POLYCHAETOUS ANNELIDS AND BENTHIC ENVIRONMENTS
IN TAMPA BAY, FLORIDA

By

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A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA
1971

ACKNOWLEDGMENTS

It is with pleasure and gratitude that I give my sincere thanks to the faculty, colleagues, and friends who assisted me in this study. I am especially indebted to Dr. Robert M. DeWitt, Zoology Department chairman, and chairman of my supervisory committee. While I was occupied in the Tampa Bay area, he attended to many administrative details associated with my program and conscientiously guided my progress by letter and phone. Other committee members, Dr. Frank J. S. Maturo, Jr. and Frank G. Nordlie, Zoology Department, and Dr. Ernest S. Ford from Botany, graciously gave help and encouragement during my research and critically reviewed this dissertation as it arrived in Gainesville in many installments. Without assistance from my committee in other innumerable ways it would have been far more difficult to pursue a doctoral program at the University of Florida while living and working at St. Petersburg Beach.

I am also grateful to the National Marine Fisheries Service for employment during this study. Mr. Carl H.

Saloman, Fishery Biologist (Research) assisted me in all phases of field work, and furnished hydrological data from permanent water sampling stations located throughout Tampa Bay. Other members of the Laboratory staff were also helpful and provided me with pertinent data from related research projects. The tedious and time consuming task of sorting animals from sediment collections was largely done by part-time students from the University of South Florida and St. Petersburg Junior College. These patient people were: Eric Roth, Orlando Villot, John Jensen, Steve Henry, Cathy Adams, Bob Ernest, Mike Mullens, Alan Burdett, Tom Baird, and Mike Marshall.

Drs. Marian H. Pettibone and Meredith L. Jones, Division of Marine Worms, U. S. National Museum, Washington, D.C., kindly allowed me to use space and reference collections at the Museum on two occasions, and otherwise helped by determining the taxonomic position of some of the polychaetes I was unable to identify. I look forward to working further at the Museum on Tampa Bay worms that have not yet been adequately described.

My friends and neighbors, Dr. and Mrs. Walter F. Jeffers, deserve special thanks for editorial help and typing the dissertation in its final form.

Finally, and with great affection, I wish to thank my wife, Patricia, for her constancy and untiring help in typing and data transcription.

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Abstract of Dissertation Presented to the Graduate Council of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

POLYCHAETOUS ANNELIDS AND BENTHIC ENVIRONMENTS
IN TAMPA BAY, FLORIDA

By

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August, 1971

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This dissertation is a systematic and ecological account of the polychaete worms found in Tampa Bay, Florida, between 1963 and 1969. The study was part of a benthic investigation, sponsored by the National Marine Fisheries Service, to determine the qualitative and quantitative distribution of benthic animals that are important to sport and commercial fisheries.

Bottom samples were collected by dredge at 363 survey stations and numerous incidental localities. The polychaetes were separated from sediments on a screen of 0.701 mm. mesh.

A total of 178 species of polychaetes were collected. They were divided among 130 genera and 40 families. Two families (PISIONIDAE and TROCHOCHAETIDAE) and 35 species

are newly reported for the Gulf of Mexico. The more saline areas of Tampa Bay were found to support the greatest species diversity as well as the greatest number of individual worms per dredge sample. Areas of low diversity and few polychaetes were limited to Hillsborough Bay where there is high sewage pollution and Boca Ciega Bay where dredge-fill development is widespread.

Data on polychaete distribution and abundance show that Tampa Bay supports a rich and varied polychaete fauna, and much of the Estuary still remains in a nearly natural condition.

CHAPTER 1

INTRODUCTION

This report is a systematic and ecological account of the polychaete worms collected in Tampa Bay, Florida, between June 1963 and June, 1969. The study was supported by the National Marine Fisheries Service as part of an estuarine survey that extended from the upper reaches of the Bay to 9.8 km. offshore in the adjacent Gulf of Mexico. The main purpose of the survey was to determine the qualitative and quantitative distribution of benthic invertebrates that directly and indirectly support commercial and sport fisheries in the Gulf of Mexico. Other objectives were (1) to evaluate the effects of pollution and coastal developments on estuarine environments, and (2) to compare the benthos in Tampa Bay to that of other estuaries in the southeast and elsewhere. Most of the biological and environmental data were collected at 363 stations sampled in 1963 and 1964. Additional information came from areas of the Bay that were sampled for other laboratory projects that included research on hydrology, sediments, coastal alterations, and polychaete mariculture.

The direct relationship between benthic biomass and abundance of ground fishes was first documented by Petersen and Jensen (1911). Later, observations by Petersen and others established the idea that similar bottom environments support similar benthic communities that can be distinguished by certain characteristic species (Thorson, 1969). The practical aspects of Petersen's work, and his concept of bottom communities, stimulated complementary lines of academic and fishery investigations which now comprise a large and diversified field of benthic, ecological research (Mare, 1944; Jones, 1950; Drach, 1960; Wigley, 1961; Day, 1964; Sanders, Hessler, and Hampson, 1965; Carriker, 1967; Muus, 1967; Peres, 1967; McIntyre and Eleftheriou, 1968; Sanders, 1968, 1969; Fenchel, 1969; Gibbs, 1969; Hargrave, 1969; Lie, 1969; Makarov and Averin, 1969; McIntyre, 1969; Rowe, 1969; Sanders and Hessler, 1969; Tietjen, 1969; Barnard, 1970; Johnson, 1970; Lie and Kisker, 1970; Luksenas, 1970; McIntyre, 1970; Neyman, 1970; Pearson, 1970).

A comparatively recent area of benthic study deals with the effects of pollution and coastal development on bottom communities. The benthos is sensitive to environmental change, and community composition can be drastically altered or eliminated depending on the type and degree of modification (Reish, 1959; McNulty, 1966; Saville, 1966; Bartsch,

Callaway, Wagner, and Woelke, 1967; Olson and Burgess, 1967; Taylor and Saloman, 1968; Bagge, 1969; Copeland, 1970; Golubic, 1970; Sykes and Hall, 1970; Taylor, Hall, and Saloman, 1970; Taylor, 1970). Polychaetes are dominant forms in most benthic communities, and in disturbed areas they are often the last metazoans to survive before bottom conditions become abiotic (Theede, Ponat, Hiroki, and Schlieper, 1969; Turner and Strachan, 1969).

On the basis of comparative benthic studies, Sanders (1968) concluded that polychaetes, together with mollusks, account for about 80 percent of the infauna retained in a sieve of 0.4-mm. mesh. In Florida, studies of Biscayne Bay and Alligator Harbor, and my own work along the west coast¹ also showed that polychaetes were a major component of the littoral infauna (McNulty, 1966; O'Gower and Wacasey, 1967; Moore, Davies, Fraser, Gore, and Lopez, 1968; Naqvi, 1968). Hartman (1951) remarked upon the vast, shallow-water polychaete fauna throughout the Gulf of Mexico, and Rowe (1966) reported on the abundance of polychaetes in the vicinity of the Sigsbee Deep from bottom samples collected at 100 fathoms down to the abyss at 2,000 fathoms.

Study of polychaetes, and other forage organisms, is

1

Data on file at the National Marine Fisheries Service Biological Laboratory, St. Petersburg Beach, Florida. 33706

particularly important in the Gulf of Mexico because Gulf fisheries are more valuable than those in any other geographic region of the United States. The annual wholesale value of the Gulf catch is over 180,000,000 dollars, and represents more than one-third of the total value of U. S. marine landings that were worth 504,500,000 dollars in 1969 (Riley, 1970). It is important to note that most of the sport and commercial species of the Gulf (65 to 90 percent depending on geographic area) spend all or part of their lives in estuaries (Rounsefell, 1954; Gunter, 1967; McHugh, 1967; Sykes, 1967, 1968; Turner, 1969). In Tampa Bay, for example, Sykes and Finucane (1966) found juveniles and adults of 23 species of sport and commercial fishes. The high fishery production that is characteristic of estuaries surrounding the Gulf of Mexico ultimately depends on high organic production at lower trophic levels. There, as planktonic larvae, and as adults that swim, crawl, or burrow, the ubiquitous polychaetes enter the food webs of fishery species (Hedgpeth, 1954; Reid, 1954; Smith, 1954; Williams, 1955; Darnell, 1958; Eldred, Ingle, Woodburn, Hutton, and Jones, 1961; Hall, 1962; Tagatz, 1968; Sastrakusumah, 1970).

CHAPTER 2

DERIVATION OF THE FAUNA

Hartman (1951) recognized that the polychaete fauna of the Gulf of Mexico consists of (1) a distinct group associated with the Mississippi drainage system, (2) a group with West Indian affinities, (3) an assemblage commonly collected along the eastern seaboard north to New England, (4) species known also from the warmer waters of the eastern Pacific, and (5) a group with world-wide distribution in low latitudes. Representatives of all these groups were found in Tampa Bay. Their occurrence may be explained in terms of historical events in the Gulf Basin and local environmental conditions that now prevail.

The Gulf Basin

According to Murray (1961) the Gulf Basin developed as a shallow trough during the Paleozoic era, and was first flooded by the sea in the Mesozoic about Jurassic time. This invasion coincides with the time when Yarborough (1967) and Bullard (1969) believe that a rift, caused by continental

drift, separated the Americas from western Europe and Africa. Progressive deepening of the Basin was apparently due to the weight of sediments that have accumulated over a shear-line around the rim since the Triassic period (Eardley, 1951; Murray, 1961; Rainwater, 1967). Since Tertiary time, the Gulf of Mexico has probably been a deep sea (Galtsoff, 1954) and its water level and area have fluctuated periodically in response to sea level changes and peripheral, tectonic activity (Rainwater, 1967).

Until the Miocene (25,000,000 years before present) the Gulf and the Atlantic Ocean were confluent across what is now peninsular Florida and the south Atlantic coastal plain (Cooke, 1945; Cheetham, 1963). Subsequent separation of the two seas by continental uplifting blocked the ingress of mid-Atlantic water and probably marked the last period of cold water in the Gulf (Alt and Brooks, 1965). The expansive Gulf-Atlantic connection through mid-Tertiary time allowed interchange of polychaetes and other neritic forms between the two seas. Hedgpeth (1953) and other authors mention this connection as a means of explaining the many patterns of disjunctive distribution between species that now inhabit the northern Gulf and the western Atlantic north of Cape Canaveral (Hartman, 1951; Galtsoff, 1954; Humm, 1969).

The Caribbean has existed since at least mid-Mesozoic time (Ewing, 1968) and through that sea there have been several periods of Atlantic-Pacific connection across Central America. In chronological order, portals existed in Jurrassic, Cretaceous, mid-Tertiary, and Pliocene time (Eardley, 1951; Lloyd, 1963; Rubinoff, 1968). As a consequence, many amphi-American species now occur on eastern and western sides of Central America, and there is still limited transmigration through the Panama Canal (Gilbert and Starks, 1904; Hildebrand, 1939; Rubinoff, 1968). From the Caribbean Sea, polychaetes have probably always had access to the Gulf through the Yucatan Strait. There is also geological evidence that indicates a past Gulf connection to the western Arctic through the Mississippi embayment during upper Cretaceous time (Rainwater, 1967).

Upland terraces and submerged sills around the periphery of the Gulf of Mexico are evidence of sea level oscillations during the glacial and interglacial periods of the Pleistocene. During that epoch, former sea stands, with respect to the present sea level, have been estimated at plus as much as 81 m. (Cooke, 1945) and minus as much as 158 m. (Uchupi, 1967). An upper limit of plus 9 m. has been proposed by the recent work of Alt and Brooks (1965). Within

the past 6,000 years or so, Gulf sea level was as much as 5 m. lower than now and rose to the present level about 2,000 years ago (Gorsline, 1967). According to Rusnak (1967) the present rate of sea level rise in the Gulf is about 1.3 cm. per year.

The Gulf of Mexico now covers about 1,700,000 sq. km., and maximum depth is about 3,700 m. (Uchupi, 1967). The coastline is about 8,000 km., and in the U. S. alone, the tidal shoreline is at least 27,200 km. (Hedgpeth, 1953). Gunter (1967) estimated that polyhaline bays between Corpus Christi, Texas, and Florida Bay cover about 52,000 sq. km. Most of that area can be included in 33 estuarine systems that have an average area of about 1,430 sq. km. Along most of the Gulf coast, the continental shelf slopes gradually seaward and covers an additional shallow water area of about 343,200 sq. km. (Carsey, 1950). Shelf width varies from about 30 to 260 km., and breaks occur at the Yucatan Strait where sill depth is about 2,100 m. and at the Florida Strait where the sill is about 1,000 m. deep (Uchupi, 1967; Armstrong, 1969; Jacobs and Ewing, 1969; Nowlin, 1971).

According to the coastal classification of Price (1954) the southwestern Gulf has a segment of orogenic coast in Mexico, and either alluvial or limestone coasts elsewhere.

Coasts of the alluvial type occur from northwestern Florida to the Rio Grande and along the Mexican coast to Campeche. The Florida and Yucatan peninsulas are limestone plateaus.

Currents and Circulation

Sea water enters the Gulf of Mexico from the Caribbean through the Yucatan Strait at a rate of about 25,000,000 m.³/sec. as the Yucatan Current (Leipper, 1968). The current extends from the surface down to the top of the sill, and consists of several tropical components near the surface and colder water masses below about 600 m. (McLellan and Nowlin, 1963; Wust, 1964; Gordon, 1967; Nowlin, 1971). These water masses flow from several areas of the Atlantic and serve as the principal route for the introduction of polychaetes to the Gulf from adjacent seas (Sverdrup, Johnson, Fleming, 1942; Thorson, 1961).

Much of the Yucatan Current leaves the Gulf directly through the Florida Strait as the Florida Current (Parr, 1937). The remainder moves north and penetrates to a distance of 480 km. or more into the central and northern Gulf (Drummond and Austin, 1958; Armstrong, 1967). The northern movements of the Yucatan Current generate a well-defined loop current in the eastern Gulf, which moves clockwise to the east and south before entering the Atlantic as

part of the Florida Current. Within the perimeter of this system, there is a persistent eddy current about 160 km. northeast of the Yucatan Channel and about the same distance south of Pensacola, Florida (Drummond and Austin, 1958; Drennan, 1963; Nowlin, Hubertz, and Reid, 1968; Nowlin, 1971). The inshore currents in the eastern Gulf consist of one or more eddies that flow between the loop current and the Florida coast, and variable longshore currents that are strongly influenced by wind and tide (Leipper, 1954; Lynch, 1954; Hela, 1956; Drummond and Austin, 1958).

The offshore currents in the western Gulf also follow a predominately clockwise direction, but the patterns are poorly defined, especially in summer (Nowlin and McLellan, 1967; Jacobs and Ewing, 1969; Nowlin, 1971). Drift bottle data, and other hydrological observations, indicate the coastal currents in the western Gulf flow from the vicinity of the Mississippi Delta toward the Mexican coast, especially between December and July (Leipper, 1954; Greenman and LeBlanc, 1956; Drennan, 1963; Gaul and Boykin, 1965). At other times, the currents shift toward the east and become part of the loop current (Drennan, 1963; Armstrong, Grady, and Stevenson, 1967).

Currents in Gulf estuaries are mostly tidal, and rarely exceed 0.3 m./sec. except in narrows and offshore passes where velocity may reach 3 m./sec. (Gorsline, 1967). The relative strength of ebb and flow can often be deduced from the observed direction of island or sand spit development (Price, 1954).

Sediments

Widespread sedimentation in the Gulf of Mexico started at the beginning of Laramide orogeny and continued through the Tertiary and Quaternary to the present time (Rainwater, 1967). The rate of sedimentation is now between two and 300 m. per 1,000 years, which produces an average subsidence in the Gulf basin of about 0.5 m. per 1,000 years (Shepard, 1953; Ludwick, 1964; Rusnak, 1967). High sedimentation rates occur near the mouth of large rivers such as the Mississippi where over 700,000,000 metric tons of sediment are deposited each year (Gunter, 1967). Lower rates of about 1 m. per 1,000 years are characteristic of semiarid lagoons, and sediments in the deep water of the Gulf may accumulate as slowly as 1 mm. or less per 1,000 years (Rusnak, 1967; Pyle, 1968). In general, however, Rusnak (1967) stated that the average rate of sedimentation is about equal to the rate of sea level rise. In addition to recent alluvial

deposits, the Gulf also contains a large amount of modern, bioclastic sediments that have been distributed by marine transgressions in the past 17,000 years following the Wisconsin glaciation (Greeman and LeBlanc, 1956; Curray, 1960; Taft and Harbaugh, 1964).

From the vicinity of Carmen, on the Mexican coast, around the northern Gulf and south to Cape Romano and the northern part of the Ten Thousand Islands in Florida, nearshore sediments are mostly quartz sand with an admixture of silt and clay. Within this area, the greatest amount of silt and clay occurs in sediments of the northern and western Gulf. Typically, these fine-grained materials are deposited nearshore. Farther from shore there is a transition to more sandy sediments and mixtures of sand and shell. In the northern Gulf, the zone of fine-grained particles and quartz sand extends offshore about 80 km. In the eastern Gulf, however, the same zone has an average width of only 32 km. and is gradually replaced almost entirely by carbonate sediments in the vicinity of Cape Romano, Florida (Gould and Stewart, 1955; Jordan and Stewart, 1959; Storr, 1964; Force, 1969). Somewhat south of Cape Romano and on the Campeche Bank of Mexico, sediments are mainly carbonaceous and consist of marl or fragments of shell, coral, and coralline algae (Taft, 1961; Scholl, 1963; Scholl and Craighead,

1967). The zone of inshore, terrigenous deposits corresponds with the region of the Gulf that receives the greatest volume of river discharge (Gould and Stewart, 1955; McNulty, 1968).

Regardless of provenance, however, sediments in Gulf estuaries are similar in a number of respects. These features include stratification, sorting, particle size distribution, organic content, and carbon-nitrogen ratio. Generally, there is little or no sediment stratification because of the burrowing and mixing accomplished by polychaetes and other benthic invertebrates. Sediment sorting improves from bay heads to the Gulf and is directly related to wave and current energy. Particle size increases toward the Gulf but local anomalies occur in channels where particles are usually larger than average, or in deep depressions where most particles are in the silt and clay range. Organic content (weight percentage of carbon) may exceed 10 percent in fine-grained deposits. The average value, however, is usually between one and two percent, and regional trends show higher values near bay heads and lower values near the Gulf. The organic carbon content of estuarine sediments comes almost entirely from vegetation so that the carbon-nitrogen ratio is generally high (Lowman, 1951; Lynch, 1954;

Price, 1954; Gould and Stewart, 1955; Jordon and Stewart, 1959; Puri and Vernon, 1959; Curry, 1960; Shepard and Moore, 1960; Goodell and Gorsline, 1961; Stewart and Gorsline, 1962; Holmes and Evans, 1963; Kofoed and Gorsline, 1963; Scholl, 1963; Ludwick, 1964; Goldsmith, 1966; Huang, 1966; Gorsline, 1967; Palacas, 1967; Uchupi, 1967; Bryant, Ewing, and Jones, 1968).

Climate, Hydrology, and Nutrients

The Gulf coast climate has been described by Hedgpeth (1953) and meteorological conditions offshore were reviewed by Leipper (1954). In the western and northwestern Gulf, Hedgpeth (1953) recognized a temperate semiarid climate which changes in order to temperate dry, and moist subhumid climates to the east, and subtropical and tropical, moist, subhumid climates on the southern half of peninsular Florida. In comparison with the open Gulf, coastal waters are strongly influenced by ambient weather in terms of a number of factors that include temperature, salinity, turbidity, and the concentrations of organic and inorganic nutrients. Temperature more than any other factor is responsible for the biotic provinces in the Gulf (Hutchins, 1947; Pulley, 1952; Hedgpeth, 1953; Humm, 1969). On the basis of temperature and mollusk distribution, Pulley (1952) distinguished six

faunal provinces for Gulf coastal waters. Three of these, south Florida, southwest Florida, and Mexican may also be considered Caribbean -- while the northeast Gulf, northwest Gulf, and Texas Transitional may be regarded as Carolinian (Hedgpeth, 1953). In deeper waters of the Gulf, Parker (1960) and Rowe (1966) have shown that water temperature decreases with depth. This phenomenon creates vertical provinces as well, which range from Caribbean or Carolinian at the surface to Boreal at 2,000 fathoms and below.

Average winter water temperature in the southern Gulf is about 23.9° C., and in the north it is about 18.3° C. (Drummond and Austin, 1958). As a yearly average, temperature data from coastal recording stations around the Gulf show a gradual decrease from south to north: Key West, Florida, and Progreso, Mexico -- 26.5° C.; St. Petersburg, Florida -- 24.0° C.; Pensacola, Florida, and Galveston, Texas -- 22.0° C. (U. S. Coast and Geodetic Survey, 1965). It is important to note, however, that these average figures are computed from temperatures that have a normal, yearly range of about 15° C. and an extreme range that may exceed 30° C. In a three-year study of estuaries in the Florida Everglades, Tabb, Dubrow, and Manning (1959) recorded a low, winter water temperature of 14.4° C. and a summer high of

33.6° C. Seasonal, temperature ranges in the northern Gulf have been reported by Dawson (1955a) as 9.5° to 35.0° C., and by Curl (1959) as 14.0° to 30.1° C. "Northerners," and high summer air temperatures, cause even greater differences in winter-summer water temperatures (0° to 44° C.) on the Texas coast (Leipper, 1954; Breuer, 1957; Simmons, 1957; Gunter, 1967). Little or no thermal stratification has been reported for coastal waters of the Gulf, but tributary springs and heated industrial waters create local temperature anomalies.

Isohalines for surface water in the Yucatan Current range from about 35.7 to 36 parts per thousand, but lower and higher values have been recorded from water masses at greater depths (Drummond and Austin, 1958; Jacobs and Ewing, 1969). In the open Gulf, Williams (1954) reported 30 to 37 parts per thousand as a normal range for surface salinity, and Curl (1959) arbitrarily selected 35 parts per thousand as a means of identifying the dividing point between off-shore water and coastal water. The width of the estuarine zone varies with season and place, and depends mainly on the flow of rivers and springs. Average discharge of fresh water into the Gulf has been estimated at 25,000,000 liters per second. About three-fourths of this volume comes from

the Mississippi River, and the rest comes mostly from Florida and the Gulf states east of Corpus Christi, Texas (Collier and Hedgpeth, 1950; Wilson, 1967). Cruise data from the M/V Alaska show that the flow of fresh water from the Mississippi River may reduce surface salinity to 26 parts per thousand at more than 96 km. from land (Drummond and Austin, 1958). Curl (1959) found a similar, but less pronounced, dilution in waters of the northeastern Gulf, and reported a band of coastal water that extended eight to 48 km. from shore depending on the seasonal volume of fresh-water runoff. In other areas of the Gulf, inshore waters are often hypersaline rather than brackish. The most extensive belt of high salinity water lies along the Mexican and Texas coasts in the Laguna Madre where Simmons (1957) reported a datum of 113.9 parts per thousand. Abnormally high salinity has also been reported for south Florida estuaries during periods of drought and high evaporation (Tabb, Dubrow, and Manning, 1959).

Turbidity in the Gulf is caused by land drainage and other factors such as wind, water currents, and bottom type (Breuer, 1962). On the west coast of Florida, clear water occurs along the Keys but turbid conditions prevail over the marl bottom in Florida Bay, and in the Ten Thousand

Islands where the water is stained by mangrove vegetation (Tabb, Dubrow, and Manning, 1962). To the north, between Cape Romano and Cedar Keys, estuarine waters are moderately clear. Farther north, and west to the Laguna Madre, the only area of clear, coastal water occurs between Cape San Blas and Pensacola, Florida (Gunter, 1967). According to Breuer (1962) turbidity in the Laguna Madre is variable, but the water is generally clearer than that of the northern Gulf coast. From Tampico, Mexico, to the Campeche Bank, the coastal water is very clear. Kornicker, Bonet, Cann, and Hoskin (1959) reported that water in the vicinity of Alacran Reef was sufficiently clear to see the bottom at 27 m.

Nutrient concentrations in the Gulf are almost entirely related to coastal runoff as the mineral-rich layers of the Yucatan Current are mostly directed toward the Florida Strait (Rounsefell, 1954; Drummond and Austin, 1958; Corcoran and Alexander, 1963). Therefore, most of the euphotic zone in the open Gulf has low concentrations of phosphorus, nitrogen, and other growth-promoting elements. A few, exceptional areas of high productivity in the Gulf of Mexico have been reported by Bogdanov, Sokolov, and Khromov (1968). Surface waters of many warm seas lack the nutrients necessary for

high, plankton production, and primary productivity in such areas usually varies between 0.05 and 0.38 g.C/m.²/day (Ryther, 1963; Beers, Steven, and Lewis, 1968). Primary production in the Gulf probably lies within that range. Near-shore, however, nutrient concentrations and primary production are higher. High, estuarine production results from mineral and organic enrichment through land drainage, intra-estuarine nutrient cycling, tidal action, high solar insolation, and the presence of a broad, shallow littoral zone that supports a variety of photosynthetic taxa (Schelske and Odum, 1962; Duke and Rice, 1967). Work in Gulf estuaries by Odum (1957), Odum and Hoskin (1958), Pomeroy (1960), and others has shown that gross primary production² is on the order of 5 to 34 g.O₂/m.²/day or roughly 2.5 to 17 g.C/m.²/day. Values at the lower end of this range are probably the result of low light transmission in areas of high turbidity (Odum and Hoskin, 1958; Ragotzkie, 1959; Gunter, 1967). Added to endogenous estuarine production, there is also an enormous area of mangrove and marsh vegetation which contributes detritus and soluble organic compounds to estuarine food webs (Darnell, 1967; Odum and de la Cruz, 1967; Stephens, 1966;

2

Net primary production is between 40 and 75 percent of gross primary production (Nielsen, 1963; Ryther, 1963).

Zieman, 1968; Heald, 1969; Taylor, 1969). Gulf enrichment by fresh-water drainage was first demonstrated by Riley (1937) in a study of phosphate-phosphorus near the mouth of the Mississippi River. His data for the delta area and coast between central Louisiana and Mobile Bay showed a maximum phosphate concentration of 16 mg./m.³. Offshore, the highest measurement was eight and the average value was 3.8 mg./m.³. In the western Gulf, Simmons (1957) observed the same pattern of estuarine enrichment in brackish bays of the Texas coast. The most thorough study of estuarine nutrification has been done in the eastern Gulf in connection with work on red tides. A selection of station data presented by Finucane and Dragovich (1959) illustrates the gradual decline of organic and inorganic nutrients in an inshore-offshore direction (table 1). The concentration of phosphorus nearshore in Tampa Bay and Charlotte Harbor is abnormally high due to the distribution of commercial phosphate deposits in nearby areas (McNeill, 1950; Dragovich, Kelly and Goodell, 1968).

Table 1.--Mean annual values for nitrite-nitrate nitrogen, total phosphorus, copper, carbohydrate, and protein from water inshore (IS) and offshore (OS) at three points along the west coast of Florida. Data from Finucane and Dragovich (1959) -- Tampa Bay stations 17 and 20; Charlotte Harbor stations 3 and 34; Everglades stations 37 and 56

Factor	Stations					
	Tampa Bay		Charlotte Harbor		Everglades	
	IS	OS	IS	OS	IS	OS
NO ₂ -NO ₃	1.1	0.8	2.5	0.5	1.8	0.5
ug.at./l.						
Total Phosphorus	9.6	0.4	19.4	0.3	2.9	0.7
ug.at./l.						
Cu	0.15	0.08	0.14	0.11	0.15	0.12
ug.at./l.						
Carbohydrate, Arabinose equivalents	3.0	0.9	3.2	1.4	2.6	1.6
mg./l.						
Protein, Tyrosine equivalents	1.2	0.2	4.2	0.4	4.2	0.3
mg./l.						

Emergent and Submergent Vegetation

Emergent vegetation along the Gulf coast between southern Florida and Yucatan consists of four main associations in biotopes that are variously influenced by exposure, drainage, coastal formation, and climate. The sand-strand association and those plants that occur on saline flats are found recurrently along the entire coastline of the Gulf of Mexico. Mangroves are confined by temperature to the southern Gulf where they dominate the coast from Tampa Bay south and along the Yucatan Peninsula. The black mangrove, Avicennia nitida Jacq., has a more extensive range than either the red, Rhizophora mangle L., or white mangrove, Laguncularia racemosa (L.). It occurs in small stands as far north as the Chandeleur Islands in Louisiana and along the Mexican coast to the vicinity of the Rio Grande. North of the well-developed mangrove forests, the predominant coastal vegetation consists of one or more species of Spartina or the black rush, Juncus roemerianus Scheele (Price, 1954; Thorne, 1954; Moul and Brown, 1957).

Submerged vegetation includes seven species of sea grasses and many kinds of algae. Among the sea grasses, two are commonly found in water of low salinity -- horned pondweed, Zanichellia palustris L., and widgeon grass, Ruppia

maritima L. The other five occur mostly in normal or hypersaline habitats: turtle grass, Thalassia testudinum König; manatee grass, Syringodium filiforme Kützing; shoal weed, Diplanthera wrightii (Ascherson); Halophila baillonis Ascherson; and Halophila engelmannii Ascherson (Thorne, 1954; Humm, 1956). Turtle grass is the most widespread sea grass in the Gulf, but on the basis of scattered collection records it seems likely that all or most of the other species are also distributed throughout the Gulf wherever light and bottom conditions are favorable (Humm, 1956; Kornicker, Bonet, Cann, and Hoskin, 1959; Phillips, 1960; Breuer, 1962; Tabb, Dubrow, and Manning, 1962; Gunter, 1967). Near Tortugas, Florida, Thorne (1954) commented on a collection of H. engelmannii from an estimated depth of 91 m., and stated that he knew of no sea grass collections from deeper than 100 m.

A rich algal flora is associated with sea grasses (Humm, 1964) and a large number of species attach to limestone outcrops, beach rock, serpuloid reefs, old coral heads, coastal vegetation, and a variety of man-made structures. Furthermore, a few species are adapted by a prodigious system of stems to growth on unconsolidated sediments. Recent work on the taxonomy, ecology, and biogeography of the Gulf algae

includes reports by Taylor (1960), Humm and Taylor (1961), Taylor (1965), Dawes (1967), and Humm (1969).

Animal Assemblages

Hedgpeth (1954) and others summarized available information on animal communities in the Gulf, and presented species lists, ecological data, and biogeographic annotations for many invertebrate and vertebrate groups. The major bottom communities that he recognized were: oyster bottom, shrimp ground, coral bottom, sponge bar, serpuloid reef, jetty, and sand beach. Drawing from an earlier paper by Ladd (1951) Hedgpeth also listed nine marine environments based on salinity and mollusk distribution. These were: bay head, inter-reef (oyster), reef (oyster), polyhaline bay, passes, open Gulf nearshore and offshore, beach, and hypersaline lagoon. Information on the deep water fauna of the Gulf was limited at that time to reports from cruises of the Blake and Albatross between 1877 and 1883.

Later reports on invertebrate assemblages in the northern Gulf described as many as 11 environmental facies for estuarine waters and eight for the continental shelf and slope (Parker, 1960; Phleger, 1960). The dominant fishes and macroinvertebrate assemblages in estuarine systems from Texas to western Florida were studied by a number

of authors including Reid (1955a, 1955b); Wurtz and Roback (1955); Breuer (1957, 1962); Simmons (1957); Darnell (1958); Arnold, Wheeler, and Baxter (1960); Gunter (1962, 1967); Hoese and Jones (1963); and Perret (1966). For the eastern Gulf, principal studies include papers by Reid (1954); Springer and Woodburn (1960); Springer and McErlean (1962); Scholl (1963); Sykes and Finucane (1966); Gunter and Hall (1965); and Tabb, Dubrow, and Manning (1962). By including Biscayne Bay, Florida, as an area adjacent to the Gulf, mention may also be made of the series of benthic investigations by McNulty and colleagues that date back to the 1950s (McNulty, 1966) and the studies on intertidal communities by O'Gower and Wacasey (1967) and Moore, Davies, Fraser, Gore, and Lopez (1968).

Recent information on the offshore fauna is available in several additional references. The most extensive collections came from exploratory fishing cruises conducted by the National Marine Fisheries Service (Bullis and Thompson, 1965). Intensive regional studies have been made by Hildebrand (1954, 1955) and Rowe (1966) in the western Gulf, and by Storr (1964) and Joyce (1968) in the eastern sector.

The first written reports on Tampa Bay and its marine life came from observations by the early Spanish explorers,

Navaez and DeSoto, in the early 1500s (Galtsoff, 1954). Their comments were of a general nature and described the more common fish and shellfish eaten by Indians (Shipp, 1881).

In addition to the littoral, polychaete aggregations reported by Hartman (1951) other papers include (1) species from the Mexican coast, Rioja (1946, 1961), -- (2) species annotated by Behre (1950) from Louisiana, (3) those in the museum report compiled by Dawson (1955b) for coastal Mississippi, (4) species in Menzel's (1956) checklist for north Florida, (5) worms found by Carpenter (1956) in Alligator Harbor, Florida, from nine habitats, (6) annelids collected by Taylor (1961) in 10 habitats, (7) those commonly found in Biscayne Bay, Florida, on level bottom and intertidal bottoms that are either vegetated or unvegetated (McNulty, 1966; O'Gower and Wacasey, 1967; Moore, Davies, Fraser, Gore, and Lopez, 1968), -- (8) worms that are found in and on coral in the south Florida reef patches (Ebbs, 1966) and (9) polychaetes found in sponges (Pearse, 1934).

Elsewhere on the Florida coasts, polychaetes have been studied by Ehlers (1887); Ashworth (1910); Treadwell (1911, 1914, 1917, 1921, 1929); Hoagland (1919); Monro (1933) Hartman (1938, 1939, 1940, 1941, 1942a, 1942b, 1944a, 1944b, 1947a, 1947b, 1949, 1950, 1952, 1954, 1956, 1957, 1958,

1959a, 1959b, 1965, 1968, 1969); Stephenson and Stephenson (1950, 1952); Voss and Voss (1955); Pettibone (1956, 1961, 1963a, 1963b, 1965, 1966); Renaud (1956); Jones (1961, 1963); McNulty (1961); Paine (1961, 1963); Tabb and Manning (1961); McNulty, Work, and Moore (1962); Mangum (1962, 1964); Tabb, Dubrow, and Manning (1962); Wells (1962); Robertson (1963); Ebbs (1964); Ebbs and Staiger (1965); Fitzsimons (1965); Wells (1965); Bush (1966); Multer and Milliman (1967); Joyce (1968); Kirtley (1968); Mangum, Santos, and Rhodes (1968); Naqvi (1968); Heald (1969); and McNulty and Lopez (1969).

One of the earliest, if not the first, collection of polychaetes in Tampa Bay was made by Eisenberg in 1856 (Wells, 1962). His collection contained a large number of Arenicola cristata that are now housed at the Museum of Comparative Zoology. Later records are limited to work by Pettibone (1957); Dragovich and Kelly (1964); Simon (1965); Taylor (1966, 1968); Kelly and Dragovich (1967); and Taylor and Saloman (1968). Only six species and some ecological observations were noted in these papers.

Human Influence

Plant and animal communities in the Gulf are probably as productive as those in any other area of the world. Before the recent impact of civilization, mortality from

environmental change was limited to natural phenomena such as hurricanes, severe cold fronts, red tide, and "Jubilees" (oxygen depletion -- Gunter, 1967).

Along much of the Gulf coast, the estuarine environment has been modified by man. These changes are caused by domestic and industrial wastes, biocides, siltation, radioactive wastes, crude oil and chemical spills, exotic species, and human predation; as well as many types of coastal construction for water diversion, storm protection, navigation, beach reclamation, and land fills (U. S. Public Health Service, 1954; Biglane and LaFleur, 1967; Cronin, 1967; Butler, 1969; Holt, 1969; Hopkins, 1969; Copeland, 1970). Most of these modifications occurred after 1940 when many coastal areas began to develop at an unprecedented rate. The magnitude and significance of human influence on Gulf estuaries is presently undergoing review by the National Marine Fisheries Service and cooperating Gulf states. The project is entitled, "Gulf of Mexico Estuarine Inventory." This monumental study shows the extent of coastal development around the Gulf and describes the present condition of nearshore waters, sediments, and biota.

On the basis of data from this inventory, Sykes (1967) estimated that four percent, or about 218,000 ha., of Gulf

estuaries, are already seriously polluted or entirely eliminated as area for useful biological production. His figures show that most of the damage has occurred in Florida where some 158,000 ha. were polluted, or filled for residential and industrial sites. As a specific example of estuarine destruction he cited Boca Ciega Bay (Tampa Bay Estuary) where land fills have covered nearly 20 percent of the original water area. Within the same Estuary, there are also areas that receive a large volume of domestic and industrial waste, and other areas that are relatively undisturbed.

The presence of natural and modified environments in Tampa Bay provided an opportunity to report additional information on the diversity, abundance, and distribution of Gulf polychaetes; and to compare the polychaete fauna of natural, undisturbed areas with those that have been altered in various ways by man. The use of polychaetes as indicators of environmental change has great relevance in the Tampa Bay area where the economy is based on retirement living, tourism, recreation and water resources.

CHAPTER 3

TAMPA BAY ESTUARY

In Miocene and Pliocene time Tampa Bay and southern Florida were under the sea. The headlands that now mark the Estuary were no more than submerged features of the Florida Plateau (Cooke, 1945; Alt and Brooks, 1965). The modern relief of Tampa Bay did not take shape until Pleistocene time when great fluctuations of sea level caused recurrent periods of erosion and sedimentation. According to Gorsline (1967) the last major period of erosion on the Florida Plateau occurred about 17,000 years ago when the Gulf was 100 m. lower than now. Thereafter, rising water brought the Gulf to its present height about 2,000 years ago, and the level has changed little since that time.

Location and Configuration

Tampa Bay is located midway along the west coast of Florida between north latitude $27^{\circ}31'4''$ and $28^{\circ}02'3''$, and west longitude $81^{\circ}23'2''$ and $82^{\circ}50'0''$ (figure 1). The shoreline is approximately 320 km. and surface area is about 905

sq. km. The main axis of the Estuary lies northeast-southwest and extends nearly 63 km. Maximum width is 40 km. near the mouth of the Estuary between the narrows in upper Boca Ciega Bay and Sarasota Pass (Olson and Morrill, 1955).

On the basis of hydrology and geography, the Estuary can be divided into six areas. Tampa Bay extends from the Gulf, between Mullet and Anna Maria Keys, landward to Interbay Peninsula. It is divided by a hypothetical line between Pinellas Point and Piney Point into upper and lower Tampa Bay. A third area, Boca Ciega Bay, lies north of Tampa Bay entrance, and a fourth, Terra Ceia Bay, is on the opposite side. A fifth area, Old Tampa Bay, is located on the west side of Interbay Peninsula, and the sixth area, Hillsborough Bay, lies on the east side of the Peninsula (figure 1). In terms of surface area, the upper and lower parts of Tampa Bay comprise about 57 percent of the Estuary, Boca Ciega Bay eight percent, Terra Ceia Bay three percent, Old Tampa Bay 22 percent, and Hillsborough Bay 10 percent.

Passes to the Gulf run between a series of barrier islands located along the seaward side of the Estuary. From Anna Maria Key north, the main passes are Passage Key Inlet, Southwest Channel, Egmont Channel, Bunces Pass, Pass-a-Grille Channel, Blind Pass, and Johns Pass. The islands are built

Figure 1.--Tampa Bay Estuary showing transect and lettered stations (solid circles) in the benthic survey of 1963, and biomass stations (solid triangles) sampled between 1963 and 1969. Solid lines show county boundaries, dotted line indicates main ship channels, and dashed lines delineate major areas of the Estuary. Small islands and spoil banks are shown in black.

and shaped by tidal action, and by waves and longshore currents. Coastal currents north of Tampa Bay entrance have a net, southerly flow, and south of the entrance in-shore currents have a predominantly northward drift. In passes, currents run slightly faster at ebb than at flood tide (Goodell and Gorsline, 1961).

Average depth of the Estuary is about 3.3 m. and practically all water deeper than 5 m. is in upper and lower Tampa Bay. The deepest water (12 m.) is just south of Mullet Key in Egmont Channel. Dredged, ship channels from the Gulf to ports in Tampa Bay, Old Tampa Bay, and Hillsborough Bay have a controlling depth of about 9 m. By area, average depths in the Estuary are as follows: lower and upper Tampa Bay, 4.3 m.; Boca Ciega Bay, 1.5 m.; Terra Ceia Bay, 1.5 m.; Old Tampa Bay, 2.7 m.; Hillsborough Bay, 3.1 m. Topographic zones in the Estuary include shallow tidal flats with an average depth of 1.2 m., slopes that drop from the flats to about 5.4 m., and natural depressions and channels that are 6 m. or deeper. Total volume of the Estuary at mean, low water (MLW) is about 0.687 cubic miles (Olson and Morrill, 1955; Goodell and Gorsline, 1961 ; U. S. Coast and Geodetic Survey Navigation Charts 586 and 587).

Offshore, the continental shelf is 192 km. wide. Depth

increases by 0.8 m. per mile (1.6 km.) to the 63 m. contour, and 3 m. per mile from there to the 180 m. mark.

At the outer limit of the shelf, there is a sharp dip, and the angle of the continental slope is about 39° between a depth of 1,800 and 2,700 m. (Gould and Stewart, 1955).

Climate and Tributary Waters

The Estuary and surrounding upland has an humid, subtropical climate. Average air temperature in St. Petersburg during 1963 was 22° C. and mean temperature of the coldest and warmest months was 12 and 28° C. (U. S. Dept. of Commerce, Climatological Data, Florida, 1963). Rainfall is about 127 cm. per year, and records show that annual precipitation varies between 72.5 and 192.5 cm. (U. S. Dept. of Commerce, Climatological Data, Florida, 1967). The rainfall is seasonal, and more than half usually falls between June and October (Dragovich and May, 1962). Much of the rain comes from localized electrical storms so that precipitation is not evenly distributed over the entire watershed. For example, in 1963, St. Petersburg and Bradenton received about 153 cm. of rain but only 109 cm. fell on Tampa. Evaporation usually equals or exceeds precipitation. In 1963, it was recorded as 170.13 cm. at a gauging station near Tampa (U. S. Dept. of Commerce, Climatological Data, Florida, 1964).

Prevailing winds over the Estuary are easterly at an average speed of 3.7 m./sec., there are only 40 to 80 days of cloud cover each year, and the sun usually shines more than six hours per day (Trewartha, 1943; Hutton, Eldred, Woodburn, and Ingle, 1956). In 1963, wind direction and cloud cover were normal, but wind velocity was considerably higher than average (5.9 m./sec.) -- (U. S. Dept. of Commerce, Climatological Data, Florida, 1963).

The watershed drained by the Estuary covers an area of about 5,600 sq. km. and contains a number of rivers, streams, and springs.³ The rivers all flow into the eastern side of the Estuary and are named Hillsborough, Palm, Alafia, Little Manatee, and Manatee (Ferguson, Linghan, Love, and Vernon, 1947). Many of the charted creeks and bayous are entirely tidal and have no fresh water source. Gauge records show that fresh water flow into the Estuary is 1,567.5 cubic feet per second (cfs) or 44,260 liters per second, and the total flow from all natural sources is probably close to 2,000 cfs (56,600 liters per second). Using 56,600 liters per second as an approximate figure, the daily fresh water flow into the Estuary is about 4.9 billion liters per day. Total fresh water input from all

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Data on file U. S. Geological Survey, Tampa, Florida, 33602.

sources should include domestic and industrial sewage which has a volume of 347,000,000 liters per day. By areas, sewage volume figures in million of liters per day are as follows: lower and upper Tampa Bay, 88; Boca Ciega Bay, 85; Terra Ceia Bay, negligible; Old Tampa Bay, 10; and Hillsborough Bay 164. Thus the grand total of fresh water entering the Estuary is about five billion liters per day with sewage volume amounting to more than six percent of that figure.

Coastal Development

In the tri-county region surrounding Tampa Bay there is a resident population of over 1,120,000 people. The largest number of people live in Pinellas County (527,920) which is the most densely populated county in Florida. The population of Hillsborough County is 505,755, and that of Manatee County is 86,500. Centers of population are the cities of St. Petersburg, Clearwater, Tampa, Palmetto, and Bradenton. Automobile travel around and between these cities is facilitated by a causeway and two bridges over Old Tampa Bay, a bridge over upper Hillsborough Bay, several bridges and causeways between the mainland and the barrier islands across Boca Ciega Bay, and the Sunshine Skyway near the mouth of the Estuary that connects St. Petersburg and Terra Ceia.

Regional commerce includes fisheries, agriculture, food processing, wholesale and retail merchandising, tobacco, electronics and other light industry, chemical production and heavy industry, shipping, air and rail transport, public utilities, and building construction. Tourism, however, is the most important component of the economy in the Tampa Bay area. Figures from the Florida Development Commission show that 3,000,000 tourists visit the Bay each year. They stay for an average vacation of 15 days and have a per capita expenditure of 274 dollars. Thus, the total yearly value of tourism is 822,000,000 dollars. The main tourist attraction is Tampa Bay Estuary and the recreation it provides (Kidd, 1963).

Development in Boca Ciega Bay is largely for homesites and tourist accommodations. Pollutants include sewage and a large volume of silt and clay that was deposited during dredge-fill projects. Land fills and construction of the Pinellas County Bayway have eliminated most coastal vegetation and drastically changed current patterns. The only remaining natural shoreline is around islands east and west of Tierra Verde and at Fort DeSoto Park (Mullet Key) where vegetation consists of mangroves, a variety of strand species, and cord grass.

In lower and upper Tampa Bay, there is practically no natural shore in Pinellas County, and the shore in Manatee County is being rapidly developed for homesites, tourism, industry, and shipping. At present, the volume of sewage and degree of coastal development is far greater in Pinellas County. The Manatee side of the Bay has some extensive stands of mangrove, but construction at Apollo Beach and Piney Point make their future uncertain. Egmont Key, at the mouth of Tampa Bay, is relatively undisturbed and has only a small boat pilot community and a U. S. Coast Guard facility to maintain Egmont Light.

In Old Tampa Bay, about two-thirds of the coast is undeveloped and supports a mixed growth of mangrove, cord grass, and black rush. Tidal flow in upper Old Tampa Bay is interrupted by Courtney Campbell Parkway. Sewage is the principal pollutant there, and the major portion of residential and industrial development is in Hillsborough County between the eastern end of W. Howard Frankland bridge and the phosphate docks at Port Tampa.

The entire perimeter of Hillsborough Bay is developed and partially filled. McDill Air Force Base covers the southern end of Interbay Peninsula, and from there to the Alafia River there is a solid front of housing, dock facilities, and heavy industry. Large sewage outfalls enter the

Bay at McDill (secondary treatment) and at Hooker Point (primary treatment).

Terra Ceia Bay has some waterfront homesites and marinas, and is polluted to a small degree from sewage carried by the Manatee River. Most of the shoreline is covered with mangroves and an interesting admixture of tropical species.

Hydrology

From a hydrological standpoint, Tampa Bay Estuary is one of the best known embayments in the world. Its water chemistry has been studied periodically since 1946, mainly in connection with investigations of the Florida red tide organism, Gymnodinium breve (Williams, 1954). In their literature survey of the Estuary, Olson and Morrill (1955) summarized existing information on water temperature, salinity, water transparency, currents, and tides. The National Marine Fisheries Service increased the scope and frequency of water sampling in 1957, and in 1966, the laboratory at St. Petersburg Beach established 30 permanent hydrographic stations. At a station at the laboratory dock on Boca Ciega Bay water is sampled twice each day, and water at the other stations is sampled on a monthly schedule. Also, daily water temperature and salinity measurements are recorded at the U. S. Coast Guard Station on Egmont Key. Factors recorded

by the Fisheries Service include water temperature, salinity, pH, total phosphorus, Kjeldahl nitrogen, dissolved oxygen, water turbidity and transparency, chlorophyll pigments, astacin and non-astacin carotenoids, planktonic primary production, and ultraviolet absorption (Saloman and Taylor, 1968). The mean and range of these factors for 1963 and the most recent year of record (1967) have been summarized (table 2).

Temperature

The mean, annual temperature of Tampa Bay is about 25° C. Normally, water temperature reaches 20° C. by April, and 30° C. in July. It drops to 20° C. or below in November, and falls to between 10 and 15° C. during winter months. Temperature fluctuations are usually gradual, but pronounced diel changes have been observed in shallow water. For example, following a cold front in February, 1966, I recorded a datum of 4.8° C. near shore at Mullet Key where the normal temperature for that month is about 15° C. At other times, rapid temperature depression in the Estuary has caused extensive fish mortality (Rinckey and Saloman, 1964). The highest temperature recorded in the Estuary (36.9° C.) was reported from a tidal flat in Boca Ciega Bay in July (Phillips, 1960). In 1963, average water temperature in the six major areas of Tampa Bay Estuary was 27.9° C.

and the observed extremes were 11.7 and 36.8° C.

Over broad areas marked by degrees of latitude, water temperature is probably the most important ecological factor that limits the distribution of marine animals. Temperature acts through its influences on metabolic processes and generally restricts the range of littoral species to one or another biogeographic zone or province (Hedgpeth, 1953, 1957; Moore, 1958). On the basis of mollusk distribution, Pulley (1952) erected the Southwest Florida Province which includes Tampa Bay Estuary and runs from Cape Romano to Anclote Key. For this zone he reported a mean, maximum summer temperature of 32° C. and a mean, minimum winter temperature of 16° C. Following the thesis of Hutchins (1947) and others, he attributed the great species diversity within that area to the fact that the average temperature regime permits reproduction and survival of species from both the Carolinian and West Indian Provinces.

Salinity

The salinity of Tampa Bay Estuary is between the concentration of fresh water (0.5 parts per thousand or less) and that of sea water (33 to 37 parts per thousand). There are no hypersaline areas in the Estuary, but in Hillsborough Bay there is an extensive deposit of gypsum (hydrated calcium

sulphate) adjacent to spoil deposited from the phosphate industry near the Alafia River.

At the entrance of the Estuary, salinity is usually greater than 30 parts per thousand, and may reach 36 parts per thousand or higher. The salinity gradient from lower Tampa Bay to the head of the Estuary is about 10 to 12 parts per thousand. Dams limit brackish-water to the mouth of the Hillsborough and Alafia Rivers, but in other tributaries, salt-water extends well upstream. Vertical salinity gradients in the Estuary are uncommon. The greatest observed difference in salt content between surface and bottom water (1.4 to 20.5 parts per thousand) was recorded at the east end of Cross Bayou Canal in Old Tampa Bay on January 13, 1963 (Finucane and Dragovich, 1966).

Diel and seasonal salinity changes in the Estuary are small. Hillsborough Bay is the only area where rainfall strongly influences salinity. There, drainage from the Hillsborough and Alafia Rivers between June and October may reduce salinity 6 to 7 parts per thousand (Saloman and Taylor, 1968). At sampling stations visited in 1963, salinity records were between 0.1 and 36.4 parts per thousand.

Next to temperature, salinity is probably the most important hydrological factor limiting the distribution of species in Tampa Bay. For most marine and fresh-water

species, intermediate salinities impose a physiological barrier to estuarine migrations. Consequently, the middle and upper reaches of brackish estuaries are inhabited by euryhaline species and holeuryhaline forms (Pearse and Gunter, 1957; Kinne, 1964).

Many polychaetes are well adapted to severe salinity changes. Some of the nereids, for example, survive water conditions that range from hypersaline to fresh through their ability to regulate water and ions against a considerable concentration gradient (Oglesby, 1968). Other worms have a limited ability to regulate or adjust in response to salinity changes, and some avoid temporary osmotic stress by retreating into burrows or tubes.

Hydrogen Ion Concentration

In most estuarine and marine habitats, pH is 7.0 or greater due to high concentrations of bicarbonate, carbonate, and borate ions (Nicol, 1960; Reid, 1961; Skirrow, 1965). Average pH for all areas of Tampa Bay in 1963 was 7.8 and the extreme values recorded that year were 5.6 and 8.5 units. Unpublished data⁴ from diel studies between 1962 and 1963 show that changes in pH are seldom more than

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Data on file National Marine Fisheries Service Biological Laboratory, St. Petersburg Beach, Florida, 33706.

1.5 unit over a 24-hour period. In tidal creeks, and sediments beneath mangroves, Goodell and Gorsline (1961) reported 6.8 as the observed, minimum pH. Humic acids and highly organic sediments are responsible for low pH values in such areas. In general, pH values in the Estuary are 7.0 or less in tributary waters, and 7.1 or above elsewhere.

Dissolved Oxygen (DO)

On the basis of daylight and diel⁴ records, DO of surface water in the Estuary seldom drops below 4 ml./l. The average concentration in 1963 was 4.8 ml./l., which represents oxygen saturation or super-saturation at observed ranges of temperature and salinity. High and low DO values for 1963 were 9.0 and 1.1 ml./l., respectively. Values near 9 ml./l. usually coincided with periods of high photosynthetic activity and low values were invariably recorded in early morning hours. DO values below 2 ml./l. are limiting to many marine animals, especially when an oxygen deficiency persists for protracted periods (Emery and Stevenson, 1957; Moore, 1958).

At the bottom of the Estuary, DO is more variable and there are records of anoxic conditions over soft sediments in Boca Ciega and Hillsborough Bays (Dragovich, Kelly, and Finucane, 1966; Saloman, Finucane, and Kelly, 1964). More

recent data (Federal Water Pollution Control Administration, 1969) show that in summer months there is little or no oxygen at the bottom over large sections of Hillsborough Bay covered by sewage sludge. Low DO in Boca Ciega Bay is limited to bayfill access canals where soft, organically rich deposits are as much as 4 m. thick (Taylor and Saloman, 1968).

In their study of the main tributaries of the Estuary, Dragovich, Kelly, and Goodell (1968), found that DO values of less than 50 percent saturation occurred in one-fifth of their samples. As in Hillsborough and Boca Ciega Bays, low DO in the Hillsborough, Alafia, and Manatee Rivers is due to biochemical oxygen demand (BOD) caused by organic pollution.

Nitrogen and Phosphorus

A data summary for nitrogen and phosphorus in Tampa Bay, prepared by Taylor and Saloman (1968), shows a history of progressive nutrient enrichment since 1952. Large amounts of both nutrients reach the Estuary from land drainage and sewage. Additional phosphorus enters the Bay from mining operations in extensive phosphatic deposits north and east of the Estuary. Dragovich, Kelly, and Goodell (1968) calculated that river discharge adds at least 600,000 kg. of phosphorus to the Estuary each year. According to the

U. S. Geological Survey (1969) approximately 45,000 kg. of orthophosphate pass each day from Tampa Bay into the Gulf of Mexico. As sewage volume in the Bay increases, the ratio of nitrogen to phosphorus will probably rise because the effluent from sewage receiving secondary treatment has a nitrogen-phosphorus ratio of about three to one (Garber, 1959).

The fertilizing effects of nitrogen and phosphorus on algae have been more noticeable in Hillsborough Bay than in other areas of the Estuary. There, excessive growth of attached algae and phytoplankton has had undesirable consequences (Dragovich, Kelly, and Kelly, 1965; Federal Water Pollution Control Administration, 1969). During hours of low light intensity, these plants deplete DO and cause widespread fish-kills. Furthermore, the seasonal demise and decomposition of the algae is the primary cause of an objectionable odor along shore.

Primary Productivity

The study of primary production in Tampa Bay was started by Pomeroy (1960). His work was limited to Boca Ciega Bay where he found that phytoplankton, benthic algae, and sea grasses all contributed about equally to production at depths of 2 m. or less. In deeper water, however, he showed that the abundance of sea grasses and benthic algae declines,

and phytoplankton become the only important producers. As an average, he reported gross primary production of the plant community at about $5 \text{ g.O}_2/\text{m}^2/\text{day}$. That figure is roughly equal to 5 g. of organic matter per day (Odum and Hoskin, 1958) or about $2.5 \text{ g.C}/\text{m}^2/\text{day}$ (Yentsch, 1963; May, 1966). Thus, each of the three types of producers (sea grasses, benthic algae, and phytoplankton) contributed about $0.6 \text{ g.C}/\text{m}^2/\text{day}$.

In 1962, productivity studies were added to the National Marine Fisheries Service program, and regular sampling began in representative areas of Tampa Bay. Plant pigments, and the light-dark bottle method were used and results were nearly equal (May, 1966). No attempt was made to measure production by benthic algae or sea grasses. In the years 1962 and 1963, the average production by phytoplankton for the entire Estuary was $1.2 \text{ g.C.}/\text{m}^2/\text{day}$, and since that time the average figure has not changed appreciably (May, 1966; McNulty, 1969).

By season, productivity in the Estuary follows a fairly uniform pattern. Lowest production occurs in winter, intermediate levels are observed in spring and fall, and peak production is in July, August, and September (McNulty, 1968).

From the standpoint of areas, the nutrient-rich waters of Hillsborough Bay have the highest production, followed in descending order by Old Tampa Bay, upper Tampa Bay, Boca Ciega Bay, Terra Ceia Bay, and lower Tampa Bay. Offshore in the Gulf of Mexico primary production drops to an average value of less than $0.01 \text{ g.C/m.}^2/\text{day}$ and the amount of chlorophyll is about one-fourth the average concentration in the Estuary (Dragovich and Johnson, 1966).

In comparison with other estuaries where productivity has been studied, primary production in Tampa Bay is high, and the amount of chlorophyll A present is nearly twice the average found in temperate coastal waters (Nielsen, 1963; Ryther, 1963; Yentsch, 1963; McNulty, 1969; Strickland, 1965).

Water Clarity

A Hach⁵ turbidity meter, photometer, and Secchi disc have been used to measure water clarity in Tampa Bay Estuary (Dragovich, Kelly, and Finucane, 1966; Saloman and Taylor, 1968; Saloman and Taylor, 1971). The Secchi disc was used only at the laboratory dock in Boca Ciega Bay, and the other instruments were used throughout the Estuary.

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References to trade names in this publication do not imply endorsement of commercial products.

Average values, based on readings from the turbidity meter and photometer, show that the greatest amount of turbidity occurs in Hillsborough Bay. A number of factors contribute to the relatively high turbidity observed in that area. A natural cause is the great quantity of humic acids that enter the Bay from river flow. Human activities that cause turbidity in Hillsborough Bay include shell dredging, ship traffic, and the introduction of large amounts of sewage and industrial wastes.

Turbidity in Florida waters cannot legally exceed 50 Jackson Turbidity Units (JTU) above background level (Supplement 52 to chapter 28.5 of the Rules of the Florida Air and Water Pollution Control Commission). Average background for all areas of the Estuary is about 7 JTU (table 2). In terms of visibility, a Secchi disc disappears from view at 110 to 120 cm. when turbidity is 7 JTU. This amount of turbidity probably reduces planktonic primary production to some extent and limits benthic algae and sea grasses to a depth of about 2 m. or less (Phillips, 1960). At a permissible turbidity level of 50 to 60 JTU, visibility would decrease to between 20 and 25 cm., and most primary production would be eliminated (Ragotzkie, 1959).

In some naturally turbid estuaries, low primary production is replaced by allochthonous organic detritus from

coastal vegetation (Odum and de la Cruz, 1967). In the same way, suspended and dissolved organic material from sewage may be a potential food source for estuarine organisms. Unfortunately, effluents from most coastal development contain a mixture of industrial and domestic wastes. As a result, there are great quantitative and qualitative differences between natural nutrients and those that originate directly or indirectly from the discharge of sewage. The importance of such differences, and the possibility of toxic compounds in sewage, determines whether or not sewage pollution may be beneficial or detrimental to a stable and productive estuarine ecosystem (Rounsefell, 1963; Copeland and Wohlschlag, 1968).

In Hillsborough Bay, there is evidence from biological and hydrological studies that the effects of pollution have been mostly undesirable (Sykes and Finucane, 1966; Taylor and Saloman, 1968; Taylor, Hall, and Saloman, 1970; Federal Water Pollution Control Administration, 1969).

Ultraviolet Absorption (UV)

An estimate can be obtained of the organic content of water from measurement of UV absorption at 220 m μ . As a rule, absorbency increases from the open sea toward shore. Relatively high values near land are accentuated after periods of high land drainage and near sources of organic pollution (Armstrong and Boalch, 1961; Sournia, 1965).

Table 2.--Yearly mean and range for hydrological factors recorded at the surface in six areas of Tampa Bay Estuary, Florida, in 1963 and 1967 (Finucane and Dragovich, 1966; Taylor and Saloman, 1968; Saloman and Taylor, 1971)

Area and Factor	1963			1967		
	Mean	Range		Mean	Range	
		High	Low		High	Low
Old Tampa Bay						
Temperature (°C)	23.4	36.8	12.5	23.6	30.6	15.0
Salinity (‰)	19.9	28.3	0.1	26.3	30.6	18.3
pH	7.8	8.5	5.6	7.9	8.4	7.4
Dissolved Oxygen (ml./l.)	4.2	6.2	1.7	4.2	5.9	2.3
Turbidity (JTU)	--	--	--	7.6	53.0	0.1
Transparency (% Transmission)	42.5	87.5	5.1	--	--	--
Kjeldahl Nitrogen (ug.at./l.)	43.2	74.1	24.3	49.4	108.0	24.3
Total Phosphorus (ug.at./l.)	22.6	32.5	5.6	24.4	38.4	14.9
Chlorophyll A (mg./m. ³)	8.6	19.9	1.7	--	--	--
B (mg./m. ³)	4.7	13.4	0.5	--	--	--
C (mg./m. ³)	5.0	12.0	1.1	--	--	--
Primary Production (g.Cm. ² /day)	0.18	0.43	0.03	1.20	3.91	0.14
Ultraviolet Absorption (220 mu.)	0.285	0.362	0.209	0.262	0.326	0.196

Table 2.--Yearly mean and range for hydrological factors recorded at the surface in six areas of Tampa Bay Estuary, Florida, in 1963 and 1967 (Finucane and Dragovich, 1966; Taylor and Saloman, 1968; Saloman and Taylor, 1971)

Area and Factor	1963			1967		
	Mean	Range		Mean	Range	
		High	Low		High	Low
Hillsborough Bay						
Temperature (°C)	24.1	31.8	14.3	24.8	32.5	16.5
Salinity (‰)	18.7	25.6	2.3	23.9	28.8	13.7
pH	7.7	8.4	7.0	7.9	8.7	7.2
Dissolved Oxygen (mL/l.)	5.2	8.6	2.5	4.6	10.1	1.5
Turbidity (JTU)	--	--	--	10.1	29.0	2.2
Transparency (% Transmission)	35.8	66.3	10.5	--	--	--
Kjeldahl Nitrogen (ug.at./l.)	53.0	77.4	6.1	67.3	224.6	34.3
Total Phosphorus (ug.at./l.)	26.6	42.7	6.9	25.2	35.2	16.1
Chlorophyll <u>A</u> (mg./m. ³)	19.8	35.4	4.7	--	--	--
<u>B</u> (mg./m. ³)	9.8	20.0	2.0	--	--	--
<u>C</u> (mg./m. ³)	12.8	38.0	3.6	--	--	--
Primary Production (g.C/m. ² /day)	0.38	0.66	0.09	1.56	5.91	0.07
Ultraviolet Absorption (220 mμ.)	0.339	0.463	0.196	0.294	0.461	0.196

Area and Factor	1963			1967		
	Mean	Range		Mean	Range	
		High	Low		High	Low
Upper Tampa Bay						
Temperature (°C)	24.0	31.6	14.6	23.7	30.5	15.2
Salinity (‰)	25.6	29.2	20.0	27.3	33.7	17.7
pH	7.8	8.3	7.0	8.0	8.5	7.5
Dissolved Oxygen (ml./l.)	4.9	6.6	2.4	4.0	8.5	1.1
Turbidity (JTU)	--	--	--	5.1	24.5	0.6
Transparency (% Transmission)	49.3	93.6	10.7	--	--	--
Kjeldahl Nitrogen (ug.at./l.)	39.8	64.3	27.7	46.9	90.8	22.3
Total Phosphorus (ug.at./l.)	24.1	35.0	6.4	24.4	43.4	12.9
Chlorophyll A (mg./m. ³)	8.5	29.6	2.2	--	--	--
B (mg./m. ³)	4.9	33.4	0.0	--	--	--
C (mg./m. ³)	5.2	17.4	0.0	--	--	--
Primary Production (g.C/m. ² /day)	0.19	0.67	0.04	1.18	4.78	0.34
Ultraviolet Absorption (220 mμ.)	0.261	0.515	0.142	0.237	0.357	0.144

areas of Tampa Bay Estuary, Florida, in 1963 and 1967 (Finucane and Dragovich, 1966; Taylor and Saloman, 1968; Saloman and Taylor, 1971)

Area and Factor	1963			1967		
	Mean	Range		Mean	Range	
		High	Low		High	Low
Boca Ciega Bay						
Temperature (°C)	23.6	33.7	11.7	23.1	30.9	14.1
Salinity (‰)	31.9	35.1	26.1	33.2	37.0	26.4
pH	8.0	8.3	7.3	8.1	8.3	7.7
Dissolved Oxygen (ml./l.)	4.9	7.6	3.0	3.8	5.8	1.7
Secchi Disc (cm.)	118.0	173.0	84.0	127.0	188.0	84.0
Turbidity (JTU)	--	--	--	8.0	22.5	1.4
Transparency (% Transmission)	48.0	88.9	4.8	--	--	--
Kjeldahl Nitrogen (ug.at./l.)	31.6	39.4	25.7	52.0	110.8	15.0
Total Phosphorus (ug.at./l.)	9.4	18.1	3.1	14.6	24.9	3.8
Chlorophyll A (mg./m. ³)	6.8	28.2	1.5	5.1	12.6	1.2
B (mg./m. ³)	2.8	14.9	0.0	6.5	15.9	0.8
C (mg./m. ³)	2.8	10.4	0.0	3.8	12.0	0.0
Primary Production (g.C/m. ² /day)	0.34	0.8	0.1	0.3	0.8	0.1
Ultraviolet Absorption (220 mu.)	0.195	0.282	0.091	--	--	--

areas of Tampa Bay Estuary, Florida, in 1963 and 1967 (Finucane and Dragovich, 1966; Taylor and Saloman, 1968; Saloman and Taylor, 1971)

Area and Factor	1963				1967			
	Mean		Range		Mean		Range	
	High	Low	High	Low	High	Low	High	Low
Terra Ceia Bay								
Temperature ($^{\circ}\text{C}$)	24.6	33.8	14.0	23.1	30.0	14.4		
Salinity (‰)	28.2	32.7	9.6	29.5	36.3	16.7		
pH	7.9	8.2	7.3	7.8	8.1	7.3		
Dissolved Oxygen (ml./l.)	4.7	6.2	3.1	3.6	5.3	2.1		
Turbidity (JTU)	--	--	--	5.5	19.0	0.7		
Transparency (% Transmission)	50.2	84.7	15.3	--	--	--		
Kjeldahl Nitrogen (ug.at./l.)	39.6	56.4	30.6	41.8	72.6	20.7		
Total Phosphorus (ug.at./l.)	17.6	20.0	14.3	20.2	28.7	9.1		
Chlorophyll $\frac{A}{B}$ (mg./m. ³)	6.5	15.7	2.7	--	--	--		
$\frac{B}{C}$ (mg./m. ³)	3.4	5.5	1.2	--	--	--		
$\frac{C}{D}$ (mg./m. ³)	3.9	8.9	0.2	--	--	--		
Primary Production (g.C/m. ² /day)	0.14	0.38	0.07	--	--	--		
Ultraviolet Absorption (220 mu.)	0.221	0.315	0.175	0.182	0.257	0.123		

areas of Tampa Bay Estuary, Florida, in 1963 and 1967 (Finucane and Dragovich, 1966; Taylor and Saloman, 1968; Saloman and Taylor, 1971)

Area and Factor	1963				1967			
	Mean		Range		Mean		Range	
			High	Low			High	Low
Lower Tampa Bay								
Temperature ($^{\circ}\text{C}$)	23.8	31.6	11.9	22.9	30.4	12.3		
Salinity (‰)	29.5	35.0	23.9	31.9	36.9	23.6		
pH	7.9	8.8	7.0	8.0	8.4	7.6		
Dissolved Oxygen (ml./l.)	5.0	9.0	1.1	3.8	6.2	1.9		
Turbidity (JTU)	--	--	--	7.5	45.0	0.6		
Transparency (% Transmission)	54.6	77.6	23.7	--	--	--		
Kjeldahl Nitrogen (ug.at./l.)	30.8	57.0	19.3	42.3	108.6	10.7		
Total Phosphorus (ug.at./l.)	15.6	28.5	4.0	19.9	31.5	3.8		
Chlorophyll A (mg./m. ³)	3.9	9.3	1.57	--	--	--		
B (mg./m. ³)	2.3	8.1	0.27	--	--	--		
C (mg./m. ³)	2.9	4.3	0.26	--	--	--		
Primary Production (g.C/m. ² /day)	0.08	0.19	0.03	0.66	1.97	0.12		
Ultraviolet Absorption (220 mu.)	0.184	0.322	0.094	0.133	0.167	0.098		

Study of UV absorbency in Tampa Bay Estuary was started by the National Marine Fisheries Service in 1963 with the idea that a rise in UV absorbency might directly correlate with plankton blooms -- especially outbreaks of the Florida red tide organism, Gymnodinium breve (McNulty, 1969). On several occasions, blooms have been recorded at times of high UV absorbency, but not always. As one might expect, average values of UV absorbency are highest in the nutrient-rich areas of the Estuary (table 2). This concordance is noted only as a point of interest for the relationship between UV absorbency and faunal abundance is unknown.

Tides and Currents

Tides in Tampa Bay Estuary have been classified as mixed-semidiurnal; i.e., there are usually two high and two low tides each day, but the levels of successive high and low water periods are seldom equal. Tidal range is normally less than 1 m., unless influenced by strong winds. Winds from the southwest tend to elevate tides and hold water in the Estuary while northeast winds have the opposite effect. Hurricane tides of 3 m. above normal have been recorded (Marmer, 1954; Olson and Morrill, 1955).

Currents in the Estuary are mainly generated by tidal action and have an average velocity of about 0.3 m./sec.

Flow rates of up to 1.3 m./sec. have been measured in the narrows between Old Tampa Bay and upper Tampa Bay, at the end of bridge abutments, and in passes leading to the Gulf. There is very sluggish water movement in Hillsborough Bay, and evidence of a large eddy east of St. Petersburg (Olson and Morrill, 1955; Taylor and Saloman, 1969).

Submerged Vegetation

Aerial observations, photographs, and planimeter measurements show that 8,500 ha. or nearly 10 percent of Tampa Bay Estuary contains sea grasses and attached algae. Most of these plants grow in shallow water and there are marked seasonal changes in their growth and biomass (Taylor and Saloman, 1966, 1970; Humm, 1969). Five species of sea grass and more than 200 species of attached algae have been reported for Tampa Bay (Phillips, 1960; Dawes, 1967). The grasses are: Thalassia testudinum, turtle grass; Diplanthera wrightii, shoal grass; Syringodium filiforme, manatee grass; Halophila engelmanni; and Ruppia maritima, widgeon grass.

Apart from their contribution to primary production (Ryther, 1963) these plants create a unique estuarine habitat (Stephens, 1966).

Sediments

Goodell and Gorsline (1961) made the first comprehensive

analysis of sediments in Tampa Bay on the basis of 400 bottom samples. An additional 773 sediment samples were collected and analyzed during the benthic survey by the National Marine Fisheries Service in 1963 (Taylor and Saloman, 1969).

Authors of the first study concluded that the limestone basin of the Estuary dates from Miocene time and has since been filled by Quaternary sediments to a depth of between 12 and 30 m. They found that the sediments are predominantly quartz sand with an admixture of biogenic particles and small amounts of silts and clays. Sediment pH was usually above 7.0, and they attributed sediment homogeneity in the upper 8 cm. to the activity of burrowing invertebrates. The mean grain size in their samples was between -0.5 and 6.0 phi (ϕ). In general, mean grain size and the weight percentage of shell increased from tidal flats to slopes and channels, and from the head of the Estuary to the Gulf. They reported the average weight percentage of organic carbon as 1.39 and found a direct relationship between high carbon content and poor sediment sorting.

The main benefits from the second study were the acquisition of sediment data for each survey station, and delineation of fine sediment deposits in parts of Old Tampa Bay, Hillsborough Bay, upper Tampa Bay, and Boca Ciega Bay. From these data features of grain size, sorting, and weight

percentage of calcium carbonate and organic carbon have been summarized for major areas of the Estuary (table 3). The means and ranges of these four factors show that each area can be regarded as a separate sedimentary basin. In other words, irrespective of overall sediment trends, each area has a very great variety of depositional environments available to the infauna of the Estuary. Sediment type alone, therefore, cannot be a limiting factor for polychaetes in any major region of Tampa Bay Estuary.

Table 3.--Mean and range of sediment grain size, sorting, and content of calcium carbonate and organic carbon in six areas of Tampa Bay Estuary -- 1963

	Grain Size		Standard Deviation		Calcium Carbonate		Organic Carbon	
	Phi units (ϕ)		Sorting, Phi units (ϕ)		(weight %)		(weight %)	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Old Tampa Bay	2.8	-4.03 to 7.08	1.3	0.41 to 4.37	3.0	0.68 to 31.99	0.43	0.06 to 2.00
Hillsborough Bay	4.2	-1.90 to 7.84	1.8	0.55 to 3.17	10.8	0.48 to 75.56	1.86	0.20 to 6.20
Upper & Lower Tampa Bay	2.7	-0.96 to 7.35	1.3	0.46 to 3.54	15.7	0.56 to 85.16	1.00	0.09 to 8.40
Boca Ciega Bay	3.1	-0.13 to 7.24	1.5	0.46 to 2.53	16.4	0.90 to 66.01	1.44	0.18 to 9.35
Terra Ceia Bay	2.6	1.74 to 3.20	1.1	0.74 to 1.47	8.9	3.80 to 32.27	0.70	0.28 to 1.99

CHAPTER 4

PROCEDURE

Field sampling at transect and special-lettered stations began in June, 1963, and continued until December of the same year. Additional areas were sampled between 1963 and 1969 to supplement survey data and to assess environmental conditions in connection with dredge-fill development applications (Taylor and Saloman, 1968) -- see figure 1.

Transect stations were located along 20 compass lines that crossed the long axis of the Estuary at intervals of two to 6 km., and extended from the headwaters to about 9.8 km. offshore. Stations were 1 km. or less apart depending on bottom type and water depth. Special stations that did not coincide with the transect pattern were established to sample unusual habitats such as tributaries, oyster reefs, spoil islands, shoals, and isolated patches of submerged vegetation.

Most of the sampling was done from an outboard motor-boat. Some shore stations were reached by truck, and stations

in parts of the Bay and Gulf were sampled from the R/V Kingfish -- a 12.9m., diesel-powered vessel. Navigation charts (587, 586, and 1257), shoreline features, compass, clock, tachometer, and buoys were used to run transect lines and establish stations. Seaward distances of off-shore transects were determined by radar. A line of stations was laid out by following a compass bearing at constant speed, and releasing plastic buoys at specific intervals.

At stations deeper than 1 m., the infauna and sediment were sampled with a bucket dredge, and epibenthic forms were collected in a rigid-frame net. The dredge was 30 cm. wide and dug to a depth of 5 cm. It had a capacity of 15 liters, filled after a haul of 100 cm., and sampled a bottom area of about 3,000 cm.². The net had an opening of 90 cm. by 26 cm. and was hung with netting of 3-mm. mesh (Taylor, 1965). One dredge sample and a two-minute net haul were taken at each station. In shallow water, the net haul was made by hand, and a shovel was used to supplement or replace the bucket dredge. In terms of surface area sampled, three shovels of sediment were considered roughly equivalent to a dredge sample.

All dredge and shovel samples were washed in a sieve

(Tyler 12-in. stainless-steel screen with 0.701-mm. mesh) and fixed in 20 percent sea-water formalin. Rose Bengal dye was added to the formalin to facilitate separation of organisms from coarse sediment particles and debris.

At each station, about 300 cc. of sediment were collected for analysis. These samples were stored in sealed, plastic cups and forwarded to the Sediment Laboratory at Florida State University, Tallahassee, Florida. Analyses were performed under the direction of Dr. H. Grant Goodell. Textural analysis was done by wet sieving on a screen of 62-u. mesh. The coarse fraction retained by the screen was oven-dried and further separated by grain-size classes on nested sieves attached to a mechanical shaker. Sediments that passed the 62-u. screen (silts and clays) were measured electronically in a Coulter counter. From grain-size data, computer programs produced statistical information for mean grain size, standard deviation (sorting), skewness, and kurtosis (Folk, 1964). A pulverized fraction of each sample was used to determine the weight percentage of calcium carbonate by the EDTA method of Turekian (1956). Weight percentages of organic carbon and organic nitrogen were determined with Coleman analytical equipment. Station data for sediments, water temperature, pH, salinity, depth, and bottom vegetation were reported by Taylor and Saloman

(1969). Measurements of dissolved oxygen, total phosphorus, Kjeldahl nitrogen, light penetration, ultraviolet absorption, and primary productivity are available for all areas of the Estuary from continuing investigations by the National Marine Fisheries Service. These measurements are performed by standard procedures (Saloman and Taylor, 1968).

In the laboratory, biological collections were rinsed in fresh water, sorted into major groups (class or order), and preserved in 70 percent isopropanol. The polychaetes were subsequently sorted to family level, and in most instances to species. Preserved representatives of all polychaetes collected within Tampa Bay were deposited in collections of the National Marine Fisheries Service at St. Petersburg Beach, Florida, and the U. S. National Museum, Washington, D. C. Major works that were especially useful for taxonomic determinations include Ehlers (1887), Fauvel (1923, 1927), Hartman (1945, 1951, 1968, 1969), Pettibone (1963a), and Day (1967). Polychaete terminology was taken from the usage of Day (1967) and nomenclature was based on publications by Hartman, or authoritative revisions in more recent reports. All determinations have not been verified, and errors that may be present are the responsibility of the author.

CHAPTER 5

SYSTEMATICS AND ECOLOGICAL OBSERVATIONS

In this section, the 40 families of polychaete worms found in Tampa Bay have been arranged phylogenetically, and wherever necessary taxonomic keys have been devised to distinguish species. The species in respective families are listed alphabetically with undetermined individuals at the end. For each species, locality records and the mean and range of environmental factors have been tabulated. Literature cited from this section includes only those references that contain the original species description or a more recent report that presents figures and a description of diagnostic features. For unidentified polychaetes, a brief description and drawings were prepared as an aid to recognition.

The most useful publication for identification of polychaete families was the illustrated key prepared by Day (1967). It contains all the families reported for the Gulf of Mexico, and most of those known from the eastern Pacific, Caribbean, and western Atlantic. Part I of

Pettibone's work on New England polychaetes (1963a) and her keys in the manual compiled by Smith (1964) were also helpful. Wass⁶ constructed a useful key and check-list for the polychaetes of Virginia that contains many species found in the Tampa Bay area, and reports by Carpenter (1951) and Taylor (1961) contain keys for polychaetes north of Tampa Bay at Alligator Harbor and Seahorse Key. Keys to species in several publications by Hartman (1945, 1951, 1968, 1969) were indispensable. Her catalogues of polychaetes of the world (1959a, 1959b, 1965) and her guide to polychaete literature were also essential references.

Family POLYNOIDAE Malmgren, 1867

Polynoids are predaceous polychaetes that have worldwide distribution from the tropics to high latitudes. They are errant forms that commonly occur in coarse sediments and crevices. Some are commensals, and a few are adapted to life in fine sediments of silt and clay.

Eight species were found in Tampa Bay. One of these (Polynoid B) was collected in all areas of the Estuary, and two were found at widely separated stations in Old Tampa Bay and Boca Ciega Bay (Polynoid A and Phyllohartmania taylori). The other five species are apparently limited

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to areas of the Estuary where average salinity is greater than 25 parts per thousand as none were found north of transect-10. Among these five, Lepidasthenia commensalis and Harmothoe lunulata were the only ones found in upper Tampa Bay, while the other three, Lepidonotus sublevis, L. variabilis, and Harmothoe aculeata were collected only in the high salinity waters of Boca Ciega Bay and lower Tampa Bay.

Key to POLYNOIDAE Collected in Tampa Bay

- 1 Lateral antennae arise below median antenna 2
 - Lateral antennae arise on anterior margin of prostomium at same level as median antenna 5
- 2 Neurosetae with undivided tips 3
 - Neurosetae with bidentate tips 4
- 3 Neurosetae finely serrate; notosetae smooth and delicate; ciliated lamella at ventral base of parapodia after setiger two Phyllohartmania taylori
 - Neurosetae coarsely serrate; notosetae stout; parapodial lamella absent..... Polynoid B
- 4 Neurosetae delicate, faintly bidentate Polynoid A
 - Neurosetae stout; elytra with large tubercles..... Harmothoe aculeata
 - Neurosetae stout; elytra smooth Harmothoe lunulata
- 5 More than 12 pairs of elytra.. Lepidasthenia commensalis
 - Twelve pairs of elytra 6

- 6 Neurosetae with bidentate tips.... Lepidonotus sublevis
- Neurosetae with undivided tips.. Lepidonotus variabilis

Harmothoe aculeata Andrews, 1891
(Described and illustrated by Ebbs, 1966)

Specimens were found only in incidental samples in southern Boca Ciega Bay and lower Tampa Bay, near Mullet Key. All of the worms were large and appeared mature, but none contained ripe gametes.

This species has been reported from shelly sediments and solid substrata along the Atlantic coast from North Carolina to the Caribbean and Gulf of Mexico.

Harmothoe lunulata (delle Chiaje, 1841)
(Described and illustrated by Day, 1967)

Specimens were collected at 38 localities. Thirty-six were survey stations and additional records came from a turtle grass flat inside Johns Pass, and in lower Tampa Bay near Mullet Key. No specimens were collected in low salinity areas of the Estuary north of transect-10. Although one-half the locality records came from upper Tampa Bay, the greatest number of individuals per dredge haul were taken at station 16-14 in lower Tampa Bay (table 4).

Average sediment type at survey stations was poorly sorted sand that contained a high percentage of shell fragments (table 5). Vegetation was recorded at 50 percent of the survey stations, and at the two incidental localities as well.

Plants at survey stations included algae, turtle grass, shoal grass, and manatee grass.

Individuals with mature gametes were collected in September and October.

H. lunulata is known as a commensal or an inhabitant of coarse sediments along the western coasts of Europe and Africa, and central and southern regions of the east and west coasts of the United States. H. lunulata has never before been reported in the Gulf of Mexico.

Table 4.--Harmothoe lunulata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
10-1-A		1		12-6	1		
11-2		2		12-9	1		
11-4	1			12-10	2		
11-5	1			12-14	2		
11-6	1			12-15	3		
11-15	1			13-4	2		
11-16	2			13-5	2		
11-20	3			13-8	1		
12-1		1		13-10	1		
Boca Ciega Bay							
D-18		1		15-5	1		
D-23		1		15-14	1		
Terra Ceia Bay							
E-5		1					
Lower Tampa Bay							
14-12	1			16-14	4		
14-16	1			16-24	2		
14-17	1			17-2	2		
15-22	2			17-3	1		
15-26	1			17-7	1		
15-31	2			17-11		1	
16-9-B		1					

Table 5.--Harmothoe lunulata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.0	14.0 to 31.0	36
Salinity (‰)	29.2	23.3 to 34.9	36
pH	8.1	7.2 to 8.9	36
Depth (m.)	1.5	1 to 4.0	36
Sediment type	sand	shelly sand to silty sand	35
Granules (wt. %)	3.7	0.1 to 41.5	35
Sands (wt. %)	92.4	43.7 to 99.9	35
Silts (wt. %)	2.9	0.0 to 13.4	35
Clay (wt. %)	1.1	0.0 to 8.8	35
CaCO ₃ (wt. %)	23.5	1.2 to 85.2	35
Organic carbon (wt. %)	1.0	0.1 to 8.5	32
Organic nitrogen (wt. %)	0.1	0.0 to 0.3	32
Mean grain size, total sample (Ø)	2.1	0.5 to 3.4	35
Standard deviation, total sample (Ø)	1.3	0.5 to 3.5	35
Skewness, total sample	0.3	0.0 to 2.1	35
Kurtosis, total sample	9.4	-0.4 to 31.9	35
Mean grain size, noncarbonate fraction (Ø)	3.3	1.7 to 9.0	35
Standard deviation, noncarbonate fraction (Ø)	1.6	0.6 to 3.4	35
Mean grain size, carbonate fraction (Ø)	0.1	-2.5 to 2.2	27
Standard deviation, carbonate fraction (Ø)	1.3	0.8 to 2.0	27

Lepidasthenia commensalis (Webster, 1879a)

Specimens were collected at six survey stations and an incidental locality near Mullet Key in lower Tampa Bay. No worms were collected north of transect-10, and no more than one individual was taken in any one sample (table 6).

Average sediment type was poorly sorted sand (table 7). The bottom at four stations was vegetated with algae, and turtle grass or shoal grass.

No gravid specimens were collected, but one juvenile worm was taken in a December sample.

L. commensalis is known from the eastern coast of the United States and the Gulf of Mexico where it is frequently associated with tube worms, gastropods, hermit crabs, and other suitable consorts.

Table 6.--Lepidasthenia commensalis--Locality records
and number of individuals from survey stations,
Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel,
N-net)

Hillsborough Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
10-17		1							
Upper Tampa Bay									
11-6		1							
Boca Ciega Bay									
D-25		1			PB-4		1		
Terra Ceia Bay									
E-1			1						
Lower Tampa Bay									
17-2		1							

Table 7.--Lepidasthenia commensalis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.9	15.5 to 30.8	6
Salinity (‰)	29.3	21.8 to 34.5	6
pH	8.1	7.7 to 8.4	6
Depth (m.)	1.5	1 to 11.0	6
Sediment type	sand	--	5
Granules (wt. %)	2.0	0.0 to 7.5	5
Sands (wt. %)	94.3	90.1 to 95.6	5
Silts (wt. %)	2.5	1.4 to 3.5	5
Clay (wt. %)	1.1	0.3 to 2.6	5
CaCO ₃ (wt. %)	14.1	2.9 to 39.8	5
Organic carbon (wt. %)	0.6	0.3 to 1.1	4
Organic nitrogen (wt. %)	0.1	0.0 to 0.1	4
Mean grain size, total sample (Ø)	2.7	1.9 to 4.5	5
Standard deviation, total sample (Ø)	1.4	0.6 to 2.3	5
Skewness, total sample	0.5	-0.4 to 2.1	5
Kurtosis, total sample	5.6	0.0 to 20.1	5
Mean grain size, noncarbonate fraction (Ø)	3.1	2.8 to 3.5	4
Standard deviation, noncarbonate fraction (Ø)	1.7	0.9 to 3.2	4
Mean grain size, carbonate fraction (Ø)	0.3	-0.1 to 0.9	4
Standard deviation, carbonate fraction (Ø)	1.3	0.9 to 1.7	4

Lepidonotus sublevis Verrill, 1873
(Described and illustrated by Hartman, 1942a)

This species was collected at six survey stations and four other localities. Two of the incidental collections came from Boca Ciega Bay, one from Old Tampa Bay, and one from lower Tampa Bay. The locality in Old Tampa Bay was near the southwest end of Gandy Bridge where salinity is usually about 25 parts per thousand. Most records came from Boca Ciega Bay as did the dredge haul containing the greatest number of individuals (table 8).

Sediment at the only station where the worm was dredged (BC-N) was poorly sorted sand that contained a high percentage of large shell particles and little organic carbon (table 9).

No vegetation was noted at that station.

Specimens with mature gametes were collected in December, and a juvenile worm was taken in November.

L. sublevis occurs in shelly sediments and lives as a commensal along the New England coast, south to Florida and the Gulf of Mexico.

Table 8.--Lepidonotus sublevis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
BC-A				1	PB-4				4
BC-M-1				1	14-3				1
BC-N	7								
Lower Tampa Bay									
16-18				1					

Table 9.--Lepidonotus sublevis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	17.5	--	1
Salinity (‰)	32.2	--	1
pH	8.3	--	1
Depth (m.)	2.0	--	1
Sediment type	sand	--	1
Granules (wt. %)	14.7	--	1
Sands (wt. %)	83.5	--	1
Silts (wt. %)	1.5	--	1
Clay (wt. %)	0.3	--	1
CaCO ₃ (wt. %)	38.2	--	1
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.1	--	1
Mean grain size, total sample (Ø)	1.4	--	1
Standard deviation, total sample (Ø)	1.9	--	1
Skewness, total sample	-0.3	--	1
Kurtosis, total sample	0.9	--	1
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation, noncarbonate fraction (Ø)	0.7	--	1
Mean grain size, carbonate fraction (Ø)	1.5	--	1
Standard deviation, carbonate fraction (Ø)	0.2	--	1

Lepidonotus variabilis Webster, 1879
(Described and illustrated by Ebbs, 1966)

Collections came from nine survey stations, and one incidental sample in lower Tampa Bay near Mullet Key. Four of the collections at survey stations came from lower Tampa Bay, and the other five were from Boca Ciega Bay. No specimens were taken north of transect-14 (table 10).

Sediment data from the two dredge collections indicate that the worm lives on poorly sorted sand that contains a high percentage of coarse shell fragments (table 11).

Benthic algae, but no sea grass, were noted at one of the dredge stations.

Specimens with mature gametes were collected in April, July, and October.

L. variabilis lives in sediments containing shell or gravel, or as a commensal over a geographic range that extends from North Carolina south to the Caribbean and Gulf of Mexico.

Table 10.--Lepidonotus variabilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
BC-N				2	PB-4				4
D-25				4	16-2				3
PB-1				1					
Lower Tampa Bay									
14-5				1	15-25		1		
14-13		1			17-2				1

Table 11.--Lepidonotus variabilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.1	18.1 to 24.0	2
Salinity (‰)	31.7	30.7 to 32.6	2
pH	8.1	8.0 to 8.3	2
Depth (m.)	3.0	--	2
Sediment type	sand	sand	2
Granules (wt. %)	4.6	3.2 to 6.0	2
Sands (wt. %)	93.3	93.1 to 93.6	2
Silts (wt. %)	1.4	0.3 to 2.5	2
Clay (wt. %)	0.7	0.2 to 1.2	2
CaCO ₃ (wt. %)	47.8	43.3 to 52.0	2
Organic carbon (wt. %)	1.5	0.3 to 2.8	2
Organic nitrogen (wt. %)	0.0	--	2
Mean grain size, total sample (Ø)	1.6	1.3 to 1.9	2
Standard deviation, total sample (Ø)	1.6	1.5 to 1.6	2
Skewness, total sample	0.3	0.1 to 0.5	2
Kurtosis, total sample	2.5	0.4 to 4.6	2
Mean grain size, noncarbonate fraction (Ø)	2.7	2.6 to 2.8	2
Standard deviation, noncarbonate fraction (Ø)	0.9	0.9 to 1.0	2
Mean grain size, carbonate fraction (Ø)	-1.1	-1.3 to -1.0	2
Standard deviation, carbonate fraction (Ø)	1.4	1.2 to 1.5	2

Phyllohartmania taylori Pettibone, 1961

A single specimen was collected by dredge in Old Tampa Bay, and another by net in Boca Ciega Bay. The Old Tampa Bay record was near the southwest end of Courtney Campbell Parkway (table 12).

Sediment data indicate that this worm lives in poorly sorted sand that has an appreciable admixture of silt and clay, and a few large shell fragments (table 13).

No bottom vegetation was noted at the dredge station.

The specimen collected from Boca Ciega Bay in May was a juvenile. No worm with mature gametes was observed.

Originally described from Seahorse Key, Florida, this report is only the second locality record for P. taylori.

Table 12.--Phyllohartmania taylori--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
4-7	1						
Boca Ciega Bay							
D-25			1				

Table 13.--Phyllohartmania taylori--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.6	--	1
Salinity (‰)	24.3	--	1
pH	7.9	--	1
Depth (m.)	1.5	--	1
Sediment type	sand	--	1
Granules (wt. %)	1.2	--	1
Sands (wt. %)	87.6	--	1
Silts (wt. %)	5.2	--	1
Clay (wt. %)	6.0	--	1
CaCO ₃ (wt. %)	1.3	--	1
Organic carbon (wt. %)	0.6	--	1
Organic nitrogen (wt. %)	0.1	--	1
Mean grain size, total sample (Ø)	3.0	--	1
Standard deviation, total sample (Ø)	2.0	--	1
Skewness, total sample	0.8	--	1
Kurtosis, total sample	3.7	--	1
Mean grain size, noncarbonate fraction (Ø)	3.1	--	1
Standard deviation, noncarbonate fraction (Ø)	1.7	--	1
Mean grain size, carbonate fraction (Ø)	-1.0	--	1
Standard deviation, carbonate fraction (Ø)	1.4	--	1

Polynoid A

The body has 23 setigerous segments and evidence of 12 pairs of elytra. Dimensions of the largest specimen were 5 mm. long by 3 mm. wide including the width of parapodia. Lateral antennae are small and inserted ventral to the median antenna (broken on all specimens). Palps are large and about the same width as the base of the median antenna. Dorsal, tentacular cirri are longer than ventral ones. Anterior eyes are beneath the prostomial lobes, and the posterior pair is in line with bases of the tentacular cirri and a median, anterior prolongation of the first segment. The anterior margin of the first segment and bases of parapodia are darkly pigmented.

Dorsal, parapodial cirri are one and one-half times longer than the pre-setal, neuropodial lobes (figure 2,A). Ventral cirri are about the same length as the post-setal lobes. Notosetae are fine, and taper to capillary tips (figure 2,B). The dorsal edge in the region of curvature has a very fine, serrate margin. Neurosetae are somewhat stouter and end in finely bidentate tips (figure 2,C). Serrations on the dorsal margin are fine and widely spaced.

This undetermined polynoid was collected at eight stations in Old Tampa Bay, and a single station in Boca

Ciega Bay (table 14).

Sediment was poorly sorted sand at all dredge stations, except one, where the bottom was silty mud. The sandy sediment had an average silt-clay content of over 10 percent and about one percent organic carbon (table 15).

No bottom vegetation was observed at dredge stations.

Specimens with mature gametes were collected in July and August.

Table 14.--Polynoid A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
3-12	1			4-17-A	1		
4-3	1			4-19	2		
4-12	1			5-8	1		
4-16	2			5-10	1		
Boca Ciega Bay							
BC-N	1						

Table 15.--Polynoid A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.6	17.5 to 31.0	9
Salinity (‰)	25.3	23.7 to 32.1	9
pH	8.1	7.9 to 8.3	7
Depth (m.)	1.5	3.0 to 7.0	9
Sediment type	sand	sand to silty mud	9
Granules (wt.%)	2.1	0.0 to 14.7	9
Sands (wt. %)	87.5	33.7 to 99.8	9
Silts (wt. %)	5.7	0.1 to 35.9	9
Clay (wt. %)	4.7	0.1 to 30.2	9
CaCO ₃ (wt. %)	8.3	1.2 to 38.2	9
Organic carbon (wt. %)	1.0	0.2 to 1.4	4
Organic nitrogen (wt. %)	0.4	0.1 to 1.1	4
Mean grain size, total sample (Ø)	3.0	1.4 to 6.0	4
Standard deviation, total sample (Ø)	1.4	0.6 to 2.5	9
Skewness, total sample	0.7	-0.3 to 1.5	9
Kurtosis, total sample	14.1	-1.3 to 61.8	9
Mean grain size, noncarbonate fraction (Ø)	3.3	2.7 to 3.7	9
Standard deviation, noncarbonate fraction (Ø)	1.7	0.7 to 2.1	9
Mean grain size, carbonate fraction (Ø)	-0.4	-2.5 to 1.6	9
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 2.1	9

Polynoid B

The body has 27 setigerous segments, and 15 pairs of elytra. The largest specimen was 7 mm. long and 4 mm. wide, including parapodia. Lateral antennae are ventral to the median antenna, and have an inflated base that narrows to form a slender tip. The median antenna, palps, and tentacular cirri are all about the same length, but palps are twice as wide as the other processes. Anterior eyes are crescent-like, and the posterior ones are smaller, round, and set close to the segmental margin (figure 2,D).

Elytra are nearly round, and have a small number of widely spaced tubercles along the outer margin (figure 2,E).

Dorsal, parapodial cirri are papillated and somewhat longer than the pre-setal lobes of neuropodia. Ventral cirri are smooth and short (figure 2,F).

Notosetae are smooth and have rounded tips (figure 2, G). Neurosetae are the same thickness as notosetae, but the outer one-third of the shaft has serrate edges. The tip is entire and curved slightly upward (figure 2,H, I).

On the basis of locality records, this worm is the most common and widely distributed polynoid in Tampa Bay. It was found in all six areas at a total of 54 stations. Areas of greatest abundance were Boca Ciega Bay, upper

Tampa Bay, and Old Tampa Bay. The largest number of individuals in a single dredge haul were recorded at station 11-6 in upper Tampa Bay (table 16).

At that station the sediment was poorly sorted, fine sand with very little shell and about four percent silt and clay. Average sediment type was poorly sorted, silty sand with about 10 percent shell (table 17).

Five of the 54 stations were vegetated with algae and two had shoal grass as well.

Individuals with mature gametes were collected in June, August, and November.

Table 16.--Polynoid B--Locality records and number of
Individuals from survey stations, Tampa Bay,
Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	1			4-2	1		
B	12			4-5	1		
1-3	2			4-6	7		
1-4	40			4-7	15		
1-5	1			4-8	1		
3-3	1			4-11	2		
3-4	4			4-12	5		
3-5	2			4-13	8		
3-6	3			4-14	5		
3-7	3			4-15	6		
3-10	1			4-16	4		1
3-11	1			4-17-A	1		
Hillsborough Bay							
10-17	1						
Upper Tampa Bay							
10-8	1			11-14	2		
11-6	16			11-17	3		
11-7	2			11-18	5		
11-8	12		1	11-20	3		1
11-11	2			11-21	1		
11-12	1			12-14	1		
11-13	1						

Table 16.--Polynoid B--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	5			15-4	1		
BC-H	3			15-5	2		
BC-I	1			15-6	2		
D-1	1			15-8	1		
D-22	1			15-13	1		
PB-5	1			15-14	4		
14-2	4						
Terra Ceia Bay							
E-3	2			E-5	4		
Lower Tampa Bay							
16-23	1						

Table 17.--Polynoid B--Mean and range of observed environmental factors from survey station, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.9	14.5 to 31.5	55
Salinity (‰)	26.8	21.2 to 34.6	55
pH	7.9	7.0 to 8.5	43
Depth (m.)	1.5	1 to 4.0	55
Sediment type	silty sand	sand to clayey silt	55
Granules (wt. %)	0.9	0.0 to 9.7	55
Sands (wt. %)	77.4	4.6 to 99.4	55
Silts (wt. %)	12.4	0.2 to 52.5	55
Clay (wt. %)	9.4	0.1 to 47.0	55
CaCO ₃ (wt. %)	10.9	0.9 to 66.0	55
Organic carbon (wt. %)	0.6	0.1 to 3.8	33
Organic nitrogen (wt. %)	0.3	0.0 to 8.0	33
Mean grain size, total sample (Ø)	3.7	1.9 to 7.3	55
Standard deviation, total sample (Ø)	1.7	0.7 to 2.7	55
Skewness, total sample	0.7	-0.9 to 2.1	55
Kurtosis, total sample	7.4	-0.9 to 37.7	55
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 4.0	55
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 2.2	55
Mean grain size, carbonate fraction (Ø)	-0.2	-2.5 to 2.4	55
Standard deviation, carbonate fraction (Ø)	1.32	0.5 to 2.9	55

Figure 2. -- Diagnostic features of Polynoid A and
Polynoid B

Polynoid A: (A) Parapodium from median section (B)
Notoseta from same parapodium (C)
Neuroseta from same parapodium

Polynoid B: (D) Prostomium (E) Elytrum from median
section (F) Parapodium from same seg-
ment (G) Notoseta from same segment (H)
Neuroseta from same segment (I) Tip of
neuroseta, rotated and enlarged.

FIGURE 2

Family POLYODONTIDAE Pflugfelder, 1834

Polyodontids comprise a small, rare group of large polychaetes that construct tubes in unconsolidated sediments. Little is known concerning their diet, but considering their large jaws and teeth, they probably eat a variety of organisms that pass within their reach. This predominantly tropical family has its greatest representation in the Caribbean and low latitudes of Atlantic and Pacific oceans. Two species were collected in Tampa Bay.

Key to POLYODONTIDAE Collected in Tampa Bay

- 1 Shaft of dorsal, pseudopenicillate neurosetae enlarged in the middle; bristles on dorsal and ventral neurosetae sparse and short.... Polyodontes sp.
- Shaft of dorsal, pseudopenicillate neurosetae without median enlargement; bristles on dorsal and ventral neurosetae conspicuous and numerous Polyodontes lupina

Polyodontes lupina (Stimpson, 1856)
(Described and illustrated by Taylor, 1961)

This species was collected at one station in Old Tampa Bay and one in lower Tampa Bay (table 18).

Sediment at both stations was sand with very little silt and clay, and a small percentage of large shell particles (table 19).

No specimens contained mature gametes and no juveniles were collected.

Previous records for P. lupina have come from muddy bottom along the south Atlantic coast and the Gulf of Mexico.

Table 18.--Polyodontes lupina--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
5-7		1							
Lower Tampa Bay									
16-27		1							

Table 19.--Polyodontes lupina--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.9	21.0 to 31.0	2
Salinity (‰)	27.4	24.6 to 30.3	2
pH	8.0	8.0 to 8.1	2
Depth (m.)	1.5	1.0 to 2.0	2
Sediment type	sand	--	2
Granules (wt.%)	0.9	0.6 to 1.8	2
Sands (wt. %)	98.5	95.5 to 99.1	2
Silts (wt. %)	1.1	0.1 to 2.1	2
Clay (wt. %)	0.4	0.2 to 0.6	2
CaCO ₃ (wt. %)	10.2	9.2 to 11.2	2
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.1	--	1
Mean grain size, total sample (Ø)	2.2	2.1 to 2.3	2
Standard deviation, total sample (Ø)	1.1	0.9 to 1.3	2
Skewness, total sample	0.3	--	2
Kurtosis, total sample	7.4	6.0 to 8.7	2
Mean grain size, noncarbonate fraction (Ø)	2.8	2.1 to 3.4	2
Standard deviation, noncarbonate fraction (Ø)	1.5	1.0 to 2.0	2
Mean grain size, carbonate fraction (Ø)	-0.94	-1.1 to -0.8	2
Standard deviation, carbonate fraction (Ø)	1.5	1.4 to 1.6	2

Polyodontes sp.

The only specimen collected was incomplete, and came from an incidental sample in Boca Ciega Bay at Bunces Pass. The anterior fragment was only 3 mm. wide including parapodia, and an entire worm would probably measure less than 30 mm. long. If the worm was mature, then this species is quite small for a polyodontid.

Each jaw has eight, small teeth, and a single, large median tooth. Behind the teeth, the proboscis has a long, median upper and lower papilla with seven smaller papillae on each side. The anterior pair of eyes is elevated on short stalks and the smaller posterior pair is situated on the mid-line of the prostomium.

Elytra have a clear margin and dark pigmentation in the center, especially over the dorsum.

Parapods are short and blunt with the post-setal lobe slightly longer than the pre-setal one. Dorsal and ventral cirri are about the same length, but the dorsal one is stouter (figure 3,A). Notosetae were not observed. If present, they are presumably fine, spinous capillaries. Ventral neurosetae are long and have an asymmetrical enlargement in the shaft near the tip (figure 3,D). The median, aristate setae have a terminal, spinous appendage

that tapers to a fine tip (figure 3,C). Dorsal neurosetae are similar to ventral ones except they are shorter and the median enlargement is symmetrical (figure 3,B).

Family SIGALIONIDAE Malmgren, 1867

The Sigalionids are burrowing or crawling predators that live in unconsolidated sediments over a wide range of latitude in all seas. Three species were found in Tampa Bay. Locality data indicate that two (Sthenelais boa and Sigalion arenicola) are limited by salinity to waters of greater than 20 parts per thousand, and one (Pholoe sp.) requires average salinity of at least 25 parts per thousand.

Key to SIGALIONIDAE Collected in Tampa Bay

- 1 Length 3 mm. or less; elytra with unbranched papillae; no cirriform branchiae Pholoe sp.
- Body large, elytra with a fringe of slender papillae; cirriform branchiae present Sthenelais boa
- Body large, elytra with pinnately branched papillae; cirriform branchiae present.. Sigalion arenicola

Sigalion arenicola Verrill, 1879
(Described and illustrated by Pettibone, 1963a)

S. arenicola was collected in one incidental sample near Gandy Bridge in Old Tampa Bay, at two survey stations in upper Tampa Bay, at a single station in Boca Ciega Bay, and at 22 stations in lower Tampa Bay. The most individuals per dredge haul (23) came from station 15-28 in lower Tampa Bay (table 20).

All specimens were collected from poorly sorted, medium sand or shelly sand with an average silt-clay content of

less than two percent. Much of the sand fraction was composed of shell fragments in the coarse sand size category (table 21).

Of the 25 dredge stations where this species was recorded, no bottom vegetation was noted at 15, and algae, but no sea grass, were found at 10.

No individuals with mature gametes were observed, however, juveniles were collected in October and November.

Table 20.--Sigalion arenicola--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
13-8	1			13-10	6		
Boca Ciega Bay							
16-5		2					
Lower Tampa Bay							
14-11	1			16-13	6		
14-12	3			16-14	8		
14-14	3			16-15	16		
14-15	2			16-16	8		
15-21	2			16-17	5		
15-22	8			16-24	1		
15-23	5			17-2	2		
15-25	20			17-3	3		
15-26	9			17-4	9		
15-27	4			17-8	1		
15-28	23			18-3	3		

Table 21.--Sigalion arenicola--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	16.0 to 25.0	25
Salinity (‰)	32.2	27.0 to 34.5	24
pH	8.0	7.7 to 8.3	25
Depth (m.)	2.1	1 to 3.9	25
Sediment type	sand	shelly sand to sand	25
Granules (wt. %)	4.2	0.5 to 20.8	25
Sands (wt. %)	94.4	77.4 to 99.2	25
Silts (wt. %)	1.1	0.2 to 7.2	25
Clay (wt. %)	0.3	0.1 to 1.9	25
CaCO ₃ (wt. %)	38.8	6.5 to 85.2	25
Organic carbon (wt. %)	0.8	0.03 to 5.0	25
Organic nitrogen (wt. %)	0.04	0.00 to 0.19	25
Mean grain size, total sample (Ø)	1.6	0.6 to 3.0	25
Standard deviation, total sample (Ø)	1.3	0.8 to 2.0	25
Skewness, total sample	0.2	-0.6 to 0.8	25
Kurtosis, total sample	4.6	-0.03 to 11.9	25
Mean grain size, noncarbonate fraction (Ø)	2.9	1.7 to 5.9	25
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	25
Mean grain size, carbonate fraction (Ø)	0.4	-1.3 to 1.7	22
Standard deviation, carbonate fraction (Ø)	1.1	0.8 to 1.6	22

Sthenelais boa (Johnston, 1833)
(Described and illustrated by Pettibone, 1963a)

Specimens were collected in all six areas of the Estuary at a total of 104 survey stations and in five incidental samples. As many as 40 individuals were collected in a single dredge haul from station BC-N in Bunces Pass. Salinity below 20 parts per thousand is apparently no barrier to S. boa as 14 localities were recorded north of Courtney Campbell Parkway in Old Tampa Bay (table 22).

Sediment data show that this species occupies a variety of bottom types which range from clayey silt to shelly sand. Average sediment type was poorly sorted sand with a moderate amount of coarse shell and less than 10 percent silt and clay (table 23).

About 25 percent of the dredge and shovel stations were vegetated with algae, and shoal grass, turtle grass, or manatee grass were recorded at a few.

Gravid specimens were collected in May and juveniles were noted in July, August, September, October, November, and December.

Table 22.--Sthenelais boa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
1-3			2	4-7	1		4
1-4			2	4-9	4		
1-5	3			4-12	3		
3-3	1			4-13	3		7
3-4	12		43	4-14	2		2
3-5			1	4-15	2		3
3-6	2		4	4-16	11		
3-7	1		5	4-17-A	3		
3-8	2			4-18-A	1		
3-10	1			4-19	2		
3-11	2		1	5-6	3		
3-12	5		1	5-8	1		
3-13	1			5-11	1		
3-16		3		5-12	3		
4-3	2		5	6-4-A	2		
4-4			9	6-5	1		
4-5	1			6-6	4		
4-6	1		1				
Hillsborough Bay							
10-15			1				

Table 22.--Sthenelais boa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-3		1		11-16			1
10-4	17			11-17			1
10-6	4			11-18	1		9
10-7	8			11-20			7
10-8	9			12-2	1		
11-3	7			12-3	4		
11-4	19		4	12-4	4		
11-5	9			12-7	4		
11-6	16			12-8	1		
11-7	6		10	12-9	1		
11-8	9		17	12-12	1		
11-9	12		9	12-14	18		6
11-12			1	13-4	1		
11-13	2		2	13-5	5		
11-14			6	13-11	1		
11-15	1		15				
Boca Ciega Bay							
BC-A	4		2	14-2	2		
BC-E	4			14-3	3		
BC-H	1			14-4	3		
BC-I	1			15-6	4		
BC-M	1			15-12	4		
BC-N	40		2	15-13			1
D-11		1		15-14	1		
D-25		3	3	15-15			1
PB-1	2			16-1		1	
PB-4	1			16-6	2		
PB-5	2						

Table 22.--Sthenelais boa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Terra Ceia Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
E-1		1			E-5		1		
E-4		1			E-8		1		
Lower Tampa Bay									
14-5		3			16-22		2		
14-6		5			16-23		1		
14-9		2			17-2		11		
14-10		6			17-6		1		
14-16		13			17-8		5		
16-9-B		1			17-9		2		
16-11		2			17-13		8		

Table 23.--Sthenelais boa-- Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.6	12.5 to 32.0	98
Salinity (‰)	27.7	21.2 to 35.8	98
pH	8.0	7.3 to 8.9	84
Depth (m.)	1.3	0.3 to 3.9	98
Sediment type	sand	shelly sand to clayey silt	98
Granules (wt. %)	2.0	0.0 to 41.5	97
Sands (wt. %)	88.3	4.6 to 99.9	97
Silts (wt. %)	5.7	0.0 to 52.6	97
Clay (wt. %)	3.9	0.0 to 43.8	97
CaCO ₃ (wt. %)	10.8	0.8 to 44.4	97
Organic carbon (wt. %)	0.9	0.02 to 8.5	65
Organic nitrogen (wt. %)	0.1	0.0 to 0.2	65
Mean grain size, total sample (Ø)	2.9	0.8 to 7.3	97
Standard deviation, total sample (Ø)	1.3	0.4 to 3.5	97
Skewness, total sample	0.6	-1.7 to 2.4	97
Kurtosis, total sample	12.5	-1.3 to 62.5	96
Mean grain size, noncarbonate fraction (Ø)	3.2	1.4 to 9.0	91
Standard deviation, noncarbonate fraction (Ø)	1.5	0.5 to 3.4	91
Mean grain size, carbonate fraction (Ø)	-0.2	-2.5 to 3.0	77
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 2.9	78

Pholoe sp.

This minute sigalionid is approximately 1.5 mm. long by 0.5 mm. wide. The 15 setigers are covered by nine pairs of elytra that leave a broad section of the dorsum exposed. Elytra have an outer fringe of secretory papillae with visible internal structure (figure 3,H,I). Parapodia have a prolonged neurosetal lobe and long ventral cirrus (figure 3,E). Notosetae are spinous capillaries and neurosetae are stout, compound falcigers (figure 3,F,G).

Specimens were collected at one station in upper Tampa Bay and three stations in lower Tampa Bay (table 24).

Sediment at all stations was poorly sorted sand with a large percentage of coarse shell. The non-carbonate fraction was largely coarse silt that contained a high percentage of organic carbon (table 25).

Algae were noted at only one station, and no sea grasses were recorded.

Neither gravid nor juvenile specimens were seen.

Table 24.--Pholoe sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
13-8		1							
Lower Tampa Bay									
16-12		1			16-14		4		
16-13		1							

Table 25.--Pholoe sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.4	21.3 to 24.1	4
Salinity (‰)	32.6	29.4 to 33.9	4
pH	7.9	7.8 to 8.2	4
Depth (m.)	2.9	2.6 to 3	4
Sediment type	sand	--	3
Granules (wt. %)	4.8	2.1 to 7.9	3
Sands (wt. %)	93.9	91.6 to 96.8	3
Silts (wt. %)	1.0	0.4 to 1.9	3
Clay (wt. %)	0.3	0.1 to 0.5	3
CaCO ₃ (wt. %)	49.1	35.0 to 68.0	3
Organic carbon (wt. %)	2.3	0.2 to 3.3	3
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	3
Mean grain size, total sample (Ø)	1.3	0.6 to 1.6	3
Standard deviation, total sample (Ø)	1.3	1.2 to 1.5	3
Skewness, total sample	0.3	0.2 to 0.6	3
Kurtosis, total sample	4.6	2.1 to 8.4	3
Mean grain size, noncarbonate fraction (Ø)	4.4	1.7 to 5.9	3
Standard deviation, noncarbonate fraction (Ø)	1.7	1.1 to 2.1	3
Mean grain size, carbonate fraction (Ø)	-0.3	-0.1 to 0.1	2
Standard deviation, carbonate fraction (Ø)	1.1	0.9 to 1.3	2

Figure 3. -- Diagnostic features of Polyodontes sp. and Pholoe sp.

Polyodontes sp.: (A) Parapodium from, a median section (B) Upper neuroseta from same parapodium (C) Middle neuroseta from same parapodium (D) Ventral neuroseta from same parapodium

Pholoe sp.: (E) Parapodium from median section (F) Notoseta from same parapodium (G) Neuroseta from same parapodium (H) Elytrum (I) Margin of elytrum greatly enlarged.

FIGURE 3

Family PISIONIDAE Southern, 1914

Pisionids are a rare group of small, temperate and tropical polychaetes. All have chitinous jaws, and in addition, some have a pair of peristomial acicula directed forward at an oblique angle that may act as accessory jaws. The jaw apparatus is indicative of a predatory mode of feeding. A single specimen of one species (Pisione remota) was found in Tampa Bay.

Pisione remota (Southern, 1914)
(Described and illustrated by Hartman, 1968)

An anterior fragment was collected at station 17-3 in lower Tampa Bay (table 26).

Sediment at this station was coarse sand that consisted of poorly sorted shell particles and fine sand grains. It contained very little organic carbon (table 27).

No bottom vegetation was noted at the collection site.

The specimen collected was mature, but not gravid.

P. remota was originally described from Ireland, and is otherwise known only from southern California and western Mexico in coarse sands.

Table 26.--Pisone remota--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
17-3	1						

Table 27.--Pisione remota--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	--	1
Salinity (‰)	34.0	--	1
pH	8.0	--	1
Depth (m.)	2.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	5.6	--	1
Sands (wt. %)	93.6	--	1
Silts (wt. %)	0.7	--	1
Clay (wt. %)	0.1	--	1
CaCO ₃ (wt. %)	85.2	--	1
Organic carbon (wt. %)	0.3	--	1
Organic nitrogen (wt. %)	0.02	--	1
Mean grain size, total sample (Ø)	0.5	--	1
Standard deviation, total sample (Ø)	1.1	--	1
Skewness, total sample	0.8	--	1
Kurtosis, total sample	8.2	--	1
Mean grain size, noncarbonate fraction (Ø)	2.9	--	1
Standard deviation, noncarbonate fraction (Ø)	1.7	--	1
Mean grain size, carbonate fraction (Ø)	1.1	--	1
Standard deviation, carbonate fraction (Ø)	0.8	--	1

Family CHRYSOPETALIDAE Ehlers, 1864

This temperate and tropical family contains only four genera of small worms that are found associated with plants and fouling organisms, or among crevices on solid substrata and coarse shell fragments. Nothing is known about their feeding habits, but judging from their mobility, they are probably omnivorous feeders that consume small organisms and bits of detritus.

The single species recorded was found in all areas of Tampa Bay except Hillsborough Bay.

Paleanotus heteroseta Hartman, 1945

This species was collected at a total of 47 stations in five areas of Tampa Bay. The largest collection (132) came from a dredge haul at station 16-13 in lower Tampa Bay. No specimens were collected north of transect-6 in the more brackish waters of Old Tampa Bay (table 28).

Average sediment type at dredge and shovel stations was poorly sorted sand with about four percent silt and clay and a fairly high percentage of coarse shell fragments. The non-carbonate sediment was mainly fine sand with less than one percent organic carbon (table 29).

Algae were recorded at about one-third of the dredge and shovel stations, and in addition, shoal grass, manatee

grass, and turtle grass were collected at one or more stations. In general, P. heteroseta was found at water depths of about 2 m. which is about the lower limit for growth of sea grasses in most areas of the Estuary.

Neither gravid nor juvenile individuals were collected.

P. heteroseta has been collected along the Atlantic seaboard in North Carolina and in the Gulf of Mexico.

Table 28.--Paleanotus heteroseta--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-1-A			1		6-3		6		
6-2		6							
Upper Tampa Bay									
10-3			3		12-12		1		
11-6		1			12-13				1
11-21		1			13-3		37		
11-22		2			13-5		3		
12-3		3			13-6		2		
12-6		1			13-7		1		
12-10		3			13-8		30		
12-11		4			13-10		34		
Boca Ciega Bay									
BC-N		6			PB-1		1		
D-23			1		15-14		1		
Terra Ceia Bay									
E-8		1							

Table 28.--Paleanotus heteroseta--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-12	5			16-14	56		3
15-22	1			16-15	75		
15-23	33			16-16	4		
15-24	8			16-17	3		
15-25	51		1	16-27	5		
15-26	45			17-2	21		
15-27	1			17-3	123		
15-28	5			17-4	27		
15-30	1			17-5	7		
15-32	1			17-7	4		
16-12			34	18-3	60		1
16-13	132						

Table 29.--Paleanotus heteroseta--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.8	15.0 to 31.8	45
Salinity (‰)	29.6	20.1 to 34.6	45
pH	8.0	7.6 to 8.3	43
Depth (m.)	2	1 to 4.0	45
Sediment type	sand	shelly sand to silty sand	42
Granules (wt. %)	4.2	0.6 to 21.5	42
Sands (wt. %)	91.8	24.5 to 99.2	42
Silts (wt. %)	1.8	0.1 to 19.0	42
Clay (wt. %)	2.2	0.1 to 13.1	42
CaCO ₃ (wt. %)	33.7	0.6 to 90.1	42
Organic carbon (wt. %)	0.8	0.1 to 6.9	38
Organic nitrogen (wt. %)	0.1	0.0 to 0.2	38
Mean grain size, total sample (Ø)	1.9	0.4 to 7.1	42
Standard deviation, total sample (Ø)	1.4	0.7 to 2.7	42
Skewness, total sample	0.1	-1.7 to 2.1	42
Kurtosis, total sample	5.0	-0.6 to 23.9	42
Mean grain size, noncarbonate fraction (Ø)	2.9	1.7 to 5.9	40
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	40
Mean grain size, carbonate fraction (Ø)	0.1	-2.5 to 1.7	32
Standard deviation, carbonate fraction (Ø)	1.2	0.8 to 2.1	32

Family AMPHINOMIDAE

These temperate and tropical worms lack jaws and feed on sessile animals by sucking out body juices with their eversible proboscis. They inhabit crevices and are often found crawling on rocks and timbers. Of the two species collected in Tampa Bay, Pseudeurythoe ambigua was distributed in all six areas and Euphrosyne triloba was found at only one station in lower Tampa Bay.

Key to AMPHINOMIDAE Collected in Tampa Bay

- 1 Body linear; prostomium with a single median antenna..... Pseudeurythoe ambigua
- Body oval; prostomium with a median and 2 lateral antennae..... Euphrosyne triloba

Euphrosyne triloba Ehlers, 1887

This species was collected in a net haul at station 18-3 near Egmont Key. Salinity in that locality is above 30 parts per thousand and sediments are shelly sand (table 30).

E. triloba was described by Ehlers from collections at depths of 10 fathoms or more at three localities in the Gulf of Mexico. To my knowledge it has not been recorded since his original report.

Table 30.--Euphrosyne triloba--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay ^a						
Stations			Individuals			
			D	S	N	
18-3					1	

Pseudeurythoe ambigua (Monro, 1933)
(Described and illustrated by Monro, 1937)

Collections of P. ambigua were made at 56 survey stations and at two incidental localities (Mobbly Bay and Mullet Key) for a total of 58 records. It is represented in all areas of the Estuary, but was taken in greatest numbers from the brackish waters of Old Tampa Bay. There, the largest number of individuals per dredge haul (40) came from station 1-3 (table 31).

Average sediment type at dredge and shovel stations was sand, but the worm was also found in shelly sand and very soft bottoms. Average silt and clay content was over 18 percent, shell was 12 percent, and organic carbon was nearly one percent (table 32).

One-third of the dredge and shovel samples contained algae, and at one locality sea grasses included turtle grass, shoal grass, manatee grass, and Halophila.

No individuals were collected with mature gametes but juveniles were found in June, July, August, September, October and November.

This species was originally described from the Pacific side of Panama and was first recorded in the Atlantic at Beaufort, North Carolina by Hartman (1945). This report is the first record for P. ambigua from the Gulf of Mexico.

Table 31.--Pseudeurythoe ambigua--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B-2		36		3-9	1		
1-1		1		4-3			1
1-3	40		10	4-4	2		
1-4	11		3	4-9	1		
1-5	6			4-13			1
3-1-A		1		5-1-A	8		
3-4	22		1	6-1-A		1	
3-5	37		1	6-1-D		3	
3-6	2			6-2	3		
3-7	1						
Hillsborough Bay							
C-3	4			9-8			1
C-9		1		10-22	3		
9-4	1						
Upper Tampa Bay							
10-3		1		11-14	1		3
10-12	1			11-19	1		
11-1		2		11-27	5		
11-7			4	11-28		2	
11-8	1		1	11-28-1		2	
11-9	12			13-1-A		6	
11-11	4		9	13-1-B		4	
11-12	2		3	13-3	1		
11-13	2		2				

Table 31.--Pseudeurythoe ambigua--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-1	1			16-4	2		
D-18		5		16-5	1		
15-13	1						
Terra Ceia Bay							
E-7	2						
Lower Tampa Bay							
16-9-B		6		17-7	1		
16-10	1			17-8	4		
16-20	7			17-9	5		
16-27	1			18-3			1
17-3	1						

Table 32.--Pseudeurythoe ambigua--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.5	15.0 to 32.0	52
Salinity (‰)	26.5	16.2 to 34.9	52
pH	7.9	7.0 to 8.5	42
Depth (m.)	1.0	1 to 3.1	52
Sediment type	sand	shelly sand to clayey silt	52
Granules (wt. %)	3.6	0.0 to 46.2	52
Sands (wt. %)	78.0	6.4 to 99.6	52
Silts (wt. %)	9.3	0.0 to 51.0	52
Clay (wt. %)	9.0	0.0 to 65.9	52
CaCO ₃ (wt. %)	12.4	0.6 to 85.2	51
Organic carbon (wt. %)	0.7	0.04 to 3.8	35
Organic nitrogen (wt. %)	0.1	0.0 to 0.9	35
Mean grain size, total sample (Ø)	3.2	-0.8 to 7.2	51
Standard deviation, total sample (Ø)	1.6	0.6 to 2.7	51
Skewness, total sample	0.4	-0.9 to 3.4	51
Kurtosis, total sample	9.0	-0.6 to 73.5	51
Mean grain size, noncarbonate fraction (Ø)	3.1	2.0 to 7.2	52
Standard deviation, noncarbonate fraction (Ø)	1.5	0.6 to 2.8	52
Mean grain size carbonate fraction (Ø)	-0.4	-2.6 to 2.4	46
Standard deviation, carbonate fraction (Ø)	1.3	0.4 to 2.7	46

Family PHYLLODOCIDAE Williams, 1851

The Phyllodocids comprise a large group of errant predators that have world-wide distribution, and are associated with a variety of sediment types as well as crevices in shells and solid substrata. Day (1967) noted that the genus Eteone is the only one that contains burrowing forms.

In Tampa Bay, five representatives of the family were collected. Two species, Eteone heteropoda and Phyllodoce arenae, were found in all areas of the Estuary; two were absent only in Hillsborough Bay, Eumida sanguinea and Phyllodoce fragilis; and Paranaitis speciosa was found everywhere except Hillsborough Bay and Terra Ceia Bay. Although three species were unrecorded in some areas, all five occurred at some stations near both the mouth and headwaters of the Estuary.

Key to PHYLLODOCIDAE Collected in Tampa Bay

- 1 Two pairs of tentacular cirri Eteone heteropoda
- Four pairs of tentacular cirri 2
- 2 Four frontal antennae, and 1 median antenna Eumida sanguinea
- Four frontal antennae, and no median antenna..... 3
- 3 Prostomium ovate; tentacular segments 1 and 2 fused Paranaitis speciosa
- Prostomium cordate; tentacular segments separate 4

- 4 Occipital papilla present; dorsum with transverse bands of dark pigment; dorsal cirri broad and thin; proboscis distinctly papillate except on dorsal surface Phyllodoce arenae
- No occipital papilla; dorsum not banded with pigment; dorsal cirri broad and thick; proboscis covered with minute papillae Phyllodoce fragilis

Eteone heteropoda Hartman, 1951

Individuals were collected in all areas of the Estuary at 55 survey stations and incidental localities at Booth Point, Old Tampa Bay; McKay Bay, Hillsborough Bay; and Mullet Key, lower Tampa Bay. This species seems best adapted to conditions in Boca Ciega Bay, Terra Ceia Bay, and the Estuary north of transect-13 as only five collections came from lower Tampa Bay. The greatest number of individuals per dredge haul (51) came from station C-2 in Hillsborough Bay (table 33).

Although the worm was collected in a variety of sediments, the average bottom type was poorly sorted, fine sand with about four percent silt and clay, a small amount of coarse shell, and less than one percent organic carbon (table 34).

All collections came from shallow water, and vegetation was recorded at about one-third of the survey stations. Algae were the most common plants. Turtle grass, shoal grass, manatee grass, and Halophila were also present at one or

more stations.

Gravid specimens were collected in June, July, and August, while juveniles were found in June, July, August, November, and December.

E. heteropoda was originally described from the Gulf of Mexico and is otherwise known from Maine to Florida. It is one of the few polychaetes previously reported from Tampa Bay where Simon (1965) made observations on its predatory behavior.

Table 33.--Eteone heteropoda--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-3		1		3-1T	2		
A-6		6		4-2	1		
B	3			4-5	1		
B-3		2		4-12	1		
1-2	2			5-3	3		
1-4			7	5-4	1		
3-3	6			5-5	3		
3-8	2			6-8		4	
3-9	1						
Hillsborough Bay							
C			5	C-8-1		1	
C-1		8		8-6		5	
C-2	51			8-8			2
C-4		13		8-9	18		6
Upper Tampa Bay							
10-0		2		10-14-A		14	
10-4	2			11-1		2	
10-12	4			11-21	1		
10-13	4			13-1-A		2	
Boca Ciega Bay							
BC-A	2		1	PB-1		7	
BC-E	1			PB-4	12		1
BC-N	1			PB-5	2		
D-1	1			15-2		4	
D-2	3			15-9		1	
D-5			1	15-10		1	
D-11	4	1		16-4		1	
D-17			1	16-6	4		

Table 33.--Eteone heteropoda--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--
(continued)

Terra Ceia Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
E-5		1			E-7		1		
Lower Tampa Bay									
14-19			6		17-12		1		
16-27		1			17-13		1		

Table 34.--Eteone heteropoda--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.3	14.5 to 34.1	52
Salinity (‰)	26.3	15.1 to 34.3	52
pH	7.9	6.7 to 8.4	44
Depth (m.)	1.0	1 to 2.1	52
Sediment type	sand	shelly sand to silty sand	52
Granules (wt. %)	2.7	0.0 to 72.9	52
Sands (wt. %)	93.0	27.1 to 99.9	52
Silts (wt. %)	2.9	0.0 to 26.8	52
Clay (wt. %)	1.5	0.0 to 13.1	52
CaCO ₃ (wt. %)	7.5	0.05 to 75.6	52
Organic carbon (wt. %)	0.5	0.01 to 1.6	27
Organic nitrogen (wt. %)	0.04	0.00 to 0.1	26
Mean grain size, total sample (Ø)	2.5	-1.9 to 4.1	52
Standard deviation, total sample (Ø)	1.2	0.5 to 2.7	52
Skewness, total sample	0.5	-1.7 to 3.6	52
Kurtosis, total sample	13.5	0.4 to 77.3	52
Mean grain size, noncarbonate fraction (Ø)	3.1	1.8 to 3.9	47
Standard deviation, noncarbonate fraction (Ø)	1.5	0.6 to 3.1	47
Mean grain size, carbonate fraction (Ø)	-0.4	-2.5 to 1.8	45
Standard deviation, carbonate fraction (Ø)	1.3	0.4 to 2.3	45

Eumida sanguinea (Oersted, 1843)
(Described and illustrated by Pettibone, 1963a)

This small worm was collected at 40 survey stations, and was found in all areas of the Estuary except Hillsborough Bay. E. sanguinea was especially well represented in Boca Ciega Bay where 108 specimens were collected in a single dredge haul from station BC-N (table 35).

Average sediment type at dredge and shovel stations was very poorly sorted, fine sand with a considerable quantity of coarse shell, four percent silt and clay, and one percent organic carbon (table 36).

One-third of the bottom samples contained algae, and shoal grass, turtle grass, or widgeon grass were recorded in a few.

Specimens with mature gametes were collected in November and January, and juveniles were noted in August, September, and October.

E. sanguinea has a world-wide distribution in tropical, temperate, and boreal seas.

Table 35.--*Eumida sanguinea*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay								
Stations		Individuals		Stations		Individuals		
		D	S	N		D	S	N
B				1	3-14		1	5
B-1				1	6-1-C		1	
2-3				1	6-2	1		1
3-12				1	6-3	1		15
Upper Tampa Bay								
10-4				8	12-9	1		
Boca Ciega Bay								
BC-I				2	PB-5	3		4
BC-M	1			1	14-4	3		
BC-N	108			5	15-3	1		
D-2	1			1	15-4	1		
D-17				1	15-11	1		
D-24				1	15-12			5
D-25				1	15-13			1
PB-1				25	15-14			4
FB-4				31	16-2			4
Terra Ceia Bay								
E-1				1	E-4	1		
E-3				1	E-8			3
Lower Tampa Bay								
14-6				3	15-24	1		
14-9	1				15-29			1
14-12				1	16-11	2		
14-13				1	16-14	2		
14-18				1				

Table 36.--Eumida sanguinea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	14.5 to 31.8	21
Salinity (‰)	30.1	23.8 to 33.5	21
pH	8.1	7.7 to 8.4	20
Depth (m.)	1.1	1 to 3.3	21
Sediment type	sand	sand to silty sand	19
Granules (wt. %)	4.6	0.0 to 14.7	19
Sands (wt. %)	91.0	78.1 to 98.8	19
Silts (wt. %)	2.8	0.0 to 13.8	19
Clay (wt. %)	1.2	0.0 to 8.0	19
CaCO ₃ (wt. %)	16.4	1.3 to 68.0	19
Organic carbon (wt. %)	1.0	0.1 to 3.3	11
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	11
Mean grain size, total sample (Ø)	2.2	0.6 to 3.1	19
Standard deviation, total sample (Ø)	2.2	0.6 to 3.1	19
Skewness, total sample	0.0	-1.7 to 1.6	19
Kurtosis, total sample	5.3	0.1 to 13.3	19
Mean grain size, noncarbonate fraction (Ø)	3.4	2.5 to 6.1	16
Standard deviation, noncarbonate fraction (Ø)	1.5	0.7 to 3.4	16
Mean grain size, carbonate fraction (Ø)	-0.1	-1.9 to 3.0	15
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 2.3	15

Paranaitis speciosa (Webster, 1880)
(Described and illustrated by Pettibone, 1963a)

This species is less common in Tampa Bay than other phyllodocids, and was found at only two incidental stations (Bunces Pass and Mullet Key) and 17 survey stations. No collections were made in Hillsborough or Terra Ceia Bays (table 37).

Specimens were found mostly in poorly sorted, fine sand that contained more than five percent silt and clay, over one percent organic carbon, and numerous, large shell fragments (table 38).

Vegetation, that consisted of algae, shoal grass, and turtle grass, was recorded at one station.

No gravid specimens were collected, but one juvenile was present in a November sample.

P. speciosa occurs from Maine to Florida and has been recorded in the Gulf of Mexico.

Table 37.--Paranaitis speciosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
3-8	1			4-17-A	1		
3-9	1			4-18-A	1		
3-12	2			6-4-A	1		
Upper Tampa Bay							
11-4	1						
Boca Ciega Bay							
BC-I	1			15-8	1		
BC-M	2			15-12	1		
15-6	2		1	16-6	5		
Lower Tampa Bay							
17-2	1			17-6	1		
17-4	2			17-13	3		

Table 38.--Paranaitis speciosa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.7	17.0 to 31.2	17
Salinity (‰)	29.4	24.5 to 34.5	17
pH	8.1	7.8 to 8.5	13
Depth (m.)	1.1	1 to 4.0	17
Sediment type	sand	sand to silty sand	17
Granules (wt. %)	1.0	0.0 to 6.1	17
Sands (wt. %)	93.7	72.5 to 99.4	17
Silts (wt. %)	3.8	0.2 to 22.1	17
Clay (wt. %)	1.5	0.3 to 5.2	17
CaCO ₃ (wt. %)	17.0	1.2 to 66.0	17
Organic carbon (wt. %)	1.1	0.1 to 8.5	14
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	14
Mean grain size, total sample (Ø)	2.7	1.3 to 4.1	17
Standard deviation, total sample (Ø)	1.3	0.7 to 2.0	17
Skewness, total sample	1.0	-0.2 to 2.2	17
Kurtosis, total sample	11.9	-0.04 to 25.9	17
Mean grain size, noncarbonate fraction (Ø)	3.5	2.5 to 9.0	17
Standard deviation, noncarbonate fraction (Ø)	1.5	0.5 to 3.2	17
Mean grain size, carbonate fraction (Ø)	-0.6	-2.3 to 2.3	14
Standard deviation, carbonate fraction (Ø)	1.3	0.6 to 2.9	14

Phyllodoce arenae Webster, 1879
(Described and illustrated by Pettibone, 1963a)

P. arenae was the Phyllodocid most commonly collected in the Estuary. Two incidental collections (northwest end of the Pinellas County Bayway and near Gandy Bridge) and collections at 192 survey stations amounted to a total of 194 localities for this species from all areas of Tampa Bay.

It was found in greatest abundance in Old Tampa Bay, and upper and lower Tampa Bay. The most individuals per dredge haul (332) were recorded at station 6-2 (table 39).

Sediment data show that P. arenae was generally found in sand, but also occurred in shelly sand and in very soft sediments. Average sediment was poorly sorted, fine sand with over six percent silt and clay, less than one percent organic carbon, and a considerable amount of fine shell (table 40).

Algae were present in 62 or about 35 percent of the dredge and shovel samples. Other plants noted at some stations were shoal, turtle, and manatee grass.

Specimens with mature gametes were collected in June, July, September, and December. Juveniles were noted in June, July, August, September, October, November, and December.

This species occurs from Maine to New Jersey, and has not been previously reported from the Gulf of Mexico.

Table 39.--*Phyllodoce arenae*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-6		3		4-12	7		2
B	7		2	4-13	2		26
1-3			3	4-14	1		
1-4	2		2	4-15	7		5
1-5	2		1	4-16	16		10
3-2	1			4-17-A	7		
3-4	1		1	4-18-A			1
3-5			1	4-19	13		22
3-6			2	5-3	2		
3-8	2			5-6	1		
3-9	1			5-8	1		
3-10	1			5-11	3		
3-11	11		1	5-12	11		10
3-12	16		8	5-13	5		
4-1		1		6-1-A		3	
4-2			2	6-2	332		23
4-6	1			6-3	12		71
4-7	1		2	6-4-A	3		1
4-9	1			6-5	11		
4-11	4			6-6	2		3
Hillsborough Bay							
C-3	4			10-16	13		4
9-3			2	10-17	4		
9-4	3		5	10-19	5		19
9-6			2	10-20			1
10-15	6		17	10-21			1

Table 39.--Phyllodoce arenae--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D	2			11-23			1
10-3		2	15	11-24	2		4
10-4	13		46	11-25	5		13
10-6	3			11-26	9		10
10-7	3			11-27	8		7
10-8	6			11-28		1	
10-9	7			11-28-1		40	
10-10	1			11-28-2		4	
10-11	1			12-1		6	
10-12	3			12-2	2		
10-14-A	5	1		12-3	3		
11-3	11		7	12-4	2		
11-4	9		1	12-5	5		
11-5	18			12-6	2		
11-6	1			12-7	9		1
11-8			5	12-8	7		
11-9	2		5	12-9	1		
11-10			1	12-10	3		
11-12	1		2	12-11	1		
11-13			1	12-12	1		
11-15			1	12-14	19		
11-16	4		8	12-15	2		
11-17	2			13-1-A		18	
11-18	1		1	13-1-B		4	
11-19	1		2	13-4	1		
11-20			12	13-5	4		
11-21	3		56	13-8	1		
11-22	2		21	13-11	1		

Table 39.--Phyllodoce arenae--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	25			PB-5	2		
BC-M	3			14-2	7		
BC-N	27			14-3	7		
D-2	3			14-4	7		
D-11	2	1		15-12			4
D-13			1	15-13	2		
D-17	1		2	15-14	1		2
D-22	1			15-17	1		
D-24			1	16-1		1	
D-25		3		16-6	19		1
PB-1	1		10	16-7	1		
PB-4	2			16-8		1	1
Terra Ceia Bay							
E-1	4		3	E-5	4		1
E-2		6		E-6	6		
E-3	6		60	E-7	9		1
E-4	9		1	E-8	3		3

Table 39.--Phyllodoce arenae--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	20		2	16-9		2	
14-6	12			16-9-A		2	
14-7	2			16-9-B		4	
14-8	8			16-10	2		1
14-9	1			16-11	3		
14-10	2			16-13	8		
14-11	1			16-14	1		
14-14	1			16-15	9		
14-16	2			16-16	4		
14-17	1			16-17	2		
14-18	1			16-19	2		
14-19		2		16-20	1		1
15-18	7		2	16-21	3		
15-19	1			16-22	6		
15-20	4			16-23	2		
15-21	6			16-24	5		
15-22	16			16-27	28		
15-23	9			17-2	6		
15-25	13			17-4	4		
15-26	4			17-5	9		
15-27	7			17-6	26		
15-28	2			17-7	4		
15-29	5			17-8	8		
15-30	15			17-9	3		
15-31	44		2	17-12	2		
15-32	14			17-13	6		
15-33		7		17-14	1		

Table 40.--Phyllodoce arenae--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.4	13.0 to 32.7	177
Salinity (‰)	28.1	16.4 to 34.8	177
pH	8.0	7.1 to 8.4	163
Depth (m.)	1.1	1 to 4.0	177
Sediment type	sand	shelly sand to silty clay	172
Granules (wt. %)	2.4	0.0 to 79.7	172
Sands (wt. %)	91.9	4.6 to 100	172
Silts (wt. %)	3.5	0.0 to 52.6	172
Clay (wt. %)	2.7	0.0 to 65.9	166
CaCO ₃ (wt. %)	13.9	0.6 to 68.0	166
Organic carbon (wt. %)	0.7	0.02 to 8.5	136
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	136
Mean grain size, total sample (Ø)	2.6	-4.0 to 7.3	171
Standard deviation, total sample (Ø)	1.3	0.4 to 3.0	171
Skewness, total sample	0.5	-1.6 to 2.4	171
Kurtosis, total sample	11.7	-0.8 to 62.5	170
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 9.0	166
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 3.4	166
Mean grain size, carbonate fraction (Ø)	0.0	-2.6 to 3.0	147
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 3.1	147

Phyllodoce fragilis Webster, 1879b

Individuals were collected at 44 survey stations, and were found associated with oysters at incidental stations in Old Tampa Bay, and upper Tampa Bay. Hillsborough Bay is the only area of the Estuary where this species was not collected (table 41).

Average sediment type at dredge and shovel stations was poorly sorted sand with less than five percent silt and clay, and a considerable quantity of shell. Organic carbon content was about one percent (table 42).

Algae were present in more than half of the bottom samples and several also had shoal grass, turtle grass, and manatee grass.

A gravid specimen was taken in October, and juveniles were collected in September, October, and November.

P. fragilis is known from the western Atlantic between Virginia and Florida, and in the Gulf of Mexico.

Table 41.--*Phyllodoce fragilis*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-1		5		5-13	1		
3-1-A		3		6-1-D		2	
Upper Tampa Bay							
11-3			1	11-28		4	
11-4			4	13-10			3
Boca Ciega Bay							
BC-A	1		25	PB-4			1
BC-M			1	PB-5			1
BC-N	34		10	14-3			1
D-2	1			15-5			1
D-22			9	15-6			20
D-24			1	15-11			1
D-25		1		16-6	2		
D-26	107			16-8		60	
PB-1			1				
Terra Ceia Bay							
E-6		26					
Lower Tampa Bay							
14-6			1	16-14	15		34
14-10			1	16-15			1
14-16			1	16-21	4		4
15-23			1	16-27	1		
15-25			2	17-5			1
16-10	3		61	17-6	1		7
16-11	1		1	17-7	2		
16-12			2	17-8	1		
16-13	15			17-10	3		1

Table 42.--Phyllodoce fragilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.9	13.0 to 32.0	22
Salinity (‰)	30.5	24.1 to 33.9	22
pH	8.0	7.1 to 8.4	21
Depth (m.)	1.0	1 to 3.0	22
Sediment type	sand	shelly sand to sandy clay	21
Granules (wt. %)	5.8	0.0 to 34.5	21
Sands (wt. %)	90.2	58.0 to 99.4	21
Silts (wt. %)	2.9	0.3 to 12.2	21
Clay (wt. %)	1.1	0.1 to 7.2	21
CaCO ₃ (wt. %)	18.0	0.9 to 68.0	21
Organic carbon (wt. %)	1.0	0.1 to 3.3	18
Organic nitrogen (wt. %)	0.04	0.00 to 0.19	18
Mean grain size, total sample (Ø)	2.2	0.6 to 3.6	21
Standard deviation, total sample (Ø)	1.6	0.6 to 3.8	21
Skewness, total sample	0.3	-1.3 to 3.4	21
Kurtosis, total sample	10.9	-0.7 to 73.5	21
Mean grain size, noncarbonate fraction (Ø)	3.4	2.1 to 6.1	21
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 2.3	21
Mean grain size, carbonate fraction (Ø)	0.3	-0.9 to 3.0	17
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 2.8	17

Family HESIONIDAE Malmgren, 1867

This family has world-wide representation in seas at all latitudes, and contains very active, errant worms that are generally regarded as predators (Day, 1967). Although most hesionids are free living, some live associated with other organisms as commensals.

Five species were collected in Tampa Bay. Two, Hesione picta and Podarke obscura, were found only in the high salinity areas of the Estuary seaward of transect-13. The other three, Gyptis vittata, Gyptis sp., and Parahesione luteola, are apparently less limited by salinity and were collected in both upper and lower reaches of the Estuary.

Key to HESIONIDAE Collected in Tampa Bay

- 1 Median antenna absent; 6 to 8 pairs of
tentacular cirri 2
- Median antenna present; 6 to 8 pairs of
tentacular cirri 3
- 2 Eight pairs of tentacular cirri Hesione picta
- Six pairs of tentacular cirri..... Parahesione luteola
- 3 Eight pairs of tentacular cirri..... 4
- Six pairs of tentacular cirri..... Podarke obscura
- 4 Numerous notosetae with spinous margin
and capillary tip..... Gyptis sp.
- Less than 12 capillary notosetae with
smooth margins Gyptis vittata

Hesione picta Muller, 1858
(Described and illustrated by Ehlers, 1887
as Hesione vittigera)

Specimens were collected in Boca Ciega Bay at one survey station (D-25) and at several incidental localities where they were associated with oysters and sponges (table 43).

Neither gravid nor juvenile worms were found

H. picta is known from the tropical, western Atlantic and the Gulf of Mexico.

Table 43.--Hesione picta--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
D-25					1	

Gyptis vittata Webster and Benedict, 1887
(Described and illustrated by Pettibone, 1963a)

Individuals were collected at 138 survey stations, in all areas of the Estuary, and at four incidental localities in Old Tampa Bay, Hillsborough Bay, and Boca Ciega Bay. The worm was most abundant at station 11-9 in upper Tampa Bay where 28 specimens were collected in a single dredge haul (table 44).

Average sediment at dredge and shovel stations was poorly sorted, very fine sand. The content of silt and clay was over 13 percent, organic carbon was one percent, and shell was under 10 percent (table 45).

The bottom at nearly one-third of these stations was vegetated with algae and one or more of the following sea grasses: turtle grass, shoal grass, manatee grass, or Halophila.

Specimens in breeding condition were collected in July and September, and juveniles were present in samples taken during June, July, August, September, October, November, and December.

G. vittata is known from the New England coast between Maine and Massachusetts. This is the first report for the Gulf of Mexico.

Table 44.--Gyptis vittata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B	2			4-8	1		
B-1			1	4-10			1
B-2		2		4-12	3		
1-3	7		1	4-13	13		2
1-4	11		4	4-15	2		
1-5	12		1	4-16	2		
3-1-A		5	1	4-19	2		
3-2	1			5-2	4		
3-4	3			5-3	1		
3-5	2			5-4	1		
3-6	2		2	5-6	3		
3-7	2			5-7	1		
3-10	1			5-9	1		
3-11	3			5-12	2		
3-12	2			6-1-A		2	
3-16		1		6-1-B		2	
4-2	2			6-2	15		
4-3	1			6-5	11		
4-4	2			6-6	1		
4-6	2			6-7-A		1	
4-7	3						
Hillsborough Bay							
C-1		1		9-4	2		
C-2	3			10-16	2		4
C-6			1	10-17	3		
7-1			1	10-19	3		16
8-8			6	10-22	2		

Table 44.--*Gyptis vittata*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
10-1-A		2		11-16	1		
10-2	3			11-17	6		2
10-3		6		11-18	2		1
10-4	2			11-19	3		6
10-6	1			11-20			5
10-7	1			11-21			6
10-8	2			11-22	4		4
10-9	2			11-23	2		1
11-2		2		11-24	2		
11-3	1			11-26	1		
11-4	4			11-27	6		
11-5	1			11-28		4	
11-6	5			11-28-1		21	
11-7			2	11-28-2		3	
11-8	3		2	12-7	1		
11-9	28		1	12-14	5		
11-11	1			12-15	10		
11-12	7		4	12-16	1		
11-13	3			13-1-A		7	
11-14	1			13-1-B		4	
11-15	4		6	13-11	2		

Boca Ciega Bay							
BC-A	1			PB-4	1		
BC-C		2		14-2	1		
BC-G		1		15-1	4		
BC-I	1			15-3		4	
BC-N	2			15-5	3		
D-2	13			15-6	2		
D-3		4		15-12	1		
D-5			1	16-1		1	
D-9	2			16-2		4	
D-10	2			16-3		1	
D-11		7		16-4		1	
D-12		1		16-5		3	
D-19-A	1	1		16-8		2	
D-21	1						
D-23		2					

Table 44.--Gyptis vittata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Terra Ceia Bay									
Stations		Individuals			Stations		Individuals		
	D	S	N		D	S	N		
E-1	1			E-4	1				
E-2		3		E-6		4			
E-3	2								
Lower Tampa Bay									
15-18	1			16-26		2			
15-31	16			16-27	4				
16-9-B		1		17-6	1				
16-10	1			17-7	1				
16-11	1			17-8	1				
16-25		1		17-11		1			

Table 45.--Gyptis vittata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.5	13.0 to 33.8	128
Salinity (‰)	26.9	18.5 to 34.4	128
pH	8.0	7.0 to 8.5	112
Depth (m.)	1	1.0 to 4.0	128
Sediment type	sand	shelly sand to clayey mud	126
Granules (wt. %)	2.8	0.0 to 79.7	126
Sands (wt. %)	82.6	0.9 to 99.9	126
Silts (wt. %)	7.8	0.0 to 56.5	126
Clay (wt. %)	5.9	0.0 to 65.9	126
CaCO ₃ (wt. %)	9.9	0.7 to 58.4	125
Organic carbon (wt. %)	1.0	0.01 to 8.5	76
Organic nitrogen (wt. %)	0.1	0.00 to 0.6	76
Mean grain size, total sample (Ø)	3.1	-4.0 to 7.3	125
Standard deviation, total sample (Ø)	1.5	0.4 to 3.5	125
Skewness, total sample	0.5	-1.4 to 3.4	125
Kurtosis, total sample	10.5	-1.3 to 73.5	125
Mean grain size, noncarbonate fraction (Ø)	3.2	1.4 to 9.0	125
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 2.8	125
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 3.0	116
Standard deviation, carbonate fraction (Ø)	1.4	0.2 to 2.9	116

Parahesionia luteola (Webster, 1880)
(Described and illustrated by Pettibone, 1956)

Collections came from 58 survey stations, and all but the three localities in Boca Ciega Bay were north of transect-12. P. luteola is obviously well adapted to brackish conditions and is one of the few polychaetes in the Estuary that was commonly found throughout Hillsborough Bay (table 46).

Average sediment at dredge and shovel stations was poorly sorted, coarse silt with an average silt-clay content of more than 30 percent. Large shell fragments were present at most stations, and organic carbon was slightly less than one percent (table 47).

Only 14 percent of the bottom samples contained vegetation. The plants recorded were: algae, and shoal, turtle, and manatee grass.

Both gravid and juvenile worms were collected in August and September.

Table 46.--Parahesione luteola--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
1-3	1			3-15		1	
1-5	2			4-3	1		
3-1-A			11	4-6	1		
3-4	1			4-7	3		
3-5	2			4-13	5		
3-7	2						
Hillsborough Bay							
C			42	9-3	6		11
C-2	3		29	9-4	4		13
C-3			23	9-6			13
7-1	32		3	9-7			3
8-2	1		15	9-8			7
8-3			1	9-9			9
8-4			3	10-15	2		6
8-5			2	10-16	11		15
8-7	1		12	10-17	4		1
8-8	10		37	10-21			1
8-9	1			10-22			2
9-2			4	10-23		1	
Upper Tampa Bay							
10-11	1		137	11-18	4		1
11-7	7			11-19	2		
11-8	1			11-21			3
11-9	7			11-22	6		3
11-11	11			11-23	5		13
11-12	14		1	11-24	3		
11-13	5			11-25	19		
11-14	18			11-26	9		
11-15	3		1	11-27			1
11-17	8		2	11-28		20	

Table 46.--Parahesione luteola--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-19-A		1			PB-4		1		
D-20		1							

Table 47.--Parahesione luteola--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.1	25.8 to 31.4	42
Salinity (‰)	23.5	16.6 to 31.8	42
pH	7.8	7.0 to 8.3	35
Depth (m.)	1.2	1 to 4.0	42
Sediment type	silty sand	shelly sand to silty clay	41
Granules (wt. %)	1.5	0.0 to 41.5	41
Sands (wt. %)	66.4	4.6 to 99.9	41
Silts (wt. %)	17.5	0.1 to 53.0	41
Clay (wt. %)	14.7	0.0 to 50.3	41
CaCO ₃ (wt. %)	12.0	0.7 to 42.0	41
Organic carbon (wt. %)	0.8	0.1 to 2.3	20
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	20
Mean grain size, total sample (Ø)	4.1	0.9 to 7.3	41
Standard deviation, total sample (Ø)	1.8	0.5 to 3.5	41
Skewness, total sample	0.4	0.8 to 1.6	41
Kurtosis, total sample	5.3	-1.2 to 28.9	41
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 4.1	41
Standard deviation, noncarbonate fraction (Ø)	1.5	0.6 to 2.5	41
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 1.7	41
Standard deviation, carbonate fraction (Ø)	1.4	0.4 to 3.1	41

Podarke obscura Verrill, 1873
(Described and illustrated by Pettibone, 1963a)

This species was found only at localities seaward of transect-13 where it was taken at 36 survey stations and in three incidental samples (Johns Pass, Pass-A-Grille Channel, and lower Tampa Bay near Mullet Key). As many as 14 specimens were collected in a dredge haul in Boca Ciega Bay at station BC-M (table 48).

Sediments at most localities were poorly sorted, fine sand with a considerable amount of small shell fragments, and very little silt, clay, or organic carbon (table 49). In many instances the worm was collected from the sea urchin Lytechinus variegatus and not directly from sediments.

One-half of the dredge and shovel samples contained algae and a number also had shoal grass, turtle grass, manatee grass, and Halophila.

No sexually mature specimens were collected, but juveniles were noted in September, October, November, and December.

P. obscura is widely distributed in the western Atlantic between New England and Florida, as well as in the Caribbean and Gulf of Mexico.

Table 48.--Podarke obscura--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-M	14		10	15-11	1		2
BC-N	3		4	15-12	1		
D-6		1		15-14			1
PB-4			1	16-4		2	1
14-3			5	16-5			1
14-4	2			16-6	7		
15-8	2			16-7			1
Terra Ceia Bay							
E-5	2			E-8	1		
E-7	6						
Lower Tampa Bay							
14-6	5			16-15	1		
14-13			4	16-17			2
14-19		1		16-19			1
15-18			1	16-22			1
15-29	1			17-5			10
15-31	1			17-6			2
15-32	1			17-7			1
16-9-A		1	1	17-9			3
16-13	1			18-3			5
16-14			2				

Table 49.--Podarke obscura--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.8	14.5 to 27.2	20
Salinity (‰)	31.6	29.3 to 34.3	20
pH	8.1	7.7 to 8.4	19
Depth (m.)	1.0	1 to 3.0	20
Sediment type	sand	sand to silty sand	19
Granules (wt. %)	3.2	0.1 to 14.7	19
Sands (wt. %)	92.5	72.5 to 99.1	19
Silts (wt. %)	3.4	0.5 to 22.1	19
Clay (wt. %)	0.9	0.1 to 5.2	19
CaCO ₃ (wt. %)	18.5	1.9 to 66.1	19
Organic carbon (wt. %)	0.5	0.04 to 3.3	18
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	18
Mean grain size, total sample (Ø)	2.4	1.3 to 4.1	19
Standard deviation, total sample (Ø)	1.3	0.7 to 2.3	19
Skewness, total sample	0.3	-0.5 to 1.6	19
Kurtosis, total sample	7.3	-0.04 to 22.2	19
Mean grain size, noncarbonate fraction (Ø)	3.1	2.1 to 6.1	19
Standard deviation, noncarbonate fraction (Ø)	1.2	0.6 to 3.1	19
Mean grain size, carbonate fraction (Ø)	0.2	-1.8 to 2.5	18
Standard deviation, carbonate fraction (Ø)	1.1	0.2 to 1.9	18

Gyptis sp.

This undetermined hesionid is a small worm about 1 mm. wide, including parapodia. No entire specimens were collected, but the estimated length is 6 mm. and there are probably about 40 setigerous segments.

The prostomium resembles Gyptis vittata (figure 4,A) except that some of the dorsal, tentacular cirri are quite long. The longest extends back to setiger eight.

Notosetae are numerous and have a spinous margin (figure 4,B). Dorsal, parapodial cirri are quite long and are attached on the body wall (figure 4,C). Ventral cirri were not observed, but a distal node on the ligule indicates the probable point of origin. Neurosetae have a striated shaft and long, falcate appendage with fine teeth on one margin (figure 4,D,E,F).

Specimens were collected at 18 survey stations, in all areas of the Estuary except lower Tampa Bay (table 50).

Sediment data indicate that this species, like Parahesione luteola, is most commonly found in silty sand (table 51).

The bottom at 16 percent of the dredge or shovel stations was vegetated with algae as well as one or more of

all five sea grasses found in the Estuary.

Gravid specimens were collected in September, but no juveniles were seen.

Table 50.--Gyptis sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
1-3	1			3-10	1		
1-4	1			4-15	1		
1-5	1			6-1-C		1	
Hillsborough Bay							
8-5	1		1	10-17	3		
10-16	1						
Upper Tampa Bay							
11-13	3			11-19	3		
11-14	2			11-22	2		
11-15	3			11-24	1		
11-17	21						
Boca Ciega Bay							
16-4		1					
Terra Ceia Bay							
E-6	2						

Table 51.--Gyptis sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.2	13.0 to 31.5	18
Salinity (‰)	25.3	22.3 to 33.4	18
pH	7.8	7.0 to 8.4	17
Depth (m.)	2.0	1 to 4.0	18
Sediment type	silty sand	shelly sand to silty clay	17
Granules (wt. %)	3.5	0.0 to 41.5	17
Sands (wt. %)	63.7	6.4 to 98.9	17
Silts (wt. %)	17.0	0.4 to 51.0	17
Clay (wt. %)	15.9	0.5 to 53.0	17
CaCO ₃ (wt. %)	14.8	1.2 to 36.9	17
Organic carbon (wt. %)	0.7	0.1 to 2.0	12
Organic nitrogen (wt. %)	0.06	0.00 to 0.24	12
Mean grain size, total sample (Ø)	4.1	0.9 to 7.4	17
Standard deviation, total sample (Ø)	1.9	0.8 to 3.5	17
Skewness, total sample	0.5	-0.7 to 2.1	17
Kurtosis, total sample	6.4	-0.9 to 37.5	17
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 4.1	17
Standard deviation noncarbonate fraction (Ø)	1.4	0.6 to 2.2	17
Mean grain size, carbonate fraction (Ø)	-0.2	-2.5 to 2.4	17
Standard deviation carbonate fraction (Ø)	1.2	0.4 to 1.7	17

Figure 4. -- Diagnostic features of Gyptis sp.

Gyptis sp.: (A) Prostomium in dorsal view (B)
Notoseta from a median parapod (C)
Median parapod (D) Proximal appendage
of neuroseta from median parapod (E)
Appendages of same neuroseta showing
articulation and spinous margin on
distal member (F) Same neuroseta show-
ing falcate tip on distal member.

FIGURE 4

Family PILARGIDAE, Saint-Joseph, 1899

The pilargids are mostly temperate and tropical worms with world-wide distribution. They are errant, crawling or burrowing predators that may also feed on dead organic matter.

The family is represented in Tampa Bay by five species. Aside from Pilargis pacifica, which was found only in Boca Ciega Bay, the pilargids occur in most areas of the Estuary from the head waters to the Gulf on bottoms of sand or silty sand.

Key to PILARGIDAE Collected in Tampa Bay

- 1 Without large, acicular notosetae.... Pilargis pacifica
- With large, hook shaped, acicular notosetae on most segments 2
- 2 Parapodia small, parapodial cirri short; no median antenna; lateral antennae and tentacular cirri short Cabira incerta
- Parapodia with distinct lobes and cirri; median antenna present; median and lateral antennae, and tentacular cirri short or long 3
- 3 Antennae and tentacular cirri short..... Ancistrostylis jonesi
- Antennae and tentacular cirri long 4
- 4 Hooked notosetae appear after setiger 10. Sigambra bassi
- Hooked notosetae appear on setiger 4 Sigambra tentaculata

Ancistrosyllis jonesi Pettibone, 1966

This species was collected at 10 stations, and at two incidental localities. One was near Pinellas County Bayway in Boca Ciega Bay, and the other was nearshore at Mullet Key in lower Tampa Bay. Terra Ceia Bay was the only area of the Estuary where no specimens were found (table 52).

Average sediment type at survey stations was silty sand with over 20 percent coarse shell, and silt and clay. These sediments, however, had less than one percent organic carbon (table 53).

Vegetation was noted at only one of the survey stations where algae and shoal grass were recorded.

No specimens contained ripe gametes, but one juvenile worm was collected in October.

This species was described from Chesapeake Bay where it was dredged in mud at seven fathoms. It has not been previously collected in the Gulf of Mexico or from any other locality.

Table 52.--Ancistrosyllis jonesi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
B-2		1							
Hillsborough Bay									
10-16		1							
Upper Tampa Bay									
11-20		1			11-25		1		
11-24		6							
Boca Ciega Bay									
BC-A		1			15-5		2		
BC-H		1			15-6		1		
Lower Tampa Bay									
17-4		1							

Table 53.--Ancistrosyllis jonesi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.7	17.0 to 32.0	9
Salinity (‰)	29.3	24.6 to 34.0	9
pH	8.1	7.9 to 8.3	9
Depth (m.)	1.1	1 to 3.0	9
Sediment type	silty sand	sand to clayey silt	9
Granules (wt. %)	1.2	0.04 to 2.8	9
Sands (wt. %)	77.2	11.2 to 95.6	9
Silts (wt. %)	12.3	1.2 to 44.4	9
Clay (wt. %)	9.3	0.5 to 43.8	9
CaCO ₃ (wt. %)	25.1	1.1 to 65.5	9
Organic carbon (wt. %)	0.3	0.1 to 0.6	6
Organic nitrogen (wt. %)	0.01	0.00 to 0.07	6
Mean grain size, total sample (Ø)	3.5	1.3 to 7.1	9
Standard deviation, total sample (Ø)	1.9	1.3 to 2.6	9
Skewness, total sample	0.8	-0.6 to 1.2	9
Kurtosis, total sample	3.7	-0.3 to 6.6	9
Mean grain size, noncarbonate fraction (Ø)	2.8	2.3 to 3.6	9
Standard deviation, noncarbonate fraction (Ø)	0.8	0.5 to 1.9	9
Mean grain size, carbonate fraction (Ø)	-0.3	-2.0 to 1.7	9
Standard deviation, carbonate fraction (Ø)	1.6	0.8 to 2.9	9

Cabira incerta Webster, 1879
(Described and illustrated by Pettibone, 1966)

C. incerta was collected at 12 survey stations in all areas of the Estuary except Hillsborough Bay (table 54).

The only sediment type recorded for this species was poorly sorted, fine sand. Average content of silt and clay was under five percent, organic carbon was less than one percent, and shell fragments comprised about 13 percent of the sediment (table 55).

Vegetation was recorded at one-half of the stations. Of these, 50 percent contained algae and some had turtle, shoal, and manatee grass as well.

Neither sexually mature nor juvenile worms were collected.

The only unquestionable record for C. incertaⁿ is from Chesapeake Bay where it was collected in mud at seven fathoms. This record is the first for the Gulf of Mexico and the only other one for the species.

Table 54.--Cabira incerta--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
4-6		1			4-12		3		
Upper Tampa Bay									
10-1-A		1			13-1-A		2		
11-16		1							
Boca Ciega Bay									
PB-1		1			14-4		1		
Terra Ceia Bay									
E-6		1							
Lower Tampa Bay									
15-25		1			16-26		3		
16-25		1			17-15		3		

Table 55.--Cabira incerta--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.9	13.0 to 31.0	12
Salinity (‰)	28.5	23.3 to 33.5	12
pH	8.1	7.7 to 8.3	11
Depth (m.)	1	1 to 3.0	12
Sediment type	sand	sand	12
Granules (wt. %)	2.3	0.0 to 10.5	12
Sands (wt. %)	93.1	72.8 to 99.9	12
Silts (wt. %)	3.2	0.0 to 11.7	12
Clay (wt. %)	1.5	0.0 to 4.9	12
CaCO ₃ (wt. %)	12.7	1.2 to 58.4	12
Organic carbon (wt. %)	0.4	0.1 to 1.4	8
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	8
Mean grain size, total sample (Ø)	2.5	1.3 to 3.2	12
Standard deviation, total sample (Ø)	1.3	0.9 to 2.7	12
Skewness, total sample	0.5	-1.4 to 1.5	12
Kurtosis, total sample	8.5	0.3 to 21.2	12
Mean grain size, noncarbonate fraction (Ø)	2.8	1.9 to 3.7	11
Standard deviation, noncarbonate fraction (Ø)	1.1	0.6 to 2.0	11
Mean grain size, carbonate fraction (Ø)	-0.2	-1.8 to 2.4	9
Standard deviation, carbonate fraction (Ø)	1.3	0.8 to 2.0	9

Pilargis pacifica Zachs, 1933

A single specimen was found at station 16-4 in Boca Ciega Bay (table 56).

The sediment was very poorly sorted, fine sand with a large percentage of large particles. The percentage of silt and clay was less than six, and organic carbon was less than one percent (table 57).

Vegetation at the collection site consisted of algae and all local sea grasses except widgeon grass.

Neither gravid nor juvenile specimens were collected.

Prior to this report, P. pacifica was known only from the coast of Japan.

Table 56.--Pilargis pacifica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
			D	S	N	
16-4			1			

Table 57.--Pilargis pacifica--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.0	--	1
Salinity (‰)	33.4	--	1
pH	8.4	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	13.4	--	1
Sands (wt. %)	80.5	--	1
Silts (wt. %)	5.3	--	1
Clay (wt. %)	0.8	--	1
CaCO ₃ (wt. %)	7.4	--	1
Organic carbon (wt. %)	0.3	--	1
Organic nitrogen (wt. %)	0.01	--	1
Mean grain size, total sample (Ø)	2.1	--	1
Standard deviation total sample (Ø)	2.3	--	1
Skewness, total sample	-0.5	--	1
Kurtosis, total sample	1.5	--	1
Mean grain size, noncarbonate fraction (Ø)	3.3	--	1
Standard deviation, noncarbonate fraction (Ø)	0.6	--	1
Mean grain size, carbonate fraction (Ø)	-1.3	--	1
Standard deviation, carbonate fraction (Ø)	1.1	--	1

Sigambra bassi (Hartman, 1945)
(Described and illustrated by Pettibone, 1966)

Specimens were collected at 13 localities in all areas of the Estuary except Terra Ceia and Hillsborough Bays (table 58).

Sediments from bottom samples were mostly poorly sorted, fine sand that contained about seven percent silt and clay, nearly one percent organic carbon, and more than 13 percent shell (table 59).

Four of the 13 stations were vegetated. All had algae, and present at some were turtle grass, shoal grass, and manatee grass.

Neither gravid individuals nor juveniles were collected.

S. bassi has been recorded from east and west coasts of the United States and the Gulf of Mexico.

Table 58.--Sigambra bassi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
1-4	3			4-12	1		
1-5	1			4-14	1		
Upper Tampa Bay							
11-24	1			13-1-A		5	
Boca Ciega Bay							
D-3		1		15-9		2	
D-11	1			16-3		1	
Lower Tampa Bay							
15-33		1		18-4		1	
16-13	1						

Table 59.--Sigambra bassi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.6	21.3 to 31.5	13
Salinity (‰)	29.7	24.4 to 34.2	13
pH	7.9	7.1 to 8.3	13
Depth (m.)	1.0	1 to 3.0	13
Sediment type	sand	sand to silty sand	13
Granules (wt. %)	2.2	0.0 to 7.4	13
Sands (wt. %)	91.2	81.0 to 99.4	13
Silts (wt. %)	4.1	0.04 to 16.6	13
Clay (wt. %)	2.6	0.0 to 13.7	13
CaCO ₃ (wt. %)	13.4	1.3 to 49.9	13
Organic carbon (wt. %)	0.7	0.1 to 3.3	7
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	7
Mean grain size, total sample (Ø)	2.6	1.6 to 4.3	13
Standard deviation, total sample (Ø)	1.5	0.6 to 2.4	13
Skewness, total sample	0.4	-1.2 to 1.7	13
Kurtosis, total sample	6.3	-0.3 to 14.8	13
Mean grain size, noncarbonate fraction (Ø)	3.0	1.8 to 6.0	12
Standard deviation, noncarbonate fraction (Ø)	1.4	0.6 to 2.2	12
Mean grain size, carbonate fraction (Ø)	-0.4	-2.5 to 0.8	11
Standard deviation, carbonate fraction (Ø)	1.3	0.9 to 1.81	11

Sigambra tentaculata (Treadwell, 1941)
(Described and illustrated by Pettibone, 1966)

With the exception of Terra Ceia Bay, collections were made throughout the Estuary at 41 stations. The greatest numbers of the worms were recorded along transect-11 in upper Tampa Bay. As many as 37 individuals were collected at station 11-9 (table 60).

The sediments along much of transect-11 are quite soft, and as an average, sediment type at all dredge and shovel stations was silty sand with over 30 percent silt and clay, and a large proportion of fine and coarse shell particles. Organic carbon, however, was only 0.5% (table 61).

Bottom vegetation was recorded at only four stations. Algae were present at all of these, and noted at some were shoal grass, turtle grass or manatee grass.

A gravid specimen was collected in September, and juveniles were found in September and December.

S. tentaculata has been reported from the Gulf, the east coast of North and South America, and the coast of southern California.

Table 60.--Sigambra tentaculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
3-4		6			4-8		1		
3-5		3			4-13		2		
4-4		1			5-1-A		1		
4-7		3							
Hillsborough Bay									
10-16				2	10-19		1		
10-17		6							
Upper Tampa Bay									
11-6		2			11-18		1		
11-7		1			11-19		7		
11-8		8		3	11-20		4		2
11-9		37		1	11-22		5		3
11-11		4			11-23		2		1
11-12		10			11-24		2		
11-13		3			11-25		2		
11-14		6		1	11-26		1		
11-15		6		1	12-14		4		
11-16		2		1	13-1-B			1	
11-17		11							
Boca Ciega Bay									
D-11			1		15-6		1		
D-23			1		15-8		1		
14-1-A			1		15-14		3		
14-4		3			16-6		1		
Lower Tampa Bay									
17-2		1			17-9		2		

Table 61.--Sigambra tentaculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.5	18.2 to 31.0	40
Salinity (‰)	27.2	23.8 to 34.6	40
pH	7.6	7.4 to 8.2	36
Depth (m.)	2	1 to 4.0	40
Sediment type	silty sand	sand to clayey silt	39
Granules (wt. %)	2.2	0.0 to 41.5	39
Sands (wt. %)	67.0	0.9 to 98.4	39
Silts (wt. %)	17.1	0.9 to 53.1	39
Clay (wt. %)	13.5	0.3 to 50.3	39
CaCO (wt. %)	18.3	0.9 to 66.0	39
Organic carbon (wt. %)	0.5	0.1 to 2.3	29
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	29
Mean grain size, total sample (Ø)	4.0	0.9 to 7.3	39
Standard deviation, total sample (Ø)	1.9	0.7 to 5.5	39
Skewness, total sample	0.4	-0.7 to 2.1	39
Kurtosis, total sample	4.2	-1.3 to 20.1	39
Mean grain size, noncarbonate fraction (Ø)	2.9	1.4 to 4.1	39
Standard deviation, noncarbonate fraction (Ø)	1.3	0.5 to 3.2	39
Mean grain size, carbonate fraction (Ø)	-0.03	-2.3 to 2.4	36
Standard deviation, carbonate fraction (Ø)	1.4	0.4 to 2.9	36

Family SYLLIDAE Grube, 1850

The syllids comprise a large group of small, thread-like worms that inhabit all seas from the tropics to the poles. Some are found in sediments and others nestle among sessile bottom animals or graze on benthic vegetation. They probably feed on the cell fluids of plants and smaller invertebrates.

Sixteen species were collected in Tampa Bay. Exogone dispar was the only species found in all areas of the Estuary. Seven others were collected only near the mouth of the Estuary or at least no further north than Interbay Peninsula (Branchiosyllis oculatus, Odontosyllis enopla, Syllis annularis, Syllis spongicola, Syllis variegata, Pionosyllis sp., and Syllis sp. A). The others were found in both brackish and high salinity areas of the Estuary (Autolytus cornutus, Brania clavata, Syllis aciculata, Syllis gracilis, Syllis vittata, Brania sp., Sphaerosyllis sp., and Syllis sp. B).

Many were collected largely or entirely by net so that sediment data is meagre or absent for some species.

Key to SYLLIDAE Collected in Tampa Bay

- 1 Ventral, parapodial cirri absent.... Autolytus cornutus
 - Ventral, parapodial cirri present 2

- 2 Palps joined at the base; 2 pairs of tentacular cirri; dorsal cirri faintly segmented or smooth..... 3
- Palps joined through one-half or more of their length; 1 or 2 pairs of tentacular cirri; dorsal cirri smooth 4
- Palps not joined, 2 pairs of tentacular cirri; dorsal cirri distinctly segmented 7
- 3 Teeth on ventral rim of pharynx; large occipital flap on peristomium Odontosyllis enopla
- Single anterior tooth on dorsal rim of pharynx; peristomial flap absent Pionosyllis sp.
- 4 One pair of tentacular cirri 5
- Two pairs of tentacular cirri 6
- 5 Dorsal cirri cylindrical..... Exogone dispar
- Dorsal cirri flask shaped; parapodia have basal capsules with rod-like inclusions Sphaerosyllis sp.
- 6 Compound setae all similar with distinct spinous margin and entire tip Brania sp.
- Compound setae have a distal appendage of 2 types (1) short and spinous with entire tip (2) short to long with spinous margin and bidentate tip Brania clavata
- 7 No compound setae; simple, acicular setae have Y-shaped tip Syllis spongicola
- No simple setae; compound, falcate setae of 2 kinds (1) short, ventral ones with a distal appendage bearing a rounded basal tooth and large, smooth, strongly curved, terminal tooth' (2) longer dorsal ones with a distal appendage bearing a spinous margin and small, curved, terminal tooth Syllis annularis
- Simple and compound setae present 8

- 8 Simple setae have an entire tip; compound setae have a distal appendage bearing a single, smooth, strongly curved tooth Branchiosyllis oculatus
- Some or all compound setae have a spinous margin 9
- 9 Median and posterior segments have simple Y-shaped, acicular, setae as well as compound falcigers and setae with various degrees of fusion between proximal and distal appendages Syllis gracilis
- Simple, acicular, Y-shaped setae absent 10
- 10 Posterior, compound setae have a short, distal appendage with no spinous margin and a bidentate tip Syllis sp. A
- Posterior compound setae all have a spinous margin..... 11
- 11 Compound setae all similar 12
- Compound setae have short or long, distal appendage 13
- 12 Distal appendage of compound setae bidentate Syllis variegata
- Distal appendage of compound setae entire Syllis vittata
- 13 Longer distal appendage of compound setae about 3 times the length of shorter appendage; both have a bidentate tip..... Syllis aciculata
- Longer distal appendage of compound setae about 7 times the length of shorter appendage; short appendage ends in a bidentate tip; long appendage ends in a capillary tip..... Syllis sp. B

Autolytus cornutus Agassiz, 1863
(Described and illustrated by Pettibone, 1963a)

Specimens were collected at 13 survey stations and

at incidental localities near Piney Point (upper Tampa Bay) and in Bunces Pass (Boca Ciega Bay). Survey stations were in Old Tampa Bay, Boca Ciega Bay and lower Tampa Bay (table 62).

The only sediment data came from collections in Boca Ciega Bay. They show a bottom type of fine, poorly sorted sand, with about nine percent silt and clay, less than one percent organic carbon, and a small percentage of coarse shell fragments (table 63).

The bottom at both stations was vegetated with algae and turtle grass.

Neither gravid nor juvenile specimens were collected.

A. cornutus has been found in growths of attached plants and animals along the Atlantic seaboard from the Arctic south to Chesapeake Bay. This report is the first for the species in the Gulf of Mexico.

Table 62.--Autolytus cornutus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay								
Stations		Individuals		Stations		Individuals		
		D	S	N		D	S	N
6-2				1	6-3			2
Boca Ciega Bay								
BC-M				5	PB-1			2
BC-N				3	PB-4			1
D-2	2			3	14-3			1
D-18			1		15-12			1
D-25				4	15-14			2
Lower Tampa Bay								
14-16				1				

Table 63.--Autolytus cornutus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.3	25.5 to 27.0	2
Salinity (‰)	34.0	33.2 to 34.9	2
pH	8.2	--	2
Depth (m.)	0.3	--	2
Sediment type	sand	--	2
Granules (wt. %)	5.3	7.1 to 3.4	2
Sands (wt. %)	86.1	81.0 to 91.2	2
Silts (wt. %)	6.9	0.3 to 13.4	2
Clay (wt. %)	1.7	1.4 to 2.1	2
CaCO ₃ (wt. %)	12.6	7.3 to 18.0	2
Organic carbon (wt. %)	0.7	--	1
Organic nitrogen (wt. %)	0.03	--	1
Mean grain size, total sample (Ø)	2.9	2.5 to 3.4	2
Standard deviation, total sample (Ø)	1.8	1.8 to 1.9	2
Skewness, total sample	0.3	-0.01 to 0.6	2
Kurtosis, total sample	3.6	2.6 to 4.6	2
Mean grain size, noncarbonate fraction (Ø)	2.9	2.7 to 3.1	2
Standard deviation, noncarbonate fraction (Ø)	1.7	1.4 to 2.1	2
Mean grain size, carbonate fraction (Ø)	-0.2	-0.4 to 0.1	2
Standard deviation, carbonate fraction (Ø)	1.2	1.0 to 1.4	2

Branchiosyllis oculata Ehlers, 1887
(Described and illustrated by Rioja, 1959)

One specimen was collected from a sponge in Boca Ciega Bay, and others were found in lower Tampa Bay at a single survey station (table 64).

Sediment data came from the dredge station in lower Tampa Bay. The bottom was composed of poorly sorted, medium sand with some large pieces of shell. There was practically no silt, clay, or organic carbon in the sample (table 65).

Algae, but no sea grasses, were recorded at the dredge station.

Neither gravid nor juvenile specimens were collected.

This syllid was originally described from a collection off Key West, Florida, and has since been reported from calcareous algae in the western Gulf near Veracruz, Mexico (Rioja, 1959). It is apparently restricted to the Gulf and Caribbean.

Table 64.--Branchiosyllis oculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
16-4		24							
Lower Tampa Bay									
15-28		1							

Table 65.--Branchiosyllis oculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.0	--	1
Salinity (‰)	31.1	--	1
pH	8.1	--	1
Depth (m.)	1.1	--	1
Sediment type	sand	--	1
Granules (wt. %)	2.8	--	1
Sands (wt. %)	96.6	--	1
Silts (wt. %)	0.4	--	1
Clay (wt. %)	0.2	--	1
CaCO ₃ (wt. %)	35.8	--	1
Organic carbon (wt. %)	0.1	--	1
Organic nitrogen (wt. %)	0.04	--	1
Mean grain size, total sample (Ø)	1.4	--	1
Standard deviation, total sample (Ø)	1.2	--	1
Skewness, total sample	0.2	--	1
Kurtosis, total sample	5.3	--	1
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation, noncarbonate fraction (Ø)	1.0	--	1
Mean grain size, carbonate fraction (Ø)	-0.8	--	1
Standard deviation carbonate fraction (Ø)	1.3	--	1

Brania clavata (Claparede, 1863)
(Described and illustrated by Pettibone, 1963a)

A total of nine survey records and one incidental collection (Old Tampa Bay) came from all areas of the Estuary except Terra Ceia Bay (table 66). Both the Hillsborough and Old Tampa Bay stations were in water that generally has a salinity greater than 20 parts per thousand, and it seems likely that more brackish waters act as a barrier to the distribution of this species.

Sediment data from eight stations indicate that B. clavata generally occurs on poorly sorted, medium sand that contains less than six percent silt and clay, but has a high content of organic carbon and a moderate amount of coarse shell fragments (table 67).

One-third of the dredge and shovel stations contained algae and one or more of the five sea grasses that occur in the Estuary.

No gravid and no young specimens were collected.

This worm is known from high and low latitudes in the eastern and western Atlantic, the Caribbean, and the Pacific coast of Mexico. As far as I know, this is the first report of B. clavata for the Gulf of Mexico.

Table 66.--Brania clavata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay								
Stations		Individuals		Stations		Individuals		
		D	S	N		D	S	N
6-1-C		21			6-3	321		
Hillsborough Bay								
10-18		2						
Upper Tampa Bay								
10-4		2						
Boca Ciega Bay								
15-12		1		4	16-4		1	
Lower Tampa Bay								
15-28		1			17-6		1	
16-13		20						

Table 67.--Brania clavata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.1	22.1 to 31.6	9
Salinity (‰)	28.5	22.1 to 33.9	9
pH	8.0	7.8 to 8.4	9
Depth (m.)	1.1	1 to 3.0	9
Sediment type	sand	shelly sand to silty sand	8
Granules (wt. %)	9.4	0.3 to 44.5	8
Sands (wt. %)	85.0	72.5 to 96.6	8
Silts (wt. %)	4.3	0.4 to 22.1	8
Clay (wt. %)	1.3	0.0 to 5.2	8
CaCO ₃ (wt. %)	26.5	1.5 to 56.9	8
Organic carbon (wt. %)	1.1	0.1 to 3.3	6
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	6
Mean grain size, total sample (Ø)	1.9	-1.0 to 4.1	8
Standard deviation, total sample (Ø)	1.5	1.2 to 2.8	8
Skewness, total sample	0.2	-0.5 to 1.6	8
Kurtosis, total sample	3.7	-1.5 to 13.7	8
Mean grain size, noncarbonate fraction (Ø)	3.3	2.5 to 5.5	8
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 2.1	8
Mean grain size, carbonate fraction (Ø)	-0.3	-1.3 to 0.6	8
Standard deviation, carbonate fraction (Ø)	1.2	0.9 to 1.6	7

Exogone dispar (Webster, 1879)
(Described and illustrated by Pettibone, 1963a)

Individuals were collected in all areas of the Estuary at a total of 87 survey stations (table 68).

Sediment data show that it was generally found on poorly sorted, fine sand, but also inhabited coarser and much finer sediments. At most dredge and shovel stations, silt and clay was less than five percent, organic carbon approached one percent, and large shell fragments were uncommon (table 69).

Twenty-nine, or about 38 percent of the bottom samples contained vegetation. Algae were present and sea grasses included all those found in the Estuary with the exception of widgeon grass.

Specimens with mature gametes were found in May, July, August, September, October, and November.

This worm has been recorded in the Gulf of Mexico and at many localities in the Atlantic and Pacific from boreal waters to the tropics.

Table 68.--Exogone dispar--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay						
Stations	Individuals			Stations	Individuals	
	D	S	N		D	S N
B-1		1	4	6-3	9	21
B-2			24	6-4-A		1
6-1-A		2		6-5	6	
6-2	325		13			
Hillsborough Bay						
7-3	1					
Upper Tampa Bay						
10-3			3	12-12	213	
10-4	480		6	12-13		1
11-4	1		2	12-14	7	
11-5	1			12-15	3	
12-2	6		2	13-3	33	
12-7	1			13-5	40	
12-9	4			13-6	1	
12-10	59			13-8	274	
12-11	356					
Boca Ciega Bay						
BC-A	16			PB-4		382
BC-M			12	PB-5	4	3
BC-N	193		1	14-3		1
D-3		5	3	15-3	1	
D-15			1	15-13	2	
D-17	1			15-14	3	6
D-18		44		15-15		1
D-19-A	1			16-1		2
D-22	2		1	16-4		1
D-25		8	11	16-6	204	
PB-1			7			

Table 68.--Exogone dispar--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Terra Ceia Bay						
Stations			Individuals			
			D	S	N	
E-5	1	6				
Lower Tampa Bay						
Stations			Individuals			
			D	S	N	
14-5	5	1				
14-6	1					
14-10	4					
14-11	4					
14-12	12					
14-15	10					
15-18	2					
15-22	60					
15-23	126					
15-24	39					
15-25	22					
15-26	42	1				
15-28	1					
15-29	7					
15-30	15					
15-32	3					
16-10		1				
16-11	1					
16-12		6				
16-13	350					
16-14	21					
16-15	170					
16-16	34					
16-17	20					
16-19	9					
16-20	2					
16-21	3					
16-22	1					
16-24	31					
16-27	17					
17-2	206					
17-3	1					
17-4	32					
17-5	25					
17-6	187					
17-7	23					
17-8	8					
17-9						
18-3	5					

Table 69.--Exogone dispar--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.0	14.0 to 32.0	76
Salinity (‰)	29.5	17.6 to 35.1	75
pH	8.0	7.3 to 8.4	75
Depth (m.)	1.3	1 to 3.9	76
Sediment type	sand	shelly sand to sandy clay	72
Granules (wt. %)	4.0	0.0 to 28.8	72
Sands (wt. %)	92.0	24.5 to 99.2	72
Silts (wt. %)	2.4	0.0 to 13.4	72
Clay (wt. %)	1.5	0.0 to 65.9	72
CaCO ₃ (wt. %)	24.1	0.7 to 85.2	72
Organic carbon (wt. %)	0.8	0.1 to 8.4	60
Organic nitrogen (wt. %)	0.04	0.00 to 0.7	60
Mean grain size, total sample (Ø)	2.1	1.1 to 7.1	72
Standard deviation, total sample (Ø)	1.4	0.7 to 3.0	72
Skewness, total sample	0.22	-1.1 to 1.9	72
Kurtosis, total sample	6.41	0.8 to 25.7	72
Mean grain size, noncarbonate fraction (Ø)	3.0	1.2 to 9.0	69
Standard deviation, noncarbonate fraction (Ø)	1.4	0.6 to 3.4	69
Mean grain size, carbonate fraction (Ø)	0.1	-2.5 to 3.0	59
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 2.4	59

Odontosyllis enopla Verrill, 1900
(Described and illustrated by
Galloway and Welch, 1911)

O. enopla was collected only in an incidental collection in Bunces Pass, Boca Ciega Bay. Salinity in the pass is always above 30 parts per thousand. No sediment data are available for the collection locality.

Hartman (1951) reported this worm in the Gulf of Mexico, and other records indicate that the range of O. enopla extends from Bermuda to the Caribbean.

Syllis aciculata (Treadwell, 1945)
(Described and illustrated by Hartman, 1968)

Collections were made at 21 survey stations and one incidental locality in Bunces Pass, Boca Ciega Bay. The survey stations included all areas of the Estuary except Old Tampa Bay (table 70).

The worm was found in sediments of poorly sorted, medium sand that had little silt and clay, but more than one percent organic carbon. The sand contained a moderate amount of coarse shell and some larger bits of shell debris (table 71).

The bottom was vegetated at nearly three-fourths of the dredge and shovel stations. Algae were recorded, as were shoal, manatee, and turtle grass.

No individuals with ripe gametes and no juveniles were found.

S. aciculata is otherwise known only from central and southern California.

Table 70.--Syllis aciculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Hillsborough Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
8-6		6							
Upper Tampa Bay									
12-9		1							
Boca Ciega Bay									
BC-M-1		1			16-5		11		
D-23		1			16-6		4		
16-1		2			16-7		1		
16-3		23							
Terra Ceia Bay									
E-6		2			E-8 "		1		
Lower Tampa Bay									
14-10		11			16-28		1		
14-13		17			17-3		1		
15-23		2			17-6		1		
15-31		33			17-8		1		
16-25		6			17-15		10		

Table 71.--*Syllis aciculata*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.0	13.0 to 29.5	18
Salinity (‰)	30.9	18.6 to 34.2	18
pH	8.1	7.6 to 8.3	18
Depth (m.)	1.0	1 to 3.0	18
Sediment type	sand	shelly sand to sand	18
Granules (wt. %)	7.8	0.3 to 72.9	18
Sands (wt. %)	89.2	27.1 to 98.3	18
Silts (wt. %)	2.4	0.0 to 7.2	18
Clay (wt. %)	0.6	0.0 to 1.9	18
CaCO ₃ (wt. %)	23.8	2.7 to 85.2	18
Organic carbon (wt. %)	1.1	0.1 to 6.9	17
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	17
Mean grain size, total sample (Ø)	1.9	-1.9 to 3.0	18
Standard deviation, total sample (Ø)	1.4	0.9 to 2.0	18
Skewness, total sample	0.4	-0.6 to 1.0	18
Kurtosis, total sample	7.1	-0.4 to 21.2	18
Mean grain size, noncarbonate fraction (Ø)	3.0	1.9 to 4.9	18
Standard deviation, noncarbonate fraction (Ø)	1.4	0.6 to 3.4	18
Mean grain size, carbonate fraction (Ø)	0.5	1.0 to 2.4	17
Standard deviation, carbonate fraction (Ø)	1.1	0.7 to 1.5	17

Syllis annularis Verrill, 1900

Specimens were collected at 10 survey stations in Boca Ciega and lower Tampa Bay, and at one incidental station near Mullet Key in lower Tampa Bay (table 72).

The five stations for which there are sediment data indicate that S. annularis occurred only in poorly sorted, fine sand where there is little silt and clay, and more than one percent organic carbon. Shell fragments comprise over 30 percent of sand and granule fractions (table 73). Three of five dredge and shovel samples contained algae, and shoal grass or turtle grass.

One juvenile worm was collected in October, but no gravid individuals were seen.

Aside from the original locality in Bermuda, I know of no other records for S. annularis.

Table 72.--Syllis annularis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-M	6		62	16-1			1
BC-N	8		1	16-2		1	30
D-25			1	16-4			2
15-11			1	16-8			2
15-16			6				
Lower Tampa Bay							
14-9	1						

Table 73.--Syllis annularis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.5	17.5 to 26.0	5
Salinity (‰)	32.6	33.0 to 35.1	5
pH	8.1	7.8 to 8.4	5
Depth (m.)	1.2	1 to 2.1	5
Sediment type	sand	--	5
Granules (wt. %)	7.4	0.1 to 14.7	5
Sands (wt. %)	88.7	83.5 to 95.2	5
Silts (wt. %)	3.1	1.0 to 8.0	5
Clay (wt. %)	0.8	0.0 to 1.9	5
CaCO ₃ (wt. %)	24.0	4.5 to 38.2	5
Organic carbon (wt. %)	1.3	0.2 to 4.8	4
Organic nitrogen (wt. %)	0.1	0.02 to 0.2	4
Mean grain size, total sample (Ø)	2.2	1.4 to 3.1	5
Standard deviation, total sample (Ø)	1.5	1.1 to 1.9	5
Skewness, total sample	0.0	-1.1 to 1.6	5
Kurtosis, total sample	5.4	1.0 to 13.3	4
Mean grain size, noncarbonate fraction (Ø)	4.3	2.7 to 8.7	4
Standard deviation, noncarbonate fraction (Ø)	1.3	0.7 to 2.2	4
Mean grain size, carbonate fraction (Ø)	0.8	-1.7 to 2.3	4
Standard deviation, carbonate fraction (Ø)	0.8	0.2 to 1.4	4

Syllis gracilis Grube, 1840
(Described and illustrated by Pettibone, 1963a)

Specimens were collected at one survey and one incidental locality in Old Tampa Bay and upper Tampa Bay, one station in Terra Ceia Bay, and at three stations in lower Tampa Bay (table 74).

Sediment data are available for two dredge stations in lower Tampa Bay. There, sediments were extremely poorly sorted, medium sand that was composed of more than 40 percent shell (table 75).

No vegetation was noted at the dredge stations.

Neither juvenile nor gravid specimens were observed.

S. gracilis has a world-wide distribution in temperate and tropical seas, where it is generally associated with sessile, bottom growth and coarse sediment particles. It has been previously reported from the Gulf of Mexico.

Table 74.--Syllis gracilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
4-19				1					
Upper Tampa Bay									
12-13				1					
Terra Ceia Bay									
E-1				1					
Lower Tampa Bay									
16-14				3	17-6		1		2
17-2		3							

Table 75.--Syllis gracilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.6	22.1 to 29.1	2
Salinity (‰)	33.8	33.1 to 34.5	2
pH	8.0	7.8 to 8.2	2
Depth (m.)	3.0	2.0 to 4.0	2
Sediment type	sand	--	2
Granules (wt. %)	3.9	1.7 to 6.1	2
Sands (wt. %)	93.0	91.2 to 94.9	2
Silts (wt. %)	2.4	2.1 to 2.7	2
Clay (wt. %)	0.7	--	2
CaCO ₃ (wt. %)	40.7	39.8 to 41.7	2
Organic carbon (wt. %)	0.4	0.3 to 0.5	2
Organic nitrogen (wt. %)	0.03	--	2
Mean grain size, total sample (Ø)	1.8	1.7 to 1.9	2
Standard deviation, total sample (Ø)	5.1	1.7 to 8.5	2
Skewness, total sample	0.3	0.1 to 0.5	2
Kurtosis, total sample	3.9	3.2 to 4.8	2
Mean grain size, noncarbonate fraction (Ø)	3.0	2.5 to 3.5	2
Standard deviation, noncarbonate fraction (Ø)	2.0	0.8 to 3.2	2
Mean grain size, carbonate fraction (Ø)	-0.1	--	1
Standard deviation, carbonate fraction (Ø)	0.9	--	1

Syllis spongicola Grube, 1855
(Described and illustrated by Day, 1967)

This species was collected only by net at a total of five stations in all areas of the Estuary except Old Tampa Bay and Hillsborough Bay (table 76). Over 2,000 specimens were found in shell fragments taken by net at station 18-3.

No young, and no gravid specimens were collected.

S. spongicola has a world-wide distribution in temperate and tropical waters, and is known from the Gulf of Mexico.

Table 76.--Syllis spongiicola--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
12-13				2	13-8				4
Boca Ciega Bay									
BC-N				1					
Terra Ceia Bay									
E-1				1					
Lower Tampa Bay									
18-3				2000+					

Syllis variegata Grube, 1860
(Described and illustrated by Fauvel, 1923)

Collections were limited to upper Tampa Bay, Boca Ciega Bay, and lower Tampa Bay at a total of 14 stations. No specimens were taken north of transect-11, and presumably the 20 to 25 parts per thousand isohaline is limiting to this species (table 77).

Sediments at dredge and shovel localities were all poorly sorted, medium sand, with little silt and clay, less than one percent organic carbon, and some large shell fragments (table 78).

Algae were present at three of these stations, and manatee grass was found at two.

No gravid, and no juvenile worms were noted.

S. variegata is a cosmopolitan species that is associated with coarse sediments and attached organisms in temperate and tropical seas. It has not been previously reported in the Gulf of Mexico.

Table 77.--*Syllis variegata*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
11-28		1		13-10			1
12-15	1						
Boca Ciega Bay							
BC-M			3	15-2		1	
BC-N	38		2	15-15			1
D-26		4		16-7	2		
PB-4			1				
Lower Tampa Bay							
15-29	5			16-17	34		2
16-15			4	17-2			2

Table 78.--Syllis variegata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	14.0 to 27.0	8
Salinity (‰)	30.9	24.9 to 34.0	8
pH	8.1	7.8 to 8.3	8
Depth (m.)	1.0	1 to 2.1	8
Sediment type	sand	--	6
Granules (wt. %)	3.4	0.3 to 14.7	6
Sands (wt. %)	93.4	83.5 to 98.5	6
Silts (wt. %)	2.6	0.3 to 10.5	6
Clay (wt. %)	0.6	0.2 to 2.2	6
CaCO ₃ (wt. %)	19.4	2.7 to 43.7	6
Organic carbon (wt. %)	0.5	0.1 to 1.2	6
Organic nitrogen (wt. %)	0.01	0.00 to 0.04	6
Mean grain size, total sample (Ø)	2.0	1.4 to 2.6	6
Standard deviation, total sample (Ø)	1.3	0.8 to 1.9	6
Skewness, total sample	0.3	-0.3 to 1.1	6
Kurtosis, total sample	7.9	0.9 to 17.9	6
Mean grain size, noncarbonate fraction (Ø)	3.0	2.5 to 3.6	6
Standard deviation noncarbonate fraction (Ø)	1.6	0.7 to 2.7	6
Mean grain size, carbonate fraction (Ø)	-0.1	-1.9 to 1.5	6
Standard deviation, carbonate fraction (Ø)	1.0	0.2 to 1.8	6

Syllis vittata Grube, 1840
(Described and illustrated by Day, 1967)

All specimens were collected by shovel at six stations. Hillsborough Bay and lower Tampa Bay were the only areas where none were taken (table 79).

Water depth at all localities was less than 1 m., and the average bottom type was poorly sorted, fine sand with one percent organic carbon, and a small amount of silt, clay, and shell (table 80).

Three of the six stations were vegetated with algae, and turtle grass, manatee grass, or shoal grass.

Neither gravid nor juvenile worms were found.

This syllid is commonly found along the western coast of Europe and Africa. It has not been previously recorded for the Gulf of Mexico.

Table 79.--Syllis vittata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-1-D		35							
Upper Tampa Bay									
11-28		27							
Boca Ciega Bay									
D-19-A		2			16-8		3		
D-26		6							
Terra Ceia Bay									
E-6		5							

Table 80.--Syllis vittata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.6	13.0 to 27.0	6
Salinity (‰)	28.9	24.1 to 32.5	6
pH	8.1	7.9 to 8.3	6
Depth (m.)	0.3	--	6
Sediment type	sand	--	5
Granules (wt. %)	2.2	0.0 to 7.0	5
Sands (wt. %)	92.2	85.4 to 98.8	5
Silts (wt. %)	4.4	0.3 to 10.5	5
Clay (wt. %)	1.1	0.5 to 2.2	5
CaCO ₃ (wt. %)	7.3	0.9 to 16.2	5
Organic carbon (wt. %)	1.0	0.2 to 2.6	3
Organic nitrogen (wt. %)	0.03	0.01 to 0.07	3
Mean grain size, total sample (Ø)	2.4	1.9 to 2.8	5
Standard deviation, total sample (Ø)	1.4	0.8 to 2.0	5
Skewness, total sample	0.9	-0.2 to 2.2	5
Kurtosis, total sample	13.2	3.1 to 30.1	5
Mean grain size, noncarbonate fraction (Ø)	2.8	2.1 to 3.5	5
Standard deviation, noncarbonate fraction (Ø)	1.1	0.7 to 1.6	5
Mean grain size, carbonate fraction (Ø)	0.2	-0.9 to 1.1	5
Standard deviation, carbonate fraction (Ø)	1.1	0.9 to 1.3	5

Brania sp.

In this species, the simple, acicular setae have a blunt tooth at the tip (figure 5,A). Compound setae all have the same shape -- the proximal shaft bears a short, terminal appendage with an entire tip, and has a distinctly serrate margin (figure 5,B).

One specimen was collected at the mouth of Hillsborough Bay, and other collections came from upper Tampa Bay and lower Tampa Bay (table 81).

All collections were taken by dredge or shovel, and average sediment type was poorly sorted, medium sand that was about one-fourth shell and contained very little silt and clay. Less than one percent organic carbon was present (table 82).

A bottom growth of algae and turtle grass was recorded at three stations.

Neither juveniles nor specimens with mature gametes were collected.

Table 81.--Brania sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Hillsborough Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
10-19		3							
Upper Tampa Bay									
10-1-A		6			10-4		2		
10-3		24			11-1		9		
Lower Tampa Bay									
17-6		1			18-4		2		
17-7		1							

Table 82.--Brania sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.4	19.6 to 31.5	8
Salinity (‰)	27.0	22.7 to 34.2	8
pH	7.9	7.7 to 8.2	7
Depth (m.)	2.6	1 to 2.3	8
Sediment type	sand	shelly sand to sand	8
Granules (wt. %)	5.3	0.1 to 21.5	8
Sands (wt. %)	92.7	78.5 to 99.9	8
Silts (wt. %)	1.4	0.0 to 3.8	8
Clay (wt. %)	0.5	0.0 to 1.5	8
CaCO ₃ (wt. %)	24.4	0.9 to 49.9	8
Organic carbon (wt. %)	0.6	0.1 to 1.2	4
Organic nitrogen (wt. %)	0.03	0.01 to 0.2	4
Mean grain size, total sample (Ø)	1.9	0.8 to 2.4	8
Standard deviation, total sample (Ø)	1.4	0.5 to 2.3	8
Skewness, total sample	-0.7	-1.4 to 0.5	8
Kurtosis, total sample	7.4	-0.2 to 26.4	8
Mean grain size, noncarbonate fraction (Ø)	2.9	2.5 to 3.8	8
Standard deviation, noncarbonate fraction (Ø)	1.4	0.8 to 2.3	8
Mean grain size, carbonate fraction (Ø)	-0.6	-1.8 to 0.6	6
Standard deviation, carbonate fraction (Ø)	1.4	0.9 to 1.7	6

Pionosyllis sp.

This unidentified worm has simple setae with an entire tip (figure 5,C) and three types of compound setae (figure 5,D,E,F). The shortest ones have a stout proximal shaft, and a very short falcate appendage that bears three teeth. Setae of intermediate length have a spinous margin at the end of the proximal appendage followed by a falcate appendage with spinous margin and bidentate tip. The third type has a long, capillary, terminal appendage with faint striations along one margin.

Specimens were collected by dredge on two occasions in Boca Ciega Bay at station BC-N (table 83).

Sediment there was poorly sorted, medium sand with very little silt, clay, and organic carbon. Shell fragments in the sand and granule size range comprised about one-third of the sediment (table 84).

No bottom vegetation was recorded.

Both specimens appeared mature, but neither contained mature gametes.

Table 83.--Pionosyllis sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
			D	S	N	
BC-N			2			

Table 84.--Pionosyllis sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	16.3	15.0 to 17.5	2
Salinity (‰)	31.7	31.3 to 32.2	2
pH	8.1	7.9 to 8.3	2
Depth (m.)	2.3	--	2
Sediment type	sand	--	2
Granules (wt. %)	9.5	4.2 to 14.7	2
Sands (wt. %)	89.7	83.5 to 95.9	2
Silts (wt. %)	1.0	0.6 to 1.5	2
Clay (wt. %)	0.1	0.0 to 0.3	2
CaCO ₃ (wt. %)	32.0	25.9 to 38.2	2
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.03	--	1
Mean grain size, total sample (Ø)	1.5	1.4 to 1.5	2
Standard deviation total sample (Ø)	1.3	0.8 to 1.9	2
Skewness, total sample	-1.0	-1.7 to -0.3	2
Kurtosis, total sample	0.6	0.3 to 0.9	2
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation noncarbonate fraction (Ø)	0.7	--	1
Mean grain size, carbonate fraction (Ø)	1.5	--	1
Standard deviation, carbonate fraction (Ø)	0.2	--	1

Sphaerosyllis sp.

This species has features that are intermediate between Sphaerosyllis hystrix and S. californiensis (Hartman, 1968). Parapodial capsules are present as in S. hystrix, but the setae more closely resemble those of S. californiensis (figure 5,G,H,I,J).

Collections were made only in Old Tampa Bay and lower Tampa Bay at a total of eight localities (table 85).

Average sediment was poorly sorted, medium sand with less than one percent organic carbon and a small proportion of silt and clay. Shell, in the sand and granule size range made up a large percentage of the sediment (table 86).

No bottom vegetation was found.

No specimens were in reproductive conditions and no young were seen.

Table 85.--Sphaerosyllis sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-3		1							
Lower Tampa Bay									
16-12		12			17-3		3		
16-13		3			17-4		5		
16-15		1			17-6		3		
17-2		1							

Table 86.--Sphaerosyllis sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.0	24.0 to 31.6	7
Salinity (‰)	32.4	24.2 to 34.5	7
pH	8.0	7.8 to 8.2	7
Depth (m.)	2.3	1.9 to 4.0	7
Sediment type	sand	--	7
Granules (wt. %)	3.8	1.7 to 5.6	6
Sands (wt. %)	94.1	91.2 to 96.3	6
Silts (wt. %)	1.6	0.7 to 2.7	6
Clay (wt. %)	0.5	0.1 to 0.7	6
CaCO ₃ (wt. %)	55.7	39.8 to 85.2	6
Organic carbon (wt. %)	0.8	0.2 to 3.3	6
Organic nitrogen (wt. %)	0.1	0.0 to 0.2	6
Mean grain size, total sample (Ø)	1.4	0.5 to 1.9	6
Standard deviation, total sample (Ø)	1.4	1.1 to 1.7	6
Skewness, total sample	0.5	0.2 to 0.8	6
Kurtosis, total sample	5.1	3.2 to 8.2	6
Mean grain size, noncarbonate fraction (Ø)	3.5	2.5 to 5.5	6
Standard deviation, noncarbonate fraction (Ø)	1.7	0.6 to 3.2	6
Mean grain size, carbonate fraction (Ø)	0.5	-0.1 to 1.7	5
Standard deviation, carbonate fraction (Ø)	0.9	0.8 to 0.9	5

Syllis sp. A

In posterior segments this species has simple, acicular setae with a blunt tip. There are three types of compound hooks -- each in a different body region. Anteriorly, the distal appendage of hooked setae has a smooth margin and a minutely bidentate tip. In median hooks, the terminal joint has a more distinct bidentate tip and a spinous margin. Posterior segments have hooks with a stout, proximal shaft and a short, distal appendage that has a smooth margin and two large, terminal teeth (figure 5,K,L,M,N,).

Collections came from 33 localities between upper Tampa Bay and lower Tampa Bay. None were found in either Old Tampa or Hillsborough Bays (table 87).

Average sediment was poorly sorted, medium sand with little silt, clay, or organic carbon. Shell particles comprised a large percentage of the sand size class (table 88).

About one-half of the bottom samples contained algae. Shoal grass, Halophila, manatee grass, and turtle grass were present in some.

Neither gravid nor young worms were found.

Table 87.--Syllis sp. A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
12-11	1			13-8	8		
13-3	2			13-9	1		
13-4	1			13-10	3		
Boca Ciega Bay							
BC-N	1			16-5	4		
16-4		30		16-8	13		
Terra Ceia Bay							
E-8	10						
Lower Tampa Bay							
14-11	4			16-13	220		
14-12	34			16-14	1		
14-14	2			16-16	30		
14-15	1			16-24	66		
15-22	30			17-2	205		
15-23	76			17-3	15		
15-24	14			17-4	15		
15-25	32			17-5	4		
15-26	6			17-6	1		
15-27	1			17-7	6		
16-12	48			18-3	25		

Table 88.--Syllis sp. A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.5	15.0 to 25.0	31
Salinity (‰)	31.7	27.5 to 34.5	30
pH	8.0	7.8 to 8.7	31
Depth (m.)	2.0	1 to 4.0	31
Sediment type	sand	shelly sand to sand	30
Granules (wt. %)	5.2	0.3 to 21.4	30
Sands (wt. %)	92.9	77.4 to 99.2	30
Silts (wt. %)	1.5	0.2 to 7.2	30
Clay (wt. %)	0.4	0.1 to 1.9	30
CaCO ₃ (wt. %)	36.6	6.5 to 85.2	30
Organic carbon (wt. %)	0.8	0.1 to 5.0	30
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	30
Mean grain size, total sample (Ø)	1.8	0.4 to 3.0	30
Standard deviation total sample (Ø)	1.4	0.8 to 2.3	30
Skewness, total sample	0.1	-0.5 to 0.8	30
Kurtosis, total sample	4.1	-0.03 to 11.9	30
Mean grain size, noncarbonate fraction (Ø)	2.8	1.7 to 5.9	30
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	30
Mean grain size, carbonate fraction (Ø)	0.4	-1.3 to 1.7	22
Standard deviation, carbonate fraction (Ø)	1.1	0.2 to 2.1	22

Syllis sp. B

This worm has three types of setae, all of which are represented in median and posterior segments. Simple, acicular setae have a notch near the bifid tip which is formed by two, low teeth (figure 5,O). The compound hooks are all similar and consist of a basal shaft, and terminal appendage that has an entire tip and strongly serrate margin (figure 5,P). The third type consist of very long, compound capillary setae. The distal appendage has fine serrations along the margin (figure 5,Q).

Specimens were collected at 48 localities in all areas of the Estuary except Hillsborough and Terra Ceia Bays (table 89).

Average bottom type in these areas was poorly sorted, fine sand with about two percent silt and clay, and one percent organic carbon. Sediment composition was about one-fifth shell in the sand and granule size range (table 90).

One-half of the bottom samples contained algae and some also had shoal grass, manatee grass, and turtle grass.

No young, and no sexually mature individuals were collected.

Table 89.--*Syllis* sp. B--Locality records and numbers of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-Shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
6-2	2			6-3	6		2
Upper Tampa Bay							
10-3		28	1	12-14	1		
10-4	2			13-1-A		255	
10-7	1			13-1-B		10	
12-1		51		13-3	27		
12-8	14			13-10	22		
Boca Ciega Bay							
BC-N	10			PB-4	3		1
D-2	12			15-3		1	
D-3			1	15-15	1		
D-6		2		16-1		4	
D-23		7		16-2		8	
D-25		5		16-6	2		
Lower Tampa Bay							
14-8	4			16-15	14		
14-15	24			16-16	42		
15-21	25			16-17	14		
15-27	44			16-21	1		
15-28	18			16-24	16		
15-30	70			16-25		12	
15-32	4			16-28		8	
15-33		32		17-5	3		
16-9		2		17-6	2		
16-9-A		4		17-8	4		
16-9-B		17		17-9	2		
16-13	75			18-3	3		

Table 90.--Syllis sp. B--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	15.5 to 32.0	51
Salinity (‰)	30.6	21.8 to 35.1	50
pH	8.0	7.7 to 8.4	50
Depth (m.)	1.0	1 to 3.0	51
Sediment type	sand	shelly sand to sand	49
Granules (wt. %)	3.5	0.0 to 21.5	49
Sands (wt. %)	92.0	77.4 to 99.2	49
Silts (wt. %)	1.9	0.0 to 11.8	49
Clay (wt. %)	0.6	0.0 to 2.8	49
CaCO ₃ (wt. %)	18.5	1.6 to 75.1	49
Organic carbon (wt. %)	1.0	0.01 to 6.9	40
Organic nitrogen (wt. %)	0.1	0.00 to 1.2	40
Mean grain size, total sample (Ø)	2.1	0.4 to 3.4	49
Standard deviation, total sample (Ø)	1.3	0.6 to 2.3	49
Skewness, total sample	0.1	-1.4 to 1.9	49
Kurtosis, total sample	8.1	-0.2 to 29.7	48
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 8.7	46
Standard deviation, noncarbonate fraction (Ø)	1.2	0.6 to 2.8	46
Mean grain size, carbonate fraction (Ø)	0.5	-1.8 to 6.6	38
Standard deviation, carbonate fraction (Ø)	1.2	0.3 to 2.3	38

Figure 5. -- Diagnostic features of Brania sp., Pionosyllis sp., Sphaerosyllis sp., Syllis sp. A, and Syllis sp. B

- Brania sp.: (A) Simple, acicular spine (B) Compound hook
- Pionosyllis sp.: (C) Simple, acicular spine (D) Short, compound hook (E) Long, compound hook (F) Compound, capillary seta
- Sphaerosyllis sp.: (G) Simple, acicular spine (H) Simple, acicular hook (I) Short, spinous compound hook (J) Short, compound hook
- Syllis sp. A: (K) Simple, acicular spine (L) Anterior, compound hook (M) Median, compound hook (N) Posterior, compound hook
- Syllis sp. B: (O) Simple, acicular spine (P) Compound hook (Q) Compound, spiniger.

FIGURE 5

Family NEREIDAE Johnston, 1865

The nereids are a large group of predominantly omnivorous worms that are well represented in all seas. Some crawl actively among sessile organisms and bottom debris, while others construct burrows, build tubes, or live commensally and perhaps parasitically. The family is well represented in Tampa Bay where 10 species were recorded.

The rarely collected, Rullierinereis mexicana, was found only in Boca Ciega Bay. Ceratonereis irritabilis, was collected in Boca Ciega and lower Tampa Bays; Namalycastis abiuma, was taken in Boca Ciega and Old Tampa Bays; and Nicon lackeyi was found in Hillsborough and upper Tampa Bays. The remaining six species were found in at least three areas of the Estuary, and probably live throughout the entire Tampa Bay system (Laeonereis culveri, Nereis arenaceodentata, Nereis pelagica occidentalis, Nereis succinea, Perinereis floridana, and Platynereis dumerilii).

Key to NEREIDAE Collected in Tampa Bay

- 1 Chitinous paragnaths absent on both basal and maxillary, pharyngeal ring..... 2
- Chitinous paragnaths present on some area of pharynx--conical or bar-like 5
- 2 Pharynx bears fleshy papillae Laeonereis culveri

- Pharynx smooth 3
- 3 Parapodia of median segments bear a large dorsal and small ventral cirrus, and a single, setal lobe Namalycastis abiuma
- Parapodia of median segments bear distinct notopodial and neuropodial lobes in addition to dorsal and ventral cirri 4
- 4 Dorsal, parapodial cirri consist of a long, basal cirrophore and short, distal appendage; ventral, heterogomph falcigers have a smooth margin Nicon lackeyi
- Dorsal, parapodial cirri unsegmented; notosetae all homogomph spinigers; dorsal neurosetae, homogomph spinigers and heterogomph falcigers; ventral neurosetae, heterogomph spinigers and falcigers Rullierinereis mexicana
- 5 Some or all pharyngeal paragnaths bar-like 6
- All paragnaths conical 7
- 6 All paragnaths bar-like Platynereis dumerilii
- Pharyngeal bars on region VI only Perinereis floridana
- 7 Basal region of pharynx smooth, maxillary region bears conical paragnaths Ceratonereis irritabilis
- Conical paragnaths on both basal and maxillary pharyngeal regions 8
- 8 Pharyngeal areas V through VIII have continuous rows of paragnaths Nereis arenaceodentata
- Basal region of pharynx has continuous rows of paragnaths on regions VII and VIII only 9
- 9 Posterior parapodia have greatly enlarged, dorsal, notopodial lobe Nereis succinea

- Posterior parapodia have a triangular, dorsal, notopodial lobe that extends no further than the notopodial, acicular lobe Nereis pelagica occidentalis

Ceratonereis irritabilis (Webster, 1879)
(Described and illustrated by Hartman, 1945)

Individuals were collected at only two stations in Boca Ciega Bay, and three in lower Tampa Bay. Such a distribution indicates that this species is restricted to areas of the Estuary where average salinity is at least 30 parts per thousand (table 91).

Sediment at dredge stations was poorly sorted, fine sand. About one-third of the sand fraction was composed of shell debris, and although organic carbon was greater than one percent, the silt-clay content was under four percent (table 92).

Algae were present at one station, and no vegetation was recorded from the other.

A gravid specimen was collected in June and swarming spawners were netted in April.

C. irritabilis is known from North Carolina and Virginia on the south Atlantic coast, but has not been previously reported in the Gulf of Mexico.

Table 91.--Ceratonereis irritabilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
15-5	1			15-11			1
Lower Tampa Bay							
15-30	1			16-15	2		
16-13	1						

Table 92.--*Ceratonereis irritabilis*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.3	24.0 to 25.0	4
Salinity (‰)	32.4	29.8 to 33.9	4
pH	8.0	7.8 to 8.2	4
Depth (m.)	2.0	1.0 to 3.0	4
Sediment type	sand	--	4
Granules (wt. %)	2.7	0.6 to 4.4	4
Sands (wt. %)	93.7	89.1 to 96.3	4
Silts (wt. %)	3.0	0.3 to 8.9	4
Clay (wt. %)	0.6	0.1 to 1.5	4
CaCO ₃ (wt. %)	34.4	13.5 to 57.4	4
Organic carbon (wt. %)	1.3	0.5 to 3.3	3
Organic nitrogen (wt. %)	0.1	--	3
Mean grain size, total sample (Ø)	2.0	1.3 to 3.4	4
Standard deviation, total sample (Ø)	1.4	1.2 to 1.5	4
Skewness, total sample	0.2	-0.4 to 0.7	4
Kurtosis, total sample	4.2	3.2 to 5.3	4
Mean grain size, noncarbonate fraction (Ø)	3.4	2.7 to 5.5	4
Standard deviation, noncarbonate fraction (Ø)	1.2	0.5 to 2.1	4
Mean grain size, carbonate fraction (Ø)	0.2	-0.1 to 0.7	4
Standard deviation, carbonate fraction (Ø)	1.4	0.9 to 2.5	4

Laeonereis culveri (Webster, 1879)
(Described and illustrated by Hartman, 1945)

This species was found in all areas of the Estuary at 34 survey stations and 10 incidental localities. The largest number in a single collection (303) were taken from a shovel station (A-5) in upper Old Tampa Bay (table 93). L. culveri can apparently withstand water of oceanic salinity as well as water that is practically fresh.

Average bottom type at dredge and shovel stations was poorly sorted, fine sand with about 10 percent silt and clay, nearly one percent organic carbon, and a small percentage of shell in both the granule and sand size classes (table 94).

One-third of the bottom samples contained algae, as well as sea grasses that included shoal grass, turtle grass, and manatee grass.

Gravid specimens were found in July, September, and November, and juveniles were noted in February, July, August, and September.

L. culveri has been recorded in the Gulf of Mexico and is otherwise known in the western Atlantic in shallow water between Brazil and North Carolina.

Table 93.--Laeonereis culveri--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay						
Stations			Individuals			
			D	S	N	
A-1			24			
A-3			1			
A-5			303			
A-6			54			
B-3			59			
4-1			2			
4-2			12			
4-4			1			
5-1-A				1		
6-1-A				1		
6-1-D				6		
6-8				1		
Hillsborough Bay						
C-1			10			
C-2	1					
C-4			3			
C-8-2			1			
C-9			1			
8-9	6					
8-10				2		
9-1				117		
10-15				5		1
10-16				2		
10-23				2		
Upper Tampa Bay						
D-28			1			
10-13	5					
10-14-A				1	123	
11-26				1		
Boca Ciega Bay						
D-11			2			
PB-1			58			
14-1-A			9			
15-2				45		
15-3				4		
Terra Ceia Bay						
E-6			9			
Lower Tampa Bay						
16-26			1			

Table 94.--Laeonereis culveri--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.3	13.0 to 34.1	36
Salinity (‰)	23.7	3.7 to 34.8	36
pH	7.8	7.1 to 8.3	29
Depth (m.)	0.5	1 to 2.0	36
Sediment type	sand	shelly sand to sandy clay	36
Granules (wt. %)	2.7	0.0 to 46.2	36
Sands (wt. %)	87.5	24.5 to 99.9	36
Silts (wt. %)	4.9	0.0 to 37.5	36
Clay (wt. %)	4.8	0.0 to 65.9	36
CaCO ₃ (wt. %)	6.7	0.5 to 32.3	36
Organic carbon (wt. %)	0.8	0.2 to 2.2	15
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	15
Mean grain size, total sample (Ø)	2.9	0.8 to 7.1	36
Standard deviation, total sample (Ø)	1.4	0.5 to 2.7	36
Skewness, total sample	0.5	-1.3 to 2.3	36
Kurtosis, total sample	11.1	-1.3 to 43.4	36
Mean grain size, noncarbonate fraction (Ø)	3.1	1.9 to 3.8	34
Standard deviation, noncarbonate fraction (Ø)	1.6	0.7 to 2.5	34
Mean grain size, carbonate fraction (Ø)	-0.6	-2.5 to 1.8	33
Standard deviation, carbonate fraction (Ø)	1.6	0.4 to 3.1	33

Namalycastis abiuma (Muller, in Grube, 1871)
(Described and illustrated by Hartman, 1959)

This species was not collected at survey stations, but was taken in the high, intertidal zone from mangrove peat and debris in Old Tampa Bay (Mobbly Bay) and lower Boca Ciega Bay (eastern side of Tierra Verde Island).

N. abiuma has been recorded from the Gulf, and according to Hartman (1959) it probably inhabits warm seas throughout the world.

Nereis arenaceodentata Moore, 1903
(Described and illustrated by Pettibone, 1963a)

Collections were made in Old Tampa Bay, upper Tampa Bay, Boca Ciega Bay, Terra Ceia Bay, and lower Tampa Bay at 71 survey stations. Six incidental collections came from Boca Ciega and lower Tampa Bays. Most collections were made in Boca Ciega Bay, where at one station (D-2) 342 specimens were found in a single dredge haul (table 95).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand composed of about 10 percent shell, and containing little silt and clay, and less than one percent organic carbon (table 96).

More than one-half of these stations were vegetated with a variety of algae, and some contained a mixture of sea grasses as well.

Specimens with mature gametes were collected in February, March, April, May, September, and November. Juveniles were found in May, October, and November.

N. arenaceodentata has world-wide distribution in warm and temperate waters where it is generally associated with coarse sediments and sessile bottom organisms. This

species has been recorded in the Gulf of Mexico, and in Tampa Bay, it has been implicated in shell blister formation in the quahog clam, Mercenaria campechiensis.

Table 95.--Nereis arenaceodentata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
5-7	2						
Upper Tampa Bay							
D	1			12-7	4		
10-2	1			13-1-A		12	
12-1		3		13-1-B		3	
Boca Ciega Bay							
BC-C		4		PB-4	166	178	7
BC-G		9		PB-5	6		
BC-I	1			14-4	3		
BC-M	23		10	15-1	9		
BC-N	14			15-2		15	
D-1	6		5	15-4	2		
D-2	342		2	15-6	1		
D-3		66		15-11	15		5
D-5			10	15-12	12		13
D-6		3		15-13	10		1
D-9	24			15-14	1		
D-11		1		15-15	209		7
D-12		6		15-16	3		
D-13	1		3	15-17	10		
D-17	2		2	16-1		9	
D-18		2		16-3		39	
D-23		1		16-4		115	
D-24			9	16-5		78	
D-25		7		16-7	72		
PB-1			1	16-8		23	2
Terra Ceia Bay							
E-4	1			E-6	3		

Table 95.--Nereis arenaceodentata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	7			16-9-A	18		
14-6	4			16-9-B	23		
14-9			4	16-16	1		
14-16			3	16-24	1		
14-20		1		16-25		30	
15-18	39		1	16-26		12	
15-19	1			16-28		1	
15-20	1			17-8	4		
15-21	1			17-12	1		
15-33		1		17-14	4		
16-9		5	1	17-15		19	

Table 96.--Nereis arenaceodentata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.8	13.0 to 31.0	72
Salinity (‰)	31.5	22.4 to 35.1	72
pH	8.1	7.7 to 8.5	70
Depth (m.)	0.7	1 to 2.3	72
Sediment type	sand	shelly sand to silty sand	70
Granules (wt. %)	3.2	0.0 to 21.4	70
Sands (wt. %)	92.7	72.5 to 99.5	70
Silts (wt. %)	3.3	0.0 to 22.8	70
Clay (wt. %)	0.8	0.0 to 5.2	69
CaCO ₃ (wt. %)	10.1	0.9 to 50.5	70
Organic carbon (wt. %)	0.7	0.0 to 6.9	55
Organic nitrogen (wt. %)	0.04	0.00 to 0.19	55
Mean grain size, total sample (Ø)	2.5	0.5 to 4.1	70
Standard deviation, total sample (Ø)	1.3	0.6 to 2.5	70
Skewness, total sample	0.1	-1.7 to 1.9	70
Kurtosis, total sample	9.1	-0.4 to 35.0	69
Mean grain size, noncarbonate fraction (Ø)	2.9	1.9 to 3.9	64
Standard deviation, noncarbonate fraction (Ø)	2.0	0.5 to 3.9	64
Mean grain size, carbonate fraction (Ø)	0.2	-2.5 to 2.5	58
Standard deviation, carbonate fraction (Ø)	1.2	0.1 to 2.9	58

Nereis pelagica occidentalis Hartman, 1945

This nereid was not found in Hillsborough or Terra Ceia Bays, but occurred in all other areas of the Estuary at a total of 69 survey and 13 incidental stations. As with N. arenaceodentata, the population center appeared to be Boca Ciega Bay. The worm was especially abundant in Bunces Pass (BC-N) where 123 individuals were collected in one dredge haul (table 97).

Sediment analyses showed that the worm was found mostly in poorly sorted, fine sand that contained less than 10 percent shell, about four percent silt and clay, and less than one percent organic carbon (table 98).

One-half of the dredge and shovel stations contained algae and some had shoal grass, turtle grass, and manatee grass.

Epitokes were found in April, May, July, August, September, October, and November, while juveniles were collected in February, May, July, August, September, October, November, and December.

N. p. occidentalis has been collected along the south Atlantic seaboard from North Carolina to the Gulf of Mexico.

Table 97.--*Nereis pelagica occidentalis*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
3-17			1	6-4-A	1		
5-1-A	1			6-7-A		1	
Upper Tampa Bay							
D	1		1	10-6			1
10-1-A		13		11-1			2
10-2	2			11-3	5		2
10-3			43	12-1		2	
10-4			1	13-1-A		1	
10-5			1	13-2	1		
Boca Ciega Bay							
BC-A	8		6	D-26		10	
BC-C		46		PB-1			25
BC-G		2		PB-4	47	2	71
BC-I	3		2	PB-5			184
BC-M	13		82	14-4	5		
BC-N	123		22	15-1			20
D-2	23		66	15-3	11	8	1
D-3			46	15-4	1		
D-4			1	15-6			10
D-6		1		15-11			6
D-8			1	15-12			1
D-12		2		15-14	1		
D-17	1		12	15-17			1
D-18		64		16-1		28	1
D-19-A		2	3	16-2			6
D-22	2		18	16-5		1	
D-23		1	4	16-6	1		1
D-25		36	22	16-8		7	2

Table 97.--Nereis pelagica occidentalis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	3		1	16-9-A		8	
14-6	3		3	16-9-B		78	
14-17	1		1	16-10	12		82
15-18			1	16-11	10		7
15-20	26			16-25		2	
15-21	5			17-8	1		
15-28	1			17-12	3		
15-32	4			18-3	3		
16-9		1	4				

Table 98.--Nereis pelagica occidentalis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.4	15.0 to 33.2	59
Salinity (‰)	31.0	22.4 to 35.1	59
pH	8.1	7.1 to 8.5	58
Depth (m.)	0.8	1 to 3.0	59
Sediment type	sand	shelly sand to silty sand	57
Granules (wt. %)	3.1	0.0 to 21.4	57
Sands (wt. %)	92.4	69.9 to 99.9	57
Silts (wt. %)	3.0	0.0 to 15.8	57
Clay (wt. %)	1.1	0.0 to 14.3	56
CaCO ₃ (wt. %)	10.6	1.1 to 38.2	57
Organic carbon (wt. %)	0.8	0.01 to 6.9	39
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	39
Mean grain size, total sample (Ø)	2.4	0.8 to 4.3	57
Standard deviation, total sample (Ø)	1.3	0.5 to 2.5	57
Skewness, total sample	0.0	-1.7 to 1.7	57
Kurtosis, total sample	9.7	-0.2 to 41.2	56
Mean grain size, noncarbonate fraction (Ø)	3.2	1.9 to 8.4	51
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 2.8	51
Mean grain size, carbonate fraction (Ø)	0.4	-2.5 to 3.0	44
Standard deviation, carbonate fraction (Ø)	1.2	0.6 to 2.8	44

Nereis succinea (Frey and Leuckart, 1847)
(Described and illustrated by Pettibone, 1963a)

One of the truly ubiquitous species in Tampa Bay, N. succinea was collected in all areas at 233 survey stations and 19 incidental localities. Large collections of over 30 specimens per dredge haul were taken in all areas of the Estuary except lower Tampa Bay, and there it was not unusual to capture more than five at a station (table 99).

Average sediment at dredge and shovel stations was poorly sorted, fine sand that contained 10 percent shell, over five percent silt and clay, and less than one percent organic carbon. Nearly four percent of the shell was in the granule size range (table 100).

Forty-four percent of the bottom samples contained vegetation that consisted of algae, and one or more species of all the sea grasses found in the Estuary.

Epitokes were collected in February, April, June, July, August, September, October, November, and December. Juveniles were recorded in April, May, June, July, August, September, October, November, and December.

N. succinea has been collected on the California coast and on both sides of the Atlantic in temperate and tropical waters. It is well known in the Gulf of Mexico.

Table 99.--*Nereis succinea*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	2		10	4-3			3
A-1		31	2	4-4	1		1
A-3		65		4-5	1		
A-5		3		4-6	7		1
B	32		5	4-7	5		2
B-1		22	3	4-8	2		2
B-2		11	5	4-9 ⁿ	10		
B-3		15		4-10			4
1-1		4		4-11	3		14
1-2	3		1	4-12	2		1
1-3	5		11	4-13	1		2
1-4	3		18	4-14			1
1-5	14		23	4-15			1
2-1		7		4-16	2		8
2-2	6		14	4-18-A			6
2-3	3		5	4-19	3		25
2-4	5			5-1-A		2	1
2-5	2			5-2	15		5
3-1-A			147	5-3	8		1
3-2	1			5-4	19		
3-8	1			5-5	1		
3-10	1			5-11	1		
3-11	1			5-12	3		
3-12	5		3	6-1-A		6	2
3-13	4		1	6-1-C		7	
3-14		4	16	6-1-D		74	
3-15		3	2	6-2	16		63
3-16		1		6-3	1		91
3-17		5		6-4-A	3		1
4-1		3		6-5	3		
4-2			5	6-8		1	

Table 99.--Nereis succinea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Hillsborough Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
C			33	8-8			42
C-2	71		71	8-9	27		21
C-3	96		212	9-2			37
C-4		23		9-3	40		141
C-5	4		3	9-4	27		18
C-6			2	9-7			4
C-7		2		9-8			5
C-8-1		4		9-9	1		11
C-8-2		3		10-15	24		59
C-9		8		10-16	9		23
7-1			1	10-18		44	
7-3	1			10-19	1		13
8-2			47	10-20	1		
8-3			2	10-22	74		340
8-6		142		10-23		5	68
8-7			7				

Table 99.--Nereis succinea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D	3			11-28	12		
10-0		2		11-28-1	297		
10-1-A		4		11-28-2	43		
10-3		1	39	12-1	1		
10-4	21		25	12-2			4
10-5	2			12-3	1		1
10-6	9		16	12-4	1		
10-7	2			12-5	7		1
10-9	3		3	12-6	5		
10-10	12		25	12-7	9		3
10-11	5		5	12-8	9		
10-12	8			12-9	18		
10-13	16		1	12-10	9		2
10-14-A	16	52		12-11	15		
11-3	3		6	12-12	6		
11-4	4		10	12-14	23		
11-5	2			12-15	7		2
11-6	2			12-16	17		2
11-15	7			13-1-A		4	
11-16	2		9	13-4	1		
11-20			11	13-5	22		1
11-21			5	13-6	10		
11-22	2		15	13-7	13		
11-23	22		20	13-8	1		1
11-24	34		89	13-9	2		
11-25	64		19	13-10	1		4
11-26	58		17	13-12	3		1
11-27	30		20	13-13		22	

Table 99.--*Nereis succinea*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-A	15		28	PB-4			10
BC-E	8			PB-5			39
BC-G		1		14-2	9		5
BC-I	28		10	14-3			26
BC-M	2		6	14-4	21		5
BC-N	268		39	15-1			6
D-1			1	15-4			6
D-2	1			15-5			1
D-8			2	15-6			3
D-11		1		15-8	2		1
D-15			6	15-11			9
D-17			4	15-12	1		1
D-18		24		15-14	2		
D-22			14	16-1			1
D-25			1	16-6	1		6
D-26		1		16-8		4	
PB-1	1		12				
Terra Ceia Bay							
E-1	74		387	E-5			5
E-2		44		E-6	36	88	
E-3	23		151	E-7	72		1
E-4	1		5	E-8			4

Table 99.--*Nereis succinea*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	1		3	16-11	13		5
14-6			4	16-14			2
14-8	4			16-15			1
14-9	6			16-17			14
14-10	16			16-19	1		2
14-11	3			16-20	1		40
14-12	2			16-21	3		11
14-13	5			16-22			2
14-15	4			16-26		8	
14-16	5		3	16-27	8		2
14-17			3	17-2	7		5
14-19		3		17-5			28
14-20		1		17-6	3		36
15-21	4		1	17-7	1		7
15-22	6			17-8	9		
15-23	1		6	17-9	3		8
15-25			1	17-11		1	
15-26	1		3	17-12			1
15-27			3	17-13			1
15-31			5	17-15			4
16-9		1		18-4			1
16-10	16		44				

Table 100.--Nereis succinea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.6	12.8 to 34.1	185
Salinity (‰)	26.1	1.2 to 35.1	184
pH	7.9	7.1 to 8.5	165
Depth (m.)	1.0	1 to 4.0	185
Sediment type	sand	shelly sand to sandy clay	180
Granules (wt. %)	3.7	0.0 to 79.7	179
Sands (wt. %)	90.2	8.6 to 100	179
Silts (wt. %)	3.3	0.0 to 53.1	179
Clay (wt. %)	2.3	0.0 to 65.9	178
CaCO ₃ (wt. %)	12.0	0.6 to 95.0	178
Organic carbon (wt. %)	0.8	0.03 to 8.5	115
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	115
Mean grain size, total sample (Ø)	2.5	-4.0 to 7.6	178
Standard deviation, total sample (Ø)	1.3	0.5 to 3.8	178
Skewness, total sample	0.6	-1.7 to 3.6	178
Kurtosis, total sample	11.8	-1.5 to 76.3	177
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 9.0	175
Standard deviation, noncarbonate fraction (Ø)	1.5	0.4 to 3.4	175
Mean grain size, carbonate fraction (Ø)	-0.3	-2.6 to 3.0	158
Standard deviation, carbonate fraction (Ø)	1.3	0.02 to 3.1	158

Nicon lackeyi Hartman, 1958

Individuals were collected by net at two stations in Hillsborough Bay, and by net and shovel at two stations in upper Tampa Bay (table 101).

The only available sediment data came from station 11-2 where the bottom was moderately sorted, fine sand that contained about two percent organic carbon (table 102).

No vegetation was noted at this station.

One gravid individual was collected in September, and a juvenile was taken in August.

This unusual worm was previously known only from a warm, mineral spring that enters the Myakka River near U. S. Highway 41 in Sarasota County, Florida. This report is the first record for the Gulf of Mexico.

Table 101.--Nicon lackeyi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Hillsborough Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
C-3		1			9-9		2		
Upper Tampa Bay									
11-1		25			11-2		1		

Table 102--Nicon lackeyi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.5	--	1
Salinity (‰)	24.2	--	1
pH	7.9	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	0.1	--	1
Sands (wt. %)	99.3	--	1
Silts (wt. %)	0.4	--	1
Clay (wt. %)	0.3	--	1
CaCO ₃ (wt. %)	1.3	--	1
Organic carbon (wt. %)	1.6	--	1
Organic nitrogen (wt. %)	0.3	--	1
Mean grain size, total sample (Ø)	2.5	--	1
Standard deviation, total sample (Ø)	0.8	--	1
Skewness, total sample	0.5	--	1
Kurtosis, total sample	12.7	--	1
Mean grain size, noncarbonate fraction (Ø)	8.1	--	1
Standard deviation, noncarbonate fraction (Ø)	2.5	--	1
Mean grain size, carbonate fraction (Ø)	--	--	--
Standard deviation, carbonate fraction (Ø)	--	--	--

Perinereis floridana (Ehlers, 1868)
(Described by Hartman, 1951)

Collections came from two survey stations in Old Tampa Bay and one in Boca Ciega Bay. Incidental collections were limited to two localities in Boca Ciega Bay and a single one in lower Tampa Bay (table 103).

Although sediment data is meagre, it is probably representative for the species as all collections came from oyster reefs or areas nearby (table 104).

Algae and shoal grass were recorded at one station.

A sexually mature specimen was collected in August, but no juveniles were found.

P. floridana is apparently associated with shell and other bottom debris, and has been collected only in the eastern Gulf of Mexico from the Florida keys north to Seahorse Key, Florida.

Table 103.--Perinereis floridana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
A-1		17			6-1-D		1		
Boca Ciega Bay									
16-8		1							

Table 104.--Perinereis floridana--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.0	28.0 to 30.0	2
Salinity (‰)	25.0	24.1 to 25.9	2
pH	7.6	7.1 to 8.0	2
Depth (m.)	0.3	--	2
Sediment type	sand	shelly sand to sand	2
Granules (wt. %)	17.2	0.0 to 34.5	2
Sands (wt. %)	78.4	58.0 to 98.8	2
Silts (wt. %)	2.6	0.3 to 5.0	2
Clay (wt. %)	1.8	0.9 to 2.6	2
CaCO ₃ (wt. %)	9.5	0.9 to 18.1	2
Organic carbon (wt. %)	0.7	--	1
Organic nitrogen (wt. %)	0.1	--	1
Mean grain size, total sample (Ø)	1.7	0.6 to 2.8	2
Standard deviation, total sample (Ø)	2.3	0.8 to 3.8	2
Skewness, total sample	1.0	-0.1 to 2.2	2
Kurtosis, total sample	14.7	-0.7 to 30.1	2
Mean grain size, noncarbonate fraction (Ø)	3.2	2.9 to 3.6	2
Standard deviation, noncarbonate fraction (Ø)	1.9	1.6 to 2.3	2
Mean grain size, carbonate fraction (Ø)	-0.8	-0.9 to -0.7	2
Standard deviation, carbonate fraction (Ø)	2.1	1.3 to 2.8	2

Platynereis dumerilii (Audouin and Milne-Edwards, 1833)
(Described and illustrated by Pettibone, 1963a)

This nereid is commonly associated with bottom vegetation and was found in all areas of the Estuary at a total of 48 survey stations, and three incidental localities in Boca Ciega Bay and upper Tampa Bay (table 105).

The 12 dredge and shovel samples all contained more than 80 percent sand that was mostly fine and poorly sorted. Few large shell particles were present and the percentages of silt, clay and organic carbon were low (table 106).

Eight of the bottom samples contained algae and some also had shoal, turtle, manatee, and widgeon grass.

Gravid specimens were collected in May, June, September, and November. Juveniles were found in May, July, August, September, October, November, and December.

P. dumerilii has been reported from the Gulf of Mexico, and from warm and temperate seas in many other areas throughout the world.

Table 105.--Platynereis dumerilii--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
1-2			1	5-2			1
2-2			4	6-1-A			1
2-3			4	6-1-C		4	
3-13			1	6-3			1
4-1			1	6-4-A			5
Hillsborough Bay							
8-4			2	10-19			1
Upper Tampa Bay							
10-1-A		1	1	10-10			2
10-2			1	12-11			1
10-4			1	13-2			6
Boca Ciega Bay							
BC-M	1		2	16-1		12	
BC-N	1			16-2			10
D-25		3	42	16-4			1
PB-4	5		30	16-5			1
14-4			2	16-6			1
15-14			1	16-8			1
15-16	2		1				
Terra Ceia Bay							
E-8			2				

Table 105.--Platynereis dumerilii--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5			5	16-10			1
14-9			2	16-26		1	
14-17			1	17-1		2	
14-18			1	17-2	5		
15-18			1	17-12			1
15-20	1			17-13			1
15-29			1	17-15			1
16-9			1	18-3			1

Table 106.--Platynereis dumerilii--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.5	17.4 to 31.0	12
Salinity (‰)	30.8	24.1 to 34.5	12
pH	8.1	7.7 to 8.4	11
Depth (m.)	0.6	1 to 4.0	12
Sediment type	sand	--	11
Granules (wt. %)	2.4	0.0 to 14.7	11
Sands (wt. %)	94.2	83.5 to 99.9	11
Silts (wt. %)	2.4	0.0 to 6.9	11
Clay (wt. %)	0.8	0.0 to 2.5	11
CaCO ₃ (wt. %)	11.5	1.2 to 39.8	11
Organic carbon (wt. %)	0.7	0.2 to 2.0	9
Organic nitrogen (wt. %)	0.1	0.02 to 0.3	9
Mean grain size, total sample (Ø)	2.5	1.4 to 3.0	11
Standard deviation, total sample (Ø)	1.2	0.5 to 1.9	11
Skewness, total sample	0.5	-1.4 to 1.6	11
Kurtosis, total sample	8.8	0.9 to 19.0	11
Mean grain size, noncarbonate fraction (Ø)	3.0	1.9 to 4.2	10
Standard deviation, noncarbonate fraction (Ø)	1.6	0.7 to 3.2	10
Mean grain size, carbonate fraction (Ø)	0.3	-1.8 to 2.3	10
Standard deviation, carbonate fraction (Ø)	0.9	0.2 to 1.4	10

Rullierinereis mexicana (Treadwell, 1942)
(Described and illustrated by Pettibone, in press)

Two specimens were collected by net at station D-25 in Boca Ciega Bay, and over 50 were taken at an incidental station nearby (table 107).

No data on sediment type or bottom vegetation are available.

The worms were swarming at the surface when collected on the evening of April 4, 1968. Both epitokous males and females were present in the mating swarm.

R. mexicana is otherwise known only from the Pacific Ocean.

Table 107.--Rullierinereis mexicana--Locality records
and number of individuals from survey stations,
Tampa Bay, Florida, 1963-69 (D-dredge, S-
shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
			D	S	N	
D-25					2	

Family NEPHTYIDAE Grube, 1850

The nephtyids have been regarded as both predatory and omnivorous feeders that actively burrow in predominantly sandy sediments throughout the world.

Four species were found in Tampa Bay. Two of these, Aglaothamus verrilli and Nephtys picta were collected in all six areas of the Estuary, while Nephtys bucera was taken in Boca Ciega Bay and lower Tampa Bay. Nephtys magellanica was taken only in Boca Ciega Bay.

Key to NEPHTYIDAE Collected in Tampa Bay

- 1 Parapodial branchiae curved inward toward the body Aglaothamus verrilli
- Parapodial branchiae curved outward away from the body 2
- 2 Eyes present; branchial filament short, about twice the length of the branchial cirrus Nephtys magellanica
- Eyes absent; tentacular cirri arise from center of the tentacular segment; short lobe present above the branchial cirrus Nephtys bucera
- Eyes absent; tentacular cirri arise from the anterior half of the tentacular segment; short lobe present below the branchial cirrus... Nephtys picta

Aglaothamus verrilli (McIntosh, 1885)
(Described and illustrated by Pettibone, 1963a)

Specimens were collected at 83 survey stations in all six areas of the Estuary, and one incidental locality

on an extensive sand bar south of Gandy Bridge in Old Tampa Bay (table 108). Large collections of over 20 individuals per dredge haul were made in Old Tampa Bay, and upper and lower Tampa Bay. The greatest number (135) came from station 11-5 in upper Tampa Bay.

Although average sediment type proved to be poorly sorted, fine sand, specimens were also found in areas of silty sand and silty mud. The sand size category was about 12 percent shell, average content of silt and clay was five percent, and organic carbon was less than one percent. No specimens were captured by shovel, six were taken by net, and the remainder came from dredge hauls in water generally deeper than 1m. (table 109).

Twenty-five of the dredge samples contained vegetation that included algae, and shoal and turtle grass.

No specimens with mature gametes were noted, but juveniles were collected in June through December.

This species has been reported from the central and eastern Pacific, and along the Atlantic coast from Maryland to Georgia and the Gulf of Mexico.

Table 108.--Aglaophamus verrilli--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
1-2	1			4-12	1		
3-3	1			4-14	3		
3-8	3			4-16	18		
3-9	10			4-17-A	8		
3-10	3			4-18-A	3		
3-11	30			5-5	2		
3-12	13			5-10	1		
4-11	1			6-6	1		
Hillsborough Bay							
10-15	10			10-19	1		
10-17	5						
Upper Tampa Bay							
10-4	2			11-27	1		
10-6	9			12-2	4		
10-7	54			12-3	2		
10-8	20			12-4	21		
10-9	36			12-5	1		
10-10	1			12-7	1		
11-4	55		5	12-12	1		
11-5	135			12-14	49		
11-6	18			12-16	3		
11-7	1			13-7	2		
11-9	1			13-10	1		
11-16	1			13-12	1		
11-17	1						

Table 108.--Aglaophamus verrilli--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	2			14-3	7		
BC-A-1	1			15-6	2		
BC-E	5			15-11	3		
D-22	1			15-13	2		
PB-1	1			15-14	3		
PB-5	2			16-6	16		
Terra Ceia Bay							
E-4	1			E-5	11		
Lower Tampa Bay							
14-6	2			16-22	3		
14-7	1			16-23	3		
14-8	3			17-2	2		
14-9	5			17-5	46		
14-10	28			17-6	21		
14-13	15			17-7	25		
14-14	1			17-8	42		
14-17	3			17-9	4		
15-22	1			17-10	6		
16-10	32			17-12	4		
16-11	5			17-15			1
16-20	5			18-4	7		
16-21	5						

Table 109.--Aglaophamus verrilli--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	13.0 to 33.8	84
Salinity (‰)	28.0	20.5 to 34.6	84
pH	8.0	7.0 to 8.9	77
Depth (m.)	1.5	1 to 4.0	84
Sediment type	sand	sand to silty mud	84
Granules (wt. %)	1.6	0.0 to 12.6	84
Sands (wt. %)	93.2	31.9 to 100	84
Silts (wt. %)	3.3	0.0 to 45.3	84
Clay (wt. %)	1.7	0.0 to 22.0	84
CaCO ₃ (wt. %)	12.2	0.7 to 58.4	84
Organic carbon (wt. %)	0.7	0.1 to 8.5	64
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	64
Mean grain size, total sample (Ø)	2.6	1.6 to 5.9	84
Standard deviation, total sample (Ø)	1.2	0.4 to 2.7	84
Skewness, total sample	0.6	-1.4 to 3.6	84
Kurtosis, total sample	14.2	-0.9 to 96.3	84
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 9.0	81
Standard deviation, noncarbonate fraction (Ø)	1.4	0.5 to 3.2	81
Mean grain size, carbonate fraction (Ø)	-0.1	-2.5 to 3.0	70
Standard deviation, carbonate fraction (Ø)	1.3	0.3 to 3.1	70

Nephtys bucera Ehlers, 1868
(Described and illustrated by Pettibone, 1963a)

A single specimen was taken by dredge at station BC-N in Boca Ciega Bay and others were dug by shovel near Mullet Key in lower Tampa Bay (table 110).

Unfortunately, sediment data for the dredge station are not available. Other environmental factors, however, are presented (table 111).

None of the specimens were gravid, and no juveniles were collected.

N. bucera is known from the Atlantic seaboard between Canada and North Carolina, and in the Gulf of Mexico.

Table 110.--Nephtys buccera--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
BC-N		1							

Table 111.--Nephtys buccera--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.4	--	1
Salinity (‰)	34.0	--	1
pH	8.0	--	1
Depth (m.)	2.3	--	1
Sediment type	--	--	--
Granules (wt. %)	--	--	--
Sands (wt. %)	--	--	--
Silts (wt. %)	--	--	--
Clay (wt. %)	--	--	--
CaCO ₃ (wt. %)	--	--	--
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (Ø)	--	--	--
Standard deviation, total sample (Ø)	--	--	--
Skewness, total sample	--	--	--
Kurtosis, total sample	--	--	--
Mean grain size, noncarbonate fraction (Ø)	--	--	--
Standard deviation, noncarbonate fraction (Ø)	--	--	--
Mean grain size, carbonate fraction (Ø)	--	--	--
Standard deviation, carbonate fraction (Ø)	--	--	--

Nephtys magellanica Augener, 1912
(Described and illustrated by Hartman, 1968)

A single specimen, in poor condition, was collected at station BC-N in Boca Ciega Bay (table 112).

The sediment there was over 95 percent moderately sorted sand, of which better than 25 percent was shell (table 113).

No vegetation was recorded at the collection site.

Neither gravid nor juvenile specimens were collected.

N. magellanica, as far as I know, has been collected previously only in the eastern Pacific and in the Gulf of Mexico at Seahorse Key, Florida.

Table 112.--Nephtys magellanica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-N	1						

Table 113.--Nephtys magellanica--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	15.0	--	1
Salinity (‰)	31.3	--	1
pH	7.9	--	1
Depth (m.)	2.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	4.2	--	1
Sands (wt. %)	95.8	--	1
Silts (wt. %)	0.6	--	1
Clay (wt. %)	0.0	--	1
CaCO ₃ (wt. %)	25.9	--	1
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (Ø)	1.5	--	1
Standard deviation, total sample (Ø)	0.8	--	1
Skewness, total sample	-1.7	--	1
Kurtosis, total sample	0.3	--	1
Mean grain size, noncarbonate fraction (Ø)	--	--	--
Standard deviation, noncarbonate fraction (Ø)	--	--	--
Mean grain size, carbonate fraction (Ø)	--	--	--
Standard deviation, carbonate fraction (Ø)	--	--	--

Nephtys picta Ehlers, 1868
(Described and illustrated by Pettibone, 1963a)

N. picta was collected at 38 survey stations in all six areas of the Estuary (table 114). The area of greatest abundance was Old Tampa Bay where 10 or more individuals were collected in a dredge haul at two locations.

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that contained little shell, less than five percent silt and clay, and less than one percent organic carbon. No specimens were found in soft sediments (table 115).

Nine of the bottom samples contained vegetation. A mixture of algae was present, and shoal grass occurred at two.

A gravid specimen was collected in October and a juvenile was found in June.

This worm is common on the Atlantic coast from Massachusetts to South Carolina. It had been collected in the Gulf of Mexico prior to this survey.

Table 114.---*Nephtys picta*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
B	2			4-9	2		
1-4	3			4-12	8		
3-3	1			4-14	13		
3-8	6			4-15	3		
3-9	6			4-16	2		
3-11	10			4-17-A	9		
3-12	5			4-18-A	1		
3-16		1		4-19	4		
4-7	1			5-2	1		
4-8	3			5-3	1		
Hillsborough Bay							
C-2	1			10-22	1		
Upper Tampa Bay							
10-4	4			12-6	1		
11-5	1			12-9	1		
11-6	4			12-14	1		
11-20			1				
Boca Ciega Bay							
14-2	1						
Terra Ceia Bay							
E-1			1				

Table 114.--Nephtys picta--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-14	1			17-6	2		
16-15	1			17-7	1		
16-22	1			18-3	2		
16-27	1						

Table 115.--Nephtys picta--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.0	15.5 to 31.5	36
Salinity (‰)	25.6	18.5 to 33.8	36
pH	8.0	7.1 to 8.3	30
Depth (m.)	1.5	1 to 3.0	36
Sediment type	sand	shelly sand to sand	36
Granules (wt. %)	1.4	0.0 to 20.8	36
Sands (wt. %)	94.5	77.4 to 99.3	36
Silts (wt. %)	2.3	0.3 to 9.1	36
Clay (wt. %)	1.9	0.2 to 6.3	36
CaCO ₃ (wt. %)	8.0	0.8 to 57.4	36
Organic carbon (wt. %)	0.7	0.1 to 2.2	21
Organic nitrogen (wt. %)	0.1	0.0 to 0.2	21
Mean grain size, total sample (Ø)	2.6	0.9 to 3.4	36
Standard deviation, total sample (Ø)	1.3	0.7 to 2.0	36
Skewness, total sample	1.0	-0.3 to 2.2	36
Kurtosis, total sample	12.3	-0.03 to 41.2	36
Mean grain size, noncarbonate fraction (Ø)	3.3	1.9 to 9.0	36
Standard deviation, noncarbonate fraction (Ø)	1.6	0.6 to 3.4	36
Mean grain size, carbonate fraction (Ø)	-0.5	-2.5 to 2.2	33
Standard deviation, carbonate fraction (Ø)	1.3	0.8 to 2.3	33

Family GLYCERIDAE Grube, 1850

Worms of this family burrow in sand or softer sediments, and their diet includes polychaetes and other small, soft bodied, invertebrates as well as detritus. They have world-wide distribution in seas at all latitudes.

Two species were found in Tampa Bay. Glycera americana was found throughout the Estuary, but the less common, Glycera dibranchiata, was collected only in lower Tampa Bay.

Key to GLYCERIDAE Collected in Tampa Bay

- 1 Retractable, branched branchiae arise on the dorso-lateral body wall near the bases of parapodia Glycera americana
- Non-retractile branchiae arise as a pair of simple lamellae above and below setigerous lobes of parapodia Glycera dibranchiata

Glycera americana Leidy, 1855

(Described and illustrated by Pettibone, 1963a)

Specimens were collected at 129 survey stations in all six areas of the Estuary and at incidental localities in Old Tampa Bay (4) Boca Ciega Bay (2) and lower Tampa Bay (1). The major center of abundance was Old Tampa Bay where 10 or more individuals were collected in a single dredge haul at 34 stations. The greatest number in a single collection (122) came from station 4-15 (table 116).

Sediment data from dredge and shovel stations show that the worm was most commonly found in poorly sorted, fine sand, but many also occurred in extremely fine sediments. As an average, shell comprised about 10 percent of the sand size particles, and was also present in larger particle classes. The silt and clay content was over five percent, and organic carbon was under one percent (table 117).

About one-third of the dredge and shovel stations were vegetated with algae, and also present at some were manatee, shoal, turtle, and widgeon grass.

A gravid specimen was collected in October, and juveniles were noted in February, June, July, August, October, November, and December.

G. americana is a temperate or tropical species that has been recorded from the central and eastern Pacific, the western Atlantic, and the Gulf of Mexico.

Table 116.--*Glycera americana*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	10			4-2	25		
A-1		2		4-3			1
A-2		2		4-4	1		
A-5		1		4-5	23		
A-6		3		4-6	43		
B	30		1	4-7	23		1
B-1		1		4-8	19		
B-2		2		4-9	26		
B-3		2		4-10	8		
1-2	12			4-11	14		
1-3	33		12	4-12	29		
1-4	85		40	4-13	25		1
1-5	42		12	4-14	13		
2-1		6		4-15	122		1
2-2	7			4-16	14		
2-3	6			4-17-A	17		
2-4	20			4-18-A	5		
2-5	8			4-19	5		1
3-1-A		1	1	5-1-A	3		1
3-2	22			5-2	13		
3-3	32			5-3	13		
3-4	17		12	5-4	17		
3-5	11		24	5-5	17		
3-6	8			5-6	4		
3-7	16			5-7	1		
3-8	50			5-8	1		
3-9	39			5-11	1		
3-10	6			5-13	1		
3-11	30		1	6-1-A		2	
3-12	44			6-1-B		2	
3-13	10			6-1-C		4	
3-14		3		6-1-D		1	
3-15		7	1	6-2	3		
3-16		7		6-3	6		
3-17		1		6-4-A	1		
4-1		12		6-7-A		8	

Table 116.--Glycera americana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Hillsborough Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
C-3	12			9-4	3		
C-7		2		10-15	1		
9-3	7			10-22	6		
Upper Tampa Bay							
10-3		4		12-3	2		
10-4	1			12-11	2		
10-12	2			13-1-A		3	
10-14-A	1			13-4	1		
11-6	2			13-12	4		
Boca Ciega Bay							
BC-A			1	D-25		3	3
BC-E	1			PB-1	26		
BC-G		1		PB-4	6	10	
BC-H	8			PB-5	7		
BC-I	1		1	14-3	10		
BC-M	1			14-4	12		
BC-N	29			15-4	1		
D-7	1			15-14	1		
D-11	3	8		16-6	2		
D-23		1					
Terra Ceia Bay							
E-1	1			E-4	1		
E-2		1		E-5	1		
E-3	1		2	E-6	1		

Table 116.--Glycera americana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	9			16-14	18		
14-6	9			16-16	1		
15-26	1			16-25		1	
15-28	1			17-2	7		
16-9-A		1		17-3	13		1
16-9-B		1		17-6	1		
16-10	1			17-8	3		
16-12			1	18-3	3		

Table 117.--Glycera americana--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.5	13.0 to 33.8	139
Salinity (‰)	27.1	16.4 to 35.1	139
pH	7.9	7.0 to 8.5	113
Depth (m.)	1.0	1 to 4.0	139
Sediment type	sand	shelly sand to silt	137
Granules (wt. %)	2.7	0.0 to 79.7	137
Sands (wt. %)	90.4	5.5 to 99.8	137
Silts (wt. %)	4.0	0.0 to 89.4	137
Clay (wt. %)	2.8	0.0 to 65.9	137
CaCO ₃ (wt. %)	9.9	0.6 to 95.0	137
Organic carbon (wt. %)	0.8	0.01 to 6.9	72
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	72
Mean grain size, total sample (Ø)	2.6	-4.4 to 7.1	137
Standard deviation, total sample (Ø)	1.3	0.5 to 3.8	137
Skewness, total sample	0.8	-1.7 to 3.6	137
Kurtosis, total sample	12.7	-0.7 to 76.3	136
Mean grain size, noncarbonate fraction (Ø)	3.2	1.9 to 7.1	124
Standard deviation, noncarbonate fraction (Ø)	1.6	0.3 to 3.2	124
Mean grain size, carbonate fraction (Ø)	-0.4	-2.6 to 2.5	116
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	116

Glycera dibranchiata Ehlers, 1868
(Described and illustrated by Pettibone, 1963a)

A single specimen was collected at one station (15-21) in lower Tampa Bay (table 118).

The sediment at this station was nearly all poorly sorted, medium sand with a few large shell particles. The percentages of silt and clay, and organic carbon, were less than one (table 119).

No vegetation was recorded from the dredge sample.

The specimen was mature, but not gravid.

G. dibranchiata is a temperate or tropical species that is well known from east and west coasts of North America, and the Gulf of Mexico.

Table 118.--Glycera dibranchiata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
15-21	1						

Table 119.--Glycera dibranchiata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.2	--	1
Salinity (‰)	31.2	--	1
pH	7.7	--	1
Depth (m.)	1.0	--	1
Sediment type	sand	--	1
Granules (wt. %)	2.7	--	1
Sands (wt. %)	97.0	--	1
Silts (wt. %)	0.2	--	1
Clay (wt. %)	0.1	--	1
CaCO ₃ (wt. %)	7.2	--	1
Organic carbon (wt. %)	0.03	--	1
Organic nitrogen (wt. %)	0.02	--	1
Mean grain size, total sample (Ø)	2.0	--	1
Standard deviation, total sample (Ø)	1.0	--	1
Skewness, total sample	-0.5	--	1
Kurtosis, total sample	6.9	--	1
Mean grain size, noncarbonate fraction (Ø)	1.7	--	1
Standard deviation, noncarbonate fraction (Ø)	0.7	--	1
Mean grain size, carbonate fraction (Ø)	-0.1	--	1
Standard deviation, carbonate fraction (Ø)	1.3	--	1

Family GONIADIDAE Kinberg, 1866

As in the closely related Glyceridae, the Goniadids are active, burrowing polychaetes that probably subsist mainly on detritus, worms, and other small, benthic animals.

Two species, Glycinde pacifica and Goniadella sp. were collected in Tampa Bay. The former was found commonly in all areas of the Estuary, and Goniadella sp. was collected at a few stations in all areas except Hillsborough Bay.

Key to GONIADIDAE Collected in Tampa Bay

- 1 Setae entirely compound Glycinde pacifica
- Setae simple and compound; simple setae
are stout hooks Goniadella sp.

Glycinde pacifica Monro, 1928

This species was collected throughout the Estuary at a total of 185 survey stations and incidental localities in Boca Ciega Bay, upper Tampa Bay, and Old Tampa Bay. Dredge hauls containing 10 or more specimens were taken several times in all areas of the Bay, and as many as 54 per haul came from station C-2 in Hillsborough Bay (table 120).

Although average sediment type was poorly sorted, fine sand, the worm was collected at 14 stations that had

a high percentage of silt and clay, and at five where the bottom was shelly sand. As an average, the silt-clay content of sediments was nearly 12 percent and organic carbon was less than one percent. Shell constituted about nine percent of the sand size particle class, and about two percent was in the granule category (table 121).

One-third of the dredge and shovel stations contained algae, and in addition, some had turtle, shoal, and manatee grass.

Juvenile specimens were collected in May, July, August, September, and November, but no adults with mature gametes were noted.

G. pacifica was originally described from the Panamanian coast near Taboga. As far as I know this report is the first for the Gulf of Mexico.

Table 120.--Glycinde pacifica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	4			4-4	2		6
A-2		1		4-5	7		
A-6		2		4-6	17		1
B	18			4-7	13		8
B-2		3		4-8	11		2
B-3		1		4-9	26		
1-3	6		10	4-10	4		1
1-4	13		45	4-11	17		
1-5	14		8	4-12	22		
2-5	1			4-13	23		9
3-1-A		1		4-14	3		2
3-2	3			4-15	4		15
3-3	1			4-16	8		8
3-4	3		12	4-17-A	9		
3-5	2		36	4-19	14		1
3-6	2		4	5-1-A	1		
3-7	5		5	5-2	6		
3-8	8			5-3	17		
3-9	2			5-4	13		
3-11	7			5-5	4		
3-12	21		2	5-6	5		
3-13	2			6-1-A		4	
3-15		1		6-1-B		1	
3-16		1		6-1-D		1	
4-1		6		6-2	5		
4-2	7		5	6-4-A	24		
4-3	1			6-5	5		

Table 120.--Glycinde pacifica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Hillsborough Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
C			3	9-6			1
C-2	54		1	9-9			1
C-3	3			10-15	6		21
8-2			1	10-16	6		1
8-8			6	10-17	7		1
9-1		2		10-22	6		2
9-3	31		4	10-23		1	
9-4	16		8				
Upper Tampa Bay							
D	1			11-18	1		5
10-4	52			11-19	11		11
10-5	2			11-20	1		26
10-7	1			11-21	1		34
10-8	7			11-22	10		25
10-9	3			11-23	1		1
10-11	1			11-24	2		1
10-12	10			11-25	3		4
10-13	2			11-26	6		2
10-14-A	8			11-27	15		2
11-4	4			11-28		1	
11-6	3			11-28-1		7	
11-7	1	2		12-1		1	
11-8	2	12		12-14	11		3
11-9	12	9		12-16	10		
11-11	1	2		13-1-A		1	
11-12	2	2		13-2	6		
11-13	1	1		13-5	1		
11-14	1			13-8	3		
11-15	5	1		13-12	4		
11-16	1	7		13-13		1	

Table 120.--Glycinde pacifica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	37			PB-5	12		
BC-C		1		14-1-A		1	
BC-E	4		1	14-2	21		
BC-H	4			14-3	11		
BC-I	7			14-4	43		
BC-M	11			15-2		1	
BC-N	4			15-4	4		
D-1	5			15-5	3		
D-2	7			15-6	13		
D-9	3			15-8	13		
D-11		1		15-11	12		3
D-12		1		15-12	17		
D-17	2		1	15-13	10		
D-21	1			15-14	12		2
D-22	2			15-15	2		2
D-23		1		15-16	1		
D-24			6	15-17	21		
D-25		3		16-6	26		
PB-1	14		7	16-7	6		
PB-4	30		1				
Terra Ceia Bay							
E-1	18		10	E-5	6		1
E-2		8		E-6	18		
E-3	28		5	E-7	39		
E-4	15						

Table 120.--Glycinde pacifica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	26		1	16-9-A		1	
14-6	8			16-11	1		
14-7	1			16-19	1		
14-8	1			16-21	1		
14-12	5			16-22	1		
14-17	1			16-23	1		
14-18	33			16-24	1		
14-19		12		16-25		1	
15-18	10			16-27	4		
15-19	3			17-10	4		
15-20	3			17-12	8		
15-21	9			17-13	1		
15-31	10			17-14	4		
15-32	3			18-3	8		

Table 121.--Glycinde pacifica--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.5	12.8 to 33.8	188
Salinity (‰)	27.2	16.4 to 35.1	188
pH	8.0	7.0 to 9.0	158
Depth (m.)	1.1	1 to 4.0	188
Sediment type	sand	shelly sand to clayey silt	184
Granules (wt. %)	2.2	0.0 to 79.7	184
Sands (wt. %)	86.3	4.6 to 99.9	184
Silts (wt. %)	6.8	0.0 to 50.8	184
Clay (wt. %)	5.0	0.0 to 65.9	183
CaCO ₃ (wt. %)	9.2	0.5 to 66.0	183
Organic carbon (wt. %)	0.7	0.03 to 8.5	123
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	123
Mean grain size, total sample (Ø)	3.0	-4.0 to 7.3	183
Standard deviation, total sample (Ø)	1.4	0.2 to 3.5	183
Skewness, total sample	0.6	-2.2 to 3.6	183
Kurtosis, total sample	11.5	-1.3 to 76.3	182
Mean grain size, noncarbonate fraction (Ø)	3.0	1.7 to 9.0	176
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 3.1	175
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 3.0	163
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	163

Goniadella sp.

This small goniadid is about 1.5 mm. wide (including parapodia) and about 10 mm. long. The long, conical prostomium has eight segments and four, terminal antennae (figure 6,A). No eyes were observed. The pharynx on some specimens was partially extended and contained rows of papillae (figure 6,B). The chevrons commonly found in this genus were not observed.

Parapodia of the first segment are simple, cirrus-like lobes without setae. By the middle of the body, they contain setae, dorsal and ventral cirri, and a long, median ligule (figure 6,C). Above the dorsal cirrus, there are two simple, stout hooks (figure 6,D). The compound setae consist of a few spinigers and falcigers (figure 6,E,F).

Specimens were collected at 25 stations, in all areas of the Estuary except Hillsborough Bay. Twenty of these stations, however, were in lower Tampa Bay. Apparently this species is limited to water that has an average salinity of over 20 parts per thousand, and it is most commonly found where salinity is at least 30 parts per thousand (table 122).

No collections were made in soft sediments. Average

bottom type was poorly sorted, medium sand that was about one-half shell. Very few large shell particles were present and percentages of silt, clay, and organic carbon were low (table 123).

Only three of the dredge and shovel samples contained vegetation. Algae were present, but no sea grasses.

No specimens with mature gametes were collected, and juveniles were noted only in October and November.

Table 122.--Goniadella sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-2		6			6-3		3		
Upper Tampa Bay									
13-3		4							
Boca Ciega Bay									
BC-N		9							
Terra Ceia Bay									
E-8		1							
Lower Tampa Bay									
15-21		4			16-13		81		
15-22		17			16-14		57		
15-23		39			16-15		134		
15-24		7			16-16		16		
15-25		59			16-17		11		
15-26		33			17-2		27		
15-27		4			17-3		101		
15-29		2			17-4		55		
15-31		30			17-5		4		
16-12		10			17-6		1		

Table 123.--*Goniadella* sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.3	15.0 to 31.8	24
Salinity (‰)	31.8	24.2 to 34.5	24
pH	8.0	7.7 to 8.2	24
Depth (m.)	2.3	1 to 4.0	24
Sediment type	sand	shelly sand to sand	24
Granules (wt. %)	5.0	0.5 to 21.4	20
Sands (wt. %)	93.7	77.8 to 99.2	20
Silts (wt. %)	1.0	0.0 to 2.7	20
Clay (wt. %)	0.3	0.0 to 0.7	20
CaCO ₃ (wt. %)	46.8	7.2 to 85.2	20
Organic carbon (wt. %)	0.6	0.03 to 3.3	19
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	19
Mean grain size, total sample (Ø)	1.4	0.4 to 1.9	20
Standard deviation, total sample (Ø)	1.4	1.0 to 1.7	20
Skewness, total sample	0.1	-0.5 to 0.8	20
Kurtosis, total sample	3.4	0.1 to 8.2	20
Mean grain size, noncarbonate fraction (Ø)	2.9	1.9 to 5.9	20
Standard deviation, noncarbonate fraction (Ø)	1.2	0.6 to 3.2	20
Mean grain size, carbonate fraction (Ø)	0.3	-1.7 to 1.7	17
Standard deviation, carbonate fraction (Ø)	1.0	0.8 to 1.5	17

Family ONUPHIDAE Kinberg, 1865

Worms of this family are tubicolous omnivores that subsist on planktonic food and small benthic organisms. They have world-wide distribution in tropical, temperate, and boreal seas.

Five species were found in Tampa Bay. Diopatra cuprea and Onuphis sp. were collected throughout the Estuary. Onuphis magna and Onuphis nebulosa were found in upper and lower Tampa Bay, and Onuphis eremita oculata was found only in lower Tampa Bay.

Key to ONUPHIDAE Collected in Tampa Bay

- 1 Branchial filaments arranged in a spiral Diopatra cuprea
- Branchial filaments simple or pectinate 2
- 2 Branchiae present from the first setiger Onuphis eremita oculata
- Branchiae appear after the first setiger 3
- 3 Branchiae pectinate with as many as 12 filaments; size large Onuphis magna
- Branchiae with 4 or fewer filaments; size small 4
- 4 Ventral cirri slender through 8 segments; tube covered with shell fragments Onuphis nebulosa
- Ventral cirri slender through 6 segments; tube covered mostly with sand grains Onuphis sp.

Diopatra cuprea (Bosc, 1802)
(Described and illustrated by Pettibone, 1963a)

Individuals were collected in all areas of the Estuary at 160 survey stations and at incidental localities in Boca Ciega Bay (4) upper Tampa Bay (1) Old Tampa Bay (3) and Hillsborough Bay (1). The largest number of specimens per dredge haul (93) were taken at station 10-22 in Hillsborough Bay (table 124).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand. Shell comprised about nine percent of the sand size fraction, and a small percentage of large shell fragments was also recorded. Organic carbon was less than one percent and silt and clay amounted to about six percent (table 125).

Over 50 percent of the bottom samples were vegetated with algae, and one or more of the five sea grasses found in the Estuary.

A single juvenile specimen was collected in May. No specimens with mature gametes were observed.

D. cuprea has a world-wide range in temperate and tropical waters, and is well known throughout the Gulf of Mexico.

Table 124.--*Diopatra cuprea*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	2			3-13	4		
B	15			3-14		4	
B-1		2	10	3-15		2	
B-2		23		3-16		3	
1-1		9		4-1		1	
1-2	4			4-2	6		
1-3	3		1	4-3	1		
1-4	2			4-5	6		
1-5	3			4-6	4		
2-1		7		4-7	1		
2-2	1			4-8	1		
2-3	13			5-1-A	1		1
2-5	5			5-3	1		
3-2	6			5-4	3		
3-3	9			6-1-A		2	
3-8	1			6-1-C		4	
3-10			1	6-4-A	2		10
3-11	1			6-6			10
3-12	1			6-7-A		18	
Hillsborough Bay							
C-1		1		8-9	5		
C-2	25			9-3	3		10
C-3	1		1	9-4	22		
C-5			10	10-15	11		10
C-6	31		10	10-16	6		
C-7		3		10-17			10
C-8		2		10-19	8		10
C-8-1		1		10-20	8		
C-8-2		1		10-22	93		5
7-3	1			10-23		38	10

Table 124.--Diopatra cuprea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-1-A		12		11-27			10
10-4	1			11-28		1	
10-5	5			11-28-1		26	
10-7	1			12-1		3	
10-10	3			12-16			10
10-11	12			13-1-A		10	
10-12	6			13-2			10
10-13	14			13-10			10
10-14-A	21	18		13-11	1		10
11-25			10	13-12			10
11-26			10	13-13		10	
Boca Ciega Bay							
BC-A	9		10	PB-1	4	2	
BC-A-1			10	PB-4	25	4	4
BC-C		10		PB-5	9		10
BC-E	7		1	14-1-A		8	
BC-G		5		14-2	20		10
BC-H	2			14-3	2		
BC-I	1		1	14-4	2		10
BC-M	10	1	4	15-1	2		2
BC-N	27		1	15-3	3	4	10
D-1			1	15-4	13		10
D-2	3		1	15-8			10
D-5			1	15-10		2	
D-6		5		15-11	4		6
D-9			1	15-13	1		4
D-10	1			15-14	1		1
D-11	1	13		15-15	4		1
D-13			10	15-16	4		1
D-14			1	15-17	13		
D-15			1	16-1		3	
D-17			1	16-2		1	10
D-19-A		1	10	16-3		1	
D-21			10	16-4		1	
D-22	2		10	16-5		2	
D-23		12	10	16-7	1		
D-25		25	1	16-8		1	

Table 124.--Diopatra cuprea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Terra Ceia Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
E-1	7		10	E-7	27		
E-2		14		E-8	3		
E-6	3	1					
Lower Tampa Bay							
14-5			10	16-10	8		10
14-7	1			16-11	2		
14-10	1			16-21			10
14-11	1			16-25		2	
14-12	1			16-26		25	
14-13	1			16-27	1		
15-19			10	17-6	1		
15-20	12			17-7	2		
15-31	3			17-8	1		
15-32	1			17-9	2		
16-9		1	10	17-10			10
16-9-A		1		17-13	1		
16-9-B		2					

Table 125.--Diopatra cuprea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.5	12.8 to 33.2	147
Salinity (‰)	27.1	0.7 to 35.1	147
pH	7.9	7.0 to 8.5	126
Depth (m.)	0.8	1 to 3.3	147
Sediment type	sand	shelly sand to clayey silt	144
Granules (wt. %)	2.4	0.0 to 79.6	144
Sands (wt. %)	91.3	11.2 to 100	144
Silts (wt. %)	3.7	0.0 to 44.4	144
Clay (wt. %)	2.4	0.0 to 65.9	144
CaCO ₃ (wt. %)	8.6	0.6 to 95.0	143
Organic carbon (wt. %)	0.8	0.02 to 6.9	86
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	86
Mean grain size, total sample (Ø)	2.6	-4.0 to 7.1	143
Standard deviation, total sample (Ø)	1.3	0.5 to 2.8	143
Skewness, total sample	0.5	-1.7 to 2.1	143
Kurtosis, total sample	10.8	-1.3 to 43.4	142
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 8.7	134
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 2.8	134
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 3.0	122
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	122

Onuphis eremita oculata Hartman, 1951

Specimens were commonly collected outside the Estuary along barrier island beaches, but only at a single station (17-10) within the Estuary (table 126). This species is apparently well adapted to wave action and turbulence, and requires water of high salinity.

The worm was found in poorly sorted, fine sand that contained a moderate amount of shell, and only traces of silt, clay, and organic carbon (table 127).

There was no bottom vegetation at the collection site in lower Tampa Bay.

Neither gravid nor juvenile specimens were collected.

O. e. oculata has been reported only from the Gulf of Mexico.

Table 126.--Onuphis eremita oculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
17-10	1						

Table 127.--Onuphis eremita oculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	19.0	--	1
Salinity (‰)	30.8	--	1
pH	8.0	--	1
Depth (m.)	1.0	--	1
Sediment type	sand	--	1
Granules (wt. %)	3.6	--	1
Sands (wt. %)	95.8	--	1
Silts (wt. %)	0.5	--	1
Clay (wt. %)	0.1	--	1
CaCO ₃ (wt. %)	10.0	--	1
Organic carbon (wt. %)	0.1	--	1
Organic nitrogen (wt. %)	0.01	--	1
Mean grain size, total sample (Ø)	2.4	--	1
Standard deviation, total sample (Ø)	1.0	--	1
Skewness, total sample	-1.3	--	1
Kurtosis, total sample	14.5	--	1
Mean grain size, noncarbonate fraction (Ø)	2.4	--	1
Standard deviation, noncarbonate fraction (Ø)	0.6	--	1
Mean grain size, carbonate fraction (Ø)	--	--	--
Standard deviation, carbonate fraction (Ø)	--	--	--

Onuphis magna (Andrews, 1891)
(Described and illustrated by Treadwell, 1921)

Specimens were taken at 18 survey stations between transect-12 (upper Tampa Bay) and the Gulf. Three incidental collections were made in Boca Ciega Bay and one in lower Tampa Bay (table 128).

Sediment at dredge and shovel stations was poorly sorted, medium sand with a moderate amount of shell in sand and granule particle size classes. The percentage of silt and clay was under two, and organic carbon was less than one percent (table 129).

Algae were present at eight of 19 dredge and shovel stations, and generally occurred with manatee, turtle, or shoal grass.

Neither gravid nor juvenile specimens were collected.

O. magna has been recorded along the Atlantic seaboard from North Carolina to the Caribbean and the Gulf of Mexico. It has also been found in tropical waters of the eastern Pacific.

Table 128.--Onuphis magna--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
12-9	1						
Boca Ciega Bay							
BC-C		11		15-16	2		
BC-N	4			16-6	1		
D-25			1				
Lower Tampa Bay							
D-27		1		15-29	1		
14-11	1			15-33		1	
15-20	1			16-9-A		1	
15-21	1			16-9-B		2	
15-23	1			17-1		1	
15-26	1			17-2	1		

Table 129.--Onuphis magna--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.1	16.2 to 29.4	19
Salinity (‰)	31.9	27.1 to 35.1	19
pH	8.0	7.7 to 8.3	17
Depth (m.)	1.4	1 to 4.0	19
Sediment type	sand	--	16
Granules (wt. %)	3.4	0.0 to 14.2	16
Sands (wt. %)	95.7	83.5 to 99.8	16
Silts (wt. %)	1.1	0.0 to 4.1	16
Clay (wt. %)	0.3	0.0 to 0.8	16
CaCO ₃ (wt. %)	18.8	1.9 to 49.5	16
Organic carbon (wt. %)	0.7	0.03 to 2.3	15
Organic nitrogen (wt. %)	0.03	0.01 to 0.1	15
Mean grain size, total sample (Ø)	2.0	1.2 to 2.8	16
Standard deviation, total sample (Ø)	1.2	0.5 to 1.9	16
Skewness, total sample	0.1	-1.1 to 1.1	16
Kurtosis, total sample	8.1	0.4 to 22.2	15
Mean grain size, noncarbonate fraction (Ø)	3.4	1.9 to 7.1	15
Standard deviation, noncarbonate fraction (Ø)	1.6	0.6 to 3.4	15
Mean grain size, carbonate fraction (Ø)	0.5	-0.56 to 2.5	14
Standard deviation, carbonate fraction (Ø)	1.0	0.2 to 1.4	14

Onuphis nebulosa Moore, 1911
(Described and illustrated by Hartman, 1968)

Individuals were collected at a total of 89 survey stations in all areas of the Estuary except Old Tampa and Hillsborough Bays. One incidental collection was made in lower Tampa Bay near Mullet Key (table 130). Dredge hauls containing more than 100 worms were taken in upper and lower Tampa Bay, and the greatest number in any one collection (420) were taken at station 12-12.

Sediment data show that this species is generally found in poorly sorted, fine sand that contains a considerable amount of shell in the sand and granule size classes. Silt and clay content was less than three percent, and organic carbon was under one percent (table 131).

One-half of the dredge and shovel samples contained algae, and in addition, some had manatee, turtle, or shoal grass.

Neither gravid nor juvenile specimens were collected.

O. nebulosa has been reported in the Gulf of Mexico and in the eastern Pacific from central California to Panama.

Table 130.--Onuphis nebulosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
11-15	1			12-13			1
11-16	13		2	12-14	47		
11-17			1	12-15	328		
11-20			1	12-16	10		
12-2	1			13-3	5		
12-3	182		1	13-4	134		
12-6	2		1	13-5	240		
12-7	12		1	13-6	111		
12-8	43		1	13-7	140		
12-9	58			13-8	309		
12-10	49			13-9	15		
12-11	43			13-10	59		
12-12	420		1	13-13		1	
Boca Ciega Bay							
BC-A	12			PB-5	23		
BC-A-1	20			15-3	1	5	
BC-E	1			15-6	2		
BC-N	70			15-9		1	
D-3		3		15-11	2		1
D-23		4	1	15-12	22		
D-24			1	15-14			1
D-25		6		16-1		1	
PB-1	3			16-6	55		1
PB-4	1						
Terra Ceia Bay							
E-8	716						

Table 130.--Onuphis nebulosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-10	50			16-10	1		
14-11	100			16-13	89		
14-12	62			16-14			1
14-14	39			16-15	9		
14-15	8			16-16	4		1
15-18	20			16-17	6		1
15-19	1			16-18			1
15-20	9			16-22	4		
15-21	55			16-25	385	4	
15-22	32			16-26		1	
15-23	7			16-27	363		1
15-24	61			17-2	931		1
15-25	1			17-3	12		
15-26	40		1	17-4	10		
15-27	17		1	17-5	53		
15-28	64		1	17-6	21		
15-29	54			17-7	24		
15-30	65			17-8	10		
15-31	250			17-11		1	
15-32	47			18-3	25		
15-33		1		18-4	4		
16-9-B		2					

Table 131.--Onuphis nebulosa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.4	12.8 to 29.3	86
Salinity (‰)	30.6	22.3 to 35.1	85
pH	8.0	7.6 to 8.4	86
Depth (m.)	1.6	1 to 4.0	86
Sediment type	sand	shelly sand to silty sand	81
Granules (wt. %)	3.6	0.0 to 41.5	81
Sands (wt. %)	93.5	72.5 to 99.9	81
Silts (wt. %)	2.1	0.0 to 22.1	81
Clay (wt. %)	0.7	0.0 to 7.2	81
CaCO ₃ (wt. %)	24.3	1.2 to 85.2	81
Organic carbon (wt. %)	0.6	0.03 to 5.0	73
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	73
Mean grain size, total sample (Ø)	2.1	0.4 to 7.6	81
Standard deviation, total sample (Ø)	1.3	0.5 to 3.5	81
Skewness, total sample	0.1	-1.7 to 1.3	81
Kurtosis, total sample	6.3	-0.4 to 24.4	80
Mean grain size, noncarbonate fraction (Ø)	2.9	1.7 to 7.1	75
Standard deviation, noncarbonate fraction (Ø)	1.3	0.5 to 3.4	75
Mean grain size, carbonate fraction (Ø)	0.3	-2.0 to 2.2	61
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 2.9	61

Onuphis sp.

This species resembles Onuphis nebulosa (figure 6,G) but constructs a sand-covered, rather than a shell-covered tube. There are also differences in the arrangement of branchiae, ventral cirri, and setae.

The first setiger has dorsal and ventral cirri (figure 6,H) and branchiae do not appear until setiger eight (figure 6,K). The ventral cirri are slender on the first six setigers, and are short and rounded thereafter. Hooded hooks are present on all setigers. On the first, they have an incomplete joint and tridentate tip (figure 6,I). On the third setiger the joint is not apparent and the teeth are blunt and less curved (figure 6,J). By setiger 16 the setal hooks are stout and bidentate with a greatly reduced terminal tooth (figure 6,L).

This species was collected at a total of 99 survey stations in all areas of the Estuary and at incidental localities in Old Tampa Bay (2) upper Tampa Bay (1) Boca Ciega Bay (3) and lower Tampa Bay (1). The greatest number in a single dredge haul (424) were collected at station PB-4 in Boca Ciega Bay (table 132).

Average sediment at dredge and shovel stations was poorly sorted, fine sand with more than 10 percent shell

in sand and coarser particle classes. Silt and clay content was less than five percent and organic carbon was nearly one percent (table 133).

Slightly more than one-third of these stations contained algae and one or more of the five sea grasses found in the Estuary.

Young specimens were observed adhering to the interior of adult's tubes in August and November.

Table 132.--*Onuphis* sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
2-1			1	6-1-C	31		
4-19	5			6-1-D	4		
5-3	1			6-2	22		
5-6	1			6-3	5		1
5-8	1			6-4-A	1		
5-13	3			6-7-A		19	
6-1-A		1					
Hillsborough Bay							
9-4	1			10-19	3		
10-16	8						
Upper Tampa Bay							
10-0		1		11-3	10		10
10-1-A		213		11-4	6		10
10-3		25		11-5	1		
10-4	106		1	11-28-1		168	
10-6	1			11-28-2		3	
10-12	36			12-1		104	
10-13	58			13-1-A		1	
10-14-A	16	51		13-1-B		150	
11-1		88		13-3	35		
11-2		17					

Table 132.--*Onuphis* sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-A	4			D-25		86	2
BC-A-1			1	PB-1	7	34	
BC-C		26		PB-4	424		3
BC-E	1			PB-5	52		
BC-G		8		14-2	1		
BC-I	1			14-3	20		1
BC-M	31		4	14-4	15		
BC-N	100			15-2		129	
D-1	1		1	15-3		29	
D-2	93			15-4	4		
D-3		60		15-8	5		
D-6		201		15-15	25		
D-7			1	15-16	25		
D-9	2			15-17	1		1
D-11		76		16-1		17	1
D-15			4	16-2		13	
D-17	16			16-4	1	6	
D-19-A			1	16-7	49		
D-23		248		16-8		35	
Terra Ceia Bay							
E-1	10			E-5	4		
E-2		10		E-6	1		
E-4	35			E-7	1		

Table 132.--*Onuphis* sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-27		1		17-1		5	
14-5	106			17-2	4		2
14-6	9			17-3	1		
16-9		10		17-4	6		
16-9-A		194		17-5	17		
16-20	1			17-6	23		
16-21	2			17-7	22		
16-23	8			17-8	17		
16-25		113		17-9	1		
16-26		4		17-14	3		

Table 133.--*Onuphis* sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.0	13.0 to 33.2	104
Salinity (‰)	29.2	18.5 to 35.1	104
pH	8.1	7.6 to 8.5	100
Depth (m.)	0.9	1 to 4.0	104
Sediment type	sand	shelly sand to sandy clay	103
Granules (wt. %)	2.4	0.0 to 21.5	103
Sands (wt. %)	93.4	24.5 to 99.9	103
Silts (wt. %)	2.7	0.0 to 22.7	103
Clay (wt. %)	1.4	0.0 to 65.9	103
CaCO ₃ (wt. %)	12.5	0.6 to 85.2	102
Organic carbon (wt. %)	0.9	0.01 to 8.5	72
Organic nitrogen (wt. %)	0.1	0.00 to 0.3	72
Mean grain size, total sample (φ)	2.5	0.4 to 7.1	102
Standard deviation, total sample (φ)	1.2	0.5 to 2.7	102
Skewness, total sample	0.3	-1.7 to 2.4	102
Kurtosis, total sample	11.9	-0.6 to 61.8	101
Mean grain size, noncarbonate fraction (φ)	3.2	1.4 to 9.0	95
Standard deviation, noncarbonate fraction (φ)	1.3	0.4 to 3.2	94
Mean grain size, carbonate fraction (φ)	-0.01	-2.5 to 2.5	80
Standard deviation, carbonate fraction (φ)	1.2	0.2 to 2.6	80

Figure 6. -- Diagnostic features of Goniadella sp. and Onuphis sp.

- Goniadella sp.: (A) Head and first parapodial segment;
(B) Pharyngeal papilla; (C) Parapod
from median section; (D) Hooked seta
from body wall adjacent to dorsal cirrus;
(E) Compound spiniger from median
parapod (F) Compound falciger from
median parapod
- Onuphis sp.: (G) Anterior end; (H) First setigerous
segment; (I) Hooded hook from first
segment (J) Hooded hook from third
segment (K) Eighth parapod (L) Setae
from sixteenth segment.

FIGURE 6

Family EUNICIDAE Savigny, 1818

A predominantly tropical family, the eunicids are active omnivores that are generally associated with shell and coral bottoms.

Three species were collected in Tampa Bay. Marphysa sanguinea was found in all areas of the Estuary, while the other two, Eunice rubra and Nematonereis hebes, were taken only in Boca Ciega Bay and lower Tampa Bay.

Key to EUNICIDAE Collected in Tampa Bay

- 1 Branchiae present 2
- Branchiae absent Nematonereis hebes
- 2 Tentacular cirri present Eunice rubra
- Tentacular cirri absent Marphysa sanguinea

Eunice rubra Grube, 1856

(Described and illustrated by Treadwell, 1921)

Specimens were collected at two stations in Boca Ciega Bay, and at five in lower Tampa Bay. All were taken by net (table 134).

No data are available for sediments or vegetation at these localities.

A gravid specimen was collected in January and juveniles were found in October.

E. rubra has been recorded in the Gulf of Mexico and Caribbean as well as along the south Atlantic and Pacific coasts.

Table 134.--Eunice rubra--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-25		1			16-8		1		
Lower Tampa Bay									
14-13		1			17-5		1		
16-14		1			18-3		2		
16-20		1							

Marphysa sanguinea (Montagu, 1815)
(Described and illustrated by Pettibone, 1963a)

This was the only eunicid found throughout the Estuary. Collections came from a total of 39 survey stations, and incidental localities in Old Tampa Bay (3) Hillsborough Bay (1) Boca Ciega Bay (8) and lower Tampa Bay (1). The largest collections were made by shovel in shallow water on grass flats or shelly bottom (table 135).

Sediments at dredge and shovel stations were poorly sorted, fine sand. Shell accounted for more than 13 percent of the sediment in sand and granule particle size categories. Silt and clay content was less than five percent and organic carbon was slightly more than one percent (table 136).

About two-thirds of the bottom samples contained algae as well as shoal, turtle, or manatee grass.

No specimens with mature gametes were collected, however, juveniles were found in May, July, August, September, October, November, and December.

M. sanguinea has been reported in the Gulf of Mexico and may be regarded as a cosmopolitan species that occurs in temperate and tropical seas.

Table 135.--Marphysa sanguinea---Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-1		7		3-15		3	
A-3		13		4-1		1	
A-6		1		6-1-D		3	
2-4	1			6-2	1		
3-1-A		37					
Hillsborough Bay							
C			8	C-2		2	
C-1		1					
Upper Tampa Bay							
13-1-A		3					
Boca Ciega Bay							
BC-C		10		PB-5			1
BC-M		1		15-3		2	
D-2			10	15-5			1
D-3			10	15-8	1		
D-6		1		16-2		9	2
D-22			1	16-3		5	6
D-23		3		16-5		1	
D-25		3		16-8		8	1
PB-1		1					
Terra Ceia Bay							
E-1			2	E-6		2	
E-4		1					

Table 135.--Marphysa sanguinea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-
(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
15-25	1			16-9-B		3	
15-26	1			17-2	2		
15-31	1			18-3	1		

Table 136.--Marphysa sanguinea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.0	13.0 to 32.7	33
Salinity (‰)	28.8	18.3 to 34.5	33
pH	8.0	6.7 to 8.4	28
Depth (m.)	0.8	1 to 4.0	33
Sediment type	sand	shelly sand to silty sand	33
Granules (wt. %)	4.1	0.0 to 34.5	33
Sands (wt. %)	91.5	58.0 to 99.4	33
Silts (wt. %)	3.1	0.0 to 11.9	33
Clay (wt. %)	1.2	0.0 to 9.1	33
CaCO ₃ (wt. %)	13.5	0.7 to 66.0	33
Organic carbon (wt. %)	1.1	0.1 to 6.9	22
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	22
Mean grain size, total sample (Ø)	2.4	0.6 to 3.4	33
Standard deviation, total sample (Ø)	1.4	0.6 to 3.8	33
Skewness, total sample	0.5	-1.2 to 3.4	33
Kurtosis, total sample	10.9	-0.7 to 73.5	33
Mean grain size, noncarbonate fraction (Ø)	3.3	1.9 to 8.7	33
Standard deviation, noncarbonate fraction (Ø)	1.5	0.6 to 3.2	33
Mean grain size, carbonate fraction (Ø)	0.1	-1.7 to 2.3	31
Standard deviation, carbonate fraction (Ø)	1.3	0.4 to 2.8	31

Nematonereis hebes Verrill, 1900
(Described and illustrated by Treadwell, 1921)

This minute and rarely collected worm was found at one station in Boca Ciega Bay, and at seven in lower Tampa Bay. Collections that contained 10 or more specimens per dredge haul were made along transect-15 and 16 (table 137).

The worm was found only in sand or shelly sand which was mostly of medium size and poorly sorted. Silt and clay content was very low, but organic carbon was greater than one percent. A moderate amount of granular shell was present, and a large percentage of the sand size particle class was composed of shell (table 138).

Of the two stations where vegetation was recorded, one had algae and the other had algae, shoal grass, and turtle grass.

Neither gravid nor juvenile specimens were collected.

N. hebes was originally described from Bermuda, which was the only known locality prior to collections recorded here for Tampa Bay.

Table 137.--Nematonereis hebes--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
D-25	3						
Lower Tampa Bay							
15-23	4			17-5	1		
15-25	13			17-8	2		
16-13	12			18-3	2		
16-14	10		2				

Table 138.--Nematonereis hebes--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.5	17.4 to 25	8
Salinity (‰)	33.0	31.5 to 33.9	8
pH	8.1	7.9 to 8.4	8
Depth (m.)	2.4	1 to 3.0	8
Sediment type	sand	shelly sand to sand	8
Granules (wt. %)	8.4	4.2 to 20.8	8
Sands (wt. %)	89.9	77.4 to 93.5	8
Silts (wt. %)	9.3	0.3 to 2.4	8
Clay (wt. %)	0.3	0.1 to 0.9	8
CaCO ₃ (wt. %)	38.8	13.2 to 68.0	8
Organic carbon (wt. %)	1.1	0.1 to 3.3	8
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	8
Mean grain size, total sample (Ø)	1.4	0.6 to 2.1	8
Standard deviation, total sample (Ø)	1.6	1.3 to 2.0	8
Skewness, total sample	-0.01	-0.6 to 0.02	8
Kurtosis, total sample	2.0	-0.03 to 4.2	8
Mean grain size, noncarbonate fraction (Ø)	3.4	2.4 to 5.9	8
Standard deviation, noncarbonate fraction (Ø)	1.2	0.6 to 2.1	8
Mean grain size, carbonate fraction (Ø)	0.2	-1.3 to 0.9	6
Standard deviation, carbonate fraction (Ø)	1.0	0.9 to 1.3	6

Family LUMBRINERIDAE Malmgren, 1867

The lumbrinerids are burrowing worms that are commonly found in unconsolidated sediments of all seas. Day (1967) considered the group as carnivorous scavengers and predators.

Six species were found in Tampa Bay. None were collected in Hillsborough Bay, and only one, Lumbrineris latreilli, was found in Old Tampa Bay, where it was collected no farther north than transect-6. Lumbrineris coccinea was collected as far into the Estuary as upper Tampa Bay, and the other four, Lumbrineris bassi, Lumbrineris erecta, Lumbrineris impatiens, and Lumbrineris sp. were found only in more saline waters seaward of transect-13.

Key to LUMBRINERIDAE Collected in Tampa Bay

- 1 Compound, hooded hooks present in anterior parapodia 2
- Compound, hooded hooks absent in anterior parapodia 3
- 2 Prostomium conical; compound, hooded hooks have a long distal appendage Lumbrineris latreilli
- Prostomium rounded; compound, hooded hooks have a short, distal appendage Lumbrineris coccinea
- 3 Simple, hooded hooks present before setiger 10..... 4
- Simple, hooded hooks present after setiger 10 5

- 4 Simple, hooded hooks present by setiger 5;
terminal teeth small, forming a crest above a
single, large, blunt, basal tooth; anterior,
median, and posterior hooks
similar Lumbrineris impatiens
- Simple, hooded hooks present before setiger 5;
terminal teeth directed laterally, not forming
a crest; hooks of median and posterior setigers
short and stout with the lower 3 teeth greatly
enlarged Lumbrineris sp.
- 5 Simple, hooded hooks present from about setiger
16, basal tooth large Lumbrineris bassi
- Simple, hooded hooks present from about setiger
30, all terminal teeth small and
similar Lumbrineris erecta

Lumbrineris bassi Hartman, 1944a

Specimens were collected at a total of seven survey stations in Boca Ciega Bay and lower Tampa Bay, and at two incidental stations in Boca Ciega Bay, and one in lower Tampa Bay (table 139).

Sediments at survey stations were entirely sand that was fine and poorly sorted. Average shell content was over 12 percent, silt and clay was under five percent, but organic carbon was nearly two percent (table 140).

Vegetation occurred at over 50 percent of the dredge and shovel stations. Four had algae, together with shoal grass, manatee grass, or turtle grass.

No gravid or juvenile specimens were collected.

L. bassi has been recorded in the Gulf and is otherwise known only from southern California.

Table 139.--Lumbrineris bassi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-6		2			D-25		2		
D-23		28							
Lower Tampa Bay									
14-13		1			16-22		1		
16-10		1			16-24		1		

Table 140.--Lumbrineris bassi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.0	18.1 to 27.8	7
Salinity (‰)	32.3	30.8 to 34.0	7
pH	8.1	7.8 to 8.3	7
Depth (m.)	1.0	1 to 3.0	7
Sediment type	sand	--	7
Granules (wt. %)	2.1	0.1 to 5.2	7
Sands (wt. %)	94.3	89.9 to 99.2	7
Silts (wt. %)	2.8	0.2 to 4.3	7
Clay (wt. %)	0.8	0.1 to 1.3	7
CaCO ₃ (wt. %)	12.9	3.6 to 43.3	7
Organic carbon (wt. %)	1.7	0.1 to 6.9	6
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	6
Mean grain size, total sample (Ø)	2.7	2.3 to 3.4	6
Standard deviation, total sample (Ø)	1.2	0.8 to 1.8	6
Skewness, total sample	0.3	-0.4 to 1.5	6
Kurtosis, total sample	10.0	2.4 to 14.0	6
Mean grain size, noncarbonate fraction (Ø)	2.8	1.9 to 4.4	6
Standard deviation, noncarbonate fraction (Ø)	1.4	1.1 to 1.9	6
Mean grain size, carbonate fraction (Ø)	0.1	-0.7 to 1.0	6
Standard deviation, carbonate fraction (Ø)	1.2	0.8 to 1.7	6

Lumbrineris coccinea (Renier, 1804)
(Described and illustrated by Pettibone, 1963a)

A total of eight collections were made at survey stations in all areas of the Estuary between upper Tampa Bay and lower Tampa Bay (table 141).

At the five, dredge stations, sediments were poorly sorted, medium sand with shell comprising about 24 percent of the sand and granule particle classes. Silt and clay were only two percent and organic carbon was less than one percent (table 142).

Algae were present in two bottom samples, but no sea grass was noted.

No juveniles, and no individuals with mature gametes were collected.

L. coccinea has been recorded in the Gulf of Mexico as well as in temperate and tropical waters in the eastern and western Atlantic and Pacific.

Table 141.--Lumbrineris coccinea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
11-4			1	12-13			2
Boca Ciega Bay							
BC-N	2			D-17	2		
Terra Ceia Bay							
E-4	2						
Lower Tampa Bay							
15-25	1			17-2			1
16-27	24						

Table 142.--Lumbrineris coccinea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.4	14.5 to 25.2	5
Salinity (‰)	32.1	30.3 to 34.8	5
pH	8.1	8.0 to 8.3	5
Depth (m.)	1.7	1 to 3.0	5
Sediment type	sand	--	5
Granules (wt. %)	5.0	0.8 to 14.7	5
Sands (wt. %)	93.1	83.5 to 98.9	5
Silts (wt. %)	1.6	0.3 to 3.7	5
Clay (wt. %)	0.4	0.1 to 0.7	5
CaCO ₃ (wt. %)	24.1	6.1 to 52.3	5
Organic carbon (wt. %)	0.2	0.2 to 0.4	5
Organic nitrogen (wt. %)	0.02	0.02 to 0.04	5
Mean grain size, total sample (Ø)	1.9	1.3 to 2.8	5
Standard deviation, total sample (Ø)	1.4	0.9 to 1.9	5
Skewness, total sample	0.03	-0.3 to 0.3	5
Kurtosis, total sample	4.2	0.4 to 9.0	5
Mean grain size, noncarbonate fraction (Ø)	2.6	2.1 to 3.1	5
Standard deviation, noncarbonate fraction (Ø)	1.0	0.7 to 1.5	5
Mean grain size, carbonate fraction (Ø)	-0.5	-1.7 to 1.5	5
Standard deviation, carbonate fraction (Ø)	1.0	0.2 to 1.4	5

Lumbrineris erecta (Moore, 1904)
(Described and illustrated by Hartman, 1968)

A total of 29 collections were made at survey stations in Boca Ciega Bay and lower Tampa Bay, and one incidental collection came from lower Tampa Bay (table 143).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand. Shell amounted to over 20 percent of the sand and granule size particles, silt and clay were under three percent and organic carbon was less than one percent (table 144).

Algae were recorded in one-third of the bottom samples, and many also had shoal grass, manatee grass, or turtle grass.

A gravid specimen was collected in November, and juvenile worms were found in May, October, and November.

L. erecta has never before been reported from the Gulf of Mexico, and was previously known only from southern California.

Table 143.--*Lumbrineris erecta*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-N	1			15-15	1		
D-25		1		16-3		2	
15-10		2		16-6	1		
15-14	2						
Lower Tampa Bay							
14-9	3			17-1		2	
14-10	2			17-2	5		
14-13	1			17-5	3		
15-22	1			17-6	9		
16-10	9			17-7	3		
16-11	2			17-8	26		
16-13	1			17-9	6		
16-15	1			17-10	15		
16-20	6			17-12	5		
16-22	1			18-3	1		
16-23	5			18-4	2		

Table 144.--*Lumbrineris erecta*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	18.0 to 27.5	29
Salinity (‰)	32.8	29.9 to 35.1	29
pH	8.0	7.8 to 8.3	29
Depth (m.)	1.7	/1 to 4.0	29
Sediment type	sand	shelly sand to sand	29
Granules (wt. %)	4.0	0.0 to 20.8	29
Sands (wt. %)	92.9	77.4 to 99.8	29
Silts (wt. %)	2.3	0.2 to 6.6	29
Clay (wt. %)	0.6	0.0 to 2.5	29
CaCO ₃ (wt. %)	20.4	1.4 to 57.4	29
Organic carbon (wt. %)	0.6	0.1 to 3.2	28
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	28
Mean grain size, total sample (Ø)	2.3	0.9 to 3.4	29
Standard deviation, total sample (Ø)	1.3	0.2 to 2.0	29
Skewness, total sample	0.1	-1.3 to 1.1	29
Kurtosis, total sample	7.6	-0.03 to 19.0	28
Mean grain size, noncarbonate fraction (Ø)	2.9	1.4 to 6.1	28
Standard deviation, noncarbonate fraction (Ø)	1.3	0.5 to 3.2	28
Mean grain size, carbonate fraction (Ø)	0.3	-1.7 to 3.0	21
Standard deviation, carbonate fraction (Ø)	1.0	0.1 to 1.5	21

Lumbrineris impatiens (Claparede, 1868)
(Described and illustrated by Pettibone, 1963a)

Specimens were collected at a single survey station in Boca Ciega Bay, and at an incidental locality in lower Tampa Bay near Mullet Key (table 145).

Sediment at the station in Boca Ciega Bay was shelly sand that contained no silt, and no clay. Particles in the granule size class accounted for over 29 percent of the sediment. Data for organic carbon and nitrogen are not available (table 146).

No vegetation was recorded at the survey station.

No gravid, and no juvenile specimens were collected.

This worm has been recorded in the Gulf of Mexico and is well known as a cosmopolitan species.

Table 145.--Lumbrineris impatiens--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
			D	S	N	
15-7			3			

Table 146.--Lumbrineris impatiens--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.3	--	1
Salinity (‰)	--	--	--
pH	--	--	--
Depth (m.)	0.3	--	1
Sediment type	Shelly sand	--	1
Granules (wt. %)	29.4	--	1
Sands (wt. %)	70.6	--	1
Silts (wt. %)	0.0	--	1
Clay (wt. %)	0.0	--	1
CaCO ₃ (wt. %)	16.1	--	1
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (Ø)	0.1	--	1
Standard deviation, total sample (Ø)	1.7	--	1
Skewness, total sample	0.1	--	1
Kurtosis, total sample	-1.0	--	1
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation, noncarbonate fraction (Ø)	0.9	--	1
Mean grain size, carbonate fraction (Ø)	0.3	--	1
Standard deviation, carbonate fraction (Ø)	0.8	--	1

Lumbrineris latreilli (Audouin and Milne-Edwards, 1833)
(Described and illustrated by Pettibone, 1963a)

More widely distributed than any other lumbrinerid found in Tampa Bay, this species was collected in Old Tampa Bay, upper Tampa Bay, Terra Ceia Bay, and lower Tampa Bay at a total of 11 survey stations (table 147).

Sediments at dredge stations were mostly poorly sorted, medium sand with less than two percent silt and clay, and nearly two percent organic carbon. About one-fourth of the sediment was composed of shell (table 148).

Algae were the only plants noted at the four stations where vegetation was recorded.

A juvenile worm was collected in October, but no gravid specimens were observed.

L. latreilli is a cosmopolitan species, and has been recorded from the Gulf of Mexico.

Table 147.--Lumbrineris latreilli--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
6-2	1						
Upper Tampa Bay							
11-4	1						
Terra Ceia Bay							
E-5	4						
Lower Tampa Bay							
14-15	2			17-5	3		
15-22	1			17-7	3		
15-26	1			17-8	1		
17-2			3	18-3	10		

Table 148.--Lumbrineris latreilli--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.0	14.5 to 31.8	10
Salinity (‰)	30.8	23.8 to 33.8	9
pH	8.1	7.8 to 8.2	10
Depth (m.)	2.0	1.0 to 3.0	10
Sediment type	sand	shelly sand to sand	10
Granules (wt. %)	5.6	0.2 to 20.8	10
Sands (wt. %)	92.7	77.4 to 99.1	10
Silts (wt. %)	1.3	0.0 to 2.4	10
Clay (wt. %)	0.5	0.0 to 1.5	10
CaCO ₃ (wt. %)	25.5	2.8 to 49.8	10
Organic carbon (wt. %)	1.8	0.1 to 8.5	9
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	9
Mean grain size, total sample (Ø)	1.8	0.9 to 2.6	10
Standard deviation, total sample (Ø)	1.4	0.7 to 2.0	10
Skewness, total sample	0.2	-0.6 to 1.7	10
Kurtosis, total sample	6.1	-0.03 to 25.7	10
Mean grain size, noncarbonate fraction (Ø)	3.3	2.2 to 9.0	10
Standard deviation, noncarbonate fraction (Ø)	1.1	0.6 to 1.9	10
Mean grain size, carbonate fraction (Ø)	0.2	-1.7 to 1.6	6
Standard deviation, carbonate fraction (Ø)	1.2	0.9 to 1.6	6

Lumbrineris sp.

This small lumbrinerid has simple, hooded hooks that begin on the first parapods and continue on all segments that follow. In anterior setigers, the hooks have a straight shaft, long hood, and small teeth (figure 7,A). In median and posterior setigers, the hooks are short and stout, the hood covers a shorter portion of the shaft, the portion of the shaft bearing teeth is reflexed, and the three basal teeth are greatly enlarged (figure 7,B).

Specimens were collected at a total of 17 survey stations in Boca Ciega and lower Tampa Bays (table 149).

Average sediment type was poorly sorted, fine sand that contained little silt and clay, and less than one percent organic carbon. Shell content was about 13 percent (table 150).

Vegetation occurred at five stations, and consisted of algae and either manatee or turtle grass.

Neither gravid nor juvenile specimens were collected.

Table 149.--Lumbrineris sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-E	1			16-6	2		
PB-5	3			16-7	1		
15-6	1						
Lower Tampa Bay							
16-10	2			17-7	4		
16-20	7			17-8	112		
16-21	33			17-9	26		
16-22	29			17-10	28		
16-23	30			17-13	1		
17-6	23			18-4	2		

Table 150.--Lumbrineris sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.2	15.5 to 30.0	18
Salinity (‰)	32.5	30.1 to 34.3	18
pH	8.1	7.8 to 8.5	18
Depth (m.)	1.3	1 to 2.3	18
Sediment type	sand	--	18
Granules (wt. %)	2.4	0.0 to 8.9	18
Sands (wt. %)	94.5	87.8 to 99.8	18
Silts (wt. %)	2.2	0.1 to 5.7	18
Clay (wt. %)	0.6	0.0 to 1.3	18
CaCO ₃ (wt. %)	13.3	2.3 to 49.9	18
Organic carbon (wt. %)	0.3	0.1 to 1.0	16
Organic nitrogen (wt. %)	0.02	0.00 to 0.1	16
Mean grain size, total sample (Ø)	2.6	1.7 to 3.2	18
Standard deviation, total sample (Ø)	1.2	0.5 to 2.0	18
Skewness, total sample	0.0	-1.4 to 1.0	18
Kurtosis, total sample	9.4	0.6 to 24.4	18
Mean grain size, noncarbonate fraction (Ø)	2.7	1.4 to 4.4	16
Standard deviation, noncarbonate fraction (Ø)	1.1	0.5 to 2.2	16
Mean grain size, carbonate fraction (Ø)	-0.1	-2.0 to 1.0	10
Standard deviation, carbonate fraction (Ø)	1.2	0.7 to 2.9	10

Family ARABELLIDAE Hartman, 1944

The arabellids are carnivorous worms that have world-wide distribution. Most forms burrow, but some spend part or all of their life as parasites in other polychaetes.

Five species were found in Tampa Bay. None were found in Hillsborough Bay, although Arabella iricolor and Drilonereis magna were collected in water of similar salinity in Old Tampa Bay. These two species were also found in upper Tampa Bay and all seaward areas of the Estuary.

Drilonereis cylindrica was collected as far into the Estuary as upper Tampa Bay. Drilonereis longa was collected only in Boca Ciega Bay, and an undetermined arabellid, Arabella sp., was found only in lower Tampa Bay.

Key to ARABELLIDAE Collected in Tampa Bay

- 1 Parapodia have no hooded or simple, acicular setae Arabella iricolor
- Parapodia have hooded, acicular setae Arabella sp.
- Parapodia have simple, acicular setae 2
- 2 First maxillary plates smooth at the base Drilonereis magna
- First maxillary plates bear teeth at the base 3
- 3 Maxillary plates symmetrical; maxillary supports long and slender; parapodial lobes short and rounded Drilonereis cylindrica

- Maxillary plates II, III, and IV asymmetrical; maxillary support enlarged anteriorly; parapodia bear enlarged presetal and postsetal lobes on posterior segments Drilonereis longa

Arabella iricolor (Montagu, 1804)
(Described and illustrated by Pettibone, 1963a)

Specimens were collected in all areas of the Estuary, except Hillsborough Bay, at 19 survey stations, and at a total of five incidental localities in Old Tampa Bay and Boca Ciega Bay (table 151).

Sediment data from dredge and shovel stations show that the worm generally inhabits poorly sorted, medium sand that contains less than five percent silt and clay, and about one percent organic carbon. Average shell content of the sediment was about 25 percent (table 152).

The bottom at seven of these stations was vegetated with algae and one or more species of sea grasses that included shoal grass, turtle grass, manatee grass and widgeon grass.

No gravid specimens were seen, but juveniles were collected in May, July, August, September, October, and November.

A. iricolor is a cosmopolitan species in temperate and tropical waters, and is well known in the Gulf of Mexico.

Table 151.--Arabella iricolor--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B-2		2		6-2	1		
6-1-C		1		6-3	1		
Upper Tampa Bay							
10-3		2		11-28-1		4	
Boca Ciega Bay							
BC-M		1	1	15-12	1		
BC-N	5			15-16	1		
Terra Ceia Bay							
E-6	1						
Lower Tampa Bay							
14-11	1			17-2	5		
15-22	3			17-5	4		
16-13	2			17-8	1		
16-14	2			17-11			1

Table 152.--Arabella iricolor--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.1	13.0 to 32.0	19
Salinity (‰)	30.0	22.7 to 35.1	19
pH	8.0	7.8 to 8.4	17
Depth (m.)	1.6	1 to 4.0	19
Sediment type	sand	shelly sand to silty sand	17
Granules (wt. %)	4.4	0.0 to 21.5	17
Sands (wt. %)	91.0	72.5 to 98.2	17
Silts (wt. %)	3.4	0.0 to 22.1	17
Clay (wt. %)	1.1	0.0 to 5.2	17
CaCO ₃ (wt. %)	25.8	1.1 to 94.8	17
Organic carbon (wt. %)	1.0	0.2 to 3.3	14
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	14
Mean grain size, total sample (φ)	2.0	0.6 to 4.1	16
Standard deviation, total sample (φ)	1.5	0.9 to 2.3	16
Skewness, total sample	0.3	-1.1 to 1.6	17
Kurtosis, total sample	6.0	-0.2 to 21.2	15
Mean grain size, noncarbonate fraction (φ)	3.1	1.9 to 5.9	16
Standard deviation, noncarbonate fraction (φ)	1.4	0.7 to 2.1	16
Mean grain size, carbonate fraction (φ)	-0.3	-1.8 to 2.3	14
Standard deviation, carbonate fraction (φ)	1.2	0.6 to 1.6	14

Drilonereis cylindrica Hartman, 1951

Individuals were found in upper Tampa Bay and all seaward areas of the Estuary at 13 survey stations, and at one incidental locality in Boca Ciega Bay and another in lower Tampa Bay (table 153).

Average sediment at dredge and shovel stations was poorly sorted, fine sand that contained about 15 percent shell, less than five percent silt and clay, and one percent organic carbon (table 154).

Algae were recorded in more than 60 percent of the bottom samples, and were accompanied by one or more of the following sea grasses -- shoal grass, turtle grass, manatee grass, and Halophila.

No specimens with mature gametes were noted, but juveniles were collected in September, October, November, and December.

D. cylindrica has been reported from North Carolina and the Gulf of Mexico.

Table 153.--Drilonereis cylindrica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-1-A	1			12-6	1		
Boca Ciega Bay							
D-6	2			15-3	4		
D-11	1			16-4	1		
PB-1	1			16-8	3		
Terra Ceia Bay							
E-2	1			E-5	1		
Lower Tampa Bay							
15-22	2			16-13	1		
15-25	1						

Table 154.--Drilonereis cylindrica--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.3	14.5 to 31.0	13
Salinity (‰)	30.7	23.3 to 34.0	13
pH	8.1	7.7 to 8.4	13
Depth (m.)	1.0	1 to 3.0	13
Sediment type	sand	--	13
Granules (wt. %)	3.2	0.0 to 13.4	13
Sands (wt. %)	93.1	80.5 to 99.9	13
Silts (wt. %)	3.1	0.0 to 11.8	13
Clay (wt. %)	0.6	0.0 to 2.4	13
CaCO ₃ (wt. %)	15.2	1.2 to 52.3	13
Organic carbon (wt. %)	1.0	0.1 to 3.3	9
Organic nitrogen (wt. %)	0.04	0.01 to 0.4	9
Mean grain size, total sample (φ)	2.3	1.3 to 3.0	13
Standard deviation, total sample (φ)	1.3	0.5 to 2.3	13
Skewness, total sample	0.3	-1.4 to 1.6	13
Kurtosis, total sample	9.4	0.4 to 23.9	13
Mean grain size, noncarbonate fraction (φ)	3.1	2.2 to 5.5	13
Standard deviation, noncarbonate fraction (φ)	1.2	0.4 to 2.9	13
Mean grain size, carbonate fraction (φ)	-0.1	-1.8 to 1.4	13
Standard deviation, carbonate fraction (φ)	1.3	0.4 to 2.6	13

Drilonereis longa Webster, 1879
(Described and illustrated by Pettibone, 1963a)

Collections were made only in Boca Ciega Bay at two survey stations (table 155).

Sediments at both were poorly sorted, fine sand. They contained about 10 percent shell, less than five percent silt and clay, and less than one percent organic carbon (table 156).

Bottom vegetation was recorded at one station, and consisted of a mixture of algae and turtle grass.

Neither gravid nor juvenile specimens were collected.

This species occurs along the Atlantic coast between New England and the Caribbean, and has been reported for the Pacific between central California and Mexico. There is no previous record for D. longa in the Gulf of Mexico.

Table 155.--Drilonereis longa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-2	2			D-17	1		

Table 156.--Drilonereis longa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.1	25.2 to 27.0	2
Salinity (‰)	34.0	33.2 to 34.8	2
pH	8.2	--	2
Depth (m.)	0.5	1 to 0.7	2
Sediment type	sand	--	2
Granules (wt. %)	4.4	1.7 to 7.1	2
Sands (wt. %)	92.6	91.2 to 93.9	2
Silts (wt. %)	2.0	0.3 to 3.7	2
Clay (wt. %)	1.0	0.7 to 1.4	2
CaCO ₃ (wt. %)	9.9	7.3 to 12.6	2
Organic carbon (wt. %)	0.4	--	1
Organic nitrogen (wt. %)	0.03	--	1
Mean grain size, total sample (Ø)	2.6	2.5 to 2.8	2
Standard deviation, total sample (Ø)	1.5	1.2 to 1.8	2
Skewness, total sample	-0.2	-0.6 to 0.1	2
Kurtosis, total sample	6.8	4.6 to 9.0	2
Mean grain size, noncarbonate fraction (Ø)	2.8	2.5 to 3.1	2
Standard deviation, noncarbonate fraction (Ø)	1.5	1.4 to 1.5	2
Mean grain size, carbonate fraction (Ø)	-0.04	-0.2 to 0.1	2
Standard deviation, carbonate fraction (Ø)	1.2	0.9 to 1.4	2

Drilonereis magna Webster and Benedict, 1887
(Described and illustrated by Pettibone, 1963a)

A total of 14 collections at survey stations came from all areas of the Estuary except Hillsborough Bay. In addition, specimens were found at one incidental locality in Boca Ciega Bay and at another in lower Tampa Bay (table 157).

Sediments at dredge and shovel stations all contained more than 90 percent sand, which was mostly fine and poorly sorted. Average shell content was over 15 percent, silt and clay content was under two percent, and organic carbon was less than one percent (table 158).

Bottom vegetation was recorded at one-half of these stations. Algae were present together with shoal, turtle, or manatee grass.

No gravid specimens were collected, however, a juvenile worm was found in September.

D. magna has been reported from the northeastern Pacific, the southeastern Atlantic, and the western Atlantic between Canada and Florida. It has also been recorded in the Gulf of Mexico.

Table 157.--Drilonereis magna--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-7-A		1							
Upper Tampa Bay									
11-28-1		1			13-1-A		2		
12-1		3			13-1-B		1		
Boca Ciega Bay									
D-2		2			PB-4		1		
D-6		1			14-3		2		
D-15		1							
Terra Ceia Bay									
E-2		2			E-6		2		
Lower Tampa Bay									
15-25		2			17-3		2		

Table 158.--Drilonereis magna--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.5	13.0 to 33.2	13
Salinity (‰)	29.8	24.4 to 34.0	13
pH	8.1	7.9 to 8.3	13
Depth (m.)	0.8	1 to 3.0	13
Sediment type	sand	--	13
Granules (wt. %)	2.6	0.0 to 7.1	13
Sands (wt. %)	95.6	91.2 to 99.2	13
Silts (wt. %)	1.1	0.1 to 3.0	13
Clay (wt. %)	0.5	0.0 to 1.4	13
CaCO ₃ (wt. %)	15.5	1.7 to 85.2	12
Organic carbon (wt. %)	0.2	0.1 to 0.3	9
Organic nitrogen (wt. %)	0.01	0.00 to 0.03	9
Mean grain size, total sample (Ø)	2.2	0.5 to 2.8	12
Standard deviation, total sample (Ø)	1.2	0.6 to 1.8	12
Skewness, total sample	0.1	-1.2 to 1.6	12
Kurtosis, total sample	10.7	0.4 to 21.2	12
Mean grain size, noncarbonate fraction (Ø)	2.6	1.9 to 3.4	12
Standard deviation, noncarbonate fraction (Ø)	1.1	0.4 to 1.9	12
Mean grain size, carbonate fraction (Ø)	0.1	-1.3 to 1.1	9
Standard deviation, carbonate fraction (Ø)	1.1	0.6 to 1.7	9

Arabella sp.

In the single specimen collected, the prostomium was missing so that the presence or absence of eyes could not be determined. Setae are all of the hooded, acicular type (figure 7,C). Maxillary supports, maxillae, and mandibles have been illustrated (figure 7,D,E,). This species is probably quite closely related to A. mutans which has been reported from North Carolina and other localities in the Atlantic and Pacific (Day, 1967).

This undetermined arabellid was collected at a single station in lower Tampa Bay (table 159).

Table 159.--Arabella sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay						
Stations			Individuals			
			D	S	N	
18-3					1	

Family DORVILLEIDAE Chamberlin, 1919

As a group, the dorvilleids are distributed in seas at all latitudes throughout the world. They are small carnivores that inhabit a variety of bottom types where they crawl or burrow.

Three species were collected in Tampa Bay. Dorvillea rudolphi was found in all areas of the Estuary, while Ophryotrocha puerilis and Dorvillea sp. were collected only in areas of reduced salinity.

Key to DORVILLEIDAE Collected in Tampa Bay

- 1 Antennae and palps minute; head and body segments bear rings of cilia Ophryotrocha puerilis
- Antennae and palps long and smooth Dorvillea sp.
- Antennae and palps long; antennae segmented and palps smooth Dorvillea rudolphi

Dorvillea rudolphi (delle Chiaje, 1828)
(Described and illustrated by Hartman, 1945)

Specimens were collected at a total of 32 survey stations in all areas of the Estuary and at six other incidental localities in Old Tampa Bay, upper Tampa Bay, Boca Ciega Bay, and lower Tampa Bay (table 160).

Most collections were made in poorly sorted, fine sand, but some worms were also taken in extremely soft sediments that contained a high percentage of silt and clay. Shell in the granule and sand particle size classes

comprised about 25 percent of the sediment. Average silt and clay content was nearly 10 percent, and organic carbon was one percent (table 161). Algae were present at 10 of the 25 dredge and shovel stations, together with shoal grass or turtle grass.

Individuals with mature gametes were collected in August and September, and a juvenile was found in August.

D. rudolphi has been recorded on both sides of the Atlantic in temperate and tropical waters. It has also been collected in the Gulf of Mexico and the eastern Pacific.

Table 160.--Dorvillea rudolphi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
3-1-A		2		6-1-A		1	
4-19	1			6-2	2		
Hillsborough Bay							
C-7		1		10-18		11	
Upper Tampa Bay							
11-8			1	11-20			1
11-18			2	11-28-1		5	
11-19	1			13-1-A		1	
Boca Ciega Bay							
BC-G		1		15-1	1		
BC-M			1	15-3		6	
BC-N	8			15-4	2		
D-2	5		1	15-12			1
D-18		4		16-1		1	
PB-4			1	16-2		6	
PB-5			2				
Terra Ceia Bay							
E-1	1			E-3			1
E-2		1					
Lower Tampa Bay							
16-14	1			17-3	4		
17-2	1			18-3	6		

Table 161.--Dorvillea rudolphi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	14.6 to 31.8	25
Salinity (‰)	29.6	18.3 to 34.9	25
pH	8.1	7.5 to 8.4	24
Depth (m.)	1.2	1 to 4.0	25
Sediment type	sand	shelly sand to silty clay	25
Granules (wt. %)	7.9	0.0 to 45.2	25
Sands (wt. %)	82.4	14.6 to 99.4	25
Silts (wt. %)	4.6	0.0 to 35.2	25
Clay (wt. %)	5.3	0.0 to 65.9	25
CaCO ₃ (wt. %)	25.1	0.7 to 95.0	24
Organic carbon (wt. %)	1.0	0.1 to 4.8	14
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	14
Mean grain size, total sample (Ø)	2.3	-1.0 to 7.2	24
Standard deviation, total sample (Ø)	1.6	0.6 to 2.7	24
Skewness, total sample	0.2	-1.7 to 3.4	24
Kurtosis, total sample	7.5	-0.6 to 73.5	24
Mean grain size, noncarbonate fraction (Ø)	3.3	2.3 to 8.7	24
Standard deviation, noncarbonate fraction (Ø)	1.5	0.4 to 3.2	24
Mean grain size, carbonate fraction (Ø)	-0.1	-2.6 to 2.1	23
Standard deviation, carbonate fraction (Ø)	1.2	0.2 to 2.3	23

Ophyrotrocha puerilis Claparede and Metschnikov, 1869
(Described and illustrated by Day, 1967)

This minute worm was collected at only one station in upper Tampa Bay (table 162).

Sediment there was poorly sorted, medium sand that contained little shell, less than one percent organic carbon, and over 12 percent silt and clay (table 163).

No vegetation was recorded.

The single specimen collected was mature, but was not in reproductive condition.

O. puerilis is a cosmopolitan species found in the littoral zone of temperate and tropical seas. It has not been previously reported from the Gulf of Mexico.

Table 162.--Ophryotrocha puerilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
11-28		1							

Table 163.--Ophryotrocha puerilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.0	--	1
Salinity (‰)	24.9	--	1
pH	7.9	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	1.8	--	1
Sands (wt. %)	85.5	--	1
Silts (wt. %)	10.5	--	1
Clay (wt. %)	2.2	--	1
CaCO ₃ (wt. %)	3.3	--	1
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.01	--	1
Mean grain size, total sample (Ø)	1.9	--	1
Standard deviation, total sample (Ø)	1.8	--	1
Skewness, total sample	1.1	--	1
Kurtosis, total sample	5.6	--	1
Mean grain size, noncarbonate fraction (Ø)	2.5	--	1
Standard deviation, noncarbonate fraction (Ø)	1.2	--	1
Mean grain size, carbonate fraction (Ø)	0.6	--	1
Standard deviation, carbonate fraction (Ø)	1.0	--	1

Dorvillea sp.

This undetermined dorvilleid is less than 5 mm. long and about 0.5 mm. wide. No eyes were noted. Both the palps and antennae are smooth. The simple setae have a faintly spinous margin and taper to a fine tip (figure 7,F). Compound setae have a very short, distal appendage that bears two, terminal teeth (figure 7,G).

Specimens were collected at one station in Old Tampa Bay and one in Hillsborough Bay (table 164).

Sediments at both stations were moderately sorted, medium sand. Data are not available for the content of organic carbon, but it was probably quite low as the silt and clay content was less than one percent (table 165).

No vegetation was noted at either station.

Both specimens appeared mature, but no gametes were observed.

Table 164.--Dorvillea sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-2		1							
Hillsborough Bay									
8-9		1							

Table 165.--Dorvillea sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	30.9	30.0 to 31.8	2
Salinity (‰)	21.3	18.8 to 23.8	2
pH	7.6	7.3 to 7.8	2
Depth (m.)	1.3	1 to 2.0	2
Sediment type	sand	--	2
Granules (wt. %)	3.1	0.0 to 6.4	2
Sands (wt. %)	96.7	93.6 to 99.9	2
Silts (wt. %)	0.03	0.0 to 0.07	2
Clay (wt. %)	0.02	0.0 to 0.05	2
CaCO ₃ (wt. %)	16.3	0.6 to 32.0	2
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (Ø)	2.0	1.4 to 2.5	2
Standard deviation, total sample (Ø)	0.9	0.5 to 1.3	2
Skewness, total sample	-0.4	-0.5 to -0.3	2
Kurtosis, total sample	10.7	0.1 to 21.3	2
Mean grain size, noncarbonate fraction (Ø)	3.0	3.0 to 3.1	2
Standard deviation, noncarbonate fraction (Ø)	1.8	1.7 to 2.0	2
Mean grain size, carbonate fraction (Ø)	-0.7	-1.7 to -0.2	2
Standard deviation, carbonate fraction (Ø)	1.3	1.1 to 1.5	2

Figure 7. -- Diagnostic features of Lumbrineris sp.,
Arabella sp., and Dorvillea sp.

Lumbrineris sp.: (A) Simple, hooked seta from the
third setiger (B) Simple, hooked
seta from the tenth setiger

Arabella sp.: (C) Parapod and hooded, acicular
setae (D) Maxillary supports and
maxillae (E) Mandibles

Dorvillea sp.: (F) Simple seta from a median
parapod (G) Compound, hooked seta
from a median parapod.

FIGURE 7

Family LYSARETIDAE Kinberg, 1865

Members of this small family are found in temperate and tropical waters throughout the world. Some have been reported as commensals or parasites in crustaceans, and others are carnivores that excavate burrows in sandy sediments.

A single species, Lysarete brasiliensis, was collected in Tampa Bay.

Lysarete brasiliensis Kinberg, 1865
(Described and illustrated by Hartman, 1951)

This species was collected only at two incidental localities. A small specimen was taken by net near station D-25 in lower Boca Ciega Bay, and a much larger one was collected from the conveyor of an hydraulic clam dredge along transect-14.

The individual collected in Boca Ciega Bay in April was a juvenile.

Family ORBINIIDAE Hartman, 1942

The orbinids are burrowing or crawling polychaetes that subsist on detritus and a variety of interstitial organisms. The family is well represented in all seas.

Six species were collected in Tampa Bay. Two of these, Scoloplos robustus and Scoloplos rubra, were collected in all areas of the Estuary. Orbinia ornata and Scoloplos fragilis were found in Old Tampa Bay, and upper and lower Tampa Bay, while Naineris sp. was taken only at stations seaward of Interbay Peninsula in upper Tampa Bay, Boca Ciega Bay, and Terra Ceia Bay. Naineris setosa had the most restricted distribution, and was collected solely in Boca Ciega Bay.

Key to ORBINIIDAE Collected in Tampa Bay

- 1 Prostomium short, anterior margin rounded 2
- Prostomium long and conical 3
- 2 Branchiae appear on setiger eight; acicular setae present in anterior neuropodia Naineris sp.
- Branchiae appear on setiger 4 to 6, acicular setae not present Naineris setosa
- 3 Acicular setae present in neuropodia of anterior segments 4
- Acicular setae absent 5
- 4 Papillae present on ventrum of some anterior segments..... Orbinia ornata

- Ventrum smooth Scoloplos rubra
- 5 Subpodal papillae present on branchial
segments Scoloplos fragilis
- Subpodal lamella present on branchial
segments Scoloplos robustus

Naineris setosa (Verrill, 1900)
(Described and illustrated by Hartman, 1951)

Specimens were collected only in Boca Ciega Bay at two survey stations and four incidental localities (table 166).

Sediments at survey stations were poorly sorted sand. Average content of silt and clay was nearly six percent and organic carbon was almost two percent. Coarse, moderately sorted shell, with a few larger fragments, comprised about 16 percent of the sediment (table 167).

Algae were recorded at all survey stations, and the sea grasses found included shoal grass and turtle grass. Turtle grass was also recorded at all incidental localities. N. setosa is apparently restricted to sea grass beds in areas where salinity is 30 parts per thousand, or higher.

Neither gravid nor juvenile specimens were collected

N. setosa is known only from the tropical, eastern Atlantic, the Caribbean, and the Gulf of Mexico.

Table 166.--Naineris setosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-25	1			16-2	2		

Table 167.--Naineris setosa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.8	17.4 to 25.0	3
Salinity (‰)	32.8	31.5 to 34.0	3
pH	8.2	8.0 to 8.4	3
Depth (m.)	0.3	--	3
Sediment type	sand	--	3
Granules (wt. %)	3.1	0.6 to 7.5	3
Sands (wt. %)	91.3	88.9 to 94.8	3
Silts (wt. %)	4.6	2.1 to 8.0	3
Clay (wt. %)	1.0	0.3 to 1.9	3
CaCO ₃ (wt. %)	16.3	9.6 to 23.4	3
Organic carbon (wt. %)	1.6	0.1 to 4.5	3
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	3
Mean grain size, total sample (Ø)	2.8	1.9 to 3.4	3
Standard deviation, total sample (Ø)	1.4	1.0 to 1.8	3
Skewness, total sample	0.2	-0.4 to 0.6	3
Kurtosis, total sample	5.0	1.2 to 11.6	3
Mean grain size, noncarbonate fraction (Ø)	4.74	2.5 to 8.7	3
Standard deviation, noncarbonate fraction (Ø)	1.5	1.1 to 2.2	3
Mean grain size, carbonate fraction (Ø)	0.8	0.5 to 1.1	3
Standard deviation, carbonate fraction (Ø)	0.7	0.4 to 0.9	3

Orbinia ornata (Verrill, 1873)
(Described and illustrated by Pettibone, 1963a)

Collections were made at four survey stations from Old Tampa Bay to lower Tampa Bay, and at one incidental locality (Port Tampa) in Old Tampa Bay (table 168).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that contained about five percent silt and clay, nearly 19 percent shell, and less than one percent organic carbon (table 169).

One-half of the bottom samples contained vegetation. Algae were noted at all, and some also had shoal, manatee or widgeon grass.

Neither juveniles nor gravid specimens were collected.

O. ornata occurs in the Gulf of Mexico and on the eastern and western North American coasts in temperate and tropical waters.

Table 168.--Orbinia ornata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-1-C		1							
Upper Tampa Bay									
11-16		1							
Lower Tampa Bay									
D-27		1			15-18		1		

Table 169.--Orbinia ornata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.3	24.9 to 30.0	4
Salinity (‰)	28.0	24.1 to 32.6	4
pH	8.0	7.8 to 8.2	4
Depth (m.)	1.0	1 to 8.0	4
Sediment type	sand	--	4
Granules (wt. %)	3.2	0.3 to 10.5	4
Sands (wt. %)	91.4	72.8 to 99.4	4
Silts (wt. %)	3.5	0.0 to 11.8	4
Clay (wt. %)	1.9	0.0 to 4.9	4
CaCO ₃ (wt. %)	18.6	1.5 to 58.4	4
Organic carbon (wt. %)	0.6	0.1 to 2.0	4
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	4
Mean grain size, total sample (Ø)	2.5	2.3 to 2.8	4
Standard deviation, total sample (Ø)	1.4	0.9 to 2.7	4
Skewness, total sample	0.2	-0.6 to 1.6	4
Kurtosis, total sample	5.9	0.3 to 13.7	4
Mean grain size, noncarbonate fraction (Ø)	2.7	2.1 to 3.1	4
Standard deviation, noncarbonate fraction (Ø)	1.0	0.6 to 1.9	4
Mean grain size, carbonate fraction (Ø)	0.4	-0.4 to 1.0	4
Standard deviation, carbonate fraction (Ø)	1.3	0.9 to 2.0	4

Scoloplos fragilis (Verrill, 1873)
(Described and illustrated by Hartman, 1951)

Specimens were collected at one survey station in upper Tampa Bay, and at two incidental localities (table 170). The incidental collections came from a sandy shoal south of Gandy Bridge in Old Tampa Bay, and a sandy beach on a small shoal near transect-18 in lower Tampa Bay.

On the basis of analyses from a single station, sediments were composed almost entirely of poorly sorted, fine, siliceous sand (table 171).

The only plants recorded were algae.

Neither gravid nor juvenile specimens were collected.

S. fragilis has been recorded in the Gulf of Mexico and on the Atlantic seaboard from Canada to southern Florida.

Table 170.--Scoloplos fragilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D		8							

Table 171.--Scoloplos fragilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	16.0	--	1
Salinity (‰)	27.9	--	1
pH	8.3	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	5.5	--	1
Sands (wt. %)	94.5	--	1
Silts (wt. %)	0.0	--	1
Clay (wt. %)	0.0	--	1
CaCO ₃ (wt. %)	1.7	--	1
Organic carbon (wt. %)	0.1	--	1
Organic nitrogen (wt. %)	0.00	--	1
Mean grain size, total sample (Ø)	2.4	--	1
Standard deviation, total sample (Ø)	1.6	--	1
Skewness, total sample	-1.6	--	1
Kurtosis, total sample	10.6	--	1
Mean grain size, noncarbonate fraction (Ø)	2.5	--	1
Standard deviation, noncarbonate fraction (Ø)	0.6	--	1
Mean grain size, carbonate fraction (Ø)	1.8	--	1
Standard deviation, carbonate fraction (Ø)	1.0	--	1

Scoloplos robustus (Verrill, 1873)
(Described and illustrated by Pettibone, 1963a)

This species was found in all areas of the Estuary at a total of 101 survey stations, and 10 incidental localities in all areas except Terra Ceia Bay (table 172). I expect that unidentifiable anterior fragments from an additional 36 survey stations, which have not been included, should actually be referred to this species.

Sediment data show that the worm inhabited firm to soft bottom, but was found mostly in poorly sorted, fine sand. Average silt and clay content was under five percent, shell was less than 10 percent, and organic carbon was nearly one percent (table 173).

Algae were present at about one-half of the dredge and shovel stations, together with one or more of the five sea grasses found in the Estuary.

No gravid specimens were collected, but juvenile worms were found in February, June, July, August, September, October, November, and December.

S. robustus has been collected in the Gulf of Mexico and is otherwise known from the Atlantic coast between Canada and North Carolina.

Table 172.--Scoloplos robustus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-2		3		5-3	2		
A-5		5		5-4	3		
A-6		4		5-7	3		
B-1		9		6-1-A		1	
B-2		12		6-1-C		1	
3-12	3			6-1-D		5	
3-13	12			6-2	1		
3-14		1		6-4-A	4		
4-5	1			6-5	1		
4-19	2			6-7-A		7	
5-2	2		1	6-8		2	
Hillsborough Bay							
C-1		41		9-1		30	
C-4		11		10-15	1		
8-9	6		1	10-23		6	
Upper Tampa Bay							
10-1-A		1		10-13	3		
10-2	1			10-14-A		7	
10-6	1			11-1		3	
10-8	1			11-28		1	
10-11	1			11-28-1		2	

Table 172.--Scoloplos robustus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	2			15-2	42		
BC-E	3			15-3	1		
BC-G		2		15-6	5		
BC-M	27		1	15-8	2		
BC-N	2			15-11	7		
D-2	6			15-12	20		
D-3		1		15-13	15		
D-6		49		15-15	4		
D-23		6		15-16	1		
D-24			2	15-17	4		
D-25		1	1	16-1		8	
PB-1		12		16-3		1	
PB-4	22			16-4		2	
PB-5	1			16-6	6		
14-1-A		2		16-8		3	
14-4	26						
Terra Ceia Bay							
E-1			1	E-6	1		
E-5	16			E-8	1		
Lower Tampa Bay							
D-27		2		16-14	1		
14-6	18			16-20	7		
14-7	7			16-21	19		
14-8	9			16-22	23		
14-9	14			16-23	42		
14-16	5			16-24	3		
14-17	3			17-2	3		
14-19		12		17-8	22		
15-18	5			17-9	7		
15-32	10			17-10	12		
15-33		2		17-12	21		
16-9-A		1		17-13	14		
16-10	2			17-14	11		
16-13	12			18-4	2		

Table 173.--Scoloplos robustus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.3	13.0 to 34.1	101
Salinity (‰)	28.4	15.6 to 35.1	101
pH	8.0	7.1 to 8.4	91
Depth (m.)	0.9	1 to 4.0	101
Sediment type	sand	shelly sand to sandy clay	101
Granules (wt. %)	2.2	0.0 to 20.8	101
Sands (wt. %)	94.0	24.5 to 99.9	101
Silts (wt. %)	2.4	0.0 to 22.1	101
Clay (wt. %)	1.5	0.0 to 65.9	101
CaCO ₃ (wt. %)	8.8	0.5 to 68.0	101
Organic carbon (wt. %)	0.7	0.01 to 6.9	68
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	68
Mean grain size, total sample (Ø)	2.6	0.6 to 7.1	100
Standard deviation, total sample (Ø)	1.2	0.5 to 2.7	100
Skewness, total sample	0.3	-1.4 to 2.2	100
Kurtosis, total sample	12.6	-0.6 to 43.9	99
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 6.1	99
Standard deviation, noncarbonate fraction (Ø)	1.4	0.5 to 3.2	99
Mean grain size, carbonate fraction (Ø)	-0.1	-2.5 to 2.5	92
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	92

Scoloplos rubra (Webster, 1879)
(Described and illustrated by Hartman, 1951)

The most common orbinid found in the Estuary, S. rubra was collected in all six areas at a total of 156 survey stations and seven incidental localities (table 174).

Specimens were found in a variety of firm to soft sediment types, but the majority were collected in poorly sorted, fine sand. Although higher at some stations, average silt and clay content was usually less than five percent. Average shell content was over 10 percent, and organic carbon was nearly one percent (table 175).

Forty percent of the dredge and shovel collections contained algae together with one or more of the five sea grasses found in the Estuary.

No gravid specimens were collected, but juveniles were found from June through October.

S. rubra has been recorded from the Gulf of Mexico and the southwestern Atlantic between Virginia and the Caribbean.

Table 174.--Scoloplos rubra--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B	6			4-7	6		
B-2		15		4-8	7		
1-2	2			4-9	10		
1-3	3		1	4-10	3		
1-4	25			4-11	2		
1-5	18			4-12	6		
2-1		1		4-13	1		
2-2	2			4-14	1		
2-3	3			4-15	1		
2-4	5			4-16	1		
2-5	3			4-17-A	1		
3-1-A		1		4-20		1	
3-2	2			5-1-B	1		
3-3	3			5-2	9		
3-8	2			5-3	35		
3-9	4			5-4	10		
3-10	1			5-5	5		
3-12	6			5-6	1		
3-14		2		5-13	1		
3-15		3		6-1-A		2	
3-16		17		6-1-B		5	
4-2	1			6-1-C		1	
4-5	4			6-1-D		1	
4-6	9			6-7-A		12	
Hillsborough Bay							
C-2	1			10-19	10		
C-3	5			10-20	1		
9-3	2			10-22	27		10
10-15	43		1	10-23		4	
10-16	28						

Table 174.--Scoloplos rubra--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-4	4			11-28	1		
10-8	1			11-28-1	7		
10-9	1			11-28-2	1		
10-10	1			12-1	1		
10-11	1			12-11	1		
10-12	7			12-14	2		
10-13	2			12-15	2		
11-2		1		13-1-A		4	
11-16	1			13-1-B		1	
11-25	62			13-8	2		
11-26	32			13-12	1		
11-27	13						
Boca Ciega Bay							
BC-A	3			14-4	6		
BC-G		2		15-1	1		
BC-M	22		10	15-2		2	
BC-N	1			15-3		2	
D-2	4			15-6	1		
D-3		2		15-9		1	
D-6		2		15-11	4		
D-9	1			15-12	5		
D-11		17		15-13	9		
D-12		5		15-14	1		
D-19-A		1		15-17	1		
D-23		12		16-3		1	
D-25		1		16-4		3	
PB-1		26		16-5		1	
PB-4	2			16-8		2	
14-1-A		4					
Terra Ceia Bay							
E-1	6			E-4	6		
E-2		6		E-6	3		
E-3	3			E-7	8		

Table 174.--Scoloplos rubra--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	2			16-14	101		1
14-6	10			16-15	15		
14-9	2			16-16	6		
14-10	4			16-17	1		
14-13	1			16-19	1		
14-14	4			16-21	5		
14-16	1			16-22	6		
14-18	3			16-23	6		
15-22	1			16-24	1		
15-23	18			16-27	1		
15-25	17			17-3	17		
15-26	9			17-4	7		
15-27	1			17-6	5		
15-31	2			17-7	3		
15-32	5			17-8	5		
15-33		1		17-10	5		
16-9		1		17-12	2		
16-10	2			17-13	1		
16-12			9	17-15		3	
16-13	9						

Table 175.--Scoloplos rubra--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.6	13.0 to 33.8	161
Salinity (‰)	28.0	16.4 to 34.8	161
pH	8.0	7.0 to 8.4	160
Depth (m.)	1.0	1 to 3.0	161
Sediment type	sand	shelly sand to sandy clay	142
Granules (wt. %)	2.7	0.0 to 99.7	160
Sands (wt. %)	92.2	8.0 to 100	160
Silts (wt. %)	2.9	0.0 to 22.8	160
Clay (wt. %)	1.8	0.0 to 65.9	160
CaCO ₃ (wt. %)	11.3	0.6 to 85.2	159
Organic carbon (wt. %)	0.8	0.1 to 6.9	108
Organic nitrogen (wt. %)	0.1	0.00 to 0.3	108
Mean grain size, total sample (Ø)	2.5	-4.0 to 7.1	159
Standard deviation, total sample (Ø)	1.3	0.6 to 3.0	159
Skewness, total sample	0.6	-1.6 to 3.6	159
Kurtosis, total sample	11.5	-0.8 to 76.3	159
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 8.1	156
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 2.7	156
Mean grain size, carbonate fraction (Ø)	-0.2	-2.5 to 2.4	144
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	144

Naineris sp.

This undetermined orbinid resembles Naineris setosa. It is smaller, however (about 1 mm. wide by 20 mm. long) and has acicular setae on thoracic segments. Behind the short, rounded prostomium, there are several parapods with long, dorsal and ventral cirri (figure 8,A). Branchiae begin on setiger eight and at first are shorter than the dorsal cirrus (figure 8,B). By setiger 18, the branchiae are at least twice the length of dorsal cirri and are present on all except a few posterior segments (figure 8,C). On anterior segments, notopodia have long spinigers (figure 8,D) and neuropodia have shorter spinigers, geniculate setae (figure 8,E) and acicular setae (figure 8,F). In median and posterior segments there are only spinigers.

Specimens were collected at a total of six survey stations in upper Tampa Bay, Boca Ciega Bay, and Terra Ceia Bay (table 176).

Average sediment at shovel stations was poorly sorted, fine sand. It contained about 12 percent shell, slightly more than five percent silt and clay, and nearly one percent organic carbon (table 177).

Plants found at three stations included algae, shoal grass, turtle grass, and manatee grass.

Juvenile worms were collected in September, October, and December, but no gravid specimens were found.

Table 176.--Naineris sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
11-28-1		7							
Boca Ciega Bay									
D-18		1			PB-1		1		
D-26		30			16-8		15		
Terra Ceia Bay									
E-6		58							

Table 177.--Naineris sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.7	13.0 to 25.5	5
Salinity (‰)	30.6	24.4 to 34.9	5
pH	8.1	8.0 to 8.2	5
Depth (m.)	0.3	--	5
Sediment type	sand	--	4
Granules (wt. %)	2.9	0.4 to 7.0	4
Sands (wt. %)	90.4	81.0 to 98.2	4
Silts (wt. %)	5.0	0.1 to 13.4	4
Clay (wt. %)	0.9	0.0 to 2.1	4
CaCO ₃ (wt. %)	11.5	3.8 to 18.0	3
Organic carbon (wt. %)	0.9	0.2 to 2.6	4
Organic nitrogen (wt. %)	0.05	0.02 to 0.07	4
Mean grain size, total sample (Ø)	2.7	2.3 to 3.4	3
Standard deviation, total sample (Ø)	1.6	0.9 to 2.0	3
Skewness, total sample	0.3	-0.2 to 1.0	3
Kurtosis, total sample	9.0	2.6 to 21.2	3
Mean grain size, noncarbonate fraction (Ø)	2.9	2.3 to 3.5	4
Standard deviation, noncarbonate fraction (Ø)	1.3	0.7 to 2.1	4
Mean grain size, carbonate fraction (Ø)	0.2	-0.6 to 1.1	4
Standard deviation, carbonate fraction (Ø)	1.1	0.9 to 1.4	4

Family PARAONIDAE Cerruti, 1909

These small worms occur in all seas where they burrow in surface sediments, and ingest sand grains and detritus.

Four species were found in Tampa Bay. Aricidea fragilis and Aricidea sp. were found in all areas of the Estuary, and Aricidea taylori was absent only from Hillsborough Bay. Cirrophorus furcatus is apparently more sensitive to low salinity than the other three species as specimens were taken only in upper Tampa Bay, Boca Ciega Bay, and lower Tampa Bay.

Key to PARAONIDAE Collected in Tampa Bay

- 1 Less than 20 pairs of branchiae Aricidea sp.
- More than 20 pairs of branchiae 2
- 2 More than 40 pairs of branchiae Aricidea fragilis
- Less than 40 pairs of branchiae 3
- 3 Abdominal setigers bear capillary and furcate setae Cirrophorus furcatus
- Abdominal setigers bear capillary setae and bidentate hooks with a short arista that arises between the 2 terminal teeth Aricidea taylori

Aricidea fragilis Webster, 1879
(Described and illustrated by Pettibone, 1965)

The most common paraonid in Tampa Bay, A. fragilis was found at a total of 79 survey stations in all areas of the Estuary, and at an additional five incidental localities in Old Tampa Bay, Boca Ciega Bay, and lower Tampa Bay (table 178).

Specimens were taken from a variety of sediment types, but the average was poorly sorted, fine sand that contained over 10 percent shell, nearly six percent silt and clay, and about one percent organic carbon (table 179).

One-half of the dredge and shovel samples contained algae and one or more species of sea grasses that included shoal grass, manatee grass, turtle grass, and Halophila.

No gravid specimens were noted, but juveniles were collected in July through November.

A. fragilis has been recorded in the Gulf of Mexico and as far north as Virginia along the Atlantic seaboard.

Table 178.--Aricidea fragilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
3-1-A			1		6-1-D			1	
5-4		2			6-7-A			18	
Hillsborough Bay									
9-2		1							
Upper Tampa Bay									
D		1			10-13		2		
D-28			1		12-1			2	
10-0			1		13-1-A			3	

Table 178.--Aricidea fragilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	6			14-1-A		1	
BC-C		2		14-2	1		
BC-G		2		15-1	2		
BC-H	1			15-2		5	
BC-I	2			15-3		8	
BC-M	4		1	15-4	7		
D-1	10			15-5	3		
D-2	40			15-6	4		
D-3		15		15-8	6		
D-5			3	15-9		1	
D-6		33		15-10		1	
D-9	45			15-11	1		
D-10	13			15-12	3		
D-11	6	20		15-13	4		
D-13	2			15-14	2		
D-17	6			15-16	1		
D-18		10		16-1		30	
D-19-A		4		16-2		1	
D-22	1			16-3		14	
D-23		19		16-4		7	
D-25		17		16-5		5	
PB-1	5	29		16-7	1		
PB-4		8		16-8		16	
PB-5	8						
Terra Ceia Bay							
E-2		1		E-6		7	

Table 178.--Aricidea fragilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-16	1			16-23	1		
14-18	1			16-25		4	
15-18	1			17-2	3		
15-33		5		17-6	1		
16-9		3		17-8	23		
16-11	3			17-9	33		
16-19	1			17-10	4		
16-20	9			17-14	1		
16-21	5			17-15		14	
16-22	2						

Table 179.--Aricidea fragilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.9	13.0 to 33.8	87
Salinity (‰)	31.3	18.4 to 34.9	87
pH	8.1	7.5 to 8.5	82
Depth (m.)	0.7	1 to 4.0	87
Sediment type	sand	shelly sand to silty clay	86
Granules (wt. %)	2.3	0.0 to 28.8	87
Sands (wt. %)	91.5	11.2 to 99.6	87
Silts (wt. %)	4.4	0.0 to 44.4	87
Clay (wt. %)	1.5	0.0 to 43.8	87
CaCO ₃ (wt. %)	10.7	0.9 to 66.0	87
Organic carbon (wt. %)	0.8	0.1 to 6.9	61
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	61
Mean grain size, total sample (φ)	2.7	1.1 to 7.1	87
Standard deviation, total sample (φ)	1.3	0.6 to 3.0	87
Skewness, total sample	0.3	-1.6 to 2.2	87
Kurtosis, total sample	9.7	-0.8 to 73.5	87
Mean grain size, noncarbonate fraction (φ)	2.9	1.4 to 8.7	77
Standard deviation, noncarbonate fraction (φ)	1.3	0.4 to 3.2	77
Mean grain size, carbonate fraction (φ)	0.2	-2.5 to 3.0	71
Standard deviation, carbonate fraction (φ)	1.2	0.4 to 2.9	71

Aricidea taylori Pettibone, 1965

Except for Hillsborough Bay, this species was found throughout the Estuary at a total of 11 survey stations, and one incidental location near Oldsmar in Old Tampa Bay (table 180).

The only sediment type recorded was sand which was mostly fine and poorly sorted. Even though the silt and clay content was less than five percent, organic carbon was over one percent. Shell content was about 16 percent and most of it was in the sand size category (table 181).

About one-third of the dredge and shovel samples contained algae, and sea grasses that included shoal, turtle, and manatee grass.

No gravid specimens were noted and no juveniles were collected.

A. taylori has been collected in the Gulf of Mexico, and was previously known only from Seahorse Key, Florida.

Table 180.---Aricidea taylori---Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
B-2		2			6-7-A		1		
6-1-D		7							
Upper Tampa Bay									
11-2		6							
Boca Ciega Bay									
15-15		4							
Terra Ceia Bay									
E-2		6							
Lower Tampa Bay									
16-13		3			17-2		2		
16-14		5			17-15			1	
16-22		1							

Table 181.--Aricidea taylori--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.1	14.5 to 33.2	11
Salinity (‰)	29.5	24.1 to 34.5	11
pH	8.1	7.9 to 8.3	11
Depth (m.)	1.2	1 to 4.0	11
Sediment type	sand	--	11
Granules (wt. %)	1.8	0.0 to 7.9	11
Sands (wt. %)	94.9	90.7 to 99.3	11
Silts (wt. %)	2.3	0.4 to 6.6	11
Clay (wt. %)	1.1	0.1 to 3.7	11
CaCO ₃ (wt. %)	16.1	0.9 to 68.0	11
Organic carbon (wt. %)	1.4	0.2 to 3.3	8
Organic nitrogen (wt. %)	0.1	0.01 to 0.3	8
Mean grain size, total sample (Ø)	2.4	0.6 to 3.4	11
Standard deviation, total sample (Ø)	1.2	0.8 to 1.6	11
Skewness, total sample	0.7	-0.6 to 2.2	11
Kurtosis, total sample	10.9	2.1 to 30.1	11
Mean grain size, noncarbonate fraction (Ø)	3.8	1.9 to 8.1	11
Standard deviation, noncarbonate fraction (Ø)	1.7	0.4 to 3.2	11
Mean grain size, carbonate fraction (Ø)	0.2	-1.8 to 2.4	10
Standard deviation, carbonate fraction (Ø)	1.1	0.6 to 1.5	10

Cirrophorus furcatus (Hartman, 1957)
(Described and illustrated by Hartman, 1969)

Aside from a single collection along transect-12 in upper Tampa Bay, all specimens were found in more saline waters along transects 15, 16, and 17 (table 182).

All collections were made by dredge at an average depth of over 2 m. Sediments at these stations were mostly medium sand that was poorly sorted. The shell content was high, average amount of silt and clay was nearly five percent, and organic carbon was one percent (table 183).

Algae were present at only one dredge station, and no sea grass was noted.

Neither juveniles nor gravid adults were collected.

C. furcatus has never before been recorded in the Gulf of Mexico. Previous reports were limited to specimens collected along the coast of southern California.

Table 182.--Cirrophorus furcatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
12-8		1							
Boca Ciega Bay									
15-12		1			15-17		1		
Lower Tampa Bay									
15-22		2			16-15		1		
16-13		4			17-2		1		
16-14		7							

Table 183.--Cirrophorus furcatus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.4	16.0 to 26.8	8
Salinity (‰)	32.4	27.1 to 34.5	8
pH	8.1	7.9 to 8.3	8
Depth (m.)	2.2	1 to 4.0	8
Sediment type	sand	sand to silty sand	8
Granules (wt. %)	2.9	0.1 to 7.9	8
Sands (wt. %)	92.4	72.5 to 99.2	8
Silts (wt. %)	3.8	0.4 to 22.1	8
Clay (wt. %)	0.9	0.1 to 5.2	8
CaCO ₃ (wt. %)	34.2	2.3 to 68.0	8
Organic carbon (wt. %)	1.0	0.2 to 3.3	8
Organic nitrogen (wt. %)	0.1	0.02 to 0.2	8
Mean grain size, total sample (Ø)	2.0	0.6 to 4.1	8
Standard deviation, total sample (Ø)	1.4	0.7 to 2.0	8
Skewness, total sample	0.3	-0.1 to 0.7	8
Kurtosis, total sample	5.4	-0.04 to 17.3	8
Mean grain size, noncarbonate fraction (Ø)	3.6	2.2 to 5.9	8
Standard deviation, noncarbonate fraction (Ø)	1.6	0.6 to 3.2	8
Mean grain size, carbonate fraction (Ø)	0.2	-1.8 to 1.8	8
Standard deviation, carbonate fraction (Ø)	1.2	0.9 to 1.6	8

Aricidea sp.

This problematic species can be immediately recognized by its small number of branchiae, and distinctly, bifurcate antenna (figure 8,G). On branchial segments the notopodial lobe is about one-half as long as the branchial filament (figure 8,H). Sharply curved hooks with entire tip and arista occur in abdominal segments -- all other setae are capillary (figure 8,I).

Specimens were collected at a total of 38 survey stations in all areas of the Estuary, and at one incidental locality near Port Tampa in Old Tampa Bay (table 184).

They were generally found in poorly sorted, fine sand that contained an average of six percent shell, about five percent silt and clay, and over one percent organic carbon (table 185).

Sixty-five percent of the dredge and shovel samples contained algae. Shoal grass, turtle grass, manatee grass, and Halophila were also recorded.

Gravid specimens were not noted and no juvenile worms were collected.

Table 184.--Aricidea sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	3			5-3	1		
B-1		218		6-1-A		12	
B-2		3	2	6-1-B		6	
2-3	1			6-1-D		9	
3-14		1		6-2	12		
Hillsborough Bay "							
C-1		13		10-15	1		
C-2	2						
Upper Tampa Bay							
10-0		2		10-13	1		
10-11	1			11-28-1		1	
10-12	6			13-1-B		27	
Boca Ciega Bay							
D-23		2		16-5		13	
16-1		6		16-6	3		
16-2		1		16-7	2		
16-3		6		16-8		2	
16-4		56					
Terra Ceia Bay							
E-2		25		E-6		8	
Lower Tampa Bay							
14-5	1			16-22	12		
16-9-B		1		16-23	6		
16-20	3			16-27	2		
16-21	16			17-9	1		

Table 185.--Aricidea sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.5	13.0 to 32.0	38
Salinity (‰)	27.5	18.3 to 34.3	38
pH	8.0	7.7 to 8.4	36
Depth (m.)	0.7	1 to 1.7	38
Sediment type	sand	sand to sandy clay	38
Granules (wt. %)	1.8	0.0 to 13.4	38
Sands (wt. %)	92.8	24.5 to 99.9	38
Silts (wt. %)	2.7	0.0 to 9.6	38
Clay (wt. %)	2.6	0.0 to 65.9	38
CaCO ₃ (wt. %)	6.0	0.6 to 32.0	37
Organic carbon (wt. %)	1.1	0.1 to 4.8	26
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	26
Mean grain size, total sample (Ø)	2.7	1.4 to 7.1	37
Standard deviation, total sample (Ø)	1.2	0.7 to 2.7	37
Skewness, total sample	0.6	-1.3 to 2.6	37
Kurtosis, total sample	13.1	-0.6 to 43.8	37
Mean grain size, noncarbonate fraction (Ø)	3.2	1.4 to 8.7	38
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 2.8	38
Mean grain size, carbonate fraction (Ø)	-0.3	-2.2 to 1.4	35
Standard deviation, carbonate fraction (Ø)	1.4	0.5 to 3.1	35

Figure 8. -- Diagnostic features of Naineris sp., and Aricidea sp.

Naineris sp.: (A) Second setiger (B) Eighth setiger
(C) Eighteenth setiger (D) Median section
of spiniger showing arrangement of spines
(E) Geniculate neuroseta (F) Acicular
neuroseta

Aricidea sp.: (G) Head and anterior segments showing
antenna and branchiae (H) Branchial
segment (I) Hooked seta from abdominal
segment.

FIGURE 8

Family SPIONIDAE Grube, 1850

The spionids occur commonly in estuarine and neritic waters throughout the world, where they produce membranous dwelling tubes in sediment, shell, or rock. They are deposit feeders, and obtain food by means of long, ciliated tentacles that sweep through the water and across the bottom.

Thirteen species were collected in Tampa Bay. Aonides mayaguezensis is apparently confined to waters of high salinity, and was found only in lower Tampa Bay near Egmont Key. Somewhat more tolerant of brackish conditions, Dispio uncinata was collected as far into the Estuary as upper Tampa Bay. Six species were found in all areas of the Estuary (Paraprionospio pinnata, Prionospio cirrobranchiata, Scoelelepis squamata, Polydora socialis, Polydora websteri, and Streblospio benedicti). Of the remaining five species, four were found everywhere except Hillsborough Bay (Apoprionospio pygmaea, Prionospio heterobranchia texana, Spio setosa, and Spiophanes bombyx). Pseudopolydora sp. was collected in all areas except Terra Ceia Bay.

Key to SPIONIDAE Collected in Tampa Bay

- 1 Fifth setiger bears large, acicular setae 2
- Acicular setae absent 4
- 2 Hooded hooks commence on setiger 7 3

- Hooded hooks commence on setiger 8.. Pseudopolydora sp.
- 3 Hooded hooks constricted near middle of the shaft Polydora websteri
- Shaft of hooded hooks not constricted near middle Polydora socialis
- 4 Prostomium bears lateral projections; branchiae absent Spiophanes bombyx
- Prostomium smoothly rounded or pointed; branchiae present 5
- 5 Second setiger bears a raised, dorsal membrane with median notch; 1 pair of branchiae; 1 pair of palps Streblospio benedicti
- Dorsal membrane absent on second setiger; branchiae more numerous 6
- 6 Branchiae partially fused to notopodial lamellae 7
- Branchiae not fused to notopodial lamellae 8
- 7 Notopodia of anterior segments divided dorsally into numerous cirriform processes Dispio uncinata
- Notopodia not divided; prostomium acutely pointed; 4 eyes arranged in a line.. Scoelelepis squamata
- Notopodia not divided; prostomium broadly rounded; 4 eyes arranged in a rectangle Spio setosa
- 8 Branchiae all smooth and cirriform 9
- Some or all branchiae pinnate 10
- 9 Prostomium broad and rounded anteriorly; eyes indistinct or absent; no occipital tentacle Prionospio cirrobranchiata

- Prostomium narrow anteriorly; 4 eyes
in front of short, occipital
tentacle Aonides mayaquezensis
- 10 Branchiae 3 pairs, all
pinnate Paraprionospio pinnata
- Branchiae 5 pairs, first, fourth,
and fifth pinnate Prionospio heterobranchia texana
- Branchiae 4 pairs, fourth
pinnate Apoprionospio pygmaea

Aonides mayaquezensis Foster, 1969

Eight specimens were collected from a single station
(18-3) in lower Tampa Bay (table 186).

Sediment there was very poorly sorted, shelly sand
that contained more than 13 percent shell. Over 20 percent
of the sample consisted of particles in the granule size
category. Silt, clay, and organic carbon percentages were
quite low (table 187).

No vegetation was found at the collection site.

Neither gravid nor juvenile specimens were collected.

A. mayaquezensis was previously known only from the
type locality near Mayaguez, Puerto Rico.

Table 186.--Aonides mayaguezensis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
18-3	8						

Table 187.--Aonides mayaguezensis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.0	--	1
Salinity (‰)	33.8	--	1
pH	8.2	--	1
Depth (m.)	3.0	--	1
Sediment type	shelly sand	--	1
Granules (wt. %)	20.8	--	1
Sands (wt. %)	77.4	--	1
Silts (wt. %)	1.6	--	1
Clay (wt. %)	0.2	--	1
CaCO ₃ (wt. %)	13.2	--	1
Organic carbon (wt. %)	0.1	--	1
Organic nitrogen (wt. %)	0.02	--	1
Mean grain size, total sample (Ø)	0.9	--	1
Standard deviation, total sample (Ø)	2.0	--	1
Skewness, total sample	0.1	--	1
Kurtosis, total sample	-0.03	--	1
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation, noncarbonate fraction (Ø)	1.1	--	1
Mean grain size, carbonate fraction (Ø)	0.9	--	1
Standard deviation, carbonate fraction (Ø)	0.9	--	1

Apoprionospio pygmaea (Hartman, 1961)

(Described by Foster, 1969 and
illustrated by Hartman, 1969)

Specimens were collected at a total of 94 survey stations in all areas of the Estuary except Hillsborough Bay. In addition, individuals were found at two incidental localities in Boca Ciega Bay (table 188).

Sediments at dredge and shovel stations were mostly poorly sorted, fine sand that contained few large particles and less than 10 percent shell in all size categories. The average content of silt and clay was less than four percent, and organic carbon was under one percent (table 189).

Algae were present in bottom samples from 32 stations, and also found in one or more of these samples were shoal grass, turtle grass, and manatee grass.

No gravid specimens were noted, but juveniles were collected in August, September, and November.

A. pygmaea was previously known only from southern California.

Table 188.--Apoprionospio pygmaea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
3-8	2			5-3	2		
3-9	1			5-4	3		
3-10	3			5-5	3		
3-12	1			5-6	10		
3-13	1			5-7	6		
4-5	3			5-8	1		
4-10	3			5-11	6		
4-16	2			5-13	2		
4-19	10			6-4-A	15		
5-2	1			6-6	1		
Upper Tampa Bay							
D	4			11-4	14		
10-5	4			11-6	1		
10-6	11			11-21			1
10-7	1			12-5	14		
10-8	1			12-7	2		
10-9	6			12-15	2		
10-10	1			13-12	8		
10-12	4			13-13		1	
10-14-A	1						

Table 188.--Apoprionospio pygmaea--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-E	13			15-1	2		
BC-M			1	15-3	1		
BC-N	1			15-4	3		
D-1	5			15-5	1		
D-2	16			15-6	2		
D-3		2		15-8	2		
D-9	4			15-9		10	
D-11		1		15-10		1	
D-13	2			15-11	13		1
D-17	26		1	15-12	5		
D-19-A		1		15-13	14		1
D-24			2	15-17	8		
D-25		1		16-1		1	
PB-4	1			16-6	37		
PB-5	5			16-7	14		
14-2	2						
Terra Ceia Bay							
E-4	24			E-5	9		
Lower Tampa Bay							
14-5	11			16-22	30		
14-8	7			16-23	11		
14-16	2			17-3	5		
14-17	2			17-6	1		
14-18	12			17-7	1		
15-18	3			17-8	11		
15-19	9			17-9	30		
15-20	4			17-10	58		
16-11	2			17-12	2		
16-19	4			17-13	1		
16-20	17			17-14	9		
16-21	10			18-4	6		

Table 189.--Apoprionospio pygmaea--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.9	12.8 to 33.8	91
Salinity (‰)	29.0	19.2 to 34.8	91
pH	8.1	7.7 to 8.4	83
Depth (m.)	1.0	1 to 2.7	91
Sediment type	sand	shelly sand to silty sand	89
Granules (wt. %)	1.8	0.0 to 28.8	89
Sands (wt. %)	94.2	27.9 to 100	89
Silts (wt. %)	2.4	0.0 to 22.1	89
Clay (wt. %)	0.8	0.0 to 5.2	88
CaCO ₃ (wt. %)	8.4	0.6 to 85.2	89
Organic carbon (wt. %)	0.8	0.01 to 8.5	66
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	66
Mean grain size, total sample (Ø)	2.5	0.5 to 4.1	89
Standard deviation, total sample (Ø)	1.1	0.4 to 3.0	89
Skewness, total sample	0.6	-1.7 to 3.6	89
Kurtosis, total sample	15.7	-0.8 to 76.3	89
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 9.0	88
Standard deviation, noncarbonate fraction (Ø)	1.4	0.5 to 2.7	88
Mean grain size, carbonate fraction (Ø)	-0.2	-2.5 to 3.0	78
Standard deviation, carbonate fraction (Ø)	1.3	0.3 to 2.9	78

Dispio uncinata Hartman, 1951

Specimens were collected at only one survey station in upper Tampa Bay, and at one in Boca Ciega Bay (table 190).

In both localities the sediment was poorly sorted, fine sand. Shell content was less than 10 percent and there were few large shell fragments. Even though the percentage of silt and clay was less than four, organic carbon content was over two percent (table 191).

Algae were found in bottom samples from both stations, but no sea grasses were noted.

The specimen taken in Boca Ciega Bay in September was a juvenile. Off St. Petersburg Beach, juveniles were also collected in May. No gravid specimens were recorded.

D. uncinata has been collected in the Gulf of Mexico and is otherwise known from the waters of New England.

Table 190.--Dispio uncinata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-10	1						
Boca Ciega Bay							
15-4	1						

Table 191.--Dispio uncinata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.5	25.0 to 29.9	2
Salinity (‰)	26.8	20.5 to 33.1	2
pH	8.1	7.9 to 8.2	2
Depth (m.)	0.7	--	2
Sediment type	sand	--	2
Granules (wt. %)	4.8	0.0 to 9.7	2
Sands (wt. %)	91.8	83.7 to 100	2
Silts (wt. %)	2.8	0.0 to 5.7	2
Clay (wt. %)	0.5	0.0 to 1.0	2
CaCO ₃ (wt. %)	8.1	1.0 to 15.1	2
Organic carbon (wt. %)	2.5	--	1
Organic nitrogen (wt. %)	0.01	--	1
Mean grain size, total sample (Ø)	2.4	2.3 to 2.5	2
Standard deviation, total sample (Ø)	1.6	0.6 to 2.5	2
Skewness, total sample	-1.1	-1.4 to -0.8	2
Kurtosis, total sample	6.6	3.1 to 10.2	2
Mean grain size, noncarbonate fraction (Ø)	2.8	2.7 to 2.8	2
Standard deviation, noncarbonate fraction (Ø)	1.2	1.1 to 1.3	2
Mean grain size, carbonate fraction (Ø)	-0.9	-1.1 to -0.8	2
Standard deviation, carbonate fraction (Ø)	1.2	--	2

Paraprionospio pinnata (Ehlers, 1901)
(Described and illustrated by Foster, 1969)

Well represented in all areas of the Estuary, P.

pinnata was collected at a total of 197 survey stations, and at two incidental localities in Old Tampa Bay as well as one in Boca Ciega Bay. The area of least abundance was lower Tampa Bay. The worm was especially abundant at station 14-2 where 357 individuals were collected in a single dredge haul (table 192).

Although the worm was found mostly in sand, it occurred in a range of sediment types from shelly sand to silty clay. Average sediment at dredge and shovel stations was poorly sorted, very fine sand. The content of organic carbon was nearly one percent and the percentage of silt and clay was over 15 percent. Large shell fragments were present at only a few stations, and the average shell content of sediments was under 10 percent (table 193).

Twenty-eight percent of the bottom samples contained algae and sea grasses were present in many. Halophila was the only sea grass not recorded.

Gravid specimens were collected in August, and juveniles were taken in June through November.

P. pinnata has been collected in temperate and tropical waters of the Atlantic and in the eastern Pacific. It has also been recorded from the Gulf of Mexico.

Table 192.--Paraprionospio pinnata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B	55		7	4-10	11		2
B-1		1		4-11	42		
1-2	11			4-12	83		4
1-3	40		12	4-13	139		72
1-4	36		241	4-14	75		23
1-5	23		53	4-15	80		74
2-2	1			4-16	75		23
2-3	2			4-17-A	75		1
2-4	1			4-18-A	3		1
2-5	3			4-19	9		2
3-2	17			4-20			2
3-3	6			5-1-A		1	
3-4	49		163	5-1-B	5		6
3-5	27		85	5-2	5		
3-6	28		59	5-3	3		1
3-7	38		58	5-4	12		
3-8	52		4	5-5	7		
3-9	44			5-6	23		
3-10	7			5-7	4		
3-11	56		3	5-8	4		
3-12	116		6	5-9	3		
3-13	1			5-11	2		
4-2	11		6	5-12	14		2
4-3	9		10	5-13	9		
4-4	26		58	6-1-A		1	
4-5	62		3	6-1-C		1	
4-6	70		13	6-2	2		
4-7	116		93	6-4-A	27		
4-8	37		38	6-5	4		
4-9	48			6-6	2		

Table 192.--Paraprionospio pinnata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Hillsborough Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
C-2	51		3	9-2			14
C-3	4		56	9-3	64		1
C-4		3		9-4	31		9
C-5	1		2	9-5			1
C-6	1			9-6			26
7-1			2	9-7	3		8
7-3	1			9-8			3
8-1			24	10-15	29		10
8-2	11		18	10-16	20		
8-3	5		5	10-17	41		3
8-4			1	10-19	49		10
8-5			1	10-20	5		102
8-7			2	10-21			56
8-8			2	10-22	49		12
8-9			3				
Upper Tampa Bay							
10-6	1			11-18	112		22
10-8	5			11-19	87		19
10-9	4			11-20	27		18
10-12	4			11-21	9		18
10-14-B	4			11-22	69		18
11-4	9		2	11-23	80		8
11-6	23			11-24	105		17
11-7	34		36	11-25	161		43
11-8	46		100+	11-26	186		8
11-9	116			11-27	173		13
11-10			2	11-28		8	
11-11	9		8	11-28-2		2	
11-12	74		17	12-11	1		
11-13	36		7	12-14	15		
11-14	198		20	12-16	2		
11-15	352		26	13-12	18		
11-16	84		25	13-13		2	
11-17	28		23				

Table 192.--Paraprionospio pinnata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	55		5	PB-1	110	1	50
BC-A-1	1			PB-4	10		1
BC-C		3		PB-5	17		
BC-E	1			14-2	357		6
BC-H	9			14-3	37		
BC-I	32			14-4	188		
BC-M	66			15-1	42		2
BC-N	1			15-3		2	
D-1	31			15-4	50		
D-2	27			15-5	289		3
D-3		2		15-6	18		
D-5			28	15-8	135		3
D-6		3		15-9		10	
D-9	26			15-11	291		1
D-10	43		1	15-12	96		1
D-11		3		15-13	221		1
D-13	18		15	15-14	49		12
D-15	2		32	15-15	8		7
D-17	15		5	15-17	78		1
D-19-B	115			16-1		1	
D-20	57		12	16-5		4	
D-21	19		10	16-6	28		
D-22	75			16-7	79		2
D-24			2	16-8			1
D-25		1	1				
Terra Ceia Bay							
E-1	27		6	E-5	4		1
E-2		4		E-7	63		
E-3	218		42	E-8	1		
E-4	33						

Table 192.--Paraprionospio pinnata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-8	43			16-20	20		
14-19		1		16-21	6		
14-20		1		16-22	19		
15-18	39			17-2	1		
15-29	1			17-8	1		
15-32	2			17-9	5		
16-10	1			17-13	45		
16-11	2			17-14	32		
16-16	1						

Table 193.--Paraprionospio pinnata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.9	12.8 to 33.8	188
Salinity (‰)	27.1	15.6 to 34.8	187
pH	7.2	7.0 to 8.5	166
Depth (m.)	1.2	1 to 4.0	188
Sediment type	sand	shelly sand to silty clay	185
Granules (wt. %)	1.7	0.0 to 79.7	185
Sands (wt. %)	84.6	3.5 to 99.9	185
Silts (wt. %)	7.9	0.0 to 56.5	185
Clay (wt. %)	5.8	0.0 to 65.9	185
CaCO ₃ (wt. %)	9.7	0.6 to 66.0	185
Organic carbon (wt. %)	0.8	0.01 to 8.5	109
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	110
Mean grain size, total sample (Ø)	3.2	-4.0 to 8.0	185
Standard deviation, total sample (Ø)	1.4	0.4 to 3.5	185
Skewness, total sample	0.6	-1.7 to 3.6	185
Kurtosis, total sample	10.9	-1.3 to 76.3	185
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 9.0	176
Standard deviation, noncarbonate fraction (Ø)	1.5	0.4 to 3.2	176
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 3.0	169
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 3.1	169

Polydora socialis (Schmarda, 1861)
(Described and illustrated by Blake, 1971)

Found in all areas of the Estuary, P. socialis was collected at a total of 139 survey stations and at 12 incidental localities. Areas of least abundance were Old Tampa and Hillsborough Bays (table 194).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that contained over 15 percent shell. The content of silt and clay was about six percent and organic carbon was under one percent (table 195).

Algae, shoal grass, turtle grass, or manatee grass, were present in 58 of the bottom samples.

A gravid specimen was collected in September, and juvenile worms were found in August through December.

P. socialis has been reported from the Gulf of Mexico and is otherwise known along the Atlantic seaboard of North America and in the eastern Pacific.

Table 194.---Polydora socialis---Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-1		65		5-3	1		
A-3		6		5-12	1		
B-2		1		6-1-A		3	
3-10	2			6-1-B		1	
3-16		1		6-2	3		
4-11	1			6-3			1
4-12	1			6-4-A	2		
4-16	1			6-5	1		
5-2	3			6-7-A		1	
Hillsborough Bay							
C-3	1			8-10			1
C-8-2		1		10-18		1	
Upper Tampa Bay							
D	1			12-9	1		
10-1-A		3		12-10	1		
10-2			1	12-12	2		
10-3			1	12-13			5
10-12	1			12-14	6		4
10-13	1			12-15	2		
11-3	2			12-16	2		1
11-5	2			13-1-A		93	
11-16	1		1	13-3	8		
11-28		26		13-5	3		1
12-2			1	13-6	1		
12-3	1			13-8	1		
12-6	3			13-10			10
12-7	5			13-13		3	
12-8	1						

Table 194.--Polydora socialis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	1			14-3	1		
BC-A-1			2	14-4	11		1
BC-C		1	5	15-1	8		
BC-G		1		15-2		3	
BC-H	1			15-3	1		
BC-M	1	1	11	15-4	5		
BC-N	64		6	15-5	3		
D-2	7		1	15-6	4		3
D-3			3	15-8	2		
D-11		5		15-9		6	
D-12		6		15-10		3	
D-13			9	15-11	12		14
D-17	4		3	15-12	14		
D-18		19		15-13	18		2
D-19-A		1		15-14			7
D-22	8			15-15	2		1
D-23		8		15-16	5		
D-24			4	16-1		17	
D-25		3	2	16-2		22	6
D-26		31		16-4			1
PB-1		1		16-5		11	
PB-4	8		6	16-6	18		5
PB-5	1		2	16-7	9		
14-1-A		1		16-8		51	4
14-2	3		2				
Terra Ceia Bay							
E-1	5			E-5	1		
E-2		5		E-6	4	8	
E-3			2	E-7	1		
E-4			3				

Table 194.--Polydora socialis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-17	1		14	16-16	1		
15-18	1			16-17	1		2
15-20	7			16-19	1		
15-21	1			16-20	1		4
15-23	1			16-21			2
15-24	5			16-22			1
15-25	1			16-25		47	
15-26	9		1	16-26		1	
15-29	19			16-27	14		
15-30	2			17-2	56		2
15-31	21			17-5	2		11
15-32	1			17-6	7		9
16-9-B		4		17-7	4		3
16-11	2			17-8	4		
16-13	15			17-9	2		
16-15	6		3	17-10	1		

Table 195.--Polydora socialis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.7	12.8 to 33.2	125
Salinity (‰)	29.7	3.7 to 35.1	125
pH	8.0	7.1 to 8.4	119
Depth (m.)	1.1	1 to 4.0	125
Sediment type	sand	shelly sand to silty clay	120
Granules (wt. %)	3.3	0.0 to 44.5	120
Sands (wt. %)	91.1	11.2 to 99.9	120
Silts (wt. %)	3.5	0.0 to 44.4	120
Clay (wt. %)	2.1	0.0 to 65.9	119
CaCO ₃ (wt. %)	15.5	0.6 to 75.1	120
Organic carbon (wt. %)	0.6	0.01 to 6.9	92
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	92
Mean grain size, total sample (Ø)	2.5	-1.0 to 7.1	120
Standard deviation, total sample (Ø)	1.3	0.5 to 3.8	120
Skewness, total sample	0.3	-1.6 to 2.6	120
Kurtosis, total sample	9.6	-1.5 to 43.8	119
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 8.7	117
Standard deviation, noncarbonate fraction (Ø)	1.3	0.4 to 3.4	117
Mean grain size, carbonate fraction (Ø)	0.1	-2.3 to 3.0	100
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 2.9	100

Polydora websteri Hartman, 1943
(Described and illustrated by Blake, 1971)

Specimens were collected at a total of 73 survey stations in all areas of the Estuary, and at three incidental localities in Old Tampa Bay and lower Tampa Bay (table 196).

Average sediment type where the worm occurred was poorly sorted, fine sand. The silt-clay fraction was nearly eight percent, and organic carbon was one percent. A few large shell fragments were present in most samples, and average shell content was nearly 11 percent (table 197).

Twenty-three of the bottom samples contained algae and one or more species of the five sea grasses found in the Estuary.

A gravid specimen was collected in August, and newly born young were found attached to dwelling tubes of adults in May, July, August, September, and November.

P. websteri has been collected in the Gulf of Mexico and is well known as a shell borer along the coasts of eastern and western North America, and the Hawaiian Islands.

Table 196.--Polydora websteri--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-3		1		5-2	1		
B-1		8	14	5-4	1		
B-2		1	3	6-1-A			2
3-1-A		19		6-1-C		17	
3-7	1			6-1-D		40	
3-17		1		6-2	1		
4-1		1		6-3	1		4
5-1-B	1			6-4-A			2
Hillsborough Bay							
C			35	8-10		1	
C-1		5		9-1		23	
C-2	43		16	9-3	76		112
C-3	45		36	9-4	5		18
C-4		50		9-8			3
C-5	1		1	9-9	5		48
C-6			13	10-15			10
7-1	8		1	10-16	1		
7-3	6		24	10-18		5	
8-2			1	10-19			1
8-6		68		10-20	1		
8-8	5		63	10-22	5		73
8-9	596		89	10-23		4	21
Upper Tampa Bay							
10-1-A		2		11-28-1		273	
11-22	1			11-28-2		2	
11-28		4		12-14	1		

Table 196.--Polydora websteri--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--
(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-I	1			15-4	17		
BC-M			14	15-6	2		
BC-N	1		1	15-8	1		
D-2	1			15-11			1
D-9			7	15-14	2		
D-18		1		15-15			3
D-25			9	16-2		1	
PB-1	1		3	16-4		1	
PB-4			783	16-5		18	
PB-5	1		3	16-7	2		
15-1			3				
Terra Ceia Bay							
E-1			1				
Lower Tampa Bay							
14-5			1	16-10			3
15-27			1				

Table 197.--Polydora websteri--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.3	15.5 to 33.8	54
Salinity (‰)	24.4	15.6 to 34.9	54
pH	7.9	6.7 to 8.5	47
Depth (m.)	0.8	1 to 2.3	54
Sediment type	sand	shelly sand to silty sand	51
Granules (wt. %)	4.2	0.0 to 72.9	51
Sands (wt. %)	90.3	27.1 to 99.9	51
Silts (wt. %)	6.1	0.0 to 13.4	51
Clay (wt. %)	1.8	0.0 to 11.1	51
CaCO ₃ (wt. %)	10.6	0.5 to 75.6	50
Organic carbon (wt. %)	1.0	0.1 to 4.8	24
Organic nitrogen (wt. %)	0.06	0.01 to 0.2	24
Mean grain size, total sample (φ)	2.6	-1.9 to 4.2	50
Standard deviation, total sample (φ)	1.4	0.5 to 2.7	50
Skewness, total sample	0.7	-0.8 to 3.4	50
Kurtosis, total sample	11.3	-1.5 to 73.5	50
Mean grain size, noncarbonate fraction (φ)	3.2	2.3 to 8.7	49
Standard deviation, noncarbonate fraction (φ)	1.6	0.5 to 2.5	49
Mean grain size, carbonate fraction (φ)	-0.5	-2.6 to 2.2	49
Standard deviation, carbonate fraction (φ)	1.4	0.2 to 2.9	49

Prionospio cirrobranchiata Day, 1961
(Described and illustrated by Day, 1967)

Collections of this species came from a total of 69 survey stations in all areas of the Estuary except lower Tampa Bay. P. cirrobranchiata was recorded in that area only from an incidental collection made near Mullet Key (table 198).

Average sediment type at dredge and shovel stations was poorly sorted, very fine sand that bordered on the silty sand category. Silt and clay content was over 18 percent and organic carbon was about one percent. The shell content was over 12 percent, and some large fragments were present (table 199).

Algae were found in about 10 percent of the bottom samples, together with one or more sea grasses that included manatee, shoal, and turtle grass.

No gravid individuals were collected, but one juvenile was found in August.

Previously unrecorded from the Gulf of Mexico, P. cirrobranchiata is known from the coast of North Carolina and Africa.

Table 198.--Prionospio cirrobranchiata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A	1			4-16	1		
B	1			4-18-B			1
1-3	2		2	5-1-B	8		1
1-4	13		1	5-3	3		
1-5	1			5-4	2		
3-1-A		2		5-6	2		
4-2	3			5-8	1		
4-6	1			5-9	1		
4-7	2			5-11	1		
4-8	1			5-12	13		
4-11	1			5-13	1		
4-13	7			6-4-A	1		
4-14	3			6-5	24		
4-15	5			6-6	14		
Hillsborough Bay							
C-3			3	10-17	15		
10-16	5		5	10-19	9		8
Upper Tampa Bay							
10-4	16			11-14	13		
10-6	2			11-15	43		
11-2		1		11-16	8		
11-4	13			11-17	6		
11-5	3			11-18	7		1
11-6	12			11-19	5		1
11-7	3			11-20	16		
11-8	8			11-22	17		10
11-9	42			11-24	1		
11-11	3			11-26	1		
11-12	7			11-28		1	
11-13	2						

Table 198.--Prionospio cirrobranchiata--Locality records
and number of individuals from survey stations,
Tampa Bay, Florida, 1963-69 (D-dredge, S-
shovel, N-net)-(continued)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-N	1			15-6	1		
D-11		1		15-8	5		
D-25			1	15-11			1
15-1	6			15-12	1		
15-3		2		15-17	1		
15-4	4			16-6	10		
15-5	9						
Terra Ceia Bay							
E-3			3				

Table 199.--Prionospio cirrobranchiata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.8	17.5 to 33.8	64
Salinity (‰)	26.0	21.0 to 34.3	64
pH	8.0	7.0 to 8.3	59
Depth (m.)	1.6	1 to 4.0	64
Sediment type	sand	shelly sand to clayey silt	63
Granules (wt. %)	1.8	0.0 to 41.5	63
Sands (wt. %)	78.9	4.6 to 100	63
Silts (wt. %)	10.4	0.0 to 52.6	63
Clay (wt. %)	7.7	0.0 to 50.3	63
CaCO ₃ (wt. %)	12.3	0.6 to 66.0	63
Organic carbon (wt. %)	0.9	0.1 to 8.5	35
Organic nitrogen (wt. %)	0.1	0.00 to 0.3	35
Mean grain size, total sample (Ø)	3.4	0.9 to 7.3	63
Standard deviation, total sample (Ø)	1.5	0.4 to 3.5	63
Skewness, total sample	0.7	-0.8 to 3.4	63
Kurtosis, total sample	11.9	-0.9 to 73.5	63
Mean grain size, noncarbonate fraction (Ø)	3.2	1.7 to 9.0	63
Standard deviation, noncarbonate fraction (Ø)	1.5	0.5 to 2.2	63
Mean grain size, carbonate fraction (Ø)	-0.3	-2.5 to 2.4	61
Standard deviation, carbonate fraction (Ø)	1.5	0.4 to 2.9	61

Prionospio heterobranchia texana Hartman, 1951

Except for Hillsborough Bay, specimens were collected in all areas of the Estuary. Fifty-six, or about 78 per cent, of the 71 survey stations where the worm was found were located in Boca Ciega Bay and lower Tampa Bay. All six of the incidental collections were also located in those two areas (table 200).

Poorly sorted, fine sand was the bottom type where specimens were generally found, but several collections came from softer sediments that contained large amounts of silt and clay. The average amount of silt and clay was about seven percent, and organic carbon was nearly one percent. Most of the shell in sediment samples was in the sand size class (table 201).

In the 28 bottom samples that contained vegetation, algae were consistently present, and some contained one or more of the five sea grasses found in the Estuary.

A gravid specimen was collected in November, and juvenile worms were found in September and October.

Prionospio h. texana is known only from the Gulf of Mexico.

Table 200.--Prionospio heterobranchia texana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B-2		8		6-1-C		20	
5-2	4			6-4-A	7		
5-4	4			6-7-A		4	
6-1-A		2		6-8		3	
6-1-B		2					
Upper Tampa Bay							
11-3	1			13-8			1
11-20			1	13-13		1	
11-22	1						
Boca Ciega Bay							
D-2			1	15-2		5	
D-3		2	1	15-3	3		
D-5			10	15-4	1		
D-7	1			15-10		2	
D-10	1			15-12			1
D-11	1	8		15-15	5		13
D-17			2	15-16	21		
D-18		1		15-17	6		
D-19-A		4		16-1		45	
D-23		24		16-2		15	
D-25		6		16-3		78	
D-26		1		16-4		62	
PB-1	140			16-5		164	
PB-4	2		17	16-6	9		
14-4	1			16-7	34		
15-1	1			16-8		1	
Terra Ceia Bay							
E-6	2			E-8	1		

Table 200.--Prionospio heterobranchia texana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-6	4			16-20	1		
15-18	18		1	16-21	3		
15-23	1			16-22	3		
15-24	4			16-25		1	
15-29	22			17-2	12		
15-31			1	17-4	5		
16-10	2			17-5	3		
16-13	23			17-6	10		
16-14	5			17-7	2		
16-15	6			18-3	43		
16-16	13			18-4	1		
16-17	7						

Table 201.--Prionospio heterobranchia texana--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.1	12.8 to 34.1	66
Salinity (‰)	31.4	24.1 to 34.9	66
pH	8.1	7.8 to 8.3	64
Depth (m.)	1.0	1 to 4.0	66
Sediment type	sand	sand to silt	62
Granules (wt. %)	2.4	0.0 to 13.4	62
Sands (wt. %)	92.3	5.5 to 99.8	62
Silts (wt. %)	4.7	0.1 to 89.4	62
Clay (wt. %)	2.1	0.0 to 65.9	62
CaCO ₃ (wt. %)	16.3	0.7 to 68.0	62
Organic carbon (wt. %)	0.9	0.1 to 6.9	43
Organic nitrogen (wt. %)	0.1	0.00 to 1.2	43
Mean grain size, total sample (Ø)	2.6	0.6 to 8.8	62
Standard deviation, total sample (Ø)	1.3	0.5 to 2.7	62
Skewness, total sample	0.3	-1.0 to 2.6	62
Kurtosis, total sample	8.4	-0.6 to 43.8	62
Mean grain size, noncarbonate fraction (Ø)	3.1	1.9 to 8.7	59
Standard deviation, noncarbonate fraction (Ø)	1.4	0.6 to 5.2	59
Mean grain size, carbonate fraction (Ø)	0.1	-1.9 to 1.8	53
Standard deviation, carbonate fraction (Ø)	1.2	0.7 to 2.6	53

Scolecopsis squamata (Muller, 1806)
(Described and illustrated by Day, 1967)

Specimens were collected at a total of 43 survey stations in all areas of the Estuary, and at three incidental localities in Old Tampa Bay, Boca Ciega Bay, and lower Tampa Bay (table 202).

Except for one station in silty sand, all collections came from medium to very fine sand. Average shell content of the sediments was about 11 percent, the silt and clay fraction was less than three percent, and organic carbon was under five percent (table 203).

Twenty-two of the bottom samples contained algae and some also had shoal grass, manatee grass, or turtle grass.

A gravid specimen was collected in December and a juvenile was found in October.

S. squamata has been collected in the Gulf of Mexico and is known also from temperate and tropical waters of the Atlantic and eastern Pacific.

Table 202.--Scolecopsis squamata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
4-20		17			6-4-A		1		
6-1-D		1			6-8			2	
Hillsborough Bay									
9-1		2							
Upper Tampa Bay									
D-28		1			11-28-1		1		
10-0		129			11-28-2		1		
10-6	1				12-16	1			
10-12	2				13-1-A		11		
11-1		1			13-12	2			
11-28		1			13-13		8		
Boca Ciega Bay									
BC-M				1	15-10		239'		
D-2	1				15-11	9			
15-2		2			15-12	2			
15-7		10			16-6	1			
15-8	1				16-7	15			
15-9		2							
Terra Ceia Bay									
E-2		1			E-5	1			
E-4	2				E-6	2			

Table 202.--Scolecipis squamata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-17	1			15-26	1		
14-19		2		16-15	1		
14-20		5		16-28		3	
15-18	1			17-2	2		
15-19	6			18-4	1		
15-20	4						

Table 203.--Scolecopsis squamata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	12.8 to 34.1	41
Salinity (‰)	28.6	17.3 to 34.5	41
pH	8.1	7.7 to 8.3	39
Depth (m.)	0.7	1 to 4.0	42
Sediment type	sand	shelly sand to silty sand	40
Granules (wt. %)	2.5	0.0 to 29.4	40
Sands (wt. %)	95.2	70.6 to 99.9	40
Silts (wt. %)	1.8	0.0 to 22.1	40
Clay (wt. %)	0.5	0.0 to 5.2	40
CaCO ₃ (wt. %)	11.1	0.5 to 66.0	39
Organic carbon (wt. %)	0.4	0.1 to 1.4	32
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	32
Mean grain size, total sample (Ø)	2.4	0.1 to 4.1	39
Standard deviation, total sample (Ø)	1.1	0.5 to 2.0	39
Skewness, total sample	0.2	-1.2 to 2.2	39
Kurtosis, total sample	13.0	-1.0 to 35.7	39
Mean grain size, noncarbonate fraction (Ø)	2.9	1.8 to 3.9	40
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 3.2	40
Mean grain size, carbonate fraction (Ø)	0.2	-2.2 to 2.1	38
Standard deviation, carbonate fraction (Ø)	1.3	0.6 to 1.9	38

Spio setosa Verrill, 1873
(Described and illustrated by Hartman, 1945)

Hillsborough Bay was the only area of the Estuary not represented among the 43 survey stations where this worm was collected. Incidental collections came from two localities in Boca Ciega Bay and one in Old Tampa Bay (table 204).

Sand was the only sediment type in which the worm was found. Average shell content was about 19 percent, but few large fragments were present. Most bottom samples had very little silt and clay, and less than one percent organic carbon (table 205).

Algae, and manatee and turtle grass were the plants found in 12 of the 40 dredge and shovel samples.

A juvenile specimen was collected in July, but no gravid worms were noted.

S. setosa occurs along the eastern coast of the United States, but has not been previously reported for the Gulf of Mexico.

Table 204.--Spio setosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
4-16	1			5-12	1		
5-5	1			5-13	5		
5-7	14			6-1-B		1	
5-8	2		1	6-3	2		
5-9	6			6-5	25		
5-11	4			6-6	6		1
Upper Tampa Bay							
10-2	4			12-10	1		
10-3			2	13-11	1		1
11-3	2						
Boca Ciega Bay							
D-22	1			16-6	6		
D-25			1	16-7	3		
Terra Ceia Bay							
E-8			2				
Lower Tampa Bay							
14-7	1			16-21	1		
15-18	53			17-2	5		
15-20	1			17-3	13		
15-21	1			17-4	39		
15-28	1			17-6	6		1
15-29	1			17-7	6		
15-31	1			17-8	13		
16-13	8			17-9	2		
16-15	12		1	17-10	13		
16-16	61			18-4	1		
16-17	11						

Table 205.--Spio setosa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.6	15.0 to 33.8	40
Salinity (‰)	29.5	22.4 to 34.6	40
pH	8.0	7.7 to 8.3	40
Depth (m.)	1.5	1 to 4.0	40
Sediment type	sand	--	37
Granules (wt. %)	1.8	0.0 to 8.9	37
Sands (wt. %)	96.4	87.8 to 100	37
Silts (wt. %)	1.3	0.0 to 8.6	37
Clay (wt. %)	0.6	0.0 to 3.6	37
CaCO ₃ (wt. %)	19.3	0.7 to 85.2	37
Organic carbon (wt. %)	0.5	0.02 to 3.3	28
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	28
Mean grain size, total sample (Ø)	2.2	0.5 to 3.3	37
Standard deviation, total sample (Ø)	1.1	0.4 to 2.0	37
Skewness, total sample	0.5	-1.3 to 3.6	37
Kurtosis, total sample	17.8	3.2 to 76.3	37
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 8.4	37
Standard deviation, noncarbonate fraction (Ø)	1.4	0.6 to 3.2	37
Mean grain size, carbonate fraction (Ø)	-0.1	-1.8 to 1.7	30
Standard deviation, carbonate fraction (Ø)	1.2	0.4 to 2.1	30

Spiophanes bombyx (Claparede, 1870)
(Described and illustrated by Day, 1967)

Specimens were collected at a total of 21 survey stations in all areas of the Estuary except Hillsborough Bay. Two incidental collections were recorded from Boca Ciega Bay and one from lower Tampa Bay. More than one-half of the station records for S. bombyx were from Boca Ciega Bay alone (table 206).

All specimens were collected in sand. As an average, the sand was fine and poorly sorted, and contained nearly 13 percent shell. The amount of silt and clay was under five percent, and organic carbon was nearly one percent (table 207).

Algae were recorded in one-third of the dredge and shovel samples, and at some, shoal grass, turtle grass, or manatee grass were also noted.

Neither juvenile nor gravid specimens were collected.

This species has a world-wide distribution in temperate and tropical waters, and has been collected in the Gulf of Mexico.

Table 206.--Spiophanes bombyx--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
3-11	1				6-7-A	1			
4-19	1								
Upper Tampa Bay									
11-5	1				12-5	1			
Boca Ciega Bay									
D-11		1			15-6	1			
D-22	1				15-8	1			
D-23		3			16-1		4		
D-25		1	1		16-6	6			
PB-1	2		1		16-7	1			
PB-5	1								
Terra Ceia Bay									
E-5	3								
Lower Tampa Bay									
16-20	1				16-27	4			
16-22	3				17-2	1			

Table 207.--Spiophanes bombyx--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.6	14.5 to 33.2	22
Salinity (‰)	30.5	21.5 to 34.5	22
pH	8.1	7.6 to 8.3	22
Depth (m.)	1.1	1 to 4.0	22
Sediment type	sand	--	22
Granules (wt. %)	1.0	0.0 to 5.2	22
Sands (wt. %)	94.5	88.9 to 99.2	22
Silts (wt. %)	3.3	0.2 to 8.6	22
Clay (wt. %)	0.8	0.1 to 2.3	22
CaCO ₃ (wt. %)	12.9	1.2 to 66.0	22
Organic carbon (wt. %)	0.9	0.1 to 6.9	14
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	14
Mean grain size, total sample (Ø)	2.7	1.9 to 3.4	22
Standard deviation, total sample (Ø)	1.2	0.6 to 1.9	22
Skewness, total sample	0.5	-0.6 to 1.9	22
Kurtosis, total sample	10.0	0.6 to 38.8	22
Mean grain size, noncarbonate fraction (Ø)	2.9	1.9 to 3.7	19
Standard deviation, noncarbonate fraction (Ø)	1.5	0.5 to 3.2	19
Mean grain size, carbonate fraction (Ø)	-0.4	-2.5 to 1.3	19
Standard deviation, carbonate fraction (Ø)	1.3	0.7 to 2.9	19

Streblospio benedicti Webster, 1879
(Described and illustrated by Hartman, 1969)

This minute spionid was recorded from one incidental locality in lower Tampa Bay (silt, in a suspended, sediment collector located in Bishop Harbor) and one in Hillsborough Bay. Otherwise, S. benedicti was found at a total of 74 survey stations in all areas of the Estuary, except lower Tampa Bay. Areas of greatest abundance were Hillsborough and Boca Ciega Bays. Dredge hauls containing more than 200 specimens were taken at several stations, and one collection of 1,044 worms was recorded at station 8-9 in Hillsborough Bay (table 208).

Sediment data show that the average bottom type occupied by S. benedicti was poorly sorted, fine sand with nearly 12 percent shell. At more than 15 percent, the silt and clay fraction was nearly large enough to classify the bottom type as silty sand (table 209).

Algae were present in 18 of 65 dredge and shovel samples, and at some of these there were also shoal, manatee or turtle grass.

Neither gravid nor juvenile specimens were seen.

S. benedicti has been collected in the Gulf of Mexico and is also known to occur on Atlantic and Pacific coasts of the United States.

Table 208.--Streblospio benedicti--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay								
Stations		Individuals		Stations		Individuals		
		D	S	N		D	S	N
A-3		25			5-1-B	13		
B				1	5-2	7		
3-17		1						
Hillsborough Bay								
C				2	8-7			10
C-1			6		8-8	3		1
C-2	139			1	8-9	1044		10
C-3	14			107	8-10		36	
C-4		23			9-2			10
C-5	10				9-3	50		10
C-6	8			23	9-4	10		10
C-9		1			9-7	1		10
7-1	968			10	9-8			10
7-2	12				9-9	42		10
7-3	302			1	10-19			10
8-2	6			10	10-22	8		10
8-3	2			10	10-23		1	
8-4				10				
Upper Tampa Bay								
11-28		2						

Table 208.--Streblospio benedicti--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	20		2	PB-4	6		6
BC-H	9			PB-5	1		
BC-I	1			15-1	41		
D-1	26			15-2		1	
D-2	17			15-3		1	
D-3		1		15-4	163		
D-5			10	15-5	84		
D-7	1			15-6	9		
D-9	6			15-8	56		
D-10	13			15-9		2	
D-13	9		6	15-10		2	
D-14	3		1	15-11	59		12
D-17	2		1	15-12	55		
D-19-A		1		15-13	51		
D-19-B	71			15-15			4
D-20	250		1	15-17	2		
D-21	254		102	16-1		2	
D-22	185			16-2		1	
D-24			3	16-5		6	
PB-1		3		16-8		8	
Terra Ceia Bay							
E-2		2					

Table 209.--Streblospio benedicti--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.7	14.5 to 32.0	65
Salinity (‰)	27.2	15.6 to 34.8	65
pH	8.0	6.7 to 8.5	61
Depth (m.)	0.8	1 to 2.0	65
Sediment type	sand	shelly sand to silty clay	64
Granules (wt. %)	2.1	0.0 to 46.2	64
Sands (wt. %)	81.7	5.0 to 99.9	64
Silts (wt. %)	10.8	0.1 to 89.4	64
Clay (wt. %)	4.8	0.0 to 46.5	64
CaCO ₃ (wt. %)	11.6	0.6 to 69.0	64
Organic carbon (wt. %)	0.8	0.1 to 4.8	33
Organic nitrogen (wt. %)	0.05	0.01 to 0.2	33
Mean grain size, total sample (Ø)	2.8	-0.8 to 7.8	64
Standard deviation, total sample (Ø)	1.5	0.5 to 2.6	64
Skewness, total sample	0.3	-1.6 to 2.2	64
Kurtosis, total sample	8.0	-1.1 to 25.5	64
Mean grain size, noncarbonate fraction (Ø)	3.1	1.8 to 8.7	62
Standard deviation, noncarbonate fraction (Ø)	1.5	0.4 to 2.5	62
Mean grain size, carbonate fraction (Ø)	-0.2	-2.6 to 1.4	62
Standard deviation, carbonate fraction (Ø)	1.4	0.4 to 2.9	62

Pseudopolydora sp.

This undetermined spionid is about 5 mm. long by 0.3 mm. wide, and looks very much like Polydora citrona (see Hartman, 1969). Characteristic setae have been illustrated (figure 9,A,B).

Specimens were collected at a total of 60 survey stations throughout the Estuary, except for Terra Ceia Bay. Hillsborough Bay was the only area where an incidental collection was made. This worm was extremely plentiful at station 11-17 in upper Tampa Bay, where 1,098 specimens were collected in a single dredge haul (table 210).

Average bottom type was very fine, poorly sorted sand that contained some large shell fragments, and about 13 percent shell altogether. The percentage of silt and clay was nearly enough to designate sediment type as silty sand, rather than sand. The weight percentage of organic carbon was under one (table 211).

Only eight of 58 bottom samples contained vegetation. Algae were present, and also found in some were shoal or turtle grass.

No gravid specimens were noted, but juveniles were collected in August, September, and December.

Table 210.--Pseudopolydora sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay						
Stations		Individuals			Stations	
		D	S	N		
		D	S	N		
B-2			4		4-10	1
1-4	94				4-12	35
3-4	5				4-13	399
3-5	1				4-14	16
3-7	3				4-15	488
3-9	1				4-16	18
3-17			4		4-18-A	
4-2	5				4-19	4
4-3	6				5-1-B	27
4-4	21				5-2	34
4-6	74				5-3	4
4-7	64				6-2	18
4-8	23				6-7-A	4
4-9	2					
Hillsborough Bay						
9-3	1				10-17	72
10-16	7					
Upper Tampa Bay						
11-7	1				11-15	167
11-8	4				11-16	1
11-9	215				11-17	1098
11-11	4				11-22	4
11-12	11				11-25	2
11-13	1				11-27	1
11-14	1				12-14	7

Table 210.--Pseudopolydora sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-9	1			15-5	7		
D-19-B	3			15-8	4		
D-20	1			15-9		1	
D-22	4			15-11	7		
D-25			1	15-17	2		
15-3		2		16-5		4	
15-4	10						
Lower Tampa Bay							
14-5	1			17-4	8		
16-15	1						

Table 211.--Pseudopolydora sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	28.2	15.5 to 33.2	58
Salinity (‰)	25.6	18.3 to 34.4	58
pH	8.0	7.1 to 8.3	47
Depth (m.)	1.6	1 to 4.0	58
Sediment type	sand	shelly sand to silty clay	57
Granules (wt. %)	1.9	0.0 to 41.5	57
Sands (wt. %)	79.1	5.0 to 99.4	57
Silts (wt. %)	11.1	0.0 to 51.0	57
Clay (wt. %)	8.6	0.0 to 47.0	57
CaCO ₃ (wt. %)	12.9	0.7 to 66.0	57
Organic carbon (wt. %)	0.7	0.1 to 2.3	28
Organic nitrogen (wt. %)	0.06	0.00 to 0.2	28
Mean grain size, total sample (Ø)	3.5	0.9 to 7.2	57
Standard deviation, total sample (Ø)	1.6	0.6 to 3.5	57
Skewness, total sample	0.6	-0.8 to 2.2	57
Kurtosis, total sample	7.8	-1.3 to 41.2	57
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 4.1	57
Standard deviation, noncarbonate fraction (Ø)	1.5	0.5 to 2.3	57
Mean grain size, carbonate fraction (Ø)	-0.3	-2.5 to 2.4	56
Standard deviation, carbonate fraction (Ø)	1.4	0.7 to 2.7	56

Family MAGELONIDAE Cunningham and Ramage, 1888

The magelonids constitute a small family of sediment dwellers that are found in temperate and tropical seas throughout the world. They are deposit feeders, and secure food by means of adhesive filaments on their long palps.

A single species, Magelona pettiboneae, was found in Tampa Bay. A larger species, Magelona riojai, occurs outside the Estuary, along St. Petersburg Beach and other island beaches.

Magelona pettiboneae Jones, 1963

Specimens were collected at a total of 71 survey stations throughout the Estuary, and at four incidental localities in upper and lower Tampa Bay as well as Boca Ciega Bay (table 212).

M. pettiboneae was found mostly in sediments of poorly sorted, fine sand that had some large shell fragments and an average shell content of less than 10 percent. Average silt and clay content was less than four percent, but organic carbon was nearly one percent (table 213).

Algae, and one or more of all the sea grasses found in the Estuary were noted in 42 of the 76 bottom samples.

No gravid specimens were seen, but juvenile worms were collected in June through December.

M. pettiboneae has been collected only in the eastern Gulf of Mexico.

Table 212.--Magelona pettiboneae--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
B-2		9		5-4	5		
3-2	2			5-5	1		
4-5	3			6-1-C		3	
4-10	1			6-1-D		20	
5-1-A		1		6-7-A		4	
Hillsborough Bay							
10-15	1						
Upper Tampa Bay ^a							
D-28		24		11-28		26	
10-1-A		2		11-28-1		37	
10-3		2		11-28-2		2	
10-4	1			12-1		7	
10-12	10			12-3	1		
10-13	3			13-1-A		11	
10-14-A	3	4		13-1-B		16	
11-1		5		13-2	1		
11-2		2		13-13		1	

Table 212.--Magelona pettiboneae--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-C		1		15-6	2		
BC-N	2			15-9		1	
D-2	9			15-10		1	
D-5			1	15-15	1		
D-11	13	47		15-16	1		
D-19-A		8		16-1		6	
D-19-B	1			16-2		3	
D-23		2		16-3		8	
D-25		12		16-4		16	
PB-1		1		16-5		1	
PB-4	1	8		16-6	1		
14-1-A		1		16-7	1		
15-2		51		16-8		1	
15-3		5					
Terra Ceia Bay							
E-6	44						
Lower Tampa Bay							
15-23	1			16-25		5	
16-9-A		21		16-26		1	
16-9-B		19		17-2	6		
16-10	1			17-6	10		
16-13	3			17-7	15		
16-20	1			17-8	7		
16-21	1			17-9	3		

Table 213.--Magelona pettiboneae--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.8	12.8 to 33.8	76
Salinity (‰)	29.3	18.5 to 35.1	76
pH	8.0	7.4 to 8.4	69
Depth (m.)	0.7	1 to 4.0	76
Sediment type	sand	shelly sand to clayey sand	75
Granules (wt. %)	2.5	0.0 to 79.7	75
Sands (wt. %)	93.3	20.2 to 99.9	75
Silts (wt. %)	2.5	0.0 to 15.8	75
Clay (wt. %)	0.9	0.0 to 14.3	75
CaCO ₃ (wt. %)	9.4	0.6 to 49.5	74
Organic carbon (wt. %)	0.9	0.1 to 6.9	53
Organic nitrogen (wt. %)	0.05	0.00 to 0.3	53
Mean grain size, total sample (Ø)	2.4	-4.0 to 4.3	74
Standard deviation, total sample (Ø)	1.2	0.5 to 2.8	74
Skewness, total sample	0.4	-1.4 to 3.6	74
Kurtosis, total sample	11.9	-0.2 to 76.3	73
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 8.7	70
Standard deviation, noncarbonate fraction (Ø)	1.4	0.5 to 3.2	70
Mean grain size, carbonate fraction (Ø)	-0.1	-2.1 to 2.5	61
Standard deviation, carbonate fraction (Ø)	1.2	0.0 to 3.1	61

Family POECILOCHAETIDAE Hannerz, 1956

This small family contains less than a dozen species, which are sparingly distributed and rarely collected in temperate and tropical waters. Poecilochaetids inhabit tubes of sand and silt, and feed on bottom deposits and suspended detritus by means of long, grooved palps.

A single species, Poecilochaetus johnsoni, was collected in Tampa Bay.

Poecilochaetus johnsoni Hartman, 1939
(Described and illustrated by Hartman, 1969)

Individuals were collected in all areas of the Estuary at a total of 26 survey stations and at two incidental localities in Boca Ciega Bay and lower Tampa Bay. At station 6-2, 24 specimens were collected in a single dredge haul (table 214).

P. johnsoni was found only in sand. As an average, the sand was fine and poorly sorted and contained about 15 percent shell. Silt and clay content never exceeded 10 percent, and organic carbon was less than one percent (table 215).

Slightly more than one-third of the bottom samples contained algae, and one had turtle grass as well.

A gravid specimen was collected in October, but no juvenile worms were found.

P. johnsoni was described from collections in southern California, and is otherwise known from the Gulf of Mexico and North Carolina.

Table 214.--Forcillochaetus johnsoni--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
4-19	4			6-2	24		
5-3	2			6-3			10
Hillsborough Bay							
10-15	1						
Upper Tampa Bay							
10-9	1		10	11-16			5
10-12	2			12-1		1	
10-13	1			13-1-A		1	
11-3	1			13-4	6		
11-5	1						
Boca Ciega Bay							
BC-N	1			15-1	12		
D-2	2			15-8	1		
D-24			1	15-9		1	
PB-1	2			15-13	1		
Lower Tampa Bay							
14-5	1			16-14	2		
15-29	1			17-2	2		

Table 215.--Poecilochaetus johnsoni--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.1	18.5 to 31.8	23
Salinity (‰)	28.1	18.5 to 34.5	23
pH	8.0	7.6 to 8.3	20
Depth (m.)	1.2	1 to 4.0	23
Sediment type	sand	--	21
Granules (wt. %)	2.3	0.0 to 7.9	21
Sands (wt. %)	95.3	88.4 to 99.8	21
Silts (wt. %)	1.6	0.0 to 6.1	21
Clay (wt. %)	0.6	0.0 to 2.6	21
CaCO ₃ (wt. %)	14.9	0.6 to 68.0	21
Organic carbon (wt. %)	0.6	0.1 to 3.3	11
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	11
Mean grain size, total sample (Ø)	2.3	0.6 to 3.1	21
Standard deviation, total sample (Ø)	1.1	0.5 to 1.9	21
Skewness, total sample	0.2	-1.3 to 1.9	21
Kurtosis, total sample	12.6	0.1 to 41.2	21
Mean grain size, noncarbonate fraction (Ø)	3.3	1.8 to 8.4	20
Standard deviation, noncarbonate fraction (Ø)	1.6	0.6 to 3.2	20
Mean grain size, carbonate fraction (Ø)	-0.7	-2.5 to 0.5	16
Standard deviation, carbonate fraction (Ø)	1.5	1.0 to 3.1	16

Family TROCHOCHAETIDAE Pettibone, 1963

This family contains one genus and about six species of worms that are rarely collected. In the United States, one species has been recorded from the California coast, and two occur in the New England region. The trochochaetids build tubes and use their long, grooved palps to gather food from bottom deposits and to capture particulate matter in the water column.

A single, undetermined species was collected in Tampa Bay.

Trochochaeta sp.

An anterior fragment was collected that measured 2 mm. wide by 20 mm. long. The palps were missing. The anterior region consists of five setigers -- the fifth bearing a series of stout, acicular setae (figure 9,C). Branchial segments begin with the sixth setiger and continued throughout the length of the fragment examined. The branchiae are single filaments that bear cilia on the inner margin (figure 9,D). Aside from the acicular setae mentioned, simple capillary setae were the only other type noted.

The single specimen collected in Boca Ciega Bay was dredged from Bunces Pass (table 216).

There, water depth was over 2 m., and bottom type was poorly sorted, medium sand. The content of shell and granule size particles was high, and percentages of fine particles and organic carbon were quite low(table 217).

No vegetation was recorded at the collection site.

The specimen was not gravid, but on the basis of its size, I assume it was an adult.

Table 216.--Trochochaeta sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-N	1						

Table 217.--Trochochaeta sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	17.5	--	1
Salinity (‰)	32.2	--	1
pH	8.3	--	1
Depth (m.)	2.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	14.7	--	1
Sands (wt. %)	83.5	--	1
Silts (wt. %)	1.5	--	1
Clay (wt. %)	0.3	--	1
CaCO ₃ (wt. %)	38.2	--	1
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.03	--	1
Mean grain size, total sample (Ø)	1.4	--	1
Standard deviation, total sample (Ø)	1.9	--	1
Skewness, total sample	-0.3	--	1
Kurtosis, total sample	0.9	--	1
Mean grain size, noncarbonate fraction (Ø)	2.7	--	1
Standard deviation, noncarbonate fraction (Ø)	0.7	--	1
Mean grain size, carbonate fraction (Ø)	1.5	--	1
Standard deviation, carbonate fraction (Ø)	0.2	--	1

Family CHAETOPTERIDAE Malmgren, 1867

Worms of this family live in membranous tubes in temperate and tropical waters throughout the world. They feed on suspended organic material that is trapped on a mucus membrane and transferred to the mouth.

Five species were found in Tampa Bay. The most common was Spiochaetopterus costarum oculus. It was found in all areas of Tampa Bay from saline waters near Egmont Key into nearly fresh, tidal waters of tributary streams.

Chaetopterus variopedatus was collected only from upper and lower Tampa Bay and Boca Ciega Bay. Three, undetermined mesochaetopterids were collected in Boca Ciega Bay and lower Tampa Bay.

Key to CHAETOPTERIDAE Collected in Tampa Bay

- 1 Dwelling tube u-shaped; palps shorter than anterior body region Chaetopterus variopedatus
- Dwelling tube straight; palps longer than anterior body region 2
- 2 Dwelling tube membranous, ringed, and transparent; setiger 4 bears a single, stout, acicular seta Spiochaetopterus costarum oculus
- Dwelling tube covered with sand grains; setiger 4 bears a group of stout, acicular, setae 3
- 3 Dwelling tube rust-colored; palps unbanded; eyes absent Mesochaetopterus sp. A

- Dwelling tube covered with uncolored sand grains; palps unbanded; eyes present.... Mesochaetopterus sp. B
- Dwelling tube brown; palps banded with brown pigment; diffuse eye spots present at base of palps Mesochaetopterus sp. C

Chaetopterus variopedatus (Renier, 1804)
(Described and illustrated by Hartman, 1969)

The 75 survey stations where C. variopedatus was collected were equally distributed between upper and lower Tampa Bay and Boca Ciega Bay. Specimens were also collected at an incidental locality on tidal flats adjacent to the Sunshine Skyway in lower Tampa Bay (table 218).

The worm was found mostly in sandy sediment, but a few collections came from shelly or silty sand. Average bottom type was poorly sorted, fine sand with nearly 20 percent shell, less than five percent silt and clay, and under one percent organic carbon (table 219).

Nineteen of 48 bottom samples contained algae, and at one of these, turtle grass was also present.

Gravid specimens were collected in June, July, and August, but no young were found.

C. variopedatus has been collected in the Gulf of Mexico and at many localities throughout the world in temperate and tropical waters. Vast beds of this worm have been observed in the Gulf a few miles off the Florida west coast.

Table 218.--Chaetopterus variopedatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-4			1	12-14	7		1
11-5			1	12-15	1		10
11-6	2			12-16			1
11-8			1	13-1-A		1	
11-16	2		1	13-3	1		
11-20	3		1	13-5	1		
11-21			1	13-6	11		
12-7	1			13-7	20		
12-8	1			13-8	1		
12-9	1			13-9	1		
12-10	1			13-10	1		
12-12	1			13-12	2		1
12-13			1				
Boca Ciega Bay							
BC-A	1			15-1			1
BC-E			1	15-3			1
BC-I	3			15-4	1		1
BC-N	1			15-5	1		1
D-2			1	15-6	1		1
D-8			1	15-8	5		1
D-16			1	15-10		1	
D-19-B	1		1	15-11	2		1
D-22	1		1	15-12	1		1
D-24			1	15-13	4		1
14-2			1	15-14	14		1
14-3	1		1	16-1		1	
14-4	1		1	16-6			1

Table 218.--Chaetopterus variopedatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-9	1			16-12			1
14-10	1		1	16-14			1
14-11	12		1	16-15			1
14-13	21		1	16-16			1
14-15	7			16-17	1		
15-18			1	16-18			1
15-21	1			16-20			1
15-23	1			16-21	1		1
15-26			1	16-22	1		1
15-27			1	17-2	2		1
16-10	1		1	17-5			1
16-11			1	17-6			1

Table 219.--Chaetopterus variopedatus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.4	13.0 to 30.8	48
Salinity (‰)	30.0	24.3 to 34.6	47
pH	8.1	7.7 to 8.5	46
Depth (m.)	1.6	1 to 4.0	48
Sediment type	sand	shelly sand to silty sand	48
Granules (wt. %)	3.0	0.1 to 21.4	48
Sands (wt. %)	92.1	72.5 to 99.1	48
Silts (wt. %)	3.6	0.1 to 22.1	48
Clay (wt. %)	1.3	0.1 to 8.8	48
CaCO ₃ (wt. %)	19.5	1.2 to 66.0	48
Organic carbon (wt. %)	0.5	0.03 to 5.0	46
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	46
Mean grain size, total sample (φ)	2.5	0.4 to 4.1	48
Standard deviation, total sample (φ)	1.4	0.7 to 2.7	48
Skewness, total sample	0.3	-1.2 to 2.1	48
Kurtosis, total sample	7.4	-0.04 to 24.5	48
Mean grain size, noncarbonate fraction (φ)	2.6	1.7 to 4.9	48
Standard deviation, noncarbonate fraction (φ)	1.4	0.5 to 3.4	48
Mean grain size, carbonate fraction (φ)	0.0	-2.5 to 2.2	38
Standard deviation, carbonate fraction (φ)	1.3	0.2 to 2.9	38

Spiochaetopterus costarum oculatus (Webster, 1879)
(Described by Gitay, 1969)

Except for Nereis succinea, this worm was found more widely distributed in the Estuary than any other polychaete. It was collected in all areas at a total of 219 survey stations, and seven incidental localities (table 220).

Average bottom type at dredge and shovel stations was poorly sorted, fine sand. Shell was present in the amount of nearly 12 percent and consisted of some large particles. The percentage of silt and clay was over 16, and nearly one percent organic carbon was present (table 221).

About 30 percent of the bottom samples contained algae, and one or more species of all sea grasses found in the Estuary aside from Halophila.

No juvenile worms were observed, and tubes were not opened to determine the reproductive condition of adults.

This species has been collected in the Gulf of Mexico and is otherwise known from the northwestern Atlantic.

Table 220.--Spiochaetopterus costarum oculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A	1			4-6	12		
A-2		1		4-7	10		1
A-6		1		4-8	13		1
B	8			4-9	4		
B-1		3		4-11	8		
B-2		3		4-12	30		
1-3	6		10	4-13	8		1
1-4	3		14	4-14	41		
1-5	3		1	4-15	46		4
2-3	1			4-16	42		7
2-5	2			4-17-A	128		
3-2	1			4-19	3		
3-3	11			5-1-B	2		
3-4	2		1	5-2	12		
3-5	4		18	5-3	7		
3-6	10		7	5-4	8		
3-7	6		2	5-5	4		
3-8	50			5-6	3		
3-9	4			5-11	1		
3-11	103			6-1-A		7	
3-12	309		1	6-1-B		9	
3-13	1			6-1-C		1	
3-14		3		6-2	3		
3-15		3		6-4-A	5		2
3-16		12		6-6"			3
4-2	3			6-7-A		2	
4-4	6		1				

Table 220.--Spiochaetopterus costarum oculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Hillsborough Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
C-1		2		8-8	1		
C-2	1			8-9	1		1
C-5	1		10	9-3	150		
C-6	1		10	9-4	60		1
C-8		1		9-6			1
C-9		1		10-15	1		1
7-1	4			10-16	4		1
7-2	1			10-17	10		1
7-3	2			10-19	9		1
8-1	1			10-20	7		
8-2	4		1	10-21	1		
8-3	8			10-22	23		

Table 220.--Spiochaetopterus costarum oculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
10-1-A		2		11-19	13		1
10-3		1	1	11-20	12		1
10-4	58		1	11-21	61		1
10-6	1			11-22	17		1
10-7	1			11-23	6		1
10-8	16			11-24	6		
10-9	14			11-25	45		1
10-14-A	1			11-26	29		1
11-2		2		11-27	30		
11-3			1	11-28		8	
11-4	5		1	11-28-1		2	
11-5	23			12-1		1	
11-6	54			12-3			1
11-7	39		1	12-4	5		1
11-8	3		1	12-6			1
11-9	1			12-7			1
11-10			1	12-9			1
11-11	5		1	12-13			1
11-12	1		1	12-14	259		
11-13	8		1	12-15	3		
11-14	10		1	12-16	1		
11-15	3		1	13-1-A		3	
11-16	117		1	13-5	3		
11-17			1	13-11			1
11-18	18			13-12	10		1

Table 220.--Spiochaetopterus costarum oculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	17			D-25		2	
BC-E	1			PB-1		2	
BC-G		1		14-1-A		10	
BC-H	1			14-2	10		1
BC-M	2		1	14-3	3		
BC-M-1		1		14-4	4		1
BC-N	3			15-1	3		
D-1			1	15-3		3	1
D-2			1	15-4	3		1
D-3		1		15-5	4		1
D-4			1	15-6	1		
D-5			1	15-7		1	
D-6		39		15-8	2		1
D-7			1	15-9		2	
D-8	1		1	15-10		1	
D-10	1		1	15-11	22		1
D-11	2	13		15-12	6		1
D-13	5		1	15-13	1		1
D-14			4	15-14	1		1
D-16			1	15-15	1		1
D-17	4			15-16	1		1
D-19-B			10	15-17	11		1
D-20	1		10	16-1		2	
D-21	3		10	16-6	24		
D-22	2		10	16-7	12		
D-23		8					
Terra Ceia Bay							
E-2		1		E-5	1		
E-3	19			E-7	17		10
E-4	5			E-8	1		

Table 220.--Spiochaetopterus costarum oculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	2		1	16-13	5		
14-6	1			16-16			1
14-10	3			16-17			1
14-11	1			16-20	19		1
14-13	2			16-21	37		1
14-15	1			16-22	37		1
14-18	12			16-23	2		
15-18	1			16-25		2	
15-19			1	16-26		5	
15-20	1			16-27	5		1
15-22	2			17-2	4		
15-23	2			17-5	3		1
15-24	1			17-6	17		
15-26			1	17-7	8		
15-31	1			17-8	2		
15-32	1			17-9	3		
16-10	3			18-3	1		
16-11	4						

Table 221.--Spiochaetopterus costarum oculatus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.1	13.0 to 33.8	199
Salinity (‰)	27.0	0.7 to 35.0	198
pH	8.0	7.0 to 8.5	174
Depth (m.)	1.2	1 to 4.0	200
Sediment type	sand	shelly sand to clayey silt	196
Granules (wt. %)	2.5	0.0 to 79.7	196
Sands (wt. %)	85.3	4.6 to 99.9	196
Silts (wt. %)	7.1	0.0 to 56.5	196
Clay (wt. %)	4.9	0.0 to 65.9	196
CaCO ₃ (wt. %)	11.5	0.6 to 69.0	195
Organic carbon (wt. %)	0.8	0.04 to 8.5	130
Organic nitrogen (wt. %)	0.05	0.00 to 0.3	130
Mean grain size, total sample (φ)	2.9	-4.0 to 7.3	195
Standard deviation, total sample (φ)	1.4	0.5 to 3.5	195
Skewness, total sample	0.6	-1.4 to 3.6	195
Kurtosis, total sample	10.3	-1.3 to 76.3	195
Mean grain size, noncarbonate fraction (φ)	3.1	1.4 to 9.0	194
Standard deviation, noncarbonate fraction (φ)	1.4	0.4 to 3.2	194
Mean grain size, carbonate fraction (φ)	-0.1	-2.6 to 3.0	181
Standard deviation, carbonate fraction (φ)	1.3	0.2 to 3.1	181

Mesochaetopterus sp. A

This species constructs a long, straight, fibrous, dwelling tube that is covered with rust-colored sand grains where it is exposed above the sediment surface. Only anterior worm fragments were collected. The largest was about 35 mm. long by 3 mm. wide. It had palps that were about 30 mm. long. An anterior portion, setae from setigers one, three, and four, and an uncinus have been illustrated (figure 9,E,F,G,H,I).

Specimens were collected at four survey stations in Boca Ciega Bay and at one in lower Tampa Bay (table 222).

Sediment at these five sites was sand that, as an average, was fine and poorly sorted. Shell content was nearly 18 percent, and the percentages of silt, clay, and organic carbon were low (table 223).

Algae, shoal grass, and turtle grass were found at two of the collection sites.

Neither gravid nor juvenile specimens were seen.

Tubes of this worm wash ashore in great numbers along St. Petersburg Beach after storms, and I have seen similar tubes on sand flats around Beaufort, North Carolina.

Table 222.--*Mesochaetopterus* sp. A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-3		1			14-3		1		
D-25		1			14-4		1		
Lower Tampa Bay									
14-12		1							

Table 223.--Mesochaetopterus sp. A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	19.8	17.4 to 27	5
Salinity (‰)	30.7	29.1 to 33.1	5
pH	8.2	8.0 to 8.4	5
Depth (m.)	1.2	1 to 3.3	5
Sediment type	sand	--	5
Granules (wt. %)	4.4	0.8 to 7.5	5
Sands (wt. %)	90.7	81.0 to 94.8	5
Silts (wt. %)	3.9	0.8 to 10.0	5
Clay (wt. %)	1.0	0.3 to 2.2	5
CaCO ₃ (wt. %)	17.9	3.5 to 45.5	5
Organic carbon (wt. %)	0.2	0.1 to 0.4	5
Organic nitrogen (wt. %)	0.02	0.01 to 0.03	5
Mean grain size, total sample (Ø)	2.4	1.4 to 3.1	5
Standard deviation, total sample (Ø)	1.6	1.2 to 2.4	5
Skewness, total sample	0.1	-0.4 to 0.9	5
Kurtosis, total sample	5.3	1.7 to 9.1	5
Mean grain size, noncarbonate fraction (Ø)	2.8	2.5 to 3.3	5
Standard deviation, noncarbonate fraction (Ø)	1.4	0.7 to 2.7	5
Mean grain size, carbonate fraction (Ø)	0.0	-0.5 to 0.8	3
Standard deviation, carbonate fraction (Ø)	1.2	0.9 to 1.8	3

Figure 9. -- Diagnostic features of Pseudopolydora sp.,
Trochochaeta sp., and Mesochaetopterus sp. A

- Pseudopolydora sp.: (A) Brush-top, acicular seta
from the fifth setiger (B)
Acicular hook from the fifth
setiger
- Trochochaeta sp.: (C) Group of acicular setae
from setiger five (D) Setiger
seven showing branchia and
single parapodial lobe
- Mesochaetopterus sp. A: (E) Anterior end (F) Setae
from setiger one (G) Seta
from setiger three (H) Setae
from setiger four (I) Uncinus
from abdominal region.

FIGURE 9

Mesochaetopterus sp. B

This mesochaetopterid lives in a fragile, membranous tube covered with sand grains. Only anterior fragments of worms were collected. The anterior region is about 5 mm. long by 2 mm. wide, and the tentacles are about 10 mm. long. Segments of the middle body region are about 3 mm. long. There is a pair of distinct eye spots near the palp bases. In some respects this species resembles Mesochaetopterus minuta. The anterior end, setae from setigers one and four, and an uncinus have been illustrated (figure 10,A,B,C,D,E,F).

Specimens were collected from Bunces Pass in Boca Ciega Bay (BC-N) and from two survey stations in lower Tampa Bay (table 224).

All collections were made in sand that was fine and poorly sorted. Shell content was high, and contained some large fragments. Silt, clay, and organic carbon percentages were very low (table 225).

Algae and turtle grass were noted in bottom samples from one station.

No juvenile worms were collected, and no observations were made on gamete production.

Table 224.--Mesochaetopterus sp. B--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
BC-N		10							
Lower Tampa Bay									
15-21		3			18-4		1		

Table 225.--Mesochaetopterus sp. B--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	23.2 to 25.1	2
Salinity (‰)	32.7	31.2 to 34.2	2
pH	7.9	7.7 to 8.1	2
Depth (m.)	1.0	--	2
Sediment type	sand	--	2
Granules (wt. %)	4.2	2.7 to 5.8	2
Sands (wt. %)	93.9	90.9 to 97.0	2
Silts (wt. %)	1.3	0.2 to 2.4	2
Clay (wt. %)	0.5	0.1 to 0.9	2
CaCO ₃ (wt. %)	28.5	7.2 to 49.9	2
Organic carbon (wt. %)	0.07	0.03 to 0.1	2
Organic nitrogen (wt. %)	0.02	--	2
Mean grain size, total sample (Ø)	2.1	2.0 to 2.1	2
Standard deviation, total sample (Ø)	1.5	1.0 to 1.9	2
Skewness, total sample	-0.6	-0.7 to -0.5	2
Kurtosis, total sample	6.7	6.4 to 6.9	2
Mean grain size, noncarbonate fraction (Ø)	2.2	1.9 to 2.6	2
Standard deviation, noncarbonate fraction (Ø)	1.0	0.7 to 1.4	2
Mean grain size, carbonate fraction (Ø)	-0.5	-0.7 to -0.4	2
Standard deviation, carbonate fraction (Ø)	1.4	1.3 to 1.4	2

Mesochaetopterus sp. C

This undetermined species constructs a brown, fibrous dwelling tube that is sparsely covered with sand grains. Only a few, anterior segments from two specimens were collected. The peristomium bears a pair of tentacles that are about 25 mm. long, and banded with light brown pigment. Black pigment spots are clustered at the palp bases (eyes?). The anterior end, and setae from setiger four have been illustrated (figure 10,G,H,I,J).

Specimens were collected at a survey station in Boca Ciega Bay (BC-N) and at an incidental locality near Mullet Key in lower Tampa Bay (table 226).

No sediment data are available for either locality.

Neither locality had bottom vegetation.

No gravid sepcimens were collected, and no juveniles were found.

Table 226.--Mesochaetopterus sp. C--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-N	1						

Figure 10. -- Diagnostic features of Mesochaetopterus sp. B
and Mesochaetopterus sp. C

Mesochaetopterus sp. B: (A) Anterior end (B) Dorsal
setae from setiger one (C)
Ventral seta from setiger one
(D) Setae from setiger four
(E) Seta from setiger four
(F) Uncinus from abdominal
region

Mesochaetopterus sp. C: (G) Anterior end (H) Dorsal
seta from setiger four (I)
Middle seta from setiger four
(J) Ventral setae from setiger
four.

FIGURE 10

Family CIRRATULIDAE Carus, 1863

Cirratulids occur in seas throughout the world where they are generally found in soft sediments. Some, however, nestle among shells, and others burrow in shell or rock. These worms have grooved palps or tentacles that are used to gather food from bottom deposits.

Twelve cirratulids were identified in Tampa Bay. Only three of these were determined with certainty as the palps, tentacles, and branchial processes, which are important taxonomic features, were often missing, especially in dredged material. Only two species, Cirratulus sp. D and Tharyx sp. C, were found in all areas of the Estuary. The next most widely distributed species, Cirratulus grandis, Cirriformia filigera, Cirriformia sp. A, Cirriformia sp. B, and Cirratulus sp. A, were found in most areas from upper Tampa Bay to Tampa Bay entrance. In addition, Cirriformia sp. A was found in Old Tampa Bay. The remaining five species were collected only in lower Tampa Bay, or that area and Boca Ciega Bay as well (Dodecaceria concharum, Cirratulus sp. B, Cirratulus sp. C, Tharyx sp. A, and Tharyx sp. B).

Key to CIRRATULIDAE Collected in Tampa Bay

1 Peristomium bears a pair of grooved palps 2

- Palps absent; anterior setigers bear
grooved, tentacular filaments 4
- 2 Parapodia contain slender, capillary setae,
as well as stout, acicular, spoon-shaped
setae Dodecaceria concharum
- Parapodia contain slender, capillary
setae only 3
- 3 Serrate, capillary setae in anterior segments
are replaced by smooth, capillary setae in
median and posterior segments Tharyx sp. A
- All setae are fine, smooth capillaries ... Tharyx sp. B
- Anterior neurosetae and all notosetae are
fine, smooth capillaries; median and
posterior neurosetae have a serrate
margin Tharyx sp. C
- 4 First branchial filaments arise with first
tentacular filaments 5
- First branchial filaments arise in front
of the tentacular filaments 7
- 5 Capillary setae only Cirratulus grandis
- Branchial and tentacular filaments arise
on the third setiger Cirratulus sp. A
- Branchial and tentacular filaments arise
on the first setiger 6
- 6 Median and posterior segments have acicular
hooks only in both notopodia and
neuropodia; eyes present Cirratulus sp. B
- Acicular hooks in median and posterior
segments accompanied by capillary setae;
eyes present Cirratulus sp. C
- Acicular hooks appear only in neuropodia
of posterior segments; no eyes Cirratulus sp. D

- 7 Acicular setae have entire tips and first
arise about setiger 12 Cirriformia filigera
- Acicular setae have entire tips and
appear on the first setiger Cirriformia sp. A
- Acicular setae appear in notopodia about
setiger 25, and in neuropodia about
setiger 15; some have bifid
tips Cirriformia sp. B

Cirratulus grandis Verrill, 1873

This species was the largest cirratulid found in the Estuary. Specimens measured up to 200 mm. in length. It was collected at a total of 53 survey stations in all areas of the Estuary except Old Tampa Bay and Hillsborough Bay. Incidental collections came from four localities in Boca Ciega and lower Tampa Bays. Thirty-seven of the survey stations and three incidental localities were in Boca Ciega Bay (table 227).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand. It had less than 10 percent shell, and only a few fragments in the granule and larger size classes. Weight percentage of silt and clay was about five percent and organic carbon was less than one percent (table 228).

One-half of the bottom samples contained algae and one or more sea grasses that included all of those found

in the Estuary except widgeon grass.

Gravid specimens were collected in March, and juvenile worms were found in May, August, October, November, and December.

C. grandis has been collected in the Gulf of Mexico and along the coast of the eastern United States.

Table 227.--*Cirratulus grandis*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
D-28		1		13-1-A		1	
12-14	2			13-13		1	
Boca Ciega Bay							
BC-A	4			15-4		1	
BC-C		10		15-6		11	
BC-E	7			15-8		4	
BC-G		4		15-9			1
BC-I	1			15-11		4	1
BC-M	25		3	15-12		16	
BC-M-1		16		15-13		7	
BC-N	2		1	15-14		5	
D-2	2			15-15		134	
D-6		10		15-16		61	
D-19-A		5		15-17		1	
D-23		1		16-1			64
D-25		2	4	16-2			2
PB-4			3	16-3			110
PB-5	1			16-4			127
14-1-A		40		16-5			1
14-2	1			16-6		2	
14-3	22			16-8			32
14-4	15						
Terra Ceia Bay							
E-4	1			E-6		1	

Table 227.--Cirratulus grandis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-6	16			16-21	2		
14-18	24			16-22	2		
15-31	2			16-23	1		
15-32	1			17-13	9		
16-10	4			17-15		142	1

Table 228.--Cirratulus grandis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.3	12.8 to 30.8	53
Salinity (‰)	30.7	26.3 to 34.8	53
pH	8.1	7.7 to 8.5	49
Depth (m.)	0.8	1 to 2.3	53
Sediment type	sand	sand to silty sand	52
Granules (wt. %)	2.5	0.0 to 14.7	52
Sands (wt. %)	92.4	72.5 to 99.8	52
Silts (wt. %)	3.9	0.1 to 22.1	52
Clay (wt. %)	1.2	0.0 to 7.2	52
CaCO ₃ (wt. %)	9.9	1.2 to 66.0	52
Organic carbon (wt. %)	0.6	0.1 to 6.9	47
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	47
Mean grain size, total sample (φ)	2.7	1.4 to 3.5	52
Standard deviation, total sample (φ)	1.3	0.5 to 2.5	52
Skewness, total sample	0.3	-1.2 to 1.6	52
Kurtosis, total sample	8.0	-0.04 to 24.4	52
Mean grain size, noncarbonate fraction (φ)	2.9	1.8 to 8.7	51
Standard deviation, noncarbonate fraction (φ)	1.1	0.5 to 2.2	51
Mean grain size, carbonate fraction (φ)	0.3	-2.5 to 2.4	45
Standard deviation, carbonate fraction (φ)	1.1	0.2 to 2.9	45

Cirriiformia filigera (delle Chiaje, 1825)
(Described and illustrated by Day, 1967)

Large, complete specimens were collected from oyster clumps at three incidental localities in Boca Ciega Bay. Others came from 14 survey stations in all areas of the Estuary between upper and lower Tampa Bay (table 229).

Sediment data indicate that C. filigera generally inhabits sand that is fine and poorly sorted. Average shell content was over 20 percent with most of it being in the sand size categories. The weight percentage of silt and clay was about five percent, and organic carbon was under one percent (table 230).

Only two of 10 bottom samples contained algae, and one or more sea grasses that included shoal, manatee, and turtle grass.

No gravid specimens were noted, but juveniles were collected in May, September, October, November, and December.

This species has been collected in the Gulf of Mexico and from equatorial and temperate waters around the world.

Table 229.--*Cirriiformia filigera*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay						
Stations			Individuals			
			D	S	N	
12-13					3	
Boca Ciega Bay						
BC-N	2					
D-25		1	1			
D-26		18				
14-3			10			
15-1					7	
15-11					1	
15-12				1		
15-13					1	
Terra Ceia Bay						
E-5			3			
E-6					2	
Lower Tampa Bay						
D-27		2				
15-32	1					
16-11					1	

Table 230.--Cirriiformia filigera--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.9	13.0 to 26.8	10
Salinity (‰)	31.8	29.4 to 35.1	10
pH	8.0	7.8 to 8.3	10
Depth (m.)	1.0	1 to 2.3	10
Sediment type	sand	sand to silty sand	9
Granules (wt. %)	4.0	0.3 to 14.7	9
Sands (wt. %)	90.8	72.4 to 99.4	9
Silts (wt. %)	4.2	0.0 to 22.1	9
Clay (wt. %)	0.9	0.0 to 5.1	9
CaCO ₃ (wt. %)	23.6	0.9 to 99.6	9
Organic carbon (wt. %)	0.6	0.1 to 3.0	7
Organic nitrogen (wt. %)	0.02	0.00 to 0.04	7
Mean grain size, total sample (Ø)	2.6	1.4 to 4.1	9
Standard deviation, total sample (Ø)	1.4	0.9 to 2.0	9
Skewness, total sample	-0.2	-1.1 to 1.0	9
Kurtosis, total sample	7.4	-0.04 to 21.2	8
Mean grain size, noncarbonate fraction (Ø)	3.1	2.1 to 6.1	8
Standard deviation, noncarbonate fraction (Ø)	1.2	0.7 to 1.8	8
Mean grain size, carbonate fraction (Ø)	0.6	-1.8 to 3.0	8
Standard deviation, carbonate fraction (Ø)	1.0	0.2 to 1.6	8

Dodecaceria concharum Oersted, 1943
(Described and illustrated by Hartman, 1969)

Many specimens were extracted from limestone clumps collected by net in lower Tampa Bay, and one was taken from a large, live gastropod (Busycon) in Boca Ciega Bay (table 231).

No specific, environmental data were obtained, and no information is available on the worm's reproductive habits.

D. concharum is commonly found in rocky, coastal waters around the world from temperate latitudes to the tropics. Hartman (1951) recorded Dodecaceria near concharum from the Gulf of Mexico.

Table 231.--Dodecaceria concharum--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-25		1							
Lower Tampa Bay									
18-3		25							

Cirratulus sp. A

This cirratulid has a rounded prostomium and no eyes. Ventrally, around the mouth and over the first few setigers, there are spots of dark pigment. Branchial and tentacular filaments begin on setiger three. Bifid, acicular neurosetae begin on the ninth setiger (figure 11,A) and bifid, acicular notosetae begin on setiger seven (figure 11,B). The acicular setae occur in pairs. Capillary setae are present dorsally and ventrally on all setigers.

Specimens were collected at 12 survey stations in lower Tampa Bay and at one in upper Tampa Bay (table 232).

Sediments at all bottom stations were either sand or shelly sand that contained very little silt and clay, but nearly one percent organic carbon. Shell content was high, and consisted mainly of sand and granule size particles (table 233).

Vegetation was noted in only two bottom samples.

Algae were present, but no sea grasses were recorded.

Neither gravid nor juvenile individuals were seen.

Table 232.--*Cirratulus* sp. A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay						
Stations	Individuals			Stations	Individuals	
	D	S	N		D	S
13-3	44					
Lower Tampa Bay						
15-29	4			16-16	3	
15-31	2			16-17	1	
16-12			8	16-20		1
16-13	2			17-2	43	
16-14	108			17-3	75	
16-15	17			17-4	13	

Table 233.--*Cirratulus* sp. A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.9	21.2 to 24.9	12
Salinity (‰)	32.6	30.4 to 34.5	12
pH	8.0	7.7 to 8.2	12
Depth (m.)	2.4	1 to 4.0	12
Sediment type	sand	shelly sand to sand	11
Granules (wt. %)	5.4	0.5 to 21.4	11
Sands (wt. %)	93.2	77.8 to 99.2	11
Silts (wt. %)	1.2	0.2 to 2.7	11
Clay (wt. %)	0.3	0.1 to 0.8	11
CaCO ₃ (wt. %)	54.0	20.7 to 85.2	11
Organic carbon (wt. %)	0.8	0.1 to 3.3	11
Organic nitrogen (wt. %)	0.06	0.01 to 0.2	11
Mean grain size, total sample (φ)	1.3	0.4 to 1.9	11
Standard deviation, total sample (φ)	1.3	1.0 to 1.6	11
Skewness, total sample	0.4	0.1 to 0.8	11
Kurtosis, total sample	4.4	0.8 to 8.2	11
Mean grain size, noncarbonate fraction (φ)	3.3	2.2 to 5.9	11
Standard deviation, noncarbonate fraction (φ)	1.4	0.6 to 3.2	11
Mean grain size, carbonate fraction (φ)	0.5	-0.1 to 1.7	10
Standard deviation, carbonate fraction (φ)	1.0	0.8 to 1.3	10

Cirratulus sp. B

The prostomium is pointed and bears a pair of distinct eyes. Branchial and tentacular filaments appear on the first setiger. Acicular setae are bifid and appear ventrally on the first setiger (figure 11,C). They first arise dorsally in median notopodia and persist in neuro-podia through posterior setigers. There are as many as 12 acicular setae per fascicle. Capillary setae are present dorsally and ventrally through about 20 setigers. Those in dorsal fascicles are quite long.

Specimens were collected at three survey stations and one incidental locality in Boca Ciega Bay, and at 12 survey stations in lower Tampa Bay (table 234).

Sediments at these stations were shelly sand or sand. The content of silt and clay was less than five percent and organic carbon was under one percent. As an average, sediment sorting was very poor (table 235).

One-third of the bottom samples contained algae and either turtle or manatee grass.

Neither juveniles nor worms in reproductive condition were collected.

Table 234.--Cirratulus sp. B--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
	D	S	N		D	S	N		
PB-4	1			16-7	1				
16-6	6								
Lower Tampa Bay									
16-11	3			16-25		1			
16-13	3			17-2	8				
16-19	5			17-6	3				
16-21	11			17-8	1				
16-22	1			17-9	3				
16-23	2			18-3	1				

Table 235.--Cirratulus sp. B--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.8	19.2 to 25.2	15
Salinity (‰)	32.9	30.5 to 34.5	15
pH	8.0	7.8 to 8.2	15
Depth (m.)	1.7	1 to 4.0	15
Sediment type	sand	shelly sand to sand	15
Granules (wt. %)	6.0	0.3 to 28.7	15
Sands (wt. %)	91.3	68.8 to 98.3	15
Silts (wt. %)	2.1	1.0 to 4.7	15
Clay (wt. %)	0.5	0.2 to 1.2	15
CaCO ₃ (wt. %)	19.0	2.7 to 44.4	15
Organic carbon (wt. %)	0.7	0.0 to 3.3	15
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	15
Mean grain size, total sample (Ø)	2.1	0.9 to 3.1	15
Standard deviation, total sample (Ø)	3.5	0.8 to 3.0	15
Skewness, total sample	0.01	-0.8 to 0.8	15
Kurtosis, total sample	7.1	-0.8 to 17.9	15
Mean grain size, noncarbonate fraction (Ø)	3.0	1.4 to 6.1	15
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	15
Mean grain size, carbonate fraction (Ø)	0.4	-0.6 to 3.0	12
Standard deviation, carbonate fraction (Ø)	1.0	0.7 to 1.3	12

Cirratulus sp. C

The prostomium bears a pair of eyes, and the peristomium is modified dorsally in the shape of an elongated cephalic plate. Branchial and tentacular filaments begin on the first setiger. Neuropodial, acicular setae appear on setiger one (figure 11,D) and continue on all segments. Dorsally, acicular setae first appear about setiger 25 (figure 11,E). Capillary notosetae of anterior segments have a spinous margin (figure 11,F). The pygidium has the characteristic shape illustrated (figure 11,G).

Specimens were collected at a survey station and incidental locality in Boca Ciega Bay, and at two survey stations in lower Tampa Bay (table 236).

Sediments at collecting stations were poorly sorted, fine sand that contained over 15 percent shell, less than five percent silt and clay, and less than one percent organic carbon (table 237).

Algae were recorded at one station.

No data on the worm's reproductive habits are available.

Table 236.--*Cirratulus* sp. C--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
16-6		1							
Lower Tampa Bay									
17-8		2			17-10		1		

Table 237.--Cirratulus sp. C--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.8	19.0 to 24.2	3
Salinity (‰)	32.5	30.8 to 34.3	3
pH	8.1	8.0 to 8.2	3
Depth (m.)	1.3	1.0 to 1.7	3
Sediment type	sand	--	3
Granules (wt. %)	4.6	1.3 to 8.9	3
Sands (wt. %)	93.2	87.8 to 96.1	3
Silts (wt. %)	1.6	0.5 to 2.4	3
Clay (wt. %)	0.5	0.1 to 0.9	3
CaCO ₃ (wt. %)	15.6	10.0 to 19.8	3
Organic carbon (wt. %)	0.5	0.1 to 1.0	3
Organic nitrogen (wt. %)	0.01	--	3
Mean grain size, total sample (Ø)	2.3	2.1 to 2.4	3
Standard deviation, total sample (Ø)	1.5	1.0 to 2.0	3
Skewness, total sample	-0.6	-1.3 to 0.1	3
Kurtosis, total sample	7.8	4.2 to 14.5	3
Mean grain size, noncarbonate fraction (Ø)	2.7	2.4 to 3.1	3
Standard deviation, noncarbonate fraction (Ø)	0.9	0.6 to 1.3	3
Mean grain size, carbonate fraction (Ø)	-0.6	--	1
Standard deviation, carbonate fraction (Ø)	0.8	--	1

Cirratulus sp. D

This species has no eyes. Branchial and tentacular filaments begin on the first setiger. Except for about the last 25 segments, only capillary setae are present in notopodia and neuropodia. In these posterior segments, bifid, acicular setae accompany capillary ones (figure 11, H). The last few segments contain only acicular setae.

This undetermined cirratulid was found in all areas of the Estuary at 15 survey stations (table 238).

Sediment type was predominantly sand, but specimens were also collected in shelly sand and soft sediments. The average sediment type was poorly sorted, fine sand that contained a large amount of shell and over 12 percent silt and clay. The organic carbon content was nearly one percent (table 239).

Most collections came from depths below 2 m., and no vegetation was noted in bottom samples.

No specimens provided information on the worm's reproductive habits.

Table 238.--Cirratulus sp. D--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay						
Stations	Individuals			Stations	Individuals	
	D	S	N		D	S N
6-2	1					
Hillsborough Bay						
10-16	4		1	10-17	4	
Upper Tampa Bay						
10-4	17			11-15	42	
11-12	1			11-16	46	3
Boca Ciega Bay						
15-4	1					
Terra Ceia Bay						
E-1			2			
Lower Tampa Bay						
15-26	1			17-2	2	
16-13	5			17-4	4	
16-16	2			17-5	1	

Table 239.--Cirratulus sp. D--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.2	22.6 to 31.8	14
Salinity (‰)	28.7	22.3 to 34.5	14
pH	8.0	7.6 to 8.2	14
Depth (m.)	2.5	1 to 4.0	14
Sediment type	sand	shelly sand to silty clay	14
Granules (wt. %)	6.6	0.4 to 41.5	14
Sands (wt. %)	80.5	12.4 to 99.2	14
Silts (wt. %)	7.4	0.0 to 40.2	14
Clay (wt. %)	4.9	0.0 to 40.0	14
CaCO ₃ (wt. %)	37.5	15.1 to 65.5	14
Organic carbon (wt. %)	0.8	0.1 to 3.3	10
Organic nitrogen (wt. %)	0.05	0.00 to 0.2	10
Mean grain size, total sample (Ø)	2.4	0.9 to 7.1	14
Standard deviation, total sample (Ø)	1.8	1.0 to 3.5	14
Skewness, total sample	0.1	-0.8 to 0.7	14
Kurtosis, total sample	2.6	-0.4 to 6.3	14
Mean grain size, noncarbonate fraction (Ø)	3.3	2.4 to 5.5	14
Standard deviation, noncarbonate fraction (Ø)	1.5	0.6 to 3.2	14
Mean grain size, carbonate fraction (Ø)	0.2	-1.7 to 1.7	13
Standard deviation, carbonate fraction (Ø)	1.4	0.8 to 2.7	13

Cirriformia sp. A

This species is characterized by the presence of a very deep ventral groove, and straight, acicular spines in neuropodia of all setigers (figure 11,I).

Specimens were collected at one survey station in each of the following areas: Old Tampa Bay, upper Tampa Bay, Boca Ciega Bay, and lower Tampa Bay. Additional, incidental collections were made at two stations in Boca Ciega Bay and lower Tampa Bay near Mullet Key (table 240).

Sediments at dredge stations were all shelly sand or sand. Average bottom type was poorly sorted, fine sand that contained over 23 percent shell, about five percent silt and clay, and an exceptionally high amount of organic carbon. Much of the shell was in the granule or coarser size category (table 241).

Vegetation was recorded at one station, and consisted of algae and turtle grass.

Neither gravid nor juvenile specimens were collected.

Table 240.--Cirriiformia sp. A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-2		1							
Upper Tampa Bay									
11-15		1							
Boca Ciega Bay									
16-2		2							
Lower Tampa Bay									
17-14		1							

Table 241.--Cirriformia sp. A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.2	18.0 to 31.8	3
Salinity (‰)	26.1	23.8 to 29.9	3
pH	8.1	7.8 to 8.3	3
Depth (m.)	2.0	1 to 3.0	3
Sediment type	sand	shelly sand to sand	3
Granules (wt. %)	16.0	0.02 to 41.5	3
Sands (wt. %)	78.8	43.7 to 99.2	3
Silts (wt. %)	3.2	0.0 to 9.2	3
Clay (wt. %)	1.9	0.0 to 5.6	3
CaCO ₃ (wt. %)	23.4	1.8 to 36.5	3
Organic carbon (wt. %)	2.7	1.1 to 4.3	3
Organic nitrogen (wt. %)	0.2	0.1 to 0.2	3
Mean grain size, total sample (φ)	1.7	0.9 to 2.7	3
Standard deviation, total sample (φ)	1.8	0.6 to 3.5	3
Skewness, total sample	0.6	-0.5 to 1.9	3
Kurtosis, total sample	11.3	-0.4 to 34.2	3
Mean grain size, noncarbonate fraction (φ)	3.4	3.0 to 4.1	3
Standard deviation, noncarbonate fraction (φ)	1.8	1.7 to 2.0	3
Mean grain size, carbonate fraction (φ)	-0.1	-1.7 to 1.0	3
Standard deviation, carbonate fraction (φ)	1.3	1.1 to 1.5	3

Cirriformia sp. B

This cirratulid has lateral lobes on the prostomium. Ventrally, acicular hooks arise about setiger 15 and continue to the end of the body. Dorsally, acicular hooks arise about setiger 25 (figure 11, J). Simple, capillary setae are present in notopodia and neuropodia of all segments.

This species was found at two survey stations in upper Tampa Bay and at one in lower Tampa Bay (table 242).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand. The percentage of shell was over 23, silt and clay were virtually absent, and organic carbon was less than one percent (table 243).

Algae were recorded at one station and were the only plants noted.

No gravid worms were seen and no juveniles were collected.

Table 242.--Cirriiformia sp. B--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-3	4			11-1	1		
Lower Tampa Bay							
15-26	1						

Table 243.--Cirriiformia sp. B--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.9	24.1 to 31.5	3
Salinity (‰)	26.1	22.7 to 32.3	3
pH	7.8	7.8 to 8.0	3
Depth (m.)	1.0	1 to 2.3	3
Sediment type	sand	shelly sand to sand	3
Granules (wt. %)	9.6	0.7 to 21.5	3
Sands (wt. %)	89.7	78.5 to 98.7	3
Silts (wt. %)	0.5	0.0 to 1.0	3
Clay (wt. %)	0.2	0.0 to 0.4	3
CaCO ₃ (wt. %)	23.8	0.9 to 46.9	3
Organic carbon (wt. %)	0.6	0.2 to 1.2	2
Organic nitrogen (wt. %)	0.07	0.02 to 0.1	2
Mean grain size, total sample (Ø)	1.5	0.8 to 2.4	3
Standard deviation, total sample (Ø)	1.5	0.7 to 2.3	3
Skewness, total sample	-0.1	-0.5 to 0.2	3
Kurtosis, total sample	9.4	-0.2 to 26.4	3
Mean grain size, noncarbonate fraction (Ø)	3.0	2.4 to 3.8	3
Standard deviation, noncarbonate fraction (Ø)	1.5	1.0 to 2.3	3
Mean grain size, carbonate fraction (Ø)	-0.7	-1.8 to 0.5	3
Standard deviation, carbonate fraction (Ø)	1.5	1.0 to 1.7	3

Tharyx sp. A

In this species the capillary setae of anterior segments have a fine, spinous edge (figure 11,K). This spinous margin disappears in median and posterior capillaries, which are entirely smooth. A pair of indistinct eyes was noted on the prostomium.

A single individual was collected in lower Tampa Bay (table 244).

At that station, the sediment was moderately sorted, medium sand that had very little shell, less than one percent silt and clay, and less than one percent organic carbon (table 245).

Vegetation at the station consisted of algae and turtle grass.

No data are available concerning reproduction in this species.

Table 244.--Tharyx sp. A--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay						
Stations			Individuals			
			D	S	N	
16-25			1			

Table 245.--Tharyx sp. A--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.0	--	1
Salinity (‰)	30.5	--	1
pH	8.2	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	1.0	--	1
Sands (wt. %)	98.3	--	1
Silts (wt. %)	0.6	--	1
Clay (wt. %)	0.2	--	1
CaCO ₃ (wt. %)	5.1	--	1
Organic carbon (wt. %)	0.5	--	1
Organic nitrogen (wt. %)	0.6	--	1
Mean grain size, total sample (Ø)	1.9	--	1
Standard deviation, total sample (Ø)	0.9	--	1
Skewness, total sample	0.2	--	1
Kurtosis, total sample	9.6	--	1
Mean grain size, noncarbonate fraction (Ø)	2.3	--	1
Standard deviation, noncarbonate fraction (Ø)	0.9	--	1
Mean grain size, carbonate fraction (Ø)	-0.1	--	1
Standard deviation, carbonate fraction (Ø)	1.2	--	1

Tharyx sp. B

This worm was distinguished from other members of the genus by the presence of smooth capillary setae on all setigers.

It was collected at one station in Boca Ciega Bay and another in lower Tampa Bay (table 246).

Sediment in both localities was poorly sorted, medium sand. The shell content was moderately high, but percentages were low in the silt, clay, and organic carbon categories (table 247).

Algae were present at one station. No sea grasses were noted.

No gravid specimens were collected, and no juveniles were observed.

Table 246.--Tharyx sp. B--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
BC-N		1		5					
Lower Tampa Bay									
15-31		1							

Table 247.--Tharyx sp. B--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	n Range	Number observations
Water temperature (°C.)	20.8	17.5 to 24.0	2
Salinity (‰)	31.3	30.4 to 32.2	2
pH	8.1	8.0 to 8.3	2
Depth (m.)	1.5	1 to 2.3	2
Sediment type	sand	--	2
Granules (wt. %)	9.6	4.5 to 14.7	2
Sands (wt. %)	88.4	83.5 to 93.4	2
Silts (wt. %)	1.7	1.5 to 1.9	2
Clay (wt. %)	0.3	0.3 to 0.4	2
CaCO ₃ (wt. %)	29.4	20.7 to 38.2	2
Organic carbon (wt. %)	0.3	0.2 to 0.4	2
Organic nitrogen (wt. %)	0.03	--	2
Mean grain size, total sample (φ)	1.6	1.4 to 1.8	2
Standard deviation, total sample (φ)	1.7	1.5 to 1.9	2
Skewness, total sample	-0.1	-0.3 to 0.1	2
Kurtosis, total sample	2.6	0.9 to 4.2	2
Mean grain size, noncarbonate fraction (φ)	2.4	2.2 to 2.7	2
Standard deviation, noncarbonate fraction (φ)	0.8	0.7 to 0.9	2
Mean grain size, carbonate fraction (φ)	0.8	0.2 to 1.5	2
Standard deviation, carbonate fraction (φ)	0.7	0.2 to 1.2	2

Tharyx sp. C

In this species the anterior setae are all smooth capillaries. Capillary setae with a serrate margin appear only in neuropodia of median and posterior segments (figure 11,L).

Specimens were collected in all areas of the Estuary at 85 survey stations and at four incidental localities in Boca Ciega Bay, upper Tampa Bay, and lower Tampa Bay (table 248).

The worms were taken in a wide range of sediments between shelly sand and clayey silt. Average sediment type was very fine, poorly sorted sand. The mean percentage of silt and clay was nearly 15 percent, and the content of organic carbon approached one percent. Shell comprised nearly 15 percent of the sediment (table 249).

Thirty-two of 53 bottom samples contained algae as well as one or more of all five species of sea grasses found in the Estuary.

No juveniles or specimens with mature gametes were collected.

Table 248.--Tharyx sp. C--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
1-4	6			6-1-C		1	
3-1-A		1		6-7-A		2	
4-2	5						
Hillsborough Bay							
C-2	2			10-20			2
10-15	5			10-21			1
10-16	6			10-22	3		
10-19	22						
Upper Tampa Bay							
10-4	1			11-17	1		
11-6	1			11-18	1		
11-8	3			11-20	35		
11-9	136			11-22	8		
11-11	14			11-25	10		
11-12	1			11-26	7		
11-13	1			11-27	2		
11-15	2			13-1-A		8	

Table 248.--*Tharyx* sp. C--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	126			14-2	101		
BC-C		1		14-3	2		
BC-H	1			14-4	38		
BC-I	2			15-3	1	29	
BC-N	1			15-4	38		
D-2	65			15-5	37		
D-3		14		15-6	38		1
D-4	1			15-8	51		
D-5			2	15-9		4	
D-6	239			15-11	9		
D-7	1			15-12	76		
D-9	19			15-13	285		
D-10	46			15-14	13		
D-11		48		15-15			1
D-12		1		15-16	1		
D-17	1			15-17	1		
D-19-A		5		16-1		17	
D-22	113			16-2		43	
D-23		49		16-4		1	
D-25		1		16-5		7	
PB-1	8			16-6	3		
PB-1-A		15		16-8		1	
PB-4	3	10					
Terra Ceia Bay							
E-1	12			E-6	7	4	
E-2		38		E-7	6		
Lower Tampa Bay							
14-19		1		16-26		19	
15-18	1			16-27	3		
16-13	1			17-4	1		
16-25		1		17-6	2		

Table 249.--Tharyx sp. C--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.7	13.0 to 33.2	85
Salinity (‰)	29.6	18.5 to 34.8	85
pH	8.1	7.1 to 8.4	80
Depth (m.)	1.1	1 to 4.0	85
Sediment type	sand	shelly sand to clayey silt	84
Granules (wt. %)	2.5	0.0 to 41.5	84
Sands (wt. %)	82.9	4.6 to 99.4	84
Silts (wt. %)	9.6	0.2 to 89.4	84
Clay (wt. %)	4.9	0.0 to 47.0	84
CaCO ₃ (wt. %)	14.9	1.0 to 66.0	84
Organic carbon (wt. %)	0.8	0.01 to 6.9	55
Organic nitrogen (wt. %)	0.05	0.00 to 0.2	55
Mean grain size, total sample (φ)	3.1	0.7 to 7.3	84
Standard deviation, total sample (φ)	1.5	0.6 to 3.5	84
Skewness, total sample	0.3	-1.7 to 3.4	84
Kurtosis, total sample	7.4	-0.9 to 73.5	84
Mean grain size, noncarbonate fraction (φ)	3.0	1.7 to 8.7	77
Standard deviation, noncarbonate fraction (φ)	1.3	0.4 to 3.1	77
Mean grain size, carbonate fraction (φ)	-0.1	-2.5 to 2.4	73
Standard deviation, carbonate fraction (φ)	1.4	0.4 to 3.1	72

Figure 11. -- Diagnostic features of Cirratulus sp. A, Cirratulus sp. B, Cirratulus sp. C, Cirratulus sp. D, Cirriformia sp. A, Cirriformia sp. B, Tharyx sp. A, and Tharyx sp. C

- Cirratulus sp. A: (A) Bifid, acicular setae from median neuropodium (B) Bifid, acicular setae from median notopodium
- Cirratulus sp. B: (C) Bifid, acicular setae from median neuropodium
- Cirratulus sp. C: (D) Acicular setae from anterior neuropodium (E) Acicular setae from posterior notopodium (F) Spinous, capillary seta from anterior notopodium (G) Pygidium in ventral view
- Cirratulus sp. D: (H) Bifid, acicular and capillary setae from posterior neuropodium
- Cirriformia sp. A: (I) Acicular setae from median neuropodium
- Cirriformia sp. B: (J) Acicular setae from posterior neuropodium
- Tharyx sp. A: (K) Spinous, capillary seta from anterior notopodium
- Tharyx sp. C: (L) Serrate, capillary seta from posterior neuropodium.

FIGURE 11

Family FLABELLIGERIDAE Saint-Joseph, 1894

Flabelligerids are generally found in temperate to tropical waters, and have a world-wide distribution. They feed on bottom deposits, and live in sediments or crevices.

A single species, Pherusa arenosa, was found in Tampa Bay.

Pherusa arenosa (Webster, 1879b)

Specimens were collected at a total of 11 survey stations in areas of the Estuary from upper Tampa Bay to lower Tampa Bay (table 250).

Average sediment type was poorly sorted, fine sand that contained nearly 15 percent shell, less than five percent silt and clay, and very little organic carbon (table 251).

One-half of the bottom samples contained algae, but no sea grasses were noted.

No juvenile specimens were collected, and no dissections were made to determine the maturity of gametes.

P. arenosa is known from the east coast of the United States, but has not been previously recorded in the Gulf of Mexico.

Table 250.--Pherusa arenosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
10-6		1			11-5		1		
Boca Ciega Bay									
15-14		1							
Terra Ceia Bay									
E-1				1	E-7		1		
Lower Tampa Bay									
14-9		2			16-10		5		
14-11		1			16-27		1		
14-13		1			18-3		2		

Table 251.--Pherusa arenosa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	15.0 to 30.5	10
Salinity (‰)	29.8	21.0 to 34.6	10
pH	8.0	7.8 to 8.3	10
Depth (m.)	1.9	1 to 3.0	10
Sediment type	sand	shelly sand to sand	10
Granules (wt. %)	5.2	0.1 to 20.8	10
Sands (wt. %)	91.3	77.3 to 99.2	10
Silts (wt. %)	2.6	0.3 to 6.2	10
Clay (wt. %)	1.0	0.1 to 3.2	10
CaCO ₃ (wt. %)	14.6	1.4 to 43.3	10
Organic carbon (wt. %)	0.4	0.04 to 2.8	8
Organic nitrogen (wt. %)	0.01	0.00 to 0.02	8
Mean grain size, total sample (φ)	2.2	0.9 to 2.9	10
Standard deviation, total sample (φ)	1.5	0.6 to 2.0	10
Skewness, total sample	0.4	-0.5 to 1.9	10
Kurtosis, total sample	8.7	-0.03 to 27.7	10
Mean grain size, noncarbonate fraction (φ)	2.9	1.9 to 4.4	10
Standard deviation, noncarbonate fraction (φ)	1.3	0.6 to 2.2	10
Mean grain size, carbonate fraction (φ)	-0.5	-2.5 to 1.0	10
Standard deviation, carbonate fraction (φ)	1.3	0.9 to 1.8	10

Family OPHELIIDAE Malmgren, 1867

The ophelids inhabit sediments in seas throughout the world where they feed on organic material contained in bottom deposits.

Three species were found in Tampa Bay. Ammotrypane aulogaster was found only as far into the Estuary as upper Tampa Bay, while the range of Armandia agilis and Travisia sp. extended as far as Old Tampa Bay. None of the three were found in Hillsborough Bay.

Key to OPHELIIDAE Collected in Tampa Bay

- 1 Body has distinct, ventral and lateral grooves;
pygidium prominent 2
- Grooves absent; pygidium knob-like Travisia sp.
- 2 Eyes present in lateral grooves Armandia agilis
- Lateral grooves have no eyes.... Ammotrypane aulogaster

Ammotrypane aulogaster Rathke, 1843
(Described and illustrated by Hartman, 1969)

A single specimen was collected in upper Tampa Bay, and the other 23 records came from survey stations in Boca Ciega Bay and lower Tampa Bay (table 252).

All collections came from shelly sand or sand. As an average, the sediment was poorly sorted, fine sand that contained about 14 percent shell. The percentage of silt and clay was small, as was the percentage of

organic carbon (table 253).

Seven of 20 bottom samples contained vegetation that consisted of algae and one or more of three sea grasses -- shoal grass, turtle grass, and manatee grass.

No information was obtained on the worm's reproductive habits.

A. aulogaster was originally described from Norway and has also been recorded from the east and west coasts of the United States. It has not been previously reported from the Gulf of Mexico.

Table 252.--Ammotrypane aulogaster--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
13-2	1						
Boca Ciega Bay							
BC-E	2			D-25	1		
BC-H	1			PB-1			1
BC-I	1			PB-4	37		
BC-M	2			PB-5			7
BC-N	12			14-4			1
D-17	2			15-9	1		
Lower Tampa Bay							
14-5			2	17-12	56		
14-8	1			17-13	19		
15-25	1			17-14	23		
16-10	1			18-3	4		
17-9	10			18-4	1		
17-10	36						

Table 253.--Ammotrypane aulogaster--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.7	17.0 to 26.8	20
Salinity (‰)	31.9	28.5 to 34.8	20
pH	8.1	7.8 to 8.5	20
Depth (m.)	1.2	1 to 3.0	20
Sediment type	sand	shelly sand to sand	20
Granules (wt. %)	4.0	0.02 to 20.8	20
Sands (wt. %)	93.5	77.4 to 99.8	20
Silts (wt. %)	1.8	0.1 to 7.9	20
Clay (wt. %)	0.7	0.02 to 4.8	20
CaCO ₃ (wt. %)	14.4	1.1 to 52.3	20
Organic carbon (wt. %)	0.4	0.01 to 4.3	19
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	19
Mean grain size, total sample (Ø)	2.3	0.9 to 3.4	20
Standard deviation, total sample (Ø)	1.2	0.5 to 2.0	20
Skewness, total sample	0.3	-1.7 to 1.9	20
Kurtosis, total sample	11.8	-0.03 to 34.3	20
Mean grain size, noncarbonate fraction (Ø)	2.7	1.4 to 4.4	19
Standard deviation, noncarbonate fraction (Ø)	1.2	0.2 to 2.7	19
Mean grain size, carbonate fraction (Ø)	0.6	-1.3 to 2.3	15
Standard deviation, carbonate fraction (Ø)	0.9	0.2 to 1.4	15

Armandia agilis (Andrews, 1891)
(Described and illustrated by Renaud, 1956)

Specimens were collected at 36 survey stations in lower Tampa Bay, one in Terra Ceia Bay, and five in Boca Ciega Bay. In addition, there were collections at two incidental localities in Boca Ciega Bay, and one on a sandy shoal south of Gandy Bridge in Old Tampa Bay (table 254).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that had a high percentage of shell, and only small amounts of silt and clay. The organic carbon content was nearly one percent (table 255).

One-half of the bottom samples contained algae and one or more sea grasses that included manatee, turtle, and shoal grass.

Juvenile worms were collected in October, but no gravid specimens were noted.

This species has been collected in the Gulf of Mexico and is otherwise known from the east coast of the United States.

Table 254.--Armandia agilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-N	1			16-6	14		
D-2	1			16-7	4		
14-4	4						
Terra Ceia Bay							
E-8	1						
Lower Tampa Bay							
14-5	9			16-13	22		
14-6	2			16-15	10		1
14-7	1			16-16	12		
14-9	6			16-17	12		
14-10	6			16-19	5		
14-12	4			16-20	2		1
14-13	9			16-21	4		
14-14	3			16-23	2		
14-15	2			16-24	1		
14-16	13			16-26		1	
14-17	2			17-2	7		
15-22	1			17-4	3		
15-23	1			17-5	4		1
15-27	2			17-6	99		4
15-29	2			17-7	25		
15-30	1			17-8	40		1
15-31	2			18-3	14		
16-11	33			18-4	1		

Table 255.--Armandia agilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.2	15.0 to 29.4	42
Salinity (‰)	32.1	29.5 to 34.5	41
pH	8.0	7.8 to 8.3	42
Depth (m.)	1.7	1 to 4.0	42
Sediment type	sand	shelly sand to sand	41
Granules (wt. %)	4.4	0.1 to 28.8	41
Sands (wt. %)	93.5	68.8 to 99.2	41
Silts (wt. %)	1.6	0.2 to 4.7	41
Clay (wt. %)	0.5	0.0 to 2.2	41
CaCO ₃ (wt. %)	26.7	2.4 to 65.5	41
Organic carbon (wt. %)	0.7	0.1 to 5.0	39
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	39
Mean grain size, total sample (Ø)	2.0	0.9 to 3.1	41
Standard deviation, total sample (Ø)	1.4	0.8 to 3.0	41
Skewness, total sample	0.05	-1.7 to 1.0	41
Kurtosis, total sample	6.6	-0.8 to 31.9	41
Mean grain size, noncarbonate fraction (Ø)	2.8	1.9 to 5.5	40
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	40
Mean grain size, carbonate fraction (Ø)	0.4	-1.7 to 2.1	34
Standard deviation, carbonate fraction (Ø)	1.1	0.4 to 1.9	34

Travisia sp.

This undetermined ophelid resembles Travisia carnea, which was described from New England and has been collected as far south as Virginia. The species from Tampa Bay has 30 or more setigers, and branchial filaments that begin on setiger three and project from all except the last few segments (figure 12,A).

Specimens were collected at a total of 136 survey stations in all areas of the Estuary except Hillsborough Bay. Large collections of the worm were common, and 458 were taken in a single dredge haul at station 13-10 in upper Tampa Bay. Other specimens came from two incidental collections in Old Tampa Bay and one in lower Tampa Bay (table 256).

The only bottom sample that contained soft sediment (sandy clay) came from Port Tampa on a clay bank covered with a thin layer of sand. All other sediments from which specimens were taken consisted of shelly sand or sand. Average bottom type was poorly sorted, fine sand. The shell fraction contained some large fragments, and accounted for more than 14 percent of all sediment particles. Silt and clay percentages were low, but organic carbon approached one percent (table 257).

Algae were present in 40 percent of the bottom samples along with one or more of all sea grasses found in the Estuary except Halophila.

Juvenile specimens were collected in June, but no gravid worms were noted.

Table 256.--Travisia sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--
(continued)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-E	12			15-8	1		
BC-M			1	15-17	1		
BC-N			6	16-1		1	
14-3	13			16-6	42		
Terra Ceia Bay							
E-4	1			E-8	51		
E-5	27						

Table 256.--Travisia sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
3-8	22			5-9	135		
3-9	72			5-10	14		
3-10	85			5-11	95		
3-11	37			5-12	38		
3-12	17			5-13	47		
3-13	3			6-1-A		8	
4-10	2			6-1-B		55	
4-16	16			6-1-C		28	
4-17-A	4			6-2	18		
4-18-A	59			6-3	200		1
4-19	4			6-4-A	6		
5-5	156			6-5	162		
5-6	53			6-6	91		
5-7	42			6-7-A		11	
5-8	107						
Upper Tampa Bay							
D	6			12-1		2	
D-28		1		12-2	23		
10-1-A		41		12-3	2		
10-2	4			12-4	2		
10-3		32		12-5	8		
10-4	7			12-6	3		
10-5	1			12-7	4		
10-6	128			12-8	8		
10-7	39			12-9	2		
10-8	132			12-10	3		
10-9	130			12-11	1		
10-10	81			12-12	1		
10-11	37			12-16	1		
10-12	51			13-1-A		22	
10-13	1			13-1-B		2	
11-1		3		13-5	69		
11-2		25		13-6	1		
11-3	22			13-7	1		
11-4	34		1	13-8	1		
11-5	11			13-10	458		
11-6	1						

Table 256.--*Travisia* sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-- (continued)

Lower Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
D-27		6		15-32	15		
14-5	390			15-33		111	
14-6	16			16-9		123	
14-7	13			16-9-A		28	
14-8	20			16-9-B		13	
14-9	4			16-10	5		
14-10	3			16-13	5		
14-11	2			16-15	5		
14-12	18			16-16	24		
14-13	1			16-17	4		
14-14	1			16-19	1		
14-15	19			16-23	17		
14-16	3			16-24	78		
14-17	17			16-27	33		
14-20		5		17-1		4	
15-18	349			17-2	1		
15-19	70			17-4	2		
15-20	5			17-5	1		
15-21	42			17-6	3		
15-22	7			17-7	1		
15-23	2			17-8	21		
15-25	3			17-10	4		
15-26	10			17-11		57	
15-27	20			17-12	41		
15-28	34			17-13	2		
15-29	12			17-14	1		
15-30	90			18-4	9		
15-31	69						

Table 257.--Travisia sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.2	13.0 to 33.8	136
Salinity (‰)	28.1	18.5 to 34.5	135
pH	8.0	7.7 to 8.3	127
Depth (m.)	1.3	1 to 4.0	136
Sediment type	sand	shelly sand to sandy clay	131
Granules (wt. %)	2.1	0.0 to 28.8	131
Sands (wt. %)	95.9	24.5 to 100	131
Silts (wt. %)	1.1	0.0 to 5.6	131
Clay (wt. %)	0.9	0.0 to 65.9	130
CaCO ₃ (wt. %)	14.6	0.6 to 66.0	131
Organic carbon (wt. %)	0.8	0.03 to 8.5	101
Organic nitrogen (wt. %)	0.05	0.00 to 0.3	101
Mean grain size, total sample (Ø)	2.3	0.8 to 7.1	131
Standard deviation, total sample (Ø)	1.1	0.4 to 3.0	131
Skewness, total sample	0.4	-1.7 to 3.6	131
Kurtosis, total sample	15.2	-0.8 to 78.2	131
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 9.0	130
Standard deviation, noncarbonate fraction (Ø)	1.4	0.5 to 3.4	130
Mean grain size, carbonate fraction (Ø)	-0.1	-2.5 to 2.5	110
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 2.1	110

Family CAPITELLIDAE Grube, 1862

This moderately large family has representative species in all seas. Capitellids are burrowing worms that feed on bottom deposits. Certain members of the genus Capitella have received considerable attention in recent years because they can withstand low levels of dissolved oxygen and may be the only polychaetes present in areas that are heavily polluted by organic matter, such as sewage.

Nine species were collected in Tampa Bay. The only one that was found exclusively in saline waters near the Gulf was Scyphoproctus platyproctus. The other eight species were taken in at least one area from the upper and lower reaches of the Estuary (Capitella capitata, Capitellides jonesi, Capitomastus aciculatus, Dasybranchus lumbricoides, Dasybranchus lunulatus, Heteromastus filiformis, Notomastus hemipodus, and Notomastus latericeus).

Key to CAPITELLIDAE Collected in Tampa Bay

- 1 Thoracic region consists of 9 setigers..... 2
- Thoracic region consists of more than
9 setigers 3
- 2 Setae occur on the peristomium; first 2
setigers bear acicular spines...Capitomastus aciculatus

- Setae occur on the peristomium; first 2 setigers have capillary setae only...Capitella capitata
- Peristomium has no setae; prostomium has a pair of distinct eye-spots; first 2 setigers have only capillary setae Capitellides jonesi
- 3 Thoracic region consists of 11 setigers 4
- Thoracic region consists of 12 or 13 setigers 6
- 4 Thoracic setigers contain capillary setae and hooded hooks beginning on the sixth setiger Heteromastus filiformis
- Thoracic setigers have capillary setae only 5
- 5 First setiger has both notosetae and neurosetae Notomastus latericeus
- First setiger has notosetae, but no neurosetae Notomastus hemipodus
- 6 Thoracic region consists of 12 setigers; body terminates in an anal plaque that bears acicular spines Scyphoproctus platyproctus
- Thoracic region consists of 13 setigers; abdominal branchiae appear as filamentous tufts Dasybranchus lumbricoides
- Thoracic region consists of 13 setigers; abdominal branchiae appear as one or several filaments Dasybranchus lunulatus

Capitella capitata (Fabricius, 1780)
(Described and illustrated by Day, 1967)

^

Specimens were collected in all areas of the Estuary at a total of 78 survey stations, and at five incidental localities in Old Tampa Bay, Boca Ciega Bay, and lower Tampa Bay. Collections of over 100 individuals per dredge

haul were made at three stations in Hillsborough Bay and at one station in Boca Ciega Bay (table 258).

Average bottom type at dredge and shovel stations was poorly sorted, fine sand. It contained nearly 11 percent shell (including some large particles) about 10 percent silt and clay, and less than one percent organic carbon (table 259).

Algae, and one or more of all five sea grasses found in the Estuary were collected in 28 of the 44 bottom samples from which C. capitata was taken.

No gravid specimens were noted, but juvenile worms were collected in May and August.

This species is distributed throughout the world and has been collected from the Gulf of Mexico.

Table 258.--Capitella capitata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-6		2		5-4 ⁿ	12		
B-1		5		6-1-B		2	
B-2		3	2	6-1-C		55	
B-3		3		6-2	4		
3-14		1		6-4-A	4		
3-15		1		6-5	1		
3-17		3		6-7-A		3	
5-2	11			6-8		1	
5-3	1						
Hillsborough Bay							
C			5	8-8	1		
C-4		116		8-9	422		25
C-5	5			8-10		30	
C-9		23		9-8			1
8-2	1			10-18		3	
8-6		310					
Upper Tampa Bay							
10-0		7		11-5	1		
10-11	16			11-6	1		
10-12	24			11-7	1		
10-13	16			11-27			1
10-14-A		4		11-28		25	
10-14-B	3			11-28-1		76	
11-1		2		13-1-A		2	
11-3	1			13-13		1	

Table 258.--Capitella capitata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-M			3	PB-4		3	1
D-1	6			PB-5	1		1
D-2	6			14-1-A		1	
D-11		3		14-2	2		
D-12		12		15-1	5		
D-13	3			15-2		11	
D-14	1			15-5	1		
D-15	3		6	15-10		7	
D-16			2	15-11	1		
D-17			1	16-1		1	
D-18		3		16-3		35	
D-20	1			16-4		125	1
D-21	1			16-5		98	
D-25			1	16-6	8		
PB-1	3						
Terra Ceia Bay							
E-2		14					
Lower Tampa Bay							
15-18	2			16-25		2	
16-14			1	16-28		1	

Table 259.--Capitella capitata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.3	12.8 to 34.1	72
Salinity (‰)	26.5	15.6 to 34.9	71
pH	8.0	7.2 to 8.4	65
Depth (m.)	0.7	1 to 3.3	72
Sediment type	sand	shelly sand to silty clay	72
Granules (wt. %)	3.9	0.0 to 72.9	72
Sands (wt. %)	86.0	5.0 to 99.9	72
Silts (wt. %)	6.9	0.0 to 66.2	72
Clay (wt. %)	3.0	0.0 to 46.5	72
CaCO ₃ (wt. %)	10.7	0.6 to 75.6	71
Organic carbon (wt. %)	0.6	0.1 to 2.2	31
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	31
Mean grain size, total sample (φ)	2.8	-1.9 to 7.2	71
Standard deviation, total sample (φ)	1.3	0.5 to 2.7	71
Skewness, total sample	0.5	-1.3 to 2.6	71
Kurtosis, total sample	11.6	-1.5 to 43.8	71
Mean grain size, noncarbonate fraction (φ)	3.0	1.9 to 8.4	66
Standard deviation, noncarbonate fraction (φ)	1.5	0.4 to 2.3	66
Mean grain size, carbonate fraction (φ)	-0.4	-2.5 to 1.9	62
Standard deviation, carbonate fraction (φ)	1.4	0.6 to 2.8	62

Capitellides jonesi Hartman, 1959a

Specimens were taken at 42 survey stations in Old Tampa Bay, Hillsborough Bay, upper Tampa Bay, Boca Ciega Bay, and lower Tampa Bay. In addition, individuals were collected at two incidental localities in lower Tampa Bay (table 260).

Although some specimens were found in very soft sediments, average figures show that the worm inhabits poorly sorted, fine sand. The mean figure for silt and clay was over eight percent, shell was under 10 percent, and organic carbon was over one percent (table 261).

One-third of the bottom samples contained algae and one or more sea grasses that included shoal, manatee, and turtle grass.

No specimens with mature gametes were observed, but juvenile worms were collected in August and October.

As far as I know, C. jonesi was previously known only from the type locality in St. Andrews Bay on the Gulf coast of Florida, and from Biscayne Bay in southern Florida.

Table 260.--Capitellides jonesi--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
B-1			5				
Hillsborough Bay							
C-2	2			9-4			1
8-8			4	9-9			1
8-9	1			10-19			6
9-3			1	10-23			1
Upper Tampa Bay							
10-1-A		1		11-9	4		3
10-11	3			11-11	9		
11-1			17	11-27	9		
11-3	1		1	12-10	1		
11-4	2			13-13		1	
Boca Ciega Bay							
BC-A	1			PB-5	10		
BC-M			1	14-4	1		
D-9	1			15-3		2	
D-13	2			15-4	1		
D-18		6		15-11	6		22
D-19-B	4			15-15			3
D-22	1			16-1		1	
D-25			1	16-2		1	
PB-1			2	16-7	81		
PB-4			5	16-8			1
Lower Tampa Bay							
15-20	1			16-28		1	
15-21	1						

Table 261.--Capitellides jonesi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	25.0	12.8 to 31.4	29
Salinity (‰)	28.7	18.5 to 34.9	29
pH	8.0	7.4 to 8.3	28
Depth (m.)	0.9	1 to 3.0	29
Sediment type	sand	shelly sand to clayey mud	28
Granules (wt. %)	2.1	0.0 to 9.7	28
Sands (wt. %)	89.9	26.9 to 99.9	28
Silts (wt. %)	5.5	0.0 to 32.8	28
Clay (wt. %)	2.7	0.0 to 39.2	28
CaCO ₃ (wt. %)	9.4	0.6 to 50.5	28
Organic carbon (wt. %)	1.2	0.03 to 8.5	20
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	20
Mean grain size, total sample (φ)	2.8	0.5 to 6.5	28
Standard deviation, total sample (φ)	1.3	0.5 to 2.5	28
Skewness, total sample	0.3	-1.4 to 1.7	28
Kurtosis, total sample	10.1	-0.4 to 41.2	28
Mean grain size, noncarbonate fraction (φ)	3.5	1.9 to 9.0	28
Standard deviation, noncarbonate fraction (φ)	1.5	0.6 to 2.4	28
Mean grain size, carbonate fraction (φ)	0.1	-1.9 to 1.4	24
Standard deviation, carbonate fraction (φ)	1.3	0.5 to 2.3	24

Capitomastus aciculatus Hartman, 1959a

Specimens were collected at a single survey station in Hillsborough Bay, and at four survey stations and one incidental locality in Boca Ciega Bay (table 262).

Sediment data show that the worm was found only in fine or very fine sand. Average content of shell was under 10 percent, and silt and clay fractions amounted to between six and seven percent. Data for organic carbon are not available (table 263).

Two bottom samples contained algae in addition to shoal and turtle grass.

Neither gravid nor juvenile specimens were noted in any collection.

C. aciculatus, as Capitellides jonesi, was described from St. Andrews Bay on the Florida Gulf coast, and has since been recorded only from Biscayne Bay, Florida.

Table 262.--Capitomastus aciculatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Hillsborough Bay					
Stations			Stations		
Individuals			Individuals		
D	S	N	D	S	N
9-1	10				
Boca Ciega Bay					
D-10	16		D-15		22
D-13		13	PB-4	1	1

Table 263.--Capitomastus aciculatus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.1	24.5 to 31.1	4
Salinity (‰)	28.8	17.3 to 33.9	4
pH	8.2	8.1 to 8.3	4
Depth (m.)	0.4	1	4
Sediment type	sand	--	4
Granules (wt. %)	0.6	0.0 to 2.0	4
Sands (wt. %)	92.8	88.2 to 98.4	4
Silts (wt. %)	5.0	1.1 to 8.9	4
Clay (wt. %)	1.6	0.5 to 2.8	4
CaCO ₃ (wt. %)	8.6	0.5 to 16.2	4
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (φ)	2.7	2.5 to 3.1	4
Standard deviation, total sample (φ)	1.2	0.8 to 1.7	4
Skewness, total sample	0.9	0.4 to 2.2	4
Kurtosis, total sample	11.8	2.4 to 35.7	4
Mean grain size, noncarbonate fraction (φ)	2.6	2.1 to 3.0	3
Standard deviation, noncarbonate fraction (φ)	1.3	1.2 to 1.5	3
Mean grain size, carbonate fraction (φ)	-0.5	-1.0 to 0.05	3
Standard deviation, carbonate fraction (φ)	1.4	0.9 to 1.9	3

Dasybranchus lumbricoides Grube, 1878
(Described and illustrated by Hartman, 1947a)

Aside from an incidental collection in Old Tampa Bay (near Oldsmar) D. lumbricoides was found only in Boca Ciega Bay and lower Tampa Bay at six survey and two incidental locations (table 264).

Average sediment type was poorly sorted, fine sand that contained under five percent silt and clay, but more than two percent organic carbon. The percentage of shell was also high (table 265).

Algae were noted in one-half of the bottom samples, together with one or more of the following sea grasses: shoal grass, manatee grass, and turtle grass.

A juvenile specimen was collected in October, but no gravid individuals were seen.

This species has been previously collected in the Gulf of Mexico as well as the eastern Pacific, and the western Atlantic between North Carolina and the Caribbean.

Table 264.--Dasybranchus lumbricoides--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
	D	S	N		D	S	N		
D-6		1		D-23		1			
D-11	1	3		PB-1-A		1			
D-19-A		1							
Lower Tampa Bay									
17-3	1								

Table 265.--Dasybranchus lumbricoides--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.4	18.0 to 30.8	8
Salinity (‰)	31.9	23.3 to 34.1	8
pH	8.2	8.0 to 8.3	8
Depth (m.)	0.6	1 to 2.7	8
Sediment type	sand	--	8
Granules (wt. %)	1.9	0.0 to 5.6	8
Sands (wt. %)	93.7	87.9 to 98.9	8
Silts (wt. %)	3.3	0.3 to 7.2	8
Clay (wt. %)	0.5	0.0 to 1.0	8
CaCO ₃ (wt. %)	22.9	3.5 to 85.2	8
Organic carbon (wt. %)	2.9	0.3 to 6.9	3
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	3
Mean grain size, total sample (Ø)	2.3	0.5 to 2.9	8
Standard deviation, total sample (Ø)	1.1	0.8 to 1.4	8
Skewness, total sample	0.4	-0.7 to 1.5	8
Kurtosis, total sample	7.8	1.7 to 22.6	8
Mean grain size, noncarbonate fraction (Ø)	2.8	2.1 to 3.4	6
Standard deviation, noncarbonate fraction (Ø)	1.4	1.0 to 1.8	6
Mean grain size, carbonate fraction (Ø)	0.0	-1.6 to 1.3	6
Standard deviation, carbonate fraction (Ø)	1.3	0.4 to 2.6	6

Dasybranchus lunulatus Ehlers, 1887
(Described and illustrated by Hartman, 1947)

Boca Ciega Bay was the only area of the Estuary where this worm was collected at survey stations. Otherwise, it was found at one incidental locality in Old Tampa Bay, one in lower Tampa Bay, and at three in Boca Ciega Bay (table 266).

Except for one station in silty sand, all dredge and shovel collections came from sand. As an average, the sand was fine and poorly sorted. It contained less than 10 percent shell, only about five percent silt and clay, and less than one percent organic carbon (table 267).

Six of 13 bottom samples contained algae, and either shoal grass or turtle grass.

Juvenile worms were collected in September and November. No gravid specimens were noted.

D. lunulatus has been previously collected in the Gulf of Mexico and has a known geographic range that extends from North Carolina to the Caribbean.

Table 266.--Dasybranchus lunulatus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A-1	2			D-6		1	
BC-C		2		D-9	4		
BC-G		1		D-11		33	
BC-M			1	PB-1-A		1	
D-1	1			PB-4	2		
D-2	3			PB-5	2		
D-3		12					

Table 267.--Dasybranchus lunulatus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.5	15.5 to 30.0	13
Salinity (‰)	31.9	23.3 to 34.3	13
pH	8.2	8.0 to 8.4	13
Depth (m.)	0.5	1 to 1.0	13
Sediment type	sand	sand to silty sand	13
Granules (wt. %)	1.9	0.0 to 7.4	13
Sands (wt. %)	92.6	75.0 to 99.0	13
Silts (wt. %)	4.6	0.3 to 22.8	13
Clay (wt. %)	0.8	0.0 to 2.2	13
CaCO ₃ (wt. %)	8.6	2.9 to 17.5	13
Organic carbon (wt. %)	0.6	0.01 to 1.0	7
Organic nitrogen (wt. %)	0.05	0.01 to 0.1	7
Mean grain size, total sample (φ)	2.7	2.2 to 4.1	13
Standard deviation, total sample (φ)	1.3	0.7 to 2.4	13
Skewness, total sample	0.4	-0.6 to 1.5	13
Kurtosis, total sample	8.9	1.3 to 22.6	13
Mean grain size, noncarbonate fraction (φ)	3.1	2.6 to 3.7	11
Standard deviation, noncarbonate fraction (φ)	1.4	0.6 to 2.2	11
Mean grain size, carbonate fraction (φ)	0.1	-1.9 to 2.1	11
Standard deviation, carbonate fraction (φ)	1.3	0.4 to 2.6	11

Heteromastus filiformis (Claparede, 1864)
(Described and illustrated by Day, 1967)

H. filiformis was the most commonly found capitellid in the Estuary, and occurred at a total of 128 survey stations in all areas as well as at nine incidental localities (table 268).

Several collections came from soft sediments, but most were taken in sand. Average sediment type was moderately sorted, fine sand. The shell content was over 15 percent, silt and clay percentages were under five, and organic carbon was nearly one percent (table 269).

Algae were noted in 60 of 132 bottom samples, together with one or more sea grasses that included all of those found in the Estuary except widgeon grass.

Gravid specimens were recorded in September and December, and juveniles were collected from May to December as well as in February.

H. filiformis has been collected in the Gulf of Mexico and has world-wide distribution.

Table 268.--Heteromastus filiformis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-2		8		4-20		3	
A-3		1		5-3	5		
A-5		13		5-4	1		
A-6		8		5-10	1		
B	1			5-13	4		
B-2		1		6-1-D		4	
B-3		2		6-2	78		
1-1		1		6-3	7		
4-7	1			6-5	2		
4-16			2	6-8		1	
Hillsborough Bay							
C-1		11		10-22			1
Upper Tampa Bay							
D-28		9		12-2	6		
10-0		4		12-3	1		
10-1-A		6		12-7	2		
10-3		18		12-8	18		
10-4	5			12-9	3		
10-6	5			12-10	18		
10-7	2			12-11	23		
11-1		2		12-12	45		
11-2		2		12-14	4		
11-3	2			12-15	7		
11-4	18			13-1-A		16	
11-9	4			13-3	32		
11-16	4		2	13-5	71		
11-20			1	13-6	3		
11-28-1		4		13-8	3		
12-1		1		13-10	39		

Table 268.--Heteromastus filiformis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-A	2			15-2		22	
BC-C		4		15-3	1	3	
BC-G		6		15-4	14		
BC-M	1			15-5	1		
BC-N	2			15-6	1		
D-2	13			15-8	1		
D-3		2		15-9		2	
D-6		41		15-10		1	
D-7	5			15-12			1
D-11	14	40		15-14	3		1
D-18		1		15-16	1		
D-19-A		1		16-1		22	
D-23		17		16-2		5	
D-25		7	1	16-3		8	
PB-1	7		1	16-4		1	
PB-1-A		25		16-5		5	
PB-4	8	1	10	16-6	30		
PB-5	6		3	16-7	2		
14-1-A		6		16-8		25	
Terra Ceia Bay							
E-1	1			E-6		26	
E-2		1		E-8	3		
E-3	3						

Table 268.--Heteromastus filiformis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	2			16-14	18		
14-10	2			16-15	4		
14-12	1			16-16	82		
14-19		3		16-17	26		
15-21	12			16-21	4		
15-22	1			16-24	3		
15-24	3			16-25		5	
15-27	2			16-27	5		
15-28	1			17-2	3		
15-29	19			17-4	2		
15-30	10			17-5	5		
15-31	67			17-6	3		
15-32	1			17-7	2		
16-9-B		1		17-10	1		
16-12			1	17-15		12	
16-13	6						

Table 269.--Heteromastus filiformis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.1	13.0 to 34.1	132
Salinity (‰)	29.3	18.3 to 35.1	132
pH	8.1	6.7 to 8.4	126
Depth (m.)	1.1	1 to 4.0	132
Sediment type	sand	shelly sand to silt	129
Granules (wt. %)	2.3	0.0 to 21.5	129
Sands (wt. %)	93.2	5.5 to 99.9	129
Silts (wt. %)	3.4	0.0 to 89.4	129
Clay (wt. %)	1.0	0.0 to 9.1	129
CaCO ₃ (wt. %)	15.6	0.7 to 75.1	129
Organic carbon (wt. %)	0.8	0.1 to 8.5	91
Organic nitrogen (wt. %)	0.1	0.00 to 2.1	91
Mean grain size, total sample (Ø)	2.4	0.4 to 6.4	128
Standard deviation, total sample (Ø)	0.9	-1.4 to 2.9	128
Skewness, total sample	0.3	-1.7 to 2.9	128
Kurtosis, total sample	10.0	-0.2 to 78.2	128
Mean grain size, noncarbonate fraction (Ø)	3.1	1.7 to 9.0	118
Standard deviation, noncarbonate fraction (Ø)	1.4	0.4 to 3.4	118
Mean grain size, carbonate fraction (Ø)	0.0	-2.5 to 2.4	102
Standard deviation, carbonate fraction (Ø)	1.3	0.4 to 2.9	102

Notomastus hemipodus Hartman, 1947
(Described and illustrated by Hartman, 1969)

Specimens were collected at a total of 26 survey stations in all areas of the Estuary except Hillsborough Bay. The only incidental collection was made in Boca Ciega Bay near Johns Pass (table 270).

Average sediment type from bottom samples was poorly sorted, fine sand. Only one collection came from soft sediment, and that was a clay bank covered by a thin layer of sand near Port Tampa in Old Tampa Bay. Very little shell was present in most samples. The mean amount of silt and clay was under 10 percent, and organic carbon was nearly one percent (table 271).

In addition to algae, shoal or manatee grass were present in about one-third of the bottom samples.

A juvenile specimen was collected in July, but no gravid worms were seen.

N. hemipodus has been found in the Gulf of Mexico and is otherwise known from the eastern and western coasts of the United States.

Table 270.--Notomastus hemipodus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
1-4	1			3-16		5	
3-8	4			4-10	1		
3-9	2			4-16	6		
3-10	2			4-17-A	1		
3-11	3			4-19	15		
3-12	2			5-13	1		
3-14		3		6-1-A		16	
3-15		5		6-1-B		4	
Upper Tampa Bay							
10-4	4			11-28		3	
11-6	1						
Terra Ceia Bay							
E-6	4						
Lower Tampa Bay							
16-9		13		16-23	1		
16-9-A		2		17-9	2		
16-22	8			17-11		27	

Table 271.--Notomastus hemipodus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.4	13.0 to 32.0	26
Salinity (‰)	26.4	23.0 to 32.4	26
pH	8.0	7.1 to 8.2	18
Depth (m.)	1.0	1 to 3.0	26
Sediment type	sand	sand to sandy clay	25
Granules (wt. %)	0.7	0.0 to 3.2	25
Sands (wt. %)	93.1	24.5 to 99.1	25
Silts (wt. %)	2.8	0.4 to 10.5	25
Clay (wt. %)	3.8	0.1 to 65.9	25
CaCO ₃ (wt. %)	3.2	0.7 to 17.9	25
Organic carbon (wt. %)	0.8	0.1 to 2.5	15
Organic nitrogen (wt. %)	0.05	0.01 to 0.1	15
Mean grain size, total sample (φ)	2.8	1.9 to 7.1	25
Standard deviation, total sample (φ)	1.2	0.7 to 2.7	25
Skewness, total sample	1.0	-1.4 to 2.6	25
Kurtosis, total sample	17.5	-0.6 to 43.8	25
Mean grain size, noncarbonate fraction (φ)	2.8	1.9 to 7.1	25
Standard deviation, noncarbonate fraction (φ)	1.5	0.7 to 2.2	25
Mean grain size, carbonate fraction (φ)	-0.7	-2.5 to 2.5	24
Standard deviation, carbonate fraction (φ)	1.3	0.9 to 1.7	24

Notomastus latericeus Sars, 1851
(Described and illustrated by Day, 1967)

Eight of the 17 survey stations where N. latericeus was collected were located in Boca Ciega Bay. The other nine were from all other areas of the Estuary except Hillsborough Bay (table 272).

One collection was made in silty sand, and all others came from sand. Average sediment type was poorly sorted, fine sand that had little silt and clay, only seven percent shell, and over one percent organic carbon (table 273).

Less than one-half of the bottom samples contained algae, and one or more sea grasses that included shoal, manatee, and turtle grass.

Juvenile specimens were collected in September, October, and November, but no gravid worms were seen.

This species has been collected in the Gulf of Mexico, and is otherwise known from localities throughout the world.

Table 272.--Notomastus latericeus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay						
Stations		Individuals			Stations	
		D	S	N		
		D	S	N		
4-1		3			5-4	1
Upper Tampa Bay						
11-6		1				
Boca Ciega Bay						
BC-1		1			15-4	1
D-23			1		15-9	2
15-1		4			15-10	1
15-2			2		15-12	6
Terra Ceia Bay						
E-2		1				
Lower Tampa Bay						
14-16		1			17-13	3
15-32		1			17-14	1
17-8		2				

Table 273.--Notomastus latericeus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.0	14.5 to 33.8	17
Salinity (‰)	30.5	23.6 to 34.1	17
pH	8.2	7.9 to 8.5	16
Depth (m.)	0.9	1 to 3.0	17
Sediment type	sand	sand to silty sand	17
Granules (wt. %)	2.0	0.02 to 9.7	17
Sands (wt. %)	93.0	83.7 to 99.6	17
Silts (wt. %)	3.7	0.2 to 22.1	17
Clay (wt. %)	1.2	0.1 to 5.2	17
CaCO ₃ (wt. %)	7.0	0.9 to 18.2	17
Organic carbon (wt. %)	1.1	0.1 to 6.9	14
Organic nitrogen (wt. %)	0.05	0.01 to 0.2	14
Mean grain size, total sample (Ø)	2.7	2.1 to 4.1	17
Standard deviation, total sample (Ø)	1.3	0.6 to 2.5	17
Skewness, total sample	0.4	-0.8 to 2.1	17
Kurtosis, total sample	11.6	-0.4 to 34.3	17
Mean grain size, noncarbonate fraction (Ø)	2.8	1.8 to 3.3	17
Standard deviation, noncarbonate fraction (Ø)	1.2	0.4 to 1.9	17
Mean grain size, carbonate fraction (Ø)	-0.1	-1.9 to 1.0	15
Standard deviation, carbonate fraction (Ø)	1.3	0.6 to 1.9	15

Scyphoproctus platyproctus Jones, 1961

One specimen was collected in Boca Ciega Bay, and another was taken in lower Tampa Bay near Mullet Key (table 274).

Sediment at the Boca Ciega Bay station was sand that contained nearly 20 percent silt and clay. The shell content was over 19 percent, and organic carbon was under one percent (table 275).

No vegetation was noted at collection sites.

No observations were made on the worm's reproductive habits.

This unusual species was originally described from collections in the northern Gulf of Mexico off Panama City, Florida. As far as I know, there are no records of S. platyproctus outside the Gulf of Mexico.

Table 274.--Scyphoproctus platyproctus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
BC-A			1			

Table 275.--Scyphoproctus platyproctus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	17.0	--	1
Salinity (‰)	31.4	--	1
pH	7.9	--	1
Depth (m.)	0.7	--	1
Sediment type	sand	--	1
Granules (wt. %)	1.8	--	1
Sands (wt. %)	78.8	--	1
Silts (wt. %)	12.2	--	1
Clay (wt. %)	7.2	--	1
CaCO ₃ (wt. %)	19.4	--	1
Organic carbon (wt. %)	0.5	--	1
Organic nitrogen (wt. %)	0.01	--	1
Mean grain size, total sample (Ø)	3.5	--	1
Standard deviation, total sample (Ø)	2.1	--	1
Skewness, total sample	0.5	--	1
Kurtosis, total sample	1.9	--	1
Mean grain size, noncarbonate fraction (Ø)	3.1	--	1
Standard deviation, noncarbonate fraction (Ø)	1.5	--	1
Mean grain size, carbonate fraction (Ø)	0.6	--	1
Standard deviation, carbonate fraction (Ø)	1.0	--	1

Family ARENICOLIDAE Johnston, 1835

Commonly known as lugworms, members of this family are distributed in all seas. Most species live in a u-shaped burrow and feed on organic matter in the sediment as well as that which is concentrated from water pumped through the sand "filter" at the anterior end of the Burrow.

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Only one species, Arenicola cristata, was collected in Tampa Bay. This species leaves no conical depression over the anterior end of the burrow, and extrudes no sand castings at the posterior end. Its only surface sign is a large, oval, gelatinous egg case.

Arenicola cristata Stimpson, 1856
(Described and illustrated by Hartman, 1969)

Specimens were collected at a total of 22 survey stations and seven incidental localities in all areas of the Estuary except Hillsborough Bay and Terra Ceia Bay (table 276).

No worms were found in soft sediments, and average sediment type at dredge and shovel stations was poorly sorted, fine sand. It contained only small amounts of shell, and silt and clay, and less than one percent organic carbon (table 277).

Seventeen of the 22 bottom samples contained algae and one or more of all sea grasses found in the Estuary except widgeon grass.

Egg cases of A. cristata were seen in every month of the year.

This species occurs in the Gulf of Mexico, and on the eastern coast of the United States from New England to Florida. On the west coast, it has been reported only from southern California.

Table 276.--Arenicola cristata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-2		1		3-14	1	1	
A-6		2		3-15		1	
B-1		1		3-17		2	
2-1		1		6-1-B		1	
Upper Tampa Bay							
D-28		14		11-1		1	
10-0		1		13-13		8	
Boca Ciega Bay							
D-1	1			16-4		2	
D-19-A		1		16-5		5	
14-1-A		9		16-8		3	
14-1-B		10					
Lower Tampa Bay							
14-19		7		17-1		1	
15-31	1						

Table 277.--Arenicola cristata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.9	12.8 to 32.7	22
Salinity (‰)	27.8	18.3 to 33.4	22
pH	8.0	7.7 to 8.3	16
Depth (m.)	0.4	1 to 1.0	22
Sediment type	sand	--	22
Granules (wt. %)	1.5	0.0 to 13.4	22
Sands (wt. %)	95.3	80.5 to 99.8	22
Silts (wt. %)	2.2	0.2 to 7.2	22
Clay (wt. %)	0.9	0.1 to 3.6	22
CaCO ₃ (wt. %)	4.6	0.7 to 20.8	22
Organic carbon (wt. %)	0.7	0.2 to 2.6	14
Organic nitrogen (wt. %)	0.04	0.01 to 0.1	14
Mean grain size, total sample (φ)	2.7	1.8 to 3.1	22
Standard deviation, total sample (φ)	1.1	0.5 to 2.3	22
Skewness, total sample	0.8	-0.5 to 2.6	22
Kurtosis, total sample	14.7	1.5 to 43.8	22
Mean grain size, noncarbonate fraction (φ)	3.1	2.1 to 4.2	22
Standard deviation, noncarbonate fraction (φ)	1.5	0.6 to 3.1	22
Mean grain size, carbonate fraction (φ)	-0.3	-2.4 to 1.8	19
Standard deviation, carbonate fraction (φ)	1.3	0.9 to 2.4	19

Family MALDANIDAE Malmgren, 1867

This is a large family of tube-building species that are found throughout the world in sand and softer sediments. The tube is composed of a membranous matrix in which sediment particles are incorporated. The diet of maldanids consists of organic material in bottom deposits, and perhaps particulate, organic material that enters the dwelling tube in water currents generated by the worm.

Five maldanid species were found in Tampa Bay.

Branchioasychis americana and Maldane sarsi were collected in all areas of the Estuary. Clymenella mucosa was found everywhere except Hillsborough Bay. Clymenella torquata calida was taken at widely separated localities in Old Tampa Bay and lower Tampa Bay, and Clymenella zonalis was found only in the comparatively saline waters of Boca Ciega Bay and lower Tampa Bay.

Key to MALDANIDAE Collected in Tampa Bay

- 1 Segments 7 to 11 bear numerous gill
filaments Branchioasychis americana
- Gill filaments absent 2
- 2 Anal plate has a lateral notch on
each side Maldane sarsi
- Anal plate has numerous, marginal filaments 3

- 3 Fourth setiger modified in the form of a broad, flanged collar; dorsal edge of cephalic plate has about 10 indentations Clymenella torquata calida
- Fourth setiger unmodified; cephalic plate has 5 indentations Clymenella zonalis
- Fourth setiger unmodified; cephalic plate has 2 indentations Clymenella mucosa

Branchioasychis americana Hartman, 1945

Although this species was found throughout Tampa Bay, most of the 47 survey station records came from Boca Ciega and Terra Ceia Bays, and lower Tampa Bay. At station E-7 in Terra Ceia Bay, 104 specimens were collected in a single dredge haul (table 278). Five incidental localities for B. americana were recorded in Boca Ciega Bay and Old Tampa Bay.

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that contained less than 10 percent shell, nearly eight percent silt and clay, but little organic carbon (table 279).

Algae were found in 19 of 43 bottom samples together with one or more sea grasses that included shoal, manatee, and turtle grass.

Juvenile worms were collected in September, October, and November. No gravid specimens were noted.

B. americana was originally described from North Carolina, and has been collected elsewhere on the south Atlantic coast of the United States and in the Gulf of Mexico.

Table 278.--Branchioasychis americana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
2-2	3			2-5	15		
2-3	1			4-12	1		
2-4	1						
Hillsborough Bay							
10-20	2						
Upper Tampa Bay							
11-16			1	11-22			1
11-20			1	11-26	3		
11-21			2	12-14	1		
Boca Ciega Bay							
BC-E	1			14-4	17		
BC-H	1			15-3		2	
BC-I	2			15-6	8		
BC-M	19			15-11	2		
D-11		2		15-14	6		
D-25		1		15-15	1		
PB-1-A		1		16-1		1	
14-2	4			16-6	1		
14-3	4						
Terra Ceia Bay							
E-1	3		1	E-4	2		
E-2		1		E-7	104		1
E-3	30			E-8	1		

Table 278.--Branchioasychis americana--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-6	2			16-23	10		
15-31	1			17-2			1
16-10	8			17-7	1		
16-20	3			17-8	4		
16-21	6			17-9	11		1
16-22	18			17-13	2		

Table 279.--Branchioasychis americana--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.7	14.5 to 31.3	43
Salinity (‰)	30.3	22.9 to 34.6	43
pH	8.0	7.3 to 8.5	43
Depth (m.)	1.0	1 to 2.3	43
Sediment type	sand	sand to clayey silt	43
Granules (wt. %)	1.6	0.0 to 11.2	43
Sands (wt. %)	90.6	11.2 to 99.8	43
Silts (wt. %)	5.2	0.1 to 44.4	43
Clay (wt. %)	2.5	0.02 to 43.8	43
CaCO ₃ (wt. %)	9.3	0.6 to 44.4	43
Organic carbon (wt. %)	0.4	0.04 to 2.0	36
Organic nitrogen (wt. %)	0.02	0.00 to 0.1	36
Mean grain size, total sample (φ)	2.9	1.7 to 7.1	43
Standard deviation, total sample (φ)	1.4	0.5 to 2.2	43
Skewness, total sample	0.6	-0.6 to 2.0	43
Kurtosis, total sample	9.05	1.4 to 24.4	43
Mean grain size, noncarbonate fraction (φ)	2.8	1.4 to 4.4	42
Standard deviation, noncarbonate fraction (φ)	1.2	0.4 to 2.4	42
Mean grain size, carbonate fraction (φ)	0.3	-2.5 to 2.3	36
Standard deviation, carbonate fraction (φ)	1.2	0.4 to 2.9	36

Clymenella mucosa (Andrews, 1891)
(Described by Mangum, 1962)

C. mucosa was found to be the most common maldanid in the Estuary, but even so, no specimens were collected in Hillsborough Bay. From all other areas of the Estuary, there were records from a total of 100 survey stations and 11 incidental localities. The worm occurred regularly and in large numbers along transects in upper Tampa Bay, and from there to transect-18 (table 280).

This species was collected in bottom types that varied from shelly sand to clayey silt, but most specimens came from sand. As an average, the sand was fine and poorly sorted, and had a considerable amount of shell. The silt and clay content was less than five percent, and the percentage of organic carbon approached one percent (table 281).

Algal vegetation was present in one-half of the bottom samples, together with sea grasses that included all five species found in the Estuary.

Gravid or juvenile specimens were collected in every month but March.

C. mucosa has a geographic range from North Carolina to the Caribbean, and has been collected in the Gulf of Mexico.

Table 280.--Clymenella mucosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
A-6		84		6-1-A		2	
B-1		13		6-1-C		31	
B-2			1	6-2			1
2-1		3		6-7-A		9	
Upper Tampa Bay							
D	4			12-6	21		
D-28		4		12-7	4		
10-0		3		12-8	30		
10-1-A		25		12-9	46		
10-10	1		1	12-10	51		
10-11	1			12-11	145		
11-1		28		12-12	110		
11-2		11		13-1-A		21	
11-3	363		1	13-1-B		16	
11-4	4			13-3	1		
11-16	1			13-4	5		
11-17	1			13-5	42		
11-22	3			13-6	40		
11-28-1		20		13-7	65		
12-1		33		13-8	17		
12-2	1			13-9	1		
12-3	6			13-10	11		
12-5	11			13-13		12	

Table 280.--Clymenella mucosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Boca Ciega Bay						
Stations	Individuals			Stations	Individuals	
	D	S	N		D	S N
BC-A	13			PB-5	14	3
BC-A-1	1			14-1-A		2
BC-C		4		14-3	3	
BC-G		3		15-1	2	
BC-I	2			15-2		4 10
BC-M	9		11	15-3		3 10
BC-M-1		1		15-5	2	
BC-N	95		1	15-6	17	
D-1			1	15-8	3	
D-2	181		5	15-11	1	
D-3		9		15-12	4	1
D-4	2			15-13	1	
D-5			4	15-15	5	
D-6		25		15-16	21	
D-11	12	30		15-17	2	
D-14			10	16-1		4 1
D-15			1	16-2		25
D-17	40		8	16-3		80
D-23		25		16-4		124
D-24			2	16-5		7
D-25		8		16-6	51	1
PB-1	13		100+	16-7	6	
PB-4	77	10	15	16-8		32
Terra Ceia Bay						
E-1	3			E-5	16	2
E-2		2		E-6	29	
E-3	5			E-8	66	3
E-4	30		1			

Table 280.--Clymenella mucosa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-27		3		16-13	67		
14-5	48		1	16-14	77		1
14-6	130			16-15	60		
14-7	6			16-16	20		10
14-8	209		10	16-17	16		
14-10	17			16-19	3		
14-12	4			16-20	1		7
14-13	1			16-21	1		1
14-14	6			16-22			3
14-15	40			16-23	2		
14-16	3			16-24			44
14-17	2			16-25		22	
15-18	36			16-26		7	
15-19	13		10	16-27	2		
15-20	9			16-28		1	
15-21	47			17-1		2	
15-22	7			17-2	58		1
15-23	1			17-3	22		
15-26	9			17-4	23		
15-27	26		10	17-5	52		
15-28	19			17-6	37		
15-29	84			17-7	22		
15-30	116			17-8	121		
15-31	35			17-9	13		1
15-32	73			17-10	28		
15-33		43		17-11		13	
16-9		8		17-12	15		
16-9-A		63		17-13	1		
16-9-B		58		17-14	2		
16-10	2			18-3	80		
16-11	26			18-4	30		
16-12			1				

Table 281.--*Clymenella mucosa*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.5	12.8 to 33.2	161
Salinity (‰)	30.2	19.2 to 35.1	161
pH	8.1	7.6 to 8.4	155
Depth (m.)	1.1	1 to 4.0	161
Sediment type	sand	shelly sand to clayey silt	155
Granules (wt. %)	2.5	0.0 to 28.8	155
Sands (wt. %)	92.8	6.9 to 100	155
Silts (wt. %)	3.1	0.0 to 75.0	155
Clay (wt. %)	1.4	0.0 to 65.9	154
CaCO ₃ (wt. %)	16.6	0.7 to 85.2	154
Organic carbon (wt. %)	0.8	0.01 to 8.5	126
Organic nitrogen (wt. %)	0.04	0.00 to 0.3	126
Mean grain size, total sample (φ)	2.4	0.4 to 7.6	154
Standard deviation, total sample (φ)	1.2	0.5 to 3.0	154
Skewness, total sample	0.2	-1.7 to 1.9	154
Kurtosis, total sample	9.1	-0.9 to 41.2	153
Mean grain size, noncarbonate fraction (φ)	3.1	1.4 to 9.0	143
Standard deviation, noncarbonate fraction (φ)	1.3	0.4 to 3.2	143
Mean grain size, carbonate fraction (φ)	0.3	-2.4 to 3.0	118
Standard deviation, carbonate fraction (φ)	1.2	0.04 to 2.9	118

Clymenella torquata calida Hartman, 1951

The cephalic plate of this worm has been illustrated (figure 12,B,C) because Hartman (1951) gave only a description.

Specimens were taken at one survey station in Boca Ciega Bay, and near Oldsmar, Florida, at an incidental station in Old Tampa Bay (table 282).

Sediment at the station in Boca Ciega Bay was very poorly sorted, fine sand that contained a moderate amount of shell and considerable silt. Data for organic carbon are not available (table 283).

No bottom vegetation was noted at either station.

No observations were made on the worm's reproductive habits.

C. torquata calida was originally described from specimens collected in Barataria Bay, Grand Isle, Louisiana. Specimens from Tampa Bay represent the only other collections, and support Hartman's contention that the Louisiana material represents a valid subspecies.

Table 282.--Clymenella torquata calida--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
D-3			1			

Table 283.--Clymenella torquata calida--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.0	--	1
Salinity (‰)	33.1	--	1
pH	8.1	--	1
Depth (m.)	0.3	--	1
Sediment type	sand	--	1
Granules (wt. %)	7.4	--	1
Sands (wt. %)	81.0	--	1
Silts (wt. %)	10.0	--	1
Clay (wt. %)	1.6	--	1
CaCO ₃ (wt. %)	17.5	--	1
Organic carbon (wt. %)	--	--	--
Organic nitrogen (wt. %)	--	--	--
Mean grain size, total sample (Ø)	2.5	--	1
Standard deviation, total sample (Ø)	2.4	--	1
Skewness, total sample	-0.2	--	1
Kurtosis, total sample	1.7	--	1
Mean grain size, noncarbonate fraction (Ø)	3.3	--	1
Standard deviation, noncarbonate fraction (Ø)	1.8	--	1
Mean grain size, carbonate fraction (Ø)	-0.3	--	1
Standard deviation, carbonate fraction (Ø)	1.8	--	1

Clymenella zonalis (Verrill, 1874)
(Described and illustrated by Mangum, 1962)

The five survey stations where C. zonalis was collected were divided between Boca Ciega Bay and lower Tampa Bay (table 284).

The bottom type at all localities was sand that, as an average, was fine and poorly sorted. Mean figures show that the percentage of shell was high, as was organic carbon (table 285).

Two bottom samples contained algae and shoal, manatee, or turtle grass.

Neither juvenile nor gravid specimens were collected.

C. zonalis has been collected on the Atlantic coast from North Carolina and New England. Tampa Bay records represent the first collections from the Gulf of Mexico.

Table 284.--Clymenella zonalis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
D-19-A		2		D-23		5	
D-22	3			15-4	1		
Lower Tampa Bay							
17-4	1						

Table 285.--Clymenella zonalis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.0	24.1 to 30.8	5
Salinity (‰)	32.4	30.8 to 34.0	5
pH	8.2	8.0 to 8.3	5
Depth (m.)	1.1	1 to 2.7	5
Sediment type	sand	--	5
Granules (wt. %)	4.0	0.2 to 9.7	5
Sands (wt. %)	90.1	83.7 to 95.6	5
Silts (wt. %)	4.9	1.2 to 8.6	5
Clay (wt. %)	1.0	0.5 to 2.3	5
CaCO ₃ (wt. %)	25.0	13.3 to 65.5	5
Organic carbon (wt. %)	2.7	0.6 to 6.9	3
Organic nitrogen (wt. %)	0.1	0.03 to 0.2	3
Mean grain size, total sample (φ)	2.3	1.3 to 3.0	5
Standard deviation, total sample (φ)	1.7	1.3 to 2.5	5
Skewness, total sample	0.3	-0.8 to 1.2	5
Kurtosis, total sample	4.8	2.4 to 6.3	5
Mean grain size, noncarbonate fraction (φ)	2.9	2.1 to 3.0	5
Standard deviation, noncarbonate fraction (φ)	1.5	1.2 to 1.9	5
Mean grain size, carbonate fraction (φ)	0.1	-1.1 to 1.7	5
Standard deviation, carbonate fraction (φ)	1.1	0.8 to 1.2	5

Maldane sarsi Malmgren, 1866
(Described and illustrated by Day, 1967)

Individuals were collected at 21 survey stations in all areas of the Estuary. About one-half of the stations were located in Old Tampa Bay. The largest number of specimens in a single dredge haul were taken at station E-3 in Terra Ceia Bay (table 286).

Average bottom type was poorly sorted, very fine sand that contained less than 10 percent shell. The silt and clay fraction was nearly 10 percent, but organic carbon was less than one percent (table 287).

One-third of the bottom samples contained algae, and shoal grass was found in a few.

Neither gravid nor juvenile specimens were found.

M. sarsi has been collected in the Gulf of Mexico and is otherwise known from numerous localities in all seas.

Table 286.--*Maldane sarsi*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B-2		2		4-8	1		
1-4	2			4-11	1		
2-4	2			4-12	6		
3-7	1			4-13	1		
3-11	1			4-15	2		
Hillsborough Bay							
10-22	1						
Upper Tampa Bay							
11-22	1						
Boca Ciega Bay							
BC-I	2			15-1	1		
D-22	2			15-12	3		
Terra Ceia Bay							
E-2		1		E-7	4		
E-3	48		1				
Lower Tampa Bay							
16-21	1			17-9	2		

Table 287.--Maldane sarsi--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.1	14.5 to 32.0	22
Salinity (‰)	27.0	22.4 to 34.0	22
pH	8.0	7.1 to 8.5	20
Depth (m.)	1.3	1 to 2.3	22
Sediment type	sand	sand to silty sand	21
Granules (wt. %)	0.6	0.0 to 4.7	21
Sands (wt. %)	89.8	72.5 to 97.2	21
Silts (wt. %)	6.0	1.3 to 22.1	21
Clay (wt. %)	3.6	0.5 to 11.2	21
CaCO ₃ (wt. %)	6.8	0.8 to 54.7	21
Organic carbon (wt. %)	0.4	0.04 to 1.0	12
Organic nitrogen (wt. %)	0.03	0.01 to 0.1	12
Mean grain size, total sample (φ)	3.1	2.6 to 4.2	21
Standard deviation, total sample (φ)	1.5	1.0 to 2.6	21
Skewness, total sample	1.0	-0.6 to 1.7	21
Kurtosis, total sample	8.0	-0.04 to 17.5	21
Mean grain size, noncarbonate fraction (φ)	3.0	1.4 to 3.8	21
Standard deviation, noncarbonate fraction (φ)	1.4	0.4 to 2.2	21
Mean grain size, carbonate fraction (φ)	-0.4	-2.5 to 1.7	20
Standard deviation, carbonate fraction (φ)	1.2	0.6 to 1.9	20

Family OWENIIDAE Rioja, 1917

This is a small family that contains about six genera. The various species are known from localities in most seas where they usually construct membranous tubes studded with particles of sand and shell. Although the diet of some species has not been determined, members of the genus Owenia, and others with a frilly, prostomial membrane, feed on particulate organic material suspended in the water column.

Three oweniids were collected in Tampa Bay. None were collected in either Old Tampa or Hillsborough Bays. Owenia fusiformis, the most commonly found species, was collected in all areas of the Estuary. Boguea enigmatica was taken in Boca Ciega and Terra Ceia Bays, and Myriochele sp., was collected only in lower Tampa Bay.

Key to OWENIIDAE Collected in Tampa Bay

- 1 Prostomium divided and modified as a frilly membrane..... Owenia fusiformis
- Prostomium modified as a smooth collar Myriochele sp.
- Prostomium unmodified; minute; not tubicolous Boguea enigmatica

Boguea enigmatica Hartman, 1945

Specimens were collected at a total of seven survey stations in Boca Ciega and Terra Ceia Bays (table 288).

Average sediment at dredge stations was poorly sorted, fine sand. It contained only nine percent shell, and very little silt, clay, or organic carbon (table 289).

All of the bottom samples contained algae, and two had turtle grass as well.

Neither gravid nor juvenile specimens were collected.

Aside from the collections reported here, Boquea enigmatica is known only from the type locality in Bogue Sound near Beaufort, North Carolina.

Table 288.--Boguea enigmatica--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
D-2	1					
D-17					6	PB-1 10
D-24					6	PB-4 1
Terra Ceia Bay						
E-4	1					E-5 5

Table 289.--Boguea enigmatica--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.5	14.5 to 27.0	3
Salinity (‰)	31.8	30.5 to 33.2	3
pH	8.2	--	3
Depth (m.)	1.3	1 to 2.0	3
Sediment type	sand	--	3
Granules (wt. %)	3.9	0.8 to 7.1	3
Sands (wt. %)	94.7	91.2 to 98.8	3
Silts (wt. %)	0.8	0.3 to 1.8	3
Clay (wt. %)	0.6	0.1 to 1.4	3
CaCO ₃ (wt. %)	9.0	6.1 to 13.6	3
Organic carbon (wt. %)	0.1	0.01 to 0.3	2
Organic nitrogen (wt. %)	0.1	0.04 to 0.1	2
Mean grain size, total sample (φ)	2.2	1.9 to 2.5	3
Standard deviation, total sample (φ)	1.4	0.9 to 1.8	3
Skewness, total sample	-0.4	-0.6 to -0.1	3
Kurtosis, total sample	6.0	4.6 to 8.7	3
Mean grain size, noncarbonate fraction (φ)	2.9	2.6 to 3.1	3
Standard deviation, noncarbonate fraction (φ)	1.0	0.6 to 1.4	3
Mean grain size, carbonate fraction (φ)	-0.2	-1.7 to 0.9	3
Standard deviation, carbonate fraction (φ)	1.1	0.8 to 1.4	3

Owenia fusiformis delle Chiaje, 1844
(Described and illustrated by Day, 1967)

In upper Tampa Bay, Boca Ciega Bay, Terra Ceia Bay, and lower Tampa Bay, O. fusiformis was found at a total of 73 survey stations. Incidental collections were recorded in Boca Ciega Bay and lower Tampa Bay. As many as 24 specimens were taken in a single dredge haul at station 11-4 in upper Tampa Bay (table 290).

Silty sand was recorded at one station, but sand was the sediment type at all others. As an average, the sand was fine and poorly sorted. It had a moderate amount of shell, less than five percent silt and clay, and nearly one percent organic carbon (table 291).

Thirty-four of 74 bottom samples contained algae and one or more sea grasses that included shoal, manatee, and turtle grass.

No gravid specimens were noted, however, a juvenile worm was collected in November.

This species has been collected in the Gulf of Mexico and at many other localities around the world.

Table 290.--Owenia fusiformis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
10-4	3			12-14	8		
10-7	2			12-15	4		
10-8	3			12-16	2		
10-14-A		1		13-1-B		1	
11-4	24		10	13-4	4		
11-5	10			13-5	9		
11-16	1			13-6	4		
12-2			1	13-7	1		
12-3	5			13-8	3		
12-6	1			13-9	3		
12-7	1			13-10	1		
12-12	2						
Boca Ciega Bay							
BC-A	4			D-25		10	
BC-A-1	1			PB-4	1		
BC-E	6			PB-5	1		
BC-N	3			15-4	1		
D-2	1			15-16	3		
D-19-B	1			16-6	15		
D-23		3					
Terra Ceia Bay							
E-4	1			E-8	5		
E-5	3						

Table 290.--Owenia fusiformis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-7	2			16-13	6		
14-8	2			16-14	1		
14-15	5			16-17			1
14-16	10			16-22	3		
14-17	5			16-23	14		
15-20	2			16-24	4		
15-21	5			16-25		3	
15-22	4			16-27	10		
15-23	1			17-2	4		
15-26	1			17-5	1		
15-27	2			17-6	7		
15-29	2			17-7	1		
15-30	3			17-8	2		
15-31	18			17-9	10		
15-32	5			17-10	1		
16-9-B		1		17-13	1		
16-10	1			18-3	1		

Table 291.--*Owenia fusiformis*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.9	13.0 to 31.3	74
Salinity (‰)	30.2	21.2 to 35.1	73
pH	8.1	7.7 to 8.4	73
Depth (m.)	1.4	1 to 4.0	74
Sediment type	sand	sand to silty sand	71
Granules (wt. %)	2.7	0.0 to 14.7	71
Sands (wt. %)	95.0	72.8 to 99.5	71
Silts (wt. %)	1.6	0.0 to 12.2	71
Clay (wt. %)	0.6	0.0 to 7.2	71
CaCO ₃ (wt. %)	18.5	1.5 to 68.0	71
Organic carbon (wt. %)	0.8	0.1 to 8.5	60
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	60
Mean grain size, total sample (φ)	2.3	0.6 to 7.6	71
Standard deviation, total sample (φ)	1.2	0.5 to 2.7	71
Skewness, total sample	0.1	-1.7 to 1.9	71
Kurtosis, total sample	9.1	0.3 to 31.9	70
Mean grain size, noncarbonate fraction (φ)	2.9	1.4 to 9.0	66
Standard deviation, noncarbonate fraction (φ)	1.3	0.5 to 3.2	66
Mean grain size, carbonate fraction (φ)	0.2	-1.8 to 2.2	50
Standard deviation, carbonate fraction (φ)	1.2	0.2 to 2.0	50

Myriochele sp.

This undetermined species resembles Myriochele pygidialis in general form, shape of prostomial collar, and shape of uncini (figure 12,D,E,F). It is much smaller, however (0.5 mm. wide by 20 mm. long) and the pygidium is forked rather than divided into numerous processes (figure 12,G).

Collections were limited to comparatively saline waters of lower Tampa Bay where the worm was taken at 21 survey stations (table 292).

Sand was the only bottom type where the worm was found. Mean grain size was in the medium sand category, and particles were poorly sorted. The average shell content was high, the percentage of silt and clay was below five, and organic carbon was under one percent (table 293).

Algae were recorded from three bottom samples, but no sea grasses were noted.

Neither gravid nor juvenile specimens were seen.

Table 292.--Myriochele sp.--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
15-24	2			17-3	1		
15-26	1			17-4	4		
16-10	3			17-5	6		
16-11	1			17-6	16		
16-13	42			17-7	6		
16-14	4			17-8	9		
16-15	17			17-9	16		
16-17	4			17-10	1		
16-20	2			17-12	3		
16-21	1			17-13	2		
17-2	16		1				

Table 293.--*Myriochele* sp.--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.5	18.0 to 25.0	21
Salinity (‰)	32.7	29.9 to 34.5	21
pH	8.0	7.8 to 8.3	21
Depth (m.)	2.1	1.0 to 4.0	21
Sediment type	sand	--	20
Granules (wt. %)	3.6	0.2 to 8.9	20
Sands (wt. %)	94.0	87.8 to 98.9	20
Silts (wt. %)	1.8	0.4 to 4.7	20
Clay (wt. %)	0.5	0.1 to 1.3	20
CaCO ₃ (wt. %)	32.0	2.4 to 85.2	20
Organic carbon (wt. %)	0.7	0.1 to 3.3	20
Organic nitrogen (wt. %)	0.04	0.00 to 0.2	20
Mean grain size, total sample (Ø)	2.0	0.5 to 3.1	20
Standard deviation, total sample (Ø)	1.3	0.7 to 2.0	20
Skewness, total sample	0.2	-1.3 to 1.0	20
Kurtosis, total sample	7.6	2.0 to 16.1	20
Mean grain size, noncarbonate fraction (Ø)	3.2	1.4 to 6.1	20
Standard deviation, noncarbonate fraction (Ø)	1.3	0.5 to 3.2	20
Mean grain size, carbonate fraction (Ø)	0.7	-0.1 to 3.0	12
Standard deviation, carbonate fraction (Ø)	1.0	0.8 to 1.3	12

Figure 12. -- Diagnostic features of Travisia sp., Clymenella torquata calida, and Myriochele sp.

Travisia sp.:

(A) Entire worm showing
ventral surface and mouth

Clymenella torquata calida:

(B) Anterior end in dorsal
view (C) Anterior end in
lateral view

Myriochele sp.:

(D) Anterior end in lateral
view (E) Anterior end showing
prostomial groove (F) Series
of uncini from setiger four
(G) Terminal segments and
pygidium.

FIGURE 12

Family SABELLARIIDAE Johnston, 1865

These worms are generally found in temperate and tropical seas throughout the world. They construct hard, sandy tubes on solid objects. Sabellariids may occur individually and in small groups, or they may proliferate as vast colonies that form reefs. Their diet consists of organic material suspended in the water column.

Two species were found in Tampa Bay. Sabellaria floridensis was collected as far into the Estuary as upper Tampa Bay, but Sabellaria gracilis was not found outside Boca Ciega Bay and lower Tampa Bay.

Key to SABELLARIIDAE Collected in Tampa Bay

- 1 Outer opercular paleae have a central, spinous spike, and 2 smooth teeth on each side Sabellaria floridensis
- Lateral teeth more numerous and arranged asymmetrically Sabellaria gracilis

Sabellaria floridensis Hartman, 1944b

Only one specimen was taken in upper Tampa Bay, and collections from the other 17 survey stations were limited to Boca Ciega and lower Tampa Bays. One incidental collection was made near Mullet Key in lower Tampa Bay (table 294).

Sand was the only bottom type recorded for collections

of S. floridensis. As an average, it was poorly sorted and fine, and contained about 17 percent shell, over seven percent silt and clay, but very little organic carbon (table 295).

One of seven bottom samples contained algae together with shoal and turtle grass.

No juvenile specimens were collected, and dwelling tubes were not opened in order to examine worms for development.

S. floridensis has been collected only in the Gulf of Mexico, where it is apparently indigenous.

Table 294.--*Sabellaria floridensis*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
12-13				1					
Boca Ciega Bay									
BC-A	5				PB-1				4
BC-A-1				3	14-2				25
BC-I	1				14-3				25
BC-M				1	14-4	40			
BC-N	12			7	15-5				6
D-22				10	15-6				3
D-25			1		15-11				1
Lower Tampa Bay									
16-10	2				17-5				1
17-2				15					

Table 295.--Sabellaria floridensis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.6	17.0 to 26.0	7
Salinity (‰)	32.3	29.8 to 35.1	7
pH	8.1	7.8 to 8.5	7
Depth (m.)	1.3	1 to 2.3	7
Sediment type	sand	--	7
Granules (wt. %)	4.5	0.6 to 14.7	7
Sands (wt. %)	91.2	83.5 to 98.8	7
Silts (wt. %)	4.8	1.0 to 12.2	7
Clay (wt. %)	2.4	0.0 to 7.2	7
CaCO ₃ (wt. %)	17.1	3.5 to 38.2	7
Organic carbon (wt. %)	0.2	0.1 to 0.5	6
Organic nitrogen (wt. %)	0.01	0.00 to 0.05	6
Mean grain size, total sample (φ)	2.7	1.4 to 3.5	7
Standard deviation, total sample (φ)	1.5	1.0 to 2.1	7
Skewness, total sample	0.2	-1.1 to 0.9	7
Kurtosis, total sample	5.9	0.9 to 11.6	6
Mean grain size, noncarbonate fraction (φ)	3.0	2.5 to 4.4	6
Standard deviation, noncarbonate fraction (φ)	1.1	0.7 to 1.9	6
Mean grain size, carbonate fraction (φ)	0.8	0.5 to 1.5	5
Standard deviation, carbonate fraction (φ)	0.8	0.2 to 1.3	5

Sabellaria gracilis Hartman, 1944
(Described and illustrated by Hartman, 1969)

Specimens were collected at a total of 31 survey stations in Boca Ciega Bay and lower Tampa Bay (table 296).

Silty sand was recorded at one station, but all other collections came from sand or shelly sand. The sand was mostly fine and poorly sorted, and average shell content was over 27 percent. The mean percentage of silt and clay fractions was less than four, and organic carbon was less than one percent (table 297).

One-third of the bottom samples contained algae and either shoal or turtle grass.

Juvenile specimens were collected in October and November, but no gravid individuals were seen.

Aside from records for Tampa Bay, S. gracilis has been collected only in southern California.

Table 296.--Sabellaria gracilis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
BC-A	1			PB-1			10
BC-A-1			2	PB-4			1
BC-M			1	PB-5	3		11
BC-N	5			15-6			10
D-13			1	15-11			1
D-23			2	16-2		2	
D-25		1	1	16-6	1		
Lower Tampa Bay							
14-5			3	16-15	3		
14-6	1			16-19	3		
14-9	1			16-25		2	
15-22	1			17-2	1		4
15-26	1			17-4	1		
15-31	5			17-5			1
16-10	63		34	17-6	2		2
16-11	15			17-7	1		
16-14			1				

Table 297.--Sabellaria gracilis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.2	15.0 to 26.0	21
Salinity (‰)	32.5	29.9 to 35.1	21
pH	8.0	7.8 to 8.2	21
Depth (m.)	1.6	1 to 4.0	21
Sediment type	sand	shelly sand to silty sand	21
Granules (wt. %)	5.4	0.0 to 28.8	21
Sands (wt. %)	91.2	78.8 to 98.3	21
Silts (wt. %)	2.6	0.6 to 12.2	21
Clay (wt. %)	0.9	0.0 to 7.2	21
CaCO ₃ (wt. %)	27.7	5.1 to 65.5	21
Organic carbon (wt. %)	0.7	0.1 to 4.8	19
Organic nitrogen (wt. %)	0.03	0.01 to 0.2	19
Mean grain size, total sample (Ø)	2.1	1.1 to 3.5	21
Standard deviation, total sample (Ø)	1.5	0.8 to 3.0	21
Skewness, total sample	0.01	-1.7 to 1.3	21
Kurtosis, total sample	4.9	-0.8 to 15.8	20
Mean grain size, noncarbonate fraction (Ø)	3.3	2.2 to 8.7	19
Standard deviation, noncarbonate fraction (Ø)	1.3	0.6 to 3.2	19
Mean grain size, carbonate fraction (Ø)	0.5	-1.7 to 3.0	17
Standard deviation, carbonate fraction (Ø)	1.1	0.8 to 1.9	17

Family PECTINARIIDAE Quatrefages, 1865

Members of this family build conical tubes in which sand and other foreign materials are incorporated. They feed on bottom deposits and are found in seas throughout the world.

A single species, Cistenides gouldii, was found in Tampa Bay.

Cistenides gouldii Verrill, 1873
(Described and illustrated by Hartman, 1942a)

Collections of this polychaete came from all areas of the Estuary at a total of 116 survey stations and five incidental localities. One-third of these records were from Old Tampa Bay alone (table 298).

The worm was collected in a range of sediments that varied from shelly sand to clayey silt. Average sediment type, however, was poorly sorted, fine sand. It had less than 10 percent shell, more than eight percent silt and clay, and nearly one percent organic carbon (table 299).

Bottom vegetation was noted at 40 of 99 dredge and shovel stations. The plants included algae and one or more species of all sea grasses found in the Estuary except Halophila.

Juvenile specimens were collected from June through

December, but no gravid individuals were seen.

C. gouldii has a geographic range that extends from New England south to the Caribbean and into the Gulf of Mexico.

Table 298.--Cistenides gouldii--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
A-1		1		3-12	6		
B	9		10	3-13	1		
B-1		1	10	3-14		1	
B-2		2		3-15		5	2
1-1		4		4-2	1		
1-2	3			4-3			1
1-3	3		40	4-5	1		
1-4	7		62	4-6	3		
1-5	8		26	4-7			2
2-1		1		4-13			2
2-4	2			4-14	1		
2-5	1			4-16	2		
3-1-A			1	4-17-A	1		
3-3	13			4-19			1
3-4	1		2	5-3	2		
3-5	1		5	5-4	1		
3-6			4	6-1-A		6	
3-7			4	6-1-C		1	
3-8	11			6-7-A		2	
3-11	4						
Hillsborough Bay							
C-2	1			C-8-2		1	
C-3	3		1	9-3	27		2
C-5	1			9-4	1		
C-6			10	10-15	5		10
C-8		1		10-16	2		
C-8-1		1		10-22	9		10

Table 298.--Cistenides gouldii--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-4	3			11-14			4
10-9	1			11-15			2
10-12	3			11-17			1
10-13	2			11-18			4
10-14-B	5			11-19			4
11-1			10	11-20			9
11-3	1			11-21			4
11-4	34		10	11-22			3
11-6	2			11-26	1		2
11-8	5		10	11-27	8		12
11-11			2	11-28		3	
11-13			5	12-2	1		
Boca Ciega Bay							
BC-A	3		10	D-23		1	
BC-A-1	1		2	D-25		3	1
BC-H	1		1	PB-1	8		
BC-I	1			PB-4	1		
BC-M	2			14-2	1		
BC-N	1			15-1	2		1
D-2	1			15-4	1		
D-5			10	15-6	3		
D-9	1			15-8	3		
D-11	1	3		15-12	2		
D-17	2		1	15-14	2		
D-20			10	15-16	1		
D-21			10	16-6	2		
Terra Ceia Bay							
E-1	1			E-6	1		
E-3	2			E-7	1		

Table 298.--Cistenides gouldii--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)-(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	1			17-1		1	
15-19	1			17-6	1		1
15-31	3			17-8	1		
16-23	1			17-9	1		
16-25		2		17-13	1		
16-26		1					

Table 299.--Cistenides gouldii--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.0	13.0 to 33.8	99
Salinity (‰)	26.5	0.7 to 35.1	99
pH	7.9	7.0 to 8.5	84
Depth (m.)	0.9	1 to 2.7	99
Sediment type	sand	shelly sand to clayey silt	98
Granules (wt. %)	1.5	0.0 to 34.5	98
Sands (wt. %)	89.6	11.2 to 99.8	98
Silts (wt. %)	5.0	0.0 to 50.2	98
Clay (wt. %)	3.5	0.0 to 65.9	98
CaCO ₃ (wt. %)	7.9	0.7 to 66.0	97
Organic carbon (wt. %)	0.8	0.04 to 8.5	55
Organic nitrogen (wt. %)	0.1	0.01 to 0.2	55
Mean grain size, total sample (Ø)	2.8	0.6 to 7.1	98
Standard deviation, total sample (Ø)	1.4	0.5 to 3.8	98
Skewness, total sample	0.7	-1.3 to 2.1	98
Kurtosis, total sample	10.5	-1.1 to 41.2	97
Mean grain size, noncarbonate fraction (Ø)	3.1	1.4 to 9.0	91
Standard deviation, noncarbonate fraction (Ø)	1.5	0.4 to 2.5	91
Mean grain size, carbonate fraction (Ø)	-0.3	-2.6 to 2.3	84
Standard deviation, carbonate fraction (Ø)	1.3	0.6 to 3.1	84

Family AMPHARETIDAE Malmgren, 1867

Ampharetids are found in all seas where they construct membranous tubes that contain particles of sand and shell, or silt. They feed on bottom deposits.

Three species were collected in Tampa Bay. The only one found in all areas of the Estuary was Melinna maculata. The next most widely distributed was Isolda pulchella, which occurred in all areas except Boca Ciega Bay.

Sabellides oculata was found at widely separated localities in Old Tampa Bay, Hillsborough Bay, and Boca Ciega Bay.

Key to AMPHARETIDAE Collected in Tampa Bay

- 1 Both smooth and pinnate branchial filaments present Isolda pulchella
- All branchiae smooth; transverse membrane on the dorsum of setiger 2 Melinna maculata
- All branchiae smooth; dorsal membrane absent Sabellides oculata

Isolda pulchella Muller, 1858
(Described and illustrated by Day, 1967)

This worm was collected at a total of 63 survey stations in all areas of the Estuary except Old Tampa Bay. More than one-half of these collections were recorded in lower Tampa Bay, and it was in that area that the greatest number per dredge haul were taken (table 300).

Aside from one collection in silty sand, all specimens came from either shelly sand or sand. Average bottom type was poorly sorted, fine sand that contained about 20 percent shell, less than three percent silt and clay, and less than one percent organic carbon (table 301).

Vegetation at 27 of the stations consisted of algae, together with shoal grass, turtle grass, or manatee grass.

Juvenile specimens were collected in September and October. No gravid worms were seen.

This species has never before been recorded from the Gulf of Mexico, although specimens have been found in Biscayne Bay, Florida, and other localities in temperate and tropical waters of both the Atlantic and Pacific.

Table 300.--Isolda pulchella--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Hillsborough Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
10-16		1							
Upper Tampa Bay									
10-4	3				12-15	1			
10-7	1				13-3	7			
11-4	7				13-4	2			
11-15		1			13-5	6			
12-2	1				13-6	2			
12-3	4				13-10	2			
12-14	10								
Boca Ciega Bay									
BC-A	1				14-4	1			
BC-E	1				15-9		1		
BC-N	14				15-14	4			
D-25		1	1		15-16	1			
14-3	1				16-6	16			
Terra Ceia Bay									
E-5	2	1			E-8	2			
E-6	1								

Table 300.--Isolda pulchella--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)--(continued)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
14-5	1			16-13	2		
14-6	8			16-15	1		
14-9	4			16-20	5		
14-10	4			16-21	16		
14-11	1			16-22	6		
14-13	6			16-23	17		
14-14	2			16-26		1	
14-15	9			16-27	20		
14-16	5			17-2	14		5
15-18	1			17-5	30		1
15-22	1			17-6	121		2
15-26	1			17-7	82		
15-29	4			17-8	83		
15-30	12			17-9	47		2
15-31	122			17-10	11		
15-32	5			17-12	10		
16-10	6			17-13	1		
16-11	2			18-3	1		

Table 301.--Isolda pulchella--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.1	13.0 to 31.3	63
Salinity (‰)	30.7	21.8 to 35.1	62
pH	8.0	7.8 to 8.4	62
Depth (m.)	1.6	1 to 4.0	63
Sediment type	sand	shelly sand to silty sand	61
Granules (wt. %)	3.2	0.02 to 21.4	61
Sands (wt. %)	94.3	77.8 to 99.8	61
Silts (wt. %)	1.8	0.1 to 12.2	61
Clay (wt. %)	0.6	0.0 to 7.2	61
CaCO ₃ (wt. %)	20.1	1.4 to 75.1	61
Organic carbon (wt. %)	0.7	0.1 to 8.4	58
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	58
Mean grain size, total sample (φ)	2.2	0.4 to 3.5	61
Standard deviation, total sample (φ)	1.3	0.5 to 2.1	61
Skewness, total sample	0.2	-1.7 to 1.9	61
Kurtosis, total sample	8.2	0.3 to 29.4	60
Mean grain size, noncarbonate fraction (φ)	2.8	1.4 to 9.0	59
Standard deviation, noncarbonate fraction (φ)	1.2	0.5 to 3.2	59
Mean grain size, carbonate fraction (φ)	0.3	-2.5 to 3.0	42
Standard deviation, carbonate fraction (φ)	1.1	0.2 to 1.9	42

Pista palmata (Verrill, 1873)

Specimens were collected at a total of 20 survey stations in all areas of the Estuary except Old Tampa Bay and Hillsborough Bay. In addition, P. palmata was recorded at four incidental localities in Boca Ciega and lower Tampa Bays. More than one-half of all collections were made in Boca Ciega Bay (table 314).

One collection came from silty sand, but the rest were all taken in shelly sand or sand. Average sediment type was poorly sorted, fine sand. It had 15 percent shell, somewhat more than five percent silt and clay, and under one percent organic carbon (table 315).

Algae were present in six of 15 bottom samples along with either shoal or turtle grass.

A gravid specimen was found in August and juvenile worms were collected in February, May, and September.

This polychaete has been collected in the Gulf of Mexico and is known along the Atlantic coast from Virginia to New England.

Table 302.--*Melinna maculata*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay								
Stations		Individuals		Stations		Individuals		
		D	S	N		D	S	N
A-1			2		2-5	7		
A-2			18		3-5			6
A-3			1		3-12	1		
B	2				3-14	8		
B-1			5		3-15		8	
2-1			4		3-16		12	1
2-2		8			3-17		11	
2-3		40			4-1		4	
2-4		15			4-2	3		
Hillsborough Bay								
C-1			6		10-20	1		
C-2		3						
Upper Tampa Bay								
10-12		1			11-26			10
11-25		1			13-2	1		
Boca Ciega Bay								
BC-G			5		D-23		1	
BC-M				10	D-25		1	2
BC-N	1				PB-4	1		
D-6			2		15-3		5	
D-11			1		16-6	1		
Terra Ceia Bay								
E-2			3		E-6	1		
Lower Tampa Bay								
16-11		1			16-27	1		
16-26			4		17-15		2	

Table 303.--Melinna maculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.6	13.0 to 32.0	38
Salinity (‰)	26.8	18.3 to 34.3	38
pH	7.9	6.7 to 8.4	31
Depth (m.)	0.7	1 to 2.3	38
Sediment type	sand	shelly sand to clayey sand	37
Granules (wt. %)	2.3	0.0 to 34.5	37
Sands (wt. %)	90.2	18.2 to 98.7	37
Silts (wt. %)	3.4	0.4 to 11.9	37
Clay (wt. %)	1.9	0.3 to 9.1	37
CaCO ₃ (wt. %)	5.4	0.6 to 21.8	37
Organic carbon (wt. %)	1.1	0.2 to 6.9	19
Organic nitrogen (wt. %)	0.1	0.01 to 1.2	19
Mean grain size, total sample (Ø)	2.7	0.6 to 3.3	37
Standard deviation, total sample (Ø)	1.4	0.6 to 3.8	37
Skewness, total sample	0.9	-0.8 to 2.0	37
Kurtosis, total sample	10.6	-0.7 to 28.9	37
Mean grain size, noncarbonate fraction (Ø)	3.3	1.9 to 6.1	36
Standard deviation, noncarbonate fraction (Ø)	1.6	0.4 to 2.4	36
Mean grain size, carbonate fraction (Ø)	-0.2	-2.4 to 3.0	36
Standard deviation, carbonate fraction (Ø)	1.4	0.6 to 2.8	36

Sabellides oculata Webster, 1879a

Specimens were found at only eight survey stations in Old Tampa Bay and Boca Ciega Bay, and at one incidental locality in Hillsborough Bay (McKay Bay). As many as 15 individuals were collected in the shovel sample at station A-2 in the upper reaches of Old Tampa Bay (table 304).

Silty mud was recorded at one station, but the other six dredge and shovel samples came from bottom that was mostly medium or fine sand. The average shell content of sediments was under 10 percent, and the percentage of silt and clay was over 12. The percentage of organic carbon was nearly one (table 305).

Vegetation was recorded at four stations, and consisted of algae in addition to either shoal or turtle grass.

A juvenile specimen was found in November, but no gravid worms were noted.

This worm has been collected in the Gulf of Mexico at Seahorse Key, Florida, and is otherwise known only along the Atlantic coast from Virginia to New England.

Table 304.--Sabellides oculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
A-2			15		2-4		1		
A-5			2		3-15			1	
Boca Ciega Bay									
BC-N		1			PB-1-A			2	
PB-1				1	PB-4		1		1

Table 305.--Sabellides oculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	24.4	15.5 to 30.5	7
Salinity (‰)	25.1	18.5 to 32.2	7
pH	7.7	7.1 to 8.3	6
Depth (m.)	0.6	1 to 2.3	7
Sediment type	sand	sand to silty mud	7
Granules (wt. %)	2.3	0.0 to 14.7	7
Sands (wt. %)	85.4	31.4 to 99.0	7
Silts (wt. %)	7.7	0.5 to 44.6	7
Clay (wt. %)	4.6	0.2 to 24.0	7
CaCO ₃ (wt. %)	8.1	0.7 to 38.2	7
Organic carbon (wt. %)	0.9	0.2 to 1.6	2
Organic nitrogen (wt. %)	0.02	0.01 to 0.03	2
Mean grain size, total sample (φ)	3.1	1.4 to 6.4	7
Standard deviation, total sample (φ)	1.4	0.7 to 2.6	7
Skewness, total sample	0.7	-0.3 to 1.6	7
Kurtosis, total sample	13.9	0.7 to 28.9	7
Mean grain size, noncarbonate fraction (φ)	3.2	2.7 to 3.9	6
Standard deviation, noncarbonate fraction (φ)	1.6	0.7 to 2.4	6
Mean grain size, carbonate fraction (φ)	0.6	-1.2 to 1.5	6
Standard deviation, carbonate fraction (φ)	1.1	0.2 to 2.1	6

Family TEREHELLIDAE Grube, 1851

The family is a large one, and terebellids are found in seas throughout the world. As a rule, these worms construct a dwelling tube and feed on organic, bottom deposits. Their feeding process has been described by Dales (1963).

Nine species were found in Tampa Bay. Hillsborough Bay was the only area of the Estuary where no terebellids were collected. Species that were found as far into the Estuary as Old Tampa Bay included Liomia medusa, Loimia viridis, Polycirrus eximius, and Thelepus setosus. Enoplobranchus sanguineus, Pista cristata, Pista palmata, and Terebella rubra were found only between upper and lower Tampa Bay. Trichobranchnus glacialis is apparently limited to the comparatively saline waters of lower Tampa Bay.

Key to TEREHELLIDAE Collected in Tampa Bay

- 1 Branchiae absent, or confined to the mid-region of the body 2
- Branchiae present on the dorsum of some anterior segments 3
- 2 Branchiae absent Polycirrus eximius
- Branchiae on the mid-region bear tufts of fine setae Enoplobranchus sanguineus
- 3 Notopodial spinigers present on more than 17 segments 4

- Notopodial spinigers present on 17 or fewer segments 5
- 4 Three pairs of branchiae, dendritically branched Terebella rubra
- Three pairs of branchiae, undivided filaments Thelepus setosus
- 5 Notosetae present on 15 thoracic segments; thoracic neurosetae have a long shaft Tricobranchus glacialis
- Notosetae present on 17 thoracic segments; thoracic neurosetae have no shaft 6
- 6 Two pairs of branchiae 7
- Three pairs of branchiae 8
- 7 Branchiae appear as a tuft of filaments born on a long, basal stalk Pista cristata
- Branchiae appear as dendritically branched filaments born on a short, basal stalk....Pista palmata
- 8 Tube composed of sand and shell; thoracic uncini have 5 or 6 teeth, and abdominal uncini have 4 Loimia medusa
- Tube composed of silt and clay; thoracic uncini have 7 teeth, and abdominal uncini have 6 Loimia viridis

Enoplobranchus sanguineus (Verrill, 1873)
(Described and illustrated by Verrill, 1881)

Specimens were collected at a single station in upper Tampa Bay, one in Boca Ciega Bay, and one in lower Tampa Bay (table 306).

Average sediment type for the three localities was

poorly sorted, medium sand that had more than 20 percent shell. Many of the shell particles were in the granule and coarser size classes. The average content of silt and clay was less than two percent, and organic carbon was nearly one percent (table 307).

Algae were recorded at one station, but no sea grasses were seen.

Neither gravid nor juvenile specimens were collected.

E. sanguineus has been collected in the Gulf of Mexico and the western Atlantic from New England to the Caribbean.

Table 306.--Enoplobranchus sanguineus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
10-3	1						
Boca Ciega Bay							
16-6	1						
Lower Tampa Bay							
15-31	1						

Table 307.--Enoplobranchus sanguineus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.6	24.0 to 31.5	3
Salinity (‰)	29.1	22.7 to 34.3	3
pH	8.1	8.0 to 8.2	3
Depth (m.)	0.8	1 to 1.3	3
Sediment type	sand	shelly sand to sand	3
Granules (wt. %)	9.1	1.3 to 21.5	3
Sands (wt. %)	89.3	78.5 to 96.2	3
Silts (wt. %)	1.3	0.0 to 2.1	3
Clay (wt. %)	0.3	0.0 to 0.5	3
CaCO ₃ (wt. %)	21.4	19.8 to 23.6	3
Organic carbon (wt. %)	0.9	0.4 to 1.2	3
Organic nitrogen (wt. %)	0.04	0.01 to 0.1	3
Mean grain size, total sample (φ)	1.7	0.8 to 2.4	3
Standard deviation, total sample (φ)	1.7	1.3 to 2.3	3
Skewness, total sample	-0.1	-0.5 to 0.1	3
Kurtosis, total sample	2.9	-0.2 to 4.7	3
Mean grain size, noncarbonate fraction (φ)	2.7	2.2 to 3.1	3
Standard deviation, noncarbonate fraction (φ)	1.1	0.9 to 1.3	3
Mean grain size, carbonate fraction (φ)	-0.7	-1.8 to 0.2	3
Standard deviation, carbonate fraction (φ)	1.2	0.8 to 1.6	3

Loimia medusa (Savigny, 1820)
(Described and illustrated by Day, 1967)

Collections of this worm came from a total of 34 survey stations in all areas of the Estuary except Hillsborough and Terra Ceia Bays. Specimens were also taken at three incidental stations in Boca Ciega Bay and lower Tampa Bay (table 308).

Sediment data show that the worm occurred only in sand that had a medium or fine texture. As an average, the sand was poorly sorted, and contained about 13 percent shell -- some of which was in large particle size classes. The average percentage of silt and clay was less than two percent, but organic carbon was more than one percent (table 309).

Eight bottom samples contained algae, and in addition, two had shoal and turtle grass.

Gravid specimens were collected in July, and juveniles were found from July through November.

L. medusa has a world-wide distribution in temperate and tropical seas. It has been collected previously in the Gulf of Mexico.

Table 308.--Loimia medusa--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
	D	S	N		D	S	N		
A-6		1		5-7	1				
3-8	3			5-11	7				
3-16		1		5-12	7				
4-6	1			6-2	3				
4-16	1			6-4-A	2				
5-3	2			6-5	1				
5-6	3			6-6	1				
Upper Tampa Bay									
10-3			1	10-6	1				
10-4	2			10-7	1				
Boca Ciega Bay									
BC-C		1		D-25			3		
BC-H			1	PB-1			4		
BC-M			1	16-1			1		
BC-N	3			16-6	1				
Lower Tampa Bay									
14-13	2			15-31	1				
15-27	1			16-9-B		1			
15-29	1			17-2	5				
15-30	3			17-7	2				

Table 309.--Loimia medusa--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	27.8	16.8 to 32.7	28
Salinity (‰)	27.3	21.0 to 35.1	28
pH	8.0	7.8 to 8.3	24
Depth (m.)	1.4	1 to 4.0	28
Sediment type	sand	--	26
Granules (wt. %)	1.9	0.0 to 14.7	26
Sands (wt. %)	96.3	83.5 to 99.9	26
Silts (wt. %)	1.2	0.0 to 6.5	26
Clay (wt. %)	0.7	0.0 to 3.6	26
CaCO ₃ (wt. %)	13.1	0.7 to 43.3	26
Organic carbon (wt. %)	1.1	0.2 to 2.9	15
Organic nitrogen (wt. %)	0.1	0.00 to 0.2	15
Mean grain size, total sample (Ø)	2.3	1.4 to 3.2	26
Standard deviation, total sample (Ø)	1.1	0.4 to 1.9	26
Skewness, total sample	0.6	-1.0 to 2.4	26
Kurtosis, total sample	17.5	0.1 to 62.5	25
Mean grain size, noncarbonate fraction (Ø)	3.2	2.5 to 7.1	25
Standard deviation, noncarbonate fraction (Ø)	1.7	0.7 to 3.2	25
Mean grain size, carbonate fraction (Ø)	-0.5	-2.3 to 1.8	23
Standard deviation, carbonate fraction (Ø)	1.3	0.2 to 2.0	23

Loimia viridis Moore, 1903
(Described and illustrated by Hartman, 1945)

This species was collected at five survey stations and one incidental locality (Port Tampa) in Old Tampa Bay, and at a single survey station in upper Tampa Bay as well as one in Boca Ciega Bay (table 310).

Average sediment type was clayey sand that had a silt and clay percentage of 24.8. The shell component was small, but contained some large particles. The average amount of organic carbon was less than one percent (table 311).

No bottom samples contained vegetation.

A juvenile worm was collected in August, but no gravid specimens were recorded.

This species has been collected in the Gulf of Mexico and along the Atlantic seaboard between North Carolina and New England.

Table 310.--Loimia viridis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
4-12	3			5-13	2		
4-14	1			6-1-A		1	
4-18-A	1						
Upper Tampa Bay							
11-8	1						
Boca Ciega Bay							
15-9		1					

Table 311.--Loimia viridis--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	29.5	26.8 to 32.0	7
Salinity (‰)	25.7	24.1 to 33.0	7
pH	8.0	7.8 to 8.1	7
Depth (m.)	1.4	1 to 2.7	7
Sediment type	clayey sand	sand to clayey silt	7
Granules (wt. %)	0.2	0.0 to 0.5	7
Sands (wt. %)	74.9	16.2 to 99.4	7
Silts (wt. %)	9.3	0.2 to 50.2	7
Clay (wt. %)	15.5	0.7 to 65.9	7
CaCO ₃ (wt. %)	5.6	0.7 to 21.9	7
Organic carbon (wt. %)	0.4	0.2 to 0.6	2
Organic nitrogen (wt. %)	0.03	0.02 to 0.05	2
Mean grain size, total sample (Ø)	4.0	2.4 to 7.1	7
Standard deviation, total sample (Ø)	1.4	0.6 to 2.7	7
Skewness, total sample	0.5	-0.6 to 1.7	7
Kurtosis, total sample	11.8	-0.6 to 26.3	7
Mean grain size, noncarbonate fraction (Ø)	2.9	1.8 to 3.7	7
Standard deviation, noncarbonate fraction (Ø)	1.7	1.2 to 2.3	7
Mean grain size, carbonate fraction (Ø)	-0.5	-1.8 to 0.5	7
Standard deviation, carbonate fraction (Ø)	1.3	1.0 to 1.7	7

Pista cristata (Muller, 1776)
(Described and illustrated by Day, 1967)

Individuals were found at a total of 14 survey stations in all areas of the Estuary except Old Tampa and Hillsborough Bays. More than one-half of these collections were recorded in Boca Ciega Bay (table 312).

Although one collection was made in silty sand, average sediment type was poorly sorted, medium sand. It contained a moderate amount of shell, less than five percent silt and clay, and nearly two percent organic carbon (table 313).

Vegetation was recorded in eight of 13 bottom samples. Algae were present together with one or more species of sea grass that included shoal, manatee, and turtle grass.

No gravid specimens were collected, but a juvenile worm was found in February.

P. cristata is a cosmopolitan species, and has been collected in the Gulf of Mexico.

Table 312.--*Pista cristata*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
11-4	1			12-3	1		
Boca Ciega Bay							
BC-A	1			PB-4	2		4
D-2	2			PB-5	1		
D-23		1		15-8	1		
D-25		7	1	16-6	4		
PB-1			1				
Terra Ceia Bay							
E-1	1						
Lower Tampa Bay							
16-27	6			17-8	1		

Table 313.--Pista cristata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.6	14.7 to 29.5	13
Salinity (‰)	31.2	24.7 to 34.3	13
pH	8.1	7.9 to 8.4	12
Depth (m.)	0.9	1 to 1.7	13
Sediment type	sand	sand to silty sand	13
Granules (wt. %)	2.7	0.0 to 8.9	13
Sands (wt. %)	92.9	78.8 to 98.7	13
Silts (wt. %)	2.9	0.3 to 12.2	13
Clay (wt. %)	1.1	0.0 to 7.2	13
CaCO ₃ (wt. %)	18.1	2.8 to 66.0	13
Organic carbon (wt. %)	1.8	0.1 to 8.5	10
Organic nitrogen (wt. %)	0.05	0.01 to 0.2	10
Mean grain size, total sample (φ)	2.5	1.9 to 3.5	13
Standard deviation, total sample (φ)	1.4	0.6 to 2.1	13
Skewness, total sample	0.3	-0.6 to 1.7	13
Kurtosis, total sample	6.5	1.0 to 25.7	13
Mean grain size, noncarbonate fraction (φ)	3.4	2.1 to 9.0	11
Standard deviation, noncarbonate fraction (φ)	1.2	0.4 to 1.9	11
Mean grain size, carbonate fraction (φ)	0.2	-0.8 to 0.8	9
Standard deviation, carbonate fraction (φ)	1.2	0.8 to 1.7	9

Pista palmata (Verrill, 1873)

Specimens were collected at a total of 20 survey stations in all areas of the Estuary except Old Tampa Bay and Hillsborough Bay. In addition, P. palmata was recorded at four incidental localities in Boca Ciega and lower Tampa Bays. More than one-half of all collections were made in Boca Ciega Bay (table 314).

One collection came from silty sand, but the rest were all taken in shelly sand or sand. Average sediment type was poorly sorted, fine sand. It had 15 percent shell, somewhat more than five percent silt and clay, and under one percent organic carbon(table 315).

Algae were present in six of 15 bottom samples along with either shoal or turtle grass.

A gravid specimen was found in August and juvenile worms were collected in February, May, and September.

This polychaete has been collected in the Gulf of Mexico and is known along the Atlantic coast from Virginia to New England.

Table 314.--*Pista palmata*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay									
Stations		Individuals			Stations		Individuals		
	D	S	N		D	S	N		
11-4			1	13-3	2				
12-14	2			13-13		1			
12-16	1								
Boca Ciega Bay									
BC-A	3		1	PB-1	1				
BC-I	1			PB-4			4		
BC-N	16			PB-5	3		2		
D-11		1		14-2	2				
D-22			1	15-4			1		
D-25		1	12	16-1		1			
Terra Ceia Bay									
E-2		1							
Lower Tampa Bay									
14-6			1	16-10	2		1		

Table 315.--Pista palmata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	18.7	12.8 to 29.4	15
Salinity (‰)	29.7	21.4 to 34.0	15
pH	8.1	7.6 to 8.5	15
Depth (m.)	1.0	1 to 2.3	15
Sediment type	sand	shelly sand to silty sand	14
Granules (wt. %)	2.7	0.0 to 21.4	14
Sands (wt. %)	90.7	77.8 to 99.9	14
Silts (wt. %)	4.3	0.1 to 12.2	14
Clay (wt. %)	1.8	0.0 to 7.2	14
CaCO ₃ (wt. %)	15.0	1.2 to 75.1	14
Organic carbon (wt. %)	0.4	0.1 to 1.5	11
Organic nitrogen (wt. %)	0.01	0.00 to 0.04	11
Mean grain size, total sample (Ø)	2.6	0.4 to 3.5	14
Standard deviation, total sample (Ø)	1.4	0.5 to 2.1	14
Skewness, total sample	0.5	-0.4 to 1.6	14
Kurtosis, total sample	6.3	0.6 to 18.4	14
Mean grain size, noncarbonate fraction (Ø)	2.9	2.1 to 4.4	12
Standard deviation, noncarbonate fraction (Ø)	1.2	0.4 to 2.0	12
Mean grain size, carbonate fraction (Ø)	0.6	-1.6 to 2.2	10
Standard deviation, carbonate fraction (Ø)	1.2	0.6 to 2.6	10

Polycirrus eximius (Leidy, 1855)
(Described and illustrated by Verrill, 1873)

Hillsborough Bay was the only area of the Estuary where P. eximius was not collected. Specimens came from a total of 38 survey stations, and 24 of these were located in lower Tampa Bay. At station 16-13, 58 specimens were collected in a single dredge haul (table 316).

Shelly sand and sand were the only bottom types in which the worm was collected. The average sediment was poorly sorted, medium sand that contained more than 20 percent shell and very little silt and clay. Its organic carbon content was one percent (table 317).

Algae were recorded at 14 of 34 dredge and shovel stations. Sea grasses present with the algae included shoal, manatee, or turtle grass.

A gravid specimen was recorded in December and juvenile worms were collected in August and December.

P. eximius has not been recorded for the Gulf of Mexico. Otherwise, it is known along the Atlantic coast from North Carolina to New England.

Table 316.--*Polycirrus eximius*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
5-12	1			6-3	6		4
6-2	14			6-5	3		
Upper Tampa Bay							
10-3		1		13-6	1		
11-4	3		1	13-10	3		
12-11	2						
Boca Ciega Bay							
15-11	1			16-5		1	
Terra Ceia Bay							
E-4			1	E-8	3		
E-7	1						
Lower Tampa Bay							
14-12			1	16-15	20		
15-18	5			16-16	59		
15-21	11			16-17	22		1
15-24	2			16-22	1		
15-28	4			16-27	9		
15-29	1			17-2	16		
15-30	1			17-3	2		
15-33		4		17-4	11		
16-9		1		17-7	1		
16-12			2	17-8	1		
16-13	58			17-9			1
16-14	12		1	17-11		1	

Table 317.--Polycirrus eximius--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.8	15.0 to 32.0	34
Salinity (‰)	30.2	22.7 to 34.5	34
pH	8.0	7.7 to 8.3	33
Depth (m.)	1.7	1 to 4.0	34
Sediment type	sand	shelly sand to sand	30
Granules (wt. %)	3.2	0.0 to 21.5	30
Sands (wt. %)	95.0	78.5 to 99.8	30
Silts (wt. %)	1.3	0.0 to 7.1	30
Clay (wt. %)	0.4	0.0 to 3.2	30
CaCO ₃ (wt. %)	26.6	2.2 to 85.2	30
Organic carbon (wt. %)	1.0	0.03 to 8.5	27
Organic nitrogen (wt. %)	0.05	0.00 to 0.2	27
Mean grain size, total sample (φ)	1.9	0.5 to 3.0	30
Standard deviation, total sample (φ)	1.3	0.6 to 2.0	30
Skewness, total sample	0.1	-1.4 to 1.7	30
Kurtosis, total sample	7.3	-0.2 to 25.7	30
Mean grain size, noncarbonate fraction (φ)	3.3	1.9 to 9.0	30
Standard deviation, noncarbonate fraction (φ)	1.3	0.6 to 3.2	30
Mean grain size, carbonate fraction (φ)	0.1	-1.8 to 1.7	25
Standard deviation, carbonate fraction (φ)	1.2	0.8 to 2.1	25

Terebella rubra (Verrill, 1873)

Specimens were found at a total of 14 survey stations in all areas of the Estuary except Old Tampa Bay and Hillsborough Bay (table 318).

All were collected in medium or fine sand that was poorly sorted. As an average, the percentage of shell in sediments was 20, silt and clay amounted to nearly three percent, and organic carbon was less than one percent (table 319).

Algae were recorded in 75 percent of the bottom samples.

Neither gravid nor juvenile specimens were found.

T. rubra has been collected in the Gulf of Mexico and southern Florida as well as along the Atlantic coast between North Carolina and New England.

Table 318.--*Terebella rubra*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Upper Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
11-6	3			13-7	1		
13-4	1						
Boca Ciega Bay							
BC-N			1	PB-1			6
D-2			10	PB-5			4
D-22			1	15-6			1
Terra Ceia Bay							
E-1	1						
Lower Tampa Bay							
17-6	1			17-15			1
17-7	1		1	18-3	1		

Table 319.--*Terebella rubra*--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.0	14.7 to 29.1	4
Salinity (‰)	28.2	24.3 to 29.9	4
pH	8.1	7.9 to 8.2	4
Depth (m.)	1.8	1 to 2.7	4
Sediment type	sand	--	4
Granules (wt. %)	1.6	0.1 to 4.9	4
Sands (wt. %)	95.5	92.8 to 97.5	4
Silts (wt. %)	1.9	1.0 to 2.9	4
Clay (wt. %)	1.0	0.3 to 1.5	4
CaCO ₃ (wt. %)	20.0	2.9 to 41.4	4
Organic carbon (wt. %)	0.3	0.1 to 0.7	4
Organic nitrogen (wt. %)	0.04	0.01 to 0.1	4
Mean grain size, total sample (φ)	2.31	1.7 to 3.0	4
Standard deviation, total sample (φ)	1.2	1.0 to 1.6	4
Skewness, total sample	1.1	0.2 to 2.1	4
Kurtosis, total sample	12.5	3.5 to 20.1	4
Mean grain size, noncarbonate fraction (φ)	2.6	2.4 to 3.3	4
Standard deviation, noncarbonate fraction (φ)	0.9	0.4 to 1.5	4
Mean grain size, carbonate fraction (φ)	0.2	-0.1 to 0.6	2
Standard deviation, carbonate fraction (φ)	1.3	0.9 to 1.7	2

Thelepus setosus (Quatrefages, 1865)
(Described and illustrated by Hartman, 1969)

Specimens were often found attached to the base of sea grasses, and were collected at a total of 24 survey stations in all areas of the Estuary except Hillsborough Bay. Fourteen survey localities and an incidental collection were recorded in Boca Ciega Bay. Another incidental locality was situated near Mullet Key in lower Tampa Bay (table 320).

All specimens from dredge and shovel samples were taken in medium to very fine sand. Average sediment type was poorly sorted, fine sand that had less than 10 percent shell, over five percent silt and clay, and more than one percent organic carbon (table 321).

Every bottom sample contained algae and one or more sea grasses that included turtle, manatee, or shoal grass.

Neither gravid nor juvenile specimens were recorded.

This polychaete has been recorded in the Gulf of Mexico and otherwise has a cosmopolitan distribution in temperate and tropical seas.

Table 320.--Thelepus setosus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
4-16				1					
Upper Tampa Bay									
10-1-A			1		10-3			1	
Boca Ciega Bay									
BC-M				2	15-3		2	1	
BC-N				1	15-15		9		1
D-2				1	15-16		3		
D-23			7		16-1			2	
D-25			4	2	16-2			108	5
PB-1				1	16-3			2	
PB-4			2	2	16-8			2	
Terra Ceia Bay									
E-6				1					
Lower Tampa Bay									
14-6			1		16-27		1		
16-14			1		17-2				2
16-25				3	17-15			2	

Table 321.--Thelepus setosus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.2	13.0 to 30.0	15
Salinity (‰)	32.0	29.4 to 33.8	15
pH	8.2	8.0 to 8.4	14
Depth (m.)	0.5	1 to 1.7	15
Sediment type	sand	--	15
Granules (wt. %)	2.9	0.04 to 11.2	15
Sands (wt. %)	91.3	82.3 to 98.3	15
Silts (wt. %)	4.6	0.6 to 11.8	15
Clay (wt. %)	1.2	0.2 to 2.8	15
CaCO ₃ (wt. %)	9.7	2.9 to 23.4	15
Organic carbon (wt. %)	1.5	0.2 to 6.9	13
Organic nitrogen (wt. %)	0.1	0.02 to 0.2	13
Mean grain size, total sample (Ø)	2.6	1.9 to 3.4	15
Standard deviation, total sample (Ø)	1.4	0.9 to 2.0	15
Skewness, total sample	0.4	-0.5 to 1.1	15
Kurtosis, total sample	6.6	1.8 to 21.2	15
Mean grain size, noncarbonate fraction (Ø)	2.6	1.9 to 3.4	15
Standard deviation, noncarbonate fraction (Ø)	1.2	0.7 to 2.2	14
Mean grain size, carbonate fraction (Ø)	0.7	-0.8 to 2.4	14
Standard deviation, carbonate fraction (Ø)	1.3	0.9 to 2.3	14

Tricobranchus glacialis Malmgren, 1866
(Described and illustrated by Day, 1967)

The single specimen collected came from lower Tampa Bay at station 16-27 (table 322).

There, the sediment was poorly sorted, fine sand that contained slightly more than 10 percent shell, less than five percent silt and clay, and very little organic carbon (table 323).

Algae were recorded in the dredge sample, but no sea grasses were present.

The specimen was neither gravid nor a juvenile.

T. glacialis has never before been collected in the Gulf of Mexico, even though it is well known from many localities throughout the world.

Table 322.--Tricobranchus glacialis--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Lower Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
16-27	1						

Table 323.--Trichobranchus glacialis^a--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.0	--	1
Salinity (‰)	30.3	--	1
pH	8.0	--	1
Depth (m.)	1.7	--	1
Sediment type	sand	--	1
Granules (wt. %)	1.8	--	1
Sands (wt. %)	95.5	--	1
Silts (wt. %)	2.1	--	1
Clay (wt. %)	0.6	--	1
CaCO ₃ (wt. %)	11.22	--	1
Organic carbon (wt. %)	0.2	--	1
Organic nitrogen (wt. %)	0.02	--	1
Mean grain size, total sample (Ø)	2.3	--	1
Standard deviation, total sample (Ø)	1.3	--	1
Skewness, total sample	0.3	--	1
Kurtosis, total sample	6.0	--	1
Mean grain size, noncarbonate fraction (Ø)	2.1	--	1
Standard deviation, noncarbonate fraction (Ø)	1.0	--	1
Mean grain size, carbonate fraction (Ø)	-0.8	--	1
Standard deviation, carbonate fraction (Ø)	1.4	--	1

Family SABELLIDAE Malmgren, 1867

This is a very large family of polychaetes that contains species which occur mostly in temperate and tropical waters around the world. Sabellids feed on organic material suspended in the water column, and some supplement their diet by feeding on bottom deposits. The feeding mechanism for Sabellastarte magnifica has been described by Fitzsimons (1965).

Six sabellid species were collected in the Estuary. Hillsborough Bay was the only area where none were found. Fabricia sabella was the most widely distributed species, and occurred in the areas between Old Tampa Bay and transect-18. Two other species, Branchiomma nigromaculata and Sabella microphthalma, also ranged into the Estuary as far as Old Tampa Bay. The remaining three, Chone duneri, Megalomma bioculatum, and Megalomma lobiferum, were not collected beyond lower Tampa Bay.

Key to SABELLIDAE Collected in Tampa Bay

- 1 Radioles have paired, external, cirriform
appendages Branchiomma nigromaculata
- Radioles lack paired processes on
the outer surface 2
- 2 Two or more radioles have compound
eyes at the distal end 3

- Radioles may have eyes, but not compound ones 4
- 3 One pair of eyes present Megalomma bioculatum
- Eyes small and numerous..... Megalomma lobiferum
- 4 Radioles joined by a membrane through about one-half of their length Chone duneri
- Radioles joined only at their bases 5
- 5 Numerous, small eyes spaced irregularly along the length of radioles Sabella microphthalma
- One pair of eyes at the base of the radioles and another on the pygidium Fabricia sabella

Branchiomma nigromaculata (Baird, 1865)
(Described and illustrated by Jones, 1962)

Other than a single specimen collected by net in Old Tampa Bay, all records were from Boca Ciega Bay and lower Tampa Bay. The worm was found at a total of 53 survey stations and six incidental localities. Forty-seven of the survey stations were situated in Boca Ciega Bay. There, at station 15-3, nearly 3,000 individuals were collected in a single dredge haul (table 324).

Average sediment type at dredge and shovel stations was poorly sorted, fine sand that had over 10 percent shell, more than eight percent silt and clay, and nearly one percent organic carbon (table 325). Mention should also be made of the enormous numbers of this worm that were

noticed, but not recorded, attached to seawalls, pilings, and floating docks. At survey stations, B. nigromaculata was generally found on tunicates or sea grass.

One-half of the bottom samples contained algae as well as one or more of all sea grasses found in the Estuary, except widgeon grass.

Gravid specimens were collected in July and November, while juveniles were found in January, February, May, and from August through November.

B. nigromaculata has been collected in the Gulf of Mexico and is otherwise known to occur in temperate to tropical waters around the world.

Table 324.--Branchiomma nigromaculata--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
B-2			1				
Boca Ciega Bay							
BC-A	6		3	PB-1	1		25
BC-C		13		PB-4	1	27	56
BC-E	3			PB-5	288		32
BC-G		93		14-2	2		
BC-H	1		10	14-4	23		10
BC-I	6		3	15-1	1		1
BC-M	7		1	15-3	2910	506	10
BC-M-1		3		15-4	72		10
BC-N	1		10	15-5	5		10
D-1	1		10	15-6			10
D-2	12		10	15-11	1		10
D-3		1	10	15-12	1		1
D-6		302		15-14			2
D-8			10	15-15			10
D-9			5	15-16	63		10
D-13			10	15-17	1		
D-18		124		16-1	524		10
D-19-A		1		16-2		690	10
D-19-B	1		10	16-3		2	
D-22	21		1	16-4		1	
D-23		8	10	16-5		1	
D-24			1	16-7			3
D-25		130	4	16-8		1	
D-26		13					
Lower Tampa Bay							
15-18			10	15-32	1		
15-30	2		4	17-13			1
15-31	1						

Table 325.--Branchiomma nigromaculata--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.2	16.5 to 30.8	44
Salinity (‰)	32.2	29.6 to 34.9	44
pH	8.2	7.7 to 8.5	43
Depth (m.)	0.7	1 to 2.3	44
Sediment type	sand	sand to clayey silt	43
Granules (wt. %)	2.9	0.0 to 14.7	43
Sands (wt. %)	88.8	11.2 to 99.8	43
Silts (wt. %)	5.9	0.1 to 44.4	43
Clay (wt. %)	2.3	0.0 to 43.8	43
CaCO ₃ (wt. %)	11.4	0.9 to 44.4	43
Organic carbon (wt. %)	0.8	0.01 to 6.9	33
Organic nitrogen (wt. %)	0.04	0.01 to 0.2	33
Mean grain size, total sample (φ)	2.8	1.4 to 7.1	43
Standard deviation, total sample (φ)	1.5	0.5 to 2.5	43
Skewness, total sample	0.3	-0.8 to 1.6	43
Kurtosis, total sample	7.0	-0.04 to 24.4	43
Mean grain size, noncarbonate fraction (φ)	3.0	1.9 to 8.7	41
Standard deviation, noncarbonate fraction (φ)	1.2	0.5 to 2.4	41
Mean grain size, carbonate fraction (φ)	0.5	-1.3 to 2.3	40
Standard deviation, carbonate fraction (φ)	1.1	0.2 to 2.5	40

Chone duneri Malmgren, 1867
(Described and illustrated by Fauvel, 1927)

Specimens were found at five survey stations and one incidental locality (Bunces Pass) in Boca Ciega Bay. Another incidental locality was in lower Tampa Bay near Mullet Key (table 326).

Sediment data show that C. duneri was collected only in sand that was medium to very fine. The average amount of shell present was over 18 percent, silt and clay amounted to less than three percent, and organic carbon was over one percent (table 327).

Algae were recorded in two of six bottom samples as were shoal and turtle grass.

A juvenile specimen was collected in October, but no gravid individuals were recorded.

C. duneri occurs along the coasts of Europe and New England, but has not been previously recorded in the Gulf of Mexico.

Table 326.--Chone duneri--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-N	6			16-7	1		
D-25			1	16-8		1	
PB-1	1		1				

Table 327.--Chone duneri--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	23.4	15.0 to 30.0	6
Salinity (‰)	32.8	31.3 to 34.0	6
pH	8.0	7.9 to 8.3	6
Depth (m.)	1.4	1 to 2.3	6
Sediment type	sand	--	5
Granules (wt. %)	5.3	0.0 to 14.7	5
Sands (wt. %)	91.8	83.5 to 97.8	5
Silts (wt. %)	2.1	0.6 to 5.6	5
Clay (wt. %)	0.5	0.0 to 1.1	5
CaCO ₃ (wt. %)	18.6	2.7 to 38.2	5
Organic carbon (wt. %)	1.1	0.4 to 2.6	3
Organic nitrogen (wt. %)	0.04	0.03 to 0.07	3
Mean grain size, total sample (φ)	2.2	1.4 to 3.0	5
Standard deviation, total sample (φ)	1.2	0.6 to 2.0	5
Skewness, total sample	-0.3	-1.7 to 0.8	5
Kurtosis, total sample	4.7	0.3 to 17.9	5
Mean grain size, noncarbonate fraction (φ)	3.3	2.7 to 3.6	3
Standard deviation, noncarbonate fraction (φ)	1.3	0.7 to 2.2	3
Mean grain size, carbonate fraction (φ)	0.8	-0.1 to 1.5	3
Standard deviation, carbonate fraction (φ)	0.7	0.2 to 1.2	3

Fabricia sabella (Ehrenberg, 1837)
(Described and illustrated by Fauvel, 1927)

Twenty-two of the 39 survey stations where F. sabella was collected were located in lower Tampa Bay. There was one record from Old Tampa Bay and a few from each other area except Hillsborough Bay. At some localities the worm was extremely abundant. For example, 869 specimens were taken in a single dredge haul at station 17-6 in lower Tampa Bay (table 328).

All dredge and shovel collections came from either shelly sand or sand. As an average, sediment was poorly sorted, medium sand that contained more than 20 percent shell, less than three percent silt and clay, and less than one percent organic carbon (table 329).

Algae and one or more of all the sea grasses found in the Estuary, except widgeon grass, were recorded in 16 of the 35 bottom samples.

Neither gravid nor juvenile specimens were noted.

F. sabella has been recorded along the coasts of Europe and eastern North America, but it has not been collected before in the Gulf of Mexico.

Table 328.--*Fabricia sabella*--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
6-2		1							
Upper Tampa Bay									
10-4		50			13-1-A		68		
11-28		6			13-3		760		
Boca Ciega Bay									
BC-M		1			15-14		6		
BC-N		156			16-3		1		
D-17		10			16-4		6		
D-22		1			16-5		5		
D-25		1			16-6		391		
Terra Ceia Bay									
E-5		1			E-6		17 41		
Lower Tampa Bay									
14-10		26			16-27		45		
14-16		1			17-2		82		
15-23		2			17-3		1		
15-31		34			17-5		64		
15-33		2			17-6		869		
16-9-B		3			17-7		79		
16-13		108			17-8		65		
16-15		12			17-9		22		
16-17		1			17-10		10		
16-23		10			17-12		2		
16-25		134			17-13		1		

Table 329.--Fabricia sabella--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	21.8	13.0 to 31.0	35
Salinity (‰)	31.5	23.0 to 35.1	35
pH	8.1	7.8 to 8.4	35
Depth (m.)	1.5	1 to 4.0	35
Sediment type	sand	shelly sand to sand	35
Granules (wt. %)	4.3	0.2 to 21.4	35
Sands (wt. %)	93.1	77.6 to 99.1	35
Silts (wt. %)	2.1	0.0 to 10.5	35
Clay (wt. %)	0.5	0.0 to 2.2	35
CaCO ₃ (wt. %)	21.5	1.4 to 85.2	35
Organic carbon (wt. %)	0.5	0.1 to 3.3	32
Organic nitrogen (wt. %)	0.03	0.00 to 0.2	32
Mean grain size, total sample (φ)	2.0	0.4 to 3.0	35
Standard deviation, total sample (φ)	1.3	0.7 to 2.3	35
Skewness, total sample	0.1	-1.7 to 1.3	35
Kurtosis, total sample	7.1	0.3 to 21.2	34
Mean grain size, noncarbonate fraction (φ)	2.8	1.4 to 5.5	33
Standard deviation, noncarbonate fraction (φ)	1.1	0.5 to 3.2	33
Mean grain size, carbonate fraction (φ)	0.2	-2.5 to 1.5	22
Standard deviation, carbonate fraction (φ)	1.1	0.2 to 1.9	22

Megalomma bioculatum (Ehlers, 1887)
(Described and illustrated by Day, 1967)

This species was collected at a total of 27 survey stations in Boca Ciega Bay, Terra Ccia Bay, and lower Tampa Bay. Most of the stations were located in Boca Ciega Bay (table 330).

Two collections were made in soft bottom, but the rest came from sand. As an average, sediment type was poorly sorted, very fine sand. It had 13 percent shell, over 10 percent silt and clay, but very little organic carbon (table 331).

Algae were recorded in one-third of the bottom samples together with one or more species of sea grass that included shoal, manatee, and turtle grass.

No gravid specimens were collected, but juvenile worms were found in February, April, May, and September through October.

This worm has been collected in the Gulf of Mexico and is also known from temperate and tropical waters in the eastern and western Atlantic.

Table 330.--Megalomma bioculatum--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay							
Stations	Individuals			Stations	Individuals		
	D	S	N		D	S	N
BC-A	3			14-3	1		
BC-H	1			14-4	3		
BC-I	4			15-4	3		
BC-M	1			15-6	8		
D-13	1			15-8	3		
D-15			1	15-11	17		10
D-25		1		15-12	9		
PB-1	21		14	15-13	4		1
PB-4	1			16-6	1		
PB-5	1			16-7	1		
14-2	8						
Terra Ceia Bay							
E-1	6		1	E-4	2		
E-3	12			E-7	13		
Lower Tampa Bay							
16-27	3			17-13	1		

Table 331.--Megalomma bioculatum--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	20.6	14.5 to 27.0	26
Salinity (‰)	31.1	29.1 to 34.5	26
pH	8.1	7.6 to 8.5	24
Depth (m.)	0.9	1 to 1.7	26
Sediment type	sand	sand to silty clay	26
Granules (wt. %)	1.4	0.0 to 9.7	26
Sands (wt. %)	88.3	11.2 to 98.7	26
Silts (wt. %)	6.7	0.3 to 44.4	26
Clay (wt. %)	3.4	0.1 to 43.8	26
CaCO ₃ (wt. %)	13.0	2.2 to 66.0	26
Organic carbon (wt. %)	0.2	0.01 to 1.0	22
Organic nitrogen (wt. %)	0.02	0.00 to 0.1	22
Mean grain size, total sample (φ)	3.1	1.9 to 7.1	26
Standard deviation, total sample (φ)	1.4	0.8 to 2.5	26
Skewness, total sample	0.4	-0.9 to 1.6	26
Kurtosis, total sample	7.7	-0.04 to 17.9	26
Mean grain size, noncarbonate fraction (φ)	2.8	2.1 to 3.6	24
Standard deviation, noncarbonate fraction (φ)	0.9	0.4 to 2.2	24
Mean grain size, carbonate fraction (φ)	0.02	-2.3 to 2.3	21
Standard deviation, carbonate fraction (φ)	1.1	0.6 to 2.9	21

Megalomma lobiferum (Ehlers, 1887)

Specimens were found at a single station in Boca Ciega Bay, and at one in lower Tampa Bay (table 332).

At the one site for which sediment data are available, the bottom was poorly sorted, medium sand. Shell content was high, and some large fragments were present. The percentage of silt and clay was under four, and organic carbon amounted to less than one percent (table 333).

No vegetation was recorded at either station.

Neither gravid nor juvenile specimens were noted.

M. lobiferum has been recorded only in the Gulf of Mexico.

Table 332.--Megalomma lobiferum--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay						
Stations			Individuals			
			D	S	N	
BC-N			1			
Lower Tampa Bay						
17-2			1			

Table 333.--Megalomma lobiferum--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.8	24.1 to 29.4	2
Salinity (‰)	34.2	34.0 to 34.5	2
pH	8.1	8.0 to 8.2	2
Depth (m.)	3.0	2.3 to 4.0	2
Sediment type	sand	--	1
Granules (wt. %)	1.7	--	1
Sands (wt. %)	94.9	--	1
Silts (wt. %)	2.7	--	1
Clay (wt. %)	0.7	--	1
CaCO ₃ (wt. %)	39.8	--	1
Organic carbon (wt. %)	0.5	--	1
Organic nitrogen (wt. %)	0.04	--	1
Mean grain size, total sample (Ø)	1.9	--	1
Standard deviation, total sample (Ø)	1.5	--	1
Skewness, total sample	0.5	--	1
Kurtosis, total sample	4.7	--	1
Mean grain size, noncarbonate fraction (Ø)	3.5	--	1
Standard deviation, noncarbonate fraction (Ø)	3.2	--	1
Mean grain size, carbonate fraction (Ø)	-0.1	--	1
Standard deviation, carbonate fraction (Ø)	0.9	--	1

Sabella microphthalma Verrill, 1873
(Illustrated by Smith, 1964)

S. microphthalma was collected at a total of 24 survey stations in all areas of the Estuary except upper Tampa Bay and Hillsborough Bay. One incidental collection came from Old Tampa Bay, and another was recorded in lower Tampa Bay. The area of greatest abundance was Boca Ciega Bay where 19 collections were recorded (table 334).

Silty sand occurred at one station, but bottom type at all others was sand. The sand was mostly fine and poorly sorted. Average shell content was over 11 percent, the silt and clay fraction was nearly seven percent, and organic carbon was over one percent (table 335).

Vegetation was present in 11 of 15 bottom samples, and consisted of algae and one or more of three sea grasses -- shoal, manatee, and turtle grass.

Gravid specimens were recorded in July, November, and December, while juveniles were collected in February, and from August through November.

S. microphthalma has been recorded along the Atlantic coast of the United States and in the Gulf of Mexico.

Table 334.--Sabella microphthalma--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Old Tampa Bay							
Stations		Individuals		Stations		Individuals	
	D	S	N		D	S	N
B-2		1		5-4	1		
Boca Ciega Bay							
BC-A	1			D-26		1	
BC-I	1			PB-1	1		100+
BC-M	32		37	PB-4	4		10
BC-N			6	PB-5			2
D-2	1		10	15-6			1
D-3			25	15-16	1		
D-8			1	16-2		4	
D-13			1	16-7			2
D-18		2		16-8		1	
D-25		2					
Terra Ceia Bay							
E-5		1		E-6	1		
Lower Tampa Bay							
15-31	1						

Table 335.--Sabella microphthalma--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	22.8	13.0 to 33.8	15
Salinity (‰)	30.6	21.4 to 34.9	15
pH	8.1	7.6 to 8.5	14
Depth (m.)	0.5	1 to 1.0	15
Sediment type	sand	sand to silty sand	14
Granules (wt. %)	1.9	0.0 to 7.1	14
Sands (wt. %)	91.0	78.8 to 99.6	14
Silts (wt. %)	4.7	0.3 to 13.4	14
Clay (wt. %)	1.9	0.1 to 4.8	14
CaCO ₃ (wt. %)	11.3	1.1 to 23.4	14
Organic carbon (wt. %)	1.1	0.2 to 4.8	10
Organic nitrogen (wt. %)	0.05	0.01 to 0.2	10
Mean grain size, total sample (Ø)	2.8	1.8 to 3.5	14
Standard deviation, total sample (Ø)	1.4	0.6 to 2.1	14
Skewness, total sample	0.5	-0.6 to 1.6	14
Kurtosis, total sample	8.3	1.3 to 31.2	14
Mean grain size, noncarbonate fraction (Ø)	3.3	2.2 to 8.7	12
Standard deviation, noncarbonate fraction (Ø)	1.3	0.7 to 2.2	12
Mean grain size, carbonate fraction (Ø)	0.5	-1.8 to 2.3	12
Standard deviation, carbonate fraction (Ø)	1.1	0.6 to 1.6	12

Family SERPULIDAE Savigny, 1818

Members of this family construct calcareous tubes that may be found attached to a variety of surfaces in seas throughout the world. Serpulids feed on suspended organic material, exclusively.

Three species were found in Tampa Bay. Spirorbis spirillum was collected on the leaves of turtle grass and other sea grasses in all areas of the Estuary except Old Tampa and Hillsborough Bays. Eupomatus dianthus was found on shells and rocks in Boca Ciega Bay and lower Tampa Bay, and Salmacina dysteri was found on the underside of submerged, wooden structures in Boca Ciega Bay.

Key to SERPULIDAE Collected in Tampa Bay

- 1 Operculum fitted with spines Eupomatus dianthus
- Operculum smooth and flat Spirorbis spirillum
- Operculum absent Salmacina dysteri

Eupomatus dianthus (Verrill, 1873)
(Described and illustrated by Hartman, 1945)

Specimens were collected at seven survey stations in Boca Ciega Bay and at one in lower Tampa Bay (table 336).

Sediment at dredge and shovel stations was sand. As an average, it was fine and poorly sorted. The mean percentage of shell was over 12, silt and clay content was

more than eight percent, and organic carbon was under one percent (table 337).

Vegetation in both bottom samples consisted of algae, and turtle grass.

A juvenile specimen was found in September, but no gravid worms were seen.

E. dianthus has been collected in the Gulf of Mexico and the western Atlantic between New England and the Caribbean.

Table 336.--Eupomatus dianthus--Locality records and number of individuals from survey stations, Tampa Bay, Florida, 1963-69 (D-dredge, S-shovel, N-net)

Boca Ciega Bay									
Stations		Individuals			Stations		Individuals		
		D	S	N			D	S	N
D-2		1			PB-1				1
D-3				2	PB-4				1
D-18			1		15-1				1
D-24				1					
Lower Tampa Bay									
17-2				1					

Table 337.--Eupomatus dianthus--Mean and range of observed environmental factors from survey stations, Tampa Bay, Florida, 1963-69

Factor	Mean	Range	Number observations
Water temperature (°C.)	26.3	25.5 to 27.0	2
Salinity (‰)	34.0	33.2 to 34.9	2
pH	8.2	--	2
Depth (m.)	0.3	--	2
Sediment type	sand	--	2
Granules (wt. %)	5.3	3.4 to 7.1	2
Sands (wt. %)	86.1	91.2 to 81.0	2
Silts (wt. %)	6.9	0.3 to 13.4	2
Clay (wt. %)	1.7	1.4 to 2.1	2
CaCO ₃ (wt. %)	12.6	7.3 to 18.0	2
Organic carbon (wt. %)	0.7	--	1
Organic nitrogen (wt. %)	0.03	--	1
Mean grain size, total sample (Ø)	2.9	2.5 to 3.4	2
Standard deviation, total sample (Ø)	1.9	1.8 to 1.9	2
Skewness, total sample	-0.3	-0.6 to -0.01	2
Kurtosis, total sample	3.6	2.6 to 4.6	2
Mean grain size, noncarbonate fraction (Ø)	2.9	2.7 to 3.1	2
Standard deviation, noncarbonate fraction (Ø)	1.7	1.4 to 2.1	2
Mean grain size, carbonate fraction (Ø)	-0.2	-0.4 to 0.1	2
Standard deviation, carbonate fraction (Ø)	1.2	1.0 to 1.4	2

Salmacina dysteri (Huxley, 1855)
(Described and illustrated by Fauvel, 1927)

Specimens were collected from the underside of wooden, sediment trays that had been submerged in mariculture tanks at the National Marine Fisheries Service dock on Boca Ciega Bay.

S. dysteri has been collected in the eastern and western Atlantic, and in the Gulf of Mexico.

Spirorbis spirillum (Linnaeus, 1758)
(Described and illustrated by Fauvel, 1927)

This species was found in great profusion on the leaves of sea grasses (especially turtle grass) at practically every station from upper Tampa Bay to transect-18. Its distribution has not been listed by station because the worm is not directly associated with sedimentary features and many were collected on fragments of grass drifting in the Estuary. In the tables summarizing polychaete distribution and abundance, S. spirillum is listed under the four most seaward areas of the Estuary, and under the category headed, very common.

S. spirillum has been collected in the Gulf of Mexico and around the world in warm seas.

CHAPTER 6

BIOGEOGRAPHY, REPRODUCTION, ABUNDANCE AND DISTRIBUTION

Concluding comments on the polychaete fauna in Tampa Bay may be made on the basis of the preceding data relative to individual species, and data on species composition and numbers of individuals found at each survey station (Appendix A and B).

Biogeography

The total number of polychaete species collected in Tampa Bay Estuary was 178 (table 338). They were divided among 40 families and 130 genera. Two of the families (PISIONIDAE and TROCHOCHAETIDAE) have not been previously reported from the Gulf of Mexico. Many of the undetermined species (33) are certainly undescribed, and may include a number that are indigenous to the Gulf. Among the species that were determined, 35 are newly recorded from Gulf waters, and have been designated by an asterisk in the table referred to above. The known geographic ranges of the worms listed emphasize the observation made by Hartman (1951) that

Gulf polychaetes are an extremely heterogeneous group, and in most instances, the resident species are found in adjacent or more distant seas.

Reproduction

Considering the subtropical location of the Estuary, and the geographic ranges exhibited by the polychaete fauna, it is not surprising that juveniles or individuals with mature gametes were recorded for 53 species in more than one season. Of these, 12 species showed evidence of year-round reproduction. If the period of intensive survey sampling had been extended to one year, and time had permitted dissection of each specimen, then I expect a far greater number of species would have been found in breeding condition throughout the year. Justification for such an assumption is based on reports of year-round breeding among many tropical and subtropical groups, and especially polychaetes as reported in Biscayne Bay, Florida, by McNulty and Lopez (1969).

Abundance and Distribution

Under this heading, the polychaetes collected in Tampa Bay Estuary have been considered by species and as individuals in the overall estuarine system, and by areas, transects, and survey stations. Comparisons between worms from

stations, transects and areas are based on dredge samples only in order to avoid the bias that would be introduced by considering data collected with other sampling gear, or in intertidal situations. Data from PB-stations have also been omitted as those stations were sampled on more than one occasion.

Species Diversity

The observed polychaete diversity in the Estuary (178 species) is greater than that reported for any single embayment in North America. Because of the polychaete variety, and the large number of species recorded for other groups, Tampa Bay may be classified as a natural, tropical system of high diversity (Copeland, 1970) in which communities are of the biologically accommodated type (Sanders, 1968). According to the thesis of Sanders, polychaete diversity in the Estuary is a result of (1) mild climate, (2) correspondingly moderate water temperature, (3) fairly high salinity over a large area, (4) sediments that are predominantly sand and shell, and (5) high primary production. Provided with such a favorable physical environment, time is also required for the development of the subtle, intra-specific relationships that are characteristic of biologically accommodated communities. Time, however, may be a comparatively minor

factor for community development in Tampa Bay because Gulf waters are part of the Atlantic circulation and have mixed with the Pacific in recent time. From these more ancient seas there has no doubt been a more or less uninterrupted influx of larval polychaetes that were, in many instances, preadapted to conditions in Tampa Bay and the Gulf generally.

The total number of species found in each area of the Estuary was as follows: Old Tampa Bay, 95; Hillsborough Bay, 55; upper Tampa Bay, 113; Boca Ciega Bay, 156; Terra Ceia Bay, 86; and lower Tampa Bay, 151 (table 338). The average number of species collected per dredge sample from the same areas was 14, 8, 15, 23, 27, and 22, respectively (Appendix A and B). The high species diversity observed in most seaward areas of the Estuary was expected and is directly related to high salinity (Wells, 1961). The low figure for Terra Ceia Bay was probably due to insufficient sampling (eight stations) whereas the low figure recorded for Hillsborough Bay is unquestionably a consequence of pollution from domestic sewage and perhaps industry as well. This conclusion is supported by other studies that show there is great diversity among fishes, crustaceans, and mollusks in all areas of the Estuary except Hillsborough Bay. Other components of the benthos that indicate a high

degree of pollution in Hillsborough Bay by their rarity or absence include sea grasses, echinoderms, lancelets (Branchiostoma caribaeum) and branchiopods (Glottidia pyramidata). The sludge deposited in Hillsborough Bay is unsuited for most polychaetes and other bottom organisms because of its fine texture and high BOD (Reish, 1959, 1967; Federal Water Pollution Control Administration, 1969). Although fine sediments are not restricted to Hillsborough Bay, it is the only area where they originate primarily from sewage solids. Aside from a few isolated areas, adjacent stations where fine sediments were recorded were found in Old Tampa Bay (stations 3-4 through 3-7; 4-3 and 4-4), upper Tampa Bay (stations 11-7 through 11-14; 11-17 through 11-21; 11-23 and 11-24) and Boca Ciega Bay (stations BC-H, D-4, D-7, D-8, D-14, D-15, D-16, D-20, D-21 and D-24). No silty or clayey bottoms were recorded in lower Tampa Bay or Terra Ceia Bay. At the 11 stations where soft sediments (greater than 20 percent silt and clay) were found in Hillsborough Bay, the average number of species collected per station was four. Sediments of similar texture in Old Tampa Bay (six stations) had an average of 13 species per station; soft sediments in upper Tampa Bay (16 stations) had an average of 14 species; and in Boca Ciega Bay, the 10 stations with fine sediments had an average

of nine species per station. Except for stations D-20, D-21, and BC-H, the fine sediments recorded in Boca Ciega Bay were all situated in deeply dredged access canals between land-fills. Such areas are closed at one end and have restricted water circulation. Bottom water in these canals and in Hillsborough Bay are the only areas of the Estuary where zero DO has been recorded.

Seventy-nine, or about 45 percent, of the polychaetes recorded for the Estuary were collected at one or more of the 49 stations where sediments proved to be silty or clayey. Eight of these species occurred at 20 or more of the stations where fine sediment was recorded and another seven were found at 15 or more localities where the bottom was soft -- Paraprionospio pinnata (41), Spiochaetopterus c. oculatus (36), Glycinde pacifica (29), Parahesion luteola (29), Gyptis vittata (25), Cistenides gouldii (21), Phyllodoce arenae (21), Nereis succinea (20), Sthenelais boa (18), Pseudeurythoe ambigua (18), Sigambra tentaculata (18), Polynoid B (17), Pseudopolydora sp. (15), Streblospio benedicti (15), Prionospio cirrobranchiata (15). The 15 worms listed above comprise only about nine percent of the species recorded in the Estuary, and the majority of them were found more commonly in areas of sandy or shelly sediment. Three species, however,

were collected mostly in sediments composed of more than 20 percent silt and clay, and may be considered as worms that are indicative of soft sediments -- Parahesion
luteola, Sigambra tentaculata, and Polynoid B.

Johnson (1970) pointed out that eurytopic species are the ones most likely to persist in areas of environmental stress. This principle apparently applies to the polychaetes collected from deposits of silt and clay in Tampa Bay Estuary. Seven of the species found at 15 or more stations where soft bottom was recorded were also among the 17 species found at 100 or more localities in the Estuary as a whole -- Nereis succinea, Spiochaetopterus c. oculatus, Paraprionospio pinnata, Phyllodoce arenae, Gyptis vittata, Glycinde pacifica, Cistenides gouldii. Of these, the first three species were collected at 200 or more localities and were the most widely distributed polychaetes found in the Estuary. It is of interest to note that the first (Nereis succinea) is an omnivore, the second (Spiochaetopterus c. oculatus) is a suspension feeder, and the third (Paraprionospio pinnata) is a deposit feeder. With few exceptions, the species listed as very common (table 338) have all been collected in the southeastern United States where estuarine systems have not been drastically disturbed. As a group,

they may be regarded as indicators of natural or nearly natural waters and sediments.

Numbers of Individuals

In Tampa Bay, there was a direct relation between species diversity and numbers of individuals per dredge sample. That is, the average number of individuals per sample was greater in lower Tampa Bay (318), Terra Ceia Bay (363), and Boca Ciega Bay (349), than in upper Tampa Bay (274), or in Old Tampa Bay (168) and Hillsborough Bay (225). The difference in figures for Old Tampa Bay and Hillsborough Bay is noteworthy because it indicates that sewage pollution has benefited the comparatively few polychaete species that remain in Hillsborough Bay. Those that are apparently favored by organic enrichment are Streblospio benedicti and Capitella capitata. These worms were the only ones found in Hillsborough Bay that occurred in abnormally high numbers (over 200 individuals per station). Both species have been noted in areas of high organic pollution in estuaries on the east and west coasts of the United States (Wass, 1967; Dean, 1970). If only the soft bottom areas in Hillsborough Bay and access canals in Boca Ciega Bay are compared in terms of average species diversity and number of individuals per dredge sample (less

than six for both calculations in both areas) it is evident that bottom conditions in these localities have deteriorated to the point where practically no worms can survive. As noted by Leppakoski (1969) and others, polychaetes are usually the last benthic metazoans that survive in sediments where organic pollution reduces DO to zero or nearly zero for prolonged periods. At present, polychaetes and a few mollusks are the only benthic invertebrates that persist over large areas of Hillsborough Bay and in the access canals of Boca Ciega Bay (Sykes and Hall, 1970; Taylor, Hall, and Saloman, 1970). On the basis of data from studies of sewage pollution in Biscayne Bay, Florida, it seems unlikely that these two impoverished areas will ever support a normal assemblage of polychaetes and other benthos.

Biomass

If the average number of individuals per dredge sample from all areas of the Estuary is multiplied by 3.3 (to convert the area dredged to lm^2) then the overall mean becomes 1314 polychaetes/ m^2 . Data from more quantitative, biomass samples (figure 1) show that polychaetes comprise about 50 percent of the infauna. Therefore, an average figure for the biomass of all benthic invertebrates would

be on the order of 2600 animals/m.² for Tampa Bay Estuary. These figures for polychaetes, and other bottom fauna, are about average when compared with biomass data from other estuarine systems (Sanders, 1956, 1960; McNulty, 1961; Gordon, 1966; McIntyre and Eleftheriou, 1968; Lie, 1969; Peer, 1970; Stephenson, Williams, and Lance, 1970).

No attempt has been made to determine the average dry weight of worms/m.², however, a figure of 137 g./m.² was previously reported for all benthic invertebrates in an undisturbed area of Boca Ciega Bay (Taylor and Saloman, 1968). This figure is quite high and exceeds by a factor of two the figure reported by Sanders, Goudsmit, Mills, and Hampson (1962) for a rich intertidal area in Barnstable Harbor, Massachusetts.

A start has been made toward understanding the origin, systematics, and distribution of polychaete worms in Tampa Bay Estuary. The embayment supports a rich and diverse polychaete fauna, but in some areas the unfortunate activities of man have made the bottom uninhabitable for most worms and other bottom life. Further work along the same lines of research is desirable, and background information is now available to begin studies on the role of polychaetes in estuarine processes -- especially those that lead to the production of species that are directly useful to man.

Table 338.--Abundance and distribution of polychaetes collected in Tampa Bay Estuary, Florida, at survey stations and other localities between 1963 and 1969 -- Old Tampa Bay (OTB), Hillsborough Bay (HB), upper Tampa Bay (UTB), Boca Ciega Bay (BCB), Terra Ceia Bay (TCB), lower Tampa Bay (LTB) -- asterisk indicates new geographic record for the Gulf of Mexico -- very rare (1-10) rare (11-30) common (31-60) very common (over 60)

Family and Species	Number of Collections by				Distribution by Areas					
	Abundance Category				OTB	HB	UTB	BCB	TCB	LTB
	Very Rare	Rare	Common	Very Common						
POLYNOIDAE										
<u>Harmothoe aculeata</u>	+				-	-	-	+	-	+
* <u>Harmothoe lunulata</u>			+		-	-	+	+	+	+
<u>Lepidasthenia commensalis</u>	+				-	+	+	+	+	+
<u>Lepidonotus sublevis</u>	+				-	-	-	+	-	+
<u>Lepidonotus variabilis</u>	+				-	-	-	+	-	+
<u>Phyllohartmania taylori</u>	+				+	-	-	+	-	-
Polynoid A	+				+	-	-	+	-	-
Polynoid B				+	+	+	+	+	+	+
POLYDONTIDAE										
<u>Polydontes lupina</u>	+				+	-	-	-	-	+
<u>Polydontes sp.</u>	+				-	-	-	+	-	-
SIGALIONIDAE										
* <u>Sigalion arenicola</u>		+			+	-	+	+	-	+
<u>Sthenelais boa</u>				+	+	+	+	+	+	+
<u>Pholoe sp.</u>	+				-	-	+	-	-	+
*PISIONIDAE										
* <u>Pisione remota</u>	+				-	-	-	-	-	+

Number of Collections by
Abundance Category

Distribution by Areas

Family and Species	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
CHRYSOPETALIDAE										
<u>Paleanotus heteroseta</u>			+		+	-	+	+	+	+
AMPHINOMIDAE										
<u>Euphrosyne triloba</u>	+				-	-	-	-	-	+
* <u>Pseudeurythoe ambigua</u>			+		+	+	+	+	+	+
PHYLLODOCIDAE										
<u>Eteone heteropoda</u>			+		+	+	+	+	+	+
<u>Eumida sanguinea</u>			+		+	-	+	+	+	+
<u>Paranaletes speciosa</u>		+			+	-	+	+	-	+
* <u>Phyllodoce arenae</u>				+	+	+	+	+	+	+
<u>Phyllodoce fragilis</u>			+		+	-	+	+	+	+
HESIONIDAE										
<u>Hesione picta</u>	+				-	-	+	+	-	-
* <u>Gyptis vittata</u>				+	+	+	+	+	+	+
<u>Parahesione luteola</u>			+		+	+	+	+	-	-
<u>Podarke obscura</u>			+		-	-	+	+	+	+
<u>Gyptis sp.</u>		+			+	+	+	+	+	-
PILARGIDAE										
* <u>Ancistrostylis jonesi</u>		+			+	+	+	+	-	+
* <u>Cabira incerta</u>		+			+	-	+	+	+	+
* <u>Pilargis pacifica</u>					-	-	-	+	-	-
<u>Sigambra bassi</u>	+				+	-	+	+	-	+
<u>Sigambra tentaculata</u>			+		+	+	+	+	-	+

Number of Collections by
Abundance Category

Distribution by Areas

Family and Species	Number of Collections by Abundance Category					Distribution by Areas						
	Very Rare	Rare	Common	Very Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB	
* <u>Nicon lackeyi</u>	+					-	+	+	-	-	-	-
<u>Perinereis floridana</u>	+					+	-	-	+	-	+	+
<u>Platynereis dumerilii</u>			+			+	+	+	+	+	+	+
* <u>Rullierinereis mexicana</u>	+					-	-	-	+	-	-	-
NEPHTYIDAE												
<u>Aqlophamus verrilli</u>				+		+	+	+	+	+	+	+
<u>Nephtys buccera</u>	+					-	-	-	+	-	+	+
<u>Nephtys magellanica</u>	+					-	-	-	+	-	-	-
<u>Nephtys picta</u>			+			+	+	+	+	+	+	+
GLYCERIDAE												
<u>Glycera americana</u>				+		+	+	+	+	+	+	+
<u>Glycera dibranchiata</u>	+					-	-	-	-	-	-	-
CONIADIDAE												
* <u>Glycinde pacifica</u>				+		+	+	+	+	+	+	+
<u>Goniadella sp.</u>		+				+	-	+	+	+	+	+
ONUPHIDAE												
<u>Diopatra cuprea</u>				+		+	+	+	+	+	+	+
<u>Onuphis e. oculata</u>	+					-	-	-	-	-	+	+
<u>Onuphis magna</u>						-	-	+	+	-	+	+
<u>Onuphis nebulosa</u>		+		+		-	-	+	+	+	+	+
<u>Onuphis sp.</u>				+		+	+	+	+	+	+	+

Family and Species	Number of Collections by Abundance Category			Distribution by Areas						
	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
EUNICIDAE										
<u>Eunice rubra</u>	+				-	-	-	+	-	+
<u>Marphysa sanguinea</u>			+		+	+	+	+	+	+
* <u>Nematonereis hebes</u>	+				-	-	-	+	-	+
LUMBRINERIDAE										
<u>Lumbrineris bassi</u>	+				-	-	-	+	-	+
<u>Lumbrineris coccinea</u>	+				-	-	+	+	+	+
* <u>Lumbrineris erecta</u>		+			-	-	-	+	-	+
<u>Lumbrineris impatiens</u>	+				-	-	-	+	-	+
<u>Lumbrineris latreilli</u>		+			+	-	+	-	+	+
<u>Lumbrineris sp.</u>		+			-	-	-	+	-	+
ARABELLIDAE										
<u>Arabella tricolor</u>		+			+	-	+	+	+	+
<u>Drilonereis cylindrica</u>		+			-	-	+	+	+	+
* <u>Drilonereis longa</u>	+				-	-	-	+	-	-
<u>Drilonereis magna</u>		+			+	-	+	+	+	+
<u>Arabella sp.</u>	+				-	-	-	-	-	+
LYSARETIDAE										
<u>Lysarete brasiliensis</u>	+				-	-	-	+	-	+
DORVILLEIDAE										
<u>Dorvillea rudolphi</u>			+		+	+	+	+	+	+
* <u>Ophryotrocha puerilis</u>	+				-	-	+	-	-	-
<u>Dorvillea sp.</u>	+				+	+	-	-	-	-

Family and Species	Number of Collections by Abundance Category				Distribution by Areas					
	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
ORBINIIDAE										
<u>Naineris setosa</u>	+				-	-	-	+	-	-
<u>Orbinia ornata</u>	+				+	-	+	-	-	+
<u>Scoloplos fragilis</u>	+				+	-	+	-	-	+
<u>Scoloplos robustus</u>			+	+	+	+	+	+	+	+
<u>Scoloplos rubra</u>			+	+	+	+	+	+	+	+
<u>Naineris sp.</u>	+				-	-	+	+	+	-
PARAONIDAE										
<u>Aricidea fragilis</u>				+	+	+	+	+	+	+
<u>Aricidea taylori</u>		+			+	-	+	+	+	+
* <u>Cirrophorus furcatus</u>	+				-	-	+	+	-	+
<u>Aricidea sp.</u>		+			+	+	+	+	+	+
SPIONIDAE										
* <u>Aonides mayaquezensis</u>	+				-	-	-	-	-	+
* <u>Apoprionospio pygmaea</u>				+	+	-	+	+	+	+
<u>Dispio uncinata</u>	+				-	-	+	+	-	-
<u>Paraprionospio pinnata</u>				+	+	+	+	+	+	+
<u>Polydora socialis</u>				+	+	+	+	+	+	+
<u>Polydora websteri</u>				+	+	+	+	+	+	+
* <u>Prionospio cirobanchiata</u>				+	+	+	+	+	+	+
<u>Prionospio h. texana</u>				+	+	+	+	+	+	+
<u>Scoelepis squamata</u>			+		+	+	+	+	+	+
* <u>Spio setosa</u>			+		+	-	+	+	+	+

Number of Collections by
Abundance Category

Distribution by Areas

Family and Species	Distribution by Areas									
	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
<u>Spiophanes bombyx</u>		+			+	-	+	+	+	+
<u>Streptosio benedicti</u>			+	+	+	+	+	+	+	+
<u>Pseudopolydora sp.</u>			+	+	+	+	+	+	-	+
MAGELONIDAE										
<u>Magelona pettiboneae</u>			+	+	+	+	+	+	+	+
POECILOCHAETIDAE										
<u>Poecilochaetus johnsoni</u>		+			+	+	+	+	+	+
*TROCHOCHAETIDAE										
* <u>Trochochaeta sp.</u>	+				-	-	-	+	-	-
CHAETOPTERIDAE										
<u>Chaetopterus variopedatus</u>				+	-	-	+	+	+	+
* <u>Spiochaetopterus c. oculatus</u>				+	+	+	+	+	+	+
* <u>Mesochaetopterus sp. A</u>	+				-	-	-	+	-	+
* <u>Mesochaetopterus sp. B</u>	+				-	-	-	+	-	+
* <u>Mesochaetopterus sp. C</u>	+				-	-	-	+	-	+
CIRRATULIDAE										
<u>Cirratulus grandis</u>			+		-	-	+	+	+	+
<u>Cirriformia filigera</u>		+			-	-	+	+	+	+
<u>Dodecaceria concharum</u>	+				-	-	-	+	-	+
<u>Cirratulus sp. A</u>		+			-	-	+	-	-	+
<u>Cirratulus sp. B</u>		+			-	-	-	+	-	+
<u>Cirratulus sp. C</u>	+				-	-	-	+	-	+

Number of Collections by
Abundance Category

Distribution by Areas

Family and Species	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
<u>Cirratulus</u> sp. D		+			+	+	+	+	+	+
<u>Cirriformia</u> sp. A	+				+	-	+	+	-	+
<u>Cirriformia</u> sp. B	+				-	-	+	-	-	+
<u>Tharyx</u> sp. A	+				-	-	-	-	-	+
<u>Tharyx</u> sp. B	+				-	-	-	+	-	+
<u>Tharyx</u> sp. C				+	+	+	+	+	+	+
FLABELLIGERIDAE										
* <u>Pherusa arenosa</u>		+			-	-	+	+	+	+
OPHELIIDAE										
* <u>Ammotrypane aulogaster</u>		+			-	-	+	+	-	+
<u>Armandia agilis</u>			+		+	-	-	+	+	+
<u>Travisia</u> sp.				+	+	-	+	+	+	+
CAPITELLIDAE										
<u>Capitella capitata</u>				+	+	+	+	+	+	+
<u>Capitellides ionesi</u>			+		+	+	+	+	-	+
<u>Capitomastus aciculatus</u>	+				-	+	-	+	-	-
<u>Dasybranchus lumbricoides</u>	+				+	-	-	+	-	+
<u>Dasybranchus lunulatus</u>		+			+	-	-	+	-	+
<u>Heteromastus filiformis</u>				+	+	+	+	+	+	+
<u>Notomastus hemipodus</u>		+			+	-	+	+	+	+
<u>Notomastus latericeus</u>		+			+	-	+	+	+	+
<u>Scyphoproctus platyproctus</u>	+				-	-	-	+	-	+

Number of Collections by
Abundance Category

Distribution by Areas

Family and Species	Very Rare	Rare	Common	Very Common	OTB	HB	UTB	BCB	TCB	LTB
ARENICOLIDAE										
<u>Arenicola cristata</u>		+			+	-	+	+	-	+
MALDANIDAE										
<u>Branchiossychis americana</u>			+		+	+	+	+	+	+
<u>Clymenella mucosa</u>				+	+	-	+	+	+	+
<u>Clymenella t. calida</u>	+				+	-	-	+	-	-
* <u>Clymenella zonalis</u>	+				-	-	-	+	-	+
<u>Maldane sarsi</u>		+			+	+	+	+	+	+
OWENIIDAE										
* <u>Boquea enigmatica</u>	+				-	-	-	+	+	-
<u>Owenia fusiformis</u>				+	-	-	+	+	+	+
<u>Myriochele</u> sp.		+			-	-	-	-	-	+
SABELLARIIDAE										
<u>Sabellaria floridensis</u>		+			-	-	+	+	-	+
* <u>Sabellaria gracilis</u>		+			-	-	-	+	-	+
PECTINARIIDAE										
<u>Cistenides gouldii</u>				+	+	+	+	+	+	+
AMPHARETIDAE										
* <u>Isolda pulchella</u>				+	-	+	+	+	+	+
<u>Melinna maculata</u>			+		+	+	+	+	+	+
<u>Sabellides oculata</u>	+				+	+	-	+	-	-

APPENDIX A

In this appendix, the polychaetes collected at special, lettered stations in Tampa Bay Estuary from June through December, 1963, are listed by family and species; and the number of individuals taken by dredge, shovel, or net is indicated. Sediment characteristics and the collection date for each station are also included.

STATION A

750

Sediment Type: Sand

Date: June 20

 Weight Percentages -- Granules: 0.0
 Silts: 0.4

 Sands: 99.4
 Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
NEREIDAE			
<u>Nereis succinea</u>	2		10
GLYCERIDAE			
<u>Glycera americana</u>	10		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Diopatra cuprea</u>	2		
PARAONIDAE			
<u>Aricidea</u> sp.	3		
SPIONIDAE			
<u>Prionospio cirrobranchiata</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		

STATION A-2

Sediment Type: Sand

Date: July 5

Weight Percentages -- Granules: 0.2

Sands: 94.3

Silts: 3.2

Clay: 2.4

Family and Species	Dredge	Shovel	Net
GLYCERIDAE			
<u>Glycera americana</u>		2	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		3	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		1	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		8	
ARENICOLIDAE			
<u>Arenicola cristata</u>		1	
AMPHARETIDAE			
<u>Melinna maculata</u>		18	
<u>Sabellides oculata</u>		15	

STATION A-4

Sediment Type: Sand

Date: July 5

Weight Percentages -- Granules: 0.2
 Silts: 0.9

Sands: 98.3
Clay: 0.6

Family and Species

Dredge	Shovel	Net
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

No Polychaetes Recorded

STATION A-5

Sediment Type: Sand

Date: July 5

Weight Percentages -- Granules: 0.6

Sands: 98.5

Silt: 0.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Laeonereis culveri</u>		303	
<u>Nereis succinea</u>		3	
GLYCERIDAE			
<u>Glycera americana</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		5	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		13	
AMPHARETIDAE			
<u>Sabellides oculata</u>		2	

STATION B--(Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	9		10
AMPHARETIDAE			
<u>Melinna maculata</u>	2		

STATION B-1

Sediment Type: Sand

Date: July 31

Weight Percentages -- Granules: 0.1

Sands: 98.1

Silt: 0.9

Clay: 0.8

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
HESIONIDAE			
<u>Gyptis vittata</u>			1
SYLLIDAE			
<u>Exogone dispar</u>		1	4
NEREIDAE			
<u>Nereis succinea</u>		22	3
GLYCERIDAE			
<u>Glycera americana</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	10
ORBINIIDAE			
<u>Scoloplos robustus</u>		9	
PARAONIDAE			
<u>Aricidea</u> sp.		218	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
<u>Polydora websteri</u>		8	14
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		3	
CAPITELLIDAE			
<u>Capitella capitata</u>		5	
<u>Capitellides Jonesi</u>			5
ARENICOLIDAE			
<u>Arenicola cristata</u>		1	

STATION B-1--(Continued)

Family and species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>		13	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	10
AMPHARETIDAE			
<u>Melinna maculata</u>		5	

STATION B-2--(Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona pettiboneae</u>		9	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		3	
CAPITELLIDAE			
<u>Capitella capitata</u>		3	2
<u>Heteromastus filiformis</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>			1
<u>Maldane sarsi</u>		2	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			1
<u>Sabella microphthalma</u>		1	

STATION C-1

Sediment Type: Sand

Date: Aug. 13

Weight Percentages -- Granules: 7.8

Sands: 88.3

Silt: 3.4

Clay: 0.6

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		8	
HESIONIDAE			
<u>Gyptis vittata</u>		1	
NEREIDAE			
<u>Laeonereis culveri</u>			10
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
EUNICIDAE			
<u>Marphysa sanguinea</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		41	
PARAONIDAE			
<u>Aricidea</u> sp.		13	
SPIONIDAE			
<u>Polydora websteri</u>		5	
<u>Streblospio benedicti</u>		6	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		2	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		11	
AMPHARETIDAE			
<u>Melinna maculata</u>		6	

STATION C-2--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitellides jonesi</u>	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Melinna maculata</u>	3		

STATION C-5

Sediment Type: Sand

Date: Aug. 15

Weight Percentages -- Granules: 0.0

Sands: 97.2

Silts: 2.8

Clay: 0.0

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>	4		5
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		2
<u>Polydora websteri</u>	1		1
<u>Streblospio benedicti</u>	10		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		10
CAPITELLIDAE			
<u>Capitella capitata</u>	5		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		

STATION C-7

Sediment Type: Shelly Sand

Date: Aug. 21

Weight Percentages -- Granules: 45.2

Sands: 54.5

Silts: 0.3

Clay: 0.0

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>		2	
GLYCERIDAE			
<u>Glycera americana</u>		2	
ONUPHIDAE			
<u>Diopatra cuprea</u>		3	
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		1	

STATION C-8-1

Sediment Type: Sand

Date: Aug. 22

 Weight Percentages -- Granules: 0.6
 Silts: 4.0

Sands: 91.7

Clay: 3.7

Family and Species	Dredge	Shovel	Net
PHYLLODOCCIDAE			
<u>Eteone heteropoda</u>		1	
NEREIDAE			
<u>Nereis succinea</u>		4	
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	

STATION C-8-2

Sediment Type: Sandy Mud

Date: Aug. 22

Weight Percentages -- Granules: 0.1

Sands: 41.4

Silt: 37.5

Clay: 21.1

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Laeonereis culveri</u>			1
<u>Nereis succinea</u>		3	
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
SPIONIDAE			
<u>Polydora socialis</u>		1	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	

STATION C-9

Sediment Type: Shelly Sand

Date: Aug. 27

Weight Percentages -- Granules: 46.2

Sands: 53.5

Silts: 0.2

Clay: 0.0

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		1	
NEREIDAE			
<u>Laeonereis culveri</u>			1
<u>Nereis succinea</u>		8	
SPIONIDAE			
<u>Streblospio benedicti</u>		1	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		23	

STATION D-2--(Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	16		
<u>Paraprionospio pinnata</u>	27		
<u>Polydora socialis</u>	7		1
<u>Polydora websteri</u>	1		
<u>Prionospio h. texana</u>			1
<u>Scoelepis squamata</u>	1		
<u>Streblospio benedicti</u>	17		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	9		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
<u>Tharyx sp. C</u>	65		
OPHELIIDAE			
<u>Armandia agilis</u>	1		
CAPITELLIDAE			
<u>Capitella capitata</u>	6		
<u>Dasybranchus lunulatus</u>	3		
<u>Heteromastus filiformis</u>	13		
MALDANIDAE			
<u>Clymenella mucosa</u>	181		5
OWENIIDAE			
<u>Boquea enigmatica</u>	1		
<u>Owenia fusiformis</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
TEREBELLIDAE			
<u>Pista cristata</u>	2		
<u>Terebella rubra</u>	10		
<u>Thelepus setosus</u>			1

STATION D-2--(Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	12		10
<u>Sabella microphthalma</u>	1		10
SERPULIDAE			
<u>Eupomatus dianthus</u>	1		

STATION D-3--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Dasybranchus lunulatus</u>		12	
<u>Heteromastus filiformis</u>		2	
MALDANIDAE			
<u>Clymenella mucosa</u>		9	
<u>Clymenella t. calida</u>		1	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		1	10
<u>Sabella microphthalma</u>			25
SERPULIDAE			
<u>Eupomatus dianthus</u>			2

STATION D-4

Sediment Type: Clayey Silt

Date: Sept. 23

Weight Percentages -- Granules: 0.0

Sands: 6.9

Silt: 75.0

Clay: 18.1

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis p. occidentalis</u>	"		1
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		

STATION D-6

Sediment Type: Sand

Date: Sept. 23

 Weight Percentages -- Granules: 0.1
 Silts: 3.0

 Sands: 96.3
 Clay: 0.6

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Podarke obscura</u>		1	
SYLLIDAE			
<u>Syllis</u> sp. B		2	
NEREIDAE			
<u>Nereis arenaceodentata</u>		3	
<u>Nereis p. occidentalis</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		5	
<u>Onuphis</u> sp.		201	
EUNICIDAE			
<u>Marphysa sanguinea</u>		1	
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>		2	
ARABELLIDAE			
<u>Drilonereis cylindrica</u>		2	
<u>Drilonereis magna</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		49	
<u>Scoloplos rubra</u>		2	
PARAONIDAE			
<u>Aricidea fragilis</u>		33	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		3	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		39	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		10	
<u>Tharyx</u> sp. C		239	

STATION D-6--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Dasybranchus lumbricoides</u>		1	
<u>Dasybranchus lunulatus</u>		1	
<u>Heteromastus filiformis</u>		41	
MALDANIDAE			
<u>Clymenella mucosa</u>		25	
AMPHARETIDAE			
<u>Melinna maculata</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		302	

STATION D-7

Sediment Type: Silt

Date: Sept. 23

Weight Percentages -- Granules: 0.0

Sands: 5.5

Silts: 89.4

Clay: 5.1

Family and Species	Dredge	Shovel	Net
GLYCERIDAE			
<u>Glycera americana</u>	1		
ONUPHIDAE			
<u>Onuphis</u> sp.			1
SPIONIDAE			
<u>Prionospio h. texana</u>	1		
<u>Streblospio benedicti</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	5		

STATION D-8

Sediment Type: Silty Sand

Date: Sept. 25

 Weight Percentages -- Granules: 0.0
 Silts: 33.9

 Sands: 60.1
 Clay: 6.0

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis p. occidentalis</u>			1
<u>Nereis succinea</u>			2
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	1		1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			10
<u>Sabella microphthalma</u>			1

STATION D-10

Sediment Type: Sand

Date: Sept. 25

Weight Percentages -- Granules: 0.3

Sands: 88.2

Silts: 8.9

Clay: 2.6

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>	2		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	13		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	43		1
<u>Prionospio h. texana</u>	1		
<u>Streblospio benedicti</u>	13		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	46		
CAPITELLIDAE			
<u>Capitomastus aciculatus</u>	16		

STATION D-11--(Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		1	
<u>Paraprionospio pinnata</u>		3	
<u>Polydora socialis</u>		5	
<u>Prionospio cirrobranchiata</u>		1	
<u>Prionospio h. texana</u>	n 1	8	
<u>Spiophanes bombyx</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>	13	47	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2	13	
CIRRATULIDAE			
<u>Tharyx</u> sp. C		48	
CAPITELLIDAE			
<u>Capitella capitata</u>		3	
<u>Dasybranchus lumbricoides</u>	1	3	
<u>Dasybranchus lunulatus</u>		33	
<u>Heteromastus filiformis</u>	14	40	
MALDANIDAE			
<u>Branchioasychis americana</u>		2	
<u>Clymenella mucosa</u>	12	30	
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1	3	
AMPHARETIDAE			
<u>Melinna maculata</u>		1	
TEREBELLIDAE			
<u>Pista palmata</u>		1	

STATION D-15

Sediment Type: Clayey Silt

Date: Sept. 25

Weight Percentages -- Granules: 0.0

Sands: 5.8

Silts: 64.5

Clay: 29.7

Family and Species	Dredge	Shovel	Net
SYLLIDAE			
<u>Exogone dispar</u>			1
NEREIDAE			
<u>Nereis succinea</u>			6
ONUPHIDAE			
<u>Diopatra cuprea</u>			1
<u>Onuphis</u> sp.			4
ARABELLIDAE			
<u>Drilonereis magna</u>			1
SPIONIDAE			
<u>Paraprionospio pinnata</u>	2		32
CAPITELLIDAE			
<u>Capitella capitata</u>	3		6
<u>Capitomastus aciculatus</u>			22
MALDANIDAE			
<u>Clymenella mucosa</u>			1
SABELLIDAE			
<u>Megalomma bioculatum</u>			1

STATION D-16

Sediment Type: Clayey Silt

Date: Sept. 25

Weight Percentages -- Granules: 0.0
Silts: 69.3Sands: 13.8
Clay: 16.8

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>			1
CAPITELLIDAE			
<u>Capitella capitata</u>			2

STATION D-17--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	2		
CAPITELLIDAE			
<u>Capitella capitata</u>			1
MALDANIDAE			
<u>Clymenella mucosa</u>	40		8
OWENIIDAE			
<u>Boquea enigmatica</u>			6
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		1
SABELLIDAE			
<u>Fabricia sabella</u>			10

STATION D-18

Sediment Type: Sand

Date: Sept. 25

Weight Percentages -- Granules: 3.4
Silts: 13.4Sands: 81.0
Clay: 2.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>		1	
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		5	
SYLLIDAE			
<u>Autolytus cornutus</u>		1	
<u>Exogone dispar</u>		44	
NEREIDAE			
<u>Nereis arenaceodentata</u>		2	
<u>Nereis p. occidentalis</u>		64	
<u>Nereis succinea</u>		24	
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		4	
ORBINIIDAE			
<u>Naineris sp.</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		10	
SPIONIDAE			
<u>Polydora socialis</u>		19	
<u>Polydora websteri</u>		1	
<u>Prionospio h. texana</u>		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		3	
<u>Capitellides jonesi</u>		6	
<u>Heteromastus filiformis</u>		1	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		124	
<u>Sabella microphthalma</u>		2	
SERPULIDAE			
<u>Eupomatus dianthus</u>		1	

STATION D-19

Sediment Type: -

Date: Sept. 30

Weight Percentages -- Granules: -

Sands: -

Silts: -

Clay: -

Family and Species

Dredge

Shovel

Net

No Polychaetes Recorded

STATION D-19-A--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella zonalis</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		1	

STATION D-20

Sediment Type: Clayey Silt

Date: Oct. 1

Weight Percentages -- Granules: 1.3

Sands: 5.0

Silts: 47.3

Clay: 46.5

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesion</u> <u>luteola</u>	1		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	57		12
<u>Streblospio</u> <u>benedicti</u>	250		1
<u>Pseudopolydora</u> <u>sp.</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	1		10
CAPITELLIDAE			
<u>Capitella</u> <u>capitata</u>	1		
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>			10

STATION D-21

Sediment Type: Clayey Silt

Date: Oct. 1

Weight Percentages -- Granules: 0.4

Sands: 11.4

Silts: 56.5

Clay: 31.7

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
SPIONIDAE			
<u>Paraprionospio pinnata</u>	19		10
<u>Streblospio benedicti</u>	254		102
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		10
CAPITELLIDAE			
<u>Capitella capitata</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			10

STATION D-22--(Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Tharyx</u> sp. C	113		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
MALDANIDAE			
Clymenella zonalis	3		
<u>Maldane sarsi</u>	2		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			10
TEREBELLIDAE			
<u>Pista palmata</u>			1
<u>Terebella rubra</u>			1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	21		1
<u>Fabricia sabella</u>			1

STATION D-23

Sediment Type: Sand

Date: Oct. 1

Weight Percentages -- Granules: 5.2

Sands: 89.9

Silts: 4.3

Clay: 0.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>		1	
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>		1	
HESIONIDAE			
<u>Gyptis vittata</u>		2	
PILARGIDAE			
<u>Sigambra tentaculata</u>		1	
SYLLIDAE			
<u>Syllis aciculata</u>		1	
<u>Syllis</u> sp. B		7	
NEREIDAE			
<u>Nereis arenaceodentata</u>		1	
<u>Nereis p. occidentalis</u>		1	4
GLYCERIDAE			
<u>Glycera americana</u>		1	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		12	10
<u>Onuphis nebulosa</u>		4	1
<u>Onuphis</u> sp.	248		
EUNICIDAE			
<u>Marphysa sanguinea</u>		3	
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>		28	
ORBINIIDAE			
<u>Scoloplos robustus</u>		6	
<u>Scoloplos rubra</u>		12	

STATION D-23--(Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>		19	
<u>Aricidea</u> sp.		2	
SPIONIDAE			
<u>Polydora socialis</u>		8	
<u>Prionospio h. texana</u>		24	
<u>Spiophanes bombyx</u>		3	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		2	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		8	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		1	
<u>Tharyx</u> sp. C		49	
CAPITELLIDAE			
<u>Dasybranchus lumbricoides</u>		1	
<u>Heteromastus filiformis</u>		17	
<u>Notomastus latericeus</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>		25	
<u>Clymenella zonalis</u>		5	
OWENIIDAE			
<u>Owenia fusiformis</u>		3	
SABELLARIIDAE			
<u>Sabellaria gracilis</u>			2
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	
AMPHARETIDAE			
<u>Melinna maculata</u>		1	
TEREBELLIDAE			
<u>Pista cristata</u>		1	
<u>Thelepus setosus</u>		7	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		8	10

STATION D-25--(Continued)

Family and Species	Dredge	Shovel	Net
EUNICIDAE			
<u>Eunice rubra</u>			1
<u>Marphysa sanguinea</u>		3	
<u>Nematonereis hebes</u>		3	
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>		2	
<u>Lumbrineris erecta</u>		1	
ORBINIIDAE			
<u>Naineris setosa</u>		1	
<u>Scoloplos robustus</u>		1	1
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		17	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		1	
<u>Paraprionospio pinnata</u>		1	1
<u>Polydora socialis</u>		3	2
<u>Polydora websteri</u>			9
<u>Prionospio cirrobranchiata</u>			1
<u>Prionospio h. texana</u>		6	
<u>Spio setosa</u>			1
<u>Spiophanes bombyx</u>		1	1
<u>Pseudopolydora sp.</u>			1
MAGELONIDAE			
<u>Magelona pettiboneae</u>		12	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculus</u>		2	
<u>Mesochaetopterus sp. A</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		2	4
<u>Cirriformia filigera</u>		1	1
<u>Dodecaceria concharum</u>		1	
<u>Tharyx sp. C</u>		1	
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>			

STATION D-25--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>			1
<u>Capitellides jonesi</u>			1
<u>Heteromastus filiformis</u>		7	1
MALDANIDAE			
<u>Branchioasychis americana</u>		1	
<u>Clymenella mucosa</u>		8	
OWENIIDAE			
<u>Owenia fusiformis</u>		10	
SABELLARIIDAE			
<u>Sabellaria floridensis</u>		1	
<u>Sabellaria gracilis</u>		1	1
PECTINARIIDAE			
<u>Cistenides gouldii</u>		3	1
AMPHARETIDAE			
<u>Isolda pulchella</u>		1	1
<u>Melinna maculata</u>		1	2
TEREBELLIDAE			
<u>Loimia medusa</u>			3
<u>Pista cristata</u>		7	1
<u>Pista palmata</u>		1	12
<u>Thelepus setosus</u>		4	2
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		130	4
<u>Chone duneri</u>			1
<u>Fabricia sabella</u>			1
<u>Megalomma bioculatum</u>		1	
<u>Sabella microphthalma</u>		2	

STATION E-1

Sediment Type: Sand

Date: Dec. 10

Weight Percentages -- Granules: 0.1

Sands: 96.2

Silts: 2.6

Clay: 1.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidasthenia commensalis</u>			1
SIGALIONIDAE			
<u>Sthenelais boa</u>			1
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
<u>Eumida sanguinea</u>			1
<u>Phyllodoce arenae</u>	4		3
HESIONIDAE			
<u>Gyptis vittata</u>	1		
SYLLIDAE			
<u>Syllis gracilis</u>			1
<u>Syllis spongicola</u>			1
NEREIDAE			
<u>Nereis succinea</u>	74		387
NEPHTYIDAE			
<u>Nephtys picta</u>			1
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	18		10
ONUPHIDAE			
<u>Diopatra cuprea</u>	7		10
<u>Onuphis sp.</u>	10		
EUNICIDAE			
<u>Marphysa sanguinea</u>			2
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	1		

STATION E-1--(Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos robustus</u>			1
<u>Scoloplos rubra</u>	6		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	27		6
<u>Polydora socialis</u>	5		
<u>Polydora websteri</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D			2
<u>Tharyx</u> sp. C	12		
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>			1
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	3		1
<u>Clymenella mucosa</u>	3		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
TEREBELLIDAE			
<u>Pista cristata</u>	1		
<u>Terebella rubra</u>	1		
SABELLIDAE			
<u>Megalomma bioculatum</u>	6		1

STATION E-2--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		1	
CIRRATULIDAE			
<u>Tharyx</u> sp. C		38	
CAPITELLIDAE			
<u>Capitella capitata</u>		14	
<u>Heteromastus filiformis</u>		1	
<u>Notomastus latericeus</u>		1	
MALDANIDAE			
<u>Branchiosaychis americana</u>		1	
<u>Clymenella mucosa</u>		2	
<u>Maldane sarsi</u>		1	
AMPHARETIDAE			
<u>Melinna maculata</u>		3	
TEREBELLIDAE			
<u>Pista palmata</u>		1	

STATION E-3

Sediment Type: Sand

Date: Dec. 10

Weight Percentages -- Granules: 0.2

Sands: 87.5

Silt: 9.3

Clay: 3.0

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	2		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
<u>Phyllodoce arenae</u>	6		60
HESIONIDAE			
<u>Gyptis vittata</u>	2		
NEREIDAE			
<u>Nereis succinea</u>	23		151
GLYCERIDAE			
<u>Glycera americana</u>	1		2
GONIADIDAE			
<u>Glycinde pacifica</u>	28		5
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>			1
ORBINIIDAE			
<u>Scoloplos rubra</u>	3		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	218		42
<u>Polydora socialis</u>			2
<u>Prionospio cirrobranchiata</u>			3
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	19		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
MALDANIDAE			
<u>Branchioasychis americana</u>	30		
<u>Clymenella mucosa</u>	5		
<u>Maldane sarsi</u>	48		1

STATION E-3--(Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
SABELLIDAE			
<u>Megalomma bioculatum</u>	12		

STATION E-4--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	5		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	2		
<u>Clymenella mucosa</u>	30		1
OWENIIDAE			
<u>Boquea enigmatica</u>	1		
<u>Owenia fusiformis</u>	1		
TEREBELLIDAE			
<u>Polycirrus eximius</u>			1
SABELLIDAE			
<u>Megalomma bioculatum</u>	2		

STATION E-5

Sediment Type: Sand

Date: Dec. 10

Weight Percentages -- Granules: 0.3

Sands: 99.1

Silts: 0.5

Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
Polynoid B	4		
SIGALIONIDAE			
<u>Sthenelais boa</u>	1		
PHYLLODOCIDAE			
<u>Eteone Heteropoda</u>	1		
<u>Phyllodoce arenae</u>	4		1
HESIONIDAE			
<u>Podarke obscura</u>	2		
SYLLIDAE			
<u>Exogone dispar</u>	1		6
NEREIDAE			
<u>Nereis succinea</u>	n		5
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	11		
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	6		1
ONUPHIDAE			
<u>Onuphis</u> sp.	4		
LUMBRINERIDAE			
<u>Lumbrineris latreilli</u>	4		
ARABELLIDAE			
<u>Drilonereis cylindrica</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	16		

STATION E-5--(Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	9		
<u>Paraprionospio pinnata</u>	4		1
<u>Polydora socialis</u>	1		
<u>Scolecopsis squamata</u>	1		
<u>Spiophanes bombyx</u>	3		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		
CIRRATULIDAE			
<u>Cirriformia filigera</u>			3
OPHELIIDAE			
<u>Travisia</u> sp.	27		
MALDANIDAE			
<u>Clymenella mucosa</u>	16		2
OWENIIDAE			
<u>Boguea enigmatica</u>			5
<u>Owenia fusiformis</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		1
SABELLIDAE			
<u>Fabricia sabella</u>	1		1
<u>Sabella microphthalma</u>			1

STATION E-6--(Continued)

Family and Species	Dredges	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>		7	
<u>Aricidea</u> sp.	8		
SPIONIDAE			
<u>Polydora socialis</u>	4	8	
<u>Prionospio h. texana</u>	2		
<u>Scoelelepis squamata</u>	2		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	44		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Cirriformia filigera</u>		2	
<u>Tharyx</u> sp. C	7	4	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		26	
<u>Notomastus hemipodus</u>	4		
MALDANIDAE			
<u>Clymenella mucosa</u>	29		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHAETIDAE			
<u>Isolda pulchella</u>	1		
<u>Melinna maculata</u>	1		
TEREBELLIDAE			
<u>Thelepus setosus</u>	1		
SABELLIDAE			
<u>Fabricia sabella</u>	17	41	
<u>Sabella microphthalma</u>	1		

STATION E-7--(Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Polycirrus</u> <u>eximius</u>	1		
SABELLIDAE			
<u>Megalomma</u> <u>bioculatum</u>	13		

STATION E-8--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.	51		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Clymenella mucosa</u>	66		3
OWENIIDAE			
<u>Owenia fusiformis</u>	5		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	3		

STATION BC-A--(Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos robustus</u>	2		
<u>Scoloplos rubra</u>	3		
PARAONIDAE			
<u>Aricidea fragilis</u>	6		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	55		5
<u>Polydora socialis</u>	1		
<u>Streblospio benedicti</u>	20		2
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>	17		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	4		
<u>Tharyx sp. C</u>	126		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
<u>Heteromastus filiformis</u>	2		
<u>Scyphoproctus platyproctus</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	13		
OWENIIDAE			
<u>Owenia fusuformis</u>	4		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>	5		
<u>Sabellaria gracilis</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		10
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
TEREBELLIDAE			
<u>Pista cristata</u>	1		
<u>Pista palmata</u>	3		1

STATION BC-A--(Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	6		3
<u>Megalomma bioculatum</u>	3		
<u>Sabella microphthalma</u>	1		

STATION BC-C

Sediment Type: Sand

Date: Nov. 18

Weight Percentages -- Granules: 1.0

Sands: 96.5

Silt: 1.9

Clay: 0.6

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>		2	
NEREIDAE			
<u>Nereis arenaceodentata</u>		4	
<u>Nereis p. occidentalis</u>		46	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		10	
<u>Onuphis magna</u>		11	
<u>Onuphis</u> sp.		26	
EUNICIDAE			
<u>Marphysa sanguinea</u>		10	
PARAONIDAE			
<u>Aricidea fragilis</u>		2	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		3	
<u>Polydora socialis</u>		1	5
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		10	
<u>Tharyx</u> sp. C		1	
CAPITELLIDAE			
<u>Dasybranchus lunulatus</u>		2	
<u>Heteromastus filiformis</u>		4	
MALDANIDAE			
<u>Clymenella mucosa</u>		4	

STATION BC-C--(Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Loimia medusa</u>		1	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		13	

STATION BC-E--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	2		
<u>Travisia</u> sp.	12		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	6		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	3		

STATION BC-G--(Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Melinna maculata</u>		5	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		93	

STATION BC-H--(Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Loimia medusa</u>			1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		10
<u>Megalomma bioculatum</u>	1		

STATION BC-I--(Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Tharyx</u> sp. C	2		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	1		
CAPITELLIDAE			
<u>Notomastus latericeus</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	2		
<u>Clymenella mucosa</u>	2		
<u>Maldane sarsi</u>	2		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
TEREBELLIDAE			
<u>Pista palmata</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	6		3
<u>Megalomma bioculatum</u>	4		
<u>Sabella microphthalma</u>	1		

STATION BC-M

Sediment Type: Sand

Date: Nov. 18

Weight Percentages -- Granules: 0.1

Sands: 95.2

Silt: 3.5

Clay: 1.3

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Eumida</u> <u>sanguinea</u>	1		1
<u>Paranaites</u> <u>speciosa</u>	2		
<u>Phyllodoce</u> <u>arenae</u>	3		
<u>Phyllodoce</u> <u>fragilis</u>			1
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>	14		10
SYLLIDAE			
<u>Autolytus</u> <u>cornutus</u>			5
<u>Exogone</u> <u>dispar</u>	12		
<u>Syllis</u> <u>annularis</u>	6		62
<u>Syllis</u> <u>variegata</u>			3
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	23		10
<u>Nereis</u> <u>p. occidentalis</u>	13		82
<u>Nereis</u> <u>succinea</u>	2		6
<u>Platynereis</u> <u>dumerilii</u>	1		2
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	1		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	11		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	10	1	4
<u>Onuphis</u> <u>sp.</u>	31		4
EUNICIDAE			
<u>Marphysa</u> <u>sanguinea</u>			1
ARABELLIDAE			
<u>Arabella</u> <u>iricolor</u>		1	1

STATION BC-M--(Continued)

Family and Species	Dredge	Shovel	Net
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>			1
ORBINIIDAE			
<u>Scoloplos robustus</u>	27		1
<u>Scoloplos rubra</u>	22		10
PARAONIDAE			
<u>Aricidea fragilis</u>	4		1
SPIONIDAE			
<u>Apoprionospio pygmaea</u>			1
<u>Paraprionospio pinnata</u>	66		
<u>Polydora socialis</u>	1	1	11
<u>Polydora websteri</u>			14
<u>Scoelelepis squamata</u>			1
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	25		3
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	2		
<u>Travisia sp.</u>			1
CAPITELLIDAE			
<u>Capitella capitata</u>			3
<u>Capitellides jonesi</u>			1
<u>Dasybranchus lunulatus</u>			1
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	19		
<u>Clymenella mucosa</u>	9		11
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			1
<u>Sabellaria gracilis</u>			1
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		

STATION BC-M--(Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Melinna maculata</u>			10
TEREBELLIDAE			
<u>Loimia medusa</u>			1
<u>Thelepus setosus</u>			2
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	7		1
<u>Fabricia sabella</u>			1
<u>Megalomma bioculatum</u>	1		
<u>Sabella microphthalma</u>	32		37

STATION BC-N

Sediment Type: Sand

Date: Nov. 18

 Weight Percentages -- Granules: 14.7
 Silts: 1.5

 Sands: 83.5
 Clay: 0.3

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidonotus sublevis</u>	7		
<u>Lepidonotus variabilis</u>			2
Polynoid A	1		
SIGALIONIDAE			
<u>Sthenelais boa</u>	40		2
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	6		
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
<u>Eumida sanguinea</u>	108		5
<u>Phyllodoce arenae</u>	27		
<u>Phyllodoce fragilis</u>	34		10
HESIONIDAE			
<u>Gyptis vittata</u>	2		
<u>Podarke obscura</u>	3		4
SYLLIDAE			
<u>Autolytus cornutus</u>			3
<u>Exogone dispar</u>	193		1
<u>Syllis annularis</u>	8		1
<u>Syllis spongicola</u>			1
<u>Syllis variegata</u>	38		2
<u>Pionosyllis sp.</u>	2		
<u>Syllis sp. A</u>	1		
<u>Syllis sp. B</u>	10		
NEREIDAE			
<u>Nereis arenaceodentata</u>	14		
<u>Nereis p. occidentalis</u>	123		22
<u>Nereis succinea</u>	268		39
<u>Platynereis dumerilii</u>	1		
NEPHTYIDAE			
<u>Nephtys buccera</u>	1		
<u>Nephtys magellanica</u>	1		

STATION BC-N--(Continued)

Family and Species	Dredge	Shovel	Net
GLYCERIDAE			
<u>Glycera americana</u>	29		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
<u>Goniadella sp.</u>	9		
ONUPHIDAE			
<u>Diopatra cuprea</u>	27		1
<u>Onuphis magna</u>	4		
<u>Onuphis nebulosa</u>	70		
<u>Onuphis sp.</u>	100		
LUMBRINERIDAE			
<u>Lumbrineris coccinea</u>	2		
<u>Lumbrineris erecta</u>	1		
ARABELLIDAE			
<u>Arabella iricolor</u>	5		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	8		
ORBINIIDAE			
<u>Scoloplos rubustus</u>	2		
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Paraprionospio pinnata</u>	1		
<u>Polydora socialis</u>	64		6
<u>Polydora websteri</u>	1		1
<u>Prionospio cirrobranchiata</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	2		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
TROCHOCHAETIDAE			
<u>Trochochaeta sp.</u>	1		

STATION BC-N--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>	3		
<u>Mesochaetopterus</u> sp. B	10		
<u>Mesochaetopterus</u> sp. C	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		1
<u>Cirriformia filigera</u>	2		
<u>Tharyx</u> sp. B	1		5
<u>Tharyx</u> sp. C	1		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	12		
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.			6
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	95		1
OWENIIDAE			
<u>Owenia fusiformis</u>	3		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>	12		7
<u>Sabellaria gracilis</u>	5		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
APHARETIDAE			
<u>Isolda pulchella</u>	14		
<u>Melinna maculata</u>	1		
<u>Sabellides oculata</u>	1		
TEREBELLIDAE			
<u>Loimia medusa</u>	3		
<u>Pista palmata</u>	16		
<u>Terebella rubra</u>			1
<u>Thelepus setosus</u>			1

STATION BC-N--(Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		10
<u>Chone duneri</u>	6		
<u>Fabricia sabella</u>	156		1
<u>Megalomma lobiferum</u>	1		
<u>Sabella microphthalma</u>			6

STATION PB-1--(Continued)

Family and Species	Dredge	Shovel	Net
EUNICIDAE			
<u>Marphysa sanguinea</u>		1	
ARABELLIDAE			
<u>Drilonereis cylindrica</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		12	
<u>Scoloplos rubra</u>		26	
<u>Naineris</u> sp.			1
PARAONIDAE			
<u>Aricidea fragilis</u>	5	29	
SPIONIDAE			
<u>Paraprionospio pinnata</u>	110	1	50
<u>Polydora socialis</u>		1	
<u>Polydora websteri</u>	1		3
<u>Prionospio h. texana</u>	140		
<u>Spiophanes bombyx</u>	2		1
<u>Streblospio benedicti</u>		3	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		2	
CIRRATULIDAE			
<u>Tharyx</u> sp. C	8		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>			1
CAPITELLIDAE			
<u>Capitella capitata</u>	3		
<u>Capitellides jonesi</u>			2
<u>Heteromastus filiformis</u>	7		1
MALDANIDAE			
<u>Clymenella mucosa</u>	13		100+

STATION PB-1--(Continued)

Family and Species	Dredge	Shovel	Net
OWENIIDAE			
<u>Bogoea enigmatica</u>			10
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			4
<u>Sabellaria gracilis</u>			10
PECTINARIIDAE			
<u>Cistenides gouldii</u>	8		
AMPHARETIDAE			
<u>Sabellides oculata</u>			1
TEREBELLIDAE			
<u>Loimia medusa</u>			4
<u>Pista cristata</u>			1
<u>Pista palmata</u>	1		
<u>Terebella rubra</u>			6
<u>Thelepus setosus</u>			1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		25
<u>Chone dunerii</u>	1		1
<u>Megalomma bioculatum</u>	21		14
<u>Sabella microphthalma</u>	1		100+
SERPULIDAE			
<u>Eupomatus dianthus</u>			1

STATION PB-4--(Continued)

Family and Species	Dredge	Shovel	Net
ARABELLIDAE			
<u>Drilonereis magna</u>	1		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>			1
ORBINIIDAE			
<u>Scoloplos robustus</u>	22		
<u>Scoloplos rubra</u>	2		
PARACONIDAE			
<u>Aricidea fragilis</u>		8	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Paraprionospio pinnata</u>	10		1
<u>Polydora socialis</u>	8		6
<u>Polydora websteri</u>			783
<u>Prionospio h. texana</u>	2		17
<u>Streblospio benedicti</u>	6		6
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1	8	
CIRRATULIDAE			
<u>Cirratulus grandis</u>			3
<u>Cirratulus</u> sp. B	1		
<u>Tharyx</u> sp. C	3	10	
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	37		
CAPITELLIDAE			
<u>Capitella capitata</u>		3	1
<u>Capitellides jonesi</u>			5
<u>Capitomastus aciculatus</u>		1	1
<u>Dasybranchus lunulatus</u>	2		
<u>Heteromastus filiformis</u>	8	1	10
MALDANIDAE			
<u>Clymenella mucosa</u>	77	10	15
OWENIIDAE			
<u>Boguea enigmatica</u>	1		1
<u>Owenia fusiformis</u>	1		

STATION PB-4--(Continued)

Family and Species	Dredge	Shovel	Net
SABELLARIIDAE			
<u>Sabellaria gracilis</u>			1
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Melinna maculata</u>	1		
<u>Sabellides oculata</u>	1		1
TEREBELLIDAE			
<u>Pista cristata</u>	2		4
<u>Pista palmata</u>			4
<u>Thelepus setosus</u>		2	2
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1	27	56
<u>Megalomma bioculatum</u>	1		
<u>Sabella microphthalma</u>	4		10
SERFULIDAE			
<u>Eupomatus dianthus</u>			1

STATION PB-5

Sediment Type: Sand

Date: Nov. 13

Weight Percentages -- Granules: 0.0

Sands: 98.0

Silt: 1.4

Clay: 0.6

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	2		
<u>Eumida</u> <u>sanguinea</u>	3		4
<u>Phyllodoce</u> <u>arenae</u>	2		
<u>Phyllodoce</u> <u>fragilis</u>			1
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	4		3
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	6		
<u>Nereis</u> <u>p. occidentalis</u>			184
<u>Nereis</u> <u>succinea</u>			39
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	2		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	7		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	12		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	9		10
<u>Onuphis</u> <u>nebulosa</u>	23		
<u>Onuphis</u> <u>sp.</u>	52		
EUNICIDAE			
<u>Marphysa</u> <u>sanguinea</u>			1
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>sp.</u>	3		

STATION PB-5--(Continued)

Family and Species	Dredge	Shovel	Net
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>			2
ORBINIIDAE			
<u>Scoloplos robustus</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	8		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	5		
<u>Paraprionospio pinnata</u>	17		
<u>Polydora socialis</u>	1		2
<u>Polydora websteri</u>	1		3
<u>Spiophanes bombyx</u>	1		
<u>Streblospio benedicti</u>	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>			7
CAPITELLIDAE			
<u>Capitella capitata</u>	1		1
<u>Capitellides jonesi</u>	10		
<u>Dasybranchus lunulatus</u>	2		
<u>Heteromastus filiformis</u>	6		3
MALDANIDAE			
<u>Clymenella mucosa</u>	14		3
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	3		11
TEREBELLIDAE			
<u>Pista cristata</u>	1		
<u>Pista palmata</u>	3		2
<u>Terebella rubra</u>			4

STATION PB-5--(Continued)

Family and Station	Dredge	Shovel	Net
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	288		32
<u>Megalomma bioculatum</u>	1		
<u>Sabella microphthalma</u>			2

n

APPENDIX B

In this appendix, the polychaetes collected at transect stations in Tampa Bay Estuary from June through December, 1963, are listed by family and species; and the number of individuals taken by dredge, shovel, or net is indicated. Sediment characteristics and the collection date for each station are also included.

n

STATION 1-1

Sediment Type: Sand

Date: June 18

 Weight Percentages -- Granules: 0.6
 Silts: 0.6

 Sands: 97.9
 Clay: 0.8

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		1	
NEREIDAE			
<u>Nereis succinea</u>		4	
ONUPHIDAE			
<u>Diopatra cuprea</u>		9	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		1	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		4	

STATION 1-4--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		14
CIRRATULIDAE			
<u>Tharyx</u> sp. C	6		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	1		
MALDANIDAE			
<u>Maldane sarsi</u>	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	7		62

STATION 1-5--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		1
PECTINARIIDAE			
<u>Cistenides gouldii</u>	8		26

STATION 2-4

Sediment Type: Sand

Date: July 3

Weight Percentages -- Granules: 0.0

Sands: 93.2

Silts: 2.3

Clay: 4.4

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>	5		
GLYCERIDAE			
<u>Glycera americana</u>	20		
EUNICIDAE			
<u>Marphysa sanguinea</u>	1		
ORBINIIDAE			
<u>Scoloplos rubra</u>	5		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Maldane sarsi</u>	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
AMPHARETIDAE			
<u>Melinna maculata</u>	15		
<u>Sabellides oculata</u>	1		

STATION 2-5

Sediment Type: Sand

Date: July 3

Weight Percentages -- Granules: 0.0

Sands: 92.8

Silt: 4.2

Clay: 3.0

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>	2		
GLYCERIDAE			
<u>Glycera americana</u>	8		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	5		
ORBINIIDAE			
<u>Scoloplos rubra</u>	3		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	3		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		
MALDANIDAE			
<u>Branchioasychis americana</u>	15		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Melinna maculata</u>	7		

STATION 3-1-B

Sediment Type: Shelly Sand

Date: July 10

Weight Percentages -- Granules: 41.3
 Silts: 10.4

Silts: 10.4

Sands: 41.8

Clay: 6.5

Family and Species	Dredge	Shovel	Net
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No Polychaetes Recorded

STATION 3-3

Sediment Type: Sand

Date: July 11

Weight Percentages -- Granules: 0.0

Sands: 97.1

Silts: 1.2

Clay: 1.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	6		
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
<u>Nephtys</u> <u>picta</u>	1		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	32		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	9		
ORBINIIDAE			
<u>Scoloplos</u> <u>rubra</u>	3		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	6		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	11		
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>	13		

STATION 3-6

Sediment Type: Silty Sand

Date: July 12

Weight Percentages -- Granules: 0.1

Sands: 77.4

Silts: 11.5

Clay: 11.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	3		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		4
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>	2		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>			2
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	2		2
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	8		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	2		4
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	28		59
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	10		7
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>			4

STATION 3-8--(Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	11		
TEREBELLIDAE			
<u>Loimia medusa</u>	3		

STATION 3-9

Sediment Type: Sand

Date: July 12

Weight Percentages -- Granules: 0.0

Sands: 97.7

Silt: 0.7

Clay: 1.6

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	1		
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
<u>Paranaites speciosa</u>	1		
<u>Phyllodoce arenae</u>	1		
NEPHTYIDAE			
<u>Aqiaophamus verrilli</u>	10		
<u>Nephtys picta</u>	6		
GLYCERIDAE			
<u>Glycera americana</u>	39		
GONIADIDAE			
<u>Glycinde pacifica</u>	2		
ORBINIIDAE			
<u>Scoloplos rubra</u>	4		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Paraprionospio pinnata</u>	44		
<u>Pseudopolydora sp.</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	4		
OPHELIIDAE			
<u>Travisia sp.</u>	72		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	2		

STATION 3-11--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Maldane sarsi</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	4		

STATION 3-12--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	17		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	6		
AMPHARETIDAE			
<u>Melinna maculata</u>	1		

STATION 3-14

Sediment Type: Sand

Date: July 18

Weight Percentages -- Granules: 0.4

Sands: 93.3

Silt: 3.0

Clay: 3.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>		1	5
NEREIDAE			
<u>Nereis succinea</u>		4	16
GLYCERIDAE			
<u>Glycera americana</u>		3	
ONUPHIDAE			
<u>Diopatra cuprea</u>		4	
ORBINIIDAE			
<u>Scoloplos robustus</u>		1	
<u>Scoloplos rubra</u>		2	
PARAONIDAE			
<u>Aricidea</u> sp.		1	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		3	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Notomastus hemipodus</u>		3	
ARENICOLIDAE			
<u>Arenicola cristata</u>	1	1	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	
AMPHARETIDAE			
<u>Melinna maculata</u>	8		

STATION 3-15

Sediment Type: Sand

Date: July 18

Weight Percentages -- Granules: 0.2

Sands: 98.1

Silt: 1.1

Clay: 0.6

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesione luteola</u>		1	
NEREIDAE			
<u>Nereis succinea</u>		3	2
GLYCERIDAE			
<u>Glycera americana</u>		7	1
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
EUNICIDAE			
<u>Marphysa sanguinea</u>		3	
ORBINIIDAE			
<u>Scoloplos rubra</u>		3	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		3	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Notomastus hemipodus</u>		5	
ARENICOLIDAE			
<u>Arenicola cristata</u>		1	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		5	2
AMPHARETIDAE			
<u>Melinna maculata</u>		8	
<u>Sabellides oculata</u>		1	

STATION 3-16

Sediment Type: Sand

Date: July 18

Weight Percentages -- Granules: 0.1
Silt: 0.9Sands: 97.5
Clay: 1.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>		3	
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>		1	
NEREIDAE			
<u>Nereis</u> <u>succinea</u>		1	
NEPHTYIDAE			
<u>Nephtys</u> <u>picta</u>		1	
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>		7	
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>		3	
ORBINIIDAE			
<u>Scoloplos</u> <u>rubra</u>		17	
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>		1	
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>		12	
CAPITELLIDAE			
<u>Notomastus</u> <u>hemipodus</u>		5	
AMPHARETIDAE			
<u>Melinna</u> <u>maculata</u>		12	1
TEREBELLIDAE			
<u>Loimia</u> <u>medusa</u>		1	

STATION 3-17

Sediment Type: Sand

Date: July 18

Weight Percentages -- Granules: 0.3

Sands: 92.7

Silts: 3.5

Clay: 3.6

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis p. occidentalis</u>			1
<u>Nereis succinea</u>		5	
GLYCERIDAE			
<u>Glycera americana</u>		1	
SPIONIDAE			
<u>Polydora websteri</u>		1	
<u>Streblospio benedicti</u>		1	
<u>Pseudopolydora sp.</u>		4	
CAPITELLIDAE			
<u>Capitella capitata</u>		3	
ARENICOLIDAE			
<u>Arenicola cristata</u>		2	
AMPHARETIDAE			
<u>Melinna maculata</u>		11	

STATION 4-1

Sediment Type: Sand

Date: July 24

Weight Percentages -- Granules: 0.3

Sands: 91.3

Silt: 4.7

Clay: 3.7

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		1	
NEREIDAE			
<u>Laeonereis culveri</u>		2	
<u>Nereis succinea</u>		3	
<u>Platynereis dumerilii</u>			1
GLYCERIDAE			
<u>Glycera americana</u>		12	
GONIADIDAE			
<u>Glycinde pacifica</u>		6	
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
EUNICIDAE			
<u>Marphysa sanguinea</u>		1	
SPIONIDAE			
<u>Polydora websteri</u>		1	
CAPITELLIDAE			
<u>Notomastus latericeus</u>		3	
AMPHARETIDAE			
<u>Melinna maculata</u>		4	

STATION 4-4

Sediment Type: Sandy Mud

Date: July 25

Weight Percentages -- Granules: 0.2
Silts: 27.5Sands: 43.4
Clay: 28.9

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>			9
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>	2		
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	2		
PILARGIDAE			
<u>Sigambra</u> <u>tentaculata</u>	1		
NEREIDAE			
<u>Laeonereis</u> <u>culveri</u>	1		
<u>Nereis</u> <u>succinea</u>	1		1
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	1		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	2		6
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	26		58
<u>Pseudopolydora</u> <u>sp.</u>	21		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	6		1

STATION 4-5

Sediment Type: Sand

Date: July 25

Weight Percentages -- Granules: 0.3
Silts: 1.1Sands: 98.1
Clay: 0.5

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	1		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	1		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	23		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	7		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	6		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	1		
<u>Scoloplos</u> <u>rubra</u>	4		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	3		
<u>Paraprionospio</u> <u>pinnata</u>	62		3
MAGELONIDAE			
<u>Magelona</u> <u>pettiboneae</u>	3		
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>	1		

STATION 4-6--(Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		
TEREBELLIDAE			
<u>Loimia medusa</u>	1		

STATION 4-7--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	10		1
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	" 1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			2

STATION 4-12

Sediment Type: Sand

Date: July 26

Weight Percentages -- Granules: 0.0

Sands: 93.6

Silts: 2.4

Clay: 3.9

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid A	1		
Polynoid B	5		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	3		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	1		
<u>Phyllodoce</u> <u>arenae</u>	7		2
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	3		
PILARGIDAE			
<u>Cabira</u> <u>incerta</u>	3		
<u>Sigambra</u> <u>bassi</u>	1		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	2		1
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
<u>Nephtys</u> <u>picta</u>	8		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	29		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	22		
ORBINIIDAE			
<u>Scoloplos</u> <u>rubra</u>	6		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	83		4
<u>Polydora</u> <u>socialis</u>	1		
<u>Pseudopolydora</u> <u>sp.</u>	35		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	30		

STATION 4-12--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Branchioasychis</u> <u>americana</u>	1		
<u>Maldane</u> <u>sarsi</u>	6		
TEREBELLIDAE			
<u>Loimia</u> <u>viridis</u>	3		

STATION 4-13--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Maldane sarsi</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			2

STATION 4-14

Sediment Type: Sand

Date: July 30

Weight Percentages -- Granules: 0.0

Sands: 93.6

Silt: 1.6

Clay: 4.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	5		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		2
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		
PILARGIDAE			
<u>Sigambra</u> <u>bassi</u>	1		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>			1
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	3		
<u>Nephtys</u> <u>picta</u>	13		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	13		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	3		2
ORBINIIDAE			
<u>Scoloplos</u> <u>rubra</u>	1		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	75		23
<u>Prionospio</u> <u>cirrobranchiata</u>	3		
<u>Pseudopolydora</u> <u>sp.</u>	16		2
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	41		
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>	1		
TEREBELLIDAE			
<u>Loimia</u> <u>viridis</u>	1		

STATION 4-16--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	16		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>			2
<u>Notomastus hemipodus</u>	6		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
TEREBELLIDAE			
<u>Loimia medusa</u>	1		
<u>Thelepus setosus</u>			1

STATION 4-18-B

Sediment Type: Sand

Date: July 30

 Weight Percentages -- Granules: 0.0
 Silts: 1.7

 Sands: 97.5
 Clay: 0.8

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Prionospio cirrobranchiata</u>			1

STATION 4-19--(Continued)

Family and Species	Dredge	Shovel	Net
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	4		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		
OPHELIIDAE			
<u>Travisia</u> sp.	4		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	15		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			1

STATION 4-20

Sediment Type: Sand

Date: July 31

Weight Percentages -- Granules: 6.2

Sands: 93.7

Silts: 0.1

Clay: 0.0

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
SPIONIDAE			
<u>Paraprionospio pinnata</u>			2
<u>Scoelelepis squamata</u>		17	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		3	

STATION 5-1-A

Sediment Type: Silty Sand

Date: Aug. 1

Weight Percentages -- Granules: 0.0

Sands: 69.9

Silts: 15.8

Clay: 14.3

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	8		
PILARGIDAE			
<u>Sigambra tentaculata</u>	1		
NEREIDAE			
<u>Laeonereis culveri</u>		1	
<u>Nereis p. occidentalis</u>	1		
<u>Nereis succinea</u>		2	1
GLYCERIDAE			
<u>Glycera americana</u>	3		1
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		1
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	

STATION 5-1-B

Sediment Type: Sand

Date: Aug. 1

Weight Percentages -- Granules: 0.1

Sands: 94.8

Silt: 3.7

Clay: 1.4

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
SPICNIDAE			
<u>Paraprionospio pinnata</u>	5		6
<u>Polydora websteri</u>	1		
<u>Prionospio cirrobranchiata</u>	8		1
<u>Streblospio benedicti</u>	13		
<u>Pseudopolydora</u> sp.	27		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		

STATION 5-3

Sediment Type: Sand

Date: Aug. 1

Weight Percentages -- Granules: 0.0

Sands: 99.3

Silt: 0.3

Clay: 0.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	3		
<u>Phyllodoce arenae</u>	2		
HESIONIDAE			
<u>Gyptis vittata</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	8		1
NEPHTYIDAE			
<u>Nephtys picta</u>	1		
GLYCERIDAE			
<u>Glycera americana</u>	13		
GONIADIDAE			
<u>Glycinde pacifica</u>	17		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
<u>Onuphis</u> sp.	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	2		
<u>Scoloplos rubra</u>	35		
PARAONIDAE			
<u>Aricidea</u> sp.	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Paraprionospio pinnata</u>	3		1
<u>Polydora socialis</u>	1		
<u>Prionospio cirrobranchiata</u>	3		
<u>Pseudopolydora</u> sp.	4		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		

STATION 5-3--(Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	7		
CAPITELLIDAE			
<u>Capitella capitata</u>	1		
<u>Heteromastus filiformis</u>	5		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
TEREBELLIDAE			
<u>Loimia medusa</u>	2		

STATION 5-4

Sediment Type: Sand

Date: Aug. 1

Weight Percentages -- Granules: 0.0
 Silts: 0.3

Sands: 99.6
Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
HESIONIDAE			
<u>Gyptis vittata</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	19		
GLYCERIDAE			
<u>Glycera americana</u>	17		
GONIADIDAE			
<u>Glycinde pacifica</u>	13		
ONUPHIDAE			
<u>Diopatra cuprea</u>	3		
ORBINIIDAE			
<u>Scoloplos robustus</u>	3		
<u>Scoloplos rubra</u>	10		
PARAONIDAE			
<u>Aricidea fragilis</u>	2		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	3		
<u>Paraprionospio pinnata</u>	12		
<u>Polydora websteri</u>	1		
<u>Prionospio cirrobranchiata</u>	2		
<u>Prionospio h. texana</u>	4		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	5		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculus</u>	8		

STATION 5-4--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>	12		
<u>Heteromastus filiformis</u>	1		
<u>Notomastus latericeus</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
SABELLIDAE			
<u>Sabella microphthalma</u>	1		

STATION 5-5

Sediment Type: Sand

Date: Aug. 1

Weight Percentages -- Granules: 0.0

Sands: 99.2

Silt: 0.3

Clay: 0.5

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	3		
NEREIDAE			
<u>Nereis succinea</u>	1		
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	2		
GLYCERIDAE			
<u>Glycera americana</u>	17		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ORBINIIDAE			
<u>Scoloplos rubra</u>	5		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	3		
<u>Paraprionospio pinnata</u>	7		
<u>Spio setosa</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	4		
OPHELIIDAE			
<u>Travisia</u> sp.	156		

STATION 5-9

Sediment Type: Sand

Date: Aug. 6

 Weight Percentages -- Granules: 0.0
 Silts: 0.0

 Sands: 100.0
 Clay: 0.0

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>	1		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	3		
<u>Prionospio cirrobranchiata</u>	1		
<u>Spio setosa</u>	6		
OPHELIIDAE			
<u>Travisia</u> sp.	135		

STATION 5-12

Sediment Type: Sand

Date: Aug. 6

Weight Percentages -- Granules: 0.0

Sands: 99.8

Silts: 0.1

Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	11		10
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	2		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	3		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	14		2
<u>Polydora</u> <u>socialis</u>	1		
<u>Prionospio</u> <u>cirrobranchiata</u>	13		
<u>Spio</u> <u>setosa</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	38		
TEREBELLIDAE			
<u>Loimia</u> <u>medusa</u>	7		
<u>Polycirrus</u> <u>eximius</u>	1		

STATION 6-1-A

Sediment Type: Sandy Clay

Date: Aug. 7

Weight Percentages -- Granules: 0.1

Sands: 24.5

Silt: 9.6

Clay: 65.9

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>		1	
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		1	
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		3	
HESIONIDAE			
<u>Gyptis vittata</u>		2	
SYLLIDAE			
<u>Exogone dispar</u>		2	
NEREIDAE			
<u>Laeonereis culveri</u>		1	
<u>Nereis succinea</u>		6	2
<u>Platynereis dumerilii</u>			1
GLYCERIDAE			
<u>Glycera americana</u>		2	
GONIADIDAE			
<u>Glycinde pacifica</u>		4	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
<u>Onuphis sp.</u>		1	
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		1	
<u>Scoloplos rubra</u>		2	
PARAONIDAE			
<u>Aricidea sp.</u>		12	

STATION 6-1-A--(Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
<u>Polydora socialis</u>		3	
<u>Polydora websteri</u>			2
<u>Prionospio h. texana</u>		2	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		7	
OPHELIIDAE			
<u>Travisia</u> sp.		8	
CAPITELLIDAE			
<u>Notomastus hemipodus</u>		16	
MALDANIDAE			
<u>Clymenella mucosa</u>		2	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		6	
TEREBELLIDAE			
<u>Loimia viridis</u>		1	

STATION 6-1-C

Sediment Type: Sand

Date: Aug. 7

 Weight Percentages -- Granules: 0.3
 Silts: 1.9

 Sands: 95.3
 Clay: 2.5

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>		1	
HESIONIDAE			
<u>Gyptis</u> sp.		1	
SYLLIDAE			
<u>Brania clavata</u>		21	
NEREIDAE			
<u>Nereis succinea</u>		7	
<u>Platynereis dumerilii</u>		4	
GLYCERIDAE			
<u>Glycera americana</u>		4	
ONUPHIDAE			
<u>Diopatra cuprea</u>		4	
<u>Onuphis</u> sp.		31	
ARABELLIDAE			
<u>Arabella iricolor</u>		1	
ORBINIIDAE			
<u>Orbinia ornata</u>		1	
<u>Scoloplos robustus</u>		1	
<u>Scoloplos rubra</u>		1	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
<u>Polydora websteri</u>		17	
<u>Prionospio h. texana</u>		20	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		3	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		1	
CIRRATULIDAE			
<u>Tharyx</u> sp. C		1	

STATION 6-1-C--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.		28	
CAPITELLIDAE			
<u>Capitella capitata</u>		55	
MALDANIDAE			
<u>Clymenella mucosa</u>		31	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		1	

STATION 6-1-D--(Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona</u> <u>pettiboneae</u>		20	
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>		4	

STATION 6-2

Sediment Type: Sand

Date: Aug. 7

Weight Percentages -- Granules: 6.4

Sands: 93.6

Silts: 0.0

Clay: 0.0

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	6		
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	3		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		1
<u>Phyllodoce arenae</u>	332		23
HESIONIDAE			
<u>Gyptis vittata</u>	15		
SYLLIDAE			
<u>Autolytus cornutus</u>			1
<u>Exogone dispar</u>	325		13
<u>Syllis</u> sp. B	2		
NEREIDAE			
<u>Nereis succinea</u>	16		63
GLYCERIDAE			
<u>Glycera americana</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	5		
<u>Goniadella</u> sp.	6		
ONUPHIDAE			
<u>Onuphis</u> sp.	22		
EUNICIDAE			
<u>Marphysa sanguinea</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris latreilli</u>	1		
ARABELLIDAE			
<u>Arabella iricolor</u>	1		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	2		
<u>Dorvillea</u> sp.	1		

STATION 6-2--(Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos robustus</u>	1		
PARAONIDAE			
<u>Aricidea</u> sp.	12		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	2		
<u>Polydora socialis</u>	3		
<u>Polydora websteri</u>	1		
<u>Pseudopolydora</u> sp.	18		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	24		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	1		
<u>Cirriformia</u> sp. A	1		
OPHELIIDAE			
<u>Travisia</u> sp.	18		
CAPITELLIDAE			
<u>Capitella capitata</u>	4		
<u>Heteromastus filiiformis</u>	78		
MALDANIDAE			
<u>Clymenella mucosa</u>			1
TEREBELLIDAE			
<u>Loimia medusa</u>	3		
<u>Polycirrus eximius</u>	14		
SABELLIDAE			
<u>Fabricia sabella</u>			1

STATION 6-3--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	7		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	6		4

STATION 6-4-A

Sediment Type: Sand

Date: Aug. 8

Weight Percentages -- Granules: 0.0

Sands: 99.4

Silts: 0.2

Clay: 0.4

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Paranaites</u> <u>speciosa</u>	1		
<u>Phyllodoce</u> <u>arenae</u>	3		1
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>			1
NEREIDAE			
<u>Nereis</u> <u>p. occidentalis</u>	1		
<u>Nereis</u> <u>succinea</u>	3		1
<u>Platynereis</u> <u>dumerilii</u>			5
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	1		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	24		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	2		10
<u>Onuphis</u> <u>sp.</u>	1		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	4		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	15		
<u>Paraprionospio</u> <u>pinnata</u>	27		
<u>Polydora</u> <u>socialis</u>	2		
<u>Polydora</u> <u>websteri</u>			2
<u>Prionospio</u> <u>cirrobranchiata</u>	1		
<u>Prionospio</u> <u>h. texana</u>	7		
<u>Scoelelepis</u> <u>squamata</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	5		2

STATION 6-4-A--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	6		
CAPITELLIDAE			
<u>Capitella capitata</u>	4		
TEREBELLIDAE			
<u>Loimia medusa</u>	2		

STATION 6-6

Sediment Type: Sand

Date: Aug. 8

Weight Percentages -- Granules: 0.3

Sands: 99.9

Silt: 0.0

Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		3
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>			10
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	1		
<u>Paraprionospio</u> <u>pinnata</u>	2		
<u>Prionospio</u> <u>cirrobranchiata</u>	14		
<u>Spio</u> <u>setosa</u>	6		1
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>			3
OPHELIIDAE			
<u>Travisia</u> <u>sp.</u>	91		
TEREBELLIDAE			
<u>Loimia</u> <u>medusa</u>	1		

STATION 6-7-A--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>		3	
MALDANIDAE			
<u>Clymenella mucosa</u>		9	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		2	

STATION 6-7-B

Sediment Type: Sand

Date: Aug. 8

Weight Percentages -- Granules: 0.4
 Silts: 1.8

Sands: 96.4

Silts: 1.8

Clay: 1.4

Family and Species	Dredge	Shovel	Net
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No Polychaetes Recorded

STATION 6-8

Sediment Type: Sand

Date: Aug. 8

Weight Percentages -- Granules: 0.26

Sands: 99.7

Silts: 0.1

Clay: 0.0

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		4	
NEREIDAE			
<u>Laeonereis culveri</u>		1	
<u>Nereis succinea</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		2	
SPIONIDAE			
<u>Prionospio h. texana</u>		3	
<u>Scoelelepis squamata</u>		2	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Heteromastus filiformis</u>		1	

STATION 7-1

Sediment Type: Sand

Date: Aug. 19

 Weight Percentages -- Granules: 0.5
 Silts: 2.8

 Sands: 95.2
 Clay: 1.5

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>			1
<u>Parahesionia luteola</u>	32		3
NEREIDAE			
<u>Nereis succinea</u>			1
SPIONIDAE			
<u>Paraprionospio pinnata</u>			2
<u>Polydora websteri</u>	8		1
<u>Streblospio benedicti</u>	968		10
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	4		

STATION 7-2

Sediment Type: Silty Mud

Date: Aug. 19

Weight Percentages -- Granules: 0.1

Sands: 37.3

Silts: 36.0

Clay: 26.7

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Streblospio benedicti</u>	12		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		

STATION 8-1

Sediment Type: Silty Mud

Date: Aug. 19

 Weight Percentages -- Granules: 0.7
 Silts: 38.4

 Sands: 37.0
 Clay: 24.0

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Paraprionospio pinnata</u>			24
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		

STATION 8-3

Sediment Type: Silty Sand

Date: Aug. 20

Weight Percentages -- Granules: 0.4

Sands: 69.0

Silts: 22.3

Clay: 8.3

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesionia luteola</u>			1
NEREIDAE			
<u>Nereis succinea</u>			2
SPIONIDAE			
<u>Paraprionospio pinnata</u>	5		5
<u>Streblospio benedicti</u>	2		10
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	8		

STATION 8-4

Sediment Type: Sandy Mud

Date: Aug. 20

Weight Percentages -- Granules: 0.9

Sands: 46.9

Silts: 28.3

Clay: 23.9

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesion</u> <u>luteola</u>			3
NEREIDAE			
<u>Platynereis</u> <u>dumerilii</u>			2
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>			1
<u>Streblospio</u> <u>benedicti</u>			10

STATION 8-6

Sediment Type: Shelly Sand

Date: Aug. 20

Weight Percentages -- Granules: 72.9

Sands: 27.1

Silts: 0.0

Clay: 0.0

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		5	
SYLLIDAE			
<u>Syllis aciculata</u>		6	
NEREIDAE			
<u>Nereis succinea</u>		142	
SPIONIDAE			
<u>Polydora websteri</u>		68	
CAPITELLIDAE			
<u>Capitella capitata</u>		310	

STATION 9-1

Sediment Type: Sand

Date: Aug. 21

Weight Percentages -- Granules: 0.0

Sands: 98.4

Silts: 1.1

Clay: 0.5

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Laeonereis culveri</u>		117	
GONIADIDAE			
<u>Glycinde pacifica</u>		2	
ORBINIIDAE			
<u>Scoloplos robustus</u>		30	
SPIONIDAE			
<u>Polydora websteri</u>		23	
<u>Scoelelepis squamata</u>		2	
CAPITELLIDAE			
<u>Capitomastus aciculatus</u>		10	

STATION 9-3

Sediment Type: Sand

Date: Aug. 21

 Weight Percentages -- Granules: 0.1
 Silts: 0.7

Sands: 98.8

Clay: 0.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			2
HESIONIDAE			
<u>Parahesionia luteola</u>	6		11
NEREIDAE			
<u>Nereis succinea</u>	40		141
GLYCERIDAE			
<u>Glycera americana</u>	7		
GONIADIDAE			
<u>Glycinde pacifica</u>	31		4
ONUPHIDAE			
<u>Diopatra cuprea</u>	3		10
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	64		1
<u>Polydora websteri</u>	76		112
<u>Streblospio benedicti</u>	50		10
<u>Pseudopolydora</u> sp.	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	150		
CAPITELLIDAE			
<u>Capitellides jonesi</u>			1
PECTINARIIDAE			
<u>Cistenides gouldii</u>	27		2

STATION 9-6

Sediment Type: Silty Clay

Date: Aug. 21

Weight Percentages -- Granules: 0.2

Sands: 14.0

Silts: 42.3

Clay: 43.5

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			2
HESIONIDAE			
<u>Parahesionella luteola</u>			13
GONIADIDAE			
<u>Glycinde pacifica</u>			1
SPIONIDAE			
<u>Paraprionospio pinnata</u>			26
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>			1

STATION 9-7

Sediment Type: Silty Clay

Date: Aug. 21

 Weight Percentages -- Granules: 0.4
 Silts: 35.5

 Sands: 3.5
 Clay: 60.8

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesion</u> <u>luteola</u>			3
NEREIDAE			
<u>Nereis</u> <u>succinea</u>			4
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	3		8
<u>Streblospio</u> <u>benedicti</u>	1		10

STATION 9-8

Sediment Type: Silty Sand

Date: Aug. 22

Weight Percentages -- Granules: 0.4

Sands: 68.0

Silts: 17.0

Clay: 14.5

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>			1
HESIONIDAE			
<u>Parahesionella luteola</u>			7
NEREIDAE			
<u>Nereis succinea</u>			5
SPIONIDAE			
<u>Paraprionospio pinnata</u>			3
<u>Polydora websteri</u>			3
<u>Streblospio benedicti</u>			10
CAPITELLIDAE			
<u>Capitella capitata</u>			1

STATION 9-9

Sediment Type: Sand

Date: Aug. 22

Weight Percentages -- Granules: 0.0

Sands: 87.7

Silts: 7.0

Clay: 5.3

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Parahesion</u> <u>luteola</u>			9
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	1		11
<u>Nicon</u> <u>lackeyi</u>			2
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>			1
SPIONIDAE			
<u>Polydora</u> <u>websteri</u>	5		48
<u>Streblospio</u> <u>benedicti</u>	42		10
CAPITELLIDAE			
<u>Capitellides</u> <u>jonesi</u>			1

STATION 9-10

Sediment Type: Sand

Date: Aug. 27

Weight Percentages -- Granules: 0.1

Sands: 94.1

Silts: 4.4

Clay: 1.4

Family and Species	Dredge	Shovel	Net
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No Polychaetes Recorded

STATION 10-1-A--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitellides jonesi</u>		1	
<u>Heteromastus filiformis</u>		6	
MALDANIDAE			
<u>Clymenella mucosa</u>		25	
TEREBELLIDAE			
<u>Thelepus setosus</u>		1	

STATION 10-1-B

Sediment Type: Sand

Date: Aug. 27

Weight Percentages -- Granules: 0.6
 Silts: 0.0

Silts: 0.0

Sands: 99.4

Clay: 0.0

Family and Species	Dredge	Shovel	Net
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No Polychaetes Recorded

STATION 10-3

Sediment Type: Shelly Sand

Date: Aug. 27

Weight Percentages -- Granules: 21.5

Sands: 78.5

Silts: 0.0

Clay: 0.0

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>		1	
CHRYSOPETALIDAE			
<u>Paleanotus</u> <u>heteroseta</u>		3	
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>		1	
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		15
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>		6	
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>			3
<u>Brania</u> sp.	24		
<u>Syllis</u> sp. B	28		1
NEREIDAE			
<u>Nereis</u> <u>p. occidentalis</u>			43
<u>Nereis</u> <u>succinea</u>	1		39
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>		4	
ONUPHIDAE			
<u>Onuphis</u> sp.		25	
ARABELLIDAE			
<u>Arabella</u> <u>iricolor</u>		2	
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>			1
<u>Spio</u> <u>setosa</u>			2
MAGELONIDAE			
<u>Magelona</u> <u>pettiboneae</u>		2	
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	1		1

STATION 10-3--(Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirriformia</u> sp. B		4	
OPHELIIDAE			
<u>Travisia</u> sp.		32	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		18	
TEREBELLIDAE			
<u>Enoplobranchus sanguineus</u>		1	
<u>Loimia medusa</u>			1
<u>Polycirrus eximius</u>		1	
<u>Thelepus setosus</u>		1	

STATION 10-4--(Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	58		1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	17		
<u>Tharyx</u> sp. C	1		
OPHELIIDAE			
<u>Travisia</u> sp.	7		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	5		
<u>Notomastus hemipodus</u>	4		
OWENIIDAE			
<u>Owenia fusiformis</u>	3		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	3		
TEREBELLIDAE			
<u>Loimia medusa</u>	2		
SABELLIDAE			
<u>Fabricia sabella</u>	50		

STATION 10-5

Sediment Type: Sand

Date: Aug. 28

Weight Percentages -- Granules: 0.0

Sands: 98.5

Silts: 1.3

Clay: 0.2

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis p. occidentalis</u>			1
<u>Nereis succinea</u>	2		
GONIADIDAE			
<u>Glycinde pacifica</u>	2		
ONUPHIDAE			
<u>Diopatra cuprea</u>	5		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	4		
OPHELIIDAE			
<u>Travisia</u> sp.	1		

STATION 10-6

Sediment Type: Sand

Date: Aug. 28

Weight Percentages -- Granules: 0.4

Sands: 99.2

Silts: 0.3

Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	3		
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
NEREIDAE			
<u>Nereis</u> <u>p. occidentalis</u>			1
<u>Nereis</u> <u>succinea</u>	9		16
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	9		
ONUPHIDAE			
<u>Onuphis</u> sp.	1		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	1		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	11		
<u>Paraprionospio</u> <u>pinnata</u>	1		
<u>Prionospio</u> <u>cirrobranchiata</u>	2		
<u>Scoletepis</u> <u>squamata</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	1		
FLABELLIGERIDAE			
<u>Pherusa</u> <u>arenosa</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	128		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	5		
TERBELLIDAE			
<u>Loimia</u> <u>medusa</u>	1		

STATION 10-7--(Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
TEREBELLIDAE			
<u>Loimia medusa</u>	1		

STATION 10-10

Sediment Type: Sand

Date: Aug. 29

 Weight Percentages:-- Granules: 0.0
 Silts: 0.0

 Sands: 100.0
 Clay: 0.0

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	12		25
<u>Platynereis dumerilii</u>			2
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	3		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Dispio uncinata</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	81		
MALDANIDAE			
<u>Clymenella mucosa</u>	1		1

STATION 10-12

Sediment Type: Sand

Date: Aug. 29

Weight Percentages -- Granules: 0.6

Sands: 98.7

Silt: 0.4

Clay: 0.3

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	1		
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	4		
<u>Phyllodoce arenae</u>	3		
NEREIDAE			
<u>Nereis succinea</u>	8		
GLYCERIDAE			
<u>Glycera americana</u>	2		
GONIADIDAE			
<u>Glycinde pacifica</u>	10		
ONUPHIDAE			
<u>Diopatra cuprea</u>	6		
<u>Onuphis</u> sp.	36		
ORBINIIDAE			
<u>Scoloplos rubra</u>	7		
PARAONIDAE			
<u>Aricidea</u> sp.	6		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	4		
<u>Paraprionospio pinnata</u>	4		
<u>Polydora socialis</u>	1		
<u>Scoelelepis squamata</u>	2		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	10		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		
OPHELIIDAE			
<u>Travisia</u> sp.	51		

STATION 10-12--(Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>	24		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		
AMPHARETIDAE			
<u>Melinna maculata</u>	1		

STATION 10-14-A

Sediment Type: Sand

Date: Sept. 4

 Weight Percentages -- Granules: 0.0
 Silts: 0.7

 Sands: 98.9
 Clay: 0.5

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		14	
<u>Phyllodoce arenae</u>	5	1	
NEREIDAE			
<u>Laeonereis culveri</u>	1	123	
<u>Nereis succinea</u>	16	52	
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	8		
ONUPHIDAE			
<u>Diopatra cuprea</u>	21	18	
<u>Onuphis sp.</u>	16	51	
ORBINIIDAE			
<u>Scoloplos robustus</u>		7	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	3	4	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		
CAPITELLIDAE			
<u>Capitella capitata</u>		4	
OWENIIDAE			
<u>Owenia fusiformis</u>		1	

STATION 10-15--(Continued)

Family and Species	Dredge	Shovel	Net
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	5		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	5		10

STATION 10-16

Sediment Type: Sand

Date: Sept. 4

 Weight Percentages -- Granules: 0.5
 Silts: 7.9

 Sands: 89.0
 Clay: 2.6

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	13		4
HESIONIDAE			
<u>Gyptis vittata</u>	2		4
<u>Parahesionia luteola</u>	11		15
<u>Gyptis</u> sp.	1		
PILARGIDAE			
<u>Ancistrosyllis jonesi</u>			1
<u>Sigambra tentaculata</u>			2
NEREIDAE			
<u>Laeonereis culveri</u>	2		
<u>Nereis succinea</u>	9		23
GONIADIDAE			
<u>Glycinde pacifica</u>	6		1
ONUPHIDAE			
<u>Diopatra cuprea</u>	6		
<u>Onuphis</u> sp.	8		
ORBINIIDAE			
<u>Scoloplos rubra</u>	28		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	20		
<u>Polydora websteri</u>	1		
<u>Prionospio cirrebranchiata</u>	5		5
<u>Pseudopolydora</u> sp.	7		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	4		1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	4		1
<u>Tharyx</u> sp. C	6		

STATION 10-16--(Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
AMPHARETIDAE			
<u>Isolda pulchella</u>			1

STATION 10-20

Sediment Type: Sand

Date: Sept. 4

Weight Percentages -- Granules: 0.8

Sands: 89.8

Silts: 6.4

Clay: 3.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			1
NEREIDAE			
<u>Nereis succinea</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	8		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	5		102
<u>Polydora websteri</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	7		
CIRRATULIDAE			
<u>Tharyx</u> sp. C			2
MALDANIDAE			
<u>Branchioasychis americana</u>	2		
AMPHARETIDAE			
<u>Melinna maculata</u>	1		

STATION 10-22--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Maldane sarsi</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	9		10

STATION 10-22--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Maldane sarsi</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	9		10

STATION 11-1--(Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>		28	
PECTINARIIDAE			
<u>Cistenides gouldii</u>			10

STATION 11-4--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	34		1
CAPITELLIDAE			
<u>Capitellides jonesi</u>	2		
<u>Heteromastus filiformis</u>	18		
MALDANIDAE			
<u>Clymenella mucosa</u>	4		
OWENIIDAE			
<u>Owenia fusiformis</u>	24		10
PECTINARIIDAE			
<u>Cistenides gouldii</u>	34		10
AMPHARETIDAE			
<u>Isolda pulchella</u>	7		
TEREBELLIDAE			
<u>Pista cristata</u>	1		
<u>Pista palmata</u>			1
<u>Polycirrus eximius</u>	3		1

STATION 11-5--(Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	11		
CAPITELLIDAE			
<u>Capitella capitata</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	10		

STATION 11-6--(Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Tharyx</u> sp. C	1		
OPHELIIDAE			
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Capitella</u> <u>capitata</u>	1		
<u>Notomastus</u> <u>hemipodus</u>	1		
<u>Notomastus</u> <u>latericeus</u>	1		
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>	2		
TEREBELLIDAE			
<u>Terebella</u> <u>rubra</u>	3		

STATION 11-11

Sediment Type: Silty Clay

Date: Sept. 17

Weight Percentages -- Granules: 1.0

Sands: 26.9

Silts: 32.8

Clay: 39.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	2		
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	4		9
HESIONIDAE			
<u>Gyptis vittata</u>	1		
<u>Parahesionia luteola</u>	11		
PILARGIDAE			
<u>Sigambra tentaculata</u>	4		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		2
SPIONIDAE			
<u>Paraprionospio pinnata</u>	9		8
<u>Prionospio cirrobranchiata</u>	3		
<u>Pseudopolydora sp.</u>	4		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	5		1
CIRRATULIDAE			
<u>Tharyx sp. C</u>	14		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	9		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			2

STATION 11-12

Sediment Type: Silty Clay

Date: Sept. 17

Weight Percentages -- Granules: 0.4

Sands: 12.4

Silts: 40.2

Clay: 47.0

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>			1
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>	2		3
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		2
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	7		4
<u>Parahesion</u> <u>luteola</u>	14		1
PILARGIDAE			
<u>Sigambra</u> <u>tentaculata</u>	10		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	2		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	74		17
<u>Prionospio</u> <u>cirrobranchiata</u>	7		
<u>Pseudopolydora</u> sp.	11		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	1		
<u>Tharyx</u> sp. C	1		

STATION 11-15

Sediment Type: Shelly Sand
 Weight percentages -- Granules: 41.5
 Silts: 9.2

Date: Sept. 18
 Sands: 43.7
 Clay: 5.6

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sthenelais boa</u>	1		15
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			1
HESIONIDAE			
<u>Gyptis vittata</u>	4		6
<u>Parahesion luteola</u>	3		1
<u>Gyptis</u> sp.	3		
PILARGIDAE			
<u>Sigambra tentaculata</u>	6		1
NEREIDAE			
<u>Nereis succinea</u>	7		
GONIADIDAE			
<u>Glycinde pacifica</u>	5		1
ONUPHIDAE			
<u>Onuphis nebulosa</u>	1		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	352		26
<u>Prionospio cirrobranchiata</u>	43		
<u>Pseudopolydora</u> sp.	167		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		1

STATION 11-15 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	42		
<u>Cirriformia</u> sp. A	1		
<u>Tharyx</u> sp. C	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>			2
AMPHARETIDAE			
<u>Isolda pulchella</u>			1

STATION 11-16

Sediment Type: Sand
 Weight percentages -- Granules: 10.5
 Silts: 11.7

Date: Sept. 18
 Sands: 72.8
 Clay: 4.9

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
SIGALIONIDAE			
<u>Sthenelais boa</u>			1
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	4		8
HESIONIDAE			
<u>Gyptis vittata</u>	1		
PILARGIDAE			
<u>Cabira incerta</u>	1		
<u>Sigambra tentaculata</u>	2		1
NEREIDAE			
<u>Nereis succinea</u>	2		9
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		7
ONUPHIDAE			
<u>Onuphis nebulosa</u>	13		2
ORBINIIDAE			
<u>Orbinia ornata</u>	1		
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	84		25
<u>Polydora socialis</u>	1		1
<u>Prionospio cirrobranchiata</u>	8		
<u>Pseudopolydora</u> sp.	1		

STATION 11-16 -- (Continued)

Family and Species	Dredge	Shovel	Net
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>			5
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	2		1
<u>Spiochaetopterus c. oculatus</u>	117		1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	46		3
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	4		2
MALDANIDAE			
<u>Branchioasychis americana</u>			1
<u>Clymenella mucosa</u>	1		
OWENIIDAE			
<u>Owenis fusiformis</u>	1		

STATION 11-17

Sediment Type: Silty Sand
 Weight percentages -- Granules: 0.1
 Silts: 25.9

Date: Sept. 18
 Sands: 56.0
 Clay: 18.0

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	3		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>			1
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	6		2
<u>Parahesione</u> <u>luteola</u>	8		2
<u>Gyptis</u> sp.	21		
PILARGIDAE			
<u>Sigambra</u> <u>tentaculata</u>	11		
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>			1
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	28		23
<u>Prionospio</u> <u>cirrobranchiata</u>	6		
<u>Pseudopolydora</u> sp.	1098		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> c. <u>oculatus</u>			1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	1		
MALDANIDAE			
<u>Clymenella</u> <u>mucosa</u>	1		

STATION 11-17 -- (Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>			1

STATION 11-20

Sediment Type: Silty Sand	Date: Sept. 19
Weight percentages -- Granules: 1.5	Sands: 76.3
Silts: 13.3	Clay: 8.8

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	3		
Polynoid B	3		1
SIGALIONIDAE			
<u>Sthenelais boa</u>			7
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			12
HESIONIDAE			
<u>Gyptis vittata</u>			5
PILARGIDAE			
<u>Ancistrosyllis jonesi</u>	1		
<u>Sigambra tentaculata</u>	4		2
NEREIDAE			
<u>Nereis succinea</u>			11
NEPHTYIDAE			
<u>Nephtys picta</u>			1
GONIADIDAE			
<u>Glycinde pacifica</u>	1		26
ONUPHIDAE			
<u>Onuphis nebulosa</u>			1
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>			1
SPIONIDAE			
<u>Paraprionospio pinnata</u>	27		18
<u>Prionospio cirrobranchiata</u>	16		
<u>Prionospio h. texana</u>			1

STATION 11-20 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	3		1
<u>Spiochaetopterus c. oculus</u>	12		1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	35		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>			1
MALDANIDAE			
<u>Branchioasychis americana</u>			1
PECTINARIIDAE			
<u>Cistenides gouldii</u>			9

STATION 11-22 -- (Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>			3

STATION 11-23

Sediment Type: Clayey Silt

Date: Sept. 19

Weight percentages -- Granules: 0.6

Sands: 8.6

Silts: 53.1

Clay: 36.7

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>			1
HESIONIDAE			
<u>Gyptis vittata</u>	2		1
<u>Parahesione luteola</u>	5		13
PILARGIDAE			
<u>Sigambra tentaculata</u>	2		1
NEREIDAE			
<u>Nereis succinea</u>	22		20
GONIADIDAE			
<u>Glycinde pacifica</u>	1		1
SPIONIDAE			
<u>Paraprionospio pinnata</u>	80		8
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	6		1

STATION 11-25

Sediment Type: Sand

Date: Sept. 27

Weight percentages -- Granules: 0.2

Sands: 90.9

Silts: 5.4

Clay: 3.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	5		13
HESIONIDAE			
<u>Parahesione luteola</u>	19		
PILARGIDAE			
<u>Ancistrosyllis jonesi</u>	1		
<u>Sigambra tentaculata</u>	2		
NEREIDAE			
<u>Nereis succinea</u>	64		19
GONIADIDAE			
<u>Glycinde pacifica</u>	3		4
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
ORBINIIDAE			
<u>Scoloplos rubra</u>	62		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	161		43
<u>Pseudopolydora sp.</u>	2		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	45		1
CIRRATULIDAE			
<u>Tharyx sp. C</u>	10		
AMPHARETIDAE			
<u>Melinna maculata</u>	1		

STATION 11-26

Sediment Type: Sand

 Weight percentages -- Granules: 0.6
 Silts: 5.0

Date: Sept. 27

Sands: 89.9

Clay: 4.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	9		10
HESIONIDAE			
<u>Gyptis vittata</u>	1		
<u>Parahesion luteola</u>	9		
PILARGIDAE			
<u>Sigambra tentaculata</u>	1		
NEREIDAE			
<u>Laeonereis culveri</u>	1		
<u>Nereis succinea</u>	58		17
GONIADIDAE			
<u>Glycinde pacifica</u>	6		2
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
ORBINIIDAE			
<u>Scoloplos rubra</u>	32		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	186		8
<u>Prionospio cirrobranchiata</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	29		1
CIRRATULIDAE			
<u>Tharyx sp. C</u>	7		
MALDANIDAE			
<u>Branchioasychis americana</u>	3		

STATION 11-26 -- (Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		2
AMPHARETIDAE			
<u>Melinna maculata</u>			10

STATION 11-27 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>			1
<u>Capitellides jonesi</u>	9		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	8		12

Station 11-28 -- (Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona pettiboneae</u>		26	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		8	
CAPITELLIDAE			
<u>Capitella capitata</u>		25	
<u>Notomastus hemipodus</u>		3	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		3	
SABELLIDAE			
<u>Fabricia sabella</u>		6	

STATION 11-28-1

Sediment Type: Sand		Date: Sept. 27
Weight percentages -- Granules: 3.6		Sands: 96.3
Silts: 0.1		Clay: 0.0

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		2	
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		40	
HESIONIDAE			
<u>Gyptis vittata</u>		21	
NEREIDAE			
<u>Nereis succinea</u>		297	
GONIADIDAE			
<u>Glycinde pacifica</u>		7	
ONUPHIDAE			
<u>Diopatra cuprea</u>		26	
<u>Onuphis sp.</u>		168	
ARABELLIDAE			
<u>Arabella iricolor</u>		4	
<u>Drilonereis magna</u>		1	
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		5	
ORBINIIDAE			
<u>Scoloplos robustus</u>		2	
<u>Scoloplos rubra</u>		7	
<u>Naineris sp.</u>		7	
PARAONIDAE			
<u>Aricidea sp.</u>		1	
SPIONIDAE			
<u>Polydora websteri</u>		273	
<u>Scolecopsis squamata</u>		1	

STATION 11-28-1 -- (Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona pettiboneae</u>		37	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		2	
CAPITELLIDAE			
<u>Capitella capitata</u>		76	
<u>Heteromastus filiformis</u>		4	
MALDANIDAE			
<u>Clymenella mucosa</u>		20	

STATION 11-28-2

Sediment Type: Sand

Date: Sept. 27

Weight percentages -- Granules: 0.0

Sands: 98.9

Silts: 0.6

Clay: 0.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		4	
HESIONIDAE			
<u>Gyptis vittata</u>		3	
NEREIDAE			
<u>Nereis succinea</u>		43	
ONUPHIDAE			
<u>Onuphis</u> sp.		3	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		2	
<u>Polydora websteri</u>		2	
<u>Scoelelepis squamata</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		2	

STATION 12-1

Sediment Type: Sand		Date: Oct. 23
Weight percentages -- Granules: 0.6		Sands: 99.2
Silts: 0.2		Clay: 0.1

Family and Species	Dredge	Shovel	Net
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POLYNOIDAE			
<u>Harmothoe lunulata</u>		1	
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		6	
SYLLIDAE			
<u>Syllis</u> sp. B		51	
NEREIDAE			
<u>Nereis arenaceodentata</u>		3	
<u>Nereis p. occidentalis</u>		2	
<u>Nereis succinea</u>		1	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		3	
<u>Onuphis</u> sp.		104	
ARABELLIDAE			
<u>Drilonereis magna</u>		3	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		2	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		7	
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>		1	

STATION 12-1 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		1	
OPHELIIDAE			
<u>Travisia</u> sp.		2	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>		33	

STATION 12-2

Sediment Type: Sand

 Weight percentages -- Granules: 0.7
 Silts: 0.4

Date: Dec. 3

Sands: 98.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	6		2
NEREIDAE			
<u>Nereis</u> <u>succinea</u>			4
NEPHTYIDAE			
<u>Aglaphamus</u> <u>verrilli</u>	4		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	1		
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>			1
OPHELIIDAE			
<u>Travisia</u> sp.	23		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	6		
MALDANIDAE			
<u>Clymenella</u> <u>mucosa</u>	1		
OWENIIDAE			
<u>Owenia</u> <u>fusiformis</u>			1
PECTINARIIDAE			
<u>Cistenides</u> <u>gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda</u> <u>pulchella</u>	1		

STATION 12-3

Sediment Type: Sand

Weight percentages -- Granules: 0.6
Silt: 0.5

Date: Dec. 3

Sands: 98.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
CHRYSOPETALIDAE			
<u>Paleanotus</u> <u>heteroseta</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	3		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	1		1
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	2		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	2		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	182		1
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>	1		
MAGELONIDAE			
<u>Magelona</u> <u>pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>			1
OPHELIIDAE			
<u>Travisia</u> <u>sp.</u>	2		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	1		

STATION 12-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	6		
OWENIIDAE			
<u>Owenia fusiformis</u>	5		
AMPHARETIDAE			
<u>Isolda pulchella</u>	4		
TEREBELLIDAE			
<u>Pista cristata</u>	1		

STATION 12-4

Sediment Type: Sand

Date: Dec. 3

Weight percentages -- Granules: 0.1

Sands: 98.9

Silts: 0.6

Clay: 0.4

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	1		
NEPHTYIDAE			
<u>Aqlaophamus</u> <u>verrilli</u>	21		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	5		1
OPHELIIDAE			
<u>Travisia</u> <u>sp.</u>	2		

STATION 12-5

Sediment Type: Sand

Date: Dec. 3

Weight percentages -- Granules: 0.1

Sands: 99.2

Silts: 0.6

Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	5		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	7		1
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	14		
<u>Spiophanes</u> <u>bombyx</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	8		
MALDANIDAE			
<u>Clymenella</u> <u>mucosa</u>	11		

STATION 12-6

Sediment Type: Sand

Date: Dec. 3

Weight percentages -- Granules: 0.6

Sands: 98.8

Silt: 0.4

Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
CHRYSOPETALIDAE			
<u>Paeanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
NEREIDAE			
<u>Nereis succinea</u>	5		
NEPHTYIDAE			
<u>Nephtys picta</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	2		1
ARABELLIDAE			
<u>Drilonereis cylindrica</u>	1		
SPIONIDAE			
<u>Polydora socialis</u>	3		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>			1
OPHELIIDAE			
<u>Travisia sp.</u>	3		
MALDANIDAE			
<u>Clymenella mucosa</u>	21		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		

STATION 12-7

Sediment Type: Sand

Weight percentages -- Granules: 0.6

Silt: 0.2

Date: Dec. 3

Sands: 99.1

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	9		1
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	1		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	4		
<u>Nereis</u> <u>succinea</u>	9		3
NEPHTYIDAE			
<u>Aqilaophamus</u> <u>verrilli</u>	1		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	12		1
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	2		
<u>Polydora</u> <u>socialis</u>	5		
CHAETOPTERIDAE			
<u>Chaetopterus</u> <u>variopedatus</u>	1		
<u>Spiochaetopterus</u> <u>c. oculatus</u>			1
OPHELIIDAE			
<u>Travisia</u> <u>sp.</u>	4		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	2		

STATION 12-7 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	4		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		

STATION 12-8

Sediment Type: Sand

Date: Dec. 5

Weight percentages -- Granules: 1.2

Sands: 98.0

Silts: 0.5

Clay: 0.3

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	7		
SYLLIDAE			
<u>Syllis</u> sp. B	14		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	9		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	43		1
PARAONIDAE			
<u>Cirrophorus</u> <u>furcatus</u>	1		
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus</u> <u>variopedatus</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	8		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	18		
MALDANIDAE			
<u>Clymenella</u> <u>mucosa</u>	30		

STATION 12-9

Sediment Type: Sand

Date: Dec. 5

Weight percentages -- Granules: 1.3

Sands: 98.3

Silts: 0.3

Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sthenelais boa</u>	1		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		
<u>Phyllodoce arenae</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	4		
<u>Syllis aciculata</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	18		
NEPHTYIDAE			
<u>Nephtys picta</u>	1		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	58		
SPIONIDAE			
<u>Polydora socialis</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>			1
OPHELIIDAE			
<u>Travisia sp.</u>	2		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		

STATION 12-9 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	46		

STATION 12-10

Sediment Type: Sand

 Weight percentages -- Granules: 1.1
 Silts: 0.4

Date: Dec. 5

Sands: 98.4

Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	3		
SYLLIDAE			
<u>Exogone dispar</u>	59		
NEREIDAE			
<u>Nereis succinea</u>	9		2
ONUPHIDAE			
<u>Onuphis nebulosa</u>	49		
SPIONIDAE			
<u>Polydora socialis</u>	1		
<u>Spio setosa</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	3		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
<u>Heteromastus filiformis</u>	18		
MALDANIDAE			
<u>Clymenella mucosa</u>	51		

STATION 12-12

Sediment Type: Sand

Date: Dec. 5

Weight percentages -- Granules: 0.8

Sands: 98.7

Silts: 0.3

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
CHRYSOPETALIDAE			
<u>Paleanotus</u> <u>heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	213		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	6		
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	1		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	420		1
SPIONIDAE			
<u>Polydora</u> <u>socialis</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus</u> <u>variopedatus</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Heteromastus</u> <u>filiformis</u>	45		
MALDANIDAE			
<u>Clymenella</u> <u>mucosa</u>	110		
OWENIIDAE			
<u>Owenis</u> <u>fusiformis</u>	2		

STATION 12-13

Sediment Type: -	Date: Dec. 5
Weight percentages -- Granules: -	Sands: -
Silts: -	Clay: -

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>			1
SYLLIDAE			
<u>Exogone dispar</u>			1
<u>Syllis gracilis</u>			1
<u>Syllis spongicola</u>			2
ONUPHIDAE			
<u>Onuphis nebulosa</u>			1
LUMBRINERIDAE			
<u>Lumbrineris coccinea</u>			2
SPIONIDAE			
<u>Polydora socialis</u>			5
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Cirriformia filigera</u>			3
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			1

STATION 12-14

Sediment Type: Sand

Date: Dec. 5

Weight percentages -- Granules: 0.5

Sands: 91.1

Silt: 5.8

Clay: 2.6

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais boa</u>	18		6
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	19		
HESIONIDAE			
<u>Gyptis vittata</u>	5		
PILARGIDAE			
<u>Sigambra tentaculata</u>	4		
SYLLIDAE			
<u>Exogone dispar</u>	7		
<u>Syllis</u> sp. B	1		
NEREIDAE			
<u>Nereis succinea</u>	23		
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	49		
<u>Nephtys picta</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	11		3
ONUPHIDAE			
<u>Onuphis nebulosa</u>	47		
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		

STATION 12-14 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Paraprionospio pinnata</u>	15		
<u>Polydora socialis</u>	6		4
<u>Polydora websteri</u>	1		
<u>Pseudopolydora sp.</u>	7		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	7		1
<u>Spiochaetopterus c. oculatus</u>	259		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	4		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	8		
AMPHARETIDAE			
<u>Isolda pulchella</u>	10		
TEREBELLIDAE			
<u>Pista palmata</u>	2		

STATION 12-15

Sediment Type: Sand

Date: Dec. 6

Weight percentages -- Granules: 0.6

Sands: 98.5

Silt: 0.6

Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
HESIONIDAE			
<u>Gyptis vittata</u>	10		
SYLLIDAE			
<u>Exogone dispar</u>	3		
<u>Syllis variegata</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	7		2
ONUPHIDAE			
<u>Onuphis nebulosa</u>	328		
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Polydora socialis</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		10
<u>Spiochaetopterus c. oculatus</u>	3		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	7		
OWENIIDAE			
<u>Owenia fusiformis</u>	4		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		

STATION 12-16

Sediment Type: Sand

Date: Dec. 6

Weight percentages -- Granules: 0.1

Sands: 99.9

Silt: 0.1

Clay: 0.0

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	17		2
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	10		
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
<u>Onuphis nebulosa</u>	10		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	2		
<u>Polydora socialis</u>	2		1
<u>Scoelelepis squamata</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	2		
TEREBELLIDAE			
<u>Pista palmata</u>	1		

STATION 13-1-A

Sediment Type: Sand		Date: Nov. 27
Weight percentages -- Granules: 6.2		Sands: 92.6
Silts: 1.0		Clay: 0.2

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		6	
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		2	
<u>Phyllodoce arenae</u>		18	
HESIONIDAE			
<u>Gyptis vittata</u>		7	
PILARGIDAE			
<u>Cabira incerta</u>		2	
<u>Sigambra bassi</u>		5	
SYLLIDAE			
<u>Syllis</u> sp. B		255	
NEREIDAE			
<u>Nereis arenaceodentata</u>		12	
<u>Nereis p. occidentalis</u>		1	
<u>Nereis succinea</u>		4	
GLYCERIDAE			
<u>Glycera americana</u>		3	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		10	
<u>Onuphis</u> sp.		1	
EUNICIDAE			
<u>Marphysa sanguinea</u>		3	
ARABELLIDAE			
<u>Drilonereis magna</u>		2	

STATION 13-1-A -- (Continued)

Family and Species	Dredge	Shovel	Net
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		1	
ORBINIIDAE			
<u>Scoloplos rubra</u>		4	
PARAONIDAE			
<u>Aricidea fragilis</u>		3	
SPIONIDAE			
<u>Polydora socialis</u>		93	
<u>Scoelelepis squamata</u>		11	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		11	
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>		1	
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>		1	
<u>Spiochaetopterus c. oculatus</u>		3	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		1	
<u>Tharyx</u> sp. C		8	
OPHELIIDAE			
<u>Travisia</u> sp.		22	
CAPITELLIDAE			
<u>Capitella capitata</u>		2	
<u>Heteromastus filiformis</u>		16	
MALDANIDAE			
<u>Clymenella mucosa</u>		21	
SABELLIDAE			
<u>Fabricia sabella</u>		68	

STATION 13-1-B

Sediment Type: Sand

Date: Oct. 23

Weight percentages -- Granules: 0.4

Sands: 98.3

Silt: 0.9

Clay: 0.4

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		4	
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		4	
HESIONIDAE			
<u>Gyptis vittata</u>		4	
PILARGIDAE			
<u>Sigambra tentaculata</u>		1	
SYLLIDAE			
<u>Syllis</u> sp. B		10	
NEREIDAE			
<u>Nereis arenaceodentata</u>		3	
ONUPHIDAE			
<u>Onuphis</u> sp.		150	
ARABELLIDAE			
<u>Drilonereis magna</u>		1	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea</u> sp.		27	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		16	
OPHELIIDAE			
<u>Travisia</u> sp.		2	

STATION 13-1-B -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>		16	
OWENIIDAE			
<u>Owenia fusiformis</u>		1	

STATION 13-3

Sediment Type: Shelly Sand		Date: Nov. 27
Weight percentages -- Granules:	21.4	Sands: 77.8
Silts:	0.7	Clay: 0.1

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<i>Palaeonotus heteroseta</i>	37		
AMPHINOMIDAE			
<i>Pseudeurythoe ambigua</i>	1		
SYLLIDAE			
<i>Exogone dispar</i>	33		
<i>Syllis</i> sp. A	2		
<i>Syllis</i> sp. B	27		
GONIADIDAE			
<i>Goniadella</i> sp.	4		
ONUPHIDAE			
<i>Onuphis nebulosa</i>	5		
<i>Onuphis</i> sp.	35		
SPIONIDAE			
<i>Polydora socialis</i>	8		
CHAETOPTERIDAE			
<i>Chaetopterus variopedatus</i>	1		
CIRRATULIDAE			
<i>Cirratulus</i> sp. A	44		
CAPITELLIDAE			
<i>Heteromastus filiformis</i>	32		
MALDANIDAE			
<i>Clymenella mucosa</i>	1		
AMPHARETIDAE			
<i>Isolda pulchella</i>	7		

STATION 13-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Pista palmata</u>	2		
SABELLIDAE			
<u>Fabricia sabella</u>	760		

STATION 13-4

Sediment Type: Sand

Date: Nov. 27

Weight percentages -- Granules: 4.9

Sands: 92.8

Silts: 1.4

Clay: 0.9

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
SIGALIONIDAE			
<u>Sthenelais boa</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
SYLLIDAE			
<u>Syllis sp. A</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	1		
GLYCERIDAE			
<u>Glycera americana</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	134		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	6		
MALDANIDAE			
<u>Clymenella mucosa</u>	5		
OWENIIDAE			
<u>Owenia fusiformis</u>	4		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		
TEREBELLIDAE			
<u>Terebella rubra</u>	1		

STATION 13-5

Sediment Type: Sand

Date: Nov. 27

Weight percentages -- Granules: 1.8

Sands: 97.1

Silt: 0.9

Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
SIGALIONIDAE			
<u>Sthenelais boa</u>	5		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	4		
SYLLIDAE			
<u>Exogone dispar</u>	40		
NEREIDAE			
<u>Nereis succinea</u>	22		1
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	240		
SPIONIDAE			
<u>Polydora socialis</u>	3		1
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>	3		
OPHELIIDAE			
<u>Travisia sp.</u>	69		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	71		

STATION 13-5 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	42		
OWENIIDAE			
<u>Owenia fusiformis</u>	9		
AMPHARETIDAE			
<u>Isolda pulchella</u>	6		

STATION 13-7

Sediment Type: Sand

Date: Nov. 27

Weight percentages -- Granules: 1.2

Sands: 97.5

Silt: 1.0

Clay: 0.3

Family and Species	Dredge	Shovel	Net
CHRYSOPTALIDAE			
<u>Paleonotus heteroseta</u>	1		
NEREIDAE			
<u>Nereis succinea</u>	13		
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	2		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	140		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	20		
OPHELIIDAE			
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	65		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
TEREBELLIDAE			
<u>Terebella rubra</u>	1		

STATION 13-8

Sediment Type: Sand

Weight percentages -- Granules: 2.1
Silt: 0.7

Date: Nov. 27

Sands: 96.8

Clay: 0.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	1		
<u>Pholoe</u> sp.	1		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	30		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	274		
<u>Syllis spongicola</u>			4
<u>Syllis</u> sp. A	8		
NEREIDAE			
<u>Nereis succinea</u>	1		1
GONIADIDAE			
<u>Glycinde pacifica</u>	3		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	309		
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		
SPIONIDAE			
<u>Polydora socialis</u>	1		
<u>Prionospio h. texana</u>			1
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		

STATION 13-8 -- (Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
MALDANIDAE			
<u>Clymenella mucosa</u>	17		
OWENIIDAE			
<u>Owenia fusiformis</u>	3		

STATION 13-9

Sediment Type: Sand

Date: Dec. 2

Weight percentages -- Granules: 0.3

Sands: 99.1

Silts: 0.6

Clay: 0.1

Family and Species	Dredge	Shovel	Net
SYLLIDAE			
<u>Syllis</u> sp. A	1		
NEREIDAE			
<u>Nereis succinea</u>	2		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	15		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	3		

STATION 13-10

Sediment Type: Sand

Date: Dec. 2

Weight percentages -- Granules: 0.8

Sands: 97.7

Silts: 1.1

Clay: 0.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGLIONIDAE			
<u>Sigalion arenicola</u>	6		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	34		
PHYLLODOCIDAE			
<u>Phyllodoce fragilis</u>			3
SYLLIDAE			
<u>Syllis variegata</u>			1
<u>Syllis</u> sp. A	3		
<u>Syllis</u> sp. B	22		
NEREIDAE			
<u>Nereis succinea</u>	1		4
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
<u>Onuphis nebulosa</u>	59		
SPIONIDAE			
<u>Polydora socialis</u>			10
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	458		

STATION 13-10 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	39		
MALDANIDAE			
<u>Clymenella mucosa</u>	11		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	3		

STATION 13-11

Sediment Type: Sand

Date: Dec. 2

Weight percentages -- Granules: 0.0

Sands: 99.6

Silts: 0.2

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	2		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	1		10
SPIONIDAE			
<u>Spio</u> <u>setosa</u>	1		1
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>			1

STATION 13-12

Sediment Type: Sand

Date: Dec. 2

Weight percentages -- Granules: 0.2

Sands: 98.7

Silts: 0.5

Clay: 0.6

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>	3		1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	1		
GLYCERIDAE			
<u>Glycera americana</u>	4		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Apoprionospio pygamea</u>	8		
<u>Paraprionospio pinnata</u>	18		
<u>Scoelelepis squamata</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	2		1
<u>Spiochaetopterus c. oculatus</u>	10		1

STATION 13-13

Sediment Type: Sand		Date: Dec. 2
Weight percentages -- Granules: 0.0		Sands: 99.8
Silts: 0.2		Clay: 0.1

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis succinea</u>		22	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Dioptara cuprea</u>		10	
<u>Onuphis nebulosa</u>		1	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		1	
<u>Paraprionospio pinnata</u>		2	
<u>Polydora socialis</u>		3	
<u>Prionospio h. texana</u>		1	
<u>Scoelelepis squamata</u>		8	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Capitellides jonesi</u>		1	
ARENICOLIDAE			
<u>Arenicola cristata</u>		8	
MALDANIDAE			
<u>Clymenella mucosa</u>		12	
TEREBELLIDAE			
<u>Pista palmata</u>		1	

STATION 14-1-A

Sediment Type: Sand

Date: Oct. 23

Weight percentages -- Granules: 0.1

Sands: 98.4

Silt: 1.2

Clay: 0.3

Family and Species	Dredge	Shovel	Net
PILARGIDAE			
<u>Sigambra tentaculata</u>		1	
NEREIDAE			
<u>Laeonereis culveri</u>		9	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		8	
ORBINIIDAE			
<u>Scoloplos robustus</u>		2	
<u>Scoloplos rubra</u>		4	
PARAONIDAE			
<u>Aricidea fragilis</u>		1	
SPIONIDAE			
<u>Polydora socialis</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		10	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		40	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Heteromastus filiformis</u>		6	

STATION 14-1-A -- (Continued)

Family and Species	Dredge	Shovel	Net
ARENICOLIDAE			
<u>Arenicola cristata</u>		9	
MALDANIDAE			
<u>Clymenella mucosa</u>		2	

STATION 14-1-B

Sediment Type: Sand

Date: Oct. 23

Weight percentages -- Granules: 0.1

Sands: 98.7

Silts: 0.9

Clay: 0.2

Family and Species

Dredge

Shovel

Net

ARENICOLIDAE

Arenicola cristata

10

STATION 14-2

Sediment Type: Sand

Date: Nov. 20

Weight percentages -- Granules: 0.4

Sands: 87.8

Silts: 9.1

Clay: 2.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	4		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	7		
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	9		5
NEPHTYIDAE			
<u>Nephtys</u> <u>picta</u>	1		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	21		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	20		10
<u>Onuphis</u> sp.	1		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	2		
<u>Paraprionospio</u> <u>pinnata</u>	357		6
<u>Polydora</u> <u>socialis</u>	3		2
CHAETOPTERIDAE			
<u>Chaetopterus</u> <u>variopedatus</u>			1
<u>Spiochaetopterus</u> <u>c. oculatus</u>	10		1

STATION 14-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Tharyx</u> sp. C.	101		
CAPITELLIDAE			
<u>Capitella capitata</u>	2		
MALDANIDAE			
<u>Branchioasychis americana</u>	4		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			25
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
TEREBELLIDAE			
<u>Pista palmata</u>	2		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	2		
<u>Megalomma bioculatum</u>	8		

STATION 14-3

Sediment Type: Sand

Date: Nov. 20

Weight percentages -- Granules: 1.9

Sands: 94.9

Silt: 2.4

Clay: 0.8

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidonotus sublevis</u>			1
SIGALIONIDAE			
<u>Sthenelais boa</u>	3		
PHYLLODOCIADE			
<u>Phyllodoce arenae</u>	7		
<u>Phyllodoce fragilis</u>			1
HESIONIDAE			
<u>Podarke obscura</u>			5
SYLLIDAE			
<u>Autolytus cornutus</u>			1
<u>Exogone dispar</u>			1
NEREIDAE			
<u>Nereis succinea</u>			26
NEPHTYIDAE			
<u>Aqilaophamus verrilli</u>	7		
GLYCERIDAE			
<u>Glycera americana</u>	10		
GONIADIDAE			
<u>Glycinde pacifica</u>	11		
ONUPHIDAE			
<u>Diopatra cuprea</u>	2		
<u>Onuphis sp.</u>	20		
ARABELLIDAE			
<u>Drilonereis magna</u>	2		

STATION 14-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Paraprionospio pinnata</u>	37		
<u>Polydora socialis</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	3		
<u>Mesochaetopterus</u> sp. A	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	22		
<u>Cirriiformis filigera</u>			10
<u>Tharyx</u> sp. C	2		
OPHELIIDAE			
<u>Travisia</u> sp.	13		
MALDANIDAE			
<u>Branchioasychis americana</u>	4		
<u>Clymenella mucosa</u>	3		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			25
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
SABELLIDAE			
<u>Megalomma bioculatum</u>	1		

STATION 14-4

Sediment Type: Sand		Date: Nov. 20
Weight percentages -- Granules:	0.8	Sands: 92.8
Silts:	4.2	Clay: 2.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	3		
PHYLLODOCIDAE			
<u>Eumida</u> <u>sanguinea</u>	3		
<u>Phyllodoce</u> <u>arenae</u>	7		
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>	2		
PILARGIDAE			
<u>Cabira</u> <u>incerta</u>	1		
<u>Sigambra</u> <u>tentaculata</u>	3		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	3		
<u>Nereis</u> <u>p. occidentalis</u>	5		
<u>Nereis</u> <u>succinea</u>	21		5
<u>Platynereis</u> <u>dumerilii</u>			2
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	12		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	43		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	2		10
<u>Onuphis</u> <u>sp.</u>	15		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	26		
<u>Scoloplos</u> <u>rubra</u>	6		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	188		
<u>Polydora</u> <u>socialis</u>	11		1
<u>Prionospio</u> <u>h. texana</u>	1		

STATION 14-4 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	4		1
<u>Mesochaetopterus</u> sp. A	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	15		
<u>Tharyx</u> sp. C	38		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>			1
<u>Armandia agilis</u>	4		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
MALDANIDAE			
<u>Branchiopasychis americana</u>	17		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>	40		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	23		10
<u>Megalomma bioculatum</u>	3		

STATION 14-5

Sediment Type: Sand

Date: Nov. 20

Weight percentages -- Granules: 0.4

Sands: 97.9

Silt: 1.4

Clay: 0.3

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidonotus variabilis</u>			1
SIGALIONIDAE			
<u>Sthenelais boa</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	20		2
SYLLIDAE			
<u>Exogone dispar</u>	5		1
NEREIDAE			
<u>Nereis arenaceodentata</u>	7		
<u>Nereis p. occidentalis</u>	3		1
<u>Nereis succinea</u>	1		3
<u>Platynereis dumerilii</u>			5
GLYCERIDAE			
<u>Glycera americana</u>	9		
GONIADIDAE			
<u>Glycinde pacifica</u>	26		1
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
<u>Onuphis sp.</u>	106		
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		
PARAONIDAE			
<u>Aricidea sp.</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	11		
<u>Polydora websteri</u>			1
<u>Pseudopolydora sp.</u>	1		

STATION 14-5 -- (Continued)

Family and Species	Dredge	Shovel	Net
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		1
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>			2
<u>Armandia agilis</u>	9		
<u>Travisia</u> sp.	390		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	48		1
SABELLARIIDAE			
<u>Sabellaria gracilis</u>			3
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		

STATION 14-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Prionospio h. texana</u>	4		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	16		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia sp.</u>	16		
MALDANIDAE			
<u>Branchioasychis americana</u>	2		
<u>Clymenella mucosa</u>	130		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	8		
TEREBELLIDAE			
<u>Pista palmata</u>			1
<u>Thelepus setosus</u>	1		

STATION 14-8

Sediment Type: Sand

Date: Nov. 20

Weight percentages -- Granules: 0.1

Sands: 99.0

Silts: 0.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	8		
SYLLIDAE			
<u>Syllis</u> sp. B	4		
NEREIDAE			
<u>Nereis succinea</u>	4		
NEPHTYIDAE			
<u>Aqilaophamus verrilli</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	9		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	7		
<u>Paraprionospio pinnata</u>	43		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	1		
<u>Travisia</u> sp.	20		
MALDANIDAE			
<u>Clymenella mucosa</u>	209		10
OWENIIDAE			
<u>Owenia fusiformis</u>	2		

STATION 14-9 -- (Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Isolda pulchella</u>	4		

STATION 14-10

Sediment Type: Sand		Date: Nov. 21
Weight percentages -- Granules: 0.9		Sands: 95.1
Silts: 2.5		Clay: 0.7

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	6		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		
<u>Phyllodoce</u> <u>fragilis</u>			1
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	4		
<u>Syllis</u> <u>aciculata</u>	11		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	16		
NEPHTYIDAE			
<u>Aglaothamus</u> <u>verrilli</u>	28		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	1		
<u>Onuphis</u> <u>nebulosa</u>	50		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>erecta</u>	2		
ORBINIIDAE			
<u>Scoloplos</u> <u>rubra</u>	4		
CHAETOPTERIDAE			
<u>Chaetopterus</u> <u>variopedatus</u>	1		1
<u>Spiochaetopterus</u> <u>c. oculatus</u>			
OPHELIIDAE			
<u>Armandia</u> <u>agilis</u>	6		
<u>Travisia</u> <u>sp.</u>	3		

STATION 14-10 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	17		
AMPHARETIDAE			
<u>Isolda pulchella</u>	4		
SABELLIDAE			
<u>Fabricia sabella</u>	26		

STATION 14-12

Sediment Type: Sand

 Weight percentages -- Granules 4.2
 Silts: 0.8

Date: Nov. 21

Sands: 94.7

Clay: 0.3

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	3		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	5		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
SYLLIDAE			
<u>Exogone dispar</u>	12		
<u>Syllis</u> sp. A	34		
NEREIDAE			
<u>Nereis succinea</u>	2		
GONIADIDAE			
<u>Glycinde pacifica</u>	5		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
<u>Onuphis nebulosa</u>	62		
CHAETOPTERIDAE			
<u>Mesochaetopterus</u> sp. A	1		
OPHELIIDAE			
<u>Armandia agilis</u>	4		
<u>Travisia</u> sp.	18		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		

STATION 14-12 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	4		
TEREBELLIDAE			
<u>Polycirrus eximius</u>			1

STATION 14-13

Sediment Type: Sand

Date: Nov. 21

Weight percentages -- Granules: 3.2

Sands: 93.0

Silt: 2.5

Clay: 1.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidonotus variabilis</u>	1		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
HESIONIDAE			
<u>Podarke obscura</u>			4
SYLLIDAE			
<u>Syllis aciculata</u>	17		
NEREIDAE			
<u>Nereis succinea</u>	5		
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	15		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
EUNICIDAE			
<u>Eunice rubra</u>			1
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>	1		
<u>Lumbrineris erecta</u>	1		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	21		1
<u>Spiochaetopterus c. oculatus</u>	2		

STATION 14-13 -- (Continued)

Family and Species	Dredge	Shovel	Net
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>	1		
OPHELIIDAE			
<u>Armandia agilis</u>	9		
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	6		
TEREBELLIDAE			
<u>Loimia medusa</u>	2		

STATION 14-14

Sediment Type: Sand		Date: Nov. 26
Weight percentages -- Granules: 1.5		Sands: 97.7
Silts: 0.6		Clay: 0.3

Family and Species	Dredge	Shovel	Net
<hr/>			
SIGALIONIDAE			
<u>Sigalion arenicola</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
SYLLIDAE			
<u>Syllis</u> sp. A	2		
NEPHTYIDAE			
<u>Aglophamus verrilli</u>	1		
<u>Nephtys picta</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	39		
ORBINIIDAE			
<u>Scoloplos rubra</u>	4		
OPHELIIDAE			
<u>Armandia agilis</u>	3		
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	6		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		

STATION 14-15

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 0.6

Sands: 98.6

Silt: 0.6

Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	2		
SYLLIDAE			
<u>Exogone dispar</u>	10		
<u>Syllis</u> sp. A	1		
<u>Syllis</u> sp. B	24		
NEREIDAE			
<u>Nereis succinea</u>	4		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	8		
LUMBRINERIDAE			
<u>Lumbrineris latreilli</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	7		
<u>Spiochaetopterus c. oculatus</u>	1		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia</u> sp.	19		
MALDANIDAE			
<u>Clymenella mucosa</u>	40		
OWENIIDAE			
<u>Owenia fusiformis</u>	5		
AMPHARETIDAE			
<u>Isolda pulchella</u>	9		

STATION 14-16

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 0.7

Sands: 97.5

Silts: 1.3

Clay: 0.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sthenelais boa</u>	13		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
<u>Phyllodoce fragilis</u>			1
SYLLIDAE			
<u>Autolytus cornutus</u>			1
NEREIDAE			
<u>Nereis arenaceodentata</u>			3
<u>Nereis succinea</u>	5		3
ORBINIIDAE			
<u>Scoloplus robustus</u>	5		
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
OPHELIIDAE			
<u>Armandia agilis</u>	13		
<u>Travisia sp.</u>	3		
CAPITELLIDAE			
<u>Notomastus latericeus</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	3		

STATION 14-16 -- (Continued)

Family and Species	Dredge	Shovel	Net
OWENIIDAE			
<u>Owenia fusiformis</u>	10		
APHARETIDAE			
<u>Isolda pulchella</u>	5		
SABELLIDAE			
<u>Fabricia sabella</u>	1		

STATION 14-17

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 1.0

Sands: 98.5

Silts: 0.3

Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
NEREIDAE			
<u>Nereis p. occidentalis</u>	1		1
<u>Nereis succinea</u>			3
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	3		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Polydora socialis</u>	1		14
<u>Scoelelepis squamata</u>	1		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia sp.</u>	17		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		
OWENIIDAE			
<u>Owenia fusiformis</u>	5		

STATION 14-18

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 0.1

Sands: 98.0

Silts: 1.4

Clay: 0.5

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
<u>Phyllodoce arenae</u>	1		
NEREIDAE			
<u>Platynereis dumerilii</u>			1
GONIADIDAE			
<u>Glycinde pacifica</u>	33		
ORBINIIDAE			
<u>Scoloplos rubra</u>	3		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	12		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	12		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	24		

STATION 14-19

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 0.1

Sands: 99.1

Silts: 0.7

Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		6	
<u>Phyllodoce arenae</u>		2	
HESIONIDAE			
<u>Podarke obscura</u>		1	
NEREIDAE			
<u>Nereis succinea</u>		3	
GONIADIDAE			
<u>Glycinde pacifica</u>		12	
ORBINIIDAE			
<u>Scoloplos robustus</u>		12	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
<u>Scoelelepis squamata</u>		2	
CIRRATULIDAE			
<u>Tharyx</u> sp. C		1	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		3	
ARENICOLIDAE			
<u>Arenicola cristata</u>		7	

STATION 14-20

Sediment Type: Sand

Date: Nov. 26

Weight percentages -- Granules: 0.4

Sands: 99.5

Silts: 0.1

Clay: 0.0

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Nereis arenaceodentata</u>		1	
<u>Nereis succinea</u>		1	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		1	
<u>Scoelelepis squamata</u>		5	
OPHELIIDAE			
<u>Travisia</u> sp.		5	

STATION 15-1

Sediment Type: Sand

Date: Sept. 26

Weight percentages -- Granules: 4.7

Sands: 88.4

Silts: 6.1

Clay: 0.8

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>	4		
NEREIDAE			
<u>Nereis arenaceodentata</u>	9		
<u>Nereis p. occidentalis</u>			20
<u>Nereis succinea</u>			6
ONUPHIDAE			
<u>Diopatra cuprea</u>	2		2
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	1		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	2		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Paraprionospio pinnata</u>	42		2
SPIONIDAE			
<u>Polydora socialis</u>	8		
<u>Polydora websteri</u>			3
<u>Prionospio cirrobranchiata</u>	6		
<u>Prionospio h. texana</u>	1		
<u>Streblospio benedicti</u>	41		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	12		

STATION 15-1 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	3		
CIRRATULIDAE			
<u>Cirriformia filigera</u>	1		7
CAPITELLIDAE			
<u>Capitella capitata</u>	5		
<u>Notomastus latericeus</u>	4		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		
<u>Maldane sarsi</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		1
SABELLIDAE			
<u>Branchioma nigromaculata</u>	1		1
SERPULIDAE			
<u>Eupomatus dianthus</u>			1

STATION 15-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitella capitata</u>		11	
<u>Heteromastus filiformis</u>		22	
<u>Notomastus latericeus</u>		2	
MALDANIDAE			
<u>Clymenella mucosa</u>		4	10

STATION 15-3

Sediment Type: Sand

Date: Sept. 26

Weight percentages -- Granules: 3.4

Sands: 82.3

Silt: 11.8

Clay: 2.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		
HESIONIDAE			
<u>Gyptis vittata</u>		4	
SYLLIDAE			
<u>Exogone dispar</u>	1		
<u>Syllis</u> sp. B		1	
NEREIDAE			
<u>Laeonereis culveri</u>		4	
<u>Nereis p. occidentalis</u>	11	8	1
ONUPHIDAE			
<u>Diopatra cuprea</u>	3	4	10
<u>Onuphis nebulosa</u>	1	5	
<u>Onuphis</u> sp.		29	
EUNICIDAE			
<u>Marphysa sanguinea</u>		2	
ARABELLIDAE			
<u>Drilonereis cylindrica</u>		4	
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		6	
ORBINIIDAE			
<u>Scoloplos robustus</u>		1	
<u>Scoloplos rubra</u>		2	
PARAONIDAE			
<u>Aricidea fragilis</u>		8	

STATION 15-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Paraprionospio pinnata</u>		2	
<u>Polydora socialis</u>	1		
<u>Prionospio cirrobranchiata</u>		2	
<u>Prionospio h. texana</u>	3		
<u>Streblospio benedicti</u>		1	
<u>Pseudopolydora sp.</u>		2	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		5	
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>		3	
CIRRATULIDAE			
<u>Tharyx sp. C</u>	1	29	
CAPITELLIDAE			
<u>Capitellides jonesi</u>		2	
<u>Heteromastus filiformis</u>	1	3	
MALDANIDAE			
<u>Branchioasychis americana</u>		2	
<u>Clymenella mucosa</u>		3	10
AMPHARETIDAE			
<u>Melinna maculata</u>		5	
TEREBELLIDAE			
<u>Thelepus setosus</u>	2	1	
SABELLIDAE			
<u>Branchioma nigromaculata</u>	2910	506	10

STATION 15-4

Sediment Type: Sand

Weight percentages -- Granules: 9.7

Silts: 5.7

Date: Sept. 26

Sands: 83.7

Clay: 1.0

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		
NEREIDAE			
<u>Nereis arenaceodentata</u>	2		
<u>Nereis p. occidentalis</u>	1		
<u>Nereis succinea</u>			6
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Diopatra cuprea</u>	13		10
<u>Onuphis sp.</u>	4		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	2		
PARAONIDAE			
<u>Aricidea fragilis</u>	7		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	3		
<u>Dispio uncinata</u>	1		
<u>Paraprionospio pinnata</u>	50		
<u>Polydora socialis</u>	5		
<u>Polydora websteri</u>	17		
<u>Prionospio cirrobranchiata</u>	4		
<u>Prionospio h. texana</u>	1		
<u>Streblospio benedicti</u>	163		
<u>Pseudopolydora sp.</u>	10		

STATION 15-4 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	3		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Cirratulus sp. D</u>	1		
<u>Tharyx sp. C</u>	38		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
<u>Heteromastus filiformis</u>	14		
<u>Notomastus latericeus</u>	1		
MALDANIDAE			
<u>Clymenella zonalis</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
TEREBELLIDAE			
<u>Pista palmata</u>			1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	72		10
<u>Megalomma bioculatum</u>	3		

STATION 15-5

Sediment Type: Sand

Weight percentages -- Granules: 0.6

Silt: 8.9

Date: Sept. 26

Sands: 89.1

Clay: 1.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
Polynoid B	2		
PHYLLODOCIDAE			
<u>Phyllodoce fragilis</u>			1
HESIONIDAE			
<u>Gyptis vittata</u>	3		
PILARGIDAE			
<u>Ancistrosyllis jonesi</u>	2		
NEREIDAE			
<u>Ceratonereis irritabilis</u>	1		
<u>Nereis succinea</u>			1
GONIADIDAE			
<u>Glycinde pacifica</u>	3		
EUNICIDAE			
<u>Marphysa sanguinea</u>			1
PARAONIDAE			
<u>Aricidea fragilis</u>	3		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Paraprionospio pinnata</u>	289		3
<u>Polydora socialis</u>	3		
<u>Prionospio cirrobranchiata</u>	9		
<u>Streblospio benedicti</u>	84		
<u>Pseudopolydora sp.</u>	7		

STATION 15-5 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus varipedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	4		1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	37		
CAPITELLIDAE			
<u>Capitella capitata</u>	1		
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			6
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	5		10

STATION 15-6

Sediment Type: Sand

Date: Sept. 26

Weight percentages -- Granules: 2.6

Sands: 90.7

Silt: 5.7

Clay: 1.0

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	2		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Paranaites</u> <u>speciosa</u>	2		1
<u>Phyllodoce</u> <u>fragilis</u>			20
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	2		
PILARGIDAE			
<u>Ancistrosyllis</u> <u>jonesi</u>	1		
<u>Sigambra</u> <u>tentaculata</u>	1		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	1		
<u>Nereis</u> <u>p. occidentalis</u>			10
<u>Nereis</u> <u>succinea</u>			3
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	2		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	13		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	2		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>sp.</u>	1		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	5		
<u>Scoloplos</u> <u>rubra</u>	1		

STATION 15-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>	4		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Paraprionospio pinnata</u>	18		
<u>Polydora socialis</u>	4		3
<u>Polydora websteri</u>	2		
<u>Prionospio cirrobranchiata</u>	1		
<u>Spiophanes bombyx</u>	1		
<u>Steblospio benedicti</u>	9		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	1		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	11		
<u>Tharyx</u> sp. C	38		1
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	8		
<u>Clymenella mucosa</u>	17		
SABELLARIIDAE			
<u>Sabellaria floradensis</u>			3
<u>Sabellaria gracilis</u>			10
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		
TEREBELLIDAE			
<u>Terebella rubra</u>			1

STATION 15-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Branchiomma nigramaculata</u>			10
<u>Megalomma bioculatum</u>	8		
<u>Sabella microphthalma</u>			1

STATION 15-7

Sediment Type: Shelly Sand	Date: Sept. 26
Weight percentages -- Granules: 29.4	Sands: 70.6
Silts: 0.0	Clay: 0.0

Family and Species	Dredge	Shovel	Net
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>impatiens</u>		3	
SPIONIDAE			
<u>Scoelelepis</u> <u>squamata</u>		10	
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>		1	

STATION 15-8 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
<u>Paraprionospio pinnata</u>	135		3
<u>Polydora socialis</u>	2		
<u>Polydora websteri</u>	1		
<u>Prionospio cirrobranchiata</u>	5		
<u>Scolecopsis squamata</u>	1		
<u>Spiophanes bombyx</u>	1		
<u>Streblospio benedicti</u>	56		
<u>Pseudopolydora sp.</u>	4		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	5		1
<u>Spiochaetopterus c. oculatus</u>	2		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	4		
<u>Tharyx sp. C</u>	51		
OPHELIIDAE			
<u>Travisia sp.</u>	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	3		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	3		
TEREBELLIDAE			
<u>Pista cristata</u>	1		
SABELLIDAE			
<u>Megalomma bioculatum</u>	3		

STATION 15-9

Sediment Type: Sand		Date: Sept. 26
Weight percentages -- Granules: 0.4		Sands: 99.4
Silts: 0.2		Clay: 0.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		1	
PILARGIDAE			
<u>Sigambra bassi</u>		2	
ONUPHIDAE			
<u>Onuphis nebulosa</u>		1	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		1	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		10	
<u>Paraprionospio pinnata</u>		10	
<u>Polydora socialis</u>		6	
<u>Scolecipis squamata</u>		2	
<u>Streblospio benedicti</u>		2	
<u>Pseudopolydora sp.</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>		1	
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		2	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		1	
<u>Tharyx sp. C</u>		4	

STATION 15-9 -- (Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>		1	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		2	
<u>Notomastus latericeus</u>		2	
AMPHARETIDAE			
<u>Isolda pulchella</u>		1	
TEREBELLIDAE			
<u>Loimia viridis</u>		1	

STATION 15-10

Sediment Type: Sand

Date: Oct. 2

Weight percentages -- Granules: 0.6

Sands: 98.8

Silt: 0.5

Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>		2	
PARAONIDAE			
<u>Aricidea fragilis</u>		1	
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		1	
<u>Polydora socialis</u>		3	
<u>Prionospio h. texana</u>		2	
<u>Scoelelepis squamata</u>		239	
<u>Streblospio benedicti</u>		2	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>		1	
<u>Spiochaetopterus c. oculatus</u>		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		7	
<u>Heteromastus filiformis</u>		1	
<u>Notomastus latericeus</u>		1	

STATION 15-11

Sediment Type: Sand

Date: Oct. 2

Weight percentages -- Granules: 4.0

Sands: 93.5

Silt: 2.1

Clay: 0.4

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		
<u>Phyllodoce fragilis</u>			1
HESIONIDAE			
<u>Podarke obscura</u>	1		2
SYLLIDAE			
<u>Syllis annularis</u>			1
NEREIDAE			
<u>Ceratonereis irritabilis</u>			1
<u>Nereis arenaceodentata</u>	15		5
<u>Nereis p. occidentalis</u>			6
<u>Nereis succinea</u>			9
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	12		3
ONUPHIDAE			
<u>Diopatra cuprea</u>	4		6
<u>Onuphis nebulosa</u>	2		1
ORBINIIDAE			
<u>Scoloplos robustus</u>	7		
<u>Scoloplos rubra</u>	4		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		

STATION 15-11 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	13		1
<u>Paraprionospio pinnata</u>	291		1
<u>Polydora socialis</u>	12		14
<u>Polydora websteri</u>			1
<u>Prionospio cirrobranchiata</u>			1
<u>Scoelelepis squamata</u>	9		
<u>Streblospio benedicti</u>	59		12
<u>Pseudopolydora</u> sp.	7		
CHAETOPTERIDAE			
<u>Chaetopterus varlopedatus</u>	2		1
<u>Spiochaetopterus c. oculatus</u>	22		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	4		1
<u>Cirriformia filigera</u>			1
<u>Tharyx</u> sp. C	9		
CAPITELLIDAE			
<u>Capitella capitata</u>	1		
<u>Capitellides jonesi</u>	6		22
MALDANIDAE			
<u>Branchioasychis americana</u>	2		
<u>Clymenella mucosa</u>	1		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			1
<u>Sabellaria gracilis</u>			1
TEREBELLIDAE			
<u>Polycirrus eximius</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		10
<u>Megalomma bioculatum</u>	17		10

STATION 15-12

Sediment Type: Silty Sand

Date: Oct. 2

Weight percentages -- Granules: 0.3

Sands: 72.5

Silts: 22.1

Clay: 5.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	4		
PHYLLODOCIDAE			
<u>Eumida</u> <u>sanguinea</u>			5
<u>Paranaites</u> <u>speciosa</u>	1		
<u>Phyllodoce</u> <u>arenae</u>			4
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
<u>Podarke</u> <u>obscura</u>	1		
SYLLIDAE			
<u>Autolytus</u> <u>cornutus</u>			1
<u>Brania</u> <u>clavata</u>	1		4
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	12		13
<u>Nereis</u> <u>p. occidentalis</u>			1
<u>Nereis</u> <u>succinea</u>	1		1
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	17		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	22		
ARABELLIDAE			
<u>Arabella</u> <u>iricolor</u>	1		
DORVILLEIDAE			
<u>Dorvillea</u> <u>rudolphi</u>			1
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	20		
<u>Scoloplos</u> <u>rubra</u>	5		

STATION 15-12 -- (Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>	3		
<u>Cirrophorus furcatus</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	5		
<u>Paraprionospio pinnata</u>	96		1
<u>Polydora socialis</u>	14		
<u>Prionospio cirrobranchiata</u>	1		
<u>Prionospio h. texana</u>			1
SPIONIDAE			
<u>Scoelelepis squamata</u>	2		
<u>Streblospio benedicti</u>	55		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	6		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	16		
<u>Cirriformia filigera</u>	1		
<u>Tharyx sp. C</u>	76		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>			1
<u>Notomastus latericeus</u>	6		
MALDANIDAE			
<u>Clymenella mucosa</u>	4		1
<u>Maldane sarsi</u>	3		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		1
<u>Megalomma bioculatum</u>	9		

STATION 15-13

Sediment Type: Sand

Date: Oct. 2

Weight percentages -- Granules: 3.4

Sands: 91.0

Silts: 5.0

Clay: 0.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>			1
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>	1		
PHYLLODOCIDAE			
<u>Eumida</u> <u>sanguinea</u>			1
<u>Phyllodoce</u> <u>arenae</u>	2		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	2		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	10		1
NEPHTYIDAE			
<u>Aglaphamus</u> <u>verrilli</u>	2		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	10		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	1		4
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	15		
<u>Scoloplos</u> <u>rubra</u>	9		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	4		

STATION 15-13 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	14		1
<u>Paraprionospio pinnata</u>	221		1
<u>Polydora socialis</u>	18		2
<u>Streblospio benedicti</u>	51		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	4		1
<u>Spiochaetopterus c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	7		
<u>Cirriformia filigera</u>			1
<u>Tharyx</u> sp. C	285		
MALDANIDAE			
<u>Clymenella mucosa</u>	1		
SABELLIDAE			
<u>Megalomma bioculatum</u>	4		1

STATION 15-14

Sediment Type: Sand

Date: Oct. 2

Weight percentages -- Granules: 5.9

Sands: 86.5

Silts: 6.2

Clay: 1.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
Polynoid B	4		
SIGALIONIDAE			
<u>Sthenelais boa</u>	1		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			4
<u>Phyllodoce arenae</u>	1		2
HESIONIDAE			
<u>Podarke obscura</u>			1
PILARGIDAE			
<u>Sigambra tentaculata</u>	3		
SYLLIDAE			
<u>Autolytus cornutus</u>			2
<u>Exogone dispar</u>	3		6
NEREIDAE			
<u>Nereis arenaceodentata</u>	1		
<u>Nereis p. occidentalis</u>	1		
<u>Nereis succinea</u>	2		
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	3		
GLYCERIDAE			
<u>Glycera americana</u>	1		

STATION 15-14 -- (Continued)

Family and Species	Dredge	Shovel	Net
GONIADIDAE			
<u>Glycinde pacifica</u>	12		2
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		1
<u>Onuphis nebulosa</u>			1
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	2		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	2		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	49		12
<u>Polydora socialis</u>			7
<u>Polydora websteri</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	14		1
<u>Spiochaetopterus c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	5		
<u>Tharyx</u> sp. C	13		
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		1
MALDANIDAE			
<u>Branchioasychis americana</u>	6		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		

STATION 15-14 -- (Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Isolda pulchella</u>	4		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			2
<u>Fabricia sabella</u>	6		

STATION 15-15

Sediment Type: Sand		Date: Oct. 14
Weight percentages -- Granules: 0.1		Sands: 90.7
Silts: 6.6		Clay: 2.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>			1
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>			1
<u>Syllis</u> <u>variegata</u>			1
<u>Syllis</u> sp. B	1		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	209		7
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	2		2
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	4		1
<u>Onuphis</u> sp.	25		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>erecta</u>	1		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	4		
PARAONIDAE			
<u>Aricidea</u> <u>taylori</u>	4		
SPIONIDAE			
<u>Paraprionospio</u> <u>pinnata</u>	8		7
<u>Polydora</u> <u>socialis</u>	2		1
<u>Polydora</u> <u>websteri</u>			3
<u>Prionospio</u> <u>h. texana</u>	5		13
<u>Streblospio</u> <u>benedicti</u>			4
MAGELONIDAE			
<u>Magelona</u> <u>pettiboneae</u>	1		

STATION 15-15 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	134		
<u>Tharyx</u> sp. C			1
CAPITELLIDAE			
<u>Capitellides jonesi</u>			3
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Clymenella mucosa</u>	5		
TEREBELLIDAE			
<u>Thelepus setosus</u>	9		1
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			10

STATION 15-16

Sediment Type: Sand		Date: Oct. 14
Weight percentages -- Granules: 0.6		Sands: 94.4
Silts: 4.1		Clay: 0.8

Family and Species	Dredge	Shovel	Net
SYLLIDAE			
<u>Syllis annularis</u>			6
NEREIDAE			
<u>Nereis arenaceodentata</u>	3		
<u>Platynereis dumerilii</u>	2		1
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	4		1
<u>Onuphis magna</u>	2		
<u>Onuphis sp.</u>	25		
ARABELLIDAE			
<u>Arabella iricolor</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Polydora socialis</u>	5		
<u>Prionospio h. texana</u>	21		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		1

STATION 15-16 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	61		
<u>Tharyx</u> sp. c	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	21		
OWENIIDAE			
<u>Owenia fusiformis</u>	3		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
TEREBELLIDAE			
<u>Thelepus setosus</u>	3		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	63		10
<u>Sabella microphthalma</u>	1		

STATION 15-17

Sediment Type: Sand

Weight percentages -- Granules: 0.1
Silts: 0.5

Date: Oct. 14

Sands: 99.2

Clay: 0.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	10		
<u>Nereis</u> <u>p. occidentalis</u>			1
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	21		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	13		
<u>Onuphis</u> <u>sp.</u>	1		1
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	4		
<u>Scoloplos</u> <u>rubra</u>	1		
PARAONIDAE			
<u>Cirrophorus</u> <u>furcatus</u>	1		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	8		
<u>Paraprionospio</u> <u>pinnata</u>	78		1
<u>Prionospio</u> <u>cirrobranchiata</u>	1		
<u>Prionospio</u> <u>h. texana</u>	6		
<u>Streblospio</u> <u>benedicti</u>	2		
<u>Pseudopolydora</u> <u>sp.</u>	2		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculus</u>	11		1
CIRRATULIDAE			
<u>Cirratulus</u> <u>grandis</u>	1		
<u>Tharyx</u> <u>sp. C</u>	1		

STATION 15-17 -- (Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		

STATION 15-18

Sediment Type: Sand

Date: Oct. 14

Weight percentages -- Granules: 1.3

Sands: 98.3

Silt: 0.4

Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	7		2
HESIONIDAE			
<u>Gyptis vittata</u>	1		
<u>Podarke obscura</u>			1
SYLLIDAE			
<u>Exogone dispar</u>	2		
NEREIDAE			
<u>Nereis arenaceodentata</u>	39		1
<u>Nereis p. occidentalis</u>			1
<u>Platynereis dumerilii</u>			1
GONIADIDAE			
<u>Glycinde pacifica</u>	10		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	20		
ORBINIIDAE			
<u>Orbinia ornata</u>	1		
<u>Scoloplos robustus</u>	5		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	3		
<u>Paraprionospio pinnata</u>	39		
<u>Polydora socialis</u>	1		
<u>Prionospio h. texana</u>	18		1
<u>Scoelelepis squamata</u>	1		
<u>Spio setosa</u>	53		

STATION 15-18 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	1		
CIRRATULIDAE			
<u>Tharyx</u> sp. C	1		
OPHELIIDAE			
<u>Travisia</u> sp.	349		
CAPITELLIDAE			
<u>Capitella capitata</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	36		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	5		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			10

STATION 15-21

Sediment Type: Sand	Date: Oct. 17
Weight percentages -- Granules: 2.7	Sands: 97.0
Silts: 0.2	Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	2		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	6		
SYLLIDAE			
<u>Syllis</u> sp. B	25		
NEREIDAE			
<u>Nereis arenaceodentata</u>	1		
<u>Nereis p. occidentalis</u>	5		
<u>Nereis succinea</u>	4		1
GLYCERIDAE			
<u>Glycera dibranchiata</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	9		
<u>Goniadella</u> sp.	4		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	55		
SPIONIDAE			
<u>Polydora socialis</u>	1		
<u>Spio setosa</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopodatus</u>	1		
<u>Mesochaetopterus</u> sp. B	3		
OPHELIIDAE			
<u>Travisia</u> sp.	42		

STATION 15-21 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Capitellides jonesi</u>	1		
<u>Heteromastus filiformis</u>	12		
MALDANIDAE			
<u>Clymenella mucosa</u>	47		
OWENIIDAE			
<u>Owenia fusiformis</u>	5		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	11		

STATION 15-22

Sediment Type: Sand		Date: Oct. 21
Weight percentages -- Granules: 5.3		Sands: 93.2
Silts: 1.2		Clay: 0.3

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	8		
CHRYSOPELALIDAE			
<u>Paleanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	16		
SYLLIDAE			
<u>Exogone dispar</u>	60		
<u>Syllis</u> sp. A	30		
NEREIDAE			
<u>Nereis succinea</u>	6		
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	1		
GONIADIDAE			
<u>Goniadella</u> sp.	17		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	32		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	1		
<u>Lumbrineris latreilli</u>	1		
ARABELLIDAE			
<u>Arabella iricolor</u>	3		
<u>Drilonereis cylindrica</u>	2		

STATION 15-22 -- (Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Cirrophorus furcatus</u>	2		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		
OPHELIIDAE			
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.	7		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	7		
OWENIIDAE			
<u>Owenia fusiformis</u>	4		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		

STATION 15-23

Sediment Type: Sand		Date: Oct. 21
Weight percentages -- Granules: 7.7		Sands: 91.9
Silts: 0.3		Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	5		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	33		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	9		
<u>Phyllodoce fragilis</u>			1
SYLLIDAE			
<u>Exogone dispar</u>	126		
<u>Syllis aciculata</u>	2		
<u>Syllis sp. A</u>	76		
NEREIDAE			
<u>Nereis succinea</u>	1		6
GONIADIDAE			
<u>Goniadella sp.</u>	39		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	7		
EUNICIDAE			
<u>Nematonereis hebes</u>	4		
ORBINIIDAE			
<u>Scoloplos rubra</u>	18		
SPIONIDAE			
<u>Polydora socialis</u>	1		
<u>Prionospio h. texana</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		

STATION 15-23 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>	2		
OPHELIIDAE			
<u>Arandia agilis</u>	1		
<u>Travisia sp.</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
SABELLIDAE			
<u>Fabricia sabella</u>	2		

STATION 15-24

Sediment Type: -

Weight percentages -- Granules: -

Silts: -

Date: Oct. 21

Sands: -

Clay: -

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	8		
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	39		
<u>Syllis</u> sp. A	14		
GONIADIDAE			
<u>Goniadella</u> sp.	7		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	61		
SPIONIDAE			
<u>Polydora socialis</u>	5		
<u>Prionospio h. texana</u>	4		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
OWENIIDAE			
<u>Myriochele</u> sp.	2		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	2		

STATION 15-25 -- (Continued)

Family and Species	Dredge	Shovel	Net
ARABELLIDAE			
<u>Drilonereis cylindrica</u>	1		
<u>Drilonereis magna</u>	2		
ORBINIIDAE			
<u>Scoloplos rubra</u>	17		
SPIONIDAE			
<u>Polydora socialis</u>	1		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	1		
<u>Travisia sp.</u>	3		

STATION 15-26

Sediment Type: Sand

Date: Oct. 21

Weight percentages -- Granules: 6.6

Sands: 92.0

Silts: 1.0

Clay: 0.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	9		
CHRYSOPE TALIDAE			
<u>Paleanotus heteroseta</u>	45		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	4		
SYLLIDAE			
<u>Exogone dispar</u>	42		1
<u>Syllis sp. A</u>	6		
NEREIDAE			
<u>Nereis succinea</u>	1		3
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Goniadella sp.</u>	33		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	40		1
EUNICIDAE			
<u>Marphysa sanguinea</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris latreilli</u>	1		

STATION 15-26 -- (Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	9		
SPIONIDAE			
<u>Polydora socialis</u>	9		1
<u>Scolecopsis squamata</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	1		
<u>Cirriformia</u> sp. B	1		
OPHELIIDAE			
<u>Travisia</u> sp.	10		
MALDANIDAE			
<u>Clymenella mucosa</u>	9		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele</u> sp.	1		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		

STATION 15-27

Sediment Type: Sand	Date: Oct. 21
Weight percentages -- Granules: 1.3	Sands: 98.5
Silts: 0.2	Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	4		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	7		
SYLLIDAE			
<u>Syllis</u> sp. A	1		
<u>Syllis</u> sp. B	44		
NEREIDAE			
<u>Nereis succinea</u>			3
GONIADIDAE			
<u>Goniadella</u> sp.	4		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	17		1
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
SPIONIDAE			
<u>Polydora websteri</u>			1
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia</u> sp.	20		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		

STATION 15-27 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	26		10
OWENIIDAE			
<u>Owenia fusiformis</u>	2		
TEREBELLIDAE			
<u>Loimia medusa</u>	1		

STATION 15-28

Sediment Type: Sand		Date: Oct. 21
Weight percentages -- Granules: 2.8		Sands: 96.6
Silts: 0.4		Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	23		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	5		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
SYLLIDAE			
<u>Branchiosyllis oculata</u>	1		
<u>Brania clavata</u>	1		
<u>Exogone dispar</u>	1		
<u>Syllis</u> sp. B	18		
NEREIDAE			
<u>Nereis p. occidentalis</u>	1		
GLYCERIDAE			
<u>Glycera americana</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	64		1
SPIONIDAE			
<u>Spio setosa</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	34		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	19		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	4		

STATION 15-29

Sediment Type: -
 Weight percentages -- Granules: -
 Silts: -

Date: Oct. 22
 Sands: -
 Clay: -

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			1
<u>Phyllodoce arenae</u>	5		
HESIONIDAE			
<u>Podarke obscura</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	7		
<u>Syllis variegata</u>	5		
NEREIDAE			
<u>Platynereis dumerilii</u>			1
GONIADIDAE			
<u>Goniadella</u> sp.	2		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	54		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		
<u>Polydora socialis</u>	19		
<u>Prionospio h. texana</u>	22		
<u>Spio setosa</u>	1		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	1		
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	4		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia</u> sp.	12		

STATION 15-29 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	19		
MALDANIDAE			
<u>Clymenella mucosa</u>	84		
OWENIIDAE			
<u>Owenia fusiformis</u>	2		
AMPHARETIDAE			
<u>Isolda pulchella</u>	4		
TEREBELLIDAE			
<u>Loimia medusa</u>	1		
<u>Polycirrus eximius</u>	1		

STATION 15-30

Sediment Type: Sand		Date: Oct. 22
Weight percentages -- Granules: 3.5		Sands: 96.1
Silts: 0.3		Clay: 0.1

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	15		
SYLLIDAE			
<u>Exogone dispar</u>	15		
<u>Syllis</u> sp. B	70		
NEREIDAE			
<u>Ceratonereis irritabilis</u>	1		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	65		
SPIONIDAE			
<u>Polydora socialis</u>	2		
OPHELIIDAE			
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.	90		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	10		
MALDANIDAE			
<u>Clymenella mucosa</u>	116		
OWENIIDAE			
<u>Owenia fusiformis</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	12		

STATION 15-30 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Loimia medusa</u>	3		
<u>Polycirrus eximius</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	2		4

STATION 15-31

Sediment Type: Sand

Date: Oct. 22

Weight percentages -- Granules: 4.5

Sands: 93.3

Silts: 1.9

Clay: 0.4

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	44		2
HESIONIDAE			
<u>Gyptis vittata</u>	16		
<u>Podarke obscura</u>	1		
SYLLIDAE			
<u>Syllis aciculata</u>	33		
NEREIDAE			
<u>Nereis succinea</u>			5
GONIADIDAE			
<u>Glycinde pacifica</u>	10		
<u>Goniadella sp.</u>	30		
ONUPHIDAE			
<u>Diopatra cuprea</u>	3		
<u>Onuphis nebulosa</u>	250		
EUNICIDAE			
<u>Marphysa sanguinea</u>	1		
ORBINIIDAE			
<u>Scoloplos rubra</u>	2		
SPIONIDAE			
<u>Polydora socialis</u>	21		
<u>Prionospio h. texana</u>			1
<u>Spio setosa</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		

STATION 15-31 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
<u>Cirratulus</u> sp. A	2		
<u>Tharyx</u> sp. B	1		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia</u> sp.	69		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	67		
ARENICOLIDAE			
<u>Arenicola cristata</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Clymenella mucosa</u>	35		
OWENIIDAE			
<u>Owenia fusiformis</u>	18		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	5		
PECTINARIIDAE			
<u>Citenides gouldii</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	122		
TEREBELLIDAE			
<u>Enoplobranchus sanguineus</u>	1		
<u>Loimia medusa</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		
<u>Fabricia sabella</u>	34		
<u>Sabella microphthalma</u>	1		

STATION 15-32

Sediment Type: Sand

Date: Oct. 22

Weight percentages -- Granules: 0.7

Sands: 98.4

Silts: 0.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	14		
HESIONIDAE			
<u>Podarke obscura</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	8		
<u>Syllis</u> sp. B	4		
NEREIDAE			
<u>Nereis p. occidentalis</u>	4		
GONIADIDAE			
<u>Glycinde pacifica</u>	3		
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
<u>Onuphis nebulosa</u>	47		
ORBINIIDAE			
<u>Scoloplos robustus</u>	10		
<u>Scoloplos rubra</u>	5		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	2		
<u>Polydora socialis</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		

STATION 15-32 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Cirriformia filigera</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	15		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
<u>Notomastus latericeus</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	73		
OWENIIDAE			
<u>Owenia fusiformis</u>	5		
AMPHARETIDAE			
<u>Isolda pulchella</u>	5		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	1		

STATION 15-33

Sediment Type: Sand

Date: Oct. 22

Weight percentages -- Granules: 2.4

Sands: 97.6

Silt: 0.0

Clay: 0.0

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		7	
PILARGIDAE			
<u>Sigambra bassi</u>		1	
SYLLIDAE			
<u>Syllis</u> sp. B		32	
NEREIDAE			
<u>Nereis arenaceodentata</u>		1	
ONUPHIDAE			
<u>Onuphis magna</u>		1	
<u>Onuphis nebulosa</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		2	
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		5	
OPHELIIDAE			
<u>Travisia</u> sp.		111	
MALDANIDAE			
<u>Clymenella mucosa</u>		43	
TEREBELLIDAE			
<u>Polycirrus eximius</u>		4	
SABELLIDAE			
<u>Fabricia sabella</u>		2	

STATION 16-1

Sediment Type: Sand

Date: Oct. 14

Weight percentages -- Granules: 1.3

Sands: 90.2

Silts: 6.9

Clay: 1.7

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>		1	
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>		1	
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>		1	
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>		2	
<u>Syllis</u> <u>aciculata</u>		2	
<u>Syllis</u> <u>annularis</u>			1
<u>Syllis</u> sp. B			4
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>		9	
<u>Nereis</u> p. <u>occidentalis</u>		28	1
<u>Nereis</u> <u>succinea</u>			1
<u>Platynereis</u> <u>dumerilii</u>		12	
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>		3	
<u>Onuphis</u> <u>nebulosa</u>		1	
<u>Onuphis</u> sp.		17	1
DORVILLEIDAE			
<u>Dorvillea</u> <u>rudolphi</u>		1	
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>		8	
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>		30	
<u>Aricidea</u> sp.		6	

STATION 16-1 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>		1	
<u>Paraprionospio pinnata</u>		1	
<u>Polydora socialis</u>		17	
<u>Prionospio h. texana</u>		45	
<u>Spiophanes bombyx</u>		4	
<u>Streblospio benedicti</u>		2	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		6	
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>		1	
<u>Spiochaetopterus c. oculatus</u>		2	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		64	
<u>Tharyx</u> sp. C		17	
OPHELIIDAE			
<u>Travisia</u> sp.		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Capitellides jonesi</u>		1	
<u>Heteromastus filiformis</u>		22	
MALDANIDAE			
<u>Branchioasychis americana</u>		1	
<u>Clymenella mucosa</u>		4	1
TEREBELLIDAE			
<u>Loimia medusa</u>			1
<u>Pista palmata</u>		1	
<u>Thelepus setosus</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>	524		10

STATION 16-2

Sediment Type: Sand	Date: Oct. 15
Weight percentages -- Granules: 1.2	Sands: 88.9
Silts: 8.0	Clay: 1.9

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Lepidonotus variabilis</u>			3
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>			4
HESIONIDAE			
<u>Gyptis vittata</u>		4	
SYLLIDAE			
<u>Syllis annularis</u>		1	30
<u>Syllis</u> sp. B		8	
NEREIDAE			
<u>Nereis p. occidentalis</u>			6
<u>Platynereis dumerilii</u>			10
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	10
<u>Onuphis</u> sp.		13	
EUNICIDAE			
<u>Marphysa sanguinea</u>		9	2
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>		6	
ORBINIIDAE			
<u>Naineris setosa</u>		2	
PARAONIDAE			
<u>Aricidea fragilis</u>		1	
<u>Aricidea</u> sp.		1	

STATION 16-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Polydora socialis</u>		22	6
<u>Polydora websteri</u>		1	
<u>Prionospio h. texana</u>		15	
<u>Streblospio benedicti</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		3	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		2	
<u>Cirriformia</u> sp. A			2
<u>Tharyx</u> sp. C		43	
CAPITELLIDAE			
<u>Capitellides jonesi</u>		1	
<u>Heteromastus filiformis</u>		5	
MALDANIDAE			
<u>Clymenella mucosa</u>		25	
SABELLARIIDAE			
<u>Sabellaria gracilis</u>		2	
TEREBELLIDAE			
<u>Thelepus setosus</u>		108	5
SABELLIDAE			
<u>Branchioma nigromaculata</u>		690	10
<u>Sabella microphthalma</u>		4	

STATION 16-3

Sediment Type: Sand

Weight percentages -- Granules: 1.2

Silts: 5.5

Date: Oct. 15

Sands: 93.3

Clay: 0.5

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>		1	
PILARGIDAE			
<u>Sigambra bassi</u>		1	
SYLLIDAE			
<u>Syllis aciculata</u>		23	
NEREIDAE			
<u>Nereis arenaceodentata</u>		39	
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
EUNICIDAE			
<u>Marphysa sanguinea</u>		5	6
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>		2	
ORBINIIDAE			
<u>Scoloplos robustus</u>		1	
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		14	
<u>Aricidea sp.</u>		6	
SPIONIDAE			
<u>Prionospio h. texana</u>		78	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		8	

STATION 16-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>		110	
CAPITELLIDAE			
<u>Capitella capitata</u>		35	
<u>Heteromastus filiformis</u>		8	
MALDANIDAE			
<u>Clymenella mucosa</u>		80	
TEREBELLIDAE			
<u>Thelepus setosus</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		2	
<u>Fabricia sabella</u>		1	

STATION 16-4

Sediment Type: Sand
 Weight percentages -- Granules: 13.4
 Silts: 5.3

Date: Oct. 15
 Sands: 80.5
 Clay: 0.8

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		2	
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>		1	
HESIONIDAE			
<u>Gyptis vittata</u>		1	
<u>Podarke obscura</u>		2	1
<u>Gyptis</u> sp.		1	
PILARGIDAE			
<u>Pilargis pacifica</u>		1	
SYLLIDAE			
<u>Branchiosyllis oculata</u>			24
<u>Brania clavata</u>		1	
<u>Exogone dispar</u>		1	
<u>Syllis annularis</u>			2
<u>Syllis</u> sp. A		30	
NEREIDAE			
<u>Nereis arenaceodentata</u>		115	
<u>Platynereis dumerilii</u>			1
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
<u>Onuphis</u> sp.	1	6	
ARABELLIDAE			
<u>Drilonereis cylindrica</u>		1	
ORBINIIDAE			
<u>Scoloplos robustus</u>		2	
<u>Scoloplos rubra</u>		3	

STATION 16-4 -- (Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>		7	
<u>Aricidea</u> sp.		56	
SPIONIDAE			
<u>Polydora socialis</u>			1
<u>Polydora websteri</u>		1	
<u>Prionospio h. texana</u>		62	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		16	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		127	
<u>Tharyx</u> sp. C		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		125	1
<u>Heteromastus filiformis</u>		1	
ARENICOLIDAE			
<u>Arenicola cristata</u>		2	
MALDANIDAE			
<u>Clymenella mucosa</u>		124	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		1	
<u>Fabricia sabella</u>		6	

STATION 16-5

Sediment Type: Sand
 Weight percentages -- Granules: 2.9
 Silts: 7.2

Date: Oct. 15
 Sands: 88.0
 Clay: 1.9

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>		2	
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		1	
HESIONIDAE			
<u>Gyptis vittata</u>		3	
<u>Podarke obscura</u>			1
SYLLIDAE			
<u>Syllis aciculata</u>		11	
<u>Syllis</u> sp. A		4	
NEREIDAE			
<u>Nereis arenaceodentata</u>		78	
<u>Nereis p. occidentalis</u>		1	
<u>Platynereis dumerilii</u>			1
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
EUNICIDAE			
<u>Marphysa sanguinea</u>		1	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
PARAONIDAE			
<u>Aricidea fragilis</u>		5	
<u>Aricidea</u> sp.		13	
SPIONIDAE			
<u>Paraprionospio pinnata</u>		4	
<u>Polydora socialis</u>		11	
<u>Polydora websteri</u>		18	

STATION 16-5 -- (Continued)

Family and Species	Dredge	Shovel	Net
<u>Prionospio h. texana</u>		164	
<u>Streblospio benedicti</u>		6	
<u>Pseudopolydora sp.</u>		4	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		1	
<u>Tharyx sp. C</u>		7	
CAPITELLIDAE			
<u>Capitella capitata</u>		98	
<u>Heteromastus filiformis</u>		5	
ARENICOLIDAE			
<u>Arenicola cristata</u>		5	
MALDANIDAE			
<u>Clymenella mucosa</u>		7	
TEREBELLIDAE			
<u>Polycirrus eximius</u>		1	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		1	
<u>Fabricia sabella</u>		5	

STATION 16-6

Sediment Type: Sand

Date: Oct. 15

Weight percentages -- Granules: 1.3

Sands: 96.2

Silt: 2.1

Clay: 0.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	4		
<u>Paranaites</u> <u>speciosa</u>	5		
<u>Phyllodoce</u> <u>arenae</u>	19		1
<u>Phyllodoce</u> <u>fragilis</u>	2		
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>	7		
PILARGIDAE			
<u>Sigambra</u> <u>tentaculata</u>	1		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	204		
<u>Syllis</u> <u>aciculata</u>	4		
<u>Syllis</u> sp. B	2		
NEREIDAE			
<u>Nereis</u> p. <u>occidentalis</u>	1		1
<u>Nereis</u> <u>succinea</u>	1		6
<u>Platynereis</u> <u>dumerilii</u>			1
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	16		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	2		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	26		
ONUPHIDAE			
<u>Onuphis</u> <u>magna</u>	1		
<u>Onuphis</u> <u>nebulosa</u>	55		1

STATION 16-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	1		
<u>Lumbrineris sp.</u>	2		
ORBINIIDAE			
<u>Scoloplos robustus</u>	6		
PARAONIDAE			
<u>Aricidea sp.</u>	3		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	37		
<u>Paraprionospio pinnata</u>	28		
<u>Polydora socialis</u>	18		5
<u>Prionospio cirrobranchiata</u>	10		
<u>Prionospio h. texana</u>	9		
<u>Scoelelepis squamata</u>	1		
<u>Spio setosa</u>	6		
<u>Spiophanes bombyx</u>	6		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	24		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
<u>Cirratulus sp. B</u>	6		
<u>Cirratulus sp. C</u>	1		
<u>Tharyx sp. C</u>	3		
OPHELIIDAE			
<u>Armandia agilis</u>	14		
<u>Travisia sp.</u>	42		
CAPITELLIDAE			
<u>Capitella capitata</u>	8		
<u>Heteromastus filiformis</u>	30		

STATION 16-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Clymenella mucosa</u>	51		1
OWENIIDAE			
<u>Owenia fusiformis</u>	15		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	2		
AMPHARETIDAE			
<u>Isolda pulchella</u>	16		
<u>Melinna maculata</u>	1		
TEREBELLIDAE			
<u>Enoplobranchus sanguineus</u>	1		
<u>Loimia medusa</u>	1		
<u>Pista cristata</u>	4		
SABELLIDAE			
<u>Fabricia sabella</u>	391		
<u>Megalomma bioculatum</u>	1		

STATION 16-7

Sediment Type: Sand		Date: Oct. 15
Weight percentages -- Granules: 0.3		Sands: 97.5
Silts: 1.7		Clay: 0.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	1		
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>			1
SYLLIDAE			
<u>Syllis</u> <u>aciculata</u>	1		
<u>Syllis</u> <u>variegata</u>	2		
NEREIDAE			
<u>Nereis</u> <u>arenaceodentata</u>	72		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	6		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	1		
<u>Onuphis</u> sp.	49		
LUMBRINERIDAE			
<u>Lumbrineris</u> sp.	1		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	1		
<u>Aricidea</u> sp.	2		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	14		
<u>Paraprionospio</u> <u>pinnata</u>	79		2
<u>Polydora</u> <u>socialis</u>	9		
<u>Polydora</u> <u>websteri</u>	2		
<u>Prionospio</u> <u>h. texana</u>	34		
<u>Scoelelepis</u> <u>squamata</u>	15		
<u>Spio</u> <u>setosa</u>	3		
<u>Spiophanes</u> <u>bombyx</u>	1		

STATION 16-7 -- (Continued)

Family and Species	Dredge	Shovel	Net
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	12		
CIRRATULIDAE			
<u>Cirratulus</u> sp. B	1		
OPHELIIDAE			
<u>Armandia agilis</u>	4		
CAPITELLIDAE			
<u>Capitellides jonesi</u>	81		
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	6		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			3
<u>Chone duneri</u>	1		
<u>Megalomma bioculatum</u>	1		
<u>Sabella microphthalma</u>			2

STATION 16-8

Sediment Type: Sand			Date: Oct. 15
Weight percentages -- Granules:	7.0	Sands:	86.3
Silts:	5.6	Clay:	1.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		1	1
<u>Phyllodoce fragilis</u>		60	
HESIONIDAE			
<u>Gyptis vittata</u>		2	
SYLLIDAE			
<u>Syllis annularis</u>			2
<u>Syllis vittata</u>		3	
<u>Syllis</u> sp. A		13	
NEREIDAE			
<u>Nereis arenaceodentata</u>		23	2
<u>Nereis p. occidentalis</u>		7	2
<u>Nereis succinea</u>		4	
<u>Perinereis floridana</u>			1
<u>Platynereis dumerilii</u>			1
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
<u>Onuphis</u> sp.		35	
EUNICIDAE			
<u>Marphysa sanguinea</u>		8	1
ARABELLIDAE			
<u>Drilonereis cylindrica</u>		3	
ORBINIIDAE			
<u>Scoloplos robustus</u>		3	
<u>Scoloplos rubra</u>		2	
<u>Naineris</u> sp.		15	

STATION 16-8 -- (Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidae fragilis</u>		16	
<u>Aricidae sp.</u>		2	
SPIONIDAE			
<u>Paraprionospio pinnata</u>			1
<u>Polydora socialis</u>	51		4
<u>Prionospio h. texana</u>	1		
<u>Streblospio benedicti</u>	8		
MAGELONIDAE			
<u>Magelona pettiboneae</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		32	
<u>Tharyx sp. C</u>		1	
CAPITELLIDAE			
<u>Capitellides jonesi</u>			1
<u>Heteromastus filiformis</u>		25	
ARENICOLIDAE			
<u>Arenicola cristata</u>		3	
MALDANIDAE			
<u>Clymenella mucosa</u>		32	
TEREBELLIDAE			
<u>Thelepus setosus</u>		2	
SABELLIDAE			
<u>Branchiomma nigromaculata</u>		1	
<u>Chone duneri</u>		1	
<u>Sabella microphthalma</u>		1	

STATION 16-9

Sediment Type: Sand		Date: Oct. 18
Weight percentages -- Granules: 1.2		Sands: 97.5
Silts: 1.2		Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		2	
SYLLIDAE			
<u>Syllis</u> sp. B		2	
NEREIDAE			
<u>Nereis arenaeodentata</u>		5	1
<u>Nereis p. occidentalis</u>		1	4
<u>Nereis succinea</u>		1	
<u>Platynereis dumerilii</u>			1
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	10
<u>Onuphis</u> sp.		10	
PARAONIDAE			
<u>Aricidea fragilis</u>		3	
ORBINIIDAE			
<u>Scoloplos rubra</u>		1	
OPHELIIDAE			
<u>Travisia</u> sp.		123	
CAPITELLIDAE			
<u>Notomastus hemipodus</u>		13	
MALDANIDAE			
<u>Clymenella mucosa</u>		8	
TEREBELLIDAE			
<u>Polycirrus eximius</u>		1	

STATION 16-9-A

Sediment Type: Sand		Date: Oct. 18
Weight percentages -- Granules: 0.2		Sands: 99.1
Silts: 0.5		Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		2	
HESIONIDAE			
<u>Podarke obscura</u>		1	1
SYLLIDAE			
<u>Syllis</u> sp. B		4	
NEREIDAE			
<u>Nereis arenaceodentata</u>		18	
<u>Nereis p. occidentalis</u>		8	
GLYCERIDAE			
<u>Glycera americana</u>		1	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		1	
<u>Onuphis magna</u>		1	
<u>Onuphis</u> sp.		194	
ORBINIIDAE			
<u>Scoloplos robustus</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		21	
OPHELIIDAE			
<u>Travisia</u> sp.		28	
CAPITELLIDAE			
<u>Notomastus hemipodus</u>		2	
MALDANIDAE			
<u>Clymenella mucosa</u>		63	

STATION 16-9-B

Sediment Type: Sand

Weight percentages -- Granules: 1.9
 Silts: 1.2

Date: Oct. 18

Sands: 96.7

Clay: 0.2

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>		1	
SIGALIONIDAE			
<u>Sthenelais boa</u>		1	
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>		6	
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>		4	
HESIONIDAE			
<u>Gyptis vittata</u>		1	
SYLLIDAE			
<u>Syllis</u> sp. B		17	
NEREIDAE			
<u>Nereis arenaceodentata</u>		23	
<u>Nereis p. occidentalis</u>		78	
GLYCERIDAE			
<u>Glycera americana</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
<u>Onuphis magna</u>		2	
<u>Onuphis nebulosa</u>		2	
EUNICIDAE			
<u>Marphysa sanguinea</u>		3	
PARAONIDAE			
<u>Aricidea</u> sp.		1	

STATION 16-9-B -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Polydora socialis</u>		4	
MAGELONIDAE			
<u>Magelona pettiboneae</u>	°	19	
OPHELIIDAE			
<u>Travisia</u> sp.		13	
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>		58	
OWENIIDAE			
<u>Owenia fusiformis</u>		1	
TEREBELLIDAE			
<u>Loimia medusa</u>		1	
SABELLIDAE			
<u>Fabricia sabella</u>		3	

STATION 16-10

Sediment Type: Sand

Date: Oct. 18

Weight percentages -- Granules: 4.3

Sands: 91.0

Silt: 3.4

Clay: 1.3

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		1
<u>Phyllodoce fragilis</u>	3		61
HESIONIDAE			
<u>Gyptis vittata</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>			1
NEREIDAE			
<u>Nereis p. occidentalis</u>	12		92
<u>Nereis succinea</u>	16		44
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Aqilaophamus verrilli</u>	32		
GLYCERIDAE			
<u>Glycera americana</u>	1		
ONUPHIDAE			
<u>Diopatra cuprea</u>	8		10
<u>Onuphis nebulosa</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>	1		
<u>Lumbrineris erecta</u>	9		
<u>Lumbrineris sp.</u>	2		
ORBINIIDAE			
<u>Scoloplos robustus</u>	2		
<u>Scoloplos rubra</u>	2		

STATION 16-10 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		
<u>Polydora websteri</u>			2
<u>Prionospio h. texana</u>	2		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	3		
CIRRATULIDAE			
<u>Cirratulus grandis</u>	4		
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>	5		
OPHELIIDAE			
<u>Ammotrypane aulowaster</u>	1		
<u>Travisia sp.</u>	5		
MALDANIDAE			
<u>Branchioasychis americana</u>	8		
<u>Clymenella mucosa</u>	2		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele sp.</u>	3		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>	2		
<u>Sabellaria gracilis</u>	63		34
AMPHARETIDAE			
<u>Isolda pulchella</u>	6		
TEREBELLIDAE			
<u>Pista palmata</u>	2		1

STATION 16-11

Sediment Type: Sand		Date: Oct. 23
Weight percentages -- Granules: 5.7		Sands: 91.6
Silts: 2.2		Clay: 0.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Eumida</u> <u>sanguinea</u>	2		
<u>Phyllodoce</u> <u>arenae</u>	3		
<u>Phyllodoce</u> <u>fragilis</u>	1		1
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	1		
NEREIDAE			
<u>Nereis</u> <u>p. occidentalis</u>	10		7
<u>Nereis</u> <u>succinea</u>	13		5
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	5		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	2		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>erecta</u>	2		
PARACONIDAE			
<u>Aricidea</u> <u>fragilis</u>	3		
SPIONIDAE			
<u>Apoprionospio</u> <u>pygmaea</u>	2		
<u>Paraprionospio</u> <u>pinnata</u>	2		
<u>Polydora</u> <u>socialis</u>	2		

STATION 16-11 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculus</u>	4		
CIRRATULIDAE			
<u>Cirraformia filigera</u>	1		
<u>Cirratulus</u> sp. B	3		
OPHELIIDAE			
<u>Armandia agilis</u>	33		
MALDANIDAE			
<u>Clymenella mucosa</u>	26		
OWENIIDAE			
<u>Myriochele</u> sp.	1		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	15		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		
<u>Melinna maculata</u>	1		

STATION 16-12

Sediment Type: -

Weight percentages -- Granules: -

Silts: -

Date: Oct. 25

Sands: -

Clay: -

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE	°		
<u>Pholoe</u> sp.	1		
CHRYSOPETAUIDAE			
<u>Paleanotus heteroseta</u>			34
PHYLLODOCIDAE			
<u>Phyllodoce fragilis</u>			2
SYLLIDAE			
<u>Exogone dispar</u>			6
<u>Sphaerosyllis</u> sp.			12
<u>Syllis</u> sp. A	48		
GLYCERIDAE			
<u>Glycera americana</u>			1
GONIADIDAE			
<u>Goniadella</u> sp.	10		
ORBINIIDAE			
<u>Scoloplos rubra</u>			9
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. A			8
CAPITELLIDAE			
<u>Heteromastus filiformis</u>			1
MALDANIDAE			
<u>Clymenella mucosa</u>			1
TEREBELLIDAE			
<u>Polycirrus eximius</u>			2

STATION 16-13

Sediment Type: Sand

Weight percentages -- Granules: 4.4

Silt: 1.9

Date: Oct. 25

Sands: 93.3

Clay: 0.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	6		
<u>Pholoe</u> sp.	1		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	132		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	8		
<u>Phyllodoce fragilis</u>	15		
HESIONIDAE			
<u>Podarke obscura</u>	1		
PILARGIDAE			
<u>Sigambra bassi</u>	1		
SYLLIDAE			
<u>Brania clavata</u>	20		
<u>Exogone dispar</u>	350		
<u>Sphaerosyllis</u> sp.	3		
<u>Syllis</u> sp. A	220		
<u>Syllis</u> sp. B	75		
NEREIDAE			
<u>Ceratonereis irritabilis</u>	1		
GONIADIDAE			
<u>Goniadella</u> sp.	81		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	89		
EUNICIDAE			
<u>Nematonereis hebes</u>	12		

STATION 16-13 -- (Continued)

Family and Species	Dredge	Shovel	Net
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	1		
ARABELLIDAE			
<u>Arabella iricolor</u>	2		
<u>Drilonereis cylindrica</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	12		
<u>Scoloplos rubra</u>	9		
PARAONIDAE			
<u>Aricidea taylori</u>	3		
<u>Cirrophorus furcatus</u>	4		
SPIONIDAE			
<u>Polydora socialis</u>	15		
<u>Prionospio h. texana</u>	23		
<u>Spio setosa</u>	8		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	3		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	5		
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	2		
<u>Cirratulus</u> sp. B	3		
<u>Cirratulus</u> sp. D	5		
<u>Tharyx</u> sp. C	1		
OPHELIIDAE			
<u>Armandia agilis</u>	22		
<u>Travisia</u> sp.	5		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	6		

STATION 16-13 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>	67		
OWENIIDAE			
<u>Owenia fusiformis</u>	6		
<u>Myriochele</u> sp.	42		
AMPHARETIDAE			
<u>Isolda pulchella</u>	2		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	58		
SABELLIDAE			
<u>Fabricia sabella</u>	108		

STATION 16-14

Sediment Type: Sand		Date: Oct. 25
Weight percentages -- Granules: 7.9		Sands: 91.6
Silts: 0.4		Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	4		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	8		
<u>Pholoe</u> sp.	4		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	56		3
PHYLLODOCIDAE			
<u>Eumida sanguinea</u>	2		
<u>Phyllodoce arenae</u>	1		
<u>Phyllodoce fragilis</u>	15		34
HESIONIDAE			
<u>Podarke obscura</u>			2
SYLLIDAE			
<u>Exocoene dispar</u>	21		3
<u>Syllis gracilis</u>			3
<u>Syllis</u> sp. A	1		
NEREIDAE			
<u>Nereis succinea</u>			2
GLYCERIDAE			
<u>Glycera americana</u>	18		
GONIADIDAE			
<u>Goniadella</u> sp.	57		
ONUPHIDAE			
<u>Onuphis nebulosa</u>			1
EUNICIDAE			
<u>Eunice rubra</u>			1
<u>Nematonereis hebes</u>	10		2

STATION 16-14 -- (Continued)

Family and Species	Dredge	Shovel	Net
ARABELLIDAE			
<u>Arabella iricolor</u>	2		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	1		
<u>Scoloplos rubra</u>	101		
PARAONIDAE			
<u>Aricidea taylori</u>	5		
<u>Cirrophorus furcatus</u>	7		
SPIONIDAE			
<u>Prionospio h. texana</u>	5		
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
CIRRATULIDAE			
<u>Cirratulus sp. A</u>	103		
CAPITELLIDAE			
<u>Capitella capitata</u>			1
<u>Heteromastus filiformis</u>	18		
MALDANIDAE			
<u>Clymenella mucosa</u>	77		1
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele sp.</u>	4		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>			1

STATION 16-14 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Polycirrus eximius</u>	12		1
<u>Thelepus setosus</u>	1		

STATION 16-15

Sediment Type: Sand		Date: Oct. 25
Weight percentages -- Granules: 2.5		Sands: 96.3
Silts: 1.0		Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	16		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	75		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	9		
<u>Phyllodoce fragilis</u>			1
HESIONIDAE			
<u>Podarke obscura</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	170		
<u>Syllis variegata</u>			4
<u>Sphaerosyllis</u> sp.	1		
<u>Syllis</u> sp. B	14		
NEREIDAE			
<u>Ceratonereis irritabilis</u>	2		
<u>Nereis succinea</u>			1
NEPHTYIDAE			
<u>Nephtys picta</u>	1		
GONIADIDAE			
<u>Goniadella</u> sp.	134		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	9		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	1		

STATION 16-15 -- (Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	15		
PARAONIDAE			
<u>Cirrophorus furcatus</u>	1		
SPIONIDAE			
<u>Polydora socialis</u>	6		3
<u>Prionospio h. texana</u>	6		
<u>Scoelelepis squamata</u>	1		
<u>Spio setosa</u>	12		1
SPIONIDAE			
<u>Pseudopolydora</u> sp.	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	17		
OPHELIIDAE			
<u>Armandia agilis</u>	10		1
<u>Travisia</u> sp.	5		
CAPITELLIDAE			
<u>Heteronastus filiformis</u>	4		
MALDANIDAE			
<u>Clymenella mucosa</u>	60		
OWENIIDAE			
<u>Myriochele</u> sp.	17		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		

STATION 16-15 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Polycirrus eximius</u>	20		
SABELLIDAE			
<u>Fabricia sabella</u>	12		

STATION 16-16

Sediment Type: Sand

Weight percentages -- Granules: 0.5
 Silts: 0.2

Date: Oct. 25

Sands: 99.2

Clay: 0.1

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	8		
CHRY SOPETALIDAE			
<u>Paleanotus heteroseta</u>	4		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	4		
SYLLIDAE			
<u>Exogone dispar</u>	34		
<u>Syllis</u> sp. A	30		
<u>Syllis</u> sp. B	42		
NEREIDAE			
<u>Nereis arenaceodentata</u>	1		
GLYCERIDAE			
<u>Glycera americana</u>	1		
GONIADIDAE			
<u>Goniadella</u> sp.	16		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	4		1
ORBINIIDAE			
<u>Scoloplos rubra</u>	6		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		
<u>Polydora socialis</u>	1		
<u>Prionospio h. texana</u>	13		
<u>Spio setosa</u>	61		

STATION 16-16 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetooterus varlopedatus</u>			1
<u>Spiochaetooterus c. oculacus</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	3		
<u>Cirratulus</u> sp. D	2		
OPHELIIDAE			
<u>Armandia agilis</u>	12		
<u>Travisia</u> sp.	24		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	82		
MALDANIDAE			
<u>Clymenella mucosa</u>	20		10
TEREBELLIDAE			
<u>Polycirrus eximius</u>	59		

STATION 16-17

Sediment Type: Sand		Date: Oct. 28
Weight percentages -- Granules: 1.0		Sands: 97.6
Silts: 1.1		Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	5		
CHRYSOPE TALIDAE			
<u>Paleanotus heteroseta</u>	3		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
HESIONIDAE			
<u>Podarke obscura</u>			2
SYLLIDAE			
<u>Exogone dispar</u>	20		
<u>Syllis variegata</u>	34		2
<u>Syllis sp. B</u>	14		
NEREIDAE			
<u>Nereis succinea</u>			14
GONIADIDAE			
<u>Goniadella sp.</u>	11		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	6		1
ORBINIIDAE			
<u>Scolecpos rubra</u>	1		
SPIONIDAE			
<u>Polydora socialis</u>	1		2
<u>Prionospio h. texana</u>	7		
<u>Spio setosa</u>	11		

STATION 16-17 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		
<u>Spiochaetopterus c. oculatus</u>			1
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	1		
OPHELIIDAE			
<u>Anandia agilis</u>	12		
<u>Travisia</u> sp.	4		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	26		
MALDANIDAE			
<u>Clymenella mucosa</u>	16		
OWENIIDAE			
<u>Owenia fusiformis</u>			1
<u>Myriochele</u> sp.	4		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	22		1
SABELLIDAE			
<u>Fabricia sabella</u>			1

STATION 16-19

Sediment Type: Shelly Sand

Date: Oct. 28

Weight percentages -- Granules: 28.8

Sands: 68.8

Silts: 1.7

Clay: 0.8

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	2		
HESIONIDAE			
<u>Podarke obscura</u>			1
SYLLIDAE			
<u>Exogone dispar</u>	9		
NEPEIDAE			
<u>Nereis succinea</u>	1		2
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apocirionosio pygmaea</u>	4		
<u>Polydora socialis</u>	1		
CIRRATULIDAE			
<u>Cirratulus</u> sp. B	5		
OPHELIIDAE			
<u>Armandia agilis</u>	5		
<u>Travisia</u> sp.	1		
MALDANIDAE			
<u>Clvmenella mucosa</u>	3		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	3		

STATION 16-20

Sediment Type: Sand		Date: Oct. 28
Weight percentages -- Granules:	0.6	Sands: 95.1
Silts:	3.7	Clay: 0.5

Family and Species	Dredge	Shovel	Net
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	7		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		1
SYLLIDAE			
<u>Exogone dispar</u>	2		
NEREIDAE			
<u>Nereis succinea</u>	1		40
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	5		
ONUPHIDAE			
<u>Onuphis</u> sp.	1		
EUNICIDAE			
<u>Eunice rubra</u>			1
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	6		
<u>Lumbrineris</u> sp.	7		
ORBINIIDAE			
<u>Scoloplos robustus</u>	7		
PARAONIDAE			
<u>Aricidea fragilis</u>	9		
<u>Aricidea</u> sp.	3		

STATION 16-20 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	17		
<u>Paraprionospio pinnata</u>	20		
<u>Polydora socialis</u>	1		4
<u>Prionospio h. texana</u>	1		
<u>Spiophanes bombyx</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	19		1
CIRRATULIDAE			
<u>Cirratulus</u> sp. A			1
OPHELIDAE			
<u>Armandia agilis</u>	2		1
MALDANIDAE			
<u>Branchioasychis americana</u>	3		
<u>Clymenella mucosa</u>	1		7
OWENIIDAE			
<u>Myriochele</u> sp.	2		
AMPHARETIDAE			
<u>Isolda pulchella</u>	5		

STATION 16-21

Sediment Type: Sand

Date: Oct. 28

Weight percentages -- Granules: 1.7

Sands: 92.4

Silt: 4.7

Clay: 1.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	3		
<u>Phyllodoce</u> <u>fragilis</u>	4		4
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	3		
<u>Syllis</u> sp. B	1		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	3		11
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	5		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>			6
<u>Onuphis</u> sp.	2		
LUMBRINERIDAE			
<u>Lumbrineris</u> sp.	33		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	19		
<u>Scoloplos</u> <u>rubra</u>	5		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	5		
<u>Aricidea</u> sp.	16		

STATION 16-21 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPICIONIDAE			
<u>Apoprionospio pygmaea</u>	10		
<u>Paraprionospio pinnata</u>	6		
<u>Polydora socialis</u>			2
<u>Prionospio h. texana</u>	3		
<u>Spio setosa</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	1		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculatus</u>	37		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
<u>Cirratulus sp. B</u>	11		
OFHELIIDAE			
<u>Armandia agilis</u>	4		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	4		
MALDANIDAE			
<u>Branchioasychis americana</u>	6		
<u>Clymeneilla mucosa</u>	1		1
<u>Maldane sarsi</u>	1		
OWENIIDAE			
<u>Myriochele sp.</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	16		

STATION 16-22

Sediment Type: Sand

Date: Oct. 28

Weight percentages -- Granules: 1.0

Sands: 95.9

Silts: 2.5

Clay: 0.6

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	6		
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>			1
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>	1		2
NEREIDAE			
<u>Nereis</u> <u>succinea</u>			2
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	3		
<u>Nephtys</u> <u>picta</u>	1		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Onuphis</u> <u>nebulosa</u>	4		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>bassi</u>	1		
<u>Lumbrineris</u> <u>erecta</u>	1		
<u>Lumbrineris</u> sp.	29		
OREINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	23		
<u>Scoloplos</u> <u>rubra</u>	6		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	2		
<u>Aricidea</u> <u>taylori</u>	1		
<u>Aricidea</u> sp.	12		

STATION 16-22 -- (Continued)

Family and Species	Dredge	Shovel	Net
SPIONIDAE			
<u>Apoorionospio pygmaea</u>	30		
<u>Paraprionospio pinnata</u>	19		
<u>Polydora socialis</u>			1
<u>Prionospio h. texana</u>	3		
<u>Spiophanes bombyx</u>	3		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>	1		1
<u>Spiochaetopterus c. oculus</u>	37		1
CIRRATULIDAE			
<u>Cirratulus grandis</u>	2		
<u>Cirratulus</u> sp. B	1		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	8		
MALDANIDAE			
<u>Branchioasychis americana</u>	18		
<u>Clymenella mucosa</u>			3
OWENIIDAE			
<u>Owenia fusiformis</u>	3		
AMPHARETIDAE			
<u>Isolda pulchella</u>	6		
TEREBELLIDAE			
<u>Folycirrus eximius</u>	1		

STATION 16-23

Sediment Type: Sand

Date: Nov. 6

Weight percentages -- Granules: 2.7

Sands: 95.2

Silts: 1.8

Clay: 0.3

Family and Species	Dredge	Shovel	Net
POLYNOIDAE	.		
Polynoid B	1		
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	2		
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	3		
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Onuphis</u> sp.	8		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>erecta</u>	5		
<u>Lumbrineris</u> sp.	30		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	42		
<u>Scoloplos</u> <u>rubra</u>	6		
PARAONIDAE			
<u>Aricidea</u> <u>fragilis</u>	1		
<u>Aricidea</u> sp.	6		
SPIONIDAE			
<u>Aporrionospio</u> <u>pygmaea</u>	11		
CHAETOPTERIDAE			
<u>Spiochaetopterus</u> <u>c. oculatus</u>	2		

STATION 16-23 -- (Continued)

Family and Species	Dredge	Shovel	Net
CIRRATULIDAE			
<u>Cirratulus grandis</u>	1		
<u>Cirratulus</u> sp. B	2		
OPHELIIDAE			
<u>Armandia agilis</u>	2		
<u>Travisia</u> sp.	17		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	1		
MALDANIDAE			
<u>Branchioasychis americana</u>	10		
<u>Clymenella mucosa</u>	2		
OWENIIDAE			
<u>Owenia fusiformis</u>	14		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	17		
SABELLIDAE			
<u>Fabricia sabella</u>	10		

STATION 16-24

Sediment Type: Sand

Date: Nov. 6

Weight percentages -- Granules: 0.5

Sands: 99.2

Silt: 0.2

Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	5		
SYLLIDAE			
<u>Exogone dispar</u>	31		
<u>Syllis</u> sp. A	66		
<u>Syllis</u> sp. B	16		
NEREIDAE			
<u>Nereis arenaceodentata</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris bassi</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	3		
<u>Scoloplos rubra</u>	1		
OPHELIIDAE			
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.	78		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		

STATION 16-24 -- (Continued)

Family and Species	Dredge	Shovel	Net
MALDANIDAE			
<u>Clymenella mucosa</u>			44
OWENIIDAE			
<u>Owenia fusiformis</u>	4		

STATION 16-25

Sediment Type: Sand

Date: Nov. 6

Weight percentages -- Granules: 1.0

Sands: 98.3

Silt: 0.6

Clay: 0.2

Family and Species	Dredge	Shovel	Net
HESIONIDAE			
<u>Gyptis vittata</u>		1	
PILARGIDAE			
<u>Cabira incerta</u>		1	
SYLLIDAE			
<u>Syllis aciculata</u>		6	
<u>Syllis</u> sp. B		12	
NEREIDAE			
<u>Nereis arenaceodentata</u>		30	
<u>Nereis p. occidentalis</u>		2	
GLYCERIDAE			
<u>Glycera americana</u>		1	
GONIADIDAE			
<u>Glycinde pacifica</u>		1	
ONUPHIDAE			
<u>Diopatra cuprea</u>		2	
<u>Onuphis nebulosa</u>	385	4	
<u>Onuphis</u> sp.		113	
PARAONIDAE			
<u>Aricidea fragilis</u>		4	
SPIONIDAE			
<u>Polydora socialis</u>		47	
<u>Prionospio h. texana</u>		1	
MAGELONIDAE			
<u>Magelona pettiboneae</u>		5	

STATION 16-25 -- (Continued)

Family and Species	Dredge	Shovel	Net
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>		2	
CIRRATULIDAE			
<u>Cirratulus</u> sp. B		1	
<u>Tharyx</u> sp. A		1	
<u>Tharyx</u> sp. C		1	
CAPITELLIDAE			
<u>Capitella capitata</u>		2	
<u>Heteromastus filiformis</u>		5	
MALDANIDAE			
<u>Clymenella mucosa</u>		22	
OWENIIDAE			
<u>Owenia fusiformis</u>		3	
SABELLARIIDAE			
<u>Sabellaria gracilis</u>		2	
PECTINARIIDAE			
<u>Cistenides gouldii</u>		2	
TEREBELLIDAE			
<u>Thelepus setosus</u>		3	
SABELLIDAE			
<u>Fabricia sabella</u>		134	

STATION 16-26 -- (Continued)

Family and Species	Dredge	Shovel	Net
PECTINARIIDAE			
<u>Cisterides gouldii</u>		1	
AMPHARETIDAE			
<u>Isolda pulchella</u>	°	1	
<u>Melinna maculata</u>		4	

STATION 16-27

Sediment Type: Sand

Date: Nov. 6

Weight percentages -- Granules: 1.8

Sands: 95.5

Silt: 2.1

Clay: 0.6

Family and Species	Dredge	Shovel	Net
POLYDONTIDAE			
<u>Polydortes lupina</u>	1		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	5		
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	1		
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
<u>Phyllodoce arenae</u>	28		
<u>Phyllodoce fragilis</u>	1		
HESIONIDAE			
<u>Gyptis vittata</u>	4		
SYLLIDAE			
<u>Exogone dispar</u>	17		
NEREIDAE			
<u>Nereis succinea</u>	8		2
NEPHTYIDAE			
<u>Nephtys picta</u>	1		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Diopatra currea</u>	1		
<u>Onuphis nebulosa</u>	363		1
LUMBRINERIDAE			
<u>Lumbrineris coccinea</u>	24		

STATION 16-27 -- (Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	1		
PARAONIDAE			
<u>Aricidea</u> sp.	2		
SPIONIDAE			
<u>Polydora socialis</u>	14		
<u>Spiophanes bombyx</u>	4		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	5		1
CIRRATULIDAE			
<u>Tharyx</u> sp. C	3		
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>	1		
OPHELIIDAE			
<u>Travisia</u> sp.	33		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	5		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		
OWENIIDAE			
<u>Owenia fusiformis</u>	10		
AMPHARETIDAE			
<u>Isolda pulchella</u>	20		
<u>Melinna maculata</u>	1		
TEREBELLIDAE			
<u>Pista cristata</u>	6		
<u>Polycirrus eximius</u>	9		
<u>Thelepus setosus</u>	1		
<u>Trichobranchus glacialis</u>	1		

STATION 16-27 -- (Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Fabricia sabella</u>	45		
<u>Megalomma bioculatum</u>	3		

STATION 16-28

Sediment Type: Shelly Sand

Date: Nov. 6

Weight percentages -- Granules: 20.3

Sands: 79.6

Silts: 0.0

Clay: 0.0

Family and Species	Dredge	Shovel	Net
SYLLIDAE			
<u>Syllis aciculata</u>		1	
<u>Syllis sp. B</u>		8	
NEREIDAE			
<u>Nereis arenaceodentata</u>		1	
SPIONIDAE			
<u>Scoelelepis squamata</u>		3	
CAPITELLIDAE			
<u>Capitella capitata</u>		1	
<u>Capitellides jonesi</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>		1	

STATION 17-1

Sediment Type: Sand

Weight percentages -- Granules: 0.0

Silts: 0.2

Date: Oct. 23

Sands: 99.8

Clay: 0.1

Family and Species	Dredge	Shovel	Net
NEREIDAE			
<u>Platynereis dumerilii</u>		2	
ONUPHIDAE			
<u>Onuphis magna</u>		1	
<u>Onuphis</u> sp.		5	
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>		2	
OPHELIIDAE			
<u>Travisia</u> sp.		4	
ARENICOLIDAE			
<u>Arenicola cristata</u>		1	
MALDANIDAE			
<u>Clymenella mucosa</u>		2	
PECINARIIDAE			
<u>Cistenides gouldii</u>		1	

STATION 17-2

Sediment Type: Sand

Date: Oct. 29

Weight percentages -- Granules: 1.7

Sands: 94.9

Silts: 2.7

Clay: 0.7

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	2		
<u>Lepidasthenia commensalis</u>	1		
<u>Lepidonotus variabilis</u>			1
SIGALIONIDAE			
<u>Sigalion arenicola</u>	2		
<u>Sthenelais boa</u>	11		
CHRYSOPETALIDAE			
<u>Palcanotus heteroseta</u>	21		
PHYLLODOCIDAE			
<u>Paranaites soeciosa</u>	1		
<u>Phyllodoce arenae</u>	6		
PILARGIDAE			
<u>Sigambra tentaculata</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	206		
<u>Syllis gracilis</u>	3		
<u>Syllis variegata</u>			2
<u>Sphaerosyllis sp.</u>	1		
<u>Syllis sp. A</u>	205		
NEREIDAE			
<u>Nereis succinea</u>	7		5
<u>Platynereis dumerilii</u>	5		
NEPHTYIDAE			
<u>Aglaphamus verrilli</u>	2		
GLYCERIDAE			
<u>Glycera americana</u>	7		

STATION 17-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
GONIADIDAE			
<u>Goniadella</u> sp.	27		
ONUPHIDAE			
<u>Onuphis magna</u>	1		
<u>Onuphis nebulosa</u>	931		1
<u>Onuphis</u> sp.	4		2
EUNICIDAE			
<u>Marphysa sanguinea</u>	2		
LUMBRINERIDAE			
<u>Lumbrineris coccinea</u>			1
<u>Lumbrineris erecta</u>	5		
<u>Lumbrineris latreilli</u>			3
ARABELLIDAE			
<u>Arabella tricolor</u>	5		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	3		
PARAONIDAE			
<u>Aricidea fragilis</u>	3		
<u>Aricidea taylori</u>	2		
<u>Cirrophorus furcatus</u>	1		
SPIONIDAE			
<u>Paraprionospio pinnata</u>	1		
<u>Polydora socialis</u>	56		2
<u>Prionospio h. texana</u>	12		
<u>Scolecopsis squamata</u>	2		
<u>Spio setosa</u>	5		
<u>Spiophanes bombyx</u>	1		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	6		

STATION 17-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
POECILOCHAETIDAE			
<u>Poecilochaetus johnsoni</u>	2		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u> °	2		1
<u>Spiochaetopterus c. oculatus</u>	4		
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	43		
<u>Cirratulus</u> sp. B	8		
<u>Cirratulus</u> sp. D	2		
OPHELIIDAE			
<u>Armandia agilis</u>	7		
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
MALDANIDAE			
<u>Branchioasychis americana</u>			1
<u>Clymenella mucosa</u>	58		1
OWENIIDAE			
<u>Owenia fusiformis</u>	4		
<u>Myriochele</u> sp.	16		1
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			15
<u>Sabellaris gracilis</u>	1		4
AMPHARETIDAE			
<u>Isolda pulchella</u>	14		5
TEREBELLIDAE			
<u>Loimia medusa</u>	5		
<u>Polycirrus eximius</u>	16		
<u>Thelepus setosus</u>			2

STATION 17-2 -- (Continued)

Family and Species	Dredge	Shovel	Net
SABELLIDAE			
<u>Fabricia</u> <u>sabella</u>	82		
<u>Megalonma</u> <u>lobiferum</u>	1		
SERPULIDAE			
<u>Euomatus</u> <u>dianthus</u>			1

STATION 17-3

Sediment Type: Sand		Date: Oct. 29
Weight percentages -- Granules: 5.6		Sands: 93.6
Silts: 0.7		Clay: 0.1

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Eumothoe lunulata</u>	1		
SIGALIONIDAE			
<u>Sigalion arenicola</u>	3		
PISIONIDAE			
<u>Pisione remota</u>	1		
CHYRSOPETALIDAE			
<u>Paleanotus heteroseta</u>	123		
AMPHINOMIDAE			
<u>Pseudeurynothoe ambigua</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	1		
<u>Syllis aciculata</u>	1		
<u>Sphaerosyllis</u> sp.	3		
<u>Syllis</u> sp. A	15		
GLYCERIDAE			
<u>Glycera americana</u>	13		1
GONIADIDAE			
<u>Goniadella</u> sp.	101		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	12		
<u>Onuphis</u> sp.	1		
ARABELLIDAE			
<u>Drilonereis magna</u>	2		
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	4		

STATION 17-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
ORBINIIDAE			
<u>Scoloplos rubra</u>	17		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	5		
<u>Spio setosa</u>	13		
CIRRATULIDAE			
<u>Cirratulus</u> sp. A	75		
CAPITELLIDAE			
<u>Dasybranchus lumbricoides</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	22		
OWENIIDAE			
<u>Myriochele</u> sp.	1		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	2		
SABELLIDAE			
<u>Fabricia sabella</u>	1		

STATION 17-4

Sediment Type: Sand	Date: Oct. 29
Weight percentages -- Granules: 2.8	Sands: 95.6
Silts: 1.2	Clay: 0.5

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	9		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	27		
PHYLLODOCIDAE			
<u>Paranaites speciosa</u>	2		
<u>Phyllodocce arenae</u>	4		
PILARGIDAE			
<u>Ancistrostylis jonesi</u>	1		
SYLLIDAE			
<u>Exopone dispar</u>	32		
<u>Sphaerosyllis sp.</u>	6		
<u>Syllis sp. A</u>	15		
GONIADIDAE			
<u>Goniadella sp.</u>	55		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	10		
<u>Onuphis sp.</u>	6		
ORBINIIDAE			
<u>Scoleplos rubra</u>	7		
SPIONIDAE			
<u>Prionospio h. texana</u>	5		
<u>Spio setosa</u>	39		
<u>Pseudopolydora</u>	8		
CIRRATULIDAE			
<u>Cirratulus sp. A</u>	13		
<u>Cirratulus sp. D</u>	4		
<u>Tharyx sp. C</u>	1		

STATION 17-4 -- (Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Armandia agilis</u>	3		
<u>Travisia</u> sp.	2		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Clymenella mucosa</u>	23		
<u>Clymenella zonalis</u>	1		
OWENIIDAE			
<u>Myriochele</u> sp.	4		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
TEREBELLIDAE			
<u>Polycirrus eximius</u>	11		

STATION 17-5

Sediment Type: Sand

Date: Oct. 30

Weight percentages -- Granules: 4.2

Sands: 93.5

Silts: 1.8

Clay: 0.5

Family and Species	Dredge	Shovel	Net
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	7		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	9		
<u>Phyllodoce fragilis</u>			1
HESIONIDAE			
<u>Podarke obscura</u>			10
SYLLIDAE			
<u>Exogone dispar</u>	25		
<u>Syllis</u> sp. A	4		
<u>Syllis</u> sp. B	3		
NEREIDAE			
<u>Nereis succinea</u>			28
NEPHTYTIDAE			
<u>Aqilaophamus verrilli</u>	46		
GONIADIDAE			
<u>Goniadella</u> sp.	4		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	53		
<u>Onuphis</u> sp.	17		
EUNICIDAE			
<u>Eunice rubra</u>			1
<u>Nematonereis hebes</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	5		
<u>Lumbrineris latreilli</u>	3		

STATION 17-5 -- (Continued)

Family and Species	Dredge	Shovel	Net
ARABELLIDAE			
<u>Arabella tricolor</u>	4		
SPIONIDAE			
<u>Polydora socialis</u>	2		11
<u>Prionospio h. texana</u>	3		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	3		
CIRRATULIDAE			
<u>Cirratulus</u> sp. D	1		
OPHELIIDAE			
<u>Armandia agilis</u>	4		1
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	5		
MALDANIDAE			
<u>Clymenella mucosa</u>	52		
OWENIIDAE			
<u>Oweria fusiformis</u>	1		
<u>Myriochele</u> sp.	6		
SABELLARIIDAE			
<u>Sabellaria floridensis</u>			1
<u>Sabellaria gracilis</u>			1
AMPHARETIDAE			
<u>Isolda pulchella</u>	30		1
SABELLIDAE			
<u>Fabricia sabella</u>	64		

STATION 17-6

Sediment Type: Sand

Date: Oct. 30

Weight percentages -- Granules: 6.1

Sands: 91.2

Silt: 2.1

Clay: 0.7

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	1		
PHYLLODCCIDAE			
<u>Paranaites</u> <u>speciosa</u>	1		
<u>Phyllodoce</u> <u>arenae</u>	26		
<u>Phyllodoce</u> <u>fragilis</u>	1		7
HESIONIDAE			
<u>Gyptis</u> <u>vittata</u>	1		
<u>Podarke</u> <u>obscura</u>			2
SYLLIDAE			
<u>Brania</u> <u>clavata</u>	1		
<u>Exogone</u> <u>dispar</u>	187		4
<u>Syllis</u> <u>aciculata</u>			1
<u>Syllis</u> <u>gracilis</u>	1		2
<u>Brania</u> sp.	1		
<u>Sphaerosyllis</u> sp.	3		
<u>Syllis</u> sp. A	1		
<u>Syllis</u> sp. B	2		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	3		36
NEPHTYIDAE			
<u>Aglaophanus</u> <u>verrilli</u>	21		
<u>Nephtys</u> <u>picta</u>	2		
GLYCERIDAE			
<u>Glycera</u> <u>americana</u>	1		
GONIADIDAE			
<u>Goniadella</u> sp.	1		

STATION 17-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
ONUPHIDAE			
<u>Diopatra cuprea</u>	1		
<u>Onuphis nebulosa</u>	21		
<u>Onuphis</u> sp.	23		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	9		
<u>Lumbrineris</u> sp.	23		
ORBINIIDAE			
<u>Scaloplos rubra</u>	5		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Polydora socialis</u>	7		9
<u>Prionospio h. texana</u>	10		
<u>Spio setosa</u>	6		1
MAGELONIIDAE			
<u>Magelona pettiboneae</u>	10		
CHAETOPTERIDAE			
<u>Chaetopterus variopedatus</u>			1
<u>Spiochaetopterus c. oculatus</u>	17		
CIRRATULIDAE			
<u>Cirratulus</u> sp. B	3		
<u>Tharvx</u> sp. C	2		
OPHELIIDAE			
<u>Armandia acilis</u>	99		4
<u>Travisia</u> sp.	3		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	3		
MALDANIDAE			
<u>Clymenella mucosa</u>	37		

STATION 17-6 -- (Continued)

Family and Species	Dredge	Shovel	Net
OWENIIDAE			
<u>Owenia fusiformis</u>	7		
<u>Myriochele</u> sp.	16		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	2		2
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		1
AMPHARETIDAE			
<u>Isolda pulchella</u>	121		2
TEREBELLIDAE			
<u>Terebella rubra</u>	1		
SABELLIDAE			
<u>Fabricia sabella</u>	869		

STATION 17-7

Sediment Type: Sand
 Weight percentages -- Granules: 2.8
 Silts: 2.0

Date: Nov. 4
 Sands: 94.5
 Clay: 0.8

Family and Species	Dredge	Shovel	Net
POLYNOIDAE			
<u>Harmothoe lunulata</u>	1		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	4		
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	1		
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	4		
<u>Phyllodoce fragilis</u>	2		
HESIONIDAE			
<u>Gyptis vittata</u>	1		
<u>Podarke obscura</u>			1
SYLLIDAE			
<u>Exogone dispar</u>	23		
<u>Brania</u> sp.	1		
<u>Syllis</u> sp. A	6		
NEREIDAE			
<u>Nereis succinea</u>	1		7
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	25		
<u>Nephtys picca</u>	1		
ONUPHIDAE			
<u>Diopatra cuurea</u>	2		
<u>Onuphis nebulosa</u>	24		
<u>Onuphis</u> sp.	22		

STATION 17-7 -- (Continued)

Family and Species	Dredge	Shovel	Net
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	3		
<u>Lumbrineris latreilli</u>	3		
<u>Lumbrineris sp.</u>	4		
ORBINIIDAE			
<u>Scoloplos rubra</u>	3		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	1		
<u>Polydora socialis</u>	4		3
<u>Prionospio h. texana</u>	2		
<u>Spio setosa</u>	6		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	15		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	8		
OPHELIIDAE			
<u>Armandia agilis</u>	25		
<u>Travisia sp.</u>	1		
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	2		
MALDANIDAE			
<u>Branchioasychis americana</u>	1		
<u>Clymenella mucosa</u>	22		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele sp.</u>	6		
SABELLARIIDAE			
<u>Sabellaria gracilis</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	82		

STATION 17-7 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Loimia medusa</u>	2		
<u>Polycirrus eximius</u>	1		
<u>Terebella rubra</u>	1		1
SABELLIDE			
<u>Fabricia sabella</u>	79		

STATION 17-8

Sediment Type: Sand	Date: Nov. 4
Weight percentages -- Granules: 8.9	Sands: 87.8
Silts: 2.4	Clay: 0.9

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	1		
<u>Sthenelais boa</u>	5		
AMPHINOMIDAE			
<u>Pseudeurythoe ambigua</u>	4		
PHYLODOCIDAE			
<u>Phyllodoce arenae</u>	8		
<u>Phyllodoce fragilis</u>	1		
HESIONIDAE			
<u>Gyptis vittata</u>	1		
SYLLIDAE			
<u>Exogone dispar</u>	8		
<u>Syllis aciculata</u>	1		
<u>Syllis sp. B</u>	4		
NEREIDAE			
<u>Nereis arenaceodentata</u>	4		
<u>Nereis p. occidentalis</u>	1		
<u>Nereis succinea</u>	9		
NEPHYTIDAE			
<u>Aglapophamus verilli</u>	42		
GLYCERIDAE			
<u>Glycera americana</u>	3		
ONUPHIDAE			
<u>Dionatra cuprea</u>	1		
<u>Onuphis nebulosa</u>	10		
<u>Onuphis sp.</u>	17		
EUNICIDAE			
<u>Nematonereis hebes</u>	2		

STATION 17-8 -- (Continued)

Family and Species	Dredge	Shovel	Net
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	26		
<u>Lumbrineris latreilli</u>	1		
<u>Lumbrineris</u> sp.	112		
ARABELLIDAE			
<u>Arabella iricolor</u>	1		
ORBINIIDAE			
<u>Scoloplos robustus</u>	22		
<u>Scoloplos rubra</u>	5		
PARAONIDAE			
<u>Aricidea fragilis</u>	23		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	11		
<u>Paraprionospio pinnata</u>	1		
<u>Polydora socialis</u>	4		
<u>Spio setosa</u>	13		
MAGELONIDAE			
<u>Magelona pettiboneae</u>	7		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	2		
CIRRATULIDAE			
<u>Cirratulus</u> sp. B	1		
<u>Cirratulus</u> sp. C	2		
OPHELIIDAE			
<u>Armandia agilis</u>	40		1
<u>Travisia</u> sp.	21		
CAPITELLIDAE			
<u>Notomastus latericeus</u>	2		
MALDANIDAE			
<u>Branchioasychis americana</u>	4		
<u>Clymenella mucosa</u>	121		

STATION 17-8 -- (Continued)

Family and Species	Dredge	Shovel	Net
OWENIIDAE			
<u>Owenia fusiformis</u>	2		
<u>Myriochele</u> sp.	9		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	83		
TEREBELLIDAE			
<u>Pista cristata</u>	1		
<u>Polycirrus eximius</u>	1		
SABELLIDAE			
<u>Fabricia sabella</u>	65		

STATION 17-9

Sediment Type: Sand

Date: Nov. 4

Weight percentages -- Granules: 1.8

Sands: 95.4

Silts: 2.0

Clay: 0.6

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	2		
AMPHINOMIDAE			
<u>Pseudeurythoe</u> <u>ambigua</u>	5		
PHYLLODOCIDAE			
<u>Phyllodoce</u> <u>arenae</u>	3		
HESIONIDAE			
<u>Podarke</u> <u>obscura</u>			3
FILARGIDAE			
<u>Sigambra</u> <u>tentaculata</u>	2		
SYLLIDAE			
<u>Exogone</u> <u>dispar</u>			1
<u>Syllis</u> sp. B	2		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>	3		8
NEPHTYIDAE			
<u>Aglaophamus</u> <u>verrilli</u>	4		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	2		
<u>Onuphis</u> sp.	1		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>erecta</u>	6		
<u>Lumbrineris</u> sp.	26		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	7		

STATION 17-9 -- (Continued)

Family and Species	Dredge	Shovel	Net
PARAONIDAE			
<u>Aricidea fragilis</u>	33		
<u>Aricidea</u> sp.	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	30		
<u>Paraprionospio pinnata</u>	5		
<u>Polydora socialis</u>	2		
<u>Spio setosa</u>	2		
MAGELONIDAE			
<u>Magelona nettiboneae</u>	3		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	3		
CIRRATULIDAE			
<u>Cirratulus</u> sp. B	3		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	10		
CAPITELLIDAE			
<u>Notomastus hemipodus</u>	2		
MALDANIDAE			
<u>Branchioasychis americana</u>	11		1
<u>Clymenella mucosa</u>	13		1
<u>Maldane sarsi</u>	2		
OWENIIDAE			
<u>Owenia fusiformis</u>	10		
<u>Myriochele</u> sp.	16		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	47		2

STATION 17-9 -- (Continued)

Family and Species	Dredge	Shovel	Net
TEREBELLIDAE			
<u>Polycirrus eximius</u>			1
SABELLIDAE			
<u>Fabricia sabella</u>	22		1

STATION 17-10

Sediment Type: Sand

Date: Nov. 4

Weight percentages -- Granules: 3.6

Sands: 95.8

Silt: 0.5

Clay: 0.1

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce fragilis</u>	3		1
NEPHTYIDAE			
<u>Aglaphanus verrilli</u>	6		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Diopatra cuprea</u>			10
<u>Onuphis e. oculata</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	15		
<u>Lumbrineris sp.</u>	28		
ORBINIIDAE			
<u>Scoloplos robustus</u>	12		
<u>Scoloplos rubra</u>	5		
PARAONIDAE			
<u>Aricidea fragilis</u>	4		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	58		
<u>Polydora socialis</u>	1		
<u>Spio setosa</u>	13		
CIRRATULIDAE			
<u>Cirratulus sp. C</u>	1		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	36		
<u>Travisia sp.</u>	4		

STATION 17-10 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Heteromastus filiformis</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	• 28		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele</u> sp.	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	11		
SABELLIDAE			
<u>Fabricia sabella</u>	10		

STATION 17-11

Sediment Type: -

Weight percentages -- Granules: -

Silts: -

Date: Nov. 19

Sands: -

Clay: -

Family and Species	Dredge	Shovel	Net
POLYNOIDAE	°		
<u>Harmothoe lunulata</u>		1	
HESICNIDAE			
<u>Gyptis vittata</u>		1	
NEREIDAE			
<u>Nereis succinea</u>		1	
ONUPHIDAE			
<u>Onuphis nebulosa</u>		1	
ARABELLIDAE			
<u>Arabella iricolor</u>			1
<u>Travisia</u> sp.		57	
CAPITELLIDAE			
<u>Notomastus hemipodus</u>		27	
MALDANIDAE			
<u>Clymenella mucosa</u>		13	
TEREBELLIDAE			
<u>Polycirrus eximius</u>		1	

STATION 17-12

Sediment Type: Sand	Date: Nov. 19
Weight percentages -- Granules: 0.2	Sands: 98.9
Silts: 0.7	Clay: 0.2

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Eteone heteropoda</u>	1		
<u>Phyllodoce arenae</u>	2		
NEREIDAE			
<u>Nereis arenaceodentata</u>	1		
<u>Nereis p. occidentalis</u>	3		
<u>Nereis succinea</u>			1
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	4		
GONIADIDAE			
<u>Glycinde pacifica</u>	8		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	5		
ORBINIIDAE			
<u>Scoloplos robustus</u>	21		
<u>Scoloplos rubra</u>	2		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	2		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	56		
<u>Travisia sp.</u>	41		
MALDANIDAE			
<u>Clymenella mucosa</u>	15		
OWENIIDAE			
<u>Myriochele sp.</u>	3		

STATION 17-12 -- (Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Isolda pulchella</u>	10		
SABELLIDAE			
<u>Fabricia sabella</u>	.	2	

STATION 17-13

Sediment Type: Sand

Date: Nov. 19

Weight percentages -- Granules: 0.2

Sands: 97.9

Silt: 1.6

Clay: 0.3

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sthenelais</u> <u>boa</u>	8		
PHYLLODOCIDAE			
<u>Eteone</u> <u>heteropoda</u>	1		
<u>Paranaites</u> <u>speciosa</u>	3		
<u>Phyllodoce</u> <u>arenae</u>	6		
NEREIDAE			
<u>Nereis</u> <u>succinea</u>			1
<u>Platynereis</u> <u>dumerilii</u>			1
GONIADIDAE			
<u>Glycinde</u> <u>pacifica</u>	1		
ONUPHIDAE			
<u>Diopatra</u> <u>cuprea</u>	1		
LUMBRINERIDAE			
<u>Lumbrineris</u> <u>sp.</u>	1		
ORBINIIDAE			
<u>Scoloplos</u> <u>robustus</u>	14		
<u>Scoloplos</u> <u>rubra</u>	1		
SPIONIDAE			
<u>Apoirionospio</u> <u>pygmaea</u>	1		
<u>Parapirionospio</u> <u>pinnata</u>	45		
CIRRATULIDAE			
<u>Cirratulus</u> <u>grandis</u>	9		
OPHELIIDAE			
<u>Ammotrypae</u> <u>aulogaster</u>	19		
<u>Travisia</u> <u>sp.</u>	2		

STATION 17-13 -- (Continued)

Family and Species	Dredge	Shovel	Net
CAPITELLIDAE			
<u>Notomastus latericeus</u>	1		
MAIDANIDAE			
<u>Branchioasychis americana</u>	2		
<u>Clymenella mucosa</u>	1		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		
<u>Myriochele</u> sp.	2		
PECTINARIIDAE			
<u>Cistenides gouldii</u>	1		
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
SABELLIDAE			
<u>Branchiomma nigromaculata</u>			1
<u>Fabricia sabella</u>	1		
<u>Megalomma bioculatum</u>	1		

STATION 17-14

Sediment Type: Sand		Date: Nov. 19
Weight percentages -- Granules: 0.0		Sands: 99.3
Silt: 0.5		Clay: 0.3

Family and Species	Dredge	Shovel	Net
PHYLLODOCIDAE			
<u>Phyllodoce arenae</u>	1		
NEREIDAE			
<u>Nereis arenaceodentata</u>	4		
GONIADIDAE			
<u>Glycinde pacifica</u>	4		
ONUPHIDAE			
<u>Onuphis</u> sp.	3		
ORBINIIDAE			
<u>Scoloplos robustus</u>	11		
PARAONIDAE			
<u>Aricidea fragilis</u>	1		
SPIONIDAE			
<u>Apoprionospio pygmaea</u>	9		
<u>Paraprionospio pinnata</u>	32		
CIRRATULIDAE			
<u>Cirriformia</u> sp. A	1		
OPHELIIDAE			
<u>Amnotrypane aulogaster</u>	23		
<u>Travisia</u> sp.	1		
CAPITELLIDAE			
<u>Notomastus latericeus</u>	1		
MALDANIDAE			
<u>Clymenella mucosa</u>	2		

STATION 17-15

Sediment Type: Sand

Date: Nov. 19

Weight percentages -- Granules: 1.6

Sands: 93.6

Silts: 3.9

Clay: 0.9

Family and Species	Dredge	Shovel	Net
PILARGIDAE			
<u>Cabira incerta</u>		3	
SYLLIDAE			
<u>Syllis aciculata</u>		10	
NEREIDAE			
<u>Nereis arenaceodentata</u>		19	
<u>Nereis succinea</u>			4
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>			1
OREINIIDAE			
<u>Scoloplos rubra</u>		3	
PARAONIDAE			
<u>Aricidea fragilis</u>		14	
<u>Aricidea taylori</u>		1	
CIRRATULIDAE			
<u>Cirratulus grandis</u>		142	1
CAPITELLIDAE			
<u>Heteromastus filiformis</u>		12	
AMPHAETIDAE			
<u>Melinna maculata</u>		2	
TEREBELLIDAE			
<u>Terebella rubra</u>			1
<u>Thelepus setosus</u>		2	

STATION 18-3

Sediment Type: Shelly Sand
 Weight percentages -- Granules: 20.8
 Silts: 1.6

Date: Oct. 9
 Sands: 77.4
 Clay: 0.2

Family and Species	Dredge	Shovel	Net
SIGALIONIDAE			
<u>Sigalion arenicola</u>	3		
CHRYSOPETALIDAE			
<u>Paleanotus heteroseta</u>	60		1
AMPHINOMIDAE			
<u>Euphrosyne triloba</u>			1
<u>Pseudeurythoe ambigua</u>			1
HESIONIDAE			
<u>Podarke obscura</u>			5
SYLLIDAE			
<u>Exogone dispar</u>	5		1
<u>Syllis spongicola</u>			2000+
<u>Syllis</u> sp. A	25		
<u>Syllis</u> sp. B	3		
NEREIDAE			
<u>Nereis n. occidentalis</u>	3		
<u>Platynereis dumerilii</u>			1
NEPHTYIDAE			
<u>Nephtys picta</u>	2		
GLYCERIDAE			
<u>Glycera americana</u>	3		
GONIADIDAE			
<u>Glycinde pacifica</u>	8		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	25		

STATION 18-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
EUNICIDAE			
<u>Eunice rubra</u>			2
<u>Marphysa sanguinea</u>	1		
<u>Nematonereis hebes</u>	2		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	1		
<u>Lumbrineris latreilli</u>	10		
ARABELLIDAE			
<u>Arabella sp.</u>			1
DORVILLEIDAE			
<u>Dorvillea rudolphi</u>	6		
SPIONIDAE			
<u>Aonides mayaguezensis</u>	8		
<u>Prionospio h. texana</u>	43		
CHAETOPTERIDAE			
<u>Spiochaetopterus c. oculatus</u>	1		
CIRRATULIDAE			
<u>Dodecaceria concharum</u>			25
<u>Cirratulus sp. B</u>	1		
FLABELLIGERIDAE			
<u>Pherusa arenosa</u>	2		
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	4		
<u>Ammandia agilis</u>	14		
MALDANIDAE			
<u>Clymenella mucosa</u>	80		
OWENIIDAE			
<u>Owenia fusiformis</u>	1		

STATION 18-3 -- (Continued)

Family and Species	Dredge	Shovel	Net
AMPHARETIDAE			
<u>Isolda pulchella</u>	1		
TEREBELLIDAE			
<u>Terebella rubra</u>	1		

STATION 18-4

Sediment Type: Sand

Date: Oct. 9

Weight percentages -- Granules: 5.8

Sands: 90.9

Silts: 2.4

Clay: 0.9

Family and Species	Dredge	Shovel	Net
PILARGIDAE			
<u>Sigambra bassi</u>	1		
SYLLIDAE			
<u>Brania</u> sp.	2		
NEREIDAE			
<u>Nereis succinea</u>			1
NEPHTYIDAE			
<u>Aglaophamus verrilli</u>	7		
ONUPHIDAE			
<u>Onuphis nebulosa</u>	4		
LUMBRINERIDAE			
<u>Lumbrineris erecta</u>	2		
<u>Lumbrineris</u> sp.	2		
ORBINIIDAE			
<u>Scoloplos robustus</u>	2		
SPICNIDAE			
<u>Apoprionospio pygmaea</u>	6		
<u>Prionospio h. texana</u>	1		
<u>Scoelelepis squamata</u>	1		
<u>Spio setosa</u>	1		
CHAETOPTERIDAE			
<u>Mesochaetopterus</u> sp. B	1		

STATION 18-4 -- (Continued)

Family and Species	Dredge	Shovel	Net
OPHELIIDAE			
<u>Ammotrypane aulogaster</u>	1		
<u>Armandia agilis</u>	1		
<u>Travisia</u> sp.	9		
MALDANIDAE			
<u>Clymenella mucosa</u>	30		

LITERATURE CITED

ALT, D., and H. K. BROOKS.

1965. Age of the Florida marine terraces. J. Geol.
73: 403-411.

ARMSTRONG, F. A. J., and G. T. BOALCH.

1961. The ultra-violet absorption of sea water.
J. Mar. Biol. Ass. U. K. 41: 591-597.

ARMSTRONG, REED S.

1967. The subtropical underwater of the eastern
Gulf of Mexico. Commer. Fish. Rev. 29: 46-48.

ARMSTRONG, REED S.

1969. Late-winter waters of Yucatan Straits, a
1968 Geronimo survey in Gulf of Mexico. U. S.
Fish Wildl. Serv., Commer. Fish. Rev. 31: 33-36.

ARMSTRONG, REED S., JOHN R. GRADY, and ROBERT E.
STEVENSON.

1967. Cruise Delta I of the Geronimo. U. S. Fish
Wildl. Serv., Commer. Fish. Rev. 29: 15-18.

ARNOLD, EDGAR L., S. WHEELER, and KENNETH N. BAXTER.

1960. Observations on fishes and other biota of
East Lagoon, Galveston, Texas. U. S. Fish. Wildl.
Serv., Spec. Sci. Rep. Fish. 344,iii + 30 pp.

ASHWORTH, JAMES HARTLEY.

1910. The annelids of the family Arenicolidae of
North and South America, including an account of
Arenicola glacialis Murdoch. Proc. U. S. Nat. Mus.
39: 1-32.

BAGGE, PAUL I.

1969. The succession of the bottom fauna communities
in polluted estuarine habitats. Limnologica 7: 89-93.

BARNARD, J. LAURENS.

1970. Benthic ecology of Bahia de San Quintin Baja
California. Smithson. Contrib. Zool. 41,iii + 60 pp.

BARTSCH, A. F., R. J. CALLAWAY, R. A. WAGNER, and C. E. WOELKE.

1967. Technical approaches toward evaluating estuarine pollution problems. In George H. Lauff (editor), *Estuaries*, pp. 693-700. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

BEERS, JOHN R., DAVID M. STEVEN, and JOHN B. LEWIS.

1968. Primary productivity in the Caribbean Sea off Jamaica and the tropical north Atlantic off Barbados. *Bull. Mar. Sci.* 18: 86-104.

BEHRE, E.

1950. Annotated list of the fauna of the Grand Isle region. *Occas. Pap. Mar. Lab.*, Louisiana State Univ. 6: 1-66.

BIGLANE, K. E., and ROBERT A. LaFLEUR.

1967. Notes on estuarine pollution with emphasis on the Louisiana Gulf coast. In George H. Lauff (editor), *Estuaries*, pp. 690-692. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

BLAKE, JAMES A.

1971. Revision of the genus Polydora from the east coast of North America (Polychaeta: Spionidae). *Smithson. Contrib. Zool.* (75): 1-31.

BOGDANOV, D. V., V. A. SOKOLOV, and N. S. KHROMOV.

1968. Regions of high biological and commercial productivity in the Gulf of Mexico and Caribbean Sea. *Oceanology* 8: 371-380.

BREUER, JOSEPH P.

1957. An ecological survey of Baffin and Alazan Bays, Texas. *Publ. Inst. Mar. Sci.*, Univ. Texas 4: 134-155.

BREUER, JOSEPH P.

1962. An ecological survey of the lower Laguna Madre of Texas, 1953-1959. *Publ. Inst. Mar. Sci.*, Univ. of Texas 8: 153-183.

BRYANT, WILLIAM R., M. EWING, and B. JONES.

1968. Structure of Mexican continental shelf and slope, Gulf of Mexico. *Amer. Ass. Petrol. Geol.* 52: 1204-1228.

BULLARD, EDWARD.

1969. The origin of the oceans. *Sci. Amer.* 221(3): 66-75.

BULLIS, HARVEY R., JR., and JOHN R. THOMPSON.

1965. Collection by the exploratory fishing vessels Oregon, Silver Bay, Combat, and Pelican made during 1956 to 1960 in the southwestern north Atlantic. U. S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 510, iii + 130.

BUSH, LOUISE F.

1966. Distribution of sand fauna in beaches at Miami, Florida. *Bull. Mar. Sci.* 16: 53-75.

BUTLER, PHILIP A.

1969. Monitoring pesticide pollution. *Bioscience* 19: 889-891.

CARPENTER, DONALD G.

1951. Distribution of polychaete annelids in the Alligator Harbor area, Franklin County, Florida. M. S. thesis. Florida State Univ., 69 pp.

CARPENTER, DONALD G.

1956. Distribution of polychaete annelids in the Alligator Harbor area, Franklin County, Florida. *Pap. Oceanogra. Inst., Florida State Univ.* 22: 89-110.

CARRIKER, MELEBOURNE R.

1967. Ecology of estuarine benthic invertebrates: a perspective. In George H. Lauff (editor), *Estuaries*, pp. 442-540. *Amer. Ass. Advan. Sci. Publ.* 83, Washington, D. C.

CARSEY, BEN J.

1950. Geology of Gulf coastal area and continental shelf. *Bull. Amer. Ass. Petrol. Geol.* 34: 361-385.

CHEETHAM, ALAN H.

1963. Late Eocene zoogeography of the eastern Gulf coast region. *Geol. Soc. Amer., Mem.* 91, xi + 113 pp.

COLLIER, ALBERT, and JOEL W. HEDGPETH.

1950. An introduction to the hydrography of tidal waters of Texas. *Publ. Inst. Mar. Sci., Univ. Texas* 1: 120-194.

- COOKE, C. WYTHE.
1945. Geology of Florida. Fla. Geol. Surv., Geol. Bull. 29, ix + 339 pp.
- COPELAND, B. J.
1970. Estuarine classification and responses to disturbances. Trans. Amer. Fish. Soc. 99: 826-835.
- COPELAND, B. J., and DONALD E. WOHLSCHLAG.
1968. Biological responses to nutrients - eutrophication: saline water considerations. In Earnest F. Gloyna and W. Wesley Eckenfelder, Jr. (editors), Advances in water quality improvement, pp. 65-82. Univ. Texas Press, Austin.
- CORCORAN, E. F., and JAMES E. ALEXANDER.
1963. Nutrient, chlorophyll and primary production studies in the Florida Current. Bull. Mar. Sci. 13: 527-541.
- CRONIN, L. EUGENE.
1967. The role of man in estuarine processes. In George H. Lauff (editor), Estuaries, pp. 667-689. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.
- CURL, HERBERT, JR.
1959. The hydrography of the inshore northeastern Gulf of Mexico. Publ. Inst. Mar. Sci., Univ. Texas 4: 193-205.
- CURRAY, JOSEPH R.
1960. Sediments and history of Holocene transgression, continental shelf, northwest Gulf of Mexico. In Francis P. Shepard, Fred B. Phleger, and Tjeerd H. van Andel (editors), Recent sediments, northwest Gulf of Mexico, pp. 221-266. Amer. Ass. Petrol. Geol., Tulsa.
- DALES, R. PHILLIPS.
1963. Annelids. Hutchinson and Co., Ltd., London, 200 pp.
- DARNELL, REZNEAT M.
1958. Food habits of fishes and larger invertebrates of Lake Pontchartrain, Louisiana, an estuarine community. Publ. Inst. Mar. Sci., Univ. Texas 5: 353-416.
- DARNELL, REZNEAT M.
1967. Organic detritus in relation to estuarine ecosystem. In George H. Lauff (editor), Estuaries, pp. 376-382. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

DAWES, C. J.

1967. Marine algae in the vicinity of Tampa Bay, Florida. Dept. Botany and Bacteriology, Univ. South Florida, Contrib. 27, 105 pp.

DAWSON, C. E.

- 1955a. A contribution to the hydrography of Apalachicola Bay, Florida. Publ. Inst. Mar. Sci., Univ. Texas 4: 15-35.

DAWSON, C. E.

- 1955b. Museum report 1963-1964. Gulf Coast Res. Lab., Ocean Springs, Mississippi, 57 pp.

DAY, J. H.

1964. The origin and distribution of estuarine animals in South Africa. Monogr. Biol. 14: 159-173.

DAY, J. H.

1967. A monograph on the polychaeta of southern Africa. Part 1. Errantia. Part 2. Sedentaria. British Museum (Natural History), London, viii + 878 pp.

DEAN, DAVID.

1970. Water quality - benthic invertebrates, relationships in estuaries. U. S. Dept. Interior, Water Resource Res. Proj., Rep. No. A-011-ME, 31 pp.

DRACH, PIERRE.

1960. Perspectives in the study of benthic fauna of the continental shelf. In A. A. Buzzati-Traverso (editor), Perspectives in marine biology, pp. 33-46. Univ. California Press, Los Angeles.

DRAGOVICH, ALEXANDER, and LUCIUS JOHNSON, JR.

1966. Chemical environment project. In Report of the Bureau of Commercial Fisheries Biological Station, St. Petersburg Beach, Florida, fiscal year 1965, pp. 16-17. U. S. Fish Wildl. Serv., Circ. 242.

DRAGOVICH, ALEXANDER, and JOHN A. KELLY, JR.

1964. Ecological observations of macro-invertebrates in Tampa Bay, Florida. Bull. Mar. Sci. 14: 74-102.

- DRAGOVICH, ALEXANDER, JOHN A. KELLY, JR., and ROBERT D. KELLY.
1965. Red water bloom of a dinoflagellate in Hillsborough Bay, Florida. *Nature* 207: 1209-1210.
- DRAGOVICH, ALEXANDER, JOHN A. KELLY, JR., and JOHN H. FINUCANE.
1966. Oceanographic observations of Tampa Bay, Charlotte Harbor, Pine Island Sound, Florida, and adjacent waters of the Gulf of Mexico, February 1964 through February 1965. U. S. Fish Wildl. Serv., Data Rep. 13, ii + 72 pp.
- DRAGOVICH, ALEXANDER, JOHN A. KELLY, JR., and H. GRANT GOODELL.
1968. Hydrological and biological characteristics of Florida's west coast tributaries. U. S. Fish Wildl. Serv., Fish. Bull. 66: 463-477.
- DRAGOVICH, ALEXANDER, and BILLIE Z. MAY.
1962. Hydrological characteristics of Tampa Bay tributaries. U. S. Fish Wildl. Serv., Fish. Bull. 205: 163-176.
- DRENNAN, KIRBY L.
1963. Surface circulation in northeastern Gulf of Mexico. Gulf Coast Res. Lab., Oceanogra. Sec., Tech. Rep. 1, 116 pp.
- DRUMMOND, KENNETH H., and GEORGE B. AUSTIN, JR.
1958. Some aspects of the physical oceanography of the Gulf of Mexico. U. S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 249, pp. 5-13.
- DUKE, T. W., and T. R. RICE.
1967. Cycling of nutrients in estuaries. Proc. 19th Annu. Sess. Gulf Caribbean Fish. Inst., pp. 59-67.
- EARDLEY, A. J.
1951. Structural geology of North America. Harper and Brothers, New York, xiv + 624 pp.
- EBBS, N. KENNETH, JR.
1964. Some errant polychaetous annelids of the coral patches of Margot Fish Shoal (off Elliott Key, Miami, Florida) excluding the Syllidae. M. S. thesis. Univ. Miami, viii + 209 pp.

EBBS, N. KENNETH, JR.

1966. The coral-inhabiting polychaetes of the northern Florida reef tract. Part 1. Aphroditidae, Polynoidae, Amphinomidae, Eunicidae, and Lysaretidae. Bull. Mar. Sci. 16: 485-555.

EBBS, N. KENNETH, JR., and JON C. STAIGER.

1965. Some osmotic adaptations of Onuphis magna (Polychaeta: Onuphidae). Bull. Mar. Sci. 15: 835-849.

EHLERS, E.

1887. Reports of the results of dredging under the direction of L. F. Pourtales, during the years 1868-1870, and of Alexander Agassiz, in the Gulf of Mexico (1877-78), and in the Caribbean Sea (1878-79), in the U. S. Coast Survey Steamer Blake, Lieut.-Com. C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. XXXI. Report on the annelids. Mem. Mus. Comp. Zool. 15, vi + 335 pp.

ELDRED, BONNIE, ROBERT M. INGLE, KENNETH D. WOODBURN, ROBERT F. HUTTON and HAZEL JONES.

1961. Biological observations on the commercial shrimp, Penaeus duorarum Burkenroad, in Florida waters. Fla. State Bd. Conserv., Mar. Lab. Prof. Pap. Serv. 3, 139 pp.

EMERY, K. O., and R. E. STEVENSON.

1957. Estuaries and lagoons. I. Physical and chemical characteristics. In J. W. Hedgpeth (editor), Treatise on marine ecology and paleoecology 1, Ecology, pp. 673-693. Geol. Soc. Amer., Mem. 67, New York.

EWING, JOHN.

1968. Sediments of the Caribbean. Univ. Miami, Stud. Trop. Oceanogr. 5: 88-102.

FAUVEL, PIERRE.

1923. Faune de France. 5. Polychaetes errantes. Paul Lechevalier, Paris, 488 pp.

FAUVEL, PIERRE.

1927. Faune de France. 16. Polychaetes sedentaires. Paul Lechevalier, Paris, 494 pp.

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION.

1969. Problems and management of water quality in Hillsborough Bay, Florida, Washington, D. C., 88 pp.

FENCHEL, TOM.

1969. The ecology of marine microbenthos. IV. Structure and function of the benthic ecosystem, its chemical and physical factors and the microfauna communities with special reference to the ciliated protozoa. *Ophelia* 6: 1-182.

FERGUSON, G. E., C. W. LINGHAM, S. K. LOVE, and R. O. VERNON.

1947. Springs of Florida. *Florida Geol. Surv., Geol. Bull.* 31, xii + 196 pp.

FINUCANE, JOHN H., and ALEXANDER DRAGOVICH.

1959. Counts of red tide organisms, Gymnodinium breve, and associated oceanographic data from Florida west coast, 1954-57. *U. S. Fish Wildl. Serv., Spec. Sci. Rep. Fish.* 289, 220 pp.

FINUCANE, JOHN H., and ALEXANDER DRAGOVICH.

1966. Hydrographic observations in Tampa Bay, Florida, and adjacent Gulf of Mexico -- 1963. *U. S. Fish Wildl. Serv., Data Rep.* 14, ii + 81 pp.

FITZSIMONS, GAIL.

1965. Feeding and tube-building in Sabellastarte magna-fica (Shaw) (Sabellidae: Polychaeta). *Bull. Mar. Sci.* 15: 642-671.

FOLK, ROBERT L.

1964. Petrology of sedimentary rocks. Hemphill's, Austin, Texas, 154 pp.

FORCE, L. M.

1969. Calcium carbonate size distribution on the west Florida shelf and experimental studies on the micro-architectural control of skeletal breakdown. *J. Sediment. Petrology* 39: 902-934.

FOSTER, NANCY M.

1969. New species of spionids (Polychaeta) from the Gulf of Mexico and Caribbean Sea with a partial revision of the genus Prionospio. *Proc. Biol. Soc. Wash.* 82: 381-399.

GALLOWAY, P. W., and PAUL S. WELCH.

1911. Studies on a phosphorescent Bermudian annelid, Odontosyllis enopla Verrill. *Trans. Amer. Microsc. Soc.* 30: 13-39.

GALTISOFF, PAUL S.

1954. Historical sketch of the explorations in the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 3-36. U. S. Fish Wildl. Serv., Fish. Bull. 89.

GARBER, WILLIAM F.

1959. Receiving water analyses. In E. A. Pearson (editor), Proceedings of the first international conference on waste disposal in the marine environment, pp. 372-402. Pergamon Press, New York.

GAUL, R. D. and R. E. BOYKIN.

1965. Northeast Gulf of Mexico hydrographic survey data collected in 1964. Texas A&M Res. Found. Proj. 286-D, vi + 85 pp.

GIBBS, P. E.

1969. A quantitative study of the polychaete fauna of certain fine deposits in Plymouth Sound. J. Mar. Biol. Ass. U. K. 49: 311-326.

GILBERT, CHARLES H., and EDWIN C. STARKS.

1904. The fishes of Panama Bay. Mem. Calif. Acad. Sci. 4: 1-304.

GITAY, ASHER.

1969. A contribution to the revision of Spiochaetopterus (Chaetopteridae, Polychaeta). Sarsia 37: 9-20.

GOLDSMITH, VICTOR.

1966. The recent sedimentary environment of Choctawhatchee Bay, Florida. M. S. thesis. Florida State Univ., vii + 75 pp.

GOLUBIC, STJEPKO.

1970. Effect of organic pollution on benthic communities. Mar. Pollut. Bull. 1 (NS): 56-57.

GOODELL, H. G., and D. S. GORSLINE.

1961. A sedimentologic study of Tampa Bay, Florida. Rept. Int. Geol. Congr., XXI Sess., Norden, 1960. Pt. XXIII, pp. 75-88. Int. Ass. Sediment., Copenhagen, 1961.

GORDON, ARNOLD L.

1967. Circulation of the Caribbean Sea. J. Geophys. Res. 72: 6207-6223.

GORDON, DONALD C., JR.

1966. The effects of the deposit feeding polychaete Pectinaria gouldii on the intertidal sediments of Barnstable Harbor. *Limnol. Oceanogr.* 11: 327-332.

GORSLINE, D. S.

1967. Contrasts in coastal bay sediments on the Gulf and Pacific coasts. *In* George H. Lauff (editor), *Estuaries*, pp. 219-225. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

GOULD, HOWARD R., and ROBERT H. STEWART.

1955. Continental terrace sediments in the northeastern Gulf of Mexico. *In* Jack L. Hough and Henry W. Menard (editors), *Finding ancient shorelines*, pp. 2-20. Soc. Econ. Paleontol. Mineral., Spec. Publ. 3.

GREENMAN, NORMAN N., and RUFUS J. LeBLANC.

1956. Recent marine sediments and environments of north-west Gulf of Mexico. *Bull. Amer. Ass. Petrol. Geol.* 40: 813-847.

GUNTER, GORDON.

1962. Shrimp landings and production of the state of Texas for the period 1956-1959, with a comparison with other Gulf states. *Publ. Inst. Mar. Sci., Univ. Texas* 8: 216-226.

GUNTER, GORDON.

1967. Some relationships of estuaries to the fisheries of the Gulf of Mexico. *In* George H. Lauff (editor), *Estuaries*, pp. 621-638. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

GUNTER, GORDON, and GORDON E. HALL.

1965. A biological investigation of the Caloosahatchee estuary of Florida. *Gulf Res. Rep.* 1: 1-17.

HALL, D. N. F.

1962. Observations on the taxonomy and biology of some Indo-West-Pacific Penaeidae. Colonial Office, Fish. Publ. 17, 229 pp. London.

HARGRAVE, HARRY T.

1969. Similarity of oxygen uptake by benthic communities. *Limnol. Oceanogr.* 14: 801-805.

HARTMAN, OLGA.

1938. Annotated list of the types of polychaetous annelids in the Museum of Comparative Zoology. Bull. Mus. Comp. Zool. 85: 1-31.

HARTMAN, OLGA.

1939. Polychaetous annelids. Part I. Aphroditidae to Pisionidae. New species of polychaetous annelids from southern California. Allan Hancock Pac. Exped., Univ. Southern California. 7: 1-170.

HARTMAN, OLGA.

1940. Polychaetous annelids. Part II. Chrysopetalidae to Goniadidae. Allan Hancock Pac. Exped., Univ. Southern California 7: 173-286.

HARTMAN, OLGA.

1941. Polychaetous annelids. Part IV. Pectinariidae with a review of all species from the Western Hemisphere. Allan Hancock Pac. Exped., Univ. Southern California 7: 325-344.

HARTMAN, OLGA.

- 1942a. The identity of some marine annelid worms in the United States National Museum. Proc. U. S. Nat. Mus. 92: 101-140.

HARTMAN, OLGA.

- 1942b. Report on the scientific results of the Atlantis expeditions to the West Indies under the joint auspices of the University of Havana and Harvard University. The polychaetous annelida. Mem. Soc. Cubana Hist. Natur. 16: 89-104.

HARTMAN, OLGA.

- 1944a. Polychaetous annelids. Part V. Eunicea. Allan Hancock Pac. Exped., Univ. Southern California 10: 1-236.

HARTMAN, OLGA.

- 1944b. Polychaetous annelids from California including the descriptions of two new genera and nine new species. Polychaetous annelids. Part VI. Parapionidae, Magelonidae, Longosomidae, Otenodrilidae, and Sabellariidae. Allan Hancock Pac. Exped., Univ. Southern California 10: 239-382.

HARTMAN, OLGA.

1945. The marine annelids of North Carolina. Duke Univ. Mar. Sta., Bull. 2, 53 pp.

HARTMAN, OLGA.

- 1947a. Polychaetous annelids. Part VII. Capitellidae. Allan Hancock Pac. Exped., Univ. Southern California 10: 391-480.

HARTMAN, OLGA.

- 1947b. Polychaetous annelids. Part VIII. Pilargiidae. Allan Hancock Pac. Exped., Univ. Southern California 10: 483-522.

HARTMAN, OLGA.

1949. A new marine annelid from Florida. Proc. U. S. Nat. Mus. 99: 503-507.

HARTMAN, OLGA.

1950. Goniadidae, Glyceridae and Nephtyidae. Allan Hancock Pac. Exped., Univ. Southern California 15: 1-180.

HARTMAN, OLGA.

1951. The littoral marine annelids of the Gulf of Mexico. Publ. Inst. Mar. Sci., Univ. Texas 2: 7-124.

HARTMAN, OLGA.

1952. Fouling serpulid worms, new to the Gulf of Mexico. Texas J. Sci. 4: 63-64.

HARTMAN, OLGA.

1954. Polychaetous annelids of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 413-417. U. S. Fish Wildl. Serv., Fish. Bull. 89.

HARTMAN, OLGA.

1956. Polychaetous annelids erected by Treadwell, 1891 to 1948, together with a brief chronology. Bull. Amer. Mus. Natur. Hist. 109: 243-310.

HARTMAN, OLGA.

1957. Orbiniidae, Apistobranchidae, Paraonidae and Longosomidae. Allan Hancock Pac. Exped., Univ. Southern California 15: 211-392.

HARTMAN, OLGA.

1958. A new nereid worm from warm mineral springs, Fla., with a review of the genus Nicon Kinberg. J. Wash. Acad. Sci. 48: 263-266.

HARTMAN, OLGA.

- 1959a. Capitellidae and Nereidae (marine annelids) from the Gulf side of Florida, with a review of freshwater Nereidae. Bull. Mar. Sci. 9: 153-168.

HARTMAN, OLGA.

- 1959b. Catalogue of the polychaetous annelids of the world. Part I and II. Allan Hancock Found. Publ., Univ. Southern California, Occas. Pap. 23, 628 pp.

HARTMAN, OLGA.

1965. Catalogue of the polychaetous annelids of the world. Supplement 1960-1965 and index. Allan Hancock Found. Publ., Univ. Southern California, Occas. Pap. 23, 197 pp.

HARTMAN, OLGA.

1968. Atlas of the errantiate polychaetous annelids from California. Allan Hancock Found., Univ. Southern California, Los Angeles, 827 pp.

HARTMAN, OLGA.

1969. Atlas of the sedentariate polychaetous annelids from California. Allan Hancock Found., Univ. Southern California, Los Angeles, 811 pp.

HEALD, ERIC JAMES.

1969. The production of organic detritus in a south Florida estuary. Ph. D. dissertation. Univ. Miami, ix + 110 pp.

HEDGPETH, JOEL W.

1953. An introduction to the zoogeography of the north-western Gulf of Mexico with reference to the invertebrate fauna. Publ. Inst. Mar. Sci., Univ. Texas 3: 106-224.

HEDGPETH, JOEL W.

1954. Bottom communities of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 203-214. U. S. Fish Wildl. Serv., Fish. Bull. 89.

HEDGPETH, JOEL W.

1957. Marine biogeography. In J. W. Hedgpeth (editor),
Treatise on marine ecology and paleoecology 1, Ecology,
pp. 359-382. Geol. Soc. Amer. Mem. 67, New York.

HELA, ILMO.

1956. A pattern of coastal circulation inferred from
synoptic salinity data. Bull. Mar. Sci. 6: 74-83.

HILDEBRAND, HENRY H.

1954. A study of the fauna of the Brown Shrimp (Penaeus
aztecus Ives) grounds in the western Gulf of Mexico.
Publ. Inst. Mar. Sci., Univ. Texas 3: 233-366.

HILDEBRAND, HENRY H.

1955. A study of the fauna of the Pink Shrimp (Penaeus
duorarum Burkenroad) grounds in the Gulf of Campeche.
Publ. Inst. Mar. Sci., Univ. Texas 4: 169-232.

HILDEBRAND, SAMUEL F.

1939. The Panama Canal as a passageway for fishes, with
lists and remarks on the fishes and invertebrates ob-
served. Zoologica (New York) 24: 15-45.

HOAGLAND, RUTH A.

1919. Polychaetous annelids from Porto Rico, the Florida
Keys, and Bermuda. Bull. Amer. Mus. Natur. Hist. 41:
571-590.

HOESE, H. D., and R. S. JONES.

1963. Seasonality of larger animals in a Texas turtle
grass community. Publ. Inst. Mar. Sci., Univ. Texas
9: 37-47.

HOLMES, CHARLES W., and RICHARD G. EVANS.

1963. Sedimentology of Gullivan Bay and vicinity, Florida.
Sedimentology 2: 189-206.

HOLT, S. J.

1969. The food resources of the ocean. Sci. Amer. 221:
178-194.

HOPKINS, THOMAS S.

1969. The Escambia River and Escambia Bay during summer
1969: a report in two parts. Dept. Mar. Biol., Univ.
West Florida, 54 pp. (mimeo).

HUANG, TER-CHIEN.

1966. A sedimentologic study of Charlotte Harbour, southwestern Florida. M. S. thesis. Florida State Univ., x + 97 pp.

HUMM, HAROLD J.

1956. Sea grasses of the northern Gulf coast. Bull. Mar. Sci. 6: 305-308.

HUMM, HAROLD J.

1964. Epiphytes of the sea grass, Thalassia testudinum, in Florida. Bull. Mar. Sci. 14: 306-341.

HUMM, HAROLD J.

1969. Distribution of marine algae along the Atlantic coast of North America. Phycologia 7: 43-53.

HUMM, H. J., and SYLVIA E. TAYLOR.

1961. Marine Chlorophyta of the upper west coast of Florida. Bull. Mar. Sci. 11: 321-380.

HUTCHINS, L. W.

1947. The bases for temperature zonation in geographical distributions. Ecol. Monogr. 17: 325-335.

HUTTON, ROBERT F., BONNIE ELDRED, KENNETH D. WOODBURN, and ROBERT M. INGLE.

1956. The ecology of Boca Ciega Bay with special reference to dredging and filling operations. Florida State Bd. Conserv. Tech. Ser. 17, Pt. 1, 87 pp.

JACOBS, MARIAN B., and MAURICE EWING.

1969. Mineral source and transport in waters of the Gulf of Mexico and Caribbean Sea. Science 163: 805-809.

JOHNSON, RALPH GORDON.

1970. Variations in diversity within benthic marine communities. Amer. Natur. 104: 285-300.

JONES, MEREDITH L.

1961. Two new polychaetes of the families Pilargidae and Capitellidae from the Gulf of Mexico. Amer. Mus. Novitates (2049): 1-12.

JONES, MEREDITH L.

1962. On some polychaetous anneliids from Jamaica, the West Indies. Bull. Amer. Mus. Natur. Hist. 124: 173-212.

JONES, MEREDITH L.

1963. Four new species of Magelona (Annelida, Polychaeta) and a redescription of Magelona longicornis Johnson. Amer. Mus. Novitates (2164): 1-31.

JONES, N. S.

1950. Marine bottom communities. Biol. Rev. (Cambridge) 25: 283-313.

JORDAN, G. F., and H. B. STEWART, JR.

1959. Continental slope off southwest Florida. Bull. Amer. Ass. Petrol. Geol. 43: 974-991.

JOYCE, EDWIN A., JR.

1968. Project Hourglass explores the continental shelf. Sea Frontiers 14: 352-359.

KELLY, JOHN A., JR., and ALEXANDER DRAGOVICH.

1967. Occurrence of macrozooplankton in Tampa Bay, Florida, and the adjacent Gulf of Mexico. U. S. Fish Wildl. Serv., Fish. Bull. 66: 209-221.

KIDD, WILLIAM R.

1963. Florida outdoor recreation at the crossroads. Governor's committee on Recreational Development, Tallahassee, Florida, 36 pp.

KINNE, O.

1964. The effects of temperature and salinity on marine and brackish water animals. II. Salinity and temperature - salinity combinations. In Harold Barnes (editor), Oceanography and marine biology, vol. 2, pp. 281-339. George Allen and Unwin, Ltd., London.

KIRTLEY, DAVID W.

1968. The reef builders. Natur. Hist. 77:40-45.

KOFCED, JOHN W., and DONN S. GORSLINE.

1963. Sedimentary environments in Apalachicola Bay and vicinity, Florida. J. Sediment. Petrology 3: 205-223.

KORNICKER, LOUIS S., F. BONET, ROSS CANN, and CHARLES M. HOSKIN.

1959. Alacran Reef, Campeche Bank, Mexico. Publ. Inst. Mar. Sci., Univ. Texas 6: 1-22.

LADD, HARRY S.

1951. Brackish-water and marine assemblages of the Texas coast, with special reference to mollusks. Publ. Inst. Mar. Sci., Univ. Texas 2: 125-163.

LEIPPER, DALE F.

1954. Marine meteorology of the Gulf of Mexico, a brief review. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 89-98. U. S. Fish Wildl. Serv., Fish. Bull. 89.

LEIPPER, DALE F.

1968. Ocean currents in the Gulf of Mexico, a review. Trans. Amer. Geophys. Union 49: 200.

LEPPAKOSKI, E.

1969. Transitory return of the benthic fauna of the Bornholm Basin, after extermination by oxygen insufficiency. Cah. Biol. Mar. 10: 163-172.

LIE, ULF.

1969. Standing crop of benthic infauna in Puget Sound and off the coast of Washington. J. Fish. Res. Bd. Canada 26: 55-62.

LIE, ULF, and DALE S. KISKER.

1970. Species composition and structure of benthic infauna communities off the coast of Washington. J. Fish. Res. Bd. Canada 27: 2273-2285.

LLOYD, JOEL J.

1963. Tectonic history of the south Central-American Orogen. Amer. Ass. Petrol. Geol., Mem. 2: 88-100.

LOWMAN, SHEPARD W.

1951. The relationship of biotic and lithic facies in recent Gulf coast sedimentation. J. Sediment. Petrology 21: 233-237.

LUDWICK, JOHN C.

1964. Sediments in northeastern Gulf of Mexico. In Robert L. Miller (editor), Papers in marine geology, Shepard commemorative volume, pp. 204-238. Macmillan Co., New York.

LUKSENAS, J. K.

1970. Biocoenoses and trophic groups of bottom invertebrates in the southern part of the Baltic Sea. *Okeanologiya* 9: 866-874.

LYNCH, S. A.

1954. Geology of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 67-86. U. S. Fish Wildl. Serv., Fish. Bull. 89.

MacNEIL, STEARNS F.

1950. Pleistocene shore lines in Florida and Georgia. U. S. Geol. Surv., Prof. Pap. 221-F, pp. 95-106.

McHUGH, J. L.

1967. Estuarine nekton. In George H. Lauff (editor), Estuaries, pp. 581-620. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.

McINTYRE, A. D.

1969. Ecology of marine meiobenthos. *Biol. Rev. (Cambridge)* 44: 245-290.

McINTYRE, A. D.

1970. International biological programme section PM (Productivity Marine) bibliography on methods of studying the marine benthos. FAO Fish. Tech. Pap. 98, vi + 96 pp.

McINTYRE, A. D., and A. ELEFThERIOU.

1968. The bottom fauna of a flatfish nursery ground. *J. Mar. Biol. Ass. U. K.* 48: 113-142.

McLELLAN, H. J., and W. D. NOWLIN.

1963. Some features of the deep water in the Gulf of Mexico. *J. Mar. Res.* 21: 233-245.

McNULTY, J. KNEELAND.

1961. Ecological effects of sewage pollution in Biscayne Bay, Florida: sediments and the distribution of benthic and fouling macro-organisms. *Bull. Mar. Sci.* 11: 394-447.

McNULTY, JOHN KNEELAND.

1966. Recovery of Biscayne Bay from pollution. Ph. D. dissertation. Univ. Miami, xii + 178 pp. Univ. Microfilms, Ann Arbor, Michigan (Order No. 66-13,006).

McNULTY, J. KNEELAND.

1968. Gulf of Mexico estuarine inventory projects. In Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, fiscal year 1967, pp. 5-9. U. S. Fish Wildl. Serv., Circ. 290.

McNULTY, J. KNEELAND.

1969. Plankton ecology project. In Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, fiscal year 1968, pp. 22-24. U. S. Fish Wildl. Serv., Circ. 313.

McNULTY, J. KNEELAND, and NELIA N. LOPEZ.

1969. Year-round production of ripe gametes by benthic polychaetes in Biscayne Bay, Florida. Bull. Mar. Sci. 19: 945-954.

McNULTY, J. KNEELAND, ROBERT C. WORK, and HILARY B. MOORE.

1962. Some relationships between the infauna of the level bottom and the sediment in south Florida. Bull. Mar. Sci. 12: 322-332.

MAKAROV, Yu. N., and B. C. AVERIN.

1969. Quantitative distribution of zoobenthos in the shelf waters of the Mozambique channel. Okeanologiya 8: 845-847.

MANGUM, CHARLOTTE PRESTON.

1962. Studies on speciation in maldanid polychaetes of the North American Atlantic coast. Postilla (65): 1-12.

MANGUM, CHARLOTTE PRESTON.

1964. Studies on speciation in maldanid polychaetes of the North American Atlantic coast. II. Distribution and competitive interaction of five sympatric species. Limnol. Oceanogr. 9: 12-26.

MANGUM, C. P., S. L. SANTOS, and W. R. RHODES, JR.

1968. Distribution and feeding in the onuphid polychaete, Diopatra cuprea (Bosc). Mar. Biol. 2: 33-40.

MARE, MOLLY F.

1944. A study of a marine benthic community with special reference to the micro-organisms. J. Mar. Biol. Ass. U. K. 25: 517-554.

MARMER, H. A.

1954. Tides and sea level in the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 101-118. U. S. Fish Wildl. Serv., Fish. Bull. 89.

MAY, BILLIE Z.

1966. Chemical environment project. In Report of the Bureau of Commercial Fisheries Biological Station, St. Petersburg Beach, Florida, fiscal years 1962-1964, pp. 15-17. U. S. Fish Wildl. Serv., Circ. 239.

MENZEL, R. WINSTON.

1956. Annotated check-list of the marine fauna and flora of the St. George's Sound - Apalachee Bay region, Florida Gulf coast. Oceanogra. Inst. Florida State Univ., Contrib. 61, iv + 78 pp.

MONRO, C. C. A.

1928. Papers from Dr. Th. Mortensen's pacific expedition, 1914-16. On the polychaeta collected by Dr. Th. Mortensen off the coast of Panama. Vidensk. Medd. Dansk. Naturh. Foren. 85: 75-103.

MONRO, C. C. A.

1933. On a collection of polychaeta from Dry Tortugas, Florida. Ann. Mag. Natur. Hist., Tenth Ser. 12: 244-269.

MONRO, C. C. A.

1937. The John Murray expedition 1933-34, scientific reports. Polychaeta 4: 243-321. British Museum (Natural History), London.

MOORE, HILARY B.

1958. Marine ecology. John Wiley and Sons, Inc., New York, vii + 493 pp.

MOORE, HILARY B., LEON T. DAVIES, THOMAS H. FRASER, ROBERT H. GORE, and NELIA R. LOPEZ.

1968. Some biomass figures from a tidal flat in Biscayne Bay, Florida. Bull. Mar. Sci. 18: 261-279.

MOUL, EDWIN T., and ROLAND W. BROWN

1957. Nonalgal marine plants. In J. W. Hedgpeth (editor), Treatise on marine ecology and paleoecology 1, Ecology, pp. 1051-1058. Geol. Soc. Amer., Mem. 67, New York.

- MULTER, H. G., and J. D. MILLIMAN.
1967. Geologic aspects of sabellarian reefs, southeastern Florida. *Bull. Mar. Sci.* 17: 255-267.
- MURRAY, GROVER E.
1961. Geology of the Atlantic and Gulf coastal province of North America. Harper and Row, New York, xvii + 692 pp.
- MUUS, BENT J.
1967. The fauna of Danish estuaries and lagoons. Distribution and ecology of dominating species in the shallow reaches of the mesohaline zone. *Medd. Dan. Fisk. Havunders.* 5: 1-316.
- NAQVI, S. M. Z.
1968. Effects of predation on infaunal invertebrates of Alligator Harbor, Florida. *Gulf Res. Rep.* 2: 313-321.
- NEYMAN, A. A.
1970. Some data on the benthos of the shelves in the northern part of the Indian Ocean. *Okeanologiya* 9: 861-866.
- NICOL, J. A. COLIN.
1960. The biology of marine animals. Interscience Publishers, Inc., New York, xi + 707 pp.
- NIELSEN, E. STEEMANN.
1963. Productivity definition and measurement. In M. N. Hill (editor), *The sea*, vol. 2, pp. 129-164. Interscience Publishers, New York.
- NOWLIN, WORTH D., JR.
1971. Water masses and general circulation of the Gulf of Mexico. *Oceanology Int.* 6: 28-33.
- NOWLIN, WORTH D., JR., J. M. HUBERTZ, and R. O. REID.
1968. A detached eddy in the Gulf of Mexico. *J. Mar. Res.* 26: 185-186.
- NOWLIN, W. D., JR., and H. J. MCLELLAN.
1967. A characterization of the Gulf of Mexico waters in winter. *J. Mar. Res.* 25: 29-59.

- ODUM, EUGENE P., and ARMANDO A. de la CRUZ.
1967. Particulate detritus in a Georgia salt marsh - estuarine ecosystem. In George H. Lauff (editor), Estuaries, pp. 383-388. Amer. Ass. Advan. Sci., Publ. 83, Washington, D. C.
- ODUM, HOWARD T.
1957. Primary production measurements in eleven Florida springs and a marine turtle-grass community. Limnol. Oceanogr. 2: 85-97.
- ODUM, HOWARD T., and CHARLES M. HOSKIN.
1958. Comparative studies on the metabolism of marine waters. Publ. Inst. Mar. Sci., Univ. Texas 5: 16-46.
- OGLESBY, LARRY C.
1968. Responses of an estuarine population of the polychaete Nereis limnicola to osmotic stress. Biol. Bull 134: 118-138.
- O'GOWER, A. K., and J. W. WACASEY.
1967. Animal communities associated with Thalassia, Diplanthera, and sand beds in Biscayne Bay. I. Analysis of communities in relation to water movement. Bull. Mar. Sci. 17: 175-210.
- OLSON, F. C. W., and JOHN B. MORRILL, JR.
1955. Literature survey of the Tampa Bay area. Oceanogra. Inst. Florida State Univ., 66 pp.
- OLSON, THEODORE A., and FREDRICK J. BURGESS.
1967. Pollution and Marine ecology, Interscience Publ., New York, xvi + 364 pp.
- PAINE, ROBERT T.
1961. Observations on Phoronis architecta in Florida waters. Bull. Mar. Sci. 11: 457-462.
- PAINE, ROBERT T.
1963. Ecology of the brachiopod Glottidia pyramidata. Ecol. Monogr. 33: 137-213.
- PALACAS, JAMES G.
1967. Organic matter in bottom sediments, Choctawhatchee Bay, Florida. Trans. Gulf Coast Ass. Geol. Soc., 17th Annu. Meet., p. 482.

PARKER, ROBERT H.

1960. Ecology and distributional patterns of marine macro-invertebrates, northern Gulf of Mexico. In Francis P. Shepard, Fred B. Phleger, and Tjeerd H. van Andel (editors), Recent sediments, northwest Gulf of Mexico, pp. 302-337. Amer. Ass. Petrol. Geol., Tulsa.

PARR, ALBERT EIDE.

1937. Report on hydrographic observations in the Gulf of Mexico and the adjacent straits made during the Yale oceanographic expedition on the Mabel Taylor in 1932. Bull. Bingham Oceanogr. Collect., Yale Univ., 5: 1-93.

PEARSE, A. S.

1934. Inhabitants of certain sponges at Dry Tortugas. Pap. Tortugas Lab., Carnegie Inst. Wash. 27: 119-124.

PEARSE, A. S., and GORDON GUNTER.

1957. Salinity. In J. W. Hedgpeth (editor), Treatise on marine ecology and paleoecology 1, Ecology, pp. 129-157. Geol. Soc. Amer. Mem. 67, New York.

PEARSON, T. H.

1970. The benthic ecology of Loch Linnhe and Loch Eil, a sea-loch system on the west coast of Scotland. I. The physical environment and distribution of the macro-benthic fauna. J. Exp. Mar. Biol. Ecol. 5: 1-34.

PEER, D. L.

1970. Relation between biomass, productivity, and loss to predators in a population of a marine benthic polychaete, Pectinaria hyperborea. J. Fish. Res. Bd. Canada 27: 2134-2153.

PERES, J. M.

1967. The Mediterranean benthos. In Harold Barnes (editor), Oceanography and marine biology, vol. 5, pp. 449-533. Hafner Publ. Co., N. Y.

PERRET, WILLIAM STANLEY.

1966. Occurrence, abundance, and size distribution of fishes and crustaceans collected with otter trawl in Vermilion Bay, Louisiana. M. S. thesis. Univ. South-western Louisiana, ix + 64 pp.

PETERSEN, C. G. JOH., and P. BOYSEN JENSEN.

1911. Valuation of the sea. I. Animal life of the sea-bottom, its food and quantity. (quantitative studies). Danish Biol. Sta. Rep. 20, Copenhagen, 81 pp.

PETTIBONE, MARIAN H.

1956. Some polychaete worms of the families Hesionidae, Syllidae, and Nereidae from the east coast of North America, West Indies, and Gulf of Mexico. J. Wash. Acad. Sci. 46: 281-294.

PETTIBONE, MARIAN H.

1957. Endoparasitic polychaetous annelids of the family Arabellidae with descriptions of new species. Biol. Bull. 113: 170-187.

PETTIBONE, MARIAN H.

1961. New species of polychaete worms from the Atlantic Ocean, with a revision of the Dorvilleidae. Proc. Biol. Soc. Wash. 74: 167-185.

PETTIBONE, MARIAN H.

- 1963a. Marine polychaete worms of the New England region. 1. Aphroditidae through Trochochaetidae. U. S. Nat. Mus. Bull. 227, Pt. 1, v + 356 pp.

PETTIBONE, MARIAN H.

- 1963b. Revision of some genera of polychaete worms of the family Spionidae, including the description of a new species of Scoelelepis. Proc. Biol. Soc. Wash. 76: 89-104.

PETTIBONE, MARIAN H.

1965. Two new species of Aricidea (Polychaeta, Paraonidae) from Virginia and Florida, and redescription of Aricidea fragilis Webster. Proc. Biol. Soc. Wash. 78: 127-140.

PETTIBONE, MARIAN H.

1966. Revision of the Pilargidae (Annelida: Polychaeta) including descriptions of new species, and redescription of the pelagic Podarmus ploa Chamberlin (Polynoidae). Proc. U. S. Nat. Mus. 118: 155-208.

PHILLIPS, RONALD C.

1960. Observations on the ecology and distribution of the Florida sea grasses. Florida State Bd. Conserv. Mar. Lab. Prof. Pap. Serv. 2, iv + 72 pp.

PHLEGER, FRED B.

1960. Sedimentary patterns of microfauna in northern Gulf of Mexico. In Francis P. Shepard, Fred B. Phleger, and Tjeerd H. van Andel (editors), Recent sediments northwest Gulf of Mexico, pp. 267-301. Amer. Ass. Petrol. Geol., Tulsa.

POMEROY, LAWRENCE R.

1960. Primary productivity of Boca Ciega Bay, Florida. Bull. Mar. Sci. 10: 1-10.

PRICE, W. ARMSTRONG.

1954. Shorelines and coasts of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 39-86. U. S. Fish Wildl. Serv., Fish. Bull. 89.

PULLEY, THOMAS E.

1952. A zoogeographic study based on the bivalves of the Gulf of Mexico. Ph.D. thesis. Harvard Univ., 215 pp.

PURI, FARHANS S., and ROBERT O. VERNON.

1959. Summary of the geology of Florida and a guide-book to the classic exposures. Florida Geol. Surv., Spec. Publ. 5, viii + 255 pp.

PYLE, THOMAS E.

1968. Late tertiary history of Gulf of Mexico based on a core from Sigsbee Knolls. Amer. Ass. Petrol. Geol. 52: 2242-2246.

RAGOTZKIE, ROBERT A.

1959. Plankton productivity in estuarine waters of Georgia. Publ. Inst. Mar. Sci., Univ. Texas 6: 146-158.

RAINWATER, E. H.

1967. Resume of Jurassic to Recent sedimentation history of the Gulf of Mexico Basin. Trans. Gulf Coast Ass. Geol. Soc., 17th Annu. Meet., pp. 179-210.

REID, GEORGE K., JR.

1954. An ecological study of the Gulf of Mexico fishes, in the vicinity of Cedar Key, Florida. Bull. Mar. Sci. 4: 1-94.

REID, GEORGE K., JR.

- 1955a. A summer study of the biology and ecology of East Bay, Texas. Texas J. Sci. 7: 316-343.

REID, GEORGE K., JR.

- 1955b. Part II. The fish fauna of East Bay, the Gulf beach, and summary. Texas J. Sci. 7: 430-453.

REID, GEORGE K., JR.

1961. Ecology of inland waters and estuaries. Reinhold Publishing Corp., New York, xvi + 375 pp.

REISH, DONALD J.

1959. An ecological study of pollution in Los Angeles-Long Beach harbors, California. Allan Hancock Found. Publ., Univ. Southern California, Occas. Pap. 22, 119 pp.

REISH, DONALD J.

1967. Relationship of polychaetes to varying dissolved oxygen concentrations. In J. Paz Marota and F. Josa (editors), Advances in water pollution research, 3, pp. 199-216. Water Pollution Control Federation, Washington, D. C.

RENAUD, JEANNE C.

1956. A report on some polychaetous annelids from the Miami-Bimini area. Amer. Mus. Novitates (1812): 1-40.

RILEY, FRANCIS.

1970. Fisheries of the United States ... 1969. U. S. Fish Wildl. Serv., C.F.S. 5300, xxx + 87 pp.

RILEY, GORDON A.

1937. The significance of the Mississippi River drainage for biological conditions in the northern Gulf of Mexico. J. Mar. Res. 1: 60-74.

RINCKEY, GORDON R., and CARL H. SALOMAN.

1964. Effect of reduced water temperature on fishes of Tampa Bay, Florida. Quart. J. Fla. Acad. Sci. 27: 9-16.

RIOJA, ENRIQUE.

1946. Estudios anelidologicos. XIV. Observaciones sobre algunos poliquetos de las costas del Golfo de Mexico. An. Inst. Biol. Univ. Mexico 17: 193-203.

RIOJA, ENRIQUE.

1959. Estudios anelidologicos. XXII. Datos para el conocimiento de la fauna de anelidos poliquetos de las costas orientales de Mexico. An. Inst. Biol. Univ. Mexico 29: 219-301.

RIOJA, ENRIQUE.

1961. Estudios anelidologicos. XXV. Un nuevo genero de la familia Pareulepidae, del Golfo de Mexico. An. Inst. Biol. Univ. Mexico 22: 235-249.

ROBERTSON, PHILIP B.

1963. A survey of the marine rock-boring fauna of southeast Florida. M. S. thesis. Univ. Miami, vii + 169 pp.

ROUNSEFELL, GEORGE A.

1954. Biology of the commercial fishes of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 507-512. U. S. Fish Wildl. Serv., Bull. 89.

ROUNSEFELL, GEORGE A.

1963. Realism in the management of estuaries. Alabama Mar. Lab., Mar. Resource Bull. 1, 15 pp.

ROWE, GILBERT THOMAS.

1966. A study of the deep water benthos of the north-western Gulf of Mexico. M. S. thesis. Texas A&M Univ., vi + 89 pp.

ROWE, GILBERT T.

1969. Benthic biomass and surface productivity. Woods Hole Oceanogra. Inst. Contrib. 2420, 22 pp.

RUBINOFF, IRA.

1968. Central American sea-level canal: possible biological effects. Science 161: 857-861.

RUSNAK, GENE A.

1967. Rates of sediment accumulation in modern estuaries, In George H. Lauff (editor), Estuaries, pp. 180-184. Amer. Ass. Advan. Sci. Publ. 83, Washington, D. C.

RYTHER J. H.

1963. Geographic variations in productivity. In M. N. Hill (editor), The sea, vol. 2, pp. 347-380. Interscience Publishers, New York.

SALOMAN, CARL H., JOHN H. FINUCANE, and JOHN A. KELLY, JR.

1964. Hydrographic observations of Tampa Bay, Florida, and adjacent waters August 1961 through December 1962. U. S. Fish Wildl. Serv., Data Rep. 4, 112 pp.

SALOMAN, CARL H., and JOHN L. TAYLOR.

1968. Hydrographic observations in Tampa Bay, Florida, and the adjacent Gulf of Mexico -- 1965-66. U. S. Fish Wildl. Serv., Data Rep. 24, 393 pp.

SALOMAN, CARL H., and JOHN L. TAYLOR.

1971. Hydrographic observations in Tampa Bay and adjacent Gulf of Mexico -- 1967. U. S. Fish Wildl. Serv., Data Rep. 55, 62 pp.

SANDERS, HOWARD L.

1956. Oceanography of Long Island Sound, 1952-1954. X. The biology of marine bottom communities. Bull. Bingham Oceanogr. Collect. 15: 345-414.

SANDERS, HOWARD L.

1960. Benthic studies in Buzzards Bay. III. The structure of the soft-bottom community. Limnol. Oceanogr. 5: 138-153.

SANDERS, HOWARD L.

1968. Marine benthic diversity: a comparative study. Amer. Natur. 102: 243-282.

SANDERS, HOWARD L.

1969. Benthic marine diversity and the stability - time hypotheses. In Diversity and stability in ecological systems, Brookhaven symposia in Biology, No. 22, pp. 71-81.

SANDERS, H. L., E. M. GOUDSMIT, E. L. MILLS, and G. E. HAMPSON.

1962. A study of the intertidal fauna of Barnstable Harbor, Massachusetts. Limnol. Oceanogr. 7: 63-79.

- SANDERS, H. L., R. R. HESSLER, and G. R. HAMPSON.
1965. An introduction to the study of deep-sea benthic faunal assemblages along the Gay Head-Bermuda transect. Deep-Sea Res. Oceanogr. Abstr. 12: 845-867.
- SANDERS, HOWARD L., and ROBERT R. HESSLER.
1969. Ecology of the deep-sea benthos. Science 163: 1419-1424.
- SASTRAKUSUMAH, SUMARDI.
1970. A study of the food of juvenile migrating pink shrimp, Penaeus duorarum Burkenroad. M. S. thesis. Univ. Miami, vi + 37 pp.
- SAVILLE, THORNDIKE.
1966. A study of estuarine pollution problems on a small unpolluted estuary and a small polluted estuary in Florida. Eng. Prog. Univ. Florida 20 (8), viii + 202 pp.
- SCHELSKE, CLAIRE L., and EUGENE P. ODUM.
1962. Mechanisms maintaining high productivity in Georgia estuaries. Proc. 14th Annu. Sess. Gulf Caribbean Fish. Inst., pp. 75-80.
- SCHOLL, DAVID W.
1963. Sedimentation in modern coastal swamps, southwestern Florida. Bull. Amer. Ass. Petrol. Geol. 47: 1501-1503.
- SCHOLL, DAVID W., and FRANK C. CRAIGHEAD.
1967. Recent geologic history of the west coast of Florida; coastal mangrove swamps, and Florida Bay. Trans. Gulf Coast Ass. Geol. Soc., 17th Annu. Meet., p. 481.
- SHEPARD, FRANCIS P.
1953. Sedimentation rates in Texas estuaries and lagoons. Bull. Amer. Ass. Petrol. Geol. 37: 1919-1934.
- SHEPARD, FRANCIS P., and DAVID G. MOORE.
1960. Bays of central Texas coast. In Francis P. Shepard, Fred E. Phleger, and Tjeerd H. van Andel (editors), Recent sediments, northwest Gulf of Mexico, pp. 117-152. Amer. Ass. Petrol. Geol., Tulsa.
- SHIPP, BERNARD.
1881. The history of Hernando DeSoto and Florida from 1512 to 1568. Robert M. Lindsay, Philadelphia, 689 pp.

SIMMONS, ERNEST G.

1957. An ecological survey of the upper Laguna Madre of Texas. Publ. Inst. Mar. Sci., Univ. Texas 4: 156-200.

SIMON, JOSEPH L.

1965. Feeding in the annelid Eteone heteropoda. Quart. J. Fla. Acad. Sci. 28: 370-372.

SKIRROW, GEOFFREY.

1965. The dissolved gasses - carbon dioxide. In J. P. Riley and G. Skirrow (editors), Chemical oceanography 1, pp. 227-317. Academic Press, Inc., London.

SMITH, F. G. WALTON.

1954. Biology of the spiny lobster. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 463-465. U. S. Fish Wildl. Serv., Fish. Bull. 89.

SMITH, RALPH I.

1964. Keys to marine invertebrates of the Woods Hole region. Systematics-Ecology Program, Mar. Biol. Lab., Woods Hole, Massachusetts, Contrib. 11, x + 208 pp.

SOURNIA, ALAIN.

1965. Ultra-violet absorption by coastal waters off Nossi-be (Madagascar). Bull. Inst. Oceanogr. Monaco 65 (1348): 1-12.

SPRINGER, VICTOR G., and ANDREW J. MCERLEAN.

1962. Seasonality of fishes on a south Florida shore. Bull. Mar. Sci. 12: 39-60.

SPRINGER, VICTOR G., and KENNETH D. WOODBURN.

1960. An ecological study of the fishes of the Tampa Bay area. Florida State Bd. Conserv. Mar. Lab. Prof. Ser. 1, v + 104 pp.

STEPHENS, WILLIAM M.

1966. Life in the turtle grass. Sea Frontiers 12: 264-275.

STEPHENSON, T. A., and ANNE STEPHENSON.

1950. Life between tide-marks in North America. I. The Florida keys. J. Ecol. 38: 354-402.

STEPHENSON, T. A., and ANNE STEPHENSON.

1952. Life between tide-marks in North America. II. Northern Florida and the Carolinas. J. Ecol. 40: 1-49.

STEPHENSON, W., W. T. WILLIAMS, and G. N. LANCE.

1970. The macrobenthos of Moreton Bay. Ecol. Monogr. 40: 459-494.

STEWART, RICHARD A., and DONN S. CORSLINE.

1962. Recent sedimentary history of St. Joseph Bay, Florida. Sedimentology 1: 256-286.

STORR, JOHN F.

1964. Ecology of the Gulf of Mexico commercial sponges and its relation to the fishery. U. S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 466, iv + 73 pp.

STRICKLAND, J. D. H.

1965. Production of organic matter in the primary stages of the marine food chain. In J. P. Riley and G. Skirrow (editors), Chemical oceanography 1, pp. 477-610. Academic Press, Inc., London.

SVERDRUP, H. U., MARTIN W. JOHNSON, and RICHARD H. FLEMING.

1942. The oceans - their physics, chemistry, and general biology. Prentice-Hall, Inc. New York, x + 1087 pp.

SYKES, JAMES E.

1967. The role of research in the preservation of estuaries. Trans. 32nd N. Amer. Wildl. Natur. Resourc. Conf., pp. 151-160.

SYKES, JAMES E.

1968. Commercial values of estuarine-generated fisheries on the south Atlantic & Gulf of Mexico coasts. Proc. Marsh and Estuary Manage. Symp. pp. 73-78. Louisiana State Univ., Baton Rouge.

SYKES, JAMES E., and JOHN H. FINUCANE.

1966. Occurrence in Tampa Bay, Florida, of immature species dominant in Gulf of Mexico commercial fisheries. U. S. Fish Wildl. Serv., Fish. Bull. 65: 369-379.

SYKES, JAMES E., and JOHN R. HALL.

1970. Comparative distribution of mollusks in dredged and undredged portions of an estuary, with a systematic list of species. U. S. Fish Wildl. Serv., Fish. Bull. 68: 299-306.

TABB, DURBIN, DAVID DUBROW, and RAYMOND MANNING.

1959. Hydrographic data from the inshore bays and estuaries of Everglades National Park, Florida, 1957-1959. Florida State Bd. Conserv. Rep. 59-5, 26 pp.

TABB, DURBIN C., DAVID L. DUBROW, and RAYMOND B. MANNING.

1962. The ecology of northern Florida Bay and adjacent estuaries. Florida State Bd. Conserv. Tech. Ser. 39, 81 pp.

TABB, DURBIN C., and RAYMOND B. MANNING.

1961. A check-list of the flora and fauna of northern Florida Bay and adjacent brackish waters of the Florida mainland collected during the period July, 1957 through September, 1960. Bull. Mar. Sci. 11: 552-649.

TAFT, WILLIAM H.

1961. Mineralogy of carbonate sediments along the western margin of Florida Bay. In D. S. Gorsline (editor), Proceedings of the first national coastal and shallow water research conference, pp. 676-677. Nat. Sci. Found. and Off. Nav. Res., Tallahassee.

TAFT, WILLIAM H., and JOHN W. HARBAUGH.

1964. Modern carbonate sediments of southern Florida, Bahamas, and Espiritu Santo Island, Baja, California: a comparison of their mineralogy and chemistry. Stanford Univ. Publ., Geol. Sci. 8(2), xiii + 133 pp.

TAGATZ, MARLIN E.

1968. Biology of the blue crab, Callinectes sapidus Rathbun, in the St. Johns River, Florida. U. S. Fish Wildl. Serv., Fish. Bull. 67: 17-33.

TAYLOR, A. G.

1969. The direct uptake of amino acids and other small molecules from sea water by Nereis virens Sars. Comp. Biochem. Physiol. 29: 243-250.

TAYLOR, JOHN L.

1961. Polychaetous annelids of the Seahorse Key area. M. S. thesis. Univ. Florida, iv + 288 pp.

TAYLOR, JOHN L.

1965. Bottom samplers for estuarine research.
Chesapeake Sci. 6: 233-237.

TAYLOR, JOHN L.

1966. A Pacific polychaete in southeastern United States. Quart. J. Fla. Acad. Sci. 29: 22-26.

TAYLOR, JOHN L.

1968. Rearing lugworms for fish bait. U. S. Fish Wildl. Serv., Commer. Fish. Rev. 30 (8-9): 61-63.

TAYLOR, JOHN L.

1970. Coastal development in Tampa Bay, Florida.
Mar. Pollut. Bull. 1 (NS): 153-156.

TAYLOR, JOHN L., JOHN R. HALL, and CARL H. SALOMAN.

1970. Mollusks and benthic environments in Hillsborough Bay, Florida. U. S. Fish Wildl. Serv., Fish. Bull. 68: 15-26.

TAYLOR, JOHN L., and CARL H. SALOMAN.

1966. Benthic project. In Report of the Bureau of Commercial Fisheries Biological Station, St. Petersburg Beach, Florida, fiscal years 1962-1964, pp. 5-8. U. S. Fish Wildl. Serv., Circ. 239.

TAYLOR, JOHN L., and CARL H. SALOMAN.

1968. Some effects of hydraulic dredging and coastal development in Boca Ciega Bay, Florida. U. S. Fish Wildl. Serv., Fish. Bull. 67: 213-241.

TAYLOR, JOHN L., and CARL H. SALOMAN.

1969. Sediments, oceanographic observations, and floristic data from Tampa Bay, Florida, and adjacent waters, 1961-1965. U. S. Fish Wildl. Serv., Data Rep. 34, 561 pp.

TAYLOR, JOHN L., and CARL H. SALOMAN.

1970. Benthic project. In Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, fiscal year 1969, pp. 3-10. U. S. Fish Wildl. Serv., Circ. 342.

TAYLOR, SYLVIA E.

1965. Phaeophyta of the eastern Gulf of Mexico. Ph.D. dissertation. Duke Univ., 312 pp.

TAYLOR, W. R.

1960. Marine algae of the eastern tropical and sub-tropical coasts of the Americas. Univ. Michigan Press, Ann Arbor, ix + 870 pp.

THEEDE H., A. PONAT, K. HIROKI, and C. SCHLIEPER.

1969. Studies on the resistance of marine bottom invertebrates to oxygen-deficiency and hydrogen sulphide. Mar. Biol. 2: 325-337.

THORNE, ROBERT F.

1954. Flowering plants of the waters and shores of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 193-202. U. S. Fish Wildl. Serv., Fish. Bull. 89.

THORSON, GUNNAR.

1961. Length of pelagic larval life in marine bottom invertebrates as related to larval transport by ocean currents. In Oceanography, pp. 455-474. Amer. Ass. Advan. Sci., Washington, D. C.

THORSON, GUNNAR.

1969. Marine level-bottom communities of recent seas, their temperature adaptation, and their "balance" between predators and food animals. In D. J. Reish (editor), Biology of the oceans, pp. 141-148. Dickenson Publ. Co., Belmont, California.

TIETJEN, JOHN H.

1969. The ecology of shallow water meiofauna in two New England estuaries. Oecologia 2: 251-291.

TREADWELL, AARON L.

1911. Polychaetous annelids from the Dry Tortugas, Florida. Bull. Amer. Mus. Natur. Hist. 30: 1-12.

TREADWELL, AARON L.

1914. Researches upon annelids at Tortugas. Carnegie Inst. Wash. Year B. 13: 220-222.

TREADWELL, AARON L.

1917. Polychaetous annelids from Florida, Porto Rico, Bermuda, and the Bahamas. Carnegie Inst. Wash., Pap. Mar. Biol. 11: 255-268.

TREADWELL, AARON L.

1921. Leodicidae of the West Indian region. Carnegie Inst. Wash. 15, iv + 131 pp.

TREADWELL, AARON L.

1929. New species of polychaetous annelids in the collections of the American Museum of Natural History, from Porto Rico, Florida, lower California, and British Somaliland. Amer. Mus. Novitates (392): 1-13.

TREWARTHA, GLENN T.

1943. An introduction to weather and climate. McGraw-Hill Book Co., New York, x + 545 pp.

TUREKIAN, KARL K.

1956. Rapid technique for determination of carbonate content of deep-sea cores. Bull. Amer. Ass. Petrol. Geol. 40: 2507-2509.

TURNER, CHARLES H., and ALEC R. STRACHAN.

1969. The marine environment in the vicinity of the San Gabriel River mouth. Calif. Fish Game 55: 53-68.

TURNER, WILLIAM R.

1969. Life history of menhadens in the eastern Gulf of Mexico. Trans. Amer. Fish. Soc. 98: 216-224.

UCHUPI, ELAZAR.

1967. Bathymetry of the Gulf of Mexico. Trans. Gulf Coast Ass. Geol. Soc., 17th Annu. Meet., pp. 161-172.

U. S. COAST and GEODETIC SURVEY.

1965. Surface water temperature and salinity Atlantic coast North and South America. U. S. Government Printing off., Wash., D. C., iii + 88 pp.

U. S. GEOLOGICAL SURVEY.

1969. Generalized distribution and concentration of orthophosphate in Florida streams, Map series 33. U. S. Government Printing off., Wash., D. C.

U. S. PUBLIC HEALTH SERVICE.

1954. Aspects of water pollution in the coastal area of the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 555-575. U. S. Fish Wildl. Serv., Fish. Bull. 89.

VERRILL, A. E.

1873. Report upon the invertebrate animals of Vineyard Sound and the adjacent waters, with an account of the physical characters of the region. U. S. Comm. Fish Fish., Rep. 1871-1872, pp. 295-778.

VERRILL, A. E.

1881. New England Annelida. Part 1. Historical sketch, with annotated list of the species hitherto recorded. Trans. Connecticut Acad. Arts Sci. 4: 285-324.

VERRILL, A. E.

1890. Additions to the Turbellaria, Nemertina, and Annelida of the Bermudas. Trans. Connecticut Acad. Arts Sci. 10 (Part 2): 596-670.

VOSS, GILBERT L., and NANCY A. VOSS."

1955. An ecological survey of Soldier Key, Biscayne Bay, Florida. Bull. Mar. Sci. 5: 203-229.

WASS, M. L.

1967. Indicators of pollution. In Theodore A. Olson and Fredrick J. Burgess (editors), Pollution and marine ecology, pp. 271-283. Interscience Publishers, New York.

WEBSTER, H. E.

- 1879a. Annelida chaetopoda of the Virginian coast. Trans. Albany Inst., New York 9: 202-269.

WEBSTER, H. E.

- 1879b. Annelid chaetopoda of New Jersey, New York State Mus. Natur. Hist., Ann. Rep. 32: 101-128.

WELLS, G. P.

1962. The warm-water lugworms of the world (Arenicolidae, Polychaeta). Proc. Zool. Soc. London 138: 22-353.

WELLS, HARRY W.

1961. The fauna of oyster beds, with special reference to the salinity factor. Ecol. Monogr. 31: 239-266.

WELLS, HARRY W.

1965. Nereid blisters in Florida scallops. Quart. J. Fla. Acad. Sci. 28: 123-128.

WIGLEY, ROLAND L.

1961. Benthic fauna of Georges Bank. Trans. 26th N. Amer. Wildl. Natur. Resourc. Conf., pp. 312-317.

WILLIAMS, AUSTIN B.

1955. A contribution to the life histories of commercial shrimps (Penaeidae) in North Carolina. Bull. Mar. Sci. 5: 116-146.

WILLIAMS, ROBERT H.

1954. Distribution of chemical constituents of sea water in the Gulf of Mexico. In Paul S. Galtsoff (coordinator), Gulf of Mexico its origin, waters, and marine life, pp. 143-151. U. S. Fish Wildl. Serv., Fish. Bull. 89.

WILSON, ALFONSO.

1967. River discharge to the sea from the shores of the conterminous United States. U. S. Geol. Surv., Hydrol. Invest. Atlas HA-282. U. S. Government Printing off., Wash., D. C.

WURTZ, CHARLES B., and SELWYN S. ROBACK.

1955. The invertebrate fauna of some Gulf coast rivers, Proc. Acad. Natur. Sci. Philadelphia 108: 167-206.

WUST, GEORG.

1964. Stratification and circulation in the Antillean-Caribbean basins. Part 1. Spreading and mixing of the water types with an oceanographic atlas. Columbia Univ. Press, New York, 201 pp.

YARBOROUGH, HUNTER.

1967. Geologic history of the Gulf basin. Trans. Gulf Ass. Geol. Soc., 17th Annu. Meet., p. 160.

YENTSCH, C. S.

1963. Primary production. In Harold Barnes (editor), Oceanography and marine biology; vol. 1, pp. 157-175. George Allen and Unwin, Ltd., London.

ZACHS, I.

1933. Polychaeta of the north Japanese Sea. Inst. Hydrobiol. Explor. Mers USSR 19: 125-137.

ZIEMAN, JOSEPH C., JR.

1968. A study of the growth and decomposition of the sea grass Thalassia testudinum. M. S. thesis. Univ. Miami, vii + 50 pp.

BIOGRAPHICAL SKETCH

John Lippincott Taylor was born October 29, 1932, at Philadelphia, Pennsylvania. In June, 1950, he was graduated from Germantown Friends School. In June, 1955, he received the degree of Bachelor of Arts with a major in Biology from Antioch College. From 1956 until 1958 he served in the United States Marine Corps. Following his discharge from military duty, he enrolled in the Graduate School of the University of Florida. He worked as a graduate teaching assistant in the Zoology Department until June, 1961, when he received the degree of Master of Science with a major in Invertebrate Zoology. Since then, he has been employed as a Fishery Biologist with the National Marine Fisheries Service while working toward the degree of Doctor of Philosophy at the University of Florida.

John Lippincott Taylor is married to the former Patricia May Bowden. He is a member of the Phi Sigma Biological Society, the Florida Academy of Sciences, the Society of Limnology and Oceanography, and the Marine Biological Association of the United Kingdom.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert M. DeWitt, Chairman
Professor of Zoology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Frank J. S. Maturo, Jr.
Professor of Zoology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Frank G. Norðlie
Professor of Zoology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Ernest S. Ford
Professor of Botany

This dissertation was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1971

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Dean, Graduate School