

**SPECIAL PUBLICATION SJ2004-SP39**

**REPORT ON THE RARE PLANT AND ANIMAL SPECIES  
AND RARE WETLAND COMMUNITIES OCCURRING  
ADJACENT TO PRIORITY SPRINGS AND SPRING-RUNS IN  
ST. JOHNS RIVER WATER MANAGEMENT DISTRICT**





**Report on the Rare Plant and Animal Species and Rare  
Wetland Communities Occurring Adjacent to Priority  
Springs and Spring-runs in St. Johns River Water  
Management District**

Prepared by the Florida Natural Areas Inventory

Contracted by the St. John's River Water Management District  
Division of Water Supply Management



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## Executive Summary

Section 62-40.473, *Florida Administrative Code*, specifies that Minimum Flow and Levels (MFL) be evaluated and determined to safeguard non-consumptive uses of water such as navigation, recreation, fish and wildlife habitats, and other natural resource values. Demands for water within the St. Johns River Water Management District (SJRWMD) may impact springs and spring-runs which could result in adverse effects to or even the possible loss of rare plant and animal species and rare wetland natural community types. Numerous wetland dependent rare species exist within the SJRWMD and are possibly at risk. The Florida Natural Areas Inventory (FNAI) reports the potential occurrence of 128 wetland dependent species within the SJRWMD (FNAI. 2001. *Report on the rare and endemic species of the St John's River Water Management District*). In this report, FNAI describes 44 rare species, including some that are not wetland dependent in the proximity of 19 springs of the SJRWMD. These rare species are documented in the FNAI database as occurring within either in a primary buffer (that includes the springhead and the immediate area of flow influence) or a secondary buffer (that extends one half mile landward of the primary buffer) surrounding each spring. Of these 44 rare species, 10 species are vascular plants, 23 vertebrates, and 11 invertebrates. Twenty of these rare species are also endemic to Florida. Twenty-six of the species identified in this report are given an FNAI global or FNAI state ranking of 1 or 2 and are considered critically imperiled or imperiled. Within the proximity of the 19 priority springs, seven rare natural communities were documented in the FNAI database.

Information derived from the FNAI database is provided for rare species and rare natural wetland community types in tabular form for 19 priority springs within the SJRWMD. This information includes scientific and common names, FNAI global and state ranks, federal and state legal status, a description of each occurrence, habitat and phenology, and other pertinent comments.

## **Introduction.**

Demands for water in the St. Johns River Water Management District (SJRWMD) may impact springs flows and their spring-runs resulting in unacceptable impacts to rare plant and animal species and rare wetland communities. Numerous wetland dependent rare species exist within the SJRWMD and are possibly at risk. Section 62-40.473, *F. A. C.*, specifies a Minimum Flow and Level (MFL) determination should be evaluated to safeguard non-consumptive uses of water such as navigation, recreation, fish and wildlife habitats, and other natural resources values.

Water supply withdrawals have the potential to alter the hydrology of springs, spring-runs, and associated wetlands resulting in possible adverse effects to or even the loss of rare species. As part of the ongoing effort to avoid such impacts, this report provides a list of the rare species documented by Florida Natural Areas Inventory (FNAI) to occur within primary or secondary buffer zones surrounding each of 19 springs and spring-runs of the SJRWMD, along with descriptions of natural communities in which they occur, habitat notes, season when found and endangerment status assigned by FNAI, the state of Florida, and the federal government. The information is derived from the FNAI database. This report was contracted by the SJRWMD's Division of Water Supply Management. These listings will be of value to the Minimum Flow and Levels Program because protection of aquatic resources also involves protection of rare species.

Specifically this report includes: a table of rare species and rare natural communities for each of 19 priority springs found within SJRWMD (Alexander, Apopka, Blue (Lake Co.), Blue (Volusia Co.), Bugg, Deleon, Gemini, Green, Holiday, Messant, Miami, Palm, Rock, Sanlando, Seminole, Silver Glen, Silver, Starbuck, and Wekiva), and a cumulative table for all 19 springs. The tables include descriptive information (status, seasonal distribution, habitat comments) derived from the FNAI database.

FNAI is a private, non-profit organization dedicated to gathering, interpreting, and disseminating information critical to the conservation of Florida's biological diversity. The Inventory was founded in 1981 as a member of The Nature Conservancy's international network of natural heritage programs. The Inventory maintains and continually updates a comprehensive database of rare plant and animal species and exemplary natural communities of Florida. Data records maintained by the Inventory are a compilation of information from published and unpublished literature, museums and herbaria, field surveys, personal communications from natural resource professionals, and other sources. The Inventory database currently includes information on approximately 470 plant species, 500 animal species (vertebrates and invertebrates), and 82 natural community types. It includes more than 27,000 occurrences of rare plant and animal species and high-quality natural communities throughout the state, more than 1,400 conservation lands managed by public and private agencies.

## Methods

Ranking. FNAI ranks the endangerment status of plant and animal species on a scale of 1 to 5 with 1 being the most imperiled and 5 the most secure, according to the criteria listed in Appendix 1. In general FNAI tracks information only on species ranked 1, 2, or 3 at either the global or state level. The criteria the Inventory uses to rank species are identical to criteria used by natural heritage programs in all fifty states. This network of natural heritage programs, now independent of The Nature Conservancy and known as NatureServe, shares information and ranking of species that range across several states. Thus, for example, if most of the range of a rare species is in Alabama, the Alabama heritage program would assign the global rank of the species and FNAI would assign only the state rank for Florida. The Inventory also ranks natural communities in Florida (FNAI 1990) based on acreage covered and degree of threat.

The state of Florida ranks species based on the endangerment of a species in Florida only, not on the status of the species throughout its range; thus, its ranks would be comparable to FNAI's state ranks. Differences between species ranks assigned by FNAI and those assigned by the state are due to differences in emphasis. For animals, the state considers primarily the degree of threat to the populations in deciding whether or not to list a species, whereas FNAI takes into account along with threat, the number and size of populations in the state and the area of the state over which the populations are distributed. For plants, the criteria for ranking are similar, but the state ranks only full species, whereas FNAI also ranks subspecies.

The federal status of rare species is assigned by the U.S. Fish and Wildlife Service based on the endangered status of the species throughout its range and thus is comparable to FNAI's global ranks. One of the main reasons FNAI's global ranks differ from those assigned by the federal government is the length of time it takes to rank a species. Since FNAI listings do not have legal force, species rankings can be modified as soon as information becomes available, rather than going through a detailed review process such as is required for ranking by the U.S. Fish and Wildlife Service.

Determination of Primary and Secondary Buffer Zones. The area of coverage around each spring was divided into a primary and a secondary buffer zone. The primary buffer zone consists of the immediate contiguous wetlands (as determined by the best available coverage) surrounding the spring and spring-runs or if impractical, a defined polygon was used. The secondary buffer zone is an upland extension from the primary buffer zone.

Primary buffer zones were determined by SJRWMD staff by examination of SJRWMD Wetlands and Vegetation Inventory maps. These generally included the spring head, immediate spring run, and immediately adjacent wetlands extending to the next major wetland community type or surface water input as determined. Sometimes these areas were difficult to interpret and the primary buffer zone included the immediate area that appeared to be influenced by the spring.

The boundary of the primary buffer zone was indicated in pencil on maps with the resulting outline digitized to produce a primary buffer zone polygon. The polygon was used as a coverage

area to determine the occurrence of rare species and rare wetland communities within its bounds as listed in the FNAI database.

The secondary buffer zone extended ½ mile landward of the primary buffer zone. This buffer zone is considered the minimum necessary buffer distance to accommodate species that may not be present at “water’s edge” but are still dependent upon the waters of the springs.

## Results

The boundaries of the primary buffer zones for the 19 priority springs follow in Table 1.

Table 1. Boundaries of primary buffer zones for 19 priority springs.

Spring	Boundary Of Primary Buffer Zone
Alexander	Immediate spring run and immediately adjacent wetlands without another surface water source.
Apopka	Immediate water, hardwood swamp, shrub swamp, and floating marsh.
Blue (Lake Co.)	Spring run from first spring to Lake Harris with 20 ft primary buffer on each side.
Blue (Volusia Co.)	Immediate spring run and hydric hammock.
Bugg	Immediate spring run, hardwood swamp, hydric hammock, and floating marsh.
Deleon	Immediate spring run, hardwood swamp, upland around springhead, and shallow marsh.
Gemini	Immediate spring run to Lake Monroe.
Green	Immediate hydric hammock draining to Lake Monroe.
Holiday	Spring run to Lake Harris with 20 ft primary buffer on each side.
Messant	Immediate water, hardwood swamp, and upland to include springhead.
Miami	Spring run to first connecting branch.
Palm, Sanlando, Starbuck	These 3 springs are in close proximity along the Little Wekiva River and used one primary buffer that included the immediate spring run, hardwood swamp, shallow marsh, and upland around springhead.
Rock	Immediate spring run, shrub swamp, and hardwood swamp.
Seminole	Spring and immediate uplands around springhead and hydric hammock.
Silver	Immediate spring run and contiguous hardwood swamp, hydric hammock, bayhead, cypress, and submerged vegetation to Marshall Swamp.
Silver Glen	Spring run to Lake George including immediate shallow marsh, water, hydric hammock, hardwood swamp, shrub swamp, and deep marsh.
Wekiwa	Immediate spring run and portions of adjacent hardwood swamp, hydric hammock, and bayhead.



A general locator map and maps of the primary and secondary buffer zones for individual springs can be found in Appendix 3.

Table and page numbers for rare species and rare natural communities for each spring are found in Table 2. No rare species or rare natural communities were listed within the FNAI database for Blue Spring (Lake Co.), Holiday Springs (Lake Co.), Gemini Springs, and Green Springs. Results for Palm, Sanlando, and Starbuck Springs, because of their close proximity, are combined into one table. A cumulative listing for all nineteen priority springs is found in Table 3, pages 6-10.

Table 2. Rare species and rare natural community tables for individual springs.

<b>Spring</b>	<b>Table Number</b>	<b>Page Number</b>
Alexander	4	11-13
Apopka	5	14-15
Blue (Volusia Co.)	6	16-17
Bugg	7	18
Deleon	8	19
Messant	9	20
Miami	10	21
Palm, Sanlando, Starbuck	11	22
Rock	12	23
Seminole	13	24
Silver	14	25-26
Silver Glen	15	27
Wekiwa	16	28-29

A total of 44 rare species are documented to occur in the proximity of 19 SJRWMD springs, including 10 species of vascular plants, 23 vertebrates, and 11 invertebrates (Table 3). Twenty of these rare species are also endemic to Florida. Of these, 26 are considered imperiled or critically imperiled having an FNAI global or FNAI state ranking of 1 or 2. Within the proximity of the 19 priority springs, seven rare natural communities were found. These listings will be of value to the Minimum Flow and Level Program because protection of aquatic resources involves protection of rare species and rare wetland communities. Consideration of the rare species and rare natural communities found in the proximity of individual springs will be useful in the establishment of MFLs.



# Florida Natural Areas Inventory



**TABLE 3. CUMULATIVE TABLE FOR 19 PRIORITY SPRINGS AND SPRING RUNS IN ST JOHNS RIVER WATER MANAGEMENT DISTRICT**

Scientific Name	Common Name	FNAI Global	FNAI State	Fed	State	Phenology	Habitat Comments
<b>PLANTS- <i>italics</i> indicates Florida endemic</b>							
<i>Carex chapmanii</i>	Chapman's Sedge	G3	S2	N	LE	Flowering Mar 15 through May 15	Floodplain forest, hydric hammock.
<i>Digitaria floridana</i>	Florida Crabgrass	G1	S1	N	N	Flowering, fruiting Sept.	Disturbed, dry sites. Sandhill.
<i>Euphorbia commutata</i>	Wood Spurge	G5	S2	N	LE	Flowering Feb 1 through Apr 30	Found on calcareous soils.
<i>Illicium parviflorum</i>	Star Anise	G2	S2	N	LE	Flowering Apr 1 through Jun 30	Sandy loams or sandy peat mucks in hydric hammock and floodplain swamps along relatively large spring-fed streams and in bayheads with <i>Chamaecyparis thuyoides</i> , <i>Agarista populifolia</i> , <i>Sabal palmetto</i> , <i>Sabal minor</i> , <i>Rhapidophyllum hystrix</i> , <i>Magnolia virginiana</i> , <i>Persea palustris</i> . Also in karst areas, on continually moist soil. Found on stream banks.
<i>Matelea floridana</i>	Florida Spiny-pod	G2	S2	N	LE	Flowering Apr 1 through Aug 30	Upland hardwood forests, with laurel oak, red oak, pignut or mockernut hichory, spruce, pine, and southern magnolia. A variety of wooded habitats from fairly moist woods, such as those in limesink areas, to dry, open oak-hickory or oak-hickory-pine upland forests. The most vigorous flowering populations occur where there has been a recent, canopy-opening disturbance; the plants may not flower at all in areas where the understory and overstory are continuous.
<i>Monotropa hypopithys</i>	Pinesap	G5	S1	N	LE	Flowering Oct 1 through Nov 30	Scrub, upland hardwood forest.
<i>Sideroxylon alachuense</i>	Silver Buckthorn	G1	S1	N	LE	No data	
<i>Spigelia loganioides sensu stricto</i>	Pinkroot	G2Q	S2	N	LE	Flowering Apr 15 through Jun 30	Forrested communities with attributes of hydric hammock, mesic hammock, and maritime hammock, with limestone at or near the surface and dominated by <i>sabal palmetto</i> and <i>Juniperus virginiana</i> , <i>Ulmus</i> spp., <i>Celtis laevigata</i> , and other wet-tolerant calciphiles.
<i>Vicia ocalensis</i>	Ocala Vetch	G1	S1	N	LE	Flowering Apr 1 through May 31	Sandy peat of open, wet thickets, open marshlands, and stream margins. Found on spring-run streams climbing over bankside thickets or marshes.
<i>Warea amplexifolia</i>	Clasping Warea	G1	S1	LE	LE	Flowering Aug 15 through Oct 15	Limited to sunny openings with exposed sand in longleaf pine/turkey oak sandhills and sand pine-scrub oak scrub.
<b>ANIMALS- <i>italics</i> indicates Florida endemic</b>							
<i>Alligator mississippiensis</i>	American Alligator	G5	S4	T(S/A)	LS	Present year-round.	Fresh and brackish marshes, ponds, lakes, rivers, swamps, bayous, large spring runs
<i>Aphaostracon asthenes</i>	Blue Spring Hydrobe	G1	S1	N	N	No data	Found in the sparsely vegetated upper portion of a spring run (Franz 1982).

TABLE 3

Scientific Name	Common Name	FNAI Global	FNAI State	Fed	State	Phenology	Habitat Comments
<i>Aphaostracon monas</i>	<i>Wekiwa Hydrobe</i>	G1	S1	N	N	No data	Found in and adjacent to springs and spring runs with water characterically high in mineral content with steady annual temperatures (Thompson 1968). Found on submerged gravel, rocks, and plants.
<i>Aphaostracon pycnum</i>	<i>Dense Hydrobe</i>	G1	S1	N	N	No data	Found on water lettuce and hyacinths in shallow, quiet, clear pools along a spring run. The plants were above a soft bottom substrate (Thompson 1968).
<i>Aramus guarauna</i>	Limpkin	G5	S3	N	LS	Present year-round.	Swampy forest, marshes, mangroves. Open freshwater marshes, pond and river margins, occasionally wooded swamps (Stiles and Skutch 1989). Also ruderal. Nests in sawgrass or loose mass of leaves just above water, in vines growing over shrubs along streams, or in bushes or trees along deeper streams (Terres 1980).
<i>Ardea alba</i>	Great Egret	G5	S4	N	N	Present year-round.	Marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, and ponds; also fields and meadows. Also ruderal. Nests primarily in tall trees, usually with other colonial water birds; in woods or thickets near water.
<i>Buteo brachyurus</i>	Short-tailed Hawk	G4G5	S1	N	N	Present year-round.	Generally open country, from mangrove and cypress swamps to open pine-oak woodland, avoiding heavily forested situations (AOU 1983). Most common in mixed woodland-savanna habitats (Terres 1980).
<i>Caecidotea sp. 1</i>	<i>Rock Springs Cave Isopod</i>	G1	S1	N	N	No data	Aquatic cave of karst origin.
<i>Cincinnatia parva</i>	<i>Blue Spring Siltsnail</i>	GX	S1	N	N	No data	Inhabits a freshwater karst spring run; snails occur on vegetation, debris, and gravel (Thompson 1968).
<i>Cincinnatia ponderosa</i>	<i>Sanlando Spring Siltsnail</i>	G1	S1	N	N	No data	<i>Cincinnatia ponderosa</i> is abundant in the spring and in the Little Wekiwa River to about 500 yards below the spring runs. It is not found beyond this point. Snails are most abundant on vegetation, although they were also common on sand and gravel which covers the bottom of the spring (Thompson, 1968).
<i>Cincinnatia vanhyningi</i>	<i>Seminole Spring Siltsnail</i>	G1	S1	N	N	No data	Inhabits a freshwater karst spring pool and run with gravel and sand bottom that contain large patches of eel grass and other vegetation. The snails are most abundant on the vegetation (Thompson 1968).
<i>Cincinnatia wekiwae</i>	<i>Wekiwa Siltsnail</i>	G1	S1	N	N	No data	Inhabits a freshwater karst spring. It occurs in the spring pool and run for a short distance below the pool. The pool bottom is covered with fine sand, where <i>C. WEKIWAE</i> is scarce and the spring run contains thick mats of submerged vegetation where it is abundant (Thompson 1968).

TABLE 3

Scientific Name	Common Name	FNAI Global	FNAI State	Fed	State	Phenology	Habitat Comments
<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake	G4	S3	N	N	Present year-round.	Pine and wiregrass flatwoods, longleaf pine-turkey oak hills, rosemary scrub, palmetto flatwoods, mesophytic hammocks, barrier islands and coastal scrub habitats, vicinity of wet savannas, mixed pine-hardwood successional woodland, abandoned farms and fields, and grown up pastures. Usually not in marshes or swamps but may pass through or occupy edges.
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S3	N	LT	Present year-round.	
<i>Egretta caerulea</i>	Little Blue Heron	G5	S4	N	LS	Present year-round.	Marshes, ponds, lakes, meadows, mudflats, lagoons, streams, mangrove lagoons, and other bodies of calm shallow water; primarily in freshwater habitats. Also ruderal.
<i>Egretta thula</i>	Snowy Egret	G5	S3	N	LS	Present year-round.	Marshes, lakes, ponds, lagoons, mangroves, and shallow coastal habitats. Also ruderal.
<i>Egretta tricolor</i>	Tricolored Heron	G5	S4	N	LS	Present year-round.	Marshes, ponds, sloughs, bayous, rivers, mangrove swamps, saltwater lagoons, islands; salt and fresh water. Also ruderal.
<i>Eudocimus albus</i>	White Ibis	G5	S4	N	LS	Present year-round.	Various salt water and freshwater habitats: marshes, mangroves, lagoons, lakes, marsh prairie, pasture, coastal swamps (AOU 1983, Kushlan 1979).
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	LS	Present year-round.	Commonly occupies habitats with a well-drained sandy substrate, ample herbaceous vegetation for food, and sunlit areas for nesting (Hallinan 1923, Landers 1980, Landers et al. 1980, Diemer 1989). These habitat types include sandhill (pine-turkey oak), sand pine scrub, xeric hammock, pine flatwoods, dry prairie, coastal grasslands and dunes, and mixed hardwood-pine communities (Landers and Speake 1980, Auffenberg and Franz 1982, Kushlan and Mazzotti 1984, Diemer 1986, 1992a). Also ruderal.
<i>Grus canadensis pratensis</i>	Florida Sandhill Crane	G5T2T3	S2S3	N	LT	Present year-round.	Wet prairies, marshy lake regions, low lying pastures (including "improved" ones), shallow flooded open areas; vicinity of ponds in areas dominated by saw palmettos and scattered wooded hammocks that support cabbage palms, pines, oaks, and wetland trees such as magnolia and cypress; along sloughs and in open pinewood flats; avoids forests and deep marshes. Preferentially used open upland habitat (pastures and pasture-transition) in north-central Florida (Nesbitt and Williams 1990). Also ruderal.
<i>Lasiurus cinereus</i>	Hoary Bat	G5	SU	N	N	Present Oct 1 through Apr 30	Prefers deciduous and coniferous forests and woodlands.
<i>Mustela frenata olivacea</i>	Southeastern Weasel	G5T4	S3?	N	N	Present year-round.	Found in diverse habitats, such as old fields, hammocks, cypress swamps, sand pine scrub.

TABLE 3

Scientific Name	Common Name	FNAI Global	FNAI State	Fed	State	Phenology	Habitat Comments
<i>Mustela frenata peninsulæ</i>	Florida Long-tailed Weasel	G5T3	S3	N	N	Present year-round.	No clear habitat preference; observed in various habitats, including pine flatwoods, sandhills, hardwood forests, cypress swamps, tropical hammocks, and sand pine scrub habitats (Layne 1978, Frank 1992). Resting and birthing sites may include tree hollows and underground burrows.
<i>Neoseps reynoldsi</i>	Sand Skink	G2	S2	LT	LT	Present year round. Most active mid-February through mid-May and late summer-early fall (USFWS 1998).	Loose sands of sand pine-rosemary scrub, less often in longleaf pine-turkey oak (sandhill) or turkey oak "barrens" adjacent to scrub; especially high pine-scrub ecotones (Telford, cited in USFWS 1998).
<i>Pituophis melanoleucus mu</i>	Florida Pine Snake	G4T3?	S3	N	LS	Present year round. Inactive in cold weather. In Florida, radio-tracked snakes were active March-October, with the greatest activity in May, June, July, and October (Franz 1992).	High pinelands; sandy places (Carr and Goin 1955). Longleaf pine-turkey oak where pocket gophers are present (Ashton and Ashton 1981). Also sand pine scrub, pine flatwoods on well-drained soils, xeric hammocks, and old fields on former sandhill sites (Franz 1992). Also ruderal.
<i>Plegadis falcinellus</i>	Glossy Ibis	G5	S3	N	N	Present year-round.	Marshes, swamps, lagoons, pond margins, lakes, flooded pastures; fresh, brackish, and salt water. Reported as mainly in freshwater habitats on the Atlantic coast of Florida.
<i>Procambarus acherontis</i>	Orlando Cave Crayfish	G1G2	S1	N	N	No data.	Karst aquifers. Collected from mouths of springs, sinkholes, underground streams, wells, and caves. Frequents both the lighted and deeper, dark portions of such systems.
<i>Procambarus attiguus</i>	Silver Glen Springs Crayfish	G1	S1	N	N	No data.	Subterranean karst stream with a moderately strong discharge through springs and sand boils; currently used for recreation (swimming).
<i>Procambarus delicatus</i>	Big-cheeked Cave Crayfish	G1	S1	N	N	No data.	Subterranean pools in aquatic caves characterized by low energy input.
<i>Pteronotropis welaka</i>	Bluenose Shiner	G3G4	S4	N	LS	Present year-round.	Deep, slow-moving coastal creeks and small to medium rivers of varying clarity and usually with silty bottoms, often heavily choked with brush and vegetation. Seems to prefer deep pools and backwaters (often 1-2 m) to more shallow areas.
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G3	S3	N	N	Present year round. Active throughout the year on sunny or warm cloudy days.	Largely restricted to evergreen oak scrub and young sand pine scrub with ample open space; less common in ecotone between scrub and sandhills, sandhills surrounded by scrub, scrubby flatwoods, and citrus groves. Also ruderal. Prefers sites with open sandy areas (for nesting, basking, and foraging) in close proximity to mature trees (PINUS or QUERCUS) that can provide shade and perch sites.
<i>Stilosoma extenuatum</i>	Short-tailed Snake	G3	S3	N	LT	Present year round. Most active mid-February through mid-May and late summer-early fall (USFWS 1998).	Dry sandy uplands, especially longleaf pine-turkey oak (sandhill) and sometimes adjacent xeric oak hammocks and rosemary-sand pine scrub. Has been found also in sphagnum bog adjacent to typical habitat

TABLE 3

Scientific Name	Common Name	FNAI Global	FNAI State	Fed	State	Phenology	Habitat Comments
Trichechus manatus	Manatee	G2	S2	LE	LE	Present year-round.	Shallow coastal waters, estuaries, bays, rivers, and lakes; throughout most of the range, appears to prefer rivers and estuaries to marine habitats (Lefebvre et al. 1989). Not averse to traveling through dredged canals or using quiet marinas.
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT	Present year round.	Large undeveloped wooded tracts; pine flatwoods, hardwood swamp, cypress swamp, cabbage palm forest, sand pine scrub, mixed hardwood hammock; usually in areas that include multiple forest types; habitat use varies with food availability (Maehr and Wooding 1992, which see for further details). Inhabits areas of dense cover, such as those referred to as "bay-galls" in south Florida, "swamps" in middle Florida, and titi swamps in the panhandle (Layne 1978).
<b>NATURAL COMMUNITIES</b>							
	Aquatic Cave	G3	S3	N	N		
	Bog	G?	S3	N	N		
	Floodplain swamp	G4	S4	N	N		
	Scrub	G2	S2	N	N		
	Spring-run stream	G2	S2	N	N		
	Upland mixed forest	G4	S4	N	N		
	Wet flatwoods	G4	S4	N	N		

TABLE 3

# Florida Natural Areas Inventory



**TABLE 4. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR ALEXANDER SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
Carex chapmanii	Chapman's Sedge	X		7/26/1994	On perimeter of a spring basin in a hydric hammock dominated by sabal palmetto-nyssa sylvatica var. biflora/rapidophyllum hystrix-illicium parviflorum. Surrounded by mesic hardwood forest on ne, a paved road on s, and a recreation area on w. ph 7.2 loamy	Scattered small colonies about 4' in diameter. vegetative.
Illicium parviflorum	Star Anise		X	7/26/1994	On perimeter of a spring basin in a hydric hammock dominated by sabal palmetto-nyssa sylvatica var. biflora/rapidophyllum hystrix. Surrounded by mesic hardwood forest on ne, a paved road on s, and a recreation area on w. ph 7.2 loamy sand.	Will (1961-05-14): flowering and budding numerous plants (s61wilsf). Reese (1994): hundreds of plants up to 10' tall, average 4-5' high, approximately 2% in seed. Dominant on ecotone between hydric hammock and mesic hardwood forest (u94ree01).
Monotropa hypopithys	Pinesap		X	11/2/1994	1994-11-02: Longleaf site with turkey oaks, wiregrass, and encroaching sand pine. Stand 3 had not been burned for a long time, recently burned on 1/90 and 12/92, a soil core was taken on 11/2/94 resulting in Astatula sand with a dark surface layer	1994-11-02: Total of 39 plants, all in flower, except one with immature fruit; plant seems to be associated with sand live oak (Quercus geminata), rather than with pines as the literature suggests (Miller).

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<i>Vicia ocalensis</i>	Ocala Vetch	X		5/22/1992	Wet thicket (s64waruf).	1964: Infrequent, many-stemmed plants, climbing, Ward collected specimen D. B. Ward (3875) UF specimen # not known. 1992-05-22: Approximately 100 plants in vegetative, flowering and fruiting stages.
<b>ANIMALS</b>						
<i>Aphaostracon pycnum</i>	Dense Hydrobe	X		7/18/1968	Shallow, quiet pools along spring run in water lettuce & hyacinths; over soft ooze bottom in clear water w/ large patches of varied aquatic plants	Type locality, only known eo; type specimens in UM (see b68tho01). F.G. Thompson also collected specimens 1968-07-18 (UF 27209).
<i>Aramus guarana</i>	Limpkin	X		1980	Run emanates from first magnitude artesian spring with average discharge of 204 cubic m/min; average width, 100 m. Submerged vegetation includes vallisneria and sagittaria. Adjacent forest includes live oaks and cabbage palms. floating mats of eichornia,	Population (<40 birds) seems to be somewhat stable for 25-year period (1955-1980). Although Ingalls recorded 40 birds in 1971 in headspring area, species no longer occurs there, probably as result of loss of submerged vegetation and pomacea. during 1979-
<i>Drymarchon couperi</i>	Eastern Indigo Snake		X	1981-11	No general description given	Indigo observed by Connie Dickard in Nov 1981 (Moler interview of Dickard, 1981-12-07).
<i>Gopherus polyphemus</i>	Gopher Tortoise		X	7/26/1994	On a roadside cut surrounded by mesic hardwood forest.	Only one active burrow seen.
<i>Pituophis melanoleucus mugitus</i>	Florida Pine Snake		X	11/2/1948	In typical scrub.	DOR coll. 2 nov. 1948 by W. Auffenberg (#3214) and Wm. Penn (UF-19590).
<i>Procambarus delicatus</i>	Big-cheeked Cave Crayfish	X		6/1/1974	Karst cave associated with sink-spring-run system; spring 60 to 70 m across; cave opens via several vents at 5 m depth, branches to small room and fissure, but cave system inaccessible to divers. Springs are surrounded by cypress, cabbage palm, hardwoods	At least three specimens collected from spring boils or bottom of pool: 1 female, usnm 144848, collected 1973-08-04 by D. Blody & K. Relyea; 1 form ii male, usnm 145578, collected 1974-06-01 by K. Bankowski & K. Relyea; 1 form ii male (holotype, usnm 218



LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
Pteronotropis welaka	Bluenose Shiner	X		9/25/1976	Spring-run stream.	40 specimens collected from 1949-1976. Specific collection data include: 1) Alexander spring run. 1976-09-25: n=6, T. J. Timmons and K.J. Foote; 2) Alexander spring run, Aster park. date unknown: n=4, uf6251, D.L. Taber and M. T. Huish; 3) Alexander sp
Ursus americanus floridanus	Florida Black Bear		X	1986	Creek swamp upslope into oak scrub.	freq. sign from 1970's to 1986.
<b>NATURAL COMMUNITIES</b>						
	Aquatic Cave	X		ZZ	No general description given	Karst sink-spring-run system; spring 70 m across; cave opens at 5 m depth, branches to small room & fissure, but cave system inaccessible to divers.

# Florida Natural Areas Inventory



**TABLE 5. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR APOPKA SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
<i>Warea amplexifolia</i>	Clasping Warea		X	3/21/1991	Xeric oak community along e side of abandoned railroad berm. Oaks present include <i>Quercus virginiana</i> , <i>Q. incana</i> , and <i>Q. laevis</i> . herbs present include <i>Polygonella fimbriata</i> , <i>Pitiopsis microcephala</i> , and <i>Andropogon</i> spp. <i>Rhus coppalina</i> also present.	ca. 50 seedlings observed over ca. 1-acre area.
<b>ANIMALS</b>						
<i>Ardea alba</i>	Great Egret		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1976-06, 1977-04, 1977-05 1978-06 (20-50 nesting pairs 1976-1978--U82NES01), 1987 06-18 and 1988-06- 23. Not observed 1978-05.
<i>Drymarchon couperi</i>	Eastern Indigo Snake		X	10/5/1991	Hydric hammock	One 5-foot long road-killed individual collected by Mark Ludlow.
<i>Egretta caerulea</i>	Little Blue Heron		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1977-04, 1977-05, 1978-05, 1978-06 (6-25 nesting pairs 1977-1978--U82NES01), and 1988-06-23. Not observed 1976-06 and 1987-06-16.
<i>Egretta thula</i>	Snowy Egret		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1976-06, 1977-04, 1977-05, 1978-06 (2-75 nesting pairs 1976-1978--U82NES01), and 1988-06-23. Not observed 1978-05 and 1987-06-16.

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
Egretta tricolor	Tricolored Heron		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1977-04 (6 nesting pairs--U82NES01) and 1988-06-23. Not observed 1976-06, 1977-05, 1978-05, 1978-06, and 1987-06-16.
Eudocimus albus	White Ibis		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1977-04 (2 nesting pairs--U82NES01), 1987-06-16, and 1988-06-23. Not observed 1976-06, 1977-05, 1978-05, and 1978-06.
Plegadis falcinellus	Glossy Ibis		X	6/23/1988	Colony site is two islands in marsh; habitat surrounding colony is marsh grass and water; nesting substrate is red maples and wax myrtle over water (U82NES01).	Species present 1977-04 (10 nesting pairs--U82NES01), 1987-06-16, and 1988-06-23. Not observed 1976-06, 1977-05, 1978-05, and 1978-06.
<b>NATURAL COMMUNITIES</b>						
	Bog	X		1973?	Floating islands with bay trees	No comments given.

# Florida Natural Areas Inventory

**TABLE 6. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR BLUE SPRING (VOLUSIA)**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Aphaostracon asthenes	Blue Spring Hydrobe	X		ZZ	Blue Sprgs is a large spring w/ wide, deep spring run that flows w ca. 1/4 mi to the St. Johns river. Spring boil nearly devoid of rooted veg.,but run has thick growth of aquatic plants.	Snail found only in spring run where plants and bottom debris were very sparse. Specimens rare.
Cincinnatia parva	Blue Spring Siltsnail	X		2/8/1975	Lg spring, ca 100' diam., steep bank. water clear.spring run ca 0.4 mi long,to St. John's river. Aquatic vegetation thick. pool & run bottom--silty sands & gravel over soft limestone.	Most abundant in spring run near spring, on vegetation, debris, & gravel. not in lower half of spring run(b68tho01). type: ummz 216530, 1962-04-21, F.G. thompson; paratypes: ummz 216531(500), ansp 301537(30), usnm 636934 (100).
Crotalus adamanteus	Eastern Diamondback Rattlesnake		X	12/14/1994	Overgrown scrub (.335).	1994-12-14: one snake observed crossing park drive; sky overcast, temp. 65-75 f. (u94smi01).
Gopherus polyphemus	Gopher Tortoise		X	1984	In sand pine scrub, south boundary of park.	No pop. survey, but numerous.
Trichechus manatus	Manatee	X		1992	Natural spring and spring-run stream. Spring-run is unvegetated with aquatic vascular plants.	Up to 50+ manatees utilize this area in the winter. Palis and Knight observed an estimated 40-50 manatees in spring run on 20 jan 1992 during a cold snap.
<b>NATURAL COMMUNITIES</b>						
	Scrub		X	1984	No general description given	Dominated by sand pine with understory of sand live oak, myrtle oak & chapman's oak. sparse ground cover of lichens, etc. (u83pro01). herbs.

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
	Spring-run stream	X		ZZ	Bordered by lowland hammock & swamp forest w/ steep wooded slopes except for lower se bank. Spring-run stream flows 0.2 mi. s then 0.2 mi sw to St. Johns river.	1st magnitude sprg. nearly circular w/ 33 m dia., 3 m high banks. Funnel-shaped pool has limestone ledge at 3 m & max. depth of 14 m. Water w/ cloudy blue-green appearance & h2s odor. Width from 23-33m average discharge 162 cubic ft. per second.
	Upland mixed forest		X	1984	Mesic hammock throughout central n-s strip of area (see map from u83pro01).	Dominated by live oak, laurel oak, cabbage palm, southern magnolia, & sweetgum, w/ understory of water oak, laurel cherry, & occasionally devils walking stick, w/ partridge berry notable as ground cover (u83pro01).

# Florida Natural Areas Inventory



**TABLE 7. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR BUGG SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Aramus guarauna	Limpkin		X	12/15/1994	A spring-fed run through a fire-excluded basin marsh.020.	Occasional birds seen along side a spring run in cladium jamaicense cover. long-term residents. 12-15-1994: two sightings of adults foraging - one with two adults and one a solitary sighting.
Neoseps reynoldsi	Sand Skink		X	1994	Ruderal.	1994: only one skink found.
<b>NATURAL COMMUNITIES</b>						
	Spring-run stream	X		1/7/1995	A small basin lake/fire excluded basin marsh successional to basin swamp/young to locally mature basin swamp/mature hydric hammock/mature with occasional old growth mesic hardwood landscape association. It is one of the largest wetland systems in Lake Co.	The flora is difficult to characterize due to its heterogeniety resulting from passing through multiple natural community types. The following are commonly seen along the spring run: sagittaria lancifolia, salvinia minima, hydrocotyle umbellata.



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**TABLE 8. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY  
BUFFERS FOR DELEON SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
<i>Illicium parviflorum</i>	Star Anise	X		1988	No general description given	No comments given



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**TABLE 9. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY  
BUFFERS FOR MESSANT SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>NATURAL COMMUNITIES</b>						
	Scrub		X	9/22/1994	Oak scrub (u81cox01). Small shrub or scrubby flatwood remnants within a large pastured ranch. These are probably remnants of a former mechanical removal of shrub oaks (f94ree01).	1-2 m oaks (u81cox01). Stunted oak with <i>Serenoa repens</i> as the predominating ground cover (f94ree01).





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**TABLE 10. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY  
BUFFERS FOR MIAMI SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
Illicium parviflorum	Star Anise		X	1986	Floodplain; pond ash.	Large, well-established population.
<b>ANIMALS</b>						
Buteo brachyurus	Short-tailed Hawk		X	7/18/1981	No general description given	1981-07-18: 1 dark phase bird. Reference: American Birds 35(6) 932-934.
<b>NATURAL COMMUNITIES</b>						
	Wet flatwoods		X	1984-	Below mesic flatwoods, above hydric hammock	Mostly pond pine, some loblolly pine; fetterbush, grasses.

# Florida Natural Areas Inventory



**TABLE 11. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR PALM SANLANDO STARBUCK SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Cincinnatia ponderosa	Sanlando Spring Siltsnail	X		8/14/1962	Circular spring pool, ca 30' diam, enclosed by wall, w/ opening to w to lg pond; pond has 2 outlets, forming runs, which flow into Little Wekiva river; pool, run, river have sand/gravel bottoms	Abundant in the spring & Little Wekiva river to ca 500 yds below the spring runs. Snails most abundant on vegetation, also common on sand & gravel. (b68tho01). F. Thompson collected specimens 1962-08- 14 (uf20228).
Procambarus acherontis	Orlando Cave Crayfish	X		1974-01	Sulfurous spring enclosed by concrete retaining wall forming a small bathing pool (60 x 20 ft. deep); small crack vent (4 x 1 ft.) on pool bottom leads into submerged karst cave.	Unstable pop. (p87fra01) Crayfish found lying in algae on bottom of pool, & also on one of the walls of the vertical crack leading into the cave. 1944: 3 repro. males, 13 non-repro. males, 12 females, 9 imm. males, 7 imm. females. No ovigerous females.
<b>NATURAL COMMUNITIES</b>						
	Aquatic cave	X		1974-01	Sulfurous spring, enclosed by concrete retaining wall forming a small bathing pool. Walls and bottom covered by thick algal growth. Pool 60 x 20 ft. deep.	Submerged karst cave; small crack vent (4 ft x 1 ft) opens into bottom of old cement-walled swimming pool.



# Florida Natural Areas Inventory



**TABLE 12. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY  
BUFFERS FOR ROCK SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Caecidotea sp. 1	Rock Springs Cave Isopod	X		ZZ	Karst aquatic cave/spring run system in an area of the state that has undergone extensive suburban development in recent decades.	Species has been collected only from this cave. No specific data available; contact Dick Franz for data. Specimen in USNM.
<b>NATURAL COMMUNITIES</b>						
	Aquatic Cave	X		ZZ	Karst aquatic cave/spring run system in an area of the state that has undergone extensive suburban development in recent decades.	Karst aquatic cave emanating from aquifer and giving rise to Rock Springs. Head spring lies in wooded ravine. Cavern is at base of 17-foot high limestone bluff; opening is 5 feet wide at mouth. In 1972 a steel grating restricted access to the cavern. Spr



# Florida Natural Areas Inventory



**TABLE 13. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY  
BUFFERS FOR SEMINOLE SPRINGS**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Cincinnatia vanhyningi	Seminole Spring Siltsnail	X		11/29/1963	Springs (headwaters of Seminole Crk) are in 2 deep ravines. Emerge from caverns at base of steep banks, form small pools. Run also fed by small boils. bottom gravel, sand, vegetation.	Snails most abundant on vegetation in spring run & pools (b68tho01). 1963-11-29: collection by F. Thompson from spring no. 2.
Gopherus polyphemus	Gopher Tortoise		X	6/21/1994	A longleaf pine plantation that is kept open by brushhogging.	Numerous active burrows in newly brushhogged area, as viewed from along paved road.
Grus canadensis pratensis	Florida Sandhill Crane		X	6/1/1905	No general description given	ca. 2-3 pairs in 1979, maybe more N. and E. of here.
Ursus americanus floridanus	Florida Black Bear		X		Black bear primary range as defined by FWC.	

# Florida Natural Areas Inventory



**TABLE 14. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR SILVER SPRINGS**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
<i>Digitaria floridana</i>	Florida Crabgrass		X	5/21/1993	Grassy field, some encroachment by bahia.	Several thousand individuals (one large clonal group?) dominate this open area.
<i>Euphorbia commutata</i>	Wood Spurge		X	5/1/1985	Mesic hammock along silver river, on knoll protruding into floodplain. simon states elsewhere that it is not a shell mound.	[None given on herbarium label]
<i>Matelea floridana</i>	Florida Spiny-pod		X	5/22/1963	Semi-sunny, flat, upland, cutover forest of quercus, fraxinus, carya, magnolia grandifolia, and serenoa. soil ph = 5.1 in upper 25 cm.	About 10 plants here, most near the small sand road, flower petals maroon.
<i>Sideroxylon alachuense</i>	Silver Buckthorn		X	4/11/1985	1985-04-11: a peninsula with a hill at the end which sticks out into floodplain.	1985-04-11: six rather large plants (simons).
<i>Spigelia loganioides sensu stricto</i>	Pinkroot		X	6/23/1994	Gradual slope, mixed hardwood forest, mostly shaded.	Scattered groups of individuals, flowers and fruit observed. 1993: Scattered individuals observed in flower. 1994: 15+ individuals observed in flower.
<i>Spigelia loganioides sensu stricto</i>	Pinkroot		X	5/21/1993	Margins of open grassy areas and into forest.	50-100 individuals found in scattered clumps along forest margins.
<i>Spigelia loganioides sensu stricto</i>	Pinkroot		X	5/21/1993	Margins of open grassy areas and into forest.	50-100 individuals found in scattered clumps along forest margins.
<b>ANIMALS</b>						
<i>Alligator mississippiensis</i>	American Alligator	X		9/19/1991	Spring-fed river through hydric hammock.	> 8 observed along 0.5 mi. stretch of river.
<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake		X	1953-08-00	No general description given	1953-08-00: Specimen collected (s53quiuc).
<i>Gopherus polyphemus</i>	Gopher Tortoise		X	ZZ	no general description given	Spec (um-108491), collector n/a, date n/a.
<i>Lasiurus cinereus</i>	Hoary Bat		X	10/27/1975	no general description given	Museum specimen #13927 fsm collected by T. Zinn, 1975-10-27.

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
Mustela frenata olivacea	Southeastern Weasel		X	1/3/1970	No general description given	Museum specimens: sm #08707, collected by W. McCormick, 1970-01-03; sm no #, collected by R. Allen, 1946-12-17; sm no # collected by D. Boyer, 1946; sm #00828 collected by R. Allen, 1941.
Mustela frenata peninsulae	Florida Long-tailed Weasel		X	1/3/1970	No general description given	1970-01-03: W. McCormick - skeleton. Fla. Mus. Nat. Hist. no. 8707.
Stilosoma extenuatum	Short-tailed Snake		X	10/26/1970	no general description given	3 fsm specimens (uf-81, 2 uncat.), 5 October 1933, 1 November 1965 & 26 October 1970). first two collected by unknown persons, 3rd by H.W. Campbell.
<b>NATURAL COMMUNITIES</b>						
	Floodplain swamp	X		5/21/1993	Forest w/ trees of variable sizes. Cypress up to 61.8" 5' up.	Major tree spp. bald cypress, blackgum, pop ash, florida ash, red maple. panicum gymnocarpon groundcover in places.
	Spring-run stream	X		5/21/1993	37 miles.	No EO data given
	Upland mixed forest		X	ZZ	Loblolly pine forest w/ grassy to shrubby understory. on " gumbo" soil, phosphatic clay w/ shell. old growth. mgt. includes burning.	No eo data given
	Upland mixed forest		X	ZZ	Hardwood forest similar to n shore of Silver River (ctn0000000.005). selectively cut?	Major canopy spp. swamp chestnut oak, hackberry, sweetgum, shumard oak, winged elm, laurel oak, white ash, cabbage palm, pignut hickory, magnolia w/ understory including hornbeam, blue palmetto, & grass chasmanthium sessiliflorum.

# Florida Natural Areas Inventory



**TABLE 15. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR SILVER GLEN SPRING**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>PLANTS</b>						
<i>Vicia ocalensis</i>	Ocala Vetch	X		7/7/1992	No general description given	A good population.
<b>ANIMALS</b>						
<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake		X	1995-04-00	Bottomland hardwood-pine.	1995-04-00: One snake observed, ca. 3.5 ft. long, 2.5 inches in diameter (U95LOW07).
<i>Procambarus attiguus</i>	Silver Glen Springs Crayfish	X	X	8/16/1990	Aquatic karst cave; water emerges from aquifer into a semicircular pool, then flows eastward as a wide spring run to Lake George and St. Johns River. Main cave entrance is at 6.5 m depth on ne side of spring pool; tight passage leads to large rooms.	Crayfish have been found in a large room that begins 213 m from entrance; specimens sequestered in small crevices in the walls. Others may have been on cave ceiling, and still more were on floor. Specimens collected by Tom Morris on 6 Feb and 16 Aug 1990
<i>Sceloporus woodi</i>	Florida Scrub Lizard		X	10/3/1953	No general description given	3 spec. (ncsm-8924-26) coll. 3 oct. 1953 by A.F. Carr et al.
<i>Trichechus manatus</i>	Manatee	X		6/10/1905	Natural spring and spring-run stream.	Up to 5 manatees utilize this site as a temporary refuge in early and late winter.
<b>NATURAL COMMUNITIES</b>						
	Aquatic Cave	X		8/16/1990	Aquatic karst cave; water emerges from aquifer into a semicircular pool, then flows eastward as a wide spring run to Lake George and St. John's River. Main cave entrance is at 6.5 m depth on ne side of spring pool; tight passage leads to large rooms.	icmal14f70 present in substantial numbers. Other cave fauna includes unidentified amphipods plus chubs, shrimps, striped bass, crabs, and eels.

# Florida Natural Areas Inventory



**TABLE 16. ELEMENT OCCURRENCE RECORDS FOR PRIMARY AND SECONDARY BUFFERS FOR WEKIWA SPRINGS**

LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
<b>ANIMALS</b>						
Aphaostracon monas	Wekiwa Hydrobe	X		5/18/1980	Spingrs form pool ca. 120 ft. diam. bottom of pool & beginning of sprg run covered w/ fine sand. Spring run is ca. 75' wide x 3' deep. algae on rocks in pool. Spring run has thick veg. mats	Element found in Wekiva springs to ca. 1 mi below springs. Snails generally distributed on submerged plants, rocks, & gravel in & around the area of the springs; Nowhere abundant.
Buteo brachyurus	Short-tailed Hawk		X	7/18/1981	No general description given	1981-07-18: 1 dark phase bird. Reference: American Birds 35(6) 932-934.
Cincinnatia wekiwae	Wekiwa Siltsnail	X		5/18/1980	Kidney-shaped spring pool(200' x 100') w/ 2-3' retaining wall;60' wide,3' deep,run flowing nw; discharge from 5 caverns below surface;sand bottom;pool has plant clumps; mats in run.	Abundant on aquatic vegetation, very scarce on sand bottom, in spring pool & run for short distance beneath pool (b68tho01). On algae on wall & to lesser extent onalgae & plants (undtho01). type: ummz 216503,1963-08-22; paratypes: ummz 216504(150 ), *
Crotalus adamanteus	Eastern Diamondback Rattlesnake		X	8/28/1992	Longleaf pine-turkey oak forest, upland hardwood forest, and mesic flatwoods.	1992-08-28: Ca. 3-3.5' long adult observed near office. 1992-04-11: Ca. 4' long adult observed near Main Park Drive. 1992-02-17: Ca. 18" long adult observed near Wekiwa Springs Road. 1992-02-11: Ca. 4-4.5 long adult observed on Pine Island. 1991-09-23: C
<b>NATURAL COMMUNITIES</b>						



LATIN NAME	COMMON NAME	BUFFER		DATE OBSERVED	DESCRIPTION	COMMENTS
		PRIMARY	SECONDARY			
	Spring-run stream	X		ZZ	Flow is ne to St. Johns river. "River swamp lines streams, then grades into hydric hammock". Home to florida scrub jay, otters, & tortoises.	Spring is ca 66 m long & 33 m wide w/ stream width to 20 m. Discharge from 5 horizontal caverns 5 m below surface. Vent ca 2 m wide & 5 m below surface. Limerock & sand bottom w/ aquatic beds.
	Wet flatwoods		X	1984-	Below mesic flatwoods, above hydric hammock	Mostly pond pine, some loblolly pine; fetterbush, grasses.

## **Bibliography**

Florida Natural Areas Inventory and Florida Department of Environmental Protection. 1990. *Guide to the Natural Communities of Florida*. Florida Natural Areas Inventory, Tallahassee.

Florida Natural Areas Inventory. 2001. *Report on the rare and endemic species of the St John's River Water Management District*. Special report to the St. Johns River Water Management District.

Muller, J. W., D. E. Hardin, D. R. Jackson, S. E. Gatewood and N. Caire. 1989. *Summary report on the vascular plants, animals and plant communities endemic to Florida*. Florida Fish and Wildlife Conservation Commission, Nongame Wildlife Program Technical Report No. 7, Tallahassee. 113 p.

## APPENDIX 1

### EXPLANATION OF FNAI GLOBAL AND STATE CONSERVATION RANKS

Florida Natural Areas Inventory (FNAI) defines an element as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the global rank, which is based on an element's worldwide status, and the state rank, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

#### GLOBAL RANK DEFINITIONS

- G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or human factor.
- G2 Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or human factor.
- G3 Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors.
- G4 Apparently secure globally (may be rare in parts of range).
- G5 Demonstrably secure globally.
- GH Occurred historically throughout its range, but has not been observed for many years.
- GX Believed to be extinct throughout range.
- GXC Extirpated from the wild but still known from captivity or cultivation.
- G#? Rank uncertain (e.g., G2?).
- G#G# Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
- G#T# Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species, and the T portion refers to the subgroup; T# has same definition as G#.
- G#Q Ranked as species but there is some question as to whether it is a valid species.
- G#T#Q Same as above, but validity as subspecies or variety is questioned.
- GU Global rank unknown; due to lack of information, no rank or range can be assigned.
- G? Temporarily not ranked.

#### STATE RANK DEFINITIONS

State ranks (S#) follow the same system and have the same definitions as global ranks, except they apply only to Florida, with the following additions:

- SA Accidental in Florida and not part of the established biota.
- SE Exotic species established in Florida (may be native elsewhere in North America).
- SX Believed to be extirpated from state.

**APPENDIX 2**  
**EXPLANATION OF FEDERAL AND STATE LEGAL STATUSES**

Provided by FNAI for information only.  
For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUSES

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

- LE      Endangered: species in danger of extinction throughout all or a significant portion of its range.
- LT      Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
- E(S/A) Endangered due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
- T(S/A) Threatened due to similarity of appearance (see above).
- PE      Proposed for listing as Endangered species.
- PT      Proposed for listing as Threatened species.
- C        Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
- XN      Non-essential experimental population.
- MC      Not currently listed, but of management concern to USFWS.
- N        Not currently listed, nor currently being considered for listing as Endangered or Threatened.

FLORIDA LEGAL STATUSES

Animals: Definitions derived from “Florida’s Endangered Species and Species of Special Concern, Official Lists” published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

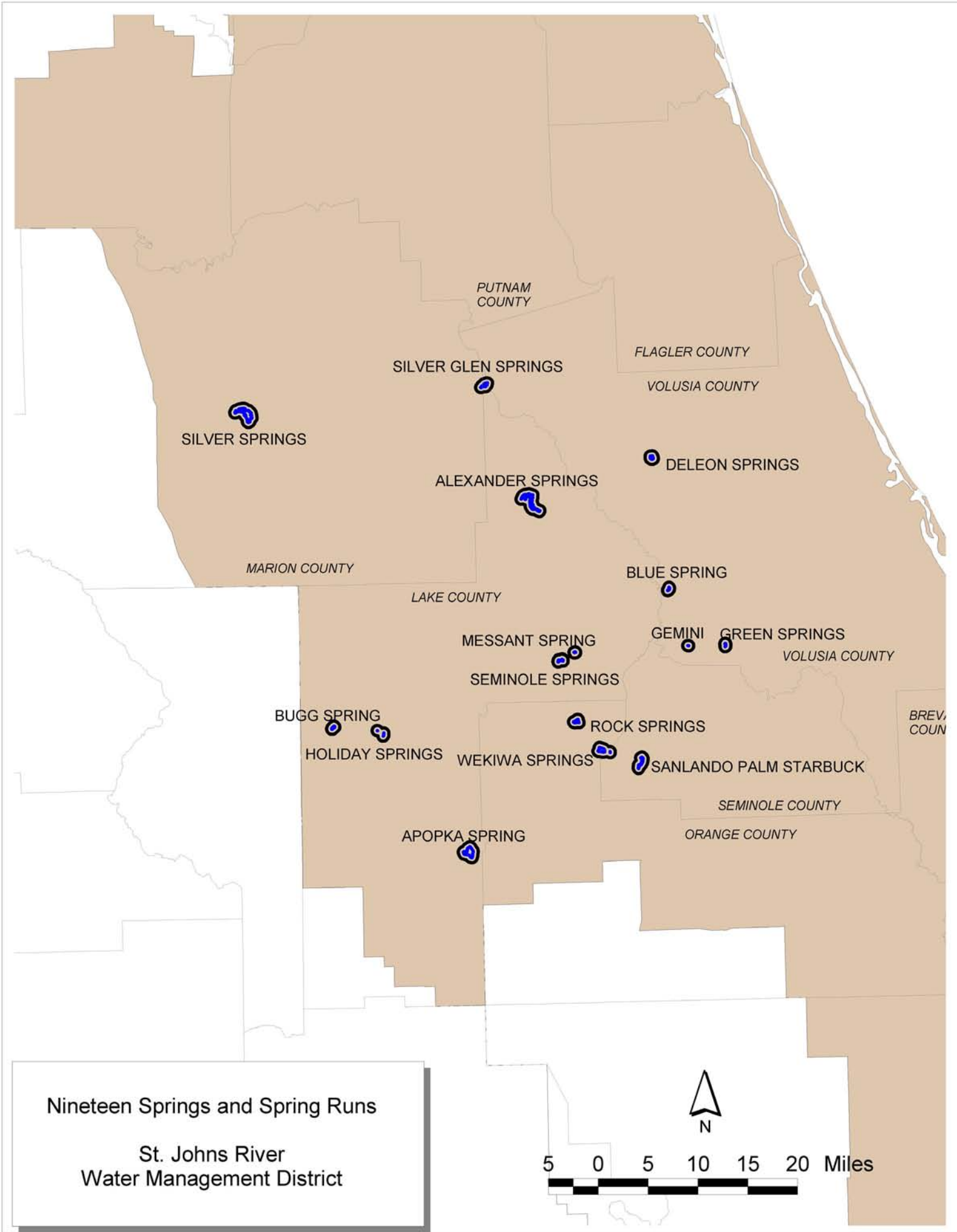
- LE      Endangered: species, subspecies, or isolated population so few or depleted in number or so restricted in range that it is in imminent danger of extinction.
- LT      Threatened: species, subspecies, or isolated population facing a very high risk of extinction in the future.
- LS      Species of Special Concern is a species, subspecies, or isolated population that is facing a moderate risk of extinction in the future.
- PE      Proposed for listing as Endangered.
- PT      Proposed for listing as Threatened.
- PS      Proposed for listing as Species of Special Concern.
- N        Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see <http://doacs.state.fl.us/~pi/5b-40.htm#.0055>.

- LE Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.
- LT Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.
- PE Proposed for listing as Endangered.
- PT Proposed for listing as Threatened.
- N Not currently listed, nor currently being considered for listing.
  
- ZZ The entry “ZZ” is used to indicate that a field has intentionally been left blank.

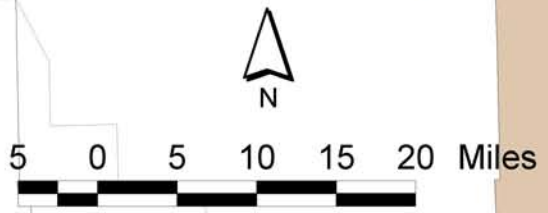
## APPENDIX 3

### Maps

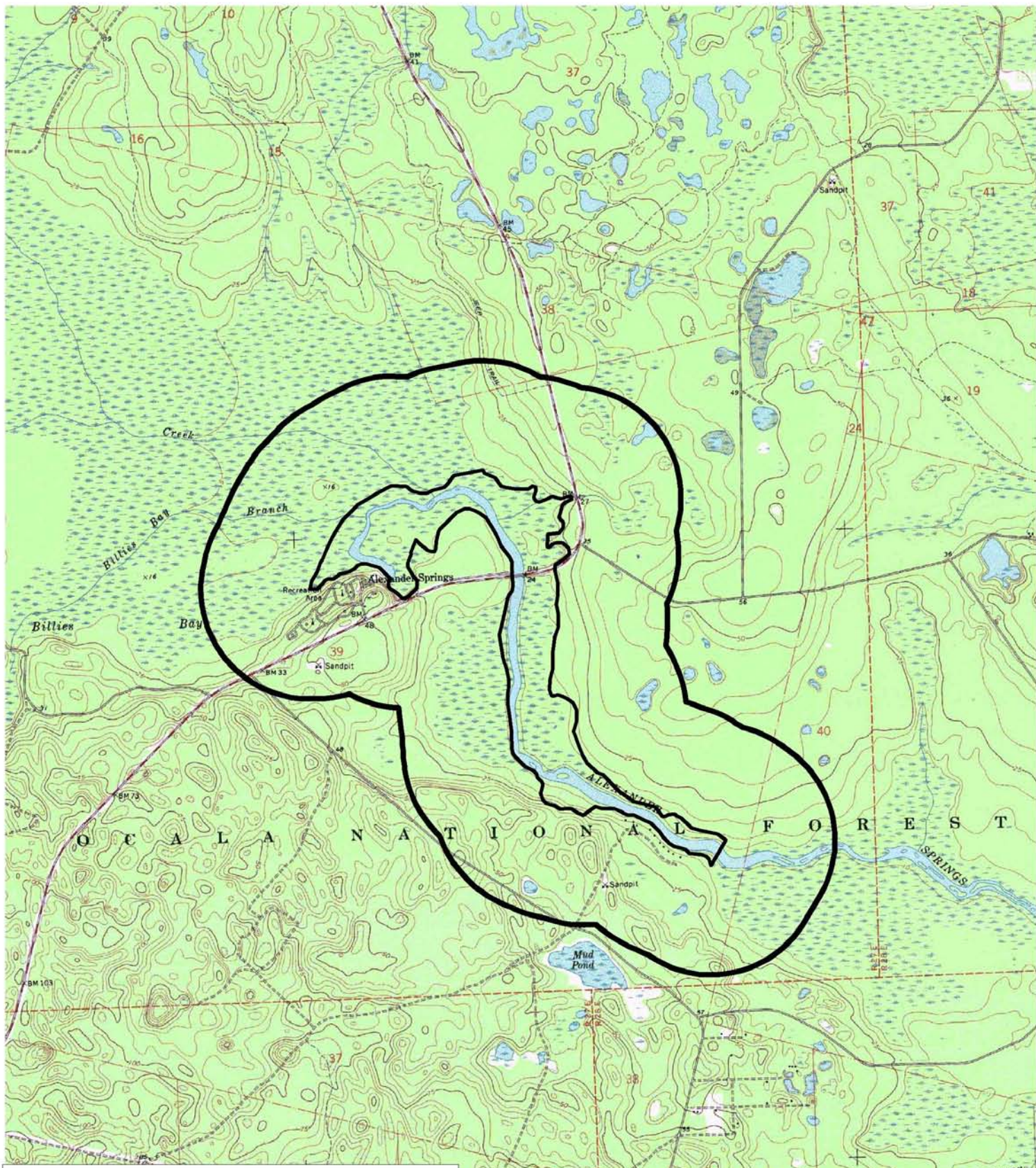


Nineteen Springs and Spring Runs

St. Johns River  
Water Management District







Alexander Springs and Spring Run  
Primary and Secondary Buffer

Lake County





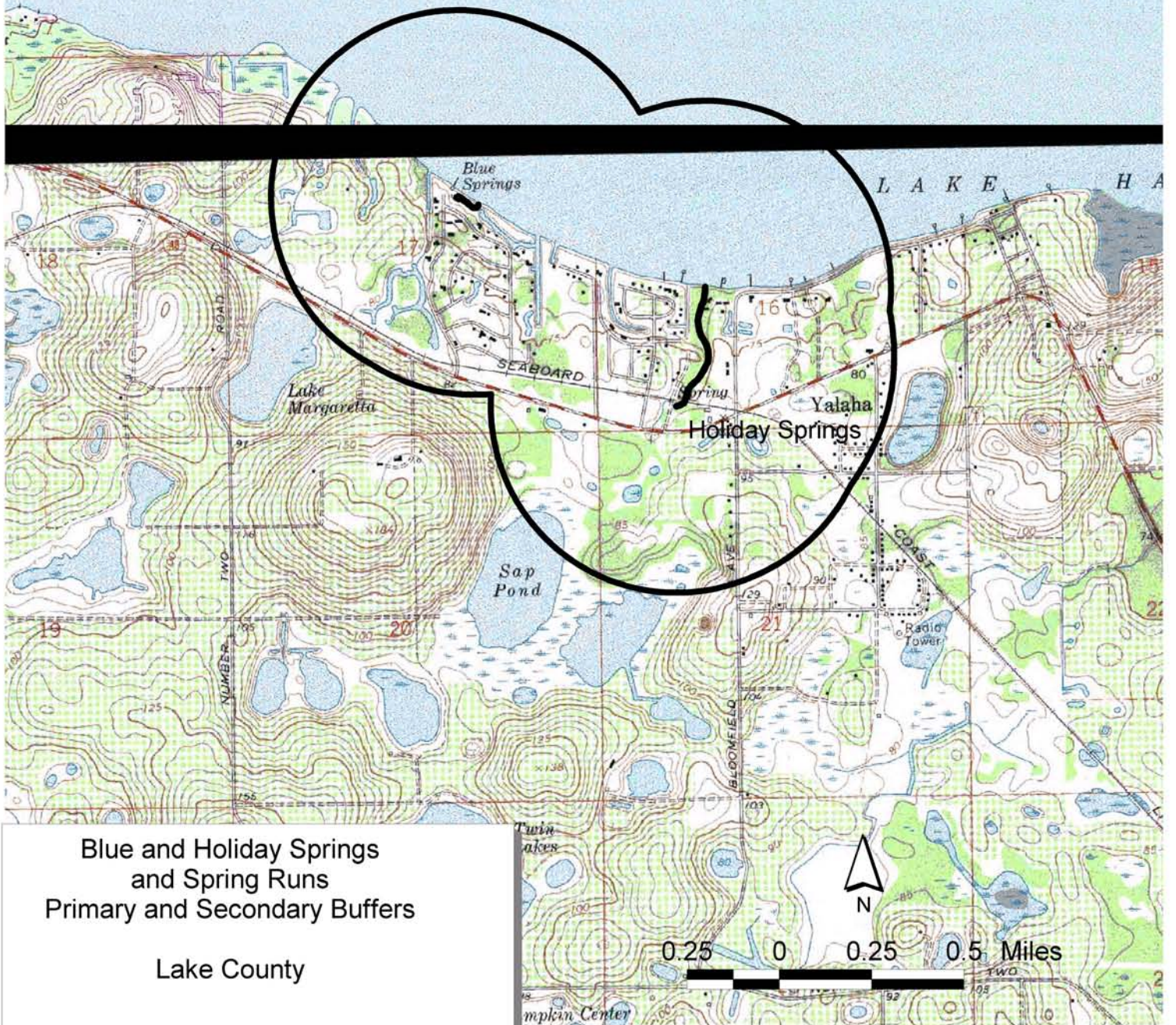




L A K E

H A L L I N G

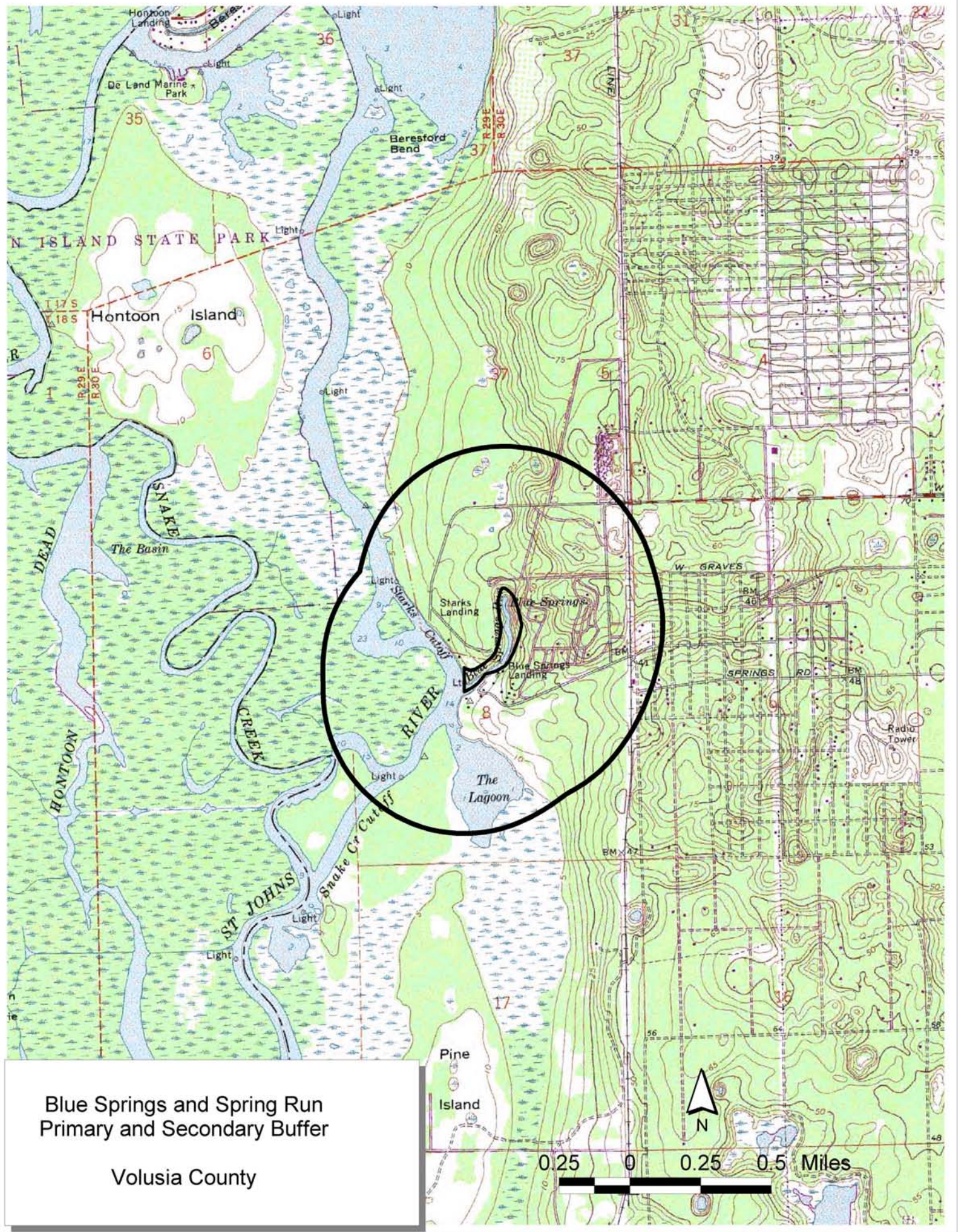
ELEVATION 63



Blue and Holiday Springs  
and Spring Runs  
Primary and Secondary Buffers

Lake County

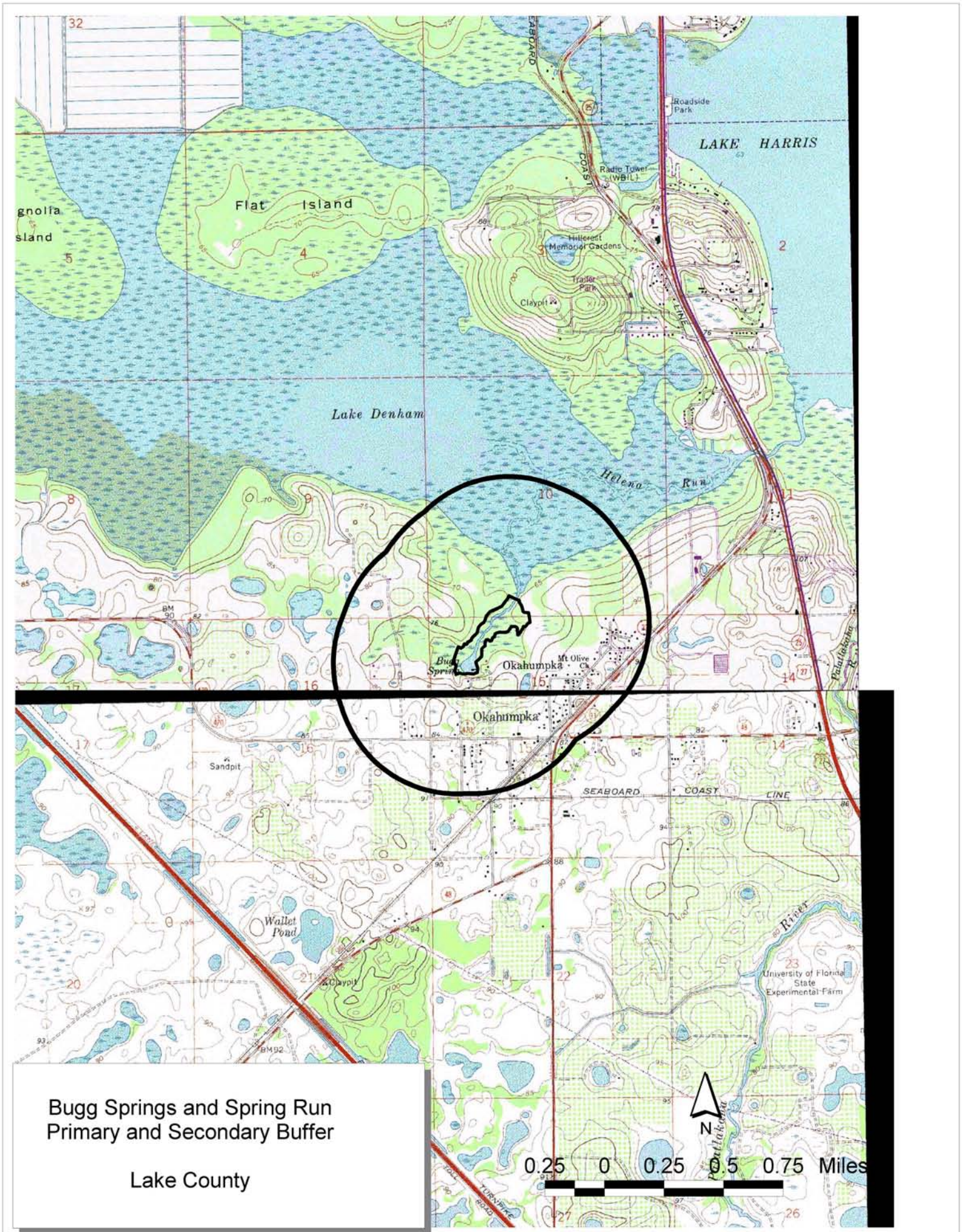




Blue Springs and Spring Run  
Primary and Secondary Buffer

Volusia County



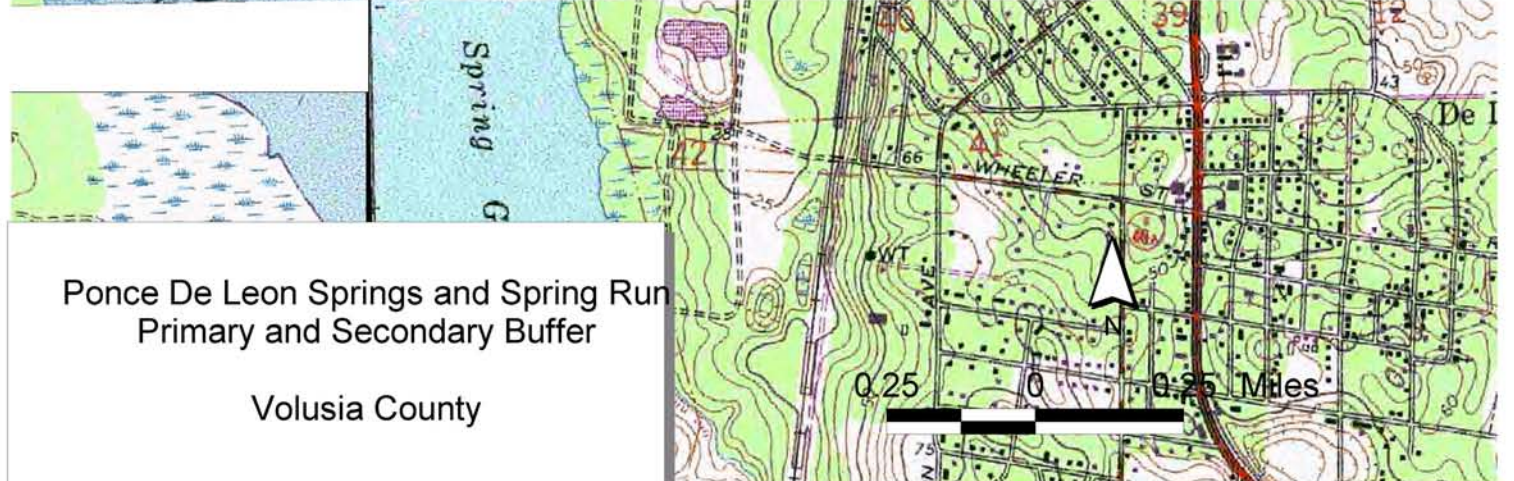
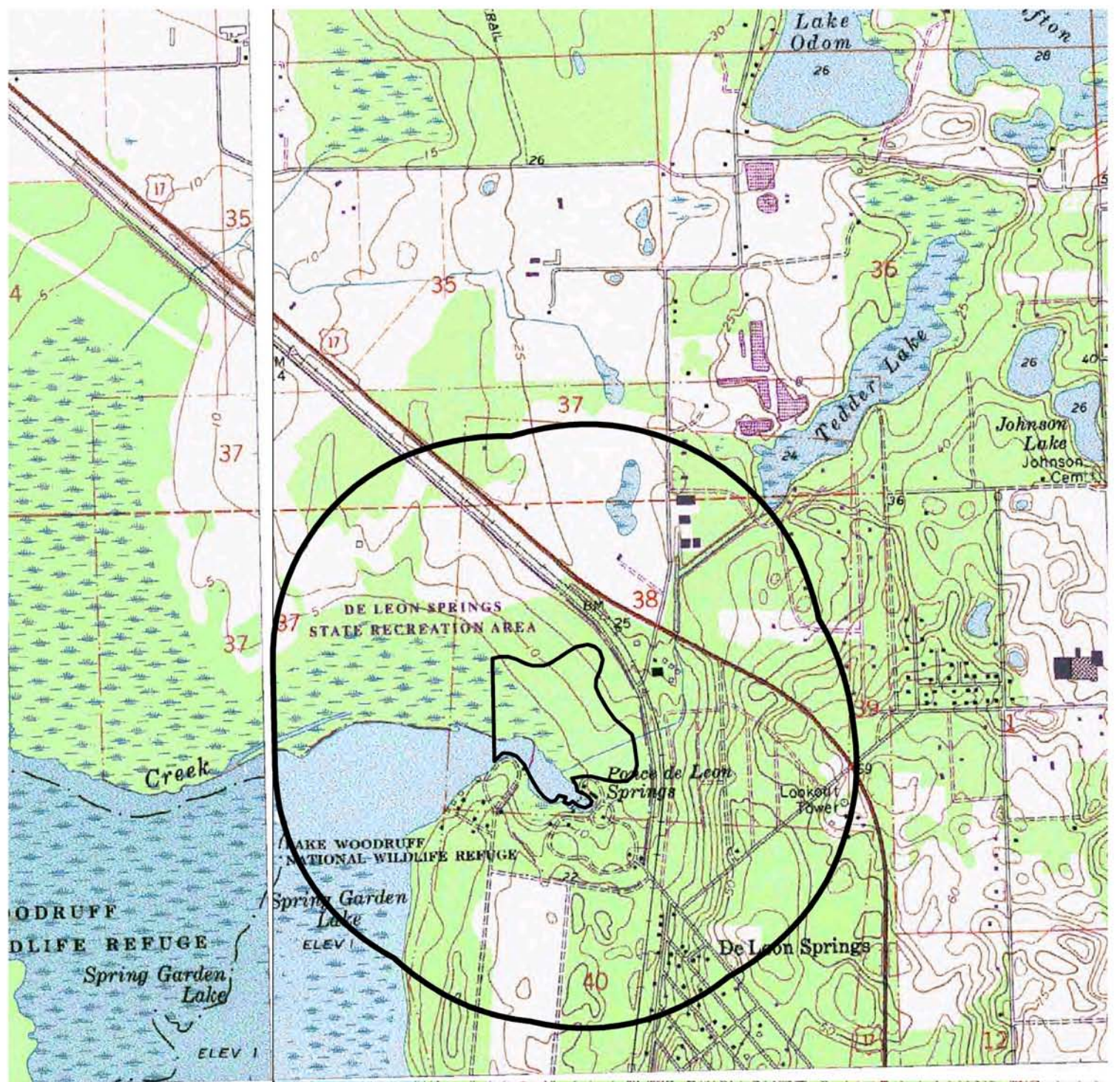


Bugg Springs and Spring Run  
Primary and Secondary Buffer

Lake County

0.25 0 0.25 0.5 0.75 Miles

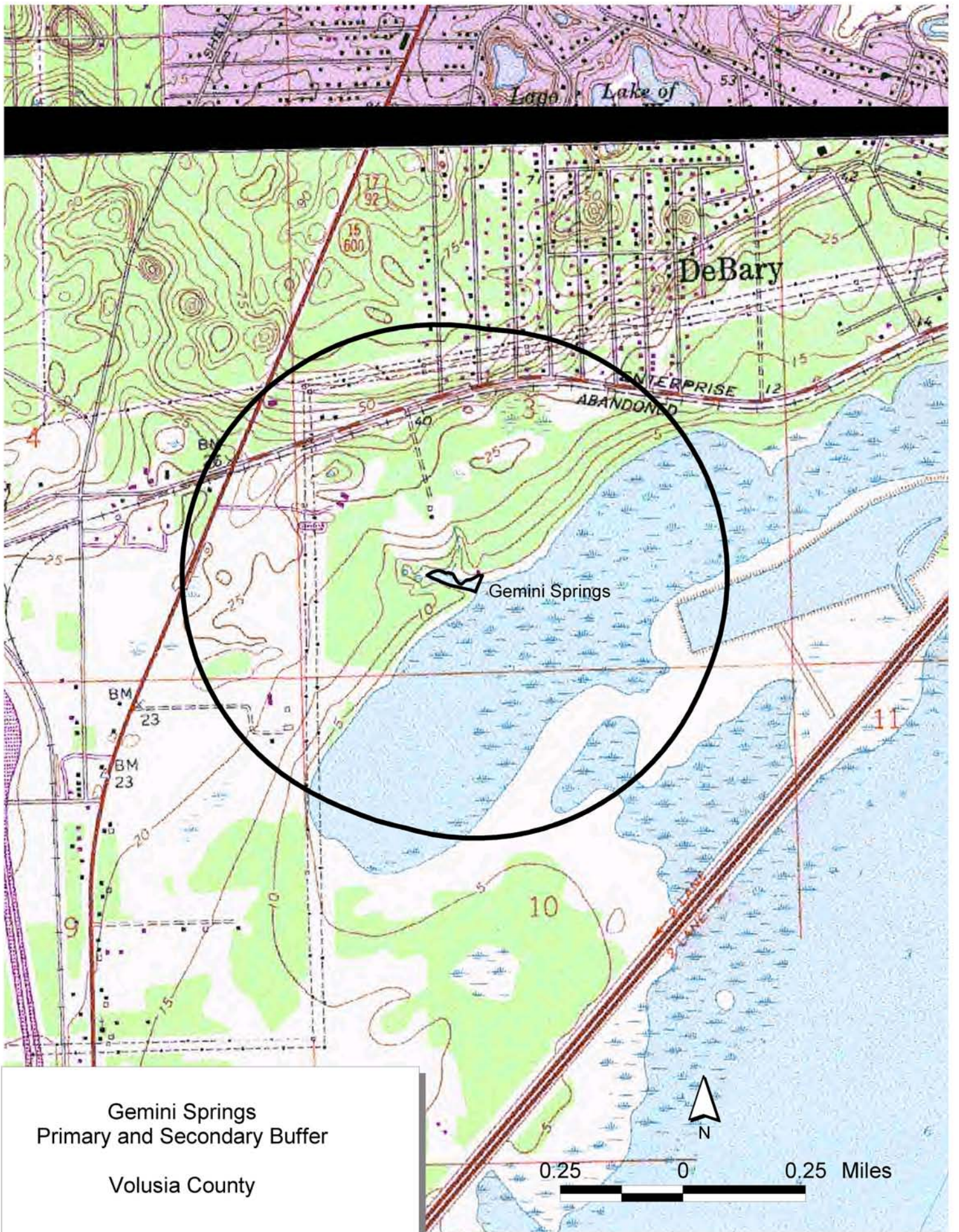




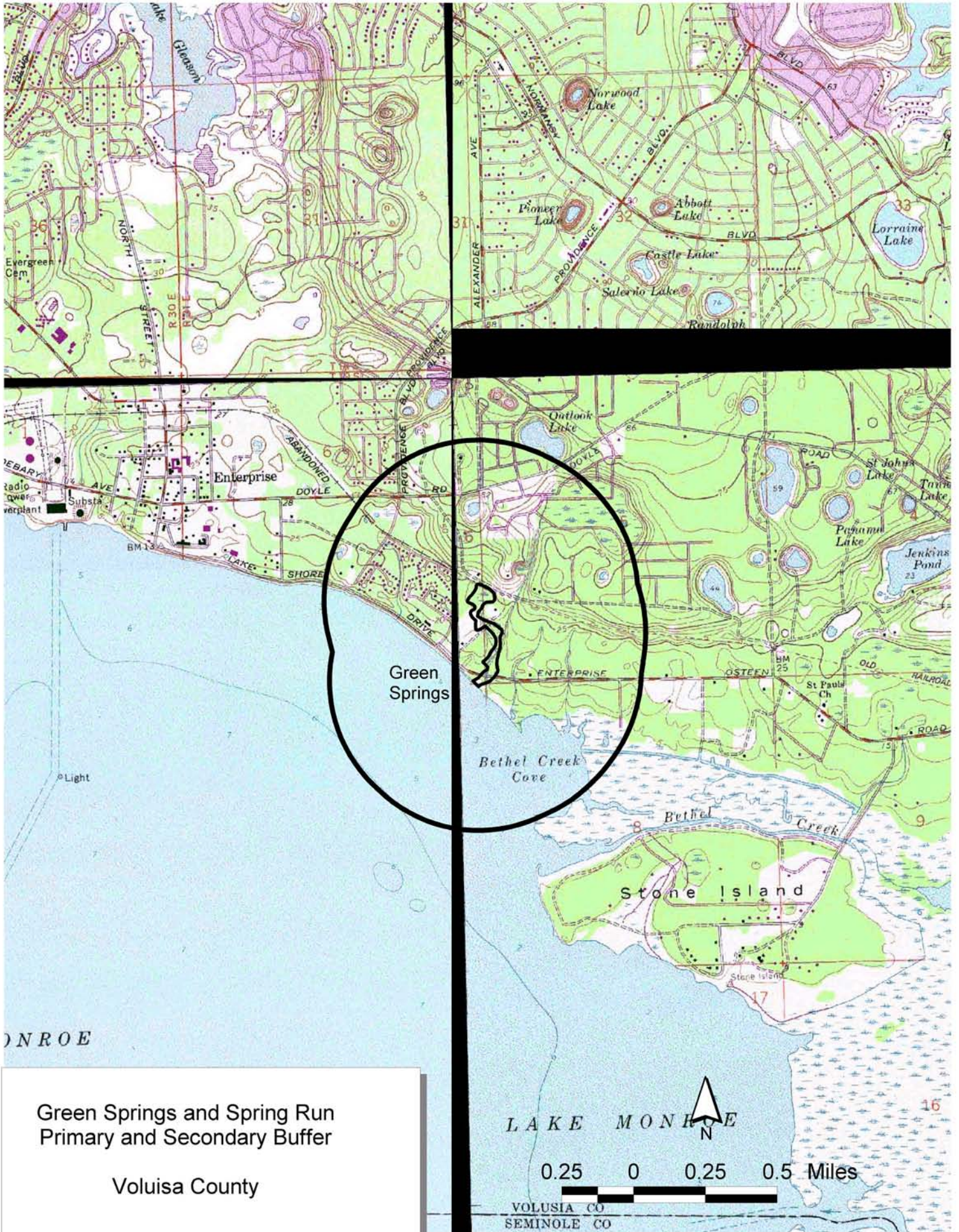
Ponce De Leon Springs and Spring Run  
Primary and Secondary Buffer

Volusia County









ON ROE

Green Springs and Spring Run  
Primary and Secondary Buffer

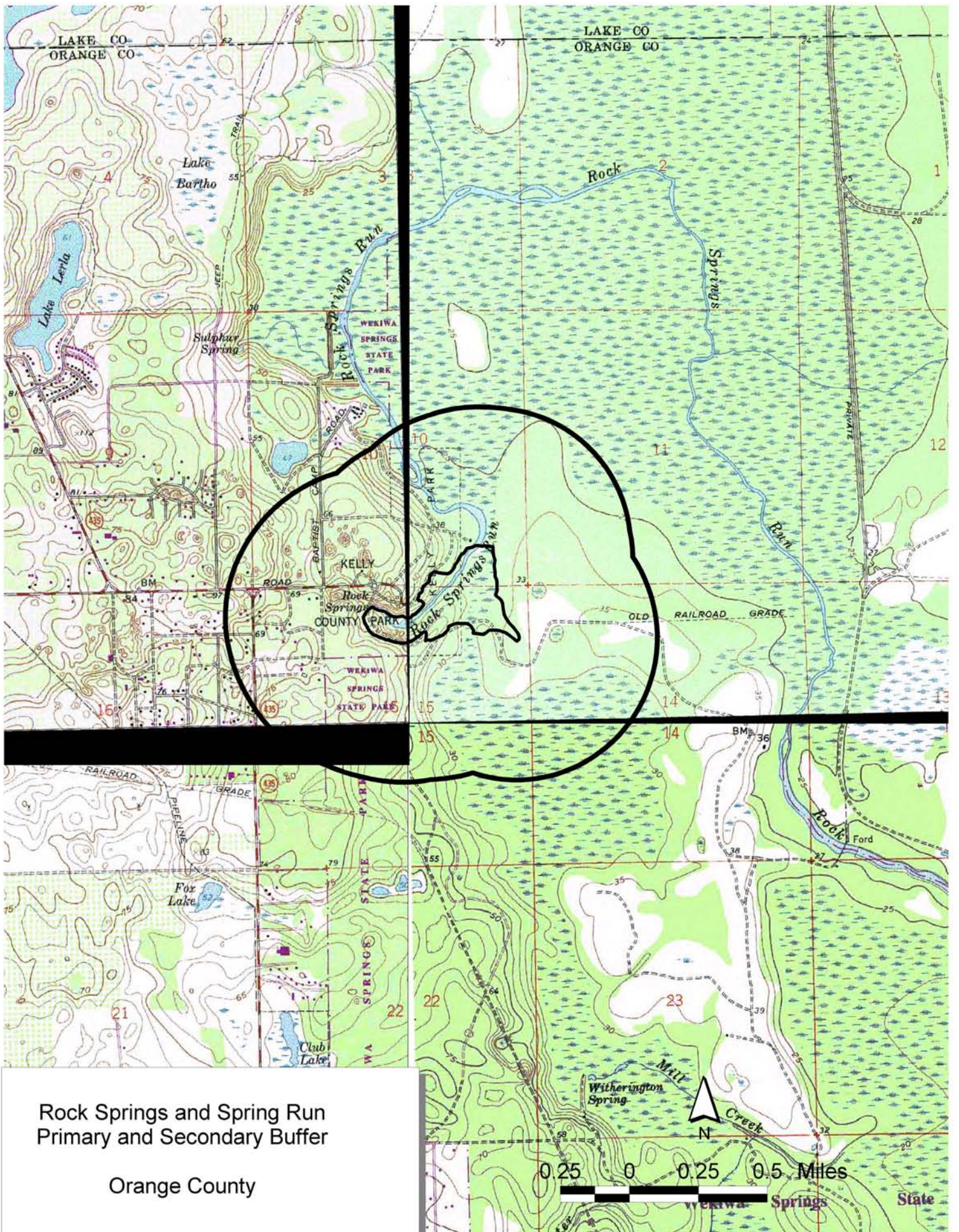
Volusia County

LAKE MONROE

0.25 0 0.25 0.5 Miles

VOLUSIA CO  
SEMINOLE CO

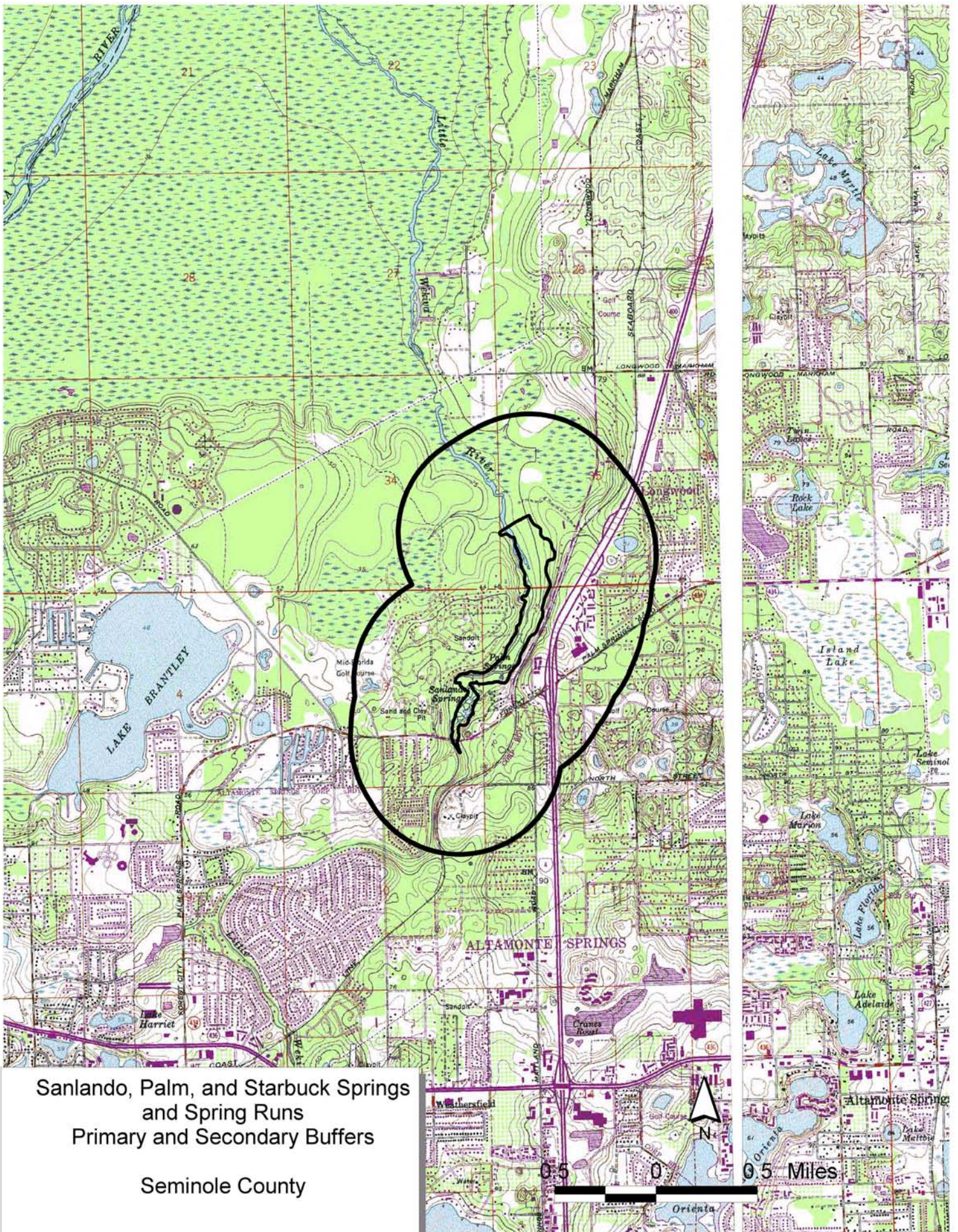




Rock Springs and Spring Run  
Primary and Secondary Buffer

Orange County



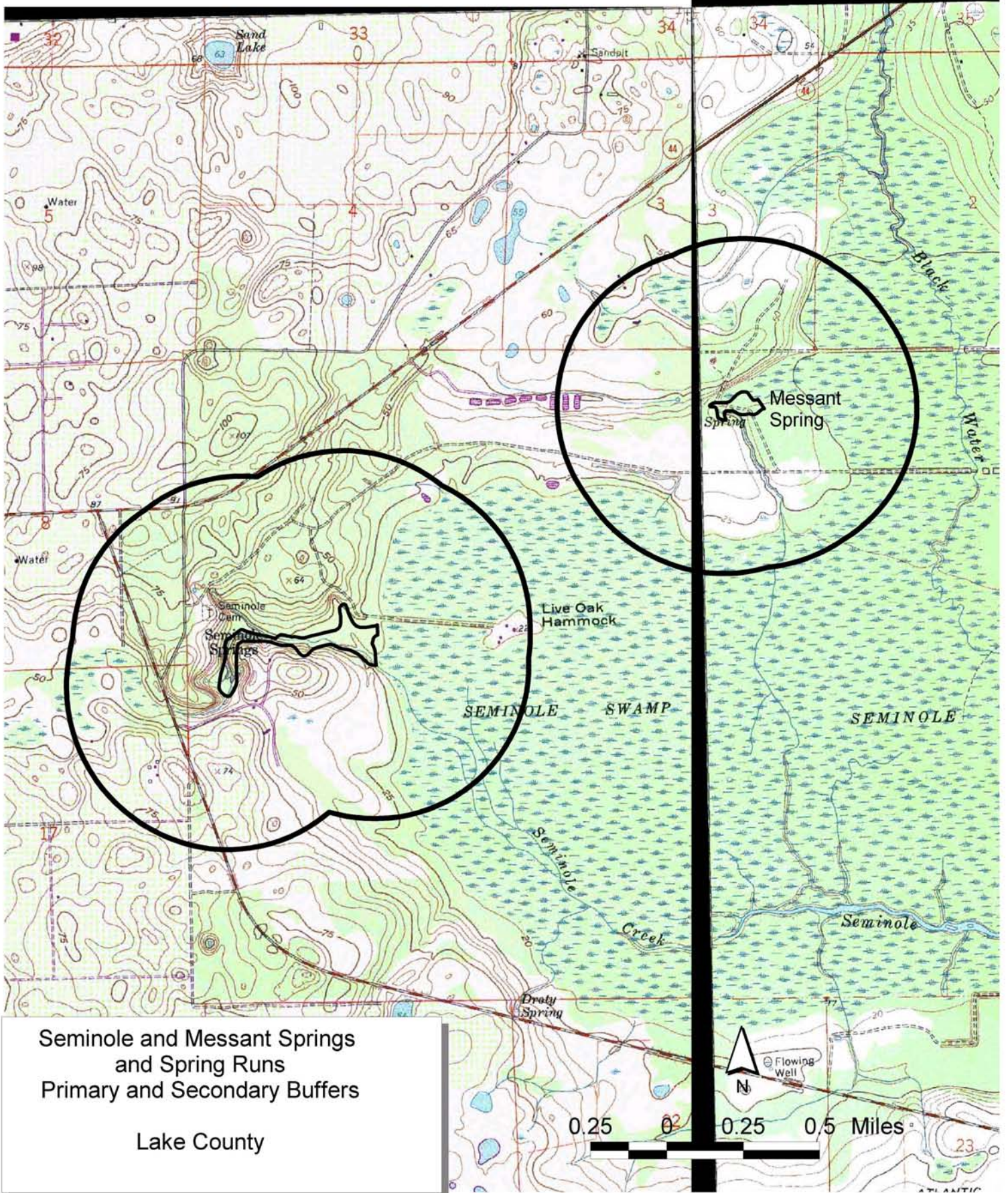


Sanlando, Palm, and Starbuck Springs  
and Spring Runs  
Primary and Secondary Buffers

Seminole County

0.5 0 0.5 Miles



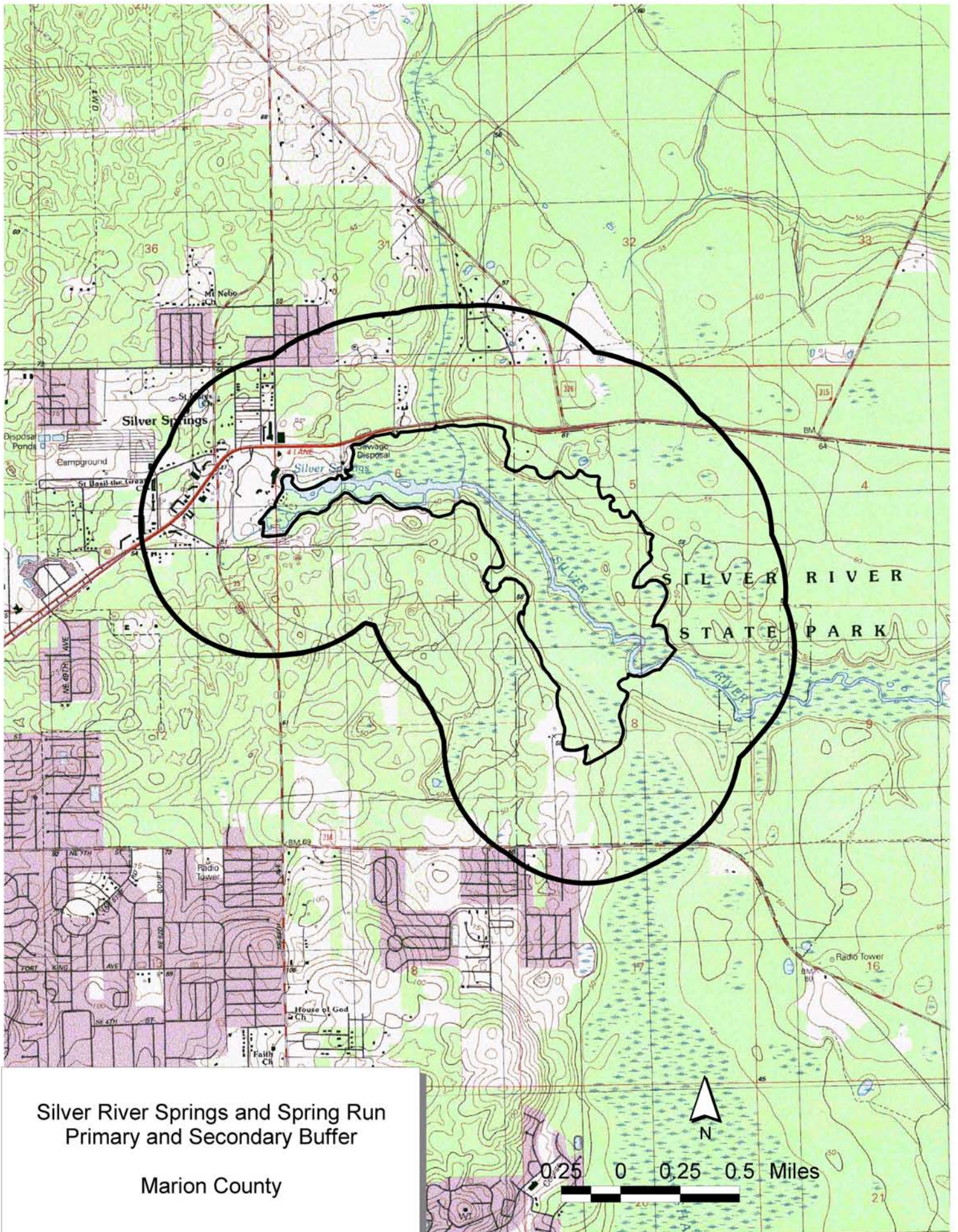


Seminole and Messant Springs  
 and Spring Runs  
 Primary and Secondary Buffers

Lake County

0.25 0.25 0.5 Miles





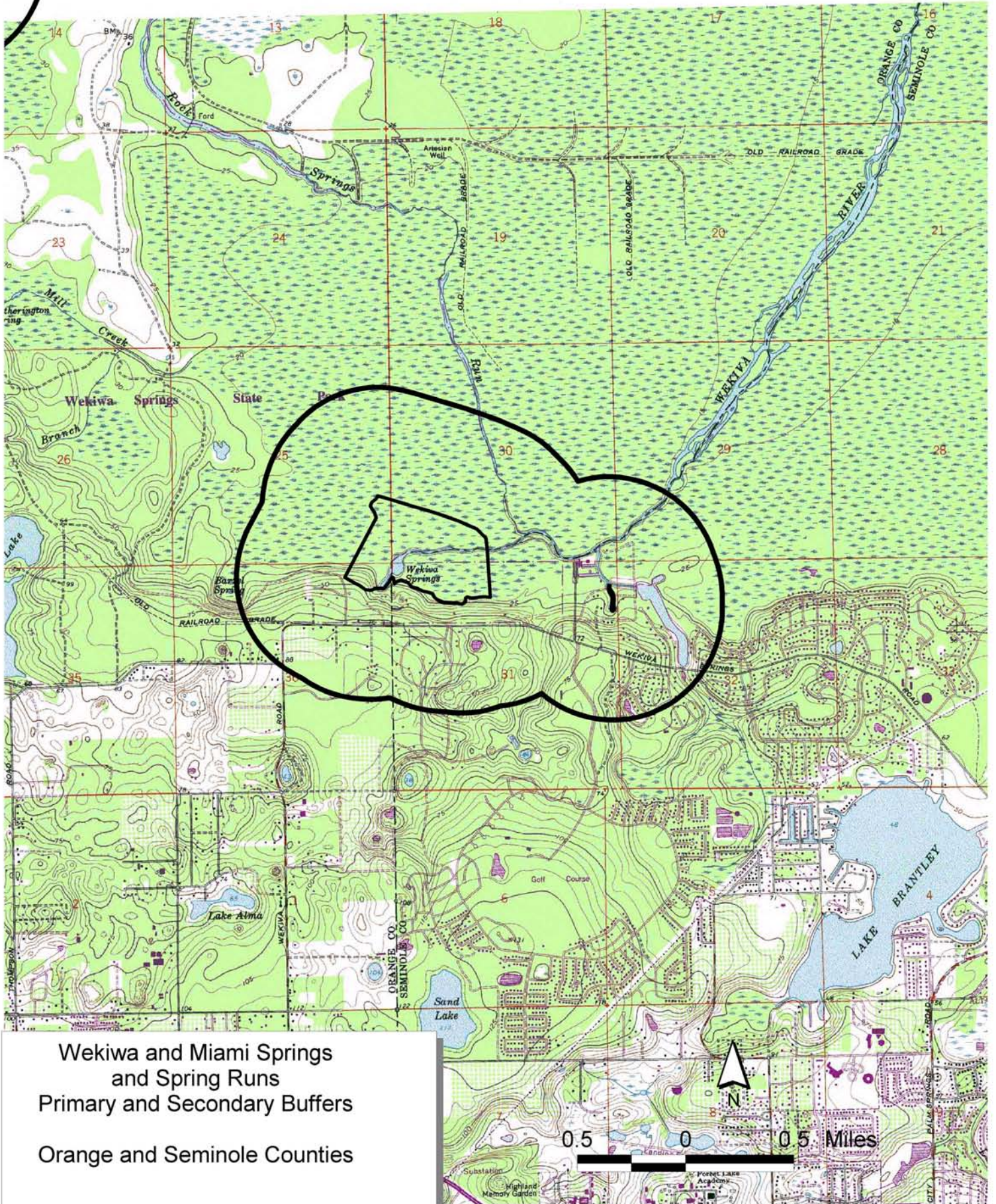




Silver Glen Springs and Spring Run  
Primary and Secondary Buffer

Marion, Lake, and Volusia Counties





Wekiiva and Miami Springs  
and Spring Runs  
Primary and Secondary Buffers  
Orange and Seminole Counties