BENTHIC INVERTEBRATE SPECIES RICHNESS & DIVERSITY AT DIFFERENT HABITATS IN THE GREATER CHARLOTTE HARBOR SYSTEM

Charlotte Harbor National Estuary Program
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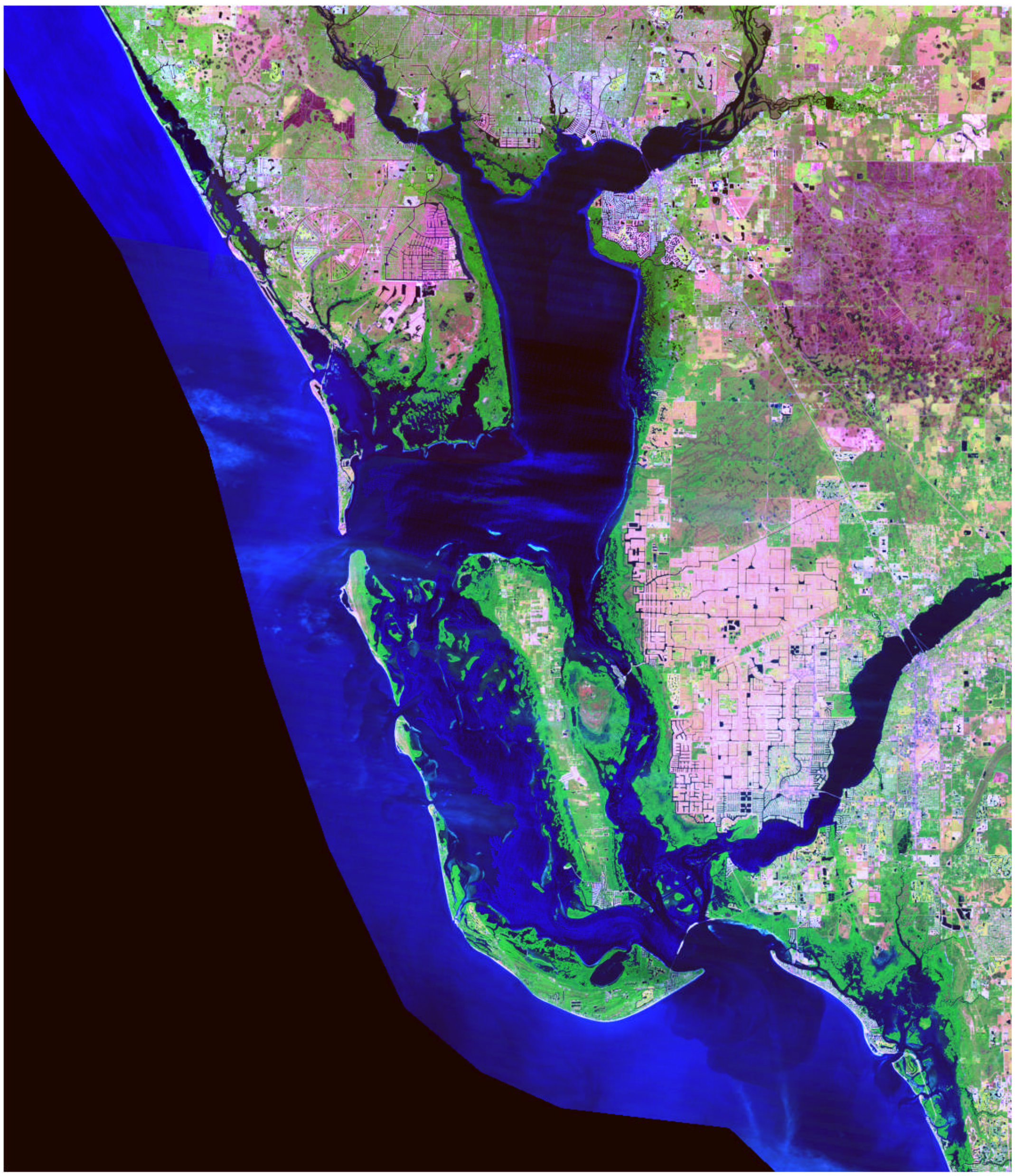

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The Charlotte Harbor National Estuary Program is a partnership of citizens, elected officials, resource managers and commercial and recreational resource users working to improve the water quality and ecological integrity of the greater Charlotte Harbor watershed. A cooperative decision-making process is used within the program to address diverse resource management concerns in the 4,400 square mile study area. Many of these partners also financially support the Program, which, in turn, affords the Program opportunities to fund projects such as this. The entities that have financially supported the program include the following:

U.S. Environmental Protection Agency
Southwest Florida Water Management District
South Florida Water Management District
Florida Department of Environmental Protection
Florida Coastal Zone Management Program
Peace River/Manasota Regional Water Supply Authority
Polk, Sarasota, Manatee, Lee, Charlotte, DeSoto and Hardee Counties
Cities of Sanibel, Cape Coral, Fort Myers, Punta Gorda, North Port, Venice and Fort Myers Beach
and the Southwest Florida Regional Planning Council.

ACKNOWLEDGMENTS

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Comments and suggestions from the of the Charlotte Harbor National Estuary Program Technical Advisory Committee members was helpful in formulating the sampling strategy. The author is especially grateful to the staff of the CHNEP, Dr. Lisa Beaver and Catherine Corbett for their patience and assistance with the final report documents including GIS mapping products.

The bay scallop *Argopecten irradians*, highly prized as a delectable seafood item nearly disappeared from the west coast as a result of pollution, habitat alteration and over harvesting.

Not everything that can be counted counts and not everything that counts can be counted.
--Albert Einstein

Here the rain is everything.
--Marjory S. Douglas

Description of Products

The results of this project are contained on a single compact disk (CD). The report document is presented as an Adobe PDF file titled *Charlotte Harbor Benthic Biodiversity Report* and is approximately 14 megabytes in size. A supplement to the report which illustrates some of the common benthic macroinfauna is also presented in PDF and is titled *Common Macrobenthic Invertebrates of Charlotte Harbor* (~42 mb). Both of these documents have hyperlinks to internet sources of additional information.

In addition to the report there are four file folders contained on the CD labeled, Data, Images, Maps and SHP files.

Data folder	Contains the raw data from this study as well as species lists from additional benthic studies conducted in the Myakka and Peace Rivers and invertebrate data for Mullock and Hendry Creeks that were provided by Ford Walton of the Florida Department of Environmental Protection. Data are formatted in a Microsoft Excel workbook and in Access. Slightly more information is contained in the Excel file as well as graphics.
Images folder	This file contains 12 folders of images including aerial images, some sample photographs of invertebrates, and pictures of habitats and field sampling efforts.
Maps folder	This folder contains individual images of maps, most of which were presented in the report.
SHP folder	This folder contains Geographic Information System (GIS) files necessary to reconstruct most of the mapping products presented in the report.

Within the database files there are several tables with a field labeled as NODC. The NODC Code is a phylogenetic numbering system developed by the National Oceanographic Data Center (NODC).http://www.nodc.noaa.gov. A detailed explanation of the code can be found at http://www.nodc.noaa.gov/General/CDR-detdesc/taxonomic-v8.html. In 1996, NODC released the final version (#8) of the NODC Taxonomic Code on CD-ROM. This CD-ROM, now out of date, provided the old NODC codes along with their new ITIS Taxonomic Serial Numbers to facilitate the transition to a new Integrated Taxonomic Information System (ITIS). From that point in time the NODC code was frozen, and ITIS assumed responsibility for assigning new TSN codes, and verifying accepted scientific names and synonyms. We have found the code to remain versatile for certain computer applications related to the sorting and analysis of species abundance data.

Any use of information of images presented in this document should be cited appropriately.

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EXECUTIVE SUMMARY

Since the time of discovery by Ponce de Leon in 1513, Europeans learned what the Native Americans had known for centuries that Charlotte Harbor was biologically diverse with abundant fisheries resources. Despite significant coastal development the condition of the bay remained good enough that in 1995, Governor Lawton Chiles nominated Charlotte Harbor as an "*estuary of national significanc*e." As a result of this nomination, Charlotte Harbor was accepted into the National Estuary Program, one of only 27 other watersheds in the United States.

The Charlotte Harbor National Estuary Program (NEP) encompasses a watershed area of 4,400 square miles and includes all or part of 8 counties. The productivity of the Harbor is a result of the abundant and diverse wetland habitats, such as mangroves and marshes, expansive shallows which harbor numerous seagrasses and intertidal flats and the freshwater nutrient inputs of three river systems. A common and critical biological element that spans all wetland habitats is the benthic invertebrate fauna that inhabit the soils of these habitats.

This project consisted of a Harbor-wide dry season synoptic survey of the benthic fauna inhabiting the principal estuarine habitats within the NEP boundaries. It is the first synoptic sampling of the benthos of multiple habitats in this region. The benthic macrofaunal community consists as a subtly changing gradient of species across the extent of the benthos. Benthic fauna are present everywhere there is water, unless there is something terribly wrong with the quality of the water or the sediment.

Benthic communities are comprised of a multitude of plants and animals including; seagrasses, algae, fishes, worms, shrimp, crabs, mollusks, and many other organisms. The majority of the fauna of benthic communities consist of a group collectively referred to as invertebrates. Invertebrates are defined as animals without backbones, or animals that are not vertebrates. Collectively they represent the majority of animal life on earth, although they represent many different animal phyla. They play a fundamental role in the transfer of energy through the food chain and are the mechanism of recycling the organic debris that settles to the bottom of any water body.

Within the Charlotte Harbor NEP defined system there are 10 basins or zones that are delineated based on bay boundary topography. The 10 areas consist of;

- Coastal Venice, including Lyons, Dona and Roberts Bays;
- Lemon Bay and tidal tributaries;
- Charlotte Harbor "proper";
- Tidal Myakka River;
- Tidal Peace River
- Tidal Caloosahatchee River;
- Pine Island Sound;
- Matlacha Pass;

- San Carlos Bay and
- Estero Bay and tidal tributaries.

The principal natural benthic habitats within each of the ten drainage basins were sampled for this project and consisted of:

- Mangroves,
- Intertidal sand bar – often exposed at low tide,
- Submerged (subtidal) sand bar – rarely or never exposed at low tide,
- Intertidal mud flats – often exposed at low tide,
- Submerged (subtidal) mud flats – rarely or never exposed at low tide,
- Saltwater marsh,
- Oyster and
- Submerged aquatic vegetation habitats, (SAV) seagrass in this survey

From this sampling effort a total of 65 basin-habitat combinations were sampled across the Charlotte Harbor study area with a total of 195 core samples and 195 sweep net samples. The analysis of these samples resulted in distinguishing 370 invertebrate taxa from more than 44,000 organisms. The results provided a good random representation of the organisms comprising the benthic community for these habitats. This may seem like a large number of species and organisms, however, the benthic community is dynamic and a long term intensive sampling program would likely increase the species list to several thousand species.

Of the 370 taxonomic designations eight accounted for slightly more than 50% of the 44,000 organisms that were collected and 90% of the fauna were represented by only 61 taxa (16% of the total taxa). The top 5 most numerically abundant species from each habitat and basin accounted for slightly more than 79% of the total individuals collected. These species are the dominant organisms of the benthos in the NEP study area.

Species dominance is not uncommon in benthic habitats although the composition of the dominant species also changes spatially and on a temporal basis. The dynamic range of the composition of benthic communities is likely a critical component of ecosystem stability analagous to the role of insects in terrestrial ecosystems.

The number of species collected from a site ranged from 7 at the Estero Bay marsh habitat to 79 at the San Carlos Bay subtidal sand site. The average number of species recovered from a site was 28 and the median was 24 species.

Salinity plays a clear role on the species richness of an area. Basins that exhibited the highest salinity values included Coastal Venice, Lemon Bay, Pine Island Sound, San Carlos Bay and Estero Bay, and these basins exhibited the greatest overall numbers of species. The basins with the lowest salinity, Myakka, Peace and Caloosahatchee Rivers illustrated the fewest number of taxa.

The greatest number of species was collected from the subtidal mud and sand habitats, which averaged 39 and 38 species respectively, followed by SAV habitat, oyster habitat, mangroves, intertidal mud, intertidal sand and salt marsh. For 5 of the eight basins intertidal mud exhibited a greater number of species than intertidal sand. For two basins the intertidal sand had a greater species count and for Matlacha Pass no suitable intertidal mud habitat could be located. For the eight basins there was an even split for the habitat, mud versus sand, exhibiting the most species.

For habitats with vegetation, and oysters the number of taxa collected ranged from 7 to 59 taxa. Seagrass habitat exhibited the greatest number of species followed by oyster habitat, mangroves and salt marsh. The salt marshes in this region are often seasonally and tidally "dry" resulting in a depauperate benthic fauna.

The most diverse basin was Lemon Bay which from which 160 invertebrate taxa were recovered from all habitats combined. The most productive basin in terms of organism abundance was San Carlos Bay which exhibited an overall abundance of 130,000 organisms/m^2, compared to a range of 16,623 to 72,292 organisms/m^2 for all of the other basins.

The number of individuals collected from a sample within a habitat ranged from 9 to 8,365 specimens (Estero Bay marsh and San Carlos Bay subtidal sand) with a mean of 578 individuals per sample and a median of 288 individuals per sample. Converted to numbers per square meter the number of organisms ranged from 722 to 670,918 with a median value of 23,059/m^2.

The number of species and their abundance illustrates the tremendous variance in numbers of organisms that is commonly exhibited within benthic habitats. The benthos is a very productive habitat. From a human perspective consider a person that is wading into the subtidal zone will have on average about 588 benthic organisms under each foot.

Representative sediment samples from each site were analyzed and illustrated that the basic soil component consists of fine to coarse quartz sand with widely varying subcomponents of shell fragments, silt, clay and organic material. The mix of these elements is determined by physical forces and in some cases the modifing influences of the biological components such as oysters, mangroves, marshes, and submerged aquatic vegetation.

The results of the project illustrate that in general the upper estuary, lower salinity regions; exhibit the greatest abundance of organisms, but have a lower overall species diversity. This relationship is a paradigm of estuarine ecology. Freshwater brings nutrients and organic matter into the sea via the mixing zone known as the estuary. Within the estuary the high nutrient levels allow for abundant primary production. The invertebrates that are adapted to the lower and fluctuating salinities of the estuary can exploit the primary production and may become extremely abundant. However, only a small portion of the diversity of species within the oceans can tolerate the conditions of the estuary and therefore the diversity of invertebrates within the upper estuary is lower than that of the more saline waters of the lower estuary.

The relevance of the benthos to humans is that these organisms are the principal agents of energy transfer from primary production to fisheries. Because the benthos is very diverse it offers a plasticity of response to changing conditions in the estuary. Fishes feed on a multitude of benthic inhabitants perhaps most notably on the microcrustaceans. The crustaceans are able to exploit the phytoplankton and benthic algae and diatoms which enable rapid growth and reproduction. They also frequently swarm off the bottom at night to be carried by tides where they settle on the most favorable habitat as controlled by salinity and substrate. Juvenile fishes in turn follow the food and seek out shelter in the seagrass, mangroves and marsh edges.

Benthic communities are sensitive to changes in the conditions of the water quality or sediment. For this reason the benthos is often use as an environmental indicator for determination of the impacts of pollutants, hydrologic alterations and sediment disturbance. Only in very severely polluted or otherwise disturbed areas are benthic communities absent.

The body of this report porvides a great deal of information describing relevance of the Charlotte Harbor Benthic habitats and the composition of the fauna. This project was conducted during the dry season and species composition will be considerably different in some areas during the wet season. However, the fundamental forces that determine diversity and abundance remain the same.

PREFACE

"So what good are they?" The first time I heard these words was at an open house at Mote Marine Laboratory. The Benthic Ecology Program's display of benthic invertebrates illustrated a variety of forms in aquarium tanks, under microscopes and in a short video loop. The display elicited a variety of responses such as "eew", "neat', "gross", "wow" and now "what good are they? The man who had asked the question was perhaps in his early thirty's and was touring our facility with his wife and two children. I was somewhat taken aback by the question and I did not have a well prepared answer that would be easily understood by the general public. A scientific discussion about the importance of invertebrates is laced with jargon and Latin names, used in this particular field of biology. I muddled through a less than brilliant explanation that seemed to adequately answer the question to his satisfaction, but I wondered if I had actually made an impression.

For many people when they ask 'what good are they", the part of the question that has been left out is "..to me", meaning "what good are these odd and mostly tiny creatures to my well being, why should I care or even be aware of them?" One of the simplest answers is that invertebrates are important because some species are used as human food, such as shrimp, crabs, clams, mussels, and squid. I consider this response to be a gross understatement although it suffices to answer the question of importance in a brief non-technical manner. The true value of invertebrates cannot be measured only as a food source for humans. In terms of global ecology the invertebrates are critically important for the maintenance of the current status of life on earth. Invertebrates serve as the principal link between primary production and all other animal life. For instance oysters are efficient filter feeders that remove phytoplankton from seawater. Oysters in turn are eaten by other animals such as birds, humans, raccoons, oyster drills (a type of snail) and humans. Invertebrates also serve a principal link between organic decomposition (the breakdown of plant and animal remains after they die) and the food chain, effectively recycling the organic material to be available to other plants and animals.

The invertebrates (animals without backbones) are a disparate group representing most of the major animal classifications known as Phyla. At present there are approximately 30 recognized animal Phyla containing approximately 1,250,000 species of which 1,190,200 are invertebrate species and 58,808 are vertebrate species. Many invertebrate species are yet to be discovered while nearly all vertebrate species have been well described by science. The invertebrates comprise approximately 97% of all multicellular animal life and include all animals except vertebrates (fish, reptiles, amphibians, birds and mammals). In common terms invertebrates include animals with commonly recognizable common names such as insects, spiders, worms, snails, clams, mussels, shrimp, crabs, corals, jellyfish, seastars, and animals with less recognizable common names such as copepods, nematodes, moss animals and flatworms.

The species of invertebrates for which we have the most information are those that we value as a food source. Scientists study these animals to learn about their biology and habitat, often to determine the causes of cycles of abundance and decline or to determine the impacts of pollution and habitat degradation. Most invertebrates have a high rate of fecundity (ability to reproduce in high numbers over a relatively short time span). A high rate of fecundity enables many species to recover from environmental disturbances rapidly and to colonize new habitats quickly and in high numbers.

Invertebrates are often used as reliable indicators of environmental health. For example the oyster is often considered a keystone species, meaning it has a disproportionate effect on its environment relative to its abundance. The disappearance of oysters from a region in which they were formerly abundant indicates a serious problem of habitat degradation. The composition, abundance, and diversity of invertebrates are also used to evaluate environmental impacts, of water borne pollutants, dredging activity, power plant impacts, alterations in freshwater flow and other habitat modifications. The principal threats to the diversity and well being of invertebrates are the nutrient enrichment of coastal waters, habitat degradation through physical and chemical degradation, and sea surface temperature increase (global warming).

So what can the average citizen do to promote the welfare of the invertebrates? Being informed and educated about the importance of these creatures is important. A simple understanding that maintaining the health and diversity of the simplest of creatures is important for maintaining our quality of life enables citizens to make responsible choices concerning the impacts of human development on natural systems.

The goal of this project is to provide information to the public that will enable some understanding of the complex and somewhat alien world of the invertebrates and the role they play in the ecology of the Charlotte Harbor system.

Special Note: This document has been formatted to be interactive. If you are reading this on your computer and you are logged onto the internet the hot links (color underlined font) will jump to a definition of the term that is underlined. In many cases these links will be to Wikipedia the interactive online encyclopedia, other links will move you to images, maps or graphics contained within this document. Some caution should be used when accessing Wikipedia information. Wikipedia is an evolving open source resource where the information for each topic is uploaded by "qualified" users. Articles are verified, changed and expanded by the internet community and there is no guarantee that all of the information is technically accurate and unbiased. If you are researching a particular topic the information on Wikipedia should be verified from original documented sources and peer reviewed scientific literature.

Charlotte Harbor National Estuary Program
Estuarine Benthic Habitats

I. Introduction

Benthic = from the Greek word benthos meaning bottom as bottom of the sea.

NEP Study Area

In 1995, Governor Lawton Chiles nominated Charlotte Harbor as an *"estuary of national significance."* As a result of this nomination, Charlotte Harbor was accepted into the National Estuary Program, one of only 27 other watersheds in the United States.

Charlotte Harbor is an estuarine basin of 270 square miles (699 square kilometers) located on the Florida West Coast, **Figure 1**. The Charlotte Harbor National Estuary Program (NEP) encompasses a watershed area of 4,400 square miles and includes all or part of 8 counties. A closer view of Charlotte Harbor is shown in **Figure 2**. The NEP program area encompasses seven watersheds shown in **Figure 3**. The watersheds include the Peace River basin **Figure 4,** Myakka River basin **Figure 5,** Coastal Venice basin **Figure 6,** Lemon Bay basin **Figure 7**, tidal Caloosahatchee River Basin **Figure 8,** Pine Island Sound basin **Figure 9**, and the Estero Bay basin **Figure 10.**

Figure 1. Satellite view of Florida illustrating the location of Charlotte Harbor.

At the northern limits, the Peace River basin begins in Polk County near Lakeland and travels over 100 miles and terminates in Charlotte Harbor. The Myakka River basin starts in eastern Manatee County and meanders through Sarasota County to meet the northwestern side of Charlotte Harbor. Along the coast, Charlotte Harbor NEP includes the watersheds of Venice and Lemon Bay. The southern portion of the NEP includes Pine Island Sound and Matlacha Pass, which connect Charlotte Harbor to the tidal Caloosahatchee River and to Estero Bay in Lee County.

Charlotte Harbor

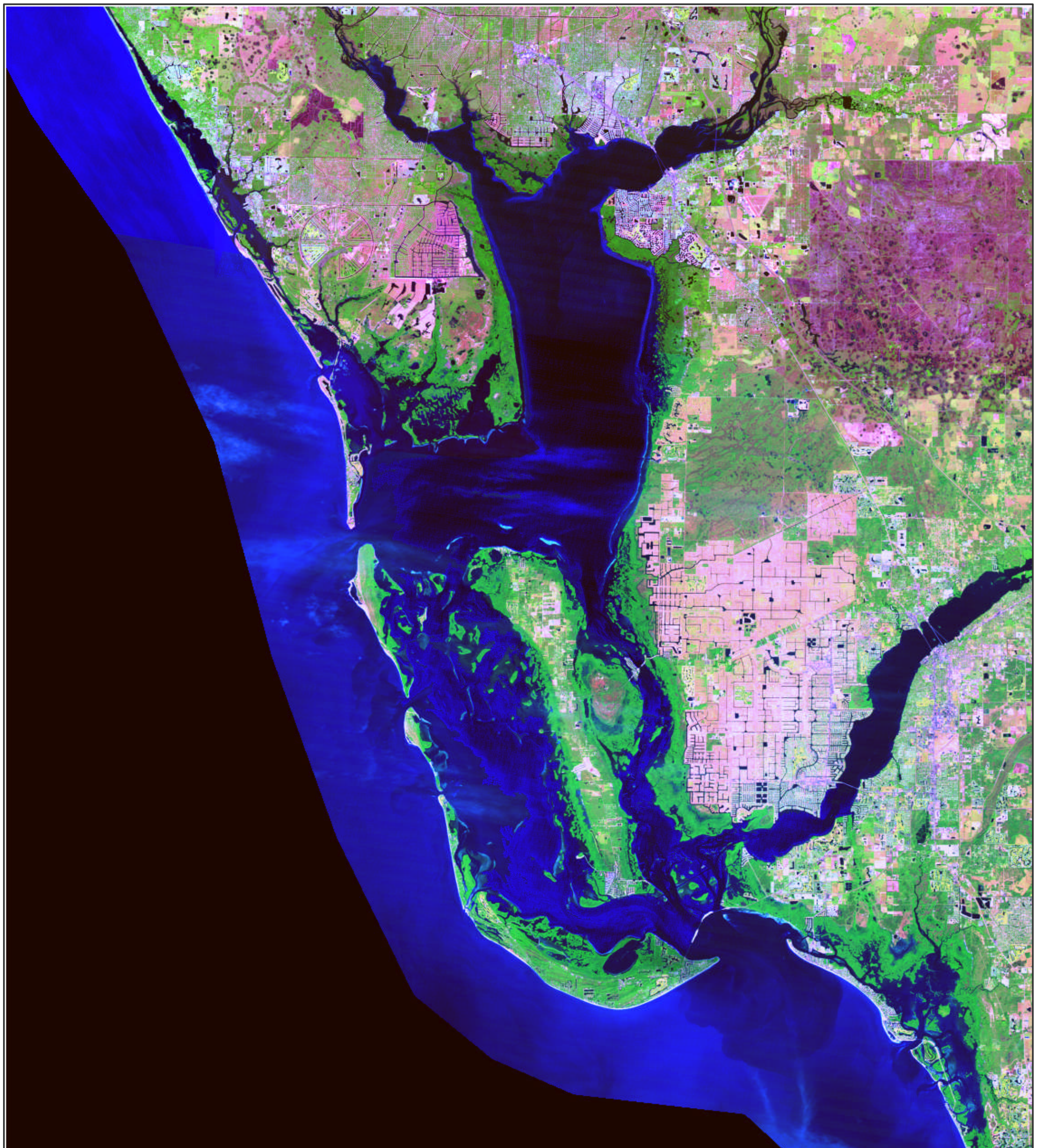


Figure 2. Satellite view of Charlotte Harbor. The lower Myakka (left) and Peace (right) Rivers are shown at the top of the image, the lower Caloosahatchee River is shown on the lower right of the image.

Most Florida estuaries exhibit relatively shallow water depths. The shallow water allows for large areas of submerged aquatic vegetation which rely on high levels of sunlight to grow. Light is the principal energy source which enables the high productivity of the estuary. This is why issues relating to control of turbidity, which limits light penetration are important concerns for a healthy estuary. The zone where submerged aquatic vegetation (SAV) is able to survive is sometimes referred to as the photic zone or more correctly the shallow photic zone since other marine plants and phytoplankton grow below the SAV zone. The shallow water depths, however, are not particularly suitable for deep draft boats. As a result dredging has been used extensively to created channels and harbors, often to the detriment of the natural landscape. Careless boating activity outside the deeper channels has resulted in extensive prop damage to seagrass beds throughout the estuary.

Boca Grande Pass at the mouth of Charlotte Harbor exhibits the deepest waters of the system scoured to a depth of over 15 meters. However, within the study area of this project the deepest portions of the Harbor are on the order of 6-7 meters and are found within the central basin of Charlotte Harbor proper. **Figure 11** illustrates the bathymetry of a large segment of the Charlotte Harbor study area.

Bathymetry plays an important role in the ecology of Charlotte Harbor. Water depth regulates a variety of physical factors such as current flows, wave attenuation, mixing, solar heating, sedimentation and sediment structure, and exposure to air during low tides. Distinct plant and animal habitats are often the result of the influence of water depth, such as intertidal (often exposed on low tides) or subtidal (never exposed at low tide) which were used as delineators for this project.

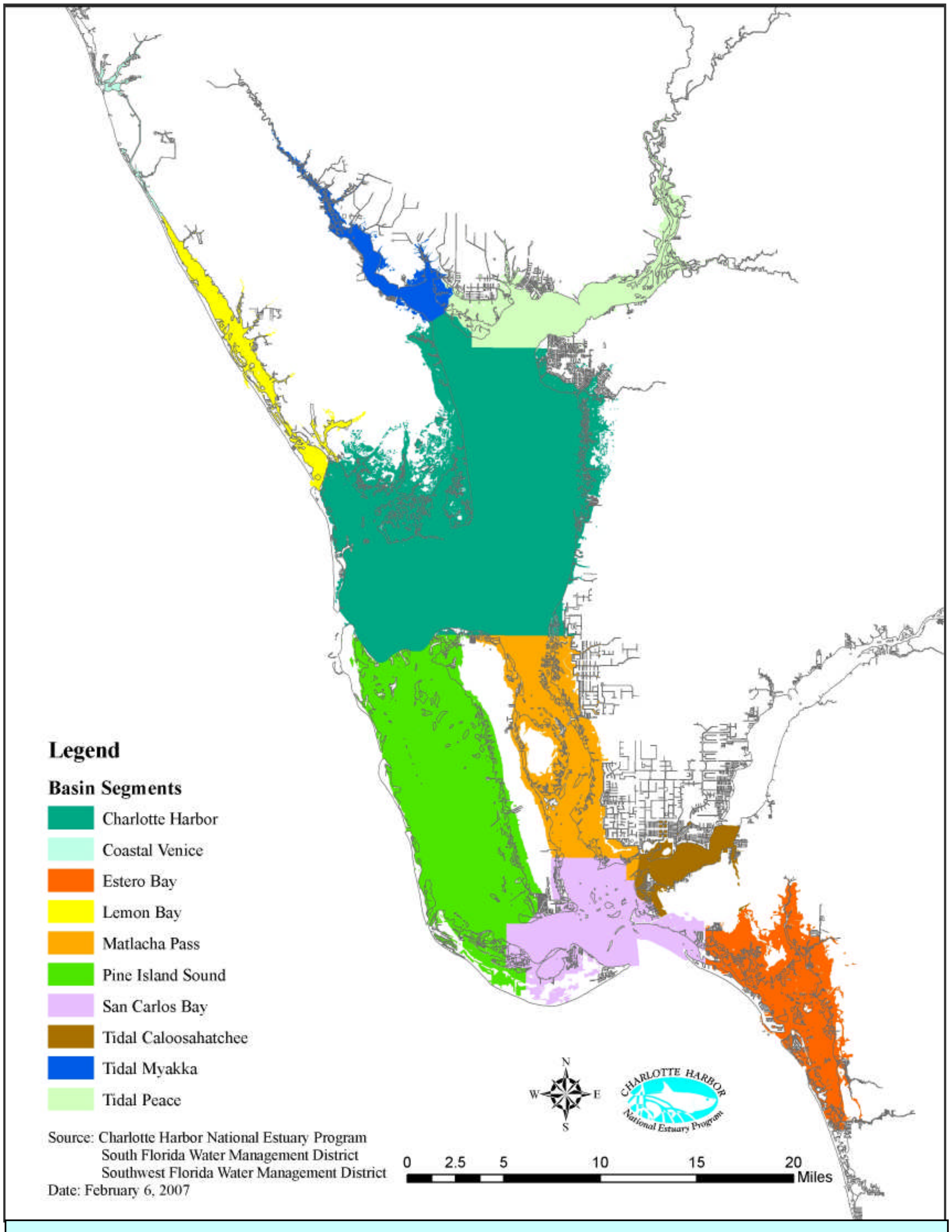


Figure 3. Charlotte Harbor survey area illustrating seven watershed basins.

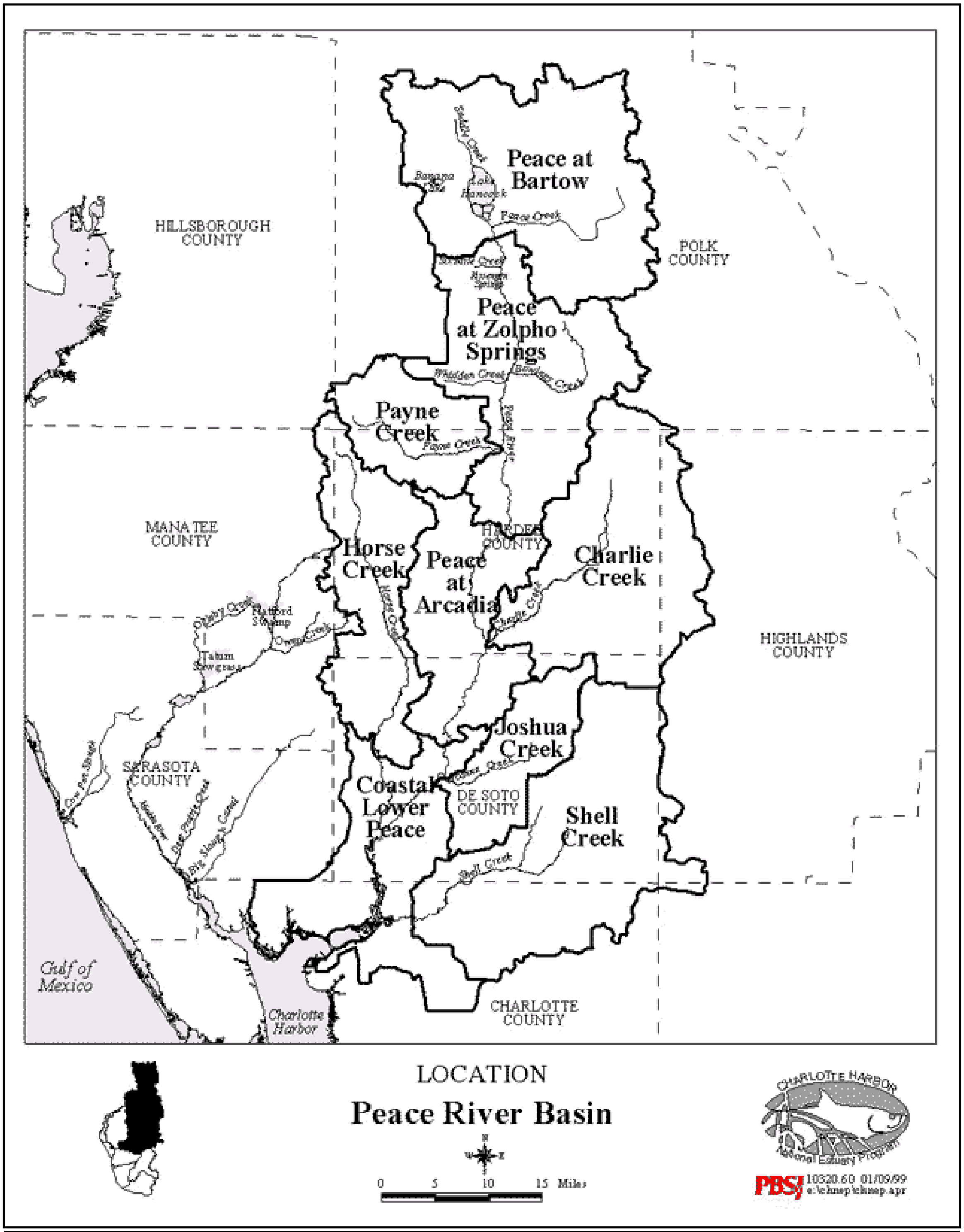


Figure 4. Peace River watershed.

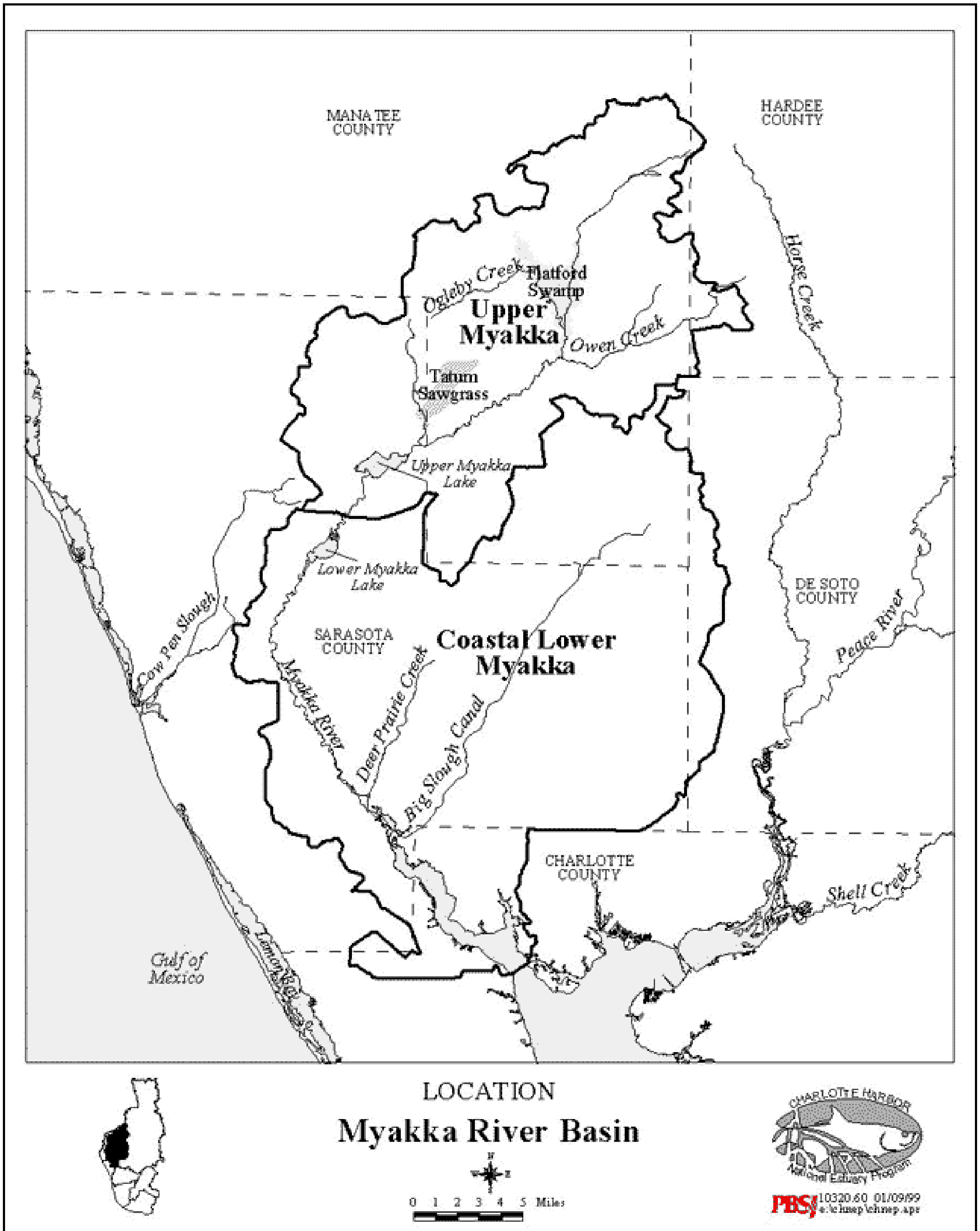


Figure 5. Myakka River watershed.

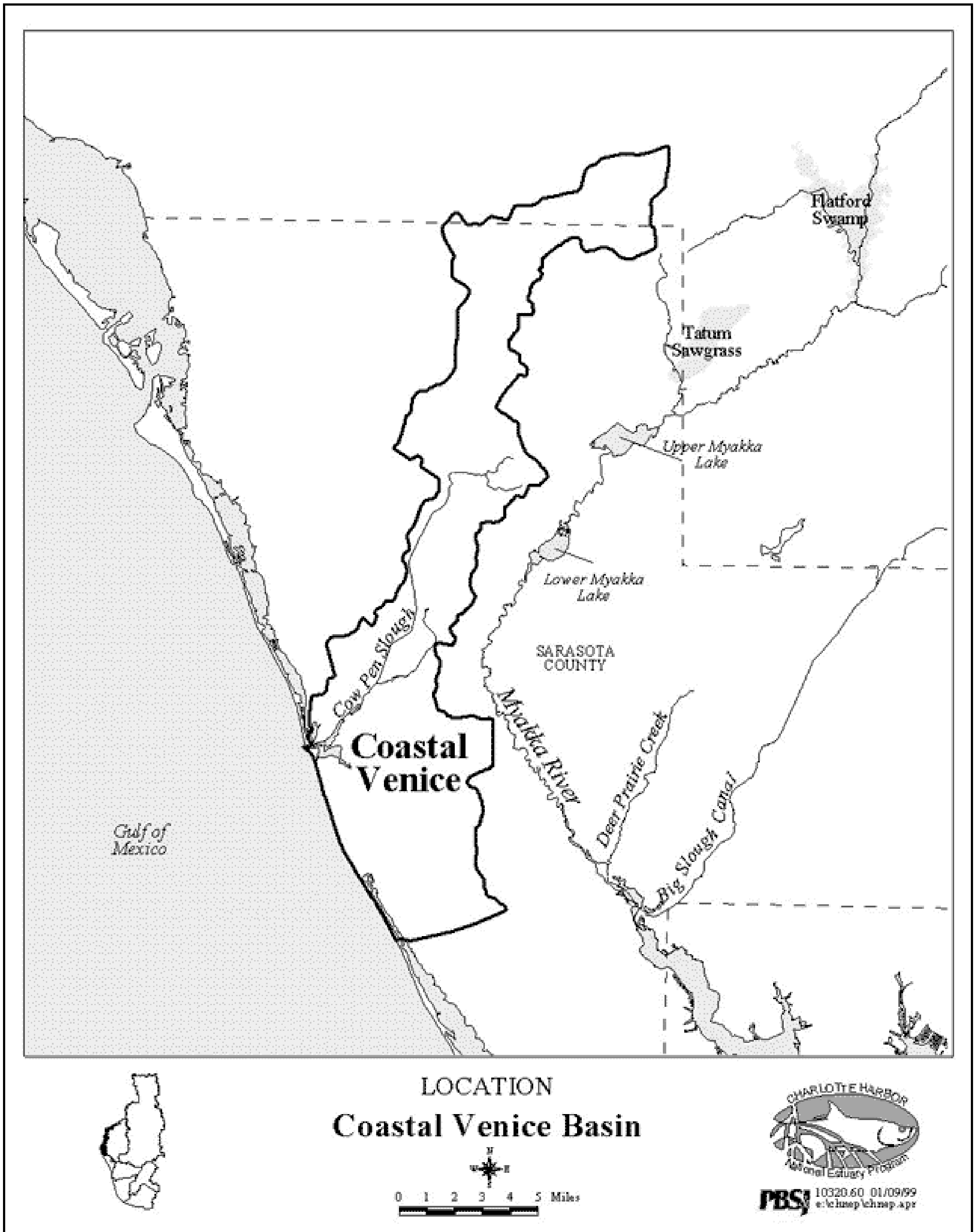


Figure 6. Coastal Venice watershed.

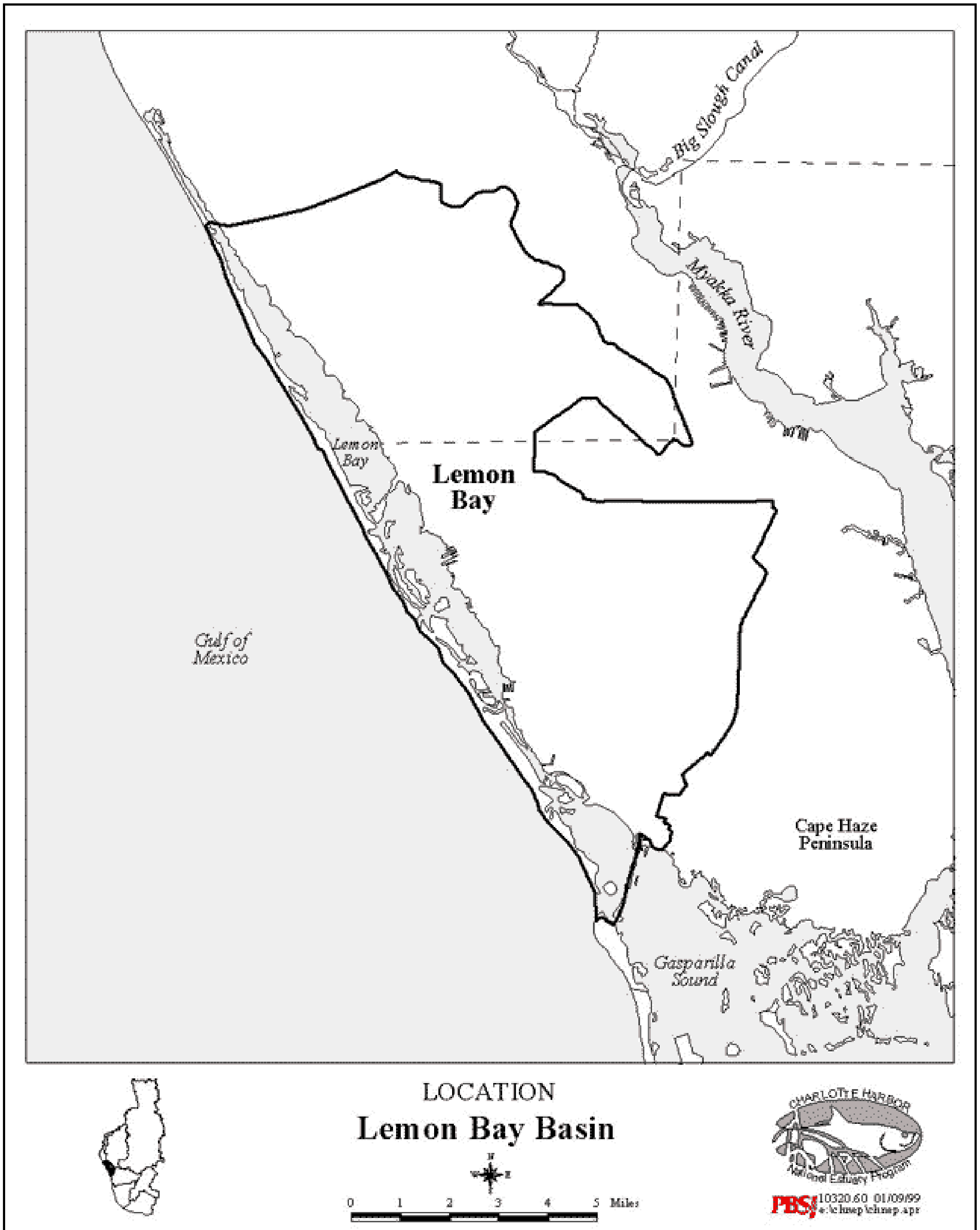


Figure 7. Lemon Bay Watershed.

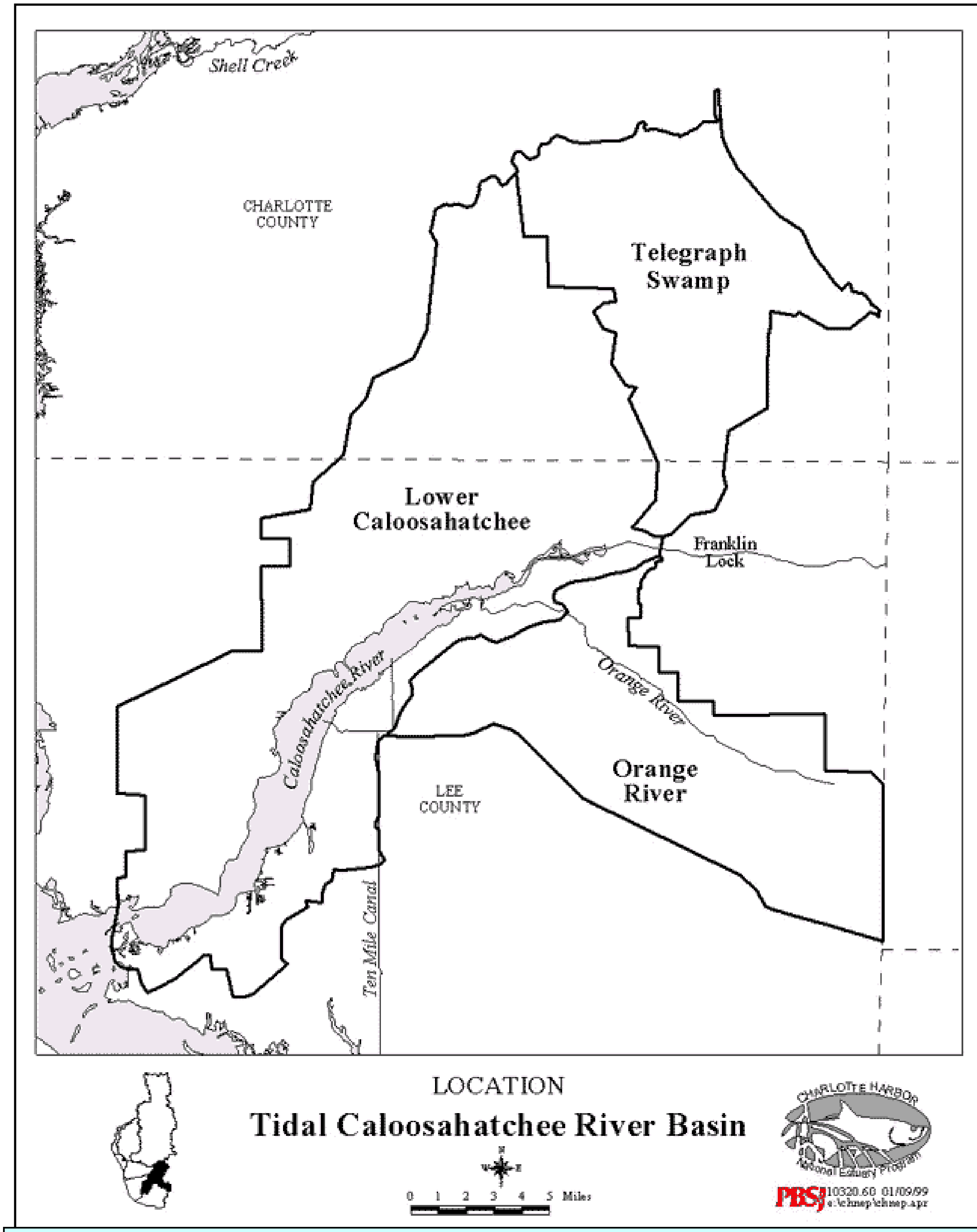


Figure 8. Tidal Caloosahatchee River watershed.

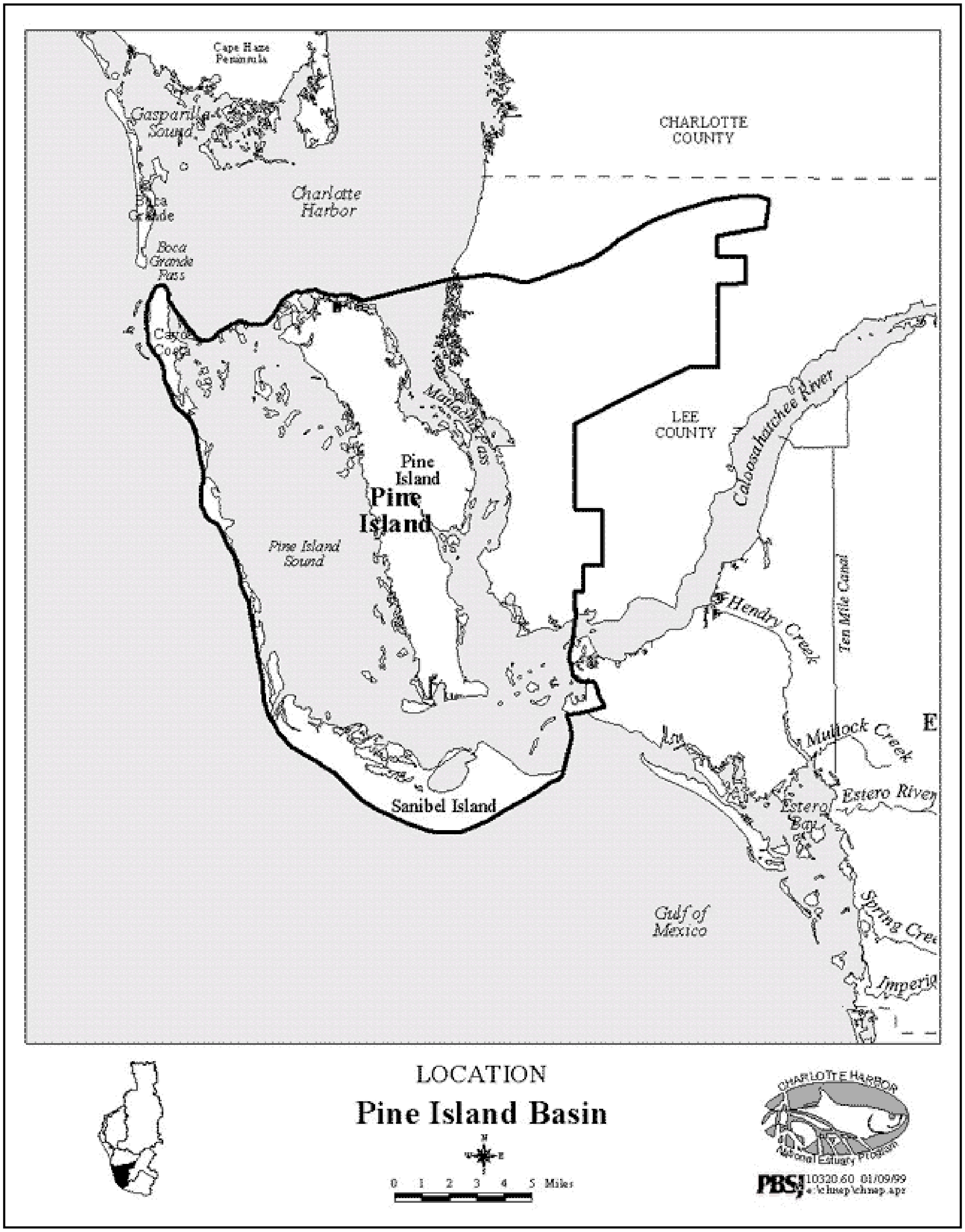


Figure 9. Pine Island Sound watershed.

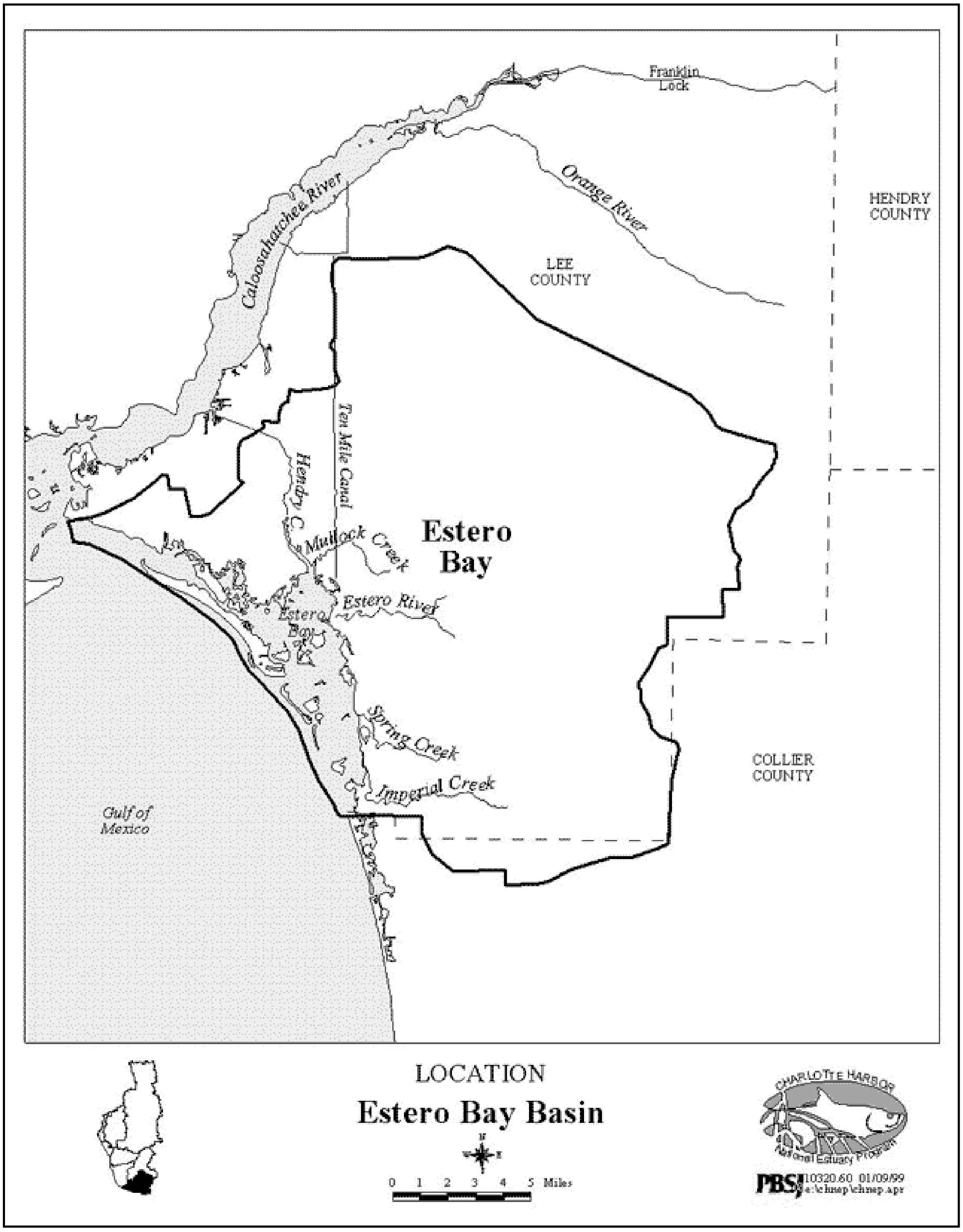


Figure 10. Estero Bay watershed.

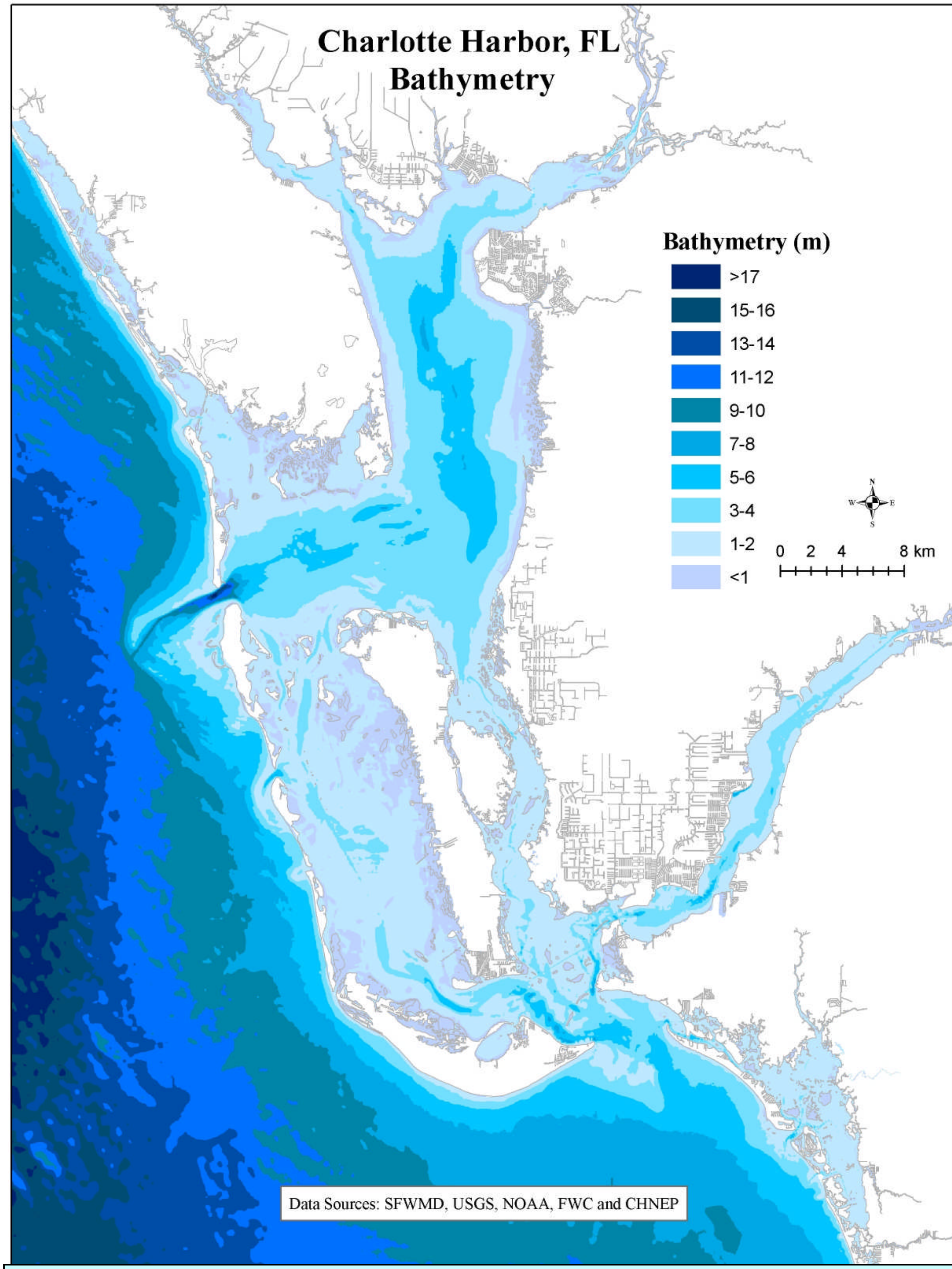


Figure 11. Graphic representation of Charlotte Harbor bathymetry.

II. Project Habitat Definitions

This project focused on describing the benthic communities of the major estuarine habitats of the Charlotte Harbor NEP study area. The benthic macrofaunal community consists as a subtly changing gradient of species across the extent of the benthos. Benthic fauna are present everywhere there is water, unless there is something terribly wrong with the quality of the water or the sediment. Benthic communities are comprised of a multitude of plants and animals including; seagrasses, algae, fishes, worms, shrimp, crabs, mollusks, and many other organisms. The majority of the fauna of benthic communities consist of a group collectively referred to as invertebrates. Invertebrates are defined as animals without backbones, or animals that are not vertebrates. Collectively they represent the majority of animal life on earth, although they represent many different animal phyla. Invertebrates comprise the dominant macrofauna of the benthic community and they were the focus of this study. The term macrofauna refers to the relative size of the organism, and for our purposes macrofauna are defined as animals that are retained on a sieve mesh of 0.5 mm.

Life on earth originated in the salty oceans. Some invertebrate species evolved from exclusively marine creatures into species that were able to exploit the nutrient rich lower salinity areas along the coastlines, known as estuaries. The ability of marine invertebrates to adapt to estuarine and freshwater conditions was a major physiological adaptation. Salinity remains one of the most important benthic community structuring forces. The fluctuation of salinity gradients within the estuary is the single most important criteria determining community composition of the benthos. Within the salinity structure of the estuary certain features of sediment type and the presence of plant species interact to form structure that creates identifiable estuarine habitats. The habitats are defined by the physical structure of sediment and plant communities.

Benthic communities are sensitive to changes in the conditions of the water or sediment. For this reason the benthos is often use as an environmental indicator for determination of the impacts of pollutants, hydrologic alterations and sediment disturbance. Only in very severely polluted or otherwise disturbed areas are benthic communities absent.

Figure 12 illustrates the distribution of the eight benthic habitat communities sampled for this project consisting of:

- Mangrove;
- Intertidal sand bar – often exposed at low tide
- Submerged (subtidal) sand bar – rarely or never exposed at low tide
- Intertidal mud flats – often exposed at low tide
- Submerged (subtidal) mud flats – rarely or never exposed at low tide
- Saltwater marsh;
- Oyster and
- Submerged aquatic vegetation habitats, (SAV) seagrass in this survey.

Within the Charlotte Harbor NEP defined system there are 10 basins or zones that can be described based on bay boundary topography. The 10 areas consist of;

- Coastal Venice, including Lyons, Dona and Roberts Bays;
- Lemon Bay and tidal tributaries;
- Charlotte Harbor "proper";
- Tidal Myakka River;
- Tidal Peace River
- Tidal Caloosahatchee River;
- Pine Island Sound;
- Matlacha Pass;
- San Carlos Bay and
- Estero Bay and tidal tributaries.

Within each of these basins the project team searched for representative areas of each of the eight habitat types which were then sampled for benthic macroinvertebrates. The following section briefly describes the ecological significance of each of these habitat types.

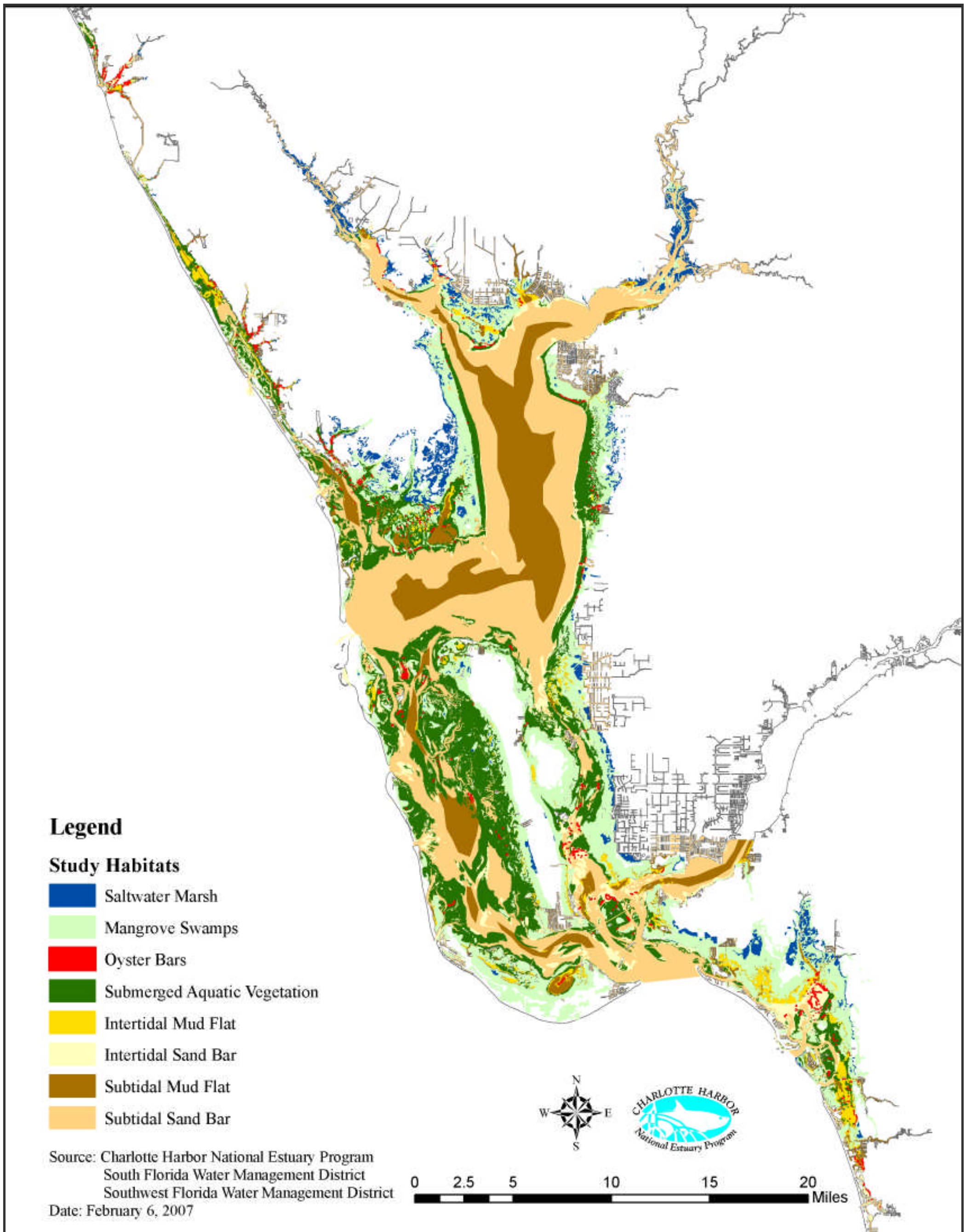


Figure 12. Illustration of the dominant habitats of Charlotte Harbor sampled for this project.

Mangrove Habitat

Mangrove trees grow in the intertidal to supratidal zones and are tropical to sub-tropical in distribution. Mangroves are terrestrial plants that have adapted to soils periodically inundated by tides. Plants that naturally occupy salty soils are known as halophytes. Mangroves are limited in their northern distribution by low temperature. There are approximately fifty different species of mangroves worldwide belonging to several different plant families. Only four true mangrove species occur in America, with three species occurring in Florida and within Charlotte Harbor. These species are the *Rhizophera mangle* (red mangrove), and *Avicennia germinans* (black mangrove) and *Laguncularia racemosa* (white mangrove). One other tree species growing at slightly higher elevations is the buttonwood, *Conocarpus erectus*. The white mangroves and buttonwood, both from the Family Combretaceae, do not have aerial roots or root outgrowths, but are still considered to be part of the mangrove community. They grow at a higher elevation, than red and black mangroves and thrive in brackish water.

Mangrove colonization creates a unique habitat that provides a variety of ecological functions. Mangroves help stabilize shorelines and protect uplands from storm surge and waves. Mangroves are an important source of primary production. The leaves and woody debris provide the input for a detrital driven food chain. The roots, prop roots and pneumatophores provide substrate for colonization by periphyton, algae, oysters and other invertebrates. On high tides small fishes and invertebrates can feed among the labyrinth of roots which offer protection from larger predators. Mangroves often border tidal mud flats. **Figures 13** and **14** shows a tidal flat along a mangrove fringe at low tide on which thousands of fiddler crabs (*Uca pugilator*) are foraging. A wide variety of birds also utilize mangroves for nesting, refuge or perching.

Mangrove Habitat Status

In 1982 there were approximately 674,260 acres of mangrove forests occurred in Florida (Lewis *et al.*, 1985). At present Florida has an estimated 469,000 acres of mangrove forests. Within the Lower Caloosahatchee River there are approximately 2,995 acres of mangroves (Post, Buckley, Schuh, and Jernigan and W. Dexter Bender and Associates, Inc 1999). The Tampa Bay region is considered to be the northernmost limit of mangrove distribution on the Florida west coast. Tampa Bay experienced considerable change in mangrove coverage following widespread human settlement. Tampa Bay is one of the ten largest ports in the nation and the waterfront has been highly altered for both industrial and residential purposes. Over the past 100 years, Tampa Bay has lost over 44 percent of its coastal wetlands acreage; this includes both mangroves and salt marshes. Charlotte Harbor is one of the least urbanized estuarine areas in Florida. However, the Harbor has also experienced mangrove destruction. The Punta Gorda waterfront development accounts for 59 percent of the total loss within the Harbor. Recent increases in mangrove acreage have been noted in parts of the Harbor. This is due to changes in the system whereby some tidal flats have become colonized by mangroves, thus tidal flat acreage decreased and mangrove acreage increased. Spoil islands, created as by-products of dredging, have also provided additional suitable habitat for mangroves.

Figure 13. Photo of fiddler crabs foraging on a tidal flat adjacent to mangroves.

Figure 14. Close-up photo of fiddler crabs along a mangrove fringe.

Seagrass Habitat – Submerged Macrophytes

Submerged aquatic vegetation (SAV) or *macrophytes* are an important component of the Charlotte Harbor estuary. Within the Charlotte Harbor system the principal submerged macrophytes consist of seagrasses. Beds of rhizomatic algae, such as *Caulerpa*, may also occur but tend to be more ephemeral. Seagrasses provide a number of critical habitat functions in the estuary. They are a source of primary production, they provide shelter and protection for fish and invertebrate species and they stabilize the substratum and act as a fine sediment trap. There are four principal bed forming species of seagrasses within the study area;

- Turtle grass – (*Thalassia testudinum*) the most common of Florida seagrasses, with a characteristic wide blade and root structures that penetrate deeper than the other seagrasses,

Image from: http://www.botany.hawaii.edu/seagrass/thal1pic.htm

- Shoal grass (*Halodule wrightii*) exhibits thin flat blades and is an early colonizer in areas of shifting sediment. It often grows on shallow shoals and on both the shallow and deep edges of *Thalassia* beds.

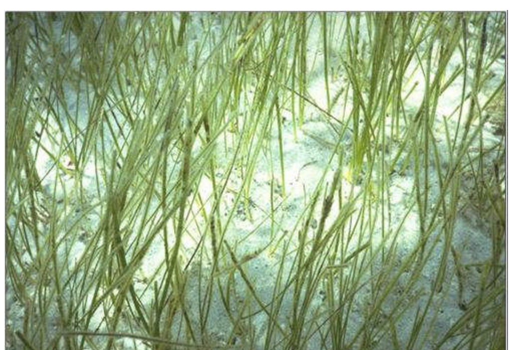


Image from: http://www.botany.hawaii.edu/seagrass/halo1pic.htm

- Manatee grass (*Syringodium filiforme*) is easily recognized by the smooth cylindrical blades. Blades may be very long or quite short depending on the habitat. Typically *Syringodium* is located in the higher salinity areas of the lower estuary.

Image from:
http://www.botany.hawaii.edu/seagrass/syri1pic.htm

- Widgeon grass (R*uppia maritime*) can be quite prolific growing able to grow in nearly fresh to full marine salinity. It has thin flat blades very similar to *Halodule*. In summer months it may send out long shoots that raft on the surface of the water.

Seagrass Habitat Status

Seagrass abundance and diversity is an indirect measure of an estuary's health. Clear water without excessive nutrients foster seagrass growth provided salinity regimes are appropriate. Turbid water and high nutrient levels, which foster excessive growth of phytoplankton and periphyton, are not conducive to healthy seagrass beds. Seagrasses are also sensitive to salinity and have preferred and tolerable salinity and temperature ranges. Seagrasses become stressed when salinity exceed these ranges. Physical alterations, such as the Sanibel Causeway, have been determined to harm seagrasses by altering water flow patterns resulting stressful salinity changes. The Intracoastal Waterway has also had negative impacts to seagrasses due to direct removal of seagrasses, changes in sediment structure and alteration of flow patterns. Like most Florida estuaries there has been a regional decrease of seagrass coverage (Chamberlain and Doering 1998a), within the Charlotte Harbor system, compared to the historic conditions. Seagrass declines negatively impacts the fish and invertebrate communities. Loss of seagrass can also cause destabilization of sediments and a shift in primary productivity from benthic macrophytes to phytoplankton.

In 1999 the FDEP, Charlotte Harbor Aquatic Preserve staff, initiated seagrass mapping studies at 52 stations in Charlotte Harbor during the months of October – December. Long term fixed monitoring is a useful tool for detection of site-specific changes over time by documenting declines or improvements in seagrass health. Detailed monitoring helps to discern between naturally occurring impacts, such as storms, from human introduced impacts. Site monitoring also provided data to aid in the interpretation of aerial photography and production of seagrass maps.

Figure 15 illustrates a relatively undisturbed natural area of Charlotte Harbor proper known as Bull Bay. Numerous mangrove islands provide sheltered shallow water areas where seagrasses proliferate.

Figures 16 through **23** show the distribution of seagrasses within Charlotte Harbor.

Figure 15. Aerial view of mangrove islands and seagrass beds of Bull Bay located on the north side of Charlotte Harbor proper.

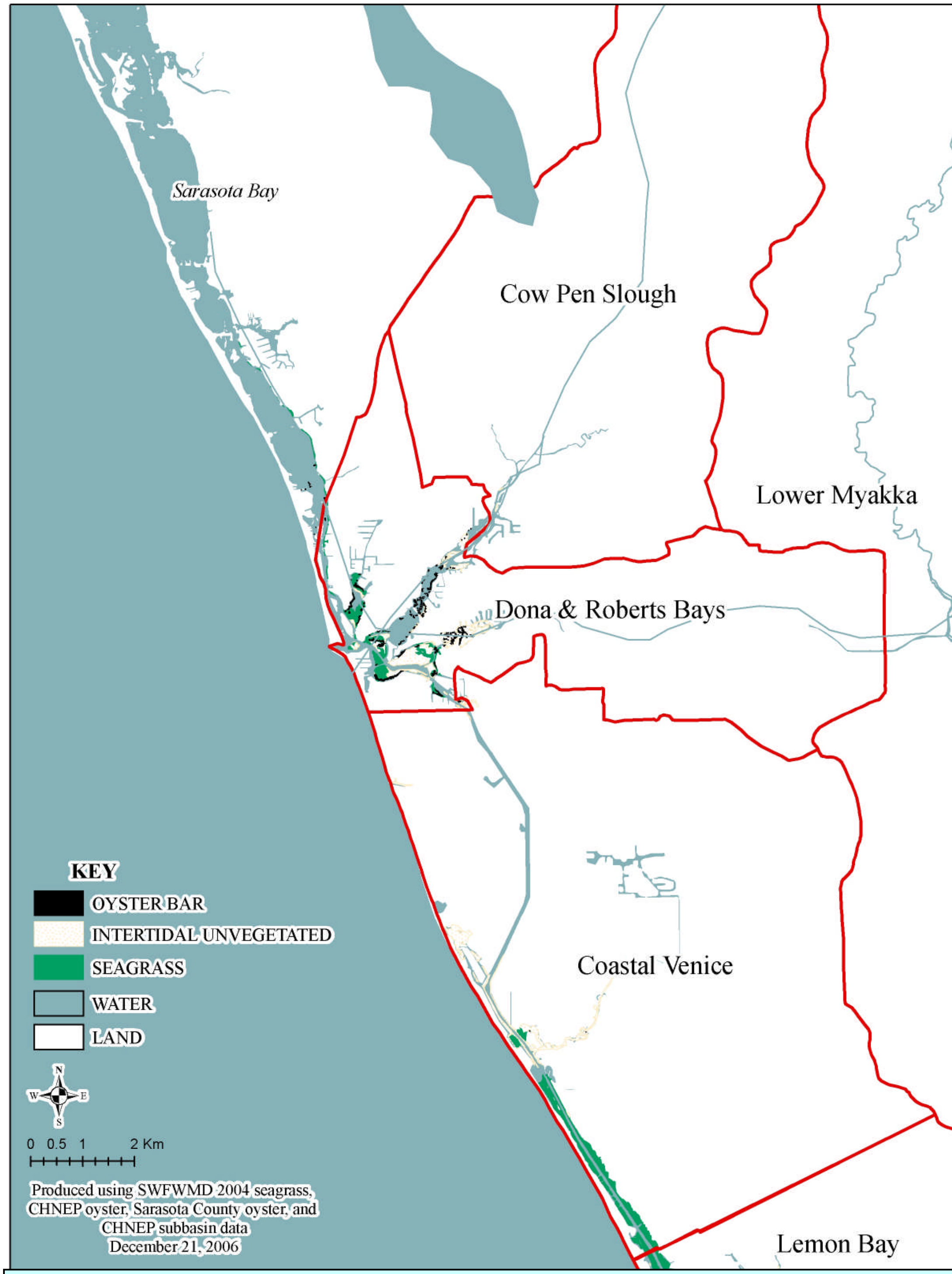


Figure 16. Seagrass, oyster and intertidal habitat in the Coastal Venice portion of the study area.

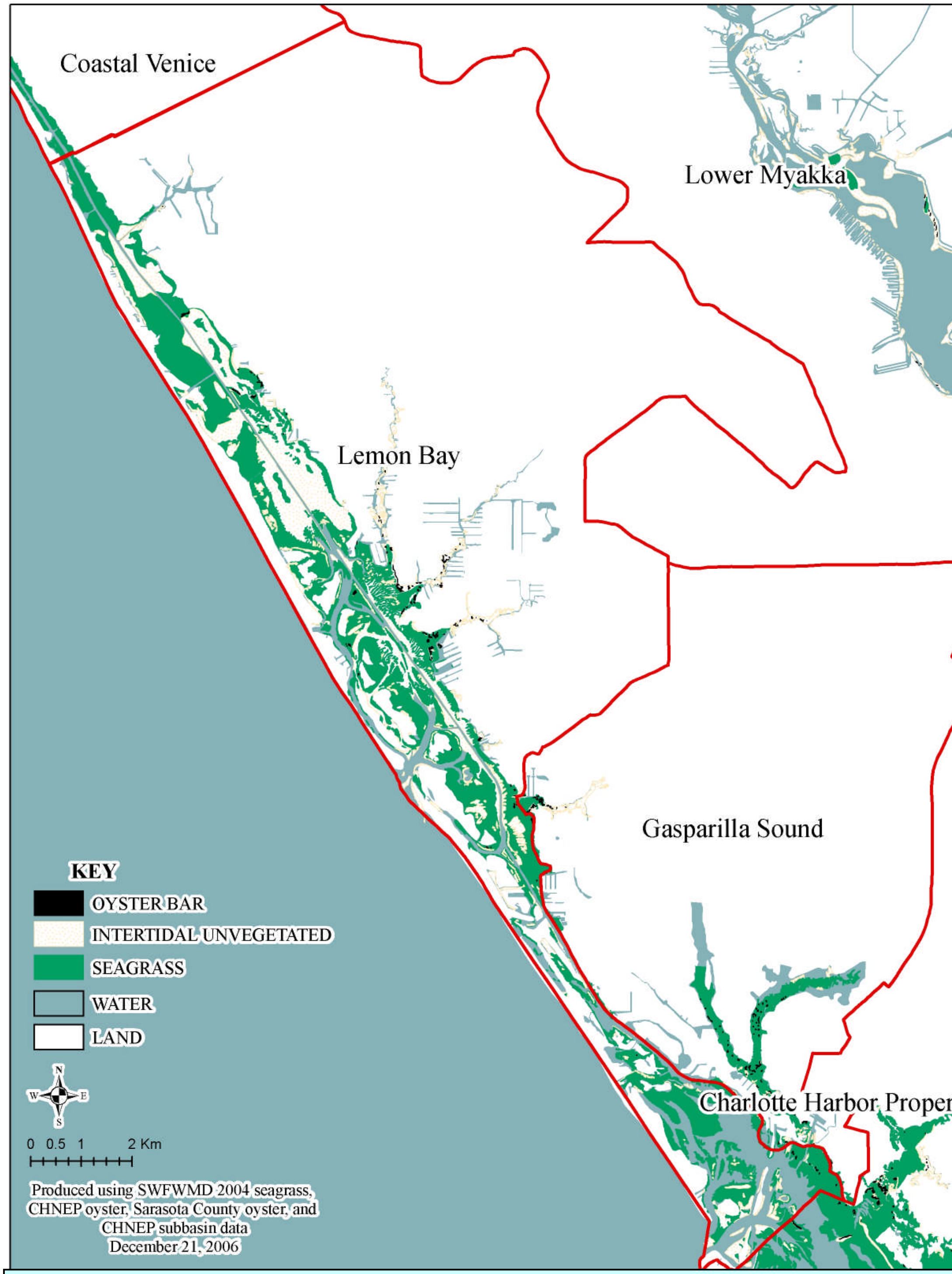


Figure 17. Seagrass, oyster and intertidal habitat in the Lemon Bay portion of the study area.

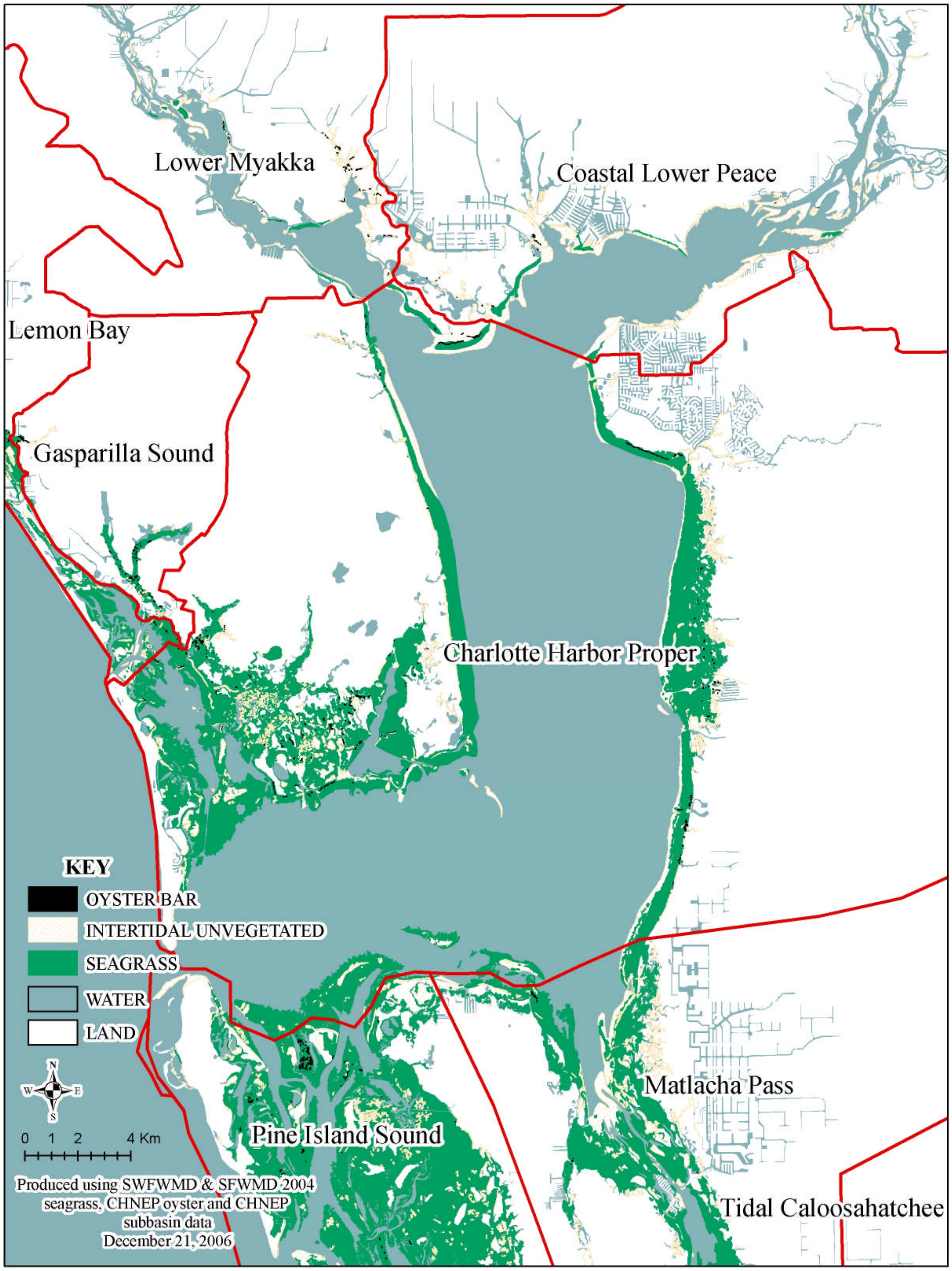


Figure 18. Seagrass, oyster and intertidal habitat in Charlotte Harbor proper portion of the study area.

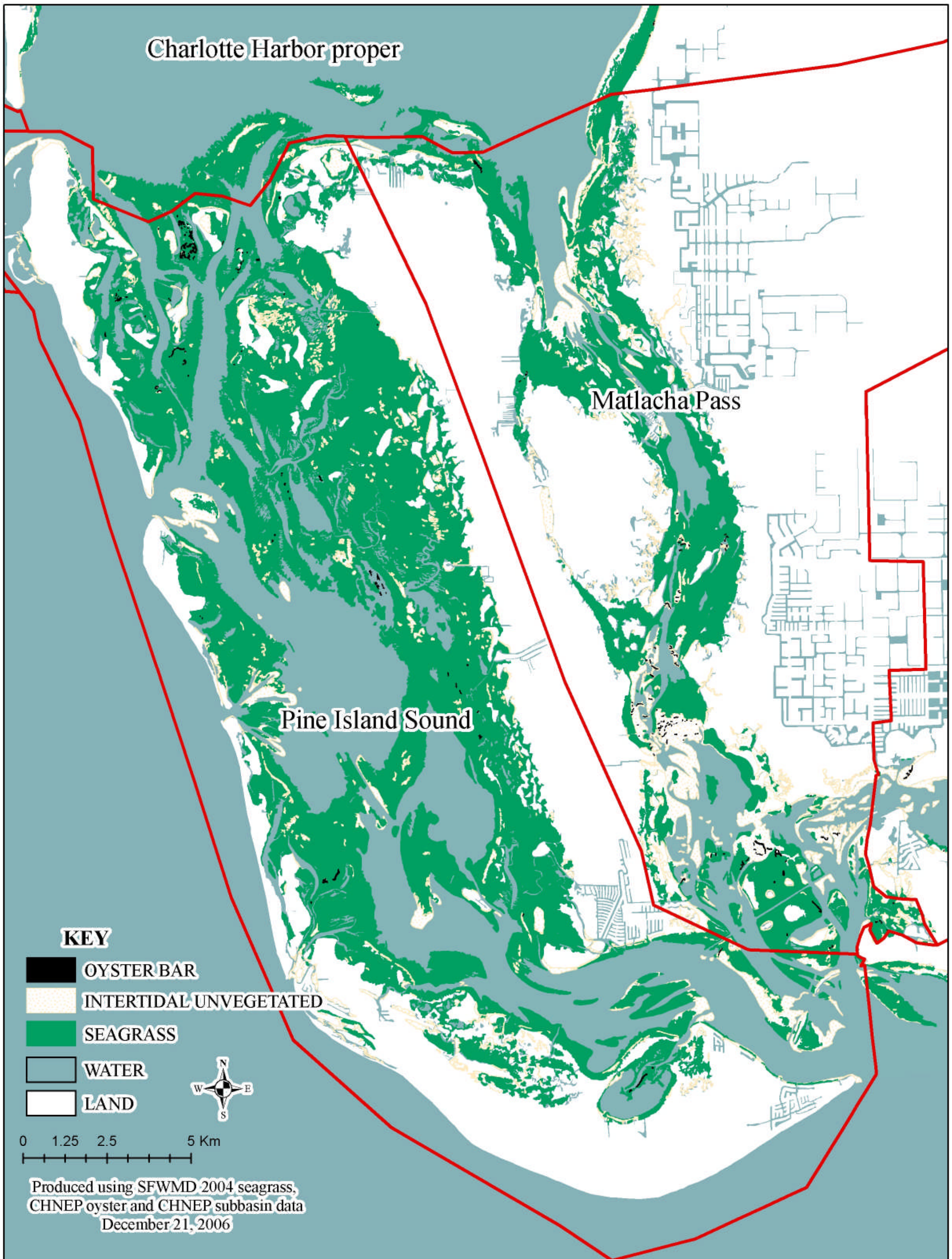


Figure 19. Seagrass, oyster and intertidal habitat in the Pine Island Sound and Matlacha Pass portions of the study area.

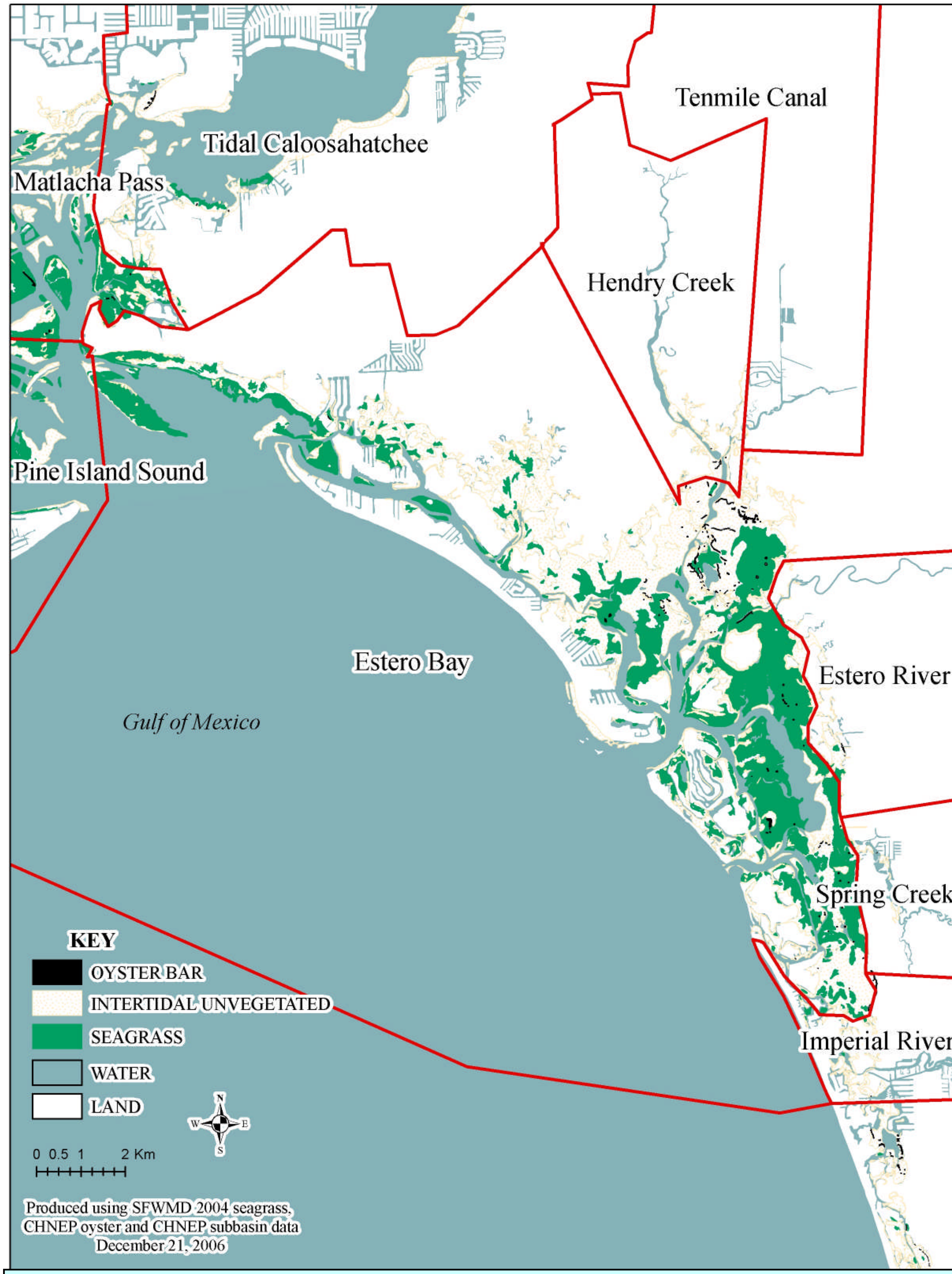


Figure 20. Seagrass, oyster and intertidal habitat in the Estero Bay portion of the study area

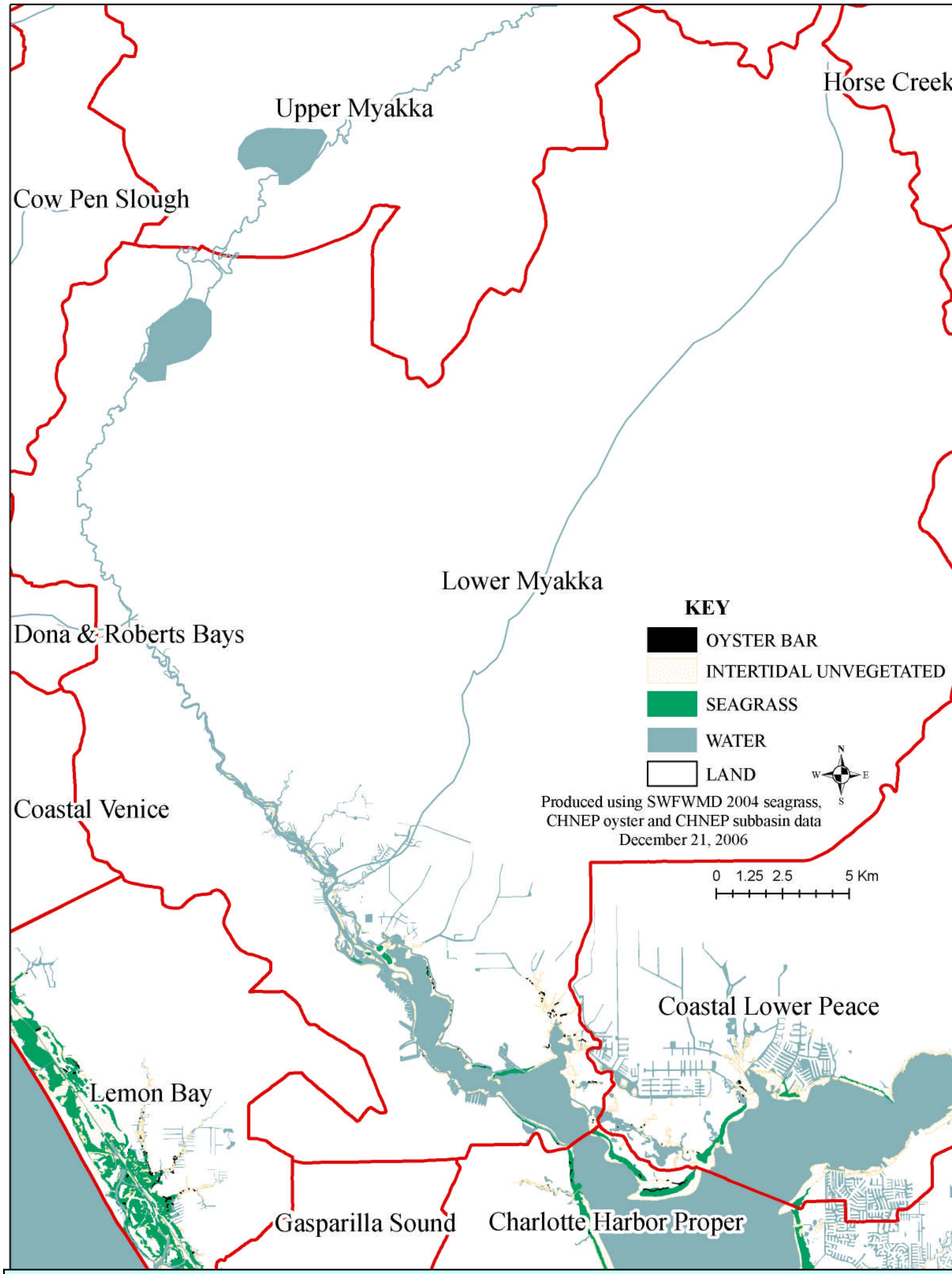


Figure 21. Seagrass, oyster and intertidal habitat in the Tidal Myakka River portion of the study area.

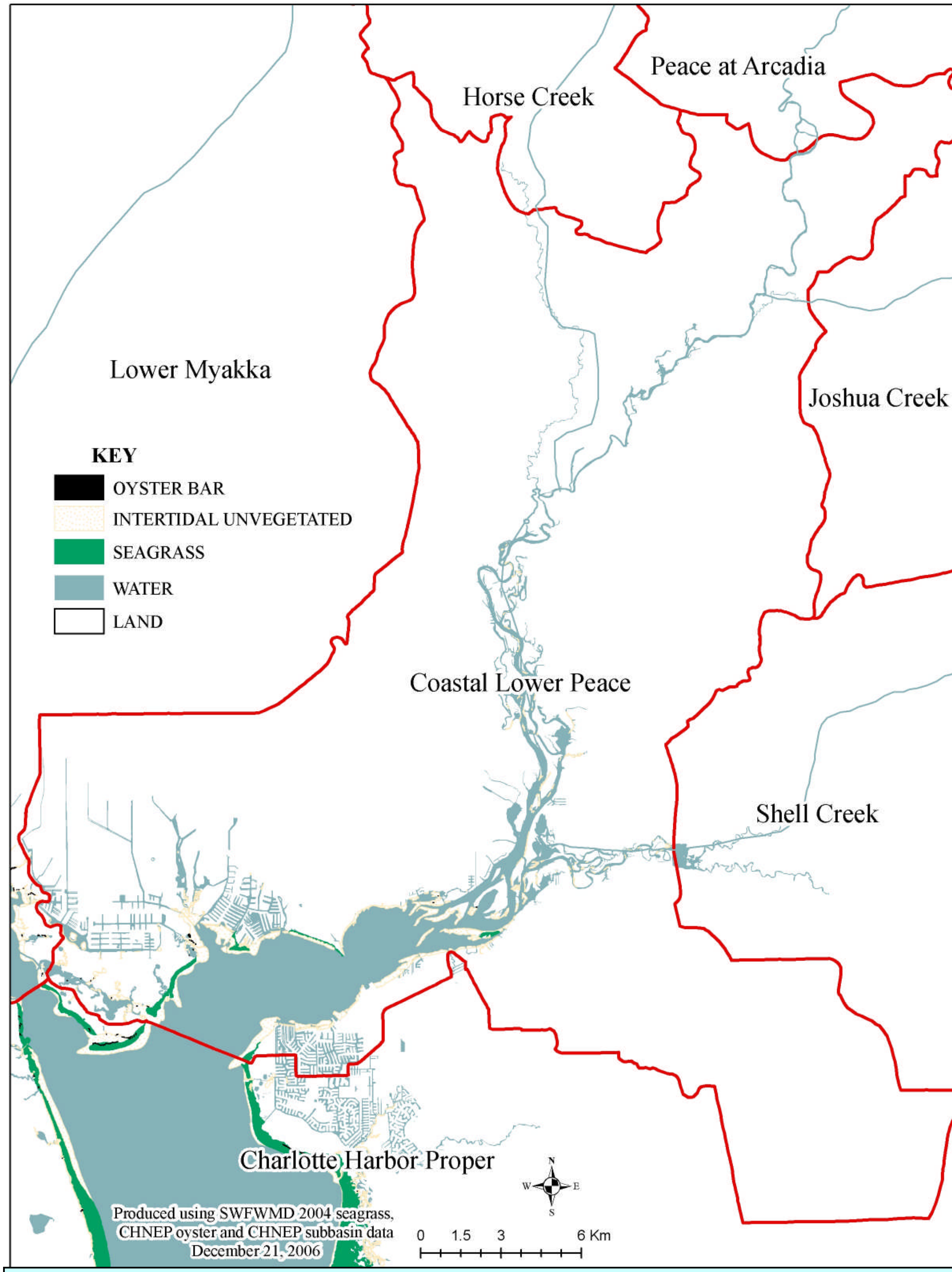


Figure 22. Seagrass, oyster and intertidal habitat in the tidal Peace River portion of the study area.

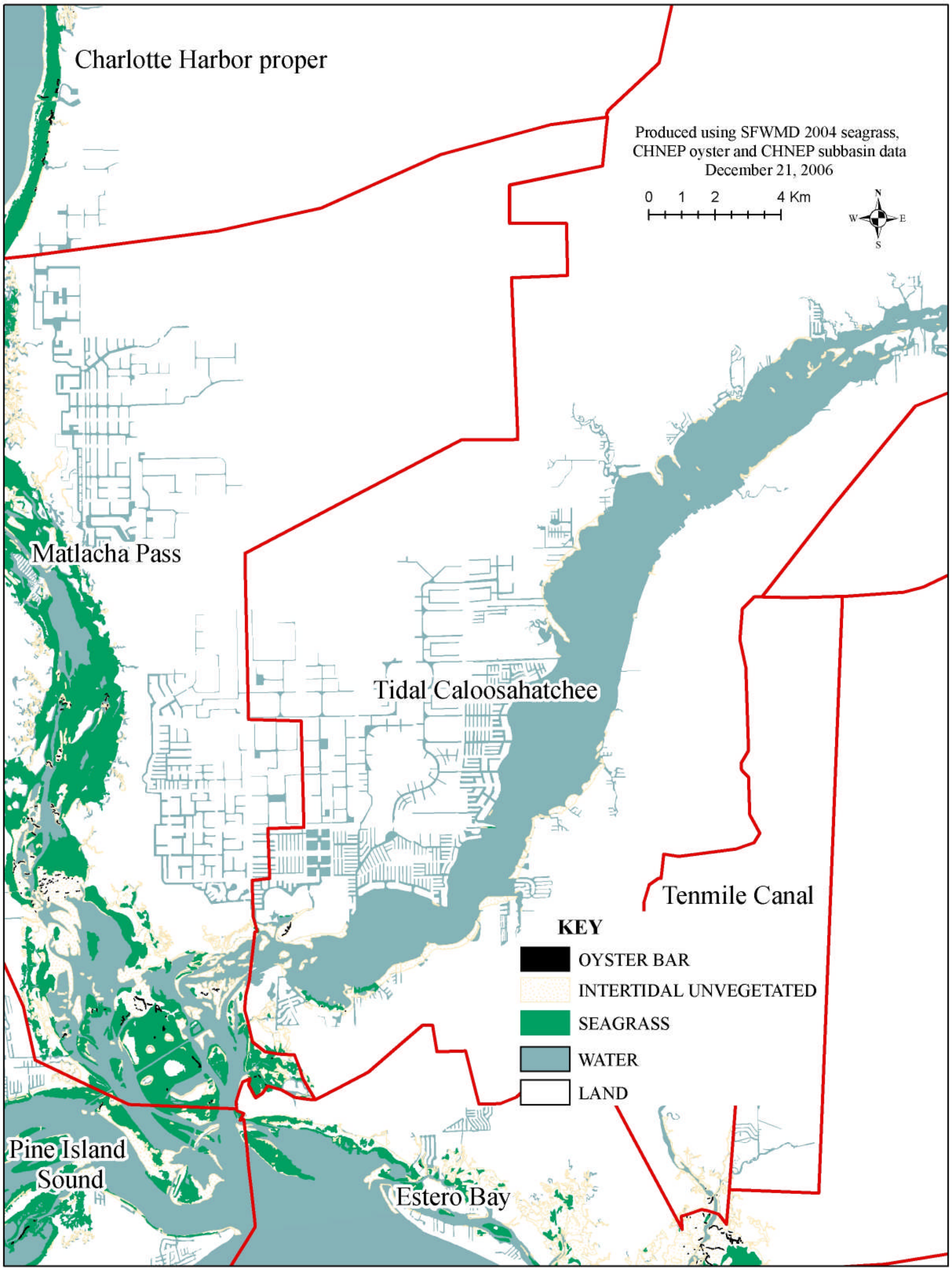


Figure 23. Seagrass, oyster and intertidal habitat in the tidal Caloosahatchee River portion of the study area.

Oysters and Oyster Bar Habitat

Oysters are filter feeding bivalves which are a class of the Phylum Mollusca. There are a number of different species of oysters, but the most common is *Crassostrea virginica*. Oysters are a highly prized seafood item for human consumption and were an important component of the diet of native Floridians as well as the first settlers. At present there are no commercial harvests of oysters within the Charlotte Harbor system. Adult oysters spawn male and female gametes into the water column where the eggs are fertilized and quickly develop into a planktonic larval stage called a veliger. The veliger remains in the water column until it encounters a suitable location for settlement. The suitability of the location is determined by the composition of the substrate (other oyster shell most preferred) and salinity. The most common settlement sites for oysters on the Florida west coast are mangrove prop roots and oyster bars. Throughout Florida oyster populations have been impacted by alterations of fresh water flows to estuaries, dredge and fill activity and water quality problems. Within the study area oysters are most abundant at in the area outside the mouth of the Caloosahatchee River, where oyster bars have formed.

Like seagrasses oysters have a modifying effect on their environment. As annual generations settle and grow at the same location, the typical oyster bar is formed. As the bar grows vertically at some point it becomes intertidal. Additional vertical growth is then inhibited by the action of waves, desiccation through exposure and an increase in temperature extremes due to exposure. A typical Charlotte Harbor oyster bar consists of irregular clumps of individuals growing on top of one another.

Oysters also modify the substratum. As oysters die and weather the surrounding sediment becomes infused with shell fragments. Oysters are filter feeders, removing phytoplankton, particulate organic carbon, sediments, pollutants, and microorganisms from the water column. They are efficient at filtering and sorting fine particulate material. Not all of the material that is filtered enters the gut. Particulates that are sorted and rejected are expelled from the mantle cavity as small packets of fine sediment and organic material known as pseudofaeces. This material settles within the cracks and crevices of the oyster bar and serves as food for small burrowing organisms such as polychaete worms. One researcher developed a list of 303 species that depend on oyster bars either directly or indirectly (Wells 1961). The oyster shell substrate also provides refuge for other bivalves, and small crustaceans such as mud crabs and amphipods. These oyster associated organisms occur in a much greater abundance than the oysters that comprise the structure of the bar. **Figures 24, 25** and **26** illustrate typical oyster Habitat.

Oyster Habitat Status

There has not been a comprehensive Harbor-wide assessment of oyster distribution and status. Studies of oysters have been conducted at the mouth of the Caloosahatchee River (Volety et al, 2003) and distributions noted within the Peace and Myakka Rivers (Estevez 2001, 1986, 1985).

Oysters require salinity levels above 4-5 ppt (Loosanoff 1932) with an optimal salinity range between 14 and 28 ppt (Chanley 1958, Galtsoff 1964). At higher salinity levels saltwater predators such as oyster drills, a large gastropod (Hofstetter 1977, White and Wilson 1996) and the protozoan parasite *Perkinsus marinus* (Volety 1995), can decimate oyster beds. Within the Peace River and Caloosahatchee River estuaries increased oligohaline conditions upstream have limited distribution of oysters.
(also see: http://www.fgcu.edu/cwi/research1.htm)

Figure 24. Emergent oyster bar.

Figure 25 Small oyster bar near mangrove fringe.

Figure 26. View of the edge of a partially submerged oyster bar.

Salt Marsh

Figure 27. Photo of the water edge of a *Juncus* marsh bordering the lower Myakka River.

Salt marshes occur on both the east and west coast of Florida in areas protected from severe wave action. Salt marshes are most abundant north of the winter freeze line where they do not have to compete with mangrove wetlands. Salt marsh is a relatively rare habitat within the Charlotte Harbor system and was not present in most of the sub-basins that were sampled for this project. Charlotte Harbor has experienced 51% reduction in the original salt marsh area coverage as result of coastal development. The remaining marsh areas are relatively small in comparison to marshlands of other areas of Florida. The dominant marsh plants are smooth cordgrass (*Spartina alterniflora*) and needlerush (*Juncus roemerianus*). **Figure 27** illustrates the water edge of a *Juncus* marsh located in the lower Myakka River.

Figure 28. Photo of a *Juncus* marsh illustrating competing mangroves shown in the foreground.

Salt marshes are unique due to the saline soils, which are often a relatively thin sandy or clayey layer over a limestone base. Marshes are irregularly inundated by tidal action which causes the soils to be saturated with salt. The build up of organic matter creates peaty soils and pH may decrease sharply with an increase in elevation across the marsh.

Salt marshes act as a transition zone from terrestrial uplands to aquatic habitats. Other halophytes, such as mangroves, may grow within salt marshes or along the borders, **Figure 28.** Marshes have some capacity to absorb and trap nutrients and potential pollutants before they reach the estuary. Like mangroves marshes also have a soil stabilizing effect on coastal shorelines, preventing erosion and sediments from washing offshore. They also offer substantial protection from storm induced erosion along coastal areas. Marshes are recognized as a highly productive coastal habitat, due to the production of plant material which provides food for invertebrates. Salt marshes provide habitat for early life stages of many species whose life cycle includes both the estuary and open ocean. The edges of salt marsh provide forage areas for many species of juvenile fish which feed on invertebrates. Gulf Coast salt marshes provide nursery habitat for at least 70 percent of Florida's recreational and commercial fishes, shellfish and crustaceans.

Unvegetated Bottom Classifications

The majority of the benthic estuarine habitats are not vegetated. These habitats are abundant yet can be impacted by human activity such as dredge and filling, boating impacts and introduction of pollutants. For this project the unvegetated habitats were broken down into groups determined by tidal exposure and sediment composition. The habitats sampled included intertidal sand bar – often exposed at low tide, submerged sand bar – rarely or never exposed at low tide, intertidal mud flats – often exposed at low tide, submerged (subtidal) mud flats – rarely or never exposed at low tide. The difference between sand and mud habitat is obvious at the extremes but the distinction becomes less discrete when sand becomes muddy or mud becomes sandy. Tidal flats can be located in areas of both high and low wave energy where a gently sloping bottom in shallow water becomes exposed at low tides, **Figure 29**. High energy areas exhibit sand flats because the fine mud and clay particles are continuously washed out of the substratum and low energy protected areas exhibit mudflats because fine particulates are able to settle out of the water column. Sand bars, both intertidal and submerged are often found in the vicinity of passes, **Figure 30**. In some areas the sand bars or shoals are vegetated with seagrasses.

Figure 29. Intertidal flat on a falling tide.

Figure 30. Sand bar shoals (light colored areas) as seen in the vicinity of Little Gasparilla Pass.

III. Sampling Methods

Sample Collection Gear

Three methods of sampling were utilized for collection of invertebrates. Field collection of sediment samples was conducted with a petite PONAR grab or a cylindrical core, which collects invertebrates that live within the sediment **Figure 31**. A sweep net, **Figure 32**, was used to supplement the PONAR samples at each sampling site. The sweep net is a more effective means of collecting motile animals that populate the surface of the sediment. The PONAR grab is considered a quantitative sampling device since it collects as discrete volume of material. In contrast the sweep net sample is considered to be semi-quantitative since the exact area of sediment surface that is sampled can only be approximated.

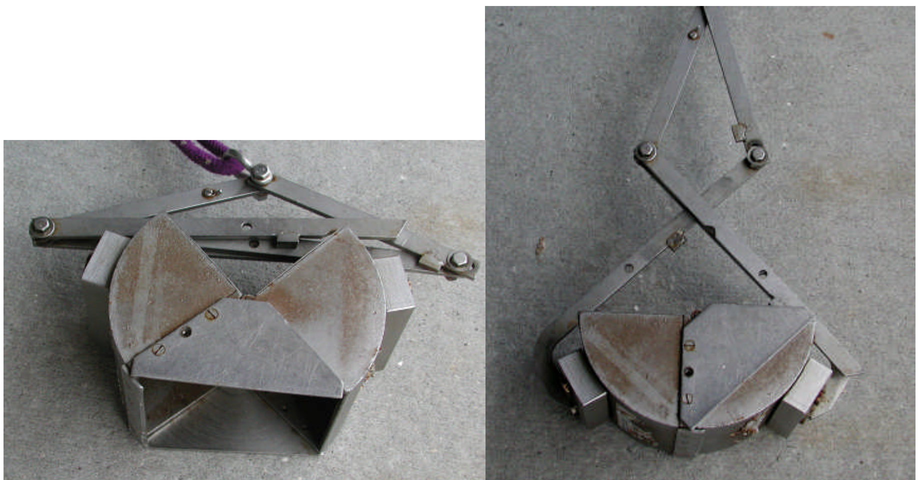


Figure 31. Petite PONAR grab, open (L) and closed (R).

Figure 32. Two views of a sweep net.

For sampling the invertebrates associated with the oyster reef habitat a "standard" clump of oysters approximately 8-10 inches in circumference was obtained from each site, **Figure 33** and **34**. The clump was then broken apart over a bucket and the associated organisms collected. All samples were washed over a 0.5 mm mesh sieve to remove fine sediments. The remaining portions of the sample consisting of the invertebrates, coarse sediment and organic debris was then placed into a labeled jar and preserved in a solution of 10% buffered Formalin.

Figure 33. A typical oyster clump.

Figure 34. An oyster clump in a bucket.

The following figures illustrate the various aspects of sample collection, **Figure 35** retrieving a grab sample, **Figure 36** sieving a sample to remove fine sediment, **Figure 37** illustration of material remaining after sieving, **Figure 38** sampling the fauna of a mangrove prop root.

Figure 35. Emptying a grab sample into a sample pan.

Figure 36. Sieving a sample.

Figure 37. Remains of a sediment sample after sieving.

Figure 38. Sampling a mangrove prop root.

Measurement of Physical Parameters

Physical water parameters measured in the field included temperature, specific conductance, salinity, dissolved oxygen and pH. Measurements of these parameters were made with a Hydrolab® Sonde multiparameter meter, **Figure 39**. The meter was calibrated prior to each field use according to the manufactures specifications.

Figure 39. Hydrolab sonde (L) and a close up of the sensors (R).

Salinity

The salinity of open ocean seawater is usually ~35 parts per thousand (o/oo, sometimes expressed as Practical Salinity Units, PSU). Salinity is a total measure of all the salts that are dissolved in the water, which is why the water in the oceans tastes salty. The majority of the salt is the same as table salt (sodium chloride) but there are also other salts. The value for salinity is actually calculated from the measurement of specific conductance or conductivity. Conductivity is a measure of the ability of water to conduct an electrical current. Water that contains a greater concentration of salts (seawater) conducts an electrical current more readily than water without salts (freshwater). This property allows for the precise measurement of specific conductance and the calculation of salinity.

Salinity is a very important factor for invertebrates because it affects the process of osmosis which is the ability of water to move in and out of living cells, in response to a concentration of a dissolved material, until equilibrium is reached. In general invertebrates are at equilibrium with the concentration of salts in seawater. In addition most invertebrates have limited ability to regulate the flow of water across the cell membranes when salinity changes. Thus most invertebrates cannot tolerate very low salinities or rapid salinity changes and only those species best adapted to low salinities are able to survive in the low salinities of the upper estuary. This is why marine invertebrates are not found in fresh water rivers, creeks, and lakes.

Field sampling for this project was conducted in May of 2004 prior to the onset of the summer rainy season. Under normal weather conditions the dry spring months result in the highest salinity values for the estuary and consequently the greatest species diversity. Average salinity for the 10 basins ranged from 14.9 PSU in Lower Peace River to 36.4 PSU in Lemon Bay. The only other low salinity area was the Lower Myakka River (18.6 PSU). The lowest salinity recorded for the project (7.8 PSU) was in marsh habitat in the lower Peace River. The highest salinity recorded for the project (37.0 PSU) was for the intertidal mud flat station in Lemon Bay.

Temperature

Water temperature is an important environmental variable that affects rates of chemical and biological processes as well as the level of dissolved oxygen present within the water column. Temperature also plays an important physiological role for regulation of metabolism of plants and animals. South Florida is considered to be a subtropical climate zone which represents a transitional area between tropical and temperate climate zones. As a result of this climate the biodiversity of the marine fauna of the region is high containing plant and animal representatives of both tropical and temperate latitudes. Benthic animals that inhabit the intertidal zone are adapted to temperature and salinity extremes.

Dissolved Oxygen

Oxygen is essential for animal life to exist. Animals require oxygen for cellular metabolism. Oxygen is a gas which comprises approximately 21% of the atmosphere and remains relatively constant at this percentage. Oxygen is also dissolved in water; however, the number of molecules present depends on the temperature and salinity of the water. The amount of oxygen present within the atmosphere is driven by photosynthetic organisms; with approximately three quarters of the oxygen being produced by algae in the oceans, and one quarter from terrestrial plants. The algae in the oceans produce an excess of oxygen which then diffuses in to the atmosphere. The cycle of photosynthesis conducted in plants consumes carbon dioxide (CO_2), taking the carbon atom (C) for the production of plant tissue and releasing the oxygen (O_2) as a byproduct into the water or atmosphere. The cycle of photosynthesis is a complex process driven by sunlight. At night plants switch to a mode that consumes oxygen. However, the net result over the day-night cycle of photosynthesis is a net production of excess of oxygen which in turn supports animal life on earth.

A healthy estuary has levels of oxygen in the water that are sufficient to sustain abundant marine life. The levels of oxygen rise and fall in concert with the day and night cycle of photosynthesis. When an estuary suffers from an excess of nutrients, which act as fertilizer to plant life, dissolved oxygen levels in the estuary can fluctuate over a very large range as the result of an overabundance of algae. These algal blooms may consume so much oxygen at night that conditions are stressful to animal life and may in the death of animals within the water and the benthos. During daylight hours algal blooms often produces enough oxygen to supersaturate the water column. Supersaturation is a condition in which the concentration of oxygen exceeds the normal saturation vapor pressure at a given temperature. Typically when this happens bubbles are observed forming on solid surfaces. Water that is supersaturated with oxygen (or any other gas) can cause physiological stresses for fishes. The process of water quality degradation due to the addition of excess nutrients is known as eutrophication. Dissolved oxygen is measured in various units and for this report dissolved oxygen is reported as milligrams per liter = mg/l.

pH and Oxidation Reduction Potential

The term pH refers to the relative acidy of a solution. Ocean water has an excellent buffering system with the interaction of carbon dioxide and water so that it is generally always at a pH of 7.5 to 8.5. Estuarine water tends to be slightly lower in pH ~7 - 7.5. Neutral water is a pH of 7.0. The upper estuary may have a slightly lower pH due to the effect of freshwater from river and stream flow. Rivers and streams in Florida tend to be slightly acidic due to the leaching of acids from decomposing plant material.

Oxidation Reduction Potential (ORP) is a measure of the relative concentration of oxidizers or reducers in a solution, and their activity or strength. Oxidizers and reducers are relatively unstable in solution. In sanitary water applications such as drinking water, wastewater treatment and swimming pool sanitizing oxidizers, such as chlorine are added to reduce (react with and destroy) microbial and organic contaminants. A positive ORP value indicates a reactive system a negative ORP indicates a lack of oxidizers. In natural systems the ORP value will be related to the amount of organic matter within the water. Strong oxidizers such as chlorine and ozone are generally absent and should not be present within healthy natural waters.

IV. Laboratory Methods

Sorting and Identification of Fauna

Samples collected and preserved in the field were returned to the laboratory for processing. After several weeks stored in formalin the samples were rinsed with water to remove excess formalin and then stored in a solution of 70% isopropyl alcohol. Formalin contains formaldehyde which fixes the tissues and prevents bacterial cecomposition of the fauna. However, the formaldehyde in the solution is a chemical that must be handled carefully as it is toxic and is irritating to the skin and respiratory system.

After substituting alcohol for the formalin, the next step of sample processing consisted of removing the preserved material, which consisted of the fauna, sediment and detritus larger than 0.5 mm in size, from the jar and placing a portion of the sample in a dish or shallow pan where the invertebrates were picked from debris. Biologists utilized a combination of pan sorting and sorting under a microscope to insure that all of the invertebrates were removed from each sample, **Figure 40** and **41**. The animals that were picked from the sample were sorted into four or five major taxonomic groups; annelids and other worm like animals, mollusks, crustaceans and miscellaneous organisms.

After rough sorting the retrieved fauna was identified and counted. Biologists examined each specimen under a microscope and utilized descriptive text to identify key features of each organism which enabled them to place a scientific name on each organism. Most of the organisms were readily identified to the species level. However, in some instances an organism could not be identified to species level and was then identified to the lowest practical taxonomic level (LPL). An organism may not be identifiable to species for several reasons, such as when the specimen is a juvenile that does not yet exhibit features necessary for identification, or the organism is damaged, or in some groups of animals the necessary keys which enable identification have not yet been published. **Figure 41** shows a microscope image of a small dish filled with crustaceans from a sample. The red stain used in the formalin makes the organisms pink in color, which facilitates the sorting process.

Figure 40. Biologists sorting invertebrate samples, pan sorting (left) and microscope sorting (right).

Figure 41. Petri dish of sediment and detritus being sorted to find benthic

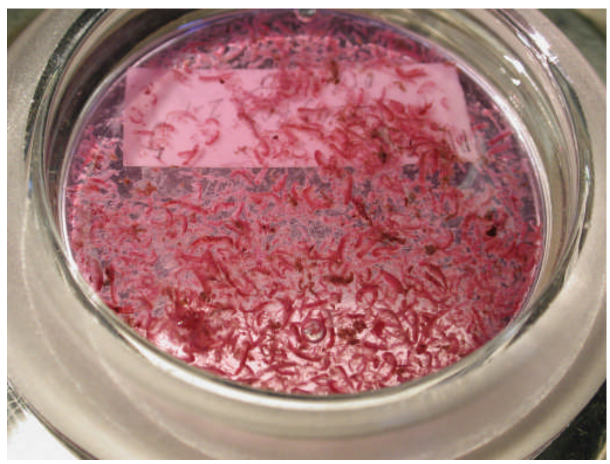


Figure 42. Petri dish of small crustaceans ready to be identified.

Sediment Processing

Benthic animals have an intimate relationship with the substratum. The components, texture, and chemical attributes of the sediment has a regulatory effect on the species that can live in any particular area. The size and mineral composition of the component particles affects characters such as the moisture content, the fluidity and the ability of dissolved substances in the water, such as oxygen and nutrients, to penetrate the sediment. What we simply call mud or sand is actually a combination of many different particle sizes mixed together. In addition the sediment contains organic components derived primarily from plants. The organic material may be present as large material such as logs sticks or leaves or may consist of microscopic particles from plankton or the breakdown of larger material. **Figure 43** shows a photograph of fresh sediment samples. For this project we used a method to describe the sediment grain size distribution and also analyzed the organic content (volatile solids) of the sediment.

Sediment grain size analysis is a method of determining the relative composition of the sediment by describing the distribution of the component particle sizes. For this project we used a sophisticated instrument that utilizes laser diffraction to determine the size and relative percentage of the particle contained within a sample of the sediment (Coulter LS-200). The "black box" instrument is capable of measurement of particulates between 0.4 and 2000 µm in diameter (1 µm = 1 micrometer = one thousandth of a millimeter, = 0.000039 inch). **Figure 44** illustrates the Coulter LS 200. For analysis a small aliquot of sediment (approximately 2.5 cc or ½ teaspoon) is placed into water, the silver cylinder on the top front of the machine. The sample circulates though the machine into a particle size detection cell where a laser beam is scattered in proportion to the particle sizes.

As the instrument is sensitive only to 2,000 µm (2.000 mm), sediments are sieved through a 2 mm mesh prior to diffraction analysis. For this study only the sediment smaller than 2 millimeters was analyzed which generally comprised the bulk of the sediment.

Total percent sand, silt and clay were calculated as the sum of volume percent between 2,000 and 62.5 µm, 62.5 and 3.91 µm, and 3.91 to 0.04 µm, respectively. Geometric distributional statistics are computed from the logarithmic center of each size grouping. Statistics provided include mean, median, and modal grain sizes and are in units of µm. The standard deviation is also in µm and is a measure of the spread of the sediment distribution.

Skewness, is a unitless coefficient that is a measure of the graphic distortion from a symmetrical particle size distribution, with a skewness of zero (where mean, median, and mode coincide) being perfectly symmetrical. Samples with an excess of material in the finer sizes (left-hand skewed) will have negative skewness coefficients, while samples with an excess of coarser material (right-hand skewed) will have skewness values greater than zero.

Kurtosis is also unitless and is a measure of the peakedness of a distribution, with kurtosis values of zero representing a normal distribution (mesokurtic), values greater than zero (leptokurtic) indicating a higher sharper peak, and values less than zero (platykurtic) indicating a comparatively broad distribution.

Organic and inorganic fractions of the sediment was determined by drying and then combusting a sample at 500 °C (Environmental Protection Agency 1973, *Standard Methods*, 1989 and Gross 1971). The loss of weight due to burning is considered to be the organic material present within the sediment also referred to as volatile solids. The weight of the material that remains is considered to be the inorganic fraction consisting of the mineral components such as quartz sands, clays, and carbonate.

Figure 43. Examples of raw sediment collected in the field.

Figure 44. Coulter LS 200 particle size analyzer.

V. Sampling Locations

The location of the sampling sites for each basin is shown in **Figures 45** through **54**. Geographic positions of the sampling locations are provided in the results section and **Appendix A**.

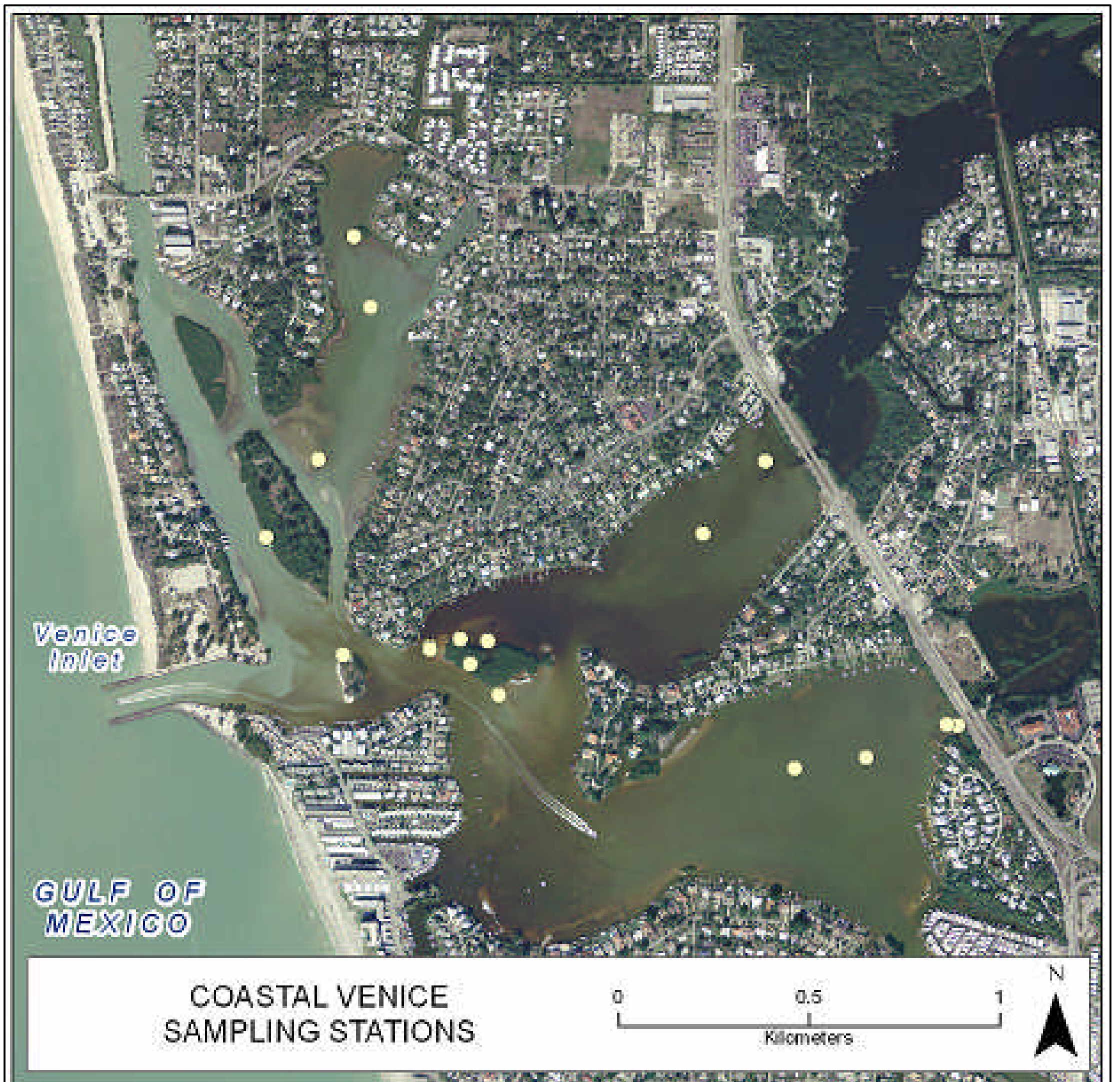


Figure 45. Sampling locations for Coastal Venice including Lyons, Dona and Roberts Bays.

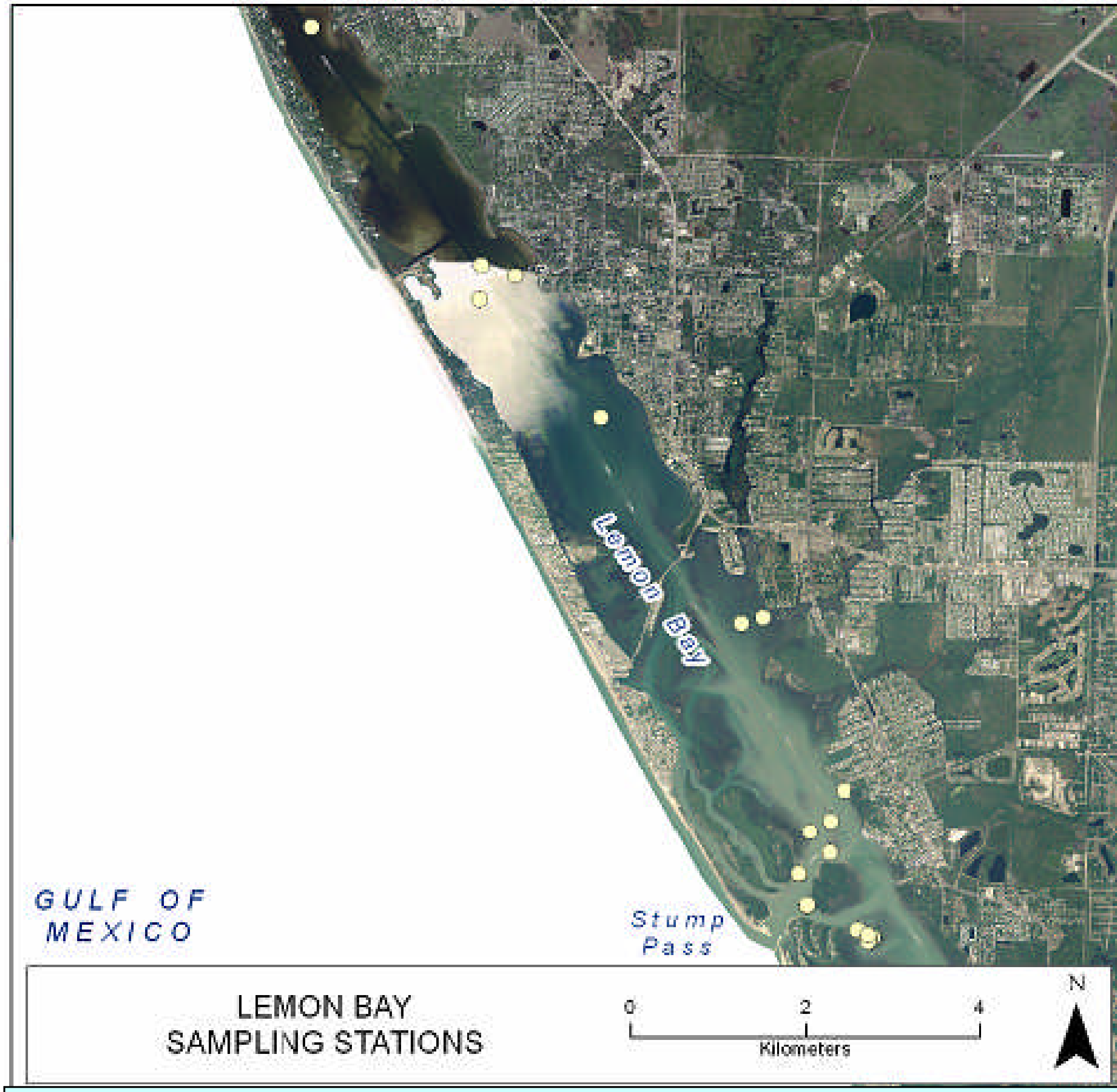


Figure 46. Sampling locations for Lemon Bay.

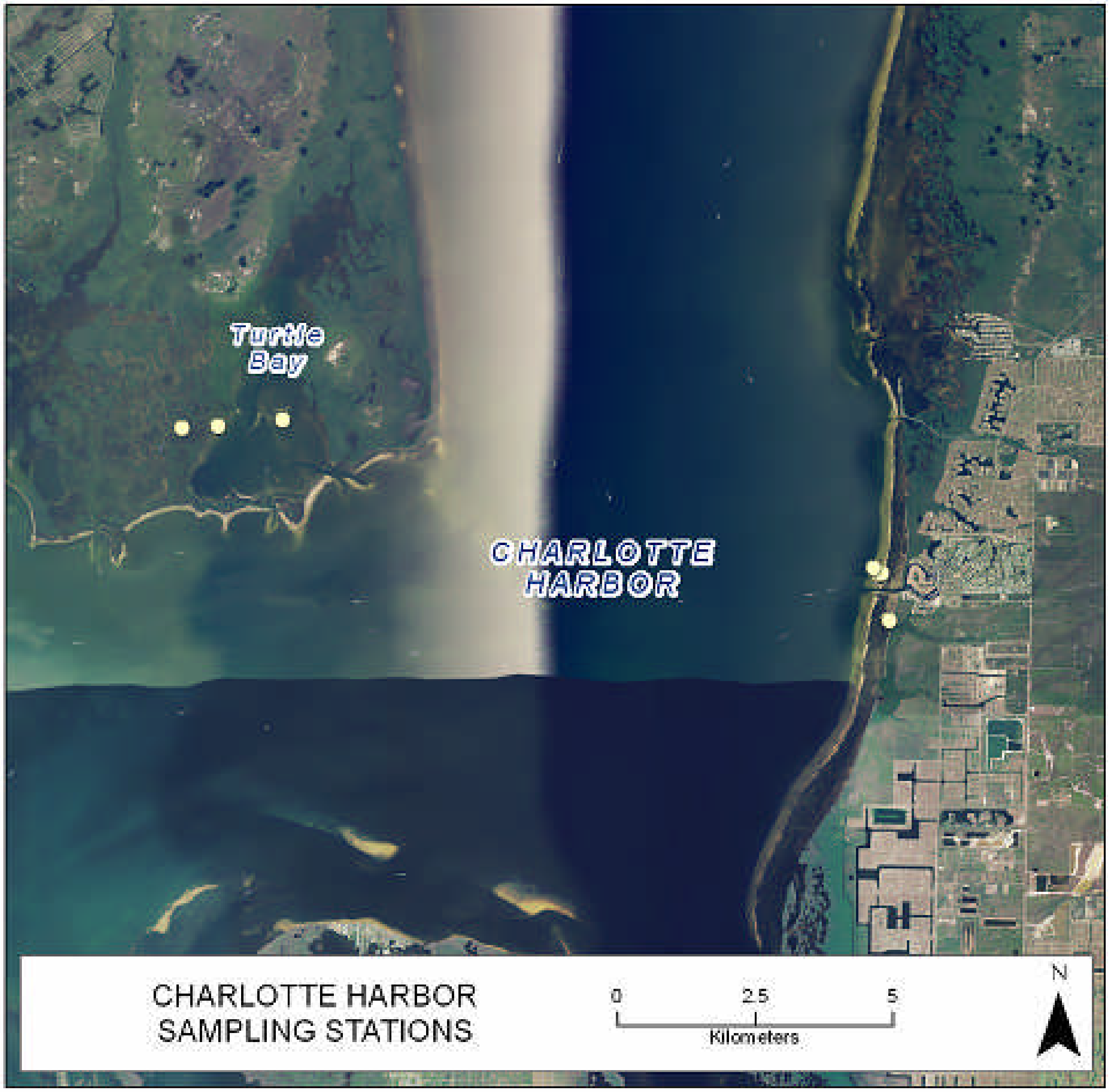


Figure 47. Sampling locations for Charlotte Harbor Proper.

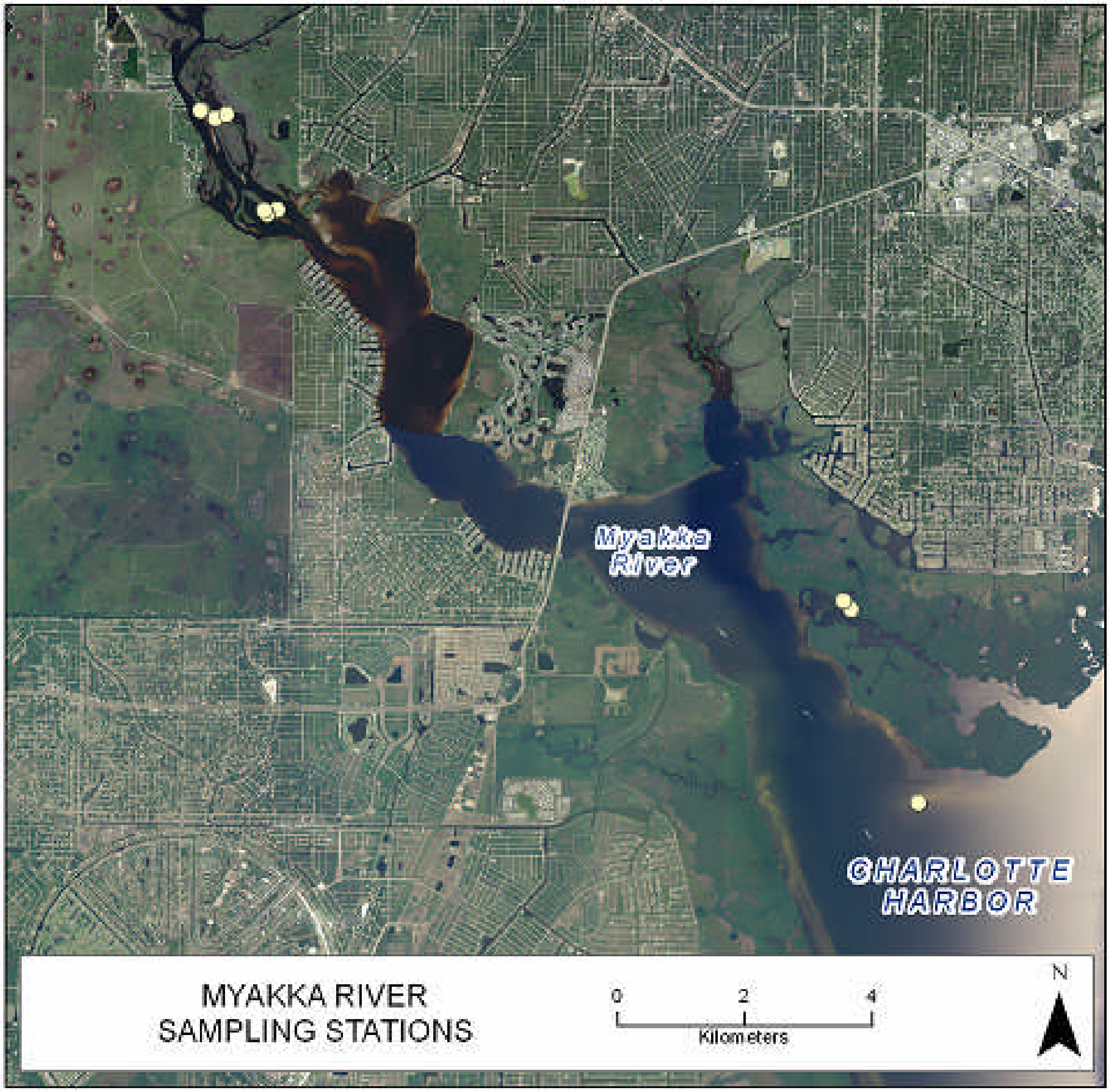


Figure 48. Sampling locations for the tidal Myakka River.

Figure 49. Sampling locations for the tidal Peace River.

Figure 50. Sampling locations for the tidal Caloosahatchee River.

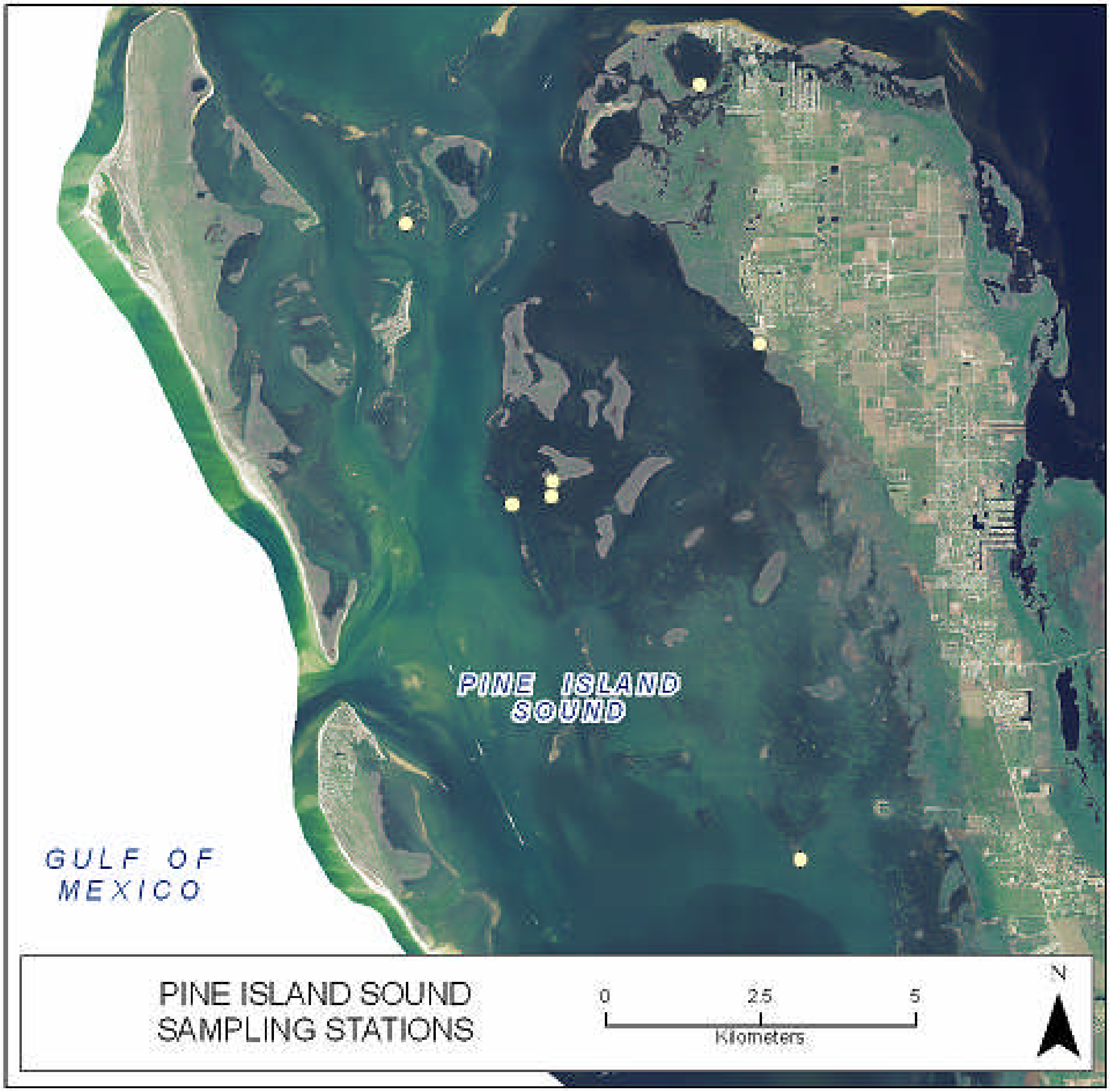


Figure 51. Sampling locations for Pine Island Sound.

Figure 52. Sampling locations for Matlacha Pass.

Figure 53. Sampling locations for San Carlos Bay.

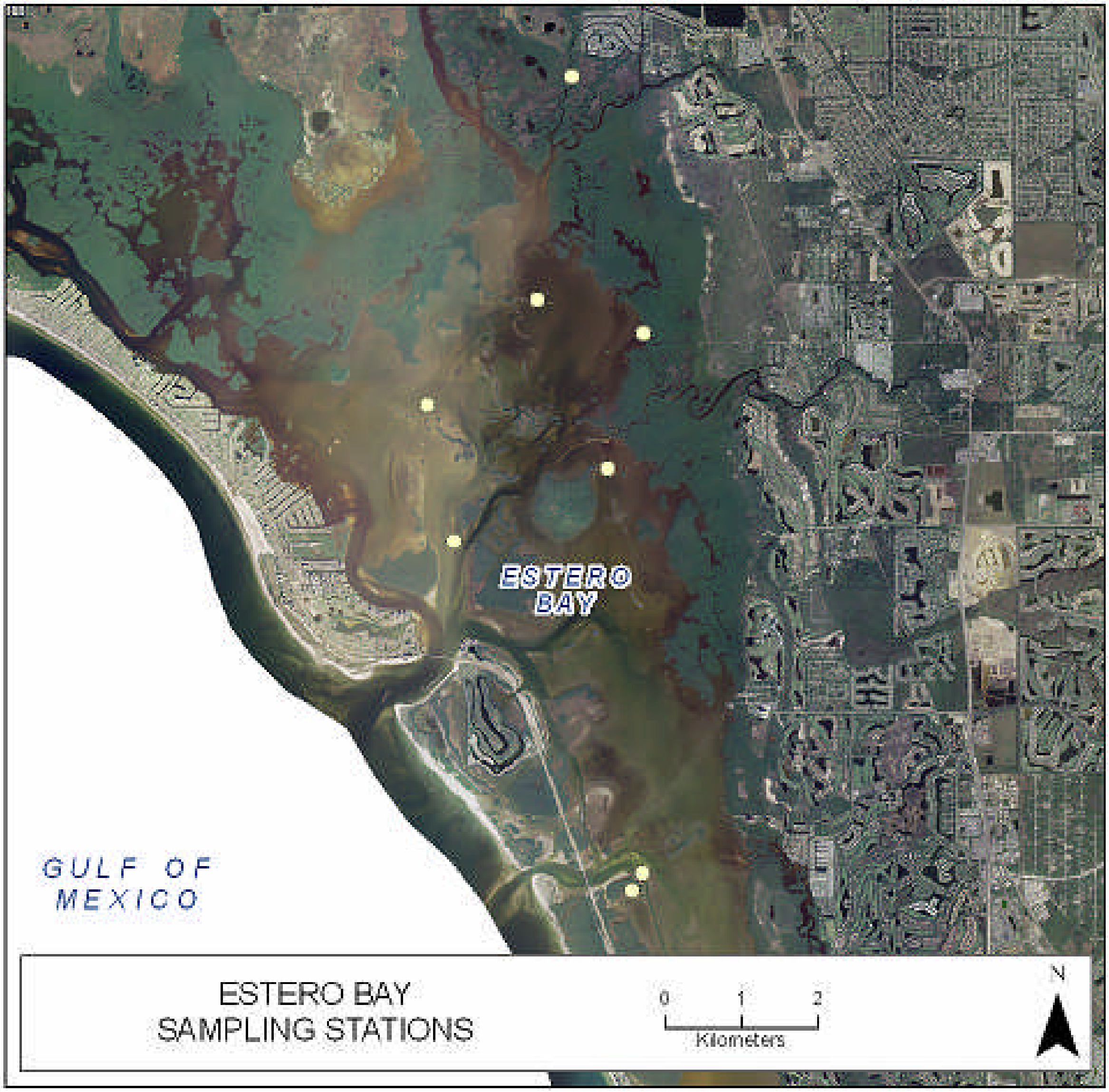


Figure 54. Sampling locations for Estero Bay.

VI. Results

Habitat Representation

Not all of the 8 distinct habitats targeted for this project were found within each of the 10 basins. **Table 1** illustrates the habitats found within each basin. Significant salt marsh habitat was not found within four of the basins; coastal Venice, Tidal Caloosahatchee, Matlacha Pass and San Carlos Bay.

Table 1. List of target habitats sampled within each of the basins, 'X' indicates significant habitat present within the basin and samples taken within these habitats.

Basin No.	Basin Name	Intertidal Mud Flat	Intertidal Sand Bar	Subtidal Mud Flat	Subtidal Sand Bar	Mangrove	Marsh	Submerged Aquatic Vegetation	Oyster
1	Coastal Venice	X	X	X	X	X		X	X
2	Lemon Bay	X	X	X	X	X	X	X	X
3	Charlotte Harbor proper	X	X	X	X	X	X	X	X
4	Tidal Myakka River	X	X	X	X	X	X	X	X
5	Tidal Peace River	X	X	X	X	X	X	X	X
6	Tidal Caloosahatchee River	X	X	X	X	X		X	X
7	Pine Island Sound	X	X	X	X	X	X	X	X
8	Matlacha Pass		X	X	X	X		X	X
9	San Carlos Bay	X	X	X	X	X		X	X
10	Estero Bay	X	X	X	X	X	X	X	X

Salt marsh habitat is not particularly abundant in southwest Florida. The soil elevation requirement, relative to sea level, of salt marsh habitat generally overlaps with that of mangroves. Areas that may initially develop as salt marsh are often replaced by mangroves in southwest Florida. The lower Peace and Myakka Rivers exhibited the largest expanses of naturally occurring tidal marsh habitat. Most of the marsh habitat observed within other basins consisted of relatively small areas. Several sites investigated on the lower Caloosahatchee River marked as marsh habitat on wetlands inventories did not actually contain marsh grasses. The central portions of the marshes are infrequently inundated with water. Marshes are typically wetted by rainstorms and on high-high tides. As a result the soils within the central portions of the marsh are usually wet but not inundated. In addition the salinity of marshlands fluctuates between fresh during rainstorms to salt during tidal inundation. The soils between the shoots are usually covered with a dense algal/diatom mat. Algae also grow around the base and up the shoots. Gastropods such as *Littorina irrorata*, which graze on this mat, are commonly found on the stalks of the marsh plants. The texture of the soil is a mass of dense peaty roots. By necessity the samples for benthic invertebrates were generally taken along marsh fringes which were not dry.

Intertidal mud flat habitat was not found in Matlacha Pass although intertidal sand bar habitat was represented. The difference between these two categories is often subtle with mud flats having a higher proportion of fine "muddy" particulates. Typically intertidal mud flats are found in backwater areas where salinity or water clarity does not allow for seagrass growth. In areas where water clarity is good intertidal flats are often colonized with seagrasses such as *Halodule* or *Ruppia*.

Abiotic Field Parameters

Temperature

Tables 2 through **11** present the field parameters measured at the time of sampling for each habitat. Water temperature at the time of sampling ranged from 24.4°C (76.1°F), at a subtidal sand bar in the coastal Venice basin to a rather remarkable 35.3°C (95.5°F), over an intertidal mud flat within Lemon Bay. This warm temperature illustrates the effect that solar heating can have in shallow calm water areas. Mean temperatures within basins ranged from 25.06°C in Venice to 30.36°C for both Pine Island Sound and San Carlos Bay. This represents a significant north to south temperature gradient within the Charlotte Harbor study area. **Figure 55** compares the mean temperature for all habitats combined for each basin.

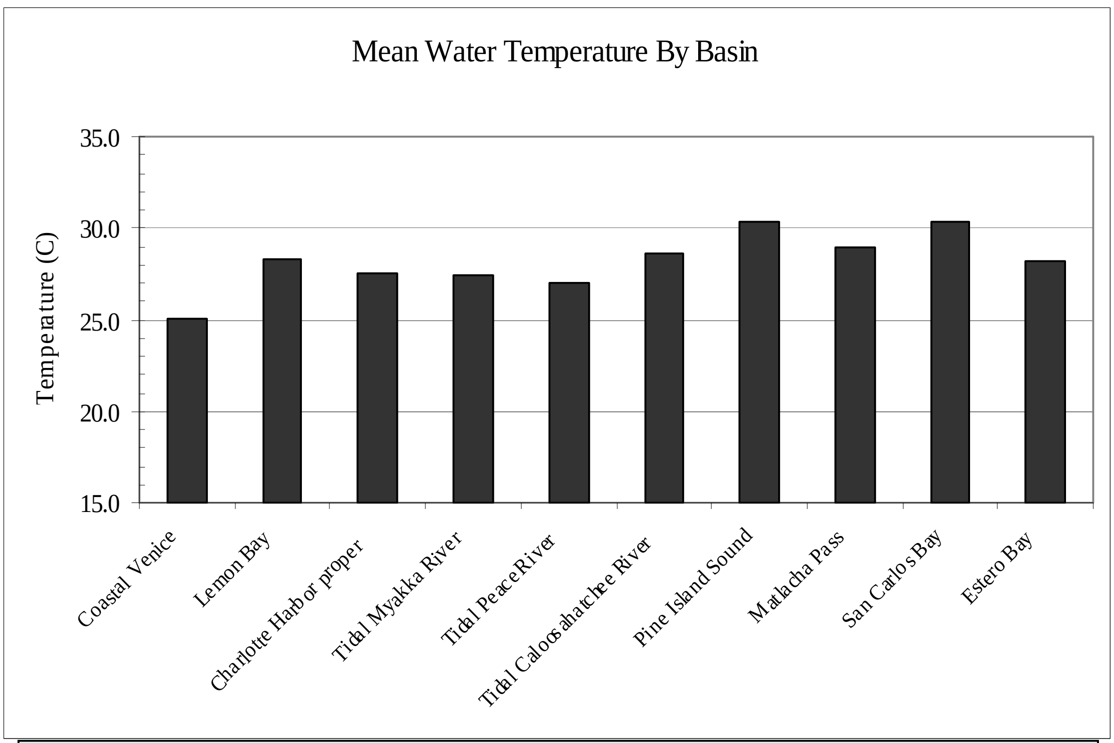


Figure 55. Mean water temperature for each basin at the time of sampling.

Salinity - Specific Conductance

Field sampling for this project was conducted in May of 2004 prior to the onset of the summer rainy season. Salinity and specific conductance values measured at the time of sampling are shown in **Tables 2** through **11.** Under normal weather conditions the dry spring months result in the highest salinities values for the estuary and consequently the greatest species diversity. Average salinity for the 10 basins ranged from 14.9 PSU in Lower Peace River to 36.4 PSU in Lemon Bay. The only other low salinity area was the Lower Myakka River (18.6 PSU). The lowest salinity recorded for the project (7.8 PSU) was in marsh habitat in the lower Peace River. The highest salinity recorded for the project (37.0 PSU) was for the intertidal mud flat station in Lemon Bay. **Figure 56** compares the mean salinity for each basin as measured at the time of sampling. As would be expected the tidal rivers exhibited the lowest salinity. Lemon Bay exhibited slightly elevated salinities. The coastal Venice basin and Pine Island Sound showed salinity equivalent to that of the Gulf of Mexico indicating the areas have a high level of water exchange with the Gulf.

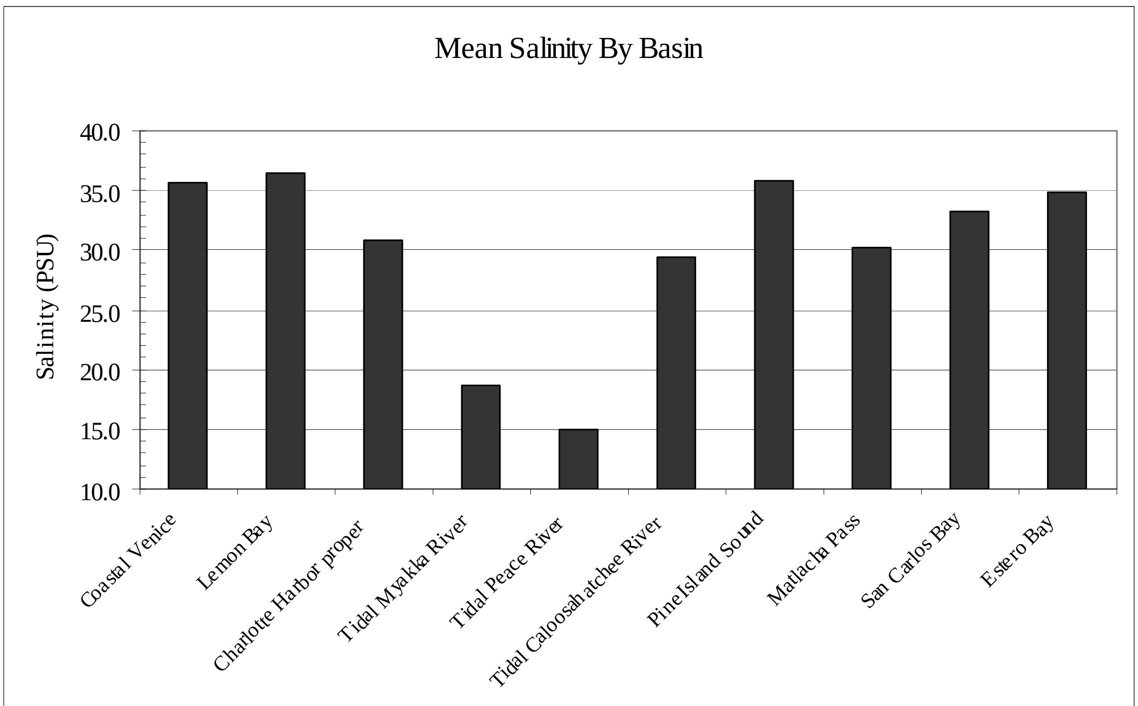


Figure 56. Mean salinity compared between basins.

Dissolved Oxygen

Dissolved oxygen values ranged from 1.69 mg/l to 11.75 mg/l. Both the low value and the high value were recorded at sites with vegetation. The low value was recorded in Pine Island Sound over seagrasses (early morning) and the high value recorded in was recorded at a marsh site in the tidal Peace River late in the morning. The low levels of dissolved oxygen observed in the morning in Pine Island Sound were likely the result of the dark phase of photosynthesis occurring within the dense grass beds. Dissolved oxygen levels reach the lowest levels in the early morning just prior to sunrise. The high levels of dissolved oxygen found in the shallow water of the salt marsh were likely enhanced by the algal mat (producing oxygen during daylight hours) typically found around the roots of marsh plants. Such extremes in dissolved oxygen are not particularly uncommon in estuaries. **Figure 57** compares the mean dissolved oxygen values for the basins at the time of sample collections.

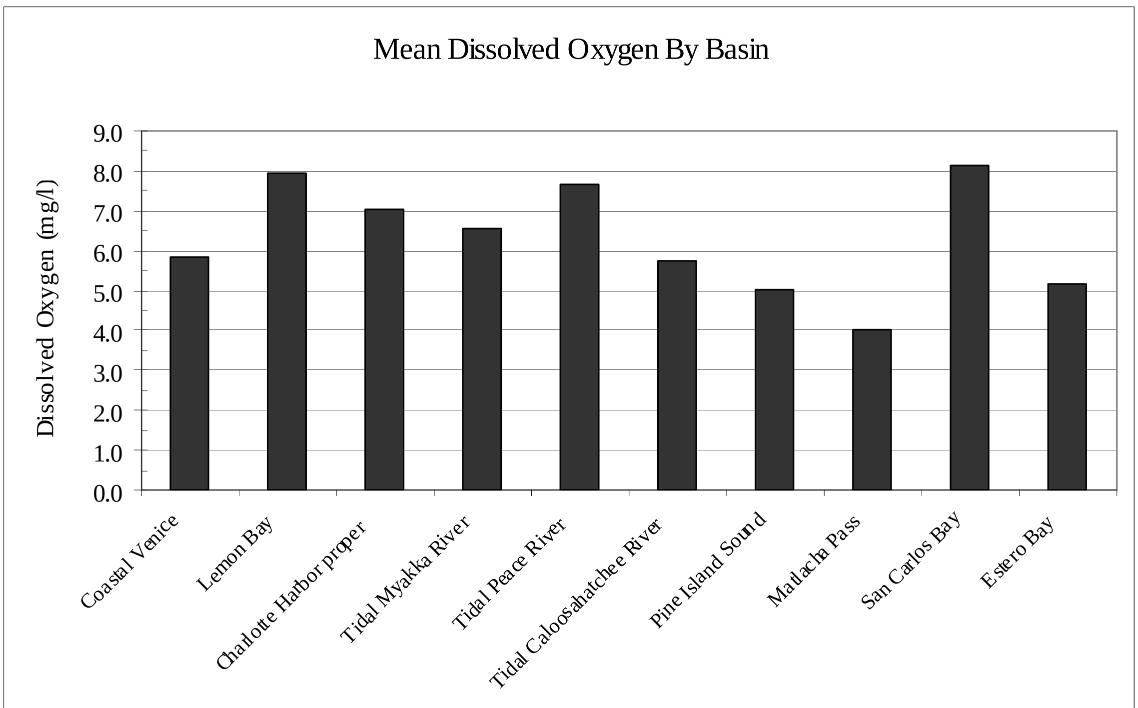


Figure 57. Mean dissolved oxygen values compared between basins.

pH and Oxidation Reduction Potential (ORP)

Values for pH ranged from 7.61 (Charlotte Harbor proper mangroves) to 8.34 (San Carlos Bay SAV site). Lower pH values are often associated with areas that receive fresh water inputs that may contain tannic acids, which are compounds released through the decomposition of vegetation. **Figure 58** illustrates the differences in mean pH for the sampling basins.

Oxidation reduction values ranged from -123 mV (Pine Island marsh) to -4.6 mV. ORP is not commonly measured in marine systems. The ORP is greatly influenced by the presence or absence of molecular oxygen. Low ORP may be caused by extensive growth of heterotrophic microorganisms. Such is often the case in developing or polluted ecosystems where microorganisms utilize the available oxygen. Low ORP is another relative measure for biological oxygen demand. **Figure 59** illustrates the differences in mean pH for the sampling basins.

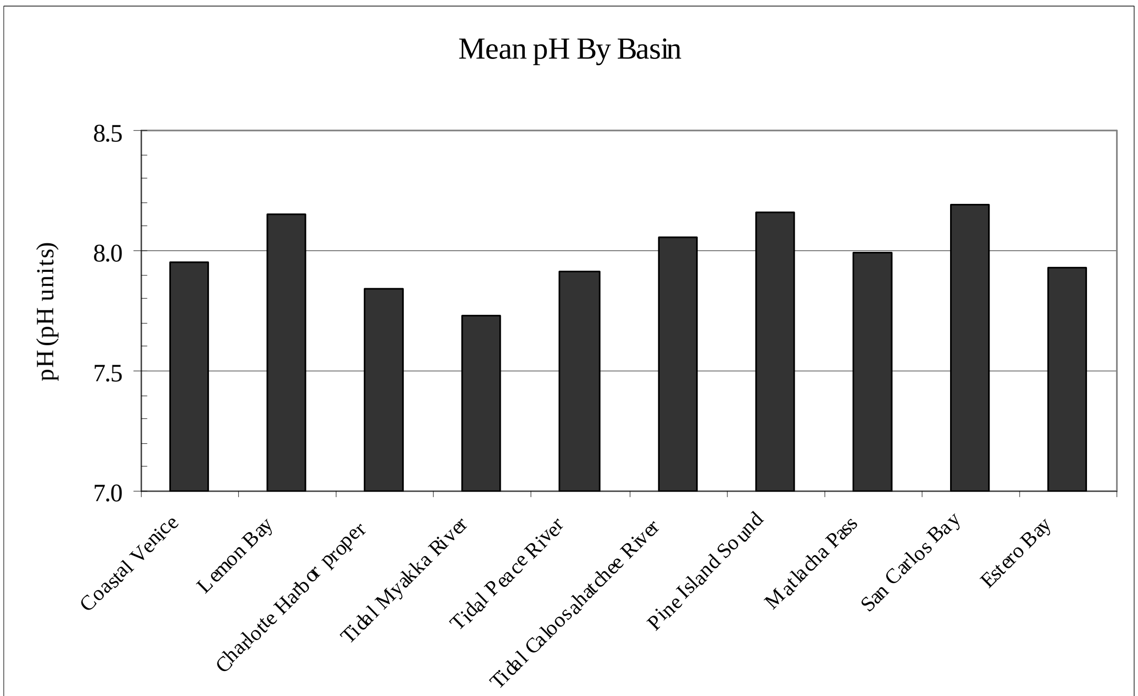


Figure 58. Mean pH values compared between basins.

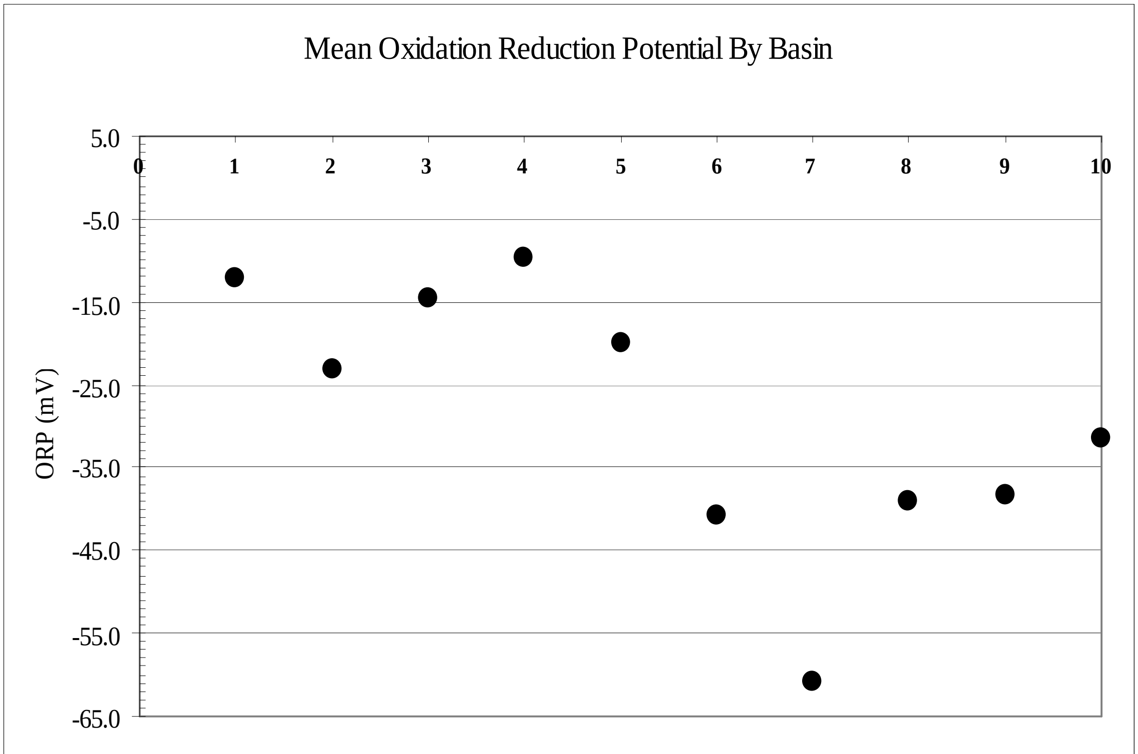


Figure 59. Mean ORP values compared between basins. Basin numbers 1 - 10 represent the basins in the same order as the previous figures.

Sediment Parameters

Sediment grain size statistics are presented in **Table 12**. In general the sediment of the study area is comprised of coarse to fine sand sized particles with varying percentages of shell material and generally low levels of silt-clay sized particles (mud). Sediment parameters exhibited a wide range of values between habitats and also for the same habitat type for different basins. For instance the percentage of volatile solids is a measure of the quantity of organic material that is present within the sediment. This value ranged from 0.3 percent at an Estero Bay intertidal sand bar to 57 percent at the Estero Bay marsh site. Sand bar habitats, both submerged and intertidal, exhibited the least organic matter, while the marsh and mangrove habitats exhibited the greatest quantity of organic material. SAV sites generally exhibited relatively low levels of organic matter within the sediment, comparable to levels in subtidal mud flats.

Quartz sand particles (fine to coarse sand) comprise the vast majority of inorganic sediment within the Charlotte Harbor Study area. Within the benthic habitats the portion of sand ranged from 46% (Estero Bay mangrove) to 99% (Charlotte Harbor proper, subtidal sand bar) of the sediment by volume. The median value for all sites was 86 percent sand. Silt and clay fractions varied inversely in proportion to the sand percentage.

The organic fraction of the sediment ranged from 0.3% at several intertidal sand bar locations to 57% at the Estero Bay marsh site. Sand bar habitats are subject to extensive movement and surface agitation due to the action of currents and waves. In this type of environment the lighter organic particles are washed away to areas of low wave and current influence or deeper basins. In contrast the marsh habitat provides areas of quiescent water where fine particulate matter can settle. In addition the marsh plants and algae provide a constant source of organic material a portion of which is incorporated into the sediment. Dense marsh has a soil that is very peaty due to the thick root structure and the accumulation of organic material. Newly colonized marshes or marsh areas with sparse plant cover exhibit soils without a high organic content, such as the Pine Island Sound marsh that exhibited an organic composition of only 1.8%, similar to that of intertidal and subtidal mudflats.

Mangrove habitat exhibited the next overall highest levels of organic material, up to 25% volatile solids at the Coastal Venice site. Mangrove fringes do not always exhibit highly organic sediments. Mangroves often colonize oyster bars and oysters also often colonize the mangrove roots resulting in a large component of oyster shell within some mangrove habitats. In addition mangroves may be subject to occasional wave action that results in removal of the organic material from the fringe area. Soils of mangrove habitat become more organic farther away from the water where wave action is generally not a significant factor due to the dense root structure.

The distribution of particle sizes for each sample that was analyzed for this project can be found in the graphics of **Appendix B**. In all cases the distribution of particles is negatively skewed. This measure indicates that the number of particle sizes about the graphic mean is greater on the negative side (fine grain) than the positive side (coarse grain), which reveals that coarse sediment material is somewhat rare in the local sediment while smaller particles are common. A positively skewed distribution would indicate the presence of larger sized materials in the sediment such as shells, pebbles or gravel.

Table 2. Water parameters for the coastal Venice basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 1 Coastal Venice											
Intertidal mud flat	IMF	27.11410	-82.45967	1.6	25.23	52.74	34.76	88.9	6.04	7.93	-13.60
Intertidal mud flat	IMF	27.11413	-82.46040	2.1	25.07	53.10	35.02	89.6	6.02	7.99	-19.20
Intertidal mud flat	IMF	27.11413	-82.46040	2.1	25.07	53.10	35.02	89.6	6.02	7.99	-19.20
Intertidal sand bar	ISB	27.11145	-82.44964	2.3	25.52	53.16	35.06	82.7	5.55	7.91	-23.20
Intertidal sand bar	ISB	27.11372	-82.46348	2.9	24.72	55.05	36.48	89.6	6.04	8.00	-14.50
Intertidal sand bar	ISB	27.11282	-82.45936	1.5	25.07	53.10	35.02	89.6	6.02	7.99	-19.20
Mangrove	MGR	27.11355	-82.46012	1.0	25.07	53.10	35.02	89.6	6.02	7.99	-19.20
Mangrove	MGR	27.12360	-82.46333	1.8	25.66	54.01	35.56	83.9	5.52	7.90	-12.60
Mangrove	MGR	27.11222	-82.44725	1.5	25.49	53.16	35.06	83.3	5.59	7.90	-16.00
Submerged aquatic vegetation	SAV	27.11833	-82.46420	1.6	24.82	54.98	36.43	91.5	6.17	7.96	-15.50
Submerged aquatic vegetation	SAV	27.11647	-82.46557	3.6	24.77	55.09	36.52	92.3	6.21	8.02	-18.20
Submerged aquatic vegetation	SAV	27.11647	-82.46557	3.6	24.77	55.09	36.52	92.3	6.21	8.02	-18.20
Subtidal mud flat	SMF	27.12193	-82.46288	4.9	25.30	54.64	36.10	82.7	5.62	7.92	-15.10
Subtidal mud flat	SMF	27.11668	-82.45402	4.0	25.13	54.43	36.02	85.5	5.69	7.97	-15.60
Subtidal mud flat	SMF	27.11117	-82.45153	5.0	24.95	54.57	36.12	91.2	6.14	8.00	-20.00
Subtidal sand bar	SSB	27.11393	-82.46120	2.6	24.48	54.59	36.10	87.7	5.75	7.95	-13.00
Subtidal sand bar	SSB	27.11390	-82.46120	2.6	24.48	54.59	36.10	87.7	5.75	7.95	-13.00
Subtidal sand bar	SSB	27.11387	-82.46120	2.6	24.48	54.59	36.10	87.7	5.75	7.95	-13.00
Oysters	OYS	27.12360	-82.46333	1.8	25.66	54.01	35.56	83.9	5.52	7.90	-12.60
Oysters	OYS	27.11224	-82.44752	1.0	25.49	53.16	35.06	83.3	5.59	7.90	-16.00
Oysters	OYS	27.11842	-82.45240	2.3	24.95	51.92	34.26	84.0	5.66	7.87	-7.30
			Mean	2.5	25.06	53.91	35.61	87.5	5.85	7.95	-15.91
			St. Dev.	1.1	0.37	0.94	0.68	3.3	0.25	0.05	3.56
			Median	2.3	25.07	54.01	35.56	87.7	5.75	7.95	-15.60
			Minimum	1.0	24.48	51.92	34.26	82.7	5.52	7.87	-23.20
			Maximum	5.0	25.66	55.09	36.52	92.3	6.21	8.02	-7.30

Table 3. Water parameters for the Lemon Bay basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 2 Lemon Bay											
Intertidal mud flat	IMF	26.89628	-82.32935	1.0	35.28	56.26	37.02	142.0	8.07	8.15	-21.60
Intertidal mud flat	IMF	26.90278	-82.33813	2.4	28.62	55.60	36.78	152.5	9.72	8.30	-28.30
Intertidal mud flat	IMF	26.90278	-82.33812	2.4	28.62	55.60	36.78	152.5	9.72	8.30	-28.30
Intertidal sand bar	ISB	26.96528	-82.37517	1.0	26.25	54.10	35.74	105.9	7.03	8.12	-23.60
Intertidal sand bar	ISB	26.89618	-82.32972	2.9	26.82	54.51	36.03	109.2	7.08	8.10	-12.60
Intertidal sand bar	ISB	26.89960	-82.33710	2.5	27.24	55.40	36.68	130.4	8.42	8.13	-21.40
Mangrove	MGR	26.89593	-82.32983	4.7	35.28	56.26	37.02	142.0	8.07	8.15	-21.60
Mangrove	MGR	26.89953	-82.33723	2.7	27.24	55.40	36.68	130.4	8.42	8.13	-21.40
Mangrove	MGR	26.90278	-82.33813	2.4	28.62	55.60	36.78	152.5	9.72	8.30	-28.30
Marsh	MAR	26.89960	-82.33710	2.5	27.24	55.40	36.68	130.4	8.42	8.13	-21.40
Marsh	MAR	26.90278	-82.33813	2.4	28.62	55.60	36.78	152.5	9.72	8.30	-28.30
Marsh	MAR	26.90278	-82.33813	2.4	28.62	55.60	36.78	152.5	9.72	8.30	-28.30
Submerged aquatic vegetation	SAV	26.96160	-82.37532	2.0	25.99	54.06	35.71	91.5	6.08	8.11	-25.80
Submerged aquatic vegetation	SAV	26.91162	-82.33292	2.5	26.51	55.22	36.56	122.4	7.92	8.07	-4.60
Submerged aquatic vegetation	SAV	26.90843	-82.33447	3.3	26.48	55.27	36.61	107.1	7.02	8.08	-22.20
Subtidal mud flat	SMF	26.94955	-82.36137	7.6	25.88	54.73	36.21	85.1	5.67	8.02	-20.50
Subtidal mud flat	SMF	26.92863	-82.34490	4.9	27.68	55.04	36.40	106.3	6.77	8.12	-23.30
Subtidal mud flat	SMF	26.98950	-82.39497	4.5	27.49	52.48	34.48	110.6	7.18	8.15	-25.40
Subtidal sand bar	SSB	26.89710	-82.33105	6.4	27.25	54.59	36.09	136.4	8.84	8.19	-35.80
Subtidal sand bar	SSB	26.90500	-82.33453	5.4	26.68	55.29	36.61	119.7	7.82	8.06	-23.40
Subtidal sand bar	SSB	26.90727	-82.33683	6.5	27.14	55.08	36.47	126.1	8.80	8.16	-23.30
Oysters	OYS	27.96410	-82.37130	1.0	26.67	54.27	35.85	92.3	6.02	8.07	-24.50
Oysters	OYS	27.89662	-82.32987	0.0	35.28	56.26	37.02	142.0	8.07	8.15	-21.60
Oysters	OYS	27.92927	-82.34245	0.0	28.33	54.44	35.93	108.1	6.91	7.99	-19.70
			Mean	3.1	28.33	55.09	36.40	125.0	7.97	8.15	-23.13
			St. Dev.	2.0	2.82	0.85	0.58	21.3	1.25	0.09	5.89
			Median	2.5	27.25	55.28	36.61	128.3	8.07	8.13	-23.30
			Minimum	0.0	25.88	52.48	34.48	85.1	5.67	7.99	-35.80
			Maximum	7.6	35.28	56.26	37.02	152.5	9.72	8.30	-4.60

Table 4. Water parameters for Charlotte Harbor proper basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 3 Charlotte Harbor proper											
Intertidal mud flat	IMF	26.75638	-82.06440	1.4	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Intertidal mud flat	IMF	26.75638	-82.06440	1.4	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Intertidal mud flat	IMF	26.75638	-82.06440	1.4	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Intertidal sand bar	ISB	26.76392	-82.06625	6.6	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Intertidal sand bar	ISB	26.76392	-82.06625	6.6	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Intertidal sand bar	ISB	26.76392	-82.06625	6.6	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Mangrove	MGR	26.78673	-82.19355	1.5	27.81	46.28	29.95	91.6	6.07	7.61	-12.00
Mangrove	MGR	26.78673	-82.19355	1.5	27.81	46.28	29.95	91.6	6.07	7.61	-12.00
Mangrove	MGR	26.78673	-82.19355	1.5	27.81	46.28	29.95	91.6	6.07	7.61	-12.00
Marsh	MAR	26.75635	-82.06433	0.5	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Marsh	MAR	26.75635	-82.06433	0.5	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Marsh	MAR	26.75635	-82.06433	0.5	29.77	49.49	32.23	138.3	8.79	7.92	-17.10
Submerged aquatic vegetation	SAV	26.76412	-82.06572	2.0	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Submerged aquatic vegetation	SAV	26.76412	-82.06572	2.0	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Submerged aquatic vegetation	SAV	26.76412	-82.06572	2.0	26.15	48.64	31.72	90.3	6.10	7.86	-13.70
Subtidal mud flat	SMF	26.78838	-82.17513	5.6	26.82	44.49	28.68	91.9	6.27	7.87	-17.10
Subtidal mud flat	SMF	26.78838	-82.17513	5.6	26.82	44.49	28.68	91.9	6.27	7.87	-17.10
Subtidal mud flat	SMF	26.78838	-82.17513	5.6	26.82	44.49	28.68	91.9	6.27	7.87	-17.10
Subtidal sand bar	SSB	26.76503	-82.06728	4.0	26.31	48.24	31.42	87.6	5.91	7.77	-10.50
Subtidal sand bar	SSB	26.76503	-82.06728	4.0	26.31	48.24	31.42	87.6	5.91	7.77	-10.50
Subtidal sand bar	SSB	26.76503	-82.06728	4.0	26.31	48.24	31.42	87.6	5.91	7.77	-10.50
Oysters	OYS	26.78713	-82.18692	2.8	27.55	45.29	29.25	124.1	8.30	7.89	-15.40
Oysters	OYS	26.78713	-82.18692	2.8	27.55	45.29	29.25	124.1	8.30	7.89	-15.40
Oysters	OYS	26.78713	-82.18692	2.8	27.55	45.29	29.25	124.1	8.30	7.89	-15.40
			Mean	3.1	27.54	47.57	30.90	106.6	7.04	7.84	-14.58
			St. Dev.	2.1	1.44	1.86	1.34	21.8	1.27	0.10	2.41
			Median	2.4	27.19	48.44	31.57	91.8	6.19	7.87	-14.55
			Minimum	0.5	26.15	44.49	28.68	87.6	5.91	7.61	-17.10
			Maximum	6.6	29.77	49.49	32.23	138.3	8.79	7.92	-10.50

Table 5. Water parameters for tidal Myakka River basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 4 Tidal Myakka River											
Intertidal mud flat	IMF	27.01604	-82.26807	1.0	27.15	24.92	15.13	95.7	6.90	7.64	-8.40
Intertidal mud flat	IMF	26.94744	-82.16681	1.8	29.28	38.49	24.35	90.5	6.09	7.65	-10.70
Intertidal mud flat	IMF	26.94744	-82.16681	1.8	29.28	38.49	24.35	90.5	6.09	7.65	-10.70
Intertidal sand bar	ISB	27.00326	82.25809	1.6	26.59	25.44	15.47	89.2	6.57	7.73	-11.40
Intertidal sand bar	ISB	27.00326	82.25809	1.6	26.59	25.44	15.47	89.2	6.57	7.73	-11.40
Intertidal sand bar	ISB	27.00326	82.25809	1.6	26.59	25.44	15.47	89.2	6.57	7.73	-11.40
Mangrove	MGR	27.00251	-82.25977	1.6	26.74	26.51	16.18	83.7	6.10	7.76	-10.90
Mangrove	MGR	27.00251	-82.25977	1.6	26.74	26.51	16.18	83.7	6.10	7.76	-10.90
Mangrove	MGR	27.00251	-82.25977	1.6	26.74	26.51	16.18	83.7	6.10	7.76	-10.90
Marsh	MAR	27.01662	-82.26628	1.0	27.03	24.65	14.94	88.1	6.41	7.62	-7.30
Marsh	MAR	27.01662	-82.26628	1.0	27.03	24.65	14.94	88.1	6.41	7.62	-7.30
Marsh	MAR	27.01662	-82.26628	1.0	27.03	24.65	14.94	88.1	6.41	7.62	-7.30
Submerged aquatic vegetation	SAV	26.92008	-82.15590	3.0	27.65	39.98	25.45	104.1	7.11	7.85	-10.80
Submerged aquatic vegetation	SAV	26.92008	-82.15590	3.0	27.65	39.98	25.45	104.1	7.11	7.85	-10.80
Submerged aquatic vegetation	SAV	26.92008	-82.15590	3.0	27.65	39.98	25.45	104.1	7.11	7.85	-10.80
Subtidal mud flat	SMF	27.00301	-82.26012	1.6	26.42	26.34	16.07	87.1	6.41	7.76	-9.80
Subtidal mud flat	SMF	27.00301	-82.26012	1.6	26.42	26.34	16.07	87.1	6.41	7.76	-9.80
Subtidal mud flat	SMF	27.00301	-82.26012	1.6	26.42	26.34	16.07	87.1	6.41	7.76	-9.80
Subtidal sand bar	SSB	27.01716	-82.27043	2.3	27.12	25.04	15.20	95.0	6.94	7.67	-7.90
Subtidal sand bar	SSB	27.01716	-82.27043	2.3	27.12	25.04	15.20	95.0	6.94	7.67	-7.90
Subtidal sand bar	SSB	27.01716	-82.27043	2.3	27.12	25.04	15.20	95.0	6.94	7.67	-7.90
Oysters	OYS	26.94855	-82.16805	1.0	29.02	38.17	24.14	96.3	6.57	7.78	-9.80
Oysters	OYS	26.94855	-82.16805	1.0	29.02	38.17	24.14	96.3	6.57	7.78	-9.80
Oysters	OYS	26.94855	-82.16805	1.0	29.02	38.17	24.14	96.3	6.57	7.78	-9.80
			Mean	1.7	27.39	30.01	18.59	92.0	6.56	7.73	-9.73
			St. Dev.	0.6	0.98	6.49	4.43	6.2	0.34	0.07	1.43
			Median	1.6	27.08	26.34	16.07	89.9	6.57	7.75	-9.80
			Minimum	1.0	26.42	24.65	14.94	83.7	6.09	7.62	-11.40
			Maximum	3.0	29.28	39.98	25.45	104.1	7.11	7.85	-7.30

Table 6. Water parameters for tidal Peace River basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 5 Tidal Peace River											
Intertidal mud flat	IMF	26.96465	-82.02058	2.5	26.85	26.84	16.41	122.0	8.88	8.09	-23.30
Intertidal mud flat	IMF	26.96465	-82.02058	2.5	26.78	26.86	16.42	118.5	8.60	8.09	-23.90
Intertidal mud flat	IMF	26.96465	-82.02058	2.5	26.77	26.86	16.42	115.1	8.39	8.09	-24.30
Intertidal sand bar	ISB	26.95106	-82.02262	0.8	27.63	23.38	14.09	106.0	7.67	7.80	-11.20
Intertidal sand bar	ISB	26.95106	-82.02262	0.8	27.52	23.40	14.11	102.5	7.46	7.78	-11.70
Intertidal sand bar	ISB	26.95106	-82.02262	0.8	27.47	23.42	14.12	100.4	7.30	7.77	-12.10
Mangrove	MGR	26.96735	-82.01482	1.6	28.82	18.62	11.04	90.4	6.85	7.88	-18.04
Mangrove	MGR	26.96735	-82.01482	1.6	25.81	18.77	11.11	78.4	5.96	7.82	-20.10
Mangrove	MGR	26.96735	-82.01482	1.6	28.81	18.77	11.11	78.8	6.05	7.82	-20.50
Marsh	MAR	26.97042	-82.01366	2.6	26.20	13.58	7.82	151.8	11.75	8.17	-24.70
Marsh	MAR	26.97042	-82.01366	2.6	26.11	14.07	8.12	100.5	7.81	8.05	-25.00
Marsh	MAR	26.97042	-82.01366	2.6	26.17	14.02	8.12	104.2	7.87	7.98	-23.60
Submerged aquatic vegetation	SAV	26.95765	-82.01465	1.7	26.02	28.50	17.54	88.1	6.46	7.90	-24.90
Submerged aquatic vegetation	SAV	26.95765	-82.01465	1.7	26.08	28.69	17.67	89.6	6.58	7.91	-27.30
Submerged aquatic vegetation	SAV	26.95765	-82.01465	1.7	26.09	28.68	17.66	89.3	6.57	7.91	-27.50
Subtidal mud flat	SMF	26.96891	-82.01473	10.0	25.99	25.08	15.25	98.3	7.32	8.01	-24.00
Subtidal mud flat	SMF	26.96891	-82.01473	10.0	25.99	25.12	15.27	98.7	7.35	8.02	-24.30
Subtidal mud flat	SMF	26.96891	-82.01473	10.0	26.00	25.13	15.28	99.1	7.38	8.02	-24.30
Subtidal sand bar	SSB	26.95104	-82.02261	1.6	27.55	23.45	14.14	106.5	7.74	7.77	-12.80
Subtidal sand bar	SSB	26.95104	-82.02261	1.6	27.55	23.44	14.13	104.5	7.61	7.77	-13.00
Subtidal sand bar	SSB	26.95104	-82.02261	1.6	27.54	23.44	14.13	103.4	7.54	7.77	-13.60
Oysters	OYS	26.95651	-82.07222	3.7	28.16	36.82	23.21	117.9	8.11	7.80	-14.00
Oysters	OYS	26.95651	-82.07222	3.7	28.18	36.82	23.21	117.4	8.05	7.84	-16.20
Oysters	OYS	26.95651	-82.07222	3.7	28.14	36.82	23.22	119.9	8.27	7.87	-16.50
			Mean	3.1	27.01	24.61	14.98	104.2	7.65	7.91	-19.87
			St. Dev.	2.8	0.97	6.49	4.30	15.9	1.16	0.13	5.55
			Median	2.1	26.82	24.27	14.70	103.0	7.58	7.89	-21.90
			Minimum	0.8	25.81	13.58	7.82	78.4	5.96	7.77	-27.50
			Maximum	10.0	28.82	36.82	23.22	151.8	11.75	8.17	-11.20

Table 7. Water parameters for tidal Caloosahatchee River basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 6 Tidal Caloosahatchee River											
Intertidal mud flat	IMF	26.51451	-81.99093	3.7	29.65	47.63	30.87	98.2	6.31	8.09	-37.30
Intertidal mud flat	IMF	26.51451	-81.99093	3.7	29.65	47.63	30.87	98.2	6.31	8.09	-37.30
Intertidal mud flat	IMF	26.51451	-81.99093	3.7	29.65	47.63	30.87	98.2	6.31	8.09	-37.30
Intertidal sand bar	ISB	26.53900	-81.99615	1.7	28.26	43.59	28.01	92.2	6.15	8.13	-61.90
Intertidal sand bar	ISB	26.53900	-81.99615	1.7	28.26	43.59	28.01	92.2	6.15	8.13	-61.90
Intertidal sand bar	ISB	26.53900	-81.99615	1.7	28.26	43.59	28.01	92.2	6.15	8.13	-61.90
Mangrove	MGR	26.53368	-81.99747	1.4	28.36	44.71	28.82	79.1	5.21	8.05	-39.40
Mangrove	MGR	26.53368	-81.99747	1.4	28.36	44.71	28.82	79.1	5.21	8.05	-39.40
Mangrove	MGR	26.53368	-81.99747	1.4	28.36	44.71	28.82	79.1	5.21	8.05	-39.40
Submerged aquatic vegetation	SAV	26.53368	-81.98655	1.5	29.52	46.06	29.75	92.2	5.96	8.08	-56.70
Submerged aquatic vegetation	SAV	26.53368	-81.98655	1.5	29.52	46.06	29.75	92.2	5.96	8.08	-56.70
Submerged aquatic vegetation	SAV	26.53368	-81.98655	1.5	29.52	46.06	29.75	92.2	5.96	8.08	-56.70
Subtidal mud flat	SMF	26.52016	-81.98433	4.7	28.79	48.16	31.30	86.7	5.62	8.03	-31.10
Subtidal mud flat	SMF	26.52016	-81.98433	4.7	28.79	48.16	31.30	86.7	5.62	8.03	-31.10
Subtidal mud flat	SMF	26.52016	-81.98433	4.7	28.79	48.16	31.30	86.7	5.62	8.03	-31.10
Subtidal sand bar	SSB	26.53438	-81.19995	1.9	28.05	44.40	28.53	82.3	5.50	7.99	-24.90
Subtidal sand bar	SSB	26.53438	-81.19995	1.9	28.05	44.40	28.53	82.3	5.50	7.99	-24.90
Subtidal sand bar	SSB	26.53438	-81.19995	1.9	28.05	44.40	28.53	82.3	5.50	7.99	-24.90
Oysters	OYS	26.53410	-81.99743	2.8	28.06	44.17	28.43	79.4	5.30	8.02	-34.30
Oysters	OYS	26.53410	-81.99743	2.8	28.06	44.17	28.43	79.4	5.30	8.02	-34.30
Oysters	OYS	26.53410	-81.99743	2.8	28.06	44.17	28.43	79.4	5.30	8.02	-34.30
			Mean	2.5	28.67	45.53	29.39	87.2	5.72	8.06	-40.80
			St. Dev.	1.2	0.64	1.70	1.22	6.9	0.40	0.05	12.85
			Median	1.9	28.36	44.71	28.82	86.7	5.62	8.05	-37.30
			Minimum	1.4	28.05	43.59	28.01	79.1	5.21	7.99	-61.90
			Maximum	4.7	29.65	48.16	31.30	98.2	6.31	8.13	-24.90

Table 8. Water parameters for Pine Island Sound basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 7 Pine Island Sound											
Intertidal mud flat	IMF	26.65997	-82.15377	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Intertidal mud flat	IMF	26.65997	-82.15377	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Intertidal mud flat	IMF	26.65997	-82.15377	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Intertidal sand bar	ISB	26.58521	-82.14651	1.8	29.18	54.64	36.05	87.6	5.49	8.29	-43.30
Intertidal sand bar	ISB	26.58521	-82.14651	1.8	29.18	54.64	36.05	87.6	5.49	8.29	-43.30
Intertidal sand bar	ISB	26.58521	-82.14651	1.8	29.18	54.64	36.05	87.6	5.49	8.29	-43.30
Mangrove	MGR	26.63978	-82.18694	3.0	27.43	55.65	36.86	27.4	1.69	8.08	-41.10
Mangrove	MGR	26.63978	-82.18694	3.0	27.43	55.65	36.86	27.4	1.69	8.08	-41.10
Mangrove	MGR	26.63978	-82.18694	3.0	27.43	55.65	36.86	27.4	1.69	8.08	-41.10
Marsh	MAR	26.65997	-82.15367	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Marsh	MAR	26.65997	-82.15367	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Marsh	MAR	26.65997	-82.15367	0.5	34.42	55.47	36.27	122.7	7.05	8.30	-123.20
Submerged aquatic vegetation	SAV	26.63759	-82.18715	4.1	27.65	54.92	36.31	28.7	1.83	8.17	-43.30
Submerged aquatic vegetation	SAV	26.63759	-82.18715	4.1	27.65	54.92	36.31	28.7	1.83	8.17	-43.30
Submerged aquatic vegetation	SAV	26.63759	-82.18715	4.1	27.65	54.92	36.31	28.7	1.83	8.17	-43.30
Subtidal mud flat	SMF	26.69756	-82.16378	5.0	30.54	51.55	33.74	80.9	5.08	7.65	-20.10
Subtidal mud flat	SMF	26.69756	-82.16378	5.0	30.54	51.55	33.74	80.9	5.08	7.65	-20.10
Subtidal mud flat	SMF	26.69756	-82.16378	5.0	30.54	51.55	33.74	80.9	5.08	7.65	-20.10
Subtidal sand bar	SSB	26.63628	-82.19350	5.4	28.75	54.04	35.62	74.5	4.73	8.21	-43.10
Subtidal sand bar	SSB	26.63628	-82.19350	5.4	28.75	54.04	35.62	74.5	4.73	8.21	-43.10
Subtidal sand bar	SSB	26.63628	-82.19350	5.4	28.75	54.04	35.62	74.5	4.73	8.21	-43.10
Oysters	OYS	26.67693	-82.21116	1.7	30.46	53.60	35.21	119.2	7.35	8.27	-48.50
Oysters	OYS	26.67693	-82.21116	1.7	30.46	53.60	35.21	119.2	7.35	8.27	-48.50
Oysters	OYS	26.67693	-82.21116	1.7	30.46	53.60	35.21	119.2	7.35	8.27	-48.50
			Mean	2.8	30.36	54.42	35.79	83.0	5.03	8.16	-60.73
			St. Dev.	1.8	2.63	1.31	0.92	37.2	2.14	0.21	37.72
			Median	2.4	29.82	54.78	36.16	84.3	5.29	8.24	-43.30
			Minimum	0.5	27.43	51.55	33.74	27.4	1.69	7.65	-123.20
			Maximum	5.4	34.42	55.65	36.86	122.7	7.35	8.30	-20.10

Table 9. Water parameters for Matlacha Pass basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 8 Matlacha Pass											
Intertidal sand bar	ISB	26.59959	-82.06428	1.0	29.21	46.75	30.25	68.4	4.43	8.03	-39.10
Intertidal sand bar	ISB	26.59959	-82.06428	1.0	29.21	46.75	30.25	68.4	4.43	8.03	-39.10
Intertidal sand bar	ISB	26.59959	-82.06428	1.0	29.21	46.75	30.25	68.4	4.43	8.03	-39.10
Mangrove	MGR	26.59687	-82.06528	1.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Mangrove	MGR	26.59687	-82.06528	1.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Mangrove	MGR	26.59687	-82.06528	1.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Submerged aquatic vegetation	SAV	26.59887	-82.06528	3.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Submerged aquatic vegetation	SAV	26.59887	-82.06528	3.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Submerged aquatic vegetation	SAV	26.59887	-82.06528	3.3	28.68	46.76	30.28	49.4	3.23	7.94	-39.00
Subtidal mud flat	SMF	26.56107	-82.07583	6.0	29.28	46.62	30.15	71.3	4.61	8.01	-36.40
Subtidal mud flat	SMF	26.56107	-82.07583	6.0	29.28	46.62	30.15	71.3	4.61	8.01	-36.40
Subtidal mud flat	SMF	26.56107	-82.07583	6.0	29.28	46.62	30.15	71.3	4.61	8.01	-36.40
Subtidal sand bar	SSB	26.59611	-82.06487	4.1	28.91	46.83	30.32	61.7	4.04	8.02	-41.10
Subtidal sand bar	SSB	26.59611	-82.06487	4.1	28.91	46.83	30.32	61.7	4.04	8.02	-41.10
Subtidal sand bar	SSB	26.59611	-82.06487	4.1	28.91	46.83	30.32	61.7	4.04	8.02	-41.10
Oysters	OYS	26.59578	-82.06366	2.5	28.65	46.56	30.13	68.0	4.45	8.01	-39.90
Oysters	OYS	26.59578	-82.06366	2.5	28.65	46.56	30.13	68.0	4.45	8.01	-39.90
Oysters	OYS	26.59578	-82.06366	2.5	28.65	46.56	30.13	68.0	4.45	8.01	-39.90
			Mean	3.0	28.90	46.71	30.24	61.4	4.00	7.99	-39.08
			St. Dev.	1.8	0.27	0.10	0.07	9.2	0.59	0.04	1.45
			Median	2.9	28.80	46.76	30.27	64.9	4.24	8.01	-39.05
			Minimum	1.0	28.65	46.56	30.13	49.4	3.23	7.94	-41.10
			Maximum	6.0	29.28	46.83	30.32	71.3	4.61	8.03	-36.40

Table 10. Water parameters for San Carlos Bay basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 9 San Carlos Bay											
Intertidal mud flat	IMF	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Intertidal mud flat	IMF	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Intertidal mud flat	IMF	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Intertidal sand bar	ISB	26.50970	-82.00945	2.2	30.75	52.14	34.15	126.0	7.81	8.06	-31.00
Intertidal sand bar	ISB	26.50970	-82.00945	2.2	30.75	52.14	34.15	126.0	7.81	8.06	-31.00
Intertidal sand bar	ISB	26.50970	-82.00945	2.2	30.75	52.14	34.15	126.0	7.81	8.06	-31.00
Mangrove	MGR	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Mangrove	MGR	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Mangrove	MGR	26.49847	-82.02787	1.4	30.49	50.43	32.89	118.1	7.35	8.14	-42.10
Sub aquatic vegetation	SAV	26.50062	-82.02557	1.4	30.67	50.34	32.86	176.8	11.05	8.34	-39.50
Sub aquatic vegetation	SAV	26.50062	-82.02557	1.4	30.67	50.34	32.86	176.8	11.05	8.34	-39.50
Sub aquatic vegetation	SAV	26.50062	-82.02557	1.4	30.67	50.34	32.86	176.8	11.05	8.34	-39.50
Subtidal mud flat	SMF	26.50336	-82.02565	4.7	29.85	51.33	33.57	128.8	8.04	8.21	-36.70
Subtidal mud flat	SMF	26.50336	-82.02565	4.7	29.85	51.33	33.57	128.8	8.04	8.21	-36.70
Subtidal mud flat	SMF	26.50336	-82.02565	4.7	29.85	51.33	33.57	128.8	8.04	8.21	-36.70
Subtidal sand bar	SSB	26.49080	-82.04467	6.1	29.71	52.21	34.23	128.2	8.07	8.26	-39.30
Subtidal sand bar	SSB	26.49080	-82.04467	6.1	29.71	52.21	34.23	128.2	8.07	8.26	-39.30
Subtidal sand bar	SSB	26.49080	-82.04467	6.1	29.71	52.21	34.23	128.2	8.07	8.26	-39.30
Oysters	OYS	26.51415	-82.04095	3.3	30.56	49.72	32.37	116.4	7.31	8.17	-37.30
Oysters	OYS	26.51415	-82.04095	3.3	30.56	49.72	32.37	116.4	7.31	8.17	-37.30
Oysters	OYS	26.51415	-82.04095	3.3	30.56	49.72	32.37	116.4	7.31	8.17	-37.30
			Mean	2.9	30.36	50.94	33.28	130.3	8.14	8.19	-38.29
			St. Dev.	1.8	0.39	0.91	0.68	20.0	1.26	0.09	3.64
			Median	2.2	30.49	50.43	32.89	126.0	7.81	8.17	-39.30
			Minimum	1.4	29.71	49.72	32.37	116.4	7.31	8.06	-42.10
			Maximum	6.1	30.75	52.21	34.23	176.8	11.05	8.34	-31.00

Table 11. Water parameters for Estero Bay basin for May 2004 for each benthic sampling location.

Habitat Sampled	Habitat Code	Latitude	Longitude	Depth (ft.)	Temperature (C)	Specific Conductance (mS/cm)	Salinity (PSU)	Dissolved Oxygen % Saturation	Dissolved Oxygen mg/l	pH	Oxidation Reduction Potential (mV)
Basin 10 Estero Bay											
Intertidal mud flat	IMF	26.44282	-81.85398	3.2	27.28	54.08	35.70	42.5	2.75	7.61	-24.90
Intertidal mud flat	IMF	26.44282	-81.85398	3.2	27.28	54.08	35.70	42.5	2.75	7.61	-24.90
Intertidal mud flat	IMF	26.44282	-81.85398	3.2	27.28	54.08	35.70	42.5	2.75	7.61	-24.90
Intertidal sand bar	ISB	26.37883	-81.85362	2.7	29.24	55.73	36.86	127.1	7.85	8.11	-36.40
Intertidal sand bar	ISB	26.37883	-81.85362	2.7	29.24	55.73	36.86	127.1	7.85	8.11	-36.40
Intertidal sand bar	ISB	26.37883	-81.85362	2.7	29.24	55.73	36.86	127.1	7.85	8.11	-36.40
Mangrove	MGR	26.37671	-81.85498	2.2	28.76	55.67	36.84	91.6	5.73	8.11	-38.10
Mangrove	MGR	26.37671	-81.85498	2.2	28.76	55.67	36.84	91.6	5.73	8.11	-38.10
Mangrove	MGR	26.37671	-81.85498	2.2	28.76	55.67	36.84	91.6	5.73	8.11	-38.10
Marsh	MAR	26.47332	-81.86365	3.0	29.94	39.78	25.29	60.8	4.01	7.55	-20.00
Marsh	MAR	26.47332	-81.86365	3.0	29.94	39.78	25.29	60.8	4.01	7.55	-20.00
Marsh	MAR	26.47332	-81.86365	3.0	29.94	39.78	25.29	60.8	4.01	7.55	-20.00
Submerged aquatic vegetation	SAV	26.42686	-81.85853	1.5	27.90	55.47	36.71	102.8	6.58	7.99	-34.50
Submerged aquatic vegetation	SAV	26.42686	-81.85853	1.5	27.90	55.47	36.71	102.8	6.58	7.99	-34.50
Submerged aquatic vegetation	SAV	26.42686	-81.85853	1.5	27.90	55.47	36.71	102.8	6.58	7.99	-34.50
Subtidal mud flat	SMF	26.43415	-81.88244	5.0	27.01	54.32	35.88	70.8	4.62	8.01	-33.10
Subtidal mud flat	SMF	26.43415	-81.88244	5.0	27.01	54.32	35.88	70.8	4.62	8.01	-33.10
Subtidal mud flat	SMF	26.43415	-81.88244	5.0	27.01	54.32	35.88	70.8	4.62	8.01	-33.10
Subtidal sand bar	SSB	26.41802	-81.87879	1.7	27.97	55.32	36.30	89.0	5.68	8.16	-35.80
Subtidal sand bar	SSB	26.41802	-81.87879	1.7	27.97	55.32	36.30	89.0	5.68	8.16	-35.80
Subtidal sand bar	SSB	26.41802	-81.87879	1.7	27.97	55.32	36.30	89.0	5.68	8.16	-35.80
Oysters	OYS	26.44672	-81.86794	1.9	27.60	53.05	34.92	66.6	4.32	7.87	-29.90
Oysters	OYS	26.44672	-81.86794	1.9	27.60	53.05	34.92	66.6	4.32	7.87	-29.90
Oysters	OYS	26.44672	-81.86794	1.9	27.60	53.05	34.92	66.6	4.32	7.87	-29.90
			Mean	2.7	28.21	52.93	34.81	81.4	5.19	7.93	-31.59
			St. Dev.	1.1	0.97	5.15	3.73	25.5	1.53	0.22	6.00
			Median	2.5	27.94	54.82	36.09	79.9	5.15	8.00	-33.80
			Minimum	1.5	27.01	39.78	25.29	42.5	2.75	7.55	-38.10
			Maximum	5.0	29.94	55.73	36.86	127.1	7.85	8.16	-20.00

Table 12. Summary of sediment moisture content and grain size parameters for each basin and habitat.

Basin Name	Habitat Type	Percentage by Weight			Sediment	Percentage by Volume			Grain Size Distribution Parmeters					
		Solids	Moisture	Volatile solids	Description	Sand	Silt	Clay	Mean (um)	Median (um)	Mode (um)	St. Dev.	Skewness	Kurtosis
Coastal Venice	Mangrove	19.7	80.3	25.5	Muddy Sand	69.3	28.8	1.9	161.2	174.0	1198.0	5.680	-0.420	-0.660
Coastal Venice	Subtidal Sand Bar	77.8	22.2	0.9	Sandy	86.0	11.6	2.4	115.1	146.7	153.8	3.150	-1.860	4.710
Coastal Venice	Intertidal Sand Bar	80.8	19.2	1.2	Clean Sand	93.2	5.9	0.9	322.0	339.0	168.8	3.490	-1.200	2.500
Coastal Venice	Intertidal Mud Flat	65.4	34.6	3.4	Silty Sand	78.8	18.7	2.5	113.4	157.7	168.8	3.620	-1.300	1.670
Coastal Venice	Subtidal Mud Flat	64.9	35.1	3.5	Muddy Sand	63.4	29.9	6.7	68.1	125.8	153.8	5.460	-0.660	-0.290
Coastal Venice	SAV	71.2	28.8	2.9	Silty Sand w/ Shell	71.0	22.9	6.1	71.0	125.6	153.8	4.450	-1.120	0.600
Lemon Bay	Mangrove	69.3	30.7	2.4	Silty Sand	80.6	17.9	1.5	113.6	145.0	153.8	3.060	-1.310	2.910
Lemon Bay	Subtidal Sand Bar	74.6	25.4	2.0	Silty Sand	74.4	21.6	3.9	87.1	135.7	153.8	4.200	-1.030	0.890
Lemon Bay	Intertidal Sand Bar	79.4	20.6	1.3	Clean Sand	95.9	3.3	0.9	275.8	190.1	153.8	3.360	-0.570	1.830
Lemon Bay	Intertidal Mud Flat	70.0	30.0	3.0	Silty Sand	73.8	24.2	2.1	117.4	153.8	168.8	4.180	-0.710	0.590
Lemon Bay	Subtidal Mud Flat	79.9	20.1	1.5	Silty Sand	76.4	18.3	5.3	78.7	124.9	140.1	4.080	-1.300	1.240
Lemon Bay	Marsh	78.7	21.3	0.6	Shelly Sand	92.4	6.2	1.3	147.6	159.6	153.8	2.520	-1.990	8.220
Lemon Bay	SAV	75.2	24.8	1.7	Silty Sand	82.7	14.5	2.8	117.5	146.8	153.8	3.790	-1.060	1.910
Charlotte Harbor	Mangrove	71.6	28.4	0.8	Sandy	93.0	6.2	0.8	159.0	184.4	185.3	2.150	-2.990	11.500
Charlotte Harbor	Subtidal Sand Bar	78.0	22.0	0.4	Clean Sand	98.8	1.0	0.3	224.1	233.3	245.2	1.610	-4.470	35.900
Charlotte Harbor	Intertidal Sand Bar	76.7	23.3	0.3	Clean Sand	98.9	0.8	0.2	255.3	249.4	203.5	1.790	-1.880	14.400
Charlotte Harbor	Intertidal Mud Flat	58.0	42.0	1.3	Clean Sand	95.0	4.5	0.5	219.8	237.9	245.2	2.140	-2.210	10.100
Charlotte Harbor	Subtidal Mud Flat	70.6	29.4	1.9	Silty Sand	73.3	23.5	3.3	93.2	160.8	185.3	4.110	-1.120	0.440
Charlotte Harbor	Marsh	66.5	33.5	1.7	Silty Sand	89.7	9.8	0.6	191.7	215.7	203.5	2.670	-1.380	3.910
Charlotte Harbor	SAV	75.3	24.7	0.5	Clean Sand	96.1	3.3	0.6	176.5	169.4	153.8	2.150	-1.320	9.240
Myakka River	Mangrove	29.5	70.5	9.4	Muddy Sand	64.9	32.7	2.3	94.0	120.1	153.8	4.380	-0.520	-0.240
Myakka River	Subtidal Sand Bar	74.4	25.6	0.8	Sandy	93.2	5.1	1.6	149.3	177.9	185.3	2.400	-3.180	11.500
Myakka River	Intertidal Sand Bar	71.8	28.2	0.4	Clean Sand	97.2	2.0	0.8	151.1	160.0	153.8	1.820	-4.340	28.000
Myakka River	Intertidal Mud Flat	52.4	47.6	3.8	Silty Sand	86.5	12.3	1.3	141.7	138.8	127.6	3.210	-0.680	2.360
Myakka River	Subtidal Mud Flat	62.4	37.6	2.4	Silty Sand	85.0	13.0	2.0	129.5	148.8	153.8	3.350	-1.080	2.590
Myakka River	Marsh	29.6	70.4	14.8	Silty Sand	77.6	20.2	2.1	152.9	190.4	153.8	4.330	-0.850	0.400
Myakka River	SAV	71.5	28.5	0.8	Clean Sand	95.9	3.2	0.9	192.4	190.6	168.8	2.340	-1.760	9.540

Tabel 12. Continued.

Basin Name	Habitat Type	Percentage by Weight Solids	Moisture	Volatile solids	Sediment Description	Percentage by Volume Sand	Silt	Clay	Grain Size Distribution Parmeters Mean (um)	Median (um)	Mode (um)	St. Dev.	Skewness	Kurtosis
Tidal Peace River	Mangrove	66.5	33.5	2.7	Silty Sand	88.1	10.2	1.7	190.8	233.6	245.2	3.450	-1.550	3.170
Tidal Peace River	Subtidal Sand Bar	76.6	23.4	0.8	Sandy	94.1	4.6	1.3	167.7	179.8	168.8	2.450	-2.370	9.360
Tidal Peace River	Intertidal Sand Bar	74.5	25.5	0.9	Sandy	92.8	5.7	1.5	135.5	154.8	153.8	2.350	-2.940	11.300
Tidal Peace River	Intertidal Mud Flat	72.2	27.8	0.8	Sandy	94.4	4.1	1.5	158.0	171.3	168.8	2.420	-2.440	10.800
Tidal Peace River	Subtidal Mud Flat	68.8	31.2	1.8	Silty Sand	87.4	10.9	1.6	172.9	221.7	245.2	3.250	-1.670	3.390
Tidal Peace River	Marsh	33.0	67.0	10.5	Muddy Sand	66.5	28.9	4.5	122.1	195.3	356.1	6.480	-0.550	-0.680
Tidal Peace River	SAV	73.6	26.4	1.1	Sandy	93.0	5.2	1.9	161.2	179.4	168.8	2.720	-2.260	7.960
Caloosahatchee	Mangrove	60.8	39.2	2.9	Silty Sand	83.8	14.7	1.5	159.3	173.7	153.8	3.670	-0.950	1.530
Caloosahatchee	Subtidal Sand Bar	83.6	16.4	0.4	Clean Sand	98.0	1.3	0.7	297.3	316.7	390.9	2.230	-2.460	13.100
Caloosahatchee	Intertidal Sand Bar	75.8	24.2	0.4	Clean Sand	97.0	2.4	0.6	189.4	188.3	168.8	2.010	-2.210	12.800
Caloosahatchee	Intertidal Mud Flat	75.6	24.4	0.4	Clean Sand	96.6	2.7	0.8	163.3	172.5	168.8	1.920	-3.600	20.800
Caloosahatchee	Subtidal Mud Flat	72.8	27.2	2.5	Silty Sand	76.2	19.2	4.7	91.7	150.2	168.8	4.200	-1.300	0.990
Caloosahatchee	SAV	78.1	21.9	0.4	Clean Sand	97.6	1.8	0.5	187.3	192.1	185.3	1.840	-3.080	20.400
Pine Island Sound	Mangrove	29.7	70.3	10.0	Silty Sand	83.3	16.0	0.7	187.7	196.0	185.3	3.580	-0.580	0.700
Pine Island Sound	Subtidal Sand Bar	76.3	23.7	0.4	Sandy	94.0	4.8	1.2	148.6	168.9	168.8	2.210	-3.370	14.200
Pine Island Sound	Intertidal Sand Bar	74.6	25.4	0.3	Clean Sand	96.7	2.4	0.9	142.0	152.8	153.8	1.800	-4.740	31.200
Pine Island Sound	Intertidal Mud Flat	61.3	38.7	1.3	Silty Sand	89.6	9.7	0.7	170.7	179.6	185.3	2.770	-0.900	3.800
Pine Island Sound	Subtidal Mud Flat	75.7	24.3	0.4	Clean Sand	95.3	3.4	1.3	157.3	176.4	168.8	2.150	-3.660	16.900
Pine Island Sound	Marsh	66.4	33.6	1.8	Silty Sand	80.5	18.5	1.0	120.6	147.5	153.8	2.990	-0.960	2.600
Pine Island Sound	SAV	57.8	42.2	3.0	Silty Sand	72.4	25.9	1.8	109.5	146.9	168.8	4.120	-0.580	0.330
Matlacha Pass	Mangrove	70.7	29.3	2.3	Silty Sand	79.9	18.3	1.8	143.2	171.3	168.8	3.990	-0.800	0.980
Matlacha Pass	Subtidal Sand Bar	72.8	27.2	1.3	Silty Sand	81.3	16.0	2.6	113.5	168.0	185.3	3.540	-1.560	1.920
Matlacha Pass	Intertidal Sand Bar	81.1	18.9	0.4	Clean Sand	96.9	2.3	0.7	190.0	198.7	185.3	2.060	-2.730	15.400
Matlacha Pass	Subtidal Mud Flat	72.5	27.5	2.0	Silty Sand	80.5	16.6	2.9	138.1	198.4	223.4	4.270	-1.210	1.130
Matlacha Pass	SAV	77.4	22.6	1.2	Silty Sand	85.2	12.4	2.4	131.8	181.0	203.5	3.300	-1.790	3.170

Table 12. Continued.

Basin Name	Habitat Type	Percentage by Weight			Sediment	Percentage by Volume			Grain Size Distribution Parmeters					
		Solids	Moisture	Volatile solids	Description	Sand	Silt	Clay	Mean (um)	Median (um)	Mode (um)	St. Dev.	Skewness	Kurtosis
San Carlos Bay	Mangrove	57.4	42.6	4.6	Muddy Sand	65.3	30.2	4.5	75.5	110.7	140.1	4.760	-0.520	0.120
San Carlos Bay	Subtidal Sand Bar	49.9	50.1	2.7	Sandy	90.1	8.6	1.3	706.4	1225.0	1909.0	4.480	-2.270	4.360
San Carlos Bay	Intertidal Sand Bar	74.2	25.8	0.3	Clean Sand	97.5	1.7	0.8	170.1	177.7	168.8	1.850	-4.270	27.800
San Carlos Bay	Intertidal Mud Flat	61.6	38.4	4.7	Silty Sand	71.8	24.5	3.6	83.7	125.8	140.1	4.040	-1.010	0.630
San Carlos Bay	Subtidal Mud Flat	70.9	29.1	1.7	Silty Sand	81.9	13.7	4.4	94.8	132.9	140.1	3.730	-1.490	2.500
San Carlos Bay	SAV	55.6	44.4	2.1	Silty Sand	80.2	17.9	1.9	104.5	133.7	140.1	3.150	-1.310	2.640
Estero Bay	Mangrove	27.3	72.7	9.5	Mud w/ Sand	45.8	47.4	6.9	46.3	48.7	140.1	5.610	-0.010	-0.480
Estero Bay	Subtidal Sand Bar	75.4	24.6	0.5	Clean Sand	95.2	3.7	1.1	172.8	195.8	203.5	2.150	-3.770	17.200
Estero Bay	Intertidal Sand Bar	82.8	17.2	0.3	Clean Sand	97.6	1.7	0.7	151.8	161.1	168.8	1.710	-5.250	38.900
Estero Bay	Intertidal Mud Flat	68.0	32.0	3.2	Silty Sand	78.2	18.3	3.6	105.2	138.8	153.8	4.220	-0.910	1.080
Estero Bay	Subtidal Mud Flat	67.3	32.7	3.3	Muddy Sand	63.3	32.0	4.7	60.4	114.6	153.8	4.090	-0.990	0.070
Estero Bay	Marsh	12.6	87.4	57.1	Muddy Sand	62.7	35.2	2.1	92.3	98.1	105.9	4.410	-0.240	-0.240
Estero Bay	SAV	62.7	37.3	3.2	Muddy Sand	68.8	28.5	2.7	83.8	132.9	168.8	3.830	-0.960	0.510

Benthic Macroinvertebrates

Species Composition

A total of 65 basin-habitat combinations were sampled across the Charlotte Harbor study area with a total of 195 core samples and 195 sweep net samples. The analysis of these samples resulted in distinguishing 370 invertebrate taxa from more than 44,000 organisms. Core samples accounted for the bulk of the species list 327 species while the sweeps collected a total of 128 species. Taking sweep samples added a total of 43 species not collected by the core samples. Conversely core samples resulted in 242 species that were not collected by the sweep samples. This combined methodology highlights the need to consider multiple sampling techniques when conducting benthic invertebrate inventories. **Table 13** presents a phylogenetic list of the species collected.

Remarkably eight taxonomic designations accounted for slightly more than 50% of the 44,000 organisms that were collected and 90% of the fauna were represented by only 61 taxa (16% of the total taxa). The top 5 most numerically abundant species from each habitat and basin accounted for slightly more than 79% of the total individuals collected. These species are the dominant organisms of the benthos in the NEP study area.

The sampling effort for this project was spatially comprehensive, covering all of the major drainage basins but not spatially intensive as there were relatively few samples taken at each site. This type of sampling strategy collects the most common and abundant species of benthic invertebrates. A spatially intensive sampling program conducted over this region would likely result in a species list 2-3 times larger as more of the sparsely distributed and uncommon species would be added to the list.

Table 14 presents summary faunal statistics for each basin and habitat type. The number of species collected from a site ranged from 7 at the Estero Bay marsh habitat to 79 at the San Carlos Bay subtidal sand site. The average number of species recovered from a site was 28 and the median was 24 species.

The number of individuals collected from a sample ranged from 9 to 8,365 specimens (Estero Bay marsh and San Carlos Bay subtidal sand) with a mean of 578 individuals per sample and a median of 288 individuals per sample. This illustrates the tremendous variance in numbers of organisms that is commonly exhibited within benthic habitats. For the purpose of maintaining scientific reporting consistency the number of animals found within a sample is usually converted to number of organisms per square meter. This value is also shown in **Table 15**. The number of organisms per square meter ranged from 722 to 670,918 with a median value of 23,059.

The benthos is a very productive habitat. From a human perspective consider a fisherman, with size 10 shoes, that is wading into the subtidal zone. On average 50 percent of the time he will have ~588 benthic organisms under each foot. Most of the mobile epifaunal organisms will be able to skitter off and not be stepped on by the fisherman. Also the sediment is relatively soft and the animals are mostly resilient and will not be substantially harmed. Fortunately for the fisherman the animals are tiny and can do him no harm, even when walking barefoot.

Table 16 consolidates the abundance counts for core data by habitat for each basin. This enables between-habitat comparisons of abundance. **Figure 60** illustrates the relative abundance of macroinvertebrates throughout the study area.

Table 17 consolidates the number of taxa for core data by habitat for each basin. This enables between habitat comparisons of species counts.

Appendices C, D and **E** provide additional data for recent benthic sampling programs conducted in Dona, Roberts and Lyons Bays, the Myakka River and Myakkahatchee Creek and the Peace River. These data were not included in the detailed analysis of this project.

Table 13. Phylogenetic species list of the benthic invertebrates.

Taxonomic Group/Identified Taxa	
CLASS ANTHOZOA	
	Actiniaria
	Athenaria
	Thenaria
PHYLUM PLATYHELMINTHES	
	Platyhelminthes
PHYLUM NEMERTEA	
	Nemertea
	Nemertea sp. F
PHYLUM ANNELIDA	
CLASS POLYCHAETA	
FAMILY POLYNOIDAE	
	Polynoidae
	Malmgreniella
FAMILY SIGALIONIDAE	
	Sthenelais
	Sthenelais boa
	Sthenelais sp. A
FAMILY CHRYSOPETALIDAE	
	Bhawania heteroseta
FAMILY PHYLLODOCIDAE	
	Eteone heteropoda
	Genetyllis castanea
	Phyllodoce arenae
FAMILY HESIONIDAE	
	Microphthalmus
	Parahesione luteola
	Podarke obscura
	Podarkeopsis levifuscina
FAMILY PILARGIDAE	
	Sigambra tentaculata
	Sigambra bassi
FAMILY SYLLIDAE	
	Syllidae
	Autolytus
	Autolytus dentalius
	Ehlersia cornuta
	Syllis (Ehlersia) cf. cornuta
	Typosyllis
	Typosyllis amica
	Exogone dispar
	Sphaerosyllis
	Sphaerosyllis taylori
	Sphaerosyllis longicauda
	Brania
	Brania clavata
	Haplosyllis spongicola
	Odontosyllis enopla
	Streptosyllis pettiboneae
FAMILY NEREIDAE	
	Nereidae
	Ceratonereis irritabilis
	Neanthes
FAMILY NEREIDAE cont.	*Neanthes acuminata*
	Neanthes succinea
	Nereis
	Nereis pelagica
	Nereis riisei
	Platynereis dumerilii
	Laeonereis culveri
	Stenoninereis martini
FAMILY NEPHTYIDAE	
	Nephtyidae
FAMILY GLYCERIDAE	
	Glycera
	Glycera americana
FAMILY GONIADIDAE	
	Glycinde solitaria
	Goniada littorea
FAMILY ONUPHIDAE	
	Onuphidae
	Diopatra cuprea
	Kinbergonuphis simoni
FAMILY EUNICIDAE	
	Marphysa
	Marphysa sanguinea
FAMILY LUMBRINERIDAE	
	Lumbrineris
	Lumbrineris tenuis
	Lumbrineris verrilli
FAMILY DORVILLEIDAE	
	Ophryotrocha
	Schistomeringos rudolphi
FAMILY ORBINIIDAE	
	Naineris
	Naineris setosa
	Leitoscoloplos robustus
	Scoloplos rubra
	Leitoscoloplos
FAMILY PARAONIDAE	
	Aricidea philbinae
	Aricidea taylori
	Cirrophorus

Table 13. Continued.

FAMILY SPIONIDAE	*Polydora*
	Polydora socialis
	Polydora ligni
	Polydora websteri
	Prionospio
	Prionospio heterobranchia
	Prionospio steenstrupi
	Prionospio pygmaea
	Prionospio perkinsi
	Prionospio sp. A
	Spio pettiboneae
	Boccardia hamata
	Spiophanes bombyx
	Paraprionospio pinnata
	Streblospio benedicti
	Scolelepis squamata
	Scolelepis texana
	Carazziella hobsonae
	Boccardiella hamata
FAMILY MAGELONIDAE	*Magelona pettiboneae*
FAMILY CHAETOPTERIDAE	*Spiochaetopterus costarum*
	Spiochaetopterus oculatus
FAMILY CIRRATULIDAE	*Caulleriella*
	Tharyx
	Monticellina dorsobranchialis
FAMILY ACROCIRRIDAE	*Macrochaeta cf. clavicornis*
FAMILY FLABELLIGERIDAE	*Piromis roberti*
FAMILY OPHELIIDAE	*Armandia agilis*
	Armandia maculata
	Travisia hobsonae
FAMILY CAPITELLIDAE	*Capitella capitata*
	Heteromastus filiformis
	Notomastus latericeus
	Notomastus hemipodus
	Mediomastus
	Mediomastus ambiseta
	Scyphoproctus
	Scyphoproctus platyproctus
FAMILY MALDANIDAE	*Asychis elongata*
	Axiothella mucosa
FAMILY OWENIIDAE	*Myriochele oculata*
FAMILY SABELLARIIDAE	*Sabellaria vulgaris*
	Sabellaria floridensis
FAMILY PECTINARIIDAE	*Pectinaria gouldii*
FAMILY AMPHARETIDAE	Ampharetidae
	Amphicteis gunneri
	Ampelisca sp. D
	Melinna maculata
FAMILY TEREBELLIDAE	*Eupolymnia nebulosa*
	Pista
	Pista cristata
	Polycirrus
	Terebella rubra
	Streblosoma hartmanae
FAMILY TRICHOBRANCHIDAE	*Terebellides stroemi*
FAMILY SABELLIDAE	Sabellidae
	Chone
	Megalomma pigmentum
	Fabriciola
	Fabricinuda trilobata
	Demonax microphthalmus
FAMILY SERPULIDAE	Serpulidae
	Serpula
CLASS OLIGOCHAETA	Oligochaeta
CLASS HIRUDINEA	Hirudinea
PHYLUM MOLLUSCA	
CLASS GASTROPODA	Gastropoda
ORDER MESOGASTROPODA	
FAMILY HYDROBIIDAE	Hydrobiidae
FAMILY RISSOIDAE	*Sayella fusca*
FAMILY VITRINELLIDAE	Vitrinellidae
	Vitrinella
	Cyclostremiscus
	Teinostoma lerema
FAMILY CAECIDAE	*Caecum pulchellum*
	Caecum imbricatum
	Caecum johnsoni
	Caecum nitidum
	Caecum floridanum
	Caecum insularum
FAMILY POTAMIDIDAE	*Cerithidae*
FAMILY CERITHIIDAE	Cerithiidae
	Bittiolum varium
	Cerithiopsis greeni
	Seila adamsi
FAMILY MELANELLIDAE	*Melanella*
FAMILY CREPIDULIDAE	*Crepidula*
	Crepidula plana
	Crepidula maculosa
FAMILY NATICIDAE	*Tectonatica pusilla*

Table 13. Continued.

ORDER NEOGASTROPODA	
FAMILY MURICIDAE	*Eupleura*
FAMILY PYRENIDAE	*Astyris lunata*
	Parvanachis obesa
FAMILY BUCCINIDAE	*Antillophos candei*
FAMILY MELONGENIDAE	*Melongena corona*
FAMILY NASSARIIDAE	*Nassarius vibex*
FAMILY OLIVIDAE	*Olivella*
FAMILY MARGINELLIDAE	Marginellidae
	Granulina ovuliformis
	Marginella aureocincta
	Gibberula lavalleenana
	Prunum apicinum
FAMILY TURRIDAE	*Pyrgocythara plicosa*
ORDER PYRAMIDELLOIDA	
FAMILY PYRAMIDELLIDAE	*Odostomia*
	Tirbonilla dalli
	Boonea impressa
ORDER CEPHALASPIDEA	
FAMILY ACTEONIDAE	*Rictaxis punctostriatus*
FAMILY CYLICHNIDAE	*Acteocina canaliculata*
FAMILY BULLIDAE	*Bulla striata*
FAMILY HAMINOEIDAE	*Haminoea succinea*
	Haminoea antillarum
ORDER BASOMMATOPHORA	
FAMILY ELLOBIIDAE	*Melampus*
FAMILY PLAKOBRANCHIDAE	Pleurobrachidae
	Nudibranchia
CLASS POLYPLACOPHORA	Polyplacophora
ORDER ACANTHOCHITONIDA	
FAMILY ACANTHOCHITONIDAE	*Acanthochitona pygmaea*
CLASS BIVALVIA	Bivalvia
	Bivalvia sp. D
	Bivalvia sp. C
ORDER SOLEMYOIDA	
FAMILY SOLEMYIDAE	*Solemya*
	Solemya velum
ORDER ARCOIDA	
FAMILY ARCIDAE	*Anadara transversa*
ORDER MYTILOIDA	
FAMILY MYTILIDAE	Mytilidae
	Musculus lateralis
	Modiolus
	Amygdalum papyrium
	Lithophaga
	Lithophaga bisuculata
ORDER PTERIOIDA	
FAMILY ANOMIIDAE	*Anomia simplex*
ORDER OSTREIDA	
FAMILY OSTREIDAE	Ostreidae
	Crassostrea virginica
ORDER VENEROIDA	
FAMILY LUCINIDAE	*Parvilucina multilineata*
	Lucina nassula
	Lucina amianta
FAMILY UNGULINIDAE	*Diplodonta semiaspera*
FAMILY CYRENOIDIDAE	*Cyrenoida floridana*
FAMILY MONTACUTIDAE	*Mysella planulata*
FAMILY CARDITIDAE	*Carditamera floridana*
FAMILY CRASSATELLIDAE	*Crassinella lunulata*
FAMILY CARDIIDAE	*Laevicardium mortoni*
	Americardia media
FAMILY MACTRIDAE	*Mulinia lateralis*
	Rangia cuneata
FAMILY TELLINIDAE	*Macoma tenta*
	Macoma constricta
	Tellina
	Tellina lineata
	Tellina alternata
	Tellina mera
	Tellina sp. 2
	Tellina sp. 1
FAMILY PSAMMOBIIDAE	*Tagelus*
	Tagelus plebeius
	Tagelus divisus
FAMILY SEMELIDAE	*Abra aequalis*
	Semelina nuculoides
FAMILY DREISSENIDAE	*Mytilopsis leucophaeata*
FAMILY CORBICULIDAE	*Polymesoda caroliniana*

Table 13. Continued.

FAMILY VENERIDAE	
	Chione grus
	Chione cancellata
	Gouldia cerina
	Anomalocardia auberiana
	Parastarte triquetra
ORDER MYINA	
FAMILY MYIDAE	
	Sphenia antillensis
FAMILY CORBULIDAE	
	Corbula contracta
	Corbula deitziana
FAMILY PHOLADIDAE	
	Martesia striata
FAMILY LYONSIIDAE	
	Lyonsia floridana
CLASS CEPHALOPODA	
	Henrya morrisoni
PHYLUM CHELICERATA	
CLASS MEROSTOMATA	
ORDER XIPHOSURIDA	
FAMILY LIMULIDAE	
	Limulus polyphemus
CLASS PYCNOGONIDA	
FAMILY PYNOGONIDAE	
	Pycnogonidae
PHYLUM CRUSTACEA	
CLASS COPEPODA	
	Copepoda
CLASS MALACOSTRACA	
ORDER MYSIDACEA	
	Mysidacea
FAMILY MYSIDAE	
	Heteromysis formosa
	Mysidopsis bigelowi
	Mysidopsis bahia
	Mysidopsis almyra
	Mysidopsis furca
	Bowmaniella brasiliensis
	Bowmaniella floridana
	Taphromysis bowmani
ORDER CUMACEA	
FAMILY DIASTYLIDAE	
	Oxyurostylis smithi
FAMILY NANNASTACIDAE	
	Almyracuma proximoculae
	Almyracuma nr. proximoculae
FAMILY BODOTRIIDAE	
	Cyclaspis pustulata
	Cyclaspis varians
ORDER TANAIDACEA	
	Tanaidacea
FAMILY PARAPSEUDIDAE	
	Halmyrapseudes bahamensis
FAMILY PSEUDOZEUXIDAE	
	Hargeria rapax
ORDER ISOPODA	
FAMILY ANTHURIDAE	
	Xenanthura brevitelson
	Cyathura polita
	Amakusanthura magnifica
FAMILY CIROLANIDAE	
	Cirolanidae
FAMILY SPHAEROMATIDAE	
	Exosphaeroma
	Exosphaeroma diminuta
	Exosphaeroma alba
	Sphaeroma quadridentata
	Sphaeroma terebrans
	Cassidinidea ovalis
	Cymodoce
	Cymodoce faxoni
	Harrieta faxoni
	Paradella
	Paradella dianae
FAMILY IDOTHEIDAE	
	Erichsonella filiformis
	Edotea montosa
ORDER AMPHIPODA	
	Amphipoda
FAMILY AMPELISCIDAE	
	Ampelisca
	Ampelisca abdita
	Ampelisca vadorum
	Ampelisca verrilli
	Ampelisca agassizi
	Ampelisca holmesi
	Ampelisca burkei
FAMILY AMPHILOCHIDAE	
	Hourstonius laguna
FAMILY AMPITHOIDAE	
	Cymadusa compta
	Anamixidae
FAMILY AORIDAE	
	Lembos unifasciatus reductus
	Rudilemboides naglei
FAMILY BATEIDAE	
	Bateidae
	Batea catharinensis
FAMILY COROPHIIDAE	
	Corophiidae
	Corophium
	Erichthonius brasiliensis
	Erichthonius rubricornis
	Unciola dissiilus
	Grandidierella bonnieroides
	Bemlos
FAMILY EUSIRIDAE	
	Eusiridae
	Eusiridae cf.
	Eusirogenes
FAMILY MELITIDAE	
	Elasmopus laevis
	Gammarus
	Gammarus palustris
	Gammarus mucronatus
	Melita
	Dulichiella
	Dulichiella appendiculata

Table 13. Continued.

FAMILY HAUSTORIIDAE	*Acanthohaustorius shoemakeri cf.*
	Acanthohaustorius bousfieldi
	Acanthohaustorius uncinus
FAMILY HYALELLIDAE	*Hyalella azteca*
FAMILY HYALIDAE	*Hyale plumulosa*
	Hyale nilssoni
FAMILY LILJEBORGIIDAE	*Listriella*
	Listriella barnardi
FAMILY LYSIANASSIDAE	*Lysianopsis alba*
FAMILY OEDICEROTIDAE	Oedicerotidae
	Monoculodes
	Americhelidium americanum
FAMILY PHOXOCEPHALIDAE	*Eobrolgus spinosus*
	Eudevenopus honduranus
	Pleustidae
FAMILY TALITRIDAE	Talitridae
FAMILY CAPRELLIDAE	*Caprella*
ORDER DECAPODA	Decapoda (unid. shrimp)
FAMILY PENAEIDAE	*Penaeus*
	Parapenaeus politus
FAMILY SERGESTIDAE	*Acetes cf.*
FAMILY PASIPHAEIDAE	*Leptochela*
FAMILY PALAEMONIDAE	*Leander*
	Palaemonetes
	Palaemonetes pugio
	Periclimenes
FAMILY HIPPOLYTIDAE	*Hippolyte*
	Hippolyte zostericola
	Tozeuma carolinense
FAMILY CALLIANASSIDAE	*Callianassa*
FAMILY PORCELLANIDAE	*Petrolisthes galathinus*
	Porcellana
FAMILY DIOGENIDAE	*Paguristes*
FAMILY PORTUNIDAE	Portunidae
	Callinectes
	Callinectes sapidus
FAMILY XANTHIDAE	Xanthidae
	Eurypanopeus
	Eurypanopeus depressus
	Panopeus
	Panopeus herbstii
	Micropanope sculptipes
FAMILY PINNOTHERIDAE	*Dissodactylus mellitae*
	Dissodactylus crinitichelis
	Pinnixa floridana
FAMILY GRAPSIDAE	*Sesarma*
	Sesarma cinereum
	Sesarma reticulatum
FAMILY THIIDAE	*Eurypanopeus galathinus*
PHYLUM SIPUNCULA	Sipuncula
FAMILY GOLFINGIIDAE	*Phascolion strombi*
PHYLUM PHORONIDA	
FAMILY PHORONIDAE	*Phoronis architecta*
PHYLUM BRACHIOPODA	
ORDER LINGULIDA	
FAMILY LINGULIDAE	*Glottidia pyramidata*
PHYLUM ECHINODERMATA	
(SUBCLASS OPHIUROIDEA)	Ophiuroidea
ORDER OPHIURIDA	*Amphiodia*
	Amphioplus
CLASS ECHINOIDEA	Echinoidea
ORDER CLYPEASTEROIDA	
FAMILY MELLITIDAE	*Mellita tenuis*
CLASS HOLOTHUROIDEA	
ORDER APODIDA	
FAMILY SYNAPTIDAE	*Leptosynapta crassipatina*
SUBPHYLUM UROCHORDATA	
CLASS ASCIDIACEA	Ascidiacea
SUBPHYLUM CEPHALOCHORDATA	
FAMILY BRANCHIOSTOMIDAE	*Branchiostoma floridae*
SUBPHYLUM VERTEBRATA	
FAMILY APHREDODERIDAE	*Opsanus tau*
	Gobiesox strumosus

Table 14. Summary statistics for benthic habitat of Charlotte Harbor.

Region	Habitat	No. of Taxa	Number of Individuals	Individuals per m2	Shannon-Weiner Diversity Index logE	log10	log2	Pielou's Index	Margalef's Index	Simpson's Index	Gini's Index
Venice	Mangrove	28	475	38,098	2.22	0.96	3.20	0.67	4.38	0.15	0.85
Venice	Sub Sand	38	157	12,592	3.07	1.33	4.43	0.84	7.32	0.07	0.93
Venice	Int Sand	24	121	9,705	2.50	1.08	3.60	0.79	4.80	0.12	0.88
Venice	Int Mud	27	279	22,377	2.27	0.99	3.28	0.69	4.62	0.14	0.86
Venice	Sub Mud	33	121	9,705	2.79	1.21	4.03	0.80	6.67	0.10	0.90
Venice	Oysters	34	1,166	93,519	1.53	0.66	2.20	0.43	4.67	0.43	0.57
Venice	SAV	59	439	35,210	3.18	1.38	4.59	0.78	9.53	0.07	0.93
Estero	Mangrove	57	486	38,980	3.12	1.36	4.50	0.77	9.05	0.07	0.93
Estero	Sub Sand	20	58	4,652	1.97	0.85	2.84	0.66	4.68	0.29	0.71
Estero	Int Sand	17	41	3,288	2.66	1.16	3.84	0.94	4.31	0.06	0.94
Estero	Int Mud	38	464	37,215	2.39	1.04	3.45	0.66	6.03	0.18	0.82
Estero	Sub Mud	50	197	15,800	3.48	1.51	5.03	0.89	9.27	0.04	0.96
Estero	Marsh	7	9	722	1.89	0.82	2.73	0.97	2.73	0.06	0.94
Estero	Oysters	34	1,171	93,920	2.49	1.08	3.59	0.71	4.67	0.12	0.88
Estero	SAV	38	101	8,101	3.18	1.38	4.59	0.87	8.02	0.06	0.94
Lemon	Mangrove	13	325	26,067	1.49	0.65	2.16	0.58	2.07	0.30	0.70
Lemon	Sub Sand	76	437	35,050	3.44	1.50	4.97	0.80	12.34	0.06	0.94
Lemon	Int Sand	28	71	5,695	2.96	1.29	4.27	0.89	6.33	0.06	0.94
Lemon	Int Mud	17	143	11,469	2.05	0.89	2.95	0.72	3.22	0.21	0.79
Lemon	Sub Mud	62	539	43,231	3.11	1.35	4.49	0.75	9.70	0.09	0.91
Lemon	Marsh	37	167	13,394	2.68	1.17	3.87	0.74	7.03	0.13	0.87
Lemon	Oysters	41	856	68,656	2.68	1.17	3.87	0.72	5.92	0.10	0.90
Lemon	SAV	42	214	17,164	2.67	1.16	3.86	0.72	7.64	0.17	0.83
CharHarb	Mangrove	24	353	28,312	2.26	0.98	3.26	0.71	3.92	0.13	0.87
CharHarb	Sub Sand	19	165	13,234	1.36	0.59	1.96	0.46	3.53	0.47	0.53
CharHarb	Int Sand	12	55	4,411	1.97	0.85	2.84	0.79	2.74	0.19	0.81
CharHarb	Int Mud	20	341	27,350	2.29	1.00	3.31	0.77	3.26	0.13	0.87
CharHarb	Sub Mud	59	1,116	89,509	2.52	1.10	3.64	0.62	8.27	0.19	0.81
CharHarb	Marsh	22	376	30,157	2.18	0.95	3.15	0.71	3.54	0.16	0.84
CharHarb	Oysters	21	568	45,557	2.06	0.90	2.98	0.68	3.15	0.17	0.83
CharHarb	SAV	35	286	22,939	2.49	1.08	3.59	0.70	6.01	0.16	0.84
Myakka	Mangrove	14	174	13,956	1.50	0.65	2.17	0.57	2.52	0.41	0.59
Myakka	Sub Sand	31	1,655	132,740	2.14	0.93	3.09	0.62	4.05	0.16	0.84
Myakka	Int Sand	17	171	13,715	2.02	0.88	2.91	0.71	3.11	0.19	0.81
Myakka	Int Mud	20	610	48,925	0.63	0.27	0.91	0.21	2.96	0.79	0.21
Myakka	Sub Mud	26	452	36,253	1.73	0.75	2.50	0.53	4.09	0.34	0.66
Myakka	Marsh	16	95	7,620	2.25	0.98	3.25	0.81	3.29	0.13	0.87
Myakka	Oysters	19	723	57,988	1.76	0.77	2.55	0.60	2.73	0.22	0.78
Myakka	SAV	26	540	43,311	1.54	0.67	2.23	0.47	3.97	0.44	0.56

Table 14. Continued.

Region	Habitat	No. of Taxa	Number of Individuals	Individuals per m2	Shannon-Weiner Diversity Index logE	log10	log2	Pielou's Index	Margalef's Index	Simpson's Index	Gini's Index
Peace	Mangrove	17	171	13,715	2.30	1.00	3.32	0.81	3.11	0.12	0.88
Peace	Sub Sand	24	757	60,715	1.34	0.58	1.94	0.42	3.47	0.50	0.50
Peace	Int Sand	10	156	12,512	1.16	0.50	1.67	0.50	1.78	0.50	0.50
Peace	Int Mud	22	295	23,661	1.99	0.86	2.87	0.64	3.69	0.26	0.74
Peace	Sub Mud	31	2,814	225,698	1.67	0.72	2.41	0.49	3.78	0.33	0.67
Peace	Marsh	18	489	39,220	1.49	0.65	2.16	0.52	2.75	0.42	0.58
Peace	Oysters	19	507	40,664	1.82	0.79	2.63	0.62	2.89	0.24	0.76
Peace	SAV	23	791	63,442	2.17	0.94	3.13	0.69	3.30	0.17	0.83
Caloos	Mangrove	21	145	11,630	2.06	0.89	2.97	0.68	4.02	0.19	0.81
Caloos	Sub Sand	24	126	10,106	2.54	1.10	3.67	0.80	4.76	0.11	0.89
Caloos	Int Sand	15	56	4,491	2.40	1.04	3.46	0.89	3.48	0.10	0.90
Caloos	Int Mud	12	36	2,887	2.28	0.99	3.29	0.92	3.07	0.10	0.90
Caloos	Sub Mud	19	126	10,106	2.30	1.00	3.32	0.78	3.72	0.14	0.86
Caloos	Oysters	32	2,624	210,459	1.84	0.80	2.65	0.53	3.94	0.31	0.69
Caloos	SAV	22	87	6,978	2.60	1.13	3.75	0.84	4.70	0.10	0.90
Pine Is	Mangrove	8	44	3,529	1.61	0.70	2.33	0.78	1.85	0.24	0.76
Pine Is	Sub Sand	40	234	18,768	2.85	1.24	4.11	0.77	7.15	0.09	0.91
Pine Is	Int Sand	25	225	18,046	1.51	0.66	2.18	0.47	4.43	0.47	0.53
Pine Is	Int Mud	12	79	6,336	1.31	0.57	1.88	0.53	2.52	0.46	0.54
Pine Is	Sub Mud	27	92	7,379	2.88	1.25	4.15	0.87	5.75	0.07	0.93
Pine Is	Marsh	9	35	2,807	1.83	0.79	2.64	0.83	2.25	0.17	0.83
Pine Is	Oysters	28	613	49,166	2.14	0.93	3.09	0.64	4.21	0.19	0.81
Pine Is	SAV	43	336	26,949	2.82	1.22	4.07	0.75	7.22	0.09	0.91
Mat Pass	Mangrove	26	425	34,087	1.61	0.70	2.33	0.50	4.13	0.37	0.63
Mat Pass	Sub Sand	29	989	79,323	1.91	0.83	2.76	0.57	4.06	0.22	0.78
Mat Pass	Int Sand	23	106	8,502	2.42	1.05	3.50	0.77	4.72	0.15	0.85
Mat Pass	Sub Mud	43	2,945	236,205	1.91	0.83	2.76	0.51	5.26	0.25	0.75
Mat Pass	Oysters	24	475	38,098	2.07	0.90	2.99	0.65	3.73	0.18	0.82
Mat Pass	SAV	25	468	37,536	1.93	0.84	2.78	0.60	3.90	0.25	0.75
San Carlos	Mangrove	27	508	40,744	2.15	0.93	3.10	0.65	4.17	0.17	0.83
San Carlos	Sub Sand	79	8,365	670,918	1.86	0.81	2.68	0.43	8.64	0.33	0.67
San Carlos	Int Sand	19	125	10,026	2.17	0.94	3.13	0.74	3.73	0.16	0.84
San Carlos	Int Mud	20	303	24,302	2.28	0.99	3.28	0.76	3.33	0.14	0.86
San Carlos	Sub Mud	37	280	22,457	2.36	1.03	3.41	0.65	6.39	0.16	0.84
San Carlos	Oysters	30	1,578	126,564	2.35	1.02	3.39	0.69	3.94	0.13	0.87
San Carlos	SAV	30	217	17,405	2.62	1.14	3.78	0.77	5.39	0.11	0.89

Table 15. Comparison of faunal densities for each habitat and drainage basin.

Region	Int Mud	Int Sand	Mangrove	Oysters	SAV	Subtidal Mud	Subtidal Sand	Marsh	Basin Statistics: Mean	St. Dev.	Median	Min	Max
Caloos	2,887	4,491	11,630	210,459	6,978	10,106	10,106	NA	36,665	76,702	10,106	2,887	210,459
CharHarb	27,350	4,411	28,312	45,557	22,939	89,509	13,234	30,157	32,684	25,971	27,831	4,411	89,509
Estero	37,215	3,288	38,980	93,920	8,101	15,800	4,652	722	25,335	31,484	11,951	722	93,920
Lemon	11,469	5,695	26,067	68,656	17,164	43,231	35,050	13,394	27,591	20,834	21,615	5,695	68,656
Mat Pass	NA	8,502	34,087	38,098	37,536	236,205	79,323	NA	72,292	83,454	37,817	8,502	236,205
Myakka	48,925	13,715	13,956	57,988	43,311	36,253	132,740	7,620	44,313	40,174	39,782	7,620	132,740
Peace	23,661	12,512	13,715	40,664	63,442	225,698	60,715	39,220	59,953	69,685	39,942	12,512	225,698
Pine Is	6,336	18,046	3,529	49,166	26,949	7,379	18,768	2,807	16,623	15,702	12,713	2,807	49,166
San Carlos	24,302	10,026	40,744	126,564	17,405	22,457	670,918	NA	130,345	241,653	24,302	10,026	670,918
Venice	22,377	9,705	38,098	93,519	35,210	9,705	12,592	NA	31,601	29,705	22,377	9,705	93,519
Mean:	22,725	9,039	24,912	82,459	27,903	69,634	103,810	15,653	47,740	63,537	24,844	6,489	187,079
St. Dev.:	14,621	4,751	13,327	53,289	17,409	88,470	203,307	15,642	33,455	67,143	11,430	3,789	183,030
Median:	23,661	9,103	27,190	63,322	24,944	29,355	26,909	10,507	34,674	35,829	23,340	6,657	113,330
Minimum	2,887	3,288	3,529	38,098	6,978	7,379	4,652	722	16,623	15,702	10,106	722	49,166
Maximum	48,925	18,046	40,744	210,459	63,442	236,205	670,918	39,220	130,345	241,653	39,942	12,512	670,918

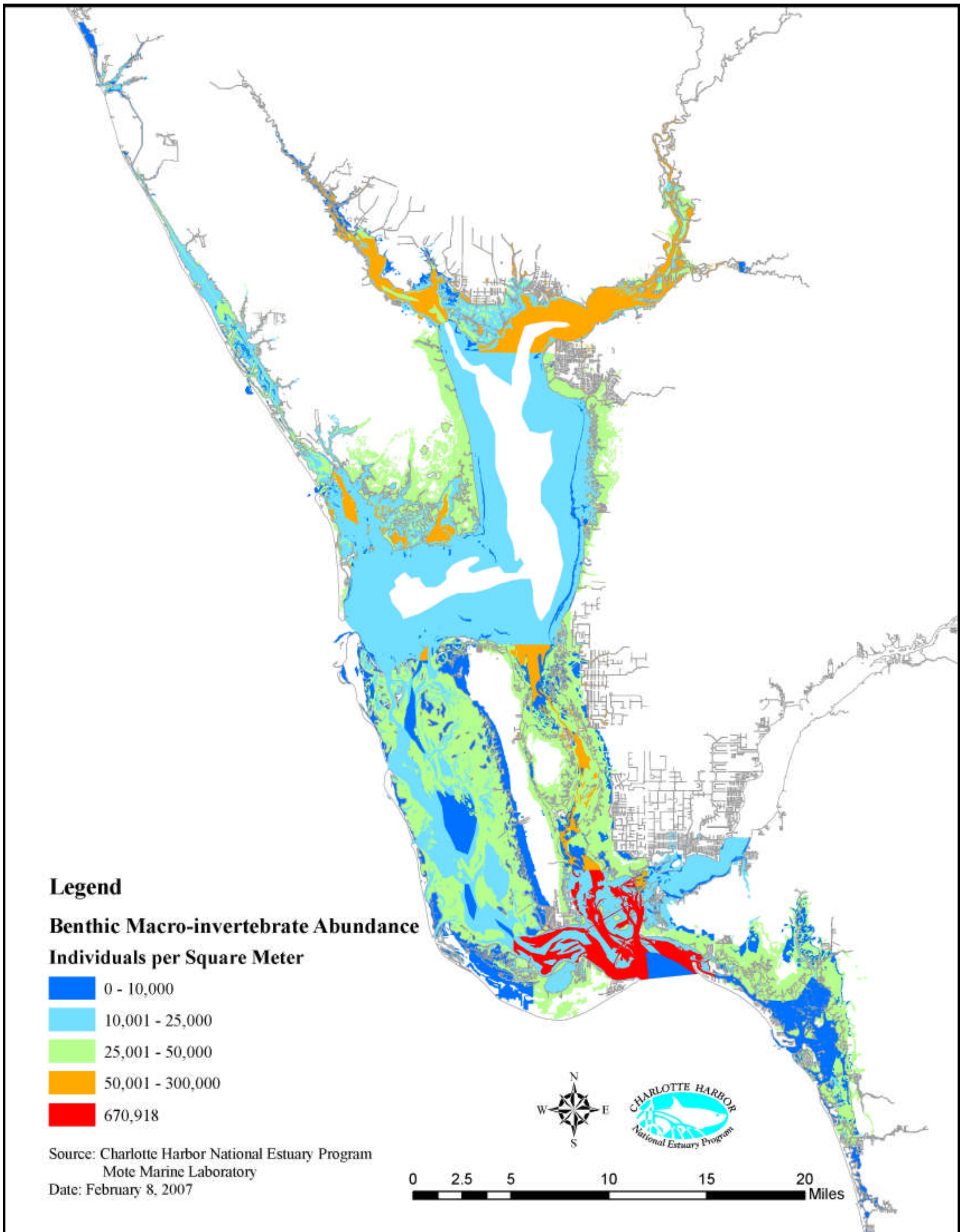


Figure 60. Map exhibiting relative abundance of benthic organisms.

Table 16. Comparison of the number of taxa recovered from each habitat for each basin.

Basin	Habitat							
	Int Mud	Int Sand	Mangrove	Oysters	SAV	Sub Mud	Sub Sand	Salt Marsh
Caloos River	12	15	21	32	22	19	24	NA
Char Harbor	20	12	24	21	35	59	19	22
Estero Bay	38	17	57	34	38	50	20	7
Lemon Bay	17	28	13	41	42	62	76	37
Mat Pass	NA	23	26	24	25	43	29	NA
Myakka River	20	17	14	19	26	26	31	16
Peace River	22	10	17	19	23	31	24	18
Pine Is Sound	12	25	8	28	43	27	40	9
San Carlos	20	19	27	30	30	37	79	NA
Venice	27	24	28	34	59	33	38	NA
Mean:	21	19	24	28	34	39	38	18
St. Dev	8	6	14	7	12	14	22	11
Median	20	18	23	29	33	35	30	8

Table 17. Comparison of the number of taxa and number of individuals recovered from all habitats combined for each basin.

Region	Count of taxa	Individuals per m2
Coastal Venice	126	31,601
Lemon Bay	160	27,591
Charlotte Harbor	112	32,684
Myakka River	63	44,313
Peace River	60	59,953
Caloosahatchee River	66	36,665
Matlacha Pass	80	72,292
Pine Island Sound	112	16,623
San Carlos Bay	124	130,345
Estero Bay	135	25,335
Mean:	104	47,740
St.Dev:	35	33,455
Median:	112	34,674

Figure 61 graphically presents the data for species counts of Table 17. This graphic clearly illustrates the effect of salinity on benthic species richness. Basins that exhibited the highest salinity values included Coastal Venice, Lemon Bay, Pine Island Sound, San Carlos Bay and Estero Bay, and these basins exhibited the greatest overall numbers of species. The basins with the lowest salinity, Myakka, Peace and Caloosahatchee Rivers illustrated the fewest number of taxa.

Figure 62 shows the number of taxa collected for intertidal mud and sand habitats which ranged from 12 to 38 taxa. For 5 of the eight basins intertidal mud exhibited a greater number of species than intertidal sand. For two basins the intertidal sand had a greater species count and for Matlacha Pass no suitable intertidal mud habitat could be located.

Figure 63 shows the number of taxa collected for subtidal mud and subtidal sand habitats which ranged from 19 to 76 taxa. For the eight basins there was an even split for the habitat, mud versus sand, exhibiting the most species.

Figure 64 shows the number of taxa collected for habitat with vegetation, and oyster habitat. The number of taxa collected ranged from 7 to 59 taxa. SAV exhibited the greatest number of species for this group followed by oyster habitat, mangroves and salt marsh. As discussed earlier the salt marshes in this region are often seasonally and tidally "dry" resulting in a depauperate benthic fauna. For the eight basins there was an even split for the habitat, mud versus sand, exhibiting the most species.

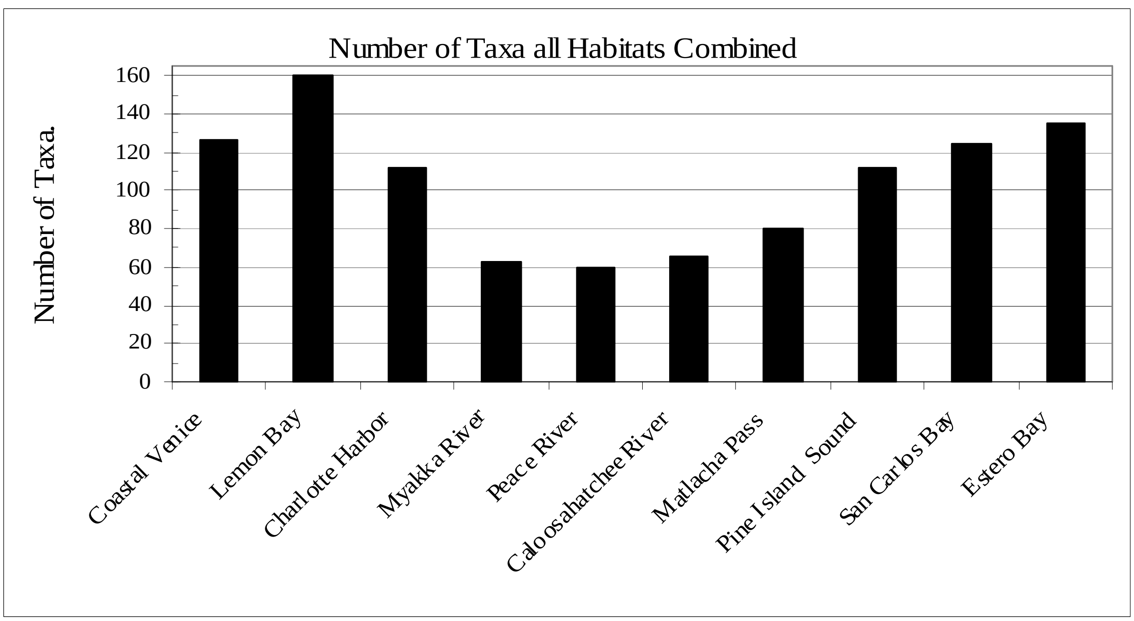


Figure 61. Graph illustrating the number of taxa collected within each sampling basin for all habitats combined.

Figure 62. Comparison of number of species for intertidal mud and sand habitats.

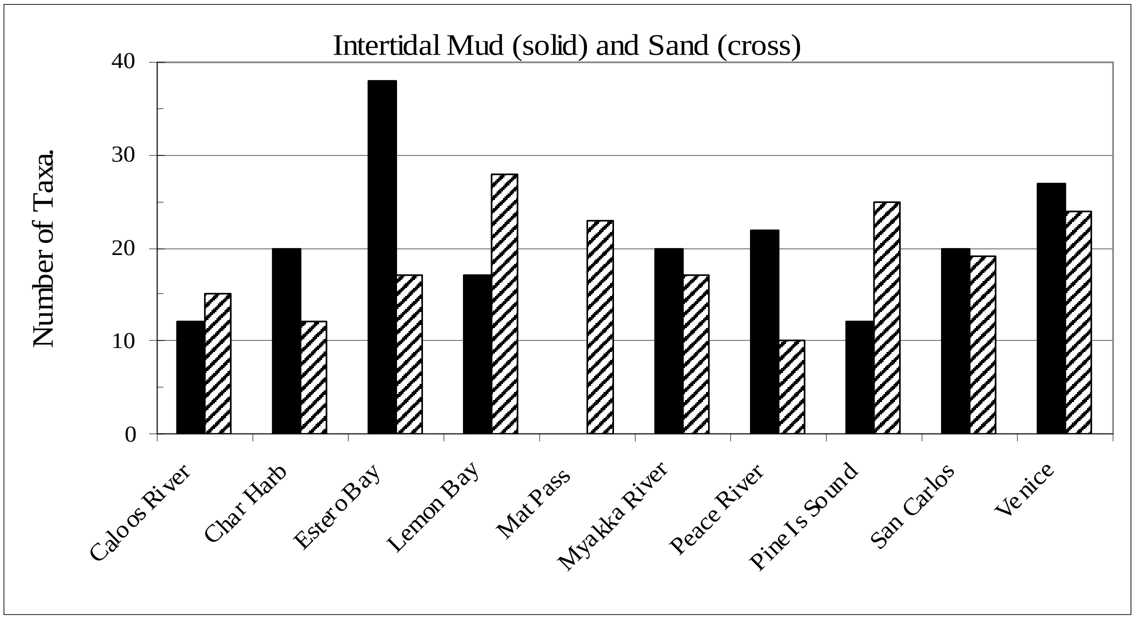


Figure 63. Comparison of number of species for subtidal mud and sand habitats.

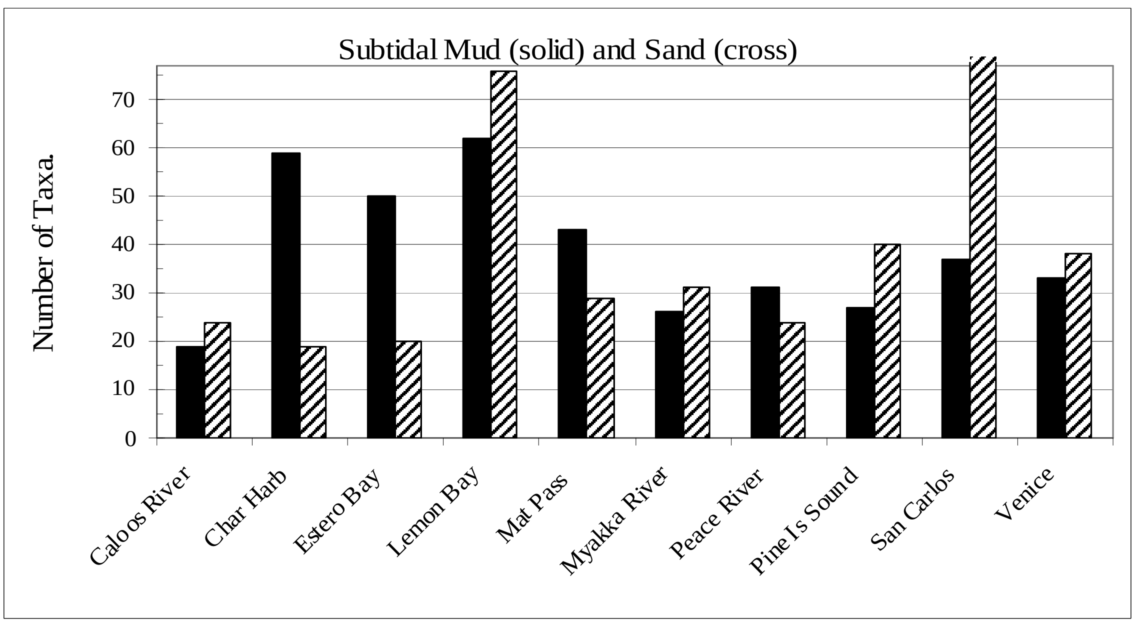


Figure 64. Comparison of number of species for mangrove, oyster, SAV and marsh habitats.

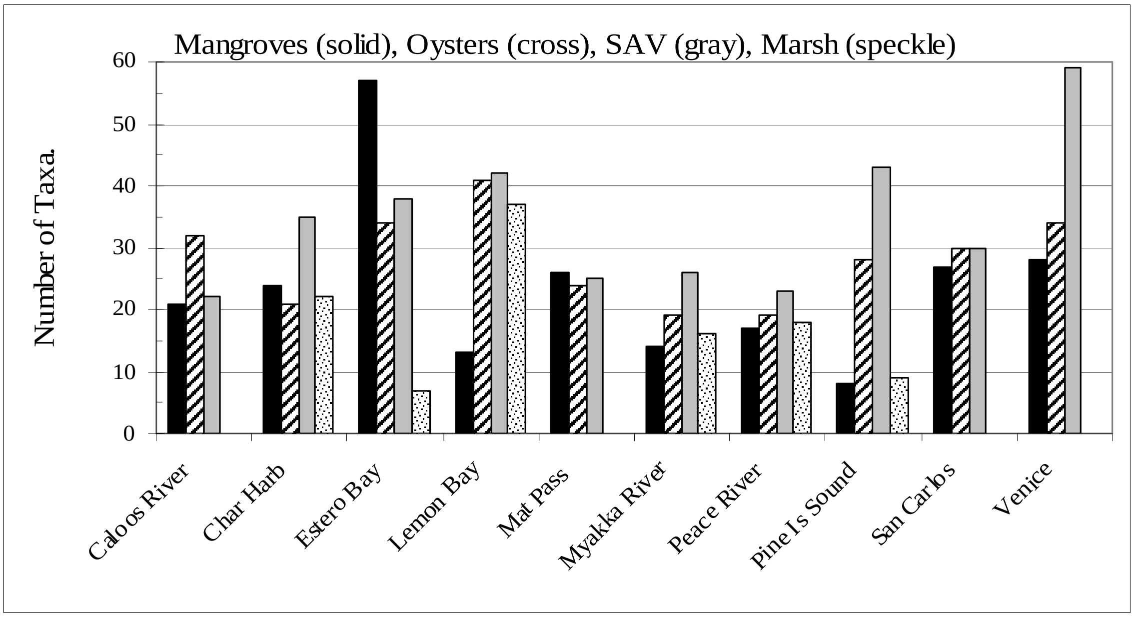
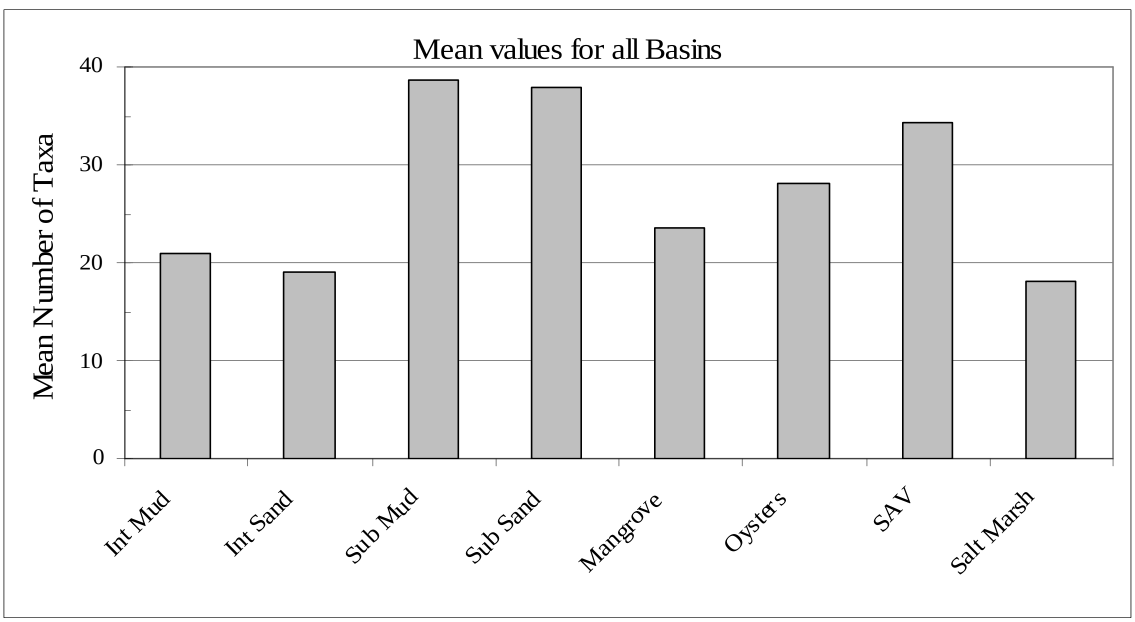


Figure 65 illustrates the mean number of taxa collected for each habitat type averaged over all ten basins. This figure shows that the greatest number of taxa were collected from the subtidal mud and sand habitats followed by SAV habitat, oyster habitat, mangroves, intertidal mud, intertidal sand and salt marsh.

Figure 65. Mean number of taxa for each habitat type averaged over all ten basins.



Faunal Abundance

Faunal abundance is an indirect measure of benthic productivity and is most commonly reported as numbers of organisms within a square meter of surface area. In reality the organisms are not distributed evenly, they often occur as a patchwork of high and low densities of organisms that live both on and within the sediment. The majority of the fauna live within the top few centimeters of the substratum, although some species burrow deeply within the sediment and others skim the very surface of the sediment. Nevertheless the standard measure of benthic faunal abundance is the number of organisms per square meter (n/m^2).

Benthic fauna are consumers; they rely on primary production to provide food necessary for growth and reproduction. It is reasonable to assume that high faunal densities are a result of favorable habitat conditions for benthic organisms. Often high values of abundance are due to one or several species that occur in very high numbers. Conditions that favor increased abundance of some species are common in estuaries. However, favorable conditions for the growth and reproduction of one or several species do not necessarily indicate a healthy habitat. The estuary is a complex and complicated mosaic of habitats and it is necessary to look at many interrelated factors, biological, chemical and physical when evaluating the health of an estuary.

Figures 66-71 illustrate the abundance of organisms within the various habitats compared among the drainage basins. Faunal abundance for intertidal mud and sand habitats is shown in **Figure 66**. With the exception of the Caloosahatchee River and Pine Island sound the mud habitat exhibited considerably higher densities of organisms. For comparisons of subtidal mud and sand habitats the differences of abundance were not quite as pronounced, **Figure 67**, and the subtidal sand habitat of San Carlos Bay exhibited the greatest faunal abundance of any of the habitats samples, over 650,000 organisms per square meter.

Figure 68 illustrates the faunal abundance for mangrove habitats. The highest levels of abundance were recorded from San Carlos Bay and the lowest abundance levels from mangroves in Pine Island Sound.

Figure 69 presents the faunal abundance for oyster habitat among the basins. The greatest faunal density of organisms associated with oysters was for the Caloosahatchee River, the lowest density of oyster associated organisms was for Matlacha Pass.

The faunal abundance within salt marsh habitat, **Figure 70**, exhibited considerable variation with greatest abundance within the Peace River Basin and the lowest abundance within the Estero Bay basin.

Figure 71 illustrates the faunal abundance for submerged aquatic vegetation (SAV) habitat. The Peace River basin exhibited the greatest abundance of benthic organisms within SAV and the Caloosahatchee River basin exhibited the fewest organisms within SAV.

Figure 66. Faunal abundance for intertidal mud and sand habitats.

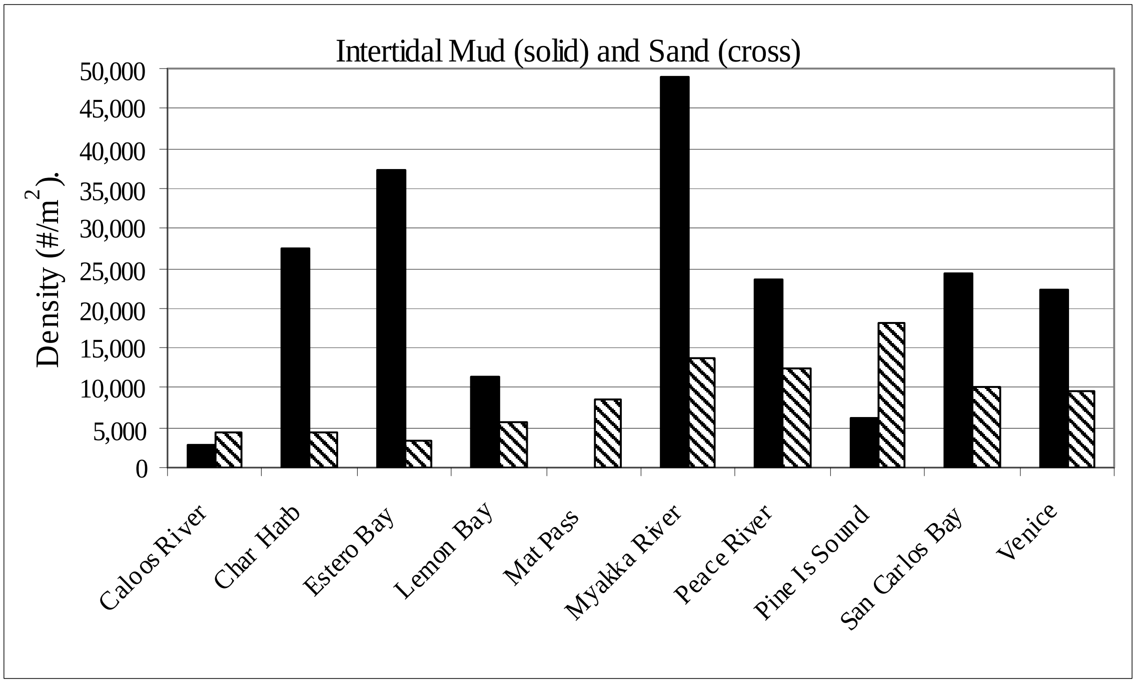


Figure 67. Faunal abundance for subtidal mud and sand habitats.

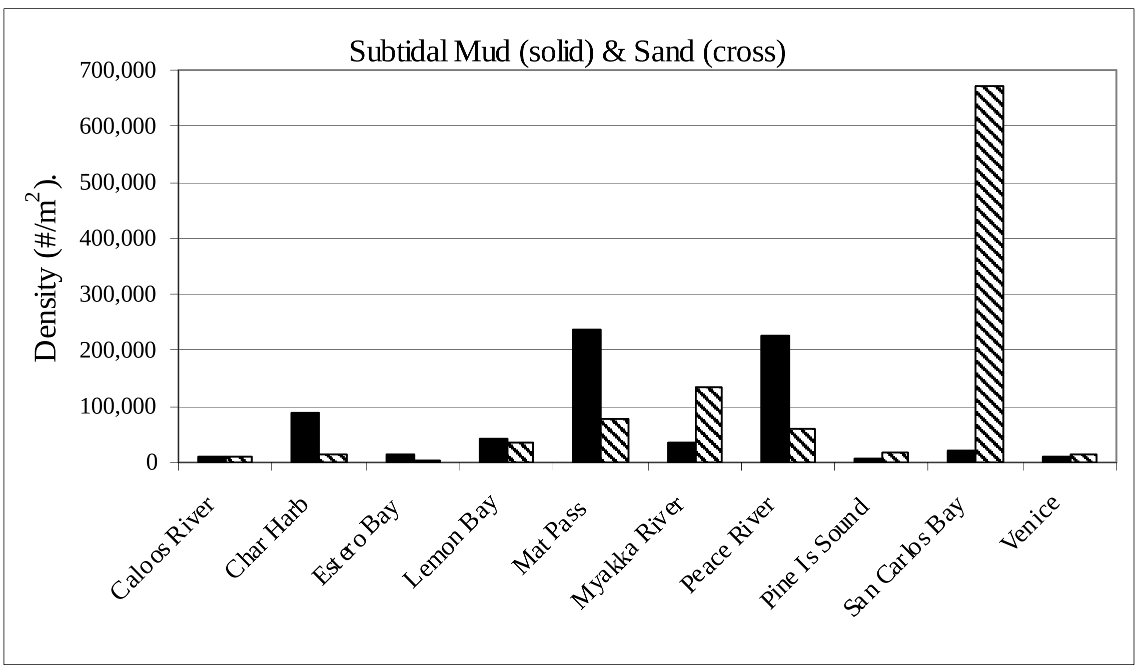


Figure 68. Faunal abundance for mangrove habitats.

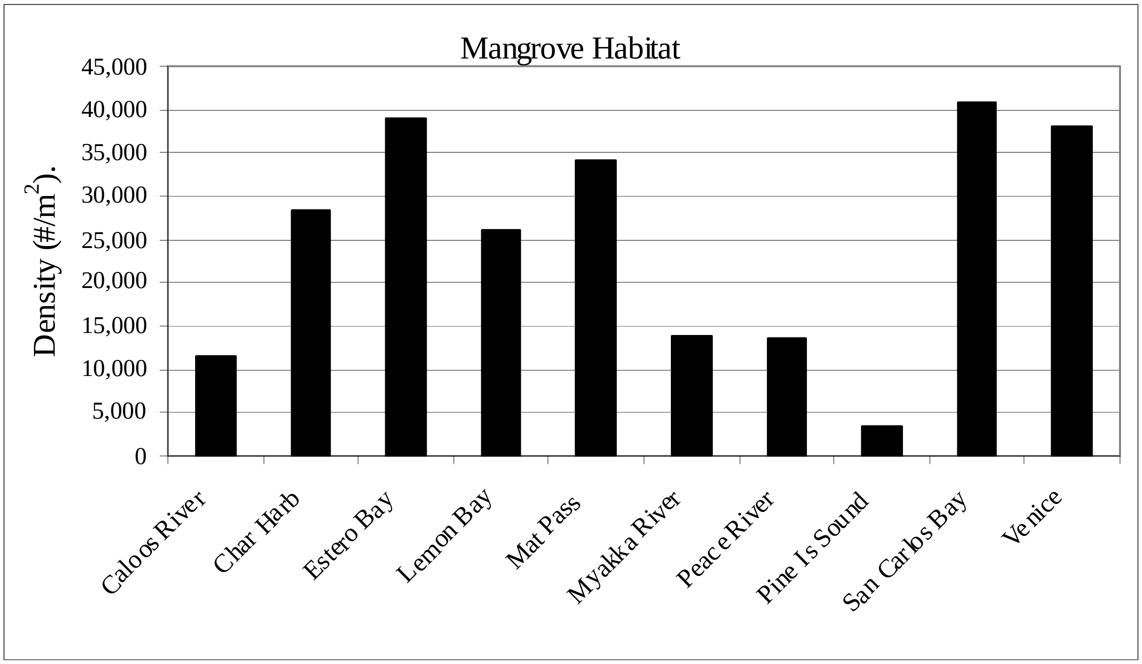


Figure 69. Faunal abundance for oyster habitats.

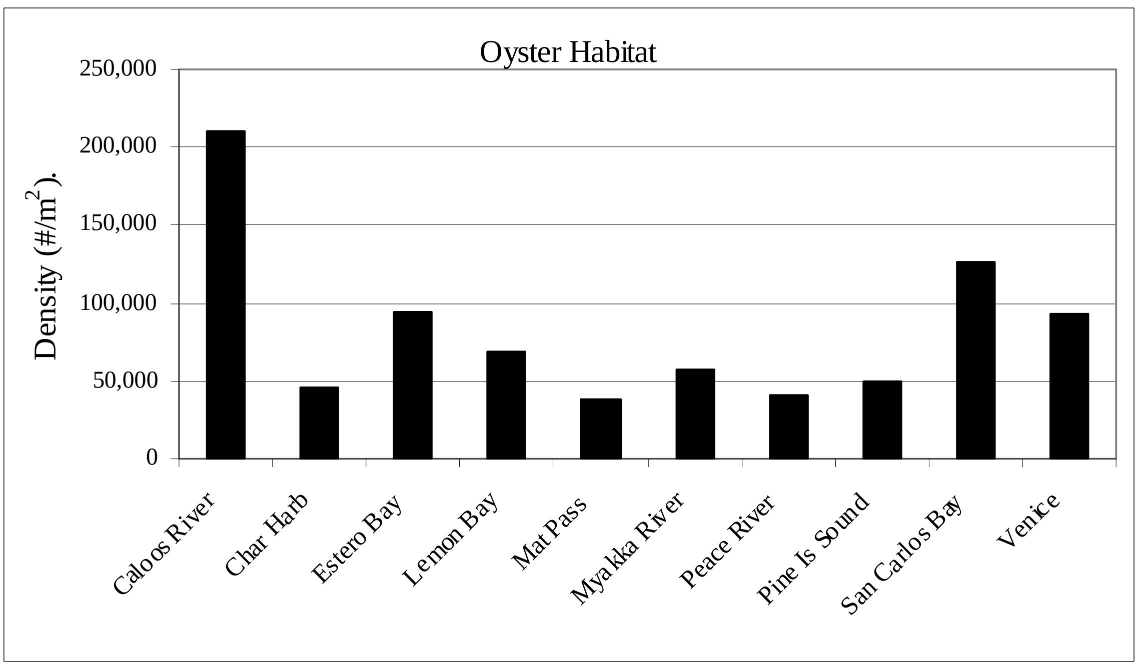


Figure 70. Faunal abundance for salt marsh habitats.

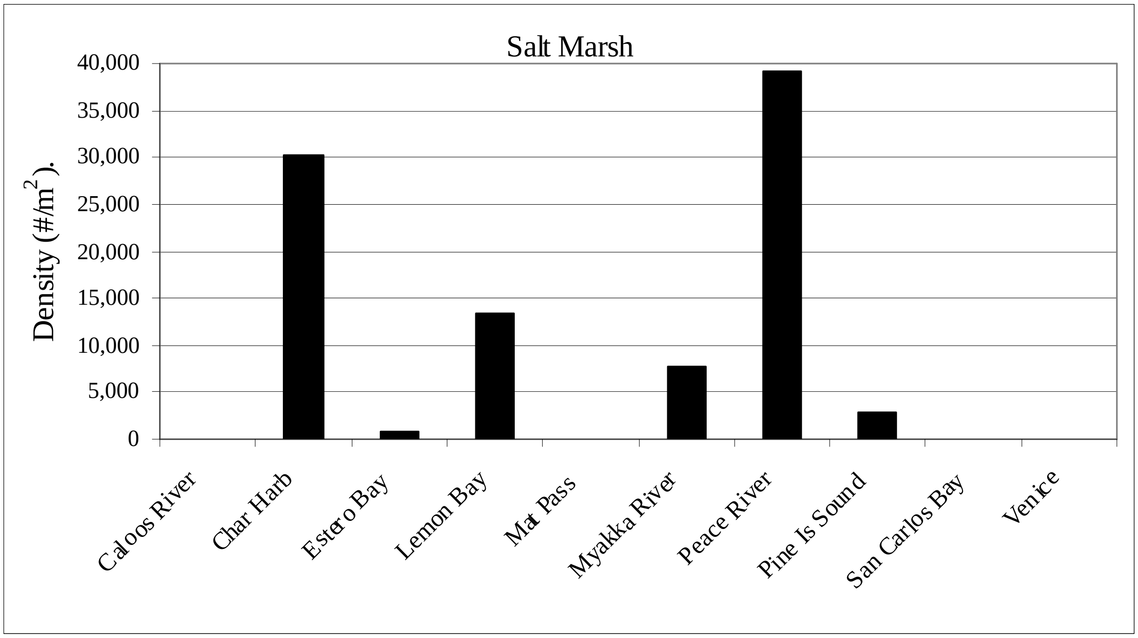
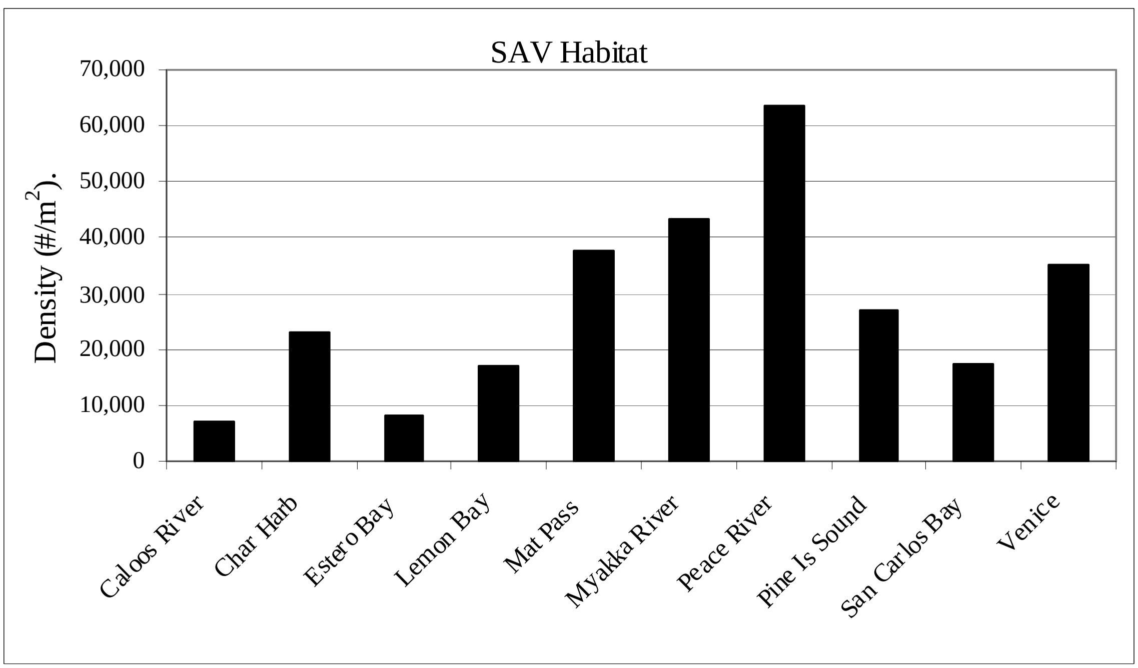


Figure 71. Faunal abundance for SAV habitats.



Species Diversity Metrics
Also presented in **Table 14** are measures of community diversity and abundance distribution among taxa. The Shannon-Weiner (aka, Shannon-Weaver) index is a common measure of species diversity which takes into account the number of individual organisms collected as distributed among the number of species found at a sampling site. This measure is often calculated by three slightly different methods using different logarithm bases. In all three cases a high number indicates high species diversity and a low number indicates relatively lower species diversity. In order to make valid comparisons between different studies it is necessary to assure that sample sizes are similar, as sample size will have an effect of the number of species recovered for a sampling program. For this study the Shannon-Weiner diversity (LogE) ranged from 0.63 (Myakka River intertidal mud) to 3.48 (Estero Bay subtidal mud). The other diversity indices include Simpson's, Margalef's and Gini's indices. The indices are calculated in different ways but, with differing underlying assumptions concerning the importance of species and abundance. However, the raw data for each index consists of the same information which is the individual species and the abundance of each species at each location.

Spatial diagrams of the relative distribution of the diversity values through out the study area are presented in **Figures 72 - 76**. The results are slightly different for each of three indices of diversity; the Shannon-Weaver Index (also known as Shannon-Wiener), Margalef's Index, and Gini's Index (reciprocal of Simpson's index). There are three different graphics for the Shannon-Weaver index which corresponds to the three log bases that are commonly used for the calculation. There is no graphic for the Shannon index. With the Shannon index, 0 represents infinite diversity and 1, no diversity. That is, the bigger the value of D, the lower the diversity. This does not make for intuitive understanding of the results. The Gini index is simply the reciprocal of Simpson's index with values ranging from 0, for low diversity, to 1.0 for high diversity.

When the above images for diversity are compared to **Figure 60** we can see that the graphs illustrate that in general the upper estuary, lower salinity regions; exhibit the greatest abundance of organisms, but lower overall diversity values. This relationship is a paradigm of estuarine ecology. Freshwater brings nutrients and organic matter into the sea via the mixing zone known as the estuary. Within the estuary the high nutrient levels allow for abundant primary production. The invertebrates that are adapted to the lower and fluctuating salinities of the estuary can exploit the primary production and may become extremely abundant. However, only a small portion of the diversity of species within the oceans can tolerate the conditions of the estuary and therefore the diversity of invertebrates within the upper estuary is lower than that of the more saline waters of the lower estuary.

The fifth figure in this series illustrates Pielou's Index of Equitability, **Figure 77**. This index is a measure of the evenness of distribution of individuals among the species present at a location. A location which has the same number of individuals for each species identified will have an evenness index of 1.00, a uniform distribution of individuals among the species. A low equitability value for example 0.50 is indicative of dominance by certain taxa, meaning some species are present in very high numbers and other species are represented by few individuals.

Faunal Similarity Analysis

Faunal similarity analysis was conducted for the benthic data. The analysis utilizes the relative proportions of species and abundance for comparisons between all stations. The formula takes into consideration the species that are common between the stations being compared as well as the number of species occurring independently at each location. The results of the analysis are exhibited in a figure called a cluster diagram. The cluster diagram illustrates all sampling sites that are joined by lines that link along a scale related to highest to lowest similarity values. The cluster diagrams for this project are illustrated by **Figure 78** for core data and **Figure 79** for sweep data. Both figures illustrate the results for data simplified as presence or absence, which does not take into consideration the relative abundance of the species. Presence/absence analysis was chosen for this data to avoid bias due to very abundant species.

For both figures the first connection or link between stations is referred to as the primary pair and always represents the connections with the highest level of similarity. Subsequent connections that are linked to the primary pair represent lower levels of similarity. All results discussed below should be taken with a degree of caution, since the number of samples taken within each station location was relatively low.

For the core sample data there were a greater number of primary pairs associated with samples from the same basin (13 pairs) than there were primary pairs for samples from the same habitat types (5 pairs) for different basins. This indicates that the location factor plays a stronger role than physical composition (sand, mud, mangrove, SAV etc) in determining the composition of the benthic community. Attributes of location that are relevant to the benthos include water parameters such as water quality, salinity, clarity, primary production and other elements of physiological relevance and food availability.

Figure 79 illustrates the similarities of the sampling sites based on presence/absence data for sweep samples. It is interesting to see that there were a greater number of primary pairs between samples from the same basin (column 1) than there were pairs for the same habitat (column 2). The items that are shown in red font, in columns 1 (basin) and 2 (habitat), represent primary pairs. There were some regional groupings of sampling sites that seemed to be more important than habitat type. Some of these regional groups are illustrated by the colors of the graphic lines, with each color representing a large group of related sites. The last 11 lines of the graphic represent samples that were generally were not similar to any other locations.

The general lack of tight cluster groups of similar stations based on habitat or basin illustrates the diversity and plasticity of the benthic fauna. However, if it had been possible to take a greater number of replicate samples from each location the analysis may have revealed a more definitive relationship between habitats and basins.

VII. SUMMARY AND DISCUSSION

Summary

The project described in this report consisted of the first ever synoptic sampling of the major benthic habitats of the Charlotte Harbor National Estuary Program (CHNEP) study area. The habitats sampled consisted of; intertidal sand bar, intertidal mud flat, subtidal sand bar, subtidal mud, seagrasses, salt marsh, mangroves and oysters. Each of the habitats was sampled in each of the 10 CHNEP basins or zones that can be described based on bay boundary topography. The 10 areas consisted of;

- Coastal Venice, including Lyons, Dona and Roberts Bays;
- Lemon Bay and tidal tributaries;
- Charlotte Harbor “proper”;
- Tidal Myakka River;
- Tidal Peace River
- Tidal Caloosahatchee River;
- Pine Island Sound;
- Matlacha Pass;
- San Carlos Bay and
- Estero Bay and tidal tributaries.

Within each of the basins the project team searched for representative areas of each habitat type which were then sampled for benthic macroinvertebrates. Benthic macroinvertebrates are defined as consisting of organisms that are retained on a 0.5 mm mesh sieve. Samples of the benthic fauna were then obtained with a combination of sediment cores/grabs and sweep nets. All samples were collected during May 2004 at the end of the dry season. This period was selected to represent the time of year expected to exhibit the greatest benthic species diversity.

The sampling effort for this project was spatially comprehensive, covering all of the major drainage basins but not spatially intensive as there were relatively few samples taken at each site. This type of sampling strategy collects the most common and abundant species of benthic invertebrates. A spatially intensive sampling program conducted over this region would likely result in a species list 2-3 times larger as more of the sparsely distributed and uncommon benthic species would be added to the list.

The particle size composition of the sediment for each habitat type was also determined based on sediment samples that were processed with a Coulter LS® particle size analyzer.

Measures of water condition were also taken at each sampling site. These measures included temperature, specific conductance, salinity, dissolved oxygen and pH.

A total of 65 basin-habitat combinations were sampled across the Charlotte Harbor study area with a total of 195 core samples and 195 sweep net samples. The analysis of these samples resulted in the identification of 370 invertebrate taxa from more than 44,000 organisms. Core samples accounted for the bulk of the species list, 327 species, while the sweeps collected a total of 128 species. Taking sweep samples added a total of 43 species not collected by the core samples. Conversely core samples resulted in 242 species that were not collected by the sweep samples. This combined methodology highlights the need to consider multiple sampling techniques when conducting benthic invertebrate inventories.

In total eight species accounted for slightly more than 50% of the 44,000 organisms that were collected and 90% of the fauna were represented by only 61 taxa (equivalent to 16% of the total number of species). The top 5 most numerically abundant species from each habitat and basin accounted for slightly more than 79% of the total individuals collected. These species are the dominant organisms of the benthos in the NEP study area and undoubtedly the play an important role in the ecology of the estuary.

The number of species collected from a site ranged from a mere 7 at the Estero Bay marsh habitat to 79 at the San Carlos Bay subtidal sand site. The average number of species recovered from a site was 28 and the median was 24 species.

Of the eight habitats subtidal mud and subtidal sand habitats exhibited the greatest species richness (# of species). Intertidal sand bar and salt marsh exhibited the lowest species richness. In addition to the above salinity plays an important role in species richness with the more saline areas exhibiting the highest species richness.

The number of individuals collected from a sample ranged from 9 to 8,365 specimens (Estero Bay marsh and San Carlos Bay subtidal sand) with a mean of 578 individuals per sample and a median of 288 individuals per sample. This illustrates the tremendous variance in numbers of organisms that is common within benthic habitats. When these numbers are converted to the standard unit of measure, organisms per square meter, the faunal densities ranged from 722 to 670,918 per m^2 with a median value of 23,059 organisms per m^2. From a human perspective this represents an average of 588 benthic organisms under a footprint of a fisherman wearing size 10 shoes. In contrast to species richness the greatest abundance of organisms is in the upper estuary near the mouth of each of the three rivers, Myakka, Peace and Caloosahatchee.

The organisms in the high abundance areas are primarily the mobile microcrustaceans. These animals cue in on the freshwater - saltwater transitional areas a process that may be driven by primary production (plankton blooms).

It is reasonable to assume that high faunal densities are a result of favorable habitat conditions for benthic organisms. Often high values of abundance are due to one or several species that occur in very high numbers. Conditions that favor increased abundance of some species are common in estuaries. However, favorable conditions for the growth and reproduction of one or several species do not necessarily indicate a healthy habitat. The estuary is a complex and complicated mosaic of habitats and it is necessary to look at many interrelated factors, biological, chemical and physical when evaluating the health of an estuary.

Faunal similarity analysis was conducted as a measure of the similarity of the benthic community between sites. The analysis utilized the number of species present and the abundance of each species to compute the relative similarity between sites. The results were then used to plot a diagram indicating the relative similarity or ecological distance between sites. For this project the results of the analysis, for core samples, showed the highest level of similarity between samples from the same basin, more so than samples from the same habitat types but from different basins. This indicates that the geographic location factor plays a stronger role than physical composition of the habitat (sand, mud, mangrove, SAV etc) in determining the composition of the benthic community. Attributes of location that are relevant to the benthos include water parameters such as water quality, salinity, clarity, primary production and other elements of physiological relevance and food availability. Data for the sweep samples illustrated a similar pattern.

The general lack of tight cluster groups of similar stations based on habitat or basin illustrates the diversity and plasticity of the benthic fauna within the Charlotte Harbor system. However, it should be noted that benthic metrics are strongly reliant on sample size. If it had been possible to take a greater number of replicate samples from each location the analysis may have revealed a more definitive relationship between habitats and basins.

It is the nature of the life within an estuary to change with the seasons driven by alterations of freshwater inflows and the changes in light and temperature. The findings resultant from the data collected for this biodiversity survey is only representative of the late spring dry season.

Discussion

What was Charlotte Harbor like 100 years ago at the turn of the 20th century? Certainly the coastal areas were much less populated than today, less coastal development, fewer boats, no air conditioning, more oysters, more fish, and more mosquitoes. For the Harbor habitats it is difficult to say exactly how different things were in terms of quantifiable information. What about 200 years ago, 1800, or even earlier before the arrival of Europeans. It is likely the surroundings would look somewhat familiar but without any coastal structures, no dredged channels, no evidence or sparse evidence of human impact on the estuary. The native inhabitants likely had localized impacts around villages but by and large this would be the period of a true biological baseline. Fishes were more abundant and larger and virtually anything could be eaten fresh from the bay with little risk of illness. However, all was not paradise as red tide would occasionally manifest, hurricanes could impact the coastline and disturb the estuary, and malaria was endemic spread by vast populations of mosquitoes. But as to the actual biological species diversity and abundance we have no quantifiable numbers, and science depends on numbers to make comparisons.

Scientific information on benthic species distribution and abundance is very sparse prior to the Second World War. In the United States the discipline of *Ecology* as an applied science came into fruition in the 1950's and 1960's in part a response to a public awareness of catastrophic environmental events such as the decline of birds due to wide spread DDT use, the poisoning of rivers and estuaries with chemical and human waste and deforestation which effected dramatic changes on the natural landscape. In 1962 the book ***Silent Spring*** by Rachel Carson was published and is credited with jump starting the popular environmental movement in the United States. Prior to that publication Carson had published *The Sea Around Us* in 1951, which was a best seller on the *New York Times* best-seller list for 86 weeks. This book piqued the interest of budding young scientists to enter the field of marine science in the 1950s and 1960's.

The term ecology is derived from *oekologie* which was coined in 1866 by the German biologist Ernst Haeckel. The word is derived from the Greek word '*oikos'* meaning "household" and *'logos'* meaning "study" and therefore "ecology" means the "study of the household (of nature).

While this study represents the first synoptic sampling of the benthos of multiple habitats in this region there have been other studies of benthic faunal within specific areas of Charlotte Harbor. Some of those studies had more intensive local sampling efforts over the course of multiple seasons, but this is the first study to sample comparable habitats in a systematic manner through the estuarine areas of the Charlotte Harbor system. The data from this project may serve as synoptic baseline data that may serve a useful purpose for future comparisons.

This project can be considered as one type of baseline survey. Baselines are critical for environmental science. A baseline is defined as; a measurement, calculation, or location used as a basis for comparison. In ecology a baseline is usually taken to mean the condition of a habitat prior to the advent of an alteration, effect or disturbance. Traditionally a baseline has often been considered to be the most desirable or the natural condition. The ideal baseline for any given habitat would be what was there before any human effect. Perhaps one of the biggest problems in environmental science is the problem of the "shifting baseline", the term coined in 1995 by a fisheries biologist (Pauly, 1995). If we know the true baseline for a given habitat then it is possible to work toward a true restoration of areas impacted by human activity. However, if the current baseline has already been shifted and we accept it as normal then we have accepted a degraded system as a restoration target.

A paper published in Science in 2001 provided an important overview of the shifting baseline problem. Right before our eyes the process of baseline shift has occurred and we failed to see the big picture or grasp the implications. Olsen (2002) summarized two of the most important findings of the *Science* article that; "overfishing had been the most important alteration in the oceans over the past millennium" and "that humans have had such a strong effect on the oceans for so long that, in many locations, it is difficult to even imagine how full of life the oceans used to be." This finding is quite shocking; we don't even know and probably cannot even imagine how abundant life once was in the oceans.

"As a significant proportion of the human population inhabits regions that lie in close proximity to estuaries and coastal areas, marine systems are particularly vulnerable to disturbance and already form some of the most impaired parts of the biosphere" (from Solan and Wigham 2005). The role of the benthos is critical for healthy ecosystems. Reviews of the biological and chemical processes of various habitats demonstrate that increased levels of biodiversity generally have a positive and linear effect on function (Loreau et al., 2001).

It is difficult for the layperson to grasp the concept that the organisms that inhabit marine/estuarine sediments comprise some of the most diverse communities on earth. The complexity of the benthic community and the role of the ecological functions take place at a mostly microscopic level. The activity of the organisms living on and in the seafloor, feeding, moving about and burrowing, collectively contributes to the process known as bioturbation. There are strong links between macro-, meio- and microorganisms. Some organisms have a disproportionately large effect on bioturbation with respect to their relative abundance (Widdicombe and Austen 2005). These organisms known as system engineers would include species such as hemichordates which overturn large quantities of sediment, oysters which change the nature of the sediment through shell accumulation and deposition of fine particulates filtered from the water column and tube building amphipods which alter the nature of the surface of the sediment.

Bioturbation facilitates microbial growth which is responsible for most of the chemical processes that occur within the sediment such as the breakdown of organic material and the cycling of nutrients. Anthropogenic impacts that are most destructive to benthic communities include; physical alteration or removal of substrate (dredging), sedimentation particularly the addition of silt clay fractions, chemical and metals contamination, nutrient enrichment (eutrophication), and alteration of hydrologic cycles (freshwater inflows).

The contributors to this report have attempted to describe the benthic estuarine community in a manner that is meaningful and relevant to the general public. We hope we have achieved that goal and have provided some insight into the ecology of a part of the world few people can observe first hand. The biosphere is a complex place and it the part of the earth in which we live. It would not be appropriate to over simplify the benthos or underestimate its' importance to the health of global ecology.

Of all the challenges faced by ecologists and agencies such as the National Estuary Program, convincing the public that we must do more to preserve and restore habitat may be one of the biggest tasks simply because people do not know what things should be like and how productive and pristine the oceans once were.

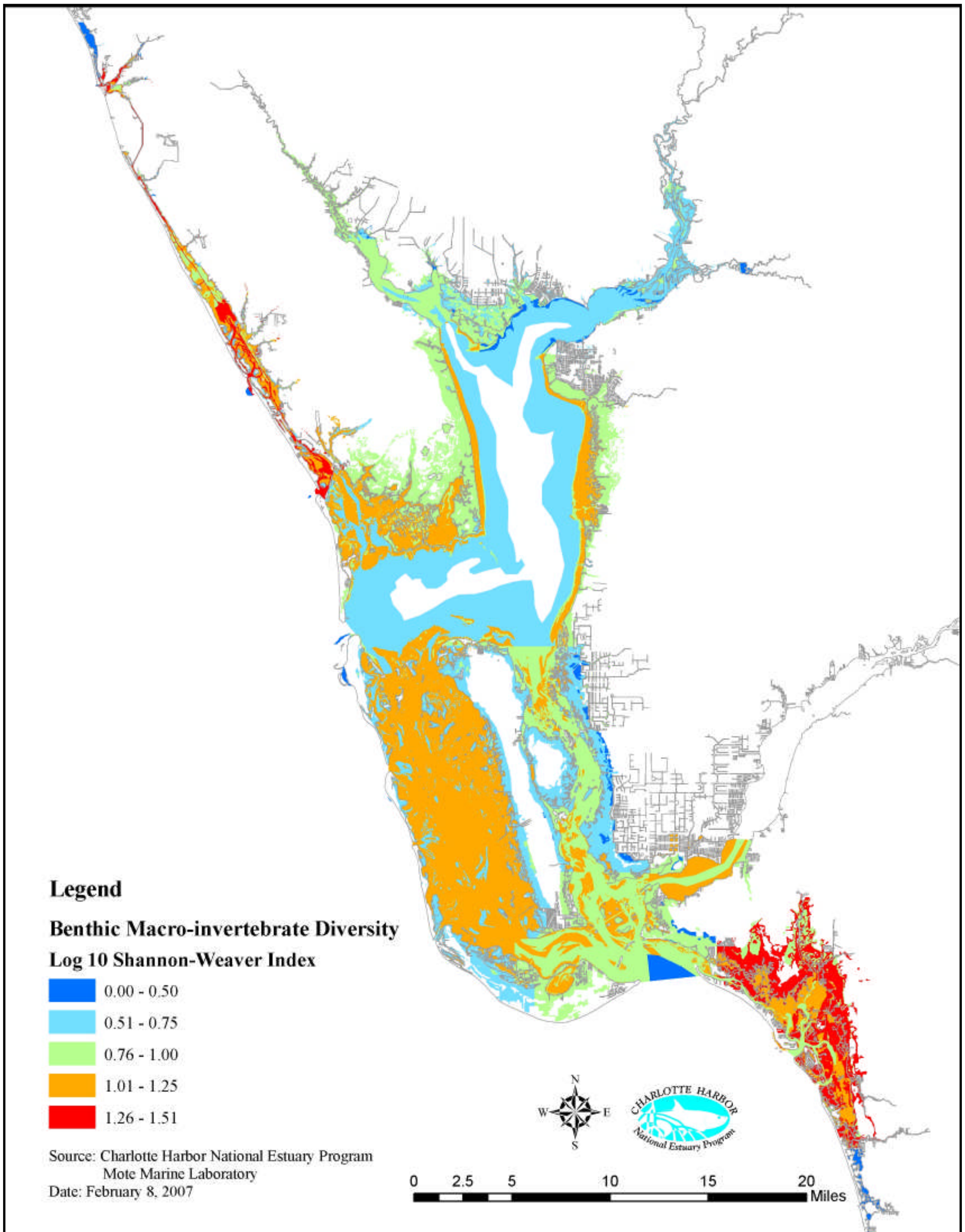


Figure 72. Diversity distribution expressed as Shannon-Wiener Index (log base 10).

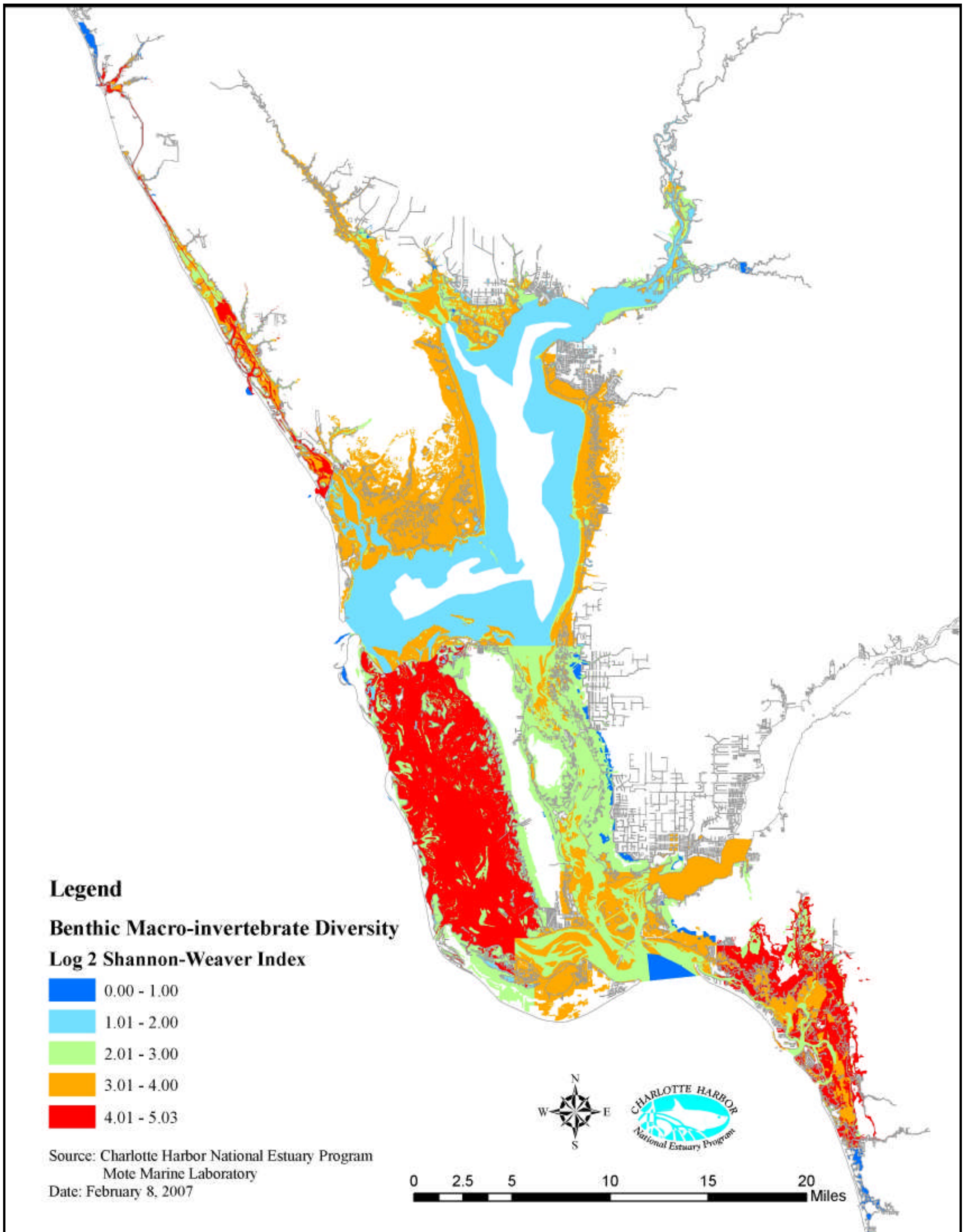


Figure 73. Diversity distribution expressed as Shannon-Wiener Index (log base 2).

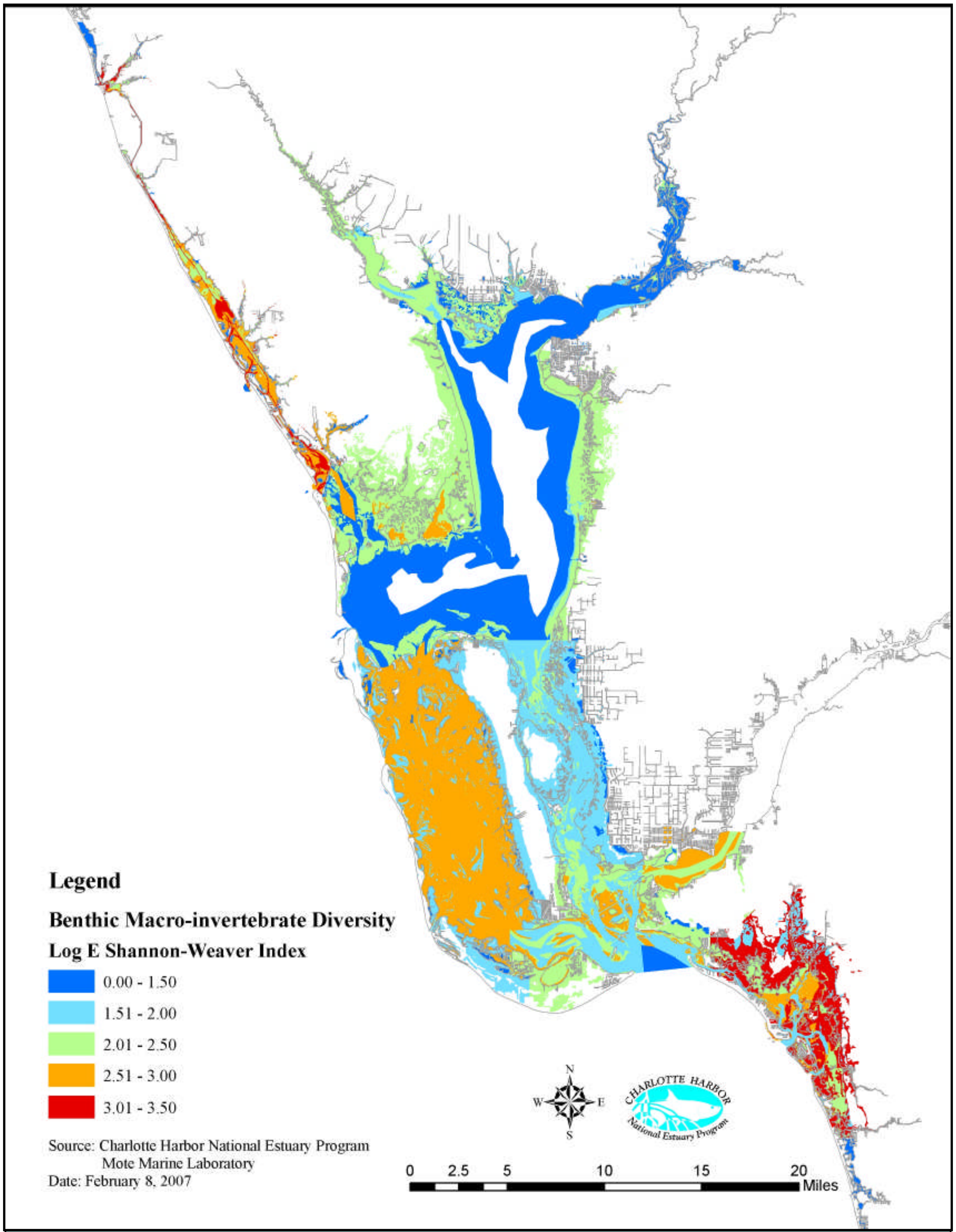


Figure 74. Diversity distribution expressed as Shannon-Wiener Index (log base E).

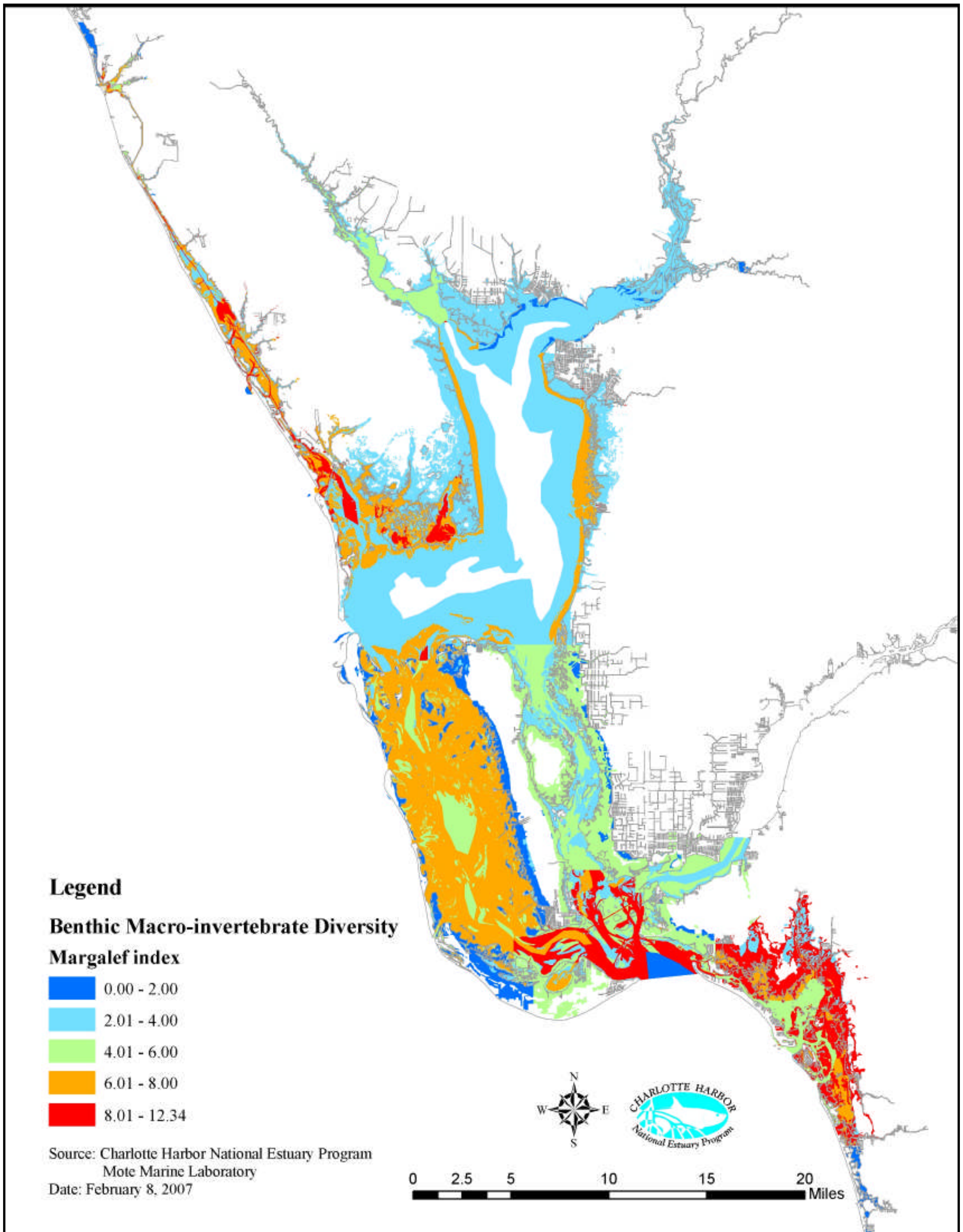


Figure 75. Distribution of values for Margalef's index of diversity.

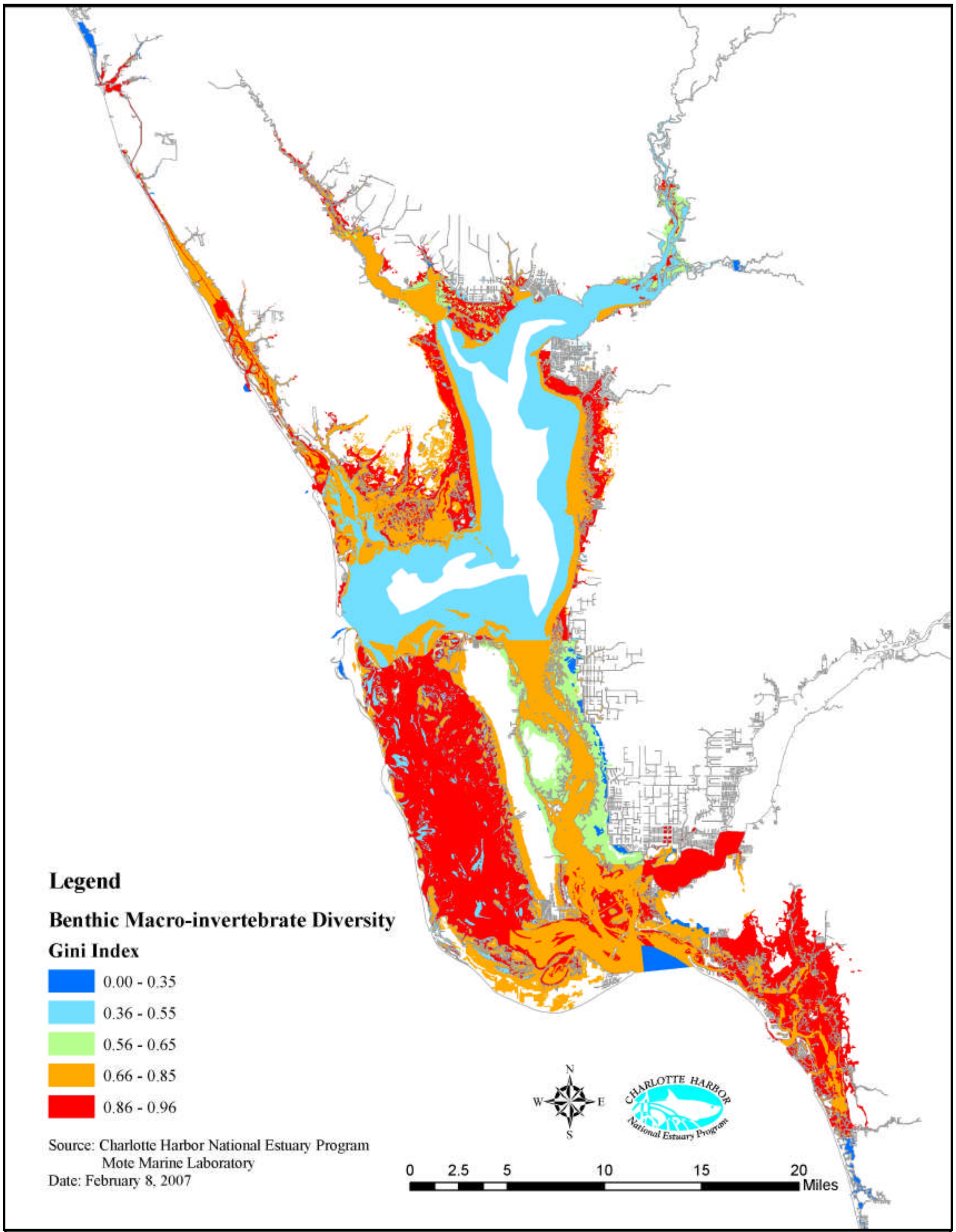


Figure 76. Distribution of values for Gini's's index of diversity.

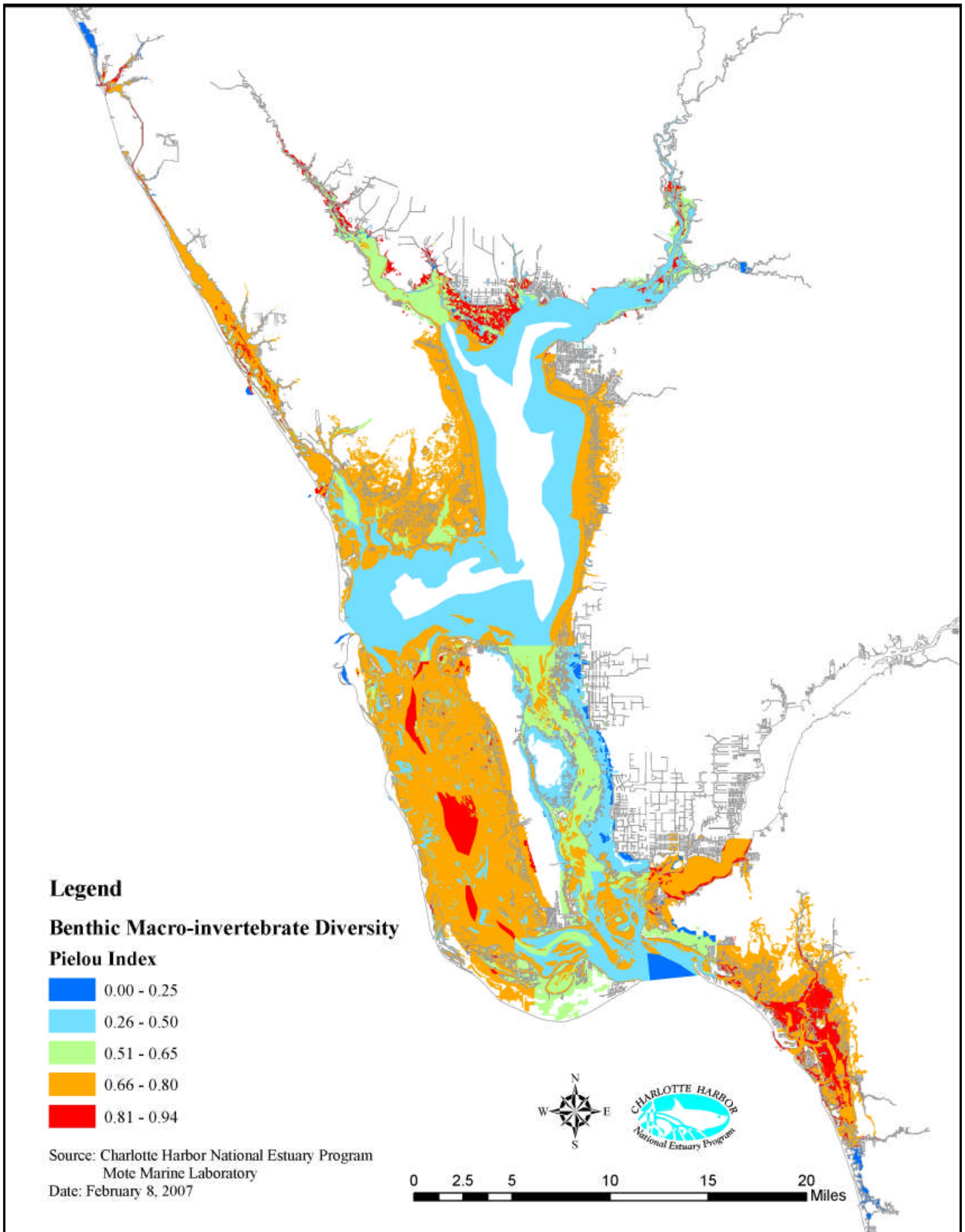


Figure 77. Distribution of values for Pielou's index of equitability.

Figure 78. Faunal similarity analysis for core sample data represented as a cluster diagram based on presence/absence of species at each location.

Basin	Habitat	Sta
Venice	Mangrove	1-1
Caloos	Mangrove	6-1
Venice	Int Sand	1-3
Venice	Int Mud	1-4
CharHarb	Int Mud	3-4
CharHarb	Salt Marsh	3-6
Lemon	Mangrove	2-1
Lemon	Int Mud	2-4
CharHarb	Mangrove	3-1
Estero	Int Mud	10-4
Mat Pass	Mangrove	8-1
Mat Pass	Sub Sand	8-2
Mat Pass	SAV	8-8
San Carlos	Mangrove	9-1
San Carlos	Int Mud	9-4
Mat Pass	Sub Mud	8-5
San Carlos	SAV	9-8
San Carlos	Sub Mud	9-5
Caloos	Sub Sand	6-2
San Carlos	Int Sand	9-3
Mat Pass	Int Sand	8-3
Caloos	Sub Mud	6-5
Caloos	Int Sand	6-3
Caloos	Int Mud	6-4
Caloos	SAV	6-8
CharHarb	SAV	3-8
Pine Is	SAV	7-8
Estero	Sub Sand	10-2
Venice	Sub Sand	1-2
Venice	Sub Mud	1-5
Venice	SAV	1-8
Lemon	Sub Sand	2-2
Lemon	Salt Marsh	2-6
Estero	Mangrove	10-1
Estero	Sub Mud	10-5
CharHarb	Sub Mud	3-5
San Carlos	Sub Sand	9-2
Lemon	Int Sand	2-3
Lemon	SAV	2-8
Lemon	Sub Mud	2-5
Estero	Int Sand	10-3
Estero	SAV	10-8
Pine Is	Int Sand	7-3
Pine Is	Sub Sand	7-2
Pine Is	Sub Mud	7-5
Venice	Oysters	1-7
Lemon	Oysters	2-7
CharHarb	Oysters	3-7
Pine Is	Oysters	7-7
Estero	Oysters	10-7
Mat Pass	Oysters	8-7
San Carlos	Oysters	9-7
Caloos	Oysters	6-7
Myakka	Oysters	4-7
Peace	Oysters	5-7
Peace	Mangrove	5-1
Myakka	Mangrove	4-1
Myakka	Salt Marsh	4-6
Peace	Salt Marsh	5-6
Myakka	Sub Sand	4-2
Myakka	Sub Mud	4-5
Peace	Sub Mud	5-5
Peace	Sub Sand	5-2
Peace	Int Mud	5-4
Peace	SAV	5-8
Myakka	Int Sand	4-3
Myakka	Int Mud	4-4
Peace	Int Sand	5-3
Myakka	SAV	4-8
Estero	Salt Marsh	10-6
Pine Is	Mangrove	7-1
Pine Is	Salt Marsh	7-6
CharHarb	Sub Sand	3-2
CharHarb	Int Sand	3-3
Pine Is	Int Mud	7-4

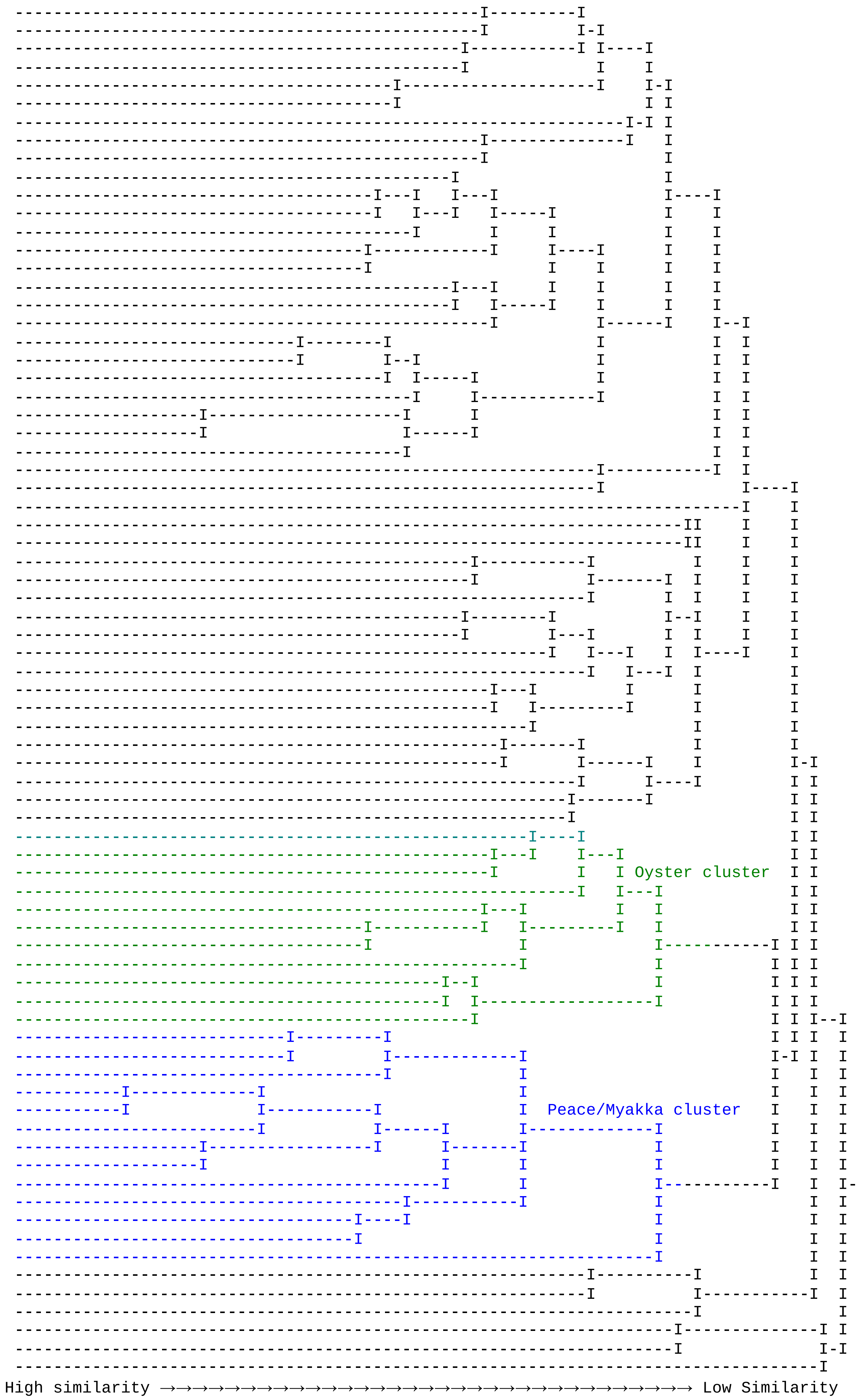
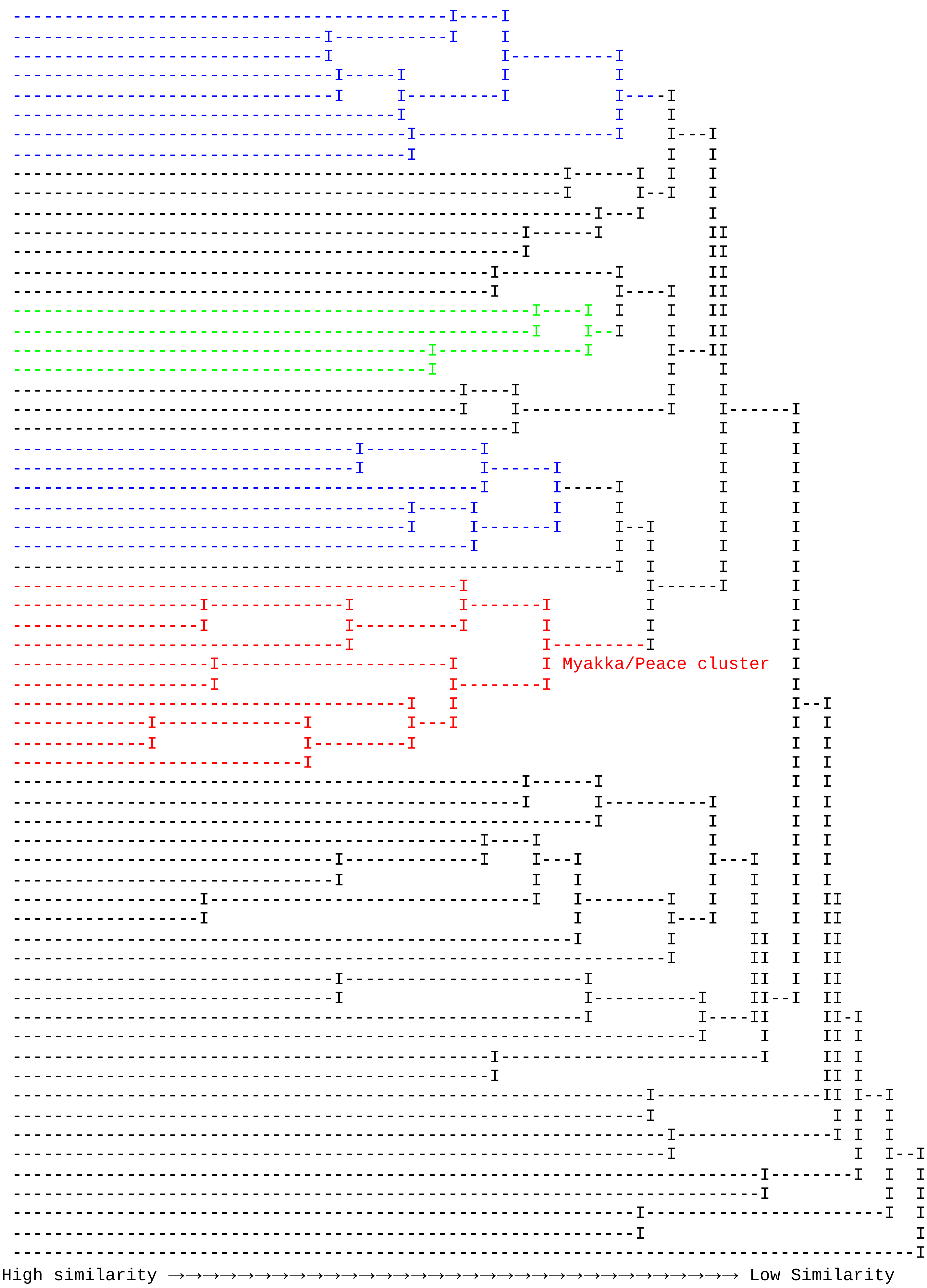


Figure 79. Faunal similarity analysis for sweep sample data represented as a cluster diagram based on presence/absence of species at each location.

Basin	Habitat	Sta
Venice	Mangrove	1-1
Mat Pass	Mangrove	8-1
San Carlos	Mangrove	9-1
Caloos	Mangrove	6-1
San Carlos	Int Sand	9-3
San Carlos	SAV	9-8
Mat Pass	Sub Sand	8-2
Mat Pass	Sub Mud	8-5
Venice	Int Mud	1-4
Estero	Sub Mud	10-5
Venice	Sub Mud	1-5
Lemon	Mangrove	2-1
Lemon	Int Mud	2-4
CharHarb	Mangrove	3-1
CharHarb	Int Mud	3-4
Caloos	Int Sand	6-3
Pine Is	Mangrove	7-1
Mat Pass	Int Sand	8-3
Mat Pass	SAV	8-8
Myakka	Mangrove	4-1
Myakka	Salt Marsh	4-6
Peace	Mangrove	5-1
Estero	Int Mud	10-4
Caloos	Int Mud	6-4
Pine Is	Sub Sand	7-2
Caloos	Sub Sand	6-2
Caloos	SAV	6-8
Caloos	Sub Mud	6-5
Lemon	Int Sand	2-3
Myakka	Sub Sand	4-2
Myakka	Int Sand	4-3
Peace	Int Sand	5-3
Peace	Sub Sand	5-2
Myakka	Int Mud	4-4
Myakka	Sub Mud	4-5
Peace	Int Mud	5-4
Peace	Sub Mud	5-5
Peace	Salt Marsh	5-6
Peace	SAV	5-8
Venice	Sub Sand	1-2
Venice	Int Sand	1-3
San Carlos	Sub Mud	9-5
Venice	SAV	1-8
Lemon	Sub Mud	2-5
Lemon	SAV	2-8
CharHarb	Sub Mud	3-5
CharHarb	SAV	3-8
Lemon	Salt Marsh	2-6
Lemon	Sub Sand	2-2
CharHarb	Sub Sand	3-2
CharHarb	Int Sand	3-3
Myakka	SAV	4-8
Pine Is	Int Sand	7-3
Estero	SAV	10-8
Pine Is	Sub Mud	7-5
Estero	Int Sand	10-3
Pine Is	Int Mud	7-4
Estero	Mangrove	10-1
Estero	Sub Sand	10-2
Pine Is	Oysters	7-7
San Carlos	Sub Sand	9-2
CharHarb	Salt Marsh	3-6
Pine Is	Salt Marsh	7-6
San Carlos	Int Mud	9-4



Selected References

AAAS. 1995. Proc. Human Population and Water, Fisheries, and Coastal Areas: Science and Policy Issues Symp., American Association for the Advancement of Science, Washington, D.C.

American Health Association. 1989. Standard Methods for the examination of water and Wastewater. 17th edition. http://www.standardmethods.org/

Camp Dresser & McKee Inc. 1988. The study of seasonal and spatial patterns of hypoxia in upper Charlotte Harbor. Technical report prepared for Southwest Florida Water Management District. 1 v. (various paging) : maps, charts.

Chapman, V.J. 1976. Mangrove Vegetation. J. Cramer, Germany.

Chapman, V.J. (ed.). 1977. Wet Coastal Ecosystems, Ecosystems of the World 1. Elsevier Scientific Publishing Co., Amsterdam, 428 pp.

Charlotte Harbor National Estuary Program.1999. Synthesis of technical information. Technical report (Charlotte Harbor National Estuary Program); no. 99-02. Includes bibliographical references. v.1. A characterization of water quality, hydrologic alterations, and fish and wildlife habitat in the Greater Charlotte Harbor Watershed; v.2 Appendices. North Fort Myers, FL: Charlotte Harbor National Estuary Program, 2 v. ill., maps. http://www.chnep.org/

Coastal Environmental, Inc. 1995. Estimates of Total Nitrogen, Total Phosphorus and Total Suspended Solids Loadings to Charlotte Harbor, Florida. Final Report to: Surface Water Improvement and Management (SWIM) Department, Southwest Florida Water Management District, Tampa, FL.

Culter, J.K. and E,.D. Estevez. 1988. Benthic macroinvertebrate and mollusc study design for Peace River regional water supply facility hydrobiological monitoring program: Phase I report; scientific plan of study to investigate potential long-term monitoring options for the Peace River. Submitted to Peace River Manasota Regional Water Supply Authority. Mote Marine Laboratory technical report; no. 555. 1 v. (various pagings) ; ill., maps, charts.

Culter, J.K. 1996. Analysis of benthic invertebrate samples from the Caloosahatchee River, Florida : a technical report. Mote Marine Laboratory technical report; no. 466. Submitted to South Florida Water Management District, West Palm Beach, Fl. iii, 55 p., ill.

Culter, J.K. and E,.D. Estevez. 2001. Peace River benthic macroinvertebrate and mollusk indicators. Mote Marine Laboratory technical report; no. 744. Prepared for the Peace River Manasota Regional Water Supply Authority.

Dixon, L.K. and G. Kirkpatrick. 1995. Light Attenuation with Respect to Seagrasses in Sarasota Bay, Florida. Final Report to Sarasota Bay National Estuary Program. Sarasota, FL.

EPA. 1973. Biological and Field Laboratory Methods for measuring the quality of surface waters and effluents. Office of Research and Development, Cincinnati, Ohio. EPA-670/4-73-001.

Estevez, E.D. 2005. Molluscan Bio-indicators of the tidal Myakka River and inshore waters of Venice Florida. Final Report for Sarasota County contract 2004-134, work authorization 04-03. Mote Marine Laboratory Technical Report No. 990

Estevez, E.D. 2001. Molluscan bio-indicators of the tidal Peace River, Florida. In: Culter and Estevez, 2001. Peace River benthic macroinvertebrate and mollusk indicators. Mote Marine Laboratory technical report; no744. Prepared for the Peace River Manasota Regional Water Supply Authority.

Estevez, E. D. and J. Beever. 1998. The story of the Greater Charlotte Harbor Watershed Charlotte Harbor National Estuary Program, 135 p.: ill., maps.

Estevez, E.D. 1997. The state of Charlotte Harbor, Florida, its adjacent inland waters and watershed : a characterization report for the Charlotte Harbor National Estuary Program / by Mote Marine Laboratory. Mote Marine Laboratory technical report; no505. Sarasota, Fla. 1 v. (unpaged) : ills., maps.

Estevez, E.D., R.K. Evans, C.A. Palmer. 1990. Distribution and abundance of marshes, mangroves and submerged aquatic vegetation in tidal waters of the Myakka River, Sarasota County, Florida. Mote Technical Report; No. 196. iv, 40 p. 17 figures, tables. Bibiography p.30-32.

Estevez, E. D. and U.S. Geological Survey. 1986. Infaunal macroinvertebrates of the Charlotte Harbor estuarine system and surrounding inshore waters, Florida. Prepared in cooperation with the Florida Dept. of Environmental Regulation. Water-resources investigations report; 85-4260, Sponsored by the U.S. Geological Survey; contract no. 14-08-0001-A-0160. U.S. Dept. of the Interior. iv, 116 p.: ill., maps.

Estevez, E.D. 1986. A dry-season characterization pf the tidal Myakka River. Mote Marine Laboratory Technical Report to Sarasota County.

Estevez, E.D. 1986. A wet-season characterization pf the tidal Myakka River. Mote Marine Laboratory Technical Report to Sarasota County.

Estevez, E. D., J. Miller, J. Morris. 1984. A review of scientific information: Charlotte Harbor estuarine ecosystem complex and the Peace River. Mote Marine Laboratory technical report; no. 80. Southwest Florida Regional Planning Council, 2 v. vi, 1062 p. in various paging. ill., maps, charts.

F.A.O. 1982. Management and Utilization of Mangroves in Asia and the Pacific. Food and Agriculture Organization of the United Nations Environmental Paper #3, Rome, 160 pp.

Field, C.D. 1995. Journey Amongst Mangroves. International Society of Mangrove Ecosystems, Okinawa, Japan, 140 pp.

Fraser, T.H. and R.T. Montgomery. 1997. Compendium of existing monitoring programs in the greater Charlotte Harbor watershed. Prepared for Charlotte Harbor National Estuary Program. Technical report (Charlotte Harbor National Estuary Program); no. 97-02. viii, 187 p. : maps

Gross, M.G. 1971. Chapter 25. Carbon Determination. In: Procedures is sedimentary Petrology. R.E. Carver, editor. University of Georgia, Athens, Ga. Wiley Interscience. p. 587

Heard, R.W. 1982. Guide to common tidal marsh invertebrates of the northeastern Gulf of Mexico. Ocean Springs, MS. Mississippi-Alabama Sea Grant Consortium, LCCN 82132581 //r962 82 p., ill.

Heyl, M.G. 1992. Point and non-point source pollutant loading assessment. In: P. Roat, C. Ciccolella, H. Smith and D. Tomasko (eds.). Sarasota, FL: Sarasota Bay Framework for Action. Sarasota Bay National Estuary Program, pp. 12.1-12.9.

Jackson, J.B.C. plus 18 co-authors. 2001. "Historical overfishing and the recent collapse of coastal ecosystems." *Science* 293-629-638.

Kaplan, E.H. 1988. A field guide to southeastern and Caribbean seashores : Cape Hatteras to the Gulf Coast, Florida, and the Caribbean. The Peterson field guide series. Houghton Mifflin, Boston. xiii, 425 p., [132] p. of plates : ill. (some col.), maps.

Kristensen, E., R.R. Haese, and J.E. Kostka, editors. 2005. Coastal and Estuarine Studies 60: Interactions between macro- and microorganisms in marine sediments. American Geophysical Union, Washington, DC. 390 p.

Loreau, M., S. Naeem, P. Inchausti, J. Bengtsson, J.P. Grime, A. Hector, D.U. Hooper, M.A. Huston, D.G. Raffaelli, B. Schimd, D. Tilman and D.A. Wardle. 2001. biodiversity and ecosystem functioning: current knowledge and future challenges. Science 294, 804-808.

Lugo, A. E., and S. C. Snedaker. 1974. The ecology of mangroves, Annual Review of Ecology and Systematics 5:39-64.

McPherson, B.F. and R.L. Miller. 1993. Causes of light attenuation in estuarine waters of Southwestern Florida. In: L.J. Morris and D.A. Tomasko (eds.). Proceedings and Conclusions of Workshops On: Submerged Aquatic Vegetation Initiative and Photosynthetically Active Radiation. Special Publication SJ93-SP13. Palatka, FL: St. Johns River Water Management District, pp. 227-234.

Morris, J. and J.Miller. 1975. A guide to written and graphic information of the Charlotte Harbor estuarine region. NotesCompiled for the Environmental Confederation of Southwest Florida (ECOSWF) at the New College Environmental Studies Program. PublisherSanibel Island, FL: ECOSWF.

Morton, J. F. 1965. Can the red mangrove provide food, feed, and shelter? Econ. Bot. 19: 113-123.

Mote Marine Laboratory, E. D. Estevez.1997. The state of Charlotte Harbor, Florida, its adjacent inland waters and watershed : a characterization report for the Charlotte Harbor National Estuary Program / by Mote Marine Laboratory. Mote Marine Laboratory technical report; no505. 1 v. (unpaged) : ills., maps.

Odum, W. E., C. C. McIvor, and T. J. Smith. 1982. The ecology of the mangroves of South Florida: a community profile. U.S. Fish and Wildlife Service, OBS Publication FWS/OBS-81/24, Washington, D.C. 144pp.

Pauly, D. 1995. "Anecdotes and the shifting baseline syndrome of fisheries." *Trends in Ecology and Evolution* 10(10):430.

Pierce, R.H., M.S. Henry, J.K. Culter and J. Sprinkel. 1998. Ecological impact assessment of abate on Florida state lands saltmarsh communities: three-year summary report January 1995 through December 1997. Mote Marine Laboratory technical report; no.567 and no.575. vii, 111 p., appendices : ill., maps, charts.

Reimold, R.J. and W.H. Queen (eds.). 1974. Ecology of Halophytes, New York: Academic Press, Inc, 605 pp.

Rey, J. R. 1999. Mangroves. In: R. W. Fairbridge and D. E. Alexander (eds.), Encyclopedia of Environmental Sciences. Kluwer Academic Publishers, Dordrecht.

Rutzler, Klaus, and C. Ilka. 1996. Caribbean Mangrove Swamps. Scientific American, March 1996.

Stoker, Y.E., U.S. Geological Survey. 1992. Salinity distribution and variation with freshwater inflow and tide, and potential changes in salinity due to altered freshwater inflow in the Charlotte Harbor estuarine system, Florida. Prepared in cooperation with the Florida Dept. of Environmental Regulation. Water-resources investigations report United States Geological Survey; 92-4062. Tallahassee, FL. 30 p. ill., maps.

Teas, H.J. (ed.). 1984a. Biology and Ecology of Mangroves. Dr. W. Junk Publishers, The Hague, 188 pp.

Teas, H.J. (ed.). 1984b. Physiology and Management of Mangroves. Dr. W. Junk Publishers, The Hague, 106 pp.

Tomlinson, P.B. 1986. The Botany of Mangroves. Cambridge University Press, London, 413 pp.

Volety, A. K., S. G. Tolley, and J. T. Winstead. 2003. Effects of seasonal and water quality parameters on oysters (Crassostrea virginica) and associated fish populations in the Caloosahatchee River. Final Report (C-12412-A1) to South Florida Water Management District.

Widdicombe, S. and M.C. Austen. 2005. Setting diversity and community structure in subtidal sediments: The importance of biological disturbance. Paper 11 In: Kristensen, E., R.R. Haese, and J.E. Kostka, editors. 2005. Coastal and Estuarine Studies 60: Interactions between macro- and microorganisms in marine sediments. American Geophysical Union, Washington, DC. 390 p.

On the Web Information Sources

Web based scientific reference material is increasing at a rapid pace which has greatly facilitated the work of scientists and laypersons. However, the availability of web based materials is unpredictable, URL's often change, or pages disappear for many reasons. Users of web based materials should also use caution in the utilization or referencing such materials as sites may contain errors, deliberate fraud or spoofs and may not always be scientifically accurate. Articles published in peer reviewed journals remain the standard for reliability of scientific information.

General References

Charlotte Harbor National Estuary Program http://www.chnep.org/

Ocean Portal - directory to web based scientific information.
http://www.iode.org/oceanportal/index.php

Gulfe Base
http://www.gulfbase.org/
Resource database for Gulf of Mexico Research.

Mote Marine Laboratory
Web Site: http://www.mote.org/
Library: http://www.mote.org/index.php?src=gendocs&link=Library&category=Library
Center for Coastal Ecology: http://www.mote.org/index.php?src=gendocs&link=CoastalEcology&submenu=Research
URL:https://dspace.mote.org:8443/dspace/

Maps - USGS topographic quadrangles, viewable on line.
Topozone: http://www.topozone.com/viewmaps.asp

Tree of Life web project: http://tolweb.org/tree/phylogeny.html

Southwest Florida Water Management District
http://www.sfwmd.gov

References for Invertebrates

A field guide to Freshwater Invertebrates (UK)
http://schools.ceh.ac.uk/advanced/freshpoll/freshpoll2.htm

Annelids

Introduction to the Annelida
http://www.ucmp.berkeley.edu/annelida/annelida.html

Tree of Life web project - annelids
http://www.tolweb.org/Annelida

University of Michigan Museum of Zoology
http://animaldiversity.ummz.umich.edu/site/accounts/information/Annelida.html

Kidport - a site directed toward science for juveniles
http://www.kidport.com/REFLIB/Science/Animals/Annelids.htm

Columbia Encyclopedia entry
http://www.bartleby.com/65/an/Annelida.html

Crustacea

List of newsletters with Crustacea content or interest:
http://www.vims.edu/tcs/newsletters.htm

Amphipods
The Amphipod Newsletter - http://www.imv.uit.no/amphipod/anmain.htm

Department of Zoology, Ecology and Plant Science, National University of Ireland
Key to northeast Atlantic and Mediterranean amphipods
http://www.amphipoda.com/index.html

US Environmental Protection Agency, Biological Indicators of Watershed Health
http://www.epa.gov/bioindicators/html/amphipods.html

Mangroves

Rhizophora mangle (Red mangrove)
Smithsonian Marine Station at Ft. Pierce
http://www.sms.si.edu/irlspec/Rhizop_mangle.htm
Wikipedia
http://en.wikipedia.org/wiki/Mangrove

Avicennia germinans (Black mangrove)
Smithsonian Marine Station at Ft. Pierce
http://www.sms.si.edu/irlspec/Avicen_germin.htm
Wikipedia
http://en.wikipedia.org/wiki/Mangrove

Bann, C. The Economic Valuation of Mangroves: A Manual for Researchers.
http://www.idrc.org.sg/eepsea/publications/report/CamilleBann.htm

Quarto, A. The Mangrove Forest. MAP Working Paper.
http://www.earthisland.org/map/mngec.htm#forestanchor

Florida DEP: http://www.dep.state.fl.us/coastal/habitats/mangroves.htm

Oysters
Florida Gulf Coast University
http://www.fgcu.edu/cwi/research1.htm

Wikipedia: http://en.wikipedia.org/wiki/Oyster

Salt Marsh

Department of Environmental Protection, Florida Marine Research Institute. "Salt Marshes." Last updated: 22 February 2002. Available online at: http://www.dep.state.fl.us/coastal/habitats/saltmarshes.htm

Mullahey, J.J., Tanner, G.W, Coates, S. "Range Sites of Florida." University of Florida Institute of Food and Agricultural Sciences. Available online at: http://wfrec.ifas.ufl.edu/range/rangelands/saltmrsh.html

Seagrasses

Florida fish and Wildlife Conservation Commission
http://research.myfwc.com/features/category_main.asp?id=1323

Department of Environmental Protection (DEP), Florida
http://www.dep.state.fl.us/coastal/habitats/seagrass/

Florida International University: http://www.fiu.edu/~seagrass/
Key to Seagrasses of Florida: http://www.fiu.edu/~seagrass/key/seagrasskey.html

World Atlas of Seagrasses
http://www.unep-wcmc.org/marine/seagrassatlas/index.htm

Wikipedia: http://en.wikipedia.org/wiki/Sea_grass

Australian Institute of marine Science (AIMS)
http://www.aims.gov.au/pages/research/project-net/seagrass/apnet-seagrasses01.html

Dauphin Island Marine Ecology Lab
http://marineecologylab.disl.org/pastprojects.htm

University of Hawaii
http://www.botany.hawaii.edu/seagrass/

Seagrass species specific reference sites

Florida Department of Environmental Protection
http://www.dep.state.fl.us/coastal/habitats/seagrass/

Halodule wrightii (Shoal Grass)
Flora of North America
http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=222000075

Ruppia maritima (Widgeon Grass),
Flora of North America
http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=220011791
Smithsonian Marine Station at Ft. Pierce
http://www.sms.si.edu/irlspec/Ruppia_mariti.htm

Thalassia testudinum (Turtle Grass)
Flora of North America
http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=132680
Smithsonian Marine Station at Ft. Pierce
http://www.sms.si.edu/irlspec/Thalas_testud.htm

Syringodium filiforme (Manatee Grass)
Flora of North America
http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=220013215
Smithsonian Marine Station at Ft. Pierce
http://www.sms.si.edu/irlspec/Syring_filifo.htm

Seawater Composition
http://www.biosbcc.net/ocean/marinesci/02ocean/swcomposition.htm

Statistics
Simpson's and Gini's Index: http://www.countrysideinfo.co.uk/simpsons.htm
http://en.wikipedia.org/wiki/Simpson_index
Shannon-Wiener Index http://en.wikipedia.org/wiki/Shannon-Wiener_index
Margalef's index http://www.csub.edu/~lmmoe/courses/advecol/SpDiversity.htmlx
Bray-Curtis Index of Similarity: http://www.physaliaos.com/braycurtis.htm

APPENDICES

APPENDIX A - Sampling station locations
Includes locations for samples taken for the data for the supplemental benthic data from other studies.

APPENDIX B - Graphic illustration of sediment grain size distribution for habitat types within each basin.

SUPPLEMENTAL BENTHIC DATA FROM OTHER STUDIES

APPENDIX C - Dona, Roberts and Lyons Bays species list.

APPENDIX D- Myakka River Myakkahatchee Creek species list.

APPENDIX E - Peace River species list.

APPENDIX A

SAMPLING STATION LOCATIONS

Includes locations for samples taken for the data for the supplemental benthic data from other studies.

Appendix Table A.1. Sampling location for sediment grain size analysis samples for the Charlotte Harbor Benthic Habitat project.

Sample Number	Basin #	Basin Name	Habitat Type	Latitude	Longitude
437	1	Coastal Venice	Intertidal mud flat	27.11410	-82.45967
438	1	Coastal Venice	Intertidal sand bar	27.11372	-82.46348
433	1	Coastal Venice	Mangrove	27.12360	-82.46333
434	1	Coastal Venice	Submerged aquatic vegetation	27.11833	-82.46420
435	1	Coastal Venice	Subtidal mud flat	27.12193	-82.46288
428	1	Coastal Venice	Subtidal sand bar	27.11393	-82.46120
462	2	Lemon Bay	Intertidal mud flat	26.89628	-82.32935
536	2	Lemon Bay	Intertidal sand bar	26.96528	-82.37517
464	2	Lemon Bay	Mangrove	26.89593	-82.32983
465	2	Lemon Bay	Marsh	26.89960	-82.33710
537	2	Lemon Bay	Submerged aquatic vegetation	26.96160	-82.37532
461	2	Lemon Bay	Subtidal mud flat	26.94955	-82.36137
459	2	Lemon Bay	Subtidal sand bar	26.89710	-82.33105
500	3	Charlotte Harbor proper	Intertidal mud flat	26.75638	-82.06440
467	3	Charlotte Harbor proper	Intertidal sand bar	26.76392	-82.06625
501	3	Charlotte Harbor proper	Mangrove	26.78673	-82.19355
611	3	Charlotte Harbor proper	Marsh	26.75635	-82.06433
615	3	Charlotte Harbor proper	Submerged aquatic vegetation	26.76412	-82.06572
618	3	Charlotte Harbor proper	Subtidal mud flat	26.78838	-82.17513
613	3	Charlotte Harbor proper	Subtidal sand bar	26.76503	-82.06728
530	4	Tidal Myakka River	Intertidal mud flat	27.01604	-82.26807
486	4	Tidal Myakka River	Intertidal sand bar	27.00326	-82.25809
527	4	Tidal Myakka River	Mangrove	27.00251	-82.25977
520	4	Tidal Myakka River	Marsh	27.01662	-82.26628
488	4	Tidal Myakka River	Submerged aquatic vegetation	27.92008	-82.15590
483	4	Tidal Myakka River	Subtidal mud flat	27.00301	-82.26012
485	4	Tidal Myakka River	Subtidal sand bar	27.01716	-82.27043
522	5	Tidal Peace River	Intertidal mud flat	26.96465	-82.02058
525	5	Tidal Peace River	Intertidal sand bar	26.95106	-82.02262
523	5	Tidal Peace River	Mangrove	26.96735	-82.01482
512	5	Tidal Peace River	Marsh	26.97042	-82.01366
518	5	Tidal Peace River	Submerged aquatic vegetation	26.95765	-82.01465
515	5	Tidal Peace River	Subtidal mud flat	26.96891	-82.01473
532	5	Tidal Peace River	Subtidal sand bar	26.95104	-82.02261

Appendix Table A.1. Sampling location for sediment grain size analysis samples for the Charlotte Harbor Benthic Habitat project (continued).

Sample Number	Basin #	Basin Name	Habitat Type	Latitude	Longitude
630	6	Tidal Caloosahatchee River	Intertidal mud flat	26.51451	-81.99093
646	6	Tidal Caloosahatchee River	Intertidal sand bar	26.53900	-81.99615
627	6	Tidal Caloosahatchee River	Mangrove	26.53368	-81.99747
651	6	Tidal Caloosahatchee River	Submerged aquatic vegetation	26.53368	-81.98655
620	6	Tidal Caloosahatchee River	Subtidal mud flat	26.52016	-81.98433
619	6	Tidal Caloosahatchee River	Subtidal sand bar	26.53438	-81.19995
635	7	Pine Island Sound	Intertidal mud flat	26.65997	-82.15377
841	7	Pine Island Sound	Intertidal sand bar	26.58521	-82.14651
634	7	Pine Island Sound	Mangrove	26.63978	-82.18694
490	7	Pine Island Sound	Marsh	26.65997	-82.15367
645	7	Pine Island Sound	Submerged aquatic vegetation	26.63759	-82.18715
837	7	Pine Island Sound	Subtidal mud flat	26.69756	-82.16378
643	7	Pine Island Sound	Subtidal sand bar	26.63628	-82.19350
507	8	Matlacha Pass	Intertidal sand bar	26.59959	-82.06428
474	8	Matlacha Pass	Mangrove	26.59687	-82.06528
656	8	Matlacha Pass	Submerged aquatic vegetation	26.59887	-82.06528
491	8	Matlacha Pass	Subtidal mud flat	26.56107	-82.07583
668	8	Matlacha Pass	Subtidal sand bar	26.59611	-82.06487
641	9	San Carlos Bay	Intertidal mud flat	26.49847	-82.02787
649	9	San Carlos Bay	Intertidal sand bar	26.50970	-82.00945
658	9	San Carlos Bay	Mangrove	26.49847	-82.02787
639	9	San Carlos Bay	Submerged aquatic vegetation	26.50062	-82.02557
640	9	San Carlos Bay	Subtidal mud flat	26.50336	-82.02565
632	9	San Carlos Bay	Subtidal sand bar	26.49080	-82.04467
863	10	Estero Bay	Intertidal mud flat	26.44282	-81.85398
874	10	Estero Bay	Intertidal sand bar	26.37883	-81.85362
864	10	Estero Bay	Mangrove	26.37671	-81.85498
868	10	Estero Bay	Marsh	26.47332	-81.86365
862	10	Estero Bay	Submerged aquatic vegetation	26.42686	-81.85853
875	10	Estero Bay	Subtidal mud flat	26.43415	-81.88244
869	10	Estero Bay	Subtidal sand bar	26.41802	-81.87879

Appendix Table A.2. Sampling locations for Dona, Roberts and Lyons Bays.

Station No.	Lyons Bay		Dona Bay		Roberts	
	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
1	27.11558	82.46551	27.11325	82.46091	27.10845	82.45865
2	27.11822	82.46381	27.11504	82.45480	27.11088	82.45246
3	27.12305	82.46351	27.11942	82.45074	27.10978	82.44851
4			27.12555	82.44838	27.11358	82.44517
5			27.12797	82.44411	27.11410	82.44271
6			27.13188	82.43821	27.11685	82.43817
7			27.13780	82.43554		
8			27.14317	82.43149		
9			27.14318	82.43049		
10			27.14689	82.42715		

Appendix Table A.3. Sampling locations for the Myakka River, June 7 and 8th 2004.

River Kilometer	Shallow or Deep	Texture	Odor	Sample Depth (ft)	Latitude	Longitude
RK 0	S	**SAV, ruppia**			26.90250	-82.17302
RK 0	D	clean sand		8.0	26.90433	-82.17003
RK 2	S	SAV sparse Thalassia			26.93268	-82.16398
RK 2	D	medium sand		7.0	26.92967	-82.16723
RK 4	D			7.0	26.94170	-82.18702
RK 6	S				26.95818	-82.19550
RK 8	S				26.96025	-82.21355
RK 10	S	coarse sand			26.96542	-82.23327
RK 12	S				26.98353	-82.23447
RK 14	S	soft sand, marsh			26.99917	-82.24472
RK 16	S	peat			27.00475	-82.25987
RK 18	S	soft clean sand over mud			27.01793	-82.27163
RK 20	S	sandy			27.03160	-82.27760
RK 20	D	clean medium sand		5.0	27.03203	-82.27742
RK 22	S	sandy by marsh			27.04297	-82.29033
RK 22	D	coarse sand		7.0	27.04355	-82.29033
RK 24	S	coarse sand, detritus	H2S		27.05333	-82.29800
RK 26	S				27.06620	-82.31518
RK 26	D	Clean sand			27.06638	-82.31430
RK 28	S		H2S		27.08183	-82.31875
RK 28	D	Coarse Sand			27.08147	-82.31873
RK 30	S	clean sand			27.08743	-82.32785
RK 30	D	sand/peat	H2S		27.08743	-82.32777
RK 32	S	medium sand			27.08733	-82.33223
RK 34	S	sand	H2S		27.10542	-82.33863
RK 34	D	Clean sand			27.10532	-82.33852
RK 36	S				27.11292	-82.34602
RK 36	D		H2S	6.5	27.11280	-82.34600
RK 38	S	sand			27.12655	-82.35113
RK 38	D	rock w/ sand patches		6.5	27.12648	-82.35113
RK 40	S				27.13437	-82.35805
RK 40	D			5.5	27.13412	-82.35808
RK 42	S	coarse sand/shell			27.14530	-82.36498
RK 42	D	coarse sand/shell			27.14530	-82.36498
RK 44	S	clean sand			27.15320	-82.36208
RK 44	D	clean sand		3.5	27.15320	-82.36208

Appendix Table A.4. Macroinvertebrate sampling locations in Peace River 1998 - 1999.

Decimal Latitude	Decimal Longitude	Site name	replicate
27.05887	-82.00120	Deep Crk	1
27.05572	-81.99797	Deep Crk	2
27.05197	-81.99742	Deep Crk	3
27.04777	-81.99907	Deep Crk	4
27.04488	-81.99718	Deep Crk	5
27.04168	-81.99997	Deep Crk	6
27.03787	-82.00053	Deep Crk	7
27.03337	-81.99827	Deep Crk	8
27.03300	-81.99643	Deep Crk	9
27.03697	-81.99640	Deep Crk	10
27.00438	-81.96457	Hunter Crk	1
27.00888	-81.97893	Hunter Crk	2
27.01318	-81.97788	Hunter Crk	3
27.01792	-81.98212	Hunter Crk	4
27.02220	-81.98510	Hunter Crk	5
27.02657	-81.98605	Hunter Crk	6
27.03072	-81.98778	Hunter Crk	7
27.03585	-81.98693	Hunter Crk	8
27.03987	-81.98110	Hunter Crk	9
27.04320	-81.98567	Hunter Crk	10
27.06437	-81.99787	Lettuce Lake	1
27.06590	-81.99433	Lettuce Lake	2
27.06978	-81.99572	Lettuce Lake	3
27.07278	-81.99080	Lettuce Lake	4
27.06930	-81.99153	Lettuce Lake	5
27.07260	-81.99207	Lettuce Lake	6
27.07537	-81.99198	Lettuce Lake	7
27.07815	-81.99088	Lettuce Lake	8
27.07725	-81.99342	Lettuce Lake	9
27.07123	-81.99428	Lettuce Lake	10
27.90017	-82.09545	SAV	

Appendix Table A.4. Macroinvertebrate sampling locations in Peace River (continued).

Peace River Main Stem - sampled 2 depth zones			
Decimal Latitude	Decimal Longitude	Site name	replicate
27.04090	-81.98958	1 >3m	1
27.05222	-81.99172	1 >3m	2
27.05793	-81.99372	1 >3m	3
27.05833	-81.99682	1 >3m	4
27.07210	-82.00417	1 >3m	5
27.07778	-82.00713	1 >3m	6
27.08447	-81.99605	1 >3m	7
27.09332	-81.97840	1 >3m	8
27.09523	-81.97930	1 >3m	9
27.09695	-81.98090	1 >3m	10
27.04072	-81.99025	1 Int	1
27.05233	-81.99257	1 Int	2
27.05813	-81.99323	1 Int	3
27.05810	-81.99680	1 Int	4
27.07237	-82.00347	1 Int	5
27.07762	-82.00692	1 Int	6
27.08460	-81.99643	1 Int	7
27.09348	-81.97862	1 Int	8
27.09573	-81.97910	1 Int	9
27.09752	-81.98053	1 Int	10
27.98872	-81.99045	2 >3m	1
27.99138	-81.98955	2 >3m	2
27.99563	-81.98820	2 >3m	3
27.99695	-81.98703	2 >3m	4
27.00388	-81.98710	2 >3m	5
27.00923	-81.98303	2 >3m	6
27.01565	-81.98527	2 >3m	7
27.01918	-81.98655	2 >3m	8
27.02735	-81.99052	2 >3m	9
27.03635	-81.99043	2 >3m	10
27.98898	-81.99012	2 Int	1
27.99147	-81.98942	2 Int	2
27.99538	-81.98788	2 Int	3
27.99662	-81.98697	2 Int	4
27.00292	-81.98627	2 Int	5
27.00923	-81.98303	2 Int	6
27.01543	-81.98585	2 Int	7
27.01942	-81.98568	2 Int	8
27.02708	-81.99110	2 Int	9
27.03610	-81.99012	2 Int	10

Appendix Table A.4. Macroinvertebrate sampling locations in Peace River (continued).

Peace River Main Stem - sampled 2 depth zones			
Decimal Latitude	Decimal Longitude	Site name	replicate
27.94233	-82.00387	3 >3m	1
27.94785	-82.04350	3 >3m	2
27.95127	-82.03520	3 >3m	3
27.95300	-82.02783	3 >3m	4
27.95495	-82.02320	3 >3m	5
27.95923	-82.01382	3 >3m	6
27.97013	-82.00887	3 >3m	7
27.97452	-82.00438	3 >3m	8
27.97275	-81.99725	3 >3m	9
27.98382	-81.99277	3 >3m	10
27.94003	-82.05275	3 Int	1
27.94292	-82.04030	3 Int	2
27.94845	-82.03382	3 Int	3
27.95008	-82.02693	3 Int	4
27.95093	-82.02250	3 Int	5
27.95808	-82.01372	3 Int	6
27.97012	-82.00828	3 Int	7
27.97455	-82.00397	3 Int	8
27.97290	-81.99642	3 Int	9
27.98332	-81.99118	3 Int	10
27.91728	-82.10448	4 >3m	1
27.91657	-82.10088	4 >3m	2
27.92522	-82.09827	4 >3m	3
27.93045	-82.09308	4 >3m	4
27.94625	-82.09210	4 >3m	5
27.94870	-82.08820	4 >3m	6
27.95203	-82.08633	4 >3m	7
27.95208	-82.08153	4 >3m	8
27.94895	-82.07262	4 >3m	9
27.94572	-82.06462	4 >3m	10
27.91350	-82.10055	4 Int	1
27.90042	-82.09577	4 Int	2
27.92162	-82.09323	4 Int	3
27.92462	-82.08973	4 Int	4
27.95360	-82.09380	4 Int	5
27.95715	-82.08983	4 Int	6
27.95808	-82.08433	4 Int	7
27.95830	-82.08052	4 Int	8
27.95570	-82.07288	4 Int	9
27.95327	-82.06517	4 Int	10

Appendix Table A.4. Macroinvertebrate sampling locations in Peace River (continued).

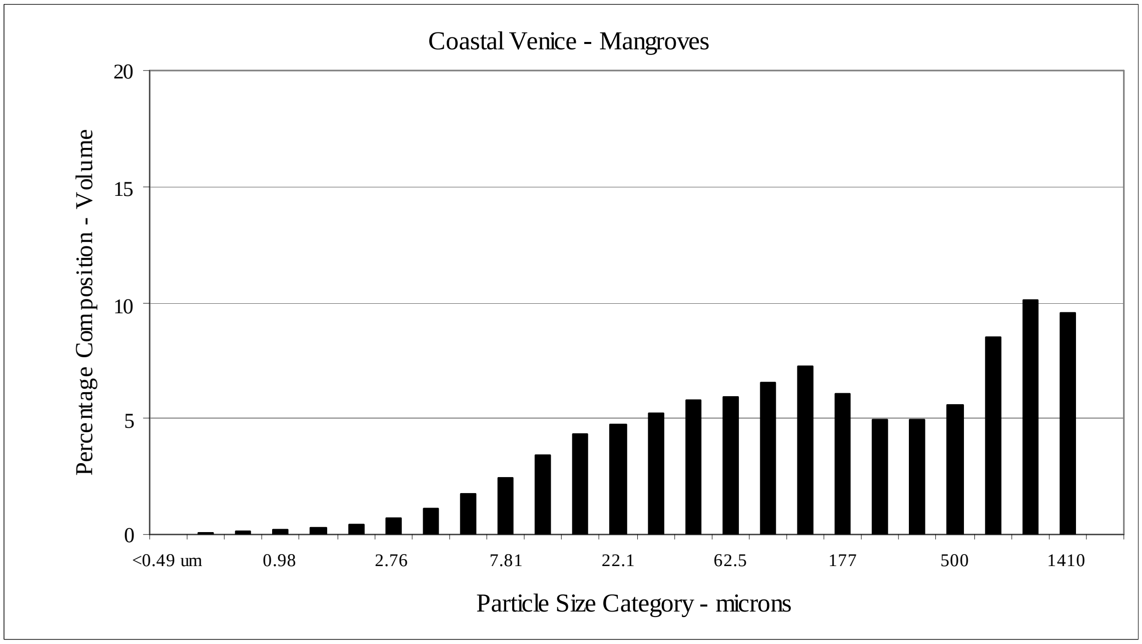
Peace River Artificial Substrate Samples		
Decimal Latitude	Decimal Longitude	Name & river Kilometer
27.95055	-82.06107	AS 6.5
27.96347	-82.05357	AS 7.5
27.96637	-82.04753	AS 8.5
27.96588	-82.03845	AS 9.5
27.96888	-82.03143	AS 10.5
27.96868	-82.01693	AS 11.5
27.97015	-82.00832	AS 12.5
27.97540	-82.00273	AS 13.5
27.98027	-81.99415	AS 14.5
27.98968	-81.99308	AS 15.5
27.99690	-81.99035	AS 16.5
27.00537	-81.98867	AS 17.5
27.01358	-81.98508	AS 18.5
27.02130	-81.98967	AS 19.5
27.03018	-81.99182	AS 20.5
27.03890	-81.99072	AS 21.5
27.04678	-81.99235	AS 22.5
27.05588	-81.99088	AS 23.5
27.06177	-81.99982	AS 24.5
27.06850	-82.00228	AS 25.5
27.07642	-82.00735	AS 26.5
27.07642	-82.00735	AS 26.5
27.07858	-82.00025	AS 27.5
27.07903	-81.99460	AS 28.5
27.08317	-81.99848	AS 29.5
27.09022	-81.99022	AS 30.5
27.08882	-81.98330	AS 31.5
27.08882	-81.98330	AS 31.5
27.09430	-81.98143	AS 32.5
27.09890	-81.98168	AS 33.5
27.10267	-81.98103	AS 34.5

APPENDIX B

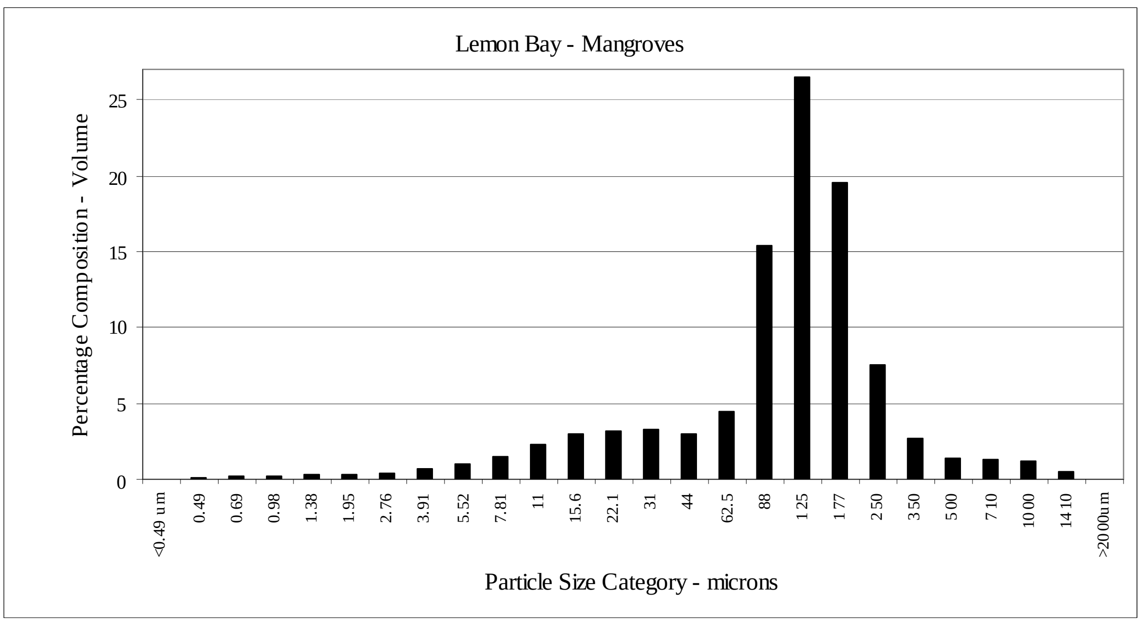
Graphic illustration of sediment grain size distribution for habitat types within each basin.

Mangrove Habitat - Sediment

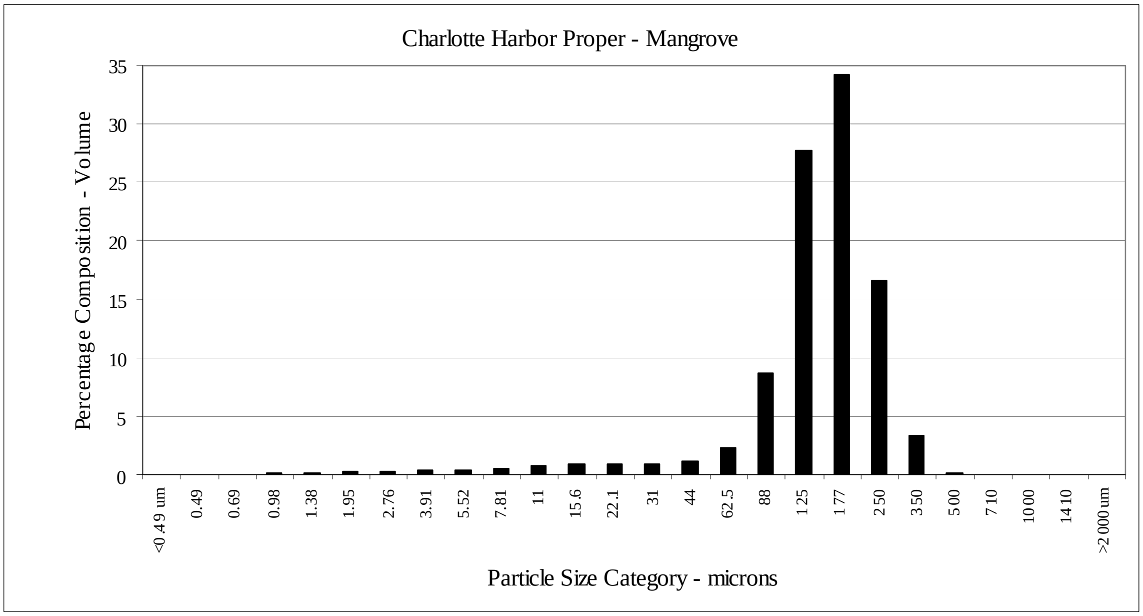
Appendix Figure B1. Grain size distribution for mangroves - Coastal Venice.



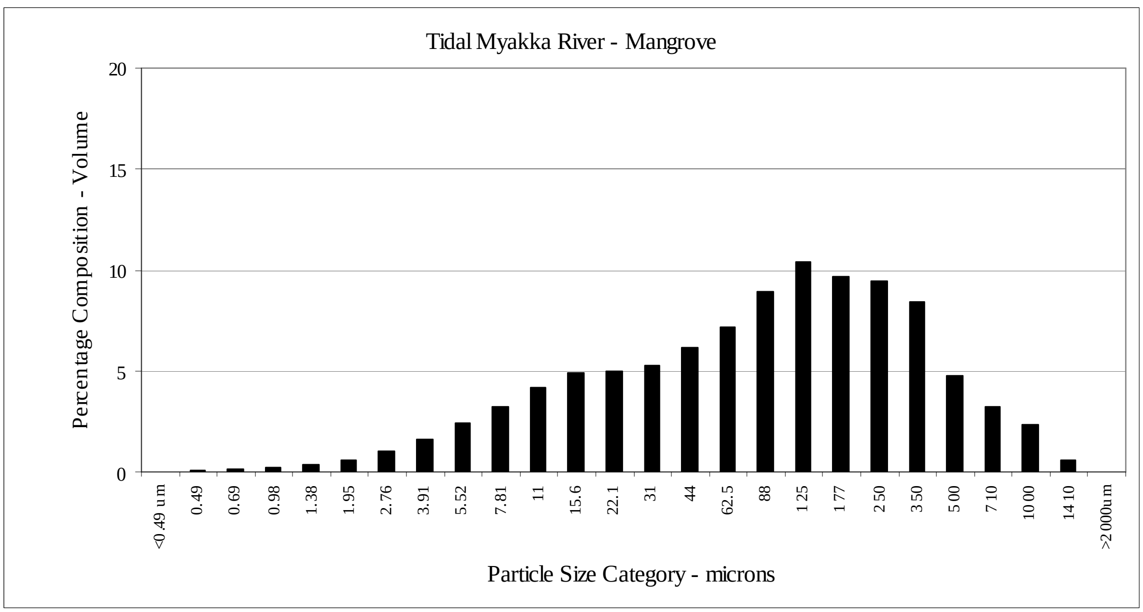
Appendix Figure B2. Grain size distribution for mangroves - Lemon Bay.



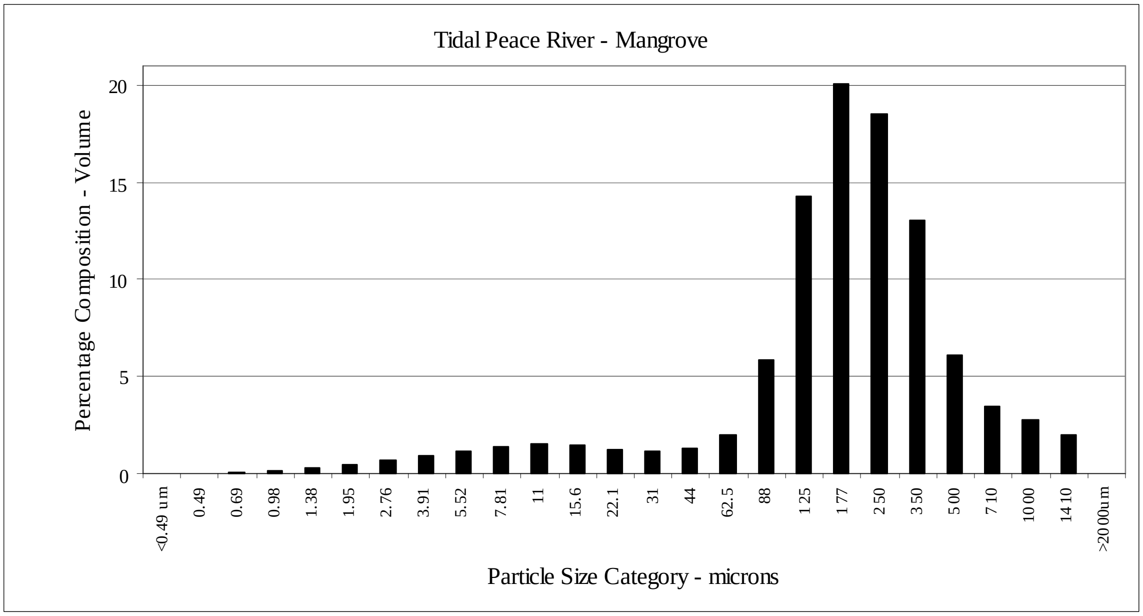
Appendix Figure B3. Grain size distribution for mangroves - Charlotte Harbor proper.



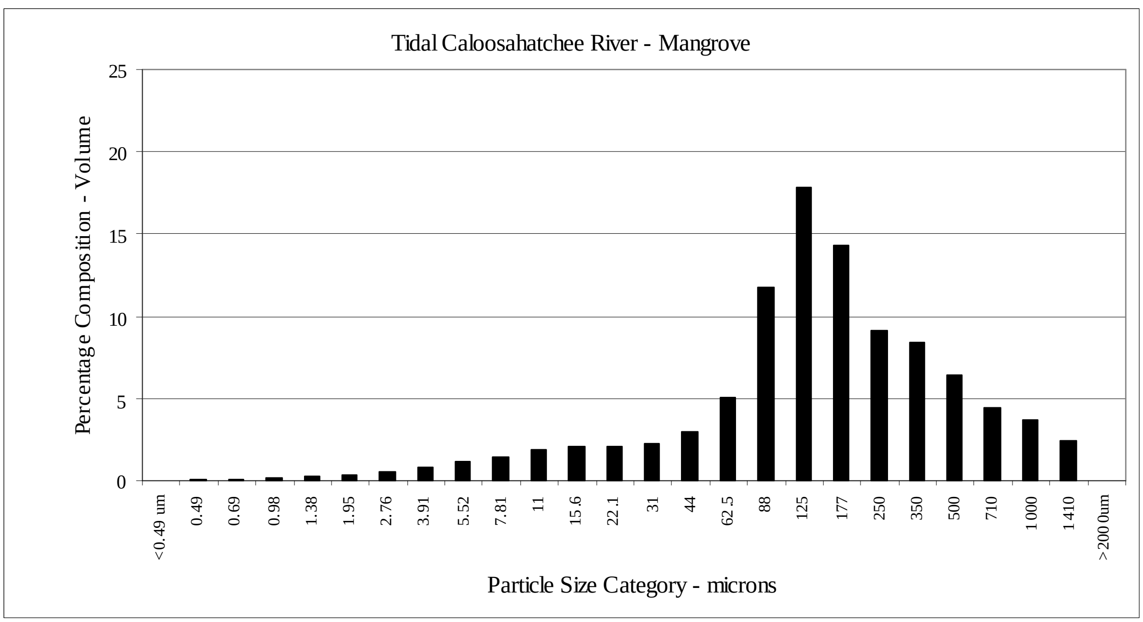
Appendix Figure B4. Grain size distribution for mangroves - tidal Myakka River.



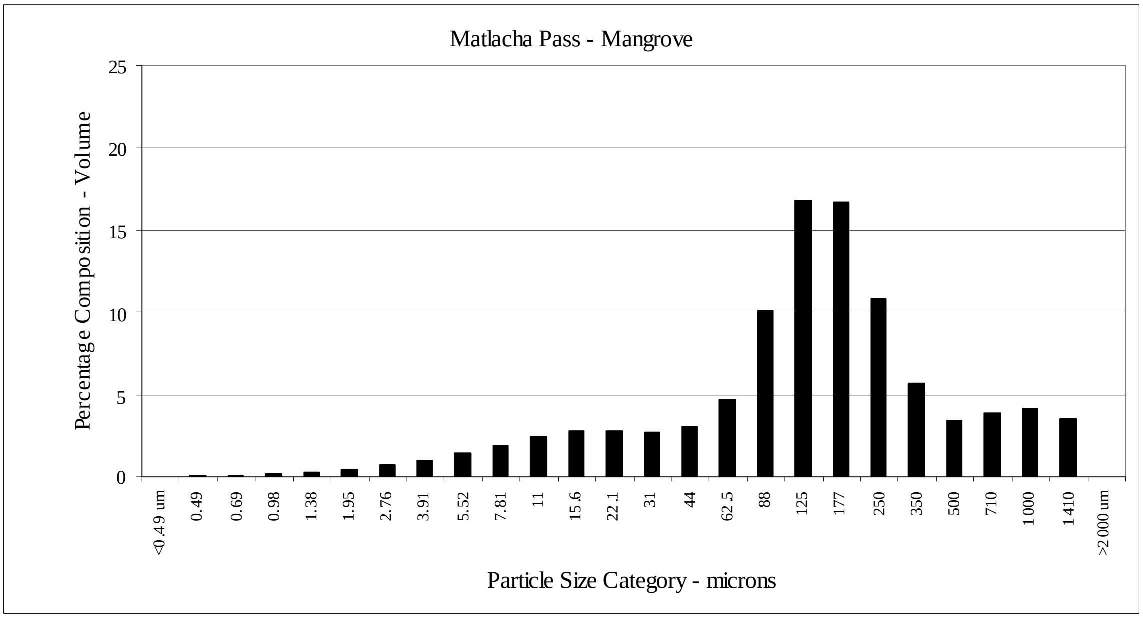
Appendix Figure B5. Grain size distribution for mangroves - tidal Peace River.



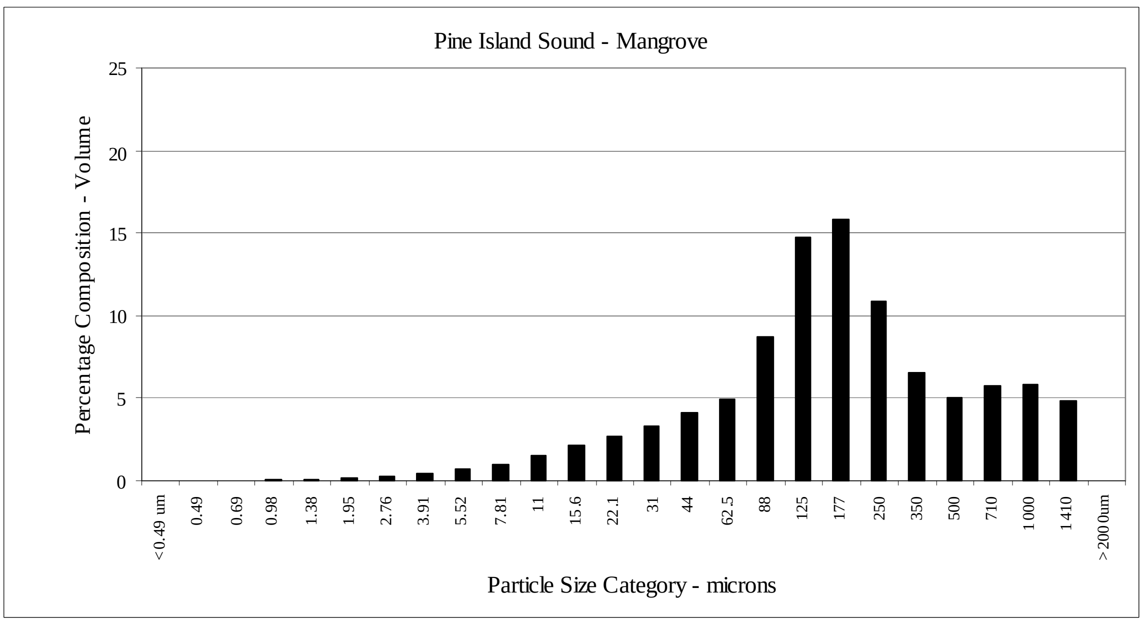
Appendix Figure B6. Grain size distribution for mangroves - Caloosahatchee River.



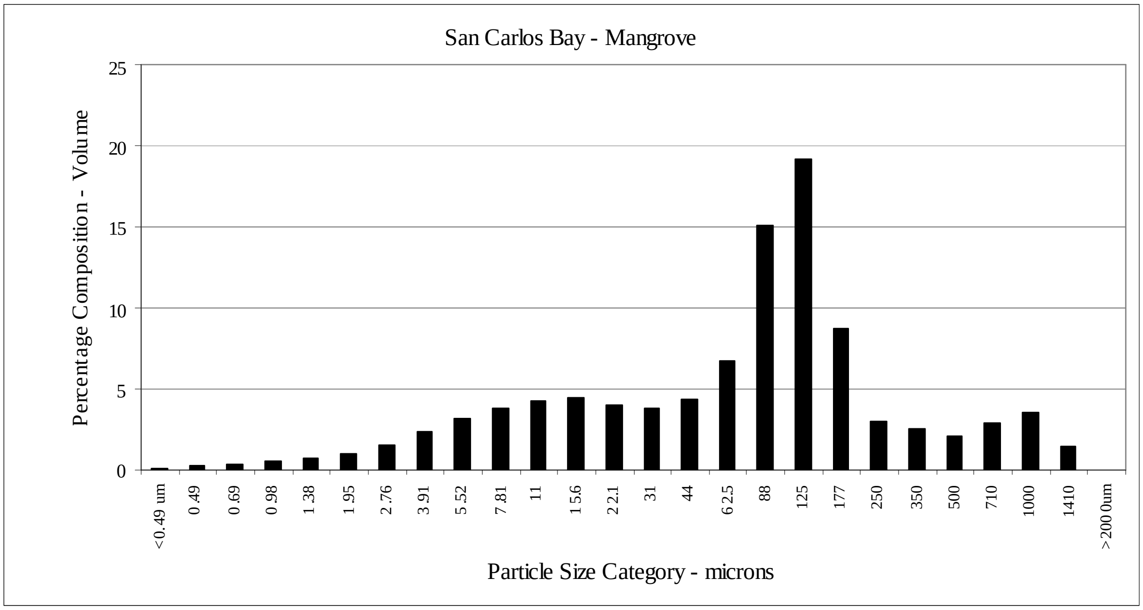
Appendix Figure B7. Grain size distribution for mangroves - Matlacha Pass.



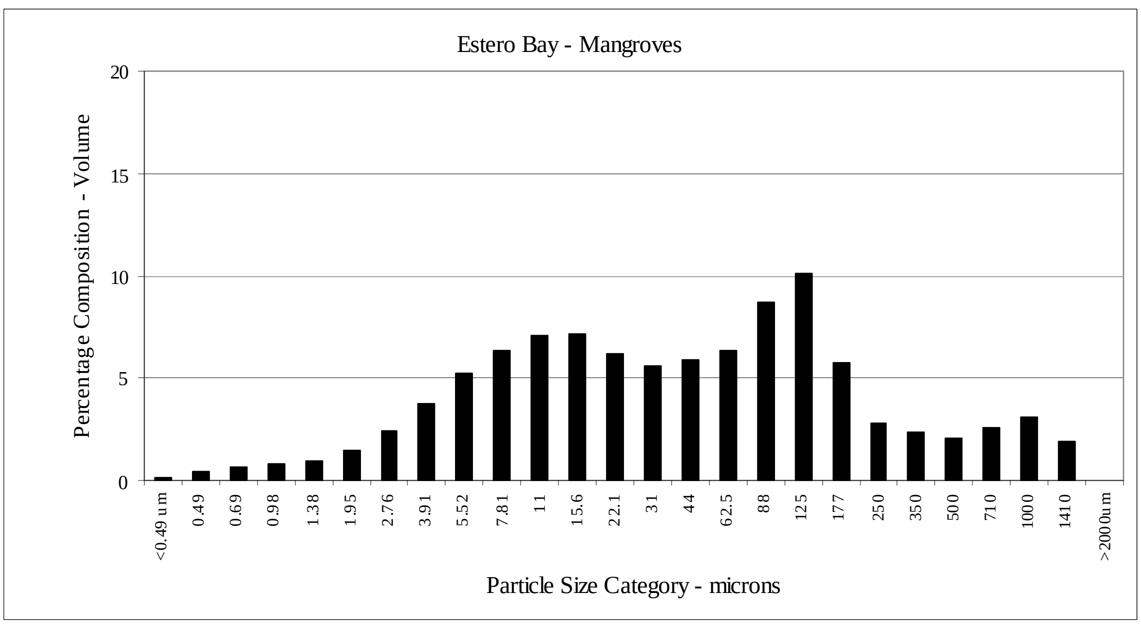
Appendix Figure B8. Grain size distribution for mangroves - Pine Island Sound.



Appendix Figure B9. Grain size distribution for mangroves - San Carlos Bay.

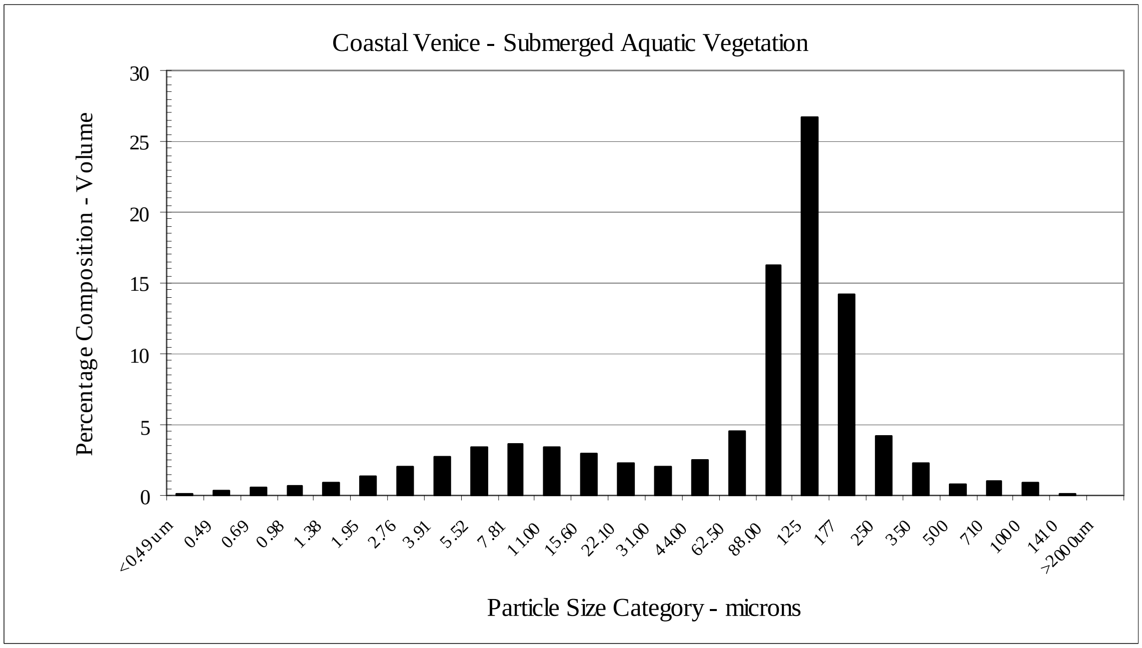


Appendix Figure B10. Grain size distribution for mangroves - Estero Bay.

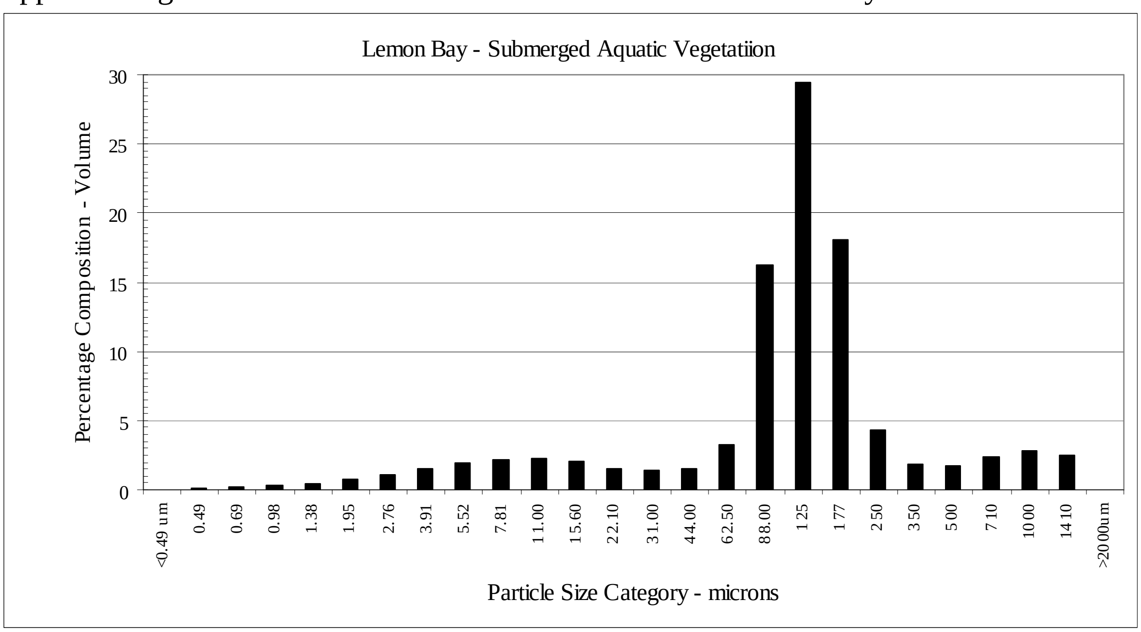


Submerged Aquatic Vegetation (SAV) - Sediment

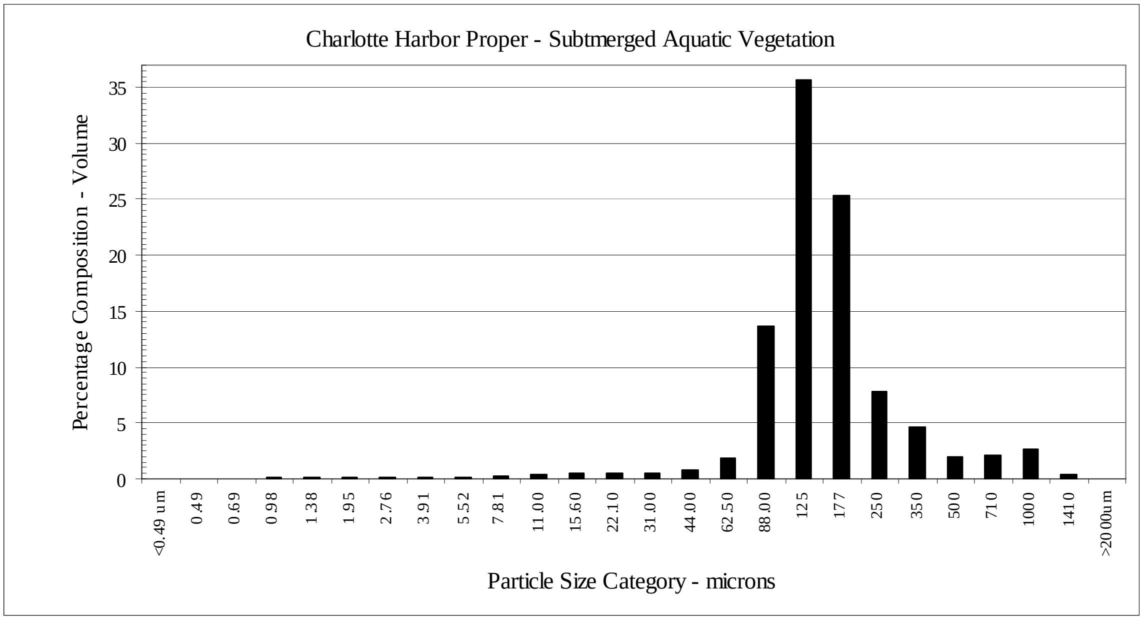
Appendix Figure B11. Grain size distribution for SAV - Coastal Venice.



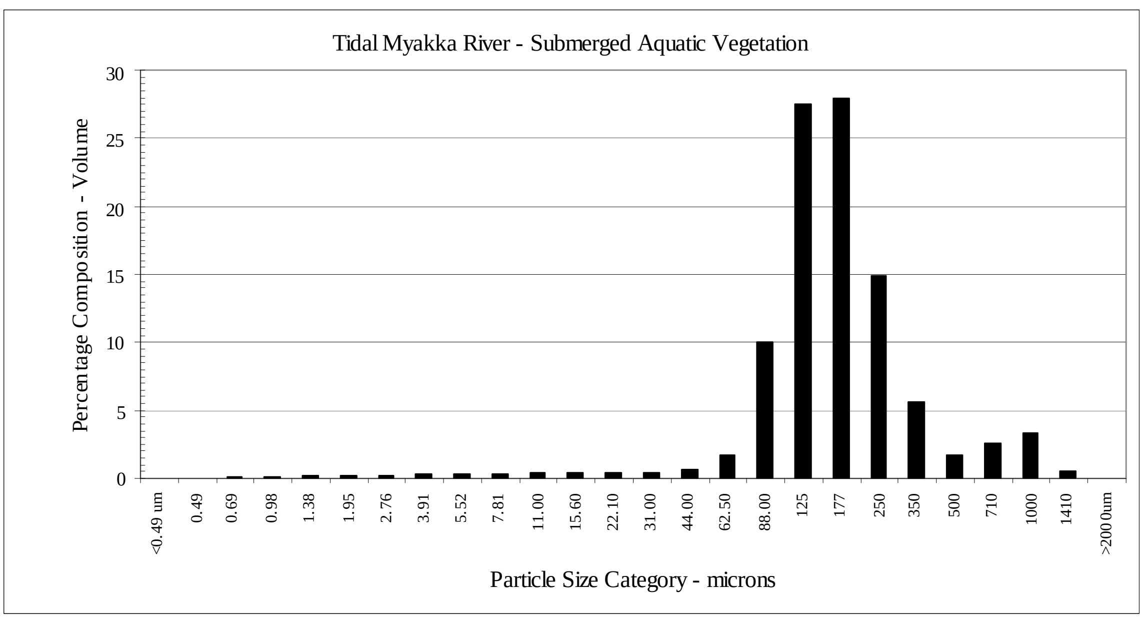
Appendix Figure B12. Grain size distribution for SAV - Lemon Bay.



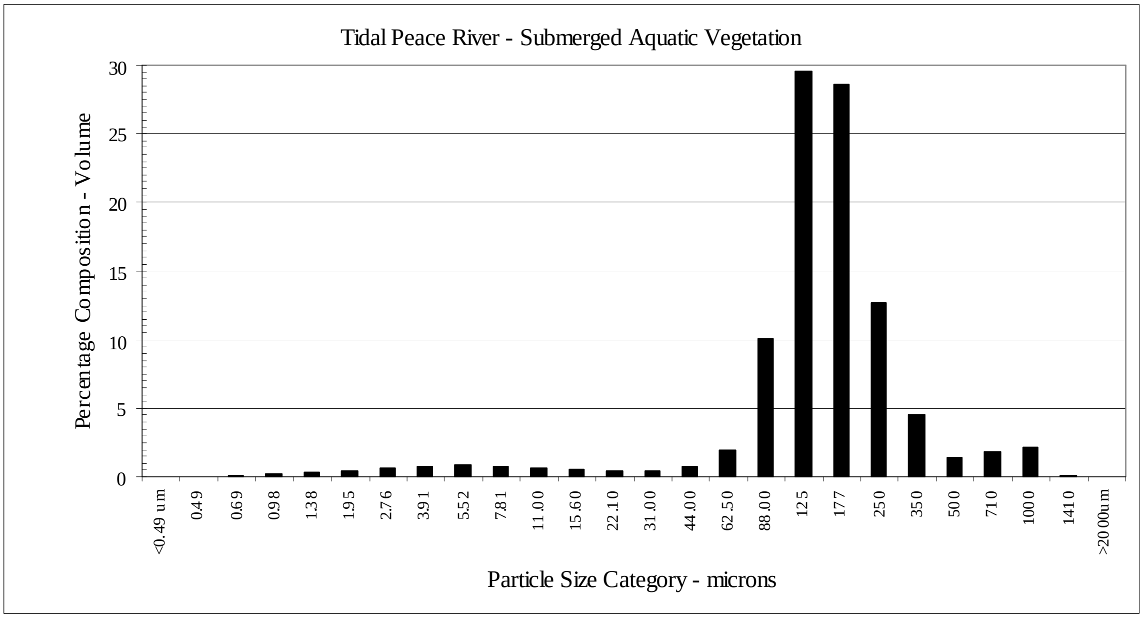
Appendix Figure B13. Grain size distribution for SAV - Charlotte Harbor proper.



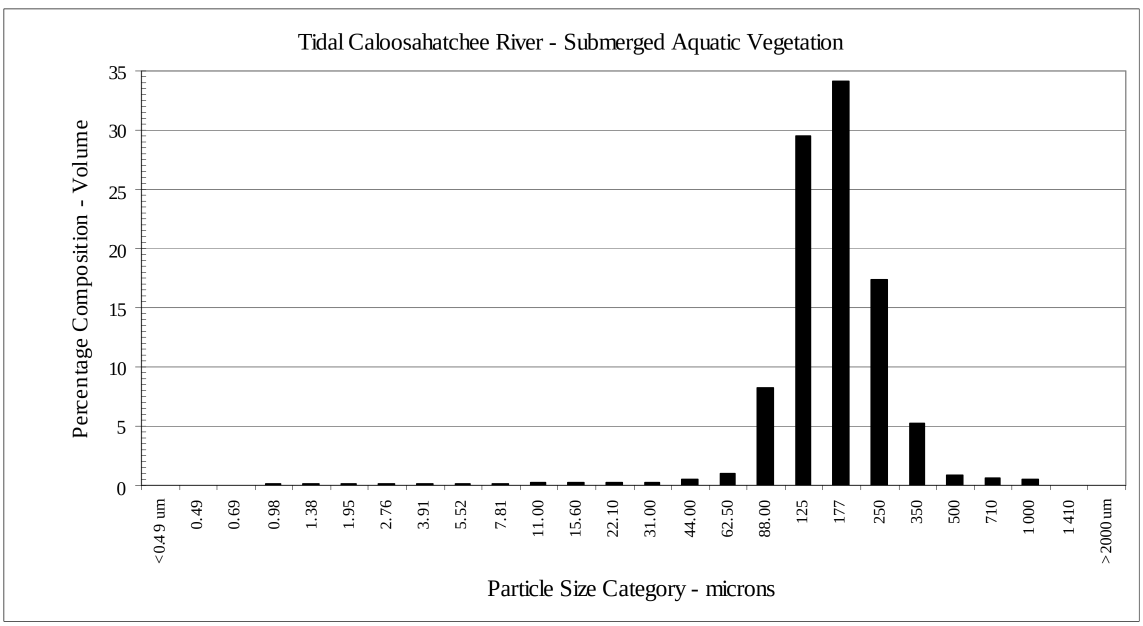
Appendix Figure B14. Grain size distribution for SAV - tidal Myakka River.



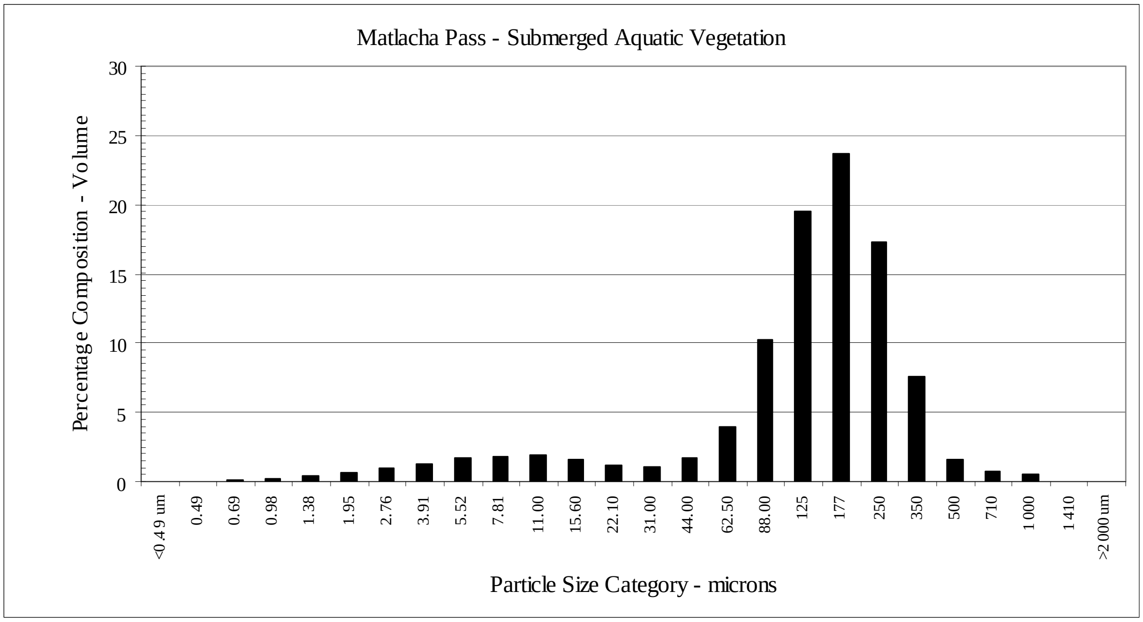
Appendix Figure B15. Grain size distribution for SAV - tidal Peace River.



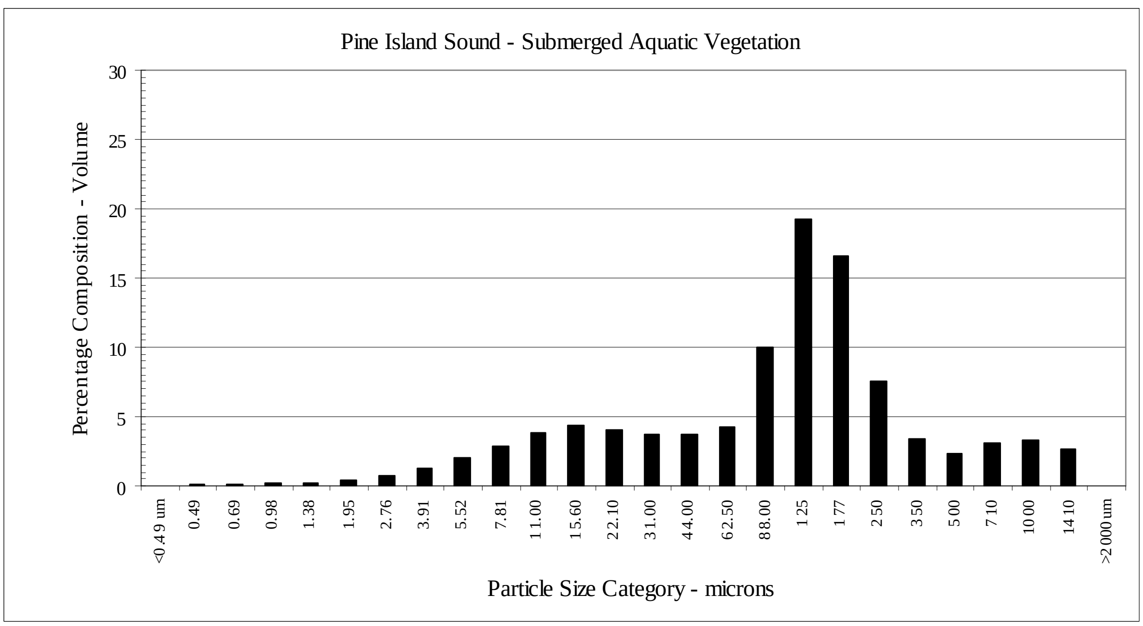
Appendix Figure B16. Grain size distribution for SAV - Caloosahatchee River.



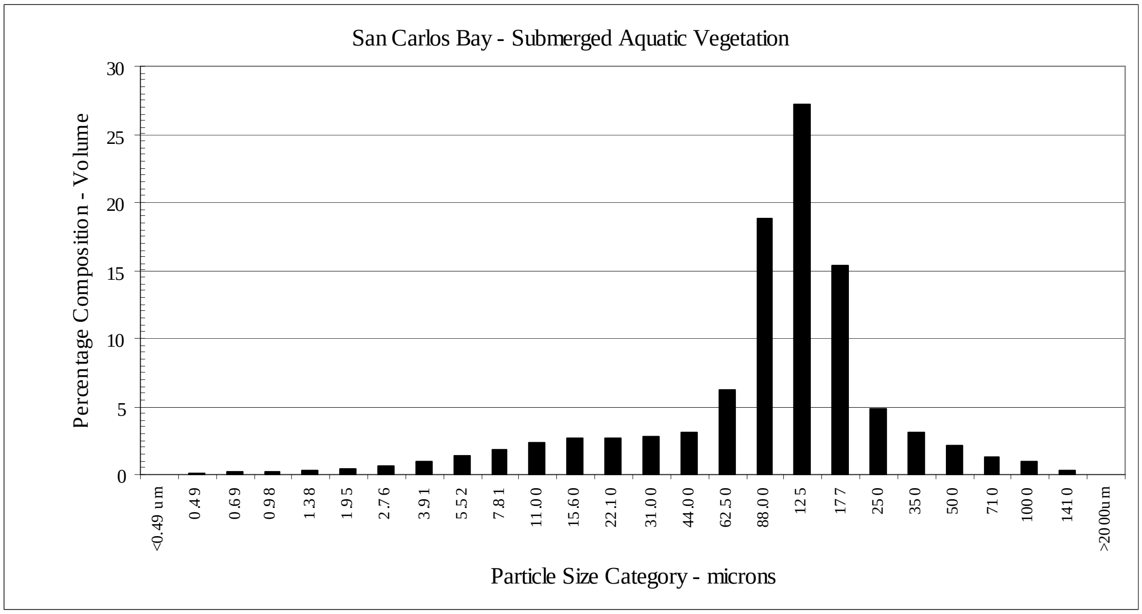
Appendix Figure B17. Grain size distribution for SAV - Matlacha Pass.



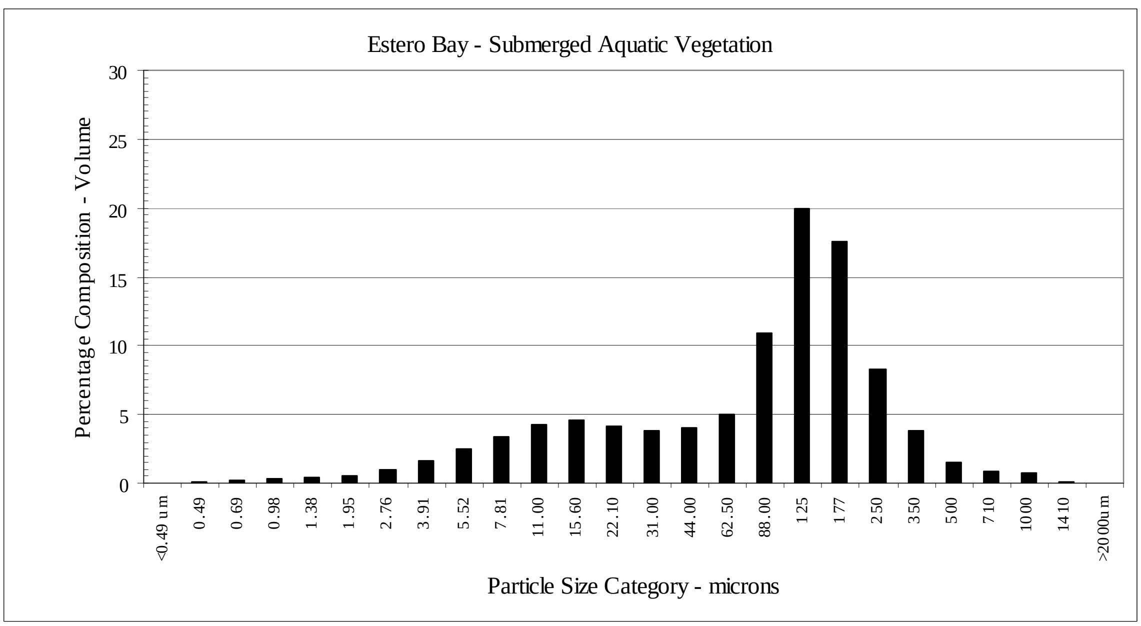
Appendix Figure B18. Grain size distribution for SAV - Pine Island Sound.



Appendix Figure B19. Grain size distribution for SAV - San Carlos Bay.

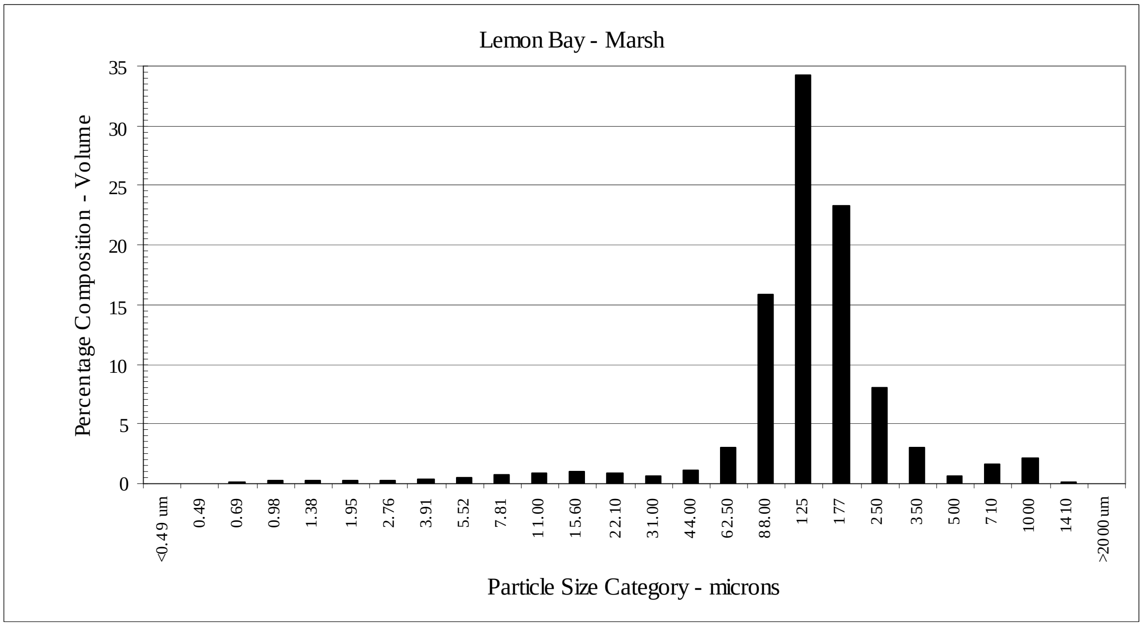


Appendix Figure B20. Grain size distribution for SAV - Estero Bay.

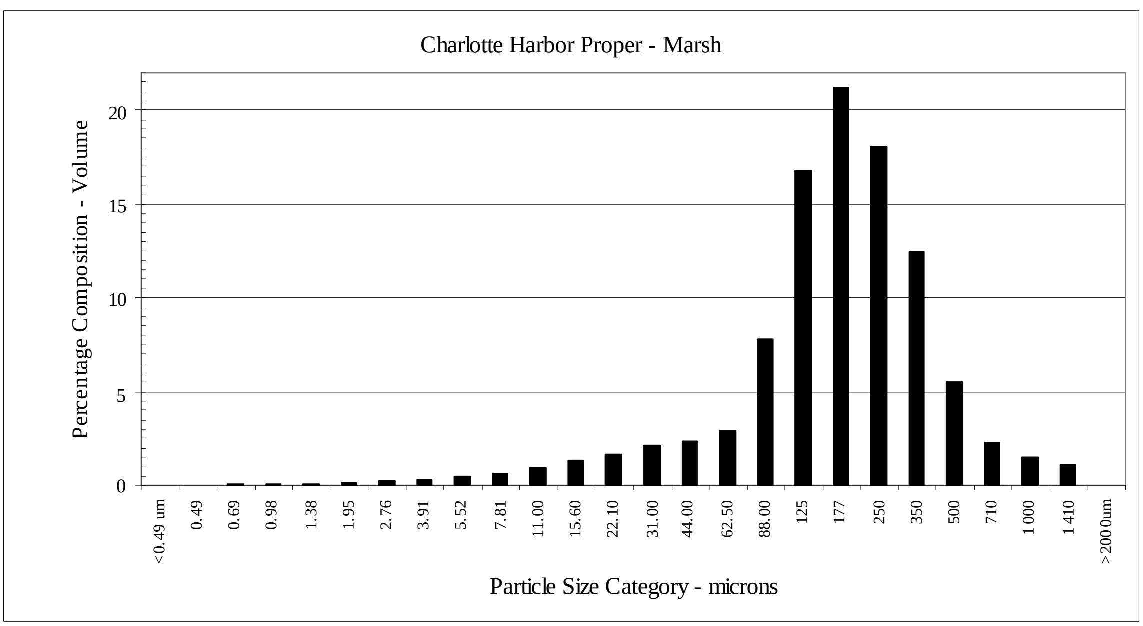


Marsh - Sediment

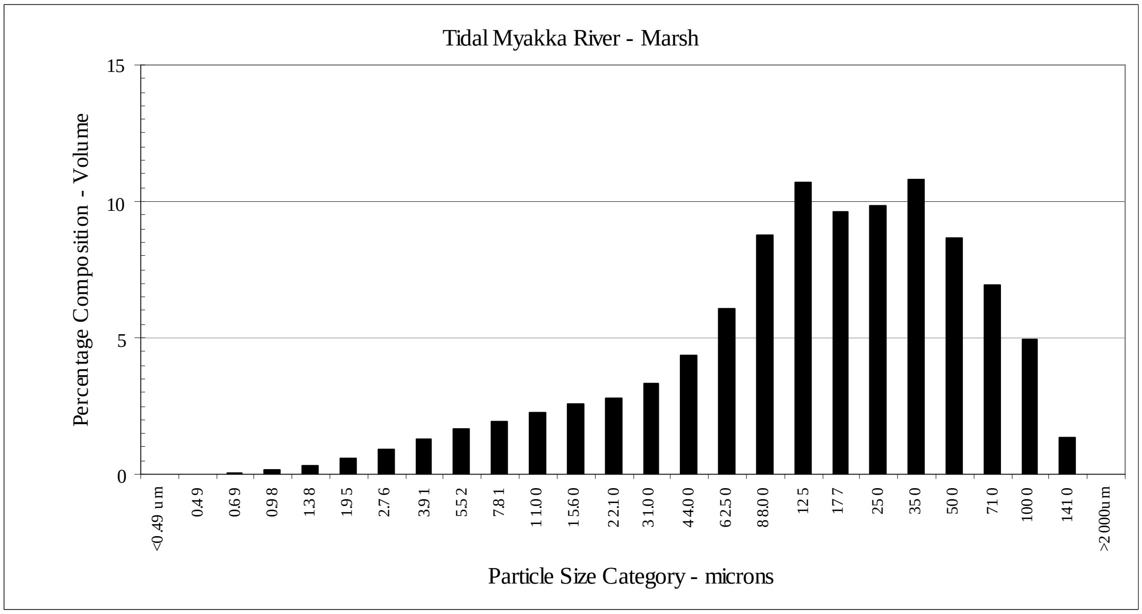
Appendix Figure B21. Grain size distribution for marsh - Lemon Bay.



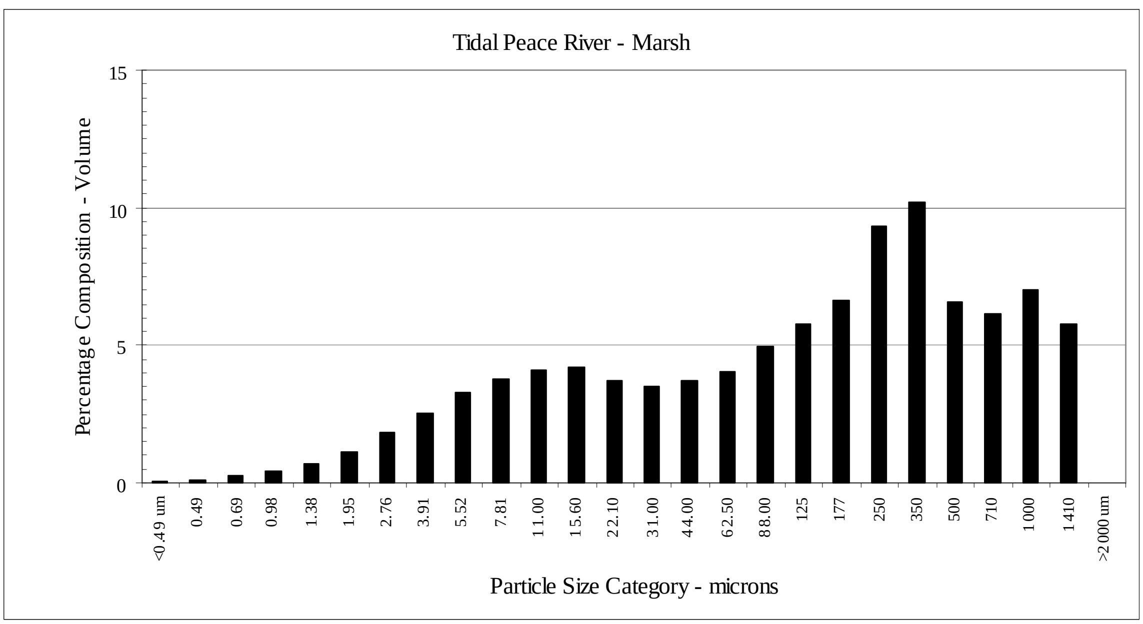
Appendix Figure B22. Grain size distribution for marsh - Charlotte Harbor proper.



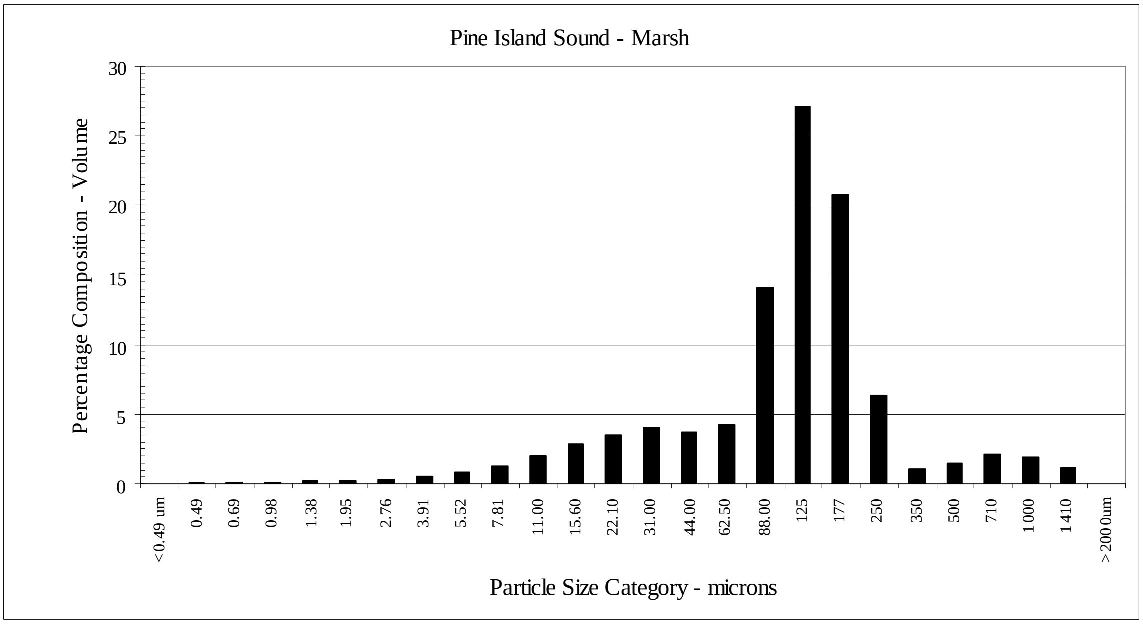
Appendix Figure B23. Grain size distribution for marsh - tidal Myakka River.



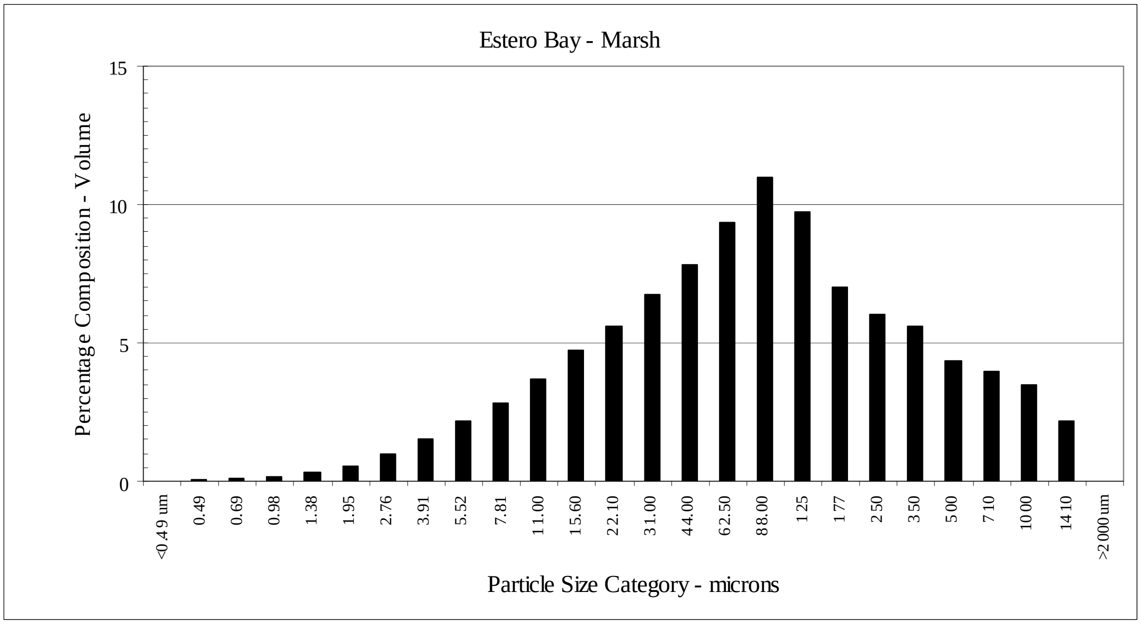
Appendix Figure B24. Grain size distribution for marsh - tidal Peace River.



Appendix Figure B25. Grain size distribution for marsh - Pine Island Sound.

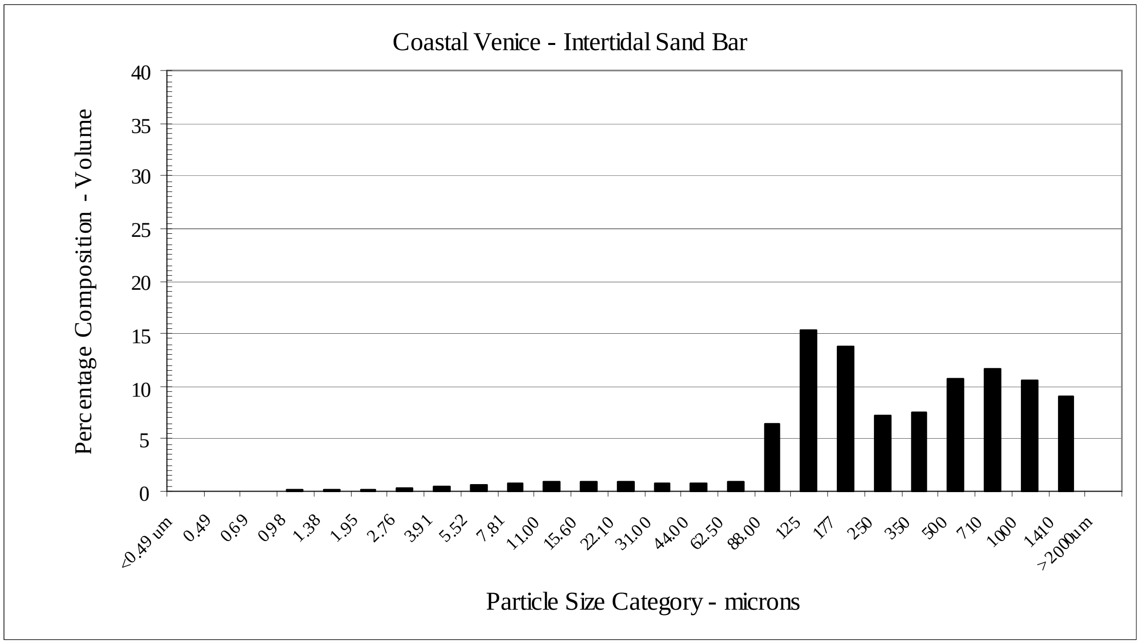


Appendix Figure B26. Grain size distribution for marsh - Estero Bay.

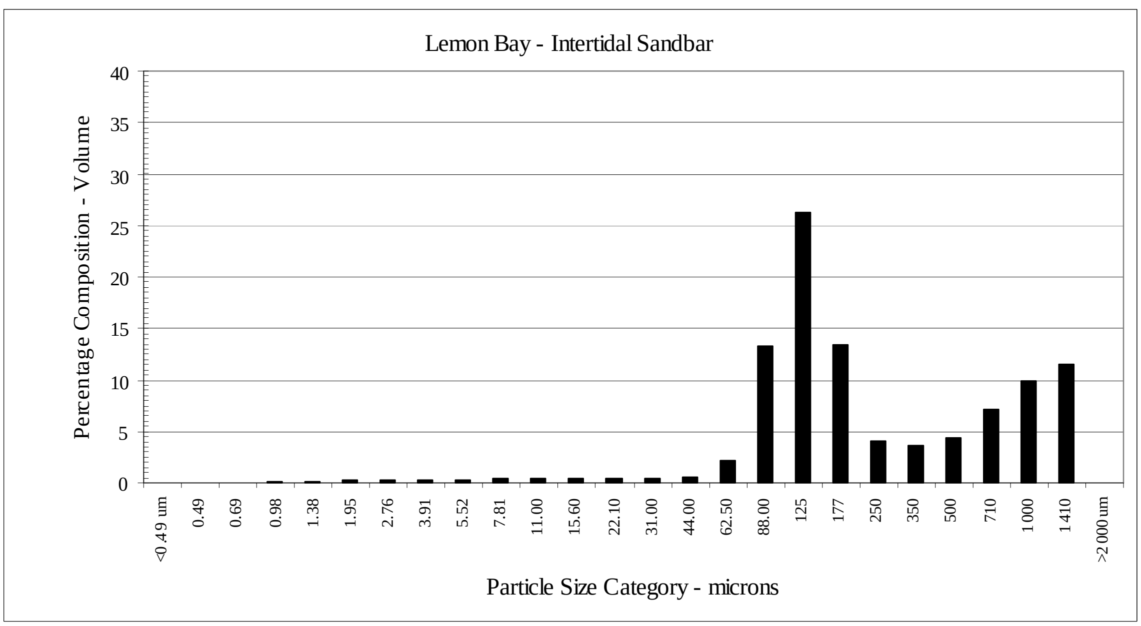


Intertidal Sand Bar - Sediment

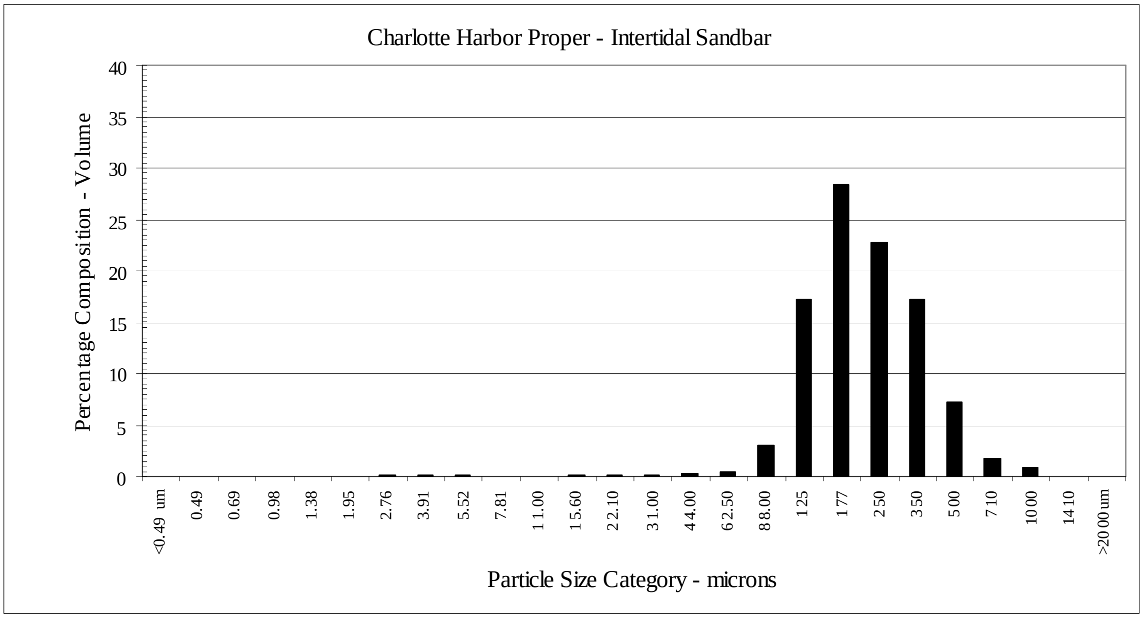
Appendix Figure B 27. Grain size distribution for intertidal sand bar - Coastal Venice.



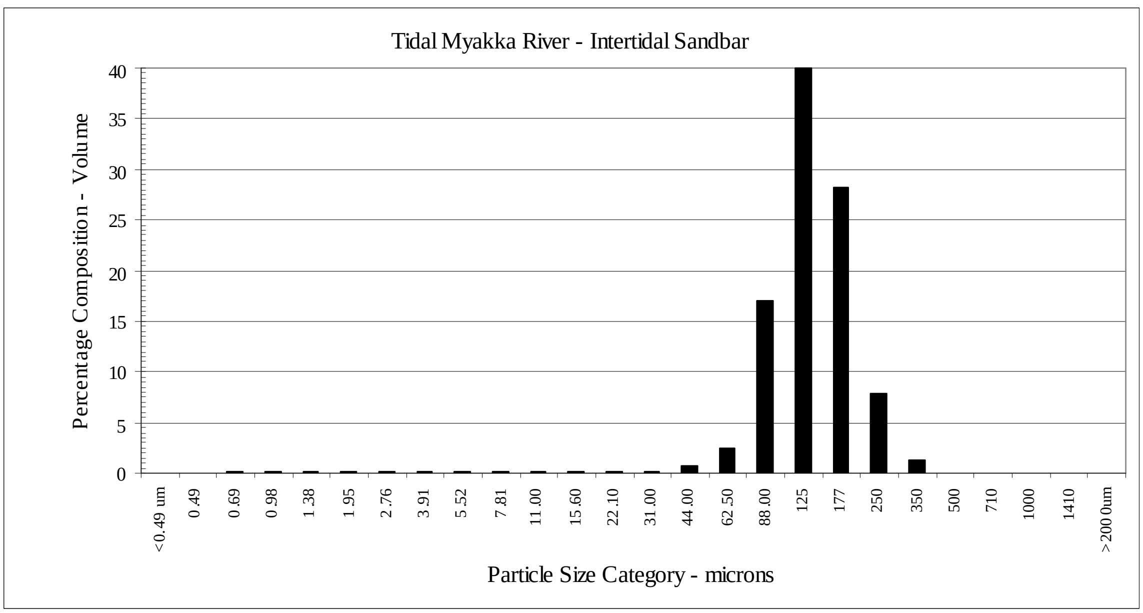
Appendix Figure B28. Grain size distribution for intertidal sand bar - Lemon Bay.



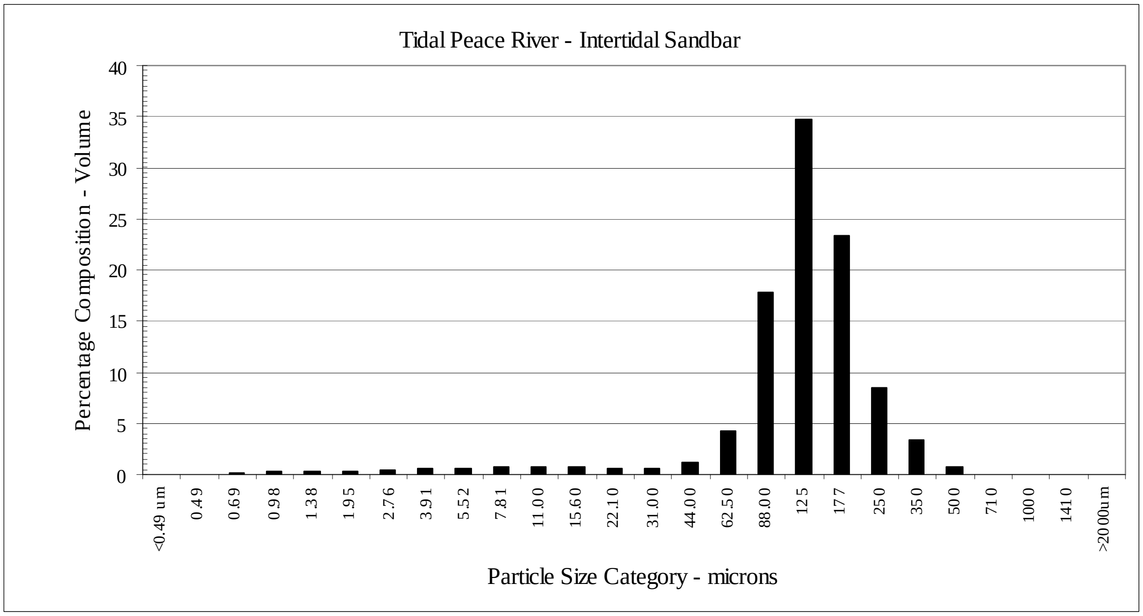
Appendix Figure B29. Grain size distribution for intertidal sand bar - Charlotte Harbor.



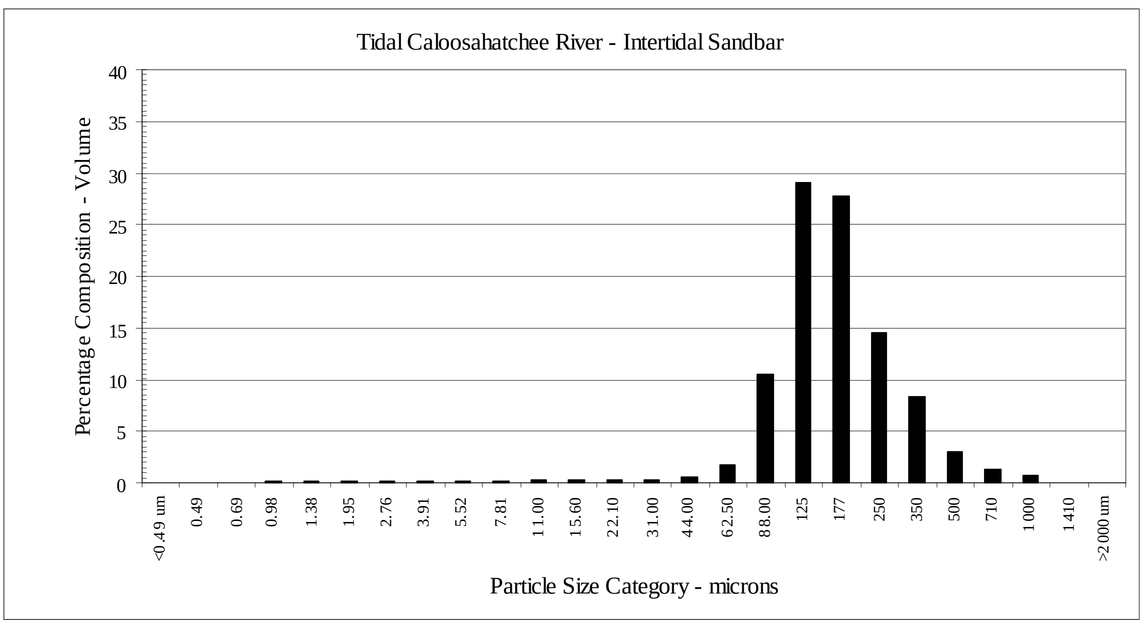
Appendix Figure B30. Grain size distribution for intertidal sand bar - tidal Myakka River.



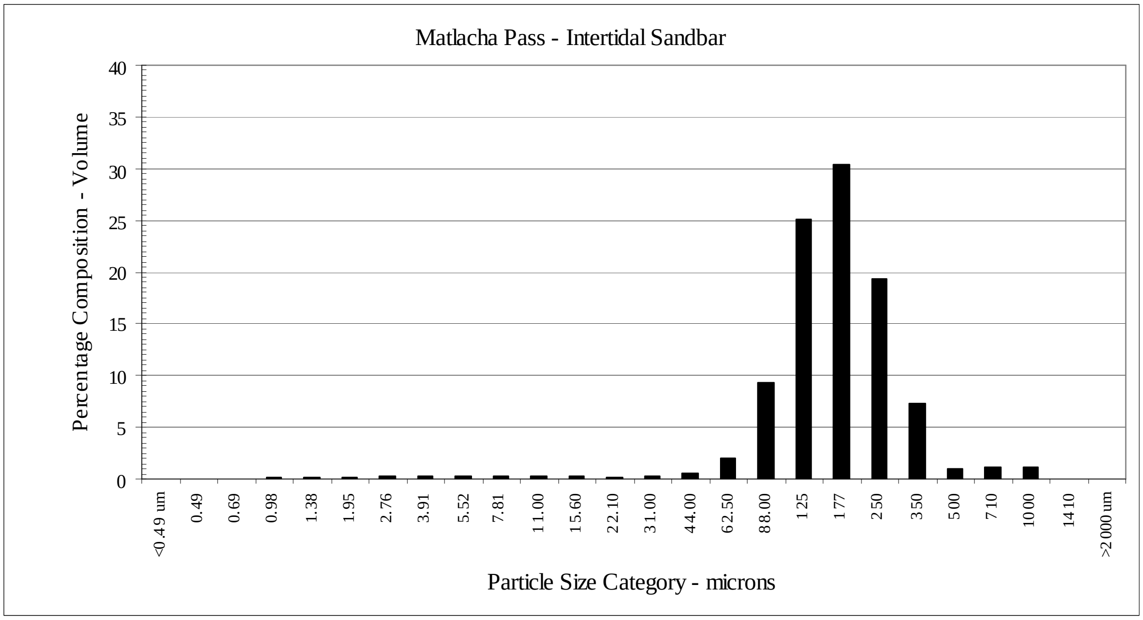
Appendix Figure B31. Grain size distribution for intertidal sand bar - tidal Peace River.



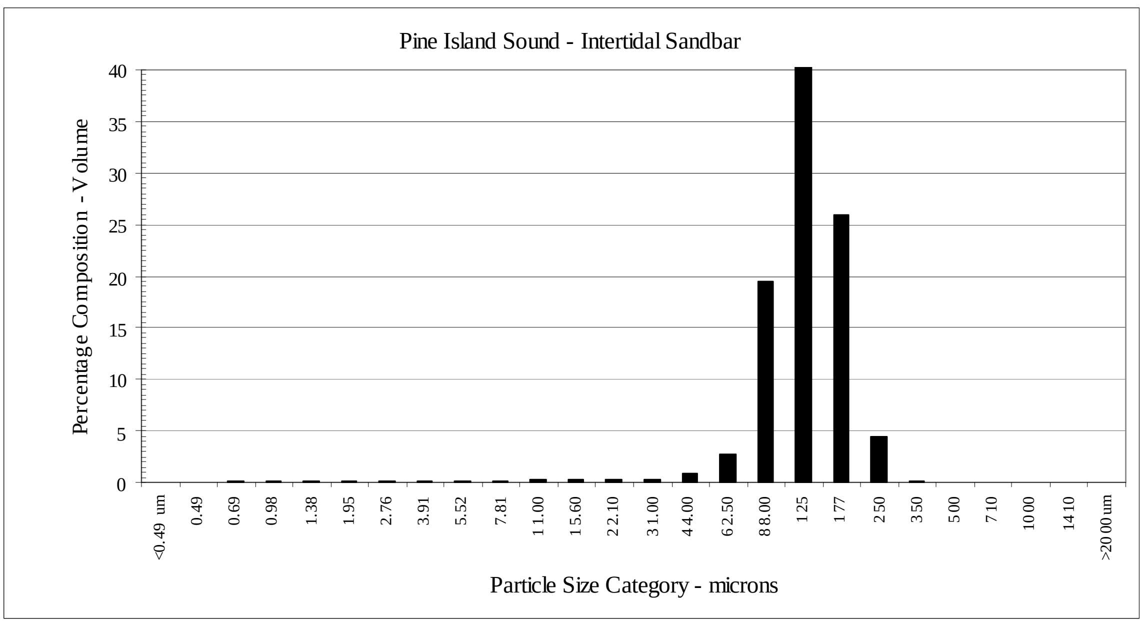
Appendix Figure B32. Grain size distribution for intertidal sand bar - Caloosahatchee River.



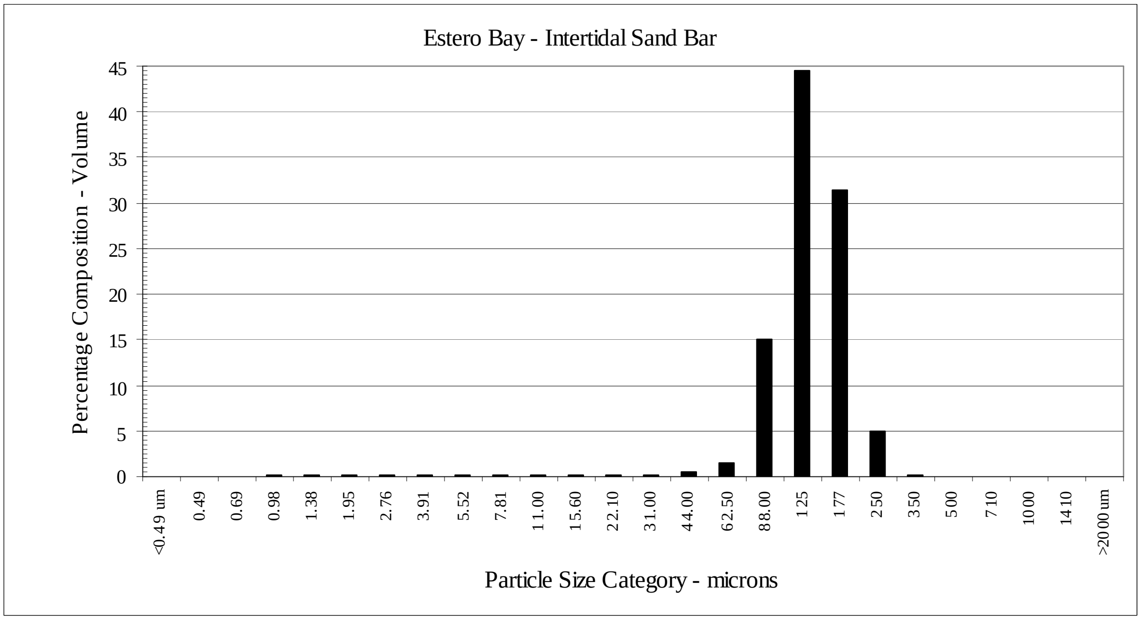
Appendix Figure B33. Grain size distribution for intertidal sand bar - Matlacha Pass.



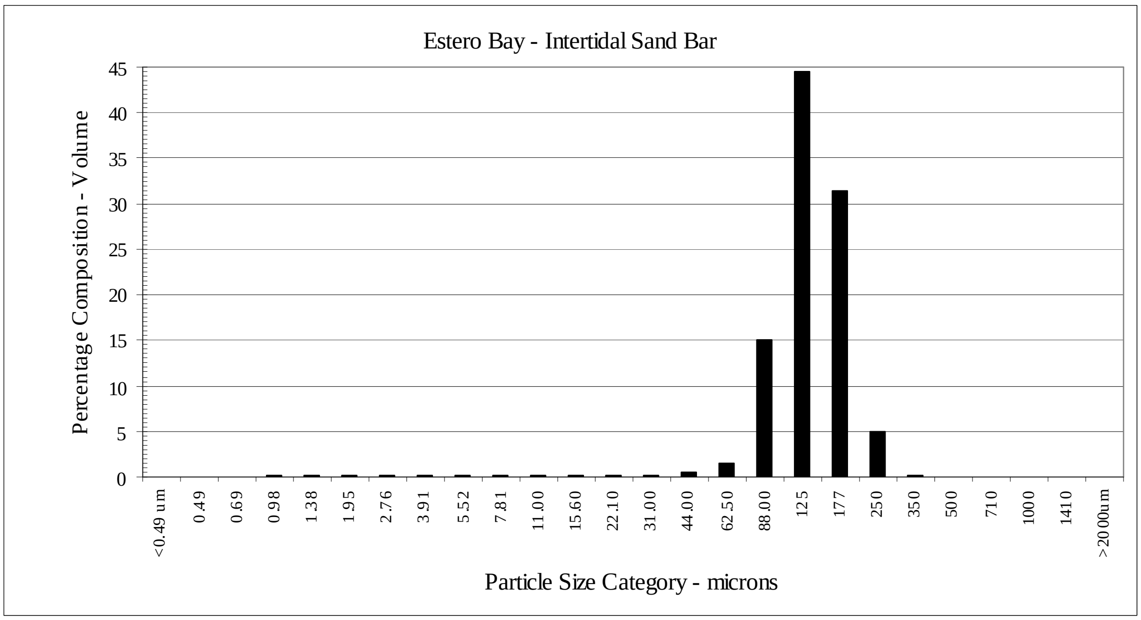
Appendix Figure B34. Grain size distribution for intertidal sand bar - Pine Island Sound.



Appendix Figure B35. Grain size distribution for intertidal sand bar - San Carlos Bay.

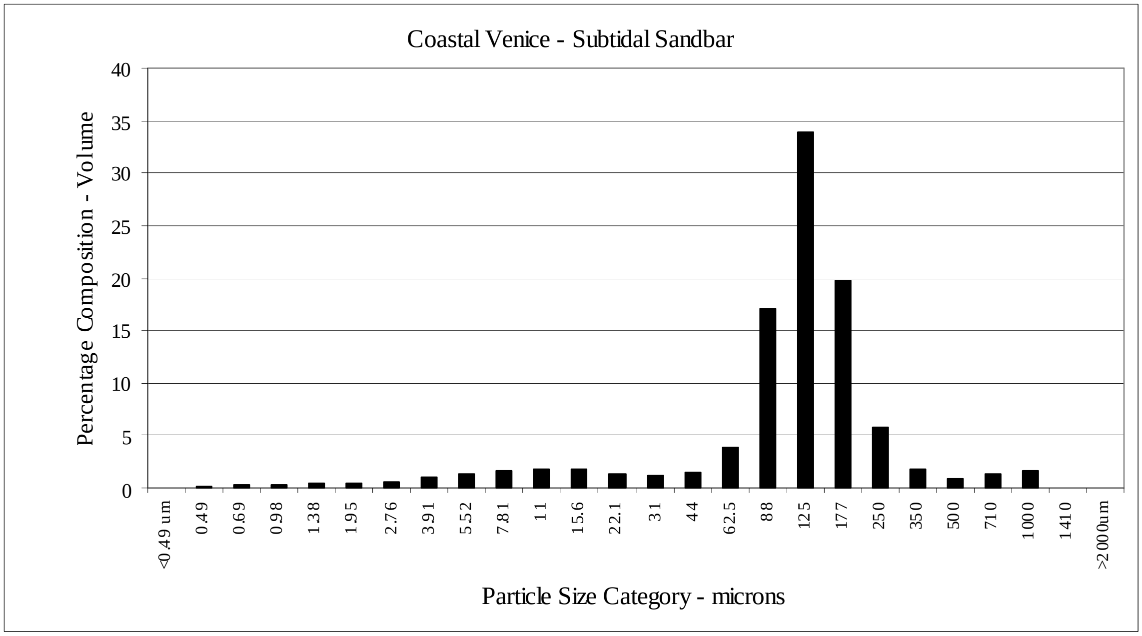


Appendix Figure B36. Grain size distribution for intertidal sand bar - Estero Bay.

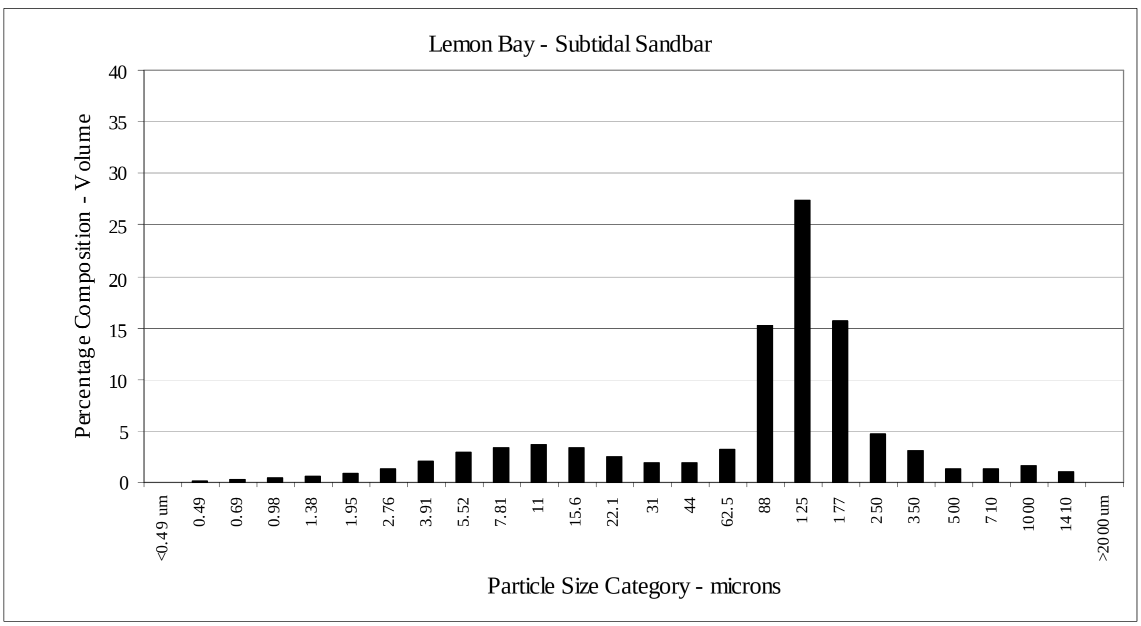


Subtidal Sandbar - Sediment

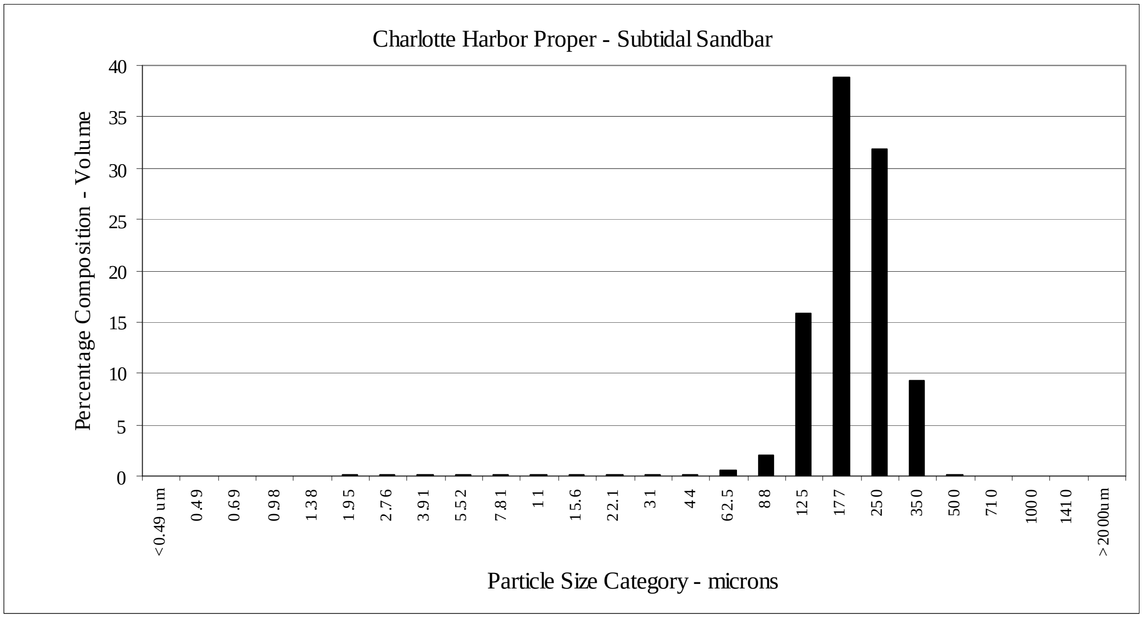
Appendix Figure B37. Grain size distribution for subtidal sandbar - Coastal Venice.



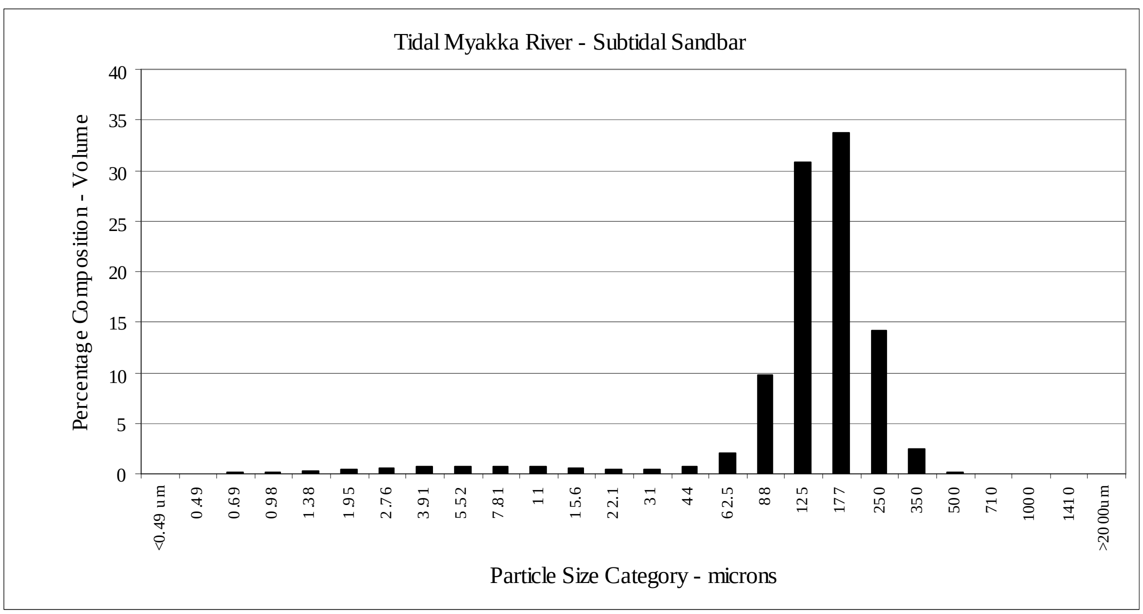
Appendix Figure B38. Grain size distribution for subtidal sandbar - Lemon Bay.



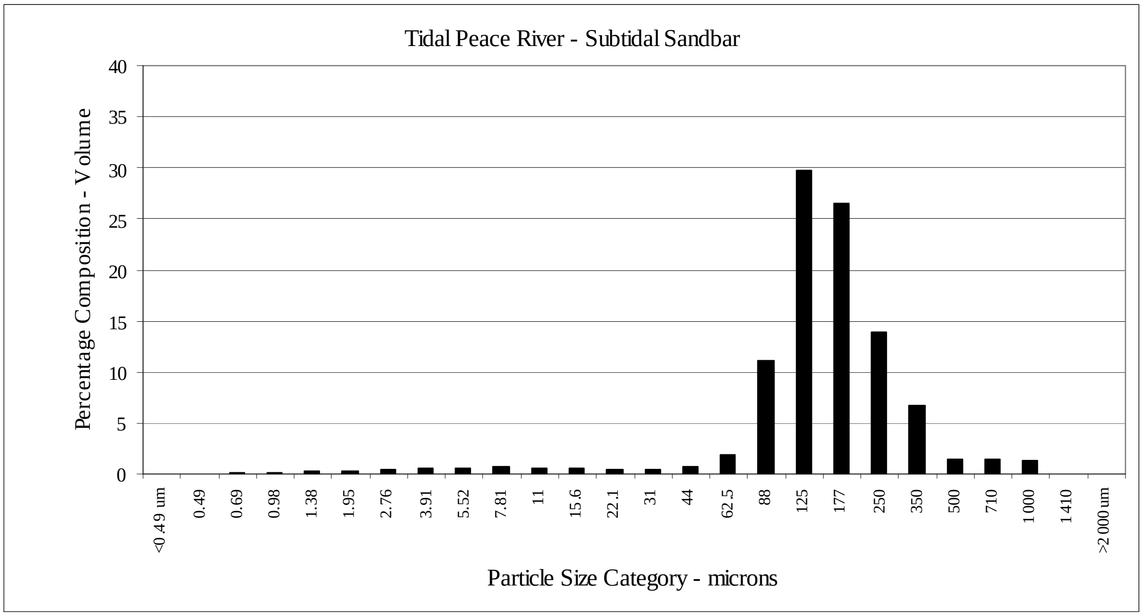
Appendix Figure B39. Grain size distribution for subtidal sandbar - Charlotte Harbor proper.



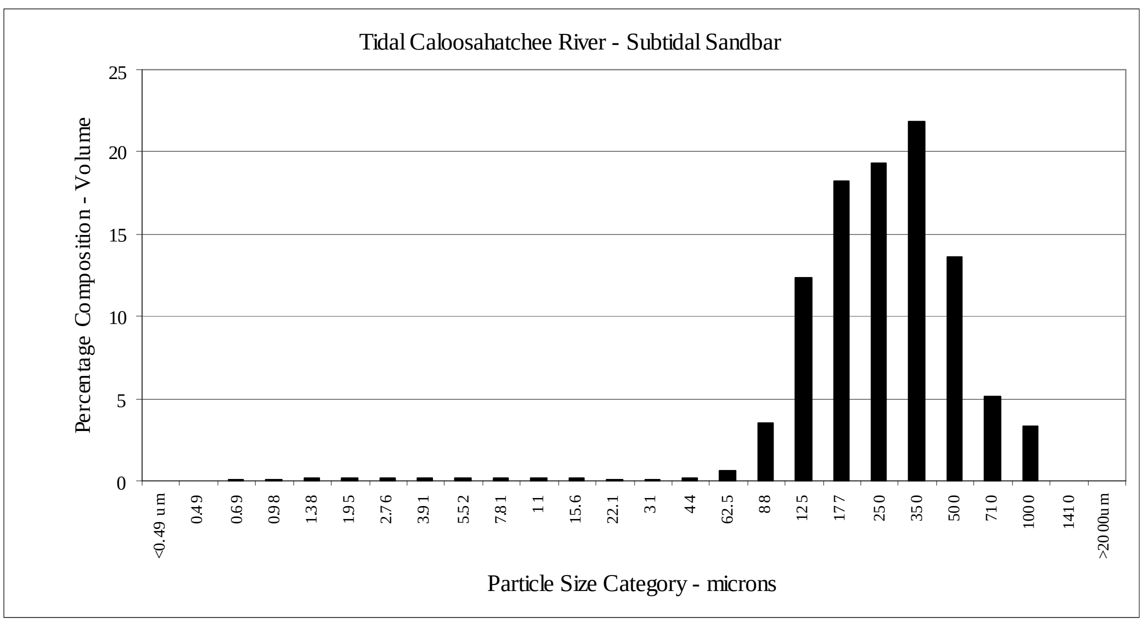
Appendix Figure B40. Grain size distribution for subtidal sandbar - Tidal Myakka River.



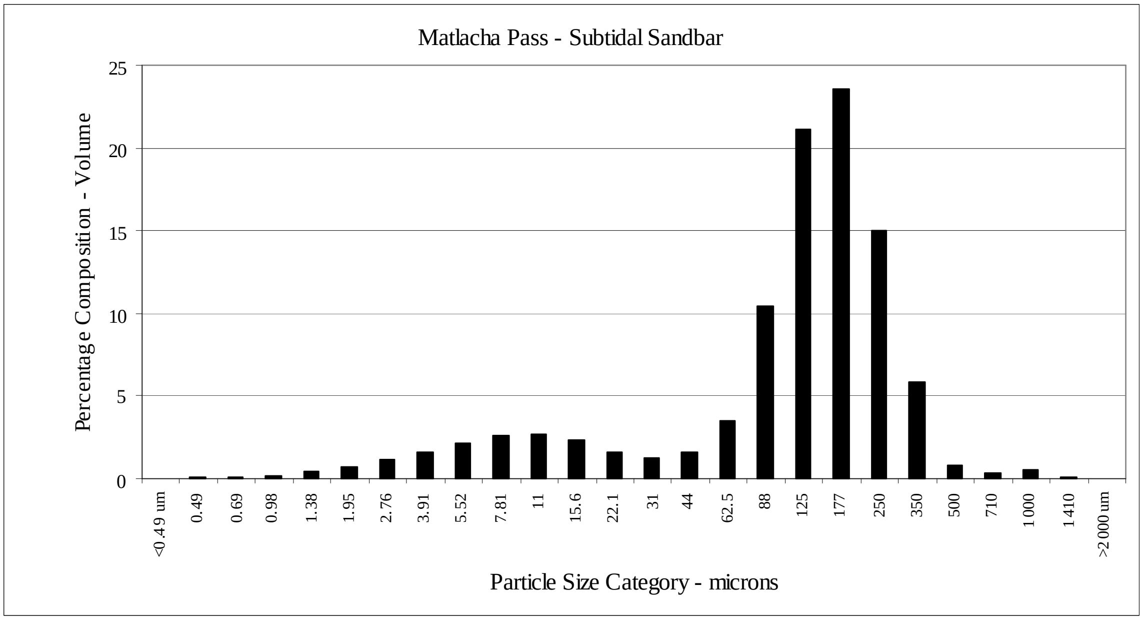
Appendix Figure B41. Grain size distribution for subtidal sandbar - Tidal Peace River.



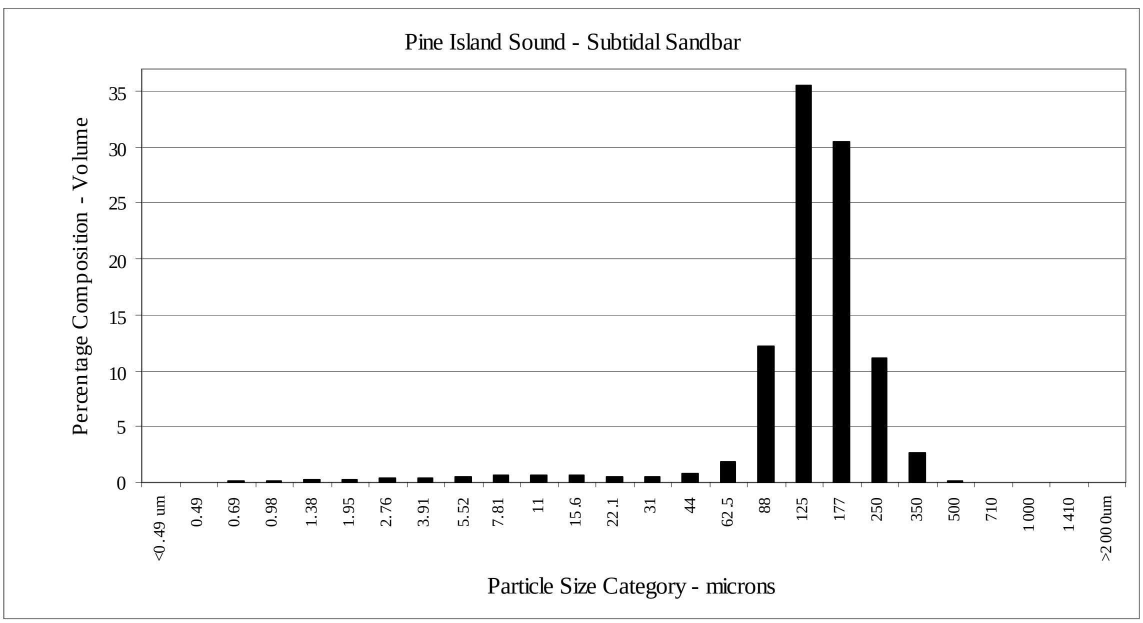
Appendix Figure B42. Grain size distribution for subtidal sandbar - Caloosahatchee River.



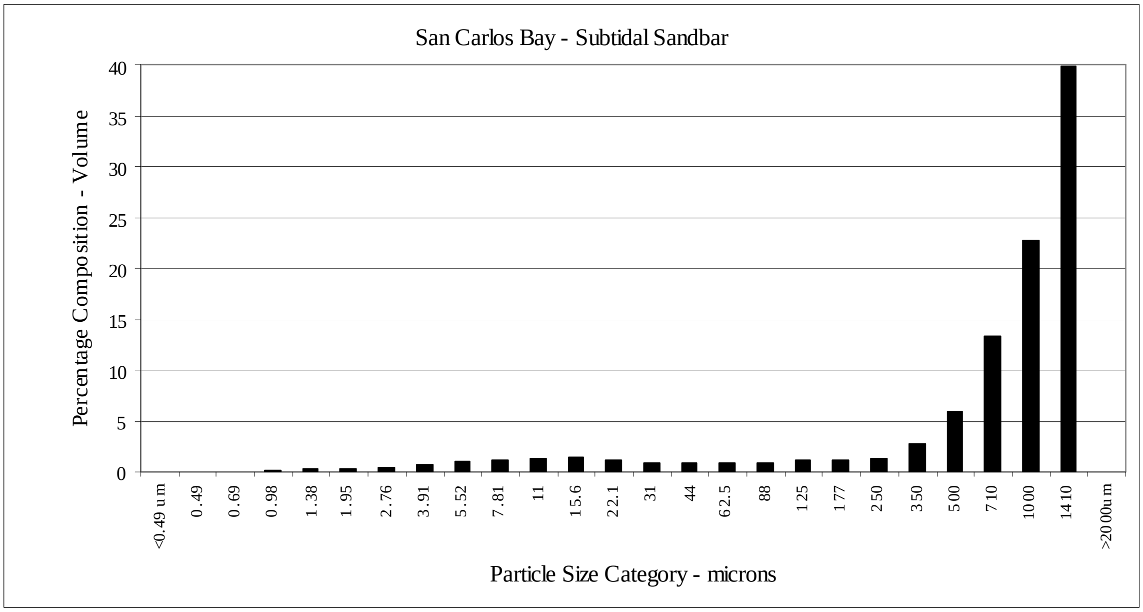
Appendix Figure B43. Grain size distribution for subtidal sandbar - Matlacha Pass.



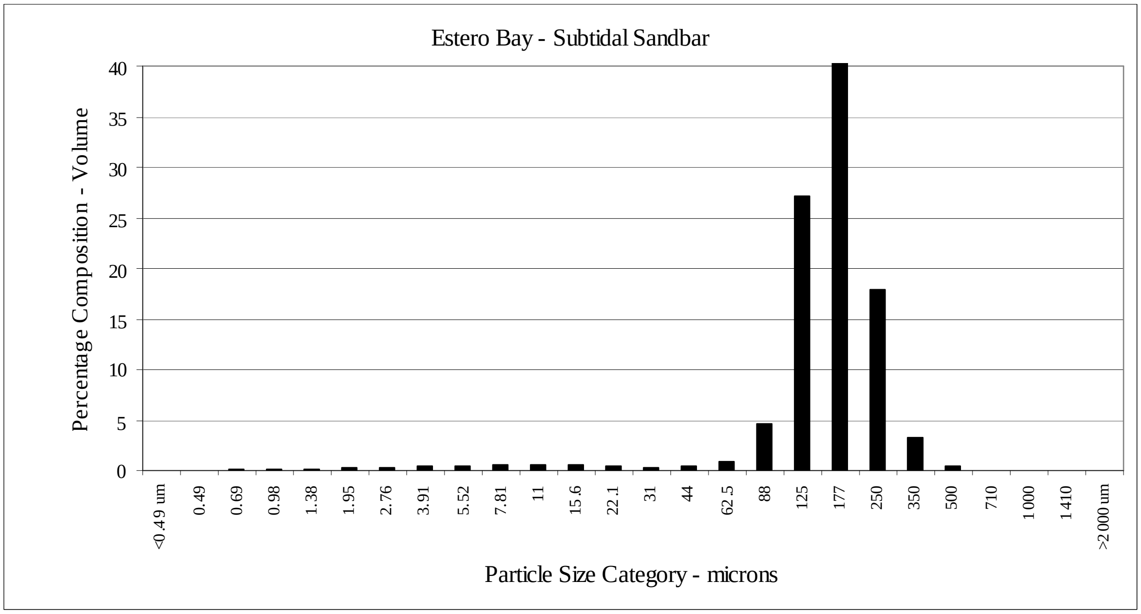
Appendix Figure B44. Grain size distribution for subtidal sandbar - Pine Island Sound.



Appendix Figure B45. Grain size distribution for subtidal sandbar - San Carlos Bay.

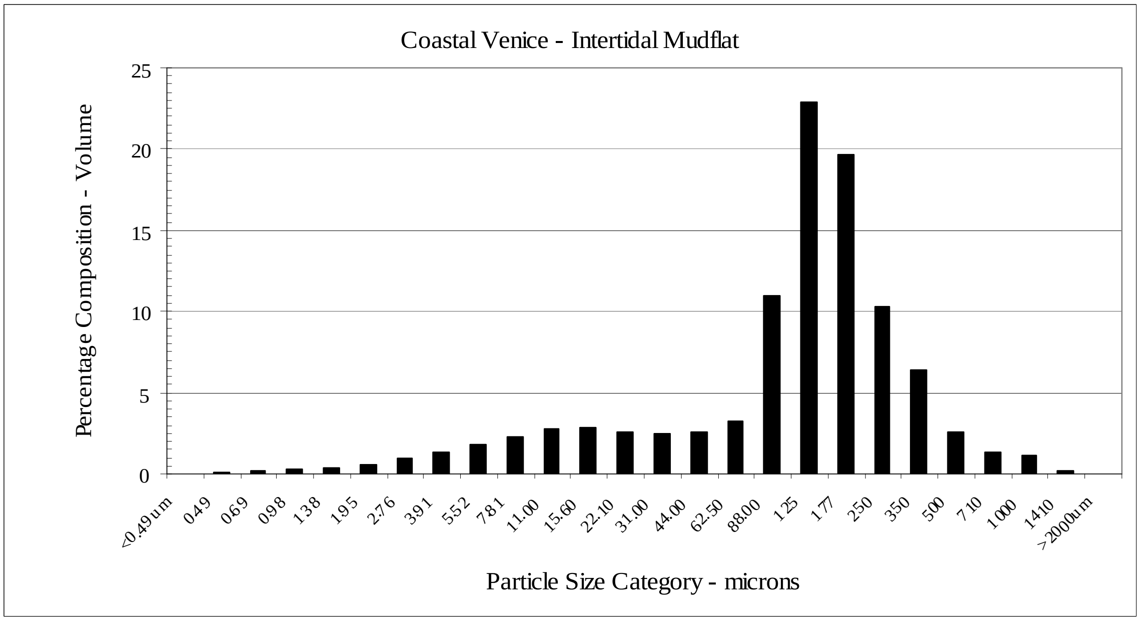


Appendix Figure B46. Grain size distribution for subtidal sandbar - Estero Bay.

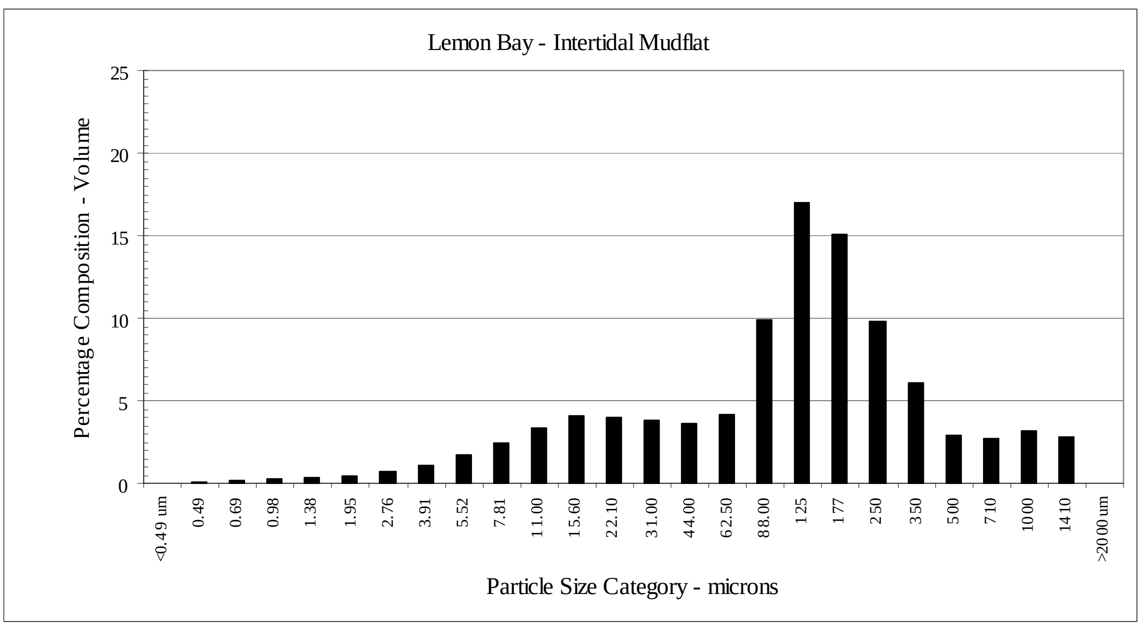


Intertidal Mudflat - Sediment

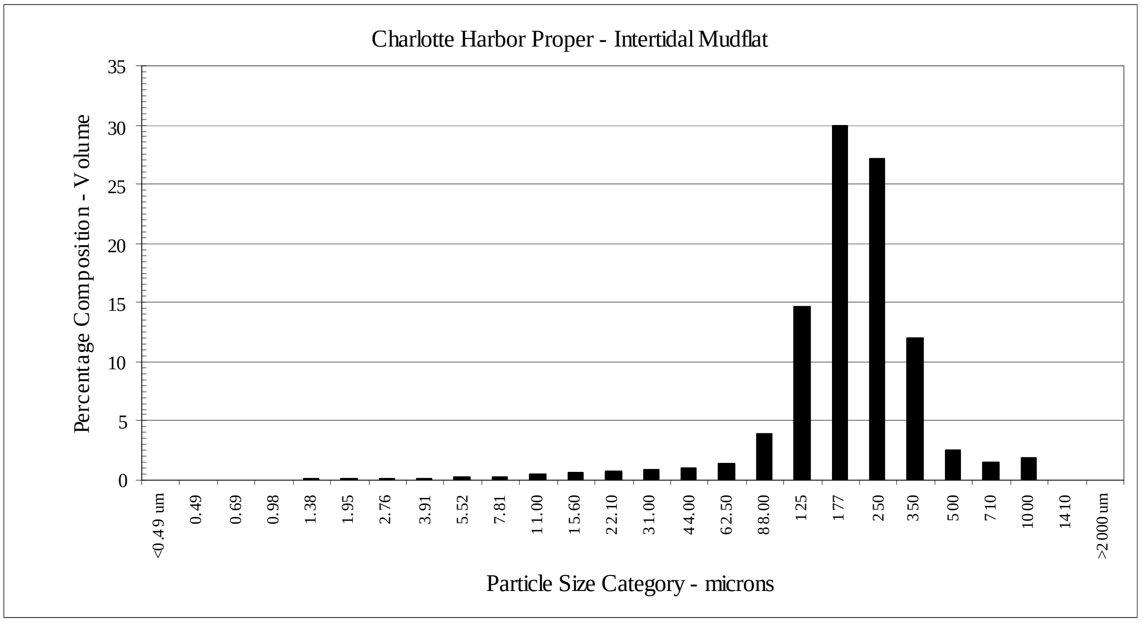
Appendix Figure B 47. Grain size distribution for intertidal mudflat - Coastal Venice.



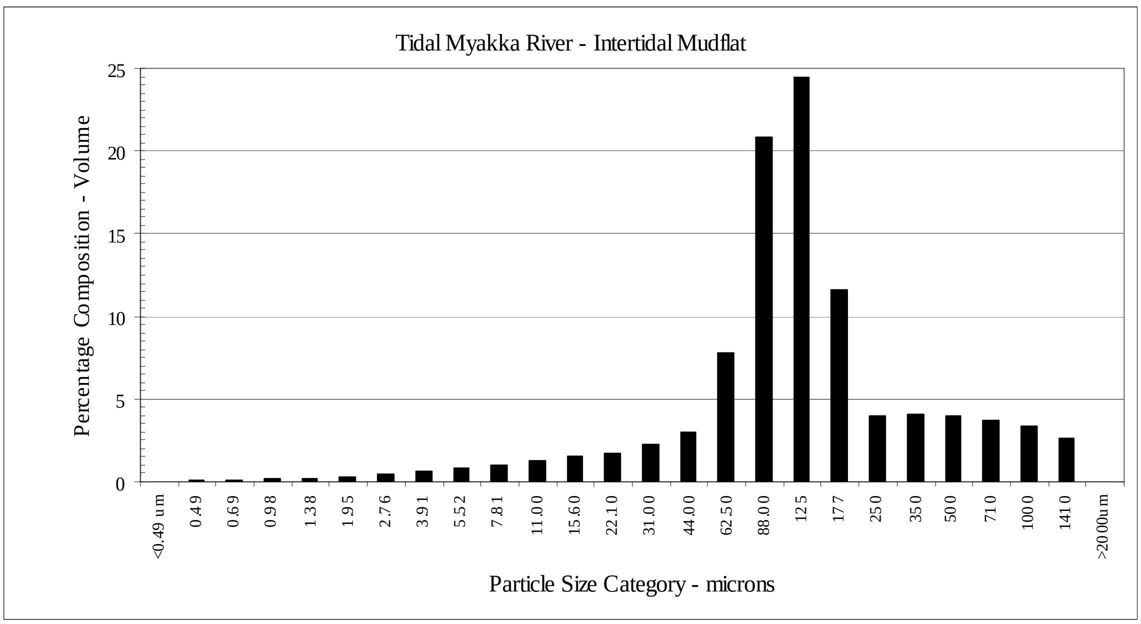
Appendix Figure B48. Grain size distribution for intertidal mudflat - Lemon Bay.



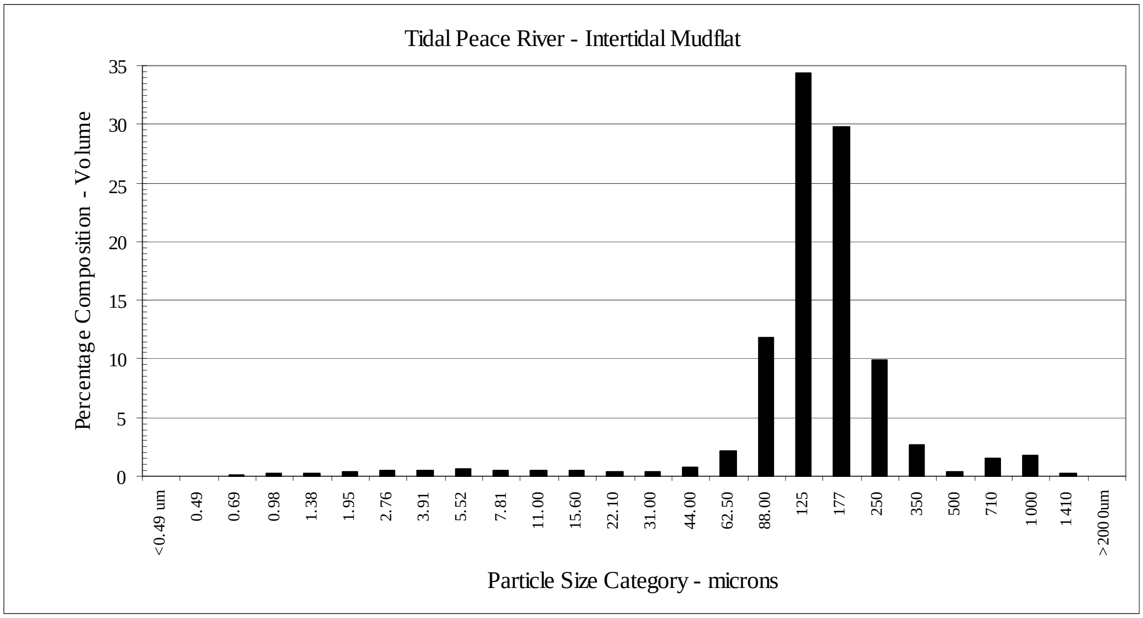
Appendix Figure B49. Grain size distribution for intertidal mudflat - Charlotte Harbor.



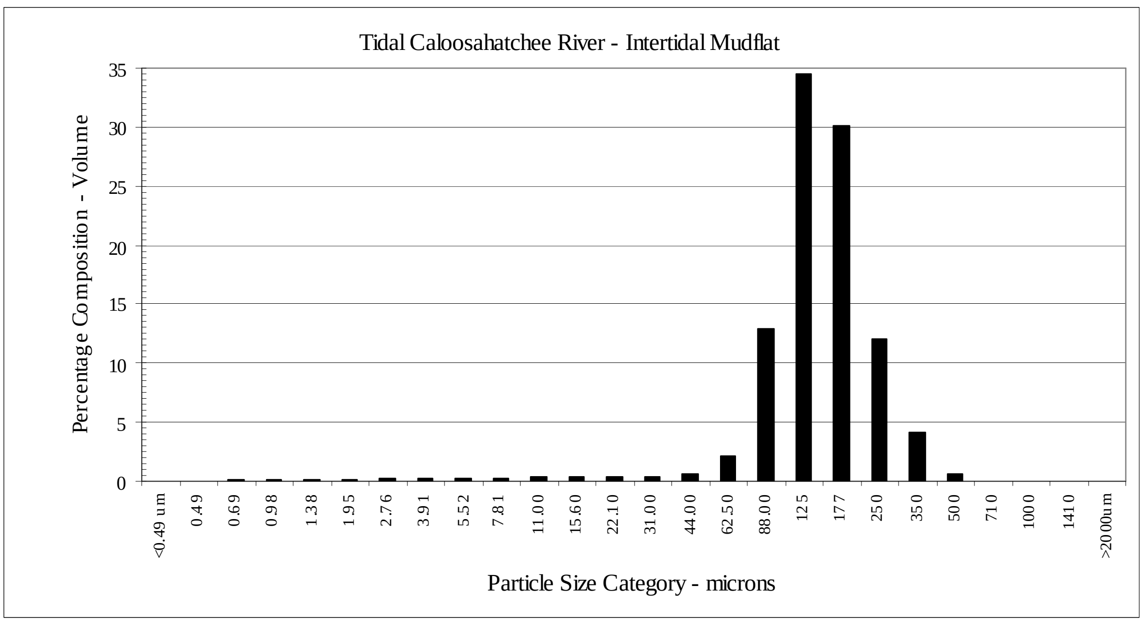
Appendix Figure B50. Grain size distribution for intertidal mudflat - tidal Myakka River.



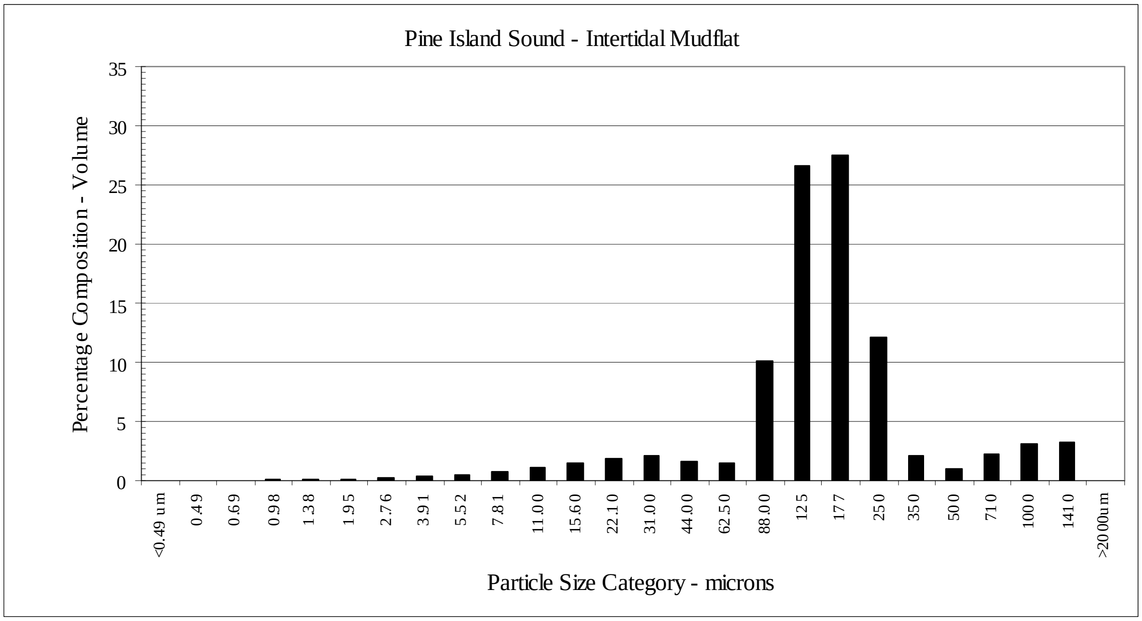
Appendix Figure B51. Grain size distribution for intertidal mudflat - tidal Peace River.



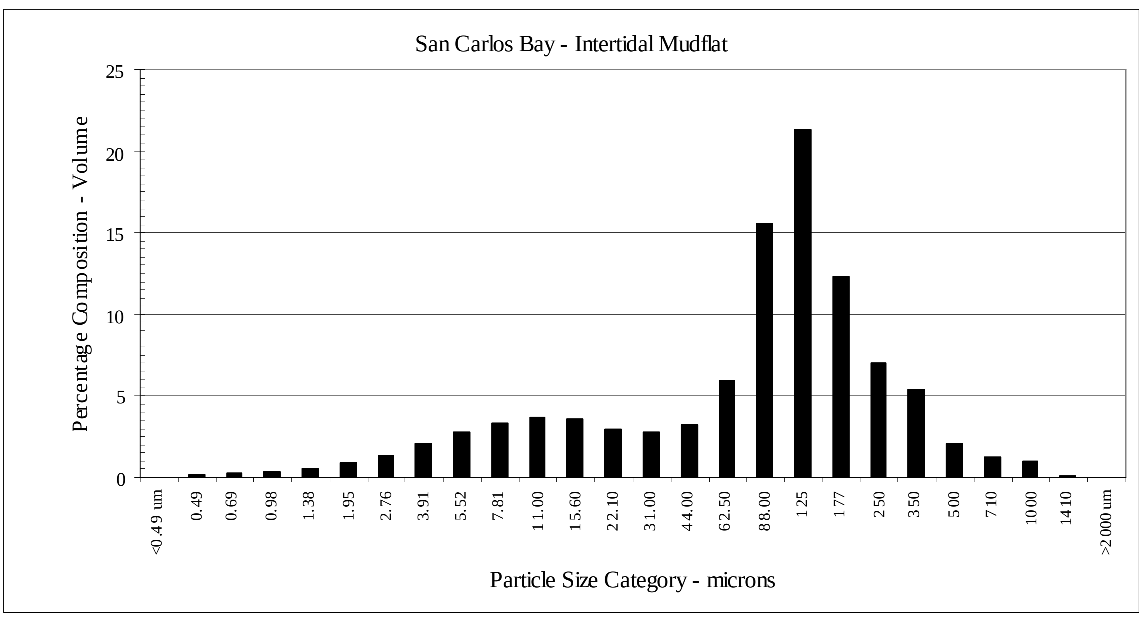
Appendix Figure B52.Grain size distribution for intertidal mudflat - Caloosahatchee River.



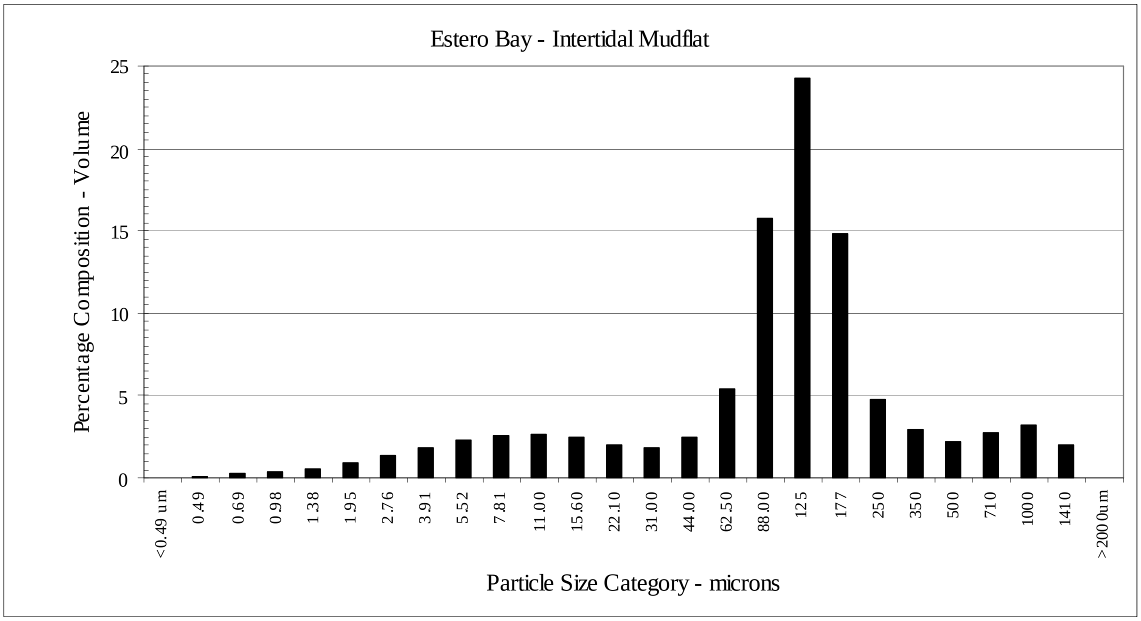
Appendix Figure B53. Grain size distribution for intertidal mudflat - Pine Island Sound.



Appendix Figure B54. Grain size distribution for intertidal mudflat - San Carlos Bay.

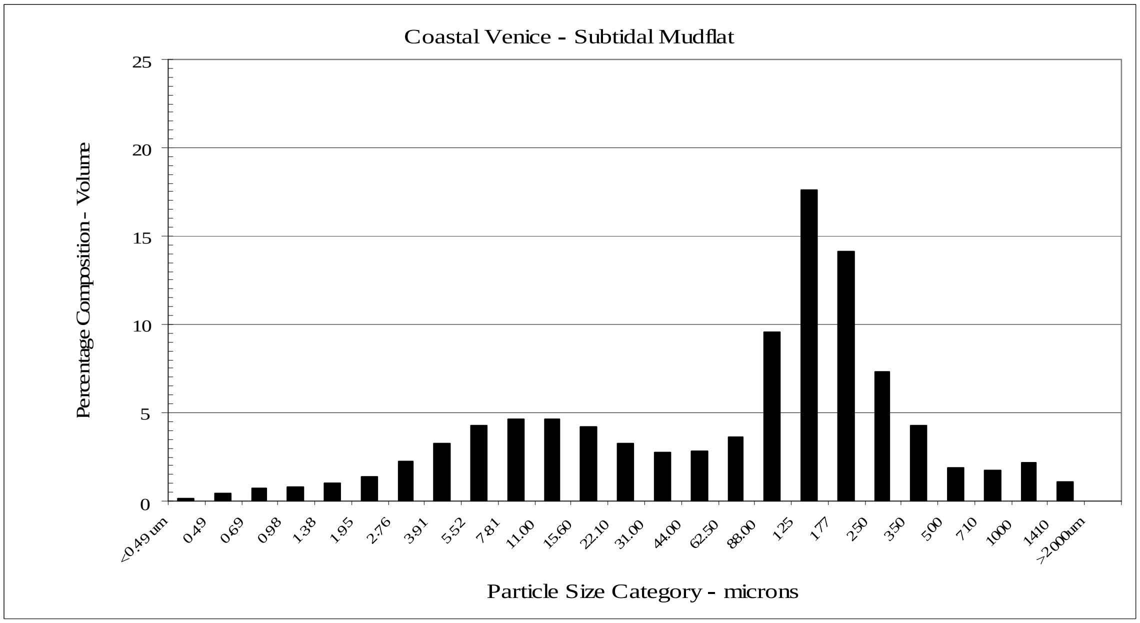


Appendix Figure B55. Grain size distribution for intertidal mudflat - Estero Bay.

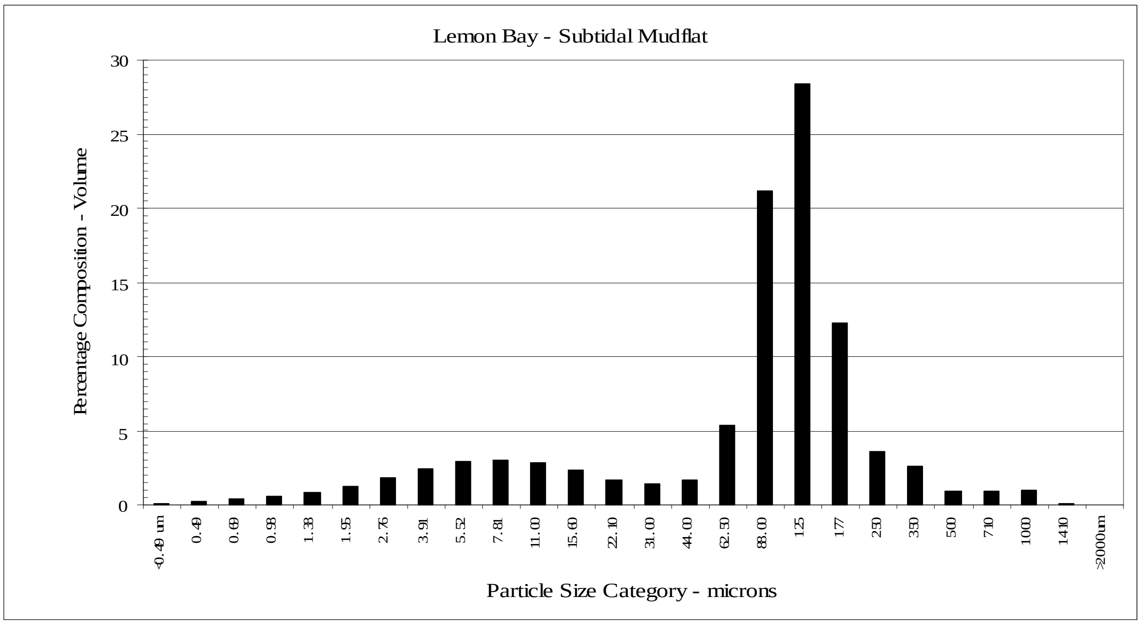


Subtidal Mud Flat

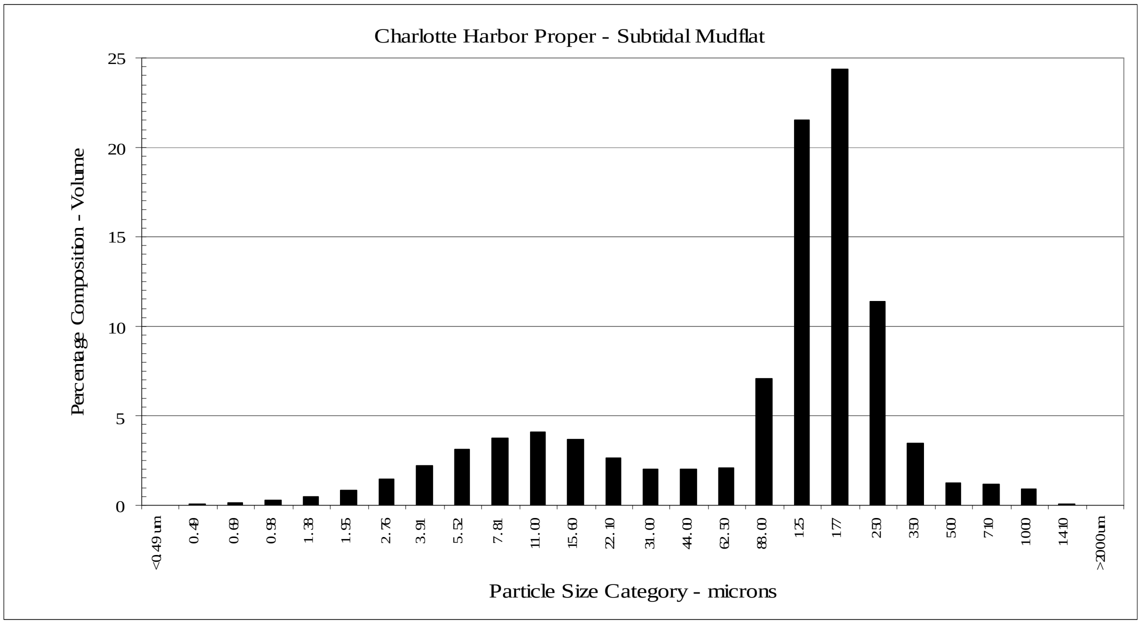
Appendix Figure B 56. Grain size distribution for subtidal mudflat - Coastal Venice.



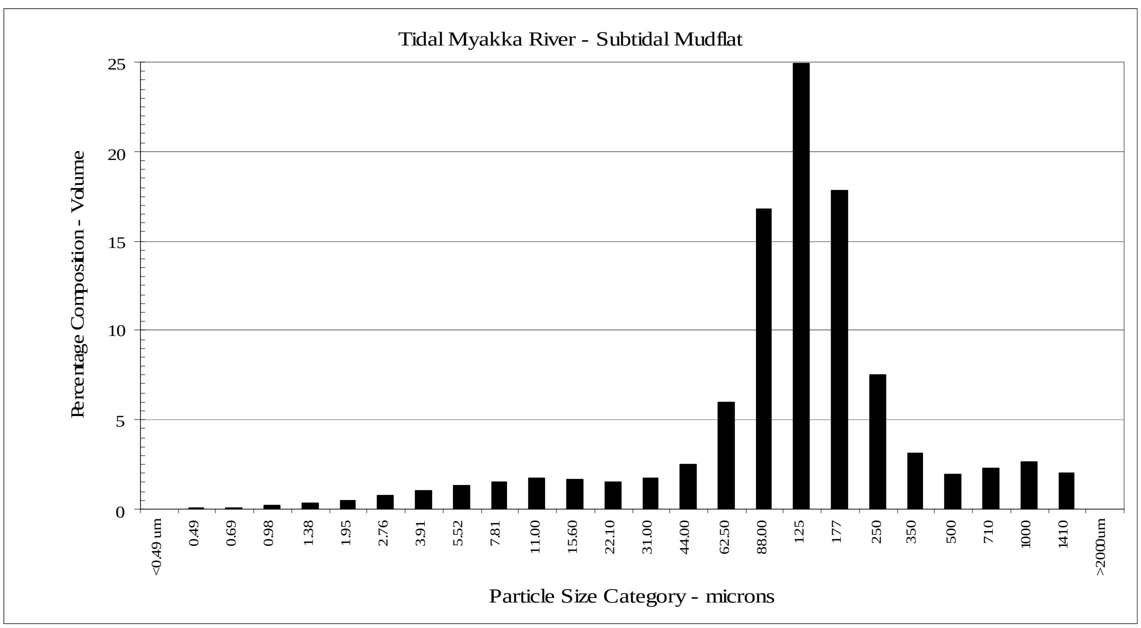
Appendix Figure B57. Grain size distribution for subtidal mudflat - Lemon Bay.



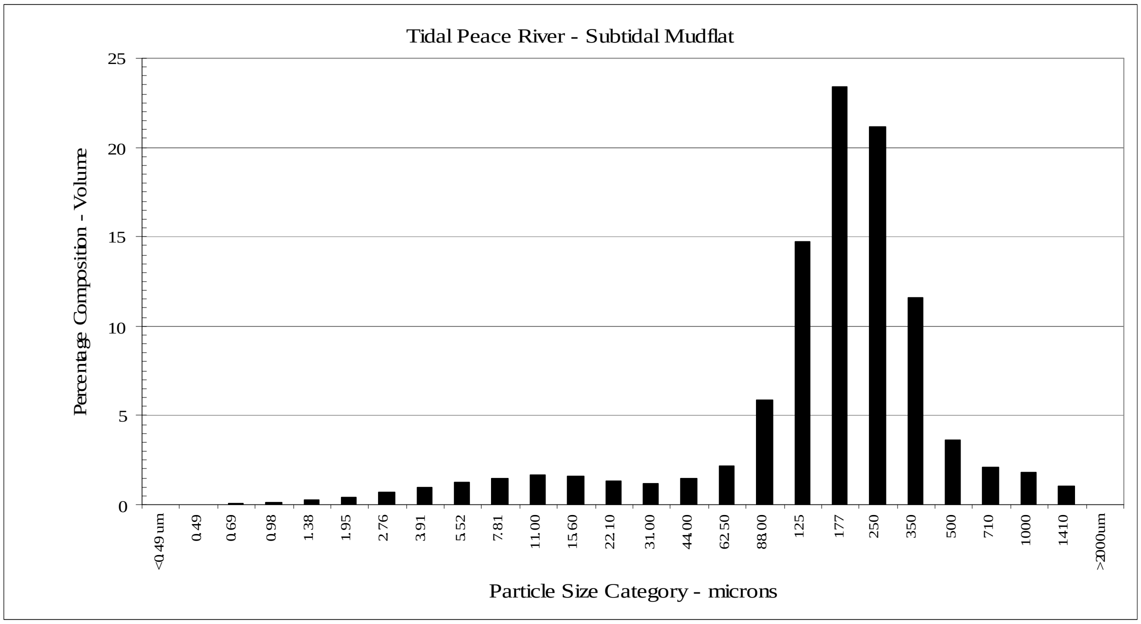
Appendix Figure B58. Grain size distribution for subtidal mudflat - Charlotte Harbor.



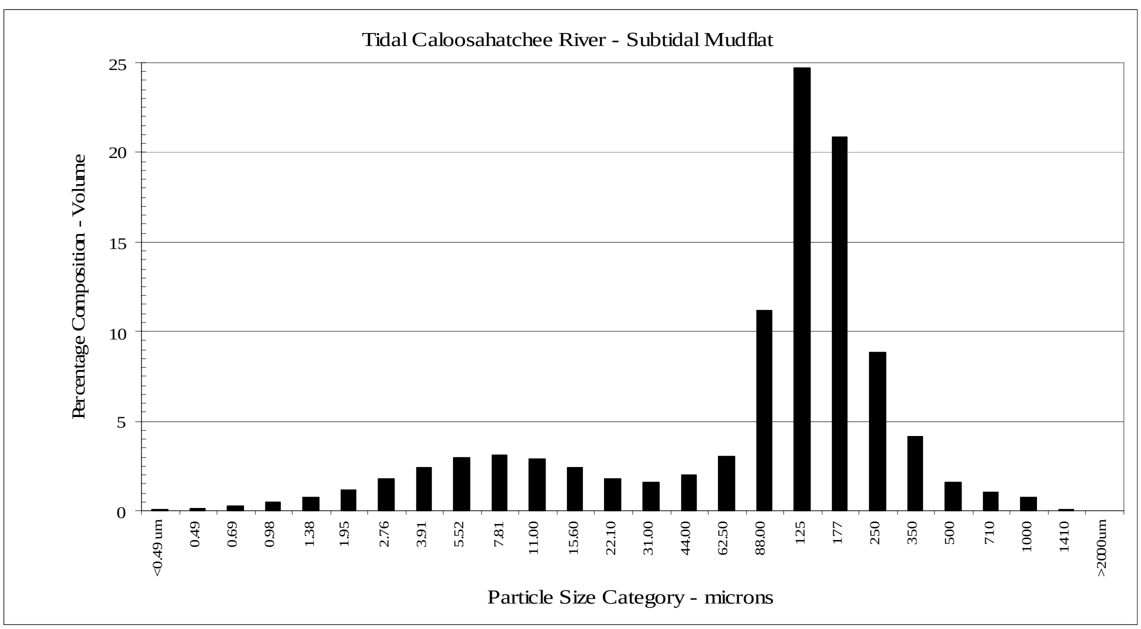
Appendix Figure B59. Grain size distribution for subtidal mudflat - tidal Myakka River.



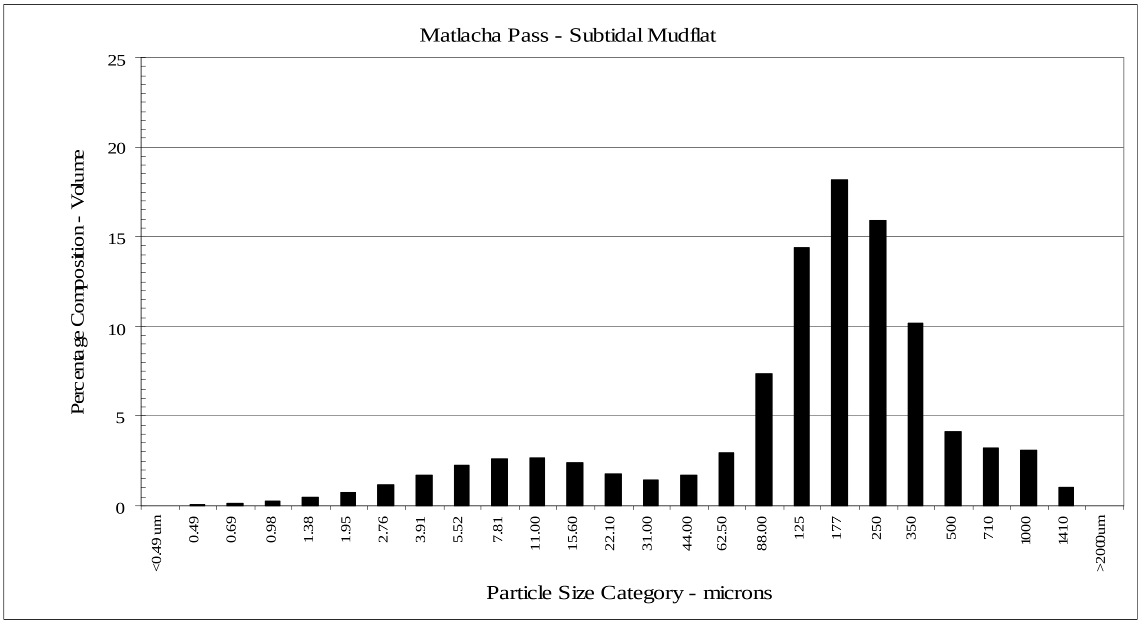
Appendix Figure B60. Grain size distribution for subtidal mudflat - tidal Peace River.



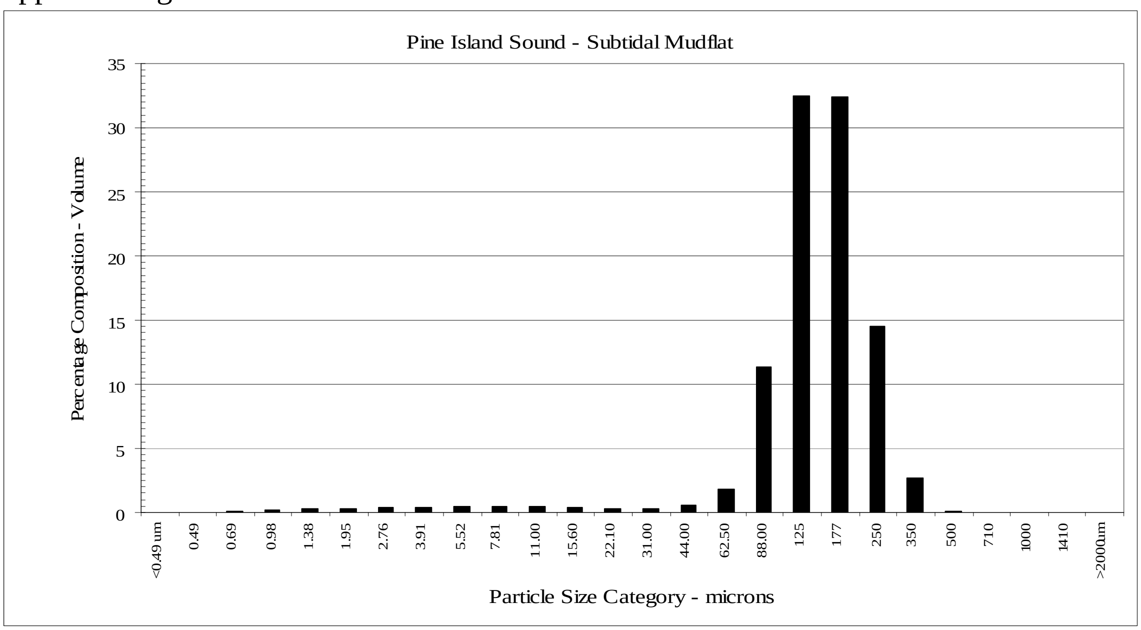
Appendix Figure B61. Grain size distribution for subtidal mudflat - Caloosahatchee River.



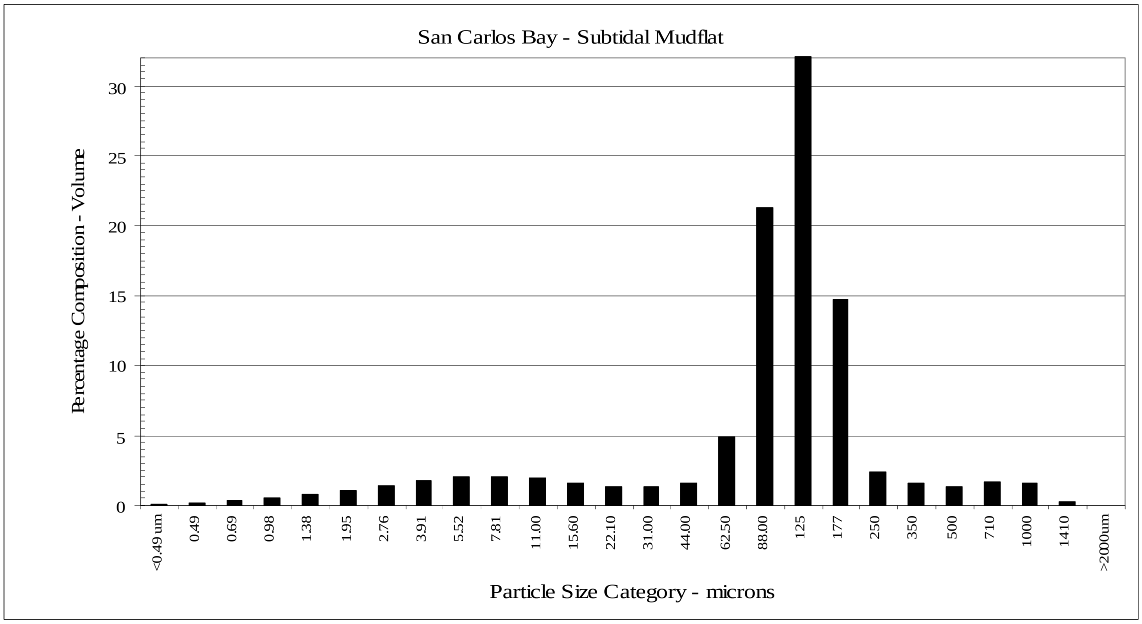
Appendix Figure B62. Grain size distribution for subtidal mudflat - Matlacha Pass.



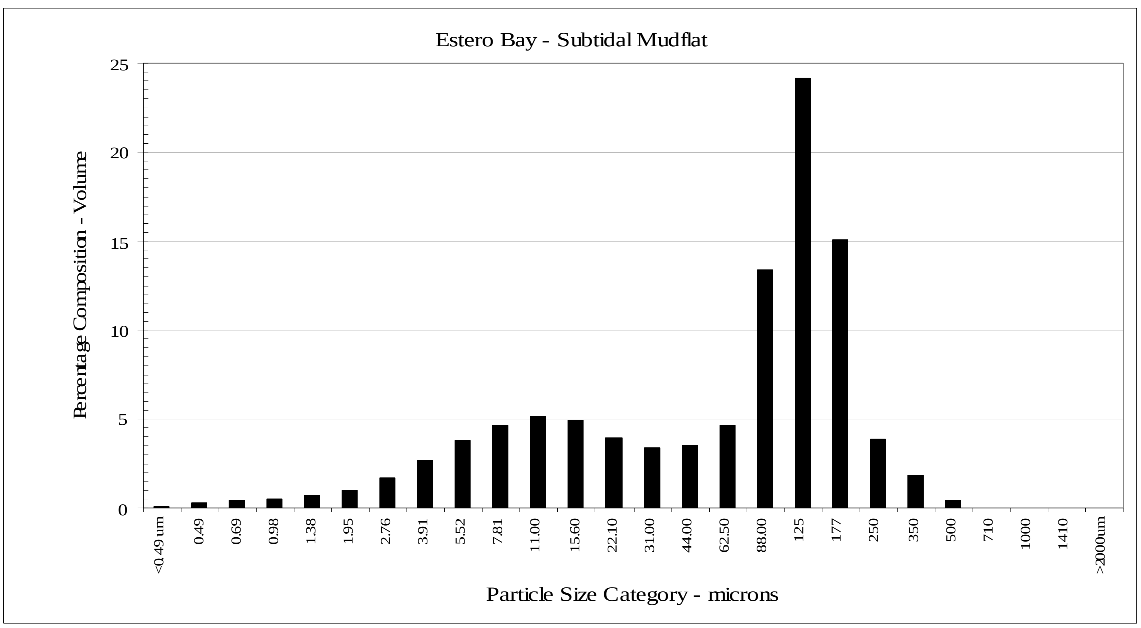
Appendix Figure B63. Grain size distribution for subtidal mudflat - Pine Island Sound.



Appendix Figure B64. Grain size distribution for subtidal mudflat - San Carlos Bay.



Appendix Figure B65. Grain size distribution for subtidal mudflat - Estero Bay.



APPENDIX C

Dona, Roberts and Lyons Bays species list.

Appendix C. Dona, Roberts and Lyons Bays species list.

Taxonomic Group/Identified Taxa	Dona Bay	% of Total	Lemon	% of Total	Roberts	% of Total
PHYLUM CNIDARIA						
CLASS ANTHOZOA						
ORDER ACTINIARIA						
Actiniaria	0		2	0.25	0	
PHYLUM PLATYHELMINTHES						
Platyhelminthes	3	0.28	1	0.12	4	0.21
PHYLUM NEMERTEA						
Nemertea	14	1.33	7	0.87	16	0.86
PHYLUM ANNELIDA						
CLASS POLYCHAETA						
FAMILY SIGALIONIDAE						
Sthenelais sp. A	0		0		6	0.32
FAMILY AMPHINOMIDAE						
Amphinomidae	0		2	0.25	0	
FAMILY PHYLLODOCIDAE						
Eteone heteropoda	0		1	0.12	5	0.27
Genetyllis castanea	0		1	0.12	0	
Paranaitis polynoides	1	0.09	0		0	
Eumida sanguinea	0		0		1	0.05
Phyllodoce arenae	0		2	0.25	0	
FAMILY HESIONIDAE						
Parahesione luteola	0		0		1	0.05
Podarke obscura	0		1	0.12	0	
Podarkeopsis levifuscina	0		0		1	0.05
FAMILY PILARGIDAE						
Sigambra tentaculata	2	0.19	0		1	0.05
Cabira incerta	0		0		1	0.05
Ancistrosyllis sp. C	0		0		1	0.05
FAMILY SYLLIDAE						
Ehlersia cornuta	0		1	0.12	0	
Typosyllis	0		3	0.37	0	
Exogone	0		6	0.75	1	0.05
Sphaerosyllis	0		1	0.12	0	
Sphaerosyllis taylori	1	0.09	1	0.12	0	
Sphaerosyllis longicauda	0		1	0.12	0	
Brania	0		1	0.12	0	
Streptosyllis pettiboneae	2	0.19	0		0	
FAMILY NEREIDAE						
Ceratonereis irritabilis	3	0.28	0		0	
Neanthes acuminata	0		9	1.12	0	
Nereis	1	0.09	0		0	
Laeonereis culveri	13	1.23	34	4.23	59	3.17

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
FAMILY NEPHTYIDAE						
Aglaophamus verrilli	0		0		1	0.05
FAMILY GLYCERIDAE						
Glycera americana	4	0.38	1	0.12	2	0.11
FAMILY GONIADIDAE						
Glycinde solitaria	4	0.38	8	1.00	21	1.13
FAMILY ONUPHIDAE						
Onuphidae	1	0.09	1	0.12	2	0.11
Diopatra cuprea	0		1	0.12	0	
FAMILY EUNICIDAE						
Eunicidae	0		1	0.12	0	
FAMILY LUMBRINERIDAE						
Lumbrineris	3	0.28	1	0.12	1	0.05
Lumbrineris ernesti	0		1	0.12	0	
FAMILY DORVILLEIDAE						
Ophryotrocha	0		1	0.12	1	0.05
FAMILY ORBINIIDAE						
Leitoscoloplos robustus	2	0.19	11	1.37	7	0.38
Scoloplos rubra	2	0.19	0		0	
FAMILY PARAONIDAE						
Aricidea philbinae	7	0.66	46	5.73	104	5.58
Aricidea taylori	1	0.09	0		6	0.32
FAMILY SPIONIDAE						
Polydora	2	0.19	0		0	
Polydora socialis	0		1	0.12	9	0.48
Polydora ligni	0		0		1	0.05
Prionospio heterobranchia	8	0.76	9	1.12	14	0.75
Prionospio steenstrupi	18	1.71	10	1.25	3	0.16
Prionospio pygmaea	2	0.19	6	0.75	1	0.05
Prionospio perkinsi	8	0.76	5	0.62	0	
Spio pettiboneae	1	0.09	7	0.87	0	
Spiophanes bombyx	0		1	0.12	1	0.05
Paraprionospio pinnata	0		1	0.12	0	
Streblospio benedicti	65	6.17	0		0	
Scolelepis texana	1	0.09	0		1	0.05
Carazziella hobsonae	0		0		4	0.21
FAMILY CIRRATULIDAE						
Caulleriella	6	0.57	19	2.37	42	2.25
Tharyx	0		4	0.50	0	
Monticellina dorsobranchialis	28	2.66	52	6.48	207	11.11
Chaetozone	1	0.09	2	0.25	2	0.11
Cirriformia sp. A	1	0.09	0		0	

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
FAMILY FLABELLIGERIDAE						
Piromis roberti	0		0		1	0.05
FAMILY OPHELIIDAE						
Armandia maculata	23	2.18	14	1.74	3	0.16
Travisia hobsonae	0		1	0.12	0	
FAMILY CAPITELLIDAE						
Capitellidae	0		0		1	0.05
Capitella capitata	15	1.42	4	0.50	84	4.51
Heteromastus filiformis	13	1.23	0		19	1.02
Notomastus	0		0		1	0.05
Mediomastus ambiseta	24	2.28	21	2.62	36	1.93
FAMILY MALDANIDAE						
Asychis elongata	0		2	0.25	5	0.27
Axiothella	0		1	0.12	0	
FAMILY OWENIIDAE						
Owenia fusiformis	2	0.19	2	0.25	0	
Myriochele oculata	2	0.19	2	0.25	8	0.43
FAMILY SABELLARIIDAE						
Sabellaria vulgaris	1	0.09	0		3	0.16
FAMILY PECTINARIIDAE						
Pectinaria gouldii	0		0		3	0.16
FAMILY AMPHARETIDAE						
Amphicteis gunneri	0		0		19	1.02
Isolda pulchella	4	0.38	0		6	0.32
FAMILY TEREBELLIDAE						
Terebellidae	0		2	0.25	0	
Eupolymnia nebulosa	0		0		2	0.11
Pista	1	0.09	0		0	
Pista palmata	0		0		1	0.05
Polycirrus	0		0		1	0.05
Streblosoma hartmanae	0		1	0.12	0	
FAMILY TRICHOBRANCHIDAE						
Terebellides stroemi	0		0		5	0.27
FAMILY SABELLIDAE						
Chone	1	0.09	0		0	
Fabriciola	165	15.65	17	2.12	15	0.81
Branchiomma	0		0		5	0.27
CLASS OLIGOCHAETA						
Oligochaeta	25	2.37	83	10.34	45	2.42
CLASS HIRUDINEA						
Hirudinea	1	0.09	0		0	

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
Gastropoda	1	0.09	0		1	0.05
ORDER MESOGASTROPODA						
FAMILY HYDROBIIDAE						
Hydrobiidae	0		0		1	0.05
FAMILY RISSOIDAE						
Assiminea succinea	15	1.42	0		2	0.11
FAMILY VITRINELLIDAE						
Cyclostremiscus pentagonus	0		0		1	0.05
FAMILY CERITHIIDAE						
Bittiolum varium	2	0.19	68	8.47	5	0.27
Cerithium muscarum	0		4	0.50	0	
FAMILY MELANELLIDAE						
Melanella	0		0		1	0.05
FAMILY NATICIDAE						
Tectonatica pusilla	0		2	0.25	0	
ORDER NEOGASTROPODA						
FAMILY PYRENIDAE						
Astyris lunata	0		0		4	0.21
Mitrella lunata	0		1	0.12	1	0.05
Parvanachis obesa	0		1	0.12	2	0.11
FAMILY NASSARIIDAE						
Nassarius vibex	0		4	0.50	3	0.16
ORDER PYRAMIDELLOIDA						
FAMILY PYRAMIDELLIDAE						
Turbonilla	0		0		1	0.05
Turbonilla interrupta	0		0		1	0.05
ORDER CEPHALASPIDEA						
FAMILY ACTEONIDAE						
Rictaxis punctostriatus	3	0.28	0		0	
FAMILY CYLICHNIDAE						
Acteocina canaliculata	2	0.19	18	2.24	11	0.59
Acteocina bidentata	0		0		2	0.11
FAMILY BULLIDAE						
Bulla striata	0		1	0.12	0	
FAMILY HAMINOEIDAE						
Haminoea succinea	2	0.19	0		2	0.11
Haminoea antillarum	3	0.28	2	0.25	1	0.05
(SUBCLASS OPISTHOBRANCHIA)						
Opisthobranchia	1	0.09	0		3	0.16
CLASS BIVALVIA						
Bivalvia	4	0.38	1	0.12	6	0.32

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
ORDER ARCOIDA						
FAMILY ARCIDAE						
Anadara transversa	5	0.47	4	0.50	11	0.59
ORDER MYTILOIDA						
FAMILY MYTILIDAE						
Musculus lateralis	1	0.09	1	0.12	1	0.05
Amygdalum papyrium	1	0.09	0		1	0.05
ORDER PTERIOIDA						
FAMILY ANOMIIDAE						
Anomia simplex	1	0.09	0		0	
ORDER VENEROIDA						
FAMILY LUCINIDAE						
Lucinidae	0		2	0.25	0	
Parvilucina multilineata	0		27	3.36	5	0.27
Lucina nassula	0		2	0.25	0	
FAMILY MONTACUTIDAE						
Mysella planulata	3	0.28	1	0.12	11	0.59
FAMILY CRASSATELLIDAE						
Crassinella lunulata	0		2	0.25	6	0.32
FAMILY CARDIIDAE						
Laevicardium mortoni	0		1	0.12	1	0.05
FAMILY MACTRIDAE						
Mulinia lateralis	0		0		1	0.05
Rangia cuneata	0		0		1	0.05
FAMILY TELLINIDAE						
Macoma tenta	5	0.47	6	0.75	18	0.97
Tellina	1	0.09	1	0.12	1	0.05
Tellina versicolor	24	2.28	65	8.09	76	4.08
Tellina alternata	19	1.80	2	0.25	52	2.79
Tellidora cristata	0		1	0.12	0	
FAMILY PSAMMOBIIDAE						
Tagelus	1	0.09	0		1	0.05
Tagelus plebeius	37	3.51	0		6	0.32
Tagelus divisus	0		1	0.12	6	0.32
FAMILY SEMELIDAE						
Abra aequalis	7	0.66	5	0.62	14	0.75
FAMILY DREISSENIDAE						
Mytilopsis leucophaeata	9	0.85	0		7	0.38
FAMILY VENERIDAE						
Mercenaria	0		5	0.62	2	0.11
Chione cancellata	6	0.57	4	0.50	6	0.32
Macrocallista nimbosa	0		1	0.12	0	
Anomalocardia auberiana	0		0		2	0.11

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
ORDER MYINA						
FAMILY MYIDAE						
Sphenia antillensis	1	0.09	0		0	
FAMILY CORBULIDAE						
Corbula contracta	0		0		1	0.05
FAMILY LYONSIIDAE						
Lyonsia floridana	0		0		2	0.11
PHYLUM CRUSTACEA						
CLASS MALACOSTRACA						
ORDER MYSIDACEA						
FAMILY MYSIDAE						
Heteromysis formosa	56	5.31	1	0.12	73	3.92
Mysidopsis almyra	22	2.09	0		18	0.97
Bowmaniella floridana	0		0		1	0.05
ORDER CUMACEA						
FAMILY LEUCONIDAE						
Leucon americanus	0		1	0.12	0	
FAMILY DIASTYLIDAE						
Oxyurostylis smithi	0		1	0.12	1	0.05
FAMILY NANNASTACIDAE						
Almyracuma nr. proximoculae	0		0		2	0.11
FAMILY BODOTRIIDAE						
Cyclaspis pustulata	0		0		7	0.38
Cyclaspis varians	0		0		4	0.21
ORDER TANAIDACEA						
FAMILY PARAPSEUDIDAE						
Halmyrapseudes bahamensis	0		1	0.12	2	0.11
FAMILY PSEUDOZEUXIDAE						
Hargeria rapax	11	1.04	22	2.74	125	6.71
ORDER ISOPODA						
FAMILY ANTHURIDAE						
Xenanthura brevitelson	0		12	1.49	6	0.32
Cyathura polita	1	0.09	0		2	0.11
Amakusanthura magnifica	0		0		5	0.27
FAMILY SPHAEROMATIDAE						
Cassidinidea ovalis	0		0		1	0.05
Harrieta faxoni	0		1	0.12	0	
FAMILY IDOTHEIDAE						
Erichsonella attenuata	0		0		1	0.05
Erichsonella filiformis	0		4	0.50	1	0.05
Edotea montosa	26	2.47	1	0.12	14	0.75

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
ORDER AMPHIPODA						
Amphipoda	5	0.47	6	0.75	0	
FAMILY AMPELISCIDAE						
Ampelisca	0		0		1	0.05
Ampelisca verrilli	5	0.47	0		1	0.05
Ampelisca agassizi	6	0.57	1	0.12	0	
Ampelisca holmesi	2	0.19	9	1.12	11	0.59
Ampelisca burkei	4	0.38	13	1.62	13	0.70
FAMILY AMPHILOCHIDAE						
Gitanopsis laguna	1	0.09	0		1	0.05
FAMILY AMPITHOIDAE						
Cymadusa filosa	3	0.28	0		0	
FAMILY AORIDAE						
Rudilemboides naglei	0		4	0.50	2	0.11
FAMILY COROPHIIDAE						
Corophiidae	0		0		1	0.05
Corophium	125	11.86	3	0.37	226	12.13
Erichthonius rubricornis	0		0		20	1.07
Unciola	0		15	1.87	20	1.07
Grandidierella bonnieroides	124	11.76	26	3.24	193	10.36
Bemlos	9	0.85	0		0	
FAMILY MELITIDAE						
Elasmopus	2	0.19	0		4	0.21
Elasmopus laevis	0		4	0.50	0	
Gammarus	0		0		2	0.11
Gammarus palustris	0		0		1	0.05
Melita	0		3	0.37	0	
Dulichiella sp. A	1	0.09	0		0	
FAMILY ISCHYROCERIDAE						
Jassa falcata	0		0		2	0.11
FAMILY LYSIANASSIDAE						
Lysianopsis alba	1	0.09	0		0	
FAMILY CAPRELLIDAE						
Caprellidae	0		1	0.12	2	0.11
ORDER DECAPODA						
Decapoda (unid. shrimp)	0		1	0.12	0	
FAMILY PENAEIDAE						
Penaeus	8	0.76	2	0.25	3	0.16
(INFRAORDER CARIDEA)						

Appendix C. Dona, Roberts and Lyons Bays species list (continued).

Taxonomic Group/Identified Taxa	Dona	% of Total	Lemon	% of Total	Roberts	% of Total
Caridea	0		15	1.87	0	
FAMILY PASIPHAEIDAE						
Leptochela	0		2	0.25	0	
FAMILY PALAEMONIDAE						
Palaemonidae	2	0.19	0		0	
Palaemonetes	0		0		3	0.16
ORDER DECAPODA						
FAMILY DIOGENIDAE						
Paguristes	0		0		1	0.05
FAMILY PORTUNIDAE						
Callinectes sapidus	1	0.09	1	0.12	0	
Portunus	0		0		1	0.05
FAMILY XANTHIDAE						
Xanthidae	1	0.09	0		6	0.32
Rhithropanopeus harrisii	0		0		1	0.05
PHYLUM UNIRAMIA						
SUBPHYLUM HEXAPODA						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
Chironomidae	1	0.09	0		0	
PHYLUM SIPUNCULA						
Sipuncula	0		0		5	0.27
FAMILY GOLFINGIIDAE						
Phascolion strombi	1	0.09	7	0.87	5	0.27
PHYLUM ECHIURA						
Echiura	0		0		1	0.05
PHYLUM ECHINODERMATA						
CLASS STELLEROIDEA						
(SUBCLASS OPHIUROIDEA)						
Ophiuroidea	0		0		1	0.05
ORDER OPHIURIDA						
FAMILY OPHIODERMATIDAE						
Amphiuroidea	0		0		1	0.05
FAMILY AMPHIURIDAE						
Amphioplus	0		0		1	0.05
PHYLUM CHORDATA						
SUBPHYLUM VERTEBRATA						
CLASS OSTEICHTHYES						
Osteichthyes	0		0		1	0.05
Total Individuals:	1,054	100	803	100	1,863	100
Mean Number of Individuals/taxa	5	1	4	1	9	1
Standard Deviation:	18.6	2.5	11.0		29.7	
Minimum	0.0	0.1	0.0		0.0	
Maximum	165	16	83		226	

APPENDIX D

Myakka River and Myakkahatchee Creek species list

Appendix D- Myakka River and Myakkahatchee Creek species list and faunal counts for a sampling program conducted in 2004.

Myakka River **6/7/04**

Distance Upstream (km)	Station	Deep or Intertidal	Core or Sweep	Position Latitude	Position Longitude	Taxa	Major Group	Total Count
0	M-0	Deep	Core	26.90433	-82.17003	Pectinaria gouldii	Polychaetea	42
0	M-0	Deep	Core	26.90433	-82.17003	Rudilemboides naglei	Crustacea	29
0	M-0	Deep	Core	26.90433	-82.17003	Mysella planulata	Mollusca	21
0	M-0	Deep	Core	26.90433	-82.17003	Amygdalum papyrium	Mollusca	18
0	M-0	Deep	Core	26.90433	-82.17003	Bivalvia	Mollusca	10
0	M-0	Int	Core	26.90250	-82.17302	Mysella planulata	Mollusca	9
0	M-0	Deep	Core	26.90433	-82.17003	Cyclaspis varians	Crustacea	8
0	M-0	Deep	Core	26.90433	-82.17003	Mulinia lateralis	Mollusca	8
0	M-0	Deep	Core	26.90433	-82.17003	Spiochaetopterus costarum	Polychaetea	8
0	M-0	Deep	Core	26.90433	-82.17003	Tellina	Mollusca	8
0	M-0	Deep	Core	26.90433	-82.17003	Glottidia pyramidata	Brachiopoda	7
0	M-0	Int	Core	26.90250	-82.17302	Erichsonella	Crustacea	7
0	M-0	Int	Core	26.90250	-82.17302	Neanthes succinea	Polychaetea	7
0	M-0	Deep	Core	26.90433	-82.17003	Acteocina canaliculata	Mollusca	4
0	M-0	Int	Core	26.90250	-82.17302	Gastropoda	Mollusca	4
0	M-0	Deep	Core	26.90433	-82.17003	Neanthes succinea	Polychaetea	3
0	M-0	Int	Core	26.90250	-82.17302	Bittiolum varium	Mollusca	3
0	M-0	Deep	Core	26.90433	-82.17003	Argissidae	Crustacea	2
0	M-0	Deep	Core	26.90433	-82.17003	Astyris lunata	Mollusca	2
0	M-0	Deep	Core	26.90433	-82.17003	Macoma tenta	Mollusca	2
0	M-0	Int	Core	26.90250	-82.17302	Acteocina canaliculata	Mollusca	2
0	M-0	Int	Core	26.90250	-82.17302	Laevicardium mortoni	Mollusca	2
0	M-0	Deep	Core	26.90433	-82.17003	Asychis elongata	Polychaetea	1
0	M-0	Deep	Core	26.90433	-82.17003	Caprellidae	Crustacea	1
0	M-0	Deep	Core	26.90433	-82.17003	Edotea montosa	Crustacea	1
0	M-0	Deep	Core	26.90433	-82.17003	Gastropoda	Mollusca	1
0	M-0	Deep	Core	26.90433	-82.17003	Glycera americana	Polychaetea	1
0	M-0	Deep	Core	26.90433	-82.17003	Melinna maculata	Polychaetea	1
0	M-0	Deep	Core	26.90433	-82.17003	Nemertea sp. F	Nemertea	1
0	M-0	Deep	Core	26.90433	-82.17003	Paraprionospio pinnata	Polychaetea	1
0	M-0	Deep	Core	26.90433	-82.17003	Sthenelais sp. A	Polychaetea	1
0	M-0	Deep	Core	26.90433	-82.17003	Turbonilla	Mollusca	1
0	M-0	Deep	Core	26.90433	-82.17003	Xenanthura brevitelson	Crustacea	1
0	M-0	Int	Core	26.90250	-82.17302	Astyris lunata	Mollusca	1
0	M-0	Int	Core	26.90250	-82.17302	Leptochela	Crustacea	1
0	M-0	Int	Core	26.90250	-82.17302	Macoma constricta	Mollusca	1
0	M-0	Int	Core	26.90250	-82.17302	Cyathura polita	Crustacea	1
0	M-0	Int	Core	26.90250	-82.17302	Oligochaeta	Oligochaeta	1
0	M-0	Int	Core	26.90250	-82.17302	Rhithropanopeus harrisii	Crustacea	1
0	M-0	Int	Core	26.90250	-82.17302	Tagelus plebeius	Mollusca	1
0	M-0	Int	Swp	26.90250	-82.17302	Bittiolum varium	Mollusca	458

0	M-0	Int	Swp	26.90250	-82.17302	Astyris lunata	Mollusca	76
0	M-0	Deep	Swp	26.90433	-82.17003	Bemlos	Crustacea	18
0	M-0	Deep	Swp	26.90433	-82.17003	Haminoea succinea	Mollusca	9
0	M-0	Deep	Swp	26.90433	-82.17003	Mulinia lateralis	Mollusca	7
0	M-0	Int	Swp	26.90250	-82.17302	Acteocina canaliculata	Mollusca	7
0	M-0	Deep	Swp	26.90433	-82.17003	Nudibranchia	Mollusca	6
0	M-0	Int	Swp	26.90250	-82.17302	Grandidierella bonnieroides	Crustacea	6
0	M-0	Deep	Swp	26.90433	-82.17003	Mysella planulata	Mollusca	4
0	M-0	Deep	Swp	26.90433	-82.17003	Vitrinellidae	Mollusca	4
0	M-0	Deep	Swp	26.90433	-82.17003	Acteocina canaliculata	Mollusca	3
0	M-0	Deep	Swp	26.90433	-82.17003	Amygdalum papyrium	Mollusca	3
0	M-0	Deep	Swp	26.90433	-82.17003	Caprellidae	Crustacea	3
0	M-0	Deep	Swp	26.90433	-82.17003	Odostomia cf. gibbosa	Mollusca	3
0	M-0	Deep	Swp	26.90433	-82.17003	Argissidae	Crustacea	2
0	M-0	Deep	Swp	26.90433	-82.17003	Astyris lunata	Mollusca	1
0	M-0	Deep	Swp	26.90433	-82.17003	Bowmaniella floridana	Crustacea	1
0	M-0	Deep	Swp	26.90433	-82.17003	Oxyurostylis smithi	Crustacea	1
0	M-0	Deep	Swp	26.90433	-82.17003	Tagelus plebeius	Mollusca	1
0	M-0	Deep	Swp	26.90433	-82.17003	Tellina	Mollusca	1
0	M-0	Int	Swp	26.90250	-82.17302	Boonea impressa	Mollusca	1
0	M-0	Int	Swp	26.90250	-82.17302	Erichsonella filiformis	Crustacea	1
0	M-0	Int	Swp	26.90250	-82.17302	Laevicardium mortoni	Mollusca	1
0	M-0	Int	Swp	26.90250	-82.17302	Nassarius vibex	Mollusca	1
0	M-0	Int	Swp	26.90250	-82.17302	Neanthes succinea	Polychaetea	1
2	M-2	Int	Core	26.93268	-82.16398	Cyclaspis varians	Crustacea	16
2	M-2	Deep	Core	26.92967	-82.16723	Pectinaria gouldii	Polychaetea	12
2	M-2	Deep	Core	26.92967	-82.16723	Mulinia lateralis	Mollusca	5
2	M-2	Int	Core	26.93268	-82.16398	Capitella capitata	Polychaetea	5
2	M-2	Deep	Core	26.92967	-82.16723	Mysella planulata	Mollusca	4
2	M-2	Deep	Core	26.92967	-82.16723	Spiochaetopterus costarum	Polychaetea	3
2	M-2	Int	Core	26.93268	-82.16398	Mysella planulata	Mollusca	3
2	M-2	Int	Core	26.93268	-82.16398	Oxyurostylis smithi	Crustacea	3
2	M-2	Int	Core	26.93268	-82.16398	Pectinaria gouldii	Polychaetea	3
2	M-2	Deep	Core	26.92967	-82.16723	Acteocina canaliculata	Mollusca	2
2	M-2	Deep	Core	26.92967	-82.16723	Gastropoda	Mollusca	2
2	M-2	Deep	Core	26.92967	-82.16723	Glycinde solitaria	Polychaetea	2
2	M-2	Deep	Core	26.92967	-82.16723	Tellina	Mollusca	2
2	M-2	Int	Core	26.93268	-82.16398	Acteocina canaliculata	Mollusca	2
2	M-2	Deep	Core	26.92967	-82.16723	Asychis elongata	Polychaetea	1
2	M-2	Deep	Core	26.92967	-82.16723	Athenaria	Echinodermata	1
2	M-2	Deep	Core	26.92967	-82.16723	Bittiolum varium	Mollusca	1
2	M-2	Deep	Core	26.92967	-82.16723	Bivalvia	Mollusca	1
2	M-2	Deep	Core	26.92967	-82.16723	Macoma tenta	Mollusca	1
2	M-2	Deep	Core	26.92967	-82.16723	Oligochaeta	Oligochaeta	1
2	M-2	Int	Core	26.93268	-82.16398	Diopatra cuprea	Polychaetea	1
2	M-2	Int	Core	26.93268	-82.16398	Gastropoda	Mollusca	1
2	M-2	Int	Core	26.93268	-82.16398	Heteromastus filiformis	Polychaetea	1
2	M-2	Int	Core	26.93268	-82.16398	Mulinia lateralis	Mollusca	1

2	M-2	Int	Core	26.93268	-82.16398	Xenanthura brevitelson	Crustacea	1
2	M-2	Int	Swp	26.93268	-82.16398	Acteocina canaliculata	Mollusca	45
2	M-2	Deep	Swp	26.92967	-82.16723	Astyris lunata	Mollusca	18
2	M-2	Int	Swp	26.93268	-82.16398	Gammarus	Crustacea	15
2	M-2	Int	Swp	26.93268	-82.16398	Astyris lunata	Mollusca	14
2	M-2	Int	Swp	26.93268	-82.16398	Penaeus	Crustacea	12
2	M-2	Deep	Swp	26.92967	-82.16723	Acteocina canaliculata	Mollusca	11
2	M-2	Deep	Swp	26.92967	-82.16723	Haminoea succinea	Mollusca	11
2	M-2	Deep	Swp	26.92967	-82.16723	Nudibranchia	Mollusca	11
2	M-2	Deep	Swp	26.92967	-82.16723	Vitrinellidae	Mollusca	11
2	M-2	Int	Swp	26.93268	-82.16398	Mulinia lateralis	Mollusca	11
2	M-2	Int	Swp	26.93268	-82.16398	Amygdalum papyrium	Mollusca	9
2	M-2	Int	Swp	26.93268	-82.16398	Bemlos	Crustacea	9
2	M-2	Int	Swp	26.93268	-82.16398	Erichsonella filiformis	Crustacea	9
2	M-2	Int	Swp	26.93268	-82.16398	Haminoea succinea	Mollusca	9
2	M-2	Deep	Swp	26.92967	-82.16723	Mulinia lateralis	Mollusca	7
2	M-2	Int	Swp	26.93268	-82.16398	Bittiolum varium	Mollusca	5
2	M-2	Deep	Swp	26.92967	-82.16723	Amygdalum papyrium	Mollusca	4
2	M-2	Deep	Swp	26.92967	-82.16723	Pectinaria gouldii	Polychaetea	4
2	M-2	Int	Swp	26.93268	-82.16398	Erichthonius brasiliensis	Crustacea	4
2	M-2	Deep	Swp	26.92967	-82.16723	Tellina	Mollusca	3
2	M-2	Int	Swp	26.93268	-82.16398	Bowmaniella floridana	Crustacea	3
2	M-2	Int	Swp	26.93268	-82.16398	Mysella planulata	Mollusca	3
2	M-2	Int	Swp	26.93268	-82.16398	Oedicerotidae	Crustacea	3
2	M-2	Deep	Swp	26.92967	-82.16723	Bittiolum varium	Mollusca	2
2	M-2	Deep	Swp	26.92967	-82.16723	Xanthidae	Crustacea	2
2	M-2	Int	Swp	26.93268	-82.16398	Caprellidae	Crustacea	2
2	M-2	Int	Swp	26.93268	-82.16398	Cyclaspis varians	Crustacea	2
2	M-2	Int	Swp	26.93268	-82.16398	Mysidopsis almyra	Crustacea	2
2	M-2	Deep	Swp	26.92967	-82.16723	Cyclaspis varians	Crustacea	1
2	M-2	Deep	Swp	26.92967	-82.16723	Glycinde solitaria	Polychaetea	1
2	M-2	Deep	Swp	26.92967	-82.16723	Laevicardium mortoni	Mollusca	1
2	M-2	Deep	Swp	26.92967	-82.16723	Penaeus	Crustacea	1
2	M-2	Int	Swp	26.93268	-82.16398	Boonea impressa	Mollusca	1
2	M-2	Int	Swp	26.93268	-82.16398	Glycinde solitaria	Polychaetea	1
2	M-2	Int	Swp	26.93268	-82.16398	Laevicardium mortoni	Mollusca	1
2	M-2	Int	Swp	26.93268	-82.16398	Nemertea	Nemertea	1
2	M-2	Int	Swp	26.93268	-82.16398	Pectinaria gouldii	Polychaetea	1
2	M-2	Int	Swp	26.93268	-82.16398	Xanthidae	Crustacea	1
4	M-4	Deep	Core	26.94170	-82.18702	Mysella planulata	Mollusca	21
4	M-4	Deep	Core	26.94170	-82.18702	Mulinia lateralis	Mollusca	20
4	M-4	Deep	Core	26.94170	-82.18702	Pectinaria gouldii	Polychaetea	8
4	M-4	Int	Core	26.94170	-82.18702	Mysella planulata	Mollusca	8
4	M-4	Int	Core	26.94170	-82.18702	Polymesoda caroliniana	Mollusca	8
4	M-4	Int	Core	26.94170	-82.18702	Erichsonella	Crustacea	5
4	M-4	Deep	Core	26.94170	-82.18702	Amygdalum papyrium	Mollusca	4
4	M-4	Int	Core	26.94170	-82.18702	Oligochaeta	Oligochaeta	4
4	M-4	Int	Core	26.94170	-82.18702	Amygdalum papyrium	Mollusca	3

4	M-4	Int	Core	26.94170	-82.18702	Bowmaniella floridana	Crustacea	3
4	M-4	Int	Core	26.94170	-82.18702	Cyathura polita	Crustacea	3
4	M-4	Deep	Core	26.94170	-82.18702	Cyclaspis varians	Crustacea	2
4	M-4	Int	Core	26.94170	-82.18702	Gastropoda	Mollusca	2
4	M-4	Int	Core	26.94170	-82.18702	Mulinia lateralis	Mollusca	2
4	M-4	Deep	Core	26.94170	-82.18702	Acteocina canaliculata	Mollusca	1
4	M-4	Deep	Core	26.94170	-82.18702	Neanthes succinea	Polychaetea	1
4	M-4	Deep	Core	26.94170	-82.18702	Nemertea sp. F	Nemertea	1
4	M-4	Deep	Core	26.94170	-82.18702	Spiochaetopterus costarum	Polychaetea	1
4	M-4	Deep	Core	26.94170	-82.18702	Turbonilla	Mollusca	1
4	M-4	Deep	Core	26.94170	-82.18702	Xenanthura brevitelson	Crustacea	1
4	M-4	Int	Core	26.94170	-82.18702	Astyris lunata	Mollusca	1
4	M-4	Int	Core	26.94170	-82.18702	Capitella capitata	Polychaetea	1
4	M-4	Int	Core	26.94170	-82.18702	Cyclaspis varians	Crustacea	1
4	M-4	Int	Core	26.94170	-82.18702	Gammarus	Crustacea	1
4	M-4	Int	Core	26.94170	-82.18702	Neanthes succinea	Polychaetea	1
4	M-4	Int	Core	26.94170	-82.18702	Nudibranchia	Mollusca	1
4	M-4	Int	Core	26.94170	-82.18702	Pectinaria gouldii	Polychaetea	1
4	M-4	Int	Core	26.94170	-82.18702	Tellina	Mollusca	1
4	M-4	Deep	Swp	26.94170	-82.18702	Mulinia lateralis	Mollusca	118
4	M-4	Deep	Swp	26.94170	-82.18702	Haminoea succinea	Mollusca	74
4	M-4	Int	Swp	26.94170	-82.18702	Mysella planulata	Mollusca	26
4	M-4	Deep	Swp	26.94170	-82.18702	Platyctenida	Ctenophora	14
4	M-4	Int	Swp	26.94170	-82.18702	Tagelus plebeius	Mollusca	14
4	M-4	Int	Swp	26.94170	-82.18702	Cyclaspis varians	Crustacea	13
4	M-4	Int	Swp	26.94170	-82.18702	Amygdalum papyrium	Mollusca	10
4	M-4	Int	Swp	26.94170	-82.18702	Bowmaniella floridana	Crustacea	10
4	M-4	Int	Swp	26.94170	-82.18702	Erichsonella filiformis	Crustacea	9
4	M-4	Int	Swp	26.94170	-82.18702	Mysidopsis almyra	Crustacea	9
4	M-4	Int	Swp	26.94170	-82.18702	Acteocina canaliculata	Mollusca	8
4	M-4	Deep	Swp	26.94170	-82.18702	Acteocina canaliculata	Mollusca	7
4	M-4	Int	Swp	26.94170	-82.18702	Oedicerotidae	Crustacea	7
4	M-4	Int	Swp	26.94170	-82.18702	Tellina	Mollusca	7
4	M-4	Deep	Swp	26.94170	-82.18702	Ampelisca	Crustacea	6
4	M-4	Deep	Swp	26.94170	-82.18702	Argissidae	Crustacea	6
4	M-4	Deep	Swp	26.94170	-82.18702	Cyclaspis varians	Crustacea	6
4	M-4	Deep	Swp	26.94170	-82.18702	Pectinaria gouldii	Polychaetea	6
4	M-4	Int	Swp	26.94170	-82.18702	Glycinde solitaria	Polychaetea	6
4	M-4	Int	Swp	26.94170	-82.18702	Mulinia lateralis	Mollusca	6
4	M-4	Deep	Swp	26.94170	-82.18702	Cyclostremiscus	Mollusca	5
4	M-4	Int	Swp	26.94170	-82.18702	Haminoea succinea	Mollusca	5
4	M-4	Deep	Swp	26.94170	-82.18702	Gastropoda	Mollusca	4
4	M-4	Deep	Swp	26.94170	-82.18702	Tellina versicolor	Mollusca	4
4	M-4	Int	Swp	26.94170	-82.18702	Capitella capitata	Polychaetea	4
4	M-4	Int	Swp	26.94170	-82.18702	Caprellidae	Crustacea	4
4	M-4	Int	Swp	26.94170	-82.18702	Limulus polyphemus	Polychaetea	4
4	M-4	Deep	Swp	26.94170	-82.18702	Amygdalum papyrium	Mollusca	3
4	M-4	Deep	Swp	26.94170	-82.18702	Oxyurostylis smithi	Crustacea	3

4	M-4	Deep	Swp	26.94170	-82.18702	Xanthidae	Crustacea	3
4	M-4	Int	Swp	26.94170	-82.18702	Pectinaria gouldii	Polychaetea	3
4	M-4	Deep	Swp	26.94170	-82.18702	Mysella planulata	Mollusca	2
4	M-4	Int	Swp	26.94170	-82.18702	Gammarus	Crustacea	2
4	M-4	Int	Swp	26.94170	-82.18702	Nemertea	Nemertea	2
4	M-4	Int	Swp	26.94170	-82.18702	Polymesoda caroliniana	Mollusca	2
4	M-4	Deep	Swp	26.94170	-82.18702	Astyris lunata	Mollusca	1
4	M-4	Deep	Swp	26.94170	-82.18702	Bemlos	Crustacea	1
4	M-4	Deep	Swp	26.94170	-82.18702	Caprellidae	Crustacea	1
4	M-4	Deep	Swp	26.94170	-82.18702	Laevicardium mortoni	Mollusca	1
4	M-4	Deep	Swp	26.94170	-82.18702	Mysidopsis almyra	Crustacea	1
4	M-4	Deep	Swp	26.94170	-82.18702	Streblospio benedicti	Polychaetea	1
4	M-4	Int	Swp	26.94170	-82.18702	Ampelisca	Crustacea	1
4	M-4	Int	Swp	26.94170	-82.18702	Argissidae	Crustacea	1
4	M-4	Int	Swp	26.94170	-82.18702	Astyris lunata	Mollusca	1
4	M-4	Int	Swp	26.94170	-82.18702	Bemlos	Crustacea	1
4	M-4	Int	Swp	26.94170	-82.18702	Laevicardium mortoni	Mollusca	1
4	M-4	Int	Swp	26.94170	-82.18702	Cyathura polita	Crustacea	1
4	M-4	Int	Swp	26.94170	-82.18702	Nudibranchia	Mollusca	1
4	M-4	Int	Swp	26.94170	-82.18702	Scolelepis texana	Polychaetea	1
4	M-4	Int	Swp	26.94170	-82.18702	Xenanthura brevitelson	Crustacea	1
6	M-6	Deep	Core	26.95818	-82.19550	Cyclaspis varians	Crustacea	17
6	M-6	Int	Core	26.95818	-82.19550	Oxyurostylis smithi	Crustacea	7
6	M-6	Deep	Core	26.95818	-82.19550	Pectinaria gouldii	Polychaetea	4
6	M-6	Int	Core	26.95818	-82.19550	Bivalvia	Mollusca	4
6	M-6	Deep	Core	26.95818	-82.19550	Ampelisca	Crustacea	2
6	M-6	Deep	Core	26.95818	-82.19550	Streblospio benedicti	Polychaetea	2
6	M-6	Int	Core	26.95818	-82.19550	Cyclaspis varians	Crustacea	2
6	M-6	Int	Core	26.95818	-82.19550	Glycinde solitaria	Polychaetea	2
6	M-6	Int	Core	26.95818	-82.19550	Tellina	Mollusca	2
6	M-6	Deep	Core	26.95818	-82.19550	Argissidae	Crustacea	1
6	M-6	Deep	Core	26.95818	-82.19550	Neanthes succinea	Polychaetea	1
6	M-6	Deep	Core	26.95818	-82.19550	Oxyurostylis smithi	Crustacea	1
6	M-6	Deep	Core	26.95818	-82.19550	Paraprionospio pinnata	Polychaetea	1
6	M-6	Deep	Core	26.95818	-82.19550	Rudilemboides naglei	Crustacea	1
6	M-6	Int	Core	26.95818	-82.19550	Acteocina canaliculata	Mollusca	1
6	M-6	Int	Core	26.95818	-82.19550	Amygdalum papyrium	Mollusca	1
6	M-6	Int	Core	26.95818	-82.19550	Paraprionospio pinnata	Polychaetea	1
6	M-6	Int	Core	26.95818	-82.19550	Pectinaria gouldii	Polychaetea	1
6	M-6	Int	Swp	26.95818	-82.19550	Amygdalum papyrium	Mollusca	93
6	M-6	Int	Swp	26.95818	-82.19550	Haminoea succinea	Mollusca	26
6	M-6	Deep	Swp	26.95818	-82.19550	Pectinaria gouldii	Polychaetea	25
6	M-6	Deep	Swp	26.95818	-82.19550	Cyclaspis varians	Crustacea	23
6	M-6	Int	Swp	26.95818	-82.19550	Cyclaspis varians	Crustacea	20
6	M-6	Deep	Swp	26.95818	-82.19550	Ampelisca	Crustacea	13
6	M-6	Int	Swp	26.95818	-82.19550	Caprellidae	Crustacea	11
6	M-6	Int	Swp	26.95818	-82.19550	Tellina	Mollusca	11
6	M-6	Int	Swp	26.95818	-82.19550	Tellina versicolor	Mollusca	8

6	M-6	Deep	Swp	26.95818	-82.19550	Oxyurostylis smithi	Crustacea	7
6	M-6	Int	Swp	26.95818	-82.19550	Pectinaria gouldii	Polychaetea	7
6	M-6	Int	Swp	26.95818	-82.19550	Assiminea succinea	Mollusca	5
6	M-6	Int	Swp	26.95818	-82.19550	Bemlos	Crustacea	5
6	M-6	Deep	Swp	26.95818	-82.19550	Cyclostremiscus	Mollusca	4
6	M-6	Deep	Swp	26.95818	-82.19550	Neanthes succinea	Polychaetea	4
6	M-6	Int	Swp	26.95818	-82.19550	Acteocina canaliculata	Mollusca	4
6	M-6	Int	Swp	26.95818	-82.19550	Bittiolum varium	Mollusca	4
6	M-6	Deep	Swp	26.95818	-82.19550	Glycinde solitaria	Polychaetea	3
6	M-6	Deep	Swp	26.95818	-82.19550	Tellina	Mollusca	3
6	M-6	Int	Swp	26.95818	-82.19550	Glycinde solitaria	Polychaetea	3
6	M-6	Int	Swp	26.95818	-82.19550	Mulinia lateralis	Mollusca	3
6	M-6	Deep	Swp	26.95818	-82.19550	Mulinia lateralis	Mollusca	2
6	M-6	Int	Swp	26.95818	-82.19550	Erichsonella filiformis	Crustacea	2
6	M-6	Int	Swp	26.95818	-82.19550	Mysella planulata	Mollusca	2
6	M-6	Int	Swp	26.95818	-82.19550	Polymesoda caroliniana	Mollusca	2
6	M-6	Deep	Swp	26.95818	-82.19550	Acteocina canaliculata	Mollusca	1
6	M-6	Deep	Swp	26.95818	-82.19550	Amygdalum papyrium	Mollusca	1
6	M-6	Deep	Swp	26.95818	-82.19550	Mysella planulata	Mollusca	1
6	M-6	Deep	Swp	26.95818	-82.19550	Nemertea	Nemertea	1
6	M-6	Deep	Swp	26.95818	-82.19550	Odostomia	Mollusca	1
6	M-6	Deep	Swp	26.95818	-82.19550	Paraprionospio pinnata	Polychaetea	1
6	M-6	Deep	Swp	26.95818	-82.19550	Tellina versicolor	Mollusca	1
6	M-6	Deep	Swp	26.95818	-82.19550	Turbonilla dalli	Mollusca	1
6	M-6	Int	Swp	26.95818	-82.19550	Laevicardium mortoni	Mollusca	1
6	M-6	Int	Swp	26.95818	-82.19550	Nemertea	Nemertea	1
6	M-6	Int	Swp	26.95818	-82.19550	Odostomia	Mollusca	1
6	M-6	Int	Swp	26.95818	-82.19550	Oedicerotidae	Crustacea	1
6	M-6	Int	Swp	26.95818	-82.19550	Penaeus	Crustacea	1
6	M-6	Int	Swp	26.95818	-82.19550	Tagelus plebeius	Mollusca	1
8	M-8	Deep	Core	26.96025	-82.21355	Cyclaspis varians	Crustacea	114
8	M-8	Deep	Core	26.96025	-82.21355	Amygdalum papyrium	Mollusca	7
8	M-8	Int	Core	26.96025	-82.21355	Cyclaspis varians	Crustacea	7
8	M-8	Deep	Core	26.96025	-82.21355	Oxyurostylis smithi	Crustacea	3
8	M-8	Int	Core	26.96025	-82.21355	Cyathura polita	Crustacea	3
8	M-8	Int	Core	26.96025	-82.21355	Tellina	Mollusca	3
8	M-8	Deep	Core	26.96025	-82.21355	Amakusanthura magnifica	Crustacea	2
8	M-8	Deep	Core	26.96025	-82.21355	Mysella planulata	Mollusca	2
8	M-8	Deep	Core	26.96025	-82.21355	Nemertea sp. F	Nemertea	2
8	M-8	Deep	Core	26.96025	-82.21355	Paraprionospio pinnata	Polychaetea	2
8	M-8	Deep	Core	26.96025	-82.21355	Bowmaniella floridana	Crustacea	1
8	M-8	Deep	Core	26.96025	-82.21355	Capitella capitata	Polychaetea	1
8	M-8	Deep	Core	26.96025	-82.21355	Glottidia pyramidata	Brachiopoda	1
8	M-8	Deep	Core	26.96025	-82.21355	Glycinde solitaria	Polychaetea	1
8	M-8	Deep	Core	26.96025	-82.21355	Cyathura polita	Crustacea	1
8	M-8	Deep	Core	26.96025	-82.21355	Mulinia lateralis	Mollusca	1
8	M-8	Deep	Core	26.96025	-82.21355	Neanthes succinea	Polychaetea	1
8	M-8	Deep	Core	26.96025	-82.21355	Polymesoda caroliniana	Mollusca	1

8	M-8	Int	Core	26.96025	-82.21355	Amakusanthura magnifica	Crustacea	1
8	M-8	Int	Core	26.96025	-82.21355	Glycinde solitaria	Polychaetea	1
8	M-8	Int	Core	26.96025	-82.21355	Grandidierella bonnieroides	Crustacea	1
8	M-8	Int	Core	26.96025	-82.21355	Pectinaria gouldii	Polychaetea	1
8	M-8	Int	Core	26.96025	-82.21355	Streblospio benedicti	Polychaetea	1
8	M-8	Int	Swp	26.96025	-82.21355	Tellina	Mollusca	95
8	M-8	Int	Swp	26.96025	-82.21355	Amygdalum papyrium	Mollusca	30
8	M-8	Int	Swp	26.96025	-82.21355	Streblospio benedicti	Polychaetea	21
8	M-8	Int	Swp	26.96025	-82.21355	Cyclaspis varians	Crustacea	20
8	M-8	Deep	Swp	26.96025	-82.21355	Tellina	Mollusca	18
8	M-8	Int	Swp	26.96025	-82.21355	Pectinaria gouldii	Polychaetea	15
8	M-8	Int	Swp	26.96025	-82.21355	Tagelus plebeius	Mollusca	12
8	M-8	Deep	Swp	26.96025	-82.21355	Cyclaspis varians	Crustacea	11
8	M-8	Deep	Swp	26.96025	-82.21355	Pectinaria gouldii	Polychaetea	7
8	M-8	Deep	Swp	26.96025	-82.21355	Mulinia lateralis	Mollusca	6
8	M-8	Deep	Swp	26.96025	-82.21355	Tagelus plebeius	Mollusca	6
8	M-8	Int	Swp	26.96025	-82.21355	Ampelisca	Crustacea	6
8	M-8	Int	Swp	26.96025	-82.21355	Haminoea succinea	Mollusca	6
8	M-8	Int	Swp	26.96025	-82.21355	Glycinde solitaria	Polychaetea	5
8	M-8	Deep	Swp	26.96025	-82.21355	Acteocina canaliculata	Mollusca	4
8	M-8	Deep	Swp	26.96025	-82.21355	Amygdalum papyrium	Mollusca	4
8	M-8	Deep	Swp	26.96025	-82.21355	Erichthonius brasiliensis	Crustacea	4
8	M-8	Deep	Swp	26.96025	-82.21355	Mysidopsis almyra	Crustacea	4
8	M-8	Int	Swp	26.96025	-82.21355	Oxyurostylis smithi	Crustacea	4
8	M-8	Deep	Swp	26.96025	-82.21355	Xanthidae	Crustacea	3
8	M-8	Int	Swp	26.96025	-82.21355	Edotea montosa	Crustacea	3
8	M-8	Int	Swp	26.96025	-82.21355	Mulinia lateralis	Mollusca	3
8	M-8	Int	Swp	26.96025	-82.21355	Mysidopsis almyra	Crustacea	3
8	M-8	Int	Swp	26.96025	-82.21355	Polymesoda caroliniana	Mollusca	3
8	M-8	Deep	Swp	26.96025	-82.21355	Bowmaniella floridana	Crustacea	2
8	M-8	Deep	Swp	26.96025	-82.21355	Haminoea succinea	Mollusca	2
8	M-8	Deep	Swp	26.96025	-82.21355	Oxyurostylis smithi	Crustacea	2
8	M-8	Int	Swp	26.96025	-82.21355	Mysella planulata	Mollusca	2
8	M-8	Deep	Swp	26.96025	-82.21355	Ampelisca	Crustacea	1
8	M-8	Deep	Swp	26.96025	-82.21355	Boonea impressa	Mollusca	1
8	M-8	Deep	Swp	26.96025	-82.21355	Gammarus	Crustacea	1
8	M-8	Deep	Swp	26.96025	-82.21355	Glycinde solitaria	Polychaetea	1
8	M-8	Deep	Swp	26.96025	-82.21355	Odostomia	Mollusca	1
8	M-8	Int	Swp	26.96025	-82.21355	Bittiolum varium	Mollusca	1
8	M-8	Int	Swp	26.96025	-82.21355	Cyathura polita	Crustacea	1
8	M-8	Int	Swp	26.96025	-82.21355	Rictaxis punctostriatus	Mollusca	1
10	M-10	Int	Core	26.86542	-82.23327	Cyclaspis varians	Crustacea	67
10	M-10	Deep	Core	26.86542	-82.23327	Cyclaspis varians	Crustacea	33
10	M-10	Int	Core	26.86542	-82.23327	Polymesoda caroliniana	Mollusca	18
10	M-10	Int	Core	26.86542	-82.23327	Pectinaria gouldii	Polychaetea	14
10	M-10	Int	Core	26.86542	-82.23327	Ampelisca	Crustacea	7
10	M-10	Int	Core	26.86542	-82.23327	Tellina	Mollusca	7
10	M-10	Deep	Core	26.86542	-82.23327	Tellina	Mollusca	6

10	M-10	Int	Core	26.86542	-82.23327	Oxyurostylis smithi	Crustacea	6
10	M-10	Int	Core	26.86542	-82.23327	Tagelus plebeius	Mollusca	5
10	M-10	Deep	Core	26.86542	-82.23327	Mysella planulata	Mollusca	4
10	M-10	Deep	Core	26.86542	-82.23327	Pectinaria gouldii	Polychaetea	4
10	M-10	Int	Core	26.86542	-82.23327	Cyathura polita	Crustacea	3
10	M-10	Int	Core	26.86542	-82.23327	Mysella planulata	Mollusca	3
10	M-10	Int	Core	26.86542	-82.23327	Oedicerotidae	Crustacea	3
10	M-10	Deep	Core	26.86542	-82.23327	Acteocina canaliculata	Mollusca	2
10	M-10	Deep	Core	26.86542	-82.23327	Amygdalum papyrium	Mollusca	2
10	M-10	Deep	Core	26.86542	-82.23327	Neanthes succinea	Polychaetea	2
10	M-10	Int	Core	26.86542	-82.23327	Amygdalum papyrium	Mollusca	2
10	M-10	Int	Core	26.86542	-82.23327	Neanthes succinea	Polychaetea	2
10	M-10	Deep	Core	26.86542	-82.23327	Ampelisca	Crustacea	1
10	M-10	Deep	Core	26.86542	-82.23327	Eulimastoma	Mollusca	1
10	M-10	Deep	Core	26.86542	-82.23327	Glycinde solitaria	Polychaetea	1
10	M-10	Int	Core	26.86542	-82.23327	Glycinde solitaria	Polychaetea	1
10	M-10	Int	Core	26.86542	-82.23327	Mulinia lateralis	Mollusca	1
10	M-10	Int	Core	26.86542	-82.23327	Scolelepis texana	Polychaetea	1
10	M-10	Int	Core	26.86542	-82.23327	Streblospio benedicti	Polychaetea	1
10	M-10	Deep	Swp	26.86542	-82.23327	Tellina	Mollusca	76
10	M-10	Deep	Swp	26.86542	-82.23327	Mulinia lateralis	Mollusca	52
10	M-10	Int	Swp	26.86542	-82.23327	Tellina	Mollusca	47
10	M-10	Int	Swp	26.86542	-82.23327	Tagelus plebeius	Mollusca	34
10	M-10	Deep	Swp	26.86542	-82.23327	Amygdalum papyrium	Mollusca	32
10	M-10	Deep	Swp	26.86542	-82.23327	Glycinde solitaria	Polychaetea	24
10	M-10	Deep	Swp	26.86542	-82.23327	Pectinaria gouldii	Polychaetea	21
10	M-10	Int	Swp	26.86542	-82.23327	Pectinaria gouldii	Polychaetea	18
10	M-10	Int	Swp	26.86542	-82.23327	Amygdalum papyrium	Mollusca	17
10	M-10	Int	Swp	26.86542	-82.23327	Oedicerotidae	Crustacea	17
10	M-10	Int	Swp	26.86542	-82.23327	Ampelisca	Crustacea	16
10	M-10	Int	Swp	26.86542	-82.23327	Polymesoda caroliniana	Mollusca	16
10	M-10	Deep	Swp	26.86542	-82.23327	Neanthes succinea	Polychaetea	7
10	M-10	Deep	Swp	26.86542	-82.23327	Paraprionospio pinnata	Polychaetea	6
10	M-10	Deep	Swp	26.86542	-82.23327	Acteocina canaliculata	Mollusca	4
10	M-10	Deep	Swp	26.86542	-82.23327	Ampelisca	Crustacea	4
10	M-10	Deep	Swp	26.86542	-82.23327	Mysella planulata	Mollusca	4
10	M-10	Int	Swp	26.86542	-82.23327	Glycinde solitaria	Polychaetea	4
10	M-10	Deep	Swp	26.86542	-82.23327	Nemertea	Nemertea	3
10	M-10	Deep	Swp	26.86542	-82.23327	Tagelus plebeius	Mollusca	3
10	M-10	Deep	Swp	26.86542	-82.23327	Xanthidae	Crustacea	3
10	M-10	Int	Swp	26.86542	-82.23327	Acteocina canaliculata	Mollusca	3
10	M-10	Int	Swp	26.86542	-82.23327	Capitella capitata	Polychaetea	**3**
10	M-10	Int	Swp	26.86542	-82.23327	Grandidierella bonnieroides	Crustacea	3
10	M-10	Int	Swp	26.86542	-82.23327	Nemertea	Nemertea	3
10	M-10	Deep	Swp	26.86542	-82.23327	Grandidierella bonnieroides	Crustacea	2
10	M-10	Deep	Swp	26.86542	-82.23327	Cyathura polita	Crustacea	2
10	M-10	Deep	Swp	26.86542	-82.23327	Mysidopsis almyra	Crustacea	2
10	M-10	Deep	Swp	26.86542	-82.23327	Polymesoda caroliniana	Mollusca	2

10	M-10	Int	Swp	26.86542	-82.23327	Erichsonella filiformis	Crustacea	2
10	M-10	Int	Swp	26.86542	-82.23327	Cyathura polita	Crustacea	2
10	M-10	Int	Swp	26.86542	-82.23327	Mulinia lateralis	Mollusca	2
10	M-10	Deep	Swp	26.86542	-82.23327	Edotea montosa	Crustacea	1
10	M-10	Deep	Swp	26.86542	-82.23327	Erichsonella filiformis	Crustacea	1
10	M-10	Deep	Swp	26.86542	-82.23327	Glycera	Polychaetea	1
10	M-10	Deep	Swp	26.86542	-82.23327	Streblospio benedicti	Polychaetea	1
10	M-10	Int	Swp	26.86542	-82.23327	Edotea montosa	Crustacea	**1**
10	M-10	Int	Swp	26.86542	-82.23327	Gammarus	Crustacea	1
10	M-10	Int	Swp	26.86542	-82.23327	Neanthes succinea	Polychaetea	1
10	M-10	Int	Swp	26.86542	-82.23327	Streblospio benedicti	Polychaetea	1
12	M-12	Deep	Core	26.98353	-82.23447	Cyclaspis varians	Crustacea	18
12	M-12	Int	Core	26.98353	-82.23447	Tagelus plebeius	Mollusca	10
12	M-12	Int	Core	26.98353	-82.23447	Cyclaspis varians	Crustacea	9
12	M-12	Int	Core	26.98353	-82.23447	Pectinaria gouldii	Polychaetea	8
12	M-12	Int	Core	26.98353	-82.23447	Tellina	Mollusca	6
12	M-12	Deep	Core	26.98353	-82.23447	Ampelisca	Crustacea	5
12	M-12	Int	Core	26.98353	-82.23447	Hydrobiidae	Mollusca	5
12	M-12	Deep	Core	26.98353	-82.23447	Tellina	Mollusca	3
12	M-12	Int	Core	26.98353	-82.23447	Mysella planulata	Mollusca	3
12	M-12	Int	Core	26.98353	-82.23447	Polymesoda caroliniana	Mollusca	3
12	M-12	Int	Core	26.98353	-82.23447	Streblospio benedicti	Polychaetea	3
12	M-12	Int	Core	26.98353	-82.23447	Amygdalum papyrium	Mollusca	2
12	M-12	Int	Core	26.98353	-82.23447	Talitridae	Crustacea	2
12	M-12	Deep	Core	26.98353	-82.23447	Amygdalum papyrium	Mollusca	1
12	M-12	Deep	Core	26.98353	-82.23447	Nemertea	Nemertea	1
12	M-12	Deep	Core	26.98353	-82.23447	Pectinaria gouldii	Polychaetea	1
12	M-12	Int	Core	26.98353	-82.23447	Bemlos	Crustacea	1
12	M-12	Int	Core	26.98353	-82.23447	Glycinde solitaria	Polychaetea	1
12	M-12	Int	Core	26.98353	-82.23447	Laeonereis culveri	Polychaetea	1
12	M-12	Int	Core	26.98353	-82.23447	Cyathura polita	Crustacea	1
12	M-12	Deep	Core	26.98353	-82.23447	Coelotanypus	Insecta	1
12	M-12	Int	Swp	26.98353	-82.23447	Polymesoda caroliniana	Mollusca	60
12	M-12	Int	Swp	26.98353	-82.23447	Cyclaspis varians	Crustacea	30
12	M-12	Int	Swp	26.98353	-82.23447	Mysidopsis almyra	Crustacea	30
12	M-12	Deep	Swp	26.98353	-82.23447	Tellina	Mollusca	27
12	M-12	Int	Swp	26.98353	-82.23447	Amygdalum papyrium	Mollusca	27
12	M-12	Int	Swp	26.98353	-82.23447	Oxyurostylis smithi	Crustacea	26
12	M-12	Int	Swp	26.98353	-82.23447	Tagelus plebeius	Mollusca	25
12	M-12	Deep	Swp	26.98353	-82.23447	Cyclaspis varians	Crustacea	24
12	M-12	Int	Swp	26.98353	-82.23447	Hydrobiidae	Mollusca	21
12	M-12	Deep	Swp	26.98353	-82.23447	Ampelisca	Crustacea	15
12	M-12	Int	Swp	26.98353	-82.23447	Edotea montosa	Crustacea	12
12	M-12	Int	Swp	26.98353	-82.23447	Tellina	Mollusca	12
12	M-12	Deep	Swp	26.98353	-82.23447	Pectinaria gouldii	Polychaetea	9
12	M-12	Int	Swp	26.98353	-82.23447	Xanthidae	Crustacea	9
12	M-12	Int	Swp	26.98353	-82.23447	Caprellidae	Crustacea	8
12	M-12	Deep	Swp	26.98353	-82.23447	Glycinde solitaria	Polychaetea	6

12	M-12	Deep	Swp	26.98353	-82.23447	Mulinia lateralis	Mollusca	6
12	M-12	Deep	Swp	26.98353	-82.23447	Paraprionospio pinnata	Polychaetea	6
12	M-12	Deep	Swp	26.98353	-82.23447	Xanthidae	Crustacea	6
12	M-12	Int	Swp	26.98353	-82.23447	Ampelisca	Crustacea	6
12	M-12	Int	Swp	26.98353	-82.23447	Gammarus	Crustacea	6
12	M-12	Deep	Swp	26.98353	-82.23447	Acteocina canaliculata	Mollusca	5
12	M-12	Deep	Swp	26.98353	-82.23447	Mysella planulata	Mollusca	5
12	M-12	Int	Swp	26.98353	-82.23447	Erichsonella filiformis	Crustacea	5
12	M-12	Deep	Swp	26.98353	-82.23447	Neanthes succinea	Polychaetea	4
12	M-12	Int	Swp	26.98353	-82.23447	Cyathura polita	Crustacea	4
12	M-12	Int	Swp	26.98353	-82.23447	Glycinde solitaria	Polychaetea	3
12	M-12	Int	Swp	26.98353	-82.23447	Capitella capitata	Polychaetea	2
12	M-12	Int	Swp	26.98353	-82.23447	Grandidierella bonnieroides	Crustacea	2
12	M-12	Deep	Swp	26.98353	-82.23447	Amygdalum papyrium	Mollusca	1
12	M-12	Deep	Swp	26.98353	-82.23447	Hydrobiidae	Mollusca	1
12	M-12	Deep	Swp	26.98353	-82.23447	Nemertea	Nemertea	1
12	M-12	Deep	Swp	26.98353	-82.23447	Odostomia	Mollusca	1
12	M-12	Deep	Swp	26.98353	-82.23447	Oxyurostylis smithi	Crustacea	1
12	M-12	Int	Swp	26.98353	-82.23447	Eteone heteropoda	Polychaetea	1
12	M-12	Int	Swp	26.98353	-82.23447	Neanthes succinea	Polychaetea	1
12	M-12	Int	Swp	26.98353	-82.23447	Osteichthyes	Osteichthyes	1
14	M-14	Deep	Core	26.99917	-82.24472	Ampelisca	Crustacea	12
14	M-14	Int	Core	26.99917	-82.24472	Tellina	Mollusca	6
14	M-14	Int	Core	26.99917	-82.24472	Cyathura polita	Crustacea	4
14	M-14	Int	Core	26.99917	-82.24472	Tagelus plebeius	Mollusca	4
14	M-14	Deep	Core	26.99917	-82.24472	Streblospio benedicti	Polychaetea	3
14	M-14	Int	Core	26.99917	-82.24472	Polymesoda caroliniana	Mollusca	3
14	M-14	Int	Core	26.99917	-82.24472	Ampelisca	Crustacea	2
14	M-14	Deep	Core	26.99917	-82.24472	Glycinde solitaria	Polychaetea	1
14	M-14	Deep	Core	26.99917	-82.24472	Grandidierella bonnieroides	Crustacea	1
14	M-14	Deep	Core	26.99917	-82.24472	Nemertea	Nemertea	1
14	M-14	Deep	Core	26.99917	-82.24472	Oligochaeta	Oligochaeta	1
14	M-14	Int	Core	26.99917	-82.24472	Amygdalum papyrium	Mollusca	1
14	M-14	Int	Core	26.99917	-82.24472	Cyclaspis varians	Crustacea	1
14	M-14	Int	Core	26.99917	-82.24472	Scolelepis texana	Polychaetea	1
14	M-14	Int	Core	26.99917	-82.24472	Streblospio benedicti	Polychaetea	1
14	M-14	Deep	Core	26.99917	-82.24472	Cladotanytarsus cf. davies	Insecta	1
14	M-14	Int	Swp	26.99917	-82.24472	Hydrobiidae	Mollusca	473
14	M-14	Int	Swp	26.99917	-82.24472	Polymesoda caroliniana	Mollusca	118
14	M-14	Int	Swp	26.99917	-82.24472	Tagelus plebeius	Mollusca	25
14	M-14	Int	Swp	26.99917	-82.24472	Amygdalum papyrium	Mollusca	22
14	M-14	Deep	Swp	26.99917	-82.24472	Glycinde solitaria	Polychaetea	16
14	M-14	Deep	Swp	26.99917	-82.24472	Tellina	Mollusca	15
14	M-14	Deep	Swp	26.99917	-82.24472	Coelotanypus	Insecta	14
14	M-14	Deep	Swp	26.99917	-82.24472	Xanthidae	Crustacea	13
14	M-14	Int	Swp	26.99917	-82.24472	Tellina	Mollusca	11
14	M-14	Deep	Swp	26.99917	-82.24472	Streblospio benedicti	Polychaetea	7
14	M-14	Int	Swp	26.99917	-82.24472	Pectinaria gouldii	Polychaetea	7

14	M-14	Int	Swp	26.99917	-82.24472	Xanthidae	Crustacea	7
14	M-14	Deep	Swp	26.99917	-82.24472	Neanthes succinea	Polychaetea	6
14	M-14	Int	Swp	26.99917	-82.24472	Ampelisca	Crustacea	6
14	M-14	Int	Swp	26.99917	-82.24472	Oxyurostylis smithi	Crustacea	6
14	M-14	Int	Swp	26.99917	-82.24472	Bowmaniella floridana	Crustacea	5
14	M-14	Int	Swp	26.99917	-82.24472	Caprellidae	Crustacea	5
14	M-14	Int	Swp	26.99917	-82.24472	Gammarus	Crustacea	5
14	M-14	Int	Swp	26.99917	-82.24472	Streblospio benedicti	Polychaetea	5
14	M-14	Deep	Swp	26.99917	-82.24472	Acteocina canaliculata	Mollusca	4
14	M-14	Deep	Swp	26.99917	-82.24472	Tellina versicolor	Mollusca	4
14	M-14	Deep	Swp	26.99917	-82.24472	Mysidopsis almyra	Crustacea	3
14	M-14	Deep	Swp	26.99917	-82.24472	Nemertea	Nemertea	3
14	M-14	Deep	Swp	26.99917	-82.24472	Paraprionospio pinnata	Polychaetea	3
14	M-14	Int	Swp	26.99917	-82.24472	Grandidierella bonnieroides	Crustacea	3
14	M-14	Int	Swp	26.99917	-82.24472	Cyathura polita	Crustacea	3
14	M-14	Int	Swp	26.99917	-82.24472	Neanthes succinea	Polychaetea	3
14	M-14	Int	Swp	26.99917	-82.24472	Oedicerotidae	Crustacea	3
14	M-14	Deep	Swp	26.99917	-82.24472	Pectinaria gouldii	Polychaetea	2
14	M-14	Int	Swp	26.99917	-82.24472	Glycinde solitaria	Polychaetea	2
14	M-14	Deep	Swp	26.99917	-82.24472	Ampelisca	Crustacea	1
14	M-14	Deep	Swp	26.99917	-82.24472	Caprellidae	Crustacea	1
14	M-14	Deep	Swp	26.99917	-82.24472	Cyclaspis varians	Crustacea	1
14	M-14	Deep	Swp	26.99917	-82.24472	Grandidierella bonnieroides	Crustacea	1
14	M-14	Deep	Swp	26.99917	-82.24472	Cyathura polita	Crustacea	1
14	M-14	Deep	Swp	26.99917	-82.24472	Tagelus plebeius	Mollusca	1
14	M-14	Int	Swp	26.99917	-82.24472	Capitella capitata	Polychaetea	1
14	M-14	Int	Swp	26.99917	-82.24472	Eteone heteropoda	Polychaetea	1
14	M-14	Int	Swp	26.99917	-82.24472	Nemertea	Nemertea	1
14	M-14	Int	Swp	26.99917	-82.24472	Osteichthyes	Osteichthyes	1
14	M-14	Int	Swp	26.99917	-82.24472	Rictaxis punctostriatus	Mollusca	1
16	M-16	Int	Core	27.00475	-82.25987	Grandidierella bonnieroides	Crustacea	43
16	M-16	Deep	Core	27.00475	-82.25987	Polymesoda caroliniana	Mollusca	41
16	M-16	Int	Core	27.00475	-82.25987	Polymesoda caroliniana	Mollusca	36
16	M-16	Int	Core	27.00475	-82.25987	Hydrobiidae	Mollusca	22
16	M-16	Deep	Core	27.00475	-82.25987	Grandidierella bonnieroides	Crustacea	16
16	M-16	Int	Core	27.00475	-82.25987	Cyclaspis pustulata	Crustacea	16
16	M-16	Deep	Core	27.00475	-82.25987	Neanthes succinea	Polychaetea	10
16	M-16	Deep	Core	27.00475	-82.25987	Corophium	Crustacea	4
16	M-16	Deep	Core	27.00475	-82.25987	Gitanopsis laguna	Crustacea	4
16	M-16	Deep	Core	27.00475	-82.25987	Xanthidae	Crustacea	4
16	M-16	Deep	Core	27.00475	-82.25987	Cyclaspis pustulata	Crustacea	3
16	M-16	Deep	Core	27.00475	-82.25987	Tellina	Mollusca	3
16	M-16	Int	Core	27.00475	-82.25987	Edotea montosa	Crustacea	3
16	M-16	Int	Core	27.00475	-82.25987	Laeonereis culveri	Polychaetea	3
16	M-16	Int	Core	27.00475	-82.25987	Nemertea	Nemertea	3
16	M-16	Int	Core	27.00475	-82.25987	Tellina	Mollusca	3
16	M-16	Int	Core	27.00475	-82.25987	Cyathura polita	Crustacea	2
16	M-16	Int	Core	27.00475	-82.25987	Streblospio benedicti	Polychaetea	2

16	M-16	Int	Core	27.00475	-82.25987	Tagelus plebeius	Mollusca	2
16	M-16	Deep	Core	27.00475	-82.25987	Bivalvia	Mollusca	1
16	M-16	Deep	Core	27.00475	-82.25987	Cyathura polita	Crustacea	1
16	M-16	Deep	Core	27.00475	-82.25987	Mysidopsis almyra	Crustacea	1
16	M-16	Deep	Core	27.00475	-82.25987	Pectinaria gouldii	Polychaetea	1
16	M-16	Deep	Core	27.00475	-82.25987	Tagelus plebeius	Mollusca	1
16	M-16	Int	Core	27.00475	-82.25987	Ampelisca	Crustacea	1
16	M-16	Int	Core	27.00475	-82.25987	Bivalvia	Mollusca	1
16	M-16	Int	Core	27.00475	-82.25987	Gastropoda	Mollusca	1
16	M-16	Int	Core	27.00475	-82.25987	Neanthes succinea	Polychaetea	1
16	M-16	Int	Core	27.00475	-82.25987	Pectinaria gouldii	Polychaetea	1
16	M-16	Int	Core	27.00475	-82.25987	Tellina alternata	Mollusca	1
16	M-16	Int	Core	27.00475	-82.25987	Cryptochironomus	Insecta	1
16	M-16	Int	Swp	27.00475	-82.25987	Hydrobiidae	Mollusca	347
16	M-16	Int	Swp	27.00475	-82.25987	Polymesoda caroliniana	Mollusca	114
16	M-16	Deep	Swp	27.00475	-82.25987	Polymesoda caroliniana	Mollusca	27
16	M-16	Deep	Swp	27.00475	-82.25987	Grandidierella bonnieroides	Crustacea	25
16	M-16	Deep	Swp	27.00475	-82.25987	Mysidopsis almyra	Crustacea	24
16	M-16	Deep	Swp	27.00475	-82.25987	Xanthidae	Crustacea	10
16	M-16	Int	Swp	27.00475	-82.25987	Mysidopsis almyra	Crustacea	7
16	M-16	Int	Swp	27.00475	-82.25987	Gammarus	Crustacea	5
16	M-16	Deep	Swp	27.00475	-82.25987	Cyclaspis varians	Crustacea	4
16	M-16	Int	Swp	27.00475	-82.25987	Xanthidae	Crustacea	4
16	M-16	Deep	Swp	27.00475	-82.25987	Tellina	Mollusca	3
16	M-16	Int	Swp	27.00475	-82.25987	Grandidierella bonnieroides	Crustacea	3
16	M-16	Int	Swp	27.00475	-82.25987	Odostomia	Mollusca	2
16	M-16	Deep	Swp	27.00475	-82.25987	Edotea montosa	Crustacea	1
16	M-16	Deep	Swp	27.00475	-82.25987	Neanthes succinea	Polychaetea	1
16	M-16	Deep	Swp	27.00475	-82.25987	Tellina versicolor	Mollusca	1
16	M-16	Int	Swp	27.00475	-82.25987	Amygdalum papyrium	Mollusca	1
16	M-16	Int	Swp	27.00475	-82.25987	Corophium	Crustacea	1
18	M-18	Deep	Core	27.01793	-82.27163	Grandidierella bonnieroides	Crustacea	16
18	M-18	Int	Core	27.01793	-82.27163	Laeonereis culveri	Polychaetea	15
18	M-18	Int	Core	27.01793	-82.27163	Grandidierella bonnieroides	Crustacea	6
18	M-18	Deep	Core	27.01793	-82.27163	Laeonereis culveri	Polychaetea	3
18	M-18	Int	Core	27.01793	-82.27163	Polymesoda caroliniana	Mollusca	3
18	M-18	Int	Core	27.01793	-82.27163	Tagelus plebeius	Mollusca	3
18	M-18	Deep	Core	27.01793	-82.27163	Corophium	Crustacea	2
18	M-18	Deep	Core	27.01793	-82.27163	Cyclaspis varians	Crustacea	2
18	M-18	Deep	Core	27.01793	-82.27163	Polymesoda caroliniana	Mollusca	2
18	M-18	Deep	Core	27.01793	-82.27163	Tellina	Mollusca	2
18	M-18	Int	Core	27.01793	-82.27163	Almyracuma nr. proximoculae	Crustacea	2
18	M-18	Deep	Core	27.01793	-82.27163	Edotea montosa	Crustacea	1
18	M-18	Deep	Core	27.01793	-82.27163	Streblospio benedicti	Polychaetea	1
18	M-18	Deep	Core	27.01793	-82.27163	Tagelus plebeius	Mollusca	1
18	M-18	Deep	Core	27.01793	-82.27163	Xanthidae	Crustacea	1
18	M-18	Int	Core	27.01793	-82.27163	Cyclaspis pustulata	Crustacea	1
18	M-18	Int	Core	27.01793	-82.27163	Eteone heteropoda	Polychaetea	1

18	M-18	Int	Core	27.01793	-82.27163	Cyathura polita	Crustacea	1
18	M-18	Int	Core	27.01793	-82.27163	Streblospio benedicti	Polychaetea	1
18	M-18	Int	Swp	27.01793	-82.27163	Hydrobiidae	Mollusca	418
18	M-18	Int	Swp	27.01793	-82.27163	Laeonereis culveri	Polychaetea	34
18	M-18	Deep	Swp	27.01793	-82.27163	Polymesoda caroliniana	Mollusca	27
18	M-18	Int	Swp	27.01793	-82.27163	Polymesoda caroliniana	Mollusca	26
18	M-18	Int	Swp	27.01793	-82.27163	Cyclaspis varians	Crustacea	10
18	M-18	Deep	Swp	27.01793	-82.27163	Laeonereis culveri	Polychaetea	8
18	M-18	Int	Swp	27.01793	-82.27163	Xanthidae	Crustacea	7
18	M-18	Int	Swp	27.01793	-82.27163	Corophium	Crustacea	6
18	M-18	Deep	Swp	27.01793	-82.27163	Edotea montosa	Crustacea	5
18	M-18	Deep	Swp	27.01793	-82.27163	Cyathura polita	Crustacea	5
18	M-18	Int	Swp	27.01793	-82.27163	Edotea montosa	Crustacea	5
18	M-18	Int	Swp	27.01793	-82.27163	Mysidopsis almyra	Crustacea	5
18	M-18	Deep	Swp	27.01793	-82.27163	Hydrobiidae	Mollusca	4
18	M-18	Deep	Swp	27.01793	-82.27163	Rangia cuneata	Mollusca	4
18	M-18	Int	Swp	27.01793	-82.27163	Cyathura polita	Crustacea	4
18	M-18	Deep	Swp	27.01793	-82.27163	Corophium	Crustacea	2
18	M-18	Deep	Swp	27.01793	-82.27163	Streblospio benedicti	Polychaetea	2
18	M-18	Deep	Swp	27.01793	-82.27163	Tellina versicolor	Mollusca	2
18	M-18	Int	Swp	27.01793	-82.27163	Amphicteis gunneri	Polychaetea	2
18	M-18	Int	Swp	27.01793	-82.27163	Pectinaria gouldii	Polychaetea	2
18	M-18	Int	Swp	27.01793	-82.27163	Streblospio benedicti	Polychaetea	2
18	M-18	Deep	Swp	27.01793	-82.27163	Neanthes succinea	Polychaetea	1
18	M-18	Deep	Swp	27.01793	-82.27163	Platyhelminthes	Platyhelminthes	1
18	M-18	Deep	Swp	27.01793	-82.27163	Tellina	Mollusca	1
18	M-18	Int	Swp	27.01793	-82.27163	Amygdalum papyrium	Mollusca	1
18	M-18	Int	Swp	27.01793	-82.27163	Corbicula fluminea	Mollusca	1
18	M-18	Int	Swp	27.01793	-82.27163	Odostomia	Mollusca	1
18	M-18	Int	Swp	27.01793	-82.27163	Osteichthyes	Osteichthyes	1
18	M-18	Int	Swp	27.01793	-82.27163	Rangia cuneata	Mollusca	1
20	M-20	Deep	Core	27.03203	-82.27742	Grandidierella bonnieroides	Crustacea	39
20	M-20	Deep	Core	27.03203	-82.27742	Polymesoda caroliniana	Mollusca	30
20	M-20	Int	Core	27.03160	-82.27760	Grandidierella bonnieroides	Crustacea	6
20	M-20	Deep	Core	27.03203	-82.27742	Streblospio benedicti	Polychaetea	4
20	M-20	Int	Core	27.03160	-82.27760	Cyathura polita	Crustacea	4
20	M-20	Int	Core	27.03160	-82.27760	Laeonereis culveri	Polychaetea	3
20	M-20	Deep	Core	27.03203	-82.27742	Gitanopsis laguna	Crustacea	2
20	M-20	Deep	Core	27.03203	-82.27742	Laeonereis culveri	Polychaetea	2
20	M-20	Int	Core	27.03160	-82.27760	Polymesoda caroliniana	Mollusca	2
20	M-20	Deep	Core	27.03203	-82.27742	Amygdalum papyrium	Mollusca	1
20	M-20	Deep	Core	27.03203	-82.27742	Capitellidae	Polychaetea	1
20	M-20	Deep	Core	27.03203	-82.27742	Corophium	Crustacea	1
20	M-20	Deep	Core	27.03203	-82.27742	Cyathura polita	Crustacea	1
20	M-20	Deep	Core	27.03203	-82.27742	Pectinaria gouldii	Polychaetea	1
20	M-20	Deep	Core	27.03203	-82.27742	Platyhelminthes	Platyhelminthes	1
20	M-20	Deep	Core	27.03203	-82.27742	Tellina	Mollusca	1
20	M-20	Deep	Core	27.03203	-82.27742	Xanthidae	Crustacea	1

20	M-20	Int	Core	27.03160	-82.27760	Hydrobiidae	Mollusca	1
20	M-20	Int	Core	27.03160	-82.27760	Neanthes succinea	Polychaetea	1
20	M-20	Int	Swp	27.03160	-82.27760	Hydrobiidae	Mollusca	477
20	M-20	Int	Swp	27.03160	-82.27760	Polymesoda caroliniana	Mollusca	62
20	M-20	Deep	Swp	27.03203	-82.27742	Grandidierella bonnieroides	Crustacea	24
20	M-20	Deep	Swp	27.03203	-82.27742	Polymesoda caroliniana	Mollusca	19
20	M-20	Deep	Swp	27.03203	-82.27742	Mysidopsis almyra	Crustacea	14
20	M-20	Int	Swp	27.03160	-82.27760	Streblospio benedicti	Polychaetea	9
20	M-20	Deep	Swp	27.03203	-82.27742	Xanthidae	Crustacea	7
20	M-20	Int	Swp	27.03160	-82.27760	Xanthidae	Crustacea	6
20	M-20	Int	Swp	27.03160	-82.27760	Edotea montosa	Crustacea	4
20	M-20	Int	Swp	27.03160	-82.27760	Taphromysis louisianae	Crustacea	4
20	M-20	Deep	Swp	27.03203	-82.27742	Corophium	Crustacea	3
20	M-20	Deep	Swp	27.03203	-82.27742	Cyathura polita	Crustacea	3
20	M-20	Deep	Swp	27.03203	-82.27742	Rangia cuneata	Mollusca	3
20	M-20	Int	Swp	27.03160	-82.27760	Caridea	Crustacea	3
20	M-20	Int	Swp	27.03160	-82.27760	Exosphaeroma diminuta	Crustacea	3
20	M-20	Deep	Swp	27.03203	-82.27742	Edotea montosa	Crustacea	2
20	M-20	Deep	Swp	27.03203	-82.27742	Streblospio benedicti	Polychaetea	2
20	M-20	Int	Swp	27.03160	-82.27760	Corophium	Crustacea	2
20	M-20	Int	Swp	27.03160	-82.27760	Mysidopsis almyra	Crustacea	2
20	M-20	Int	Swp	27.03160	-82.27760	Osteichthyes	Osteichthyes	1
20	M-20	Int	Swp	27.03160	-82.27760	Platyhelminthes	Platyhelminthes	1
22	M-22	Deep	Core	27.04355	-82.29033	Grandidierella bonnieroides	Crustacea	62
22	M-22	Deep	Core	27.04355	-82.29033	Hydrobiidae	Mollusca	31
22	M-22	Deep	Core	27.04355	-82.29033	Corophium	Crustacea	24
22	M-22	Deep	Core	27.04355	-82.29033	Streblospio benedicti	Polychaetea	9
22	M-22	Int	Core	27.04297	-82.29033	Grandidierella bonnieroides	Crustacea	6
22	M-22	Int	Core	27.04297	-82.29033	Laeonereis culveri	Polychaetea	5
22	M-22	Deep	Core	27.04355	-82.29033	Edotea montosa	Crustacea	3
22	M-22	Deep	Core	27.04355	-82.29033	Xanthidae	Crustacea	3
22	M-22	Deep	Core	27.04355	-82.29033	Amphicteis gunneri	Polychaetea	2
22	M-22	Deep	Core	27.04355	-82.29033	Cyathura polita	Crustacea	1
22	M-22	Deep	Core	27.04355	-82.29033	Rangia cuneata	Mollusca	1
22	M-22	Int	Core	27.04297	-82.29033	Hydrobiidae	Mollusca	1
22	M-22	Int	Core	27.04297	-82.29033	Cyathura polita	Crustacea	1
22	M-22	Int	Core	27.04297	-82.29033	Polymesoda caroliniana	Mollusca	1
22	M-22	Int	Core	27.04297	-82.29033	Xanthidae	Crustacea	1
22	M-22	Int	Core	27.04297	-82.29033	Cryptochironomus	Insecta	1
22	M-22	Int	Swp	27.04297	-82.29033	Hydrobiidae	Mollusca	142
22	M-22	Deep	Swp	27.04355	-82.29033	Corophium	Crustacea	30
22	M-22	Int	Swp	27.04297	-82.29033	Polymesoda caroliniana	Mollusca	27
22	M-22	Int	Swp	27.04297	-82.29033	Streblospio benedicti	Polychaetea	21
22	M-22	Deep	Swp	27.04355	-82.29033	Xanthidae	Crustacea	12
22	M-22	Deep	Swp	27.04355	-82.29033	Hydrobiidae	Mollusca	8
22	M-22	Int	Swp	27.04297	-82.29033	Xanthidae	Crustacea	8
22	M-22	Deep	Swp	27.04355	-82.29033	Edotea montosa	Crustacea	5
22	M-22	Int	Swp	27.04297	-82.29033	Taphromysis louisianae	Crustacea	4

22	M-22	Deep	Swp	27.04355	-82.29033	Streblospio benedicti	Polychaetea	3
22	M-22	Deep	Swp	27.04355	-82.29033	Laeonereis culveri	Polychaetea	2
22	M-22	Deep	Swp	27.04355	-82.29033	Tellina	Mollusca	2
22	M-22	Int	Swp	27.04297	-82.29033	Caridea	Crustacea	2
22	M-22	Int	Swp	27.04297	-82.29033	Edotea montosa	Crustacea	2
22	M-22	Deep	Swp	27.04355	-82.29033	Amphicteis gunneri	Polychaetea	1
22	M-22	Deep	Swp	27.04355	-82.29033	Amygdalum papyrium	Mollusca	1
22	M-22	Deep	Swp	27.04355	-82.29033	Hourstonius laguna	Crustacea	1
22	M-22	Deep	Swp	27.04355	-82.29033	Mysidopsis almyra	Crustacea	1
22	M-22	Deep	Swp	27.04355	-82.29033	Polydora	Polychaetea	1
22	M-22	Deep	Swp	27.04355	-82.29033	Polymesoda caroliniana	Mollusca	1
24	M-24	Deep	Core	27.05333	-82.29800	Grandidierella bonnieroides	Crustacea	36
24	M-24	Int	Core	27.05333	-82.29800	Corophium	Crustacea	33
24	M-24	Int	Core	27.05333	-82.29800	Grandidierella bonnieroides	Crustacea	26
24	M-24	Deep	Core	27.05333	-82.29800	Hydrobiidae	Mollusca	15
24	M-24	Deep	Core	27.05333	-82.29800	Corophium	Crustacea	14
24	M-24	Int	Core	27.05333	-82.29800	Laeonereis culveri	Polychaetea	8
24	M-24	Deep	Core	27.05333	-82.29800	Laeonereis culveri	Polychaetea	3
24	M-24	Int	Core	27.05333	-82.29800	Cyathura polita	Crustacea	3
24	M-24	Deep	Core	27.05333	-82.29800	Edotea montosa	Crustacea	2
24	M-24	Int	Core	27.05333	-82.29800	Polymesoda caroliniana	Mollusca	2
24	M-24	Int	Core	27.05333	-82.29800	Cryptochironomus	Insecta	2
24	M-24	Deep	Core	27.05333	-82.29800	Corbicula fluminea	Mollusca	1
24	M-24	Deep	Core	27.05333	-82.29800	Polymesoda caroliniana	Mollusca	1
24	M-24	Int	Core	27.05333	-82.29800	Amphicteis gunneri	Polychaetea	1
24	M-24	Int	Core	27.05333	-82.29800	Oligochaeta	Oligochaeta	1
24	M-24	Int	Core	27.05333	-82.29800	Xanthidae	Crustacea	1
24	M-24	Deep	Core	27.05333	-82.29800	Cryptochironomus	Insecta	1
24	M-24	Int	Core	27.05333	-82.29800	Polypedilum scalaenum gp.	Insecta	1
24	M-24	Deep	Swp	27.05333	-82.29800	Laeonereis culveri	Polychaetea	23
24	M-24	Deep	Swp	27.05333	-82.29800	Xanthidae	Crustacea	9
24	M-24	Deep	Swp	27.05333	-82.29800	Edotea montosa	Crustacea	6
24	M-24	Int	Swp	27.05333	-82.29800	Taphromysis louisianae	Crustacea	6
24	M-24	Int	Swp	27.05333	-82.29800	Xanthidae	Crustacea	5
24	M-24	Deep	Swp	27.05333	-82.29800	Tellina	Mollusca	2
24	M-24	Deep	Swp	27.05333	-82.29800	Cryptochironomus	Insecta	2
24	M-24	Deep	Swp	27.05333	-82.29800	Amygdalum papyrium	Mollusca	1
24	M-24	Deep	Swp	27.05333	-82.29800	Rangia cuneata	Mollusca	1
24	M-24	Int	Swp	27.05333	-82.29800	Corophium	Crustacea	1
24	M-24	Int	Swp	27.05333	-82.29800	Exosphaeroma diminuta	Crustacea	1
24	M-24	Int	Swp	27.05333	-82.29800	Laeonereis culveri	Polychaetea	1
26	M-26	Int	Core	27.06620	-82.31518	Grandidierella bonnieroides	Crustacea	59
26	M-26	Deep	Core	27.06638	-82.31430	Corophium	Crustacea	34
26	M-26	Deep	Core	27.06638	-82.31430	Grandidierella bonnieroides	Crustacea	27
26	M-26	Deep	Core	27.06638	-82.31430	Hydrobiidae	Mollusca	15
26	M-26	Int	Core	27.06620	-82.31518	Oligochaeta	Oligochaeta	10
26	M-26	Int	Core	27.06620	-82.31518	Laeonereis culveri	Polychaetea	9
26	M-26	Int	Core	27.06620	-82.31518	Corophium	Crustacea	7

26	M-26	Deep	Core	27.06638	-82.31430	Corbicula fluminea	Mollusca	4
26	M-26	Int	Core	27.06620	-82.31518	Polymesoda caroliniana	Mollusca	2
26	M-26	Int	Core	27.06620	-82.31518	Xanthidae	Crustacea	2
26	M-26	Deep	Core	27.06638	-82.31430	Xanthidae	Crustacea	1
26	M-26	Int	Core	27.06620	-82.31518	Gammarus	Crustacea	1
26	M-26	Int	Core	27.06620	-82.31518	Platyhelminthes	Platyhelminthes	1
26	M-26	Deep	Swp	27.06638	-82.31430	Taphromysis louisianae	Crustacea	20
26	M-26	Int	Swp	27.06620	-82.31518	Edotea montosa	Crustacea	15
26	M-26	Deep	Swp	27.06638	-82.31430	Grandidierella bonnieroides	Crustacea	11
26	M-26	Deep	Swp	27.06638	-82.31430	Xanthidae	Crustacea	9
26	M-26	Int	Swp	27.06620	-82.31518	Xanthidae	Crustacea	8
26	M-26	Deep	Swp	27.06638	-82.31430	Corophium	Crustacea	5
26	M-26	Deep	Swp	27.06638	-82.31430	Hydrobiidae	Mollusca	4
26	M-26	Int	Swp	27.06620	-82.31518	Laeonereis culveri	Polychaetea	3
26	M-26	Int	Swp	27.06620	-82.31518	Polymesoda caroliniana	Mollusca	3
26	M-26	Deep	Swp	27.06638	-82.31430	Corbicula fluminea	Mollusca	2
26	M-26	Deep	Swp	27.06638	-82.31430	Gammarus	Crustacea	2
26	M-26	Int	Swp	27.06620	-82.31518	Penaeidae	Crustacea	2
26	M-26	Deep	Swp	27.06638	-82.31430	Bivalvia	Mollusca	1
26	M-26	Deep	Swp	27.06638	-82.31430	Laeonereis culveri	Polychaetea	1
26	M-26	Int	Swp	27.06620	-82.31518	Oxyurostylis smithi	Crustacea	1
28	M-28	Deep	Core	27.08147	-82.31873	Corophium	Crustacea	86
28	M-28	Deep	Core	27.08147	-82.31873	Grandidierella bonnieroides	Crustacea	31
28	M-28	Deep	Core	27.08147	-82.31873	Corbicula fluminea	Mollusca	22
28	M-28	Int	Core	27.08183	-82.31875	Grandidierella bonnieroides	Crustacea	19
28	M-28	Int	Core	27.08183	-82.31875	Corophium	Crustacea	16
28	M-28	Deep	Core	27.08147	-82.31873	Bivalvia	Mollusca	2
28	M-28	Int	Core	27.08183	-82.31875	Oligochaeta	Oligochaeta	2
28	M-28	Deep	Core	27.08147	-82.31873	Cryptochironomus	Insecta	2
28	M-28	Deep	Core	27.08147	-82.31873	Ceratopogonidae	Insecta	1
28	M-28	Deep	Core	27.08147	-82.31873	Polydora	Polychaetea	1
28	M-28	Deep	Core	27.08147	-82.31873	Xanthidae	Crustacea	1
28	M-28	Int	Core	27.08183	-82.31875	Xanthidae	Crustacea	1
28	M-28	Deep	Core	27.08147	-82.31873	Polypedilum scalaenum gp.	Insecta	1
28	M-28	Int	Swp	27.08183	-82.31875	Xanthidae	Crustacea	20
28	M-28	Int	Swp	27.08183	-82.31875	Laeonereis culveri	Polychaetea	2
28	M-28	Int	Swp	27.08183	-82.31875	Polymesoda caroliniana	Mollusca	1
30	M-30	Deep	Core	27.08743	-82.32777	Corophium	Crustacea	62
30	M-30	Int	Core	27.08743	-82.32785	Oligochaeta	Oligochaeta	20
30	M-30	Deep	Core	27.08743	-82.32777	Gammarus	Crustacea	10
30	M-30	Deep	Core	27.08743	-82.32777	Grandidierella bonnieroides	Crustacea	6
30	M-30	Deep	Core	27.08743	-82.32777	Corbicula fluminea	Mollusca	5
30	M-30	Int	Core	27.08743	-82.32785	Gammarus	Crustacea	5
30	M-30	Int	Core	27.08743	-82.32785	Corbicula fluminea	Mollusca	4
30	M-30	Int	Core	27.08743	-82.32785	Corophium	Crustacea	4
30	M-30	Int	Core	27.08743	-82.32785	Hydrobiidae	Mollusca	4
30	M-30	Deep	Core	27.08743	-82.32777	Oligochaeta	Oligochaeta	3
30	M-30	Deep	Core	27.08743	-82.32777	Xanthidae	Crustacea	3

30	M-30	Int	Core	27.08743	-82.32785	Ceratopogonidae	Insecta	2
30	M-30	Int	Core	27.08743	-82.32785	Grandidierella bonnieroides	Crustacea	2
30	M-30	Deep	Core	27.08743	-82.32777	Bivalvia	Mollusca	1
30	M-30	Deep	Core	27.08743	-82.32777	Hydrobiidae	Mollusca	1
30	M-30	Deep	Core	27.08743	-82.32777	Nemertea	Nemertea	1
30	M-30	Int	Core	27.08743	-82.32785	Tanytarsus cf. sp. Q	Insecta	1
30	M-30	Deep	Swp	27.08743	-82.32777	Mysidopsis almyra	Crustacea	15
30	M-30	Deep	Swp	27.08743	-82.32777	Gammarus	Crustacea	11
30	M-30	Int	Swp	27.08743	-82.32785	Xanthidae	Crustacea	6
30	M-30	Int	Swp	27.08743	-82.32785	Mysidopsis almyra	Crustacea	4
30	M-30	Deep	Swp	27.08743	-82.32777	Grandidierella bonnieroides	Crustacea	2
30	M-30	Deep	Swp	27.08743	-82.32777	Taphromysis louisianae	Crustacea	2
30	M-30	Int	Swp	27.08743	-82.32785	Grandidierella bonnieroides	Crustacea	2
30	M-30	Int	Swp	27.08743	-82.32785	Callibaetus floridanus	Insecta	2
30	M-30	Deep	Swp	27.08743	-82.32777	Corbicula fluminea	Mollusca	1
30	M-30	Deep	Swp	27.08743	-82.32777	Corophium	Crustacea	1
30	M-30	Deep	Swp	27.08743	-82.32777	Xanthidae	Crustacea	1
32	M-32	Deep	Core	27.08733	-82.33223	Corophium	Crustacea	42
32	M-32	Int	Core	27.08733	-82.33223	Oligochaeta	Oligochaeta	10
32	M-32	Int	Core	27.08733	-82.33223	Hydrobiidae	Mollusca	6
32	M-32	Deep	Core	27.08733	-82.33223	Oligochaeta	Oligochaeta	3
32	M-32	Deep	Core	27.08733	-82.33223	Cladotanytarsus cf. davies	Insecta	2
32	M-32	Deep	Core	27.08733	-82.33223	Gammarus	Crustacea	1
32	M-32	Deep	Core	27.08733	-82.33223	Hydrobiidae	Mollusca	1
32	M-32	Int	Core	27.08733	-82.33223	Dasyhelea	Insect	1
32	M-32	Int	Core	27.08733	-82.33223	Polypedilum halterale gp.	Insecta	1
32	M-32	Int	Core	27.08733	-82.33223	Polypedilum scalaenum gp.	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Caenis hilaris	Insecta	13
32	M-32	Int	Swp	27.08733	-82.33223	Exosphaeroma diminuta	Crustacea	6
32	M-32	Deep	Swp	27.08733	-82.33223	Taphromysis louisianae	Crustacea	3
32	M-32	Int	Swp	27.08733	-82.33223	Oligochaeta	Oligochaeta	3
32	M-32	Int	Swp	27.08733	-82.33223	Xanthidae	Crustacea	3
32	M-32	Int	Swp	27.08733	-82.33223	Oecetis inconspicua complex sp. A	Insect	3
32	M-32	Deep	Swp	27.08733	-82.33223	Hydrobiidae	Mollusca	2
32	M-32	Int	Swp	27.08733	-82.33223	Pseudochironomus	Insect	2
32	M-32	Deep	Swp	27.08733	-82.33223	Corophium	Crustacea	1
32	M-32	Deep	Swp	27.08733	-82.33223	Gammarus	Crustacea	1
32	M-32	Deep	Swp	27.08733	-82.33223	Grandidierella bonnieroides	Crustacea	1
32	M-32	Deep	Swp	27.08733	-82.33223	Oligochaeta	Oligochaeta	1
32	M-32	Deep	Swp	27.08733	-82.33223	Xanthidae	Crustacea	1
32	M-32	Int	Swp	27.08733	-82.33223	Corophium	Crustacea	1
32	M-32	Deep	Swp	27.08733	-82.33223	Oecetis	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Coelotanypus cf. concinnus	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Dicrotendipes neomodestus	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Djalmabatista pulchra variant	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Ischnura	Insecta	1
32	M-32	Int	Swp	27.08733	-82.33223	Oecetis sp. E	Insecta	1

34	M-34	Int	Core	27.10542	-82.33863	Oligochaeta	Oligochaeta	23
34	M-34	Deep	Core	27.10532	-82.33852	Oligochaeta	Oligochaeta	5
34	M-34	Deep	Core	27.10532	-82.33852	Corbicula fluminea	Mollusca	3
34	M-34	Int	Core	27.10542	-82.33863	Corbicula fluminea	Mollusca	3
34	M-34	Int	Core	27.10542	-82.33863	Ceratopogonidae	Insecta	2
34	M-34	Int	Core	27.10542	-82.33863	Hydrobiidae	Mollusca	1
34	M-34	Int	Core	27.10542	-82.33863	Polypedilum halterale gp.	Insecta	1
34	M-34	Deep	Swp	27.10532	-82.33852	Mysidopsis almyra	Crustacea	20
34	M-34	Deep	Swp	27.10532	-82.33852	Taphromysis louisianae	Crustacea	20
34	M-34	Int	Swp	27.10542	-82.33863	Callibaetus floridanus	Insecta	5
34	M-34	Deep	Swp	27.10532	-82.33852	Corophium	Crustacea	3
34	M-34	Int	Swp	27.10542	-82.33863	Oecetis inconspicua complex sp. A	Insecta	3
34	M-34	Deep	Swp	27.10532	-82.33852	Oligochaeta	Oligochaeta	2
34	M-34	Int	Swp	27.10542	-82.33863	Oligochaeta	Oligochaeta	2
34	M-34	Int	Swp	27.10542	-82.33863	Coelotanypus cf. concinnus	Insecta	2
34	M-34	Int	Swp	27.10542	-82.33863	Dicrotendipes tritomus	Insecta	2
34	M-34	Int	Swp	27.10542	-82.33863	Oecetis sp. A	Insecta	2
34	M-34	Deep	Swp	27.10532	-82.33852	Corbicula fluminea	Mollusca	1
34	M-34	Deep	Swp	27.10532	-82.33852	Gammarus	Crustacea	1
34	M-34	Deep	Swp	27.10532	-82.33852	Xanthidae	Crustacea	1
34	M-34	Int	Swp	27.10542	-82.33863	Corbicula fluminea	Mollusca	1
34	M-34	Int	Swp	27.10542	-82.33863	Exosphaeroma diminuta	Crustacea	1
34	M-34	Int	Swp	27.10542	-82.33863	Gammarus	Crustacea	1
34	M-34	Int	Swp	27.10542	-82.33863	Xanthidae	Crustacea	1
34	M-34	Deep	Swp	27.10532	-82.33852	Caenis hilaris	Insecta	1
34	M-34	Deep	Swp	27.10532	-82.33852	Coelotanypus	Insecta	1
34	M-34	Deep	Swp	27.10532	-82.33852	Stenochironomus	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Ablabesmyia (Karelia)	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Argia tibialis	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Caenis hilaris	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Coenagrionidae	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Curculionidae	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Dicrotendipes neomodestus	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Oecetis sp. E	Insecta	1
34	M-34	Int	Swp	27.10542	-82.33863	Pseudochironomus	Insecta	1
36	M-36	Int	Core	27.11292	-82.34602	Oligochaeta	Oligochaeta	54
36	M-36	Deep	Core	27.11280	-82.34600	Oligochaeta	Oligochaeta	12
36	M-36	Int	Core	27.11292	-82.34602	Ceratopogonidae	Insecta	11
36	M-36	Deep	Core	27.11280	-82.34600	Corbicula fluminea	Mollusca	5
36	M-36	Int	Core	27.11292	-82.34602	Bivalvia	Mollusca	4
36	M-36	Deep	Core	27.11280	-82.34600	Dicrotendipes tritomus	Insecta	3
36	M-36	Deep	Core	27.11280	-82.34600	Pseudochironomus	Insecta	2
36	M-36	Int	Core	27.11292	-82.34602	Cryptochironomus	Insecta	2
36	M-36	Int	Core	27.11292	-82.34602	Orthocladiinae	Insecta	2
36	M-36	Deep	Core	27.11280	-82.34600	Gammarus	Crustacea	1
36	M-36	Deep	Core	27.11280	-82.34600	Hydrobiidae	Mollusca	1
36	M-36	Deep	Core	27.11280	-82.34600	Taphromysis louisianae	Crustacea	1

36	M-36	Deep	Core	27.11280	-82.34600	Xanthidae	Crustacea	1
36	M-36	Int	Core	27.11292	-82.34602	Corbicula fluminea	Mollusca	1
36	M-36	Int	Core	27.11292	-82.34602	Taphromysis louisianae	Crustacea	1
36	M-36	Deep	Core	27.11280	-82.34600	Ablabesmyia mallochi	Insecta	1
36	M-36	Deep	Core	27.11280	-82.34600	Procladius (Holotanypus)	Insecta	1
36	M-36	Deep	Core	27.11280	-82.34600	Tanytarsus sp. O	Insecta	1
36	M-36	Int	Core	27.11292	-82.34602	Cladotanytarsus	Insecta	1
36	M-36	Int	Core	27.11292	-82.34602	Paralauterborniella nigrohalterale	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Corbicula fluminea	Mollusca	14
36	M-36	Int	Swp	27.11292	-82.34602	Dicrotendipes tritomus	Insecta	10
36	M-36	Deep	Swp	27.11280	-82.34600	Ablabesmyia mallochi	Insecta	8
36	M-36	Deep	Swp	27.11280	-82.34600	Bezzia/Palmpomyia	Insecta	5
36	M-36	Deep	Swp	27.11280	-82.34600	Procloeon viridocularis	Insect	5
36	M-36	Deep	Swp	27.11280	-82.34600	Oligochaeta	Oligochaeta	4
36	M-36	Int	Swp	27.11292	-82.34602	Osteichthyes	Osteichthyes	4
36	M-36	Deep	Swp	27.11280	-82.34600	Coelotanypus	Insecta	4
36	M-36	Int	Swp	27.11292	-82.34602	Dicrotendipes neomodestus	Insecta	3
36	M-36	Deep	Swp	27.11280	-82.34600	Hirudinea	Hirudinea	2
36	M-36	Deep	Swp	27.11280	-82.34600	Xanthidae	Crustacea	2
36	M-36	Int	Swp	27.11292	-82.34602	Oligochaeta	Oligochaeta	2
36	M-36	Deep	Swp	27.11280	-82.34600	Callibaetus floridanus	Insecta	2
36	M-36	Deep	Swp	27.11280	-82.34600	Oecetis inconspicua complex sp. A	Insecta	2
36	M-36	Deep	Swp	27.11280	-82.34600	Polypedilum halterale gp.	Insecta	2
36	M-36	Deep	Swp	27.11280	-82.34600	Pseudochironomus	Insecta	2
36	M-36	Int	Swp	27.11292	-82.34602	Cryptochironomus	Insecta	2
36	M-36	Deep	Swp	27.11280	-82.34600	Platyhelminthes	Platyhelminthes	1
36	M-36	Int	Swp	27.11292	-82.34602	Ancylidae	Mollusca	1
36	M-36	Int	Swp	27.11292	-82.34602	Hirudinea	Hirudinea	1
36	M-36	Deep	Swp	27.11280	-82.34600	Ablabesmyia	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Ablabesmyia (Karelia)	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Brachycercus maculatus	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Coelotanypus concinnus	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Dicrotendipes tritomus	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Oecetis sp. E	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Procladius	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Tanypus	Insecta	1
36	M-36	Deep	Swp	27.11280	-82.34600	Tanytarsus sp. O	Insecta	1
38	M-38	Int	Core	27.12655	-82.35113	Oligochaeta	Oligochaeta	25
38	M-38	Deep	Core	34.58960	-82.35113	Oligochaeta	Oligochaeta	20
38	M-38	Deep	Core	34.58960	-82.35113	Gammarus	Crustacea	8
38	M-38	Deep	Core	34.58960	-82.35113	Corbicula fluminea	Mollusca	5
38	M-38	Deep	Core	34.58960	-82.35113	Taphromysis louisianae	Crustacea	1
38	M-38	Int	Core	27.12655	-82.35113	Gastropoda	Mollusca	1
38	M-38	Deep	Core	34.58960	-82.35113	Cryptochironomus	Insecta	1
38	M-38	Deep	Core	34.58960	-82.35113	Pseudochironomus	Insecta	1
38	M-38	Int	Swp	27.12655	-82.35113	Taphromysis louisianae	Crustacea	8
38	M-38	Deep	Swp	34.58960	-82.35113	Tanytarsus sp. O	Insecta	3

38	M-38	Int	Swp	27.12655	-82.35113	Dicrotendipes tritomus	Insecta	3
38	M-38	Int	Swp	27.12655	-82.35113	Oecetis	Insecta	2
38	M-38	Deep	Swp	34.58960	-82.35113	Corbicula fluminea	Mollusca	1
38	M-38	Int	Swp	27.12655	-82.35113	Oligochaeta	Oligochaeta	1
38	M-38	Deep	Swp	34.58960	-82.35113	Coelotanypus	Insecta	1
38	M-38	Deep	Swp	34.58960	-82.35113	Coelotanypus tricolor	Insecta	1
38	M-38	Deep	Swp	34.58960	-82.35113	Dicrotendipes neomodestus	Insecta	1
38	M-38	Deep	Swp	34.58960	-82.35113	Dicrotendipes tritomus	Insecta	1
38	M-38	Int	Swp	27.12655	-82.35113	Bezzia/Palmpomyia	Insecta	1
38	M-38	Int	Swp	27.12655	-82.35113	Dicrotendipes neomodestus	Insecta	1
38	M-38	Int	Swp	27.12655	-82.35113	Ephemeroptera	Insect	1
38	M-38	Int	Swp	27.12655	-82.35113	Polypedilum scalaenum gp.	Insecta	1
38	M-38	Int	Swp	27.12655	-82.35113	Pseudochironomus	Insecta	1
40	M-40	Deep	Core	27.13412	-82.35808	Oligochaeta	Oligochaeta	24
40	M-40	Int	Core	27.13437	-82.35805	Polypedilum scalaenum gp.	Insecta	9
40	M-40	Int	Core	27.13437	-82.35805	Cladotanytarsus cf. davies	Insecta	8
40	M-40	Deep	Core	27.13412	-82.35808	Gammarus	Crustacea	4
40	M-40	Int	Core	27.13437	-82.35805	Oligochaeta	Oligochaeta	3
40	M-40	Deep	Core	27.13412	-82.35808	Bivalvia	Mollusca	2
40	M-40	Deep	Core	27.13412	-82.35808	Setodes	Insecta	2
40	M-40	Int	Core	27.13437	-82.35805	Corbicula fluminea	Mollusca	2
40	M-40	Deep	Core	27.13412	-82.35808	Ceratopogonidae	Insecta	1
40	M-40	Deep	Core	27.13412	-82.35808	Hydrobiidae	Mollusca	1
40	M-40	Int	Core	27.13437	-82.35805	Bivalvia	Mollusca	1
40	M-40	Int	Core	27.13437	-82.35805	Hydrobiidae	Mollusca	1
40	M-40	Deep	Core	27.13412	-82.35808	Pseudochironomus	Insecta	1
40	M-40	Deep	Swp	27.13412	-82.35808	Taphromysis louisianae	Crustacea	304
40	M-40	Int	Swp	27.13437	-82.35805	Gammarus	Crustacea	18
40	M-40	Int	Swp	27.13437	-82.35805	Polypedilum scalaenum gp.	Insecta	17
40	M-40	Int	Swp	27.13437	-82.35805	Oligochaeta	Oligochaeta	11
40	M-40	Int	Swp	27.13437	-82.35805	Cladotanytarsus cf. davies	Insecta	11
40	M-40	Deep	Swp	27.13412	-82.35808	Stenelmis	Insecta	9
40	M-40	Deep	Swp	27.13412	-82.35808	Oligochaeta	Oligochaeta	4
40	M-40	Deep	Swp	27.13412	-82.35808	Caenis	Insecta	2
40	M-40	Int	Swp	27.13437	-82.35805	Corbicula fluminea	Mollusca	1
40	M-40	Deep	Swp	27.13412	-82.35808	Cladotanytarsus cf. davies	Insecta	1
40	M-40	Deep	Swp	27.13412	-82.35808	Dubiraphia vittata	Insecta	1
40	M-40	Deep	Swp	27.13412	-82.35808	Nyctiophylax	Insecta	1
40	M-40	Deep	Swp	27.13412	-82.35808	Pseudochironomus	Insecta	1
40	M-40	Int	Swp	27.13437	-82.35805	Polypedilum halterale gp.	Insecta	1
42	M-42	Int	Core	27.14530	-82.36498	Oligochaeta	Oligochaeta	20
42	M-42	Deep	Core	27.14530	-82.36498	Oligochaeta	Oligochaeta	11
42	M-42	Int	Core	27.14530	-82.36498	Taphromysis louisianae	Crustacea	6
42	M-42	Int	Core	27.14530	-82.36498	Bivalvia	Mollusca	3
42	M-42	Int	Core	27.14530	-82.36498	Ceratopogonidae	Insecta	3
42	M-42	Deep	Core	27.14530	-82.36498	Tanytarsus sp. K	Insecta	3
42	M-42	Int	Core	27.14530	-82.36498	Polypedilum halterale gp.	Insecta	2
42	M-42	Int	Core	27.14530	-82.36498	Polypedilum scalaenum gp.	Insecta	2

42	M-42	Int	Core	27.14530	-82.36498	Tanytarsus	Insecta	2
42	M-42	Deep	Core	27.14530	-82.36498	Corbicula fluminea	Mollusca	1
42	M-42	Deep	Core	27.14530	-82.36498	Hydrobiidae	Mollusca	1
42	M-42	Int	Core	27.14530	-82.36498	Corbicula fluminea	Mollusca	1
42	M-42	Deep	Core	27.14530	-82.36498	Cryptochironomus	Insecta	1
42	M-42	Int	Core	27.14530	-82.36498	Paralauterborniella nigrohalterale	Insecta	1
42	M-42	Deep	Swp	27.14530	-82.36498	Procloeon viridocularis	Insect	43
42	M-42	Int	Swp	27.14530	-82.36498	Procloeon viridocularis	Insect	26
42	M-42	Deep	Swp	27.14530	-82.36498	Caenis hilaris	Insecta	18
42	M-42	Deep	Swp	27.14530	-82.36498	Brachycercus maculatus	Insecta	15
42	M-42	Int	Swp	27.14530	-82.36498	Cladotanytarsus cf. davies	Insecta	8
42	M-42	Deep	Swp	27.14530	-82.36498	Coelotanypus concinnus	Insecta	5
42	M-42	Int	Swp	27.14530	-82.36498	Corixidae	Hexapoda	5
42	M-42	Int	Swp	27.14530	-82.36498	Polypedilum scalaenum gp.	Insecta	5
42	M-42	Deep	Swp	27.14530	-82.36498	Tanytarsus sp. O	Insecta	4
42	M-42	Deep	Swp	27.14530	-82.36498	Cladotanytarsus cf. davies	Insecta	3
42	M-42	Deep	Swp	27.14530	-82.36498	Cryptotendipes	Insecta	3
42	M-42	Deep	Swp	27.14530	-82.36498	Polypedilum halterale gp.	Insecta	3
42	M-42	Int	Swp	27.14530	-82.36498	Brachycercus maculatus	Insecta	3
42	M-42	Int	Swp	27.14530	-82.36498	Tanytarsus	Insecta	3
42	M-42	Int	Swp	27.14530	-82.36498	Oligochaeta	Oligochaeta	2
42	M-42	Deep	Swp	27.14530	-82.36498	Bezzia/Palmpomyia	Insecta	2
42	M-42	Deep	Swp	27.14530	-82.36498	Oecetis inconspicua complex sp. A	Insecta	2
42	M-42	Deep	Swp	27.14530	-82.36498	Corbicula fluminea	Mollusca	1
42	M-42	Deep	Swp	27.14530	-82.36498	Hirudinea	Hirudinea	1
42	M-42	Deep	Swp	27.14530	-82.36498	Cryptochironomus	Insecta	1
42	M-42	Deep	Swp	27.14530	-82.36498	Hymenoptera	Insecta	1
42	M-42	Deep	Swp	27.14530	-82.36498	Libellulidae	Insecta	1
42	M-42	Deep	Swp	27.14530	-82.36498	Tanytarsus	Insecta	1
42	M-42	Int	Swp	27.14530	-82.36498	Bezzia/Palmpomyia	Insecta	1
42	M-42	Int	Swp	27.14530	-82.36498	Caenis hilaris	Insecta	1
42	M-42	Int	Swp	27.14530	-82.36498	Cryptochironomus	Insecta	1
42	M-42	Int	Swp	27.14530	-82.36498	Hymenoptera	Insecta	1
42	M-42	Int	Swp	27.14530	-82.36498	Tanytarsus sp. O	Insecta	1
44	M-44	Deep	Core	27.15320	-82.36208	Cladotanytarsus cf. davies	Insecta	15
44	M-44	Deep	Core	27.15320	-82.36208	Oligochaeta	Oligochaeta	13
44	M-44	Deep	Core	27.15320	-82.36208	Bivalvia	Mollusca	8
44	M-44	Int	Core	27.15320	-82.36208	Corbicula fluminea	Mollusca	8
44	M-44	Int	Core	27.15320	-82.36208	Oligochaeta	Oligochaeta	7
44	M-44	Deep	Core	27.15320	-82.36208	Polypedilum scalaenum gp.	Insecta	7
44	M-44	Int	Core	27.15320	-82.36208	Cladotanytarsus cf. davies	Insecta	7
44	M-44	Deep	Core	27.15320	-82.36208	Ceratopogonidae	Insecta	6
44	M-44	Deep	Core	27.15320	-82.36208	Polypedilum halterale gp.	Insecta	3
44	M-44	Deep	Core	27.15320	-82.36208	Tanytarsus sp. O	Insecta	3
44	M-44	Deep	Core	27.15320	-82.36208	Gammarus	Crustacea	2
44	M-44	Deep	Core	27.15320	-82.36208	Hydrobiidae	Mollusca	2
44	M-44	Int	Core	27.15320	-82.36208	Ceratopogonidae	Insecta	2

44	M-44	Deep	Core	27.15320	-82.36208	Platyhelminthes	Platyhelminthes	1
44	M-44	Deep	Core	27.15320	-82.36208	Plecoptera	Insecta	1
44	M-44	Deep	Core	27.15320	-82.36208	Taphromysis louisianae	Crustacea	1
44	M-44	Deep	Core	27.15320	-82.36208	Ablabesmyia mallochi	Insecta	1
44	M-44	Deep	Core	27.15320	-82.36208	Cryptochironomus	Insecta	1
44	M-44	Deep	Core	27.15320	-82.36208	Nilothauma	Insecta	1
44	M-44	Int	Core	27.15320	-82.36208	Tanytarsus sp. O	Insecta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Caenis hilaris	Insecta	134
44	M-44	Int	Swp	27.15320	-82.36208	Cladotanytarsus cf. davies	Insecta	60
44	M-44	Int	Swp	27.15320	-82.36208	Polypedilum scalaenum gp.	Insecta	50
44	M-44	Int	Swp	27.15320	-82.36208	Procloeon viridocularis	Insect	40
44	M-44	Int	Swp	27.15320	-82.36208	Oligochaeta	Oligochaeta	24
44	M-44	Int	Swp	27.15320	-82.36208	Sphaeriidae	Mollusca	15
44	M-44	Int	Swp	27.15320	-82.36208	Cryptochironomus	Insecta	15
44	M-44	Deep	Swp	27.15320	-82.36208	Brachycercus maculatus	Insecta	13
44	M-44	Int	Swp	27.15320	-82.36208	Brachycercus maculatus	Insecta	11
44	M-44	Int	Swp	27.15320	-82.36208	Caenis hilaris	Insecta	8
44	M-44	Deep	Swp	27.15320	-82.36208	Procloeon viridocularis	Insect	7
44	M-44	Deep	Swp	27.15320	-82.36208	Tricorythodes albilineatus	Insect	6
44	M-44	Deep	Swp	27.15320	-82.36208	Dicrotendipes tritomus	Insecta	3
44	M-44	Int	Swp	27.15320	-82.36208	Corixidae	Hexapoda	3
44	M-44	Deep	Swp	27.15320	-82.36208	Cladotanytarsus cf. davies	Insecta	2
44	M-44	Deep	Swp	27.15320	-82.36208	Stenelmis	Insecta	2
44	M-44	Int	Swp	27.15320	-82.36208	Oecetis inconspicua complex sp. A	Insecta	2
44	M-44	Int	Swp	27.15320	-82.36208	Stenelmis	Insecta	2
44	M-44	Int	Swp	27.15320	-82.36208	Tanytarsus sp. O	Insecta	2
44	M-44	Deep	Swp	27.15320	-82.36208	Hirudinea	Hirudinea	1
44	M-44	Deep	Swp	27.15320	-82.36208	Oligochaeta	Oligochaeta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Dineutus	Insecta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Gomphidae	Insecta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Neureclipsis crepuscularis	Insecta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Oecetis sp. E	Insecta	1
44	M-44	Deep	Swp	27.15320	-82.36208	Stenacron interpunctatum	Insect	1
44	M-44	Int	Swp	27.15320	-82.36208	Coelotanypus	Insecta	1
44	M-44	Int	Swp	27.15320	-82.36208	Pseudochironomus	Insecta	1

Myakahatchee Creek **06/09/04**

Distance Upstream (km)	Station	Deep or Intertidal	Core or Sweep	Position Latitude	Position Longitude	Taxa	Major Group	Total Count
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Leptochela	Crustacea	41
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Grandidierella bonnieroides	Crustacea	25
Na	MC-1	Int	Sweep	27.02845	-82.25999	Corophium	Crustacea	21
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Xanthidae	Crustacea	16
Na	MC-1	Deep	Core	27.02845	-82.25999	Grandidierella bonnieroides	Crustacea	11
Na	MC-1	Int	Core	27.02845	-82.25999	Laeonereis culveri	Polychaetea	7

Na	MC-1	Int	Sweep	27.02845	-82.25999	Palaemonetes pugio	Crustacea	5
Na	MC-1	Deep	Core	27.02845	-82.25999	Laeonereis culveri	Polychaetea	4
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Hydrobiidae	Mollusca	4
Na	MC-1	Int	Sweep	27.02845	-82.25999	Hydrobiidae	Mollusca	4
Na	MC-1	Int	Sweep	27.02845	-82.25999	Xanthidae	Crustacea	4
Na	MC-1	Deep	Core	27.02845	-82.25999	Hydrobiidae	Mollusca	3
Na	MC-1	Int	Core	27.02845	-82.25999	Corophium	Crustacea	3
Na	MC-1	Int	Sweep	27.02845	-82.25999	Laeonereis culveri	Polychaetea	3
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Streblospio benedicti	Polychaetea	2
Na	MC-1	Int	Core	27.02845	-82.25999	Oligochaeta	Oligochaeta	2
Na	MC-1	Int	Sweep	27.02845	-82.25999	Polymesoda caroliniana	Mollusca	2
Na	MC-1	Deep	Core	27.02845	-82.25999	Mediomastus	Polychaetea	1
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Corophium	Crustacea	1
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Laeonereis culveri	Polychaetea	1
Na	MC-1	Deep	Sweep	27.02845	-82.25999	Cyathura polita	Crustacea	1
Na	MC-1	Int	Core	27.02845	-82.25999	Grandidierella bonnieroides	Crustacea	1
Na	MC-1	Int	Core	27.02845	-82.25999	Polydora ligni	Polychaetea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Boccardiella	Polychaetea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Exosphaeroma diminuta	Crustacea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Cyathura polita	Crustacea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Neanthes succinea	Polychaetea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Oligochaeta	Oligochaeta	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Polydora	Polychaetea	1
Na	MC-1	Int	Sweep	27.02845	-82.25999	Rhithropanopeus harrisii	Crustacea	1
Na	MC-2	Int	Sweep	27.03543	-82.24872	Hydrobiidae	Mollusca	42
Na	MC-2	Int	Sweep	27.03543	-82.24872	Grandidierella bonnieroides	Crustacea	22
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Hydrobiidae	Mollusca	16
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Streblospio benedicti	Polychaetea	12
Na	MC-2	Int	Core	27.03543	-82.24872	Grandidierella bonnieroides	Crustacea	8
Na	MC-2	Deep	Core	27.03543	-82.24872	Streblospio benedicti	Polychaetea	7
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Polymesoda caroliniana	Mollusca	6
Na	MC-2	Int	Core	27.03543	-82.24872	Oligochaeta	Oligochaeta	5
Na	MC-2	Int	Sweep	27.03543	-82.24872	Leptochela	Crustacea	4
Na	MC-2	Int	Sweep	27.03543	-82.24872	Rhithropanopeus harrisii	Crustacea	4
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Grandidierella bonnieroides	Crustacea	3
Na	MC-2	Int	Core	27.03543	-82.24872	Laeonereis culveri	Polychaetea	2
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Leptochela	Crustacea	1
Na	MC-2	Deep	Sweep	27.03543	-82.24872	Rhithropanopeus harrisii	Crustacea	1
Na	MC-2	Int	Core	27.03543	-82.24872	Streblospio benedicti	Polychaetea	1
Na	MC-2	Int	Sweep	27.03543	-82.24872	Xanthidae	Crustacea	1
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Hydrobiidae	Mollusca	88
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Grandidierella bonnieroides	Crustacea	46
Na	MC-3	Int	Sweep	27.04330	-82.24222	Leptochela	Crustacea	36
Na	MC-3	Int	Sweep	27.04330	-82.24222	Hydrobiidae	Mollusca	32
Na	MC-3	Deep	Core	27.04330	-82.24222	Hydrobiidae	Mollusca	19
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Streblospio benedicti	Polychaetea	12
Na	MC-3	Int	Core	27.04330	-82.24222	Laeonereis culveri	Polychaetea	10
Na	MC-3	Int	Sweep	27.04330	-82.24222	Laeonereis culveri	Polychaetea	9

Na	MC-3	Deep	Core	27.04330	-82.24222	Streblospio benedicti	Polychaetea	6
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Corophium	Crustacea	5
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Laeonereis culveri	Polychaetea	5
Na	MC-3	Deep	Core	27.04330	-82.24222	Grandidierella bonnieroides	Crustacea	4
Na	MC-3	Int	Sweep	27.04330	-82.24222	Edotea montosa	Crustacea	4
Na	MC-3	Int	Core	27.04330	-82.24222	Hirudinea	Hirudinea	3
Na	MC-3	Int	Sweep	27.04330	-82.24222	Exosphaeroma diminuta	Crustacea	2
Na	MC-3	Int	Sweep	27.04330	-82.24222	Grandidierella bonnieroides	Crustacea	2
Na	MC-3	Int	Sweep	27.04330	-82.24222	Xanthidae	Crustacea	2
Na	MC-3	Deep	Core	27.04330	-82.24222	Corophium	Crustacea	1
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Platyhelminthes	Platyhelminthes	1
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Rangia cuneata	Mollusca	1
Na	MC-3	Deep	Sweep	27.04330	-82.24222	Rhithropanopeus harrisii	Crustacea	1
Na	MC-4	Int	Sweep	27.04619	-82.23978	Laeonereis culveri	Polychaetea	107
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Streblospio benedicti	Polychaetea	64
Na	MC-4	Int	Sweep	27.04619	-82.23978	Hydrobiidae	Mollusca	52
Na	MC-4	Int	Core	27.04619	-82.23978	Laeonereis culveri	Polychaetea	48
Na	MC-4	Int	Sweep	27.04619	-82.23978	Leptochela	Crustacea	48
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Hydrobiidae	Mollusca	32
Na	MC-4	Deep	Core	27.04619	-82.23978	Streblospio benedicti	Polychaetea	22
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Laeonereis culveri	Polychaetea	17
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Mytilopsis leucophaeata	Mollusca	15
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Rangia cuneata	Mollusca	12
Na	MC-4	Int	Core	27.04619	-82.23978	Hydrobiidae	Mollusca	9
Na	MC-4	Int	Sweep	27.04619	-82.23978	Edotea montosa	Crustacea	6
Na	MC-4	Int	Core	27.04619	-82.23978	Grandidierella bonnieroides	Crustacea	5
Na	MC-4	Int	Sweep	27.04619	-82.23978	Rangia cuneata	Mollusca	4
Na	MC-4	Deep	Core	27.04619	-82.23978	Hydrobiidae	Mollusca	3
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Leptochela	Crustacea	3
Na	MC-4	Int	Core	27.04619	-82.23978	Corophium	Crustacea	2
Na	MC-4	Deep	Core	27.04619	-82.23978	Mytilopsis leucophaeata	Mollusca	1
Na	MC-4	Deep	Core	27.04619	-82.23978	Rangia cuneata	Mollusca	1
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Corbicula fluminea	Mollusca	1
Na	MC-4	Deep	Sweep	27.04619	-82.23978	Nemertea	Nemertea	1
Na	MC-4	Int	Core	27.04619	-82.23978	Edotea montosa	Crustacea	1
Na	MC-4	Int	Core	27.04619	-82.23978	Hirudinea	Hirudinea	1
Na	MC-4	Int	Core	27.04619	-82.23978	Oligochaeta	Oligochaeta	1
Na	MC-4	Int	Core	27.04619	-82.23978	Rangia cuneata	Mollusca	1
Na	MC-4	Int	Core	27.04619	-82.23978	Rhithropanopeus harrisii	Crustacea	1
Na	MC-4	Int	Sweep	27.04619	-82.23978	Corophium	Crustacea	1
Na	MC-4	Int	Sweep	27.04619	-82.23978	Grandidierella bonnieroides	Crustacea	1
Na	MC-4	Int	Sweep	27.04619	-82.23978	Osteichthyes	Osteichthyes	1

APPENDIX E

Peace River Macrobenthic species list

Appendix E. Composite benthic species list for the Peace River, distribution by location, sampling period and methodology, from a study from 1998 - 1999 conducted for the Peace River Manasota Water Supply Authority. Column headings are as follows; LL = Lettuce Lake, DC = Deep Creek, HC=Hunter Creek, Z1-Z4 = river zones where Z1 is the freshwater habitat and Z4 is estuarine, SAV = submerged aquatic vegetation area at Punta Gorda.

		Core								Sweeps							
		LL	DC	HC	Z1	Z2	Z3	Z4	SAV	LL	DC	HC	Z1	Z2	Z3	Z4	SAV
Apocorophium lacustre (5037)																	
	1 Nov98	0	3	0	3	0	1	0	1	2	12	1	0	0	0	0	0
	2 Jan99	26	13	136	20	121	1	0	0	0	31	63	24	83	1	0	0
	3 Feb99	12	35	226	78	275	5	0	0	18	39	88	148	121	0	0	0
	4 Apr99	12	53	50	200	1235	26	0	14	30	25	31	75	347	13	0	1
	5 Jun99	166	161	15	249	103	120	0	7	36	191	56	124	44	66	0	0
Ampelisca abdita (4291)																	
	1 Nov98	0	0	0	0	0	3	78	2	0	0	0	0	0	13	249	0
	2 Jan99	0	0	3	0	5	39	40	1	0	0	5	0	87	100	174	0
	3 Feb99	0	0	1	0	72	96	233	28	0	0	16	0	198	88	241	19
	4 Apr99	0	0	16	1	364	574	229	115	0	0	79	0	272	210	221	0
	5 Jun99	0	0	0	0	2	38	175	20	0	0	0	0	4	22	158	0
Mulinia lateralis (3632)																	
	1 Nov98	0	0	0	0	3	182	91	4	0	0	0	0	0	96	203	1
	2 Jan99	0	0	0	0	0	1262	45	0	0	0	4	0	5	268	191	0
	3 Feb99	0	0	0	1	10	241	64	83	0	0	0	0	18	146	81	48
	4 Apr99	0	0	0	0	0	92	162	3	0	0	2	0	0	32	172	0
	5 Jun99	0	2	0	0	0	18	29	1	0	10	0	0	3	22	37	0
Oligochaeta (3524)																	
	1 Nov98	24	10	7	83	26	7	53	125	98	84	17	29	6	5	1	0
	2 Jan99	77	85	4	458	15	84	42	158	13	24	1	45	0	0	0	0
	3 Feb99	97	61	1	85	11	42	11	83	37	7	13	60	0	1	1	0
	4 Apr99	96	57	30	156	9	11	17	87	40	23	2	53	0	0	0	0
	5 Jun99	143	5	0	184	52	28	70	194	53	19	0	100	4	0	0	0
Cyclaspis varians (3136)																	
	1 Nov98	0	0	0	0	0	27	200	1	0	0	0	0	0	32	187	0
	2 Jan99	0	0	0	0	9	157	10	0	0	0	0	0	0	25	2	0
	3 Feb99	0	0	3	0	70	559	80	0	0	0	5	0	2	181	29	0
	4 Apr99	0	0	8	4	85	613	481	0	0	0	14	1	4	28	39	0
	5 Jun99	0	0	0	0	0	15	194	1	0	0	0	0	0	16	54	0
Grandidierella bonnieroides (3103)																	
	1 Nov98	0	1	22	4	38	6	1	0	0	0	22	0	3	5	1	0
	2 Jan99	2	31	273	124	417	16	0	0	0	19	171	116	417	31	0	0
	3 Feb99	7	8	83	78	120	7	0	0	11	13	82	130	134	10	0	0
	4 Apr99	66	25	25	61	43	22	0	1	42	30	84	76	36	8	1	0
	5 Jun99	0	10	10	5	19	15	4	0	8	6	17	26	11	49	0	0
Capitella capitata (2383)																	
	1 Nov98	0	3	1	1	0	2	513	1708	0	0	0	0	0	0	23	3
	2 Jan99	0	0	3	0	0	28	13	6	0	0	0	0	0	0	0	0
	3 Feb99	0	0	7	0	0	10	9	0	0	0	0	0	0	0	4	0
	4 Apr99	0	0	0	0	0	0	13	21	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	10	4	0	0	0	0	0	0	1	0

Taphromysis bowmani (1959)																	
	1 Nov98	0	0	0	0	0	0	0	0	76	0	10	0	0	0	0	0
	2 Jan99	0	0	0	2	0	0	0	0	216	96	1	315	41	7	1	0
	3 Feb99	0	0	0	5	0	0	0	0	55	102	3	147	30	5	16	0
	4 Apr99	7	3	3	17	0	1	0	0	188	119	12	249	26	7	11	0
	5 Jun99	0	0	2	5	0	1	0	0	74	9	44	44	4	3	2	0
Gammarus cf. tigrinus (1861)																	
	1 Nov98	0	0	0	0	0	0	0	0	6	7	2	0	0	0	0	0
	2 Jan99	5	8	8	48	19	1	0	0	29	13	15	79	67	0	1	0
	3 Feb99	14	23	27	40	31	4	3	0	46	94	4	187	56	0	0	0
	4 Apr99	27	9	2	156	5	2	0	0	118	36	4	164	38	0	0	0
	5 Jun99	10	21	6	137	25	4	0	0	24	37	39	71	87	2	0	0
Streblospio benedicti (1782)																	
	1 Nov98	0	0	0	0	1	77	300	87	0	0	2	0	9	236	83	0
	2 Jan99	0	0	141	0	87	207	69	1	0	1	5	0	22	30	44	0
	3 Feb99	0	0	9	0	55	19	4	0	0	0	16	0	32	11	23	0
	4 Apr99	0	5	6	6	12	5	0	0	0	1	35	0	9	1	7	0
	5 Jun99	0	1	1	2	15	49	0	0	0	3	7	2	12	32	0	0
Amygdalum papyrium (1732)																	
	1 Nov98	0	0	0	0	0	57	102	29	0	0	0	0	0	11	85	0
	2 Jan99	0	0	67	0	81	296	35	12	0	0	15	0	1	38	8	0
	3 Feb99	0	0	0	0	41	312	69	0	0	0	2	0	17	64	11	0
	4 Apr99	0	0	0	0	6	58	63	4	0	0	0	0	6	36	47	0
	5 Jun99	0	0	0	0	0	42	36	0	0	0	0	0	0	35	46	0
Corbicula fluminea (1641)																	
	1 Nov98	0	11	0	136	29	0	0	0	2	0	0	118	0	0	0	0
	2 Jan99	21	64	12	127	54	0	0	0	1	3	1	70	1	0	0	0
	3 Feb99	92	0	5	190	78	0	0	0	5	0	2	128	0	0	0	0
	4 Apr99	18	1	11	73	12	0	0	0	22	1	0	56	0	0	0	0
	5 Jun99	7	0	0	107	3	0	0	0	40	5	0	134	1	0	0	0
Mysidopsis almyra (1535)																	
	1 Nov98	0	0	0	0	0	1	0	0	0	0	2	1	0	24	25	0
	2 Jan99	0	0	0	1	2	2	0	0	13	12	141	6	134	83	29	0
	3 Feb99	0	0	0	0	1	1	1	0	3	23	55	30	238	236	52	0
	4 Apr99	0	0	0	1	0	1	1	0	27	155	0	38	50	84	11	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	1	2	6	34	8	0
Bivalvia (1472)																	
	1 Nov98	0	0	0	3	1	19	62	6	0	0	0	1	2	14	0	0
	2 Jan99	0	0	13	36	152	116	79	37	0	0	0	2	0	10	0	0
	3 Feb99	0	0	48	22	86	56	21	0	0	0	2	3	4	1	1	0
	4 Apr99	23	3	7	57	33	41	80	61	0	0	4	5	9	32	6	0
	5 Jun99	7	22	10	46	33	56	85	5	0	5	1	2	13	16	13	0
Laeonereis culveri (1447)																	
	1 Nov98	0	0	1	0	20	59	204	77	0	1	29	0	4	113	54	0
	2 Jan99	2	3	14	11	39	21	1	1	0	1	5	12	18	24	1	0
	3 Feb99	1	3	8	15	30	16	6	0	4	1	6	17	5	8	0	0
	4 Apr99	27	20	77	12	40	15	0	0	11	22	97	18	22	4	0	0
	5 Jun99	13	12	12	19	66	15	1	0	3	14	20	24	26	18	4	0

Cladotanytarsus (1438)																	
	1 Nov98	0	10	3	3	0	0	0	0	6	54	0	0	2	0	0	0
	2 Jan99	138	74	3	140	18	0	0	0	12	64	5	68	1	0	0	0
	3 Feb99	80	25	0	197	0	0	0	0	5	8	6	96	0	0	0	0
	4 Apr99	61	11	0	218	1	0	0	0	8	6	2	82	0	0	0	0
	5 Jun99	1	0	0	24	0	0	0	0	0	0	1	5	0	0	0	0
Oxyurostylis smithi (1225)																	
	1 Nov98	0	0	0	0	0	0	15	1	0	0	0	0	0	1	70	1
	2 Jan99	0	0	0	0	0	1	55	0	0	0	0	0	0	16	284	0
	3 Feb99	0	0	0	0	0	16	67	7	0	0	0	0	1	66	257	71
	4 Apr99	0	0	0	0	0	15	69	0	0	0	0	0	0	37	125	1
	5 Jun99	0	0	0	0	0	0	8	1	0	0	0	0	0	0	40	0
Hydrobiidae (1068)																	
	1 Nov98	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0
	2 Jan99	10	9	1	7	12	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	15	0	4	3	44	0	0	0	0	0	0	2	0	1	0	0
	4 Apr99	83	81	128	239	170	0	2	0	0	2	21	4	2	3	0	0
	5 Jun99	30	13	23	101	48	0	0	0	0	0	0	1	0	0	3	0
Apocorophium louisianum (1040)																	
	1 Nov98	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	2 Jan99	0	1	22	6	31	1	0	0	0	1	18	4	29	0	0	0
	3 Feb99	4	9	147	21	90	8	0	0	10	10	49	86	61	2	0	0
	4 Apr99	2	12	4	31	153	9	0	0	1	1	6	11	53	0	0	0
	5 Jun99	0	6	3	5	28	17	0	0	1	0	25	11	16	34	0	0
Neanthes succinea (949)																	
	1 Nov98	1	0	2	0	0	14	147	183	0	0	0	0	1	51	100	0
	2 Jan99	0	0	0	1	5	24	1	1	0	0	16	0	24	43	30	0
	3 Feb99	0	0	0	0	3	21	15	0	0	0	1	1	8	16	3	0
	4 Apr99	0	0	0	0	5	14	19	12	0	0	0	0	9	30	36	0
	5 Jun99	0	0	0	0	1	16	46	17	0	0	0	0	0	13	19	0
Polypedilum scalaenum gp. (767)																	
	1 Nov98	18	24	2	2	9	14	0	0	54	26	7	1	5	4	0	0
	2 Jan99	53	17	4	60	89	37	0	0	3	5	0	6	0	1	0	0
	3 Feb99	17	1	1	37	38	22	0	0	1	0	0	16	0	2	0	0
	4 Apr99	13	11	30	13	34	5	0	0	0	0	3	3	5	0	0	0
	5 Jun99	1	0	8	13	36	6	0	0	0	0	3	3	2	2	0	0
Mysella planulata (752)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	3 Feb99	0	0	0	0	23	0	295	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	71	192	75	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	11	84	0	0	0	0	0	0	0	0	0
Polymesoda caroliniana (721)																	
	1 Nov98	0	0	2	4	7	5	0	0	0	0	6	2	0	8	0	0
	2 Jan99	0	0	45	0	38	66	0	0	0	0	5	0	0	0	0	0
	3 Feb99	0	1	14	0	22	40	0	0	0	1	8	0	16	13	0	0
	4 Apr99	0	1	13	12	38	53	0	0	0	1	27	18	49	29	1	0
	5 Jun99	2	0	5	3	23	42	0	0	0	10	22	13	35	20	1	0

Apocorophium (667)																	
	2 Jan99	0	0	30	0	20	0	0	0	0	0	0	0	2	0	0	0
	3 Feb99	1	22	0	0	83	7	0	0	0	0	0	0	0	0	0	0
	4 Apr99	25	7	0	97	248	2	1	0	4	3	26	6	34	1	0	0
	5 Jun99	0	0	0	6	35	0	1	1	0	0	0	1	4	0	0	0
Hobsonia florida (554)																	
	1 Nov98	0	0	6	2	8	84	20	8	0	2	4	0	40	16	8	0
	2 Jan99	0	0	33	0	38	11	0	0	0	0	10	0	20	16	7	0
	3 Feb99	2	1	24	0	9	0	0	0	0	1	13	0	10	2	43	0
	4 Apr99	0	2	15	10	8	0	0	0	0	10	15	19	4	8	1	0
	5 Jun99	0	1	0	0	12	1	0	0	3	1	1	2	1	2	0	0
Mysidopsis bahia (530)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	2	0	26	0	13	0
	2 Jan99	0	0	0	0	0	0	0	0	3	15	50	48	330	40	2	0
	4 Apr99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Edotea montosa (510)																	
	1 Nov98	0	0	0	2	0	4	1	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	13	0	10	6	0	2	0	2	4	0	0	9	0	0
	3 Feb99	1	9	24	1	16	8	7	0	0	0	11	0	23	21	0	0
	4 Apr99	4	10	16	17	55	9	0	0	1	8	14	11	33	19	0	0
	5 Jun99	10	0	3	1	53	31	0	0	0	0	0	0	1	40	0	0
Gammarus mucronatus (458)																	
	1 Nov98	0	1	0	0	0	0	6	2	0	0	0	0	0	1	121	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	17	5	0
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	11	2	0
	4 Apr99	0	0	0	0	0	8	8	4	0	0	1	0	0	85	130	0
	5 Jun99	0	0	0	0	0	0	8	0	0	0	0	0	0	1	46	0
Gammarus tigrinus (452)																	
	1 Nov98	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
	2 Jan99	0	3	0	17	2	0	0	0	2	0	8	38	42	0	0	0
	3 Feb99	0	3	0	1	15	0	0	0	5	12	2	57	12	0	0	0
	4 Apr99	10	1	0	23	2	0	0	0	13	3	0	43	4	0	0	0
	5 Jun99	1	1	0	2	0	0	0	0	21	35	11	48	13	0	0	0
Nemertea (407)																	
	1 Nov98	0	0	1	0	1	18	26	2	0	0	7	0	3	19	32	1
	2 Jan99	0	0	6	0	29	42	6	2	0	0	5	0	23	13	1	0
	3 Feb99	6	1	1	1	11	30	4	1	2	0	2	1	7	3	2	0
	4 Apr99	0	0	1	0	6	6	4	3	1	0	3	0	3	5	4	0
	5 Jun99	1	1	5	3	11	14	5	1	2	2	0	1	4	3	9	0
Polydora ligni (385)																	
	1 Nov98	0	0	0	0	3	0	15	77	0	0	0	0	0	0	0	0
	2 Jan99	0	0	58	0	43	0	13	3	0	0	5	0	2	1	9	0
	3 Feb99	0	0	7	1	13	4	20	0	0	0	0	0	0	0	23	0
	4 Apr99	0	4	0	7	18	3	0	0	0	0	0	3	0	3	0	0
	5 Jun99	0	2	0	0	5	21	22	0	0	0	0	0	0	0	0	0
Neritina usnea (339)																	
	1 Nov98	0	0	0	0	7	4	0	0	4	0	1	1	16	76	0	0
	2 Jan99	1	0	0	0	0	3	0	0	0	0	1	1	1	81	0	0
	3 Feb99	0	1	0	0	0	8	0	0	0	14	0	3	4	6	0	0
	4 Apr99	0	1	0	2	1	2	0	0	1	5	3	5	1	39	0	0
	5 Jun99	0	0	0	0	1	4	0	0	5	6	1	6	3	20	0	0
Tellinidae (335)																	
	1 Nov98	0	0	0	0	5	2	27	9	0	0	0	0	0	0	22	0
	2 Jan99	0	0	5	0	41	64	0	0	0	0	0	0	63	10	15	0

	3 Feb99	0	0	4	0	8	31	1	0	0	0	3	0	2	5	0	0
	4 Apr99	0	0	0	0	0	4	0	0	0	0	5	0	2	3	0	0
	5 Jun99	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0
Pectinaria gouldii (312)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	95	58	0
	2 Jan99	0	0	0	0	0	7	13	5	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	3	25	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	17	50	2	0	0	0	0	0	0	19	0
	5 Jun99	0	0	0	0	0	3	3	0	0	0	0	0	0	6	6	0
Balanomorpha (308)																	
	1 Nov98	0	0	0	0	0	0	4	10	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	136	6	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	34	44	7	4
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	40	11	0
Amakusanthura magnifica (303)																	
	2 Jan99	0	2	0	0	0	8	1	0	0	0	0	0	0	0	0	0
	3 Feb99	0	1	0	0	3	15	3	2	0	0	0	0	0	0	0	0
	4 Apr99	1	1	7	2	24	42	17	0	0	0	0	0	0	0	0	0
	5 Jun99	1	12	8	6	53	16	9	0	1	4	2	18	33	10	1	0
Americamysis bahia (298)																	
	2 Jan99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	1	1	0	0	5	12	19	16	76	41	50	2
	4 Apr99	0	5	7	2	0	1	0	0	4	2	5	1	2	14	20	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	1	0	1	9	0	0
Assiminea succinea (271)																	
	1 Nov98	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	3 Feb99	0	0	0	0	0	15	0	0	0	0	0	1	0	0	0	0
	4 Apr99	0	0	0	0	0	197	4	2	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	43	6	0	0	0	0	0	0	0	0	0
Chironomus (257)																	
	1 Nov98	0	0	0	0	0	2	0	0	1	1	0	0	0	5	0	0
	2 Jan99	17	12	8	39	4	13	0	0	40	8	2	15	9	7	0	0
	3 Feb99	0	3	3	1	2	0	0	0	0	1	2	3	0	0	0	0
	4 Apr99	4	6	2	2	0	0	0	0	5	1	2	6	4	0	0	0
	5 Jun99	1	0	4	3	0	1	0	0	15	0	3	0	0	0	0	0
Coelotanypus (257)																	
	1 Nov98	1	1	6	5	1	0	0	0	5	17	3	0	0	0	0	0
	2 Jan99	3	16	16	4	12	0	0	0	4	5	1	16	7	0	0	0
	3 Feb99	9	11	8	2	4	0	0	0	9	13	19	1	0	0	0	0
	4 Apr99	3	0	1	1	2	0	0	0	5	0	10	3	1	0	0	0
	5 Jun99	2	0	3	6	1	0	0	0	0	1	3	8	8	0	0	0

Polypedilum halterale gp. (248)																	
	1 Nov98	2	2	1	6	0	0	0	0	5	8	3	0	4	0	0	0
	2 Jan99	15	20	8	36	2	0	0	0	0	5	0	4	0	0	0	0
	3 Feb99	13	21	2	25	3	0	0	0	4	1	0	6	0	0	0	0
	4 Apr99	20	1	0	7	0	0	0	0	0	0	0	1	0	0	0	0
	5 Jun99	6	0	0	5	0	1	0	0	6	1	0	4	0	0	0	0
Glottidia pyramidata (247)																	
	4 Apr99	0	0	0	0	0	0	31	0	0	0	0	0	0	0	7	0
	5 Jun99	0	0	0	0	0	21	155	0	0	0	0	0	0	3	30	0
Erichthonius brasiliensis (240)																	
	2 Jan99	0	0	0	0	0	0	1	57	0	0	0	0	0	0	4	0
	3 Feb99	0	0	0	0	0	0	0	22	0	0	0	0	0	0	42	21
	4 Apr99	0	0	0	0	0	1	0	57	0	0	0	0	0	3	10	1
	5 Jun99	0	0	0	0	0	0	8	1	0	0	0	0	0	0	12	0
Platyhelminthes (234)																	
	1 Nov98	0	0	0	0	0	3	0	0	1	0	0	0	0	0	1	0
	2 Jan99	1	0	4	2	1	0	0	0	0	0	0	0	0	1	22	0
	3 Feb99	0	0	7	1	11	8	1	0	0	0	0	0	2	12	10	0
	4 Apr99	2	4	2	2	60	5	4	9	1	0	3	4	10	5	22	0
	5 Jun99	0	0	0	0	0	0	1	1	0	2	0	1	0	0	8	0
Tanytarsus (225)																	
	2 Jan99	7	11	2	34	2	0	0	0	3	5	0	0	1	0	0	0
	3 Feb99	8	8	0	4	0	0	0	0	2	4	0	1	0	0	0	0
	4 Apr99	22	38	1	6	1	0	0	0	4	16	1	2	0	0	0	0
	5 Jun99	3	0	1	25	1	0	0	0	3	0	2	7	0	0	0	0
Cirripedia (210)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1
	2 Jan99	0	0	30	0	0	1	1	8	0	0	0	0	11	0	0	0
	3 Feb99	0	0	0	0	0	18	1	10	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	5	1	106	0	0	0	0	0	0	0	0
Haminoea succinea (209)																	
	1 Nov98	0	0	0	0	0	0	6	0	0	0	0	0	0	0	52	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
	3 Feb99	0	0	0	0	0	1	12	12	0	0	0	0	0	4	52	1
	4 Apr99	0	0	0	0	2	2	2	2	0	0	7	0	0	1	5	0
	5 Jun99	0	0	0	0	0	9	7	0	0	0	0	0	0	9	13	0
Palaemonetes pugio (208)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	8	5	23	5	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	54	13	18	4
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	8	30	3	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	2	0	3	10	5	6
	5 Jun99	0	0	1	0	0	0	0	0	0	0	2	0	0	6	2	0
Glycinde solitaria (199)																	
	1 Nov98	0	0	0	0	0	2	12	7	0	0	0	0	0	5	37	0
	2 Jan99	0	0	0	0	0	3	6	4	0	0	0	0	0	4	36	0
	3 Feb99	0	0	0	0	0	1	6	18	0	0	0	0	3	3	15	3
	4 Apr99	0	0	0	0	0	3	11	3	0	0	0	0	0	0	3	0
	5 Jun99	0	0	0	0	0	1	5	0	0	0	0	0	0	1	7	0

Tagelus plebeius (199)																	
	1 Nov98	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	4	0	24	31	31	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	20	20	0	0	0	1	0	1	8	6	0
	4 Apr99	0	0	6	0	12	15	1	3	0	0	0	0	1	0	0	0
	5 Jun99	0	0	0	0	2	6	0	2	0	0	0	0	3	1	0	0
Cymadusa compta (179)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
	3 Feb99	0	0	0	0	0	0	0	7	0	0	0	0	0	0	19	0
	4 Apr99	0	0	0	0	0	0	0	122	0	0	0	0	0	0	11	6
	5 Jun99	0	0	0	0	0	0	1	9	0	0	0	0	0	0	1	0
Paraprionospio pinnata (167)																	
	1 Nov98	0	0	5	0	5	1	18	0	0	0	0	0	0	11	85	0
	2 Jan99	0	0	0	0	0	3	4	3	0	0	0	0	0	0	6	0
	3 Feb99	0	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	6	2	0	0	0	0	0	0	0	6	0
Tanytarsus sp. O (163)																	
	1 Nov98	1	0	1	3	0	0	0	0	9	0	4	2	0	0	0	0
	2 Jan99	4	16	6	4	0	0	0	0	0	43	0	4	0	0	0	0
	3 Feb99	24	5	1	3	0	0	0	0	10	7	0	0	0	0	0	0
	4 Apr99	4	0	0	2	0	0	0	0	2	0	0	6	0	0	0	0
	5 Jun99	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Amphipoda (160)																	
	1 Nov98	0	0	1	2	0	0	0	0	0	0	0	2	1	10	6	2
	2 Jan99	4	6	2	11	0	9	0	0	0	0	0	0	10	0	0	0
	3 Feb99	0	7	0	12	55	1	1	2	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	1	0	0	0	0	1	0	0	1	0	4	1	4
	5 Jun99	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0
Cryptochironomus (140)																	
	1 Nov98	0	1	1	0	1	3	0	0	0	0	0	0	1	0	0	0
	2 Jan99	2	2	3	7	19	13	0	0	3	0	0	0	0	0	0	0
	3 Feb99	1	2	1	6	11	7	1	0	1	1	0	8	0	0	0	0
	4 Apr99	0	2	2	8	10	0	0	0	1	2	3	4	2	0	0	0
	5 Jun99	0	3	0	0	3	2	0	0	0	0	0	0	3	0	0	0
Chironomidae (135)																	
	1 Nov98	0	0	1	0	0	0	0	0	1	0	0	0	0	4	0	0
	2 Jan99	18	4	2	7	4	0	0	0	0	0	0	0	1	0	0	0
	3 Feb99	9	4	0	22	0	0	0	0	0	0	2	2	0	0	0	0
	4 Apr99	12	1	1	13	1	0	0	0	0	1	0	12	0	0	0	0
	5 Jun99	0	0	2	4	1	0	0	0	2	0	0	3	0	1	0	0
Rangia cuneata (135)																	
	1 Nov98	0	0	0	1	0	0	0	0	0	0	3	0	1	0	0	0
	2 Jan99	0	0	25	0	22	10	0	0	0	0	2	0	6	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	4	0	21	3	0	0
	4 Apr99	0	0	0	0	1	0	0	0	0	1	0	0	23	1	0	0
	5 Jun99	0	0	0	3	0	0	0	0	0	0	6	1	1	0	0	0

Almyracuma nr. proximoculae (131)																	
	1 Nov98	0	0	0	0	0	5	7	0	0	0	0	0	0	1	0	0
	2 Jan99	0	0	0	1	0	14	6	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	4	3	6	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	7	0	25	20	0	0	0	0	0	3	0	0	0	0
	5 Jun99	0	0	3	3	17	2	4	0	0	0	0	0	0	0	0	0
Rhithropanopeus harrisii (131)																	
	1 Nov98	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0
	2 Jan99	0	1	1	0	1	0	0	4	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	1	0	0	0	0	1	0	1	2	0	0	0
	4 Apr99	0	0	0	0	0	3	0	0	0	0	0	0	2	0	2	0
	5 Jun99	0	0	0	0	9	6	2	0	0	2	7	2	40	36	4	0
Tellina (131)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	18	7	7	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0
	4 Apr99	0	0	0	0	3	3	13	1	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	32	0	0	0	0	0	0	2	25	0
Paramphinome (120)																	
	1 Nov98	0	0	0	0	0	0	7	0	0	0	0	0	0	0	12	0
	2 Jan99	0	0	0	0	0	1	24	2	0	0	0	0	0	0	17	0
	3 Feb99	0	0	0	0	0	4	20	1	0	0	0	0	0	0	11	0
	4 Apr99	0	0	0	0	0	1	8	0	0	0	0	0	0	0	4	0
	5 Jun99	0	0	0	0	0	1	3	0	0	0	0	0	0	0	4	0
Hippolyte zostericola (119)																	
	2 Jan99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
	5 Jun99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6	37
Bemlos (117)																	
	2 Jan99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	2	11	27	0	0	0	0	0	0	9	0
	5 Jun99	0	0	0	0	0	0	31	2	0	0	0	0	0	0	31	0
Dicrotendipes (113)																	
	4 Apr99	20	1	0	16	0	0	0	0	4	2	3	24	0	0	0	0
	5 Jun99	1	0	0	4	7	0	0	0	25	0	5	0	1	0	0	0
Acteocina canaliculata (110)																	
	1 Nov98	0	0	0	1	0	0	2	2	0	0	0	0	0	0	2	0
	2 Jan99	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	1	7	2	0	0	0	0	0	0	11	0
	5 Jun99	0	0	0	0	0	10	19	6	0	0	0	0	0	16	22	1
Procladius (108)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
	2 Jan99	1	5	3	3	2	0	0	0	4	0	0	5	1	0	0	0
	3 Feb99	4	10	2	5	0	1	0	0	6	8	10	0	0	0	0	0
	4 Apr99	3	1	2	11	0	0	0	0	10	1	1	3	0	0	0	0
	5 Jun99	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0

Nereidae (105)																	
	1 Nov98	0	0	0	0	0	0	31	4	0	0	0	0	26	0	0	2
	2 Jan99	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	7	25	0	0	0	0	1	0	0	0
Gitanopsis laguna (102)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0
	2 Jan99	0	0	1	0	3	17	0	9	0	0	0	0	3	1	0	0
	3 Feb99	0	0	0	0	4	1	0	1	0	0	0	0	0	4	0	0
	4 Apr99	0	1	2	1	11	8	1	0	0	1	2	0	12	2	0	0
	5 Jun99	1	0	0	0	7	1	0	0	0	1	0	0	2	0	1	0
Tanaidacea (102)																	
	3 Feb99	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0
	4 Apr99	0	0	1	0	1	6	15	11	0	0	0	0	0	0	0	0
	5 Jun99	2	0	0	9	5	31	6	1	0	0	0	0	0	8	0	0
Diastoma varium (99)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	41
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	16
Erichsonella attenuata (99)																	
	2 Jan99	0	0	0	0	0	0	1	4	0	0	0	0	0	0	1	3
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0
	4 Apr99	0	0	0	0	0	2	6	0	0	0	0	0	0	30	36	2
	5 Jun99	0	0	0	0	0	0	1	3	0	0	0	0	0	1	2	0
Nemertea sp. F (98)																	
	1 Nov98	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	1	7	10	2	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	4 Apr99	0	0	0	0	0	14	20	8	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	6	4	0	0	0	0	0	10	0	0
Nereis lamellosa (93)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0
Caprellidae (84)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
	3 Feb99	0	0	0	0	0	0	9	0	0	0	0	0	0	0	5	0
	4 Apr99	0	0	0	0	0	32	4	5	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	24	0
Decapoda (zoea) (82)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	20	1	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	49	12	0
Mysidacea (68)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
	2 Jan99	0	1	0	0	0	0	0	0	1	3	5	0	0	2	0	0
	3 Feb99	1	0	0	0	0	0	0	17	0	0	0	0	0	0	4	0
	4 Apr99	1	0	3	6	0	0	0	0	4	4	1	1	1	3	0	0
	5 Jun99	0	0	0	0	0	0	0	0	1	0	0	1	3	3	0	0
Eteone (67)																	
	1 Nov98	0	0	0	0	0	0	5	0	0	0	0	0	0	0	13	0
	2 Jan99	0	0	1	0	0	0	3	0	0	0	0	0	2	1	1	0
	3 Feb99	0	0	0	0	3	15	0	0	0	0	1	0	0	5	3	0
	4 Apr99	0	0	0	0	0	0	0	0	0	1	7	0	2	1	3	0

Anthuridae (66)																	
	1 Nov98	0	2	2	1	5	7	1	0	0	0	0	0	0	5	4	1
	2 Jan99	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	1	7	10	13	3	0
Macoma tenta (64)																	
	2 Jan99	0	0	15	0	0	3	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	3	17	0	0	0	0	0	0	2	0	0
Osteichthyes (64)																	
	1 Nov98	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0
	2 Jan99	1	0	0	1	0	0	0	0	2	0	0	0	0	2	0	1
	3 Feb99	0	0	0	0	0	0	0	0	1	0	0	2	0	3	0	0
	4 Apr99	0	0	0	0	0	0	0	0	4	1	1	7	2	3	2	1
	5 Jun99	0	0	0	0	0	0	0	0	0	0	6	2	0	9	8	2
Bowmaniella (63)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
	3 Feb99	0	0	0	0	0	0	0	2	0	0	0	0	0	10	3	39
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Ceratopogonidae (63)																	
	1 Nov98	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0
	2 Jan99	5	3	3	5	2	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	1	2	1	5	2	0	0	0	0	0	1	1	0	0	0	0
	4 Apr99	1	1	3	3	0	2	0	0	0	0	4	2	0	0	0	0
	5 Jun99	2	1	2	4	2	0	0	0	0	0	0	0	0	0	0	0
Nereis succinea (60)																	
	2 Jan99	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0
Gastropoda (59)																	
	1 Nov98	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	4	0	1	4	7	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	3	3	0	2	0	0	0	0	0	0	0	1	0
	4 Apr99	0	0	0	0	3	7	8	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	8	0	0	0	0	0	0	0	4	0
Astyris lunata (58)																	
	2 Jan99	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	22
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	1	6	17
Nudibranchia (56)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0
	2 Jan99	0	0	0	0	0	1	0	20	0	0	0	0	0	12	2	0
	3 Feb99	0	0	0	0	0	1	0	0	0	0	0	0	0	6	1	0
	4 Apr99	0	0	0	0	0	0	0	1	0	0	2	0	1	1	2	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Caprella (55)																	
	2 Jan99	0	0	0	0	0	0	1	12	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	15	20	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0

Fissimentum (55)																	
	2 Jan99	3	5	0	16	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	10	8	7	1	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0
Stictochironomus (49)																	
	1 Nov98	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2 Jan99	5	6	1	3	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	14	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0
	5 Jun99	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
Hippolyte (47)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47
Mediomastus californiensis (46)																	
	3 Feb99	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0
Eteone heteropoda (43)																	
	3 Feb99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	3	0	8	11	8	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	3	0	0	0	0	0	0	0	6	0
Polydora socialis (40)																	
	1 Nov98	0	0	0	0	0	0	13	5	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1
	5 Jun99	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0
Tanytarsus sp. S (39)																	
	1 Nov98	0	0	0	1	0	0	0	0	0	23	0	1	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0
Batea catharinensis (36)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
	3 Feb99	0	0	0	0	0	0	0	5	0	0	0	0	0	0	15	0
	4 Apr99	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
Erichsonella (36)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0
	4 Apr99	0	0	0	0	0	2	0	27	0	0	0	0	0	0	0	0
Mysidopsis bigelowi (34)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	2 Jan99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	14	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
Stempellina (34)																	
	1 Nov98	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
	2 Jan99	5	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0
	3 Feb99	6	1	0	6	0	0	0	0	0	0	0	4	0	0	0	0
	4 Apr99	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0

Tozeuma carolinense (34)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	10
Mitrella lunata (32)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
Taphromysis louisianae (32)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	12	0	6	3	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0
Cryptotendipes (30)																	
	1 Nov98	1	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0
	2 Jan99	3	0	0	1	0	0	0	0	0	3	0	1	0	0	0	0
	3 Feb99	4	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
	4 Apr99	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Genetyllis castanea (29)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	4 Apr99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	3	0	0	0	0	0	0	3	20	0
Corbiculidae (28)																	
	3 Feb99	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0
Mediomastus (27)																	
	2 Jan99	0	0	0	0	0	2	14	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	1	6	0	3	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polydora (27)																	
	2 Jan99	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	10	4	0	0	0	0	0	4	0	0	0
Asellota (26)																	
	2 Jan99	0	3	0	16	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Balanus (26)																	
	1 Nov98	0	0	0	0	0	2	0	0	0	0	13	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	6	0	2	3	0	0
Spiochaetopterus costarum (26)																	
	4 Apr99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	4	16	4	0	0	0	0	0	0	0	0
Elmidae (25)																	
	4 Apr99	1	0	0	17	1	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Monoculodes nyei (25)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
	3 Feb99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0
	4 Apr99	0	0	0	0	0	2	1	3	0	0	0	0	0	1	3	0

Oecetis (24)																	
	2 Jan99	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	4 Apr99	0	0	0	7	0	0	0	0	1	1	0	4	0	0	0	0
	5 Jun99	1	0	0	4	0	0	0	0	1	0	0	1	0	0	0	0
Chaetognatha (23)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	13	4	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2
Nassarius vibex (22)																	
	1 Nov98	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
	4 Apr99	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	3
Orthocladiinae (22)																	
	2 Jan99	0	2	1	6	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
	5 Jun99	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus (22)																	
	1 Nov98	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
	3 Feb99	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	5 Jun99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Aricidea philbinae (20)																	
	1 Nov98	0	0	0	0	0	0	4	16	0	0	0	0	0	0	0	0
Caenidae (19)																	
	1 Nov98	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	2 Jan99	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0
	3 Feb99	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
	4 Apr99	2	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0
	5 Jun99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triaenodes (19)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0
Xanthidae (19)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	1	3	0	3	0
	4 Apr99	0	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Heteromastus filiformis (18)																	
	4 Apr99	0	0	0	0	0	0	15	3	0	0	0	0	0	0	0	0
Idoteidae (18)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0
	5 Jun99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Phyllodoce arenae (16)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	2 Jan99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0
	4 Apr99	0	0	0	0	0	1	0	2	0	0	0	0	0	0	4	0
	5 Jun99	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
Actiniaria (15)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0
	4 Apr99	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0

	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Chironomini Genus A (15)																	
	1 Nov98	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0
Mysidopsis (15)																	
	2 Jan99	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	0
Oecetis nocturna (15)																	
	3 Feb99	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
Chironominae (14)																	
	1 Nov98	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	2 Jan99	3	1	0	0	0	0	0	0	2	3	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Exosphaeroma diminuta (14)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	7	0	2	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Munna (14)																	
	4 Apr99	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0
Callinectes sapidus (13)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	1
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Diopatra cuprea (13)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0
	4 Apr99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Prionospio (Minuspio) (13)																	
	5 Jun99	0	0	0	0	0	1	11	0	0	0	0	0	0	0	1	0
Ascidiacea (12)																	
	4 Apr99	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0
Odostomia (12)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	3 Feb99	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Polycirrus carolinensis (12)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	5	2	2	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Tanytarsus sp. T (12)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
Vitrinellidae (12)																	
	4 Apr99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0
Argissa hamatipes (11)																	
	5 Jun99	0	0	0	0	0	3	3	0	0	0	0	0	0	0	5	0
Corbicula (11)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	3	8	0	0
Paratendipes basidens (11)																	
	2 Jan99	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0

Sphaeroma terebrans (11)																	
	1 Nov98	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	4 Apr99	0	0	0	2	0	0	0	0	0	0	0	1	6	0	0	0
Tanaidae (11)																	
	2 Jan99	0	0	0	0	0	1	0	0	0	0	1	0	0	1	2	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	5 Jun99	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0
Lopescladius (10)																	
	2 Jan99	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Bowmaniella portoricensis (9)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0
Mytilopsis leucophaeata (9)																	
	2 Jan99	0	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0
	4 Apr99	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Sphaeroma quadridentata (9)																	
	2 Jan99	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	4 Apr99	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0
Anadara transversa (8)																	
	4 Apr99	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Argissa (8)																	
	4 Apr99	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
Limulus polyphemus (8)																	
	4 Apr99	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Parvilucina multilineata (8)																	
	2 Jan99	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Rictaxis punctostriatus (8)																	
	2 Jan99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Aegathoa oculata (7)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0
	5 Jun99	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Asychis elongata (7)																	
	4 Apr99	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Baetidae (7)																	
	1 Nov98	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0

Brachidontes exustus (7)																	
	2 Jan99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Hyalidae (7)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0
Leitoscoloplos robustus (7)																	
	2 Jan99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Melitidae (7)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	5 Jun99	0	0	0	0	0	1	1	0	0	0	0	0	0	2	2	0
Monoculodes (7)																	
	2 Jan99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	1	1	0	0	0	0	0	3	1	0
Parakeifferiella (7)																	
	2 Jan99	0	0	0	0	0	0	0	0	3	0	0	2	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Trinectes maculatus (7)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	4 Apr99	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Xenanthura brevitelson (7)																	
	4 Apr99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Decapoda (megalopa) (6)																	
	5 Jun99	0	0	0	0	0	1	2	0	0	0	0	0	0	3	0	0
Ephemeroptera (6)																	
	1 Nov98	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
	4 Apr99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Geukensia demissa (6)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
Ostracoda (6)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Paraprionospio (6)																	
	3 Feb99	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Penaeus duorarum (6)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
Solenoceridae (6)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
Tharyx (6)																	
	2 Jan99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Anachis (5)																	
	5 Jun99	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0

Aoridae (5)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
Axarus (5)																	
	1 Nov98	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Corophiidae (5)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
	3 Feb99	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus (5)																	
	4 Apr99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Hyssurridae (5)																	
	1 Nov98	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Leitoscoloplos (5)																	
	1 Nov98	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0
Leptochela serratorbita (5)																	
	2 Jan99	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Sthenelais (5)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
	4 Apr99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Caridea (4)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	5 Jun99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Dendrobranchiata (4)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Dicrotendipes neomodestus (4)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	2 Jan99	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Djalmabatista (4)																	
	3 Feb99	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyale (4)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Isotomidae (4)																	
	3 Feb99	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	4 Apr99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos foliosus (4)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Mactridae (4)																	
	2 Jan99	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0
Ogyrides (4)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Penaeus (Farfantepenaeus) (4)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polypedilum illinoense gp. (4)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Scolelepis texana (4)																	
	4 Apr99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
Sphaerium striatinum (4)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Caenis diminuta (3)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
Cerapus tubularis (3)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Cladopelma (3)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	5 Jun99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cricotopus (3)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Eurypanopeus depressus (3)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Harrieta faxoni (3)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Hydroptilidae (3)																	
	2 Jan99	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Laevicardium mortoni (3)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Leucon americanus (3)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Monticellina (3)																	
	1 Nov98	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Notemigonus crysoleucas (3)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0
Opisthobranchia (3)																	
	4 Apr99	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Parachironomus carinatus (3)																	
	3 Feb99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Paracladopelma (3)																	
	2 Jan99	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parahesione luteola (3)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

Paranaitis polynoides (3)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Prionospio perkinsi (3)																	
	4 Apr99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Processa (3)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tellina texana (3)																	
	3 Feb99	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Trichoptera (3)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Brania (2)																	
	2 Jan99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Brania wellfleetensis (2)																	
	3 Feb99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Cephalochordata (2)																	
	1 Nov98	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Crassostrea virginica (2)																	
	5 Jun99	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Crepidula (2)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Diptera (2)																	
	5 Jun99	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ensis minor (2)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	4 Apr99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Epitonium (2)																	
	4 Apr99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Hemipodus roseus (2)																	
	4 Apr99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Hippolyte curacaoensis (2)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Hirudinea (2)																	
	4 Apr99	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Hydracarina (2)																	
	2 Jan99	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Insecta (2)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Ischadium recurvum (2)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Leptoceridae (2)																	
	3 Feb99	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptochela (2)																	
	4 Apr99	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Mitrella (2)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Nanocladius (2)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Oecetis cinerascens (2)																	

	2 Jan99	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Orchestia (2)																	
	4 Apr99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Pinnixa sayana (2)																	
	5 Jun99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Polychaeta (2)																	
	2 Jan99	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Polypedilum flavum (2)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Rheotanytarsus exiguus gp. (2)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Sigambra bassi (2)																	
	1 Nov98	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Sigambra tentaculata (2)																	
	5 Jun99	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Tanypodinae (2)																	
	2 Jan99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Tanytarsini (2)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Turbonilla (2)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Ambidexter symmetricus (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Anchialina typica (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Aplysia (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Arabellidae (1)																	
	5 Jun99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Argia (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Arthropoda (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Boccardia (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Brachidontes (1)																	
	3 Feb99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Branchiostoma floridae (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Caprellidea (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Clinotanypus (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Cnidaria (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Cordulegastridae (1)																	
	5 Jun99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corixidae (1)																	
	3 Feb99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclinella tenuis (1)																	
	5 Jun99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cymodoce faxoni (1)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Discias atlanticus (1)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Einfeldia natchitocheae (1)																	
	4 Apr99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eumida sanguinea (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Exosphaeroma (1)																	
	2 Jan99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fittkauimyia (1)																	
	4 Apr99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gammarus (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Glycera americana (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Harnischia (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Hemiptera (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Hyalella azteca (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hydroptila (1)																	
	4 Apr99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Isopoda (1)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Leitoscoloplos fragilis (1)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lucinidae (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Macoma constricta (1)																	
	3 Feb99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Molgulidae (1)																	
	4 Apr99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Mysidopsis furca (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Nemertea sp. A (1)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Nemertea sp. B (1)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Neverita duplicata (1)																	
	1 Nov98	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Odonata (1)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Ogyrides alphaerostris (1)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Ogyrides limicola (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Onuphidae (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Osteichthyes sp. A (1)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Paguridea (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Pagurus (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Paratendipes (1)																	
	1 Nov98	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Petrolisthes armatus (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Phyllodocidae (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Pinnixa (1)																	
	2 Jan99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Planorbidae (1)																	
	5 Jun99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Plecoptera (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Podarkeopsis levifuscina (1)																	
	5 Jun99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polycirrus (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polydora caulleryi (1)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polypedilum (1)																	
	3 Feb99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rocinela signata (1)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Saldidae (1)																	
	4 Apr99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Scolelepis squamata (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Scolytidae (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Sigalionidae (1)																	
	2 Jan99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sipuncula (1)																	
	1 Nov98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Solenocera vioscai (1)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Stenochironomus (1)																	
	3 Feb99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenothoe minuta (1)																	
	5 Jun99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sthenelais sp. A (1)																	
	2 Jan99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Syngnathidae (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Syngnathus (1)																	
	3 Feb99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tagelus divisus (1)																	
	5 Jun99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tanypus carinatus (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Tellina tampaensis (1)																	
	3 Feb99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tricorythidae (1)																	
	2 Jan99	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Valvifera (1)																	
	1 Nov98	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Zavreliella (1)																	
	4 Apr99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zygoptera (1)																	
	4 Apr99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0