:00 **Return Cooler? Yes**___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1 ANALYZE	4/26/11	15:11	5/10/11	17:37	
		51	City of Ocala Well #2 ANALYZE	4/26/11	15:19	5/10/11	17:40	
		61	Windstream Well #2 HOLD	4/26/11	13:45	5/10/11	13:06	
		62	Blue Skies Well 1 ANALYZE	4/26/11	14:55	5/10/11	15:51	
		63	Cedar Hills Well ANALYZE	4/26/11	14:05	5/10/11	13:20	
		64	Fort King Forest Well ANALYZE	4/26/11	14:20	5/10/11	13:37	
		65	Pine Ridge Well ANALYZE	4/26/11	14:33	5/10/11	13:49	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT/Phase 1 Wells/RBS Week 28 Samples Collected By: Matt Hubner, Pete Butt, Bill Colona

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 5 / 12 / 11 Date Samples Received: 5/16/11 Time Samples Received: 13:00 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well ANALYZE	4/26/11	16:20	5/10/11	16:54	
		56	Ocala Springs Elementary East Well ANALYZE	4/26/11	15:34	5/10/11	17:24	
		66	Sheri Oaks Well HOLD	4/26/11	16:06	5/10/11	17:05	
		41	Rainbow Springs Bubbling Spring ANALYZE	4/26/11	12:52	5/10/11	12:11	
		42	Rainbow Springs Rainbow River ANALYZE	4/26/11	12:31	5/10/11	11:38	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes______ No X Charts for samples on this page proofed by OUL:______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 35 **Samples Collected By:** Matt Hubner, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL
Date Samples Shipped: 5 / 27 / 11 **Date Samples Received:** 6 / 1 / 11 **Time Samples Received:** 14 : 00 **Return Cooler? Yes**___ **No** X
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day384)		(Day399)		
		1	Mammoth East ANALYZE	5/11/11	09:02	5/26/11	13:50	
		2	Mammoth West ANALYZE	5/11/11	09:06	5/26/11	13:55	
		4	Catfish Reception Hall ANALYZE	5/11/11	09:15	5/26/11	14:03	
		5	Bridal Chamber HOLD	5/11/11	09:21	5/26/11	14:08	
		6	Oscar HOLD	5/11/11	09:43	5/26/11	14:26	
		7	Devil's Kitchen A HOLD	5/11/11	09:32	5/26/11	14:16	
		9	Ladies Parlor ANALYZE	5/11/11	09:26	5/26/11	14:12	
		10	Alligator Hole ANALYZE	5/11/11	09:37	5/26/11	14:21	
		11	Mastodon Bone HOLD	5/11/11	09:49	5/26/11	14:31	
		12	Geyser ANALYZE	5/11/11	09:52	5/26/11	14:38	
		13	Blue Grotto ANALYZE	5/11/11	09:57	5/26/11	14:43	
		14	Christmas Tree ANALYZE	5/11/11	10:03	5/26/11	14:50	
		15	Garden of Eden ANALYZE	5/11/11	10:08	5/26/11	14:57	
		16	Log HOLD	5/11/11	10:11	5/26/11	14:59	
		18	Indian Cave ANALYZE	5/11/11	10:20	5/26/11	15:15	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes___ **No** X **Charts for samples on this page proofed by OUL:**___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: ~~SSG~~ Week 35 Samples Collected By: Matt Hubner, Tom Morris

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 5 / 27 / 11 Date Samples Received: 6 / 1 / 11 Time Samples Received: 14 : 00 Return Cooler? Yes ___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day384)		(Day399)		
		19	First Fisherman's Paradise HOLD	5/11/11	10:25	5/27/11	15:20	
		20	No Name Cove ANALYZE	5/11/11	11:27	5/27/11	15:27	
		21	Turtle Meadows ANALYZE	5/11/11	10:32	5/27/11	15:33	
		23	Catfish Hotel ANALYZE	5/11/11	10:42	5/27/11	15:50	
		24	Turtle Nook HOLD	5/11/11	11:20	5/27/11	15:56	
		26	Raccoon Island HOLD	5/11/11	11:14	5/27/11	16:01	
		28	Shipwreck ANALYZE	5/11/11	10:50	5/27/11	16:05	
		30	Timber ANALYZE	5/11/11	10:59	5/27/11	16:13	
		31	Silver River @ 1200 Meter Station HOLD	5/11/11	11:05	5/27/11	16:25	
		32	South Boathouse Vent ANALYZE	5/11/11	12:30	5/27/11	17:30	
		33	Gang of Five Vent 3 HOLD	5/11/11	11:46	5/27/11	17:07	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ No X Charts for samples on this page proofed by OUL: ___

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15:51SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 21 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OU

Date Samples Shipped: 5 / 27 / 11 **Date Samples Received:** 6 / 1 / 11 **Time Samples Received:** 14 : 00 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER 1-4 Numbers**	**STATION NAME**	**PLACED DATE**	**PLACED TIME**	**COLLECTED DATE**	**COLLECTED TIME**	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1 ANALYZE	5/10/11	17:37	5/25/11	15:31	
		51	City of Ocala Well #2 ANALYZE	5/10/11	17:40	5/25/11	15:38	
		61	Windstream Well #2 HOLD	5/10/11	13:06	5/25/11	13:56	
		62	Blue Skies Well 1 ANALYZE	5/10/11	15:51	5/26/11	12:15	
		63	Cedar Hills Well ANALYZE	5/10/11	13:20	5/25/11	14:15	
		64	Fort King Forest Well ANALYZE	5/10/11	13:37	5/25/11	14:33	
		65	Pine Ridge Well ANALYZE	5/10/11	13:49	5/25/11	14:50	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 1 Wells/RBS Week 29 **Samples Collected By:** Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OU

Date Samples Shipped: 5 / 27 / 11 **Date Samples Received:** 6 / 1 / 11 **Time Samples Received:** 14 : 00 **Return Cooler?** Yes___ No X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED			# WATER REC'D
				DATE	TIME	DATE	TIME		
			Charcoal Samplers and *Water Sample Vial* in labeled bag.						
		55	North Marion High School West Well ANALYZE	5/10/11	16:54	5/25/11	16:51		
		56	Ocala Springs Elementary East Well ANALYZE	5/10/11	17:24	5/25/11	16:05		
		66	Sheri Oaks Well HOLD	5/10/11	17:05	5/25/11	16:31		
		40	Rainbow Springs Headsprings ANALYZE	5/10/11	11:30	5/25/11	12:18		
		41	Rainbow Springs Bubbling Spring ANALYZE	5/10/11	12:11	5/25/11	12:57		
		42	Rainbow Springs Rainbow River ANALYZE	5/10/11	11:38	5/25/11	12:30		

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes______ No X **Charts for samples on this page proofed by OUL:**______

OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: oul@tri-lakes.net

SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 36 **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/ OUL

Date Samples Shipped: 6 / 17 / 11 **Date Samples Received:** 6 /20/ 11 **Time Samples Received:** 14 :30 **Return Cooler? Yes** __ **No** X

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day399)		(Day419)		
		1	Mammoth East ANALYZE	5/26/11	13:50	6/15/11	13:23	
		2	Mammoth West ANALYZE	5/26/11	13:55	6/15/11	13:45	
		4	Catfish Reception Hall ANALYZE	5/26/11	14:03	6/15/11	14:15	
		5	Bridal Chamber HOLD	5/26/11	14:08	6/15/11	14:20	
		6	Oscar HOLD	5/26/11	14:26	6/15/11	14:38	
		7	Devil's Kitchen A HOLD	5/26/11	14:16	6/15/11	14:28	
		9	Ladies Parlor ANALYZE	5/26/11	14:12	6/15/11	14:25	
		10	Alligator Hole ANALYZE	5/26/11	14:21	6/15/11	14:33	
		11	Mastodon Bone HOLD	5/26/11	14:31	6/15/11	14:43	
		12	Geyser ANALYZE	5/26/11	14:38	6/15/11	14:47	
		13	Blue Grotto ANALYZE	5/26/11	14:43	6/15/11	14:51	
		14	Christmas Tree ANALYZE	5/26/11	14:50	6/15/11	14:56	
		15	Garden of Eden ANALYZE	5/26/11	14:57	6/15/11	15:01	
		16	Log HOLD	5/26/11	14:59	6/15/11	15:06	
		18	Indian Cave ANALYZE	5/26/11	15:15	6/15/11	15:15	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes ____ **No** X **Charts for samples on this page proofed by OUL:** ____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSG Week 36 **Samples Collected By:** Matt Hubner, Pete Butt
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott / QL
Date Samples Shipped: 6 / 17 / 11 **Date Samples Received:** 6 / 20 / 11 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*							OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME		PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.		(Day399)		(Day419)		
		19	First Fisherman's Paradise	HOLD	5/27/11	15:20	6/17/11	15:18	
		20	No Name Cove	ANALYZE	5/27/11	15:27	6/17/11	16:21	
		21	Turtle Meadows	ANALYZE	5/27/11	15:33	6/17/11	15:23	
		23	Catfish Hotel	ANALYZE	5/27/11	15:50	6/17/11	15:32	
		24	Turtle Nook	HOLD	5/27/11	15:56	6/17/11	16:14	
		26	Raccoon Island	HOLD	5/27/11	16:01	6/17/11	16:08	
		28	Shipwreck	ANALYZE	5/27/11	16:05	6/17/11	15:38	
		30	Timber	ANALYZE	5/27/11	16:13	6/17/11	15:47	
		31	Silver River @ 1200 Meter Station	HOLD	5/27/11	16:25	6/17/11	15:52	
		32	South Boathouse Vent	ANALYZE	5/27/11	17:30	6/17/11	17:10	
		33	Gang of Five Vent 3	HOLD	5/27/11	17:07	6/17/11	17:02	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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15:51SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT Phase 2 Wells Week 22 **Samples Collected By:** Matt Hubner
Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OL
Date Samples Shipped: 6 / 17 / 11 **Date Samples Received:** 6 / 20 / 11 **Time Samples Received:** 14 : 30 **Return Cooler? Yes** ___ **No** X
Bill to: URS Corp. **Send Results to:** URS/KES
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		50	City of Ocala Well #1 ANALYZE	5/25/11	15:31	6/16/11	16:00	
		51	City of Ocala Well #2 ANALYZE	5/25/11	15:38	6/16/11	16:06	
		61	Windstream Well #2 HOLD	5/25/11	13:56	6/16/11	14:11	
		62	Blue Skies Well 1 ANALYZE	5/26/11	12:15	6/16/11	15:41	
		63	Cedar Hills Well ANALYZE	5/25/11	14:15	6/16/11	14:27	
		64	Fort King Forest Well ANALYZE	5/25/11	14:33	6/16/11	14:43	
		65	Pine Ridge Well ANALYZE	5/25/11	14:50	6/16/11	15:20	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.
This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT Phase 1 Wells/RBS Week 30 Samples Collected By: Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 6 / 17 / 11 Date Samples Received: 6 / 20 / 11 Time Samples Received: 14:30 Return Cooler? Yes___ No X

Bill to: URS Corp. Send Results to: URS/KES

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		55	North Marion High School West Well ANALYZE	5/25/11	16:51	6/16/11	17:08	
		56	Ocala Springs Elementary East Well ANALYZE	5/25/11	16:05	6/16/11	16:28	
		66	Sheri Oaks Well HOLD	5/25/11	16:31	6/16/11	16:49	
		40	Rainbow Springs Headsprings ANALYZE	5/25/11	12:18	6/16/11	12:30	
		41	Rainbow Springs Bubbling Spring ANALYZE	5/25/11	12:57	6/16/11	13:03	
		42	Rainbow Springs Rainbow River ANALYZE	5/25/11	12:30	6/16/11	12:44	

COMMENTS: Analyze SELECTED charcoal samples, and corresponding water samples if charcoal is dye positive.

This sheet filled out by OUL staff? Yes______ No X Charts for samples on this page proofed by OUL:______

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT/SSG July **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** Dave Cookson OUL

Date Samples Shipped: 7 / 26 / 11 **Date Samples Received:** 7/28/11 **Time Samples Received:** 13:45 **Return Cooler? Yes** ___ **No** X

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day419)		(Day456)		
		1	Mammoth East	6/15/11	13:23	7/22/11	13:29	
		2	Mammoth West	6/15/11	13:45	7/22/11	13:36	
		9	Ladies Parlor	6/15/11	14:25	7/22/11	13:52	
		13	Blue Grotto	6/15/11	14:51	7/22/11	14:01	
		14	Christmas Tree	6/15/11	14:56	7/22/11	14:07	
		23	Catfish Hotel	6/17/11	15:32	7/22/11	14:24	
		28	Shipwreck	6/17/11	15:38	7/22/11	14:30	
		32	South Boathouse Vent	6/17/11	17:10	7/22/11	15:01	

COMMENTS: Analyze charcoal samples, and corresponding water samples as appropriate.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

OUL

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT/RBS/Phase 2 Wells July **Samples Collected By:** Matt Hubner, Pete Butt

Samples Shipped By: KES via FedEx **Samples Received By:** [illegible]

Date Samples Shipped: 7 / 26 / 11 **Date Samples Received:** 7/28/11 **Time Samples Received:** 13:45 **Return Cooler? Yes** ___ **No** X

Bill to: URS Corp. **Send Results to:** URS/KES

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	**LAB NUMBER**	**STATION NUMBER** 1-4 Numbers	**STATION NAME**	**PLACED** DATE	**PLACED** TIME	**COLLECTED** DATE	**COLLECTED** TIME	**# WATER REC'D**
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		40	Rainbow Springs Headsprings	6/16/11	12:30	7/22/11	10:36	
		41	Rainbow Springs Bubbling Spring	6/16/11	13:03	7/22/11	10:54	
		50	City of Ocala Well #1	6/16/11	16:00	7/22/11	16:16	
		51	City of Ocala Well #2	6/16/11	16:06	7/22/11	16:15	
		62	Blue Skies Well 1	6/16/11	15:41	7/22/11	16:01	
		63	Cedar Hills Well	6/16/11	14:27	7/22/11	12:05	
		64	Fort King Forest Well	6/16/11	14:43	7/22/11	12:17	
		65	Pine Ridge Well	6/16/11	15:20	7/22/11	12:25	

COMMENTS: Analyze charcoal samples, and corresponding water samples if appropriate.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

[illegible]

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT SSG August **Samples Collected By:** Pete Butt, Georgia Shemitz, Tom Morris
Samples Shipped By: KES via FedEx **Samples Received By:** Julie Stearns
Date Samples Shipped: 8 / 16 / 11 **Date Samples Received:** 8 / 18 / 11 **Time Samples Received:** 16 : 15 **Return Cooler? Yes** __ **No** X
Bill to: KES. **Send Results to:** KES/URS
Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers and *Water Sample Vial* in labeled bag.	(Day456)		(Day480)		
		1	Mammoth East	7/22/11	13:29	8/15/11	14:06	
		2	Mammoth West	7/22/11	13:36	8/15/11	14:09	
		9	Ladies Parlor	7/22/11	13:52	8/15/11	14:20	
		13	Blue Grotto	7/22/11	14:01	8/15/11	15:38	
		14	Christmas Tree	7/22/11	14:07	8/15/11	15:31	
		23	Catfish Hotel	7/22/11	14:24	8/15/11	15:58	
		28	Shipwreck	7/22/11	14:30	8/15/11	16:08	
		33	Gang of Five Vent 3 ((Note: Substituted for missing Sta. 32 samplers.)	6/15/11	15:01	8/15/11	17:11	

COMMENTS: Analyze charcoal samples, and corresponding water samples as appropriate.
This sheet filled out by OUL staff? Yes ____ **No** X **Charts for samples on this page proofed by OUL:** ____

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT RBS/Phase 2 Wells August **Samples Collected By:** Pete Butt, Georgia Shemitz, Tom Morris

Samples Shipped By: KES via FedEx **Samples Received By:** Julie Sturman

Date Samples Shipped: 8 / 16 / 11 **Date Samples Received:** 8 / 18 / 11 **Time Samples Received:** 16:15 **Return Cooler? Yes** ___ **No** X

Bill to: KES. **Send Results to:** KES/URS

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB **Ship cooler to:** n/a

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
			Charcoal Samplers and *Water Sample Vial* in labeled bag.					
		40	Rainbow Springs Headsprings	7/22/11	10:36	8/15/11	11:45	
		41	Rainbow Springs Bubbling Spring (Note: sampler was out of water.)	7/22/11	10:54	8/15/11	11:27	
		50	City of Ocala Well #1	7/22/11	16:16	8/15/11	11:56	
		51	City of Ocala Well #2	7/22/11	16:15	8/15/11	11:46	
		62	Blue Skies Well 1	7/22/11	16:01	8/15/11	12:15	
		63	Cedar Hills Well	7/22/11	12:05	8/15/11	12:45	
		64	Fort King Forest Well	7/22/11	12:17	8/15/11	12:58	
		65	Pine Ridge Well	7/22/11	12:25	8/15/11	13:07	

COMMENTS: Analyze charcoal samples, and corresponding water samples if appropriate.

This sheet filled out by OUL staff? Yes ___ **No** X **Charts for samples on this page proofed by OUL:** ___

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace **Week No:** SSDT SSG September **Samples Collected By:** Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx **Samples Received By:** Rebecca Scott/OUL

Date Samples Shipped: 9 / 15 / 11 **Date Samples Received:** 9 / 16 / 11 **Time Samples Received:** 12 : 00 **Return Cooler? Yes** __ **No** X

Bill to: KES. **Send Results to:** KES/URS

Analyze for: Fluorescein X **Eosine** X **Rhodamine WT** X **Other** SRB **Ship cooler to:** n/a

OUL use only		***Please indicate stations where dye was visible in the field*** *for field technician use - use black ink only*						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
			Charcoal Samplers in labeled bag.	(Day480)		(Day510)		
		1	Mammoth East	8/15/11	14:06	9/14/11	14:23	
		2	Mammoth West	8/15/11	14:09	9/14/11	14:40	
		9	Ladies Parlor	8/15/11	14:20	9/14/11	14:58	
		13	Blue Grotto	8/15/11	15:38	9/14/11	15:38	
		14	Christmas Tree	8/15/11	15:31	9/14/11	15:04	
		23	Catfish Hotel	8/15/11	15:58	9/14/11	15:14	
		28	Shipwreck	8/15/11	16:08	9/14/11	15:18	
		32	South Boathouse Vent	8/15/11	17:30	9/14/11	15:50	

COMMENTS: Analyze all charcoal samples. Water samples were not included with this shipment.

This sheet filled out by OUL staff? Yes __ **No** X **Charts for samples on this page proofed by OUL:** __

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: Silver Springs Dye Trace Week No: SSDT RBS/Phase 2 Wells September Samples Collected By: Pete Butt, Matt Hubner

Samples Shipped By: KES via FedEx Samples Received By: Rebecca Scott/OUL

Date Samples Shipped: 9 / 15 / 11 Date Samples Received: 9 / 16 / 11 Time Samples Received: 12 : 00 Return Cooler? Yes __ No X

Bill to: KES. Send Results to: KES/URS

Analyze for: Fluorescein X Eosine X Rhodamine WT X Other SRB Ship cooler to: n/a

Please indicate stations where dye was visible in the field
for field technician use - use black ink only

OUL use only # CHAR REC'D	*OUL use only* LAB NUMBER	STATION NUMBER 1-4 Numbers	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	*OUL use only* # WATER REC'D
			Charcoal Samplers in labeled bag.					
		40	Rainbow Springs Headsprings	8/15/11	11:45	9/14/11	10:36	
		41	Rainbow Springs Bubbling Spring (Note: sampler was out of water.)	8/15/11	11:27	9/14/11	10:53	
		50	City of Ocala Well #1	8/15/11	11:56	9/14/11	13:14	
		51	City of Ocala Well #2	8/15/11	11:46	9/14/11	13:21	
		62	Blue Skies Well 1	8/15/11	12:15	9/14/11	12:56	
		63	Cedar Hills Well	8/15/11	12:45	9/14/11	11:59	
		64	Fort King Forest Well	8/15/11	12:58	9/14/11	12:13	
		65	Pine Ridge Well	8/15/11	13:07	9/14/11	12:27	

COMMENTS: __ : __ Analyze all charcoal samples. Water samples were not included with this shipment.

This sheet filled out by OUL staff? Yes ____ No X Charts for samples on this page proofed by OUL: ____

APPENDIX H

Ozark UNDERGROUND LABORATORY 1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 oul@tri-lakes.net

Certificate of Analysis

Date of certificate: September 8, 2010
Client: Alachua Co., FL Environmental Protection Dept.
Project: Orange Lake Dye Trace
Contact Persons: Jim Myles (jlmyles@alachuacounty.us)
Robin Hallborg (robin@alachuacounty.us)
Address: 201 Southeast 2nd Ave, Suite 201
Gainesville, FL 32601

Samples collected by: Greg Owen
Date Samples Shipped: September 1, 2010
Date Samples Rec'd at OUL: September 3, 2010
Date Analyzed by OUL: September 7, 2010
Included with certificate of analysis: Table of results and copies of sample collection data sheets

Results for charcoal samples analyzed for the presence of fluorescein dye.

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

OUL Number	Station Name	Date/Time Placed	Date/Time Collected	Fluorescein Results	
				Peak (nm)	Conc. (ppb)
U1135	Micanopy	3/29/10 NT	4/12/10 1123	ND	
U1136	Micanopy	4/12/10 1123	5/10/10 1140	ND	
U1137	Micanopy	5/17/10 1330	5/24/10 1055	ND	
U1138	Micanopy	6/7/10 0950	6/14/10 1005	ND	
U1139	Micanopy	6/14/10 1005	6/28/10 1003	ND	
U1140	Laboratory control charcoal blank				
U1141	Island Grove	4/5/10 0950	4/12/10 1005	ND	
U1142	Island Grove	5/3/10 1025	5/10/10 1100	ND	
U1143	Island Grove	5/10/10 1100	5/24/10 1020	ND	
U1144	Island Grove	6/1/10 0930	6/7/10 0925	ND	
U1145	Island Grove	6/7/10 0925	6/14/10 0940	ND	
U1146	Cross Creek	4/5/10 0925	4/12/10 0945	ND	
U1147	Cross Creek	5/3/10 1000	5/10/10 0925	ND	
U1148	Cross Creek	5/17/10 1025	5/24/10 0920	ND	
U1149	Cross Creek	5/24/10 0920	6/7/10 0910	ND	
U1150	Cross Creek	6/7/10 0910	6/14/10 0925	ND	

Note: Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

Footnotes: ND = No dye detected
NT = No time given

Thomas J. Aley, PHG and RG

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URS

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