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AN EVALUATION OF BENTHIC MACROINVERTEBRATE DATA FROM 20 SURFACE WATER SITES WITHIN THE LOWER ST. JOHNS RIVER BASIN, 2002–2003

An Evaluation of Benthic Macroinvertebrate Data from 20 Surface Water Sites Within the Lower St. Johns River Basin, 2002 - 2003

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1 Introduction

The State of Florida created the St. Johns River Water Management District (SJRWMD) in 1972, and authorized it to protect and preserve the state's water resources. Additional authority was provided by the state, through the Surface Water Improvement and Management (SWIM) Act of 1987, to restore and protect the Lower St. Johns River Basin (LSJRB). In response to these directives, SJRWMD developed the LSJRB - SWIM Plan, with the goals to (1) restore and protect the basin's surface water quality to meet or exceed Florida Class III water standards, and to (2) restore and protect the natural systems associated with the basin's surface water. To achieve these goals, there is a need for additional information on the LSJRB benthic community structure. This information can be used to guide and prioritize restoration efforts.

Benthic macroinvertebrate communities are influenced by their environment and can serve as indicators of water and sediment quality. Benthic invertebrates are particularly useful as biological indicators because many are stationary and unable to avoid stressful environmental conditions. Changes in benthic invertebrate assemblages also may affect other biological communities. Because benthic macroinvertebrates provide an important food resource for many types of fish, invertebrate abundance and diversity can influence fisheries production. Because of the potential usefulness of benthic invertebrate data in making water resource management decisions, a preliminary survey of the benthic invertebrate communities in specific areas of the Lower St. Johns River and its tributaries was conducted from March through August 2000 (Evans and Higman 2001). A second supplemental benthic invertebrate survey was conducted from October 2002 through August 2003. SJRWMD retained Water & Air Research to conduct laboratory analysis of the supplemental benthic macroinvertebrate samples and to evaluate the supplemental data collected at each of 20 surface water sites sampled in 2002 and 2003. This report presents a preliminary evaluation of the 2002 and 2003 supplemental data.

2 Methods

2.1 Description of Sampling Locations

Locations of 20 sampling sites within freshwater and estuarine rivers and streams of the Lower St. Johns River Basin in northeast Florida are depicted in Figures A-1 and A-2 of Appendix A. These 20 benthic sampling locations were selected because sediments in these locations were known or suspected to be contaminated. Sediment samples were collected along with the benthic invertebrate samples at these 20 locations and analyzed for contamination. Station identification code, site location, collection dates, collection times, and latitude/longitude coordinates are presented in Table 1.

2.2 Laboratory Analysis, Data Tabulation, and Benthic Community Metrics

SJRWMD staff recorded instantaneous field measurements of water temperature, dissolved oxygen, conductivity and salinity at the 20 locations. Typically, measurements were taken at approximately 50 cm below the water surface. These data were entered into the SJRWMD database and the salinity and dissolved oxygen data were submitted to Water & Air Research for inclusion in this report.

Four replicate petite Ponar grabs were collected from each site and preserved in the field. Samples were not composited. Samples were analyzed in Water & Air's biological laboratory in accordance with Water & Air's Quality Assurance Manual (#900322). This plan addresses sample

logging/tracking/custody, verification of sorting completeness, accuracy of taxonomic identification, verification of data entry, and other processes.

Each grab sample was sorted independently in the laboratory and organisms were identified to the lowest practical identification level and enumerated. Gross morphological deformities in chironomid menta and ligulae were recorded during organism identification. The number of deformed chironomid larvae and the percent occurrence of morphological deformities were calculated for each taxon in which deformities were observed. Although exposure to sediment contaminants may result in deformities in benthic invertebrates other than the Chironomidae, such deformities are not known to have been demonstrated or documented in readily available literature.

After all samples were processed and organisms were identified and enumerated, data were tabulated and the following benthic community metrics were calculated: total organism density, number of taxa, Shannon-Wiener species diversity, and the number and percent occurrence of deformities in chironomid larvae, pollution-tolerant taxa and salt-tolerant taxa. In addition a composite benthic sediment quality index (CBSI) was calculated for each sampling location. This Index was specifically developed by Water & Air Research staff (Evans et al. 2004) for estuarine portions of the LSJRB and is based on two metrics, Shannon-Wiener species diversity (SWDI) and the total number of taxa (NTAXA), using the following equation:

$$CBSI = 2SWDI + NTAXA$$

The CBSI is inversely correlated with a sediment hazard index derived from threshold effects concentrations applicable to Florida estuaries (MacDonald et al. 2000). This inverse relationship is based on significant Spearman's rank correlations. Values of CBSI below 14 corresponded to medium to high sediment contamination hazard risk. CBSI values of 14 and above corresponded to low sediment hazard risk (Evans et al. 2004).

2.3 Site Evaluation and Classification

Sites were evaluated based on four metrics: total organism density, number of taxa, Shannon-Wiener species diversity, and the degree of dominance by pollution-tolerant taxa. Based on best professional judgement, using Shannon-Wiener species diversity and the degree of dominance by pollution-tolerant taxa, the assessed sites were placed into the following two classes:

Class A – moderate diversity (2.0 to 3.0, SWDI value); pollution-tolerant taxa moderately dominant to dominant (10 to 100 percent).

Class B – low diversity (<2.0, SWDI value); dominated by pollution-tolerant taxa (> 40 percent).

2.4 Impairment Ranking of Sites

Benthic invertebrate data collected during this assessment were used to rank and categorize the sites by degree of impairment. Sites were ranked according to the degree of biological impairment based on best professional judgment using a combination of the site classification and the number of larval deformities. The number of larval deformities per site was chosen as the criterion representing impairment rather than the percentage of larval deformities per site because the latter measure tends to over-emphasize occurrence of deformities when the number of larvae collected is small (Evans and Higman 2001).

The sites were assigned Impairment Categories as follows:

1. **Moderately Impaired -** Site Class A; No Larval Deformities; Diversity ≥ 2.00; Percent Dominance by Pollution-tolerant Taxa 10 to 100 percent
2. **Moderately Impaired –** Site Class A; One to eight Deformed Larvae; Diversity ≥ 2.00; Percent Dominance by Pollution-tolerant Taxa 10 to 100 percent
3. **Severely Impaired –** Site Class A; More than Eight Deformed Larvae; Diversity ≥ 2.00; Percent Dominance by Pollution-tolerant Taxa > 90 percent
4. **Severely Impaired –** Site Class B; Zero to Eight Larval Deformities; Diversity Index 1.00-1.99; Percent Dominance by Pollution-tolerant Taxa 40 to 100 percent
5. **Very Severely Impaired –** Site Class B; Zero to Eight Deformed Larvae; Diversity Index < 1.00; Percent Dominance by Pollution-tolerant Taxa 75 to 100 percent
6. **Very Severely Impaired –** Site Class B; Larval Deformities greater than or equal to nine; Diversity Index <2.00; Percent Dominance by Pollution-tolerant Taxa 75 to 100 percent

2.5 Statistical Analysis

Multivariate statistical analyses were performed using Primer 5 for Windows version 5.2.9 (Clarke and Gorley 2001; Clarke and Warwick 2001). Non-metric multidimensional scaling (MDS) was performed on Bray-Curtis similarity matrices (Bray and Curtis 1957) derived from square root transformed station-specific macroinvertebrate abundances. For MDS plots, the stress value displayed indicated how well the two-dimensional plot represented the multidimensional ordination, with lower values indicating a better fit (Clarke and Gorley 2001; Clarke and Warwick 2001). Primer 5 software was used to overlay graphic representations (bubble plots) of biological metric values on sites represented on macroinvertebrate data ordinations (Clarke and Gorley 2001).

Conventional statistical analyses were performed using Minitab release version 13.32 software (Minitab 2000). For parametric one-way Analysis of Variance (ANOVA) performed with Fisher's pair-wise comparison, data were tested for normality using the Anderson-Darling test. Data found to be non-normally distributed were transformed using the Box-Cox procedure. Where a specific p-value is not given, significance was determined at the $p<0.05$ level.

When non-parametric tests (e.g., Spearman's rank correlation tests) were used, analysis was performed on untransformed data. Spearman's rank correlation tests can be used to reveal significant correlations among database variables (Walpole and Myers 1978). The Spearman's rank correlation procedure was used to identify significant relationships of water quality variables with biological metrics, and among macroinvertebrate metrics. Correlations were performed for all biological metrics except organism density, which is derived from organism abundance.

Insufficient data from some of the 20 sites prevented the calculation of certain metrics for these sites (e.g. CBSI). In such cases, sites with missing data were removed from the data set prior to analyses.

3 Results and Discussion

3.1 Species Composition and Community Metrics

Species abundance tables are presented for each sampling site in Appendix B. Table 2 presents a list of taxa collected at the 20 sites. The most diverse taxonomic groups were annelid worms (17 taxa), chironomid larvae (11 taxa), and amphipods (9 taxa).

The 20 sites exhibited wide ranges in organism density (11 to 896 m^{-2}), number of taxa (1 to 15), and Shannon-Wiener species diversity (0.00 to 3.02).

Percent dominance by pollution-tolerant taxa at the sites ranged from 17 to 100 percent (Table 3). Percent dominance was greater than 60 percent at 15 of the 20 sites.

3.2 Morphological Deformities

The presence of deformities indicates the potential presence of contaminants at sub-lethal concentrations. Elevated metal concentrations, particularly lead and copper, can cause deformities and perhaps growth inhibition in *Chironomus* larvae (Janssens de Bisthoven et al. 1992). Some organic compounds (e.g. pesticides) also are hypothesized to induce morphological deformities (Hamilton and Saether 1971, Warwick 1980). Additional information linking deformities to other contaminants was not available at the writing of this report.

Gross morphological deformities in chironomid menta were recorded during organism identification, as previously described in Section 2.2. Percent occurrence of morphological deformities was calculated for each taxon with recorded deformities (Table 4). Morphological deformities occurred at 10 of the 20 sites. Deformities occurred in *Djalmabatista pulchra* and *Coelotanypus* sp. at Racy Point (RACY01), Puerto Rico Cove (PUER01), Palmo Cove (PALM01), Goodby's Creek (GDBY01), Julington Creek (JULC01), Point La Vista (PTLV01), South Side (SSID02), Pirate Cove (PIRC01), South NAS (SNAS02), and Bolles School (BOLL02; Table 4, Figures A-3 and A-4). No deformities were observed at the remainder of the sampling locations.

Where deformities were observed, percent occurrence within the deformed taxa ranged from approximately 22 percent to 100 percent. As presented in Table 4, the highest numbers of deformed larvae were collected at SNAS02=23, JULC01=12, PALM01=12, and SSID02=7. A total of 76 percent of the total number of deformities (54 of 71 recorded) were observed at these sites, suggesting presence of metals or other contaminants (Janssens de Bisthoven et al. 1992). Sediment and water quality data could also be evaluated to reveal possible relationships between contaminant concentrations and the frequency of morphological deformities.

3.3 Site Evaluation and Classification

Based on community metrics, sites were placed into two classes, Class A with moderate diversity and Class B with low diversity, as described in Section 2.3. This evaluation revealed 13 Class A and 7 Class B sites (Table 3). The following sites located on the mainstem of the St. Johns River were designated Class B: Point La Vista (PTLV01), Bolles School (BOLL02) Orangedale (ORAN02), Green Cove (GRNC02), Pirate Cove (PIRC01), and South NAS (SNAS02; Figures A-5 and A-6). Doctors Lake (DRLK01), a lake connected to the mainstem, also was designated Class B (Figure A-6).

Mean values for organism density, number of unique taxa, diversity (SWDI), percent dominance of pollution-tolerant organisms, and the percentage of total deformities within Classes A and B are

presented in Table 5. Class ranges and means for organism density, number of taxa, and Shannon-Wiener species diversity are depicted in Figures 1, 2, and 3, respectively. Organism density can be highly variable depending on the type of environmental stress imposed on the benthic community. Low diversity and low organism density with a high dominance of pollution tolerant taxa at some Class B sites may be due to low dissolved oxygen and/or presence of toxic contaminants. Conversely, other Class B sites with high organism densities in combination with low species diversity and a moderate to high dominance of pollution tolerant taxa may be primarily affected by low dissolved oxygen and high organic loading (BOLL02; Figures 1 and 3, Table 3). Sites in Class A with a moderate level of diversity perhaps are influenced by mechanisms similar to those hypothesized for Class B sites, but to a lesser degree (Figure 3, Table 3).

3.4 Impairment Ranking

For decision-making purposes related to water resource management, it is useful to evaluate the data to estimate which of the sites can be considered impaired and which sites are relatively unimpaired. Simply stated, "Where are biological impacts most apparent?" To answer this question additional information is necessary (e.g. water quality, sediment type and quality), but due to the limited scope of this project task, these variables were not included in this preliminary data report. Only the benthic invertebrate data collected during this assessment were used to evaluate and rank the sites according to the estimated degree of impairment. Following the ranking process, each site was assigned an Impairment Category as described in Section 2.4. All of the sites were considered to be impaired to some degree (Table 6).

Sites that are biologically impaired tend to have the following characteristics: low numbers of taxa, low Shannon-Wiener diversity values, abundant pollution-tolerant taxa, and/or a relatively high number of deformed chironomid larvae. Eleven of the 20 sites were given a moderately impaired ranking (see Impairment Categories 1 and 2) because these sites typically had a moderate diversity index (> 2.00), low to high dominance of pollution-tolerant taxa, and few or no deformed larvae. The remaining nine sites had greater impairment. The six severely impaired sites (see Impairment Categories 3 and 4) typically had a low to moderate species diversity, moderate to strong dominance of pollution-tolerant taxa, and a wide range (0 to 12) in the number of deformed chironomid larvae. The very severely impaired sites (see Impairment Categories 5 and 6) either had a diversity index less than 1.00 with less than nine deformed chironomid larvae, or had a diversity index value lower than 2.00 with nine or more deformed chironomid larvae (Table 6). Very severely impaired sites were dominated by pollution-tolerant taxa. Site locations by Impairment Category are depicted in Figures A-7 and A-8.

Impairment Category 1: Seven of the eleven moderately impaired sites without chironomid larvae deformities were assigned to Impairment Category 1 (Table 6). Mandarin (MAND02), Baptist Hospital (HOSP02), Moccasin Slough (MOCC02), Trout River (TROT02), Broward River (BROW01), Dunn River (DUNR01), Clapboard Creek (CLAP01). The first three sites were located in the mainstem of the St. Johns River and the latter four sites were located in tributaries dominated by salt-tolerant fauna (Figures A-7 and A-8).

Impairment Category 2: Two to seven deformed chironomid larva were recorded at the four remaining moderately impaired sites. These sites were assigned to Impairment Category 2. Goodby's Creek (GDBY01), South Side (SSID02), Puerto Rico Cove (PUER01), and Racy Point (RACY01). Site GDBY01 was located in Goodby's Creek, a tributary of the St. Johns

River dominated by freshwater fauna. The remaining three sites were located along the mainstem of the St. Johns River (Figures A-7 and A-8).

Impairment Category 3: Twelve deformed larvae were recorded at two of the six severely impaired sites. JULC01 was located near the mouth of Julington Creek, a tributary of the St. Johns River dominated by freshwater fauna. Palmo Cove (PALM01) was located along the mainstem of the St. Johns River (Figures A-7 and A-8).

Impairment Category 4: Zero to three deformed larvae were found at four of the six severely impaired sites: Point La Vista (PTLV01), Bolles School (BOLL02), Orangedale (ORAN02), and Green Cove (GRNC02). All four of the sites in Impairment Category 4 were located along the mainstem of the St. Johns River.

Impairment Category 5: Zero and two deformed larvae were found at Doctors Lake (DRLK01) and Pirate Cove (PIRC01), respectively. DRLK01 was located in Doctors Lake, an oligohaline lake connected to the St. Johns River mainstem. Pirate Cove (PIRC01) was located on the mainstem of the St. Johns River south of the mouth of the Ortega and Cedar rivers.

Impairment Category 6: Twenty-three deformed larvae were recorded at one of the three very severely impaired sites. This site was located in the mainstem of the St. Johns River at South NAS (SNAS02).

Based on this evaluation, the greatest degree of biological impairment was associated with nine sites in Impairment Categories 3, 4, 5, and 6. Most of these sites were located on the mainstem of the St. Johns River: Palmo Cove (PALM01), Orangedale (ORAN02), Green Cove (GRNC02), Doctors Lake (DRLK01), Julington Creek (JULC01), South NAS (SNAS02), Bolles School (BOLL02), Pirate Cove (PIRC01), and Point La Vista (PTLV01; Table 6 and Figures A-7 and A-8). The remaining eleven sites were moderately impaired. No sites were considered to be unimpaired.

Although these results may indicate the degree to which sampled sites were biologically impaired, they do not in themselves identify sources of stress, which may include toxic substances, low dissolved oxygen, poor substrate quality (e.g. flocculent sediments), wide fluctuations in salinity concentration, or a combination of factors.

3.5 Data Analysis

3.5.1 Non-metric Multidimensional Scaling on Bray-Curtis Similarity Matrices

Initial exploratory analysis consisted of non-metric multidimensional scaling (MDS) performed on Bray-Curtis similarity matrices. Sites located on the mainstem of the St. Johns River tended to cluster on the right half of the plot and tributary sites were grouped on the left half (Figure 4).

Figure 5 is a similar MDS plot with bubble size indicating proportional percent abundance of salt-tolerant invertebrate fauna. Sites located in the mainstem of the St. Johns River tended to cluster on right side of plot with the percentage of salt tolerant organisms increasing from the upper right quadrant (freshwater) to the lower right quadrant of the plot (more saline sites). Sites located in tributaries of the St. Johns River tended to cluster on the left side of the plot. No apparent trend was indicated by the MDS relating to the percent of salt-tolerant organisms in the tributaries. Three of these sites were completely dominated (100 percent) by salt-tolerant organisms. These included the tributary sites Broward River (BROW01) and Clapboard Creek (CLAP01) and the connected lake site Doctors Lake (DRLK01). Salt-tolerant organisms also dominated the other two sites Dunn River (DUNR01) and Trout River (TROT02).

These results suggest that mainly salinity and then to a lesser degree other conditions associated with the river mainstem and tributaries, may play important roles in shaping benthic macroinvertebrate assemblages in the Lower St. Johns River Basin. These factors may be acting in conjunction with or independently of the human-induced site conditions that may be causing biological impairment.

3.5.2 Location Class Designation

Since salinity had a significant influence in shaping benthic macroinvertebrate assemblages in the Lower St. Johns River Basin, salinity tolerance was used to classify sample site locations. Consequently, the 20 sites were placed into location classes, in order to compare conditions and key biological metrics. The percent dominance by salt-tolerant taxa was used to place sites in the following location classes (Table 7):

Fresh-dominated Mainstem (FM): FM sites were located in the river mainstem and were dominated (> 50 percent) by freshwater benthic macroinvertebrates.

Salt-dominated Mainstem (SM): SM sites were located in the river mainstem and were dominated (> 50 percent) by salt-tolerant benthic macroinvertebrates.

Fresh-dominated Tributary (FT): FT sites were located in tributaries of the St. Johns River and were dominated (> 50 percent) by freshwater benthic macroinvertebrates,

Salt-dominated Tributary (ST): ST sites were located in tributaries of the St. Johns River and were dominated (> 50 percent) by salt-tolerant benthic macroinvertebrates,

Connected Lake (CL): A single site, DRLK01 was placed in a unique location class (CL) because it was located in Doctors Lake, an oligohaline lake connected to the river mainstem.

3.5.3 Comparison of Sites by Location Class

As expected, mean salinity recorded at the ST sites (19.1 ppt) was significantly higher than mean salinity recorded at FT sites (3.3 ppt) and FM sites (2.3 ppt). Average salinity at respective SM sites ranged from 3.6 ppt at BOLL02 to 10.3 ppt at SSID02 (Table 7). Due to high variability in salinity among the SM sites, mean salinity at SM sites (7.7 ppt) was not significantly different in salinity from other site classes (ST, FM or FT).

ANOVA revealed that mean diversity (SWDI) was significantly higher in salt-dominated tributaries (2.61) than in fresh- (1.90) and salt- (1.97) dominated mainstem sites as shown by the percentage of salt-tolerant organisms ($p<0.05$; Figure 6). The relatively high SWDI values at salt-dominated tributary sites could be a result of more favorable salinity regimes. Review of additional data is needed to determine whether salinity regimes or other water or sediment quality variables may explain the lower species diversity observed at sites in the river mainstem.

The percentage of pollution-tolerant organisms at FM sites (mean = 84.22 percent) was significantly higher than at SM sites (mean = 48.5 percent; Figure 7) but not significantly different from the ST or FT sites. Other indicators of impairment such as SWDI and the number of deformities were not significantly different between the SM and FM sites.

3.5.4 Composite Benthic Sediment Quality Index

Composite benthic sediment quality index (CBSI) values were calculated for estuarine sites (sites influenced by marine waters). Freshwater sites for which CBSI was not calculated are marked “NA” for this parameter in Table 7. Evans et al. (2004) interpreted CBSI values for sites within the LSJRB estuary

in relation to hazard index values. Values of CBSI below 14 corresponded to medium to high sediment contamination hazard risk. CBSI values of 14 and above corresponded to low sediment hazard risk. Among the 20 sites evaluated in this report, three sites, Goodby's Creek (GDBY01), Dunn River (DUNR01), and Clapboard Creek (CLAP01) had CBSI values above 14, indicating a low sediment hazard risk. CBSI values for the remainder of the marine-influenced sites indicated medium to high sediment hazard risk (Table 7).

3.5.5 Rank Correlation Relationships Among Biological and Abiotic Variables

Relationships between biological metrics and salt-tolerant variables are presented with reference to impairment category in Figures 8, 9 and 10. Positive correlations were observed between the total number of salt-tolerant macroinvertebrates and the number of unique taxa (Figure 8), SWDI (Figure 9) and CBSI (Figure 10). Number of taxa also tends be higher at sites with relatively high total raw count (Figure 11). These relationships suggest that salinity did not limit macroinvertebrate production (total raw count) and diversity (SWDI).

Reduced abundance, reduced species diversity and/or dominance by pollution-tolerant taxa can indicate environmental stress. The inverse correlation observed in the current data between percent dominance by pollution-tolerant organisms and Shannon-Wiener species diversity index (Figure 12) and CBSI (Figure 13) revealed that macroinvertebrate diversity (SWDI) was limited at the most impaired sites.

The number of chironomid larvae deformities recorded appears to be highly dependent upon salinity and decreased with percent dominance by salt-tolerant organisms (Figure 14). The chironomid larvae, *Coelotanypus* and *Djalmabatista*, are known to prefer freshwater environments; thus it is not surprising to find a lower occurrence of deformities at sites dominated by salt-tolerant organisms (Figure 14).

Among sites dominated by freshwater organisms, where deformities are most prevalent, the number of deformities tended to be highest among sites that are dominated by pollution-tolerant organisms (Figure 15). This finding indirectly supports the hypothesis that occurrence of deformities is linked to human-induced site impairment, but evaluation of additional water and sediment quality data is needed to confirm this linkage.

4 Summary of Findings

Benthic macroinvertebrate data were summarized using five metrics: average organism density, total number of unique taxa observed, pooled Shannon-Wiener species diversity index, percent dominance of pollution-tolerant taxa and the total number of deformed larvae at each sampling site. Average organism density ranged from 11 to 896 m^{-2}, total numbers of unique taxa from 1 to 15, and Shannon-Wiener species diversity index from 0.00 to 3.02. The percent dominance by pollution-tolerant taxa ranged from 17 to 100 percent.

Gross morphological deformities in chironomid menta were recorded during organism identification. Morphological deformities were observed at 10 of the 20 sites, with percent occurrence ranging from 22 percent to 100 percent. Highest numbers of deformed larvae were collected at South NAS SNAS02 (23), Palmo Cove PALM01 (12), Julington Creek JULC01 (12) and South Side SSID02 (7). Deformed larvae were also noted at Racy Point RACY01 (4), Goodby's Creek GDBY01 (4), Bolles School BOLL02 (3), Puerto Rico Cove PUER01 (2), Point La Vista PTLV01 (2), and Pirate Cove PIRC01 (2). Approximately 76 percent of the recorded deformities were observed at four sites (SNAS02, PALM01, JULC01 and SSID02), suggesting the possible presence of metals or other contaminants at those sites.

The twenty sites were placed in two classes, based primarily on organism diversity and the degree of dominance by pollution tolerant taxa. This evaluation revealed 13 moderately impaired Class A and 7 severely to very severely impaired Class B sites (Table 3, Figures A-5 and A-6).

Sites were also ranked and categorized by severity of impairment based on best professional judgment using a combination of factors including site classification, Shannon-Wiener species diversity, the degree of dominance by pollution-tolerant taxa, and the total number of deformities recorded. Each site was assigned an Impairment Category (Table 6 and Figures A-7 and A-8). The Doctors Lake (DRLK01), Pirate Cove (PIRC01) and South NAS (SNAS02) sites were the most severely impaired. All three of these sites had low diversity (0.00 to 0.92) and high percentages of pollution-tolerant taxa (96 to 100). At two of the sites, 100 percent of *Coelotanypus* larvae were deformed with a total of 23 larvae at SNAS01 and two larvae at PIRC01. Although these results may indicate the degree to which sampled sites were biologically impaired, they do not in themselves identify sources of stress, which may include toxic substances, low dissolved oxygen, poor substrate quality (e.g. flocculent sediments), or a combination of factors.

Non-metric multidimensional scaling using Bray-Curtis similarity values indicated that site location in the river mainstem or tributaries and salinity regimes play a critical role in shaping the composition of benthic invertebrate assemblages of the LSJRB. Based on these findings, sites were classified by location (tributary or mainstem) and dominance by salt-tolerant or freshwater fauna (Section 3.5.2).

ANOVA showed some differences in biological metrics among four major site classes (salt-dominated tributaries, fresh-dominated tributaries, salt-dominated mainstem, and fresh-dominated mainstem sites). Mean salinity recorded at the ST sites (19.1 ppt) was significantly higher than mean salinity recorded at FT sites (3.3 ppt) and FM sites (2.3 ppt). Mean salinity at SM sites (7.7 ppt) was highly variable and was not significantly different in salinity from other site classes (ST, FT, and FM). Mean diversity (SWDI) was significantly higher in salt-dominated tributaries (2.61) than in fresh- (1.90) and salt- (1.97) mainstem sites ($p<0.05$). The relatively high SWDI values at salt-dominated tributary sites may be a result of more favorable salinity regimes.

ANOVA also revealed that the percentage of pollution-tolerant organisms at FM sites (mean = 84.22 percent) was significantly higher than at SM sites (mean = 48.5 percent), but not significantly different from the ST or FT sites. Other indicators of impairment such as SWDI and the number of deformities were not significantly different between the SM and FM sites.

The relationships among biological variables were further investigated, and positive correlations were observed between the total number of salt-tolerant macroinvertebrates and the number of unique taxa, SWDI and CBSI. The total number of unique taxa also tended to be higher at sites with a relatively high total raw count. Conversely, negative correlations were observed among the percent dominance by pollution-tolerant organisms and SWDI and CBSI.

The number of chironomid deformities recorded appears to be highly dependent upon salinity, such that observed deformities decreased as the percent dominance by salt-tolerant organisms increased. The chironomid larvae, *Coelotanypus* and *Djalmabatista*, are known to prefer freshwater environments; thus it is not surprising to find a lower occurrence of deformities at sites dominated by salt-tolerant organisms.

Among sites dominated by freshwater organisms, where deformities are most prevalent, the number of deformities tended to be highest among sites that are dominated by pollution-tolerant organisms. This finding indirectly supports the hypothesis that occurrence of deformities is linked to human-induced site impairment, but review of additional water quality and sediment data is needed to confirm this linkage.

Composite benthic sediment quality index or CBSI values of 14 and above corresponded to low sediment hazard risk Evans et al. (2004). Among the 20 sites evaluated in this report, three sites, Goodby's Creek (GDBY01), Dunn River (DUNR01), and Clapboard Creek (CLAP01) had CBSI values above 14, indicating a low sediment hazard risk. CBSI values for the remainder of the marine-influenced sites indicated medium to high sediment contamination hazard risk.

5 Conclusions and Recommendations

A combination of natural and human-induced environmental conditions gives rise to the varying benthic macroinvertebrate assemblages of the Lower St. Johns River Basin. It has been shown that low macroinvertebrate diversity tends to occur where environmental stress is prevalent, pollution-sensitive taxa are rare or absent, and pollution-tolerant species dominate. These results were used to identify sites with reduced abundance, reduced species diversity, a dominance by pollution-tolerant taxa and a prevalence of chironomid deformities. These results do not in themselves identify specific sources of stress, which may include toxic substances, low dissolved oxygen, poor substrate quality, or a combination of factors.

To further investigate the relationship between sediment quality and biological communities, it may be useful to collect additional biological, water, and sediment samples along environmental gradients (e.g. metal content) at the impaired sites. These new data combined with additional sediment toxicity testing results could strengthen statements that can be made regarding the influence of sediment quality on benthic invertebrate communities.

This descriptive data evaluation suggests that benthic invertebrate data may provide a useful tool in assessing biological response to toxic substances, and other sources of environmental stress. Additional review and statistical analysis of biological and water/sediment quality data should be performed to identify ecologically meaningful relationships that can be of use to water resource managers in decision-making.

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7 Glossary

Analysis of Variance (ANOVA) – A statistical method whereby the means of several *a priori* categories are tested for statistical differences simultaneously.

Anderson-Darling Test – A procedure that graphs the data being tested (versus a set of normal probability reference values) for normality and calculates the probability that the data represent a normal distribution.

Average Organism Density – The average number of invertebrate organisms collected per unit area. Usually presented as the number of individuals per square meter.

Benthic – Associated with sediments or other substrates on the bottom of water bodies.

Box Cox Procedure – An iterative procedure that identifies and applies the ideal *lambda* value to transform non-normal data into a normal or more normal distribution.

Bray Curtis Similarity Matrices – A matrix of similarity or dissimilarity values calculated for all pairs of sites for the group of stations under consideration. The equation *d[jk] = (sum abs(x[ij]-x[ik])/(sum (x[ij]+x[ik]))* represents the calculation for stations *j* and *k* for species abundance *x* and for *i*th species. Data are often transformed to reduce the influence of common species and increase the effect of rare species prior to constructing the similarity matrix.

Estuarine – Pertaining to waterbodies where ocean water and fresh water mix.

Eutrophic – Nutrient-enriched. In this context, waters that have relatively high concentrations of inorganic plant nutrients and abundant algal populations.

Flocculent – Sediments formed by chemical and physical processes which convert dissolved material into very fine particulate material. Such sediments tend to have a low settling rate and can remain suspended in the water for long periods.

Macroinvertebrate – An invertebrate organism that is retained by U.S. Standard No. 30 mesh sieve and is generally visible to the naked eye.

Metrics – Calculated or measured variables that characterize a biological community.

Non-metric Multidimensional Scaling (MDS) – A statistical ordination procedure that portrays the relationships among site/station similarity distances (the Bray-Curtis measure is often used for biological data; the Euclidean distance measure is often used for environmental data) in a three dimensional space. The *stress* value for a given MDS ordination indicates the degree to which the three dimensional portrayal relates the actual similarities among all sites, with lower values indicating a better fit.

Non-Parametric Tests – Statistical tests that do not require data with normal distributions or homogeneity of variance in order to function properly.

Parametric Tests – Statistical tests that require data with normal distributions and/or homogeneity of variance in order to function properly (e.g., ANOVA).

Petite Ponar Grab – A sediment sample taken with a petite Ponar dredge (dimensions: 6" by 6").

RCC – Abbreviation for Spearman's rank correlation coefficient.

Replicate Samples – Multiple grab samples collected at the same sampling location.

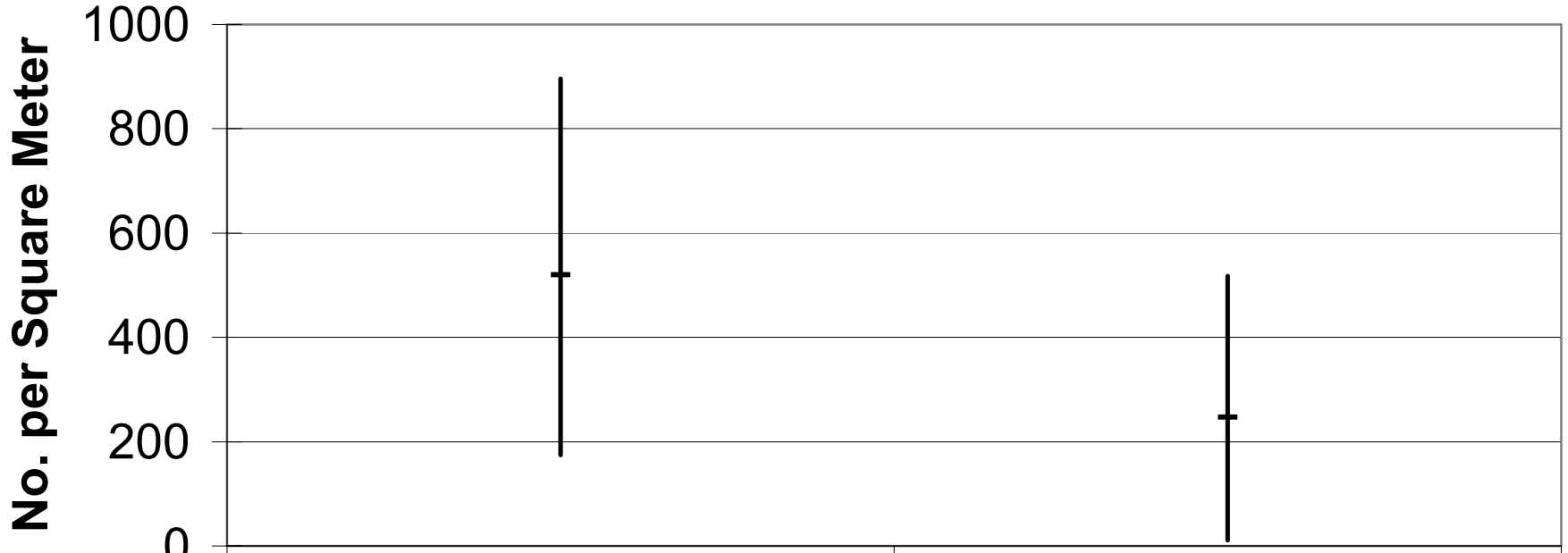
Shannon-Wiener Species Diversity Index – A calculated index value expressing the degree of species diversity in a given sample or group of samples. The calculation is influenced by both the number of species present as well as the evenness of abundance among the species. Values generally range from 0 to 5, with values at the high end of the range indicating high species diversity. This index also is known as the Shannon-Weaver Species Diversity Index.

Spearman's Rank Correlation Test – A non-parametric correlation procedure that is performed on ranks (calculated in a standard manner) for the data rather than on the actual data.

Taxa – The plural form of taxon (taxonomic unit). A taxon is a morphologically unique set of organisms. A taxon may consist of one or more species.

Figures

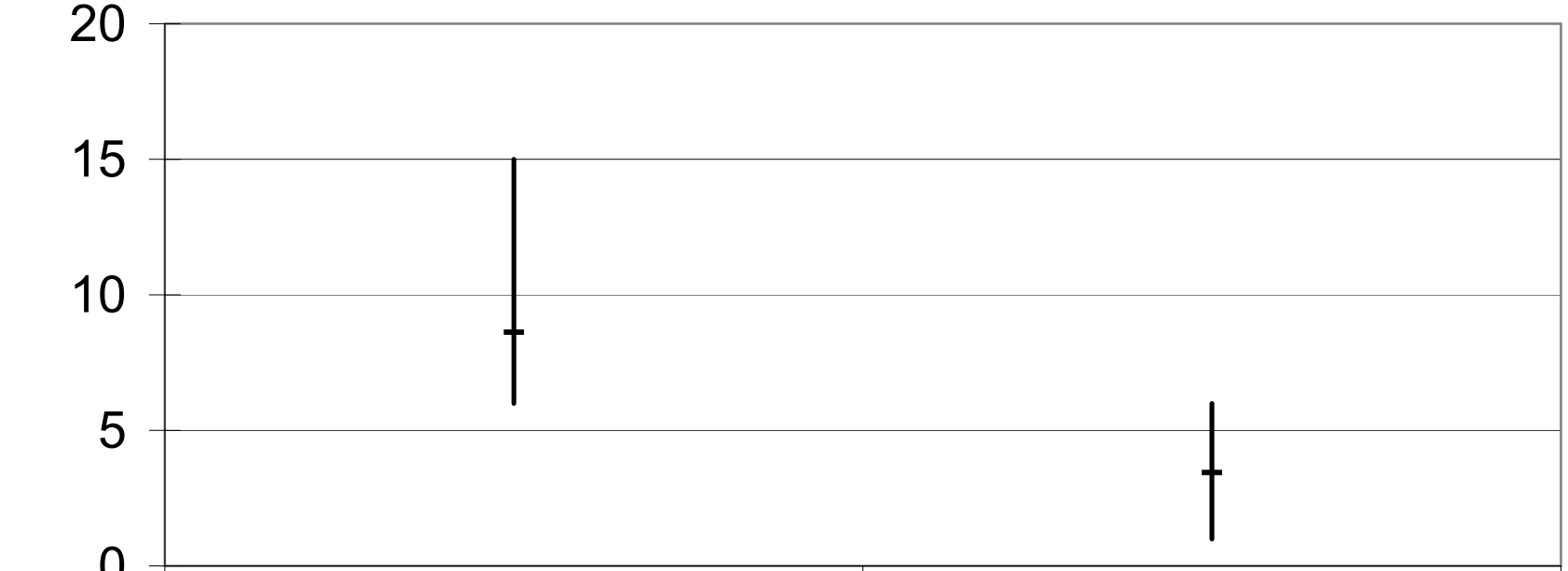
Figure 1
Density by Site Class



	Class A	Class B
Max	896	517
Min	174	11
– Mean	520.2307692	246.5714286

Site Class

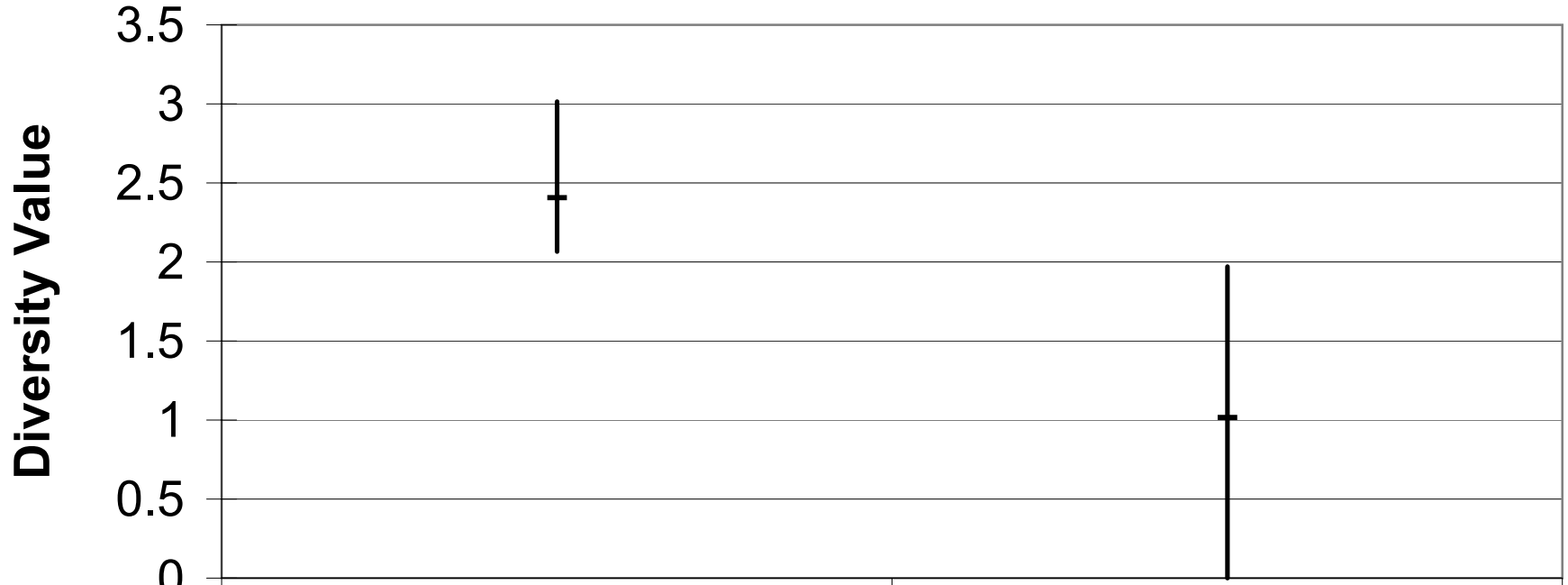
Figure 2
No. of Taxa by Site Class



	Class A	Class B
Max	15	6
Min	6	1
– Mean	8.615384615	3.428571429

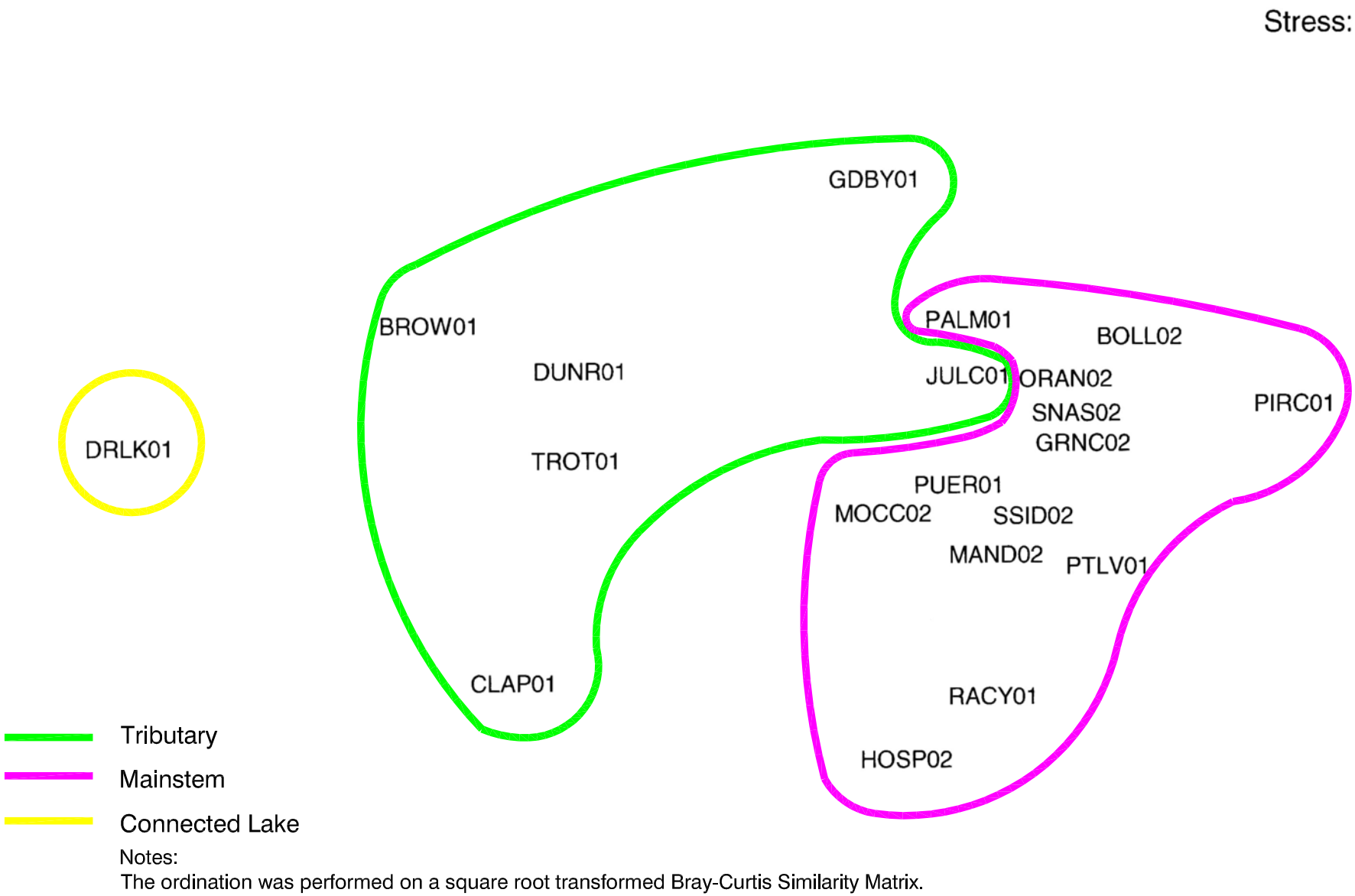
Site Class

Figure 3
Diversity by Site Class



	Class A	Class B
Max	3.016	1.97
Min	2.064	0
– Mean	2.403384615	1.015142857

Site Class

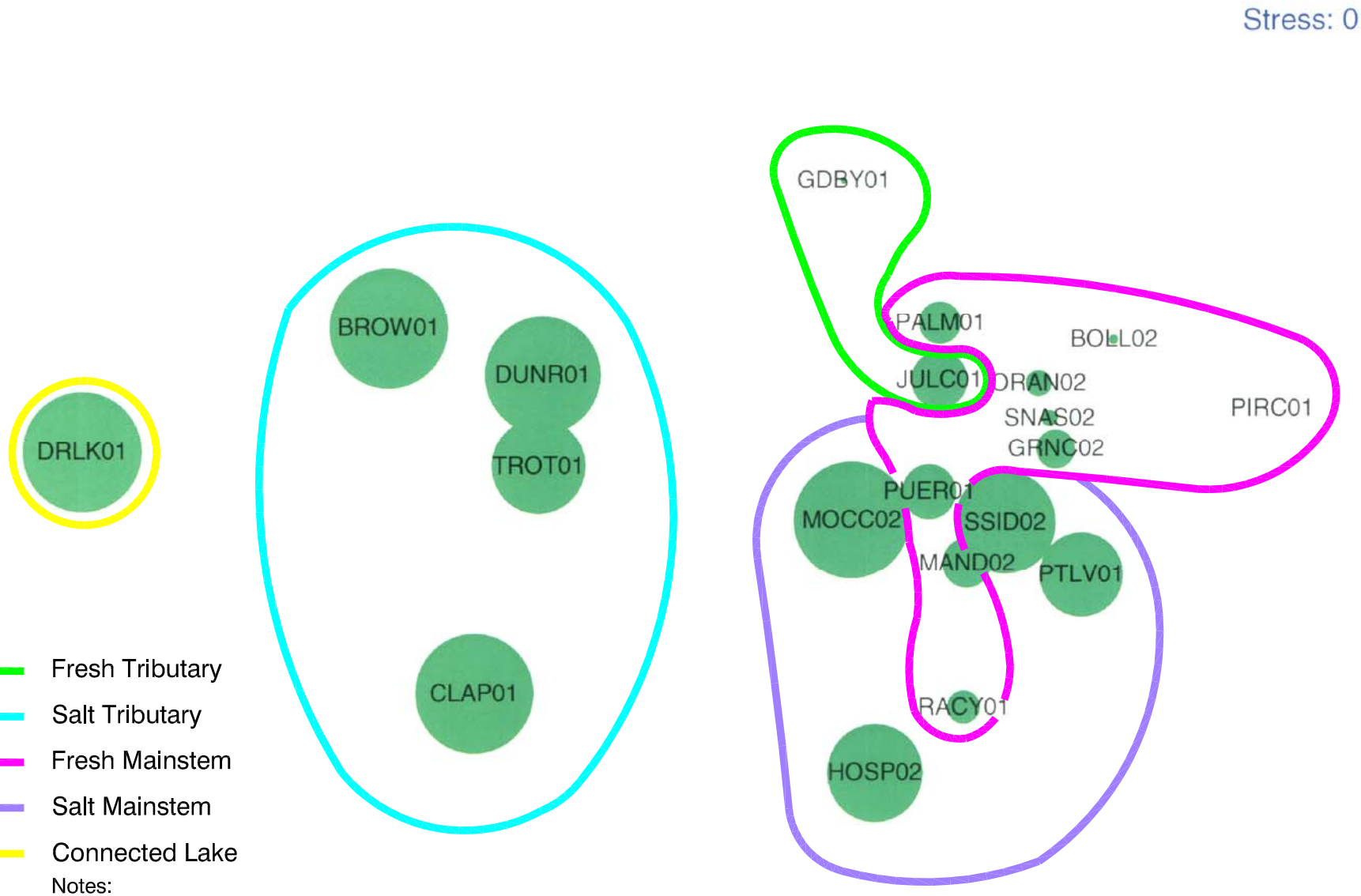


Notes:
The ordination was performed on a square root transformed Bray-Curtis Similarity Matrix.

FIGURE 4.
Nonmetric Multidimensional Scaling Ordination for 2002 - 2003 Macroinvertebrate Data
Replicates Combined

Source: Water & Air Research, Inc., 2003.

water & air RESEARCH, INC.



Notes:
The ordination was performed on a square root transformed Bray-Curtis Similarity Matrix. The green bubbles overlying the site labels are sized proportionately to the value for percent salt-tolerant organisms for each site.

FIGURE 5.
Nonmetric Multidimensional Scaling Ordination for 2002 - 2003 Macroinvertebrate Data with Percent Salt-Tolerant Organisms Replicates Combined

Source: Water & Air Research, Inc., 2003.

water & air RESEARCH, INC.

Figure 6
Shannon-Wiener Species Diversity Index (SWDI) vs. Percent Salt-tolerant Location Class

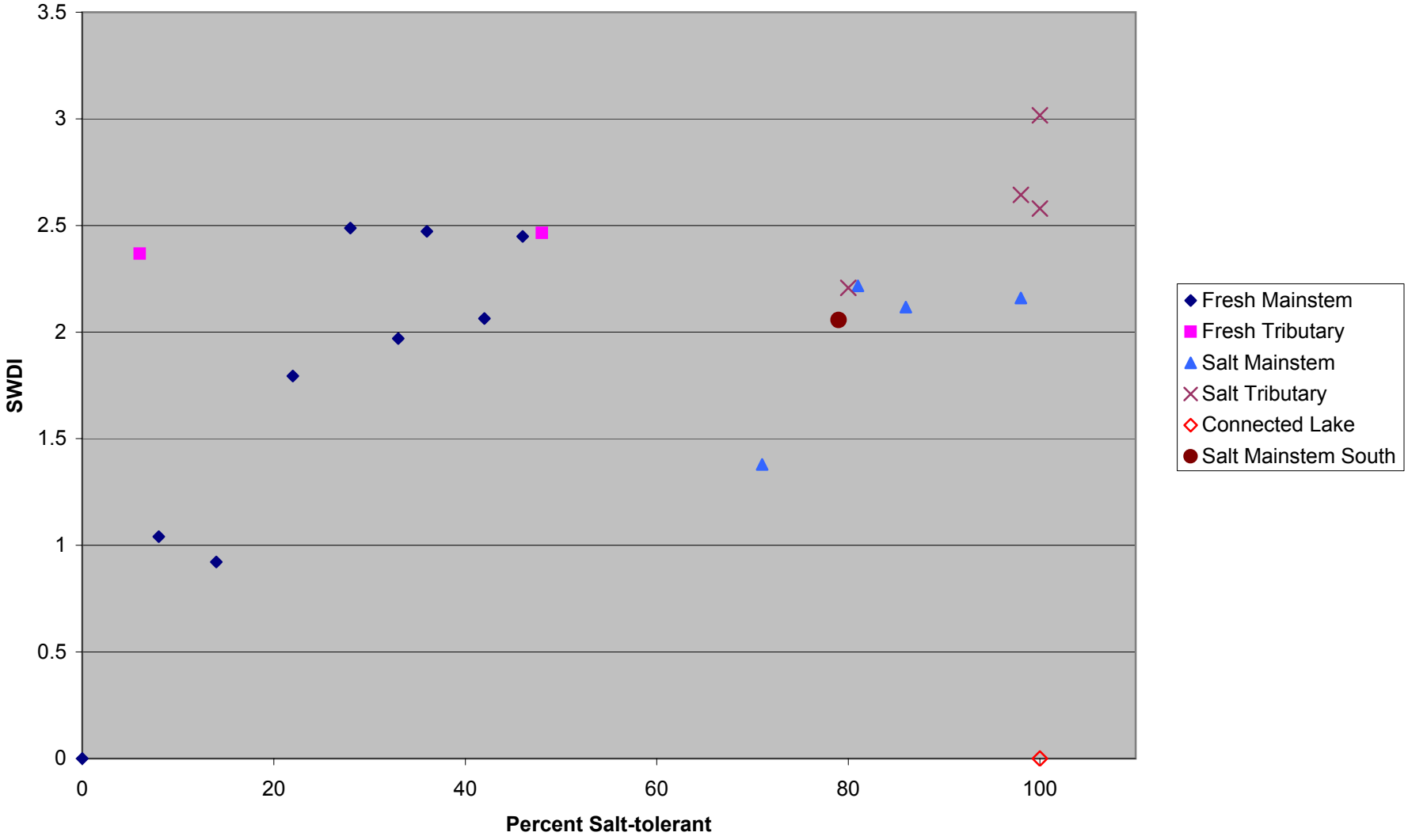


Figure 7
Percent Pollution-tolerant vs. Percent Salt-tolerant
Location Class

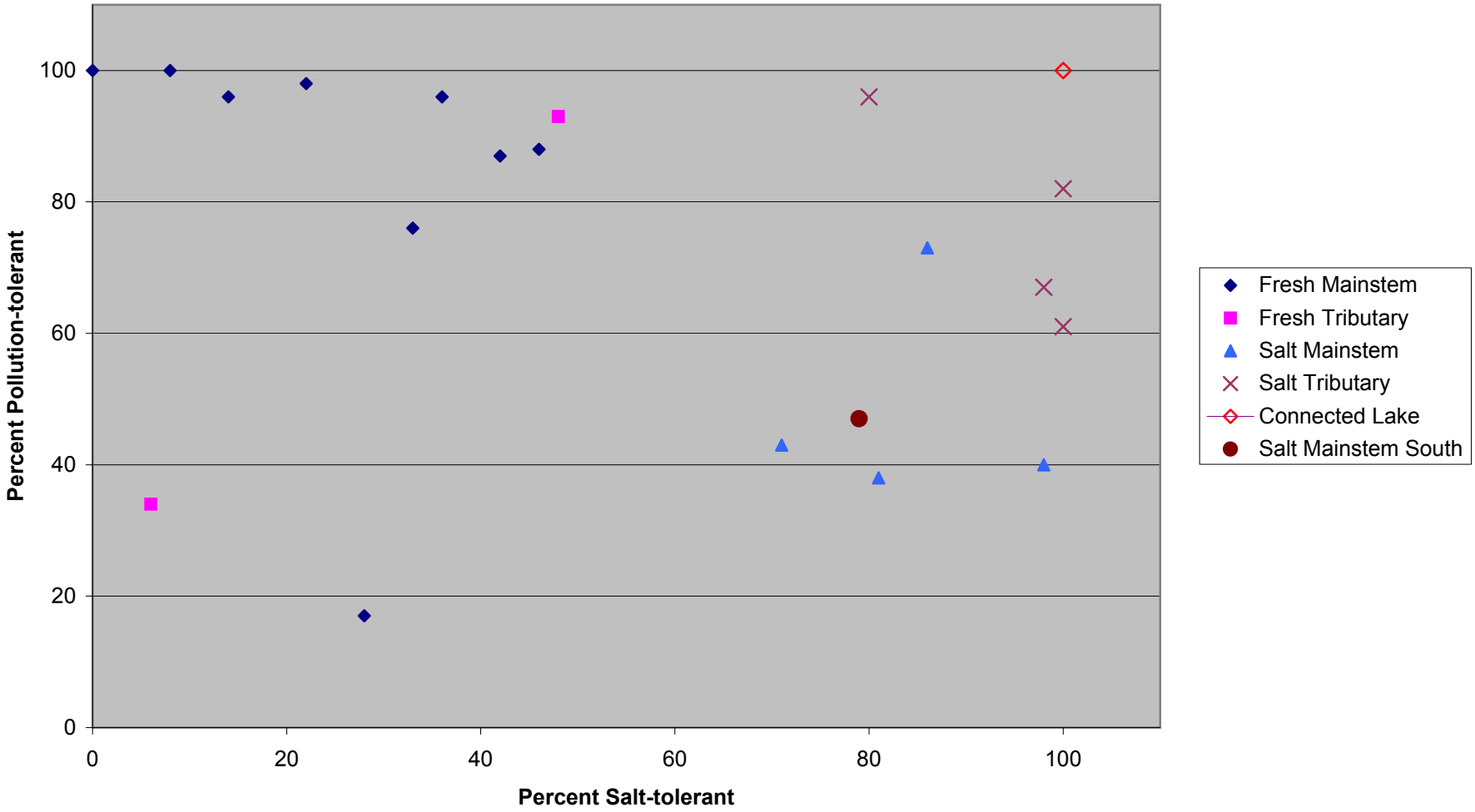


Figure 8
Number of Unique Taxa vs. Total Number Salt-tolerant
Impairment Category

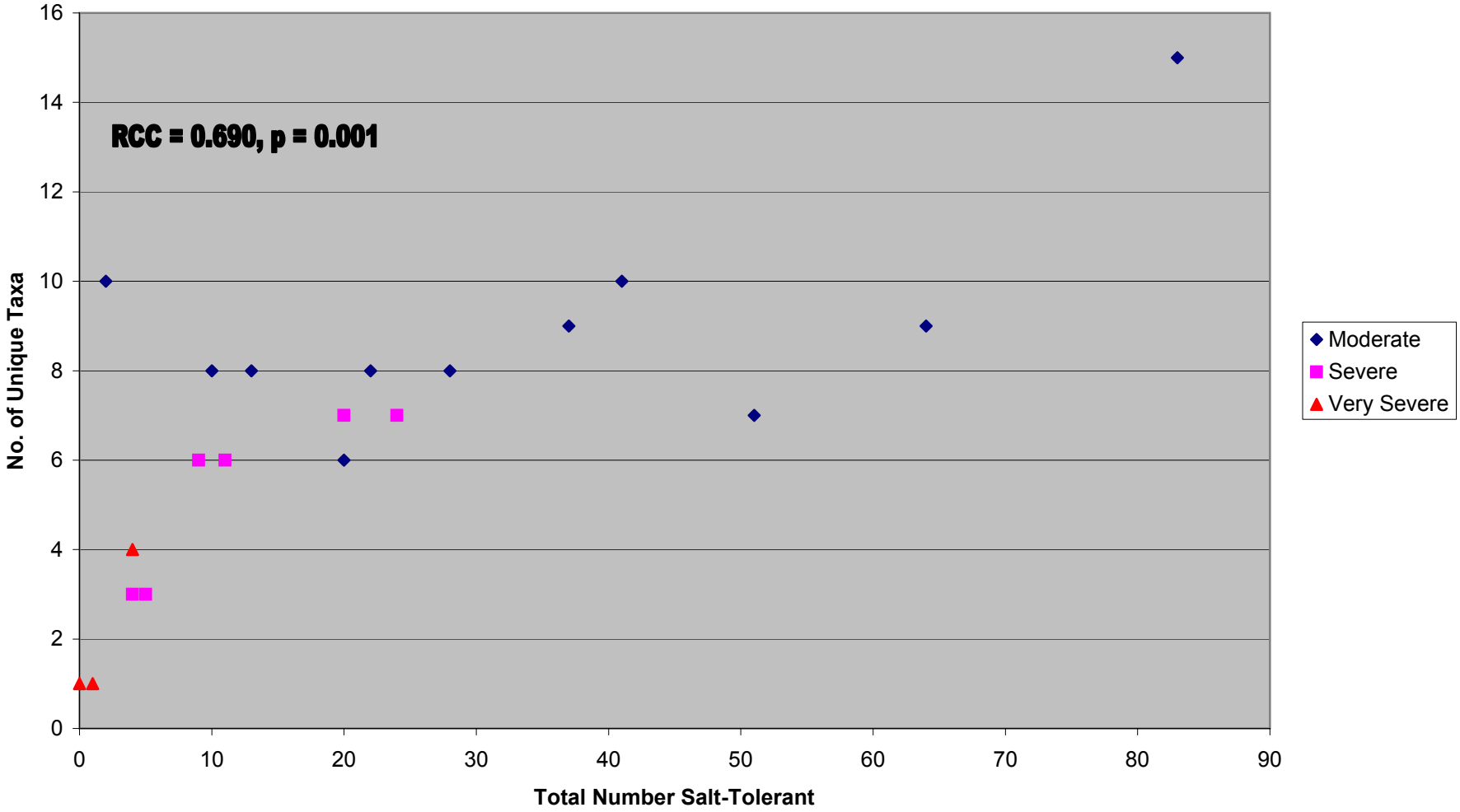


Figure 9
Shannon-Wiener Species Diversity vs. Total Number Salt-tolerant Impairment Category

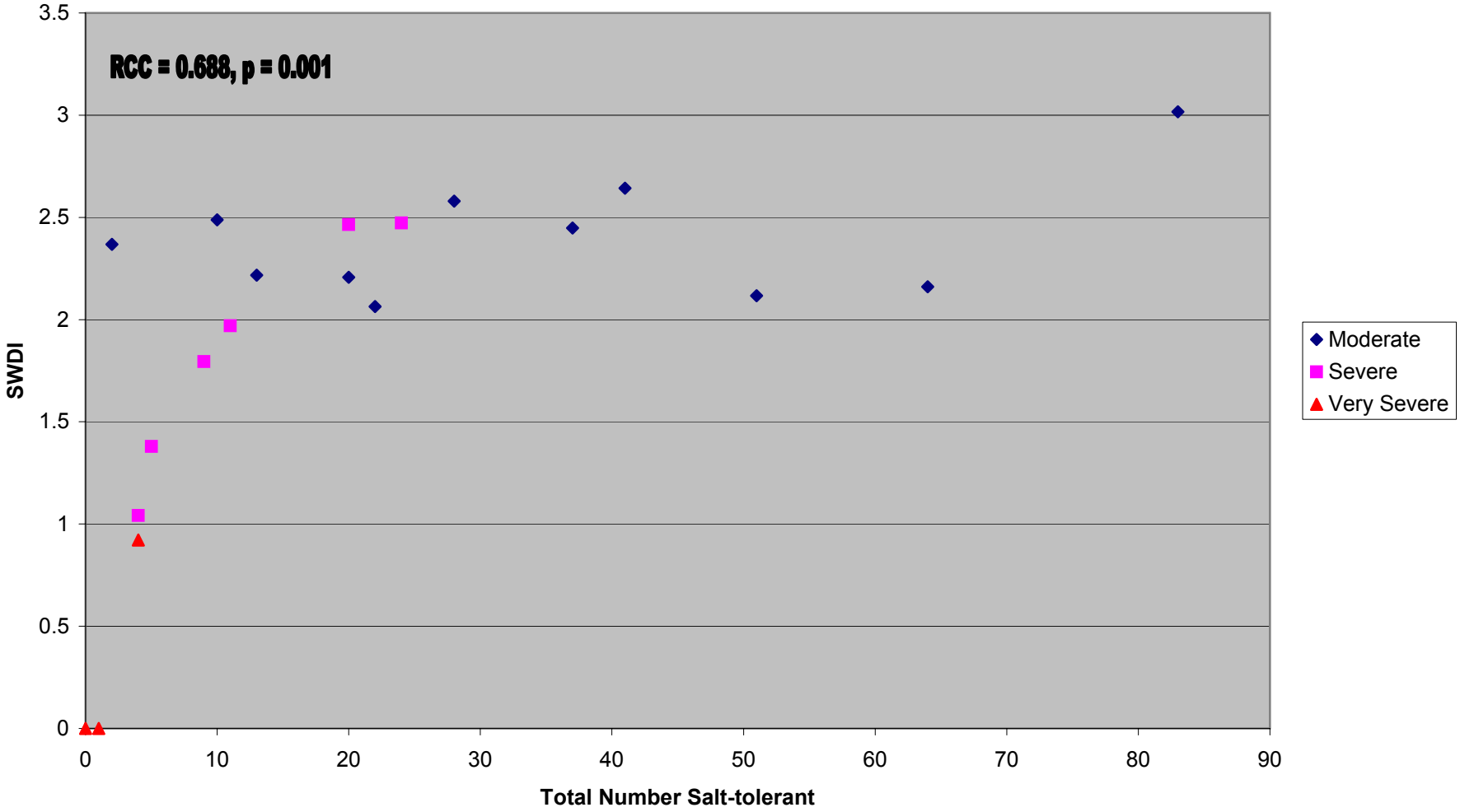


Figure 10
Composite Benthic Sediment Quality Index (CBSI) vs. Total Number Salt-tolerant Impairment Category

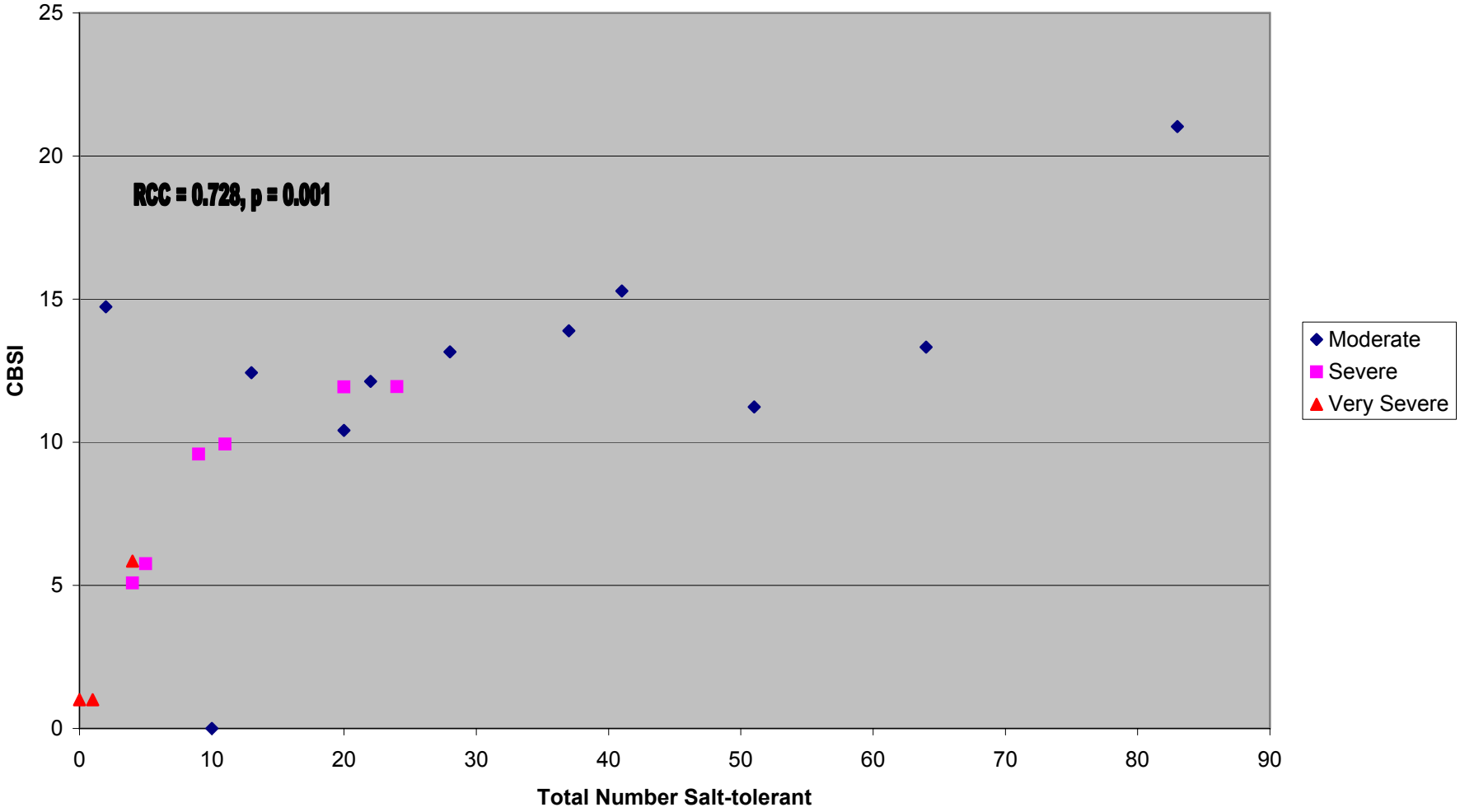


Figure 11
Number of Unique Taxa vs. Total Raw Count
Impairment Category

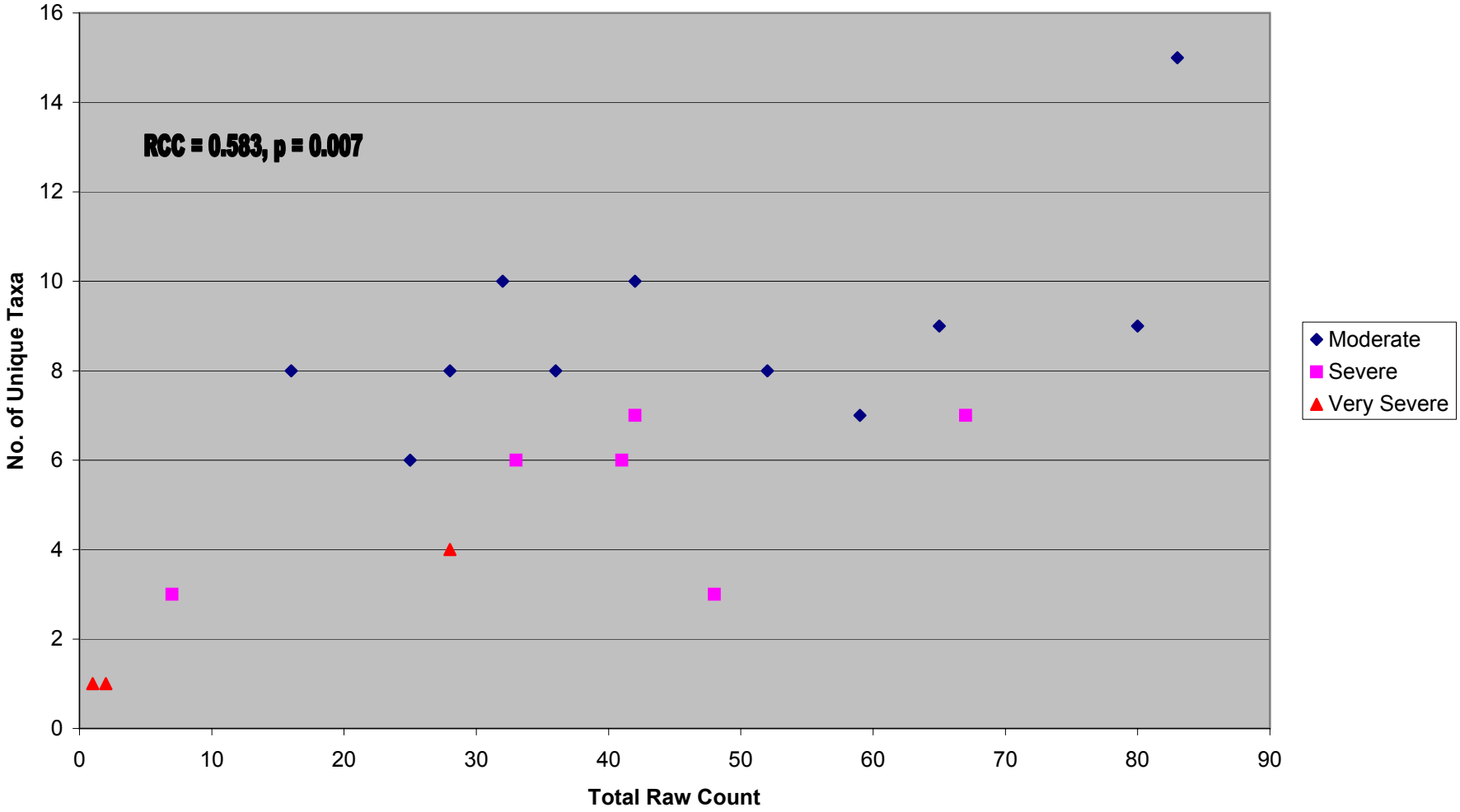


Figure 12
Shannon-Wiener Species Diversity (SWDI) vs. Percent Pollution-tolerant Impairment Category

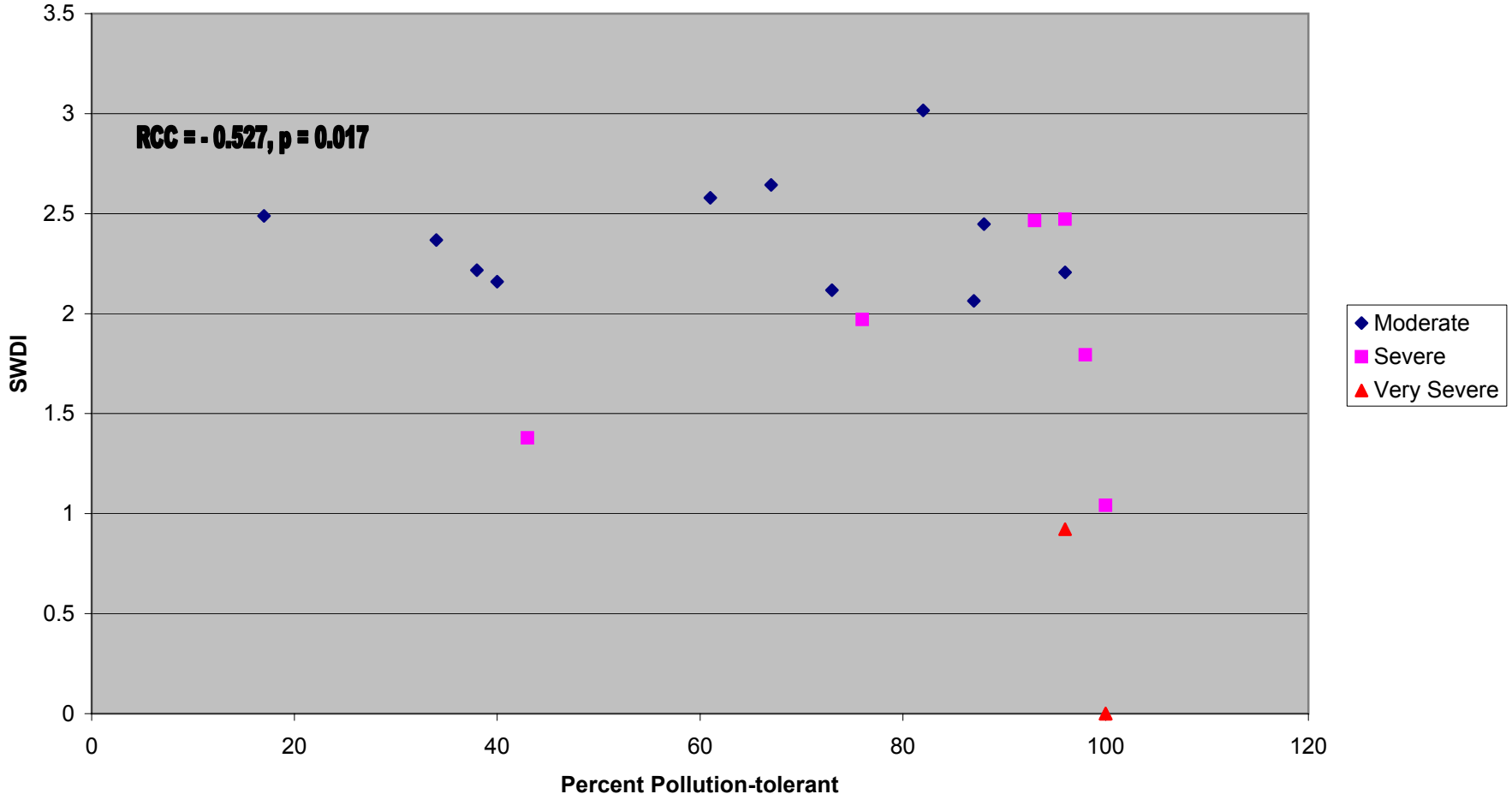


Figure 13
Composite Benthic Sediment Quality Index (CBSI) vs. Percent Pollution-tolerant Impairment Category

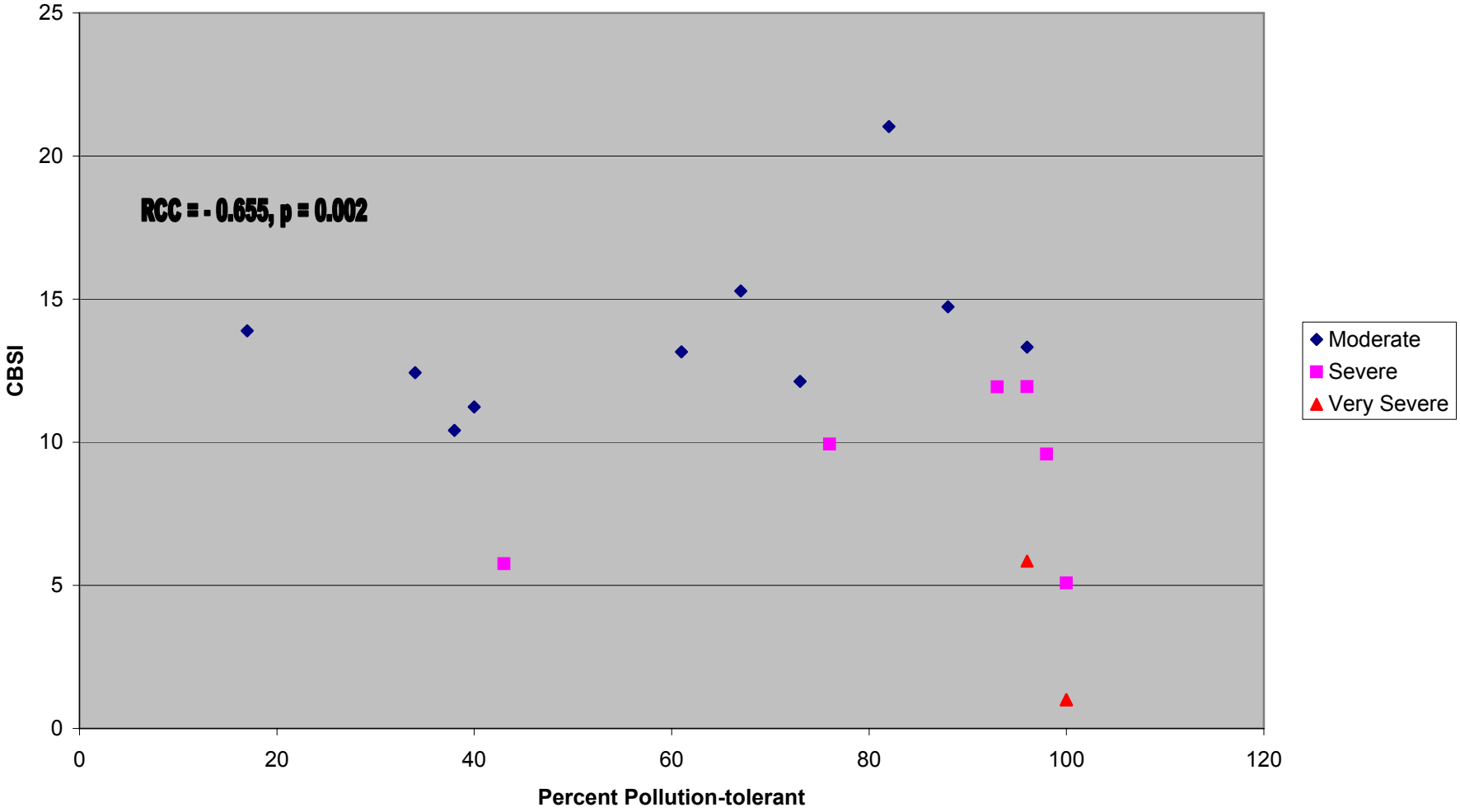


Figure 14
Number of Deformities vs. Percent Salt-tolerant
Fresh and Salt-dominated

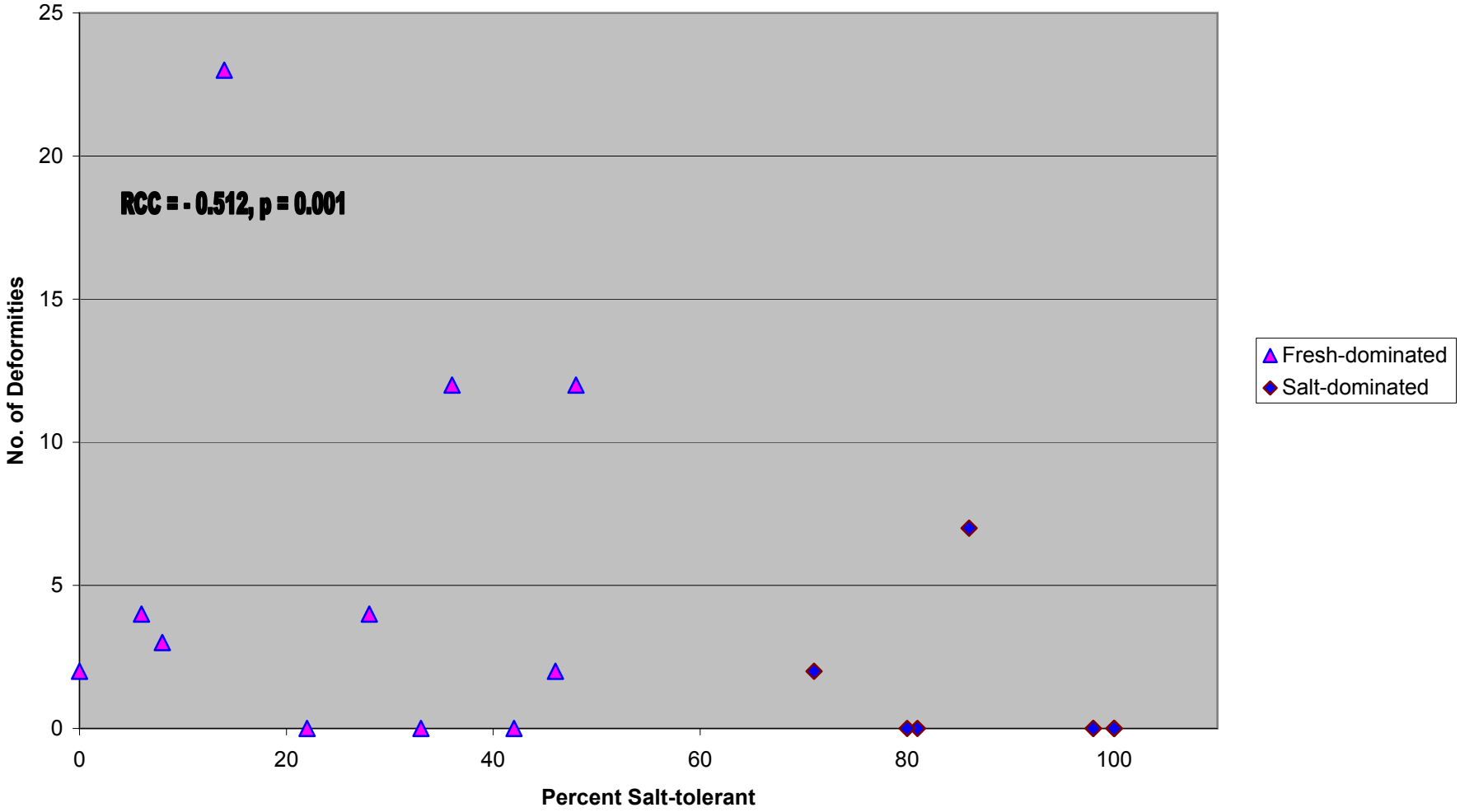
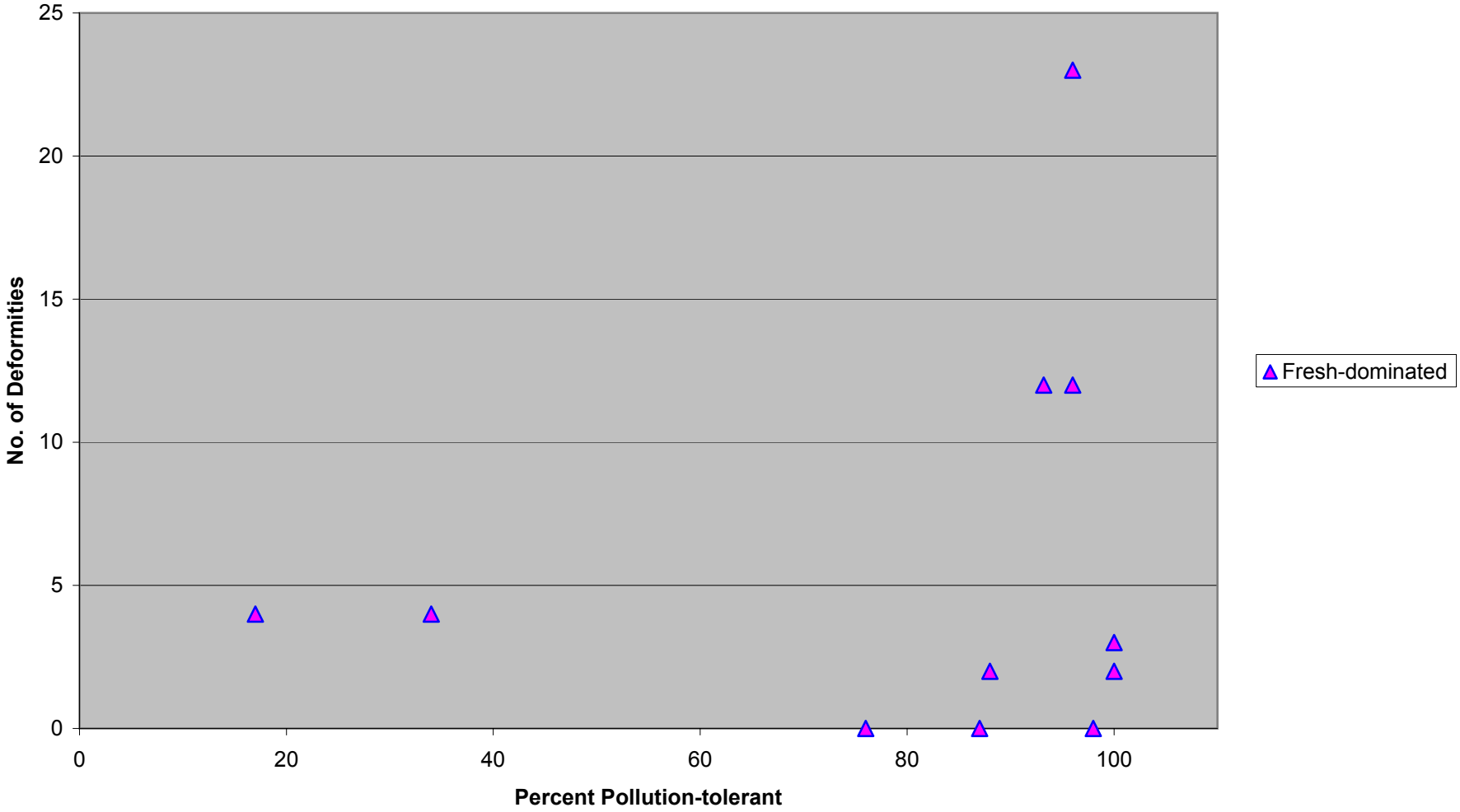


Figure 15
Number of Deformities vs. Percent Pollution-tolerant
Fresh-dominated Sites



Tables

Table 1

Benthic Sampling Locations and Collection Dates at 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Station Identification Code	Site Location	Collection Date	Collection Time	Latitude (DD.MMSS) NORTH	Longitude (DD.MMSS) WEST
RACY01	Racy Point	10/2/02	10:26	29.8047	81.5530
MAND02	Mandarin	10/3/02	15:11	30.2153	81.6546
HOSP02	Baptist Hospital	10/3/02	10:25	30.2770	81.6749
ORAN02	Orangedale	10/4/02	10:49	30.0051	81.6150
PUER01	Puerto Rico	10/8/02	12:04	29.9464	81.6095
GRNC02	Green Cove	10/23/02	12:38	29.9817	81.6397
DRLK01	Doctors Lake	10/29/02	9:20	30.1106	81.7491
TROT02	Trout River	11/20/02	13:51	30.4162	81.6870
PALM01	Palmo Cove	10/30/02	10:26	29.9711	81.5668
GDBY01	Goodby's Creek	1/16/03	11:33	30.2158	81.6135
JULC01	Julington Creek	2/3/03	16:20	30.1337	81.6231
PTLV01	Point La Vista	2/19/03	15:35	30.2879	81.6615
SSID02	South Side	2/19/03	11:05	30.2468	81.6794
PIRC01	Pirate Cove	2/28/03	10:30	30.2502	81.6864
SNAS02	South NAS	5/19/03	14:13	30.1970	81.6868
MOCC02	Moccasin Slough	6/25/03	13:08	30.1237	81.6872
BOLL02	Bolles School	7/31/03	10:19	30.2412	81.6324
BROW01	Broward River	8/6/03	12:10	30.4199	81.6112
DUNR01	Dunn River	8/21/03	10:56	30.4227	81.5841
CLAP01	Clapboard Creek	8/26/03	11:37	30.4389	81.5133

Table 2
List of Macroinvertebrate Taxa Collected from 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Major Taxonomic Group	Scientific Name	Pollution Tolerance	Salt Tolerance
Nemertea			
	NEMERTEA (LPIL)	T	S
Annelida			
Polychaeta			
	CAPITELLA CAPITATA	T	S
	HETEROMASTUS FILIFORMIS	T	S
	MEDIOMASTUS CALIFORNIENSIS	T	S
	SABACO AMERICANUS	T	S
	LAEONEREIS CULVERI	T	S
	NEANTHES SUCCINEA	T	S
	ORBINIIDAE (LPIL)	I	S
	SCOLOPLOS RUBRA	I	S
	ETEONE HETEROPODA	T	S
	MARENZELLERIA VIRIDIS	T	S
	SPIONIDAE (LPIL)	T	S
	STREBLOSPIO SP.	T	S
	POLYCHAETA (LPIL)	T	S
Oligochaeta			
	AULODRILUS PIGUETI	T	F
	CF. TUBIFICOIDES SP.	T	S
	LIMNODRILUS HOFFMEISTERI	T	F
	TUBIFICOIDES SP.	T	S
Crustacea			
Cirrepedia			
	BALANUS SP. A	T	S
	BALANUS SP. B	T	S
Cumacea			
	CYCLASPIS VARIANS	I	S
Mysidacea			
	AMERICAMYSIS BIGELOWI	I	S
Isopoda			
	CYATHURA POLITA	T	S
	EDOTIA TRILOBA	T	S

Table 2
List of Macroinvertebrate Taxa Collected from 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Major Taxonomic Group	Scientific Name	Pollution Tolerance	Salt Tolerance
Amphipoda			
	AMEROCULODES SP.	I	S
	AMPELISCA SP.	I	S
	AMPHIPODA (LPIL)	T	S
	APOCOROPHIUM LACUSTRE	T	S
	CERAPUS BENTHOPHILUS	T	S
	GAMMARUS SP.	T	S
	GRANDIDIERELLA BONNIEROIDES	T	S
	MELITA NITIDA	I	S
	OEDICEROTIDAE (LPIL)	I	S
Decapoda			
	DECAPODA (LPIL)	I	S
	RHITHROPANOPEUS HARRISII	T	S
Insecta			
Ephemeroptera			
	CAENIS SP.	T	F
Odonata			
	PERITHEMIS TENERA SEMINOLE	T	F
Coleoptera			
	CELINA HUBBELLI	T	F
Diptera - Chironomidae			
	CHIRONOMUS SP.	T	F
	COELOTANYPUS SP.	T	F
	COELOTANYPUS TRICOLOR	T	F
	CRYPTOCHIRONOMUS SP.	T	F
	DJALMABATISTA PULCHRA	I	F
	EINFELDIA NATCHITOCHEAE	T	F
	POLYPEDILUM HALTERALE GROUP	I	F
	POLYPEDILUM SCALAENUM GROUP	I	F
	PROCLADIUS (HOLOTANYPUS) SP.	I	F
	TANYTARSUS SP.	I	F
	TANYTARSUS SP. L	I	F
Diptera - Other			
	CHAOBORUS PUNCTIPENNIS	T	F

Table 2
List of Macroinvertebrate Taxa Collected from 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Major Taxonomic Group	Scientific Name	Pollution Tolerance	Salt Tolerance
Trichoptera			
	OECETIS SP.	I	F
Mollusca			
Gastropoda			
	HYDROBIIDAE (LPIL)	T	F
	LITTORIDINOPS SP.	T	F
Bivalvia			
	BIVALVIA (LPIL)	T	S
	MACOMA TENTA	T	S
	MYTILOPSIS LEUCOPHAEATA	T	S
	RANGIA CUNEATA	T	S

LPIL - Lowest Practical Identification Level
T - Pollution-tolerant
I - Pollution-intolerant
S - Salt-tolerant
F - Freshwater

Table 3
Benthic Community Metrics and Site Classification at 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Station Identification Code	Site Location	Density	No. of Taxa	Diversity	Percent Dominance by Tolerant Taxa	Site Class
CLAP01	Clapboard Creek	896	15	3.02	82	A
DUNR01	Dunn River	453	10	2.64	67	A
BROW01	Broward River	303	8	2.58	61	A
RACY01	Racy Point	389	8	2.49	17	A
PALM01	Palmo Cove	722	7	2.47	96	A
JULC01	Julington Creek	453	7	2.47	93	A
PUER01	Puerto Rico	863	9	2.45	88	A
GDBY01	Goodby's Creek	346	10	2.37	34	A
HOSP02	Baptist Hospital	174	8	2.22	38	A
TROT02	Trout River	269	6	2.21	96	A
MOCC02	Moccasin Slough	701	9	2.16	40	A
SSID02	South Side	635	7	2.12	73	A
MAND02	Mandarin	559	8	2.06	87	A
GRNC02	Green Cove	356	6	1.97	76	B
ORAN02	Orangedale	442	6	1.79	98	B
PTLV01	Point La Vista	76	3	1.38	43	B
BOLL02	Bolles School	517	3	1.04	100	B
SNAS02	South NAS	302	4	0.92	96	B
DRLK01	Doctors Lake	11	1	0.00	100	B
PIRC01	Pirate Cove	22	1	0.00	100	B

Class A - Sites with moderate diversity; pollution-tolerant taxa dominant to moderately dominant
Class B - Sites with low diversity; dominated by pollution-tolerant taxa

Table 4

Number and Percent Occurrence of Morphological Deformities Observed at 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Station Identification Code	Site Location	Taxon	No. of Deformities	Total Count for Taxon	Percent Occurrence Deformities
SNAS02	South NAS	Coelotanypus	23	23	100.00
PALM01	Palmo Cove	Coelotanypus	12	12	100.00
JULC01	Julington Creek	Coelotanypus	12	12	100.00
SSID02	South Side	Coelotanypus	7	7	100.00
RACY01	Racy Point	Djalmabatista variant	4	4	100.00
GDBY01	Goodby's Creek	Coelotanypus	4	4	100.00
BOLL02	Bolles School	Coelotanypus	3	8	37.50
PUER01	Puerto Rico	Coelotanypus /Djalmabatista	2	9	22.22
PTLV01	Point La Vista	Coelotanypus	2	2	100.00
PIRC01	Pirate Cove	Coelotanypus	2	2	100.00
MAND02	Mandarin	Coelotanypus	0	30	0.00
HOSP02	Baptist Hospital	Polypedilum scalaenum gr.	0	1	0.00
ORAN02	Orangedale	Coelotanypus	0	22	0.00
GRNC02	Green Cove	Coelotanypus	0	14	0.00
DRLK01	Doctors Lake	Absent	0	N/A	N/A
TROT02	Trout River	Polypedilum halterale gr.	0	1	0.00
MOCC02	Moccasin Slough	Absent	0	N/A	N/A
BROW01	Broward River	Absent	0	N/A	N/A
DUNR01	Dunn River	Absent	0	N/A	N/A
CLAP01	Clapboard Creek	Absent	0	N/A	N/A

N/A - No indicator organisms present.

Table 5
Summary of Community Metrics by Site Class

Metrics	Class A	Class B
Number of Sites	13	7
Mean Organism Density (No. m^{-2})	520	247
Mean No. of Unique Taxa	8.6	3.4
Mean Shannon-Wiener Diversity	2.40	1.02
Mean % Dominance Tolerant Taxa	67	88
% of Total No. of Deformities	58	42

Table 6
Impairment Ranking and Categorization at 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

Station Identification Code	Site Location	Site Class	No. of Deformed Larvae	Diversity Index	% Dominance by Tolerant Taxa	Degree of Impairment	Impairment Category
CLAP01	Clapboard Creek	A	0	3.02	82	Moderate	1
DUNR01	Dunn River	A	0	2.64	67	Moderate	1
BROW01	Broward River	A	0	2.58	61	Moderate	1
HOSP02	Baptist Hospital	A	0	2.22	38	Moderate	1
TROT02	Trout River	A	0	2.21	96	Moderate	1
MOCC02	Moccasin Slough	A	0	2.16	40	Moderate	1
MAND02	Mandarin	A	0	2.06	87	Moderate	1
RACY01	Racy Point	A	4	2.49	17	Moderate	2
PUER01	Puerto Rico	A	2	2.45	88	Moderate	2
GDBY01	Goodby's Creek	A	4	2.37	34	Moderate	2
SSID02	South Side	A	7	2.12	73	Moderate	2
PALM01	Palmo Cove	A	12	2.47	96	Severe	3
JULC01	Julington Creek	A	12	2.47	93	Severe	3
PTLV01	Point La Vista	B	2	1.38	43	Severe	4
GRNC02	Green Cove	B	0	1.97	76	Severe	4
ORAN02	Orangedale	B	0	1.79	98	Severe	4
BOLL02	Bolles School	B	3	1.04	100	Severe	4
DRLK01	Doctors Lake	B	0	0.00	100	Very Severe	5
PIRC01	Pirate Cove	B	2	0.00	100	Very Severe	5
SNAS02	South NAS	B	23	0.92	96	Very Severe	6

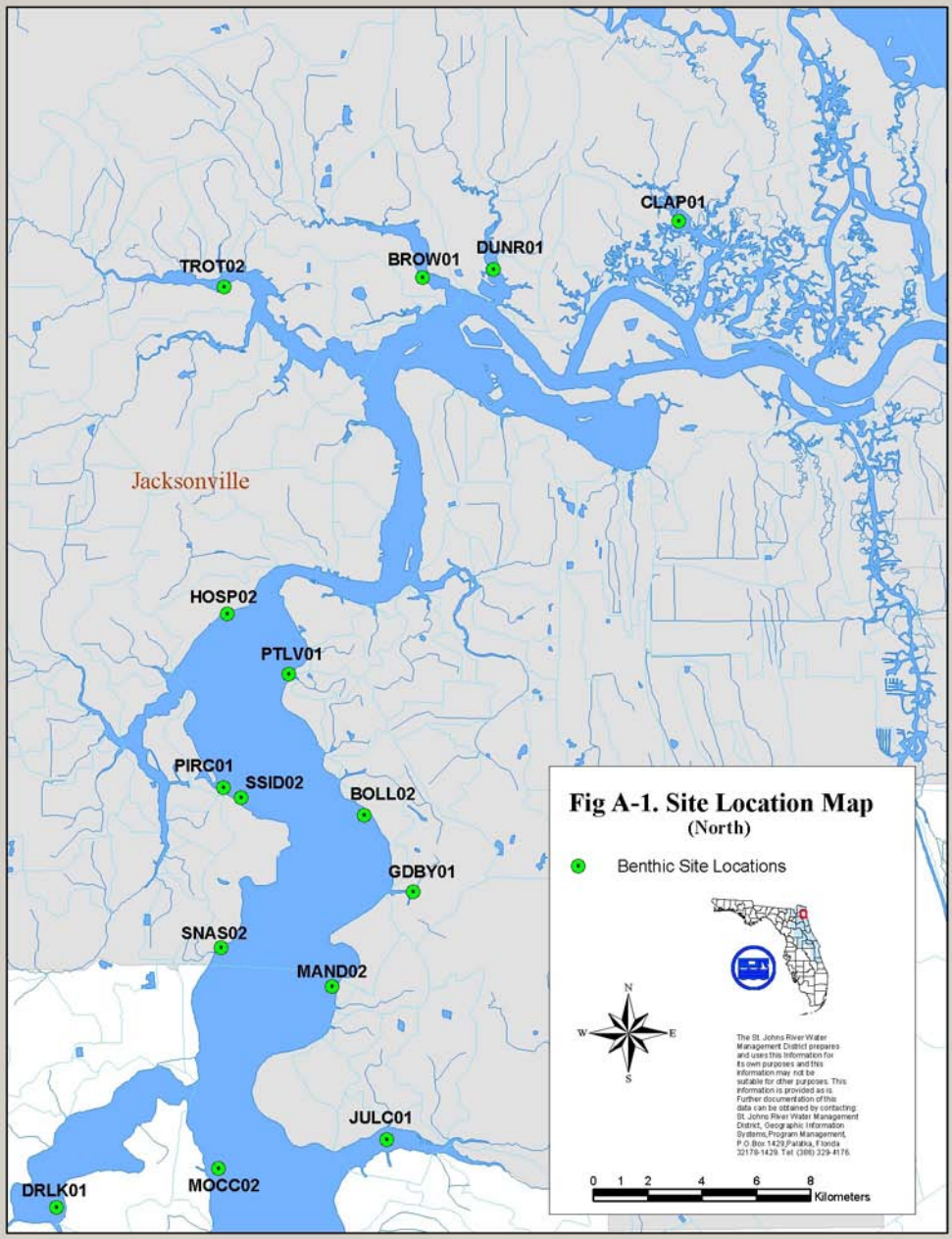
Table 7
Biological Metrics, Location Class, Salinity and Dissolved Oxygen at 20 Sites in the Lower St. Johns River Basin, Florida, 2002 - 2003

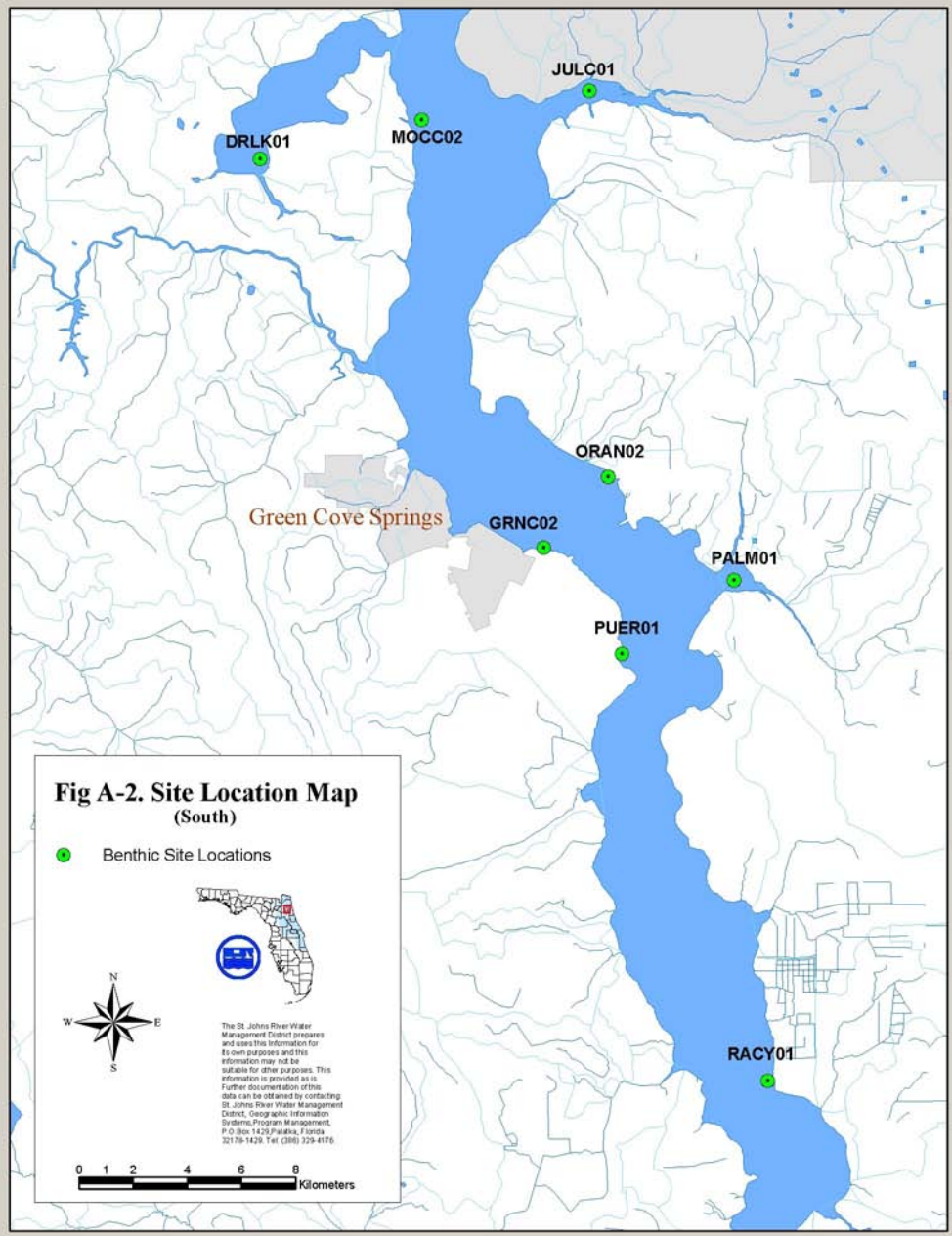
Station Identification Code	Site Location	Density (No. m^{-2})	Total Raw Count	Number of Taxa	Diversity	CBSI	Total No. Salt-tolerant	Percent Salt-tolerant	Salt/Fresh Dominance	Location Class	Average Salinity (ppt)	Average Dissolved Oxygen (mg/L)
RACY01	Racy Point	389	36	8	2.49	NA	10	28	F	FM	0.5	8.18
MAND02	Mandarin	559	52	8	2.06	12.13	22	42	F	FM	4.3	8.27
HOSP02	Baptist Hospital	174	16	8	2.22	12.43	13	81	S	SM	7.6	7.84
ORAN02	Orangedale	442	41	6	1.79	9.59	9	22	F	FM	1.7	8.23
PUER01	Puerto Rico	863	80	9	2.45	13.90	37	46	F	FM	1.5	6.84
GRNC02	Green Cove	356	33	6	1.97	9.94	11	33	F	FM	1.4	7.30
DRLK01	Doctors Lake	11	1	1	0.00	1.00	1	100	S	CL	3.2	8.14
TROT02	Trout River	269	25	6	2.21	10.41	20	80	S	ST	NA	NA
PALM01	Palmo Cove	722	67	7	2.47	11.94	24	36	F	FM	1.4	7.08
GDBY01	Goodby's Creek	346	32	10	2.37	14.74	2	6	F	FT	3.3	NA
JULC01	Julington Creek	453	42	7	2.47	11.93	20	48	F	FT	3.3	6.55
PTLV01	Point La Vista	76	7	3	1.38	5.76	5	71	S	SM	9.3	7.47
SSID02	South Side	635	59	7	2.12	11.23	51	86	S	SM	10.3	7.01
PIRC01	Pirate Cove	22	2	1	0.00	1.00	0	0	F	FM	NA	NA
SNAS02	South NAS	302	28	4	0.92	5.84	4	14	F	FM	2.8	7.91
MOCC02	Moccasin Slough	701	65	9	2.16	13.32	64	98	S	SM	3.6	7.64
BOLL02	Bolles School	517	48	3	1.04	5.08	4	8	F	FM	4.5	8.16
BROW01	Broward River	303	28	8	2.58	13.16	28	100	S	ST	18.4	6.69
DUNR01	Dunn River	453	42	10	2.64	15.29	41	98	S	ST	19.8	6.84
CLAP01	Clapboard Creek	896	83	15	3.02	21.03	83	100	S	ST	NA	5.36

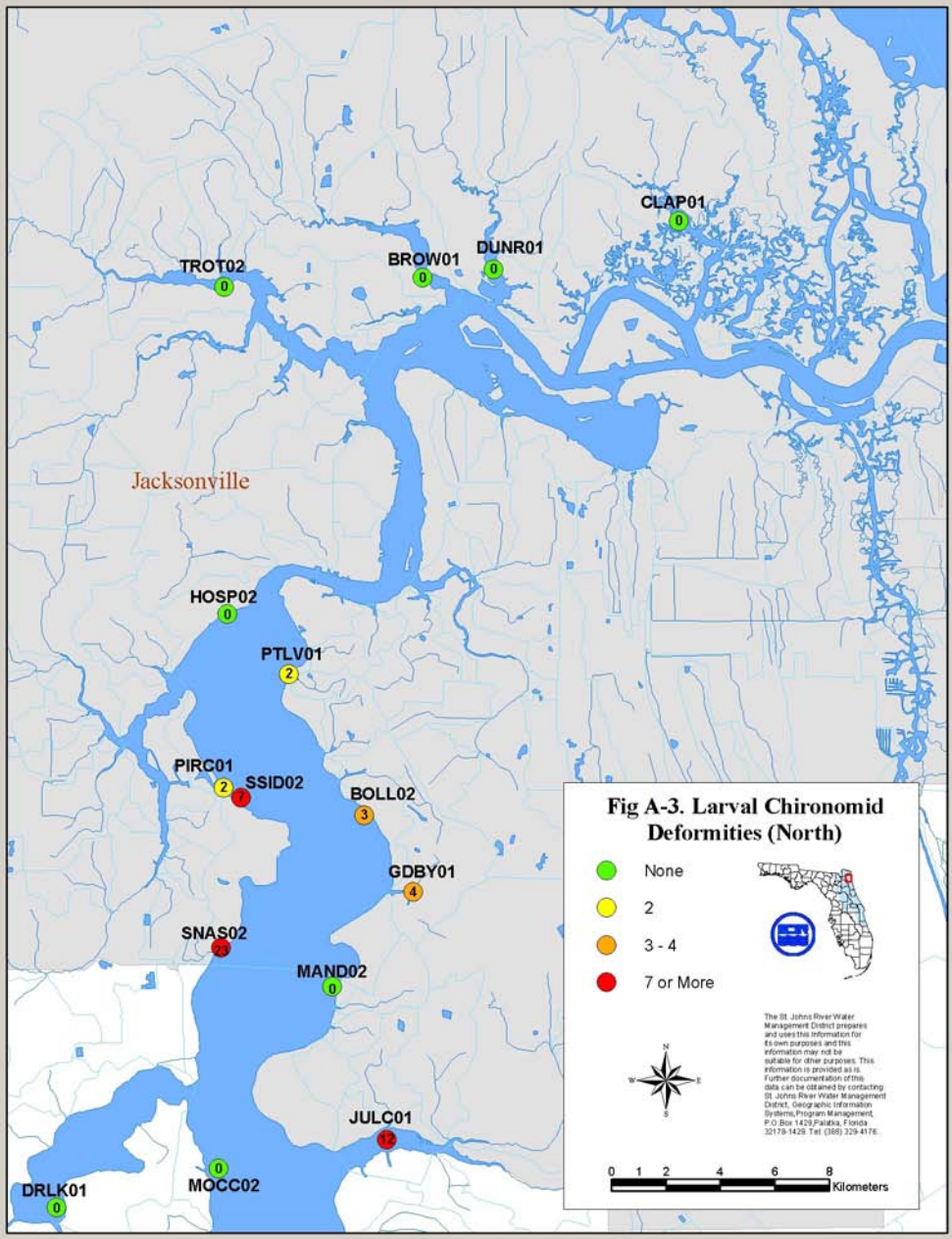
F - Dominated by freshwater organisms (> 50 percent)
S - Dominated by salt-tolerant organisms (> 50 percent)

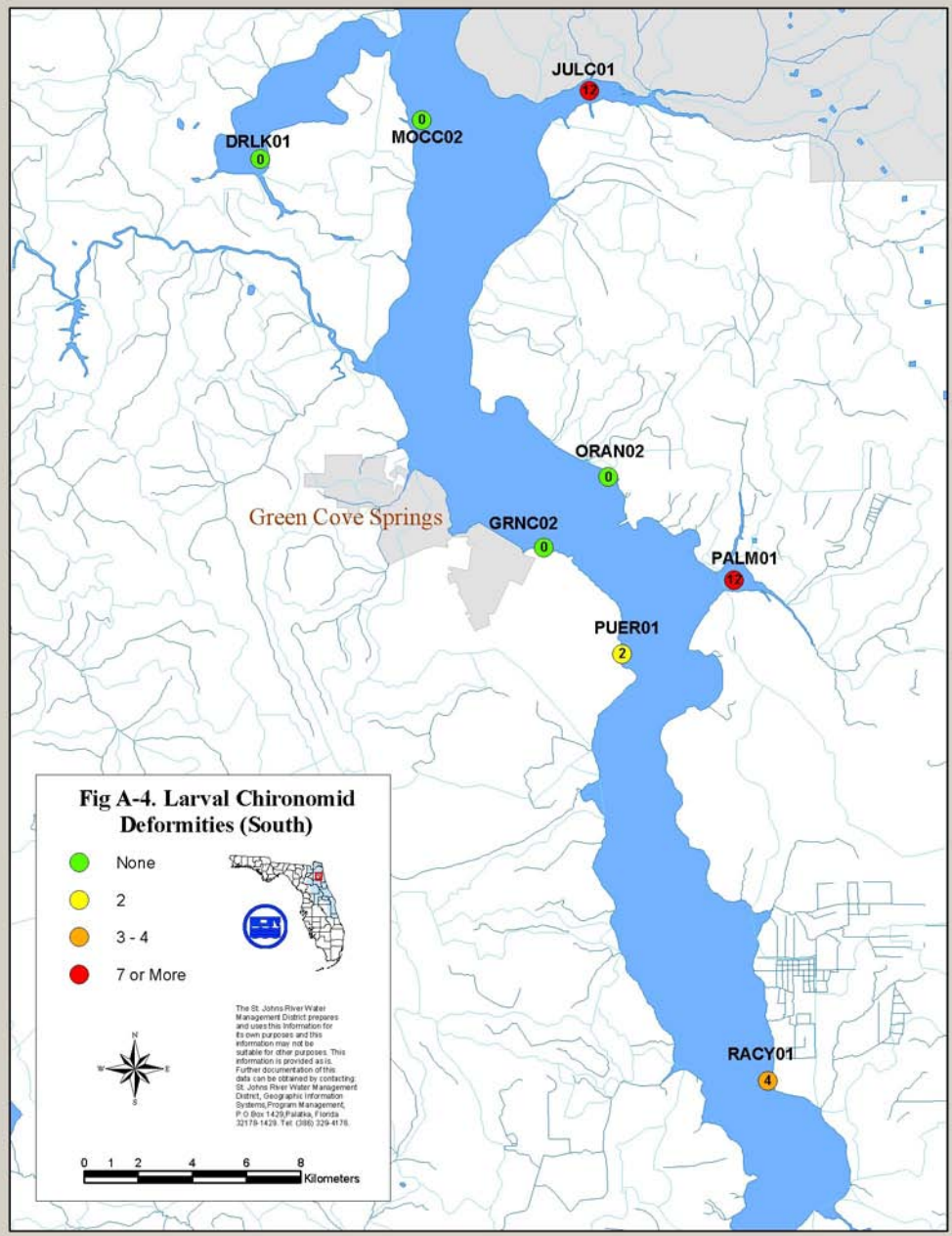
Location Class (LOCCLASS)
Site Location / Salinity Classification - Salt-Dominated Mainstem (SM), Salt-Dominated Tributary (ST),
Fresh-Dominated Mainstem (FM), Fresh-Dominated Tributary (FT),
Connected Lake (CL)

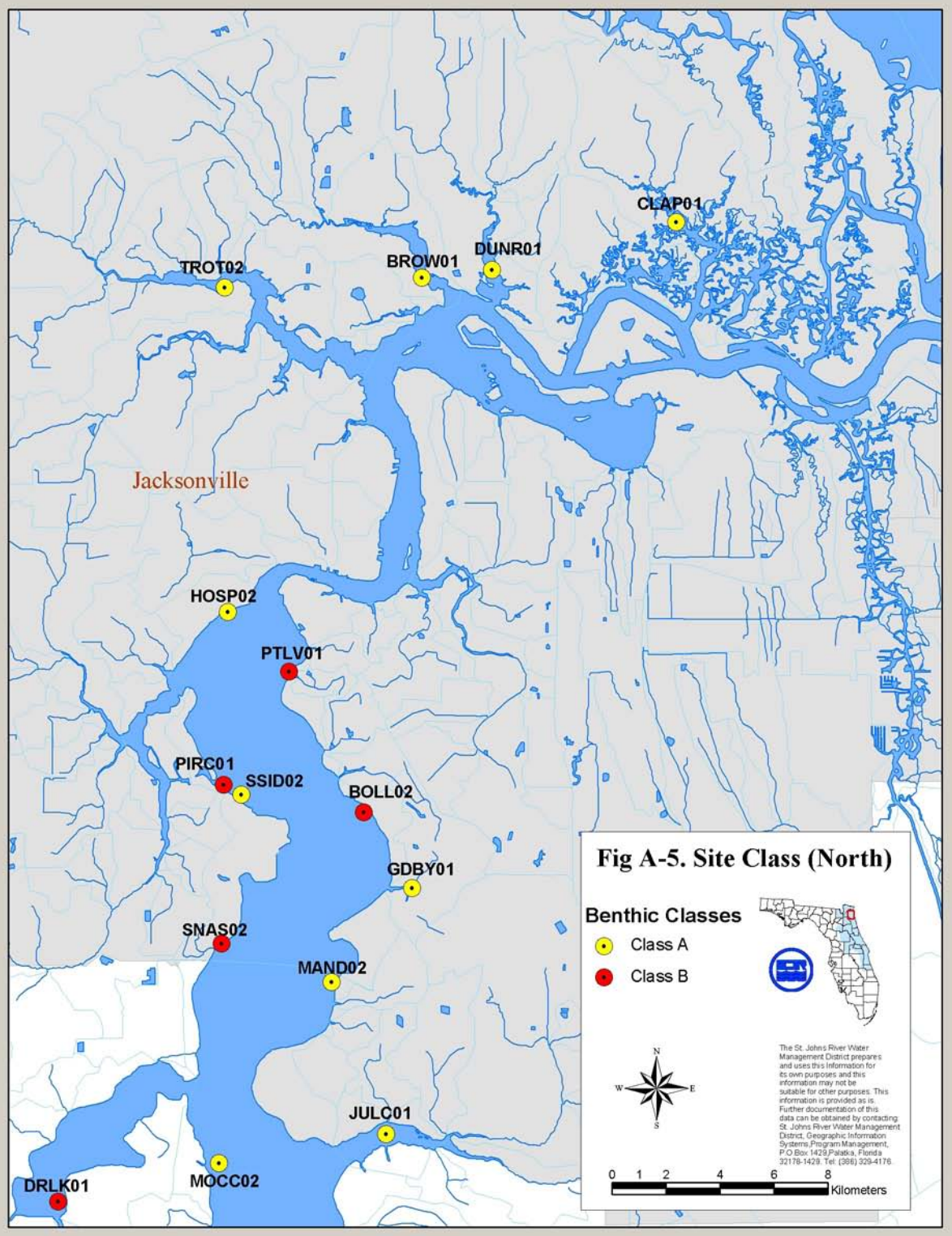
Appendix A
Site Location Maps

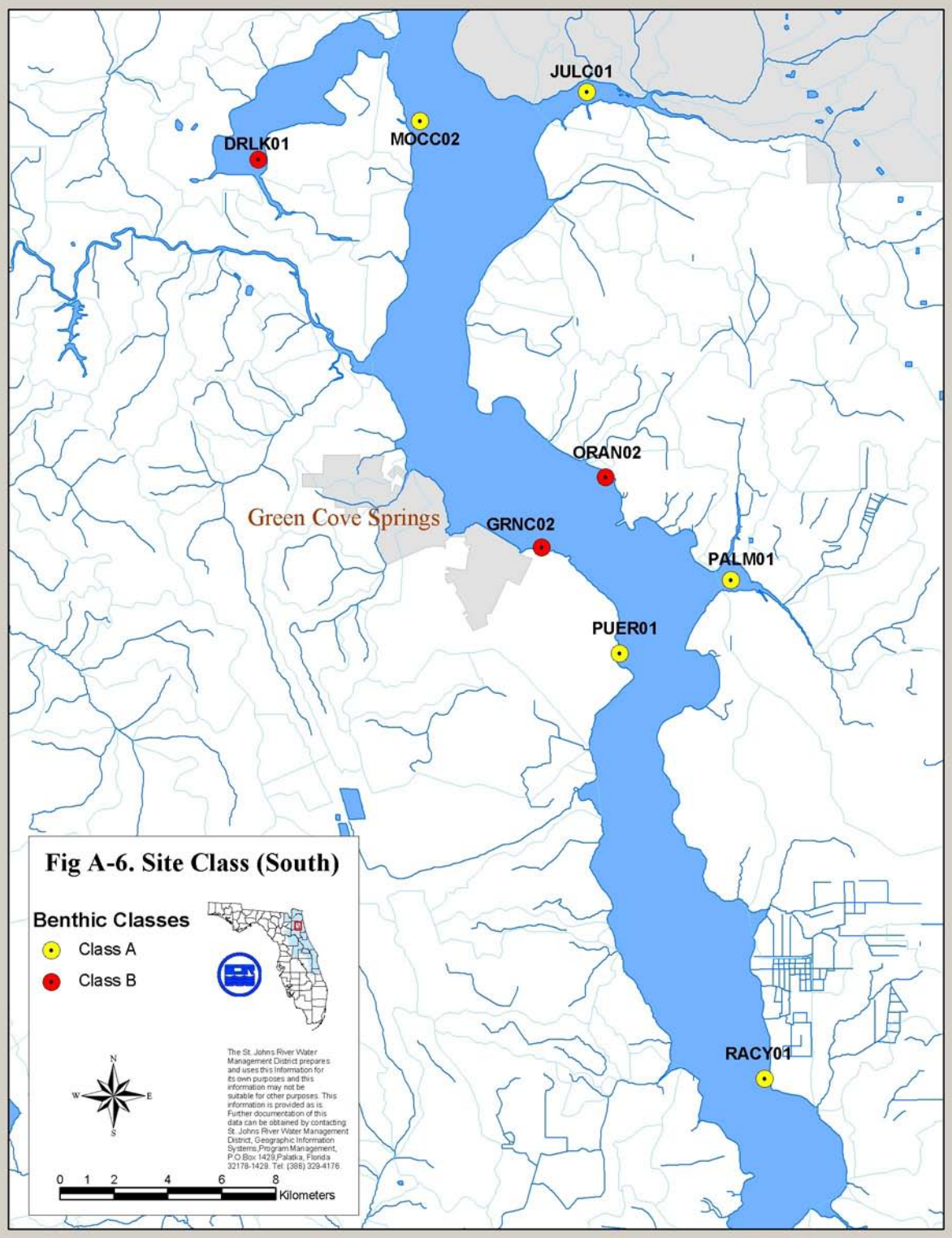

CLAP01
DUNR01
BROW01
TROT02
Jacksonville
HOSP02
PTLV01
PIRC01
SSID02
BOLL02
GDBY01
SNAS02
MAND02
JULC01
MOCC02
DRLK01
Fig A-1. Site Location Map
(North)
Benthic Site Locations
N
W
E
S
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems, Program Management, P.O.Box 1429,Palatka, Florida 32178-1429. Tel: (386) 329-4176.
0 1 2 4 6 8
Kilometers

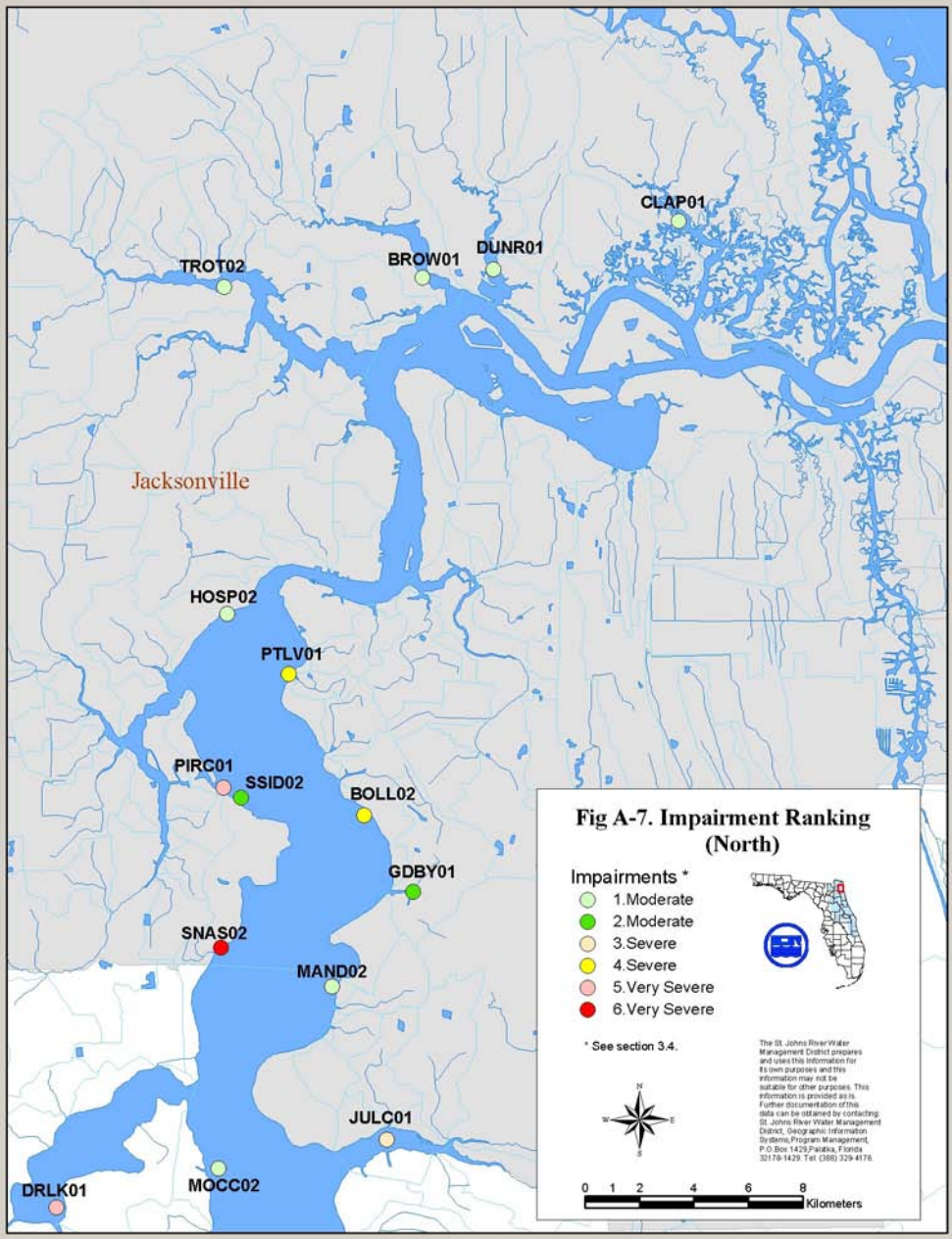

JULC01
MOCC02
DRLK01
ORAN02
Green Cove Springs
GRNC02
PALM01
PUER01
RACY01
Fig A-2. Site Location Map
(South)
Benthic Site Locations
N
W
E
S
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems, Program Management, P.O. Box 1429, Palatka, Florida 32178-1429. Tel: (386) 329-4176.
0 1 2 4 6 8
Kilometers

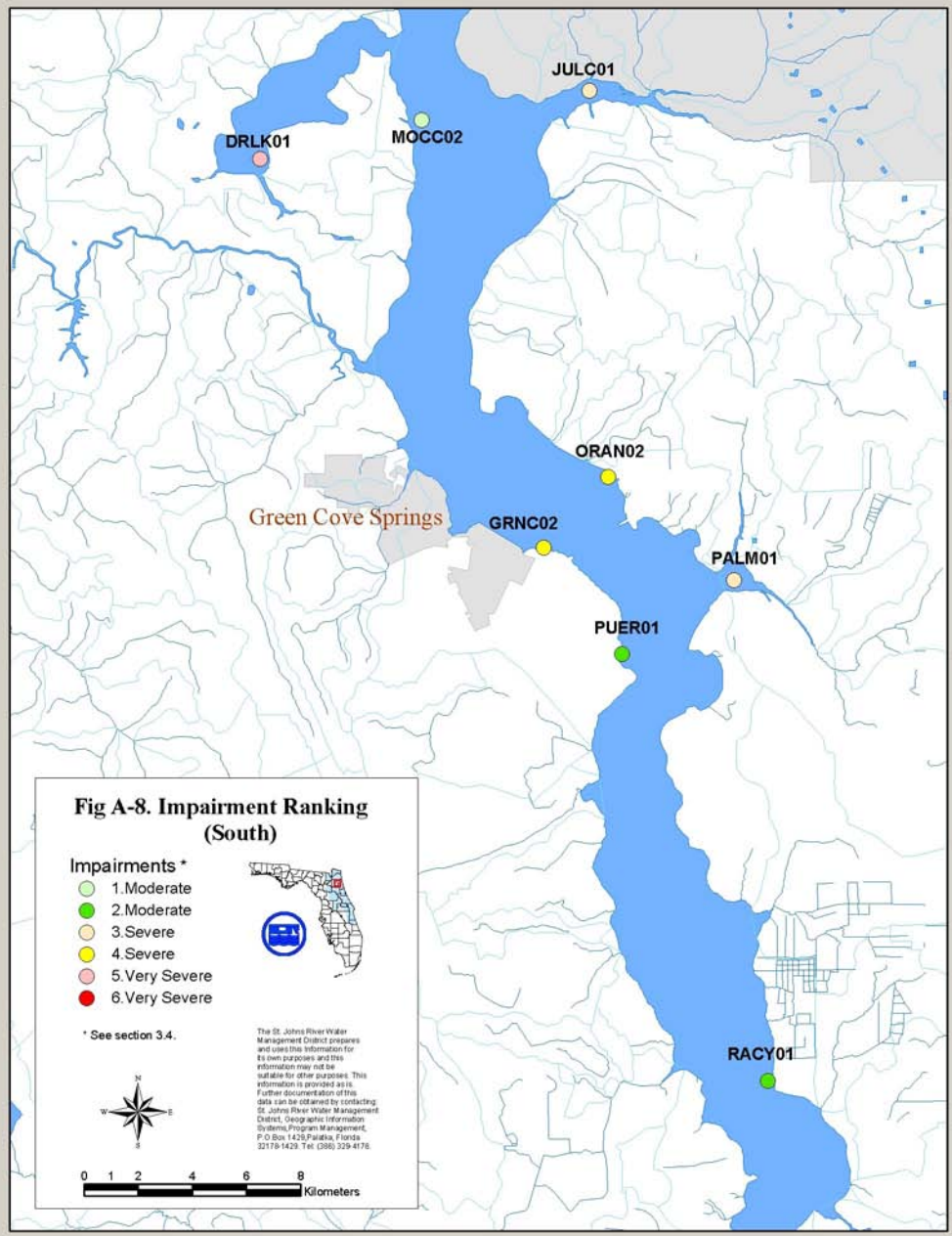

CLAP01
0
DUNR01
0
BROW01
0
TROT02
0
Jacksonville
HOSP02
0
PTLV01
2
PIRC01
2
SSID02
7
BOLL02
3
GDBY01
4
SNAS02
23
MAND02
0
JULC01
12
0
MOCC02
DRLK01
0
Fig A-3. Larval Chironomid Deformities (North)
None
2
3 - 4
7 or More
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems, Program Management, P.O.Box 1429,Palatka, Florida 32178-1429. Tel: (386) 329-4176.
N
W
E
S
0 1 2 4 6 8
Kilometers


JULC01
12
MOCC02
0
DRLK01
0
ORAN02
0
Green Cove Springs
GRNC02
0
PALM01
12
PUER01
2
RACY01
4
Fig A-4. Larval Chironomid Deformities (South)
None
2
3 - 4
7 or More
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O. Box 1429,Palatka, Florida 32178-1429. Tel: (386) 329-4178.
0 1 2 4 6 8
Kilometers


CLAP01
DUNR01
BROW01
TROT02
Jacksonville
HOSP02
PTLV01
PIRC01
SSID02
BOLL02
GDBY01
SNAS02
MAND02
JULC01
MOCC02
DRLK01
Fig A-5. Site Class (North)
Benthic Classes
Class A
Class B
N
W
E
S
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429,Palatka, Florida 32178-1429. Tel: (386) 329-4176.
0 1 2 4 6 8
Kilometers


JULC01
MOCC02
DRLK01
ORAN02
Green Cove Springs
GRNC02
PALM01
PUER01
RACY01
Fig A-6. Site Class (South)
Benthic Classes
Class A
Class B
N
W
E
S
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429,Palatka, Florida 32178-1429. Tel. (386) 329-4176.
0 1 2 4 6 8
Kilometers


CLAP01
DUNR01
BROW01
TROT02
Jacksonville
HOSP02
PTLV01
PIRC01
SSID02
BOLL02
GDBY01
SNAS02
MAND02
JULC01
MOCC02
DRLK01
Fig A-7. Impairment Ranking (North)
Impairments *
1.Moderate
2.Moderate
3.Severe
4.Severe
5.Very Severe
6.Very Severe
* See section 3.4.
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems, Program Management, P.O.Box 1429, Palatka, Florida 32178-1429. Tel: (386) 329-4176.
N
W
E
S
0 1 2 4 6 8
Kilometers


JULC01
MOCC02
DRLK01
ORAN02
Green Cove Springs
GRNC02
PALM01
PUER01
RACY01
Fig A-8. Impairment Ranking (South)
Impairments *
1.Moderate
2.Moderate
3.Severe
4.Severe
5.Very Severe
6.Very Severe
* See section 3.4.
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429,Palatka, Florida 32178-1429. Tel: (386) 329-4176.
N
W
E
S
0 1 2 4 6 8
Kilometers

Appendix B

Benthic Macroinvertebrate Data, Petite Ponar Samples Collected October 2002-August 2003

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
NEMERTEA									
NEMERTEA (LPIL)	--	--	--	--	--	--	--	7	--
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	--
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	--	--	--	--	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	--
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	--	--	--	--	--	--	--
SPIONIDAE (LPIL)	--	1	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	1	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	--	--	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	1	--	--	--	--	3	--
LIMNODRILUS HOFFMEISTERI	--	--	--	1	2	--	--	4	20
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	1	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	1	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	2	1	1	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	3	--	--	--	--	--	--	--
BALANUS SP. B	--	4	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	--	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	--	--	--	--	--	1
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	2	--	--	--	--	--	--	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	5	7	9	1	5	1	--	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	--
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	--	--	--
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	3	--	--	--	--	--	1	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	1	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	--	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	1	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	1	30	--	22	7	14	--	--	12
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	8
CRYPTOCHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
DJALMABATISTA PULCHRA	4	--	--	--	2	--	--	--	--
EINFELDIA NATCHITOCHEAE	--	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	7	--	--	--	2	7	--	1	--
POLYPEDILUM SCALAENUM GROUP	--	--	1	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--	--	--	--	--	--	--	3
TANYTARSUS SP.	--	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	14	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	1	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	--	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	1	--	30	--	--	--	--
LITTORIDINOPS SP.	--	--	--	8	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	1	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	1	9	--
MYTILOPSIS LEUCOPHAEATA	--	3	--	--	10	1	--	--	15
RANGIA CUNEATA	--	--	--	8	21	9	--	--	8
TOTAL NUMBER OF ORGANISMS	36	52	16	41	80	33	1	25	67
NUMBER OF TAXA	8	8	8	6	9	6	1	6	7

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
NEMERTEA									
NEMERTEA (LPIL)	1	--	--	--	--	--	--	--	6
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	5
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	5	--	--	2	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	3
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	1	26	--	--	2	--	--
SPIONIDAE (LPIL)	--	--	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	--	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	1	3	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
LIMNODRILUS HOFFMEISTERI	--	6	--	--	--	1	1	--	--
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	2
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	--	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	--	--	--	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	--	--	--	--	--	--	--	--
BALANUS SP. B	--	--	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	1	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	1	--	--	4	--	--
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	--	--	--	--	--	--	1	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	--	2	4	16	--	1	36	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	1
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	3	--	9
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	1

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	--	--	--	--	--	--	--	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	--	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	1	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	1	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	4	12	2	7	2	23	--	8	--
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	--
CRYPTOCHIRONOMUS SP.	--	--	--	1	--	--	--	--	--
DJALMABATISTA PULCHRA	--	--	--	--	--	--	--	--	--
EINFELDIA NATCHITOCHEAE	2	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	--	--	--	--	--	--	--	--	--
POLYPEDILUM SCALAENUM GROUP	--	--	--	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	17	1	--	--	--	--	--	--	--
TANYTARSUS SP.	1	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	--	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	3	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	--	--	--	--	--	36	--
LITTORIDINOPS SP.	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	--	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	--	--	1
MYTILOPSIS LEUCOPHAEATA	--	7	--	--	--	--	9	--	--
RANGIA CUNEATA	--	11	--	3	--	3	7	4	--
TOTAL NUMBER OF ORGANISMS	32	42	7	59	2	28	65	48	28
NUMBER OF TAXA	10	7	3	7	1	4	9	3	8

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION	Station	DUNR01	CLAP01
NEMERTEA			
NEMERTEA (LPIL)		1	8
POLYCHAETA - CAPITELLIDAE			
CAPITELLA CAPITATA		--	1
HETEROMASTUS FILIFORMIS		12	--
MEDIOMASTUS CALIFORNIENSIS		--	3
POLYCHAETA - MALDANIDAE			
SABACO AMERICANUS		--	2
POLYCHAETA - NEREIDAE			
LAEONEREIS CULVERI		--	--
NEANTHES SUCCINEA		4	--
POLYCHAETA - ORBINIIDAE			
ORBINIIDAE (LPIL)		--	2
SCOLOPLOS RUBRA		--	2
POLYCHAETA - PHYLLODOCIDAE			
ETEONE HETEROPODA		--	1
POLYCHAETA - SPIONIDAE			
MARENZELLERIA VIRIDIS		1	--
SPIONIDAE (LPIL)		--	--
STREBLOSPIO SP.		5	13
POLYCHAETA			
POLYCHAETA (LPIL)		--	--
OLIGOCHAETA - TUBIFICIDAE			
AULODRILUS PIGUETI		--	--
CF. TUBIFICOIDES SP.		--	--
LIMNODRILUS HOFFMEISTERI		--	--
TUBIFICOIDES SP.		--	1
CRUSTACEA - MYSIDACEA			
AMERICAMYSIS BIGELOWI		--	1

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
ISOPODA - IDOTEIDAE		
EDOTIA TRILOBA	--	--
AMPHIPODA - AMPELISCIDAE		
AMPELISCA SP.	--	9
CRUSTACEA - AMPHIPODA		
AMPHIPODA (LPIL)	--	3
CERAPUS BENTHOPHILUS	--	30
AMPHIPODA - AORIDAE		
GRANDIDIERELLA BONNIEROIDES	--	6
CRUSTACEA		
BALANUS SP. A	--	--
BALANUS SP. B	--	--
AMPHIPODA - COROPHIIDAE		
APOCOROPHIUM LACUSTRE	1	--
AMPHIPODA - GAMMARIDAE		
GAMMARUS SP.	--	--
AMPHIPODA - HAUSTORIIDAE		
CYATHURA POLITA	1	--
AMPHIPODA - OEDICEROTIDAE		
AMEROCULODES SP.	--	--
OEDICEROTIDAE (LPIL)	--	--
AMPHIPODA - MELITIDAE		
MELITA NITIDA	13	--
CRUSTACEA - DECAPODA		
DECAPODA (LPIL)	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
DECAPODA - XANTHIDAE		
RHITHROPANOPEUS HARRISII	--	--
CRUSTACEA - CUMACEA		
CYCLASPIS VARIANS	--	1
INSECTA - EPHEMEROPTERA		
CAENIS SP.	--	--
INSECTA - ODONATA		
PERITHEMIS TENERA SEMINOLE	--	--
INSECTA - COLEOPTERA		
CELINA HUBBELLI	--	--
INSECTA - DIPTERA - CHIRONOMIDAE		
CHIRONOMUS SP.	--	--
COELOTANYPUS SP.	--	--
COELOTANYPUS TRICOLOR	--	--
CRYPTOCHIRONOMUS SP.	--	--
DJALMABATISTA PULCHRA	--	--
EINFELDIA NATCHITOCHEAE	--	--
POLYPEDILUM HALTERALE GROUP	--	--
POLYPEDILUM SCALAENUM GROUP	1	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--
TANYTARSUS SP.	--	--
TANYTARSUS SP. L	--	--
INSECTA - DIPTERA - OTHER		
CHAOBORUS PUNCTIPENNIS	--	--
INSECTA - TRICHOPTERA		
OECETIS SP.	--	--
MOLLUSCA - GASTROPODA		
HYDROBIIDAE (LPIL)	--	--
LITTORIDINOPS SP.	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

RAW DATA

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
MOLLUSCA - BIVALVIA		
BIVALVIA (LPIL)	--	--
MACOMA TENTA	3	--
MYTILOPSIS LEUCOPHAEATA	--	--
RANGIA CUNEATA	--	--
TOTAL NUMBER OF ORGANISMS	42	83
NUMBER OF TAXA	10	15

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
NEMERTEA									
NEMERTEA (LPIL)	--	--	--	--	--	--	--	75	--
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	--
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	--	--	--	--	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	--
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	--	--	--	--	--	--	--
SPIONIDAE (LPIL)	--	11	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	11	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	--	--	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	11	--	--	--	--	32	--
LIMNODRILUS HOFFMEISTERI	--	--	--	11	22	--	--	43	216
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	11	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	11	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	22	11	11	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	32	--	--	--	--	--	--	--
BALANUS SP. B	--	43	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	--	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	--	--	--	--	--	11
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	22	--	--	--	--	--	--	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	54	75	97	11	54	11	--	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	--
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	--	--	--
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	32	--	--	--	--	--	11	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	11	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	--	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	11	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	11	323	--	237	75	151	--	--	129
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	86
CRYPTOCHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
DJALMABATISTA PULCHRA	43	--	--	--	22	--	--	--	--
EINFELDIA NATCHITOCHEAE	--	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	75	--	--	--	22	75	--	11	--
POLYPEDILUM SCALAENUM GROUP	--	--	11	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--	--	--	--	--	--	--	32
TANYTARSUS SP.	--	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	151	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	11	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	--	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	11	--	323	--	--	--	--
LITTORIDINOPS SP.	--	--	--	86	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	11	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	11	97	--
MYTILOPSIS LEUCOPHAEATA	--	32	--	--	108	11	--	--	162
RANGIA CUNEATA	--	--	--	86	226	97	--	--	86
TOTAL NUMBER OF ORGANISMS	389	559	174	442	863	356	11	269	722
NUMBER OF TAXA	8	8	8	6	9	6	1	6	7

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
NEMERTEA									
NEMERTEA (LPIL)	11	--	--	--	--	--	--	--	65
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	54
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	54	--	--	22	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	32
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	11	280	--	--	22	--	--
SPIONIDAE (LPIL)	--	--	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	--	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	11	32	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
LIMNODRILUS HOFFMEISTERI	--	65	--	--	--	11	11	--	--
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	22
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	--	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	--	--	--	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	--	--	--	--	--	--	--	--
BALANUS SP. B	--	--	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	11	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	11	--	--	43	--	--
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	--	--	--	--	--	--	11	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	--	22	43	172	--	11	388	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	11
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	32	--	97
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	11

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	--	--	--	--	--	--	--	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	--	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	11	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	11	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	43	129	22	75	22	248	--	86	--
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	--
CRYPTOCHIRONOMUS SP.	--	--	--	11	--	--	--	--	--
DJALMABATISTA PULCHRA	--	--	--	--	--	--	--	--	--
EINFELDIA NATCHITOCHEAE	22	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	--	--	--	--	--	--	--	--	--
POLYPEDILUM SCALAENUM GROUP	--	--	--	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	183	11	--	--	--	--	--	--	--
TANYTARSUS SP.	11	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	--	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	32	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	--	--	--	--	--	388	--
LITTORIDINOPS SP.	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	--	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	--	--	11
MYTILOPSIS LEUCOPHAEATA	--	75	--	--	--	--	97	--	--
RANGIA CUNEATA	--	119	--	32	--	32	75	43	--
TOTAL NUMBER OF ORGANISMS	346	453	76	635	22	302	701	517	303
NUMBER OF TAXA	10	7	3	7	1	4	9	3	8

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01
NEMERTEA		
NEMERTEA (LPIL)	11	86
POLYCHAETA - CAPITELLIDAE		
CAPITELLA CAPITATA	--	11
HETEROMASTUS FILIFORMIS	129	--
MEDIOMASTUS CALIFORNIENSIS	--	32
POLYCHAETA - MALDANIDAE		
SABACO AMERICANUS	--	22
POLYCHAETA - NEREIDAE		
LAEONEREIS CULVERI	--	--
NEANTHES SUCCINEA	43	--
POLYCHAETA - ORBINIIDAE		
ORBINIIDAE (LPIL)	--	22
SCOLOPLOS RUBRA	--	22
POLYCHAETA - PHYLLODOCIDAE		
ETEONE HETEROPODA	--	11
POLYCHAETA - SPIONIDAE		
MARENZELLERIA VIRIDIS	11	--
SPIONIDAE (LPIL)	--	--
STREBLOSPIO SP.	54	140
POLYCHAETA		
POLYCHAETA (LPIL)	--	--
OLIGOCHAETA - TUBIFICIDAE		
AULODRILUS PIGUETI	--	--
CF. TUBIFICOIDES SP.	--	--
LIMNODRILUS HOFFMEISTERI	--	--
TUBIFICOIDES SP.	--	11
CRUSTACEA - MYSIDACEA		
AMERICAMYSIS BIGELOWI	--	11

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
ISOPODA - IDOTEIDAE		
EDOTIA TRILOBA	--	--
AMPHIPODA - AMPELISCIDAE		
AMPELISCA SP.	--	97
CRUSTACEA - AMPHIPODA		
AMPHIPODA (LPIL)	--	32
CERAPUS BENTHOPHILUS	--	323
AMPHIPODA - AORIDAE		
GRANDIDIERELLA BONNIEROIDES	--	65
CRUSTACEA		
BALANUS SP. A	--	--
BALANUS SP. B	--	--
AMPHIPODA - COROPHIIDAE		
APOCOROPHIUM LACUSTRE	11	--
AMPHIPODA - GAMMARIDAE		
GAMMARUS SP.	--	--
AMPHIPODA - HAUSTORIIDAE		
CYATHURA POLITA	11	--
AMPHIPODA - OEDICEROTIDAE		
AMEROCULODES SP.	--	--
OEDICEROTIDAE (LPIL)	--	--
AMPHIPODA - MELITIDAE		
MELITA NITIDA	140	--
CRUSTACEA - DECAPODA		
DECAPODA (LPIL)	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
DECAPODA - XANTHIDAE		
RHITHROPANOPEUS HARRISII	--	--
CRUSTACEA - CUMACEA		
CYCLASPIS VARIANS	--	11
INSECTA - EPHEMEROPTERA		
CAENIS SP.	--	--
INSECTA - ODONATA		
PERITHEMIS TENERA SEMINOLE	--	--
INSECTA - COLEOPTERA		
CELINA HUBBELLI	--	--
INSECTA - DIPTERA - CHIRONOMIDAE		
CHIRONOMUS SP.	--	--
COELOTANYPUS SP.	--	--
COELOTANYPUS TRICOLOR	--	--
CRYPTOCHIRONOMUS SP.	--	--
DJALMABATISTA PULCHRA	--	--
EINFELDIA NATCHITOCHEAE	--	--
POLYPEDILUM HALTERALE GROUP	--	--
POLYPEDILUM SCALAENUM GROUP	11	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--
TANYTARSUS SP.	--	--
TANYTARSUS SP. L	--	--
INSECTA - DIPTERA - OTHER		
CHAOBORUS PUNCTIPENNIS	--	--
INSECTA - TRICHOPTERA		
OECETIS SP.	--	--
MOLLUSCA - GASTROPODA		
HYDROBIIDAE (LPIL)	--	--
LITTORIDINOPS SP.	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

NUMBER PER SQUARE METER

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
MOLLUSCA - BIVALVIA		
BIVALVIA (LPIL)	--	--
MACOMA TENTA	32	--
MYTILOPSIS LEUCOPHAEATA	--	--
RANGIA CUNEATA	--	--
TOTAL NUMBER OF ORGANISMS	453	896
NUMBER OF TAXA	10	15

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
NEMERTEA									
NEMERTEA (LPIL)	--	--	--	--	--	--	--	27.9	--
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	--
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	--	--	--	--	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	--
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	--	--	--	--	--	--	--
SPIONIDAE (LPIL)	--	2.0	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	6.3	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	--	--	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	6.3	--	--	--	--	11.9	--
LIMNODRILUS HOFFMEISTERI	--	--	--	2.5	2.5	--	--	16.0	29.9
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	1.3	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	6.3	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	5.7	2.0	6.3	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	5.7	--	--	--	--	--	--	--
BALANUS SP. B	--	7.7	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	--	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	--	--	--	--	--	1.5
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	5.7	--	--	--	--	--	--	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	13.9	13.4	55.7	2.5	6.3	3.1	--	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	--
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	--	--	--
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	5.7	--	--	--	--	--	4.1	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	2.5	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	--	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	6.3	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	2.8	57.8	--	53.6	8.7	42.4	--	--	17.9
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	11.9
CRYPTOCHIRONOMUS SP.	--	--	--	--	--	--	--	--	--
DJALMABATISTA PULCHRA	11.1	--	--	--	2.5	--	--	--	--
EINFELDIA NATCHITOCHEAE	--	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	19.3	--	--	--	2.5	21.1	--	4.1	--
POLYPEDILUM SCALAENUM GROUP	--	--	6.3	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--	--	--	--	--	--	--	4.4
TANYTARSUS SP.	--	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	38.8	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	3.1	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	--	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	6.3	--	37.4	--	--	--	--
LITTORIDINOPS SP.	--	--	--	19.5	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	2.8	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	100.0	36.1	--
MYTILOPSIS LEUCOPHAEATA	--	5.7	--	--	12.5	3.1	--	--	22.4
RANGIA CUNEATA	--	--	--	19.5	26.2	27.2	--	--	11.9
TOTAL	100	100	100	100	100	100	100	100	100
NUMBER OF TAXA	8	8	8	6	9	6	1	6	7

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
NEMERTEA									
NEMERTEA (LPIL)	3.2	--	--	--	--	--	--	--	21.5
POLYCHAETA - CAPITELLIDAE									
CAPITELLA CAPITATA	--	--	--	--	--	--	--	--	--
HETEROMASTUS FILIFORMIS	--	--	--	--	--	--	--	--	17.8
MEDIOMASTUS CALIFORNIENSIS	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
SABACO AMERICANUS	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
LAEONEREIS CULVERI	--	--	--	8.5	--	--	3.1	--	--
NEANTHES SUCCINEA	--	--	--	--	--	--	--	--	10.6
POLYCHAETA - ORBINIIDAE									
ORBINIIDAE (LPIL)	--	--	--	--	--	--	--	--	--
SCOLOPLOS RUBRA	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
ETEONE HETEROPODA	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
MARENZELLERIA VIRIDIS	--	--	14.5	44.1	--	--	3.1	--	--
SPIONIDAE (LPIL)	--	--	--	--	--	--	--	--	--
STREBLOSPIO SP.	--	--	--	--	--	--	--	--	--
POLYCHAETA									
POLYCHAETA (LPIL)	--	--	--	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
AULODRILUS PIGUETI	3.2	7.1	--	--	--	--	--	--	--
CF. TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	--
LIMNODRILUS HOFFMEISTERI	--	14.3	--	--	--	3.6	1.6	--	--
TUBIFICOIDES SP.	--	--	--	--	--	--	--	--	7.3
CRUSTACEA - MYSIDACEA									
AMERICAMYSIS BIGELOWI	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
ISOPODA - IDOTEIDAE									
EDOTIA TRILOBA	--	--	--	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
AMPELISCA SP.	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
AMPHIPODA (LPIL)	--	--	--	--	--	--	--	--	--
CERAPUS BENTHOPHILUS	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
GRANDIDIERELLA BONNIEROIDES	--	--	--	--	--	--	--	--	--
CRUSTACEA									
BALANUS SP. A	--	--	--	--	--	--	--	--	--
BALANUS SP. B	--	--	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
APOCOROPHIUM LACUSTRE	3.2	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
GAMMARUS SP.	--	--	--	1.7	--	--	6.1	--	--
AMPHIPODA - HAUSTORIIDAE									
CYATHURA POLITA	--	--	--	--	--	--	1.6	--	--
AMPHIPODA - OEDICEROTIDAE									
AMEROCULODES SP.	--	4.9	56.6	27.1	--	3.6	55.3	--	--
OEDICEROTIDAE (LPIL)	--	--	--	--	--	--	--	--	3.6
AMPHIPODA - MELITIDAE									
MELITA NITIDA	--	--	--	--	--	--	4.6	--	32.0
CRUSTACEA - DECAPODA									
DECAPODA (LPIL)	--	--	--	--	--	--	--	--	3.6

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
DECAPODA - XANTHIDAE									
RHITHROPANOPEUS HARRISII	--	--	--	--	--	--	--	--	--
CRUSTACEA - CUMACEA									
CYCLASPIS VARIANS	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
CAENIS SP.	--	--	--	--	--	--	--	--	--
INSECTA - ODONATA									
PERITHEMIS TENERA SEMINOLE	3.2	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
CELINA HUBBELLI	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
CHIRONOMUS SP.	3.2	--	--	--	--	--	--	--	--
COELOTANYPUS SP.	12.4	28.5	28.9	11.8	100.0	82.1	--	16.6	--
COELOTANYPUS TRICOLOR	--	--	--	--	--	--	--	--	--
CRYPTOCHIRONOMUS SP.	--	--	--	1.7	--	--	--	--	--
DJALMABATISTA PULCHRA	--	--	--	--	--	--	--	--	--
EINFELDIA NATCHITOCHEAE	6.4	--	--	--	--	--	--	--	--
POLYPEDILUM HALTERALE GROUP	--	--	--	--	--	--	--	--	--
POLYPEDILUM SCALAENUM GROUP	--	--	--	--	--	--	--	--	--
PROCLADIUS (HOLOTANYPUS) SP.	52.9	2.4	--	--	--	--	--	--	--
TANYTARSUS SP.	3.2	--	--	--	--	--	--	--	--
TANYTARSUS SP. L	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - OTHER									
CHAOBORUS PUNCTIPENNIS	--	--	--	--	--	--	--	--	--
INSECTA - TRICHOPTERA									
OECETIS SP.	9.2	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
HYDROBIIDAE (LPIL)	--	--	--	--	--	--	--	75.0	--
LITTORIDINOPS SP.	--	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
MOLLUSCA - BIVALVIA									
BIVALVIA (LPIL)	--	--	--	--	--	--	--	--	--
MACOMA TENTA	--	--	--	--	--	--	--	--	3.6
MYTILOPSIS LEUCOPHAEATA	--	16.6	--	--	--	--	13.8	--	--
RANGIA CUNEATA	--	26.3	--	5.0	--	10.6	10.7	8.3	--
TOTAL	100	100	100	100	100	100	100	100	100
NUMBER OF TAXA	10	7	3	7	1	4	9	3	8

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01
NEMERTEA		
NEMERTEA (LPIL)	2.4	9.6
POLYCHAETA - CAPITELLIDAE		
CAPITELLA CAPITATA	--	1.2
HETEROMASTUS FILIFORMIS	28.5	--
MEDIOMASTUS CALIFORNIENSIS	--	3.6
POLYCHAETA - MALDANIDAE		
SABACO AMERICANUS	--	2.5
POLYCHAETA - NEREIDAE		
LAEONEREIS CULVERI	--	--
NEANTHES SUCCINEA	9.5	--
POLYCHAETA - ORBINIIDAE		
ORBINIIDAE (LPIL)	--	2.5
SCOLOPLOS RUBRA	--	2.5
POLYCHAETA - PHYLLODOCIDAE		
ETEONE HETEROPODA	--	1.2
POLYCHAETA - SPIONIDAE		
MARENZELLERIA VIRIDIS	2.4	--
SPIONIDAE (LPIL)	--	--
STREBLOSPIO SP.	11.9	15.6
POLYCHAETA		
POLYCHAETA (LPIL)	--	--
OLIGOCHAETA - TUBIFICIDAE		
AULODRILUS PIGUETI	--	--
CF. TUBIFICOIDES SP.	--	--
LIMNODRILUS HOFFMEISTERI	--	--
TUBIFICOIDES SP.	--	1.2
CRUSTACEA - MYSIDACEA		
AMERICAMYSIS BIGELOWI	--	1.2

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
ISOPODA - IDOTEIDAE		
EDOTIA TRILOBA	--	--
AMPHIPODA - AMPELISCIDAE		
AMPELISCA SP.	--	10.8
CRUSTACEA - AMPHIPODA		
AMPHIPODA (LPIL)	--	3.6
CERAPUS BENTHOPHILUS	--	36.0
AMPHIPODA - AORIDAE		
GRANDIDIERELLA BONNIEROIDES	--	7.3
CRUSTACEA		
BALANUS SP. A	--	--
BALANUS SP. B	--	--
AMPHIPODA - COROPHIIDAE		
APOCOROPHIUM LACUSTRE	2.4	--
AMPHIPODA - GAMMARIDAE		
GAMMARUS SP.	--	--
AMPHIPODA - HAUSTORIIDAE		
CYATHURA POLITA	2.4	--
AMPHIPODA - OEDICEROTIDAE		
AMEROCULODES SP.	--	--
OEDICEROTIDAE (LPIL)	--	--
AMPHIPODA - MELITIDAE		
MELITA NITIDA	30.9	--
CRUSTACEA - DECAPODA		
DECAPODA (LPIL)	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
DECAPODA - XANTHIDAE		
RHITHROPANOPEUS HARRISII	--	--
CRUSTACEA - CUMACEA		
CYCLASPIS VARIANS	--	1.2
INSECTA - EPHEMEROPTERA		
CAENIS SP.	--	--
INSECTA - ODONATA		
PERITHEMIS TENERA SEMINOLE	--	--
INSECTA - COLEOPTERA		
CELINA HUBBELLI	--	--
INSECTA - DIPTERA - CHIRONOMIDAE		
CHIRONOMUS SP.	--	--
COELOTANYPUS SP.	--	--
COELOTANYPUS TRICOLOR	--	--
CRYPTOCHIRONOMUS SP.	--	--
DJALMABATISTA PULCHRA	--	--
EINFELDIA NATCHITOCHEAE	--	--
POLYPEDILUM HALTERALE GROUP	--	--
POLYPEDILUM SCALAENUM GROUP	2.4	--
PROCLADIUS (HOLOTANYPUS) SP.	--	--
TANYTARSUS SP.	--	--
TANYTARSUS SP. L	--	--
INSECTA - DIPTERA - OTHER		
CHAOBORUS PUNCTIPENNIS	--	--
INSECTA - TRICHOPTERA		
OECETIS SP.	--	--
MOLLUSCA - GASTROPODA		
HYDROBIIDAE (LPIL)	--	--
LITTORIDINOPS SP.	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

PERCENT BY DENSITY

TAXONOMIC CLASSIFICATION Station	DUNR01	CLAP01
CONTINUED FROM PREVIOUS PAGE		
MOLLUSCA - BIVALVIA		
BIVALVIA (LPIL)	--	--
MACOMA TENTA	7.1	--
MYTILOPSIS LEUCOPHAEATA	--	--
RANGIA CUNEATA	--	--
TOTAL	100	100
NUMBER OF TAXA	10	15

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
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STATION INDICES

Station	SHANNON-WIENER DIVERSITY BASE 2	PIELOU'S EVENNESS (H/Hmax)
RACY01	2.488	0.829
MAND02	2.064	0.688
HOSP02	2.217	0.739
ORAN02	1.794	0.694
PUER01	2.448	0.772
GRNC02	1.970	0.762
DRLK01	0.000	0.000
TROT02	2.207	0.854
PALM01	2.472	0.880
GDBY01	2.368	0.713
JULC01	2.465	0.878
PTLV01	1.379	0.870
SSID02	2.117	0.754
PIRC01	0.000	0.000
SNAS02	0.922	0.461
MOCC02	2.160	0.681
BOLL02	1.041	0.657
BROW01	2.579	0.860
DUNR01	2.643	0.795
CLAP01	3.016	0.772

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
NEMERTEA									
Number of Taxa	--	--	--	--	--	--	--	1	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	75	--
Organisms % All Stations	--	--	--	--	--	--	--	30	--
Organisms % This Station	--	--	--	--	--	--	--	28	--
POLYCHAETA - CAPITELLIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - MALDANIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - ORBINIIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
Number of Taxa	--	1	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	11	--	--	--	--	--	--	--
Organisms % All Stations	--	2	--	--	--	--	--	--	--
Organisms % This Station	--	2	--	--	--	--	--	--	--
POLYCHAETA									
Number of Taxa	--	--	1	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	11	--	--	--	--	--	--
Organisms % All Stations	--	--	100	--	--	--	--	--	--
Organisms % This Station	--	--	6	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
Number of Taxa	--	--	1	1	1	--	--	2	1
NUMBER PER SQUARE METER	--	--	11	11	22	--	--	75	216
Organisms % All Stations	--	--	2	2	4	--	--	15	43
Organisms % This Station	--	--	6	2	3	--	--	28	30

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
CRUSTACEA - MYSIDACEA									
Number of Taxa	--	--	--	--	1	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	11	--	--	--	--
Organisms % All Stations	--	--	--	--	50	--	--	--	--
Organisms % This Station	--	--	--	--	1	--	--	--	--
ISOPODA - IDOTEIDAE									
Number of Taxa	--	--	1	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	11	--	--	--	--	--	--
Organisms % All Stations	--	--	100	--	--	--	--	--	--
Organisms % This Station	--	--	6	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
Number of Taxa	1	1	1	--	--	--	--	--	--
NUMBER PER SQUARE METER	22	11	11	--	--	--	--	--	--
Organisms % All Stations	6	3	3	--	--	--	--	--	--
Organisms % This Station	6	2	6	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA									
Number of Taxa	--	2	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	75	--	--	--	--	--	--	--
Organisms % All Stations	--	100	--	--	--	--	--	--	--
Organisms % This Station	--	13	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	1
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	11
Organisms % All Stations	--	--	--	--	--	--	--	--	17
Organisms % This Station	--	--	--	--	--	--	--	--	2
AMPHIPODA - HAUSTORIIDAE									
Number of Taxa	1	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	22	--	--	--	--	--	--	--	--
Organisms % All Stations	50	--	--	--	--	--	--	--	--
Organisms % This Station	6	--	--	--	--	--	--	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
COLLAPSED DATA

SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
AMPHIPODA - OEDICEROTIDAE									
Number of Taxa	1	1	1	1	1	1	--	--	--
NUMBER PER SQUARE METER	54	75	97	11	54	11	--	--	--
Organisms % All Stations	6	8	10	1	6	1	--	--	--
Organisms % This Station	14	13	56	2	6	3	--	--	--
AMPHIPODA - MELITIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA - DECAPODA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
DECAPODA - XANTHIDAE									
Number of Taxa	--	1	--	--	--	--	--	1	--
NUMBER PER SQUARE METER	--	32	--	--	--	--	--	11	--
Organisms % All Stations	--	74	--	--	--	--	--	26	--
Organisms % This Station	--	6	--	--	--	--	--	4	--
CRUSTACEA - CUMACEA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
Number of Taxa	--	--	--	1	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	11	--	--	--	--	--
Organisms % All Stations	--	--	--	100	--	--	--	--	--
Organisms % This Station	--	--	--	2	--	--	--	--	--
INSECTA - ODONATA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
Number of Taxa	--	--	1	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	11	--	--	--	--	--	--
Organisms % All Stations	--	--	100	--	--	--	--	--	--
Organisms % This Station	--	--	6	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
Number of Taxa	4	1	1	1	3	2	--	1	3
NUMBER PER SQUARE METER	280	323	11	237	119	226	--	11	247
Organisms % All Stations	12	14	0	10	5	10	--	0	11
Organisms % This Station	72	58	6	54	14	63	--	4	34

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	RACY01	MAND02	HOSP02	ORAN02	PUER01	GRNC02	DRLK01	TROT02	PALM01
CONTINUED FROM PREVIOUS PAGE									
INSECTA - DIPTERA - OTHER									
Number of Taxa	--	--	--	--	--	1	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	11	--	--	--
Organisms % All Stations	--	--	--	--	--	100	--	--	--
Organisms % This Station	--	--	--	--	--	3	--	--	--
INSECTA - TRICHOPTERA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
Number of Taxa	--	--	1	1	1	--	--	--	--
NUMBER PER SQUARE METER	--	--	11	86	323	--	--	--	--
Organisms % All Stations	--	--	1	11	40	--	--	--	--
Organisms % This Station	--	--	6	19	37	--	--	--	--
MOLLUSCA - BIVALVIA									
Number of Taxa	1	1	--	1	2	2	1	1	2
NUMBER PER SQUARE METER	11	32	--	86	334	108	11	97	248
Organisms % All Stations	1	2	--	6	23	7	1	7	17
Organisms % This Station	3	6	--	19	39	30	100	36	34
SUMMARY TOTALS FOR STATIONS									
Number of Taxa	8	8	8	6	9	6	1	6	7
NUMBER PER SQUARE METER	389	559	174	442	863	356	11	269	722
Organisms % All Stations	5	7	2	5	10	4	0	3	9

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
NEMERTEA									
Number of Taxa	1	--	--	--	--	--	--	--	1
NUMBER PER SQUARE METER	11	--	--	--	--	--	--	--	65
Organisms % All Stations	4	--	--	--	--	--	--	--	26
Organisms % This Station	3	--	--	--	--	--	--	--	21
POLYCHAETA - CAPITELLIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	1
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	54
Organisms % All Stations	--	--	--	--	--	--	--	--	24
Organisms % This Station	--	--	--	--	--	--	--	--	18
POLYCHAETA - MALDANIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - NEREIDAE									
Number of Taxa	--	--	--	1	--	--	1	--	1
NUMBER PER SQUARE METER	--	--	--	54	--	--	22	--	32
Organisms % All Stations	--	--	--	36	--	--	15	--	21
Organisms % This Station	--	--	--	9	--	--	3	--	11
POLYCHAETA - ORBINIIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - PHYLLODOCIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
POLYCHAETA - SPIONIDAE									
Number of Taxa	--	--	1	1	--	--	1	--	--
NUMBER PER SQUARE METER	--	--	11	280	--	--	22	--	--
Organisms % All Stations	--	--	2	53	--	--	4	--	--
Organisms % This Station	--	--	14	44	--	--	3	--	--
POLYCHAETA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
OLIGOCHAETA - TUBIFICIDAE									
Number of Taxa	1	2	--	--	--	1	1	--	1
NUMBER PER SQUARE METER	11	97	--	--	--	11	11	--	22
Organisms % All Stations	2	19	--	--	--	2	2	--	4
Organisms % This Station	3	21	--	--	--	4	2	--	7

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
CRUSTACEA - MYSIDACEA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
ISOPODA - IDOTEIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
AMPHIPODA - AMPELISCIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA - AMPHIPODA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
AMPHIPODA - AORIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
AMPHIPODA - COROPHIIDAE									
Number of Taxa	1	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	11	--	--	--	--	--	--	--	--
Organisms % All Stations	50	--	--	--	--	--	--	--	--
Organisms % This Station	3	--	--	--	--	--	--	--	--
AMPHIPODA - GAMMARIDAE									
Number of Taxa	--	--	--	1	--	--	1	--	--
NUMBER PER SQUARE METER	--	--	--	11	--	--	43	--	--
Organisms % All Stations	--	--	--	17	--	--	66	--	--
Organisms % This Station	--	--	--	2	--	--	6	--	--
AMPHIPODA - HAUSTORIIDAE									
Number of Taxa	--	--	--	--	--	--	1	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	11	--	--
Organisms % All Stations	--	--	--	--	--	--	25	--	--
Organisms % This Station	--	--	--	--	--	--	2	--	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
AMPHIPODA - OEDICEROTIDAE									
Number of Taxa	--	1	1	1	--	1	1	--	1
NUMBER PER SQUARE METER	--	22	43	172	--	11	388	--	11
Organisms % All Stations	--	2	5	18	--	1	41	--	1
Organisms % This Station	--	5	57	27	--	4	55	--	4
AMPHIPODA - MELITIDAE									
Number of Taxa	--	--	--	--	--	--	1	--	1
NUMBER PER SQUARE METER	--	--	--	--	--	--	32	--	97
Organisms % All Stations	--	--	--	--	--	--	12	--	36
Organisms % This Station	--	--	--	--	--	--	5	--	32
CRUSTACEA - DECAPODA									
Number of Taxa	--	--	--	--	--	--	--	--	1
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	11
Organisms % All Stations	--	--	--	--	--	--	--	--	100
Organisms % This Station	--	--	--	--	--	--	--	--	4
DECAPODA - XANTHIDAE									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
CRUSTACEA - CUMACEA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - EPHEMEROPTERA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - ODONATA									
Number of Taxa	1	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	11	--	--	--	--	--	--	--	--
Organisms % All Stations	100	--	--	--	--	--	--	--	--
Organisms % This Station	3	--	--	--	--	--	--	--	--
INSECTA - COLEOPTERA									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - DIPTERA - CHIRONOMIDAE									
Number of Taxa	5	2	1	2	1	1	--	1	--
NUMBER PER SQUARE METER	270	140	22	86	22	248	--	86	--
Organisms % All Stations	12	6	1	4	1	11	--	4	--
Organisms % This Station	78	31	29	14	100	82	--	17	--

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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COLLAPSED DATA

SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	GDBY01	JULC01	PTLV01	SSID02	PIRC01	SNAS02	MOCC02	BOLL02	BROW01
CONTINUED FROM PREVIOUS PAGE									
INSECTA - DIPTERA - OTHER									
Number of Taxa	--	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	--	--
Organisms % All Stations	--	--	--	--	--	--	--	--	--
Organisms % This Station	--	--	--	--	--	--	--	--	--
INSECTA - TRICHOPTERA									
Number of Taxa	1	--	--	--	--	--	--	--	--
NUMBER PER SQUARE METER	32	--	--	--	--	--	--	--	--
Organisms % All Stations	100	--	--	--	--	--	--	--	--
Organisms % This Station	9	--	--	--	--	--	--	--	--
MOLLUSCA - GASTROPODA									
Number of Taxa	--	--	--	--	--	--	--	1	--
NUMBER PER SQUARE METER	--	--	--	--	--	--	--	388	--
Organisms % All Stations	--	--	--	--	--	--	--	48	--
Organisms % This Station	--	--	--	--	--	--	--	75	--
MOLLUSCA - BIVALVIA									
Number of Taxa	--	2	--	1	--	1	2	1	1
NUMBER PER SQUARE METER	--	194	--	32	--	32	172	43	11
Organisms % All Stations	--	13	--	2	--	2	12	3	1
Organisms % This Station	--	43	--	5	--	11	25	8	4
SUMMARY TOTALS FOR STATIONS									
Number of Taxa	10	7	3	7	1	4	9	3	8
NUMBER PER SQUARE METER	346	453	76	635	22	302	701	517	303
Organisms % All Stations	4	5	1	7	0	4	8	6	4

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
PETITE PONAR SAMPLES COLLECTED OCTOBER, 2002 - AUGUST, 2003
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01	MEAN VALUES
NEMERTEA			
Number of Taxa	1	1	0
NUMBER PER SQUARE METER	11	86	12
Organisms % All Stations	4	35	--
Organisms % This Station	2	10	3
POLYCHAETA - CAPITELLIDAE			
Number of Taxa	1	2	0
NUMBER PER SQUARE METER	129	43	11
Organisms % All Stations	57	19	--
Organisms % This Station	28	5	3
POLYCHAETA - MALDANIDAE			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	22	1
Organisms % All Stations	--	100	--
Organisms % This Station	--	2	0
POLYCHAETA - NEREIDAE			
Number of Taxa	1	--	0
NUMBER PER SQUARE METER	43	--	8
Organisms % All Stations	28	--	--
Organisms % This Station	9	--	2
POLYCHAETA - ORBINIIDAE			
Number of Taxa	--	2	0
NUMBER PER SQUARE METER	--	44	2
Organisms % All Stations	--	100	--
Organisms % This Station	--	5	1
POLYCHAETA - PHYLLODOCIDAE			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	11	1
Organisms % All Stations	--	100	--
Organisms % This Station	--	1	0
POLYCHAETA - SPIONIDAE			
Number of Taxa	2	1	0
NUMBER PER SQUARE METER	65	140	26
Organisms % All Stations	12	26	--
Organisms % This Station	14	16	6
POLYCHAETA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
OLIGOCHAETA - TUBIFICIDAE			
Number of Taxa	--	1	1
NUMBER PER SQUARE METER	--	11	25
Organisms % All Stations	--	2	--
Organisms % This Station	--	1	6

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01	MEAN VALUES
CONTINUED FROM PREVIOUS PAGE			
CRUSTACEA - MYSIDACEA			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	11	1
Organisms % All Stations	--	50	--
Organisms % This Station	--	1	0
ISOPODA - IDOTEIDAE			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
AMPHIPODA - AMPELISCIDAE			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	97	5
Organisms % All Stations	--	100	--
Organisms % This Station	--	11	1
CRUSTACEA - AMPHIPODA			
Number of Taxa	--	2	0
NUMBER PER SQUARE METER	--	355	20
Organisms % All Stations	--	89	--
Organisms % This Station	--	40	5
AMPHIPODA - AORIDAE			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	65	3
Organisms % All Stations	--	100	--
Organisms % This Station	--	7	1
CRUSTACEA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	4
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	1
AMPHIPODA - COROPHIIDAE			
Number of Taxa	1	--	0
NUMBER PER SQUARE METER	11	--	1
Organisms % All Stations	50	--	--
Organisms % This Station	2	--	0
AMPHIPODA - GAMMARIDAE			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	3
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	1
AMPHIPODA - HAUSTORIIDAE			
Number of Taxa	1	--	0
NUMBER PER SQUARE METER	11	--	2
Organisms % All Stations	25	--	--
Organisms % This Station	2	--	1

BENTHIC MACROINVERTEBRATE DATA, LOWER ST. JOHNS RIVER BASIN, FLORIDA
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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01	MEAN VALUES
CONTINUED FROM PREVIOUS PAGE			
AMPHIPODA - OEDICEROTIDAE			
Number of Taxa	--	--	1
NUMBER PER SQUARE METER	--	--	47
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	11
AMPHIPODA - MELITIDAE			
Number of Taxa	1	--	0
NUMBER PER SQUARE METER	140	--	13
Organisms % All Stations	52	--	--
Organisms % This Station	31	--	3
CRUSTACEA - DECAPODA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
DECAPODA - XANTHIDAE			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	2
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	1
CRUSTACEA - CUMACEA			
Number of Taxa	--	1	0
NUMBER PER SQUARE METER	--	11	1
Organisms % All Stations	--	100	--
Organisms % This Station	--	1	0
INSECTA - EPHEMEROPTERA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
INSECTA - ODONATA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
INSECTA - COLEOPTERA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
INSECTA - DIPTERA - CHIRONOMIDAE			
Number of Taxa	1	--	2
NUMBER PER SQUARE METER	11	--	117
Organisms % All Stations	0	--	--
Organisms % This Station	2	--	28

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SUMMARY TABLE

TAXONOMIC CLASSIFICATION / Station	DUNR01	CLAP01	MEAN VALUES
CONTINUED FROM PREVIOUS PAGE			
INSECTA - DIPTERA - OTHER			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	1
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
INSECTA - TRICHOPTERA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	2
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	0
MOLLUSCA - GASTROPODA			
Number of Taxa	--	--	0
NUMBER PER SQUARE METER	--	--	40
Organisms % All Stations	--	--	--
Organisms % This Station	--	--	10
MOLLUSCA - BIVALVIA			
Number of Taxa	1	--	1
NUMBER PER SQUARE METER	32	--	72
Organisms % All Stations	2	--	--
Organisms % This Station	7	--	17
SUMMARY TOTALS FOR STATIONS			
Number of Taxa	10	15	7
NUMBER PER SQUARE METER	453	896	424
Organisms % All Stations	5	11	--