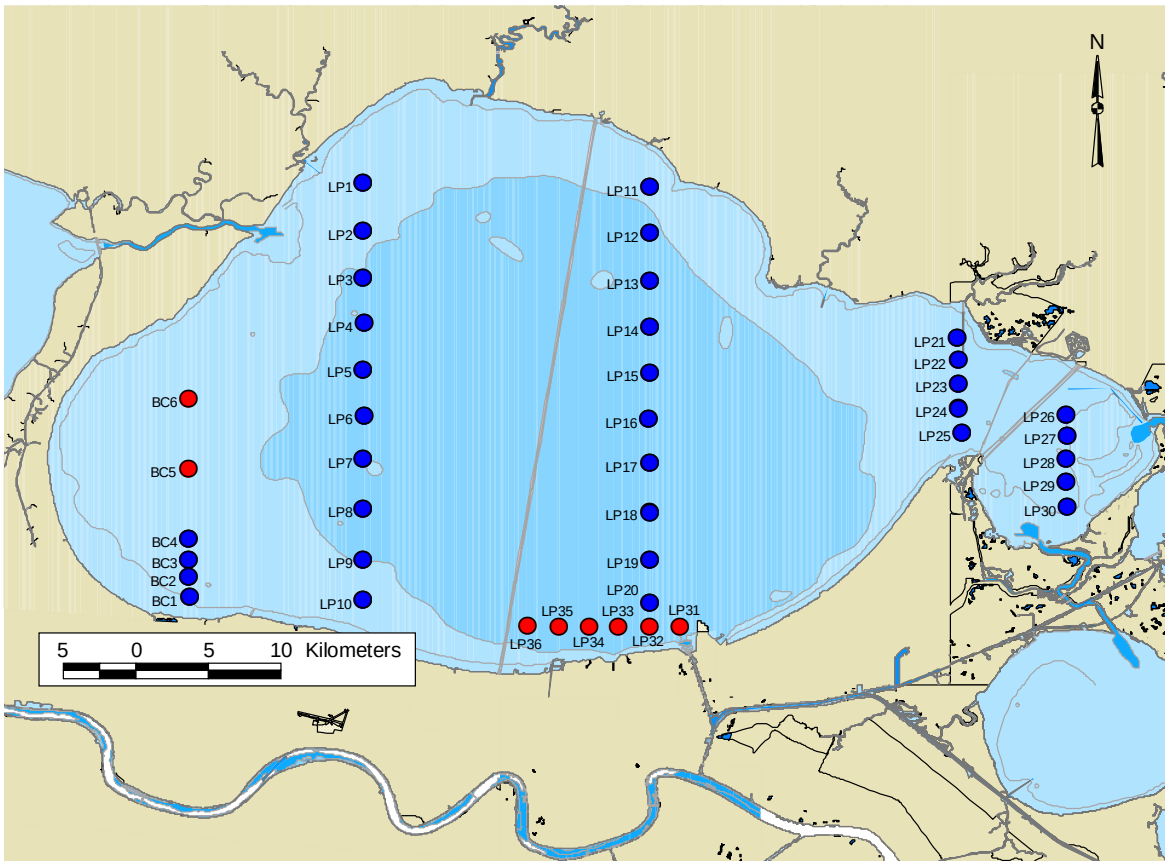
Response of Benthic Invertebrate Communities Following the 2008 Bonnet Carre' Spillway Release.



A Report to the U.S. Army Engineer District, New Orleans

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Introduction:

On April 11, 2008 the U. S. Army Engineer District, New Orleans partially opened the Bonnet Carre' Spillway to lower water levels on the Mississippi River and relieve pressure on levees bordering the city of New Orleans. With 160 of the 350 bays opened, the spillway remained in operation until May 8 releasing as much as 160,000 cubic feet per second (cfs) of river water into Lake Pontchartrain (USACE, Bonnet Carre' Spillway Website, http://www.mvn.usace.army.mil/bCarre'/2008%20operation.asp). The spillway was constructed between 1929 and 1936 and had previously been opened only eight times (1937, 1945, 1950, 1973, 1975, 1979, 1983, and 1997). Although the duration and magnitude of previous openings vary considerably, previous operations utilized an average of 319 bays over 37 days with peak flows of 219 cfs (values calculated from data in GEC/ Steimle & Associates, 1998). This places the 2008 opening as one of the shorter duration and lower volume releases since installation of the facility.

The spillway was constructed on the site of a natural crevasse, and empties into the western end of Lake Pontchartrain. Normally most of the freshwater input to the lake is from the Tickfaw, Amite-Comte, and Tangipahoa Rivers although some may enter through Lake Maurepas. Freshwater can also enter indirectly from the Pearl River through the Rigolets during high flow years (Sikora and Sikora 1982). The lake is actually a shallow, oligohaline estuary (Stern et al. 1968; Sikora and Sikora 1982) with predominately muddy sediments, although sandy sediments are common near the Rigolets and in a small area in the northeastern end of the lake (Manheim and Hayes 2002). Averaging around 5 psu, salinities range from freshwater (0 psu) to 10.6 psu depending upon river flow and circulation within the lake (Sikora and Sikora 1982; Sikora and Kjerfve 1985). The large surface area, large fetch, shallow depth, and muddy sediments of the lake make its bottom sediments susceptible to frequent resuspension. Bahr (1980) estimates that wave heights of 1 m can resuspend bottom sediments and these conditions are likely to occur when wind speeds reach 20 miles per hour (mph). Gael (1980) indicates that these conditions are met approximately 15% of the time with the result that lake sediments are frequently in motion and lake waters are often turbid.

Lake Pontchartrain contains a wide range of habitats including freshwater swamps and marshes, brackish, intermediate and saline marshes, submerged aquatic vegetation, as well as unvegetated estuarine bottom. It provides a nursery for recreationally and commercially important fish and invertebrate species such as spotted seatrout (*Cynoscion lethostigma*), red drum (*Sciaenops ocellata*), Gulf menhaden (*Brevortia patronus*), striped mullet (*Mugil cephalus*), brown shrimp (*Farfantepenaeus aztecus*), and white shrimp (*Litopenaeus setiferus*) (Lake Pontchartrain Basin Foundation 2005). The lake also supports an extensive blue crab (*Callinectes sapidus*) fishery.

Wagner and Hart (1986) have identified urban runoff and subsequent pollutant loading, release of partially treated sewage effluent, destruction of wetlands, alteration of natural freshwater flows resulting from levee construction, and development of anoxia in the deeper lake waters resulting from the movement of relatively high salinity water from the Mississippi River Gulf Outlet (MRGO) via the Inner Harbor Navigation Canal (IHNC) as

potential environmental stressors on the Lake Pontchartrain ecosystem. Prior to 1990 dredging of shell deposits also impacted benthic habitats and resuspended sediments (USACE 1987). In addition, periodic tropical cyclones have resulted in major, if temporary disruption of the lake ecosystem.

Opening of the Bonnet Carre' spillway has the potential for both positive and negative environmental impacts on the lake's ecosystem (Lake Pontchartrain Basin Foundation 2005). Potential positive impacts include long-term increases in productivity, increases in shrimp populations, reduction of salt stress on freshwater vegetation and increased nutrient levels in adjacent wetlands. Potential negative impacts include freshening of the estuarine habitat to the point that critical biological resources such as oysters are impaired, short-term displacement of estuarine fish and invertebrates (e.g. brown shrimp, blue crab) and introduction of excess nutrients potentially leading to eutrophication and anoxia of lake waters. Significant negative impacts have been experienced during several past releases (1950, 1973, 1983, and 1997). Substantial oyster mortalities due to reduced salinity occurred in Lake Borgne and Mississippi Sound following spillway releases in 1950, 1973 and 1983 (Gunter 1950, Dugas and Perret 1976 and Chatry and Millard 1986). In 1997 a blue-green algal bloom associated with the opening produced anoxic bottom waters resulting in fish kills (Dortch 1998, Poirrier and King 1998) and negatively affected submerged aquatic vegetation (Poirrier et all. 1998). Crocker (1988) has also documented localized scouring of bottom sediments near the spillway following the 1973 release and deposition of fine materials further away.

Another environmental concern regarding spillway releases is the potential impact on foraging habitat of the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*). The Gulf sturgeon is an anadromous species, migrating from winter residency in the Gulf of Mexico to riverine spawning grounds in the spring, returning to the gulf in the fall (U.S. Fish and Wildlife Service 1995, Parauka et al. 2001, Edwards et al. 2003). They are indiscriminate benthic suctorial feeders (Gilbert, 1989), feeding on a variety of benthic prey especially those associated with sandy and muddy sand bottom sediments (Huff 1975, Mason and Clugston 1993, USFWS/ GSMFC 1995, Wakeford 2001, Fox et al. 2002, Harris 2003, and Brooks et al. 2004). Lancelets (*Branchiostoma caribaeum*), brachiopods (*Glottidia pyramidata*), amphipods (*Ampelisca* spp, *Cerapus* sp., and *Lepidactylus* sp.) and the callianassid shrimp *Lepidophthalmus louisianensis* have all been identified as important food items for sturgeon (Mason and Clugston 1993, Fox et al. 2000, Heard et al. 2000, Parauka et al. 2001, and Harris 2003).

The benthic macroinvertebrate community of Lake Pontchartrain has previously been studied by Bahr et al. (1980), Sikora and Sikora (1982), Junot et al. (1983), Poirrier et al. (1984), Poirrier et al. (1992), Jeandron (1999), Pedalino (1999), Brammer et al. (2007), USEPA (2007), Ray (2007), and Poirrier et al. (2008). Three of these studies, (Sikora and Sikora 1982, Jeandron 1999 and Brammer et al. 2007) specifically address impacts to infauna from spillway releases. Poirrier et al. (2008) describes changes in the benthic assemblage following Hurricane Katrina.

In this paper, benthic macroinvertebrate, sediment, and water quality data collected after the 2008 spillway release are reported with specific emphasis on the identification of

Gulf sturgeon foraging habitat and potential impacts to this habitat resulting from the 2008 Bonnet Carre' spillway release. Changes in benthic assemblages potentially resulting from other factors are also examined.

Field Methods:

Sample sites were established along five transects oriented along the north-south axis of the lake (Figure 1). Each was sampled for water quality, sediment grain size and organic content and infauna during three samples periods. The first, April 24 to 29, 2008, occurred within two weeks of the opening of the spillway. The second, August 11-13, 2008, was initially intended to occur near the middle or end of June when it was thought that algal blooms and anoxic conditions had the best chance of developing. In the absence of these conditions sampling was delayed until August when the most stressful natural conditions (e.g. low dissolved oxygen concentrations, high predator abundances) where expected to occur. The final sample period, October 6-7, 2008, was timed to capture recovery of the benthic community following natural or spillway release-induced disturbances. It should be noted that the lake was impacted by two separate hurricanes between the August and October sample periods. Hurricane Gustav passed over the lake on September 1, 2008 with sustained winds of over 57 mph and gusts of nearly 81 mph (Bevin and Kimberlain 2009). Hurricane Ike passed over Lake Pontchartrain on September 12 with sustained winds of almost 51 mph and gusts up to 69 mph (Berg 2009).

The first sampling transect was located immediately north of where the Bonnet Carre' floodway empties into Lake Ponchartrain (Figure 1). In April 2008 four stations were established at approximate 1 mile intervals along this transect (Stations BC1-BC4). An additional two stations (BC5-BC6) were added for the August and October sample periods to improve sample coverage of the eastern end of the lake. The second transect, located about one third of the way across the width of the lake, began north of the dock at Williams Boulevard Park and ended southeast of the outlet of the Tangipahoa River. It consisted of 10 stations at 2 mile intervals (LP1-LP10). The third transect, situated approximately two thirds across the width of the lake, began west and north of the municipal airport and extended to near Green Point (Fontainbleau State Park). It also consisted of 10 stations at 2 mile intervals (LP11-LP20). The fourth transect began west of the railroad bridge north of South Point and extended in the direction of Bayou Bonfouca. It was comprised of five stations located at roughly 1 mile intervals (LP21-LP25). The final transect ran from north and east of Chef Monteur Pass to near the northern end of the new I20 bridge. It was also comprised of five stations located at roughly 1 mile intervals (LP26-LP30). In August an additional six stations were established along an east-west oriented transect extending from the end of the municipal airport to the causeway (LP31-LP36). These stations were added in order to capture the effects of potential anoxia in the vicinity of the Inner Harbor Navigation Canal. A complete list of station positions is provided in Table 1.

Standard water quality measures (temperature, salinity, and dissolved oxygen concentration) were measured at the surface and bottom of each station using an YSI meter during each

sampling event. The meter was calibrated for temperature and salinity and the sensor membrane replaced prior to each field trip. Meter calibration for dissolved oxygen was performed at the beginning of each day of field operations following the manufacture's recommendations. Secchi depth was measured using a standard 15 cm (6 inch) diameter secchi disc attached to a line marked in 5 cm intervals. Complete station water quality data are provided in Appendix Table 1.

Each station was sampled during each time period for sediment grain size and sediment organic content using a standard Ponar Grab sampler (area = 523 cm^2). Sediment grain size samples were placed in pre-labeled "Whirl-Pac" sample bags, stored on ice, and transported to laboratory facilities at the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS. Sediment total organic content was analyzed by loss upon ignition. In this procedure an aliquot of each sample was dried at 100 ^{o}C for 18 hours. Samples were weighed, placed in a muffle furnace at 500 ^{o}C for an additional 18 hours, reweighed and total organic content calculated as percentage loss between ash-free dry-weight and dry-weight. Sediment grain size analysis was performed using a combination of wet-sieving and flotation procedures. Samples were soaked overnight in a solution of Sodium Hexametaphosphate to disaggregate the silt and clay fractions then agitated in sonic bath for several minutes (Folk 1968, Galehouse 1971). The procedure was performed prior to sieving to separate fine and coarse fractions and was repeated prior to pipette analysis of the fine fraction to insure separation of the silt and clays. Sediment data analysis was conducted using Gradistat 4.0 (Blott 2000). Summary sediment parameters are provided in Appendix Table 2 and sediment composition by size fraction is presented in Appendix Tables 3-5. Changes in mud content between sample periods can be found in Appendix Table 6.

Each station was sampled for infaunal macroinvertebrates using the Ponar Grab. Infaunal samples were rinsed in the field over a 0.5 mm screen, placed in individual, pre-labeled fabric bags, and fixed and stored in a four percent formaldehyde solution. After transport to laboratory facilities at ERDC, infaunal samples were rinsed again over a 0.5 mm mesh sieve using tap water, stained with Rose Bengal, and stored in 70% ethanol. Samples were subsequently examined using 3X illuminated magnification and organisms sorted from the detritus. All organisms were identified to the lowest practical identification level and counted. Complete infaunal data and summary biological indices are provided in Appendix Tables 7-9.

In addition, real color images from NOAA's MODIS Rapid Response System (satellite photographs) were retrieved from time periods prior to, during, and following the spillway release. Images with a resolution of 1 pixel = 250 m were obtained from dates where unobstructed views could be found as close to the time periods of interest as possible. Images were also obtained for time periods corresponding to the sampling events. MODIS images are available online at http://rapidfire.sci.gsfc.nasa.gov/.

Statistical Methods

A variety of statistical methods were used to characterize the data including both univariate and multivariate techniques. The physical and chemical environments of the sampling sites were examined using Principal Components Analysis (PCA). PCA is a multivariate ordination technique that can be used to compare the similarity of sample attributes (e.g. physical and chemical characteristics). Prior to analysis data was normalized to place all variables on the same dimensionless scale then the data were examined for autocorrelation, i.e., checked to identify groups of variables with identical distribution patterns. Once extraneous variables had been eliminated similarity was computed using Euclidean distance as the similarity measure. PCA plots show the position of samples in multivariate space while accompanying PCA scores identify the correlation of each variable with the various axes. In this way groups of samples with similar attributes (e.g. high salinity, high sand content) can be readily identified.

Summary biological indices (number of taxa/sample, number of animals/sample, Shannon-Weiner Diversity Index ($H'\log_e$), and Pileou's Evenness were calculated for each sample using PRIMER (Version 6.0) statistical software. Complete summary biological index and species abundance data are provided in Appendix Tables 7-9. Community species composition was analyzed by multivariate statistical methods including hierarchical clustering and Non-Metric Dimensional Scaling (NMDS).

Hierarchical clustering is a technique that associates pairs of samples based on the similarity of their species composition and abundances. Analysis proceeds in a series of steps during which samples with the highest degree of similarity are successively combined. The final result is presented as a dendrogram (tree diagram) in which the degree of similarity is indicated by how samples are linked. In this study the Bray-Curtis Index was used as the similarity index and samples are combined by group averaging. All data were logarithmically transformed (Log_{10} X+1) prior to analysis to reduce the influence of extremely abundant species. SIMPROF (Similarity Profile), a bootstrapping technique, was preformed on the nodes (sample groups) generated by clustering to determine the likelihood that individual groups were generated purely by chance. Both normal (association of samples based on their species composition) and inverse (association of species based on their sample distribution) clustering were performed. Data were then jointly presented in a nodal diagram in order to readily identify species-sample associations.

Species composition data was also analyzed by NMDS, an ordination technique that compares species composition among sample pairs and is particularly suited for infaunal data (Clarke and Warwick 2001). NMDS results are interpreted by examining the degree of difference in the spread of data points across axes on a 2- or 3-dimensional plot. Simply put, the proximity of any two data points on the plot is a measure of the degree of similarity between those two samples. The goodness-of-fit of the plot is measured by a stress value. Plots with stress values of 0.1 or less indicate a high degree of fit (and therefore interpretation with relatively high confidence), while those with stress levels ranging between 0.1 and 0.2 should be interpreted with more care. Plots with stress values of 0.2 or greater should not be interpreted.

When simultaneous plotting (biplots) of NMDS and clustering results yield similar patterns, it is assumed that those patterns are robust. Data were also analyzed by Analysis of Similarity (ANOSIM), a nonparametric test analogous to Analysis of Variance (ANOVA), to determine if patterns detected in the clustering-NMDS biplots were statistically significant. ANOSIM requires replicate samples for calculation so stations were classified by geographical position and tests performed among the station groups. The station groups were BC (BC1-BC6), NW (LP1-LP5), SW (LP6-LP10), NE (LP11-LP15), SE (LP16-LP20), SE B (LP31-LP36), and RIG (LP21-LP30). The same groupings were used for Similarity Percentage Analysis (SIMPER), a test of which species contributed the most to the degree of similarity (and dissimilarity) among station groups. All multivariate techniques employed in this study (Clustering, SIMPROF, NMDS, and ANOSIM, were performed using PRIMER (Version 6.0) statistical software following interpretive guidance found in Clarke and Warwick (2001).

As mentioned in the Introduction, intrusion of relatively high salinity waters via the IHNC can produce anoxic conditions particularly at sites deeper than 3.7 m (12 feet). In order to assess potential impacts related to depth, stations were also classified into one of three depth ranges: 1) less than 3.7 m (12 feet), 3.7 m - 4.5 m (12-15 feet), and greater than 4.5 m (>15 feet). Stations near the Rigolets were excluded from this classification due to differences in sediment type. Multivariate tests were repeated on the reclassified data and nonparametric analysis of variance (Kruskal Wallis test) conducted on select biological and physical variables. Kruskal-Wallis tests were performed using JMP (SAS Inc.) software.

Results

Satellite Images

Selected images obtained from the MODIS satellite are presented in Figure 2. The first image (March 26, 2008) was taken prior to opening of the spillway and shows turbidity associated with Lake Maurepas and the western end of Lake Pontchartrain (Figure 2A). There is also some indication of elevated turbidity near where the spillway empties into the lake possibly from water seeping through the gates. The second image (April 13, 2008) was taken two days after the official opening of the spillway and shows a distinct plume near the spillway (Figure 2B). Approximately two weeks later during the first sampling event (August 29, 2008) the turbidity plume is found throughout the southern end of the lake as far as the Rigolets (Figure 2C). This same pattern is found the next week (May 4, 2008, Figure 2D) but by May 11, 2008 (Figure 2E), two days after the official closing of the spillway, the plume is reduced to just the vicinity of the spillway. On May 20, 2008 there does not appear to be any evidence of a plume (Figure 2F). Images take near the second sampling event (August 9, 2008) show what appears to be elevated turbidity along the western and northern shores of the lake (Figure 2G) but these are not evident later in the month (August 28, 2008) (Figure 2H). This turbidity may be due to runoff from local waterways. There is no obvious plume or discoloration obvious during the final sampling period in October (Figure 2I).

Temperature

Plots of surface and bottom water temperature in April 2008 show the extent of the freshwater plume emanating from the spillway at that time (Figures 3 and 4 respectively). Surface temperatures at Stations BC1-BC4 ranged between 17.8 ^{o}C and 18.1 ^{o}C while bottom temperatures were approximately 16.5 ^{o}C (Appendix Table 1). Surface temperatures elsewhere in the lake averaged more than 20 ^{o}C while bottom temperatures were slightly lower. By August 2008 both surface and bottom water temperatures were both above 27 ^{o}C (Figures 5 and 6) while in October both surface and bottom water temperatures ranged from to 24.1 ^{o}C to 27 ^{o}C except near the Rigolets where temperatures were marginally lower (Figures 7 and 8.)

Salinity

Salinity values for surface and bottom waters in April 2008 also show the extent of the plume. Salinities less than 1 psu were common in the surface waters not only of Stations BC1-BC4 but also at Stations LP5- LP10 (Figure 9). Surface salinities less than 3 psu were common as far away as Stations LP16-LP20. Elsewhere in the lake salinities generally exceeded 3 psu. The extent of the plume along the bottom was less extensive at this time with salinities less than 1 psu limited to Stations BC1-BC4 and salinities less than 3 psu to Stations LP7-LP10 (Figure 10). In August 2008 surface salinities were generally between 3 psu and 5 psu at all stations except LP1-LP3 and LP11-LP12 where salinities were less than 3 psu (Figure 11). Presumably these lower salinities were due to freshwater runoff or input from the Tangipahoa or Tchefuncta Rivers as suggested in the satellite photos (See Figure 2H). August bottom salinities were similar to surface waters except at Stations LP 31 and LP 36. These salinities exceeded 7 psu and were probably the result of input from the IHNC (Figure 12). During October surface and bottom salinities were generally less than 7 psu west of the causeway and more than 7 psu east of the causeway (Figures 13 and 14).

Dissolved Oxygen Concentrations

Surface dissolved oxygen concentrations exceeded 5 mg/L at all stations regardless of sample period (Appendix Table 1). Bottom water dissolved oxygen concentrations in April 2008 were more than 6 mg/L at all of the Rigolets stations (LP21-30) and above 5 mg/L at most other stations (Figure 15). Stations LP1-LP10 generally had dissolved oxygen greater than 4 mg/L but less than 5 mg/L (Figure 15 and Appendix Table 1). The lowest value was at LP 7 where only 3.99 mg/L was measured. In August 2008 bottom water dissolved oxygen concentrations were greater than 5 mg/L at all stations except LP31-LP36 (Figure 16). LP32, LP34 and LP35 had concentrations of more than 4 mg/L at this time, but LP31 had only 2 mg/L and LP36 had less than 1 mg/L (Appendix Table 1). By October 2008 bottom dissolved oxygen concentrations exceed 6 mg/L at all stations except LP17 which had 5.7 mg/L (Figure 17).

Secchi Depth Measurements

Secchi depth measurements (water clarity) in April 2008 also illustrate the freshwater plume extending from the spillway (Figure 18). Secchi depths of less than 0.3 m were found at Stations BC1-BC4 and readings of less than 0.5 m at Stations LP4-LP10. Low secchi readings were also recorded at the southernmost stations near the Rigolets. Elsewhere in the lake secchi depths did not fall below 0.5 m. This pattern closely matches that seen in the satellite imagery where increased discoloration is notable all along the southern lakeshore as far as the Rigolets (Figure 2C). In August 2008, secchi depths were highest in the south and lowest in the north and east (Figure 19). Values in the north match the pattern of discoloration seen in satellite imagery from this time period (Figure 2G). During the October sampling event secchi depths were lowest in the west, middle reaches of the third transect, and the entire fourth transect with values less than 0.5 m (Figure 20). Values above 0.5 m were encountered at Stations LP2-LP13, LP20 and LP31-LP36, and LP26-LP27. No obvious pattern of discoloration of lake water was obvious from satellite imagery (Figure 2I) at this time.

Sediment Mean Grain Size

Sediments in the Lake were predominately fine grained with the average station classified as mud or sandy mud (Figures 21-23 and Appendix Table 2). Sediments with significant sand content were restricted to Stations LP11 and LP21-LP36, an observation that corresponds closely with the findings of (Manheim and Hayes 2002). Sediments in western portion of the lake and those closest to the IHNC (Stations LP31-LP36) were consistently fine grained throughout the study (Figures 21-23) whereas those in the lower half of the third transect (LP15-LP20) tended to become sandier over time. In contrast, those stations closest to the Gulf (LP26-LP30) became finer over the period of the study (Figures 21-23).

Sediment Organic Content

Sediment organic content corresponded closely with sediment grain size with most values falling below 6% by dry weight with highest organic content being only 7.2% (Appendix Table 2). In April 2008 sediment organic content was highest in the western end of the lake (BC1-BC4 and LP1-LP10) with values ranging 2%-6% (Figure 24). Values less than 2% were common in the eastern end of the lake. In August sediment organic contents at Stations LP11-LP14 had increased slightly while stations further south on that transect appeared to have lost organic content (Figure 25). Stations LP26-LP30 experienced substantial increases in organic content probably as the result of an influx of finer sediments (as noted in the results for mean grain size). Results for October were similar in most regards to those of August (Figure 26).

Because of the potential for alterations of sediment distributions resulting from the spillway release and the two hurricanes that occurred during the study, plots of changes in mud content were made for the April-August and August-October time periods

(Appendix Table 6). Between April and August there were slight but detectable increases in mud content at several stations in the southern and eastern ends of the study area (Figure 27). Although some of these increases might be ascribed to spatial variability or the limits of the analytical methods, the pattern of change is consistent with the deposition of fine grained material as noted by Crocker (1988). The only sites where substantial decreases in mud content occurred were LP 11 and LP25. Between August and October there were several stations where mud content increased over 10% (Stations LP11, LP21, and LP31) as well as evidence of substantial losses at Stations LP22-LP28 (Figure 28).

Principal Components Analysis

Results from Principal Components Analysis (PCA) of the April 2008 physical and chemical data indicated that 70% of the variability in the data could be explained by only two axes (Table 2). Axis 1 was most positively associated with depth and most negatively with mean grain size. Axis 2 was most positively associated with bottom dissolved oxygen concentrations and most negatively with bottom water salinity. Distribution of stations within the April PCA plot (Figure 29) demonstrated the association of the easternmost stations (LP21-LP30) and Station LP11 with the lower end of Axis 1 (high mean grain size) and the stations closest the spillway (BC1-BC4) with the higher end of Axis 2 (lowest bottom salinity) (Table 3). The remaining stations were immediate to these two groupings. In August 2008 three axes were required to explain more than 70% of the variability (Table 2). Axis 1 was most positively associated with turbidity and bottom water salinity and most negatively with bottom water dissolved oxygen concentrations. Axis 2 was most positively associated with bottom water salinity and most negatively with bottom water dissolved oxygen concentration. The third axis was most positively associated with mean grain size and most negatively with sediment skewness (a measure of the homogeneity of grain size composition). The PCA plot for August clearly shows the separation of the two stations with the lowest oxygen concentrations (LP31 and LP36) on the positive end of Axis 1 (Figure 30). Stations with relatively high oxygen concentrations and high mean grain size (LP21-LP30) formed a separate group high on Axis 2 and towards the lower end of Axis 1 (Table 3). Once again the remaining stations occupied intermediate positions within the plot. Three axes were also required to account for more than 70% of the variability in the October PCA plot (Table 2). Axis 1 was most positively associated with bottom temperature and most negatively with salinity, dissolved oxygen concentrations, and sediment mean grain size. Axis 2 was most positively associated with depth and most negatively with secchi depth. The third axis was not positively associated with any of the variables but negatively associated with bottom salinity and secchi depth. The October PCA plot once again showed the separation of the sandier stations (LP21-LP30) from all others along the negative region of Axis 1 and to a lesser extent Axis 2 (Figure 31). Stations LP17-LP20 and BC4-BC6 were positioned high on Axis 2 and with the remaining stations being near the center of the plot.

Benthic Assemblages-Species Composition

A total of 53 taxa and 8,987 animals were collected in the course of the study (Table 4). Polychaetes were the dominant group accounting for more than 52% of all animals and 28% of all taxa collected while molluscs constituted 35% of all animals and 28% of all taxa. Although crustaceans made up more than 42% of the number of taxa they contributed only 9.5% to total numbers of animals. Amphipods were the predominant crustacean taxon contributing 5.5 % to total numbers of animals and 18% to the total numbers of taxa. The most abundant taxon overall was the polychaete *Mediomastus ambiseta*. It made up nearly a quarter of all animals collected and was the most abundant species during all three sampling dates. The second most abundant taxon was the bivalve mollusc family Mactridae (LPIL). This taxon was made up of juvenile specimens of at least three different species: *Rangia cuneata*, *Mulinia laterals,* and *M. pontchartrainesis*. Taxonomic separation of these specimens, while possible, exceeded the resources available in this study. Mactridae (LPIL) comprised 14% of all specimens collected, was one of the three most abundant taxa found in April and August samples, but was relatively scarce in October. The polychaete *Streblospio* (LPIL) was the third most abundant taxon comprising more than 10% of all specimens and was one of the top four most abundant taxa during each of the three collections dates. The genus *Streblospio* contains two species that may be present in the collections: *Streblospio benedicti* and *S. gynobranchiata*. The later differs from the more commonly known *S. benedicti* principally by the presence of strap-like branchia in sexually mature females (Rice and Levin 1998). Since most of the specimens collected were immature it was not possible to distinguish between these two species and identification was limited to the genus level. The fourth most abundant taxon, the polychaete *Hobsonia florida,* was collected in large numbers only in August. Other numerically abundant taxa included the polychaetes *Parandalia americana* and *Capitella* (LPIL), the oligochaete *Tubificoides* (LPIL), the bivalve molluscs *Brachiodontes exustus, Macoma mitchelli, Mytilopsis leucophaeta, Tagelus divisus* and *Rangia cuneata*, the gastropod mollusc *Texadina sphinctostoma*, the amphipods *Cerapus benthophilus* and *Ameroculodes miltoni*, two unidentified nemerteans (ribbon worms), and at least two separate taxa of chironomid fly larvae (Tanypodinae LPIL and Chironominae LPIL). Although not a numerically dominant species, the callianassid shrimp *Lepidophalamus louisianensis* (an important Gulf sturgeon prey item) was frequently encountered at Stations LP21-LP30. A complete listing of species abundances by sample is provided in Appendix Tables 7-9.

Temporal fluctuations in abundance occurred in a number of taxa (Table 4). Particularly noticeable were the drops in abundance between April and August by the bivalves *B. exustus, T. divisus, Mulinia* (LPIL), and *Amygadalium papyria,* the polychaetes *Capitella* (LPIL) and *Pectinaria gouldii*, the amphipods *C. benthophilus*, *A. miltoni*, *Ampelisca abdita,* and *Grandidierella bonneroides,* the isopod *Edotea triloba*, and the chironomid fly larva Chironominae (LPIL). Several other taxa had either increased abundance or relatively consistent abundance during the first two sampling events but declined between the summer and fall. These included the polychaetes *M. ambiseta* and *Streblospio* (LPIL), the bivalves Mactridae (LPIL), *R. cuneata,* and *M. mitchelli,* and the crab

Rhithropanopeus harrisii. Taxa which were most abundant only during the August sampling period were the bivalves *M. leucophaeta* and Mytilidae (LPIL), the gastropod *T. sphinctostoma*, mysid shrimp (Mysidacea), and the polychaetes *H. florida* and *Nereis succinea*. The chironomid fly larva *Tanypodinae* (LPIL) was more abundant in summer and fall than spring while taxa that occurred in abundance only during the fall were the polychaetes *Glycinde solitaria* and *Paraprionospio pinnata*, the bivalve Tellinidae (LPIL), and the amphipod *Lepidactylus dytiscus.* As will be discussed later, the reasons for these fluctuations vary and may include natural seasonal or spatial variation as well as impacts from the either the spillway release or the two late summer hurricanes.

Taxa/Sample

The largest numbers of taxa were collected in the April samples (Table 4) and the highest numbers of taxa/sample at that time were found in stations nearest the Rigolets (LP21-LP30) (Figure 32). Although total numbers of taxa and taxa/sample were lower in the August samples the pattern of higher values near the Rigolets remained constant (Figure 33) while in October that highest numbers of taxa/sample were in the lower half of the third transect not far from the IHNC (LP15-LP20 and LP32) (Figure 34).

Animals/Sample

Like the taxa values, the highest numbers of animals/sample in April were also found near the Rigolets (Figure 35). By August 2008, the time period when the greatest numbers of animals were collected (Table 4), total numbers of animals/sample were highest at Stations BC1-BC4, Stations LP21-LP23, and Stations LP31, LP33, and LP35 (Figure 36). In October abundance values were the lowest of the three sample periods (Table 4) with the highest values found in the lower half of the third transect (LP15-LP20) and near the airport (LP31-LP32) (Figure37).

Shannon Weiner Diversity and Pielou's Evenness

Values for Shannon Weiner Diversity ($H'\log_e$) mirrored those of taxa/sample. In April the highest diversities were associated with stations near the Rigolets (LP1-LP30) (Figure 38). This pattern was repeated in August (Figure 39) while in October the highest values were found at stations near the IHNC (Figure 40). Values for Pielou's Evenness Index were relatively low throughout the lake in April (Figure 41), moderately higher in the central portions of the lake and lowest near the IHNC in August (Figure 42), and seemingly randomly distributed in October (Figure 43).

Hierarchical Clustering

Normal hierarchical clustering of the April species composition data detected the presence of four sets of station groupings (Figure 44): A) Station LP 3 as a singleton group, B) the stations nearest the Rigolets (LP21-LP30), C) the easternmost stations (BC1-BC4) plus Stations LP1-LP2, and LP10, and D) the remainder of the stations. Inverse clustering of this dataset produced multiple species groups many of which were

singleton groups (Figure 45). The largest species group included *M. ambiseta,* Mactridae (LPIL), *Streblospio* (LPIL), *H. florida, R. cuneata, M. mitchelli, Capitella* (LPIL), the two nemertean taxa, and Chironominae (LPIL). The next largest group included *Poyldora cornuta, A. miltoni, A. abdita, B. exustus, P. americana, C. benthophilus, T. divisus,* and *Tubificoides* (LPIL). Nodal analysis (comparison of the two clustering results) indicated that the first large species group was common to virtually all station groups while the second was most abundant at stations near the Rigolets (Table 5). Two species found exclusively in stations closest to the spillway and therefore most likely influenced by the release (Station Group E) were the amphipod *Grandidierella bonneroides* and larvae of the insect *Chaoborus* (LPIL).

Normal clustering of the August species data yielded seven station groups (Figure 46 and Table 6): F) Stations LP16-LP19, G) Station LP12, H) Station LP15, I) stations nearest the IHNC (LP31-LP36 plus LP20, J) Stations BC1-BC4 and BC6, plus LP10-LP11, K) the stations nearest the Rigolets (LP21-LP30), and L) the remaining stations. Inverse clustering of the August data once again produced multiple singleton groups (Figure 47). The largest species group was comprised of *M. ambiseta,* Mactridae (LPIL), *Streblospio* (LPIL), *H. florida, R. cuneata, T. sphinctostoma, Mytilopsis leucophaeta,* Nemertea (large), and *Tanypodinae* (LPIL) and was distributed among all of the station groups (Table 6). As in April the next largest groups were associated primarily with the near-Rigolets stations and included *P. americana, C. benthophilus, Tubificoides* (LPIL), *Nereis succinea,* and *M. mitchelli*. Other species closely associated with the near-Rigolets stations were *P. cornuta, L. louisianensis, Edotea triloba,* and *A. miltoni* (Table 6).

Normal clustering of the October data produced six station groups (Figure 48): M) Station BC3, N) Stations LP9, LP34, and LP36, O) Station LP30, P) Station LP11 and the near-Rigolets stations, Q) Stations BC2, BC4-6, LP1-LP10, LP18, LP20, LP31, and LP33, R) Stations LP12, LP14, LP14, LP22, and BC1, and S) Stations LP13, LP15, LP17, LP19, and LP32. Station LP35 was depauperate. Inverse clustering formed mostly singleton species groups (Figure 49). As with previous nodal analysis, one large species group was identified as being widely distributed: *M. ambiseta, Streblospio* (LPIL), Nemertea (large), *P. americana,* and Mactridae (LPIL). Three other groups were closely associated with the near-Rigolets stations. The first and most abundant of these groups was composed of *A. miltoni, P. cornuta, G. solitaria,* Tellinidae (LPIL), *Tubificoides* (LPIL), and *Capitella* (LPIL). The second and far less abundant species group was composed of *C. benthophilus, Amygadalium papyria, Apocorophium lacustre, B. exustus, Almyracuma* (LPIL), *Pectinaria gouldii, L. dytiscus,* and *Mysidopsis alymra*. The third group, contained *N. succinea L. louisianensis,* Mysidacea (LPIP), and unidentified harpacticoid copepods.

Nonmetric Multidimensional Scaling

Nonmetric Multidimensional Scaling (MDS) results for the April species composition data mirrored that of the normal Hierarchical clustering (Figure 50). Interpretation of the results was limited to only the broadest scale results due to a moderately high stress value

(Stress = 0.15), but the separation of stations was similar to that produced by clustering. The near-Rigolets stations were separate from the bulk of the stations as were those closest to the spillway plume (BC1-BC4 and LP10). MDS of the August samples also matched patterns seen in normal clustering (Figure 51). For instance, stations closest to the IHNC formed a clear group, as did LP16-LP19, and LP12 was positioned well away from the remaining groups. October MDS results had a relatively high stress value (Stress = 0.18) limiting interpretation even more but there was still a distinct similarity between MDS and normal clustering results (Figure 52). The near-Rigolets stations grouped together, Stations LP9, LP34, and LP36 were positioned closely together, BC3 formed a singleton group, and the remaining stations were positioned as two large groups.

Analysis of Similarity

Results from Analysis of Similarity (ANOSIM) support the findings from MDS and clustering (Table 8). ANOSIM tests were significant ($p < 0.5\%$ or 0.05) for all three sampling events, but R values (a measure of the strength of the differences detected) were highest for the April and August time periods ($R > 0.6$). Pairwise comparisons of the April samples were significant for all pairs except NW vs. SW, SW vs. NE, and SW vs. SE. The highest R values were found between pairs which included either RIG (near-Rigolets stations) or BC (near-Bonnet Carre' stations). These results indicate that the stations with the most distinctive species composition were those either under the immediate influence of the freshwater plume or those near the Rigolets. The August pairwise tests were significant ($p < 0.5\%$) for all pairs except NW vs. SW, NW vs. SE, and SW vs. NE. Most of the significant tests had very high R values indicating strong differences among the comparisons (Table 8). The highest of these values were for comparisons including the SE stations, SE B stations, and NW stations. Here again the ANOSIM results supported the station groupings detected in MDS and clustering: the stations nearest the IHNC (SE B stations), the lower half of the third transect (LP15-LP20), and upper half of the second transect (LP1-LP5) were distinct from the remaining stations. Finally, ANOSIM results for October reflected not only the pattern of station groupings from MDS and clustering, but also the weakness of the overall pattern. The R value for this sample set was the lowest of the three sampling events ($R=0.479$) and nearly half of the pairwise comparisons (9 of 21) were not significant ($p>0.5\%$) (Table 8). The highest R values were for pairs including stations from RIG (LP21-LP30).

Similarity Percentage Analysis

Similarity Percentage Analysis (SIMPER) results also mirrored the findings from MDS, clustering, and nodal analysis (Table 9 and Appendix Tables 10-12). Average similarity of station groups was generally above 50% during all sampling events except for NE and SE in August and NE, SE, and SE B in October. The highest average dissimilarities (greatest differences) for pairwise comparisons in April were in combinations involving RIG and BC stations, as seen in both the MDS, clustering and ANOSIM results. During August the greatest differences were encountered in combinations involving SE or SE B and in October those comparisons which included RIG. Taxa which contributed the most

to average similarity of the station groups could be roughly divided into two groups: 1) those found throughout the lake and 2) those characteristic of the stations near the Rigolets (Table 10). As found in nodal analysis, taxa common throughout the lake included Mactridae (LPIL), *M. ambiseta*, and *M. mitchelli* (particularly in April), and *Streblospio* (particularly in August) (Table 10). Plots of the abundance of *M. ambiseta*, *Streblospio* (LPIL) and Mactridae (LPIL) illustrate the ubiquitous nature of these species' distributions (Figures 53A-53C). Other taxa common throughout the lake (as found in the pairwise comparisons) were *R. cuneata*, Chironominae, Tanypodinae, and *H. florida* (Appendix Tables 10-12 and Figure 53D). Taxa characteristic of Stations LP21-LP30 (RIG) included *B. exustus, A. miltoni, P. americana, T. divisus, Tubificoides* (LPIL), and *A. abdita* (Table 10). A plot of the abundance of *P. americana* (Figure 52E) illustrates the spatial distribution of these taxa. Other species indicative of these stations are *C. benthophilus* and *L. louisianensis* (Figures 52F and 53G).

Depth Related Analyses

Reanalysis of the data based on depth classification (<3.7 m, 3.7-4.5 m, and >4.5 m) revealed varying patterns of similarity among different depth ranges. Combined clustering and MDS detected a distinct difference between <3.7 m stations and those of greater depths in April and August, but not October (Figure 54). April results displayed a distinction between <3.7 m and deeper stations, while August results indicated a difference among all three depth ranges. These results were confirmed by ANOSIM both in the global (overall) tests and the pairwise comparisons (Table 11). ANOSIM results for October were not significant ($p \geq 6.0\%$ or 0.06). Global SIMPER results indicated the same species were present and generally dominant in all sampling periods, but differences arose in the relative abundance of individual taxa (Table 12). In April depth ranges >3.7 m were characterized by higher abundances of *Capitella* (LPIL). Depths >4.5 m had relatively high abundance of *P. americana* (Table 13). By August the <3.7 m stations were characterized by high numbers of *H. florida*, while the 4.5 stations have few if any Mactridae (LPIL). In October, <3.5 m stations had the highest densities of *M. ambiseta* and *Streblospio (*LPIL) and depths greater than 4.5 m typically had the highest numbers of Tanypodinae (LPIL).

Results from the Kruskal-Wallis test, a nonparametric equivalent of ANOVA), were significant (p Chi Square $\leq$0.05) in April only for Shannon Weiner Diversity ($H'Lo_{ge}$) which was highest in depths <3.7 m and lowest in depths >4.5 m (Table 14, Figure 55C). In August test results were significant (p Chi Square $\leq$0.05) for all parameters except Pielou's Evenness Index. Values for taxa /sample, animals/sample, diversity, and dissolved oxygen concentrations (DO) were highest in depths <3.7 m (Table 15). Taxa/sample, diversity, and DO were lowest in depths >4.5 m, while animals/sample were lowest in depths of 3.5-4.5 m (Figure 55A-55D). By October only the test for animals/sample was significant (p Chi Square < 0.05) with values being highest at depths >4.5 m and least at depths <3.7 m (Table 16 and Figure 55B).

Discussion

The Gulf sturgeon is a subspecies of Atlantic sturgeon occurring from western Florida to Louisiana (Wakeford 2001). It spends most of its life in estuarine and coastal waters, but migrates into freshwater in late winter or early spring to spawn, returning to the sea in the fall. Over-wintering sturgeon do not migrate far from shore, but remain in relatively shallow inshore waters. This species has been collected periodically throughout the Lake Pontchartrain Basin including reports from the Amite, Tickfaw, Tangipahoa, and Tchefuncte Rivers (USFWS and GSMFC 1995) and Lake Maurepas (Kirk et al. 2008).

Gulf sturgeon feed indiscriminately on a wide variety of benthic prey, "vacuuming" the bottom with their protrusible mouths" (Gilbert 1989). Although most studies focusing on sturgeon feeding habitats have originated in the east or center of the species range, the consistency of results make application to the western end of the range reasonable. Mason and Clugston (1993) reported the prey of subadults in the Suwannee River estuary to be gammarid, haustorid and corophoiid amphipods (e.g., *Cerapus* sp. and *Corophium tuberculatum*), chironomid and ceratopogonid fly larvae, grass shrimp (*Palaemonetes* spp.), and mysid shrimp. Polychaetes, tubificid oligochaetes, and the callianassid shrimp *L. louisianensis* were also plentiful in the diet. Juvenile fish immigrating from offshore had lancelets (*Branchiostoma caribaeum*), brachiopods (*Glottidia pyramidata*), shrimp, polychaetes, molluscs, starfish and sea cucumbers in the stomachs. Also working in the Suwannee River estuary, Harris (2003) indicated that brachiopods were particularly important in the diet of gulf sturgeon although amphipods (*Ampelisca* spp.) and brittlestars (ophiouroids) were also frequent prey. In Choctawhatchee Bay, Florida Heard et al. (2000) reported the callianassid shrimp *L. louisianensis* to be the principal prey.

In the present study, multiple species identified as sturgeon prey items, including *C. benthophilus, A. abdita, L. dytiscus,* and *L. louisianensis*, were found, particularly in the sandy sediments near the Rigolets (Stations LP21-LP30). Based on the distribution of their favored prey, Sturgeon appear to prefer to forage in sandy sediments. The Rigolets is the only area where such sediments can be found in the lake, except for one small patch near the northern terminus of the causeway (Figures 21-23 and Manheim and Hayes 2002). Thus, one of the critical questions addressed in this study, "Is Gulf sturgeon foraging habitat present in Lake Pontchartrain" can be quickly answered in the affirmative.

The benthic assemblage of Lake Pontchartrain has previously been described by a number of authors and to a large extent resembles that described for oligohaline waters throughout the Gulf of Mexico (e.g., Engle and Summers 2000). Sikora and Sikora (1982) found the gastropods *T. sphinctostoma* and *Probythinella louisianae* and the clams *R. cuneata* and *M. pontchartrainensis* to be the numerical and biomass dominants in the lake. Polychaetes including *H. florida* (listed as *Hypaniola florida*), *Mediomastus, and Streblospio benedicti,* the amphipods *A. miltoni*. (Listed as *Monoculodes edwardsi*), *Apocorophium* (= *Corophium*) *lacustre,* and *C. benthophilus* and the mysid *Americamysis* (=*Mysidopsis*) *alymyra* were also abundant. Focusing on assemblages along the southern shore influenced by salt water intrusion from the Inner Harbor Navigation Canal, Junot et al. (1983) reported a similar assemblage with the exception that *M. mitchelli* was among

the numerical dominants. Poirrier et al. (1984) also found *M. pontchartrainensis* and the polychaetes *Mediomastus* and *Streblospio* to be the most abundant taxa in southern Lake Pontchartrain. The Environmental Protection Agency's EMAP program (USEPA 2007) conducted during the mid 1990's also found the same assemblage as Sikora and Sikora (1982), while Pedalino (1999) reported oligochaetes and the polychaetes *Streblospio* and *Hobsonia* as the most abundant species in the southern end of the lake. Ray (2007) examined infauna along the shallows of the southern shoreline and found assemblages associated with the three predominant sediment types: mud, sand, and peat. Muddy substrate assemblages were similar to those of previous studies, while sandy sediments were dominated by the amphipods *A. miltoni* and *L. dytiscus*, and the cumacean *Alymyracuma*. Peat sediments were dominated by *Apocorophium* spp. Results from the present study mirror these previous works with the exception of the absence of *P. louisianae* and the relatively low abundance of *Mulinia* (LPIL). The abundance of individual species can vary widely over time due to many interacting physical and biological factors, therefore the precise reason for the absence of species such as *P. louisianae* at this time will probably never be known. Likewise, the necessity of using the taxon Mactridae makes it impossible to determine whether *Mulinia* spp were drastically reduced in abundance or merely present only as juvenile forms.

The extent to which the spillway release affected sturgeon foraging habitat and benthic assemblages throughout the lake is best assessed by first estimating the physical extent of the freshwater plume. Satellite photographs indicate that portions of the plume had moved quickly along the southern shoreline of the lake and was beyond the Rigolets within two weeks of the opening (Figure 2C). Water quality data collected at this time show a wedge of relatively cold freshwater on the surface extending from the floodway as far as the first Rigolets transect (Figures 3 and 9). However, the wedge did not affect the entire water column since significant dilution of bottom water salinities only extended to the second transect (Figure 10). Additional information is available from monitoring stations of the Lake Pontchartrain Basin Foundation (LPBF) (Appendix Table 13). The LPBF samples water quality at mid-depths of a series of locations along both the north and south shores of the lake on a weekly basis. For this report only information from the south shore stations (Laketown (Kenner, LA) to Northshore Beach near the Rigolets) are utilized. Examination of the data indicates dilution of lake water beginning immediately after opening of the spillway and extending through late July and early August. The lowest salinities (< 1 psu) were limited to the period from the opening of the spillway to approximately the end of May. Initially only stations nearest the spillway were affected, but eventually stations as far as the municipal airport experienced salinities less than 1 psu. Salinities near the Rigolets did not drop below 2 psu until early May and appeared to have recovered by late July or early August. By mid-August salinity conditions were similar to those prior to the spillway release (~4 psu). The combined results of the LPBF monitoring and the present study suggest that complete freshening (i.e., salinity = 0 psu) of the water column was probably not felt much beyond western end of the lake. It is likely, however that significantly lower bottom salinities (< 1 psu) were experienced at least as far east as the municipal airport through the end of May. Bottom salinities in the area of chief concern, near the Rigolets, were undoubtedly reduced, but whether or not this reduction was sufficient to negatively impact the benthic community is unclear. The

lack of large scale reductions in diversity or abundance between April and August would seem to argue against this view however, the community parameters did decline during this period and the absence or reduced abundance of several taxa found primarily at these sites would seem to support such impact. Specifically, declines in taxa generally associated with relatively higher salinity such as *T. divisus, P. gouldii, A. abdita,* and *A. papyria* suggest such an effect. Similar changes in species composition following a freshet have been reported by Boesch et al. (1976) in the lower Chesapeake Bay. They also noted declines in taxa richness and diversity similar to that of the near-Rigolets stations although for a different reason. In the Chesapeake Bay example the dominant taxa changed, altering the basic structure of the community. Such a dramatic change was not noted in Lake Pontchartrain. Although depressed salinity may have had only limited impact on potential Gulf sturgeon foraging habitat following the 2008 opening, other aspects of the spillway release, specifically sediment transport and erosion may have had more serious impacts. This is evidenced by both the highest gains (sediment deposition) and greatest losses (erosion) of mud content at the near-Rigolets stations between April and August (Figure 27). In combination with the partially reduced salinity these impacts may be responsible for declines in community parameters at these sites during this time period (Figures 55A-C).

Sediment grain size results from the present work differ somewhat from those of previous studies. Sikor and Sikor (1982) describe lake sediments as predominately silty clay (i.e. clay content exceeded 50%). This finding is supported by reports by Steinmeyer (1939) and Flowers and Isphording (1990). Clay contents in the present study were always less than 1% of the sediment (Appendix Table 3-5) although total silts and clay values were similar to those of Sikor and Sikora (1982). There are a number of possible reasons for such a difference including methodological issues, spatial and temporal variability, and occurrence of extreme events. Since great care was taken to insure the separation of the fine fractions (both chemical and physical disaggregation) methodological issues would seem to be unlikely. Pedalino (1999) reports clay fractions varying by as much as 41% between some 1995 and 1996 samples so spatial and temporal variability may be a factor. Likewise it is also possible that lake sediments were disrupted by one or more extreme events (e.g. hurricanes) prior to 2008.

Previous studies of spillway releases on lake fauna have reported varying results. Hawes and Perry (1978) studied the impact of the 1973 spillway opening on zooplankton assemblages near the Rigolets and in western Mississippi Sound. They found that total plankton volume (a measure of biomass and abundance) remained essentially constant, while the normally estuarine-dominated species assemblage included many freshwater and oligohaline taxa following the release. The low salinity taxa disappeared from the samples after closure of the spillway and a return to normal salinities. Sikora and Sikora (1982) studied infaunal responses to the 1979 opening and found that abundances generally increased after the influx of freshwater with numbers of nematodes in particular reaching peak numbers immediately prior to the official opening of the spillway. The authors hypothesize that sediment laden water leaking from the facility provided a fresh food resource which the nematodes were able to take advantage of. Macrofauna showed more varied responses with the gastropod *P. louisianae* achieving high abundance

following the spillway release and the gastropod *T. sphinctostoma* and bivalve *R. cuneata* declining in both abundance and biomass. Close examination of Sikora and Sikora's data indicates a consistent trend of decreasing total macrofaunal abundance occurring between spring and summer during both 1979 (spillway opened) and 1980 (spillway not opened) (Figure 56). This finding suggests that the peak in abundance following the release may have been limited to nematodes. Macrofaunal abundance may simply have been following the normal summer decline in numbers of animals. Jeandron (1999) sampled both infauna and epifauna before and after the 1997 release and found decreased diversity in mid-bay benthic assemblages, but did not detect dramatic changes in species composition. One epifaunal species, the tanaid *Hargeria rapax*, was eliminated following the release just as it had been following the 1973 and 1975 releases (Poirrier and Mulino 1975 and 1977). In a follow-up study, Brammer et al. (2007) detected a pattern of decreased diversity with distance spillway after the release. Since the furthest stations had previously been the highest this resulted in a pattern of uniform diversity among stations immediately following the influx of freshwater. They also found no indication of increased benthic productivity the year after the release. Brammer et al. (2007) speculate that absence of such a response in 1997 may have been due to eutrophication and the subsequent development of anoxic conditions. GEC/Steimle and Associates (1998) sampled oysters and trawlable fish and invertebrates after the 1997 release and while fish kills were reported in parts of the lake they were unable to detect dramatic impacts in the areas they sampled. Perret et al. (Undated) also conducted oyster and trawl studies after the 1997 release and found few long lasting impacts. In contrast, high oyster mortalities were reported in Lake Borgne and Mississippi Sound following spillway releases in 1945, 1950, 1973 and 1983 (Gunter 1950, Dugas and Perret 1976 and Chatry and Millard 1986).

Studies of the relationship between estuarine ecosystems and freshwater inflow have, in large part, shown a correlation between inflow and the productivity and structure of estuarine ecosystems (e.g., Flint 1985, Montagna and Kalke 1992, and Livingston et al 1997). The underlying hypothesis is that high flows provide new sources of nutrients and detritus to fuel estuarine food webs. The critical difference between creating potentially positive or negative impacts with increased freshwater flow is the volume and duration of the flow. Where one incident of increased freshwater flow may lead to enhanced fisheries harvest another may lead to eutrophication and fish kills. For example, Wilber (1992) has examined long term records of oyster harvests and river flow in Apalachicola Bay, Florida and found that high flows of low duration (less than 1 month) had no significant impact on harvests two years later (the time lag for development of oyster in Apalachicola Bay), whereas high flows for greater time periods were correlated with poor harvests. Gunter (1950) has shown that adult oysters can survive in freshwater for several days and salinities averaging 2 psu for periods up to a month. The implication from these studies is that extended exposure to low salinity can result in reduced recruitment, reduced growth, or increased mortality. The same sort of impacts can be ascribed to freshwater flows from the spillway on the assumption that there are critical levels of flow after which too high of a nutrient load has been delivered or too great a portion of the lake has been converted to freshwater to permit normal ecosystem functioning. The 2008 release although similar in duration to that of 1997 appears to

have had far fewer negative impacts perhaps because fewer bays were opened (160 vs. 298) and lower maximum flows were maintained (160 kcfs vs. 243 kcfs) therefore less water entered the lake. Previous openings which resulted in negative impacts (1945, 1950, 1950, 1973, 1983, and 1997) were associated with opening of 298-350 of the 350 bays and maximum flows of 250 kcfs or greater.

Factors other than the spillway release undoubtedly also had effects on the benthic assemblages of Lake Pontchartrain in 2008. Community level parameters (e.g., taxa/sample, animals/sample, diversity) declined between April and August, but the declines were lake-wide therefore most likely reflecting natural seasonal factors such as low dissolved oxygen concentrations and high predator abundances. Similar summer declines in benthic assemblages have been reported by Holland et al. (1985), Armstrong (1987), Livingston (1987) and Service and Feller (1992). Low dissolved oxygen levels have been identified by numerous authors as a limiting factor on benthos. For instance, Ritter and Montagna (1999) have documented persistent summer hypoxia in areas of Corpus Christi Bay. The Lake Pontchartrain ecosystem has been shown to experience repeated episodes of low oxygen concentrations as a result of the intrusion of salt water from the MRGO via the IHNC (Poirrier 1978, Junot et al. 1983, Pedalino 1999). Li et al. (2008) have developed a model of the phenomenon and demonstrated that under northerly winds a wedge of saltwater enters the lake from the IHNC and spreads through the deeper portions of the lake. Hypoxic or anoxic conditions can develop as the denser salt wedge becomes stagnant. Poirrier (1978) documented salinity stratification beginning in later spring and progressing through the summer months particularly in the deeper southern portion of the lake near the IHNC. Stratification was broken up as lake waters became mixed over winter months. Both Junot et al. (1983) and Pedalino (1999) have detected decreased abundance and diversity of benthos during such hypoxic and anoxic conditions. Both also reported that assemblages of impacted sites were characterized by the stress tolerant taxa such as *Streblospio, H. florida,* and oligochaetes and reduced densities of relatively stress intolerant taxa including *T. sphinctostoma, P. louisianae, R. cuneata, M. mitchelli,* and *M. pontchartrainensis*. Findings from the depth-related analyses performed in the present study are consistent with low oxygen stress in the depths of the lake. Not only were elevated salinities and low oxygen concentrations noted near the IHNC in August but the analysis of the biological data indicated lower abundance and diversity assemblages in the deepest stations at this time.

Another critical factor that almost certainly had an effect on benthos of the lake during 2008 was the passage of two hurricanes. Hurricanes can have a variety of impacts including freshets (influx of freshwater), salt water intrusion, nutrient loading, eutrophication, hypoxia or anoxia, scouring of bottom sediments, sedimentation, remobilization of contaminants, organic enrichment, scouring of bottom sediments, sedimentation, and organic enrichment (e.g. Boesch et al. 1976, Van Dolah and Anderson 1991, Mallin et al. 1999, Balthius et al. 2006, and Engle et al. 2009). The nature and extent of the impacts vary with the specific characteristics of the individual storm and the area it impinges upon (Mallin and Corbett 2006). Two recent studies have reported the effects of Hurricane Katrina (2005) on the benthos of Lake Pontchartrain. Poirrier et al. (2008) reported the loss of *R. cuneata* from 50% of the lake as well as substantial

declines in the abundance of many dominant species such as *P. louisianae, T. sphinctostoma, C. benthophilus* and *H. florida.* Oligochaetes, *Streblospio, P. americana* and nemerteans increased in abundance following the storm. There was also an increase in salinity due to the storm surge and accumulation of large amounts of dead *Rangia* shell along the shoreline. Engle et al. (2009) report similar results with large declines in numbers of taxa, abundance, and diversity as well as the disappearance of *T. sphinctostoma, C. benthophilus, H. florida, Amphicteis* spp., and *Ischadium recurvum* from the assemblage. *Mediomastus* spp. and Mactridae, and *R. cuneata* remained among the dominant taxa, but were found in far less abundance. The polychaete *Streblospio* became the overall numerical dominant in the assemblage immediately following the storm. Impacts to the benthos in the wake of Hurricanes Gustav and Ike are similar in that abundance of *M. ambiseta, T. sphinctostoma, Mactridae, H. florida, C. benthophilus* and *R. cuneata* all declined, while those of *Streblospio, P. americana, Tubificoides* (Oligochaeta), and nemertea all either increased or remained relatively constant. There is also some indication of hurricane-induced disturbance in the depth-related analyses. Abundance and diversity of the shallowest sites (<3.5 m) declined significantly compared to deeper stations during the period that the hurricanes occurred. Species composition was also altered to the point that neither ordination (Clustering and MDS) nor ANOSIM were able detect differences among depth ranges. These results are consistent with a large scale resuspension of lake sediments following a severe storm which could reasonably be assumed to be most severe at the shallowest stations.

Conclusions

Three basic questions were posed at the outset of this study: Is there potential Gulf sturgeon foraging habitat in Lake Pontchartrain, Was it impacted by the 2008 spillway release, and How were other benthic assemblages affected by the spillway release and other environmental factors? The presence of multiple prey species, especially in sandy sediments of the eastern end of the lake, confirms the presence of potential sturgeon foraging habitat in Lake Pontchartrain. The 2008 spillway release seems to have affected this habitat although the impacts were not catastrophic. Some relatively higher salinity species disappeared from the assemblage following the release and moderate declines were seen in abundance and diversity. These impacts were probably due to a combination of reduced salinities and sediment redistribution created by flows emanating from the spillway. Nonetheless despite the release and two intervening hurricanes important prey species such as *L. louisianensis* were still relatively abundant in this habitat at the end of the study (October 2008). Elsewhere in the lake changes in infauna following the spillway release were consistent with the normal pattern of summer declines in abundance and diversity. Evidence of low oxygen conditions were detected in the southern end of the lake during August although the timing of the sampling prevented us from detecting the development of major biological impacts. Examination of physical-chemical and biological data by depth suggests that such impacts did exist. Relatively low numbers of taxa/sample, abundance and diversity and the predominance by the disturbance tolerant polychaete *Capitella* (LPIL) at depths greater than 3.7 m in August suggest that these sites were under stress. Passage of the two hurricanes appeared to have had considerable impact as evidence both by the disappearance of the

clam *Rangia cuneata* and the steep decline in all biological parameters at depths less than 3.7 m following the storms.

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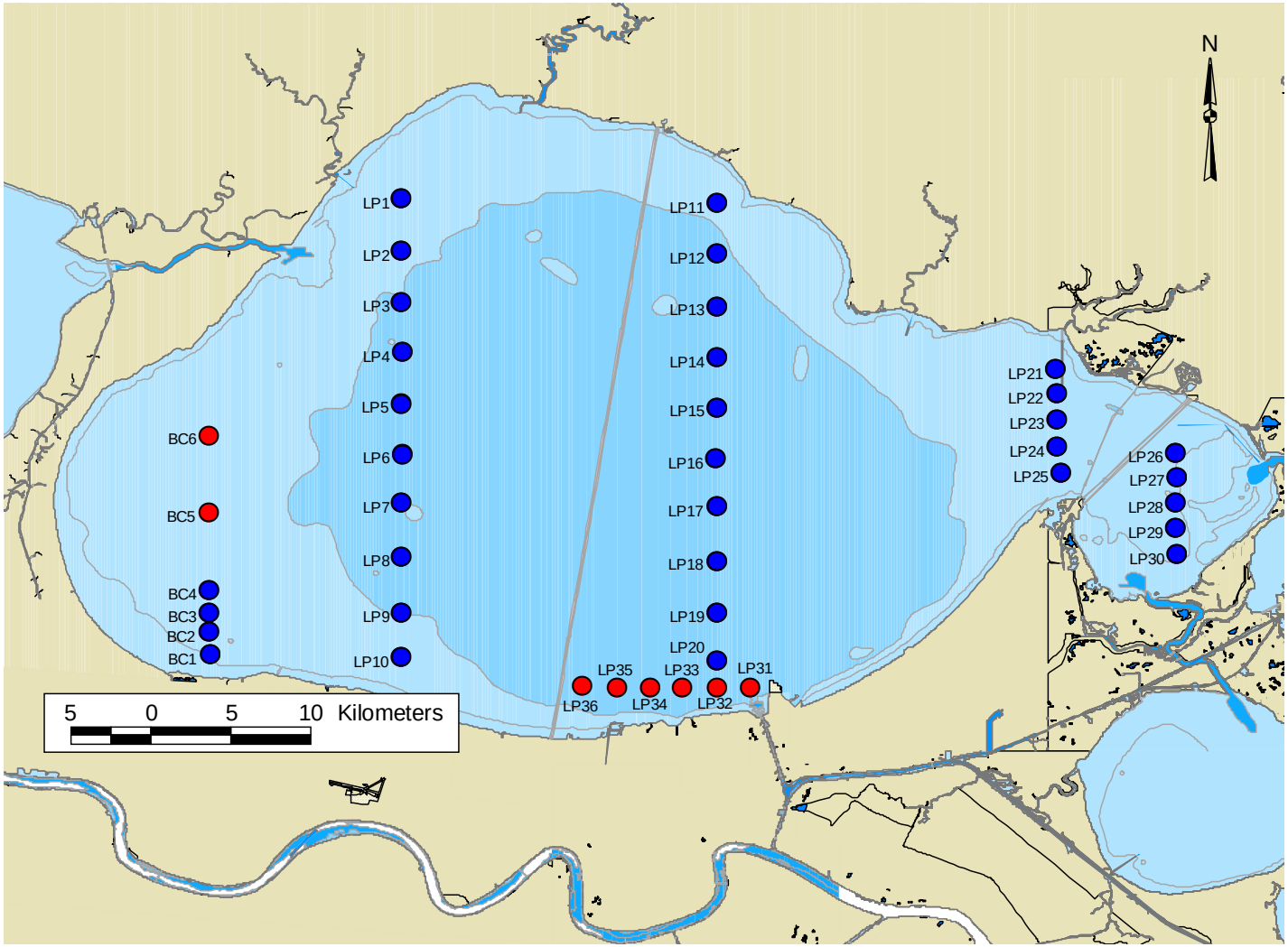
Figure 1. Location of Lake Pontchartrain sampling stations*



***Stations in blue were sampled in all time periods (April, August, and October). Stations in red were sampled in August and October.**

Figure 2. Satellite Images of Lake Pontchartrain Before, During, and After the 2008 Bonnet Carre' Spillway Release

Figure 2A. March 26, 2008

Figure 2B. April 13, 2008

Figure 2C. April 29, 2008

Figure . Satellite Images of Lake Pontchartrain Before, During, and After the 2008 Bonnet Carre' Spillway Release (Cont.)

Figure 2D. May 04, 2008

Figure 2E. May 11, 2008

Figure 2F. May 20, 2008

Figure . Satellite Images of Lake Pontchartrain Before, During, and After the 2008 Bonnet Carre' Spillway Release (Cont.)

Figure 2G. August 9, 2008

Figure 2H. August 28, 2008

Figure 2I. October 4, 2008

Figure 3. Surface Water Temperature (^{o}C) in April 2008.

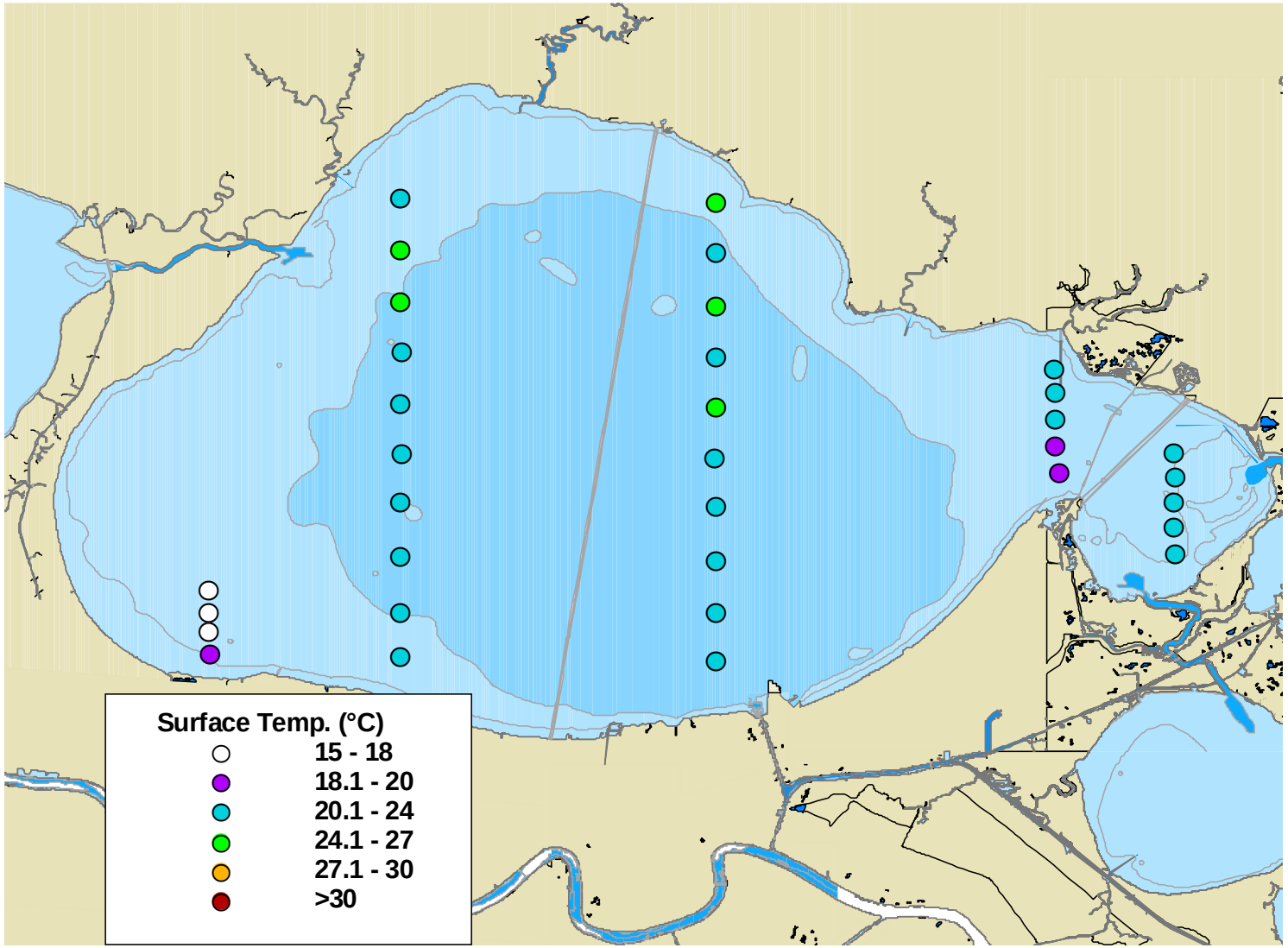


Figure 4. Bottom Water Temperature (^{o}C) in April 2008.

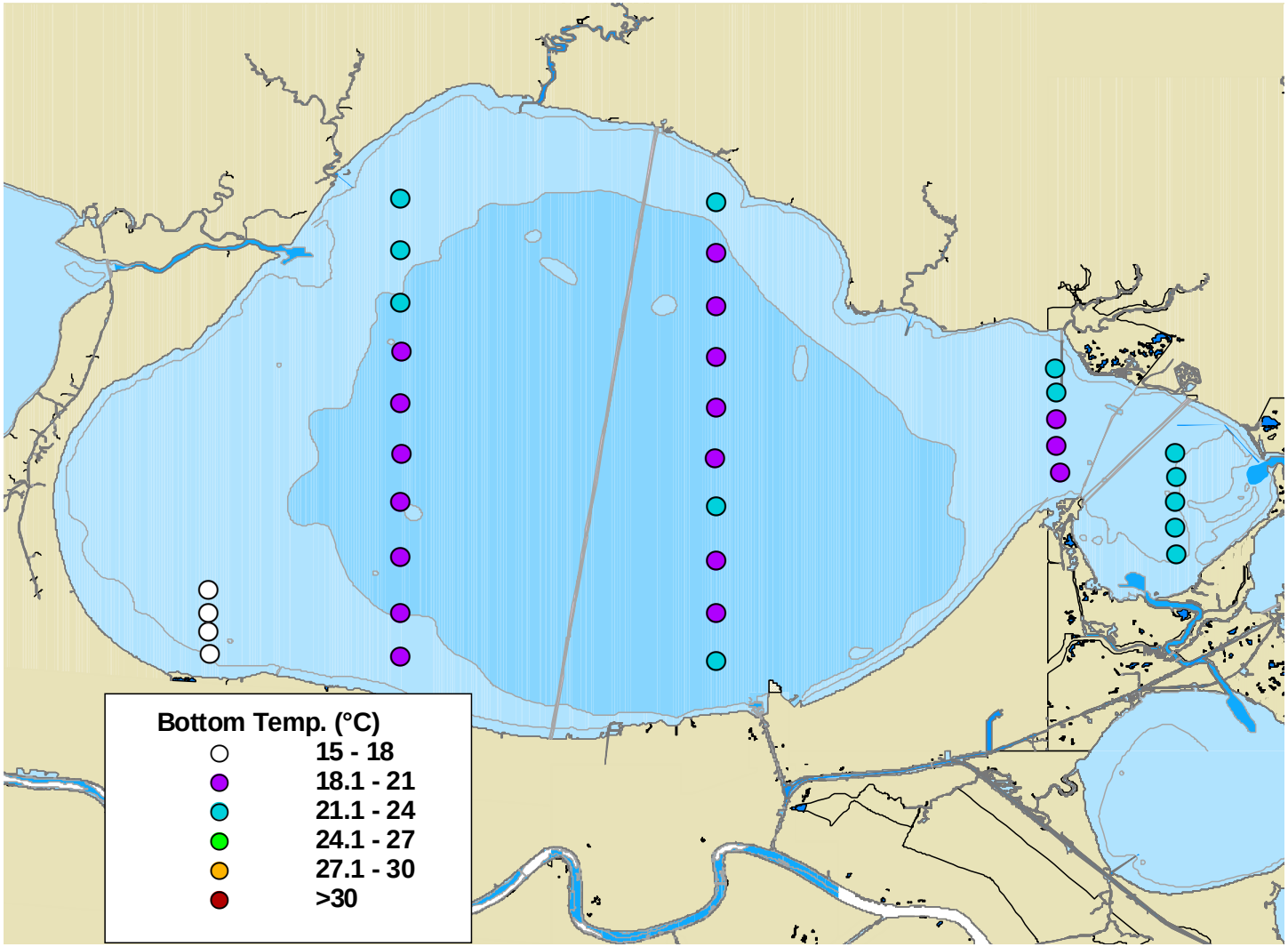


Figure 5. Surface Water Temperature (^{o}C) in August 2008.

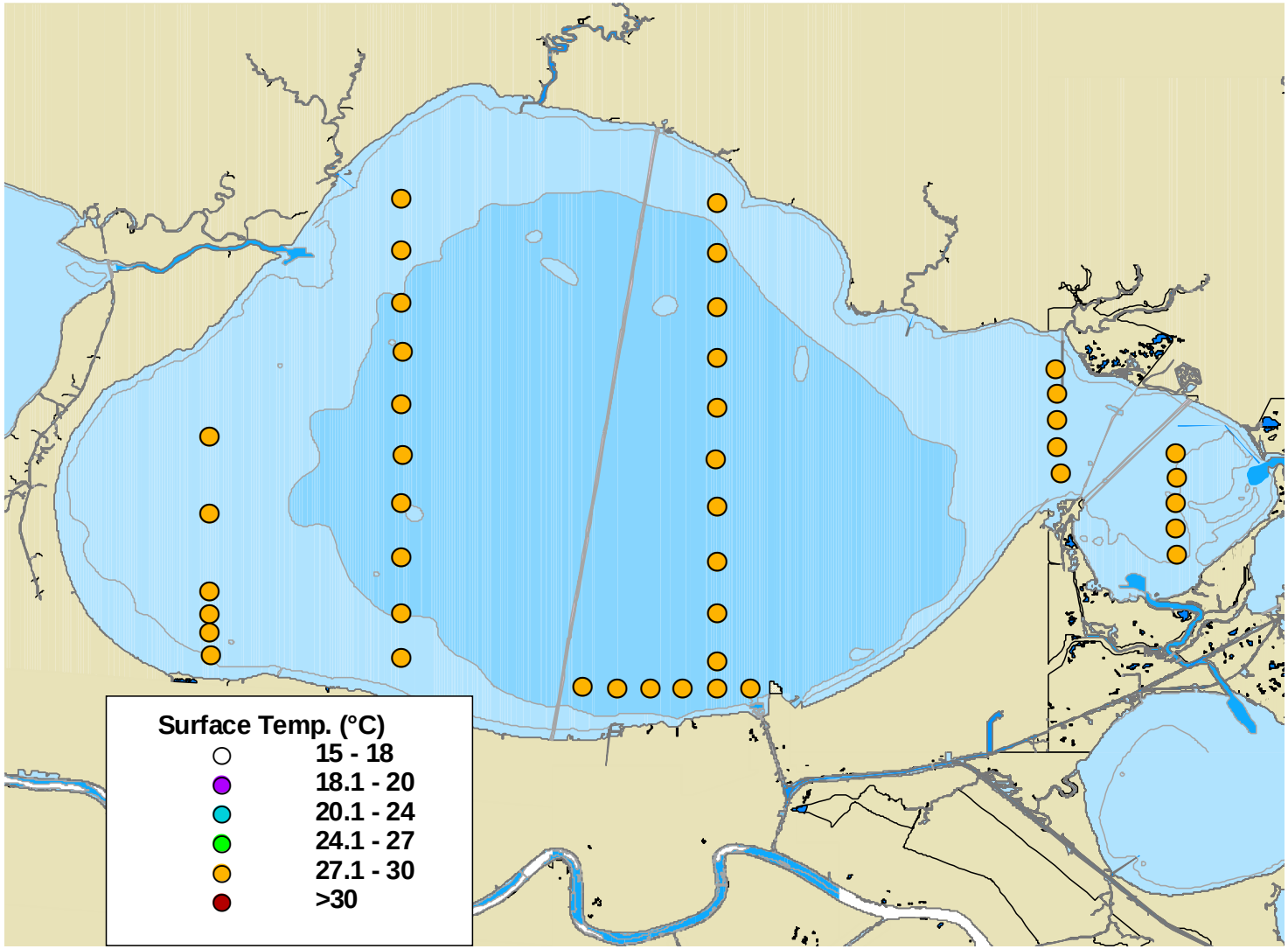


Figure 6. Bottom Water Temperature (^{o}C) in August 2008.

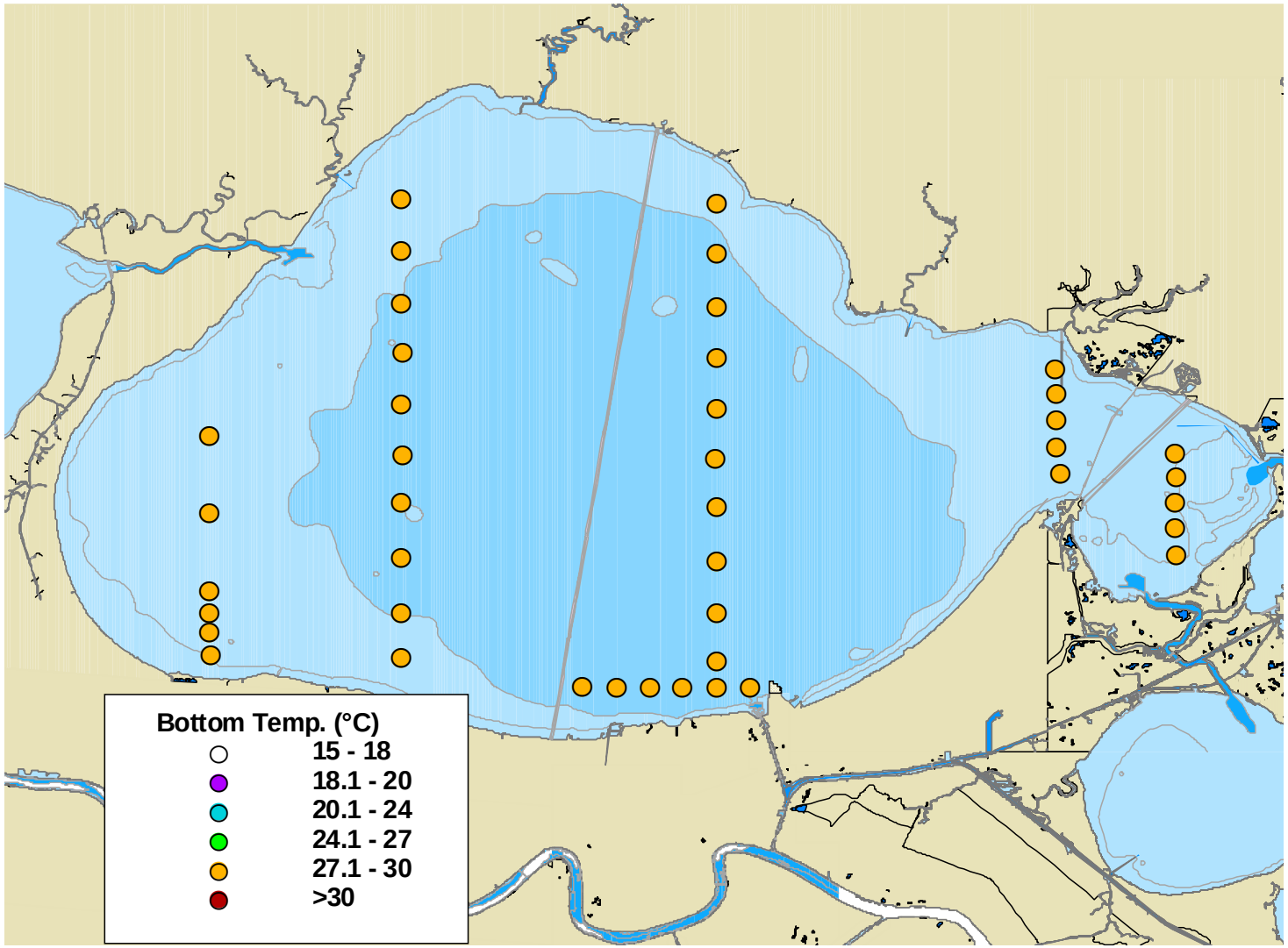


Figure 7. Surface Water Temperature (^{o}C) in October 2008.

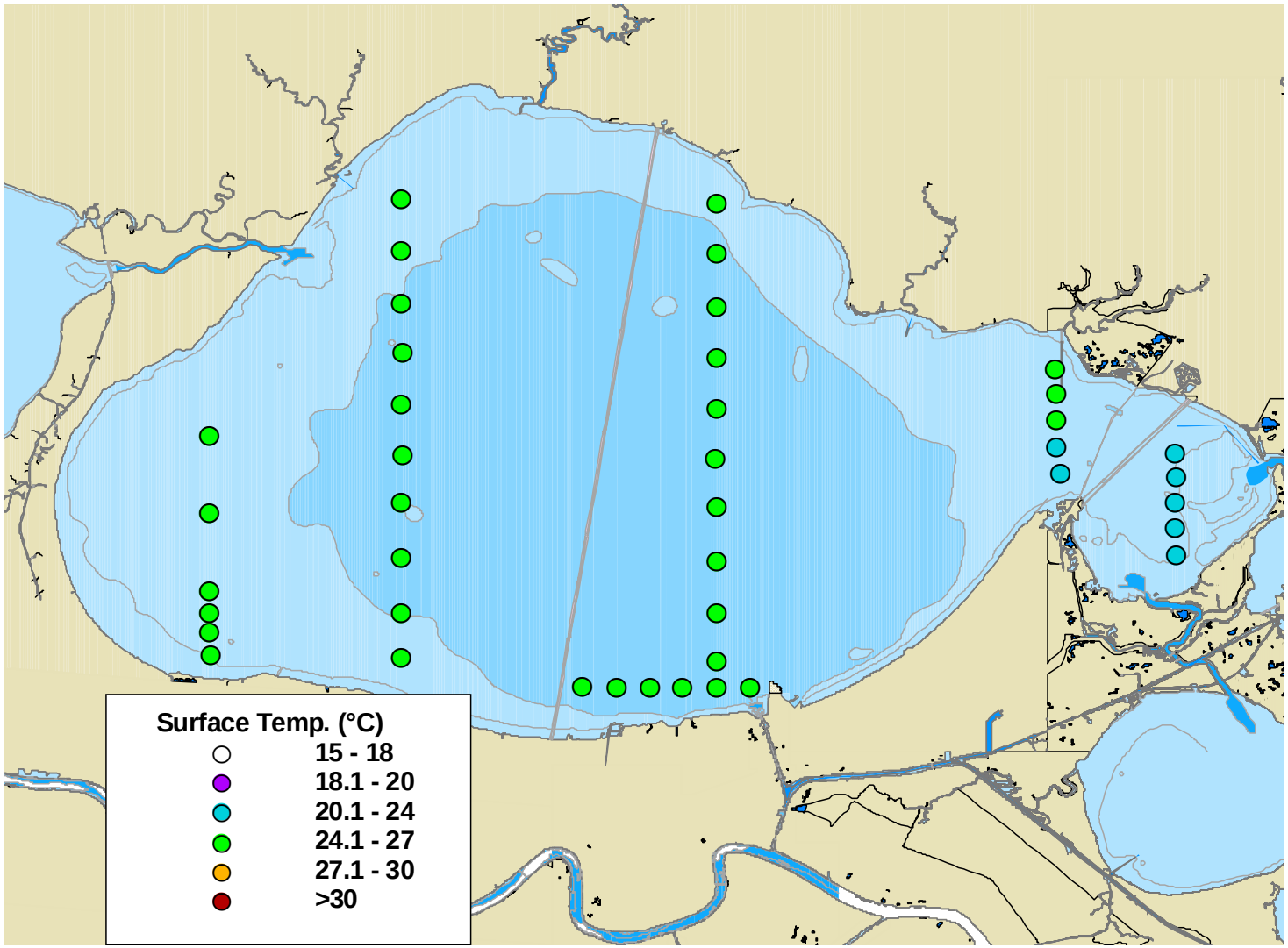


Figure 8. Bottom Water Temperature (^{o}C) in October 2008.

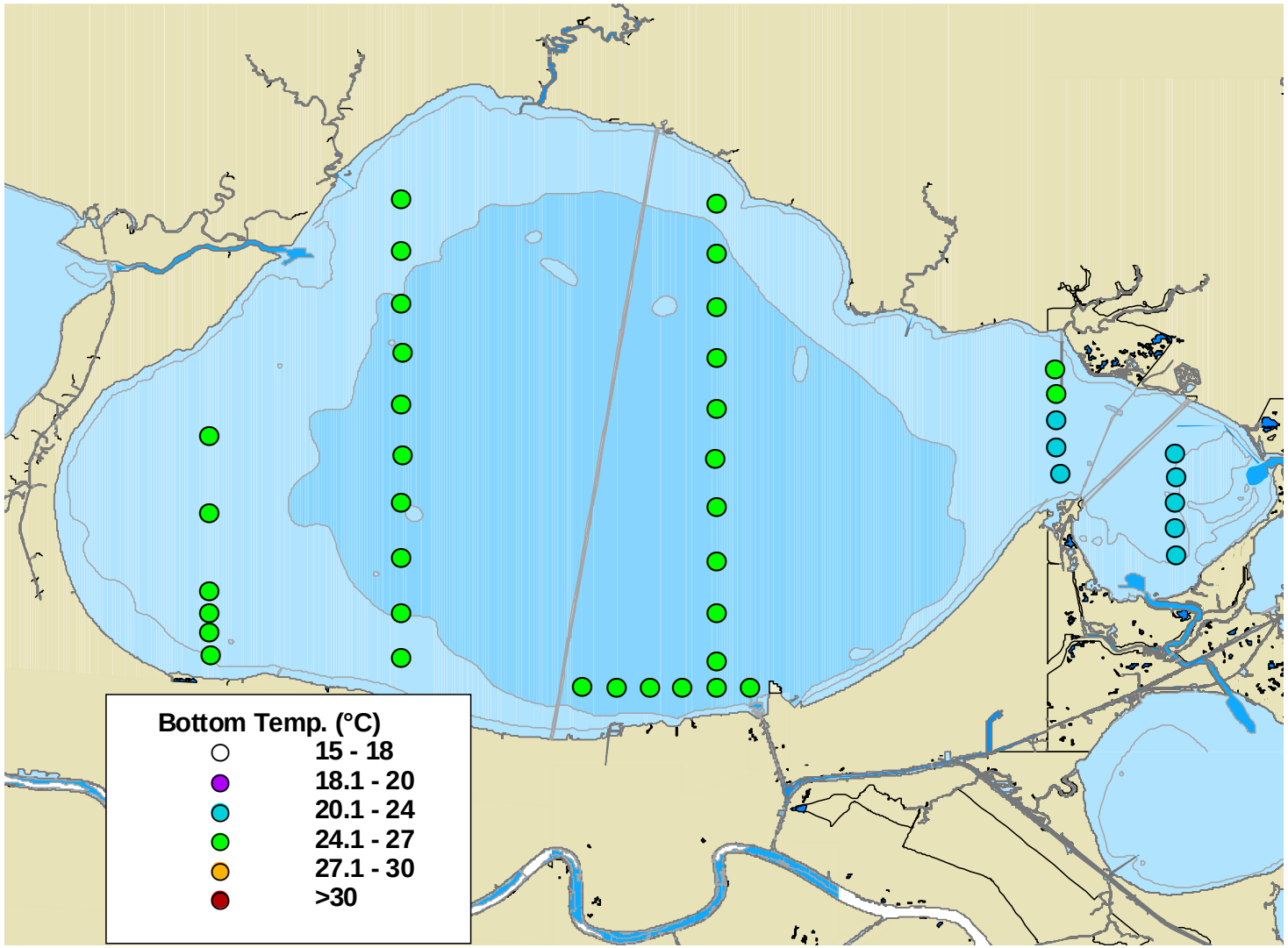


Figure 9. Surface Water Salinity (PSU) in April 2008.

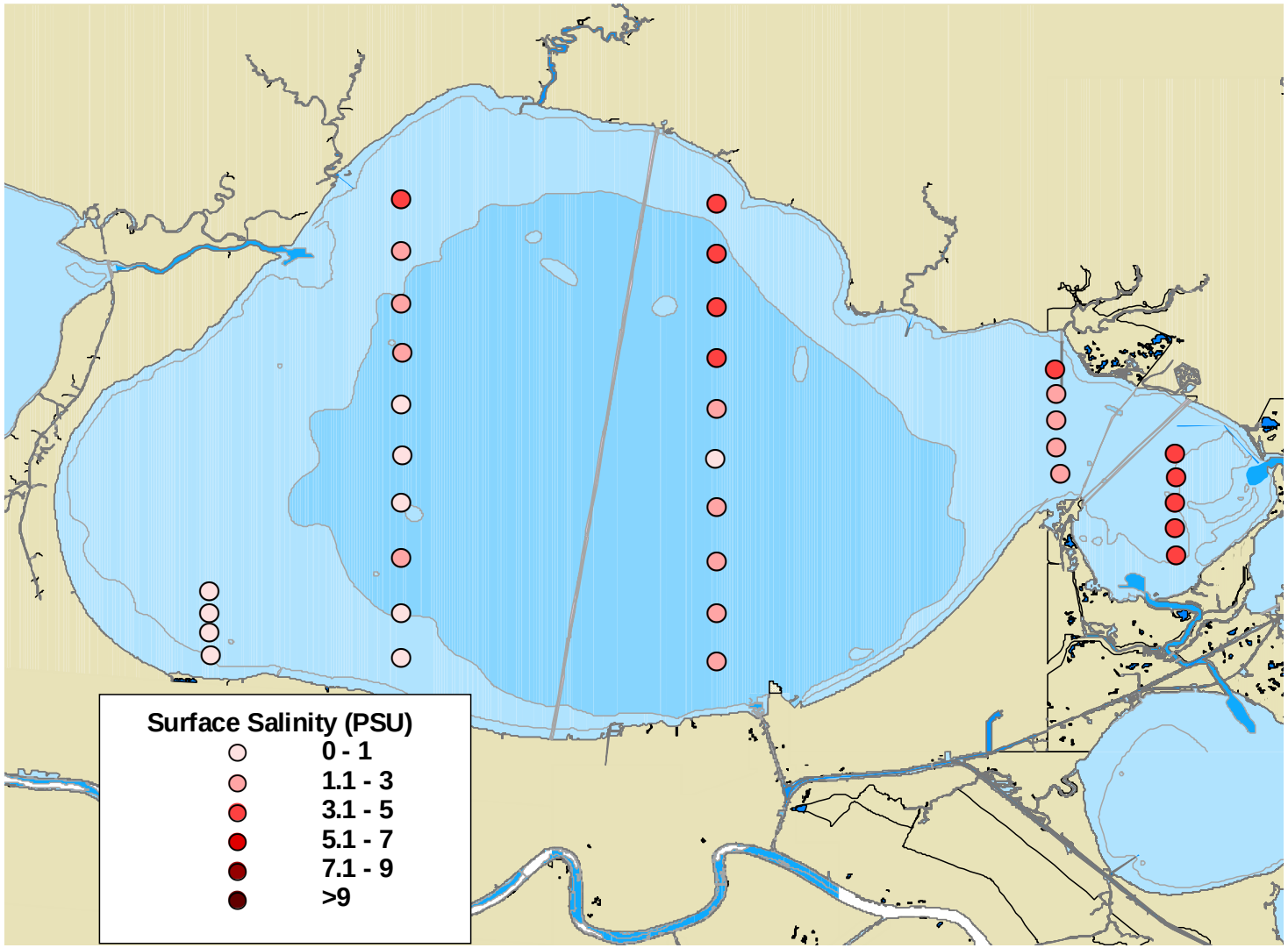


Figure 10. Bottom Water Salinity (PSU) in April 2008.

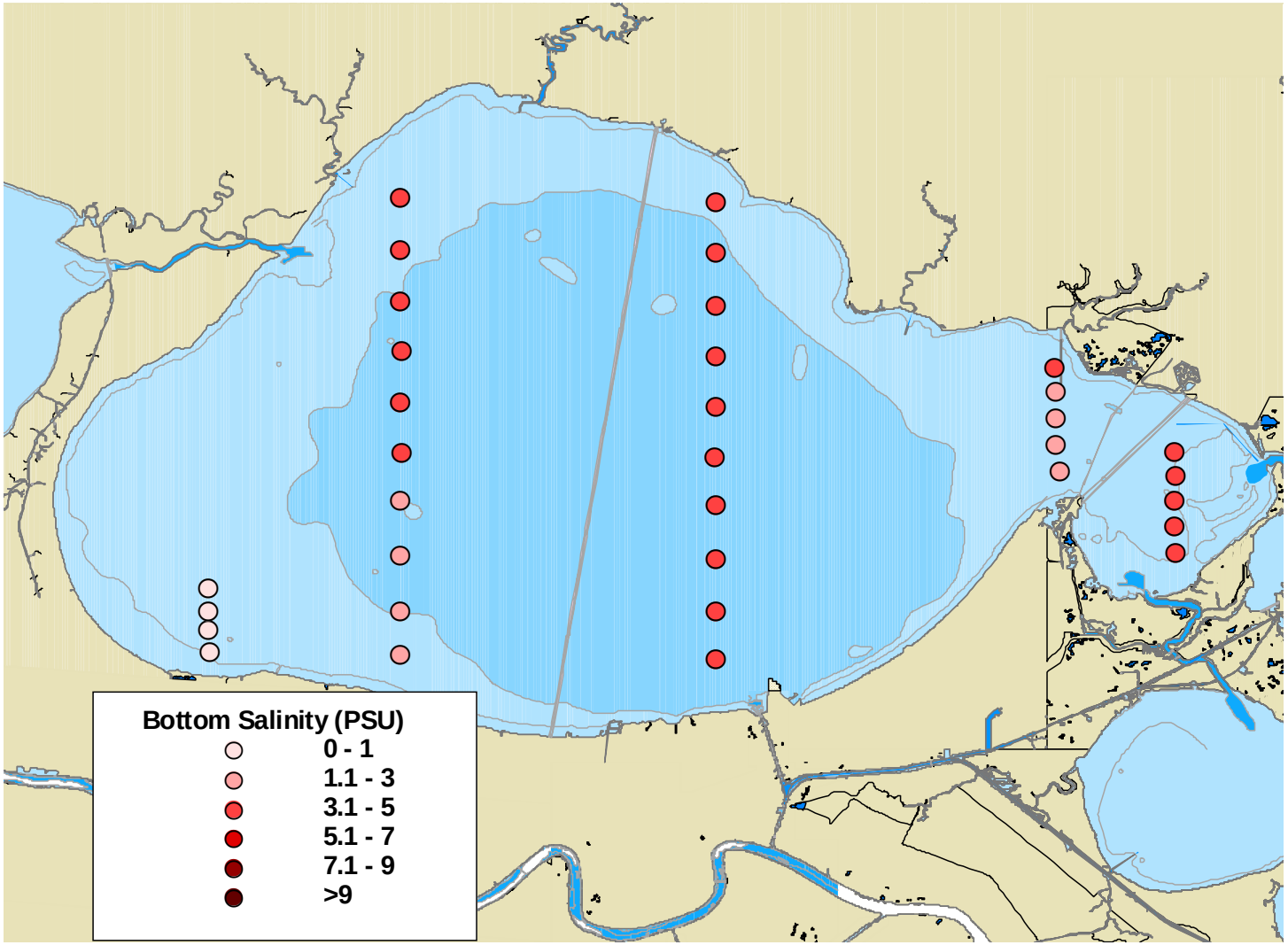


Figure 11. Surface Water Salinity (PSU) in August 2008.

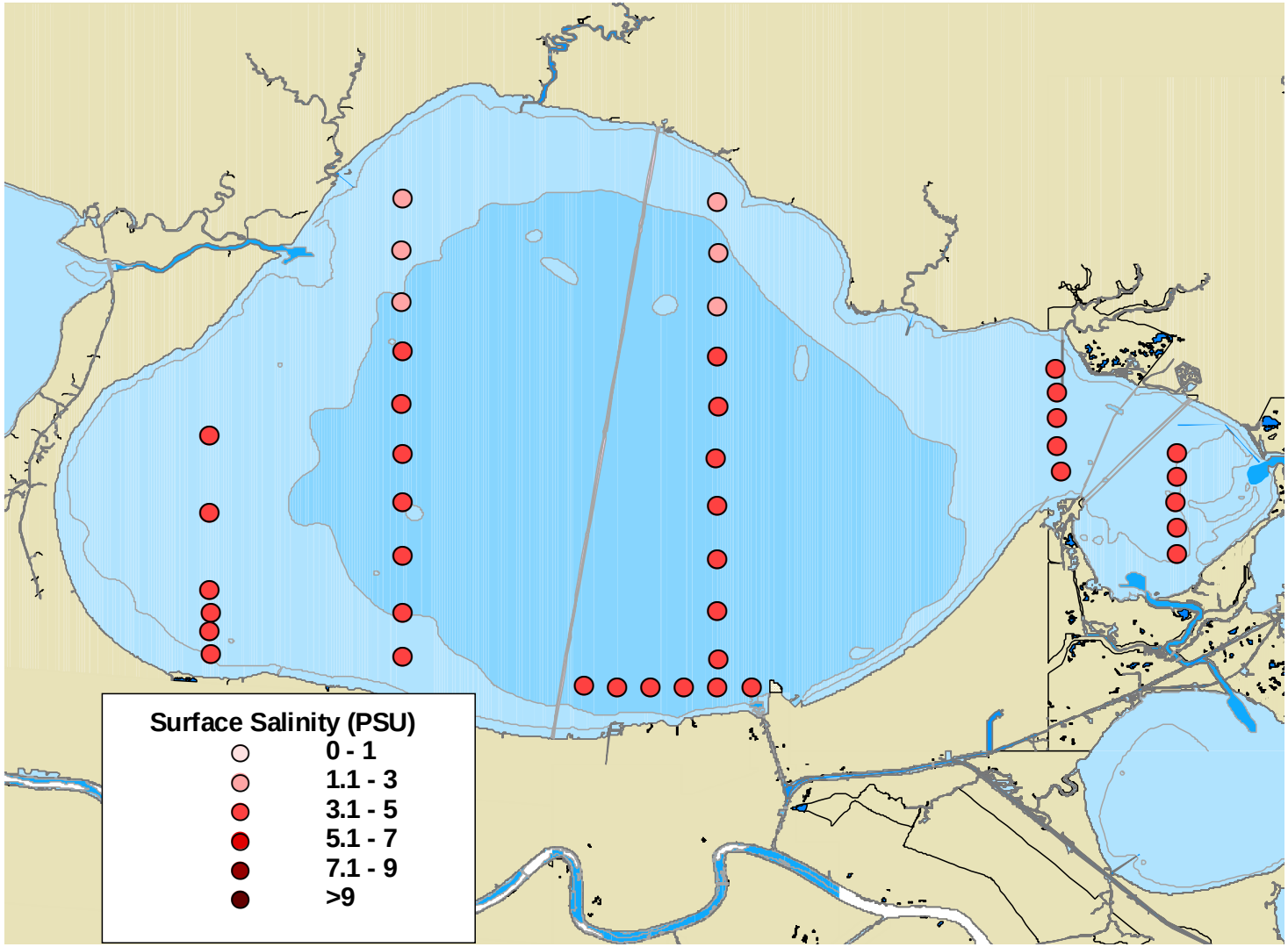


Figure 12. Bottom Water Salinity (PSU) in August 2008.

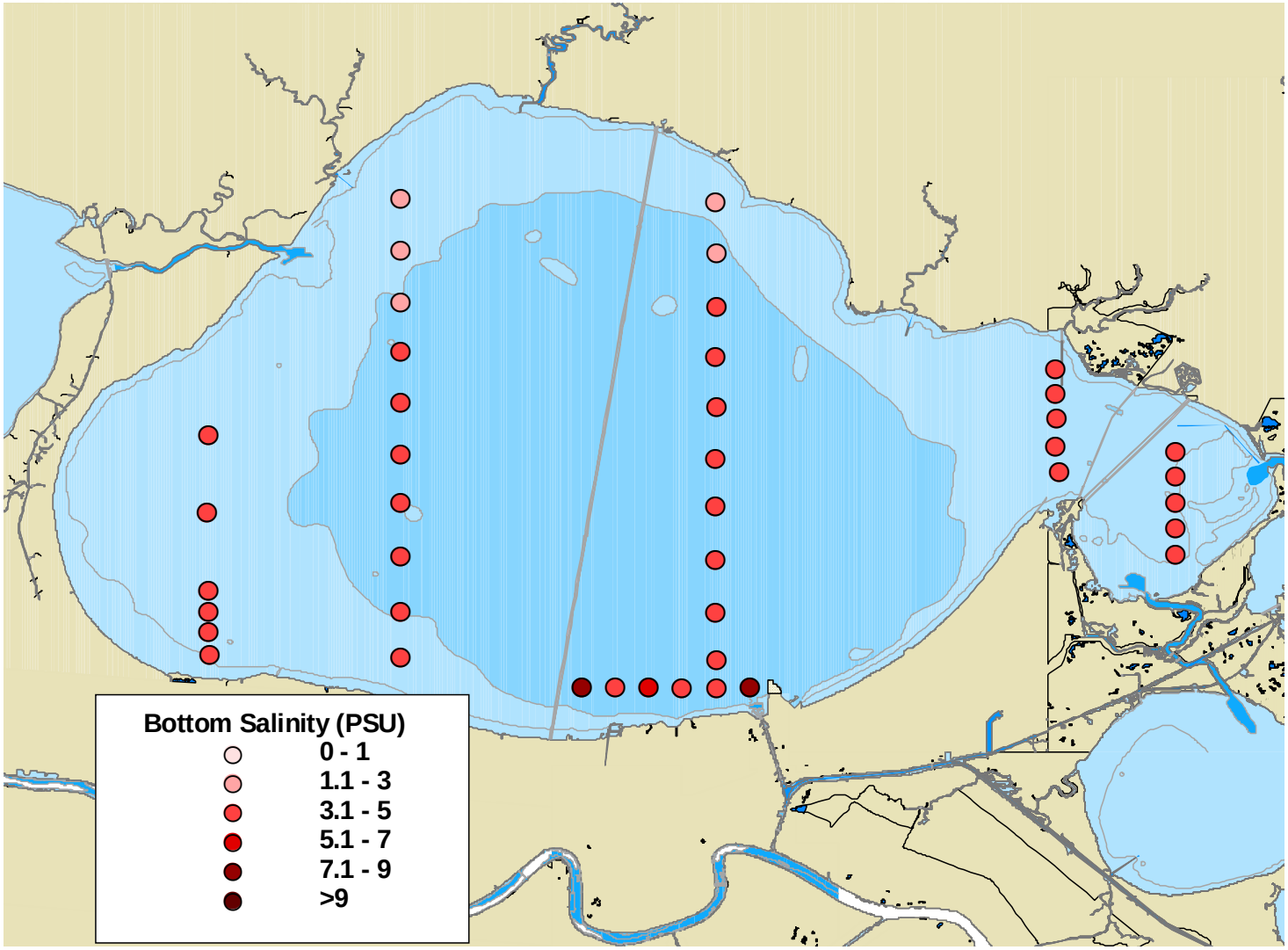


Figure 13. Surface Water Salinity (PSU) in October 2008.

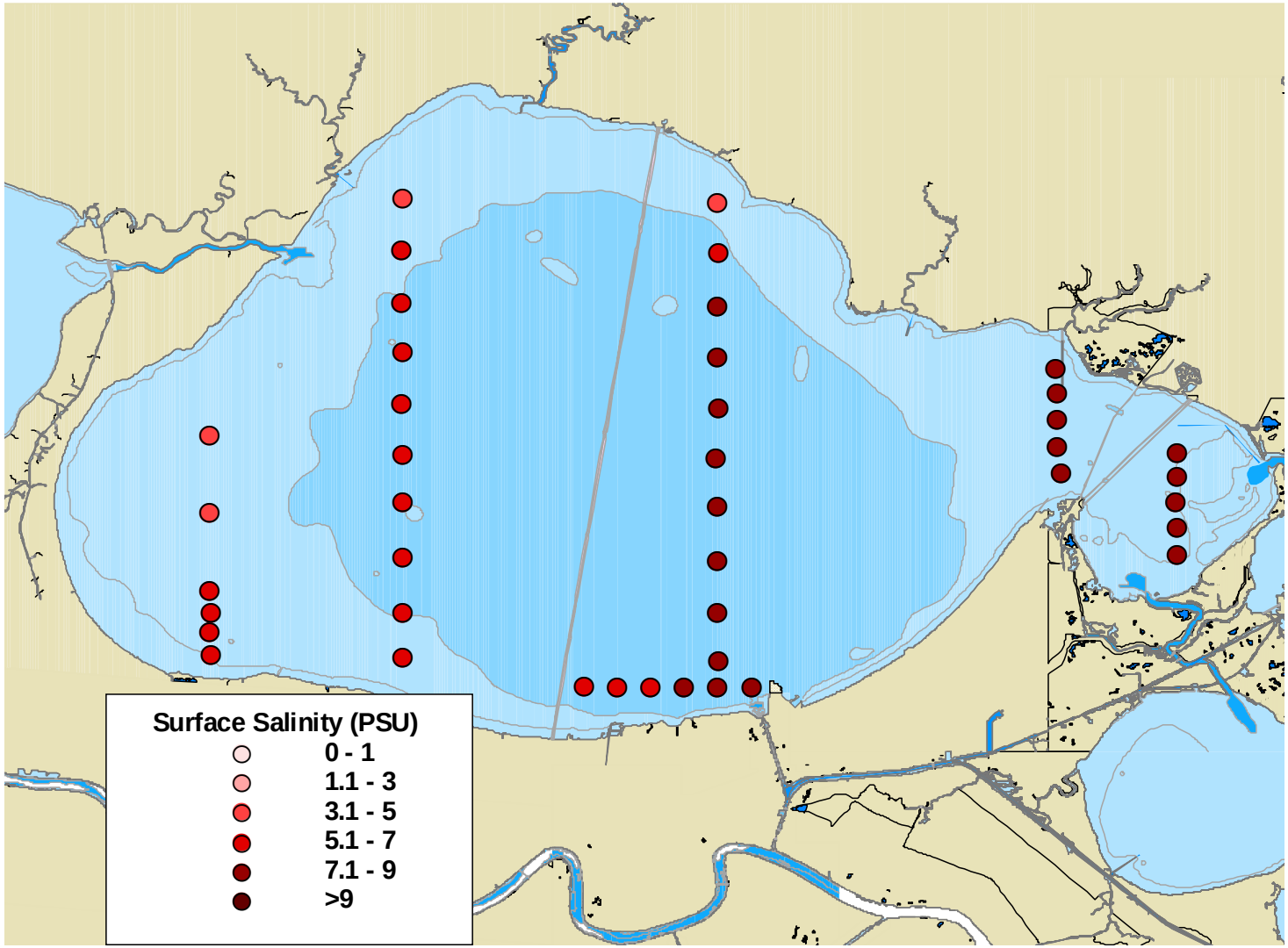


Figure 14. Bottom Water Salinity (PSU) in October 2008.

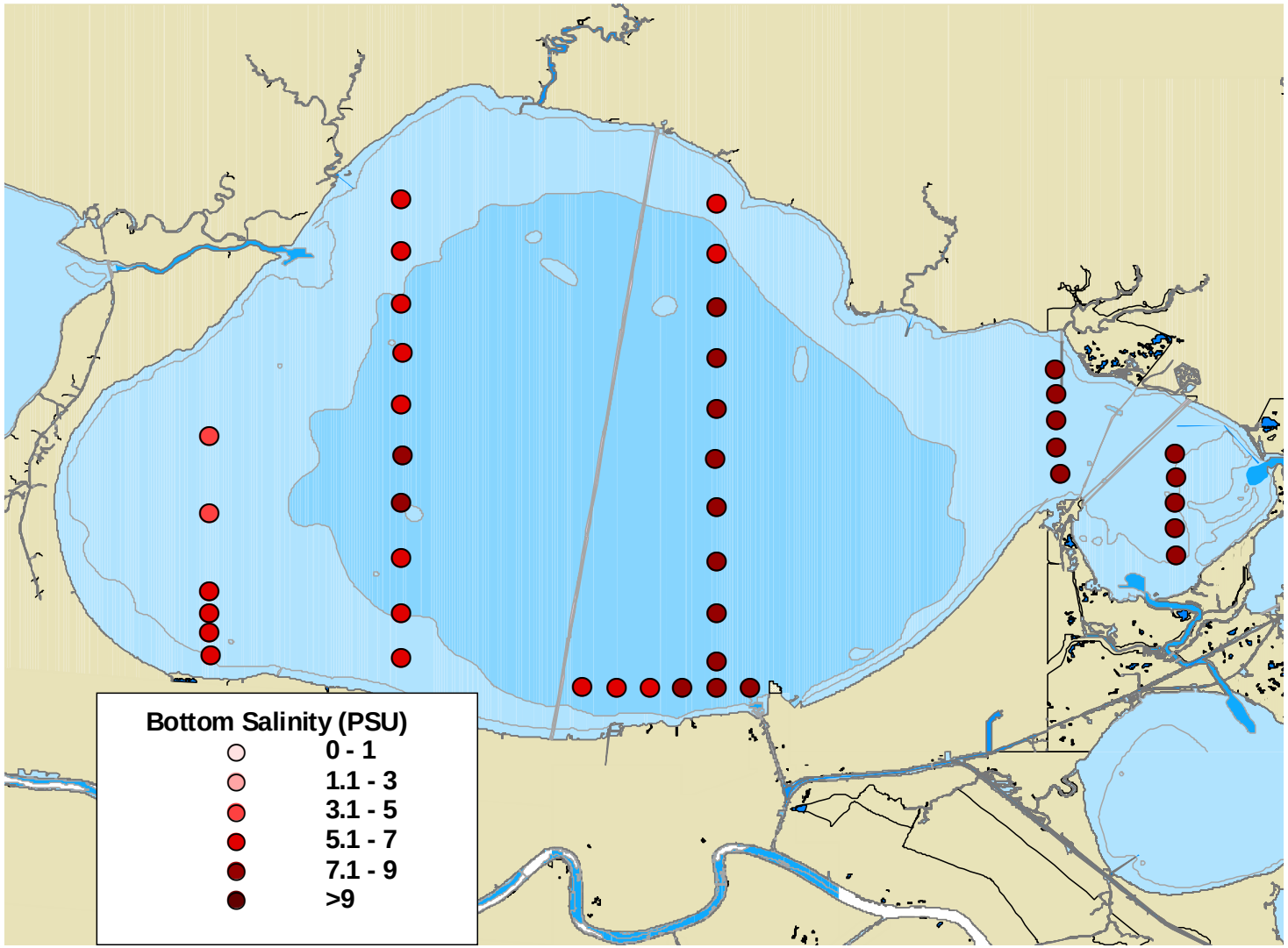


Figure 15. Bottom Water Dissolved Oxygen (mg/L) in April 2008.

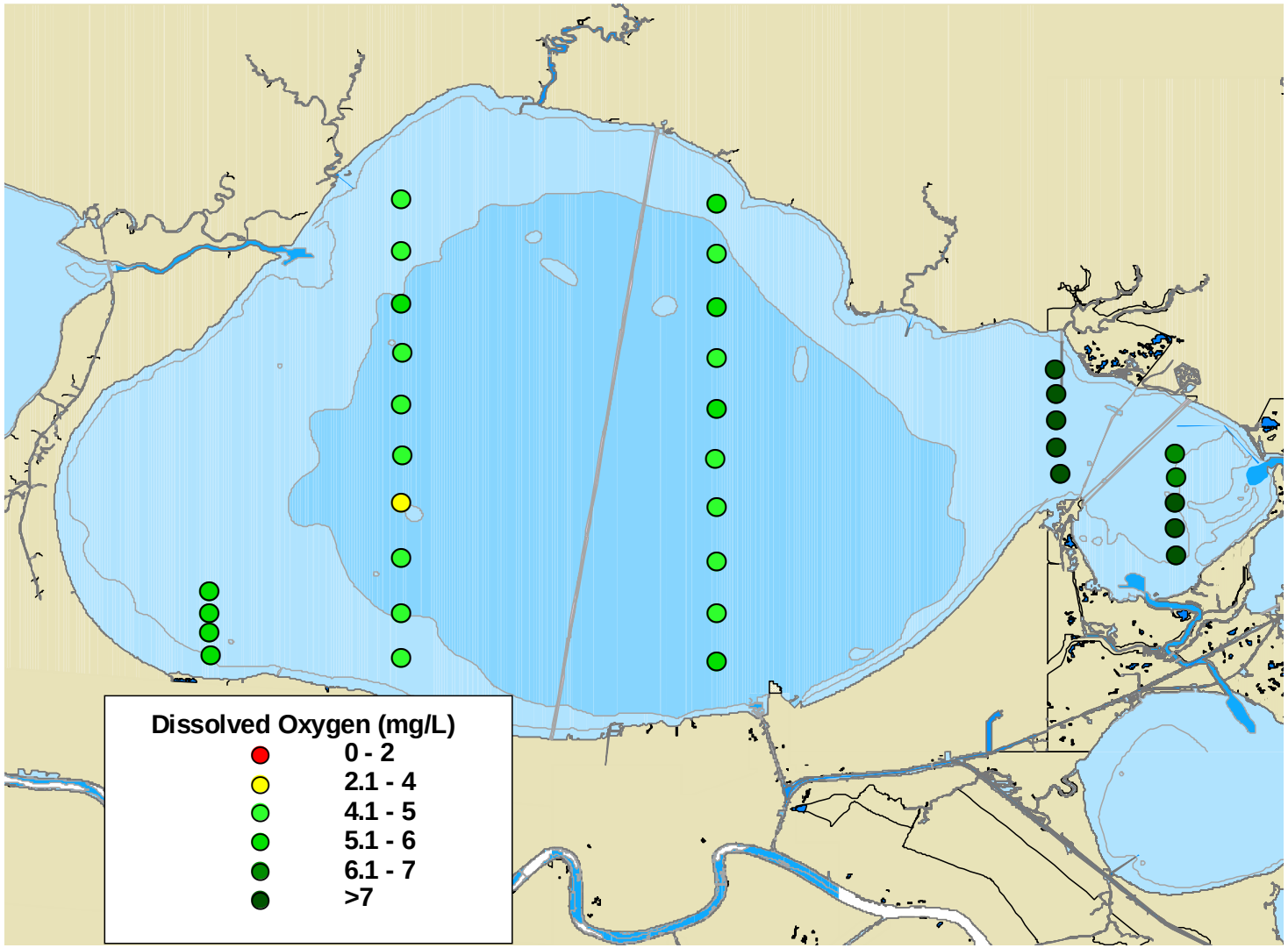


Figure 16. Bottom Water Dissolved Oxygen (mg/L) in August 2008.

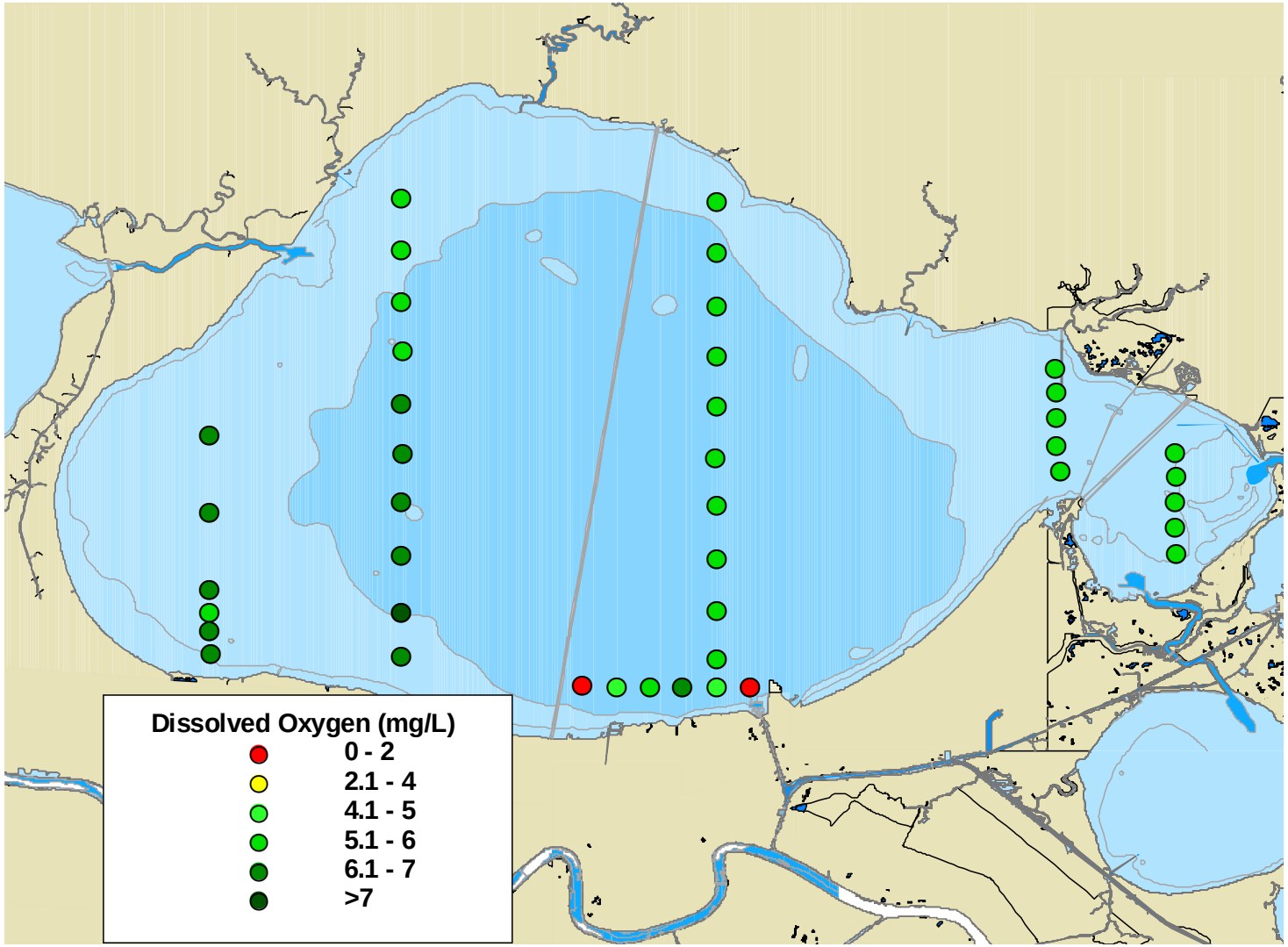


Figure 17. Bottom Water Dissolved Oxygen (mg/L) in October 2008.

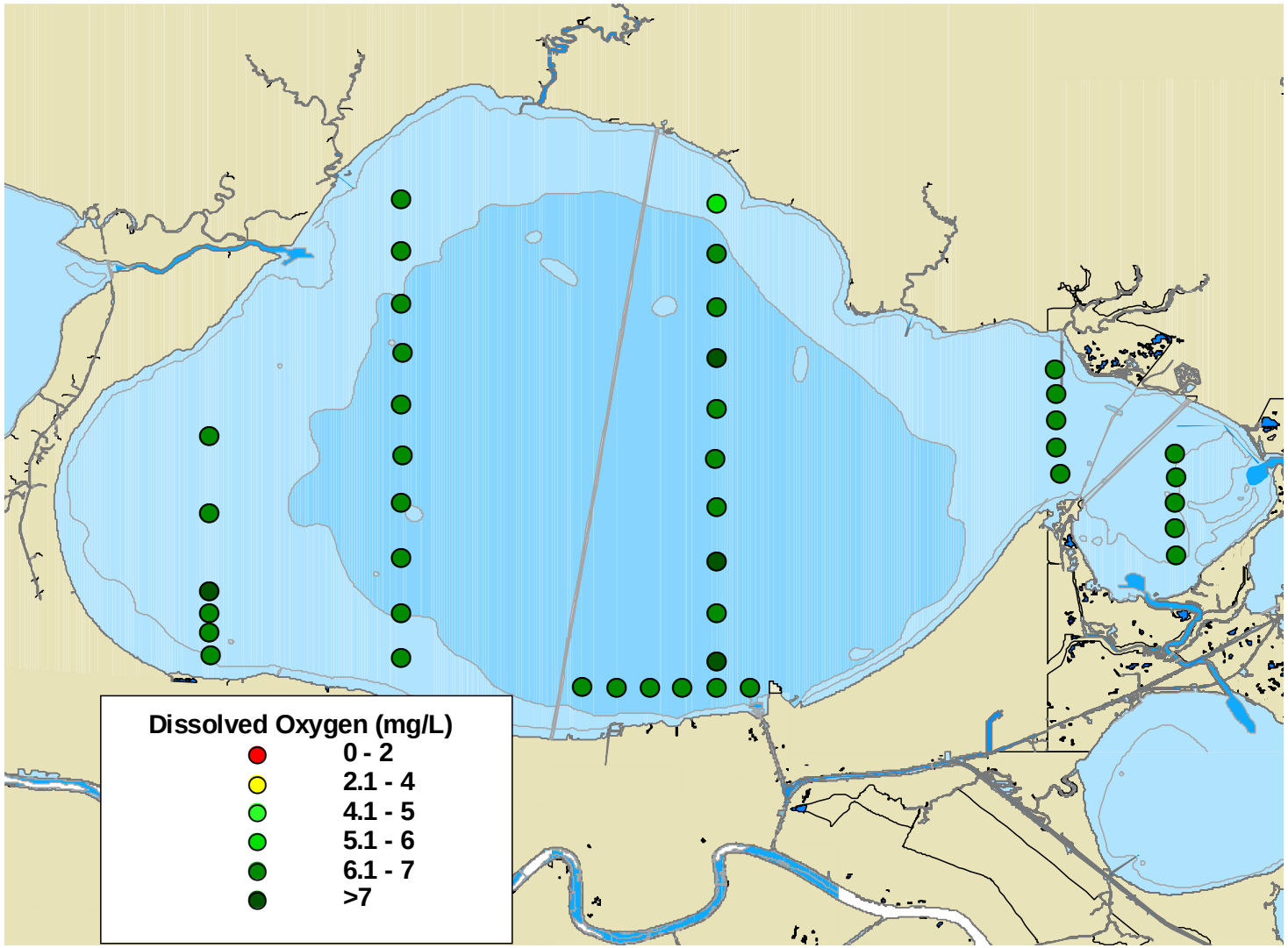


Figure 18. Secchi Depth (m) in April 2008.

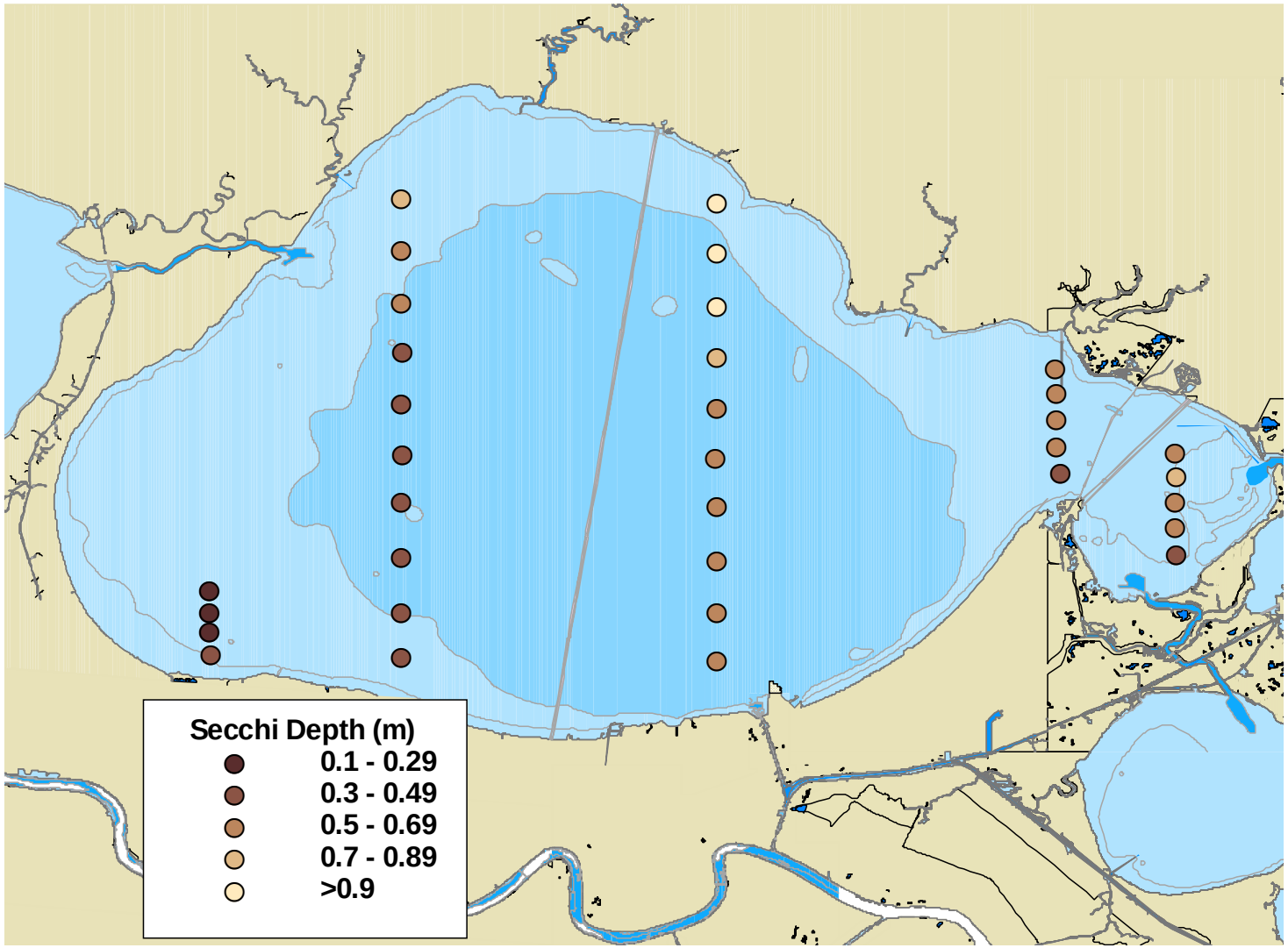


Figure 19. Secchi Depth (m) in August 2008.

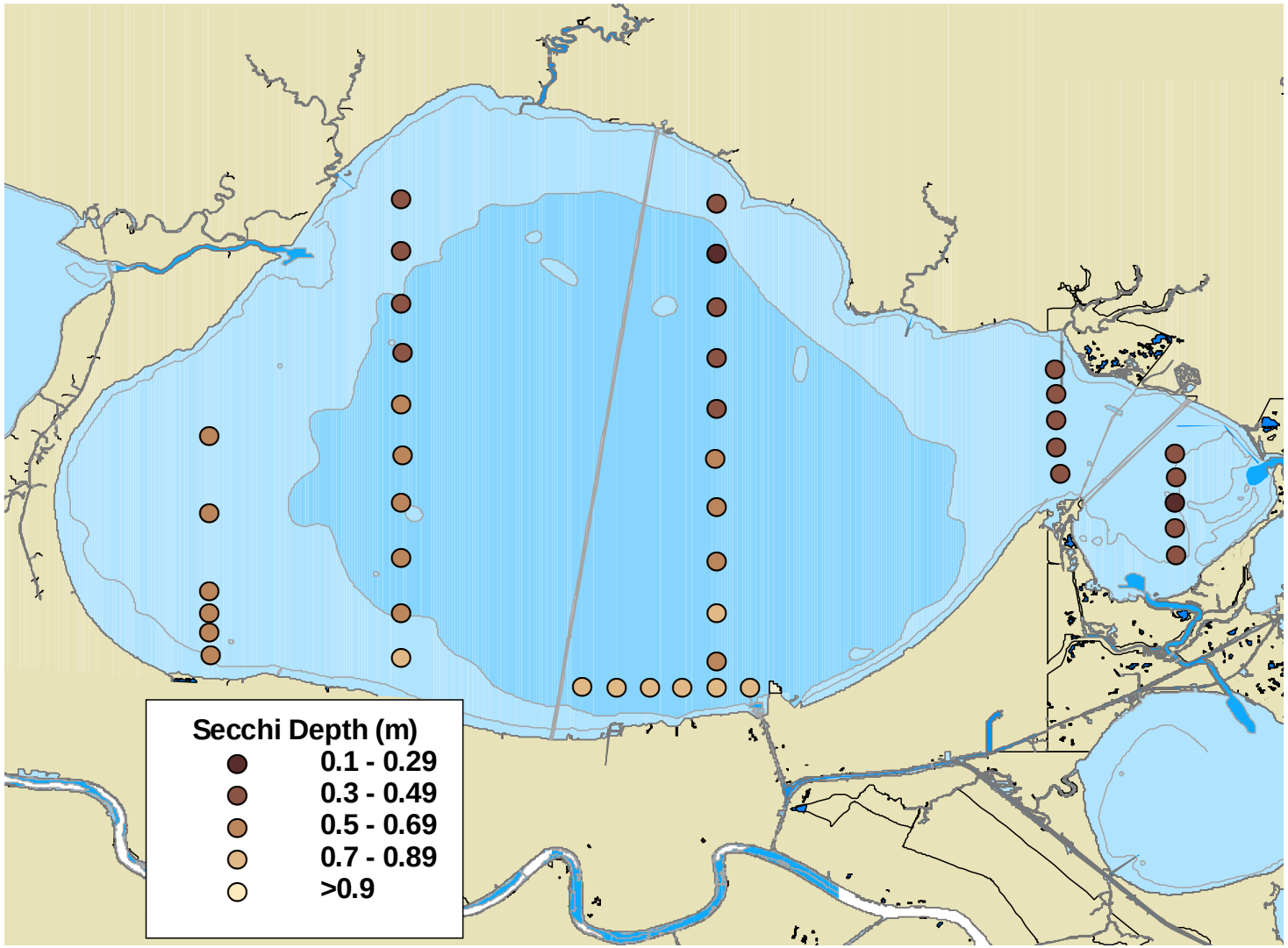


Figure 20. Secchi Depth (m) in October 2008.

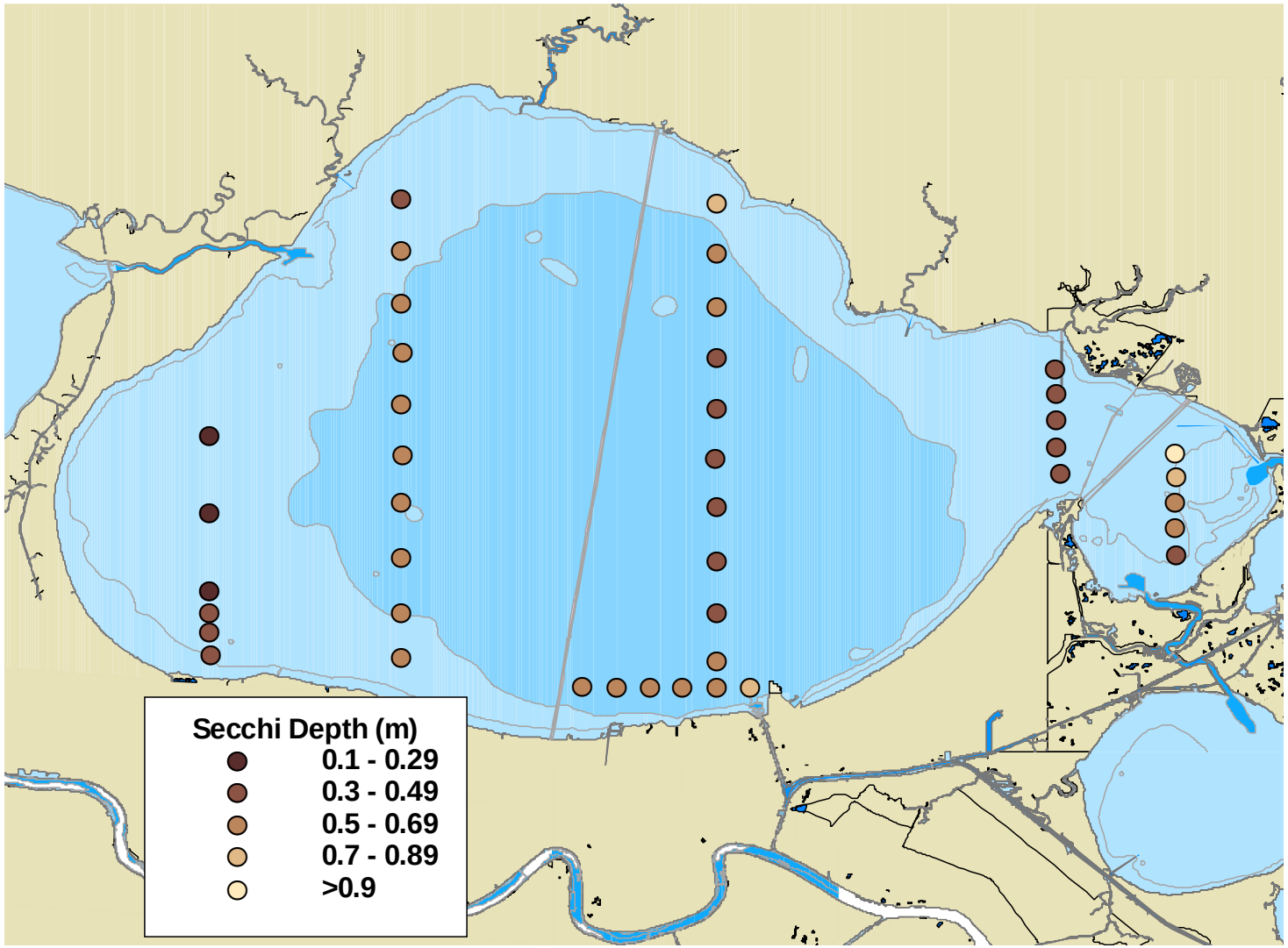


Figure 21. Sediment Mean Grain Size (*u*m) in April 2008.

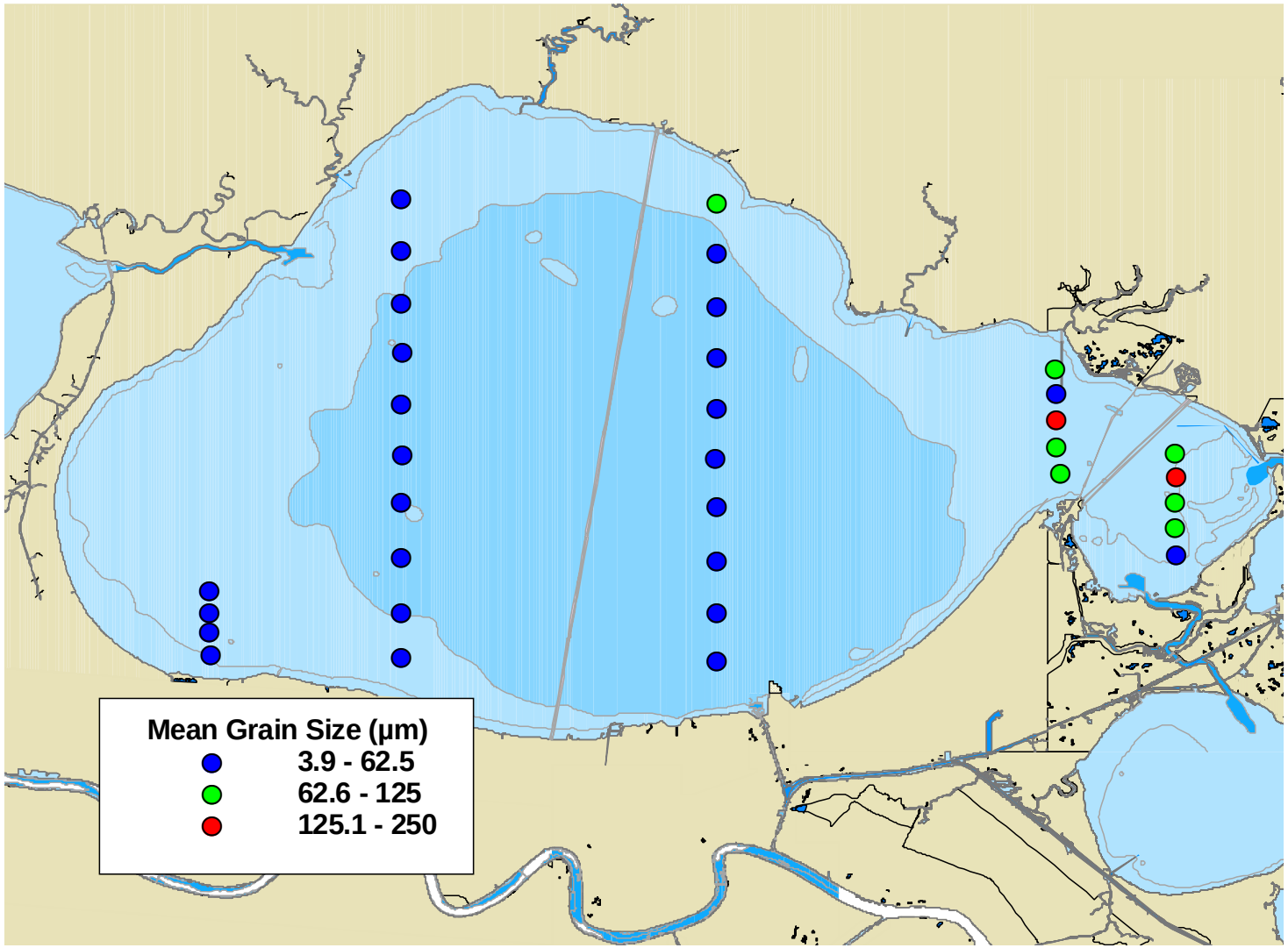


Figure 22. Sediment Mean Grain Size (*u*m) in August 2008.

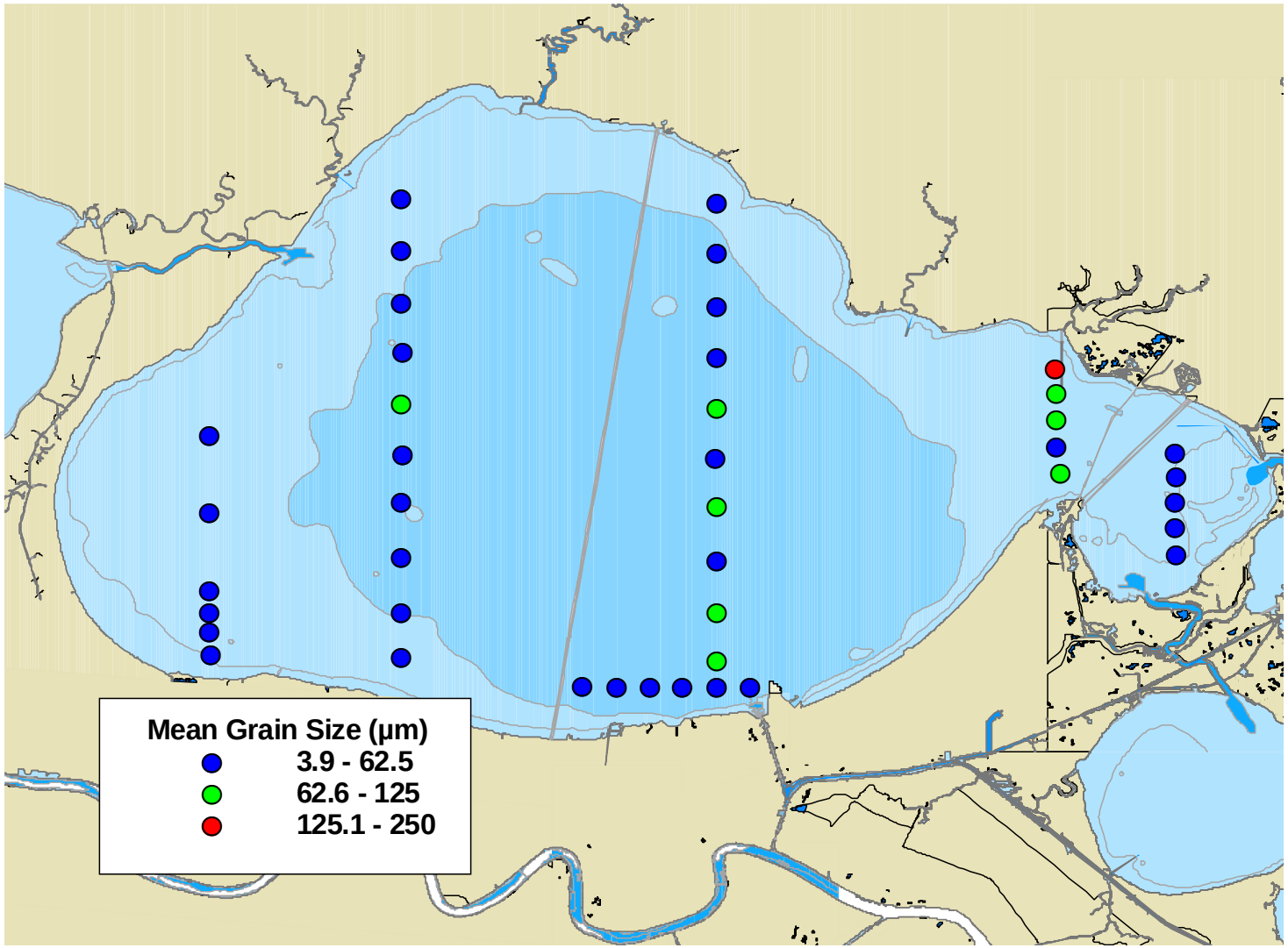


Figure 23. Sediment Mean Grain Size (*u*m) in October 2008.

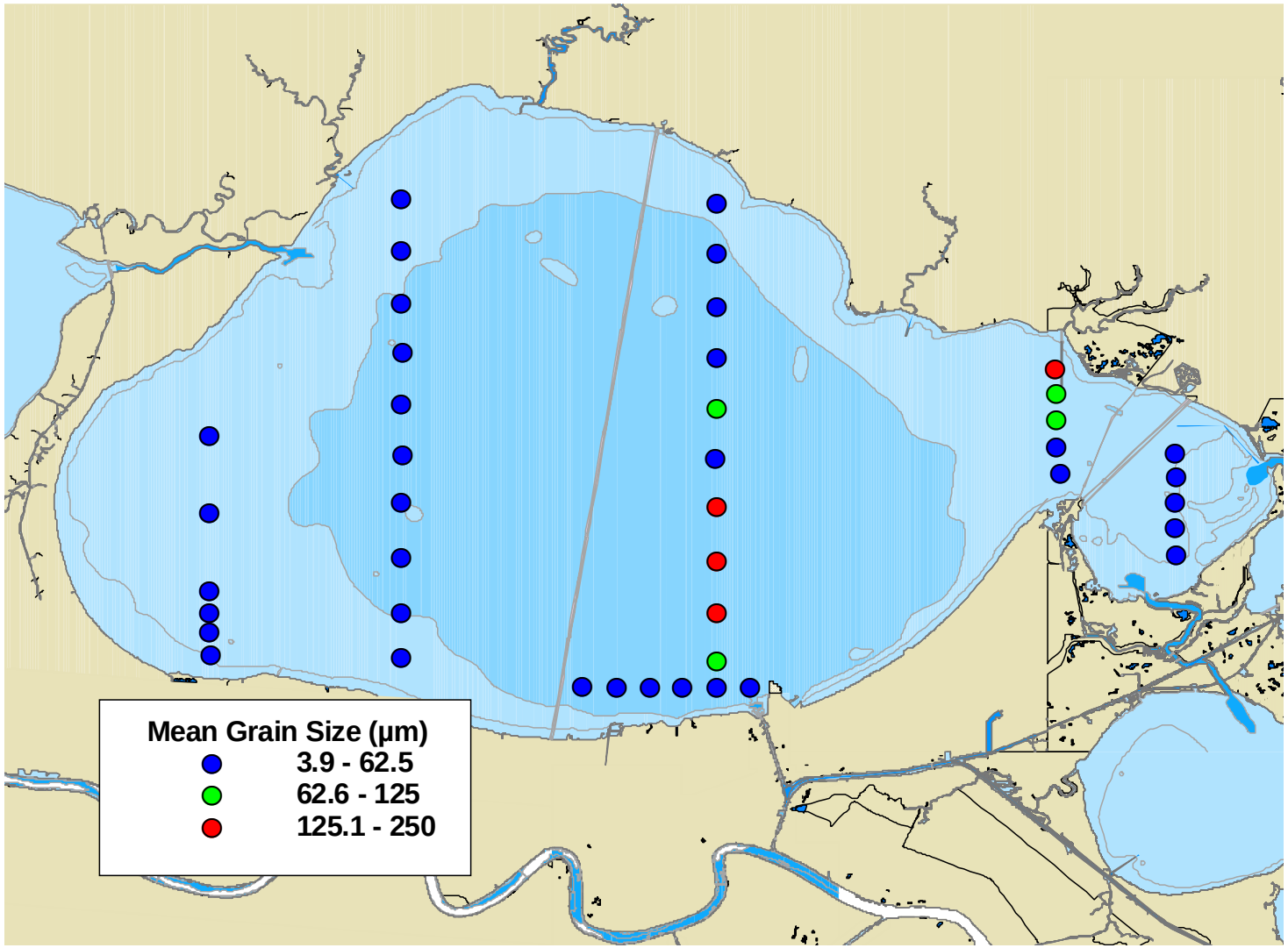


Figure 24. Sediment Organic Content (%) in April 2008.

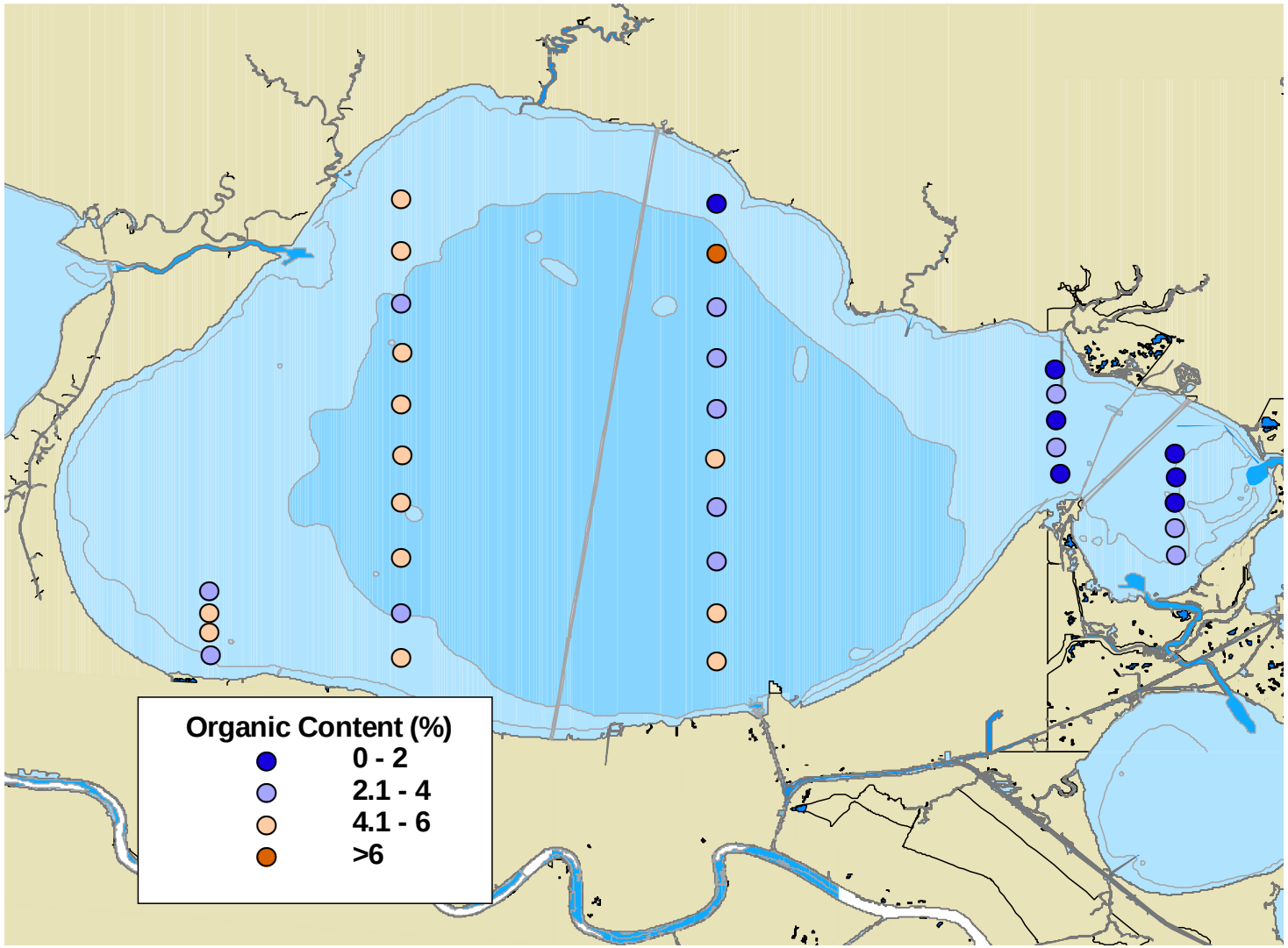


Figure 25. Sediment Organic Content (%) in August 2008.

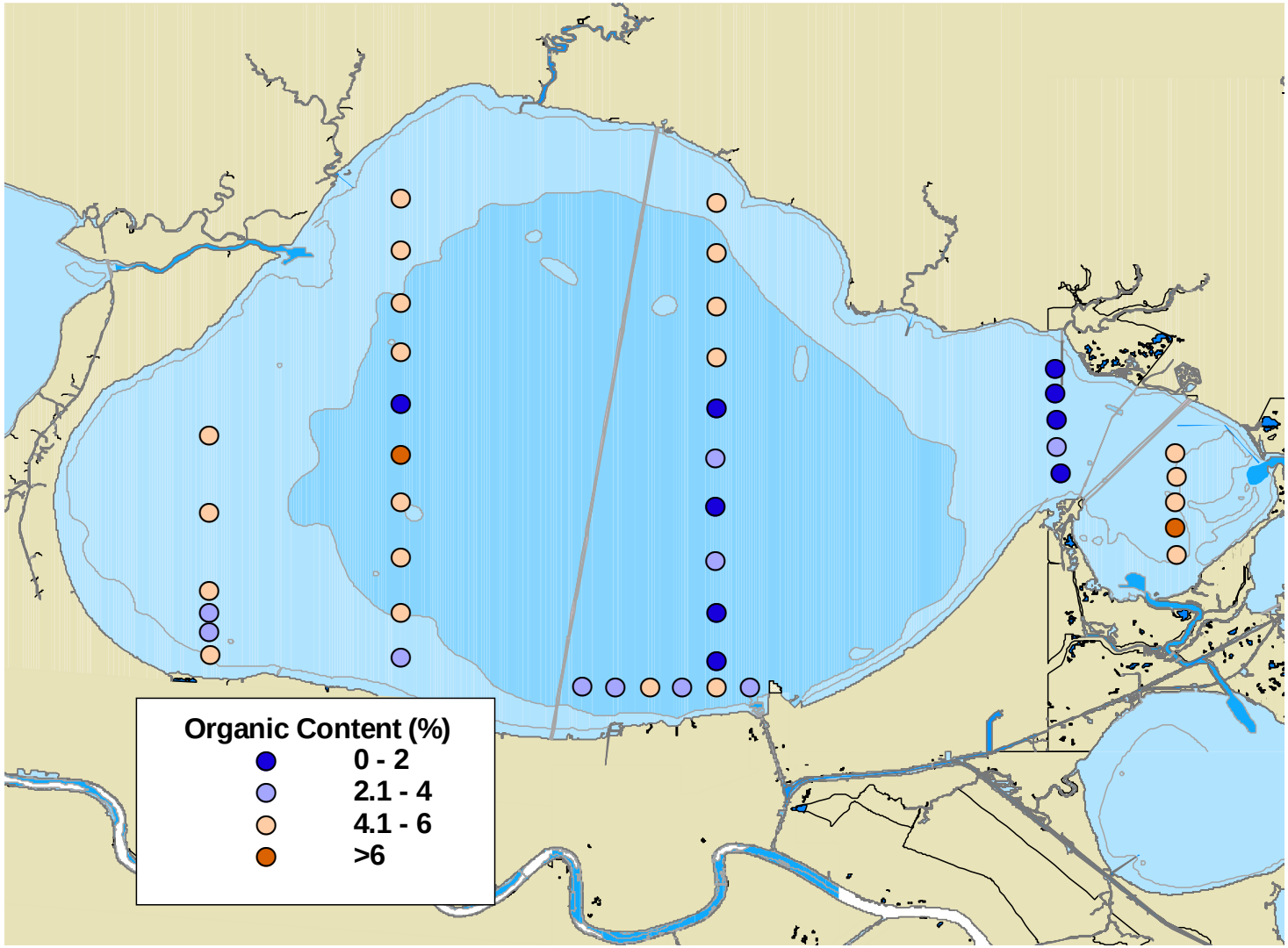


Figure 26. Sediment Organic Content (%) in October 2008.

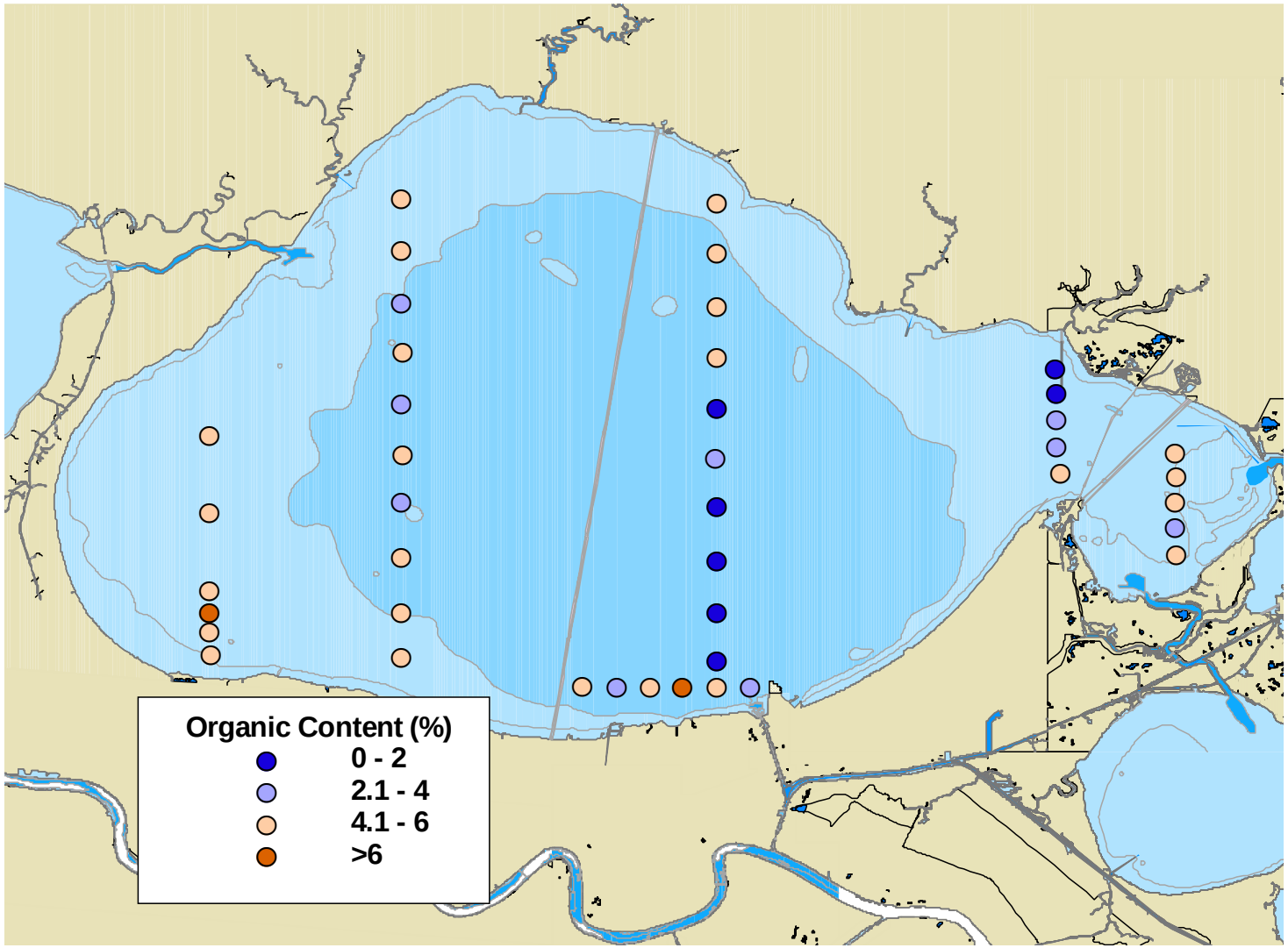


Figure 27. Change in Percent Mud between April and August 2008

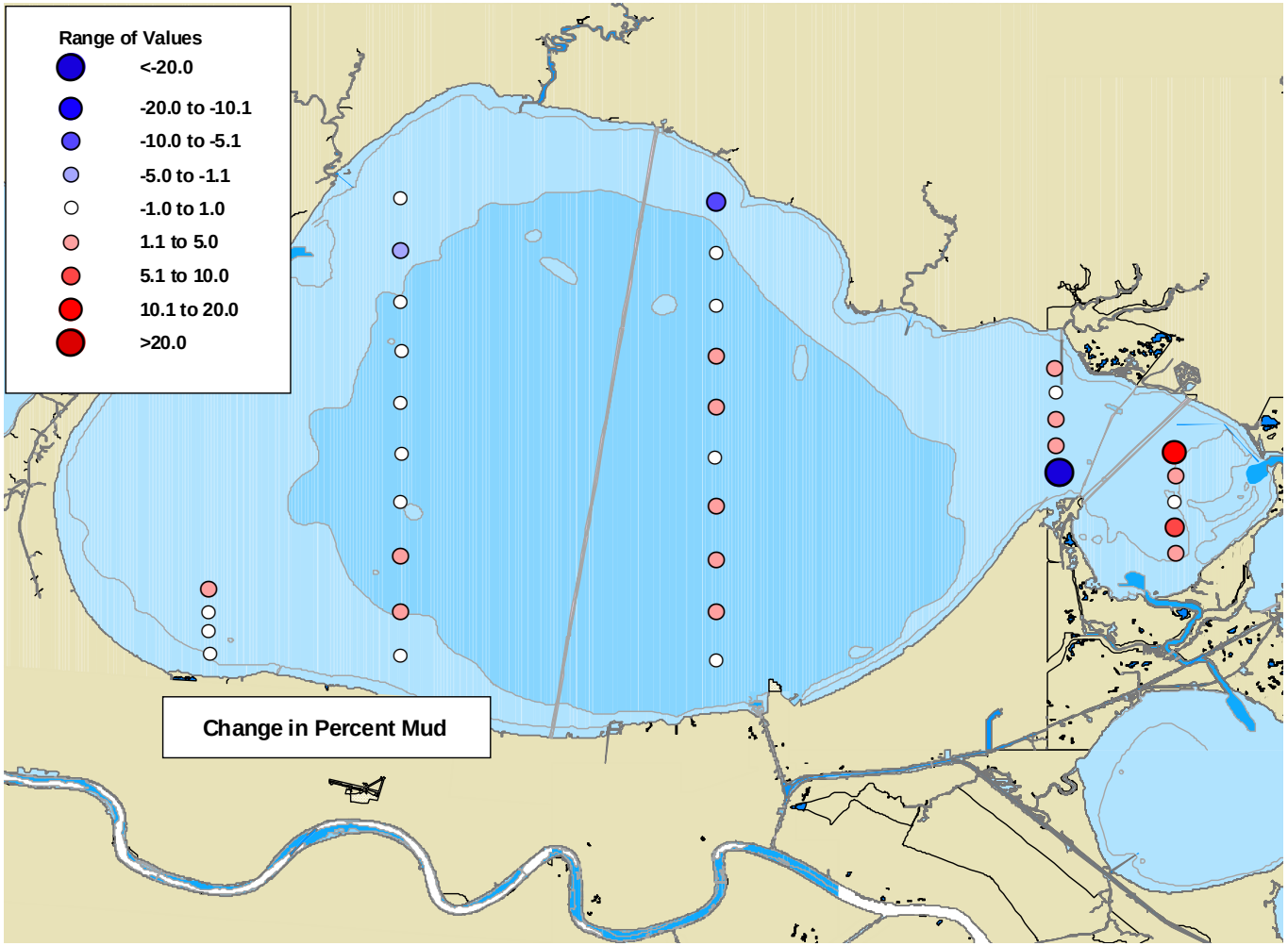


Figure 28. Change in Percent Mud between August and October 2008

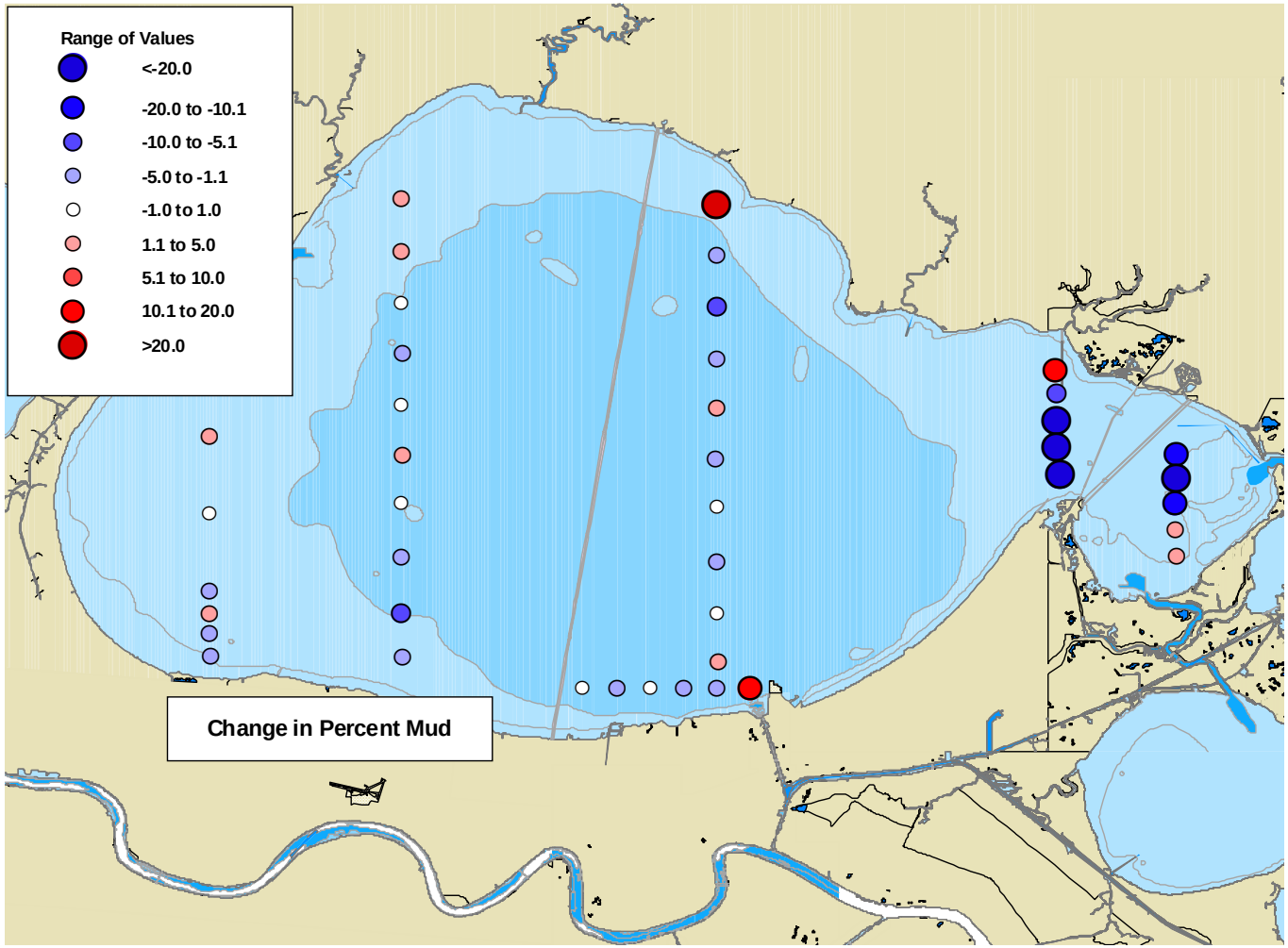


Figure 29. Principal Components Analysis (PCA) Results for April 2008

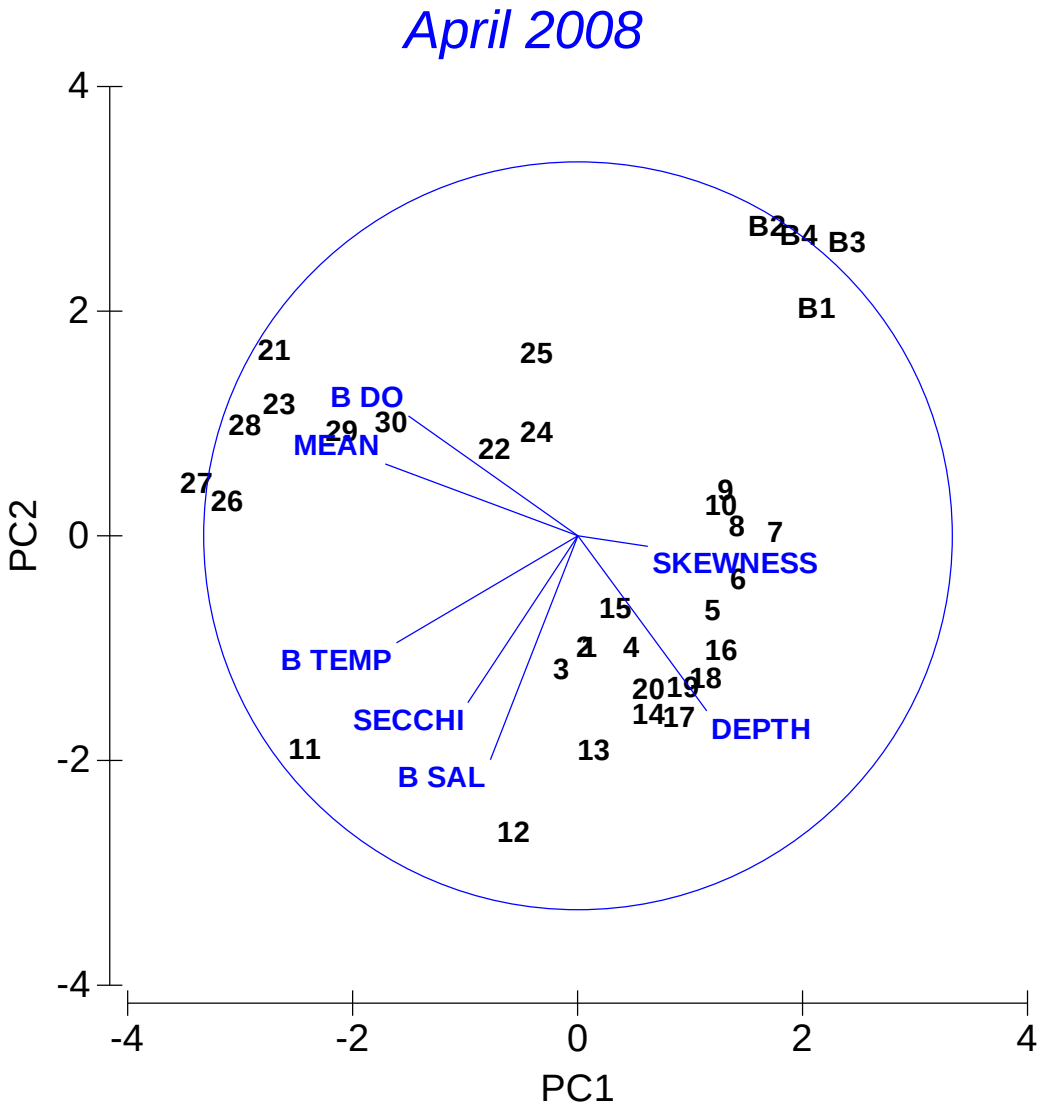


Figure 30. Principal Components Analysis (PCA) Results for August 2008

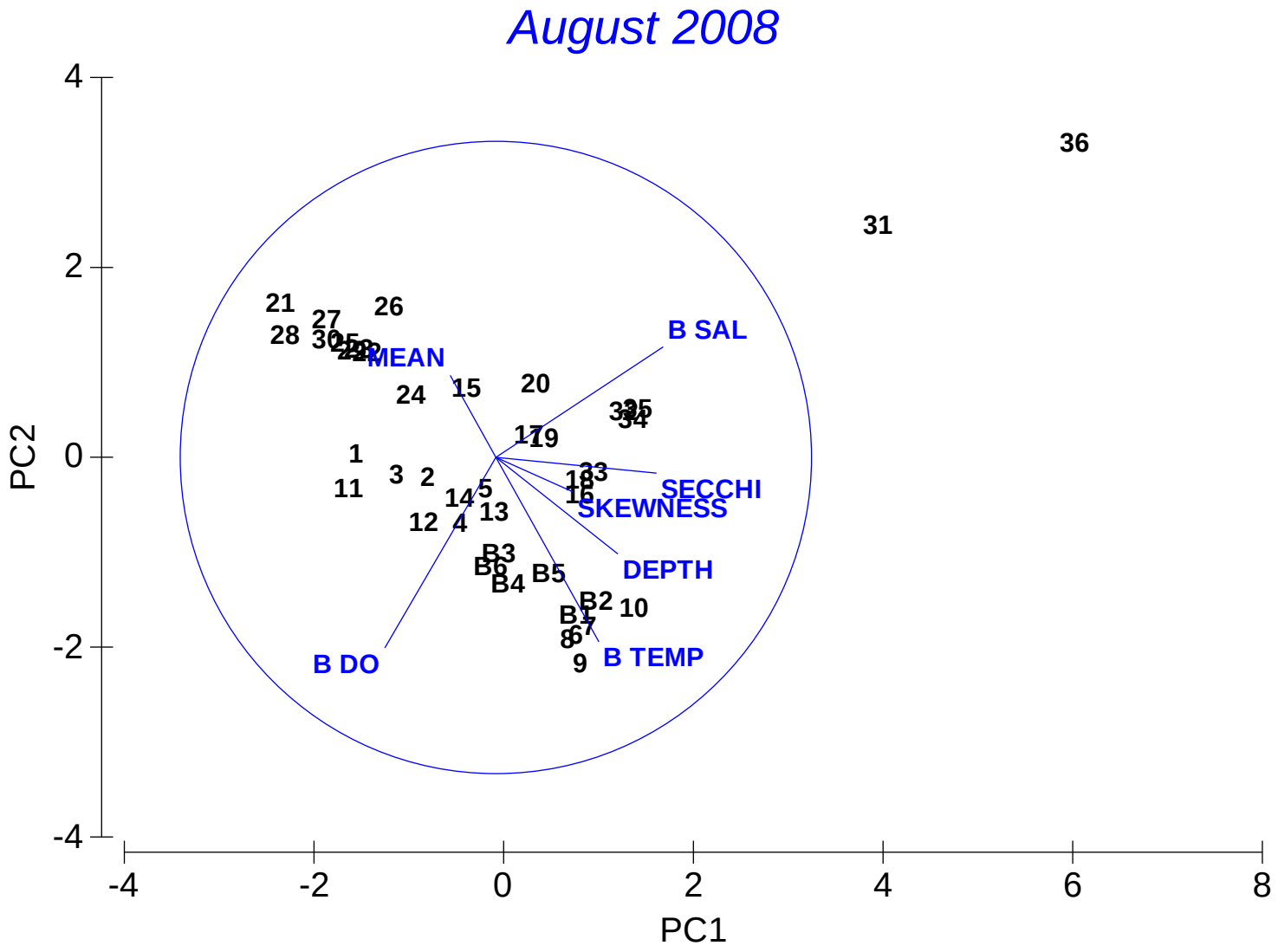


Figure 31. Principal Components Analysis (PCA) Results for October 2008

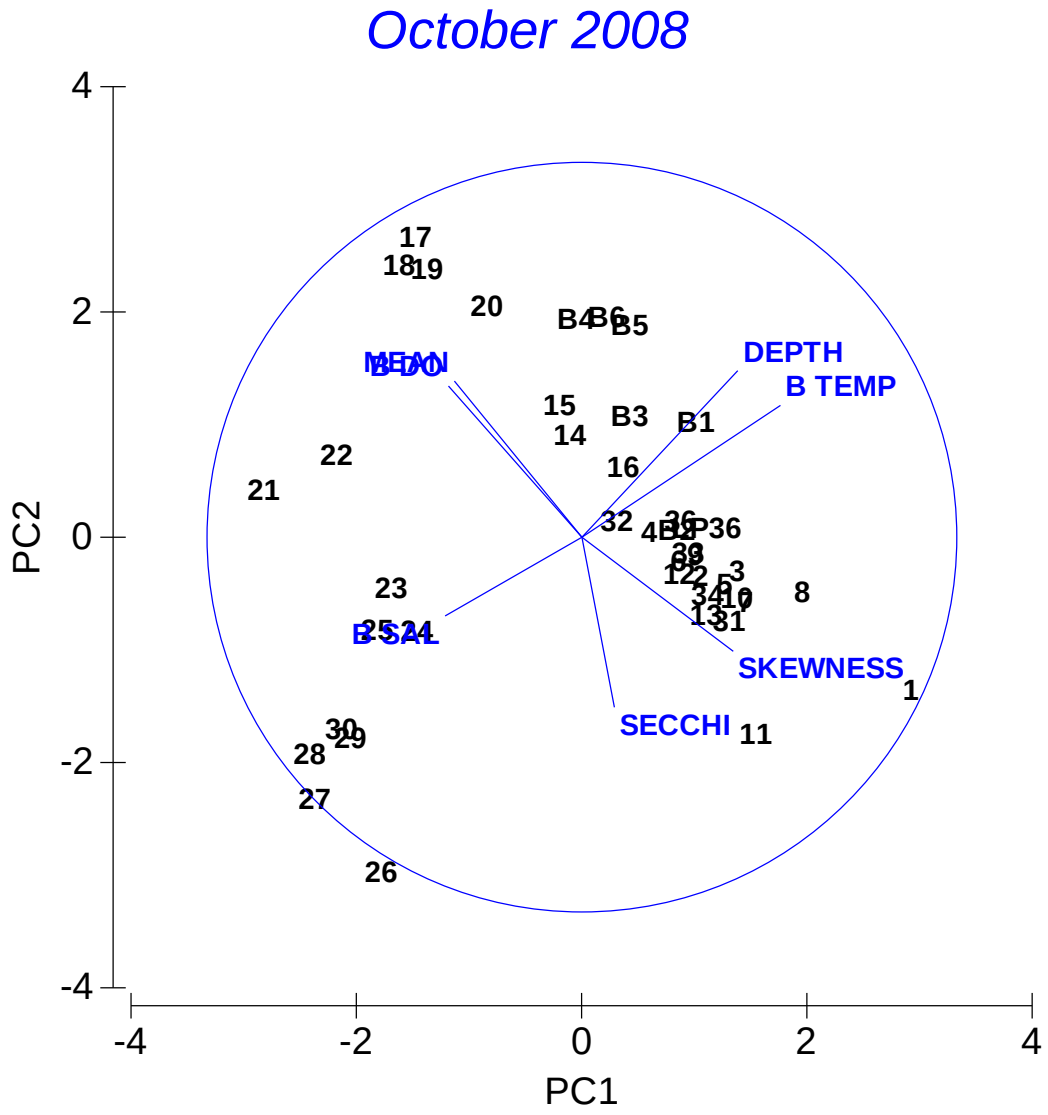


Figure 32. Numbers of Taxa/Sample in April 2008.

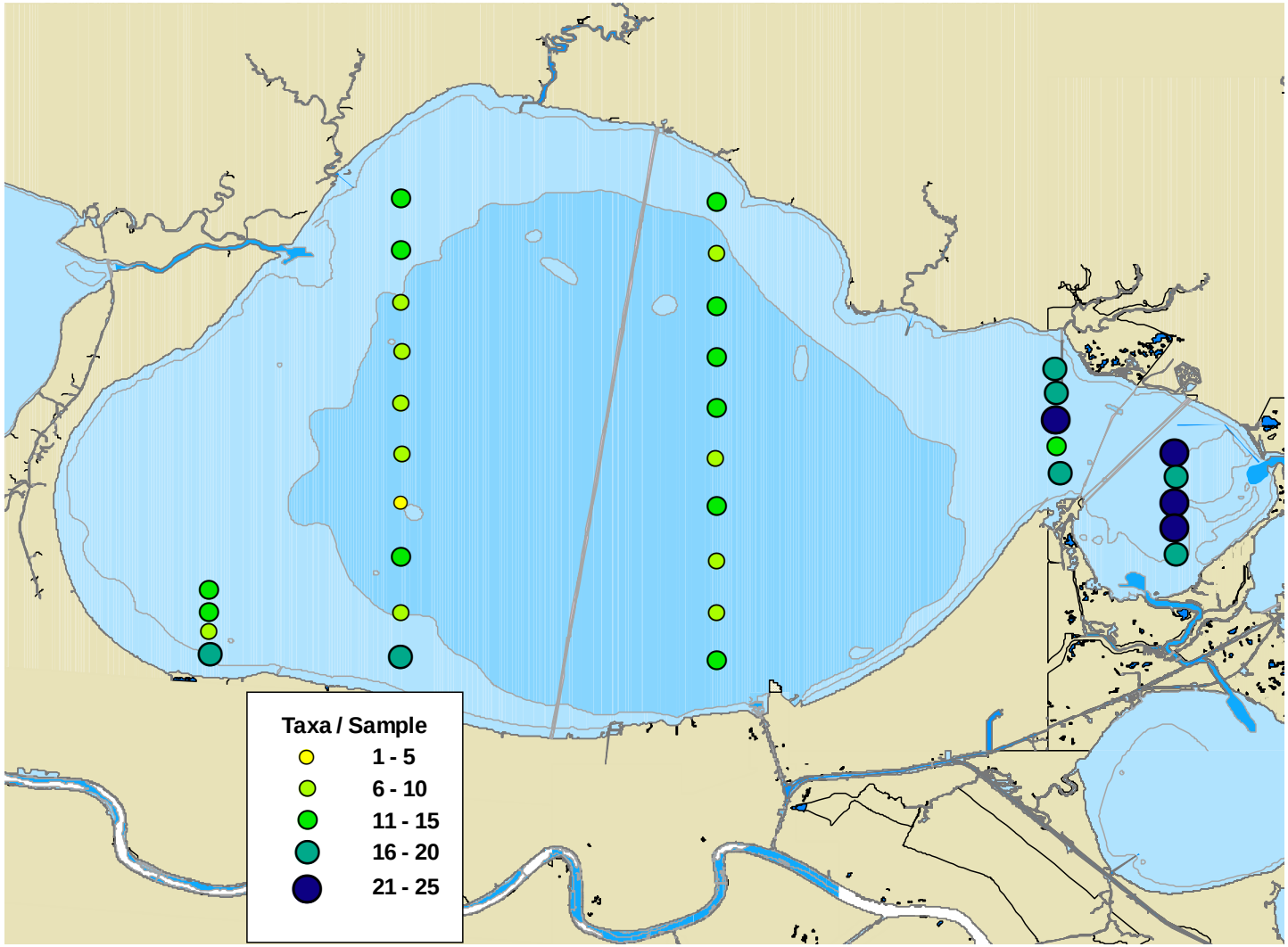


Figure 33. Numbers of Taxa/Sample in August 2008.

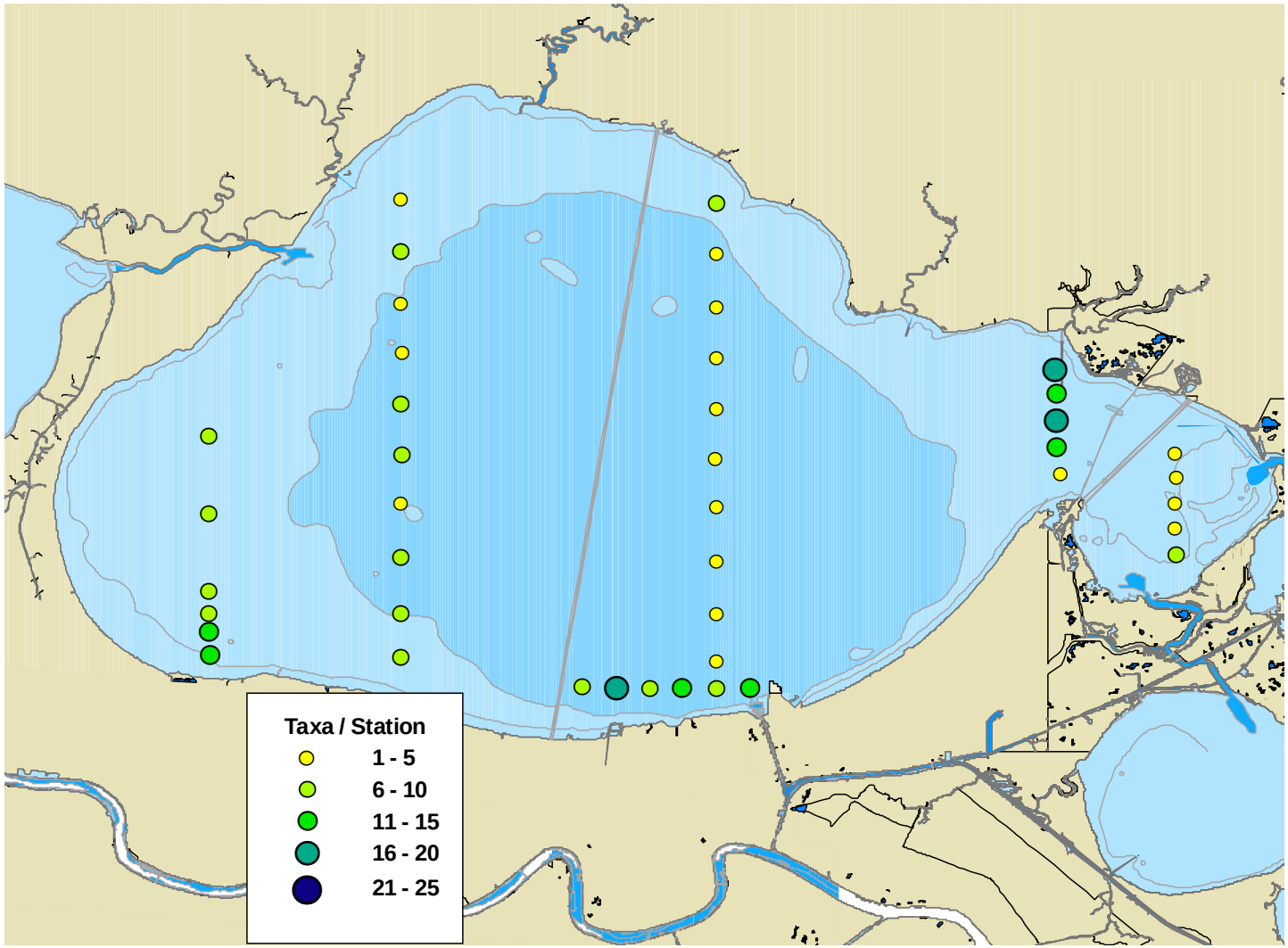


Figure 34. Numbers of Taxa/Sample in October 2008.

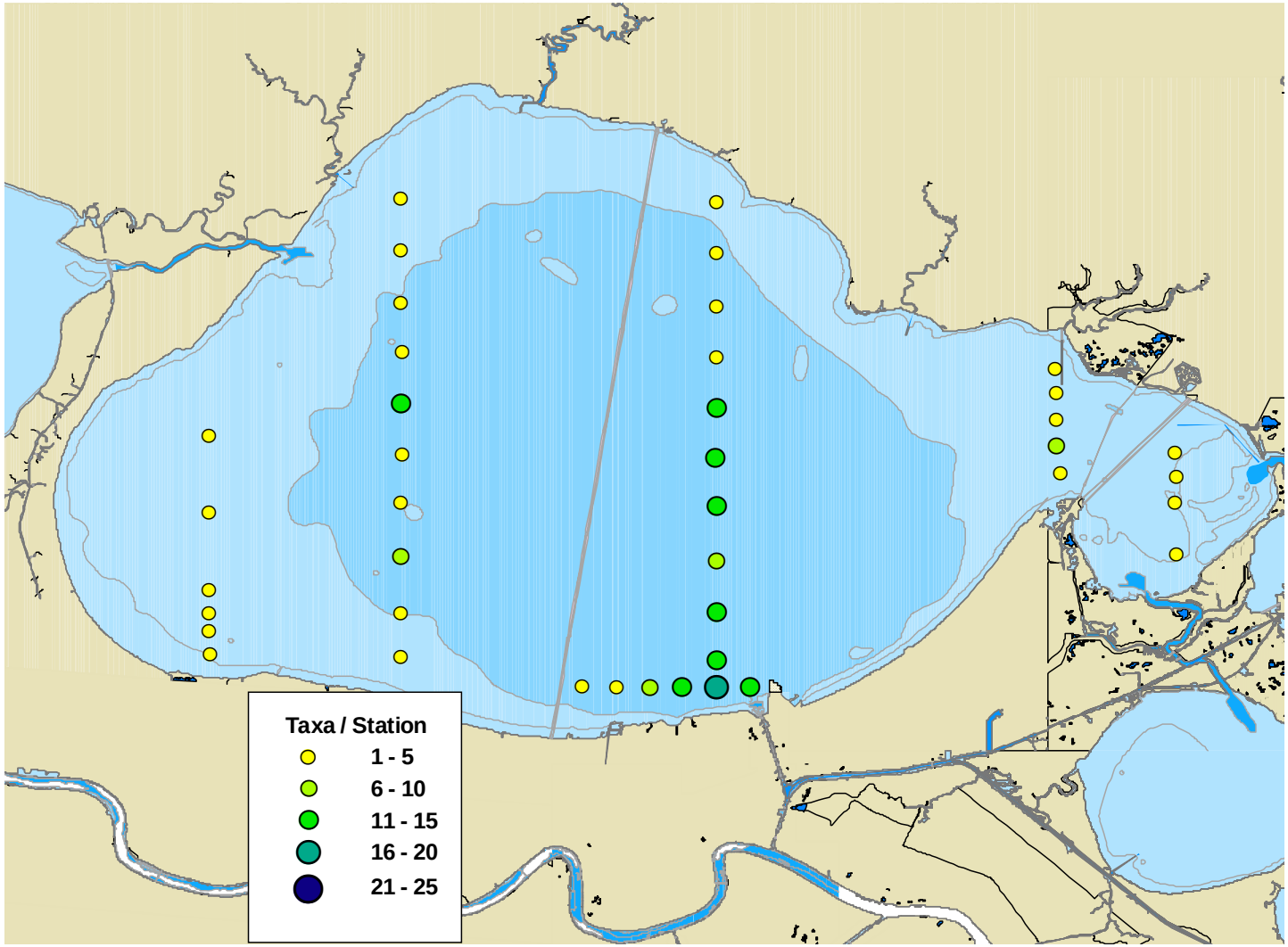


Figure 35. Numbers of Animals/Sample in April 2008.

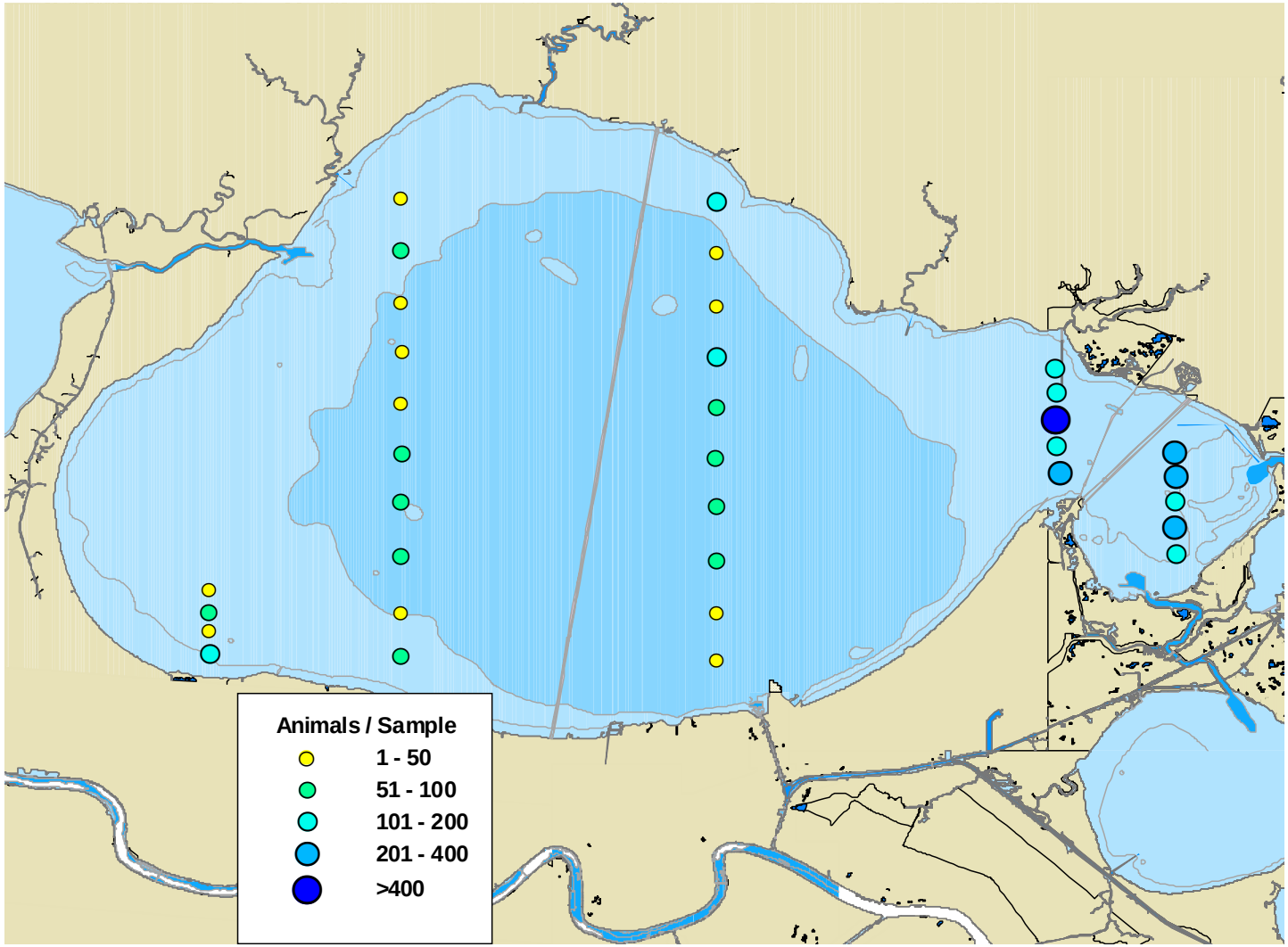


Figure 36. Numbers of Animals/Sample in August 2008.

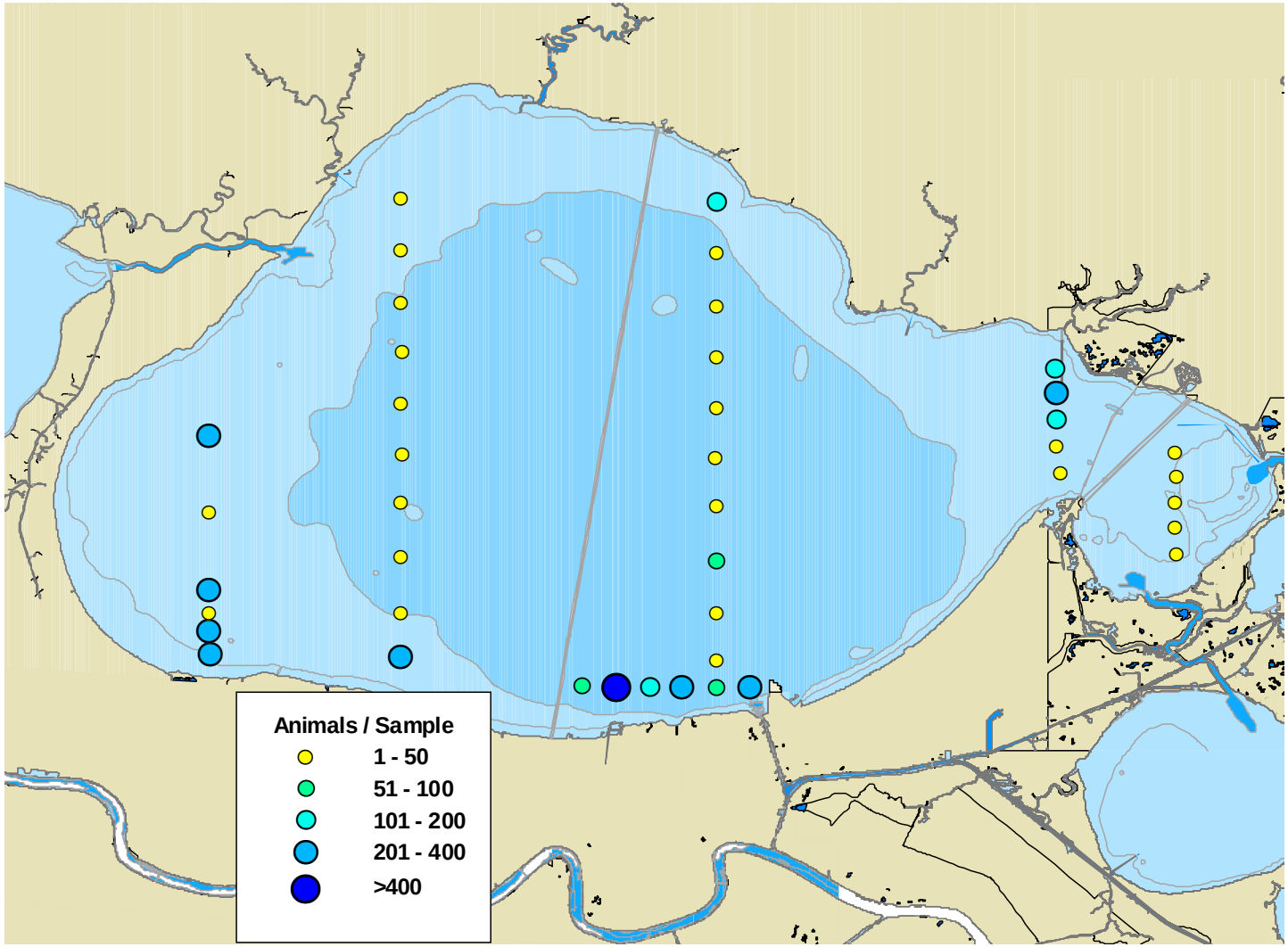


Figure 37. Numbers of Animals/Sample in October 2008.

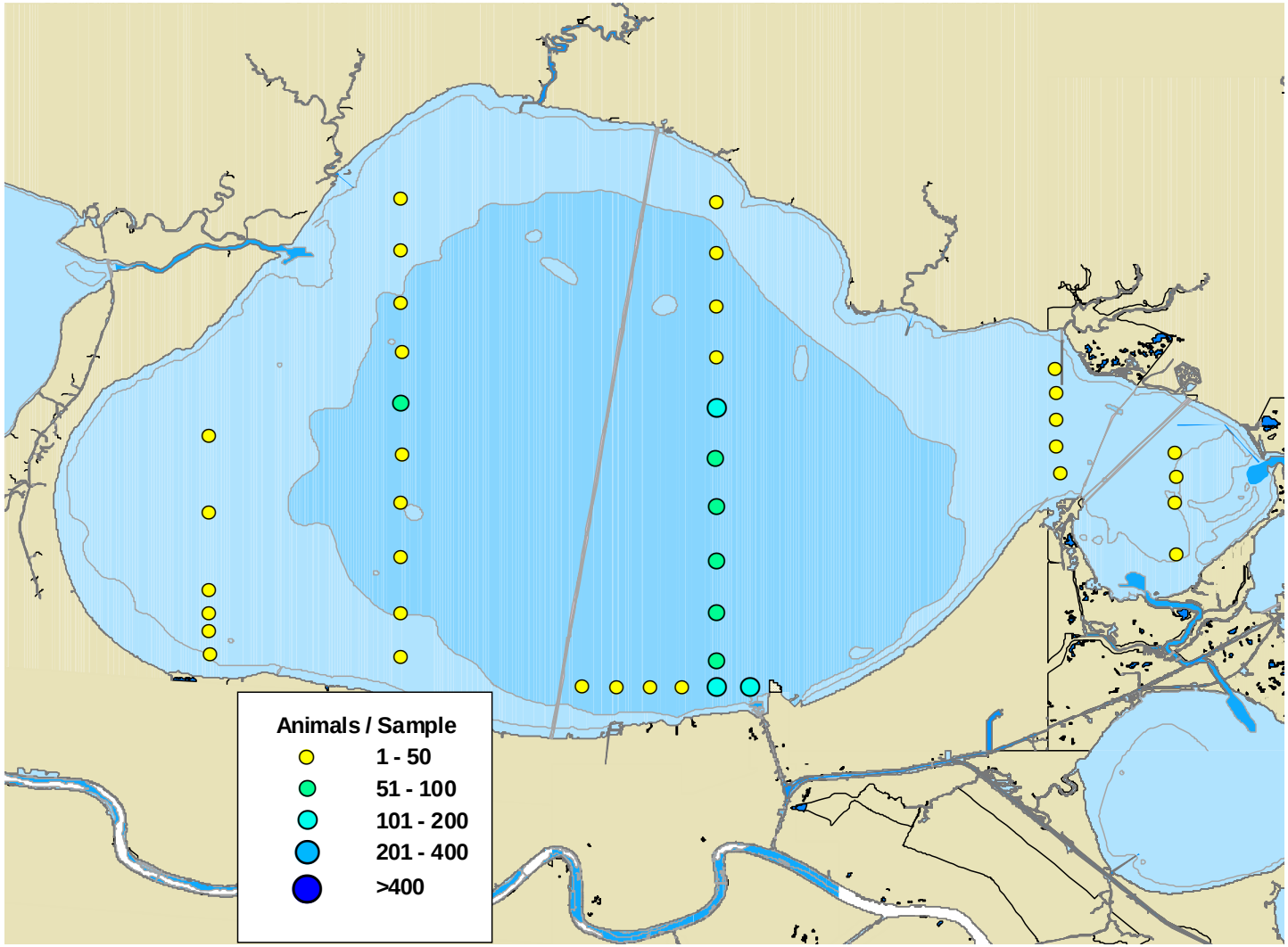


Figure 38. Shannon-Weiner Diversity Index Values in April 2008.

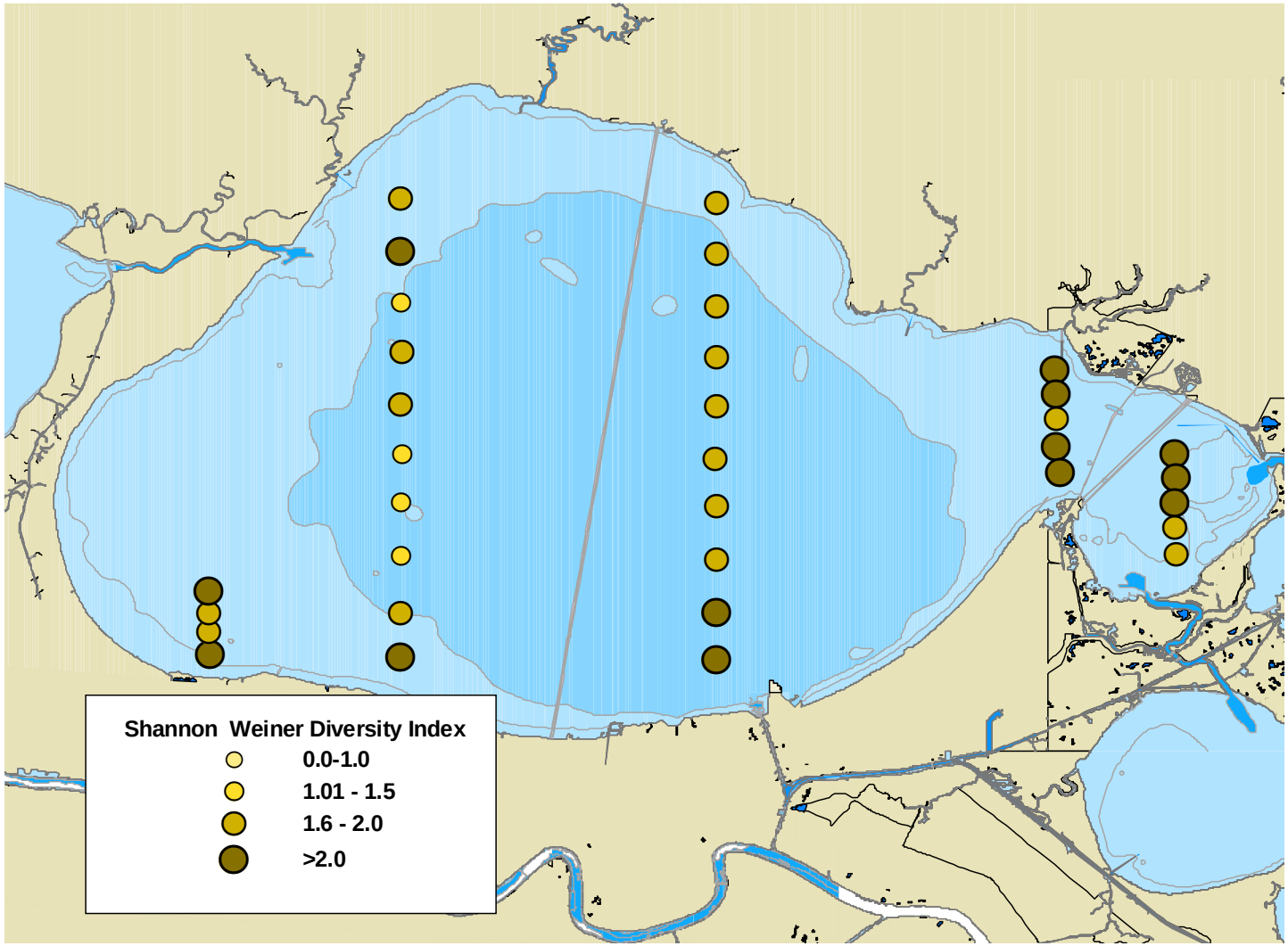


Figure 39. Shannon-Weiner Diversity Index Values in August 2008.

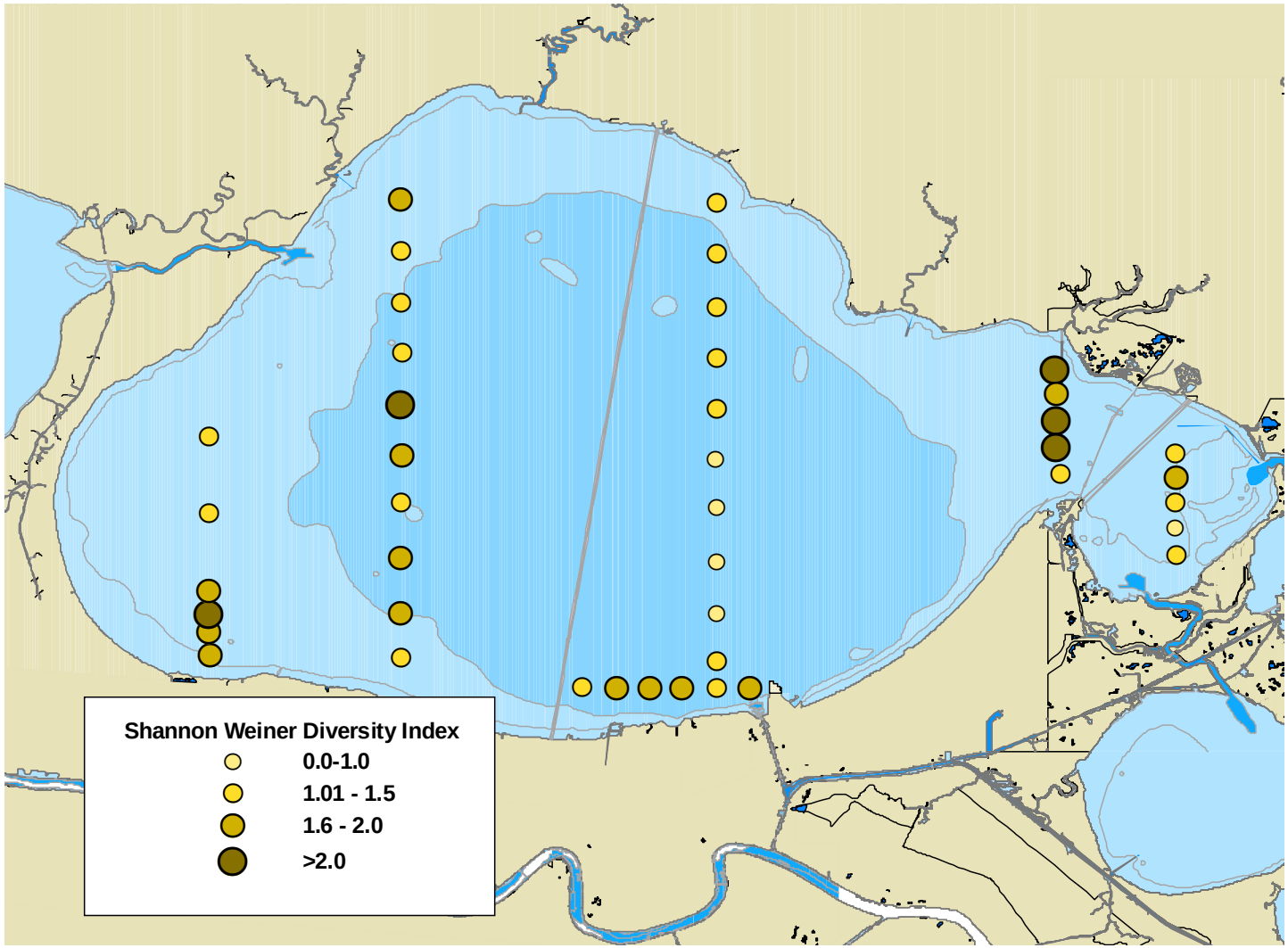


Figure 40. Shannon-Weiner Diversity Index Values in October 2008.

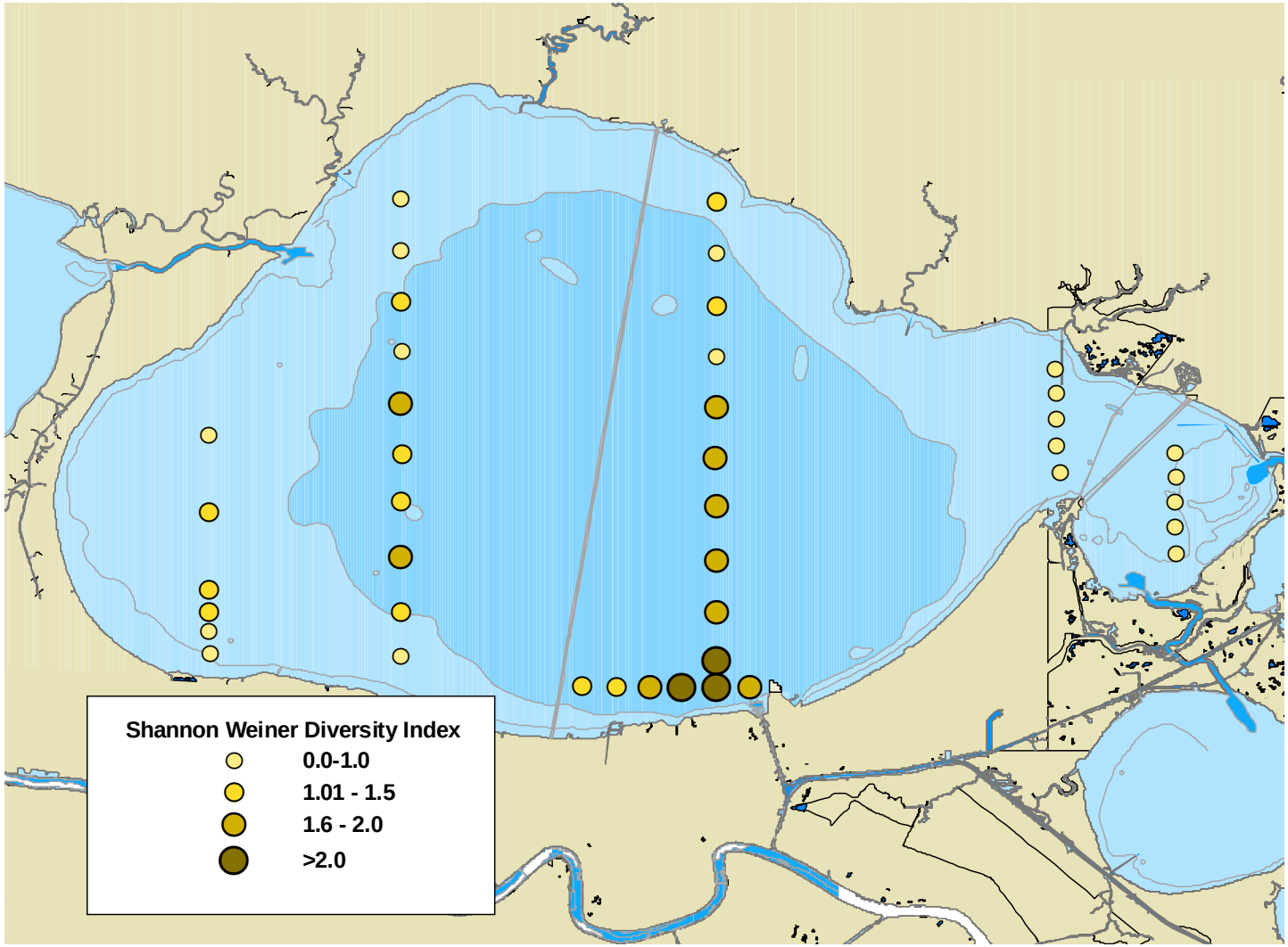


Figure 41. Pielou's Evenness Index Values in April 2008.

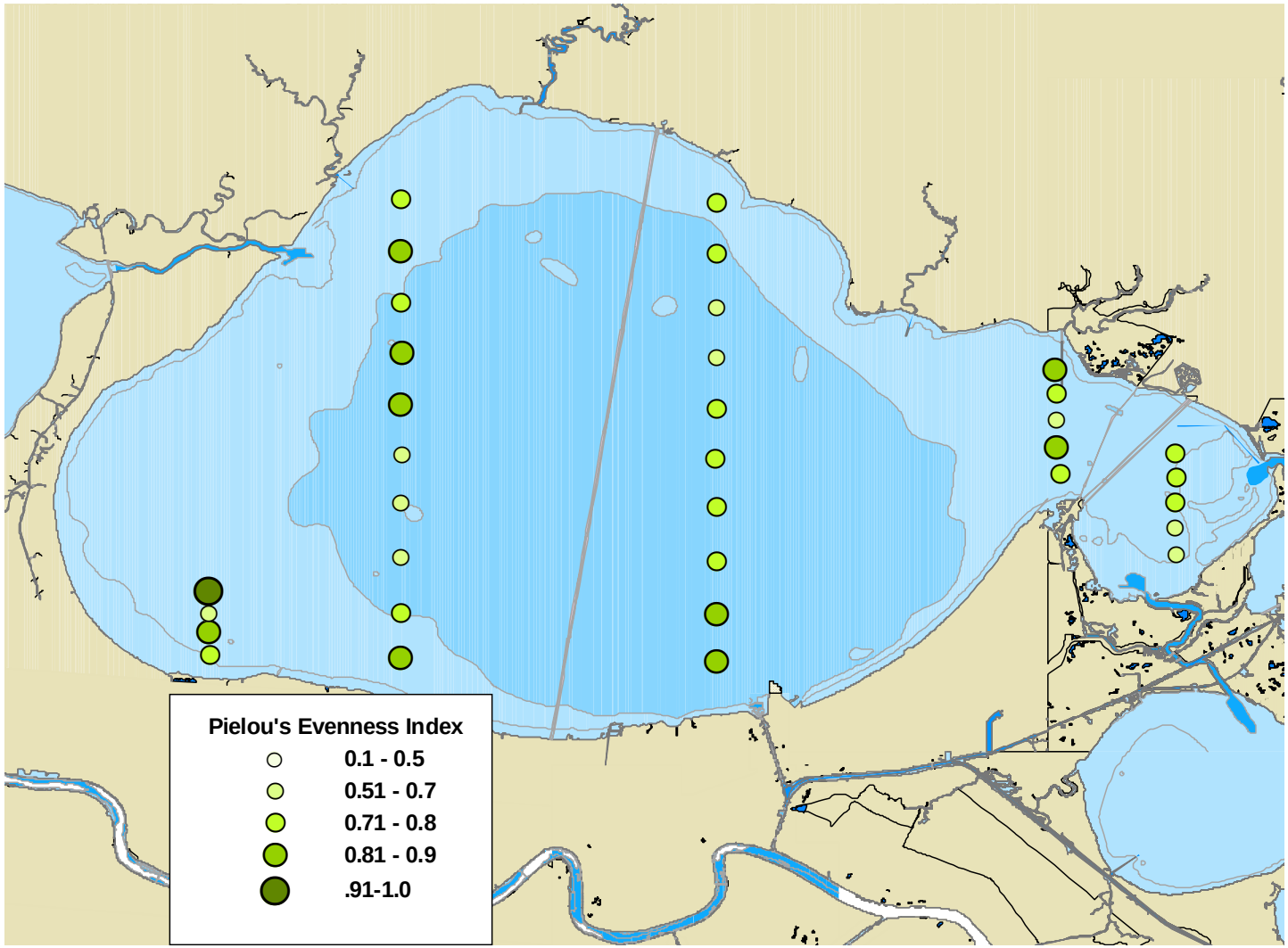


Figure 42. Pielou's Evenness Index Values in August 2008.

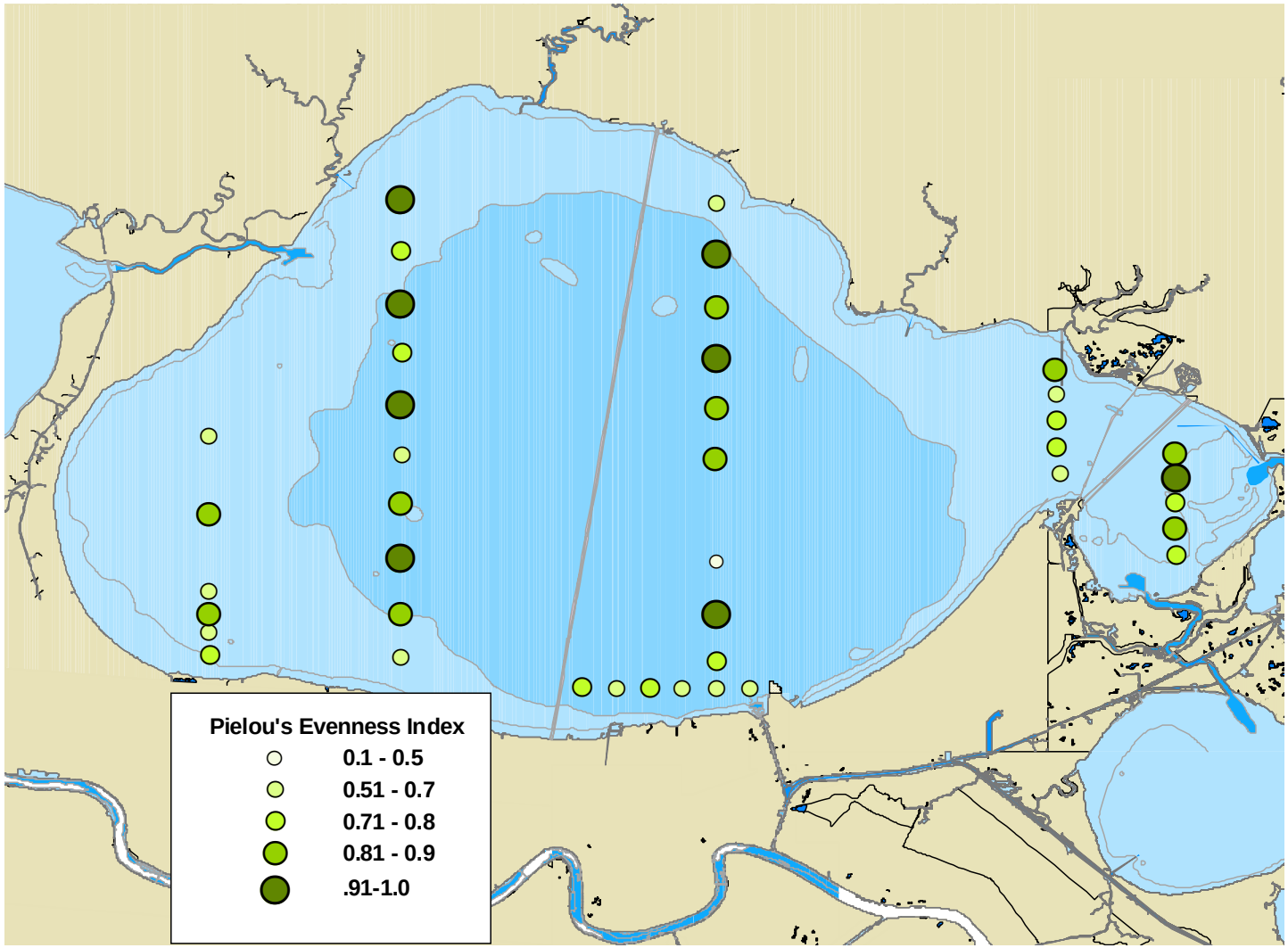


Figure 43. Pielou's Evenness Index Values in October 2008.

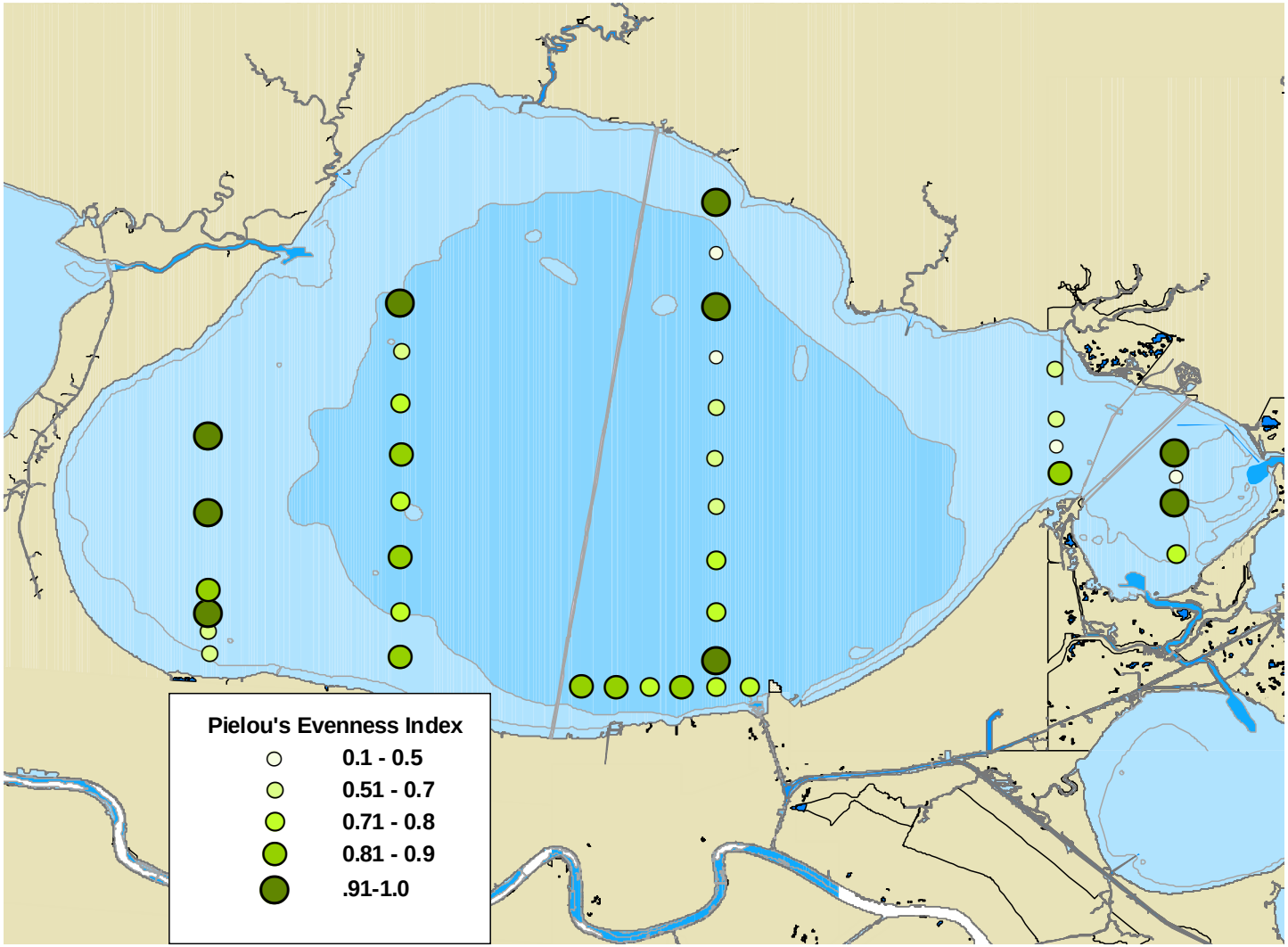


Figure 44. Normal Cluster Dendrogram for April 2008 Infaunal Samples. Red indicates no significant difference by SIMPROF Test

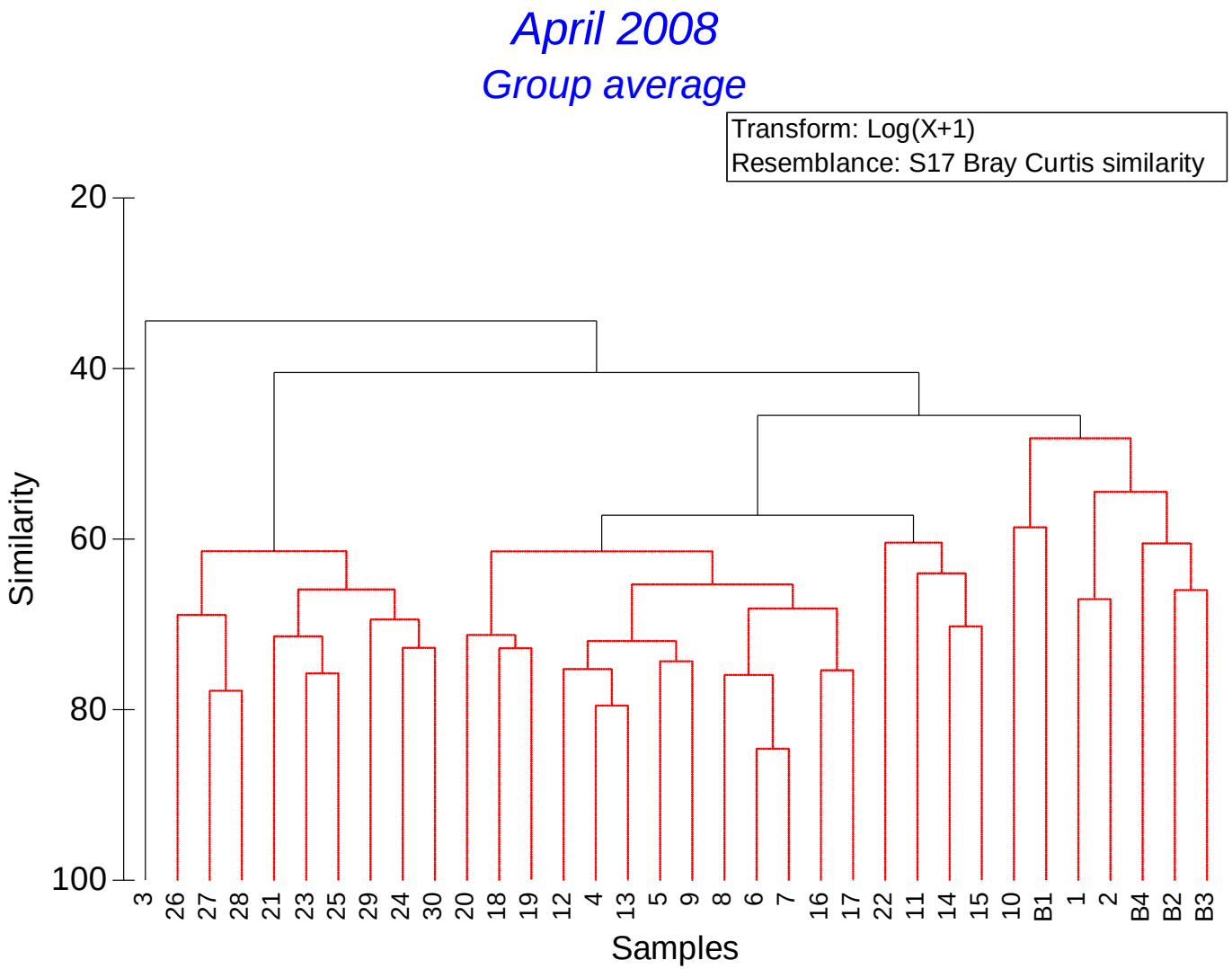


Figure 45. Inverse Cluster Dendrogram for April 2008 Infaunal Samples. Red indicates no significant difference by SIMPROF Test

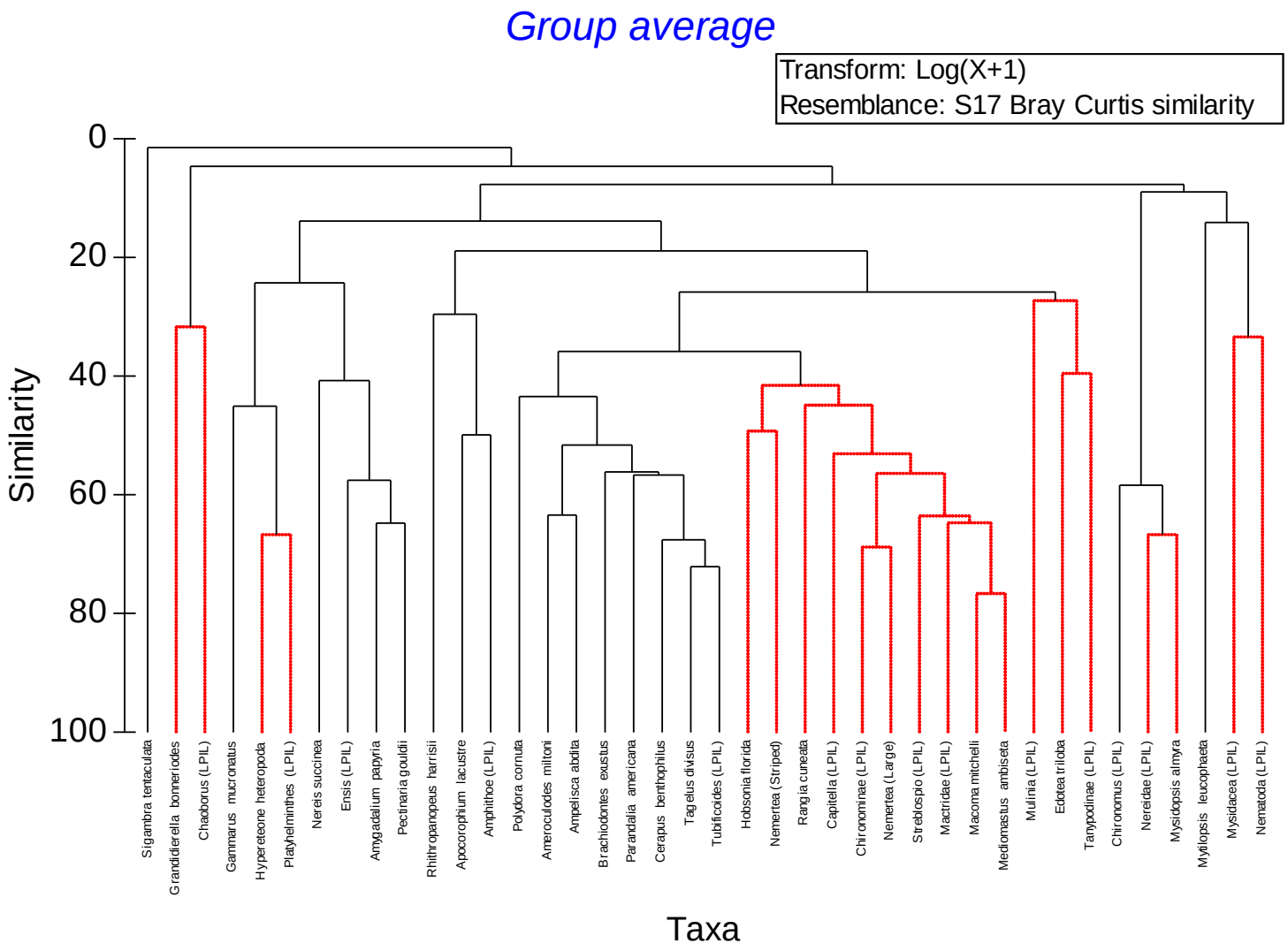


Figure 46. Normal Cluster Dendrogram for August 2008 Infaunal Samples. Red indicates no significant difference by SIMPROF Test

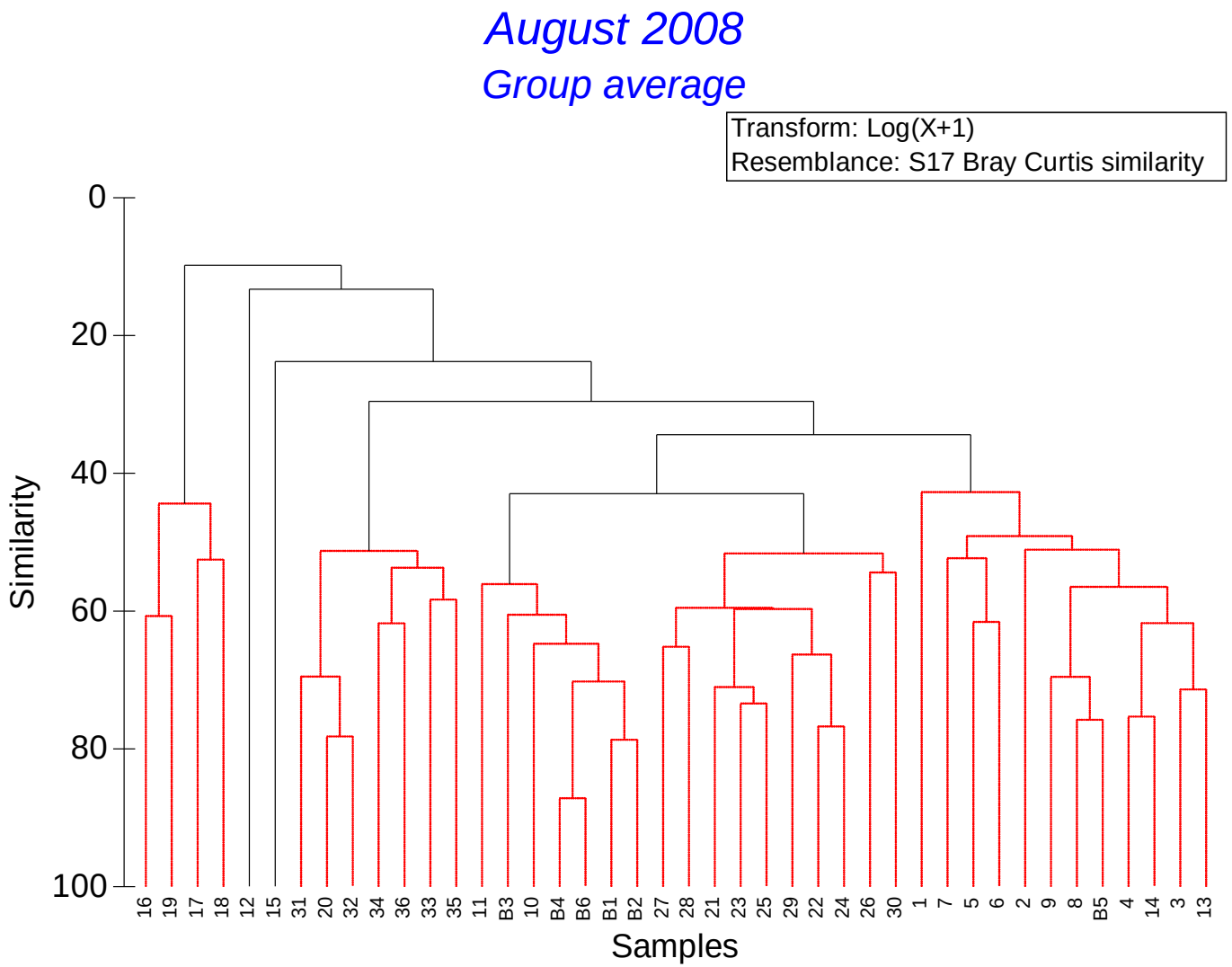


Figure 47. Inverse Cluster Dendrogram for August 2008 Infaunal Samples. Red indicates no significant difference by SIMPROF Test

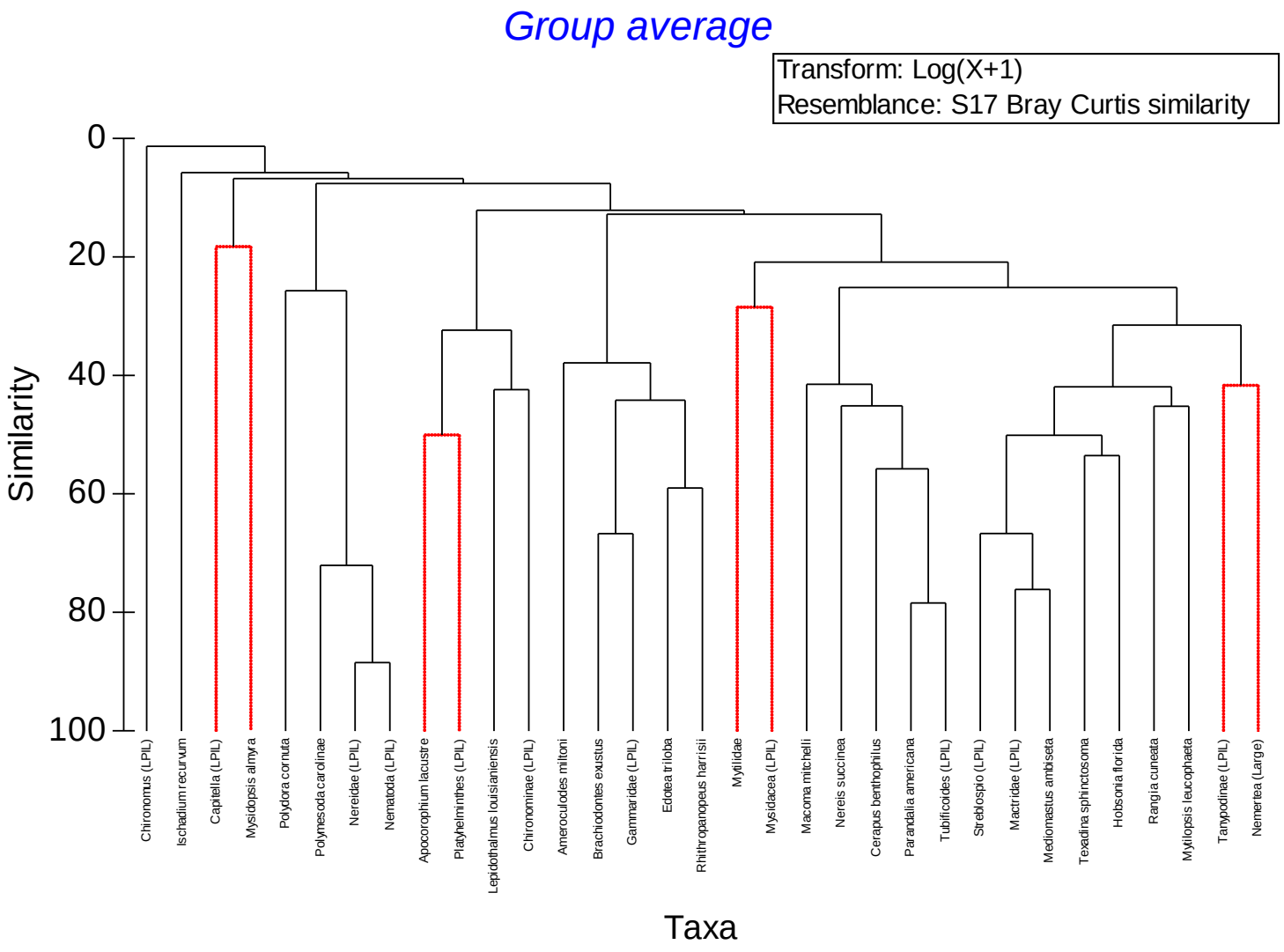


Figure 48. Normal Cluster Dendrogram for October 2008 Infauna Samples. Red indicates no significant difference by SIMPROF Test

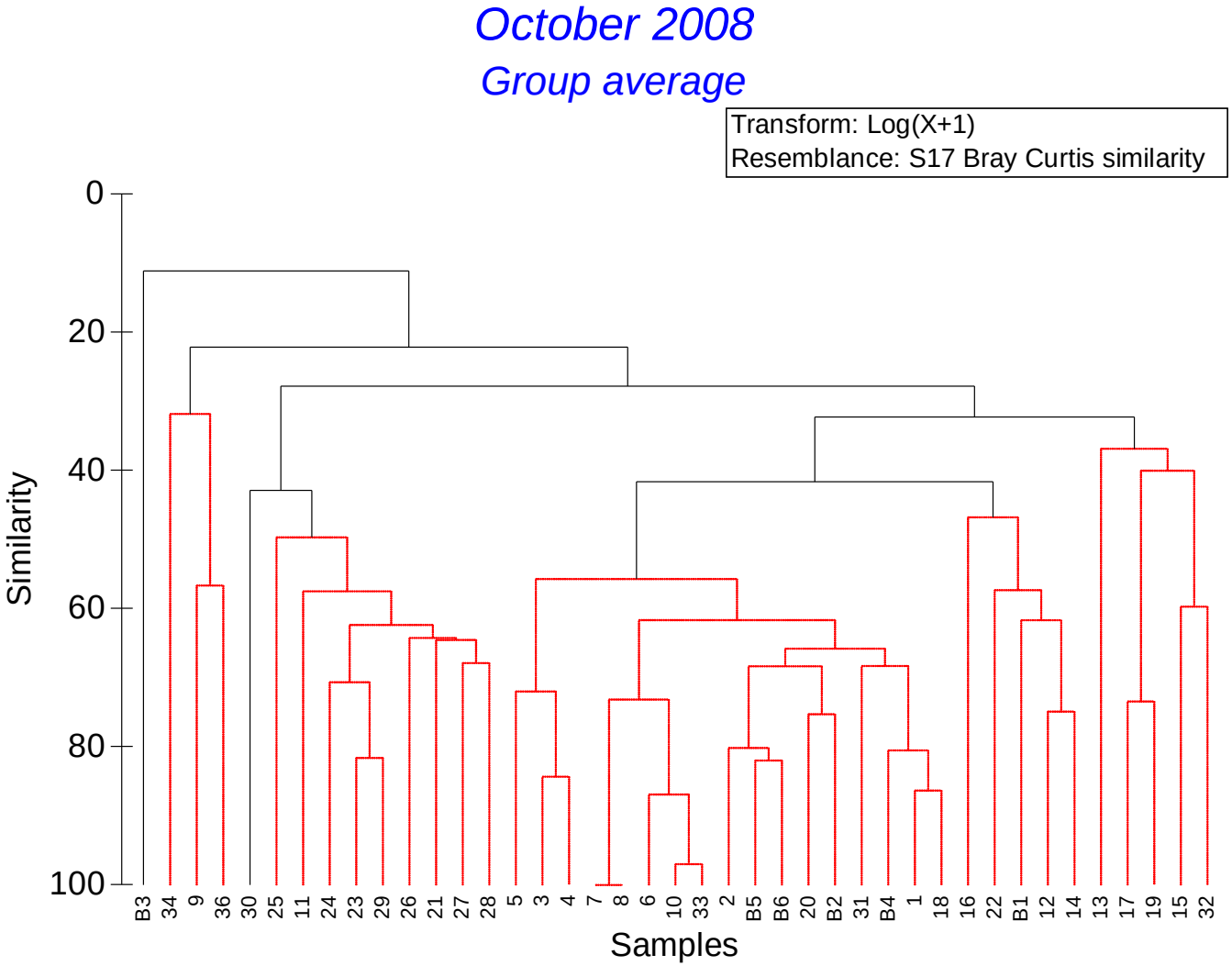


Figure 49. Inverse Cluster Dendrogram for August 2008 Infaunal Samples. Red indicates no significant difference by SIMPROF Test

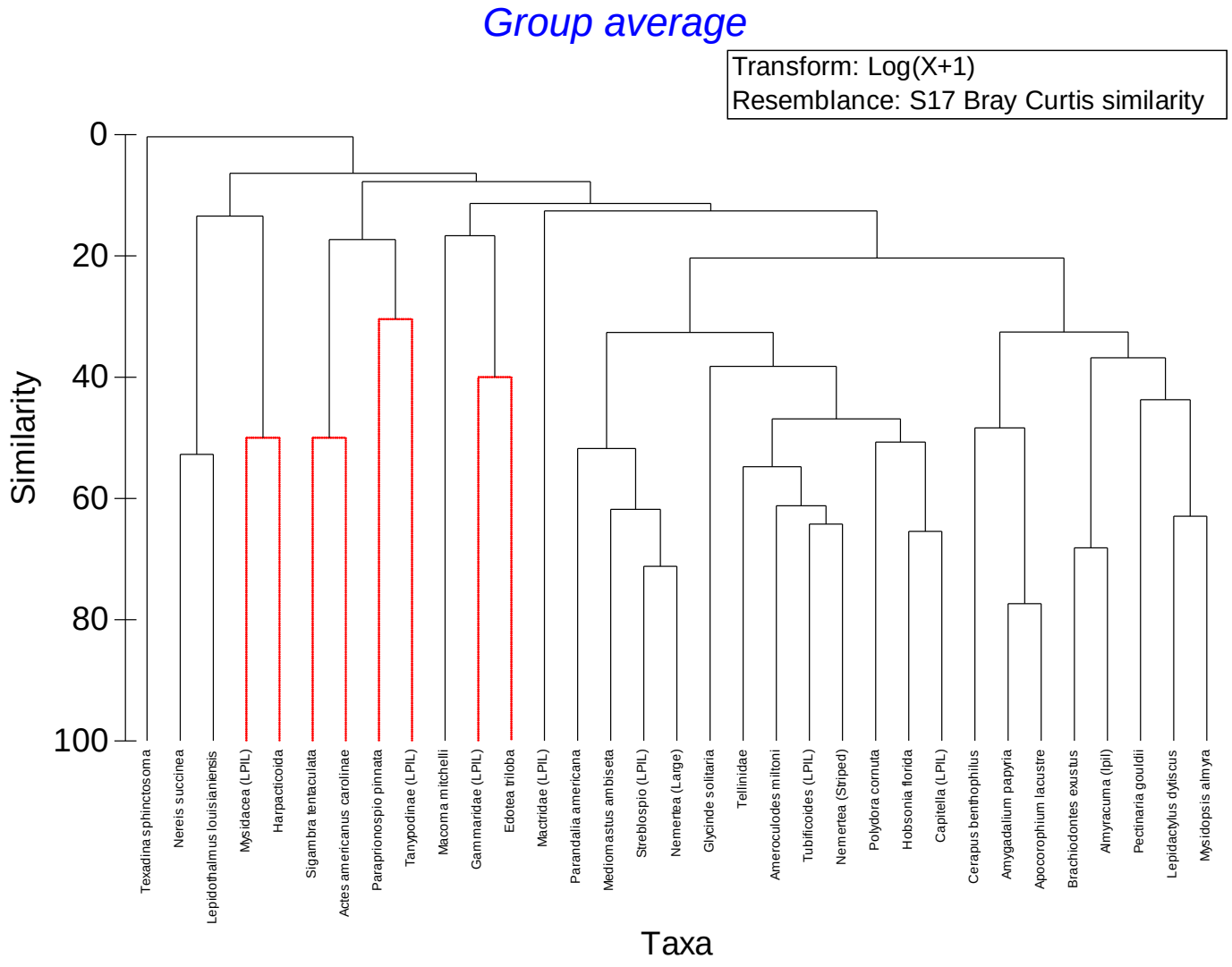


Figure 50. Combined MDS and Clustering Results for April 2008 Infaunal Samples

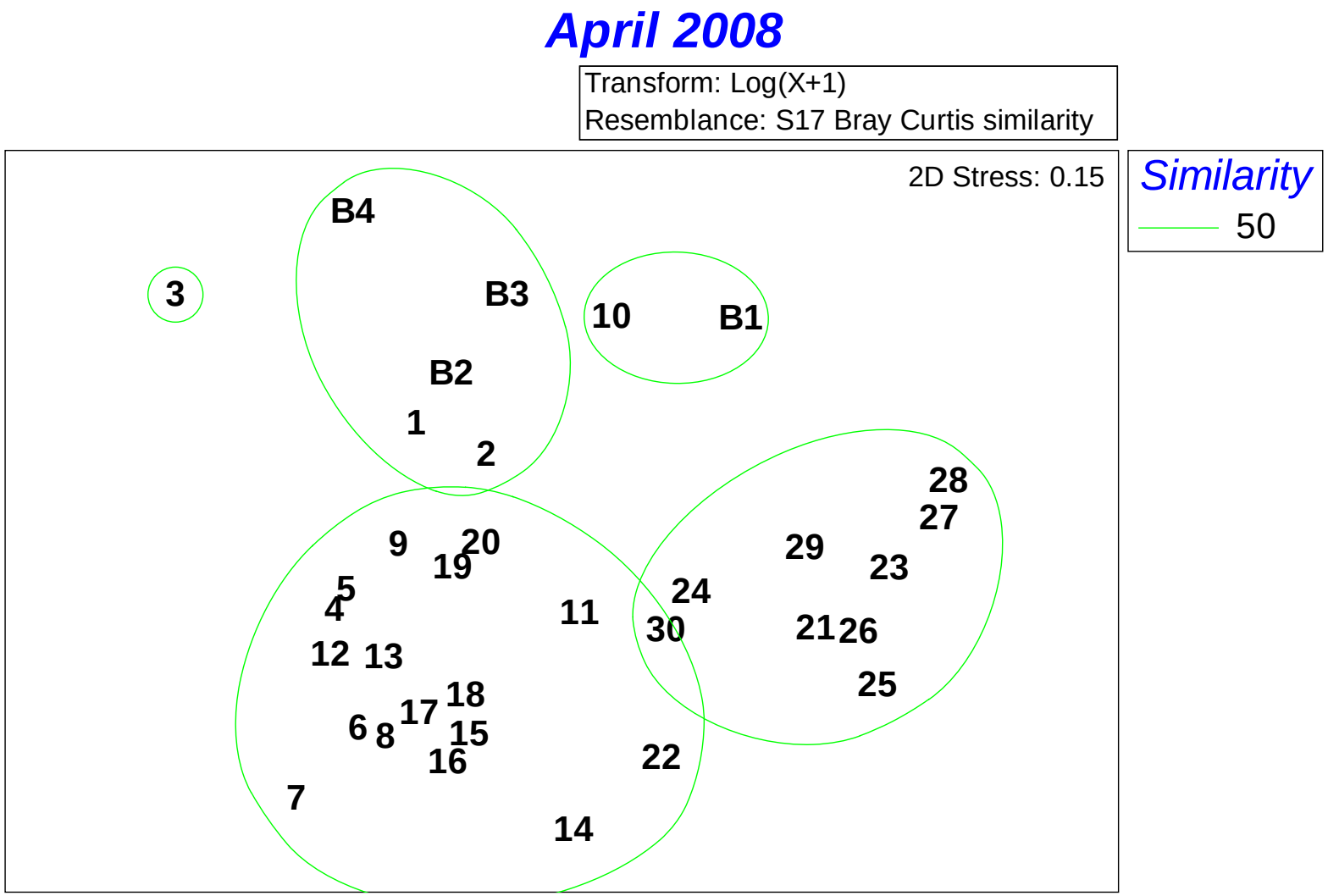


Figure 51. Combined MDS and Clustering Results for August 2008 Infaunal Samples

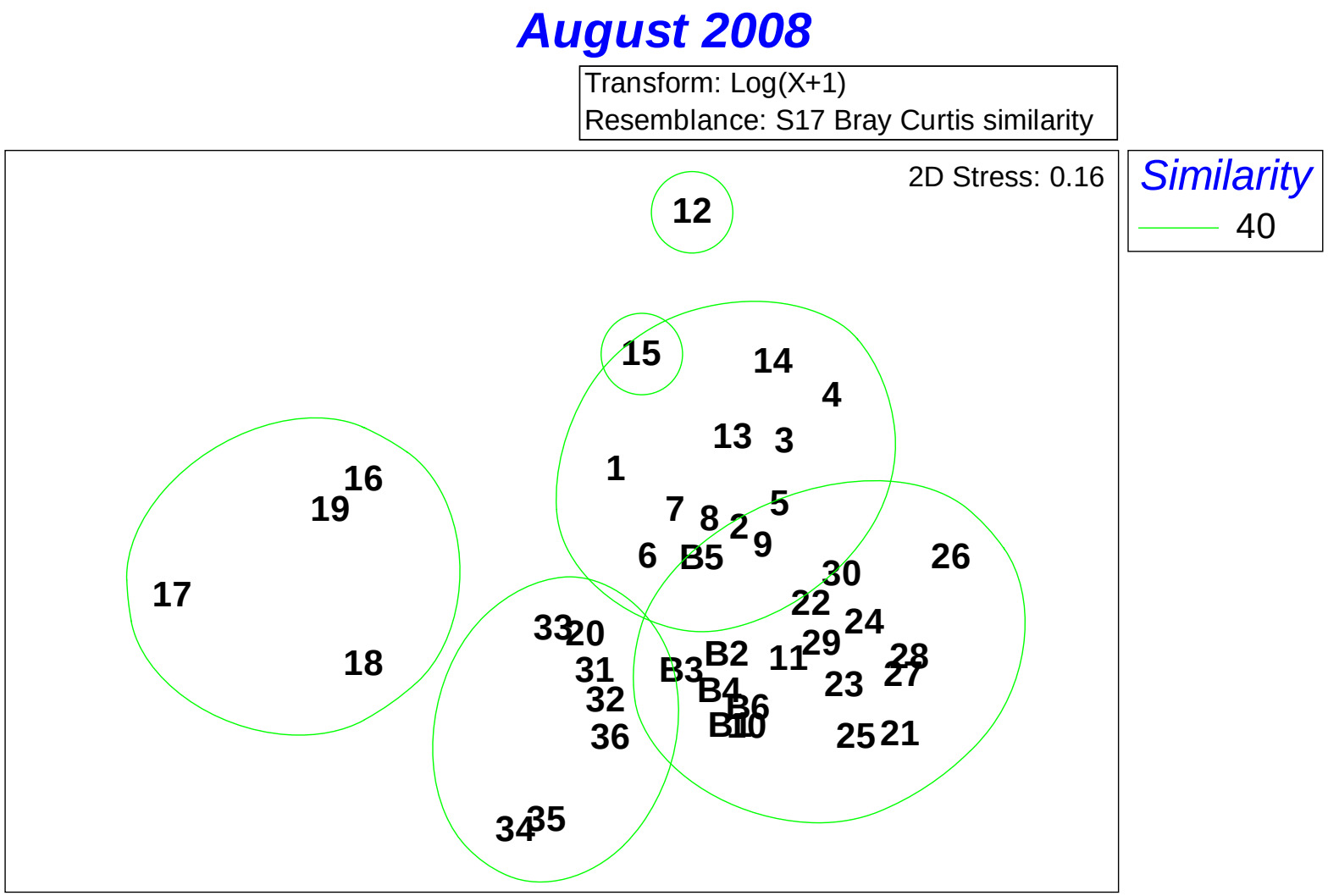


Figure 52. Combined MDS and Clustering Results for October 2008 Infaunal Samples

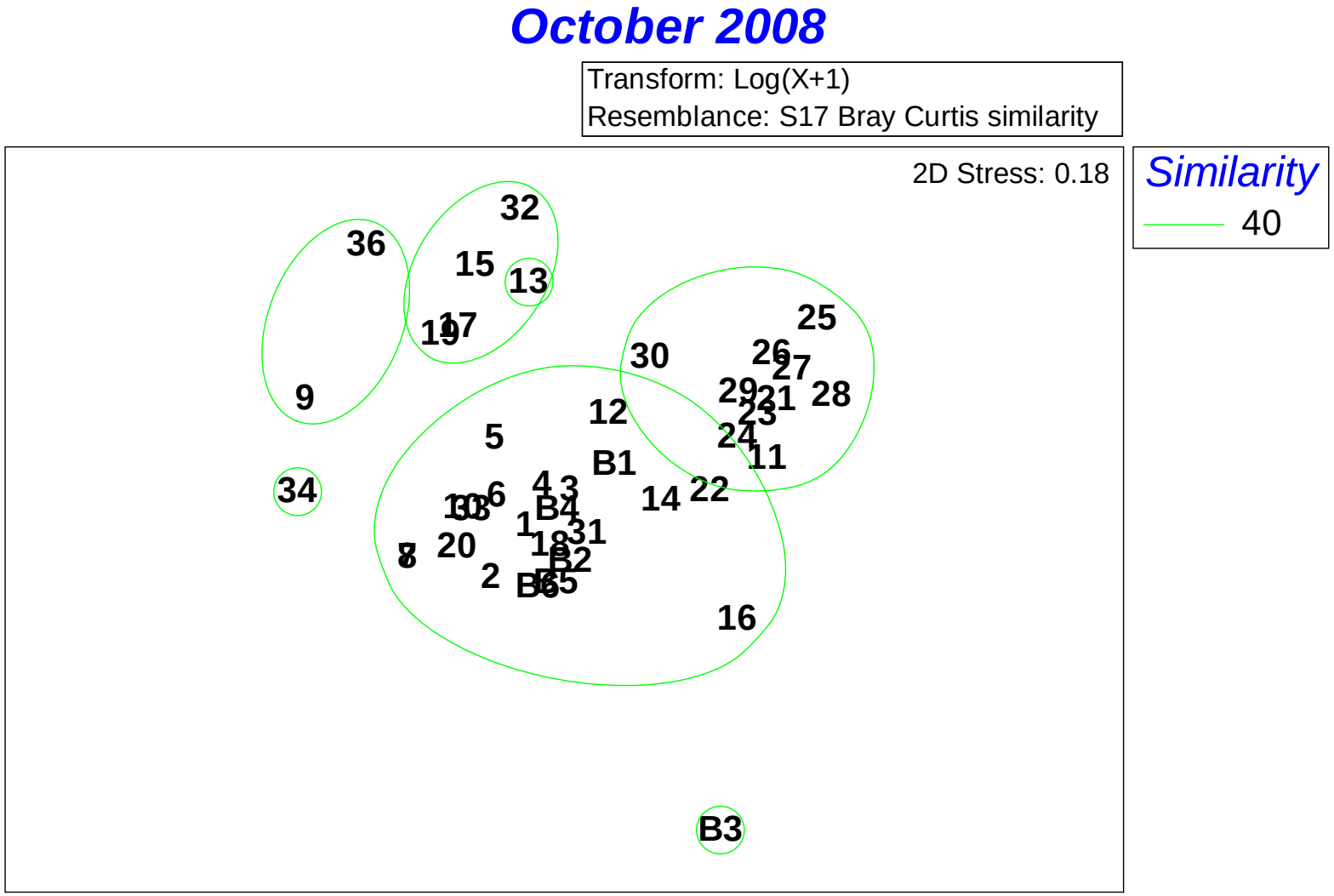


Figure 53A. Distribution of Select Species. ***Mediomastus ambiseta***

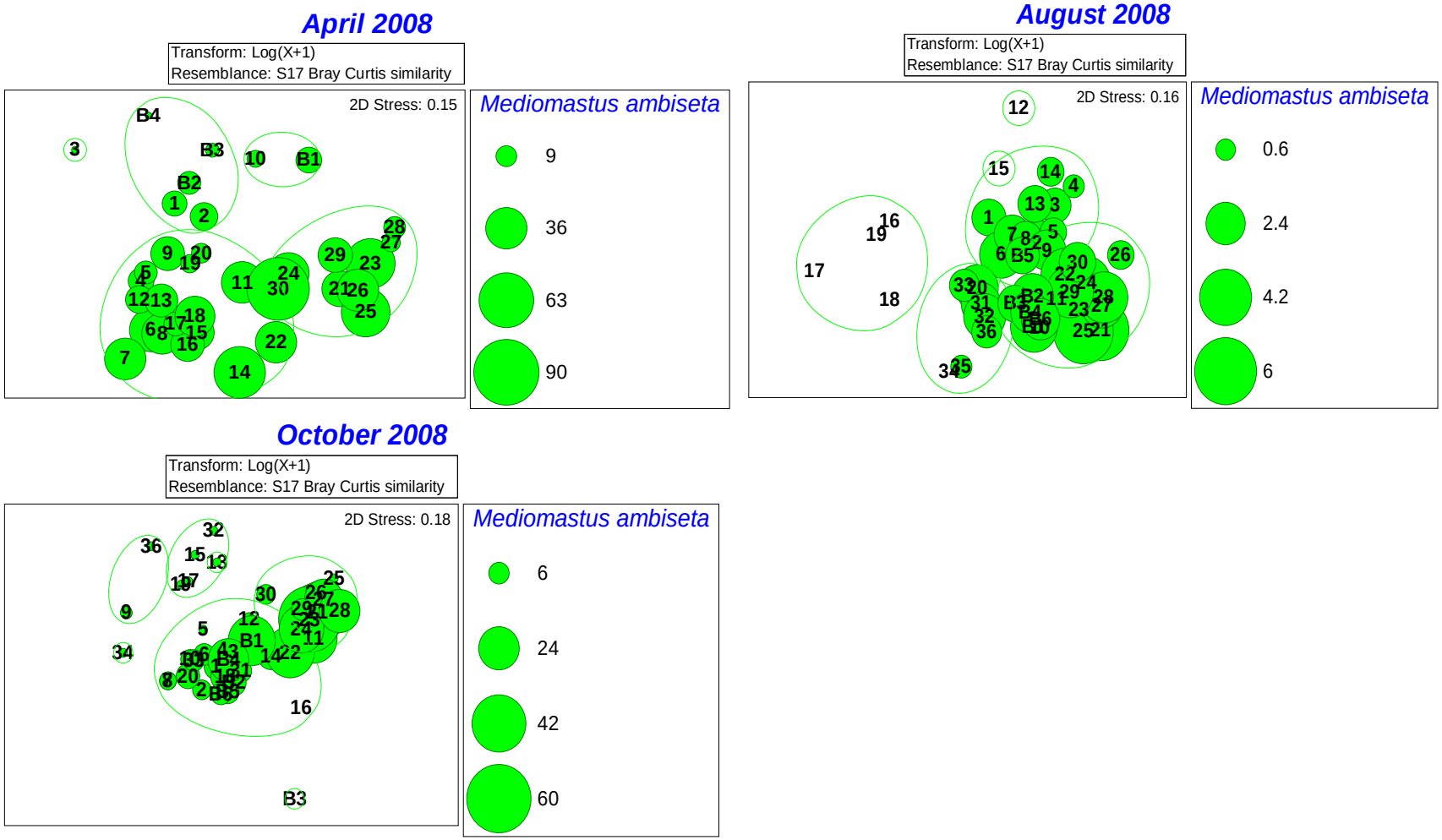


Figure 53B. Distribution of Select Species. ***Streblospio* (LPIL)**

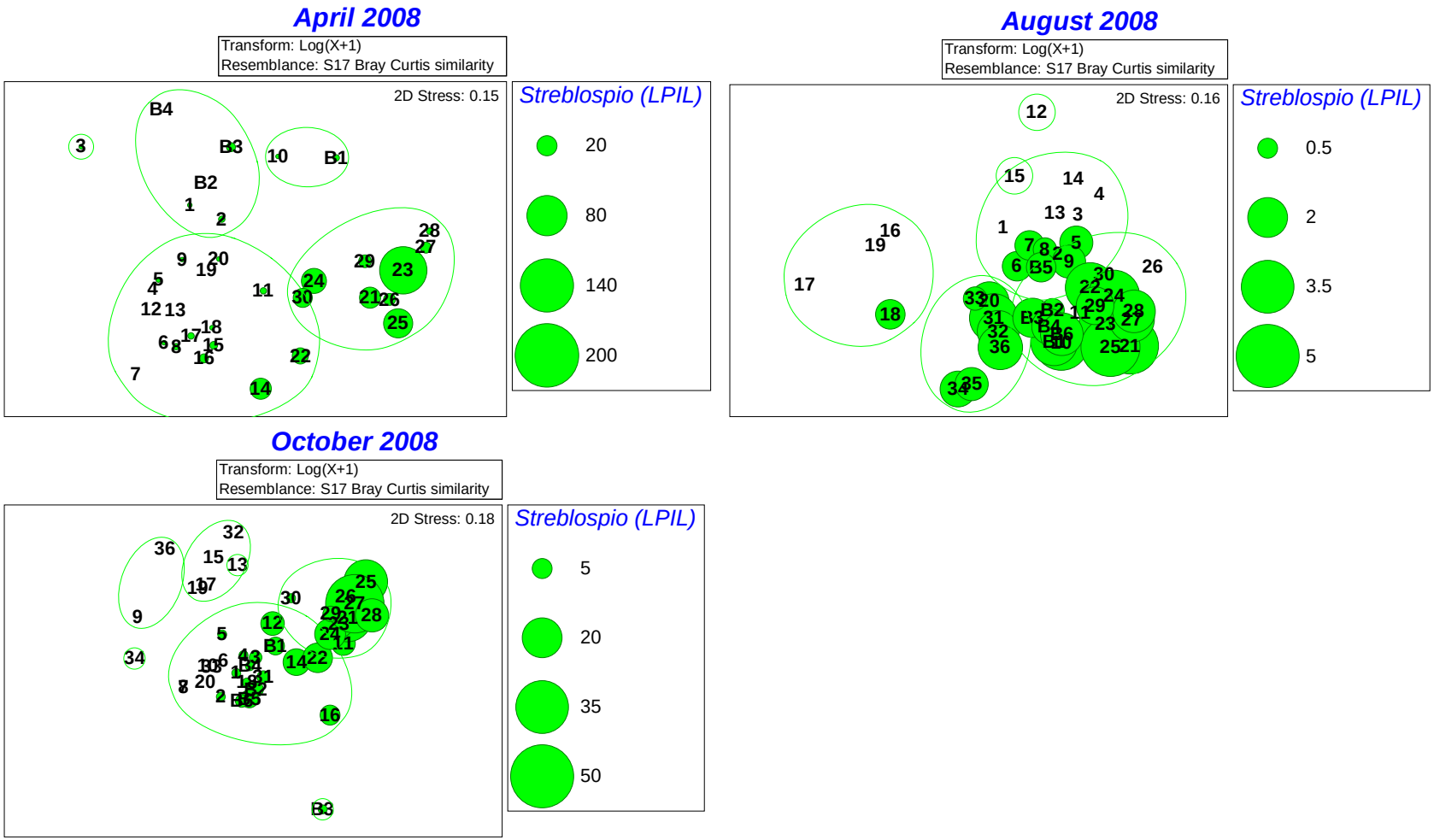
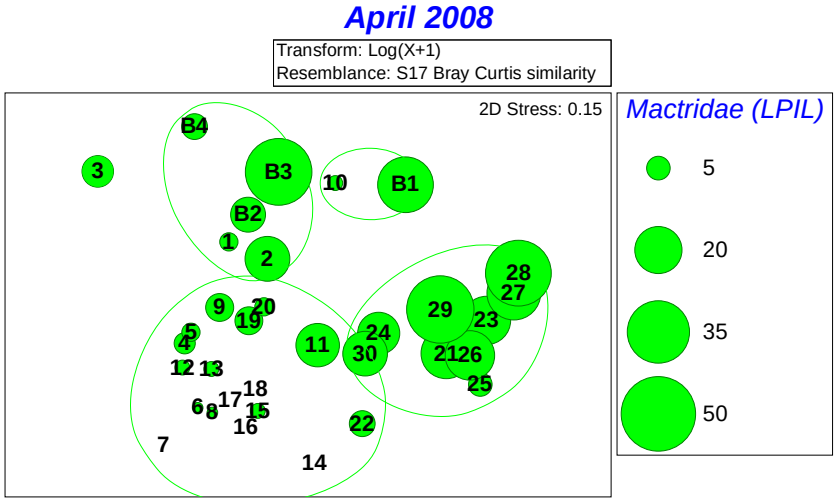


Figure 53C. Distribution of Select Species**. Mactridae (LPIL)**



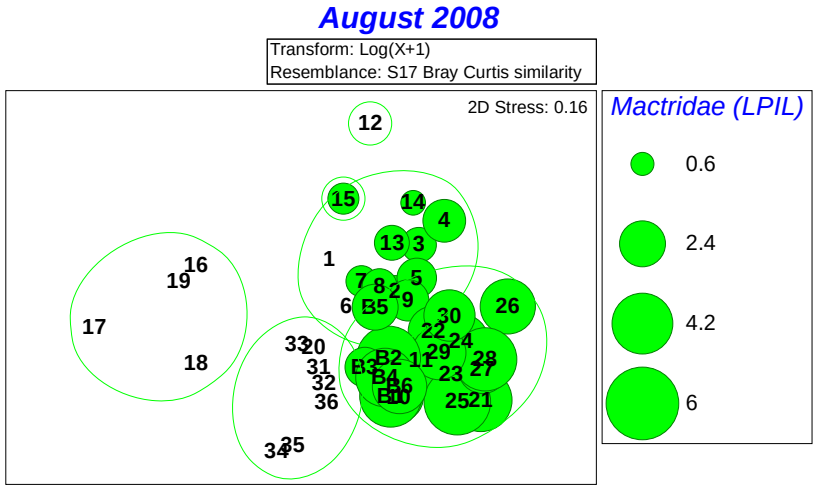
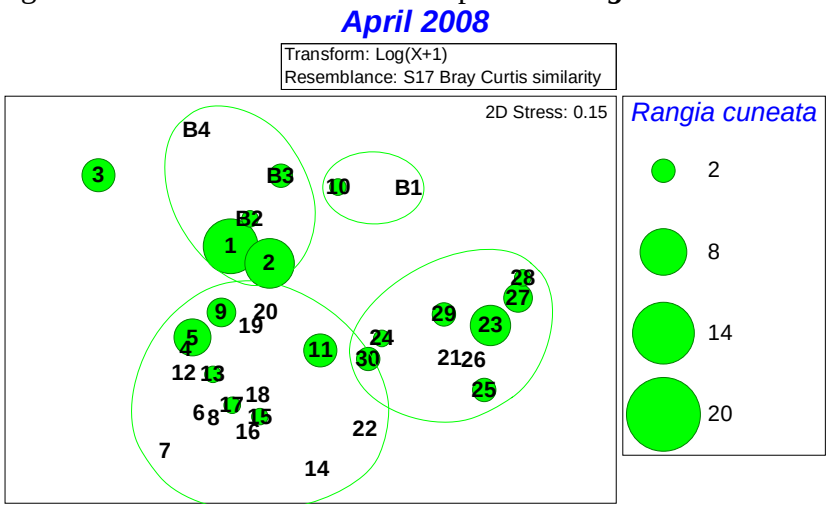


Figure 53D. Distribution of Select Species**. *Rangia cuneata***



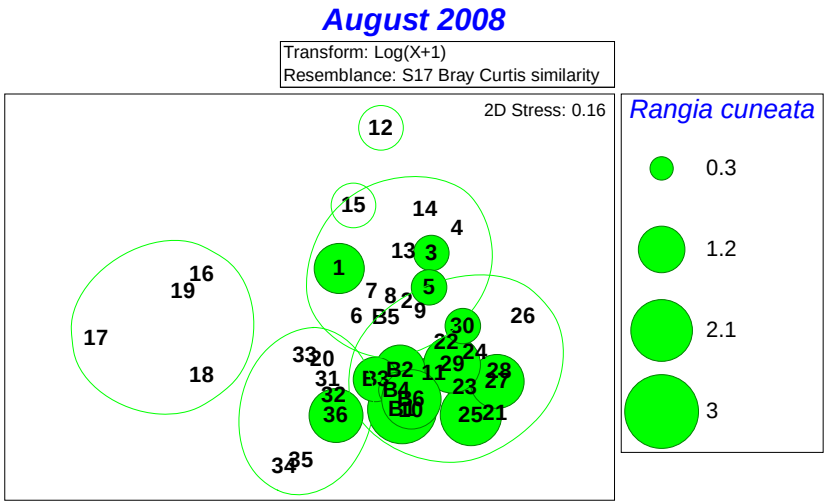
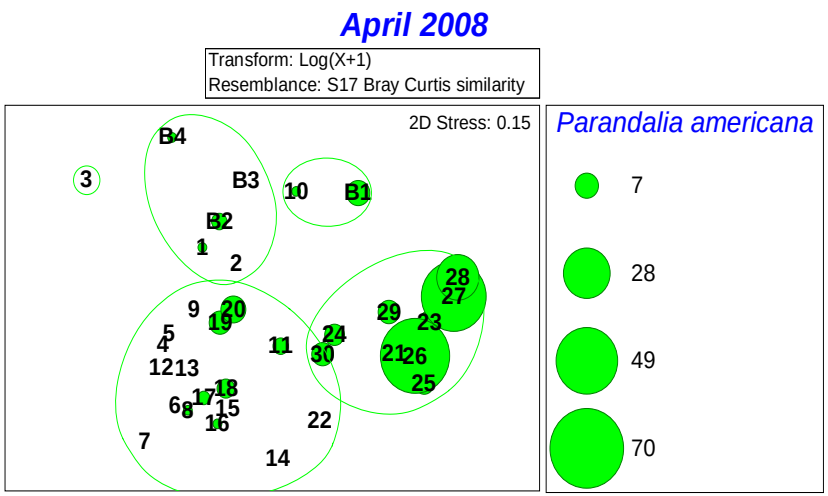
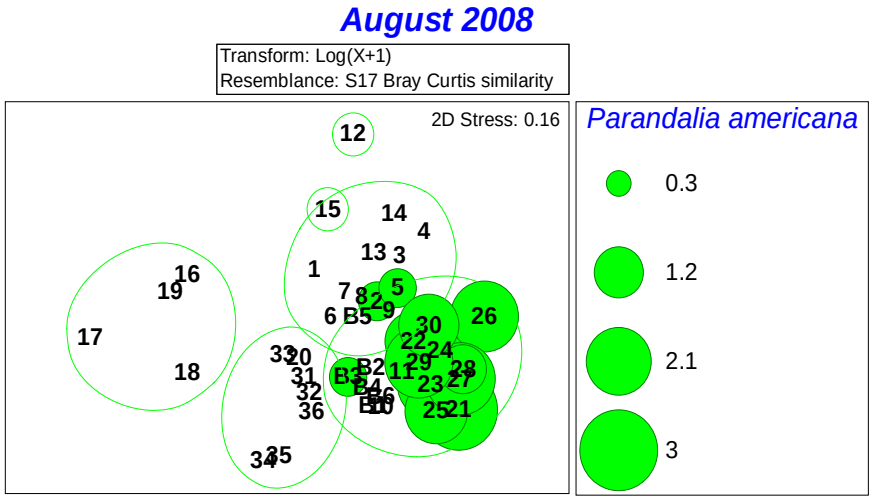


Figure 53E. Distribution of Select Species. ***Parandalia americana***





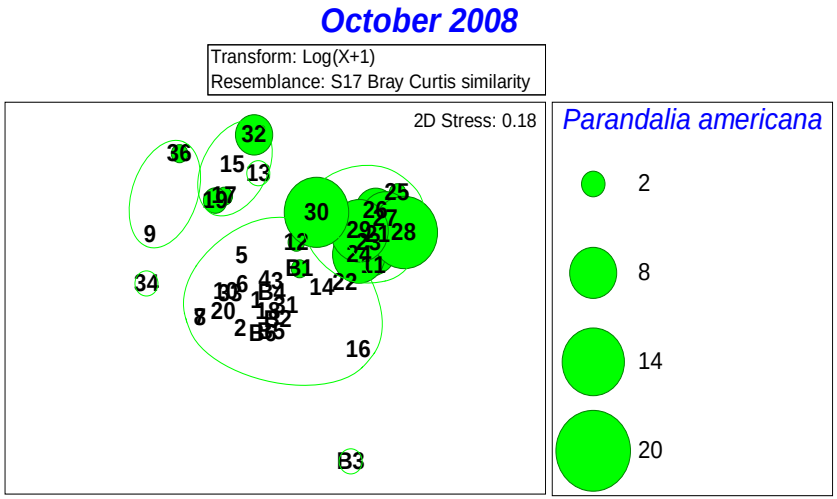


Figure 53F. Distribution of Select Species. ***Cerapus benthophilus***

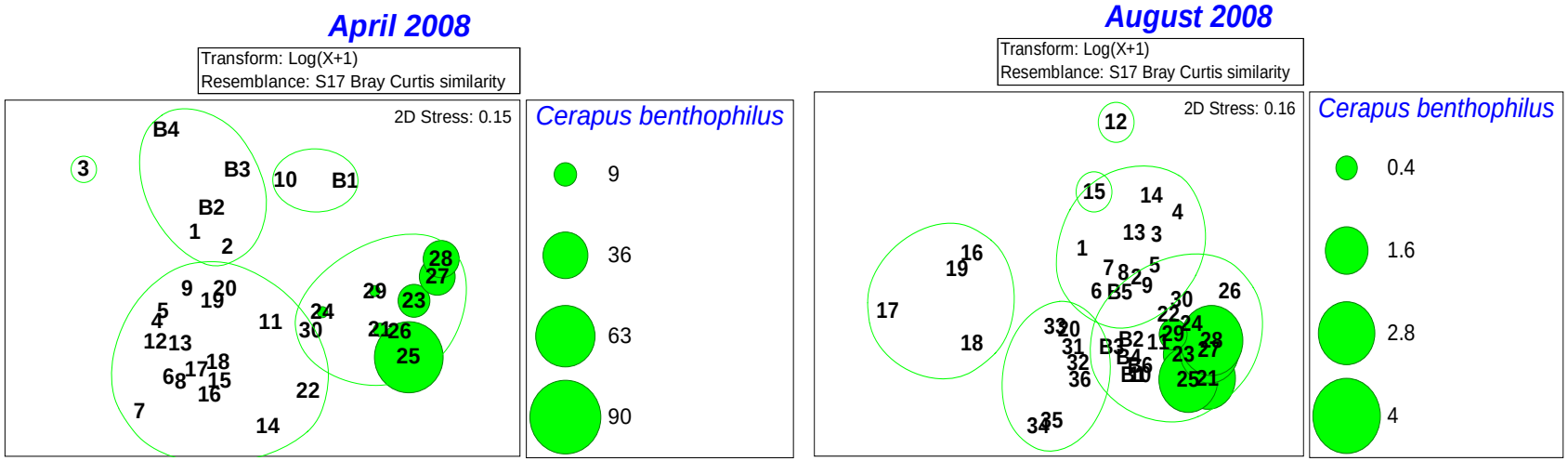


Figure 53G. Distribution of Select Species. ***Lepidophalmus louisianensis***

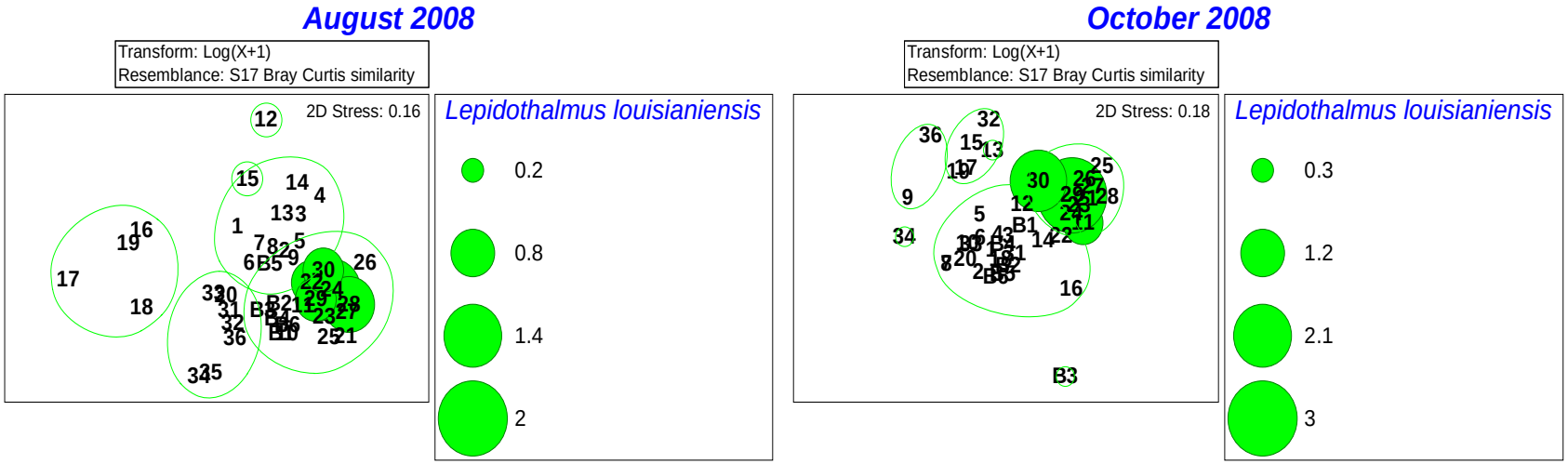


Figure 54. Combined MDS and Clustering Results Stations by Depth.

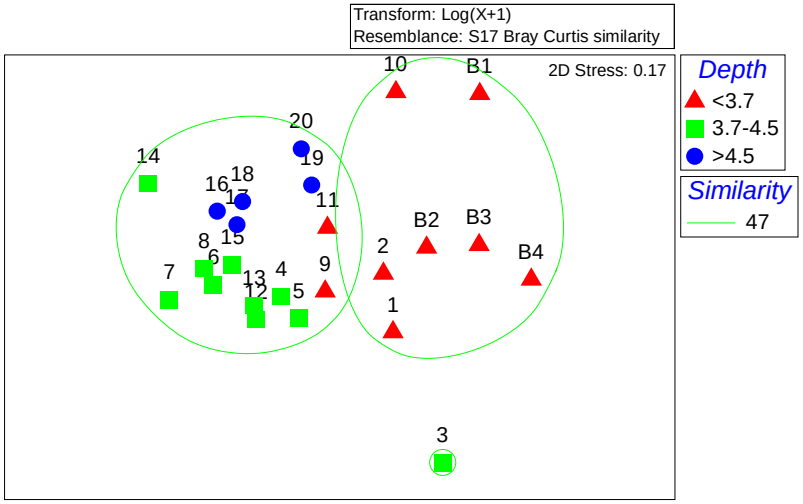


Figure 54A. APRIL 2008

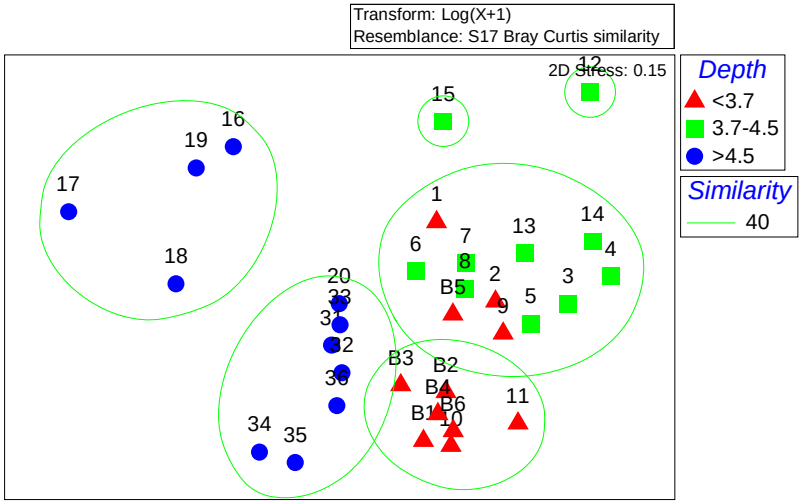


Figure 54B. AUGUST 2008

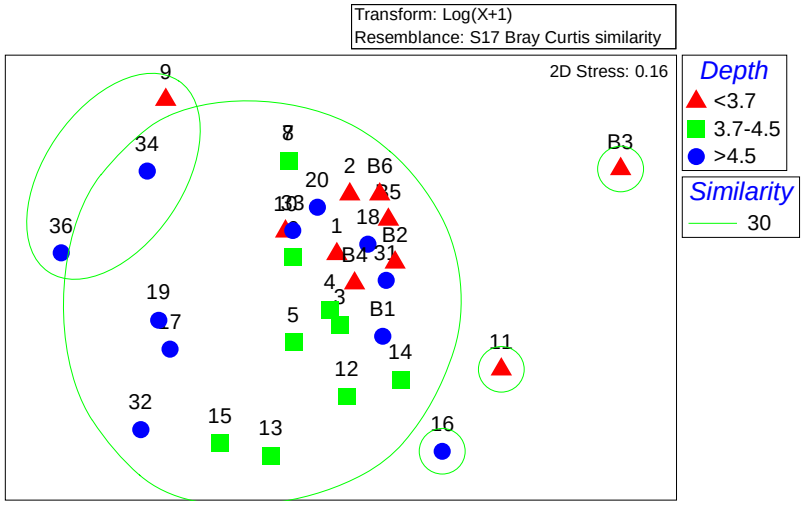


Figure 54C OCTOBER 2008

Figure 55. Combined MDS and Clustering Results Stations by Depth.

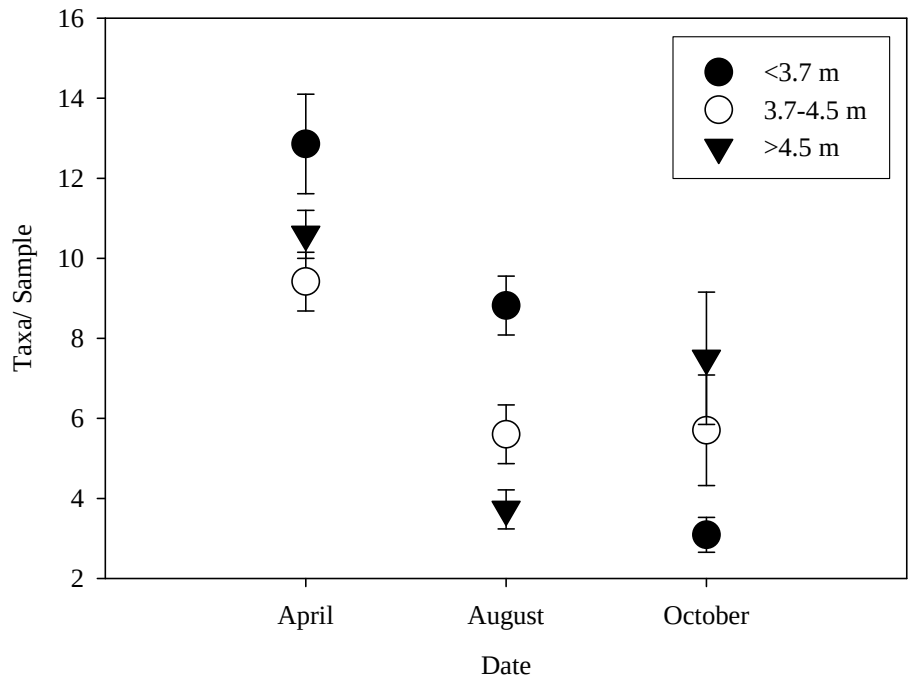


Figure 55A. Taxa/sample

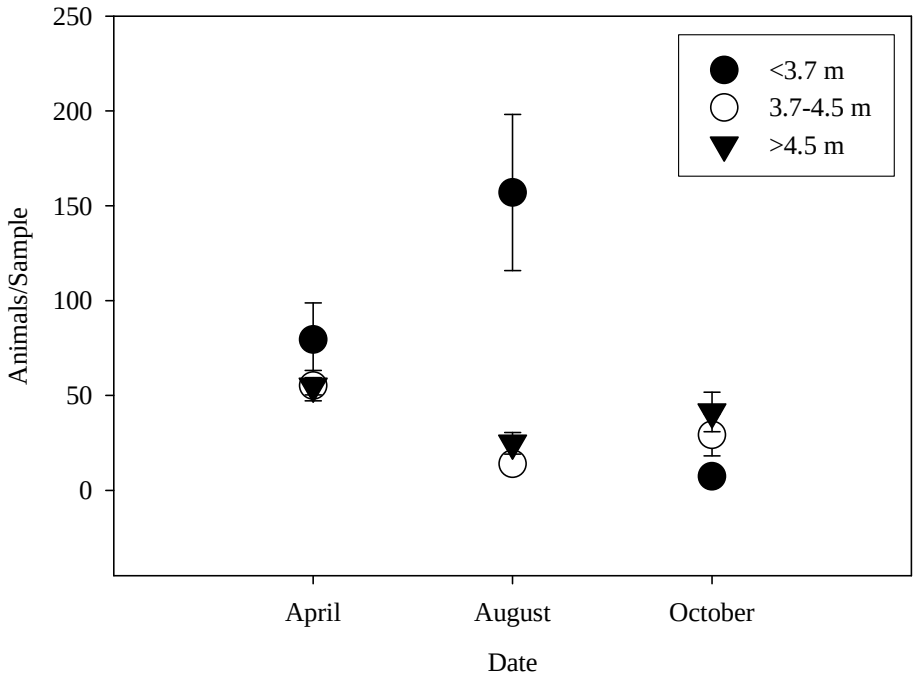


Figure 55B. Animals/sample

April <3.7m n= 7; 3.7-5.5 m n = 12; >4.5 m n=5
August and October <3.7m n= 10; 3.7-5.5 m n = 11; >4.5 m n=11

Figure 55. Combined MDS and Clustering Results Stations by Depth.

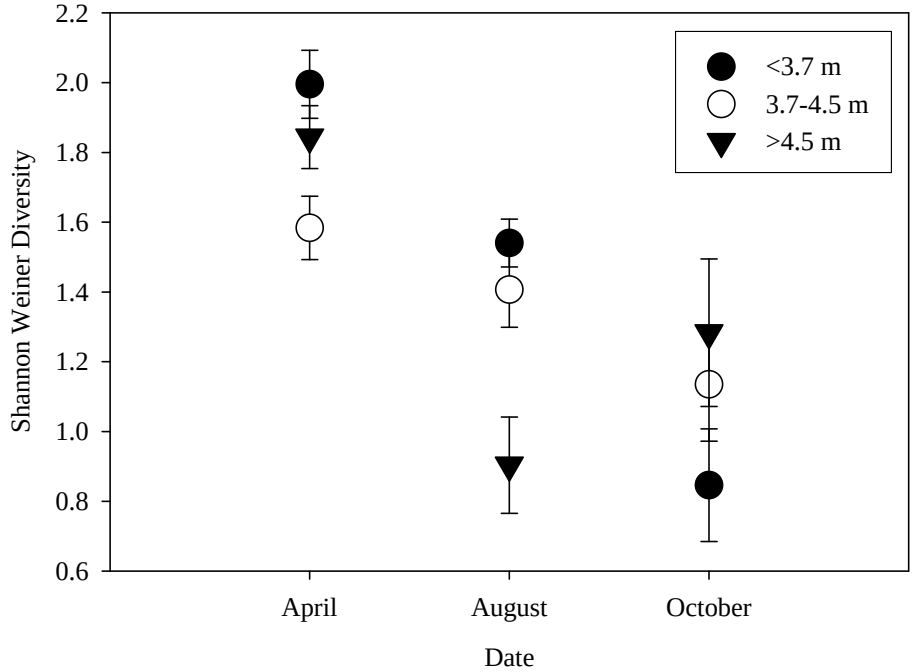


Figure 55C. Shannon Weiner Diversity

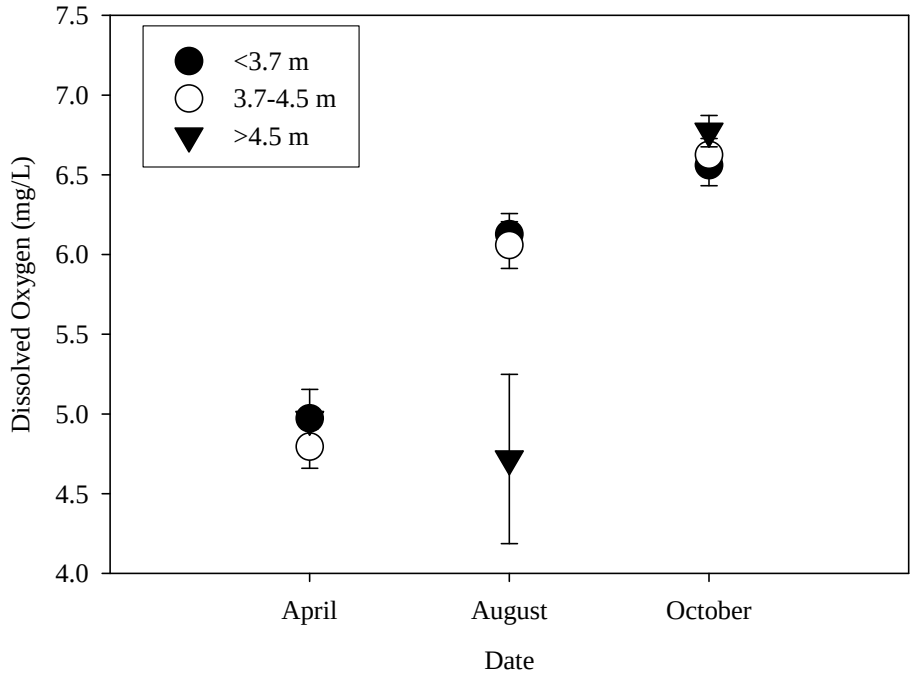


Figure 55D. Dissolved Oxygen Concentrations (mg/L)

April <3.7m n= 7; 3.7-5.5 m n = 12; >4.5 m n=5
August and October <3.7m n= 10; 3.7-5.5 m n = 11; >4.5 m n=11

Figure 56. Sikora and Sikora (1982) Figure 42.

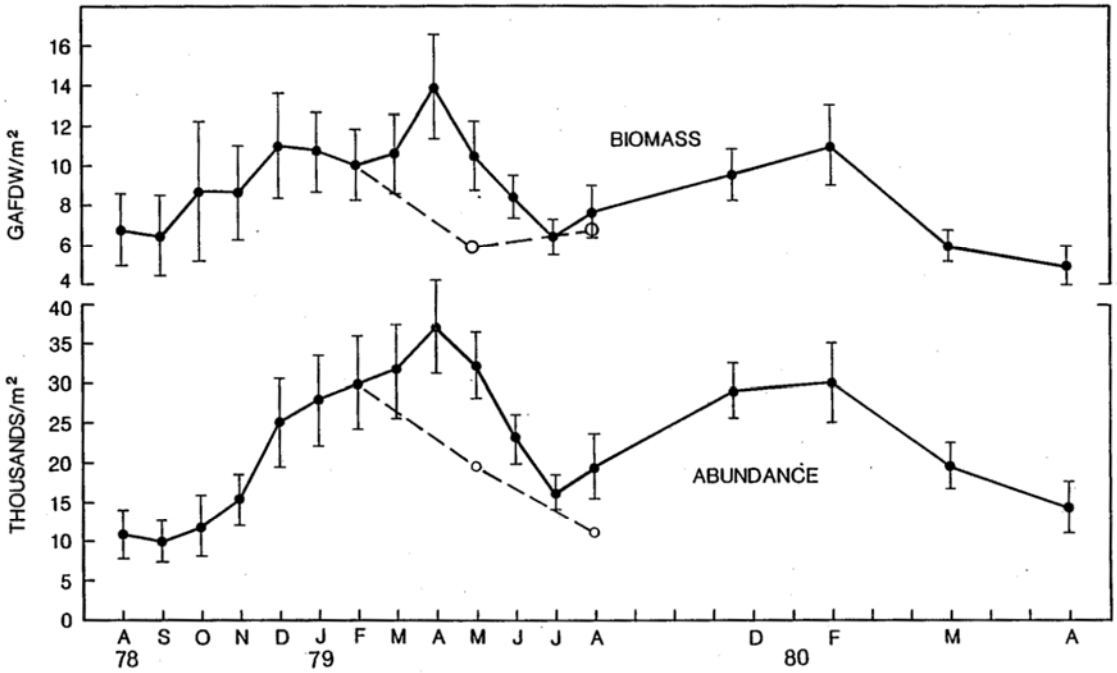


Figure 42. Mean biomass and abundance of macrofauna in Lake Pontchartrain by month. Values for May 1980 and August 1980 are repeated as open circles on a broken line beneath the values for 1979 to emphasize the difference in the two years.

Table 1. Station Locations.

Station	N	W	Station	N	W
BC1	30° 03.994	90° 20.722	**LP16**	30° 10.615	90° 03.671
BC2	30° 04.760	90° 20.763	**LP17**	30° 09.012	90° 03.654
BC3	30° 05.421	90° 20.748	**LP18**	30° 07.182	90° 03.657
BC4	30° 06.182	90° 20.754	**LP19**	30° 05.427	90° 03.644
BC5	30° 08.795	90° 20.777	**LP20**	30° 03.808	90° 03.616
BC6	30° 11.402	90° 20.757	**LP21**	30° 13.629	89° 52.211
LP1	30° 19.390	90° 14.274	**LP22**	30° 12.821	89° 52.191
LP2	30° 17.634	90° 14.283	**LP23**	30° 11.945	89° 52.170
LP3	30° 15.893	90° 14.285	**LP24**	30° 11.032	89° 52.183
LP4	30° 14.199	90° 14.267	**LP25**	30° 10.147	89° 52.046
LP5	30° 12.479	90° 14.293	**LP26**	30° 10.818	89° 48.148
LP6	30° 10.768	90° 14.263	**LP27**	30° 10.007	89° 48.132
LP7	30° 09.144	90° 14.274	**LP28**	30° 09.146	89° 48.160
LP8	30° 07.318	90° 14.274	**LP29**	30° 08.269	89° 48.156
LP9	30° 05.420	90° 14.276	**LP30**	30° 07.365	89° 48.135
LP10	30° 03.928	90° 14.268	**LP31**	30° 02.906	90° 02.500
LP11	30° 19.234	90° 03.644	**LP32**	30° 02.897	90° 03.626
LP12	30° 17.529	90° 03.621	**LP33**	30° 02.880	90° 04.782
LP13	30° 15.757	90° 03.628	**LP34**	30° 02.906	90° 05.898
LP14	30° 14.029	90° 03.647	**LP35**	30° 02.906	90° 07.025
LP15	30° 12.352	90° 03.620	**LP36**	30° 02.915	90° 08.161

Table 2. Summary Principal Component Analysis (PCA) Results

Eigenvalues	April					August					October				
	PC	**Values**	**% Variation**	**Cum.% Variation**		**PC**	**Values**	**% Variation**	**Cum.% Variation**		**PC**	**Values**	**% Variation**	**Cum.% Variation**	
	1	2.83	40.40	40.40		**1**	2.55	36.40	36.40		**1**	2.13	30.50	30.50	
	2	2.07	29.60	70.00		**2**	1.59	22.70	59.10		**2**	1.77	25.30	55.80	
	3	0.99	14.20	84.10		**3**	1.18	16.80	75.90		**3**	1.42	20.30	76.10	
	4	0.49	7.00	91.10		**4**	0.87	12.40	88.30		**4**	0.71	10.10	86.20	
	5	0.33	4.70	95.90		**5**	0.45	6.40	94.80		**5**	0.55	7.90	94.10	
	Eigenvectors					**Eigenvectors**					**Eigenvectors**				
Variables*	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**
B Temp.	-0.485	-0.286	-0.176	0.314	0.395	0.326	-0.583	-0.069	0.111	-0.465	0.530	0.352	-0.244	0.196	-0.181
B. Sal.	-0.234	-0.599	0.057	0.327	0.126	0.530	0.350	-0.047	-0.018	-0.251	-0.365	-0.210	-0.595	-0.126	0.006
B. D.O.	-0.453	0.321	-0.258	0.101	-0.315	-0.352	-0.602	0.146	0.017	-0.187	-0.356	0.403	0.077	-0.593	-0.562
Depth	0.344	-0.468	-0.074	0.294	-0.679	0.386	-0.305	0.414	0.188	0.721	0.416	0.444	-0.372	-0.162	-0.020
Secchi	-0.294	-0.446	-0.019	-0.825	-0.152	0.509	-0.050	0.336	-0.258	-0.256	0.087	-0.454	-0.567	0.002	-0.329
MGS	-0.515	0.192	-0.015	0.108	-0.488	-0.145	0.259	0.531	0.733	-0.297	-0.341	0.417	-0.341	-0.029	0.635
Skewness	0.187	-0.028	-0.945	-0.074	0.084	0.244	-0.109	-0.637	0.590	0.113	0.404	-0.304	0.067	-0.753	0.374

*B. Temp. = Bottom Water Temperature (^{o}C)
B. Sal. = Bottom Water Salinity (PSU)
B. D.O. = Bottom Water Dissolved Oxygen (mg/L) Concentration
Depth = Depth (m)
Secchi = Secchi Depth (m)
MGS = Sediment Mean Grain Size (*u*m)
Skewness = Sediment Grain Size Skewness

Table 3. Principal Component Analysis (PCA) Results for Stations

	Principal Component Scores for Stations														
	April					August					October				
Sample	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**
B1	2.130	2.020	0.540	-0.539	-0.746	0.785	-1.660	-1.900	1.040	-0.995	1.020	1.010	1.610	0.747	-0.117
B2	1.690	2.750	1.200	-0.771	0.195	0.986	-1.510	-2.090	1.470	-0.836	0.860	0.055	2.000	-0.077	0.473
B3	2.400	2.610	-2.510	-1.050	0.541	-0.040	-1.010	0.147	-0.823	-0.684	0.438	1.070	1.560	0.398	-0.547
B4	1.980	2.670	0.640	-0.578	0.102	0.061	-1.330	-0.310	-0.435	-0.621	-0.035	1.930	1.920	0.359	-1.020
B5	----	----	----	----	----	0.486	-1.220	-0.072	-0.529	-0.575	0.437	1.870	2.650	0.621	-0.560
B6	----	----	----	----	----	-0.124	-1.160	0.060	-0.800	-0.600	0.230	1.940	2.410	0.610	-0.951
1	0.103	-0.999	-0.230	-0.872	0.775	-1.560	0.029	-0.134	-0.935	0.333	2.920	-1.370	1.580	-1.190	2.010
2	0.060	-1.000	-0.106	-0.113	0.641	-0.793	-0.213	-1.240	0.458	1.130	1.050	-0.353	0.498	0.095	0.070
3	-0.146	-1.200	0.866	0.110	0.411	-1.130	-0.188	-0.215	-0.466	0.827	1.380	-0.308	0.000	0.306	0.685
4	0.481	-0.996	1.130	0.684	0.352	-0.457	-0.699	0.653	-0.665	1.090	0.605	0.046	-0.217	0.752	-0.357
5	1.200	-0.669	1.420	0.923	0.320	-0.189	-0.336	1.790	1.170	-0.427	1.270	-0.424	-0.324	-0.569	0.416
6	1.430	-0.388	1.360	0.775	0.000	0.764	-1.870	0.375	-0.387	-0.361	0.862	-0.218	-0.591	0.497	-0.066
7	1.750	0.029	1.410	0.446	0.001	0.907	-1.780	-0.494	0.478	-0.144	1.440	-0.582	-0.711	0.176	0.793
8	1.410	0.075	-0.110	0.000	0.212	0.684	-1.920	0.189	-0.215	-0.430	1.960	-0.497	0.146	-0.916	0.654
9	1.310	0.405	-0.123	0.207	0.200	0.813	-2.180	-0.151	0.238	-0.497	1.000	-0.162	-0.461	0.499	-0.674
10	1.280	0.266	0.952	-0.024	0.424	1.380	-1.580	0.949	-0.858	-0.497	1.370	-0.551	-0.395	1.130	0.365
11	-2.430	-1.910	0.376	-1.730	-0.127	-1.640	-0.333	-0.258	-0.776	0.354	1.540	-1.760	-0.781	2.600	0.408
12	-0.574	-2.640	0.599	-1.890	-0.253	-0.841	-0.683	-1.420	0.875	1.320	0.866	-0.336	-0.525	-1.370	-0.580
13	0.145	-1.920	-0.352	-1.170	-0.272	-0.101	-0.581	-0.772	0.597	1.210	1.100	-0.691	-0.520	-2.480	-0.235
14	0.630	-1.590	-0.345	-0.141	-0.094	-0.459	-0.431	0.134	-0.168	1.310	-0.108	0.902	0.086	-0.741	-1.040
15	0.339	-0.646	0.053	0.452	-0.384	-0.386	0.732	1.520	2.030	0.083	-0.195	1.160	-0.321	-0.691	-0.164
16	1.270	-1.030	0.530	0.369	-0.784	0.811	-0.394	-0.160	0.638	1.260	0.365	0.619	-0.113	-1.620	-0.154
17	0.899	-1.620	-2.420	0.816	0.043	0.263	0.236	1.290	1.190	0.337	-1.480	2.650	-1.880	-0.125	1.560
18	1.140	-1.270	-1.820	0.513	-0.235	0.810	-0.233	-0.296	0.849	0.930	-1.620	2.410	-1.150	-0.474	0.031
19	0.931	-1.350	-0.824	0.631	-0.303	0.431	0.197	2.440	0.412	0.041	-1.370	2.370	-1.510	0.221	0.755
20	0.625	-1.370	-0.121	0.791	-0.221	0.341	0.770	1.550	0.822	0.137	-0.848	2.040	-1.710	-0.212	-0.463

Table 3. Principal Component Analysis (PCA) Results for Stations (Cont.)

	Principal Component Scores for Stations														
	April					August					October				
Sample	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**	**Score1**	**Score2**	**Score3**	**Score4**	**Score5**
21	-2.700	1.650	-0.343	0.294	-0.200	-2.350	1.620	1.100	1.410	-1.310	-2.820	0.419	-0.033	0.695	1.400
22	-0.746	0.765	-1.870	0.199	-0.058	-1.440	1.100	1.200	1.180	-0.202	-2.180	0.715	-0.291	0.014	0.657
23	-2.660	1.160	-0.017	0.302	-1.850	-1.520	1.140	0.305	0.601	-0.461	-1.690	-0.453	0.510	0.299	1.030
24	-0.365	0.917	-0.368	0.019	-0.800	-0.972	0.653	-0.513	-0.023	0.272	-1.460	-0.846	1.030	-0.339	0.627
25	-0.372	1.620	0.051	-0.096	-0.847	-1.670	1.200	-0.158	0.978	-0.497	-1.810	-0.835	1.220	-0.509	0.410
26	-3.120	0.301	0.383	0.317	0.412	-1.210	1.580	-1.010	-0.772	-0.041	-1.780	-2.980	-0.556	-0.725	-1.150
27	-3.390	0.461	0.453	0.132	0.018	-1.860	1.450	-0.821	-1.140	-0.359	-2.370	-2.330	-0.192	0.278	-0.918
28	-2.960	0.977	0.271	0.354	0.559	-2.300	1.280	-1.120	-1.010	-0.551	-2.420	-1.920	0.258	0.476	-0.268
29	-2.100	0.928	-0.069	0.308	0.861	-1.600	1.120	-1.650	-0.357	-0.249	-2.050	-1.790	0.756	-0.050	-0.241
30	-1.660	1.010	-0.610	0.328	1.110	-1.870	1.240	-0.941	-1.010	-0.376	-2.140	-1.720	1.210	-0.045	0.165
31	----	----	----	----	----	3.950	2.450	0.583	-1.130	0.168	1.300	-0.752	-2.410	1.120	-0.221
32	----	----	----	----	----	1.270	0.487	1.060	-1.290	0.441	0.312	0.136	-1.600	-0.339	-1.220
33	----	----	----	----	----	0.946	-0.169	0.799	-0.989	-0.063	0.942	-0.149	-1.620	0.593	-0.607
34	----	----	----	----	----	1.370	0.394	1.080	-1.460	-0.213	1.120	-0.525	-0.741	-0.060	-0.321
35	----	----	----	----	----	1.420	0.508	0.752	-1.160	0.040	0.877	0.130	-0.400	0.155	-0.383
36	----	----	----	----	----	6.030	3.300	-2.250	0.961	-0.291	1.110	0.071	-0.417	-0.117	-0.247

Table 4. Summary Species Data for Infaunal Samples

		April 2008		August 2008		October 2008		Grand Total	
Taxa	**Taxon**	**Total**	**% of Total**	**Total**	**% of Total**	**Total**	**% of Total**	**Sum**	**% of Total**
Mediomastus ambiseta	**P**	829	22.15	924	22.66	434	37.16	2187	24.34
Mactridae (LPIL)	**B**	383	10.24	876	21.49	7	0.60	1266	14.09
Streblospio (LPIL)	**P**	311	8.31	384	9.42	206	17.64	901	10.03
Hobsonia florida	**P**	65	1.74	612	15.01	17	1.46	694	7.72
Brachiodontes exustus	**B**	447	11.95	2	0.05	3	0.26	452	5.03
Parandalia americana	**P**	206	5.51	90	2.21	100	8.56	396	4.41
Macoma mitchelli	**B**	288	7.70	85	2.08	2	0.17	375	4.17
Mytilopsis leucophaeta	**B**	58	1.55	297	7.28	0	0.00	355	3.95
Texadina sphinctosoma	**G**	0	0.00	257	6.30	1	0.09	258	2.87
Cerapus benthophilus	**A**	155	4.14	92	2.26	5	0.43	252	2.80
Nemertea (Large)	**N**	64	1.71	27	0.66	103	8.82	194	2.16
Capitella (LPIL)	**P**	169	4.52	3	0.07	17	1.46	189	2.10
Tagelus divisus	**B**	164	4.38	0	0.00	0	0.00	164	1.82
Tubificoides (LPIL)	**O**	58	1.55	58	1.42	34	2.91	150	1.67
Ameroculodes miltoni	**A**	109	2.91	8	0.20	27	2.31	144	1.60
Mytilidae (LPIL)	**B**	0	0.00	134	3.29	0	0.00	134	1.49
Chironominae (LPIL)	**I**	111	2.97	8	0.20	0	0.00	119	1.32
Rangia cuneata	**B**	60	1.60	55	1.35	0	0.00	115	1.28
Tanypodinae (LPIL)	**I**	19	0.51	41	1.01	36	3.08	96	1.07
Polydora cornuta	**P**	28	0.75	29	0.71	22	1.88	79	0.88
Nemertea (Striped)	**N**	31	0.83	0	0.00	45	3.85	76	0.85
Edotea triloba	**Is**	39	1.04	10	0.25	5	0.43	54	0.60
Ampelisca abdita	**A**	39	1.04	0	0.00	0	0.00	39	0.43
Nereis succinea	**P**	6	0.16	22	0.54	2	0.17	30	0.33
Mysidacea (LPIL)	**My**	3	0.08	23	0.56	1	0.09	27	0.30
Apocorophium lacustre	**A**	21	0.56	3	0.07	2	0.17	26	0.29
Mulinia (LPIL)	**B**	18	0.48	0	0.00	0	0.00	18	0.20
Glycinde solitaria	**P**	0	0.00	0	0.00	18	1.54	18	0.20
Tellinidae	**B**	0	0.00	0	0.00	17	1.46	17	0.19
Paraprionospio pinnata	**P**	0	0.00	0	0.00	17	1.46	17	0.19
Mysidopsis almyra	**My**	2	0.05	10	0.25	5	0.43	17	0.19
Pectinaria gouldii	**P**	12	0.32	0	0.00	4	0.34	16	0.18
Lepidothalmus louisianiensis	**Ca**	0	0.00	8	0.20	7	0.60	15	0.17
Lepidactylus dytiscus	**A**	0	0.00	0	0.00	14	1.20	14	0.16
Rhithropanopeus harrisii	**Cr**	7	0.19	5	0.12	0	0.00	12	0.13
Amygadalium papyria	**B**	8	0.21	0	0.00	1	0.09	9	0.10
Grandidierella bonneriodes	**A**	8	0.21	0	0.00	0	0.00	8	0.09
Almyracuma (lpil)	**Cu**	0	0.00	0	0.00	7	0.60	7	0.08
Amphithoe (LPIL)	**A**	6	0.16	0	0.00	0	0.00	6	0.07

Table 4. Summary Species Data (Cont.)

		April 2008		August 2008		October 2008		Grand Total	
Taxa	**Taxon**	**Total**	**% of Total**	**Total**	**% of Total**	**Total**	**% of Total**	**Sum**	**% of Total**
Nematoda (LPIL)	**Ne**	3	0.08	3	0.07	0	0.00	6	0.07
Chironomus (LPIL)	**I**	2	0.05	3	0.07	0	0.00	5	0.06
Ensis (LPIL)	**B**	4	0.11	0	0.00	0	0.00	4	0.04
Sigambra tentaculata	**P**	1	0.03	0	0.00	3	0.26	4	0.04
Harpacticoida	**Co**	0	0.00	0	0.00	4	0.34	4	0.04
Ischadium recurvum	**B**	0	0.00	3	0.07	0	0.00	3	0.03
Nereidae (LPIL)	**P**	1	0.03	2	0.05	0	0.00	3	0.03
Gammarus mucronatus	**A**	3	0.08	0	0.00	0	0.00	3	0.03
Platyhelminthes (LPIL)	**Pl**	2	0.05	1	0.02	0	0.00	3	0.03
Gammaridae (LPIL)	**A**	0	0.00	1	0.02	1	0.09	2	0.02
Polymesoda carolinae	**B**	0	0.00	1	0.02	0	0.00	1	0.01
Hypereteone heteropoda	**P**	1	0.03	0	0.00	0	0.00	1	0.01
Actes americanus carolinae	**Sh**	0	0.00	0	0.00	1	0.09	1	0.01
Chaoborus (LPIL)	**I**	1	0.03	0	0.00	0	0.00	1	0.01
Total Annelida		1687	45.08	2124	52.10	874	74.83	4685	52.13
Total Mollusca		1430	38.21	1710	41.94	31	2.65	3171	35.28
Total Insecta		133	3.55	52	1.28	36	3.08	221	2.46
Total Amphipoda		341	9.11	104	2.55	49	4.20	494	5.50
Total Other Crustacea		51	1.36	56	1.37	30	2.57	137	1.52
Total Miscellaneous		100	2.67	31	0.76	148	12.67	279	3.10
Total Animals		3742		4077		1168		8987	
Annelid Taxa		12	30.00	9	27.27	12	36.36	14	28.00
Mollusc Taxa		9	22.50	9	27.27	6	18.18	14	28.00
Insect Taxa		4	10.00	3	9.09	1	3.03	4	8.00
Amphipod Taxa		7	17.50	4	12.12	5	15.15	9	18.00
Other Crustacean Taxa		4	10.00	5	15.15	7	21.21	8	16.00
Miscellaneous Taxa		4	10.00	3	9.09	2	6.06	4	8.00
Total Taxa		40		33		33		53	

P	**Polychaete**	**Sh**	**Shrimp**
O	**Oligochaete**	**Ca**	**Callianassid**
B	**Bivalve**	**Ne**	**Nematode**
G	**Gastropod**	**N**	**Nemertean**
A	**Amphipod**	**Co**	**Copepod**
Is	**Isopod**		
I	**Insect**		
Cu	**Cumacean**		
My	**Mysid**		
Cr	**Crab**		

Table 5. Nodal Diagram for April 2008 Infaunal Samples

Cluster Group	A	B	C	D	E
Sigambra tentaculata			1		
Grandidierella bonneriodes					8
Chaoborus (LPIL)					1
Gammarus mucronatus		2			1
Hypereteone heteropoda		1			
Platyhelminthes (LPIL)		1		1	
Nereis succinea		3		1	2
Ensis (LPIL)		4			
Amygadalium papyria		8			
Pectinaria gouldii		12			
Rhithropanopeus harrisii		3		4	
Apocorophium lacustre		7		3	2
Amphithoe (LPIL)		4		2	
Polydora cornuta		18			10
Ameroculodes miltoni		73	2	34	
Ampelisca abdita		35		4	
Brachiodontes exustus		410	2	21	14
Parandalia americana		168	22	3	13
Cerapus benthophilus		155			
Tagelus divisus		163	1		
Tubificoides (LPIL)		58			
Hobsonia florida		23	4	7	31
Nemertea (Striped)		12	10	6	3
Rangia cuneata	4	17	7	5	27
Capitella (LPIL)	1	6	123	34	5
Chironominae (LPIL)		22	21	16	52
Nemertea (Large)		20	21	10	13
Streblospio (LPIL)	1	247	12	40	11
Mactridae (LPIL)	9	211	23	25	115
Macoma mitchelli	1	68	95	107	17
Mediomastus ambiseta	1	326	259	164	89
Mulinia (LPIL)		7	4	3	4
Edotea triloba		8	5	19	7
Tanypodinae (LPIL)			7	1	11
Chironomus (LPIL)		1	1		
Nereidae (LPIL)		1			
Mysidopsis almyra		1	1		
Mytilopsis leucophaeta					58
Mysidacea (LPIL)		1	1	1	
Nematoda (LPIL)			1		2

Normal Cluster Groups

A	B	C	D	E
LP3	LP26	LP20	LP22	LP10
	LP27	LP18	LP11	BC1
	LP28	LP19	LP14	LP1
	LP21	LP12	LP15	LP2
	LP23	LP4		LP9
	LP25	LP13		BC4
	LP29	LP5		BC2
	LP24	LP8		BC3
	LP30	LP6		
		LP7		
		LP16		
		LP17		

Table 6. Nodal Diagram for August 2008 Infaunal Samples

Taxa	F	G	H	I	J	K	L
***Chironomus* (LPIL)**				3			
Ischadium recurvum						3	
Capitella (LPIL)							3
Mysidopsis almyra		3			1	4	2
Polydora cornuta					2	9	
Polymesoda carolinae						1	
Nereidae (LPIL)						2	
Nematoda (LPIL)						3	
Apocorophium lacustre						3	
Platyhelminthes (LPIL)						1	
Lepidothalmus louisianiensis						8	
Chironominae (LPIL)			1		1	5	1
Ameroculodes miltoni						7	
Brachiodontes exustus						2	
Gammaridae (LPIL)						1	
Edotea triloba					2	8	
Rhithropanopeus harrisii						5	
Mytilidae	67			2	64	1	
Mysidacea (LPIL)					10	5	8
Macoma mitchelli			5		4	65	
Nereis succinea						22	
Cerapus benthophilus						92	
Parandalia americana					1	78	
Tubificoides (LPIL)						49	
Streblospio (LPIL)	2			51	77	241	13
Mactridae (LPIL)			2		280	543	42
Mediomastus ambiseta				39	136	629	75
Texadina sphinctosoma	4		1	16	182	25	19
Hobsonia florida					559	36	17
Rangia cuneata				4	28	18	5
Mytilopsis leucophaeta				61	235	1	0
Tanypodinae (LPIL)		2			13	5	21
Nemertea (Large)	1	1	1	4	4	11	5

Normal Cluster Groups

F	G	H	I	J	K	L
LP16	LP12	LP15	LP31	LP11	LP27	LP1
LP19			LP20	BC3	LP28	LP7
LP17			LP32	LP10	LP21	LP5
LP18			LP34	BC4	LP23	LP6
			LP36	BC6	LP25	LP2
			LP33	BC1	LP29	LP9
			LP35	BC2	LP22	LP8
					LP24	BC5
					LP26	LP4
					LP30	LP14
						LP3
						LP13

Table 7. Nodal Diagram for October 2008 Infaunal Samples

Taxa	M	N	O	P	Q	R	S	T
Texadina sphinctosoma							1	
Nereis succinea				2				
Lepidothalmus louisianiensis			2	4				
Mysidacea (LPIL)				1				
Harpacticoida		3		1				
Sigambra tentaculata				1	1	1		
Actes americanus carolinae						1		
Paraprionospio pinnata				2	1	5	9	
Tanypodinae (LPIL)				1	7	20	8	
Macoma mitchelli				1	1			
Gammaridae (LPIL)				1				
Edotea triloba			3	2				
Mactridae (LPIL)				4		2	1	
Parandalia americana		1	15	74		2	8	
Mediomastus ambiseta		4	5	213	120	75	5	
Streblospio (LPIL)	1		1	19	19	36		
Nemertea (Large)			2	64	17	15	5	
Glycinde solitaria				9		8	1	
Tellinidae				17				
Ameroculodes miltoni			1	16	1			
Tubificoides (LPIL)				34				
Nemertea (Striped)				45				
Polydora cornuta		10		11		1		
Hobsonia florida				17				
Capitella (LPIL)				13	2	1	1	
Cerapus benthophilus			1	3		1		
Amygadalium papyria				1				
Apocorophium lacustre				2				
Brachiodontes exustus				3				
Almyracuma (lpil)				7				
Pectinaria gouldii				4				
Lepidactylus dytiscus				14				
Mysidopsis almyra	1			4				

Normal Cluster Group

M	N	O	P	Q	R	S	T
BC3	LP34	LP30	LP25	LP5	LP16	LP13	LP35
	LP9		LP11	LP3	LP22	LP17	
	LP36		LP24	LP4	BC1	LP19	
			LP23	LP7	LP12	LP15	
			LP29	LP8	LP14	LP32	
			LP26	LP6			
			LP21	LP10			
			LP27	LP33			
			LP28	LP2			
				BC5			
				BC6			
				LP20			
				BC2			
				LP31			
				BC4			
				LP1			
				LP18			

Table 8. Summary ANOSIM Results

Global Test						
Test Parameters	**April**		**August**		**October**	
Sample statistic (Global R)	0.663		0.733		0.479	
Significance level (%)	0.10%		0.10%		0.10%	
No. of permutations	999		999		999	
No. of permutations > R	0		0		0	
Pairwise Tests						
Groups	**R**	**Sig. %**	**R**	**Sig. %**	**R**	**Sig. %**
NW & SW	0.164	**9.5**	0.160	**13.5**	0.366	3.2
NW & NE	0.416	0.8	0.022	**35.7**	0.420	0.8
NW & SE	0.500	0.8	0.904	0.8	0.096	**26.2**
NW & RIG	0.929	0.1	0.908	0.1	0.919	0.1
NW & BC	0.556	0.8	0.688	0.6	0.175	**8.2**
SW & NE	0.110	**16.7**	0.084	**23.0**	0.668	0.8
SW & SE	0.232	**7.1**	0.760	0.8	0.172	**6.3**
SW & RIG	0.884	0.1	0.831	0.1	0.972	0.2
SW & BC	0.625	1.6	0.443	2.6	0.421	0.2
NE & SE	0.444	1.6	0.872	0.8	0.082	**28.6**
NE & RIG	0.792	0.2	0.828	0.1	0.576	0.1
NE & BC	0.800	0.8	0.616	0.4	0.344	0.4
SE & RIG	0.899	0.1	0.982	0.1	0.835	0.1
SE & BC	0.844	0.8	0.859	0.2	0.171	**8.2**
RIG & BC	0.915	0.1	0.861	0.1	0.765	0.1
NW & SE B			0.931	0.2	0.236	**7.1**
SW & SE B			0.715	0.2	0.088	**16.7**
NE & SE B			0.796	0.2	0.196	**11.9**
SE & SE B			0.752	0.2	-0.192	**91.3**
RIG & SE B			0.981	0.1	0.846	0.3
SE B & BC			0.830	0.2	0.297	1.9

*Values in bold are not significant at 5.0% ($p \geq 0.05$)
**BC = BC1-4 (April) and BC1-6 (Aug-Oct); LP NW = LP1-5; LP SW = LP 6-10; LP NE = LP 11-15; LP SE = LP 16-20; LP SE B = LP 31-36 (Aug-Oct only); RN = LP 21-25; RS = LP 26-30.

Table 9. Summary SIMPER Results

Within Group Comparisons			
Av.Sim	**APRIL**	**AUGUST**	**OCTOBER**
BC	55.15	62.94	53.01
NW	59.58	49.02	68.19
SW	59.24	48.97	61.82
NE	63.47	31.57	41.16
SE	67.42	41.58	33.87
RIG	63.00	58.29	55.04
SE B	----	56.23	30.55
Pairwise Comparisons			
Av.Diss	**APRIL**	**AUGUST**	**OCTOBER**
NW & SW	44.93	54.50	47.60
NW & NE	47.32	58.95	57.97
SW & NE	40.84	62.59	72.46
NW & SE	47.10	88.70	50.72
SW & SE	40.09	82.72	59.94
NE & SE	40.85	91.76	65.21
NW & RIG	62.75	68.61	71.31
SW & RIG	62.61	62.49	80.23
NE & RIG	54.65	74.94	65.36
SE & RIG	58.08	89.61	74.73
NW & BC	53.12	59.09	43.61
SW & BC	59.16	53.54	61.34
NE & BC	56.72	71.80	65.18
SE & BC	56.17	79.41	62.30
RIG & BC	61.57	57.46	70.28
NW & SE B	----	77.19	59.20
SW & SE B	----	63.36	56.63
NE & SE B	----	82.40	70.13
SE & SE B	----	77.25	63.04
RIG & SE B	----	77.30	78.33
SE B & BC	----	61.04	67.96

Table 10. Species Contributing the Most to Station Group Similarities (SIMPER)

BC	NW	SW	NE	SE	SE B	RIG
			APRIL			
Mactridae (LPIL)	*Mediomastus ambiseta*	*Mediomastus ambiseta*	*Mediomastus ambiseta*	*Capitella* (LPIL)		*Mediomastus ambiseta*
Chironominae (LPIL)	Mactridae (LPIL)	*Macoma mitchelli*	*Macoma mitchelli*	*Mediomastus ambiseta*		Mactridae (LPIL)
Mediomastus ambiseta	*Macoma mitchelli*	*Capitella* (LPIL)	*Capitella* (LPIL)	*Macoma mitchelli*		*Streblospio* (LPIL)
Tanypodinae (LPIL)	*Rangia cuneata*	Chironominae (LPIL)	Nemertea (Large)	*Parandalia americana*		*Brachiodontes exustus*
Macoma mitchelli	Capitella (LPIL)		Chironominae (LPIL)	Chironominae (LPIL)		*Ameroculodes miltoni*
Nemertea (Large)						*Macoma mitchelli*
						Parandalia americana
						Tagelus divisus
						Tubificoides (LPIL)
						Ampelisca abdita
			AUGUST			
Mactridae (LPIL)	Tanypodinae (LPIL)	*Mediomastus ambiseta*	Mactridae (LPIL)	Mytilidae	*Mytilopsis leucophaeta*	Mactridae (LPIL)
Texadina sphinctosoma	*Mediomastus ambiseta*	*Streblospio* (LPIL)	Nemertea (Large)	*Texadina sphinctosoma*	Streblospio (LPIL)	*Mediomastus ambiseta*
Mediomastus ambiseta	Mactridae (LPIL)	Mactridae (LPIL)	Tanypodinae (LPIL)		*Mediomastus ambiseta*	*Parandalia americana*
Hobsonia florida		*Tanypodinae (LPIL)*	*Mediomastus ambiseta*			*Streblospio* (LPIL)
Streblospio (LPIL)						*Tubificoides* (LPIL)
						Macoma mitchelli
			OCTOBER			
Mediomastus ambiseta	*Mediomastus ambiseta*	*Mediomastus ambiseta*	Tanypodinae (LPIL)	*Mediomastus ambiseta*	*Mediomastus ambiseta*	*Mediomastus ambiseta*
Streblospio (LPIL)	*Streblospio* (LPIL)		Nemertea (Large)	Nemertea (Large)		*Streblospio* (LPIL)
			Mediomastus ambiseta			Nemertea (Large)
						Parandalia americana
						Nemertea (Striped)
						Ameroculodes miltoni

Table 11. ANOSIM Results for Depth Classifications.

Global Test						
Test Parameters	**April**		**August**		**October**	
Sample statistic (Global R)	0.355		0.497		0.074	
Significance level (%)	0.10%		0.10%		6.00%	
No. of permutations	999		999		999	
No. of permutations > R	0		0		59	
Pairwise Tests						
Groups	**R**	**Sig. %**	**R**	**Sig. %**	**R**	**Sig. %**
<3.7, 3.7-4.5	0.45	0.1	0.40	0.1	0.13	1.8
<3.7, 4.5	0.40	1.2	0.50	0.1	0.12	2.9
3.7-4.5, >4.5	0.23	5.2	0.60	0.1	-0.01	48.7

Table 12. SIMPER Results for Depth Classifications –Global Results

APRIL			AUGUST			OCTOBER		
Group <3.7			*Group <3.7*			*Group <3.7*		
Av.Sim = 54.24	Av.Abn	Cntrb%	Av.Sim = 52.33	Av.Abn	Cntrb%	Av.Sim = 46.81	Av.Abn	Cntrb%
Mactridae	2.43	19.74	M. ambiseta	2.47	24.53	M. ambiseta	1.99	69.55
M. ambiseta	2.42	19.49	Mactridae	2.61	18.53	Streblospio	0.89	25.29
Chironominae	1.89	15.80	H. florida	2.87	16.24			
M. mitchelli	1.34	8.56	T. sphinctosoma	1.89	11.71			
R. cuneata	1.14	6.44	Streblospio	1.42	6.95			
Nemertea (Large)	0.84	5.92	Tanypodinae	0.89	6.67			
Tanypodinae	0.74	4.75	M. leucophaeta	1.70	6.31			
Streblospio	0.78	4.42						
P. americana	0.77	3.50						
H. florida	0.92	3.43						
Group 3.7-4.5			*Group 3.7-4.5*			*Group 3.7-4.5*		
Av.Sim = 60.96	Av.Abn	Cntrb%	Av.Sim = 44.29	Av.Abn	Cntrb%	Av.Sim = 48.14	Av.Abn	Cntrb%
M. ambiseta	3.01	30.93	Mactridae	1.09	26.56	M. ambiseta	1.36	53.89
M. mitchelli	2.18	22.58	M. ambiseta	1.29	26.28	Nemertea (Large)	0.95	23.38
Capitella	1.92	18.83	Tanypodinae	0.84	21.15	Tanypodinae	0.92	15.02
Mactridae	1.00	8.06	M. mitchelli	0.66	9.02			
Nemertea (Large)	0.73	5.41	Nemertea (Large)	0.42	8.59			
Chironominae	0.64	5.35						
Group >4.5			*Group >4.5*			*Group >4.5*		
Av.Sim = 67.42	Av.Abn	Cntrb%	Av.Sim = 35.31	Av.Abn	Cntrb%	Av.Sim = 35.58	Av.Abn	Cntrb%
Capitella	2.64	24.34	Streblospio	1.31	26.74	M. ambiseta	1.44	62.37
M. ambiseta	2.72	22.50	T. sphinctosoma	0.92	21.61	Nemertea (Large)	0.54	18.71
M. mitchelli	1.79	12.29	Mytilidae	0.87	17.85	P. americana	0.45	9.25
P. americana	1.51	10.84	M. leucophaeta	1.12	15.42			
Chironominae	1.28	10.11	M. ambiseta	1.04	14.66			
Nemertea (Striped)	0.96	7.09						

Table 13. SIMPER Results for Depth Classifications –Pairwise Comparisons

APRIL				AUGUST				OCTOBER			
<3.7 & 3.7-4.5				*<3.7 & 3.7-4.5*				*<3.7 & 3.7-4.5*			
Av.Diss = 52.77	<3.7	3.7-4.5		Av.Diss = 64.23	<3.7	3.7-4.5		Av.Diss = 57.72	<3.7	3.7-4.5	
Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%
Capitella	0.52	1.92	9.60	H. florida	2.87	0.14	16.62	M. ambiseta	1.99	1.36	20.63
Mactridae	2.43	1.00	9.06	T. sphinctosoma	1.89	0.32	11.64	Streblospio	0.89	0.69	16.75
Chironominae	1.89	0.64	7.92	Mactridae	2.61	1.09	11.35	Nemertea (Large)	0.40	0.95	16.07
M. mitchelli	1.34	2.18	7.90	M. ambiseta	2.47	1.29	9.60	Tanypodinae	0.18	0.92	15.78
M. ambiseta	2.42	3.01	7.13	M. leucophaeta	1.70	0.00	9.26	P. pinnata	0.00	0.26	4.75
R. cuneata	1.14	0.48	6.45	Streblospio	1.42	0.43	8.04	P. cornuta	0.28	0.00	4.14
H. florida	0.92	0.11	5.17	R. cuneata	0.99	0.14	5.94				
<3.7 & >4.5				*<3.7 & >4.5*				*<3.7 & >4.5*			
Av.Diss = 50.23	<3.7	>4.5		Av.Diss = 72.62	<3.7	>4.5		Av.Diss = 62.42	<3.7	>4.5	
Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%
Capitella	0.52	2.64	13.31	H. florida	2.87	0.00	15.38	M. ambiseta	1.99	1.44	25.76
Mactridae	2.43	0.69	10.86	Mactridae	2.61	0.00	14.97	Streblospio	0.89	0.47	16.94
R. cuneata	1.14	0.14	6.53	M. ambiseta	2.47	1.04	11.38	Nemertea (Large)	0.40	0.54	11.07
M. mitchelli	1.34	1.79	6.52	M. leucophaeta	1.70	1.12	9.46	P. americana	0.07	0.45	9.40
P. americana	0.77	1.51	5.92	T. sphinctosoma	1.89	0.92	9.13	P. cornuta	0.28	0.19	7.52
M. ambiseta	2.42	2.72	5.31	Streblospio	1.42	1.31	7.90	Tanypodinae	0.18	0.23	6.06
Nemertea (Striped)	0.28	0.96	4.57	Mytilidae	0.77	0.87	7.59				
H. florida	0.92	0.28	4.51								
M. leucophaeta	0.87	0.00	4.37								
Chironominae	1.89	1.28	4.34								
Nemertea (Large)	0.84	0.99	4.13								

Table 13. SIMPER Results for Depth Classifications –Pairwise Comparisons (Cont.)

APRIL				AUGUST				OCTOBER			
3.7-4.5 & >4.5				*3.7-4.5 & >4.5*				*3.7-4.5 & >4.5*			
Av.Diss = 41.29	3.7-4.5	>4.5		Av.Diss = 82.37	3.7-4.5	>4.5		Av.Diss = 59.32	3.7-4.5	>4.5	
Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%	Species	Av.Abn	Av.Abn	Cntrb%
P. americana	0.07	1.51	12.46	M. ambiseta	1.29	1.04	12.84	M. ambiseta	1.36	1.44	20.00
Mactridae	1.00	0.69	8.40	Mactridae	1.09	0.00	12.02	Tanypodinae	0.92	0.23	15.67
M. ambiseta	3.01	2.72	7.95	Streblospio	0.43	1.31	11.26	Nemertea (Large)	0.95	0.54	14.75
M. mitchelli	2.18	1.79	7.51	Mytilidae	0.00	0.87	10.94	Streblospio	0.69	0.47	14.50
Nemertea (Striped)	0.21	0.96	7.43	M. leucophaeta	0.00	1.12	10.18	P. americana	0.07	0.45	9.73
Capitella	1.92	2.64	7.19	Tanypodinae	0.84	0.00	9.54	P. pinnata	0.26	0.25	8.40

Table 14. Kruskal-Wallis Test Results for April 2008

	APRIL				
Taxa	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	7	117.5	16.7857	1.888
	3.7-4.5	12	119.5	9.9583	-1.745
	>4.5	5	63.0	12.6	0
	ChiSquare	**DF**	**Prob>ChiSq**		
	4.1847	2	0.1234		
Abundance	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	7	98.0	14	0.636
	3.7-4.5	12	138.0	11.5	-0.665
	>4.5	5	64.0	12.8	0.071
	ChiSquare	**DF**	**Prob>ChiSq**		
	0.565	2	0.7539		
Diversity *H')	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	7	122.0	17.4286	2.159
	3.7-4.5	12	105.0	8.75	-2.569
	>4.5	5	73.0	14.6	0.711
	ChiSquare	**DF**	**Prob>ChiSq**		
	7.2167	2	0.0271		
Evenness (J)	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	7	114.0	16.2857	1.652
	3.7-4.5	12	114.5	9.5417	-2.021
	>4.5	5	71.5	14.3	0.604
	ChiSquare	DF	Prob>ChiSq		
	4.4328	2	0.109		
DO	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	7	99.0	14.1429	0.699
	3.7-4.5	12	134.5	11.2083	-0.866
	>4.5	5	66.5	13.3	0.249
	ChiSquare	**DF**	**Prob>ChiSq**		
	0.8426	2	0.6562		

Table 15. Kruskal-Wallis Test Results for August 2008

	AUGUST				
Taxa	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	275.0	25	3.726
	3.7-4.5	10	155.5	15.55	-0.369
	>4.5	11	97.5	8.8636	-3.345
	ChiSquare	**DF**	**Prob>ChiSq**		
	16.7422	2	0.0002		
Abundance	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	269.5	24.5	3.473
	3.7-4.5	10	103.0	10.3	-2.501
	>4.5	11	155.5	14.1364	-1.012
	ChiSquare	**DF**	**Prob>ChiSq**		
	13.0761	2	0.0014		
Diversity *H')	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	250.5	22.7727	2.718
	3.7-4.5	10	182.0	18.2	0.671
	>4.5	11	95.5	8.6818	-3.393
	ChiSquare	**DF**	**Prob>ChiSq**		
	12.8897	2	0.0016		
Evenness (J)	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	131.0	11.9091	-1.838
	3.7-4.5	10	206.0	20.6	1.924
	>4.5	10	159.0	15.9	-0.021
	ChiSquare	DF	Prob>ChiSq		
	4.7936	2	0.091		
DO	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	234.5	21.3182	2.084
	3.7-4.5	10	197.0	19.7	1.281
	>4.5	11	96.5	8.7727	-3.354
	ChiSquare	**DF**	**Prob>ChiSq**		
	11.5378	2	0.0031		

Table 16. Kruskal-Wallis Test Results fro October 2008

	OCTOBER				
Taxa	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	131.0	11.9091	-1.857
	3.7-4.5	10	176.0	17.6	0.662
	>4.5	10	189.0	18.9	1.217
	ChiSquare	**DF**	**Prob>ChiSq**		
	3.6293	2	**0.1629**		
Abundance	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	111.0	10.0909	-2.674
	3.7-4.5	10	174.5	17.45	0.594
	>4.5	10	210.5	21.05	2.122
	ChiSquare	**DF**	**Prob>ChiSq**		
	8.0521	2	0.0178		
Diversity *H')	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	138.0	12.5455	-1.549
	3.7-4.5	10	170.0	17	0.402
	>4.5	10	188.0	18.8	1.162
	ChiSquare	**DF**	**Prob>ChiSq**		
	2.6589	2	0.2646		
Evenness (J)	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	9	158.5	17.6111	1.085
	3.7-4.5	10	132.5	13.25	-0.78
	>4.5	10	144.0	14.4	-0.252
	ChiSquare	DF	Prob>ChiSq		
	1.3197	2	0.5169		
DO	**Depth**	**Count**	**Sum**	**Mean**	**MeanDiff/SD**
	<3.7	11	163.5	14.8636	-0.695
	3.7-4.5	10	149.5	14.95	-0.61
	>4.5	11	215.0	19.5455	1.31
	ChiSquare	**DF**	**Prob>ChiSq**		
	1.77	2	0.4127		

Appendix Table 1. Water Quality Data

	Surface											
	Temperature (^{0}C)			Salinity (PSU)			Dissolved Oxygen (mg/L)			Secchi Depth (m)		
Station	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**
BC1	**18.1**	**30.0**	**25.4**	**0.1**	**4.0**	**5.2**	**5.47**	**7.14**	**6.24**	**0.30**	**0.50**	**0.70**
BC2	**17.9**	**29.6**	**25.2**	**0.1**	**3.9**	**5.4**	**5.55**	**6.15**	**6.75**	**0.25**	**0.50**	**0.60**
BC3	**17.8**	**29.3**	**25.4**	**0.1**	**3.6**	**5.7**	**5.46**	**6.00**	**6.76**	**0.25**	**0.50**	**0.60**
BC4	**17.8**	**29.1**	**25.6**	**0.1**	**3.1**	**5.6**	**5.41**	**6.20**	**7.03**	**0.20**	**0.60**	**0.60**
BC5	**No Data**	**29.3**	**25.0**	**No Data**	**3.7**	**4.4**	**No Data**	**6.09**	**6.83**	**No Data**	**0.60**	**0.50**
BC6	**No Data**	**29.1**	**25.5**	**No Data**	**3.1**	**4.9**	**No Data**	**6.30**	**6.97**	**No Data**	**0.60**	**0.50**
LP1	**23.8**	**29.0**	**25.3**	**3.2**	**2.6**	**5.0**	**6.64**	**7.00**	**6.65**	**0.80**	**0.30**	**0.30**
LP2	**24.2**	**29.1**	**25.2**	**2.6**	**2.4**	**5.8**	**7.41**	**6.60**	**6.82**	**0.65**	**0.30**	**0.30**
LP3	**24.4**	**29.1**	**25.2**	**2.9**	**2.5**	**6.1**	**7.18**	**6.99**	**6.83**	**0.65**	**0.30**	**0.30**
LP4	**23.5**	**28.6**	**25.3**	**1.7**	**3.2**	**6.6**	**7.47**	**5.95**	**6.57**	**0.45**	**0.40**	**0.20**
LP5	**21.8**	**28.9**	**25.2**	**0.4**	**3.7**	**6.9**	**6.82**	**6.15**	**6.65**	**0.30**	**0.50**	**0.20**
LP6	**22.3**	**29.5**	**25.2**	**0.1**	**3.8**	**6.8**	**6.20**	**6.58**	**6.73**	**0.30**	**0.60**	**0.20**
LP7	**20.2**	**29.4**	**25.3**	**0.2**	**4.0**	**6.5**	**7.38**	**6.48**	**6.43**	**0.30**	**0.50**	**0.40**
LP8	**22.0**	**29.6**	**25.3**	**1.3**	**4.2**	**6.2**	**7.26**	**6.71**	**6.21**	**0.42**	**0.50**	**0.50**
LP9	**20.1**	**29.8**	**25.4**	**0.5**	**4.2**	**6.5**	**6.39**	**6.97**	**6.50**	**0.35**	**0.50**	**0.50**
LP10	**21.7**	**29.6**	**25.6**	**0.6**	**4.2**	**6.8**	**7.67**	**5.96**	**6.45**	**0.40**	**0.70**	**0.50**
LP11	**24.8**	**29.2**	**25.4**	**4.6**	**2.2**	**4.2**	**5.78**	**6.61**	**7.23**	**1.30**	**0.30**	**0.50**
LP12	**23.6**	**29.3**	**25.3**	**4.7**	**2.5**	**6.9**	**5.90**	**7.02**	**7.34**	**1.30**	**0.20**	**0.50**
LP13	**24.2**	**29.1**	**25.1**	**4.3**	**2.9**	**7.1**	**6.60**	**6.96**	**6.89**	**1.00**	**0.40**	**0.50**
LP14	**23.8**	**29.2**	**25.1**	**3.7**	**3.2**	**7.1**	**7.88**	**7.36**	**6.90**	**0.70**	**0.30**	**0.50**
LP15	**24.3**	**29.0**	**25.1**	**2.0**	**3.6**	**7.1**	**7.89**	**7.11**	**6.81**	**0.50**	**0.40**	**0.60**

Appendix Table 1. Water Quality Data (Cont.)

	Surface											
	Temperature (^{0}C)			Salinity (PSU)			Dissolved Oxygen (mg/L)			Secchi Depth (m)		
Station	April	August	October	April	August	October	April	August	October	April	August	October
LP16	21.9	28.7	25.0	0.7	3.9	7.2	7.71	6.56	6.71	0.52	0.50	0.50
LP17	22.2	28.7	25.1	1.4	4.0	7.6	7.67	6.28	6.96	0.50	0.50	0.70
LP18	23.4	28.6	25.0	2.7	4.0	7.5	8.10	6.15	7.05	0.50	0.50	0.60
LP19	23.0	28.3	25.4	2.2	3.6	7.5	8.32	6.29	7.04	0.50	0.80	0.60
LP20	22.2	28.5	25.5	2.2	4.0	8.2	8.03	6.59	6.55	0.50	0.60	0.40
LP21	21.7	28.2	24.2	3.1	3.4	7.3	8.30	6.01	6.70	0.50	0.30	0.40
LP22	21.4	28.5	24.2	2.8	3.7	7.5	8.24	6.05	6.67	0.50	0.30	0.40
LP23	20.9	28.3	24.1	3.0	3.7	7.8	7.69	5.65	6.47	0.60	0.30	0.40
LP24	19.5	28.4	24.0	2.6	3.6	7.5	7.30	5.20	6.76	0.50	0.30	0.40
LP25	19.3	28.2	24.0	1.7	3.2	7.6	7.30	5.35	6.75	0.45	0.30	0.40
LP26	23.9	27.7	23.8	4.1	3.8	7.4	6.74	5.33	7.08	0.65	0.40	0.50
LP27	23.5	27.8	23.8	3.9	3.8	7.9	6.85	5.60	6.65	0.70	0.30	0.40
LP28	23.3	28.0	23.8	3.7	3.5	8.3	7.29	5.55	6.75	0.55	0.20	0.40
LP29	22.9	27.9	23.8	3.5	3.6	7.6	7.21	5.57	6.69	0.50	0.30	0.30
LP30	22.9	27.9	23.6	3.4	3.6	7.6	7.41	5.55	6.63	0.45	0.30	0.30
LP31	No Data	28.5	25.8	No Data	4.0	7.4	No Data	6.60	7.07	No Data	0.80	0.30
LP32	No Data	28.4	25.9	No Data	3.8	7.1	No Data	5.58	7.12	No Data	0.80	0.90
LP33	No Data	28.5	25.8	No Data	4.2	7.1	No Data	6.68	7.52	No Data	0.80	0.70
LP34	No Data	28.6	25.7	No Data	4.2	7.0	No Data	6.45	7.16	No Data	0.80	0.50
LP35	No Data	28.6	25.7	No Data	3.9	6.9	No Data	7.06	7.08	No Data	0.80	0.50
LP36	No Data	28.6	25.8	No Data	3.9	6.9	No Data	6.85	7.00	No Data	0.80	0.40

Appendix Table 1. Water Quality Data (Cont.)

	Bottom											
	Temperature (^{0}C)			Salinity (PSU)			Dissolved Oxygen (mg/L)			Depth (m)		
Station	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**
BC1	**16.6**	**29.7**	**25.7**	**0.1**	**4.0**	**8.1**	**5.42**	**6.51**	**6.15**	**4.5**	**3.4**	**5.8**
BC2	**16.5**	**29.7**	**25.7**	**0.1**	**3.9**	**8.1**	**5.28**	**6.13**	**6.89**	**3.0**	**3.5**	**5.2**
BC3	**16.6**	**29.4**	**25.7**	**0.1**	**3.6**	**7.8**	**5.20**	**6.04**	**6.47**	**3.0**	**3.7**	**5.5**
BC4	**16.5**	**29.3**	**25.5**	**0.1**	**3.1**	**7.0**	**5.18**	**6.29**	**6.54**	**3.3**	**3.6**	**4.9**
BC5	**No Data**	**29.4**	**25.4**	**No Data**	**3.6**	**6.9**	**No Data**	**6.08**	**6.60**	**No Data**	**3.9**	**5.2**
BC6	**No Data**	**29.2**	**25.5**	**No Data**	**3.1**	**6.9**	**No Data**	**6.26**	**6.60**	**No Data**	**3.6**	**5.2**
LP1	**21.3**	**28.4**	**25.3**	**3.6**	**2.9**	**5.2**	**4.61**	**5.80**	**6.60**	**4.0**	**3.4**	**4.8**
LP2	**21.5**	**28.3**	**25.2**	**4.1**	**2.9**	**5.4**	**4.97**	**5.65**	**6.62**	**4.3**	**4.0**	**3.6**
LP3	**21.3**	**28.4**	**25.4**	**4.6**	**3.0**	**5.6**	**5.17**	**5.80**	**6.84**	**4.5**	**4.0**	**4.3**
LP4	**20.4**	**28.6**	**25.5**	**4.8**	**3.2**	**5.6**	**4.75**	**6.00**	**7.13**	**4.7**	**4.9**	**4.3**
LP5	**19.4**	**29.0**	**24.9**	**4.5**	**3.7**	**4.4**	**4.14**	**6.16**	**6.90**	**4.8**	**4.6**	**4.9**
LP6	**18.9**	**29.6**	**25.4**	**3.9**	**3.8**	**4.9**	**4.32**	**6.65**	**7.03**	**5.0**	**4.6**	**4.3**
LP7	**18.6**	**29.6**	**25.2**	**2.9**	**4.0**	**5.2**	**3.99**	**6.47**	**6.14**	**4.9**	**4.6**	**4.3**
LP8	**19.8**	**29.7**	**25.1**	**2.3**	**4.2**	**6.0**	**4.47**	**6.84**	**6.47**	**4.7**	**4.6**	**4.6**
LP9	**19.9**	**29.8**	**25.1**	**2.1**	**4.2**	**6.2**	**4.79**	**7.05**	**6.28**	**4.6**	**4.6**	**5.2**
LP10	**19.6**	**29.7**	**25.1**	**2.3**	**4.2**	**6.7**	**4.19**	**6.14**	**6.49**	**4.3**	**4.8**	**5.2**
LP11	**22.7**	**28.7**	**25.2**	**4.8**	**2.1**	**6.9**	**5.54**	**5.44**	**6.48**	**3.8**	**3.4**	**5.2**
LP12	**21.0**	**28.6**	**25.3**	**4.8**	**2.7**	**7.2**	**5.03**	**5.70**	**6.41**	**5.0**	**4.3**	**5.2**
LP13	**20.0**	**28.5**	**25.4**	**4.7**	**3.1**	**7.2**	**5.09**	**5.73**	**6.21**	**5.0**	**4.6**	**5.2**
LP14	**20.2**	**28.5**	**25.3**	**4.7**	**3.5**	**6.2**	**4.78**	**5.84**	**6.45**	**5.2**	**4.9**	**5.2**
LP15	**20.0**	**28.5**	**25.5**	**4.2**	**3.8**	**6.5**	**5.41**	**5.40**	**6.57**	**5.0**	**4.6**	**4.9**

Appendix Table 1. Water Quality Data (Cont.)

	Bottom											
	Temperature (^{0}C)			Salinity (PSU)			Dissolved Oxygen (mg/L)			Depth (m)		
Station	April	August	October	April	August	October	April	August	October	April	August	October
LP16	19.5	28.5	25.7	3.6	4.0	6.9	4.89	5.65	6.15	6.0	5.2	4.6
LP17	22.7	28.6	25.6	3.9	4.0	6.5	4.90	5.53	5.71	6.0	4.9	4.0
LP18	20.6	28.6	25.1	4.2	4.0	6.9	4.99	5.44	6.89	5.7	4.9	5.2
LP19	20.6	28.3	25.0	4.4	3.7	7.1	4.85	6.00	6.97	5.7	4.9	5.2
LP20	21.2	28.4	25.1	4.4	4.0	7.1	5.20	5.14	7.10	5.7	4.6	5.2
LP21	21.9	28.1	25.0	3.1	3.4	7.1	8.27	5.88	6.97	2.6	2.4	5.5
LP22	21.5	28.2	25.0	2.8	3.7	7.2	8.10	5.70	7.01	4.0	3.7	5.5
LP23	21.0	28.2	25.1	3.0	3.7	7.6	7.71	5.61	6.90	4.0	3.0	5.8
LP24	19.6	28.3	25.0	2.6	3.6	7.5	7.25	5.33	7.23	4.3	3.4	5.5
LP25	19.3	28.2	25.4	1.7	3.2	7.6	7.37	5.33	6.95	4.0	2.7	5.2
LP26	23.9	27.7	25.8	4.1	3.8	7.7	6.84	5.15	7.16	2.7	2.4	5.2
LP27	23.6	27.8	24.1	3.9	3.8	7.3	6.89	5.57	6.71	2.7	2.1	3.0
LP28	23.3	28.0	24.1	3.7	3.5	7.5	7.30	5.58	6.87	2.3	1.8	4.3
LP29	22.8	27.9	24.0	3.5	3.6	7.8	7.27	5.61	6.52	2.5	2.1	3.6
LP30	22.6	27.9	23.8	3.4	3.6	7.6	7.41	5.61	6.64	2.5	2.1	3.6
LP31	No Data	28.8	23.9	No Data	7.1	7.6	No Data	2.03	6.79	No Data	4.9	3.0
LP32	No Data	28.4	23.7	No Data	4.2	7.4	No Data	4.79	6.90	No Data	4.6	2.4
LP33	No Data	28.4	23.7	No Data	4.5	7.9	No Data	6.25	6.77	No Data	4.3	2.4
LP34	No Data	28.5	23.8	No Data	5.1	8.3	No Data	5.51	6.64	No Data	4.3	2.4
LP35	No Data	28.5	23.8	No Data	4.6	7.6	No Data	4.94	6.75	No Data	4.3	2.4
LP36	No Data	29.1	23.6	No Data	8.8	7.6	No Data	0.61	6.68	No Data	4.3	2.4

Appendix Table 2. Summary Sediment Data

	Mean Grain Size (um)			Sorting Coefficient			Silts & Clays (%)			Organic Content (%)		
Station	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**
BC1	24.3	24.4	28.1	2.710	2.697	2.545	83.0	83.1	78.6	3.9	3.8	3.9
BC2	24.8	23.2	26.2	2.653	2.737	2.592	83.5	84.4	82.1	4.3	4.4	4.6
BC3	26.2	23.0	23.6	2.569	2.825	2.742	83.0	82.9	84.2	5.0	3.5	7.3
BC4	24.8	22.5	24.2	2.657	2.785	2.702	83.2	85.0	83.6	3.3	4.7	4.8
BC5	No Sample	22.9	23.1	No Sample	2.822	2.812	No Sample	83.2	82.8	No Sample	4.0	3.9
BC6	No Sample	25.3	24.5	No Sample	2.721	2.718	No Sample	79.9	82.5	No Sample	3.3	4.4
LP1	23.4	23.0	21.2	2.814	2.828	2.890	82.3	82.8	85.1	4.3	4.6	5.1
LP2	24.9	29.7	23.9	2.700	2.455	2.791	82.2	78.2	81.6	4.1	2.4	4.2
LP3	22.7	21.7	22.2	2.807	2.877	2.870	84.1	84.7	84.0	4.0	3.7	6.3
LP4	22.0	20.3	22.0	2.830	2.931	2.852	84.9	85.9	84.5	4.8	5.7	4.3
LP5	20.2	20.2	20.1	2.955	2.939	2.927	85.9	86.2	86.4	5.3	6.0	5.9
LP6	20.5	20.2	19.3	2.912	2.927	2.885	85.9	86.3	89.2	5.1	5.8	5.9
LP7	20.3	20.4	20.8	2.927	2.918	2.907	86.1	86.1	85.5	4.8	5.6	5.7
LP8	21.0	20.9	22.2	2.951	2.907	2.877	84.4	85.5	83.4	5.4	5.8	5.0
LP9	20.7	21.1	24.1	2.966	2.889	3.322	82.7	85.3	76.7	3.4	5.6	3.3
LP10	21.8	21.5	22.4	2.827	2.824	2.829	85.2	85.8	84.3	4.6	4.9	4.7
LP11	43.8	52.4	24.1	4.006	4.136	2.842	62.2	52.8	79.7	1.3	1.1	3.9
LP12	21.1	21.0	22.5	2.885	2.908	2.849	85.6	85.4	83.7	6.8	6.2	5.9
LP13	22.5	22.1	24.5	2.863	2.909	3.154	83.1	82.8	77.0	2.5	4.9	2.9
LP14	22.8	21.4	24.2	2.850	2.886	2.766	82.8	85.1	81.7	2.3	5.8	5.0
LP15	24.4	22.1	21.9	3.364	2.911	2.893	78.4	82.8	84.0	3.4	5.7	5.3
LP16	22.2	21.3	24.5	2.836	2.869	2.752	84.8	85.4	81.7	4.3	4.0	4.4
LP17	22.5	21.0	21.4	2.849	2.894	2.884	83.3	85.5	85.1	3.5	4.1	4.7
LP18	22.2	20.9	21.9	2.871	2.887	2.873	83.3	86.0	84.1	4.0	4.6	4.4
LP19	23.7	22.0	21.8	2.847	2.878	2.886	81.1	83.5	83.9	4.4	4.1	4.3
LP20	23.4	23.1	22.3	2.752	2.805	2.818	84.1	83.3	84.5	4.7	4.5	5.2

Appendix Table 2. Summary Sediment Data (Cont.)

	Mean Grain Size (um)			Sorting Coefficient			Silts & Clays (%)			Organic Content (%)		
Station	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**	**April**	**August**	**October**
LP21	**58.9**	**54.2**	**40.0**	**3.713**	**4.269**	**3.470**	**48.1**	**50.8**	**64.0**	**1.2**	**1.3**	**2.0**
LP22	**26.1**	**25.3**	**29.4**	**2.878**	**2.818**	**2.797**	**76.9**	**76.5**	**71.4**	**2.9**	**3.4**	**3.1**
LP23	**62.4**	**48.3**	**128.9**	**4.784**	**3.874**	**3.189**	**50.5**	**51.7**	**21.6**	**1.3**	**1.4**	**0.5**
LP24	**30.9**	**26.2**	**96.2**	**3.667**	**3.101**	**2.935**	**68.1**	**72.7**	**27.2**	**2.2**	**3.7**	**0.6**
LP25	**46.2**	**57.4**	**132.7**	**2.829**	**3.447**	**2.363**	**69.4**	**46.4**	**15.2**	**1.6**	**1.3**	**0.4**
LP26	**63.3**	**47.2**	**72.8**	**3.521**	**4.053**	**3.494**	**44.2**	**55.3**	**37.4**	**1.0**	**1.3**	**0.9**
LP27	**72.8**	**65.5**	**106.6**	**3.728**	**3.929**	**2.822**	**40.1**	**42.4**	**21.5**	**0.9**	**0.8**	**0.5**
LP28	**57.1**	**57.1**	**72.6**	**3.839**	**3.948**	**3.283**	**49.9**	**49.5**	**36.7**	**1.2**	**1.4**	**1.0**
LP29	**47.1**	**44.0**	**40.6**	**3.014**	**3.967**	**3.552**	**51.0**	**57.9**	**59.8**	**2.2**	**1.9**	**2.1**
LP30	**29.5**	**26.3**	**24.9**	**3.126**	**3.134**	**3.011**	**68.9**	**73.4**	**77.5**	**2.5**	**3.3**	**3.9**
LP31	**No Sample**	**46.2**	**25.9**	**No Sample**	**3.786**	**3.069**	**No Sample**	**57.2**	**77.2**	**No Sample**	**1.7**	**4.2**
LP32	**No Sample**	**23.4**	**25.4**	**No Sample**	**2.748**	**2.633**	**No Sample**	**84.1**	**82.5**	**No Sample**	**5.3**	**4.5**
LP33	**No Sample**	**22.5**	**24.4**	**No Sample**	**2.796**	**2.692**	**No Sample**	**84.7**	**83.6**	**No Sample**	**5.5**	**5.7**
LP34	**No Sample**	**23.4**	**23.9**	**No Sample**	**2.765**	**2.735**	**No Sample**	**83.9**	**83.3**	**No Sample**	**5.4**	**5.3**
LP35	**No Sample**	**22.2**	**24.4**	**No Sample**	**2.816**	**2.726**	**No Sample**	**84.8**	**82.3**	**No Sample**	**7.2**	**3.8**
LP36	**No Sample**	**22.6**	**22.8**	**No Sample**	**2.790**	**2.809**	**No Sample**	**84.7**	**83.9**	**No Sample**	**5.7**	**5.4**

Appendix Table 3. Percent Composition by Size Fraction. April 2008

	%C Sand	%M Sand	%F Sand	%FV Sand	%VC Silt	%C Silt	%M Silt	%F Silt	%VF Silt	% Clay
LP1	0.0%	0.0%	0.2%	17.5%	29.0%	25.2%	10.7%	9.2%	7.9%	0.3%
LP2	0.0%	0.0%	0.1%	17.7%	30.7%	25.8%	10.1%	8.2%	7.1%	0.3%
LP3	0.0%	0.0%	0.1%	15.8%	28.9%	26.3%	11.1%	9.6%	7.8%	0.3%
LP4	0.0%	0.0%	0.0%	15.0%	28.5%	26.7%	11.3%	9.8%	8.3%	0.3%
LP5	0.0%	0.0%	0.0%	14.1%	27.0%	26.2%	11.2%	11.4%	9.7%	0.4%
LP6	0.0%	0.0%	0.0%	14.1%	27.0%	26.3%	12.1%	11.0%	9.2%	0.4%
LP7	0.0%	0.0%	0.0%	13.9%	27.2%	26.0%	12.1%	11.0%	9.4%	0.4%
LP8	0.0%	0.0%	0.4%	15.1%	27.0%	25.2%	11.8%	10.8%	9.3%	0.4%
LP9	0.0%	0.3%	1.5%	15.5%	25.6%	22.7%	10.1%	17.0%	7.1%	0.3%
LP10	0.0%	0.0%	0.1%	14.6%	28.0%	26.8%	11.9%	10.1%	8.1%	0.3%
LP11	0.0%	11.3%	8.5%	18.0%	23.6%	19.0%	7.3%	6.5%	5.6%	0.2%
LP12	0.0%	0.0%	0.1%	14.3%	27.7%	26.6%	11.7%	10.3%	8.9%	0.4%
LP13	0.0%	0.4%	1.5%	14.9%	28.0%	25.8%	11.0%	9.7%	8.3%	0.3%
LP14	0.0%	0.4%	1.3%	15.5%	28.0%	26.0%	10.9%	9.5%	8.2%	0.3%
LP15	0.0%	4.4%	3.5%	13.7%	26.9%	24.3%	10.1%	9.1%	7.7%	0.3%
LP16	0.0%	0.1%	0.1%	15.0%	29.1%	26.3%	11.0%	9.6%	8.4%	0.3%
LP17	0.7%	0.1%	0.4%	15.5%	27.7%	26.0%	11.4%	9.8%	8.1%	0.3%
LP18	0.5%	0.5%	1.5%	14.2%	27.1%	26.2%	11.5%	10.1%	8.2%	0.3%
LP19	0.1%	1.0%	3.1%	14.6%	27.9%	25.0%	10.9%	9.2%	7.7%	0.3%
LP20	0.0%	0.0%	0.2%	15.7%	29.6%	26.8%	11.0%	9.0%	7.5%	0.3%
LP21	1.9%	7.1%	21.3%	21.6%	18.1%	14.5%	5.8%	5.2%	4.4%	0.2%
LP22	0.5%	1.1%	2.4%	19.1%	28.4%	23.7%	9.2%	8.2%	7.1%	0.3%
LP23	8.8%	9.6%	14.4%	16.6%	18.0%	15.0%	6.5%	5.8%	5.1%	0.2%
LP24	0.4%	2.9%	10.9%	17.7%	21.9%	20.9%	9.4%	8.4%	7.2%	0.3%
LP25	0.0%	3.0%	13.4%	14.2%	37.6%	19.7%	4.5%	4.1%	3.5%	0.1%
LP26	0.0%	6.9%	34.0%	14.9%	17.1%	13.1%	5.1%	4.6%	4.1%	0.2%
LP27	0.0%	11.9%	35.7%	12.2%	14.1%	12.0%	5.1%	4.7%	4.0%	0.2%
LP28	0.0%	9.1%	25.0%	16.0%	18.2%	15.0%	6.1%	5.5%	4.9%	0.2%
LP29	0.0%	2.9%	8.5%	37.6%	19.4%	15.3%	6.1%	5.4%	4.6%	0.2%
LP30	0.2%	0.7%	10.7%	19.5%	25.2%	21.2%	8.5%	7.5%	6.3%	0.2%
BC1	0.0%	0.1%	0.2%	16.7%	30.6%	25.3%	11.0%	9.1%	6.8%	0.3%
BC2	0.0%	0.0%	0.1%	16.4%	31.1%	26.8%	10.4%	8.3%	6.6%	0.3%
BC3	0.1%	0.0%	0.1%	16.7%	32.6%	27.5%	9.2%	7.5%	6.1%	0.2%
BC4	0.0%	0.1%	0.4%	16.4%	30.4%	27.4%	10.4%	8.2%	6.6%	0.3%

Appendix Table 4. Percent Composition by Size Fraction. August 2008

	%C Sand	%M Sand	%F Sand	%FV Sand	%VC Silt	%C Silt	%M Silt	%F Silt	%VF Silt	% Clay
LP1	0.0%	0.1%	0.2%	16.9%	28.8%	25.5%	10.7%	9.5%	8.0%	0.3%
LP2	0.1%	0.1%	0.4%	21.2%	33.5%	24.9%	7.8%	6.4%	5.3%	0.2%
LP3	0.0%	0.0%	0.1%	15.2%	28.2%	25.9%	11.4%	10.2%	8.6%	0.3%
LP4	0.0%	0.0%	0.0%	14.1%	26.9%	25.8%	12.4%	11.0%	9.4%	0.4%
LP5	0.0%	0.0%	0.0%	13.8%	26.8%	26.0%	12.3%	11.1%	9.6%	0.4%
LP6	0.0%	0.0%	0.0%	13.7%	26.9%	26.2%	12.3%	11.1%	9.5%	0.4%
LP7	0.0%	0.0%	0.0%	13.9%	27.2%	26.0%	12.2%	10.9%	9.3%	0.4%
LP8	0.0%	0.0%	0.2%	14.3%	27.4%	26.0%	12.0%	10.6%	9.1%	0.4%
LP9	0.0%	0.0%	0.1%	14.5%	27.5%	26.4%	11.8%	10.3%	8.9%	0.4%
LP10	0.0%	0.0%	0.0%	14.2%	28.0%	27.0%	12.1%	10.1%	8.3%	0.3%
LP11	0.0%	11.6%	18.0%	17.5%	18.6%	15.6%	6.8%	6.1%	5.4%	0.2%
LP12	0.0%	0.1%	0.1%	14.4%	27.8%	26.1%	11.6%	10.3%	9.2%	0.4%
LP13	0.0%	0.3%	0.8%	16.1%	27.8%	24.8%	11.2%	10.0%	8.8%	0.3%
LP14	0.0%	0.1%	0.1%	14.7%	28.3%	26.0%	11.5%	10.1%	8.9%	0.4%
LP15	0.0%	0.1%	1.0%	16.1%	27.4%	25.1%	11.2%	10.0%	8.7%	0.3%
LP16	0.0%	0.0%	0.0%	14.6%	27.9%	26.4%	11.8%	10.2%	8.7%	0.3%
LP17	0.0%	0.0%	0.0%	14.4%	27.4%	26.2%	12.0%	10.6%	8.9%	0.4%
LP18	0.0%	0.2%	0.8%	13.0%	27.9%	26.5%	11.8%	10.5%	9.0%	0.4%
LP19	0.0%	0.5%	1.3%	14.8%	27.2%	25.7%	11.8%	10.3%	8.2%	0.3%
LP20	0.0%	0.0%	0.2%	16.5%	29.0%	26.0%	10.9%	9.2%	7.9%	0.3%
LP21	5.0%	6.9%	16.2%	21.1%	17.8%	15.0%	6.3%	6.1%	5.4%	0.2%
LP22	0.0%	1.0%	1.8%	20.7%	27.7%	22.5%	9.7%	8.7%	7.6%	0.3%
LP23	0.6%	6.6%	15.6%	25.5%	17.2%	15.3%	7.1%	6.3%	5.6%	0.2%
LP24	0.2%	1.5%	3.8%	21.7%	25.3%	21.8%	9.4%	8.5%	7.4%	0.3%
LP25	0.0%	3.4%	28.1%	22.0%	16.7%	13.7%	5.8%	5.3%	4.7%	0.2%
LP26	0.3%	6.7%	22.4%	15.3%	19.2%	16.2%	7.1%	6.6%	5.9%	0.2%
LP27	0.3%	13.5%	30.4%	13.4%	14.3%	12.6%	5.5%	5.1%	4.6%	0.2%
LP28	0.0%	10.5%	24.2%	15.9%	17.5%	14.8%	6.3%	5.6%	5.0%	0.2%
LP29	0.0%	6.0%	18.8%	17.3%	20.0%	17.4%	7.4%	6.7%	6.2%	0.2%
LP30	0.0%	0.3%	6.5%	19.8%	25.8%	21.9%	9.6%	8.5%	7.3%	0.3%
LP31	0.8%	3.2%	24.1%	14.7%	20.7%	17.0%	7.3%	6.4%	5.6%	0.2%
LP32	0.0%	0.1%	0.5%	15.4%	29.2%	27.4%	10.8%	9.0%	7.4%	0.3%
LP33	0.0%	0.0%	0.1%	15.2%	28.9%	27.1%	11.1%	9.5%	7.9%	0.3%
LP34	0.0%	0.0%	0.1%	16.0%	29.7%	26.7%	10.7%	9.0%	7.6%	0.3%
LP35	0.0%	0.0%	0.1%	15.1%	28.2%	27.2%	11.3%	9.8%	8.0%	0.3%
LP36	0.0%	0.0%	0.1%	15.2%	29.1%	27.0%	11.0%	9.4%	7.9%	0.3%
BC1	0.0%	0.0%	0.1%	16.8%	30.3%	26.7%	10.3%	8.6%	7.0%	0.3%
BC2	0.0%	0.0%	0.1%	15.5%	29.1%	27.3%	11.2%	9.2%	7.3%	0.3%
BC3	0.0%	0.0%	0.6%	16.5%	28.6%	25.6%	11.0%	9.4%	7.9%	0.3%
BC4	0.0%	0.0%	0.0%	15.0%	28.8%	27.2%	11.3%	9.4%	7.9%	0.3%
BC5	0.0%	0.0%	0.2%	16.5%	28.5%	25.8%	11.2%	9.4%	8.0%	0.3%
BC6	0.1%	0.1%	0.3%	19.7%	29.9%	24.4%	9.9%	8.3%	7.1%	0.3%

Appendix Table 5. Percent Composition by Size Fraction. October 2008

	%C Sand	%M Sand	%F Sand	%FV Sand	%VC Silt	%C Silt	%M Silt	%F Silt	%VF Silt	% Clay
LP1	0.0%	0.0%	0.1%	14.8%	27.5%	26.3%	11.7%	10.4%	8.9%	0.4%
LP2	0.0%	0.2%	0.8%	17.4%	28.9%	25.3%	10.4%	8.9%	7.7%	0.3%
LP3	0.0%	0.0%	0.1%	15.9%	28.7%	25.5%	11.0%	9.8%	8.5%	0.3%
LP4	0.0%	0.0%	0.0%	15.5%	28.4%	26.1%	11.4%	9.9%	8.4%	0.3%
LP5	0.0%	0.0%	0.0%	13.6%	26.9%	26.3%	12.2%	11.1%	9.5%	0.4%
LP6	0.0%	0.0%	0.0%	10.8%	27.8%	27.3%	12.7%	11.3%	9.7%	0.4%
LP7	0.0%	0.0%	0.1%	14.3%	27.5%	26.0%	11.9%	10.7%	9.1%	0.4%
LP8	0.0%	0.1%	1.5%	15.0%	27.4%	26.0%	11.4%	10.0%	8.3%	0.3%
LP9	0.0%	1.6%	6.6%	15.1%	25.1%	23.2%	10.5%	9.4%	8.2%	0.3%
LP10	0.0%	0.0%	0.2%	15.5%	28.6%	26.4%	11.2%	9.7%	8.1%	0.3%
LP11	0.0%	0.7%	2.7%	16.9%	28.1%	24.3%	10.2%	8.9%	7.9%	0.3%
LP12	0.0%	0.1%	0.1%	16.1%	29.0%	25.5%	10.8%	9.8%	8.2%	0.3%
LP13	0.0%	1.3%	4.5%	17.2%	26.1%	23.6%	10.2%	8.9%	7.9%	0.3%
LP14	0.0%	0.7%	0.9%	16.7%	29.5%	25.7%	10.0%	8.9%	7.4%	0.3%
LP15	0.0%	0.0%	0.2%	15.8%	28.0%	25.5%	11.3%	10.0%	8.8%	0.3%
LP16	0.0%	0.1%	0.2%	18.0%	30.5%	25.0%	9.9%	8.5%	7.5%	0.3%
LP17	0.0%	0.0%	0.1%	14.8%	27.9%	26.0%	11.7%	10.3%	8.8%	0.3%
LP18	0.0%	0.2%	1.1%	14.5%	27.7%	26.2%	11.5%	10.1%	8.4%	0.3%
LP19	0.0%	0.4%	1.0%	14.7%	27.1%	26.0%	11.9%	10.1%	8.5%	0.3%
LP20	0.0%	0.0%	0.1%	15.3%	28.5%	26.5%	11.4%	9.8%	8.0%	0.3%
LP21	0.0%	3.8%	13.2%	19.0%	24.8%	20.0%	7.1%	6.5%	5.5%	0.2%
LP22	0.0%	1.4%	2.8%	24.4%	29.1%	20.9%	7.8%	7.1%	6.3%	0.2%
LP23	1.9%	28.1%	29.7%	18.7%	8.1%	6.1%	2.6%	2.4%	2.2%	0.1%
LP24	0.0%	6.7%	49.4%	16.7%	10.6%	7.7%	3.1%	2.9%	2.7%	0.1%
LP25	0.0%	8.9%	58.7%	17.3%	4.9%	3.5%	2.2%	2.2%	2.3%	0.1%
LP26	0.0%	7.1%	38.8%	16.7%	13.0%	11.1%	4.9%	4.4%	4.0%	0.2%
LP27	0.0%	7.9%	55.7%	14.9%	6.8%	6.2%	3.0%	2.7%	2.6%	0.1%
LP28	0.0%	5.0%	39.3%	19.1%	13.3%	10.8%	4.6%	4.1%	3.7%	0.1%
LP29	0.0%	1.6%	17.5%	21.2%	21.4%	18.5%	7.4%	6.6%	5.7%	0.2%
LP30	0.0%	0.1%	4.4%	18.1%	27.2%	23.7%	10.0%	8.7%	7.6%	0.3%
LP31	0.0%	0.2%	6.9%	15.7%	27.3%	24.7%	9.8%	8.3%	6.8%	0.3%
LP32	0.0%	0.0%	1.3%	16.2%	30.5%	27.6%	9.8%	7.9%	6.4%	0.3%
LP33	0.0%	0.0%	0.1%	16.3%	30.7%	26.9%	10.2%	8.5%	7.0%	0.3%
LP34	0.0%	0.0%	0.1%	16.6%	29.9%	26.6%	10.5%	8.7%	7.4%	0.3%
LP35	0.0%	0.0%	0.2%	17.4%	30.0%	26.0%	10.3%	8.5%	7.2%	0.3%
LP36	0.0%	0.1%	0.1%	16.0%	29.3%	25.7%	11.2%	9.5%	7.9%	0.3%
BC1	0.0%	0.0%	0.1%	21.2%	32.5%	24.6%	8.4%	7.0%	5.9%	0.2%
BC2	0.0%	0.1%	0.1%	17.7%	31.9%	27.1%	9.1%	7.5%	6.3%	0.2%
BC3	0.0%	0.0%	0.1%	15.7%	30.1%	27.0%	10.4%	8.9%	7.4%	0.3%
BC4	0.0%	0.1%	0.3%	16.0%	30.1%	27.3%	10.3%	8.5%	7.1%	0.3%
BC5	0.0%	0.1%	0.4%	16.8%	28.5%	25.9%	10.9%	9.3%	7.8%	0.3%
BC6	0.0%	0.1%	0.3%	17.1%	30.4%	26.1%	10.1%	8.5%	7.2%	0.3%

Appendix Table 6. Change in Percent Composition by Silts and Clays

Station	Apr-Aug	Aug-Oct
BC1	0.06	-4.52
BC2	0.91	-2.26
BC3	-0.14	1.27
BC4	1.84	-1.41
BC5	No Data	-0.43
BC6	No Data	2.63
LP1	0.47	2.33
LP2	-3.97	3.40
LP3	0.57	-0.75
LP4	0.98	-1.38
LP5	0.34	0.19
LP6	0.41	2.85
LP7	0.01	-0.56
LP8	1.06	-2.08
LP9	2.60	-8.59
LP10	0.60	-1.48
LP11	-9.42	26.88
LP12	-0.17	-1.68
LP13	-0.34	-5.75
LP14	2.33	-3.41
LP15	4.42	1.22
LP16	0.64	-3.65
LP17	2.20	-0.40
LP18	2.66	-1.86
LP19	2.40	0.38
LP20	-0.78	1.24

Station	Apr-Aug	Aug-Oct
LP31	No Data	20.00
LP32	No Data	-1.60
LP33	No Data	-1.14
LP34	No Data	-0.56
LP35	No Data	-2.49
LP36	No Data	-0.81
LP21	2.69	13.22
LP22	-0.39	-5.13
LP23	1.19	-30.13
LP24	4.64	-45.51
LP25	-23.05	-31.25
LP26	11.13	-17.86
LP27	2.29	-20.92
LP28	-0.42	-12.82
LP29	6.91	1.88
LP30	4.49	4.06
Average	0.56	-3.07

Appendix Table 7. Species List and Abundances for April 2008*

Taxa	BC1	BC2	BC3	BC4	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Macoma mitchelli	1	1	1	1	2	4	1	6	5	9	9	7	6	1	51	17	8	12	19
Rangia cuneata	0	1	2	0	11	9	4	0	5	0	0	0	3	1	4	0	1	0	1
***Mulinia* (LPIL)**	0	0	0	2	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0
Mactridae (LPIL)	28	11	40	6	3	18	9	4	3	1	0	1	7	2	17	2	2	0	2
Mytilopsis leucophaeta	42	0	0	0	0	3	0	0	0	0	0	0	0	13	0	0	0	0	0
Brachiodontes exustus	14	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	1	4	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amygadalium papyria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Ensis* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parandalia americana	7	3	0	1	1	0	0	0	0	0	0	1	0	1	3	0	0	0	0
Mediomastus ambiseta	14	11	4	1	13	16	1	14	11	39	36	35	24	6	36	16	23	56	26
***Streblospio* (LPIL)**	2	0	4	0	1	2	1	0	1	1	0	2	1	1	2	0	0	22	3
Polydora cornuta	1	0	0	0	1	3	0	0	0	0	0	0	0	5	0	0	0	0	0
Hobsonia florida	19	1	1	0	1	2	0	0	0	0	0	0	0	7	0	2	0	0	0
***Capitella* (LPIL)**	0	0	0	0	0	3	1	7	11	11	18	5	1	1	6	2	3	9	6
Nereis succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
Nereidae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra tentaculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pectinaria gouldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypereteone heteropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Tubificoides* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apocorophium lacustre	10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Ameroculodes miltoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
***Amphithoe* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cerapus benthophilus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ampelisca abdita	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Values = Number per sample ($0.052m^2$)

Appendix Table 7. Species List and Abundances for April 2008 (Cont.)*

Taxa	BC1	BC2	BC3	BC4	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Gammarus mucronatus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grandidierella bonneriodes	4	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edotea triloba	1	0	3	3	0	0	0	0	0	0	0	0	0	0	2	0	1	5	11
Rhithropanopeus harrisii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Mysidacea (LPIL)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Mysidopsis almyra	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Chironominae (LPIL)	3	7	20	3	2	9	0	2	0	1	1	1	3	5	12	1	1	1	2
Tanypodinae (LPIL)	1	3	1	3	0	2	0	1	1	0	1	0	1	0	1	1	1	0	0
***Chironomus* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Chaoborus* (LPIL)**	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea (Large)	2	1	1	1	0	1	0	1	2	1	0	1	4	3	1	3	1	3	1
Nemertea (Striped)	0	0	0	0	1	0	0	0	1	0	0	0	0	2	1	0	0	3	0
Nematoda (LPIL)	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Platyhelminthes (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Number of Taxa	17	9	11	11	11	13	6	8	10	7	5	11	9	16	15	8	12	13	11
Total Animals	151	39	80	23	37	73	17	36	41	63	65	56	50	52	154	44	44	119	74
Evenness (J')	0.770	0.816	0.647	0.908	0.764	0.842	0.750	0.812	0.834	0.587	0.674	0.580	0.754	0.861	0.723	0.727	0.668	0.673	0.751
Diversity (H'(loge)	2.180	1.793	1.550	2.178	1.833	2.160	1.344	1.688	1.920	1.143	1.085	1.392	1.656	2.388	1.957	1.512	1.661	1.727	1.801

*Values = Number per sample ($0.052m^2$)

Appendix Table 7. Species List and Abundances for April 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30	TOTAL
Macoma mitchelli	4	14	12	3	1	7	25	3	10	14	2	5	1	3	23	288
Rangia cuneata	0	1	0	0	0	0	0	6	1	2	0	3	1	2	2	60
***Mulinia* (LPIL)**	0	0	0	1	0	0	3	0	0	0	0	0	1	3	3	18
Mactridae (LPIL)	0	0	0	7	3	23	6	21	16	5	22	26	39	41	18	383
Mytilopsis leucophaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
Brachiodontes exustus	0	0	0	1	0	25	1	172	4	57	2	27	29	94	0	447
Tagelus divisus	0	0	0	0	1	12	0	8	0	8	39	58	35	2	1	164
Amygadalium papyria	0	0	0	0	0	1	0	1	0	0	0	3	2	1	0	8
***Ensis* (LPIL)**	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	4
Parandalia americana	1	2	4	6	8	1	0	6	5	5	62	54	23	6	6	206
Mediomastus ambiseta	24	12	34	7	8	27	36	52	36	50	37	7	10	25	82	829
***Streblospio* (LPIL)**	4	2	1	0	1	22	13	111	31	42	7	6	2	8	18	311
Polydora cornuta	0	0	0	0	0	1	0	1	0	4	1	8	1	2	0	28
Hobsonia florida	0	0	1	0	1	8	7	3	7	0	1	0	2	1	1	65
***Capitella* (LPIL)**	16	15	9	13	13	0	13	0	1	0	1	0	0	1	3	169
Nereis succinea	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	6
Nereidae (LPIL)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Sigambra tentaculata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Pectinaria gouldii	0	0	0	0	0	0	0	0	0	0	5	3	3	1	0	12
Hypereteone heteropoda	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
***Tubificoides* (LPIL)**	0	0	0	0	0	1	0	4	5	4	14	21	4	3	2	58
Apocorophium lacustre	0	0	0	0	0	0	3	0	0	5	1	0	1	0	0	21
Ameroculodes miltoni	1	0	0	0	0	14	31	11	3	14	12	0	2	5	12	109
***Amphithoe* (LPIL)**	0	0	0	0	0	0	1	0	0	3	1	0	0	0	0	6
Cerapus benthophilus	0	0	0	0	0	3	0	18	2	84	0	23	23	2	0	155
Ampelisca abdita	0	0	0	0	0	7	4	2	0	3	11	4	1	1	6	39

*Values = Number per sample ($0.052m^2$)

Appendix Table 7. Species List and Abundances for April 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30	TOTAL
Gammarus mucronatus	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	3
Grandidierella bonneriodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Edotea triloba	3	1	0	0	0	3	1	1	0	2	2	0	0	0	0	39
Rhithropanopeus harrisii	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	7
Mysidacea (LPIL)	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3
Mysidopsis almyra	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Chironominae (LPIL)	4	1	3	4	2	1	1	6	8	1	1	1	0	1	3	111
Tanypodinae (LPIL)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	19
***Chironomus* (LPIL)**	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
***Chaoborus* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Nemertea (Large)	0	1	5	5	1	2	5	8	3	1	3	1	1	0	1	64
Nemertea (Striped)	1	2	1	1	4	2	2	0	3	0	1	1	1	3	1	31
Nematoda (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Platyhelminthes (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Number of Taxa	10	12	9	10	12	19	18	23	15	19	22	19	24	21	16	40
Total Animals	59	53	70	48	44	161	154	440	135	305	227	254	186	206	182	3742
Evenness (J')	0.736	0.751	0.722	0.883	0.820	0.820	0.780	0.610	0.810	0.729	0.725	0.775	0.720	0.612	0.685	
Diversity (H'(loge)	1.695	1.866	1.586	2.033	2.038	2.413	2.254	1.913	2.194	2.145	2.242	2.283	2.287	1.862	1.899	

*Values = Number per sample ($0.052m^2$)

Appendix Table 8. Species List and Abundances for August 2008*

Taxa	BC1	BC2	BC3	BC4	BC5	BC6	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Macoma mitchelli	0	1	0	0	1	0	0	0	0	1	1	2	0	4	1	0	3	0	0	1	5
Rangia cuneata	13	3	2	1	0	6	3	0	1	0	1	0	0	0	0	2	1	0	0	0	0
Mactridae (LPIL)	79	104	5	49	10	28	0	2	3	7	5	0	2	3	6	14	10	0	3	1	2
Mytilopsis leucophaeta	50	3	10	6	0	8	0	0	0	0	0	0	0	0	0	153	5	0	0	0	0
Brachiodontes exustus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytilidae (LPIL)	45	16	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polymesoda carolinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ischadium recurvum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Texadina sphinctosoma	5	7	9	75	9	84	3	2	0	0	0	2	0	3	0	2	0	0	0	0	1
Parandalia americana	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Mediomastus ambiseta	30	15	5	9	5	9	5	14	4	1	2	18	7	4	8	6	62	0	5	2	0
***Streblospio* (LPIL)**	15	1	6	4	2	9	0	0	0	0	3	2	2	1	3	42	0	0	0	0	0
Polydora cornuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0
Hobsonia florida	119	47	2	77	0	176	0	13	1	0	0	0	0	1	2	72	66	0	0	0	0
***Capitella* (LPIL)**	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
Nereis succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereidae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Tubificoides* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apocorophium lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ameroculodes miltoni	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerapus benthophilus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edotea triloba	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Rhithropanopeus harrisii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidothalmus louisianiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mysidacea (LPIL)	4	5	1	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0

*Values = Number per sample ($0.052m^2$)

Appendix Table 8. Species List and Abundances for August 2008 (Cont.)*

Taxa	BC1	BC2	BC3	BC4	BC5	BC6	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Mysidopsis almyra	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	3	0	0	0
Chironominae (LPIL)	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tanypodinae (LPIL)	3	1	0	5	1	3	3	2	3	2	3	1	0	1	1	1	0	2	1	3	0
***Chironomus* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea (Large)	1	1	0	0	0	0	0	1	0	0	1	1	1	0	0	1	1	1	1	0	1
Nematoda (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Platyhelminthes (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Taxa	13	12	10	9	6	9	5	7	5	4	10	9	5	7	7	10	9	3	4	4	5
Total Animals	366	204	42	228	28	324	15	35	12	11	22	32	13	17	22	313	150	6	10	7	10
Evenness (J')	0.731	0.607	0.874	0.685	0.819	0.600	0.940	0.734	0.916	0.746	0.917	0.699	0.810	0.921	0.839	0.629	0.561	0.921	0.843	0.921	0.845
Diversity (H'(loge)	1.876	1.508	2.013	1.506	1.467	1.319	1.512	1.428	1.474	1.034	2.111	1.537	1.304	1.793	1.633	1.449	1.232	1.011	1.168	1.277	1.359

*Values = Number per sample ($0.052m^2$)

Appendix Table 8. Species List and Abundances for August 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30
Macoma mitchelli	0	0	0	0	0	0	2	3	0	1	26	5	23	2	3
Rangia cuneata	0	0	0	0	0	0	0	1	0	7	0	4	0	5	1
Mactridae (LPIL)	0	0	0	0	0	86	17	77	27	153	31	14	93	26	19
Mytilopsis leucophaeta	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Brachiodontes exustus	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Mytilidae (LPIL)	3	7	56	1	1	0	0	0	0	0	0	0	0	1	0
Polymesoda carolinae	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ischadium recurvum	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Texadina sphinctosoma	1	0	1	2	3	0	0	3	0	13	1	0	0	3	5
Parandalia americana	0	0	0	0	0	19	4	8	15	6	9	10	2	9	5
Mediomastus ambiseta	0	0	0	0	16	137	44	88	40	268	2	15	32	32	7
***Streblospio* (LPIL)**	0	0	2	0	6	55	22	31	27	80	0	12	9	5	0
Polydora cornuta	0	0	0	0	0	4	0	2	0	3	0	0	0	0	0
Hobsonia florida	0	0	0	0	0	11	2	4	0	12	0	0	2	2	3
***Capitella* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis succinea	0	0	0	0	0	1	0	0	0	0	1	4	9	7	0
Nereidae (LPIL)	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
***Tubificoides* (LPIL)**	0	0	0	0	0	10	0	9	5	9	8	3	1	12	1
Apocorophium lacustre	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
Ameroculodes miltoni	0	0	0	0	0	0	0	0	1	1	2	2	0	1	0
Cerapus benthophilus	0	0	0	0	0	14	0	3	0	20	0	23	31	1	0
Gammaridae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Edotea triloba	0	0	0	0	0	0	0	0	0	5	0	3	0	0	0
Rhithropanopeus harrisii	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1
Lepidothalmus louisianiensis	0	0	0	0	0	0	1	0	3	0	0	0	2	1	1
Mysidacea (LPIL)	0	0	0	0	0	1	0	0	0	0	0	1	3	0	0

*Values = Number per sample ($0.052m^2$)

Appendix Table 8. Species List and Abundances for August 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30
Mysidopsis almyra	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1
Chironominae (LPIL)	0	0	0	0	0	2	0	0	1	0	0	0	1	0	1
Tanypodinae (LPIL)	0	0	0	0	0	0	2	0	2	0	0	0	0	1	0
***Chironomus* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea (Large)	1	0	0	0	0	3	2	0	1	1	0	1	1	1	1
Nematoda (LPIL)	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Platyhelminthes (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Number of Taxa	3	1	3	2	4	15	9	12	10	18	8	16	15	17	14
Total Animals	5	7	59	3	26	349	96	232	122	584	80	101	211	112	50
Evenness (J')	0.865	NC	0.212	0.918	0.730	0.644	0.685	0.646	0.738	0.546	0.723	0.840	0.650	0.770	0.783
Diversity (H'(loge)	0.950	0.000	0.233	0.637	1.012	1.744	1.504	1.604	1.698	1.578	1.503	2.328	1.759	2.180	2.067

*Values = Number per sample ($0.052m^2$)
** = Not Calculable

Appendix Table 8. Species List and Abundances for August 2008 (Cont.)*

Taxa	LP31	LP32	LP33	LP34	LP35	LP36	TOTAL
Macoma mitchelli	0	0	0	0	0	0	85
Rangia cuneata	0	0	0	0	0	4	55
Mactridae (LPIL)	0	0	0	0	0	0	876
Mytilopsis leucophaeta	1	6	4	26	5	19	297
Brachiodontes exustus	0	0	0	0	0	0	2
Mytilidae (LPIL)	1	0	0	0	0	0	134
Polymesoda carolinae	0	0	0	0	0	0	1
Ischadium recurvum	0	0	0	0	0	0	3
Texadina sphinctosoma	0	2	4	16	0	1	257
Parandalia americana	0	0	0	0	0	0	90
Mediomastus ambiseta	10	15	3	0	1	3	924
***Streblospio* (LPIL)**	18	8	1	4	3	11	384
Polydora cornuta	0	0	0	0	0	0	29
Hobsonia florida	0	0	0	0	0	0	612
***Capitella* (LPIL)**	0	0	0	0	0	0	3
Nereis succinea	0	0	0	0	0	0	22
Nereidae (LPIL)	0	0	0	0	0	0	2
***Tubificoides* (LPIL)**	0	0	0	0	0	0	58
Apocorophium lacustre	0	0	0	0	0	0	3
Ameroculodes miltoni	0	0	0	0	0	0	8
Cerapus benthophilus	0	0	0	0	0	0	92
Gammaridae (LPIL)	0	0	0	0	0	0	1
Edotea triloba	0	0	0	0	0	0	10
Rhithropanopeus harrisii	0	0	0	0	0	0	5
Lepidothalmus louisianiensis	0	0	0	0	0	0	8
Mysidacea (LPIL)	0	0	0	0	0	0	23
Mysidopsis almyra	0	0	0	0	0	0	10
Chironominae (LPIL)	0	0	0	0	0	0	8
Tanypodinae (LPIL)	0	0	0	0	0	0	41
***Chironomus* (LPIL)**	0	0	0	2	0	1	3
Nemertea (Large)	1	0	2	0	0	1	27
Nematoda (LPIL)	0	0	0	0	0	0	3
Platyhelminthes (LPIL)	0	0	0	0	0	0	1
Number of Taxa	5	4	5	4	3	7	33
Total Animals	31	31	14	48	9	40	4077
Evenness (J')	0.629	0.862	0.940	0.749	0.853	0.725	
Diversity (H'(loge)	1.013	1.195	1.512	1.038	0.937	1.410	

*Values = Number per sample ($0.052m^2$)

Appendix Table 9. Species List and Abundances for October 2008*

Taxa	BC1	BC2	BC3	BC4	BC5	BC6	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Macoma mitchelli	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Mactridae (LPIL)	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Brachiodontes exustus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amygadalium papyria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellinidae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Texadina sphinctosoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parandalia americana	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Mediomastus ambiseta	32	9	0	24	7	6	8	5	3	4	1	6	4	4	2	5	32	2	1	9	1
***Streblospio* (LPIL)**	4	3	1	1	4	2	1	1	2	1	1	0	0	0	0	0	7	7	0	9	0
Polydora cornuta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0
Hobsonia florida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
***Capitella* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0
Nereis succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra tentaculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pectinaria gouldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Glycinde solitaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0
Paraprionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
***Tubificoides* (LPIL)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apocorophium lacustre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ameroculodes miltoni	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerapus benthophilus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridae (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidactylus dytiscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edotea triloba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
***Almyracuma* (lpil)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidothalmus louisianiensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

*Values = Number per sample ($0.052m^2$)

Appendix Table 9. Species List and Abundances for October 2008 (Cont.)*

Taxa	BC1	BC2	BC3	BC4	BC5	BC6	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9	LP10	LP11	LP12	LP13	LP14	LP15
Actes americanus carolinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mysidacea (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Mysidopsis almyra	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0
Tanypodinae (LPIL)	2	2	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	9	6	8	1
Nemertea (Large)	1	0	0	1	0	0	1	0	4	3	1	3	0	0	0	1	6	3	1	4	1
Nemertea (Striped)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0
Number of Taxa	3	2	4	5	4	2	1	1	3	2	12	5	5	6	5	3	4	4	3	2	15
Total Animals	10	6	10	10	4	9	4	4	8	6	74	22	10	34	10	9	5	16	4	9	109
Evenness (J')	0.582	0.650	0.923	0.881	1.000	0.918	NC	NC	0.985	0.650	0.712	0.845	0.763	0.901	0.763	0.853	0.961	0.497	0.946	0.503	0.653
Diversity (H'(loge)	0.639	0.451	1.280	1.418	1.386	0.637	0.000	0.000	1.082	0.451	1.769	1.360	1.228	1.614	1.228	0.937	1.332	0.689	1.040	0.349	1.768

*Values = Number per sample ($0.052m^2$)
NC = Not Calculable

Appendix Table 9. Species List and Abundances for October 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30
Macoma mitchelli	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Mactridae (LPIL)	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Brachiodontes exustus	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0
Amygadalium papyria	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tellinidae (LPIL)	0	0	0	0	0	5	0	0	0	1	3	7	1	0	0
Texadina sphinctosoma	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Parandalia americana	0	1	0	2	0	5	0	14	10	1	6	9	16	12	15
Mediomastus ambiseta	0	1	13	1	8	47	34	56	29	1	6	22	24	6	5
***Streblospio* (LPIL)**	5	0	1	0	0	30	11	10	12	24	6	43	14	3	1
Polydora cornuta	0	0	0	0	0	1	1	1	1	0	2	2	1	0	0
Hobsonia florida	0	0	0	0	0	2	0	1	6	1	2	0	2	2	0
***Capitella* (LPIL)**	0	0	0	0	0	3	1	0	2	1	2	0	2	0	0
Nereis succinea	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Sigambra tentaculata	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0
Pectinaria gouldii	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Glycinde solitaria	0	0	0	0	0	2	5	3	1	0	0	0	1	2	0
Paraprionospio pinnata	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0
***Tubificoides* (LPIL)**	0	0	0	0	0	1	0	2	1	0	3	3	20	4	0
Apocorophium lacustre	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Ameroculodes miltoni	0	0	0	0	0	2	0	1	0	10	1	4	6	1	1
Cerapus benthophilus	0	0	0	0	0	0	1	0	0	0	0	0	3	0	1
Gammaridae (LPIL)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Lepidactylus dytiscus	0	0	0	0	0	0	0	0	0	6	7	0	1	0	0
Edotea triloba	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3
***Almyracuma* (lpil)**	0	0	0	0	0	0	0	0	0	3	0	3	1	0	0
Lepidothalmus louisianiensis	0	0	0	0	0	0	0	1	0	0	0	0	0	3	2

*Values = Number per sample ($0.052m^2$)

Appendix Table 9. Species List and Abundances for October 2008 (Cont.)*

Taxa	LP16	LP17	LP18	LP19	LP20	LP21	LP22	LP23	LP24	LP25	LP26	LP27	LP28	LP29	LP30
Actes americanus carolinae	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Mysidacea (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mysidopsis almyra	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0
Harpacticoida (LPIL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanypodinae (LPIL)	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Nemertea (Large)	3	2	1	1	0	1	4	7	8	5	7	11	13	6	2
Nemertea (Striped)	0	0	0	0	0	6	0	3	0	2	7	3	6	2	0
Number of Taxa	11	12	9	15	14	13	20	11	8	5	4	2	1	3	6
Total Animals	63	100	70	59	58	111	117	42	30	13	10	7	1	9	42
Evenness (J')	0.648	0.618	0.768	0.737	0.945	0.755	0.791	0.887	0.758	0.810	0.843	0.592	NC	0.622	0.502
Diversity (H'(loge)	1.553	1.535	1.688	1.997	2.495	1.937	2.371	2.128	1.577	1.304	1.168	0.410	0.000	0.684	0.899

*Values = Number per sample ($0.052m^2$)

Appendix Table 9. Species List and Abundances for October 2008 (Cont.)*

Taxa	LP31	LP32	LP33	LP34	LP35	LP36	TOTAL
Macoma mitchelli	0	0	0	0	0	0	2
Mactridae (LPIL)	0	0	0	0	0	0	7
Brachiodontes exustus	0	0	0	0	0	0	3
Amygadalium papyria	0	0	0	0	0	0	1
Tellinidae (LPIL)	0	0	0	0	0	0	17
Texadina sphinctosoma	0	0	0	0	0	0	1
Parandalia americana	0	5	0	0	0	1	100
Mediomastus ambiseta	7	1	6	1	0	1	434
***Streblospio* (LPIL)**	2	0	0	0	0	0	206
Polydora cornuta	0	0	0	0	0	7	22
Hobsonia florida	0	0	0	0	0	0	17
***Capitella* (LPIL)**	2	0	0	0	0	0	17
Nereis succinea	0	0	0	0	0	0	2
Sigambra tentaculata	0	0	0	0	0	0	3
Pectinaria gouldii	0	0	0	0	0	0	4
Glycinde solitaria	0	0	0	0	0	0	18
Paraprionospio pinnata	1	3	0	0	0	0	17
***Tubificoides* (LPIL)**	0	0	0	0	0	0	34
Apocorophium lacustre	0	0	0	0	0	0	2
Ameroculodes miltoni	0	0	0	0	0	0	27
Cerapus benthophilus	0	0	0	0	0	0	5
Gammaridae (LPIL)	0	0	0	0	0	0	1
Lepidactylus dytiscus	0	0	0	0	0	0	14
Edotea triloba	0	0	0	0	0	0	5
***Almyracuma* (lpil)**	0	0	0	0	0	0	7
Lepidothalmus louisianiensis	0	0	0	0	0	0	7
Actes americanus carolinae	0	0	0	0	0	0	1
Mysidacea (LPIL)	0	0	0	0	0	0	1
Mysidopsis almyra	0	0	0	0	0	0	5
Harpacticoida (LPIL)	0	0	0	0	0	0	4
Tanypodinae (LPIL)	0	1	0	0	0	0	36
Nemertea (Large)	1	0	1	0	0	0	103
Nemertea (Striped)	0	0	0	0	0	0	45
Number of Taxa	3	2	4	2	0	3	
Total Animals	14	2	27	11	0	9	
Evenness (J')	0.812	1.000	0.340	0.946	0.000	0.773	
Diversity (H'(loge)	0.892	0.693	0.471	0.655	0.000	0.849	

*Values = Number per sample ($0.052m^2$)

Appendix Table 10. SIMPER Results for April 2008

NW	Av. Sim = 59.58				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.27	13.31	2.17	22.35	22.35
Mactridae (LPIL)	1.93	12.10	3.63	20.31	42.66
Macoma mitchelli	1.43	8.37	3.34	14.04	56.70
SW	Av. Sim = 59.24				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	3.21	21.83	2.51	36.84	36.84
Macoma mitchelli	1.86	11.95	1.76	20.17	57.01
NE	Av. Sim = 63.47				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	3.39	17.51	6.72	27.58	27.58
Macoma mitchelli	2.92	14.28	5.11	22.50	50.08
SE	Av. Sim = 67.42				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Capitella (LPIL)	2.64	16.41	13.30	24.34	24.34
Mediomastus ambiseta	2.72	15.17	6.13	22.50	46.84
Macoma mitchelli	1.79	8.28	2.11	12.29	59.12
RIG	Av. Sim = 63.00				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	3.42	8.76	4.05	13.90	13.90
Mactridae (LPIL)	2.96	7.51	4.10	11.92	25.82
Streblospio (LPIL)	2.80	6.32	2.89	10.03	35.85
Brachiodontes exustus	2.72	4.64	1.23	7.36	43.22
Ameroculodes miltoni	2.08	4.37	1.61	6.93	50.15
BC	Av. Sim = 55.15				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mactridae (LPIL)	2.88	13.87	4.98	25.15	25.15
Chironominae (LPIL)	1.97	9.19	2.80	16.67	41.82
Mediomastus ambiseta	1.87	7.33	2.16	13.30	55.12

Appendix Table 10. SIMPER Results for April 2008 (Cont.)

NW & SW	Av. Diss = 44.93					
	NW	SW				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Rangia cuneata	1.64	0.42	5.31	1.57	11.82	11.82
Mediomastus ambiseta	2.27	3.21	5.07	1.08	11.29	23.11
Mactridae (LPIL)	1.93	0.91	4.58	1.44	10.18	33.29
Capitella (LPIL)	1.33	1.72	4.39	1.16	9.78	43.07
Chironominae (LPIL)	0.90	1.05	3.17	1.81	7.05	50.11
NW & NE	Av. Diss = 47.32					
	NW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Macoma mitchelli	1.43	2.92	4.96	1.78	10.48	10.48
Rangia cuneata	1.64	0.60	4.29	1.57	9.07	19.55
Mediomastus ambiseta	2.27	3.39	3.92	1.02	8.29	27.84
Edotea triloba	0.00	1.21	3.80	1.30	8.04	35.88
Mactridae (LPIL)	1.93	1.24	3.45	1.54	7.29	43.17
Streblospio (LPIL)	0.64	1.12	3.21	1.26	6.79	49.96
Capitella (LPIL)	1.33	1.74	3.01	1.42	6.36	56.32
SW & NE	Av. Diss = 40.84					
	SW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Edotea triloba	0.00	1.21	3.70	1.32	9.07	9.07
Macoma mitchelli	1.86	2.92	3.13	1.56	7.66	16.72
Streblospio (LPIL)	0.64	1.12	3.12	1.24	7.64	24.37
Capitella (LPIL)	1.72	1.74	2.94	1.50	7.19	31.55
Brachiodontes exustus	0.00	1.03	2.86	1.02	7.00	38.55
Mactridae (LPIL)	0.91	1.24	2.85	1.35	6.97	45.52
Rangia cuneata	0.42	0.60	1.95	1.16	4.77	50.29
NW & SE	Av. Diss = 47.10					
	NW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Rangia cuneata	1.64	0.14	5.43	1.89	11.54	11.54
Parandalia americana	0.14	1.51	4.93	2.02	10.48	22.01
Capitella (LPIL)	1.33	2.64	4.90	1.34	10.40	32.41
Mactridae (LPIL)	1.93	0.69	4.89	1.55	10.38	42.79
Mediomastus ambiseta	2.27	2.72	3.26	0.96	6.93	49.72
Chironominae (LPIL)	0.90	1.28	3.10	1.46	6.59	56.31

Appendix Table 10. SIMPER Results for April 2008 (Cont.)

SW & SE	Av. Diss = 40.09					
	SW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Parandalia americana	0.28	1.51	4.38	1.76	10.92	10.92
Capitella (LPIL)	1.72	2.64	3.44	1.41	8.59	19.51
Mactridae (LPIL)	0.91	0.69	3.22	1.36	8.03	27.54
Nemertea (Striped)	0.22	0.96	2.99	1.86	7.46	34.99
Mediomastus ambiseta	3.21	2.72	2.89	1.41	7.21	42.20
Macoma mitchelli	1.86	1.79	2.81	1.64	7.02	49.22
Nemertea (Large)	0.88	0.99	2.55	1.22	6.35	55.57
NE & SE	Av. Diss = 40.85					
	NE	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Parandalia americana	0.28	1.51	4.14	1.82	10.13	10.13
Macoma mitchelli	2.92	1.79	3.55	1.49	8.69	18.82
Mactridae (LPIL)	1.24	0.69	3.29	1.62	8.05	26.88
Edotea triloba	1.21	0.42	3.08	1.30	7.53	34.41
Streblospio (LPIL)	1.12	0.82	3.06	1.30	7.49	41.90
Capitella (LPIL)	1.74	2.64	2.94	1.53	7.19	49.09
Brachiodontes exustus	1.03	0.14	2.66	1.06	6.50	55.59
NW & RIG	Av. Diss = 62.75					
	NW	RIG				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Brachiodontes exustus	0.00	2.72	5.53	1.67	8.81	8.81
Streblospio (LPIL)	0.64	2.80	4.58	2.09	7.30	16.11
Ameroculodes miltoni	0.00	2.08	4.43	2.04	7.05	23.16
Parandalia americana	0.14	2.14	4.21	1.67	6.72	29.88
Tagelus divisus	0.00	2.01	4.05	1.39	6.46	36.33
Cerapus benthophilus	0.00	1.73	3.46	1.17	5.52	41.85
Tubificoides (LPIL)	0.00	1.56	3.23	1.88	5.15	47.00
Mediomastus ambiseta	2.27	3.42	2.87	1.25	4.57	51.57
SW & RIG	Av. Diss = 62.61					
	SW	RIG				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Brachiodontes exustus	0.00	2.72	5.45	1.68	8.70	8.70
Streblospio (LPIL)	0.64	2.80	4.49	2.10	7.18	15.88
Mactridae (LPIL)	0.91	2.96	4.36	2.14	6.96	22.84
Ameroculodes miltoni	0.00	2.08	4.36	2.07	6.96	29.79
Tagelus divisus	0.00	2.01	3.99	1.40	6.38	36.17
Parandalia americana	0.28	2.14	3.95	1.60	6.31	42.48
Cerapus benthophilus	0.00	1.73	3.41	1.18	5.45	47.92
Tubificoides (LPIL)	0.00	1.56	3.18	1.89	5.08	53.00

Appendix Table 10. SIMPER Results for April 2008 (Cont.)

NE & RIG	Av. Diss = 54.65					
	NE	RIG				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Brachiodontes exustus	1.03	2.72	4.08	1.44	7.46	7.46
Streblospio (LPIL)	1.12	2.80	3.76	1.53	6.89	14.35
Parandalia americana	0.28	2.14	3.72	1.55	6.81	21.16
Tagelus divisus	0.00	2.01	3.69	1.39	6.74	27.90
Mactridae (LPIL)	1.24	2.96	3.52	1.86	6.44	34.34
Ameroculodes miltoni	0.55	2.08	3.16	1.82	5.79	40.13
Cerapus benthophilus	0.00	1.73	3.15	1.17	5.77	45.90
Tubificoides (LPIL)	0.00	1.56	2.93	1.87	5.36	51.26
SE & RIG	Av. Diss = 58.08					
	SE	RIG				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Brachiodontes exustus	0.14	2.72	5.03	1.64	8.66	8.66
Mactridae (LPIL)	0.69	2.96	4.59	2.15	7.91	16.57
Capitella (LPIL)	2.64	0.61	4.01	2.68	6.90	23.47
Streblospio (LPIL)	0.82	2.80	3.97	1.94	6.84	30.31
Ameroculodes miltoni	0.14	2.08	3.96	2.02	6.82	37.13
Tagelus divisus	0.14	2.01	3.69	1.40	6.36	43.49
Cerapus benthophilus	0.00	1.73	3.29	1.18	5.66	49.16
Tubificoides (LPIL)	0.00	1.56	3.06	1.91	5.27	54.43
NW & BC	Av. Diss = 53.12					
	NW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Chironominae (LPIL)	0.90	1.97	4.73	1.28	8.90	8.90
Rangia cuneata	1.64	0.45	4.62	1.76	8.70	17.60
Capitella (LPIL)	1.33	0.00	4.53	1.36	8.53	26.13
Mactridae (LPIL)	1.93	2.88	3.70	1.68	6.97	33.10
Mediomastus ambiseta	2.27	1.87	3.32	1.03	6.26	39.35
Parandalia americana	0.14	1.04	3.11	1.39	5.86	45.22
Edotea triloba	0.00	0.87	3.07	1.23	5.77	50.99
SW & BC	Av. Diss = 59.16					
	SW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	0.91	2.88	6.51	1.93	11.00	11.00
Capitella (LPIL)	1.72	0.00	6.13	1.51	10.36	21.37
Mediomastus ambiseta	3.21	1.87	5.42	1.35	9.16	30.53
Macoma mitchelli	1.86	0.69	4.19	1.69	7.08	37.61
Chironominae (LPIL)	1.05	1.97	3.55	1.29	6.00	43.60
Hobsonia florida	0.42	1.10	3.32	1.30	5.61	49.22
Mytilopsis leucophaeta	0.53	0.94	3.12	0.75	5.28	54.49
Edotea triloba	0.00	0.87	2.97	1.26	5.02	59.51

Appendix Table 10. SIMPER Results for April 2008 (Cont.)

NE & BC	Av. Diss = 56.72					
	NE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Macoma mitchelli	2.92	0.69	6.46	3.70	11.40	11.40
Mactridae (LPIL)	1.24	2.88	5.13	1.98	9.05	20.44
Capitella (LPIL)	1.74	0.00	5.00	4.13	8.81	29.26
Mediomastus ambiseta	3.39	1.87	4.64	1.47	8.17	37.43
Chironominae (LPIL)	1.15	1.97	3.40	1.46	6.00	43.43
Brachiodontes exustus	1.03	0.68	3.12	1.13	5.49	48.92
Streblospio (LPIL)	1.12	0.68	3.02	1.04	5.33	54.25
SE & BC	Av. Diss = 56.17					
	SE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Capitella (LPIL)	2.64	0.00	8.37	4.92	14.89	14.89
Mactridae (LPIL)	0.69	2.88	6.69	2.02	11.91	26.81
Mediomastus ambiseta	2.72	1.87	3.53	1.17	6.29	33.10
Macoma mitchelli	1.79	0.69	3.48	1.35	6.20	39.30
Nemertea (Striped)	0.96	0.00	3.04	2.28	5.41	44.71
Parandalia americana	1.51	1.04	2.75	1.35	4.89	49.60
Grandidierella bonneriodes	0.00	0.92	2.63	1.56	4.69	54.29
RIG & BC	Av. Diss = 61.57					
	RIG	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Brachiodontes exustus	2.72	0.68	4.67	1.47	7.59	7.59
Streblospio (LPIL)	2.80	0.68	4.27	1.73	6.94	14.53
Ameroculodes miltoni	2.08	0.00	4.08	2.01	6.63	21.17
Tagelus divisus	2.01	0.00	3.76	1.37	6.10	27.27
Mediomastus ambiseta	3.42	1.87	3.30	1.51	5.36	32.63
Cerapus benthophilus	1.73	0.00	3.21	1.16	5.21	37.84
Tubificoides (LPIL)	1.56	0.00	2.99	1.84	4.85	42.69
Parandalia americana	2.14	1.04	2.86	1.32	4.64	47.33
Ampelisca abdita	1.36	0.00	2.63	1.77	4.28	51.61

Appendix Table 11. SIMPER Results for August 2008

NW	Av.Sim = 49.02				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	1.27	16.30	4.36	33.26	33.26
Mediomastus ambiseta	1.58	14.87	2.60	30.33	63.59
SW	Av.Sim = 48.97				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.16	18.28	2.72	37.34	37.34
Streblospio (LPIL)	1.61	9.22	2.74	18.82	56.16
NE	Av.Sim = 31.57				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mactridae (LPIL)	1.12	8.51	1.01	26.95	26.95
Nemertea (Large)	0.55	6.94	0.96	21.97	48.92
Tanypodinae (LPIL)	0.64	6.55	0.58	20.75	69.66
SE	Av.Sim = 41.58				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mytilidae	1.78	28.31	1.73	68.09	68.09
Texadina sphinctosoma	0.77	11.54	1.02	27.75	95.84
SE B	Av.Sim = 56.23				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mytilopsis leucophaeta	2.06	19.96	2.34	35.50	35.50
Streblospio (LPIL)	1.89	18.31	2.67	32.56	68.06
BC	Av.Sim = 62.94				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mactridae (LPIL)	3.42	13.05	4.54	20.73	20.73
Texadina sphinctosoma	2.87	11.27	2.64	17.91	38.64
Mediomastus ambiseta	2.40	9.99	5.48	15.87	54.52
RIG	Av.Sim = 58.29				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mactridae (LPIL)	3.71	13.53	5.31	23.21	23.21
Mediomastus ambiseta	3.55	11.21	2.89	19.24	42.45
Parandalia americana	2.14	7.70	3.21	13.21	55.66

Appendix Table 11. SIMPER Results for August 2008 (Cont.)

NW & SW	Av.Diss = 54.50					
	NW	SW				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	0.28	1.61	7.18	2.03	13.17	13.17
Hobsonia florida	0.67	1.22	6.17	1.16	11.32	24.49
Mactridae (LPIL)	1.27	1.43	5.01	1.26	9.19	33.68
Mediomastus ambiseta	1.58	2.16	4.95	1.25	9.08	42.76
Tanypodinae (LPIL)	1.27	0.55	4.47	1.44	8.20	50.96
NW & NE	Av.Diss = 58.95					
	NW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.58	1.41	9.73	1.66	16.51	16.51
Mactridae (LPIL)	1.27	1.12	7.16	1.14	12.14	28.65
Hobsonia florida	0.67	0.84	7.09	0.88	12.03	40.68
Macoma mitchelli	0.28	0.77	5.22	1.06	8.85	49.54
Tanypodinae (LPIL)	1.27	0.64	4.69	1.25	7.96	57.50
SW & NE	Av.Diss = 62.59					
	SW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.16	1.41	9.98	1.51	15.95	15.95
Streblospio (LPIL)	1.61	0.00	8.80	2.70	14.06	30.01
Hobsonia florida	1.22	0.84	7.12	1.10	11.38	41.39
Mactridae (LPIL)	1.43	1.12	5.83	1.38	9.31	50.70
NW & SE	Av.Diss = 88.70					
	NW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilidae	0.00	1.78	16.26	1.52	18.33	18.33
Mediomastus ambiseta	1.58	0.57	13.98	2.20	15.76	34.08
Mactridae (LPIL)	1.27	0.00	12.35	1.33	13.92	48.00
Tanypodinae (LPIL)	1.27	0.00	12.05	3.29	13.59	61.59
SW & SE	Av.Diss = 82.72					
	SW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.16	0.57	14.74	1.83	17.82	17.82
Mytilidae	0.00	1.78	13.18	1.39	15.94	33.76
Mactridae (LPIL)	1.43	0.00	9.91	1.72	11.98	45.74
Streblospio (LPIL)	1.61	0.61	8.46	1.82	10.23	55.97
NE & SE	Av.Diss = 91.76					
	NE	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilidae	0.00	1.78	19.78	1.46	21.56	21.56
Mediomastus ambiseta	1.41	0.57	13.19	1.24	14.37	35.93
Mactridae (LPIL)	1.12	0.00	10.37	1.62	11.30	47.24
Tanypodinae (LPIL)	0.64	0.00	8.96	1.01	9.76	57.00

Appendix Table 11. SIMPER Results for August 2008 (Cont.)

NW & RIG	Av.Diss = 68.61					
	NW	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	1.27	3.71	7.65	2.52	11.16	11.16
Streblospio (LPIL)	0.28	2.50	7.12	1.63	10.38	21.54
Mediomastus ambiseta	1.58	3.55	6.45	1.88	9.40	30.94
Parandalia americana	0.28	2.14	6.20	2.36	9.04	39.98
Tubificoides (LPIL)	0.00	1.63	5.11	1.79	7.45	47.43
Macoma mitchelli	0.28	1.39	4.29	1.06	6.25	53.68
SW & RIG	Av.Diss = 62.49					
	SW	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	1.43	3.71	6.74	1.96	10.78	10.78
Parandalia americana	0.00	2.14	6.36	2.91	10.18	20.96
Streblospio (LPIL)	1.61	2.50	5.20	1.93	8.31	29.28
Tubificoides (LPIL)	0.00	1.63	4.64	1.74	7.43	36.71
Mediomastus ambiseta	2.16	3.55	4.56	1.85	7.30	44.01
Cerapus benthophilus	0.00	1.45	3.59	0.99	5.75	49.76
Hobsonia florida	1.22	1.13	3.59	1.35	5.75	55.50
NE & RIG	Av.Diss = 74.94					
	NE	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	1.12	3.71	8.94	2.17	11.93	11.93
Mediomastus ambiseta	1.41	3.55	8.43	1.71	11.25	23.19
Streblospio (LPIL)	0.00	2.50	7.87	1.62	10.50	33.69
Parandalia americana	0.00	2.14	7.40	2.84	9.87	43.56
Tubificoides (LPIL)	0.00	1.63	5.36	1.72	7.16	50.72
SE & RIG	Av.Diss = 89.61					
	SE	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	0.00	3.71	13.55	4.86	15.12	15.12
Mediomastus ambiseta	0.57	3.55	11.05	2.20	12.33	27.45
Parandalia americana	0.00	2.14	8.05	2.95	8.98	36.44
Streblospio (LPIL)	0.61	2.50	7.54	1.54	8.41	44.85
Mytilidae	1.78	0.07	6.40	1.31	7.15	52.00
NW & SE B	Av.Diss = 77.19					
	NW	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilopsis leucophaeta	0.00	2.06	13.87	2.48	17.97	17.97
Streblospio (LPIL)	0.28	1.89	11.47	1.85	14.86	32.84
Mactridae (LPIL)	1.27	0.00	8.96	1.44	11.61	44.45
Tanypodinae (LPIL)	1.27	0.00	8.84	3.99	11.45	55.91

Appendix Table 11. SIMPER Results for August 2008 (Cont.)

SW & SE B	Av.Diss = 63.36					
	SW	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilopsis leucophaeta	1.01	2.06	12.35	2.49	19.49	19.49
Mactridae (LPIL)	1.43	0.00	7.67	1.78	12.11	31.60
Mediomastus ambiseta	2.16	1.44	6.21	1.34	9.80	41.40
Streblospio (LPIL)	1.61	1.89	5.90	1.58	9.31	50.71
NE & SE B	Av.Diss = 82.40					
	NE	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilopsis leucophaeta	0.36	2.06	14.65	1.73	17.78	17.78
Streblospio (LPIL)	0.00	1.89	14.48	2.23	17.58	35.36
Mediomastus ambiseta	1.41	1.44	10.31	1.58	12.51	47.86
Mactridae (LPIL)	1.12	0.00	7.45	1.67	9.04	56.90
SE & SE B	Av.Diss = 77.25					
	SE	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mytilopsis leucophaeta	0.00	2.06	18.68	2.41	24.18	24.18
Mytilidae	1.78	0.12	15.14	1.38	19.60	43.78
Streblospio (LPIL)	0.61	1.89	14.00	1.53	18.13	61.90
RIG & SE B	Av.Diss = 77.30					
	Rigolets	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	3.71	0.00	11.87	5.45	15.35	15.35
Parandalia americana	2.14	0.00	7.03	3.16	9.09	24.44
Mediomastus ambiseta	3.55	1.44	6.94	1.84	8.98	33.42
Mytilopsis leucophaeta	0.07	2.06	6.53	2.06	8.45	41.87
Tubificoides (LPIL)	1.63	0.00	5.11	1.80	6.61	48.48
Streblospio (LPIL)	2.50	1.89	4.91	1.52	6.35	54.82
NW & BC	Av.Diss = 59.09					
	NW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Hobsonia florida	0.67	3.22	9.42	1.72	15.94	15.94
Texadina sphinctosoma	0.50	2.87	8.97	1.86	15.18	31.13
Mactridae (LPIL)	1.27	3.42	7.37	1.90	12.48	43.60
Mytilopsis leucophaeta	0.00	1.98	6.50	1.75	10.99	54.59
SW & BC	Av.Diss = 53.54					
	SW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Hobsonia florida	1.22	3.22	8.12	1.47	15.16	15.16
Texadina sphinctosoma	0.72	2.87	7.40	1.60	13.82	28.98
Mactridae (LPIL)	1.43	3.42	6.61	1.75	12.35	41.33
Mytilopsis leucophaeta	1.01	1.98	6.52	1.77	12.18	53.51

Appendix Table 11. SIMPER Results for August 2008 (Cont.)

NE & BC	Av.Diss = 71.80					
	NE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Texadina sphinctosoma	0.14	2.87	10.96	2.23	15.26	15.26
Hobsonia florida	0.84	3.22	10.11	1.46	14.09	29.35
Mactridae (LPIL)	1.12	3.42	8.98	1.87	12.51	41.85
Streblospio (LPIL)	0.00	1.74	6.69	2.60	9.32	51.17
SE & BC	Av.Diss = 79.41					
	SE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	0.00	3.42	14.26	3.97	17.95	17.95
Hobsonia florida	0.00	3.22	11.52	1.72	14.51	32.46
Texadina sphinctosoma	0.77	2.87	9.33	1.77	11.75	44.21
Mediomastus ambiseta	0.57	2.40	8.97	2.29	11.30	55.51
RIG & BC	Av.Diss = 57.46					
	Rigolets	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Hobsonia florida	1.13	3.22	5.60	1.66	9.74	9.74
Texadina sphinctosoma	0.79	2.87	5.00	1.61	8.70	18.44
Parandalia americana	2.14	0.12	4.67	2.77	8.12	26.56
Mytilopsis leucophaeta	0.07	1.98	4.14	1.70	7.20	33.76
Tubificoides (LPIL)	1.63	0.00	3.66	1.75	6.37	40.13
Streblospio (LPIL)	2.50	1.74	3.58	1.66	6.23	46.36
Mediomastus ambiseta	3.55	2.40	3.44	1.58	5.99	52.35
SE B & BC	Av.Diss = 61.04					
	SE B	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mactridae (LPIL)	0.00	3.42	12.18	4.48	19.96	19.96
Hobsonia florida	0.00	3.22	10.15	1.71	16.63	36.59
Texadina sphinctosoma	1.04	2.87	7.52	1.55	12.33	48.92
Mytilopsis leucophaeta	2.06	1.98	4.74	1.09	7.77	56.69

Appendix Table 12. SIMPER Results for October 2008

NW	Av.Sim = 68.19				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.54	32.23	2.54	47.27	47.27
Streblospio (LPIL)	0.77	19.11	5.26	28.02	75.28
SW	Av.Sim = 61.82				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.61	59.44	2.61	96.15	96.15
NE	Av.Sim = 41.16				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	1.43	11.67	0.97	28.36	28.36
Nemertea (Large)	1.27	10.56	3.45	25.66	54.02
Mediomastus ambiseta	1.66	10.51	3.15	25.53	79.55
SE	Av.Sim = 33.87				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.24	16.77	0.92	49.51	49.51
Nemertea (Large)	0.77	13.04	1.09	38.50	88.01
SE B	Av.Sim = 30.55				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.22	25.80	2.28	84.44	84.44
BC	Av.Sim = 53.01				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.17	28.48	1.32	53.73	53.73
Streblospio (LPIL)	1.18	21.20	3.14	40.00	93.73
RIG	Av.Sim = 55.04				
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mediomastus ambiseta	2.76	11.36	2.24	20.64	20.64
Streblospio (LPIL)	2.46	9.93	2.70	18.05	38.68
Nemertea (Large)	1.86	8.14	2.96	14.79	53.47
Parandalia americana	2.00	7.96	1.40	14.46	67.92
Nemertea (Striped)	1.09	2.90	0.90	5.26	73.18
Ameroculodes miltoni	0.98	2.66	1.14	4.84	78.02

Appendix Table 12. SIMPER Results for October 2008 (Cont.)

NW & SW	Av. Diss = 47.60					
	NW	SW				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	0.77	0.00	12.65	4.35	26.58	26.58
Nemertea (Large)	0.88	0.42	11.50	1.37	24.17	50.75
NW & NE	Av. Diss = 57.97					
	NW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	0.42	1.43	10.76	1.33	18.56	18.56
Streblospio (LPIL)	0.77	1.29	9.40	3.72	16.22	34.78
Mediomastus ambiseta	1.54	1.66	8.01	1.54	13.82	48.60
Paraprionospio pinnata	0.00	0.53	5.65	0.61	9.75	58.34
SW & NE	Av. Diss = 72.46					
	SW	NE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	0.00	1.43	15.30	1.53	21.11	21.11
Streblospio (LPIL)	0.00	1.29	9.73	1.10	13.43	34.53
Mediomastus ambiseta	1.61	1.66	9.11	1.94	12.57	47.10
Nemertea (Large)	0.42	1.27	8.44	1.86	11.65	58.75
NW & SE	Av. Diss = 50.72					
	NW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.54	1.24	14.04	1.58	27.67	27.67
Streblospio (LPIL)	0.77	0.50	10.04	1.90	19.81	47.48
Nemertea (Large)	0.88	0.77	8.38	1.23	16.53	64.01
SW & SE	Av. Diss = 59.94					
	SW	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.61	1.24	17.22	2.35	28.72	28.72
Nemertea (Large)	0.42	0.77	11.32	1.32	18.88	47.60
Streblospio (LPIL)	0.00	0.50	7.59	0.67	12.67	60.27
NE & SE	Av. Diss = 65.21					
	NE	SE				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	1.43	0.14	12.85	1.48	19.70	19.70
Mediomastus ambiseta	1.66	1.24	9.37	1.32	14.37	34.07
Streblospio (LPIL)	1.29	0.50	9.36	1.19	14.35	48.43
Paraprionospio pinnata	0.53	0.14	6.00	0.67	9.20	57.62

Appendix Table 12. SIMPER Results for October 2008 (Cont.)

NW & RIG	Av. Diss = 71.31					
	NW	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Parandalia americana	0.00	2.00	9.29	1.72	13.02	13.02
Streblospio (LPIL)	0.77	2.46	7.28	2.01	10.22	23.24
Mediomastus ambiseta	1.54	2.76	6.36	1.54	8.91	32.15
Nemertea (Large)	0.88	1.86	4.87	1.61	6.83	38.98
Nemertea (Striped)	0.00	1.09	4.38	1.43	6.15	45.13
Ameroculodes miltoni	0.00	0.98	4.16	1.35	5.84	50.97
SW & RIG	Av. Diss = 80.23					
	SW	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	0.00	2.46	11.36	3.22	14.16	14.16
Parandalia americana	0.00	2.00	9.85	1.69	12.28	26.44
Nemertea (Large)	0.42	1.86	7.05	2.13	8.79	35.23
Mediomastus ambiseta	1.61	2.76	6.20	1.55	7.73	42.96
Nemertea (Striped)	0.00	1.09	4.60	1.44	5.74	48.70
Ameroculodes miltoni	0.00	0.98	4.39	1.35	5.47	54.17
NE & RIG	Av. Diss = 65.36					
	NE	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Parandalia americana	0.28	2.00	6.87	1.58	10.52	10.52
Mediomastus ambiseta	1.66	2.76	6.10	1.39	9.34	19.86
Streblospio (LPIL)	1.29	2.46	5.76	1.27	8.81	28.67
Tanypodinae (LPIL)	1.43	0.14	5.31	1.43	8.13	36.80
Nemertea (Striped)	0.57	1.09	4.15	1.47	6.34	43.15
Ameroculodes miltoni	0.00	0.98	3.46	1.31	5.29	48.44
Tubificoides (LPIL)	0.00	0.99	3.31	1.19	5.07	53.51
SE & RIG	Av. Diss = 74.73					
	SE	Rigolets				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	0.50	2.46	9.04	2.09	12.09	12.09
Mediomastus ambiseta	1.24	2.76	8.18	1.59	10.95	23.04
Parandalia americana	0.36	2.00	8.15	1.66	10.91	33.96
Nemertea (Large)	0.77	1.86	5.11	1.83	6.84	40.80
Nemertea (Striped)	0.00	1.09	4.44	1.44	5.94	46.74
Ameroculodes miltoni	0.00	0.98	4.22	1.36	5.65	52.38
NW & SE B	Av. Diss = 59.20					
	NW	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.54	1.22	11.30	1.14	19.09	19.09
Streblospio (LPIL)	0.77	0.22	10.80	2.05	18.25	37.33
Nemertea (Large)	0.88	0.28	10.18	1.23	17.19	54.52

Appendix Table 12. SIMPER Results for October 2008 (Cont.)

SW & SE B	Av. Diss = 56.63					
	SW	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.61	1.22	14.35	1.26	25.34	25.34
Polydora cornuta	0.28	0.42	9.58	0.65	16.92	42.26
Nemertea (Large)	0.42	0.28	8.18	0.89	14.45	56.71
NE & SE B	Av. Diss = 70.13					
	NE	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Tanypodinae (LPIL)	1.43	0.14	13.47	1.36	19.20	19.20
Streblospio (LPIL)	1.29	0.22	9.30	1.16	13.26	32.46
Nemertea (Large)	1.27	0.28	7.99	1.74	11.39	43.85
Mediomastus ambiseta	1.66	1.22	7.36	1.21	10.49	54.34
SE & SE B	Av. Diss = 63.04					
	SE	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.24	1.22	14.02	1.14	22.24	22.24
Nemertea (Large)	0.77	0.28	9.88	1.13	15.67	37.91
Parandalia americana	0.36	0.50	9.26	0.96	14.68	52.59
RIG & SE B	Av. Diss = 78.33					
	Rigolets	SE B				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	2.46	0.22	10.15	2.50	12.96	12.96
Parandalia americana	2.00	0.50	7.95	1.42	10.15	23.11
Mediomastus ambiseta	2.76	1.22	7.71	1.53	9.84	32.95
Nemertea (Large)	1.86	0.28	7.28	2.47	9.30	42.25
Nemertea (Striped)	1.09	0.00	4.46	1.43	5.70	47.94
Ameroculodes miltoni	0.98	0.00	4.25	1.35	5.42	53.36
NW & BC	Av. Diss = 43.61					
	NW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.54	2.17	15.07	1.32	34.55	34.55
Nemertea (Large)	0.88	0.23	9.30	1.26	21.32	55.87
SW & BC	Av. Diss = 61.34					
	SW	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Streblospio (LPIL)	0.00	1.18	17.46	2.92	28.46	28.46
Mediomastus ambiseta	1.61	2.17	17.10	1.19	27.88	56.34

Appendix Table 12. SIMPER Results for October 2008 (Cont.)

NE & BC	Av. Diss = 65.18					
	NE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.66	2.17	11.84	1.62	18.16	18.16
Tanypodinae (LPIL)	1.43	0.48	10.70	1.27	16.42	34.58
Streblospio (LPIL)	1.29	1.18	9.11	1.86	13.97	48.55
Nemertea (Large)	1.27	0.23	7.86	1.89	12.05	60.61
SE & BC	Av. Diss = 62.30					
	SE	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.24	2.17	18.86	1.48	30.27	30.27
Streblospio (LPIL)	0.50	1.18	12.52	1.74	20.10	50.37
RIG & BC	Av. Diss = 70.28					
	Rigolets	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Parandalia americana	2.00	0.12	8.65	1.63	12.31	12.31
Nemertea (Large)	1.86	0.23	7.18	2.48	10.22	22.52
Mediomastus ambiseta	2.76	2.17	5.95	1.14	8.46	30.98
Streblospio (LPIL)	2.46	1.18	5.90	1.78	8.40	39.38
Nemertea (Striped)	1.09	0.00	4.26	1.42	6.06	45.44
Tubificoides (LPIL)	0.99	0.00	3.83	1.22	5.46	50.90
SE B & BC	Av. Diss = 67.96					
	SE B	BC				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mediomastus ambiseta	1.22	2.17	18.76	1.52	27.61	27.61
Streblospio (LPIL)	0.22	1.18	14.66	1.67	21.58	49.19
Parandalia americana	0.50	0.12	6.24	0.74	9.18	58.37

Appendix Table 13. Lake Pontchartrain Basin Foundation Salinity Data for the period March 2008 to October 2008.*

	Station				
Date	**1**	**2**	**3**	**4**	**10**
3/4/08	6.1	5.1	5.6	5.0	
3/11/08	5.9	5.4	5.4	5.4	3.8
3/18/08					
3/25/08	5.2	5.0	5.0	5.0	4.8
4/1/08	5.2	4.9	4.9	4.8	3.1
4/8/08	4.7	4.4	4.5	4.4	4.1
4/15/08	0.2	1.9	3.5	3.9	3.7
4/22/08	2.0	3.9	4.5	4.5	4.5
4/29/08	0.2	0.3	0.4	0.5	4.3
5/6/08	0.4	0.8	1.0	1.1	2.6
5/13/08	0.7	0.6	0.9	0.9	2.6
5/20/08	0.8	1.4	1.2	1.1	1.4
5/27/08	1.3	1.5	1.7	1.7	1.6
6/3/08	1.8	2.7	2.4	2.7	1.7
6/17/08	2.6	2.5	2.3	3.0	1.8
6/24/08					2.1
7/1/08	2.6	3.1	3.0	3.0	2.4
7/8/08	3.3	3.3	3.0	3.0	3.2
7/15/08	3.0	2.9	2.8	2.7	2.0
7/22/08	3.0	3.1	3.0	2.9	7.6
7/29/08	2.9	3.1	3.4	3.4	4.7
8/4/08	3.7	4.1	4.3	4.3	8.0
8/12/08	4.1	5.2	3.9	3.8	4.4
8/19/08	4.2	4.0	4.0	3.9	6.4
8/26/08	3.1	4.1	4.8	4.8	3.1
9/9/08	5.8	5.3	5.7	6.0	7.3
9/16/08	5.4	6.8	7.1	7.3	11.0
9/23/08	6.3	6.6	6.7	7.1	8.6
10/7/08	7.4	7.5	7.4	7.4	7.8
10/14/08	7.1	7.1	8.8	8.9	8.2
10/21/08	7.1	7.1	8.1	8.0	7.0
10/28/08	5.1	6.0	5.9	6.2	7.8

*Data courtesy of the Lake Ponchartrain Basin Foundation (POC-Andrea Bourgeois-Calvin). Only data for stations on southern shoreline shown.