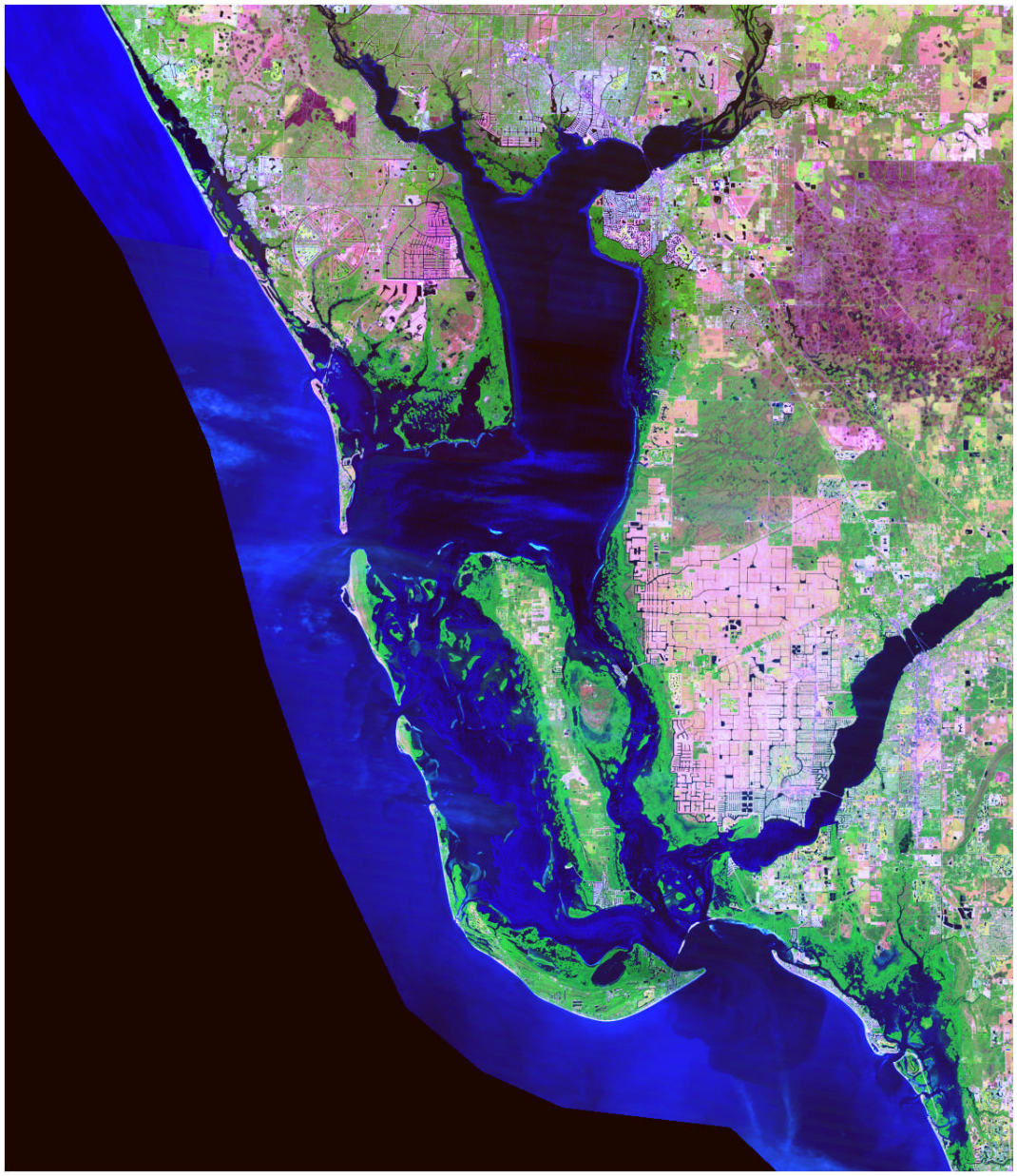
COMMON MACROBENTHIC INVERTEBRATES OF CHARLOTTE HARBOR

A PHOTOGRAPHIC SUPPLEMENT TO:
BENTHIC INVERTEBRATE SPECIES RICHNESS & DIVERSITY AT DIFFERENT HABITATS IN THE GREATER CHARLOTTE HARBOR SYSTEM

Charlotte Harbor National Estuary Program
1926 Victoria Avenue
Fort Myers, Florida 33901



Mote Marine Laboratory Technical Report No. 1169 (supplement)

ACKNOWLEDGMENTS

This document was prepared with support from the Charlotte Harbor National Estuary Program with supplemental support from Mote Marine Laboratory. The project was conducted through the Benthic Ecology Program of Mote's Center for Coastal Ecology. Mote staff project participants included: Principal Investigator James K. Culter; Field Biologists and Invertebrate Taxonomists, Jay R. Leverone, Debi Ingrao, Anamari Boyes, Bernadette Hohmann and Lucas Jennings; Data Management, Jay Sprinkel and Janet Gannon; Sediment Analysis, Jon Perry and Ari Nissanka.

Photos provided within this section were taken by Mote Marine Laboratory staff, Jim Culter, Debi Ingrao, and Lucas Jennings.

Comments and suggestions from the of the Charlotte Harbor National Estuary Program Technical Advisory Committee members was helpful in formulating the products resultant from the study. 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.

COMMON MACROBENTHIC INVERTEBRATES OF CHARLOTTE HARBOR

This portion of the document provides images of some of the common macroinvertebrates of Charlotte Harbor. It is not intended to provide a comprehensive photographic documentation of species but provides a look at the variety of shapes and sizes of benthic invertebrates. It is difficult to identify most invertebrates from photographs. Microscopic examination of the details of specific small structures is usually required to provide an accurate identification.

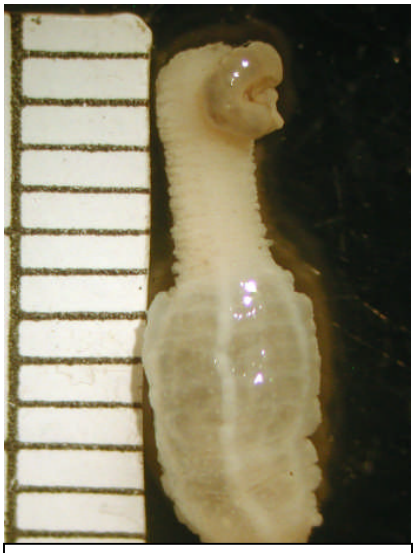
Phylum Porifera

Sponges are one of the most primitive groups of animals comprised of more than 5,000 living species. Sponges lack many of the typical features of animals including nerves and locomotion and may be thought to be plants by the casual observer. Sponges are abundant in the Gulf of Mexico and are common in the more saline areas of lower Charlotte Harbor, primarily near the passes. Often they are small and inconspicuous. One of the more common sponges is the sulfur sponge, *Cliona celata*, which begins as an encrusting layer on rock or shell and may form in to an upright structure as shown below. Sponges have many different appearances and definitive identification of some species requires a microscopic examination of the skeletal material known as spicules.

Yellow sulfur sponge *Cliona celata*.

Phylum Cnidaria

This phylum is almost exclusively marine and includes the following classes; Hydrozoa (mostly small and colonial, plant-like appearance), Scyphozoa and Cubozoa (jellyfish), , Anthozoa (anemones and corals), most of which contain stinging cells, called nematocysts, used to capture and kill prey, and which also function as a defensive mechanism. Hydrozoans are common throughout the estuary and appear as small branching plant like structures on seagrasses and firm substrate. The hydrozoans may cause a stinging or burning sensation on the legs when wading through seagrasses. Some types of corals, small solitary stony corals and soft corals such as *Leptogorgia*, are present within the study area within the high salinity areas near passes. However, anemones including the burrowing species are more common in the soft bottom benthos of Charlotte Harbor. In the past five years a species of jellyfish that is common in the Florida Keys, *Cassiopea andromeda* (the upside-down jellyfish) has undergone a range extension to the north and is now found as far north as Longboat Key, just south of Tampa Bay. A reason for the range extension has not been determined but may be linked to changes in coastal water temperature, as many tropical invertebrates are limited in distribution by cold water temperatures.



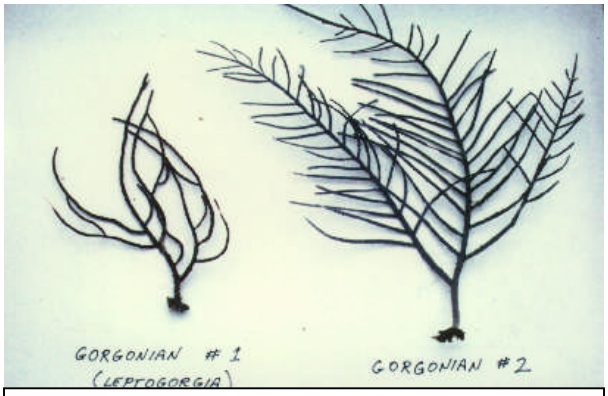
Leptosynapta sp. is a burrowing anemone.

Cassiopeia andromeda shown in the laboratory.

Tentacle crown of the burrowing anemone *Ceriantheopsis americanus*.

Ceriantheopsis as it appears in nature.

Ceriantheopsis as it appears outside of tube.



Examples of the soft coral *Leptogorgia* sp. which are usually dark pink or purple in color

Phylum Annelida – segmented worms

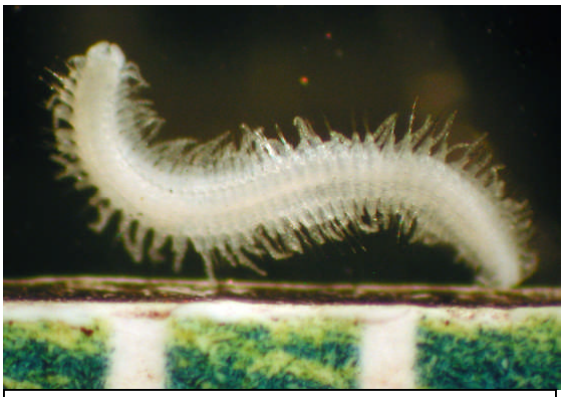
The annelids or segmented worms are one of the most abundant groups of invertebrates found within benthic habitats. They are very diverse in size and form but are generally recognizable as "worms" although not all worm-like creatures are annelids. The annelids have soft bodies and generally range in size from less than a millimeter to several centimeters in length. Annelids are represented by three major classes, the Polychaeta, the Oligochaeta and the Hirudinea (leaches).The polychaete annelids are the equivalent of the earthworms for the aquatic environment, although they are much more abundant than earthworms. The annelids have representative of all the major feeding types, filter feeder, herbivore, detritivore, scavenger, and predator.

The scale lines in the photographs are 1 mm apart.

Prionospio steenstrupi

Diopatra cuprea (head and jaws)

Heteromastus filifomis

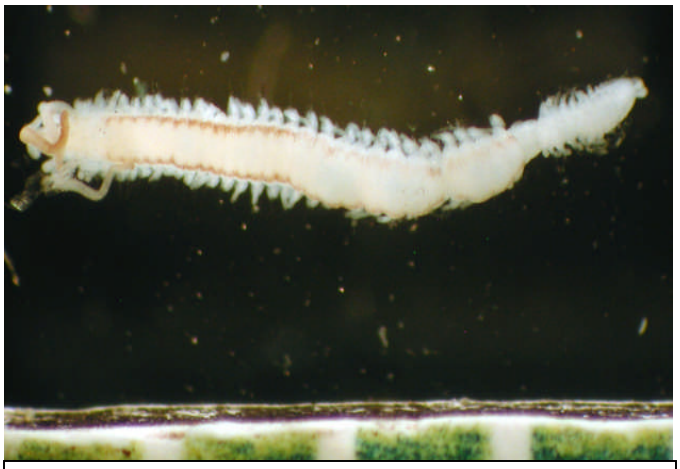


Syllis cf. cornuta

The polychaetes are often the dominant fauna of the marine environment, occurring in virtually all marine and estuarine habitats. Oligochaetes are generally smaller than the polychaetes and are more plentiful in freshwater and are well known as terrestrial earthworms. The leaches are mostly found in freshwater habitats.

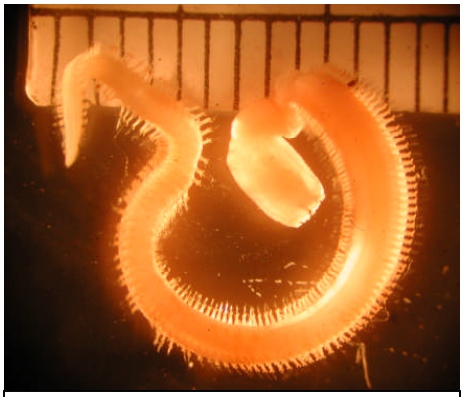
Annelids play a critical role in energy transfer in the ecological pyramid. They are the principal consumers of the organic material that becomes trapped within the sediment. They in turn become food for other organisms such as fishes and crabs which return the energy from the organic sediments back to the food chain. Planktonic larvae from the polychaetes and other benthic organisms are also harvested as food by pelagic plankton feeders.

Polydora websteri, anterior region only.



Autolytus dentalius

Terebella rubra



Glycera americana

Terebella rubra

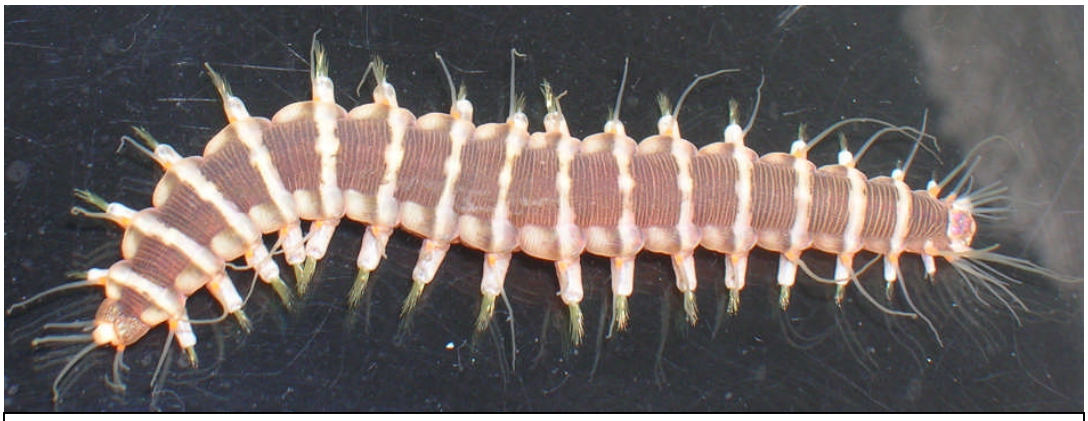
Polynoidae sp. a scale worm.

Some species of polychaetes are sessile and may spend their entire life within a tube or burrow. Other species are highly mobile and may crawl across the surface or burrow through the sediment in search of food.

Paper like tube constructed by the polychaete *Chaetopterus variopedatus*. The tubes maximum tube diameter is approximately 1 inch. Two small commensal crabs (1 male, 1 female) live with the worm in the tube.

Photo of the odd segmented body of the parchment tube worm *Chaetopterus variopedatus*. The head end is to the left the tail to the right. The paddle shaped structures in the middle are used to circulate water through the tube so the worm can feed on the suspended material in the water.

Picture of two live polychaetes (fire worms, *Eurythoe* sp.) in an aquarium, large one in the center and a small one on the right. The heads are not visible. Fire worms have venemous bristles (white projections in above image) that cause swelling and burning if touched. They inhabat hard bottom areas and sand and mud.



Picture of a live Hesionidae polychaete in a petri dish. Head is on the right.

For additional information on Annelids see the following:
Introduction to the Annelida
http://www.ucmp.berkeley.edu/annelida/annelida.html
Family Polynoidea: http://rmbr.nus.edu.sg/polychaete/Polynoidea.html
http://seagrant.gso.uri.edu/research/georges_bank/Species_List/Polynoidae.htm

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

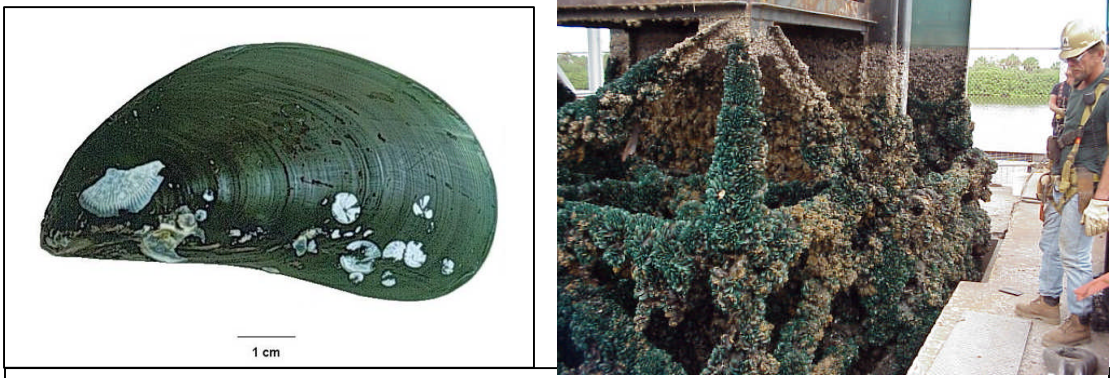
Phylum Mollusca

Mollusks are the second largest of the invertebrate groups and are very abundant in Charlotte Harbor as they are worldwide. Mollusks include a variety of species that are well known as seafood or as decorative shells. The major classes of the Mollusca consists of the Polyplacophora (chitons), Gastropoda (snails), Bivalvia (mussels, clams, oysters, etc.), Scaphopods (tusk shells, a small group having tubular tapered shells not represented in Charlotte Harbor), and the Cephalopods (octopus and squid). The key characteristic of the mollusks is the calcareous shell, such as the gastropods and bivalves but also includes animals with out an obvious shell such as the octopus and squid. Because most mollusks have a calcareous shell they are well represented in the fossil record. Mollusks are commonly identified on the basis of shell morphology. However, accurate determination of the identity of closely related species may require examination of internal structures or the location of mussel attachments to the shell.

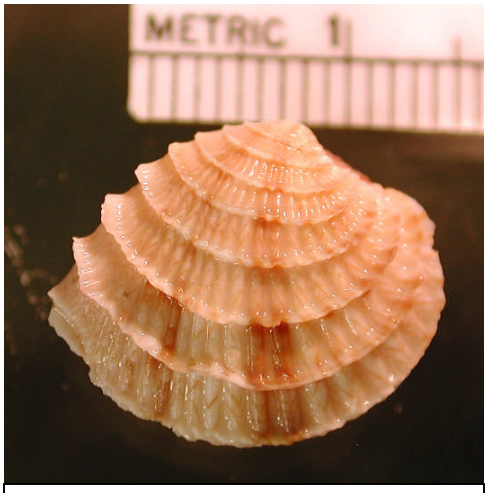
Bivalves

Bivalves have a two part hinged shell. Bivalves are primarily filter feeders that circulate seawater through an internal filter structure to select food particles. Because they filter phytoplankton bivalves may concentrate environmental pollutants such as bacteria or metals or toxins from red tide blooms.

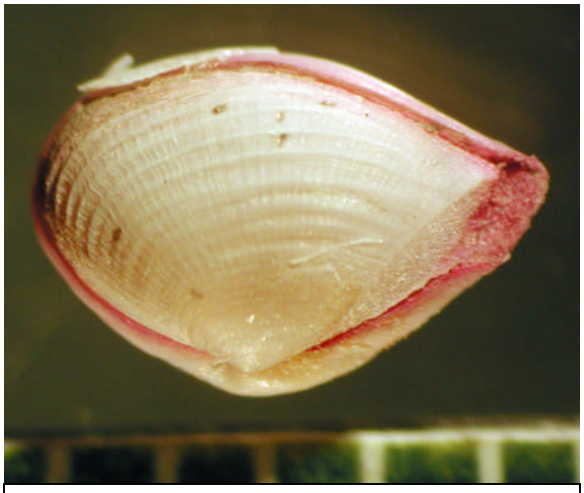
The introduced invasive green mussel species, *Perna viridis* is illustrated first due to the potential to alter habitats and displace native species. This edible species grows rapidly and prefers areas with good water circulation. As a result *Perna* is a major problem for power plants where they grow in abundance within the water intake structures of power plants.



Perna viridis, close view (L), view fouling the intake structure of a power plant (R).



Chione cancellata

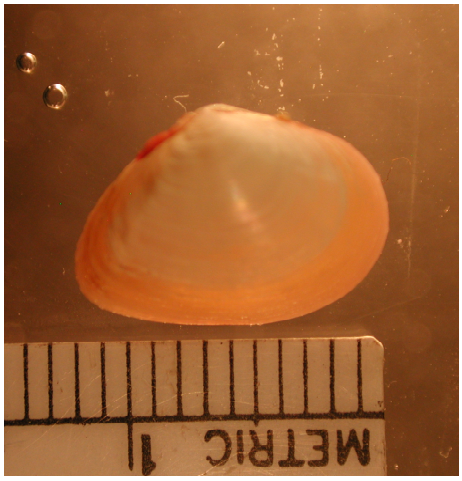


Corbula contracta

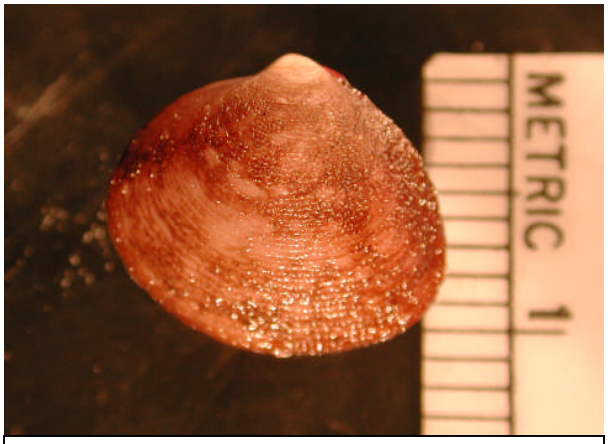
Carditamera floridana
Broad ribbed cardita, a common bivalve of the Florida west coast.

Argopecten irradians
The bay scallop. The small blue eyes along the fringe sense light and object movement which serves as a warning of predators.

Photograph of the Sunray Venus, *Macrocallista nimbosa*, in a vertical position just prior to extending the foot to pull itself into the sand. Even large bivalves such as this one can reposition within the sediment if displaced. A blenny in the background observes the activity.

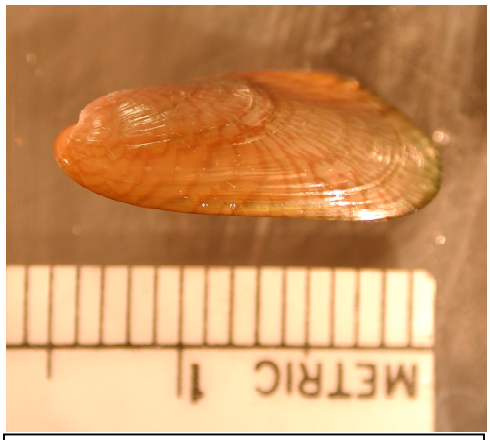


Tellina mera

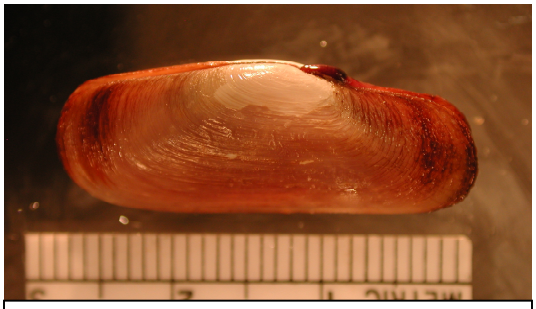


Polymesoda carloinea

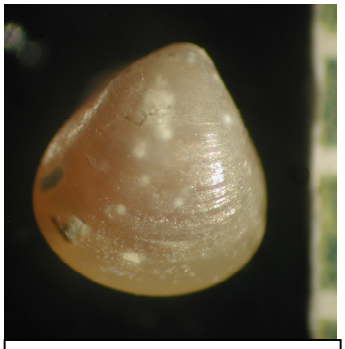
Anomalocardia auberiana



Amygdalum papyrium

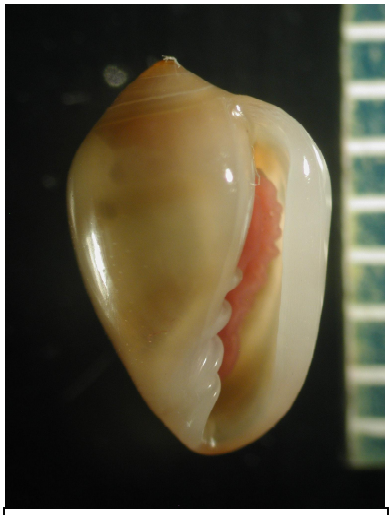


Tagelus plebeius

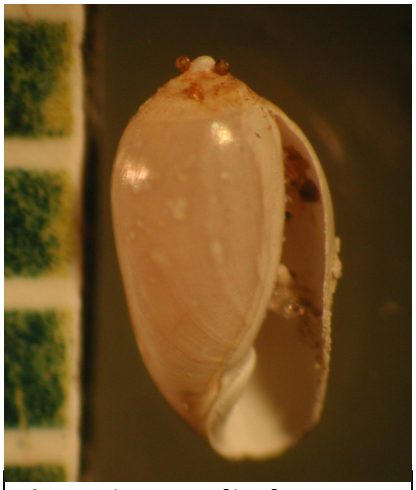


Parastarte triquetra

Class Gastropoda – Snails



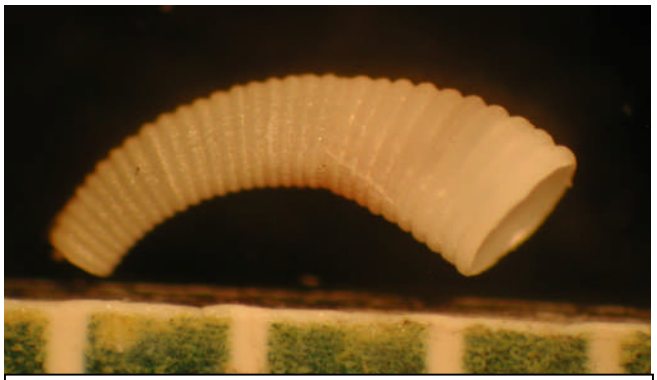
Marginella apicinum



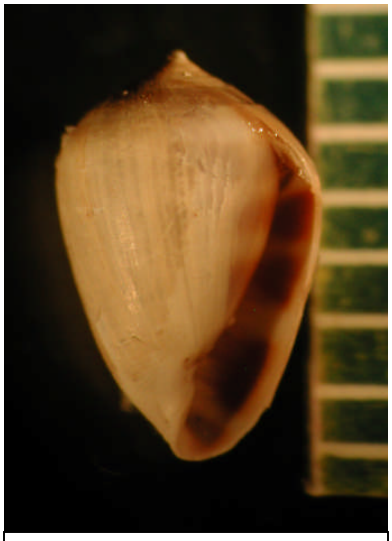
Acteocina canaliculata

Mitrella lunata

Conus jaspidus



Caecum sp.



Melampus coffeus

Boonea impressa

Rictaxis punctostriatus

Photo of the banded tulip *Fasciolaria lilium* in an aquarium. The animal is depositing egg cases which can be seen at the lower right.

Class Polyplacophora - Chitons

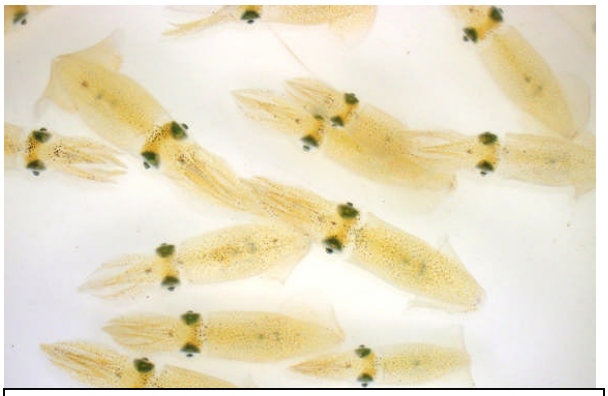
Shell consists of a series of eight calcareous plates that form a protective flexible shell. Chitons move slowly are generally found on hard substrates such as rocks and pilings.

Acanthochitona pygmaea

Cephalopoda

The cephalopods are a relatively small group of mollusks with about 790 described living species. They are characterized by bilateral body symmetry, a prominent head, and a modification of the mollusk foot, into arms or tentacles. There are two subclasses; the Coleoidea (includes the octopuses, squid, and cuttlefish) and the Nautiloidea (includes the nautilus). The cephalopods have a highly developed nervous system and the octopus has been shown to be capable of simple problem solving in the pursuit of prey. The octopus is a mobile epibenthic creature and can be found in the more saline areas of Charlotte Harbor and generally lives in rock crevasses, burrows or shells and forages for food at night. Squid are fast moving pelagic predators but deposit their eggs on the benthos, where they subsequently hatch.

Octopus vulgaris



Juvenile squid *Loligoguncula brevis*

Phylum Arthropoda

The phylum Arthropoda is the largest of the invertebrate groups. Comprised of over a million species they are often considered to have achieved the greatest biological success in terms of abundance and diversity. This phylum is composed of; **Chelicerata** (spiders, mites, scorpions), **Myriapoda** (millipedes and centipedes), **Hexapoda** (insects), and **Crustacea (**primarily marine, lobsters, crabs, shrimp, barnacles, etc.). The amphipods and cumaceans are particularly important as fish prey items. These two groups are often very abundant in the upper estuary. They often swarm into the plankton at night and ride the tide to settle in appropriate habitat, keying in on specific salinity gradients. Examples of crustaceans are show below.

Crustacea – Crustaceans
Decapoda - Crabs

A variety of decapods are present in the Charlotte Harbor system although few species were caught using the grab and sweep net survey methods since they are generally large enough to avoid capture by these methods. The blue crab *Callinectes sappidus* is one of the best know and most economically important decapods, and are caught in large numbers, particularly in the lower Peace River. The blue crab shown below was caught in a trawl (for a different study) and has grabbed a fish in the left claw (cheliped). Blue crabs are both scavengers and aggressive predators and will grab and eat any suitable prey that ventures too near. There is also a small juvenile anchovy resting on the crab's carapace. The rear legs of the crab are flat, an evolutionary adaptation that allows the crab to swim in the water column as well as crawl along the bottom.

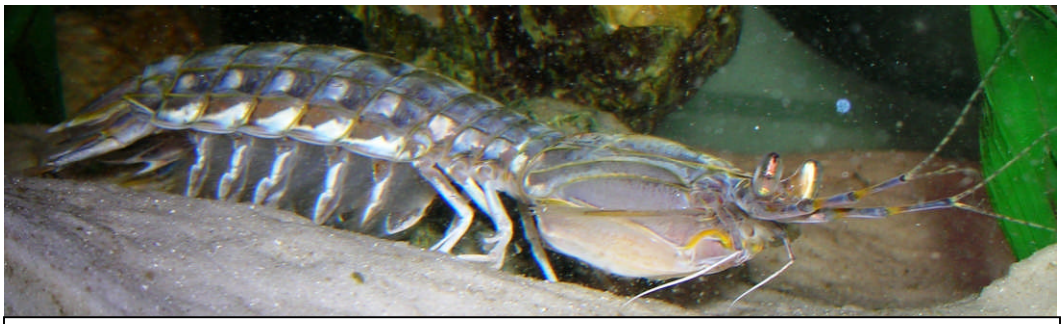
Photo of a live hermit crab, *Pagurus* sp., examining a banded tulip shell. Hermit crabs live in the shells of dead gastropods which serve as protection. As the crab grows it requires a larger shell. A crab may spend considerable time evaluating the suitability of a new shell.

Hairy sponge crab, *Dromidia antillensis* shown wearing a seastar. Sponge crabs typically attach sponges or other material to their carapace to serve as camouflage.

Green porcelain crab, *Petrolisthes amatus*. Porcelain crabs are not true crabs but are more closely related to lobsters and have evolved to resemble crabs.

Photo of a big claw snapping shrimp, *Alpheus heterochaelis* shown emerging from his burrow under a block.

Photo of a red clawed snapping shrimp, *Synalpheus minus.* Snapping shrimp can stun their prey by making a loud pop with their large cheliped.

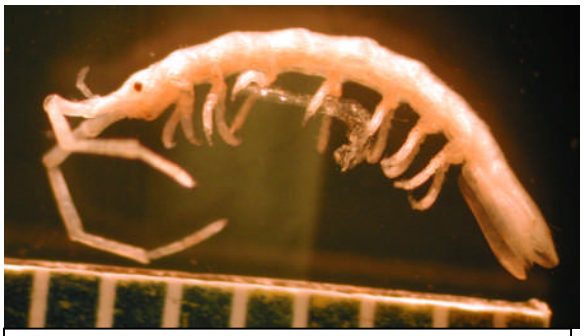


The mantis shrimp, *Squilla empusa*, is a fast moving predator.

Eyes of the pink shrimp *Penaeus duorarum.* Shrimp generally remain buried during the day to avoid predators. They forage at night.

The cleaner shrimp, *Lysmata wurdemanni* may be found in sponges or among rocks and seagrasses.

Isopoda - isopods



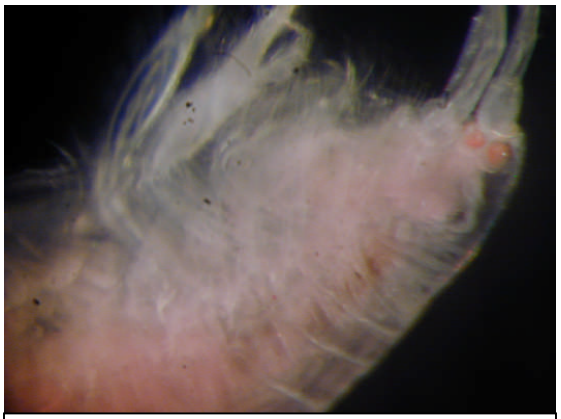
Erichsonella filiformis, common isopod

Amphipoda - amphipods

Erichthonius rubicornis (missing the paired antennae)

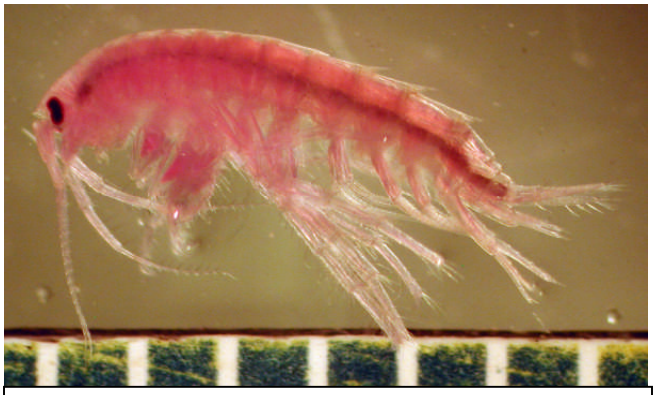
Erichthonius brasiliensis, missing the paired antennae.

Ampelisca abdita a common amphipod.



Close-up of head region of *A. abdita*. Note two red eyes at upper right.

Hourstonius laguna



Gammarus mucronatus

Cymadusa compta. The paired antennae are missing for this specimen. Note the red eye.

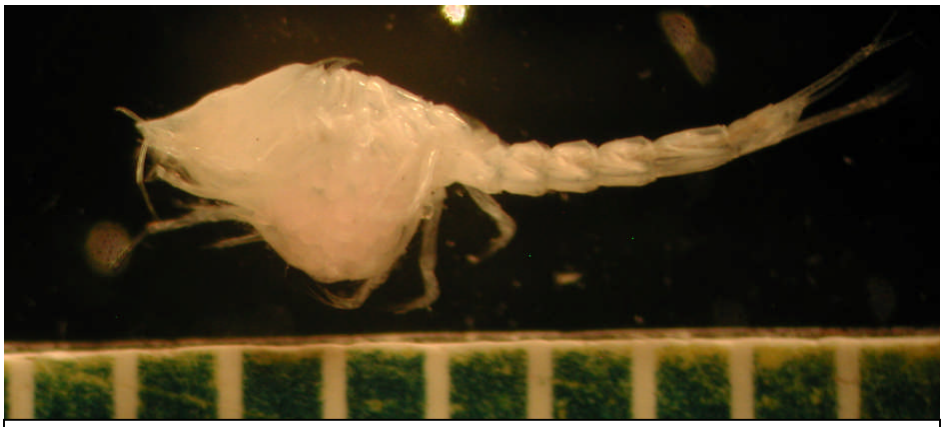
Corophium sp. The *Corophium* species can be very abundant in parts of Charlotte Harbor. They are particularly abundant in the lower portions of the tidal rivers. They are an important fish prey item.

Caprellid amphipod

Caprellid amphipod #2

Crustacea

Cumaceans



Oxyurostylis smithi

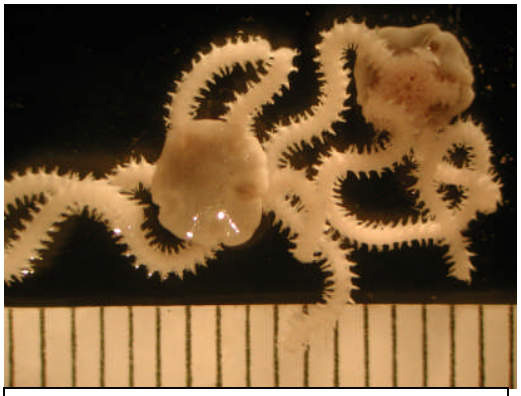
Crustacea.net http://www.crustacea.net/index.htm

Gammarids of San Francisco Bay
http://www.calacademy.org/research/izg/sfbay2k/Gammarids_of_SFBay.htm

Phylum Echinodermata

The word echinoderm is derived from the Greek word meaning *spiny skin.* The phylum is relatively large consisting of about 6,500 species occurring in shallow estuarine as well as deep oceanic waters. The phylum includes the Asteroidea (sea stars) the Ophiuroidea (brittle stars), the Echinoidea (sea urchins), the Holothuroidea (sea cucumbers), Crinoidea (crinoids) and the Concentricycloidea (sea daisies). Representatives species sea stars, brittle stars, sea urchins, sea cucumbers are relatively common in the Charlotte Harbor system, primarily in high salinity areas.

Asteroidea - seastar
Echinaster sp.



Ophiuroidea – Brittlestars

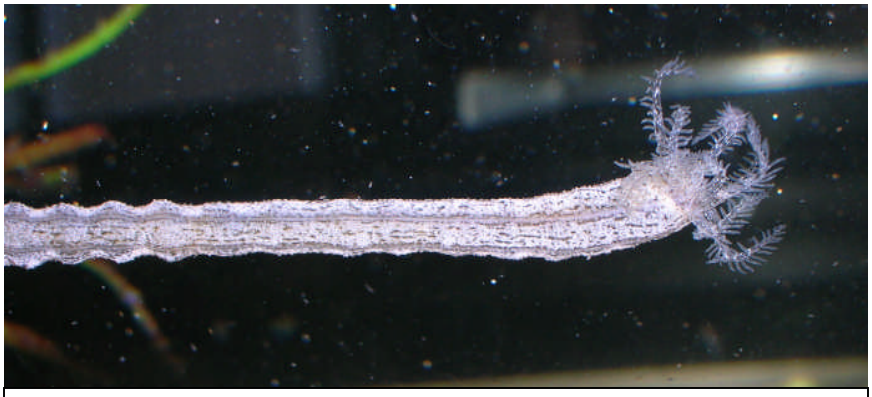


Photo of an unusual Holothuroidea (sea cucumber) of the Family Synaptidae that may be found attached to algae or in seagrass beds. This long thin animal, *Leptosynapta* sp., has sticky skin that allows it to stick to surfaces such as this aquarium glass. They use their oral tentacles to gather food particles from the substrate, opening and closing slowly to bring food to their mouth.

The purple sea urchin, *Lytechinus variegatus*, is commonly found in seagrass beds. The animal often decorates by holding bits of shell to the spines with small tube feet, which may serve as camouflage for predator

Picture of sand dollars, *Mellita quinquiesperforata*, in a sieve which are common on clean sandy bottoms near passes.

For additional information on Echinoderms see:

http://en.wikipedia.org/wiki/Sea_urchin
http://en.wikipedia.org/wiki/Sand_dollar
http://en.wikipedia.org/wiki/Sea_cucumber
http://en.wikipedia.org/wiki/Brittlestar
http://www.sms.si.edu/IRLFieldGuide/Seacucumbers.htm
http://www.humboldt.edu/~natmus/newsletter/Tidepools/echinoderms.html
http://www.advancedaquarist.com/issues/nov2002/invert.htm

Phylum Sipuncula

The Sipuncula are also known commonly as peanut worms due to a superficial resemblance of the contracted animal to a peanut shell. There are relatively few species in this phylum ~320. Sipunculids may live buried in sediment, within the cracks and crevices of rocks or corals or within gastropod shells. Some species bore into rock/coral or wood. They feed by collecting particulate matter from the water or sediment surface.

Sipuncula nudis, the anterior feeding end of the animal is at the top right of the picture.

Phylum Hemichordata

This is a relatively small group of worm shaped marine animals consisting of approximately 100 species. They are considered to be related to the Chordates. Hemichordata are divided into two classes: the Enteropneusta, commonly called acorn worms, and the Pterobranchia.

The Enteropneusta are common within Charlotte Harbor. They form a loose mucous coated 'U' shaped burrow and ingest sediment from which they digest organic matter. The castings of sand that have passed through their gut undigested mater leaves telltale piles of sediment that can be observed on tidal flats. There is one common acorn worm in this region of Florida, *Balanoglossus* sp. They are generally in the range of 5-20 centimeters in length and about 0.5 centimeters in diameter.

Sand castings from a feeding hemichordate buried within the sand.

Anterior end of the acorn worm Balanoglossus sp. as seen through aquarium glass. Note the disturbed area of sand on which the animal has been feeding.