Effects of Dredging and Unconfined Disposal of Dredged Material on Macrobenthic Communities in Sewee Bay, South Carolina

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by

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INTRODUCTION

Shoaling occurs at a number of locations in the Atlantic Intracoastal Waterway (AIWW) through South Carolina, and periodic maintenance dredging is necessary to keep waterway channels at their prescribed depth. Materials dredged from most shoals in the waterway through this state are usually placed in diked disposal areas. However, a shoal through Sewee Bay, requiring maintenance dredging in the winter of 1977-1978, has no confined disposal site nearby. An agreement was made during the annual waterway dredging consultation between the Corps of Engineers and several state and federal agencies in 1977 to undertake unconfined disposal of dredged material in the area.

The impact of dredging and disposal of dredged material in marine and estuarine environments has received increased attention in recent years (for reviews, see Sherk, 1971; Saila, et al., 1972; Windom, 1976; Morton, 1977), but the reported effects of such activities on benthic communities are inconsistent. For example, Leathem, et al. (1973), Slotta, et al. (1973) and Stickney and Perlmutter (1975) observed only minimal or short term effects from dredging operations while Breuer (1962), Taylor and Saloman (1968), and Kaplan, et al. (1974) noted more severe and long-term disruption of benthic communities resulting from dredging activities. In addition, other studies have noted graded effects of dredging and disposal operations on benthic communities which were dependent on distance from the disposal sites and depth of the resultant sediment layer (Howell and Shelton, 1970; Saila, et al., 1972; Maurer, et al., 1974; Bingham, 1978).

Due to the variable findings noted above and the paucity of dredge-impact studies in areas similar to Sewee Bay, the Division of Marine Resources of the South Carolina Wildlife and Marine Resources Department entered into a contract with the Charleston District of the U. S. Army Corps of Engineers to assess the effects of unconfined disposal of dredged material in this area. The purpose of the study was to determine whether this method could be utilized with minimal disturbance to the biological communities present and possibly with less disturbance than would be caused by diking new areas.

STUDY AREA

Sewee Bay is a very shallow water mass located west of Bulls Bay about midway along the coast of South Carolina. It is sheltered from the open Atlantic Ocean by Bulls Island. The bay is bordered on the west by a series of small islands and bars, created from dredged material left during the original dredging of the Atlantic Intracoastal Waterway through the area. Spartina marshes surround the bay to the south, east, and north. The AIWW through the Sewee Bay area requires dredging every 10 to 14 years to maintain a channel depth of about 4 m.

Although Sewee Bay appears to be relatively open at high tide, a substantial portion of its area is exposed as mud flats and oysters bars at low tide. A number of channels, accessible either from the AIWW or from creeks entering via Bulls Bay to the east, are deep enough (1-3 m) to permit small boats to navigate through the bay. Water currents are moderately strong in the area and result from tidal action. Mean tidal range for Sewee Bay is 5.0 feet (National Ocean Survey, 1978).

The disposal sites used in Sewee Bay during this study were intertidal mud flats adjacent to the AIWW but separated from it by several small barrier islands (Fig. 1). This area has infrequently received dredged material in the past, with the last dredging operation occurring in 1964. However, no impact studies have been conducted in connection with previous dredging operations in this area.

METHODS

Benthic Sampling

Benthic samples were collected at 18 stations in Sewee Bay during the period from August 1977 to September 1978. Four of the stations were located in the dredged area of the waterway, two in peripheral areas near Moores Landing, and 12 in a series of 4 transects at various distances from the disposal sites (Fig. 1). All stations were sampled prior to dredging to provide base line data. Samples were then collected at every station within two weeks after dredging to define the area and extent of impact. The stations were again sampled three and six months after dredging to monitor subsequent recovery of the fauna.

Qualitative samples were collected at the 13 subtidal stations using a modified oyster dredge, towed for three minutes. The dredge used during this study consisted of a rectangular steel frame measuring 53 cm across the mouth, with a 1 m long bag of 3 cm stretch mesh polypropylene. A skirt of interlacing metal rings protected the bottom of the bag from chafing. After preliminary sorting of the dredge catch on station, unidentified epifaunal invertebrates and a representative sample of firm substrates were preserved in a 10% seawater-formaldehyde solution and returned to the laboratory for microscopic examination.

Quantitative samples were collected at all 18 stations using a 0.05 m^2 Ponar grab. Three replicate samples were taken at each station. After measuring the volume of each sample, the material was placed in large buckets and returned to the laboratory where it was immediately washed through a 1.0 mm sieve. Organisms and sediment remaining on the sieve after washing were preserved in a 10% seawater-formaldehyde solution and stained with rose bengal to facilitate further sorting under magnification. After identification and enumeration, all animals were blotted dry to remove excess liquid and weighed on a mettler model PN323 balance to determine wet-weight biomass.

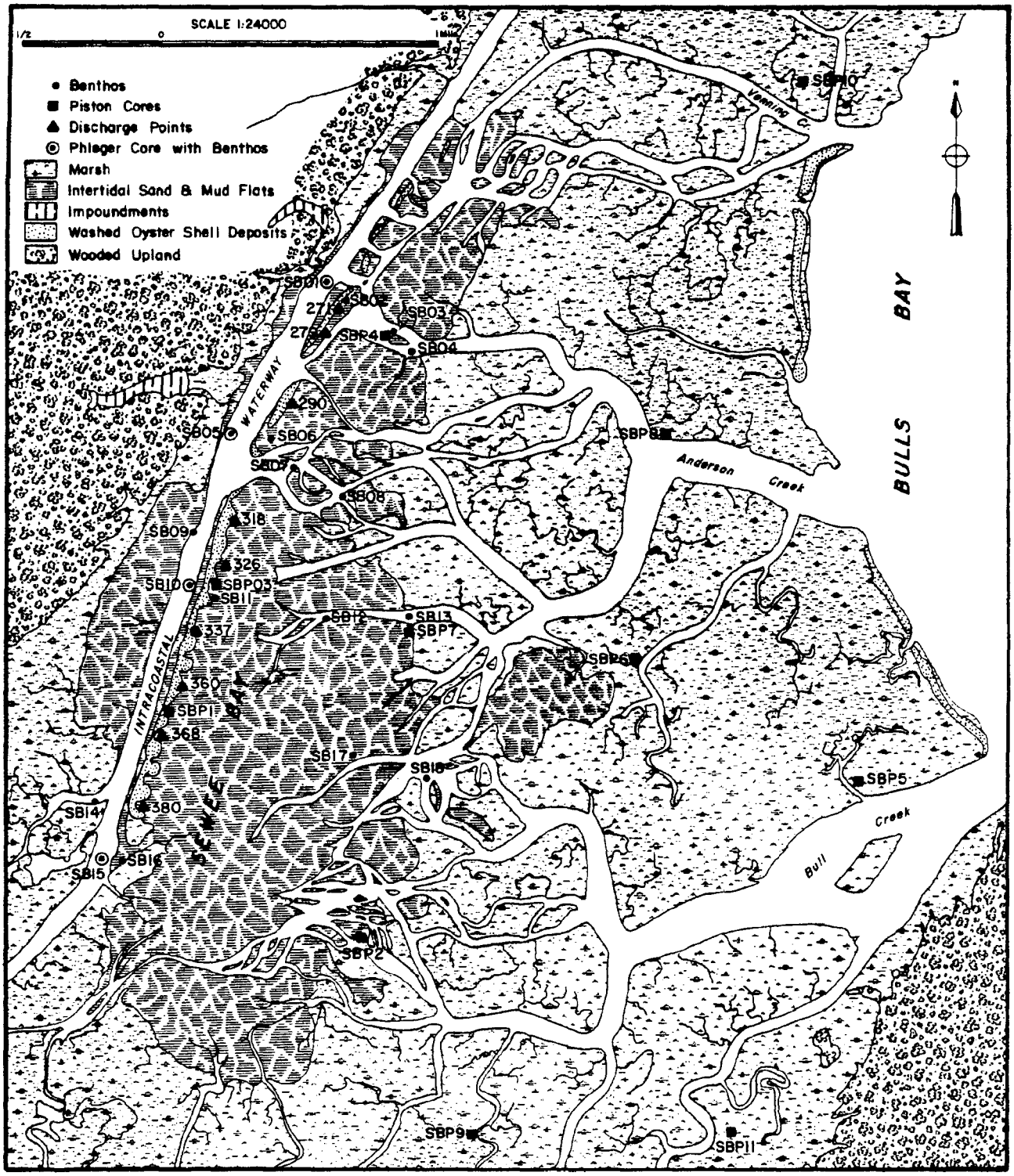
Sediment samples were also collected from each station throughout the study. However, the results will not be presented in this report since significant changes in sediment composition were never noted (Van Dolah, et al., 1979).

Benthic Analytical Techniques

Community structure was analyzed using several equations from information theory. Species diversity was measured with Shannon's formula (Pielou, 1975):

$$H' = -\Sigma pi \log_2 pi$$

Figure 1. Map of Sewee Bay disposal areas and station locations.



where H' is the diversity in bits of information per individual, and pi equals $\frac{ni}{N}$ or the proportion of the sample belonging to the ith species. Species richness was calculated using the formula:

$$SR = \frac{S-1}{\ln N}$$

where S is the number of species and lnN is the natural logarithm of the total number of individuals of all species in the sample. Evenness or equitability, the distribution of individuals among the various species, was measured by:

$$J' = \frac{H'}{\log_2 S}$$

where H' is the species diversity in bits of information per individual and S is the number of species.

Faunal homogeneity was measured from both qualitative dredge samples and quantitative grab samples. The qualitative measure of similarity used was the Sorensen coefficient (Sorensen, 1948):

$$S_1 = \frac{2C}{(a+b)}$$

where a and b are the numbers of species obtained at a station on each of the two collection dates and c is the number common to both. The quantitative measure of similarity was the Bray-Curtis coefficient (Boesch, 1977):

$$S_2 = \frac{\sum 2i\min(x_{ij}, x_{ij})}{\sum i(x_{ij}+x_{ik})}$$

where x_{ij} and x_{ik} are the number of individuals of the ith species in two collections under comparison. Using this coefficient, a normal analysis was completed on modified data sets with a flexible sorting strategy and standard BETA value of -0.025. All data were log transformed and species which occurred in fewer than 4 collections were eliminated from the analysis. However, prior to this elimination, certain species were grouped together to reduce error from incomplete identification of damaged specimens. These groups are as follows: Pinnixa sayana were lumped with Pinnixa sp.; Panopeus herbstii with Xanthidae (undet.); Squilla empusa with Stomatopoda (undet.); Notomastus lobatus with Notomastus sp.; Scoloplos rubra with Scoloplos sp.; Haploscoloplos robustus, H. foliosus and H. fragilis with Haploscoloplos sp.; Nemertina sp. A with Nemertina (undet.). These groupings make the similarity comparison between collections more meaningful since, with few exceptions, the specimens which could only be partially identified were probably the species which could be identified.

Water Chemistry

Water chemistry was monitored throughout the study using Van Dorn bottles (6-liter capacity) at every station in Sewee Bay except SB02, SB04, SB09, SB11 and SB16. Samples were collected 1 m below the water surface and 0.3 m above the bottom at each station. Parameters measured included temperature, dissolved oxygen, salinity, turbidity, and total and settleable solids. Water temperatures were measured when the samples were collected using thermometers mounted in the Van Dorn bottles. Dissolved oxygen and turbidity samples were fixed immediately after collection. In the laboratory, dissolved oxygen was analyzed by the modified Winkler titration method. Turbidity and salinity were measured using a Hach Model 2100A Turbidimeter and a Beckman Model RS7B Induction Salinometer. Solids were analyzed by American Public Health Association (APHA) Standard Methods 224C and 224F (APHA, 1971).

RESULTS and DISCUSSION

Water Chemistry:

Temperature - The shallow waters of Sewee Bay rapidly reflected variations in air temperature; wide seasonal differences were observed during this investigation (Table 1). Temperatures were low ($\leq$ 7.0 °C) throughout the study area in January as South Carolina experienced an unusually cold winter. Temperatures of approximately 20 °C by late April and 30 °C by late July were observed in 1978. A maximum temperature range of 27.3 °C (from a January reading of 4.7 °C at SB07 to 32.0 °C at SB03 in July) was noted during the study. Differences from station to station were relatively minor on any given sampling date, and differences between surface and bottom readings were never large (a maximum of 1.8 °C at SB01 in April). Thus, waters of Sewee Bay are well-mixed with respect to temperature.

Salinity - Although Sewee Bay is influenced to some extent by the AIWW, it is relatively isolated from any major sources of fresh water other than rainfall and runoff from adjacent land areas. Salinity measurements taken during the study were all in the euhaline range (30-40 °/oo), and fluctuations were relatively minor (Table 1). Salinities were highest in summer and autumn samples and lowest in winter. Differences in salinity measurements from surface to bottom and from station to station on a given date were negligible. As Sewee Bay has high and stable salinities with no distinct halocline in any direction, it corresponds with the characteristics of a neutral embayment. According to Glooschenko and Harriss (1974), a neutral embayment is defined as a partially-enclosed marine environment receiving negligible fresh water inflow from rivers and with precipitation approximating evaporation. Glooschenko and Harriss considered water temperature, light, and nutrients to be the primary factors of ecological importance in temperate neutral embayments. Certainly, stresses due to variable salinity on marine organisms in Sewee Bay are relatively small, at least for species occurring subtidally. Although it is possible that salinities of the area may be reduced somewhat following heavy rainfall, no indication of this was evident from the present study.

Dissolved Oxygen - Oxygen levels were never observed to be critically low in Sewee Bay during the study period (Table 1). Dissolved oxygen values ranged from a low of 5.0 mg/l in bottom samples from stations SB08, SB17, and SB18 during summer to a high of 10.9 mg/l in surface samples from SB08 and SB10 in January. Oxygen readings were lowest in summer, highest in winter, and intermediate in spring and autumn. The winter samples, collected within a few days after dredging and unconfined disposal of dredged material, indicate that the dredging operation was not followed by a widespread and drastic reduction in dissolved oxygen levels. Dissolved oxygen levels could not be recorded for samples taken immediately after dredging at station SB04 due to very high silt levels. However, the epibenthic sample collected shortly thereafter smelled noxious, which may have been attributable either to anaerobic conditions, or smothering and subsequent decomposition of some bottom-dwelling organisms.

The low oxygen values observed in summer are due

to a combination of factors, including high water temperatures and the respiration of organisms. However, D.O. levels never departed significantly from saturation levels. The effects of dredging would probably have been much more adverse had the operation been conducted at any other season of the year, but especially in summer when oxygen levels are low and community metabolism is high. Waterway dredging through Sewee Bay was fortuitously well-timed to coincide with a period when its environmental impact, particularly with respect to D.O., was probably lowest.

Turbidity and Solids - Values for these parameters were rather high throughout the year in Sewee Bay. Pronounced increases as a result of dredging were apparent in winter samples from four stations (SB01, SB03, SB04, SB05), while samples from the remaining stations at this time were generally comparable to, or even lower than, those collected during other seasons of the year (Table 1). It is particularly noteworthy that samples from stations SB01, SB03, SB04, and SB05 were taken within 4-5 days after dredging and unconfined disposal of dredged material in and adjacent to these sites, and while the dredge was still operating in the waterway through Sewee Bay. Samples from the remaining stations were collected shortly after all dredging in the area had been completed. This indicates that abnormally high levels of turbidity and solids resulting from the dredging operations were of very short duration. Several of the turbidity and solids values reached their lowest levels in winter. This corresponds with the data of Mathews and Shealy (1978), who observed that turbidities and solids in the Edisto and Cooper estuaries were lower in winter than at any other time of the year.

Benthic Oyster Dredge Collections:

A moderately diverse assemblage of species was noted in the epifauna of the Sewee Bay area. Overall, species composition was relatively similar from one location to another, especially before dredging operations were undertaken (Tables 2-14). For example, a suite of relatively stenohaline bryozoans (Bugula neritina, Schizoporella errata, Hippoporina verrilli, Microporella ciliata, Parasmittina nitida) was present at the majority of the 13 stations where sampling with a modified oyster dredge was conducted.

Physical disruption of epibenthic assemblages, caused by dredging of the Atlantic Intracoastal Waterway during January of 1978, was clearly evident in samples from stations SB01, SB05, SB10, and SB15 (Tables 2, 5, 8, 12). The average number of species at these four waterway stations was 28 before dredging and 6 immediately after. Repopulation was noted in subsequent sampling intervals. Three months after dredging, the average number of species at the four stations in the AIWW had risen to 20. Six months after dredging, the average number of species was 22, only slightly lower than the number observed the previous summer. Faunal homogeneity between pre-dredge and post-dredge collections was low to moderately low immediately after dredging but increased substantially by the end of the study (Tables 2, 5, 8, 12). The total catch of animals and hard substrate was usually small both before and after dredging at all of the stations in the waterway.

Oyster dredge samples were taken at four stations (SB03, SB07, SB12, SB17) along the axis of Sewee Bay (Fig. 1). Of these, SB03 was especially noteworthy because it had the richest assemblage of epifaunal species found anywhere in Sewee Bay during the study. The bottom at this station consisted of relatively mud-free shell, and an average of 43 species was collected over the four sampling periods. While the minimum number of species collected (32) came immediately after dredging, there was no evidence that the drop in species numbers could be attributed to smothering from spreading dredged material. Instead, many of the epifaunal species found there, especially certain hydroids, entoprocts, and sponges, undergo a period of dormancy in winter due to low water temperatures and were simply not active during February. Species numbers and community composition in spring and summer samples were very similar to those noted in the pre-dredge survey (Table 3). The bottom at station SB07 consisted largely of broken shell and mud, but a moderately diverse faunal assemblage was present (Table 6). No adverse effects were apparent from the disposal of dredged material nearby. Two other stations in the middle of Sewee Bay (SB12, SB17) were located in muddy, shallow water areas. The epifauna at both stations, and particularly SB12, was impoverished and no changes were detectable that were obviously related to disposal practices (Tables 9, 13).

Four stations were also sampled at the mouths of creeks along the eastern edge of Sewee Bay (Fig. 1). The relatively low number of species observed in February samples at stations SB08, SB13, and SB18 was again attributed largely to the seasonal dormancy of a number of sponges, hydroids, entoprocts, and others (Tables 7, 10, 14). However, the reduction in species numbers collected at station SB04 was drastic (Table 4), and clear evidence of smothering by sediments from unconfined disposal of dredged material was apparent at the time of sampling. A considerable amount of soft mud was taken in the February oyster dredge tow. In addition, dead mud crabs and bivalves (Tagelus plebeius, Tellina sp.) were collected and the entire sample was malodorous. No appreciable recovery of the fauna was observed when sampling was conducted in late April. By the summer of 1978, the community was still less diverse than before dredging but a substantial increase in the number of species had occurred over the winter and spring samples, and faunal homogeneity had increased markedly (Table 4).

Finally, oyster dredge collections were taken at station SB14 in a small creek west of the AIWW. This station was relatively isolated from disposal sites and no impact was observed on the epifauna of the area (Table 11).

Benthic Grab Collections:

Species Composition - A total of 129 identifiable species was collected by the Ponar grab in Sewee Bay (Tables 15-32). Of these, four polychaete species, Lumbrineris tenuis, Paraprionospio pinnata, Heteromastus filiformis, and Nereis succinea, comprised over 46% of the total number of animals collected throughout the study period. These species, as well as several others, were quite ubiquitous in their distribution among stations.

For example, L. tenuis, H. filiformis and N. succinea were present at all 18 stations at least once during the study period while P. pinnata was observed at 17 stations during the one-year period.

The community structure of the channel stations (SB01, SB05, SB10, SB15) was dominated by P. pinnata in the late summer prior to dredging. Other abundant species generally present at this time included the decapod Ogyrides limicola and two polychaetes, L. tenuis (all stations) and Glycinde solitaria (SB15). Following the winter dredging operation, P. pinnata densities had decreased at all stations and, at two stations, it was replaced in terms of numerical dominance by the pelecypod Mulinia lateralis (SB05) and the decapod O. limicola (SB10).

An analysis of overall species composition using the Bray-Curtis similarity coefficient showed no consistent or distinctive patterns among channel stations with respect to dredge effects. Six months after dredging, species composition was only slightly similar to the pre-dredge species composition at stations SB01 and SB05, and dissimilar at stations SB10 and SB15 (Fig. 2) even though these sampling periods were in equivalent seasons. However, comparable trends were observed at stations which should not have been affected by the dredging operation (discussed later). Thus, some of the changes in community structure may have been due to normal seasonal and sampling variations.

Alterations in species composition which might be attributable to the dredging operation were noted at station SB01. Three months after dredging, there was a substantial increase in the number of species normally associated with "live" bottom communities at this station (Table 15). Therefore, it is possible that the dredge removed soft mud from the channel down to a firmer substrate which permitted a "live" bottom community to form. However, this community is either patchy or was smothered by channel wall slump since a similar species composition was not observed during the fourth quarter sampling period.

Community structure at stations nearest the disposal sites exhibited varied effects from deposition of dredged material. Station SB02 was situated very close to a disposal site and was the most severely affected. Prior to dredging, the community at this station was dominated by the polychaetes L. tenuis and Aricidea fragilis (Table 16). During the second quarter sampling period, the dominant species was H. filiformis, but L. tenuis remained an important component of the community. Most of the changes which occurred at this time were probably seasonal, as dredged material was still being deposited nearby. Three months after spoil deposition, however, the community was reduced to one infaunal species, N. succinea (a spoil-resistant polychaete; Maurer, et al., 1978) and two epifaunal crustacean species (each represented by one individual). Thus, the original community was smothered and although community complexity had increased to a pre-dredge level six months after dredged material deposition, the species composition was altered (Table 16) and dissimilar by Bray-Curtis similarity coefficient analysis (Fig. 2).

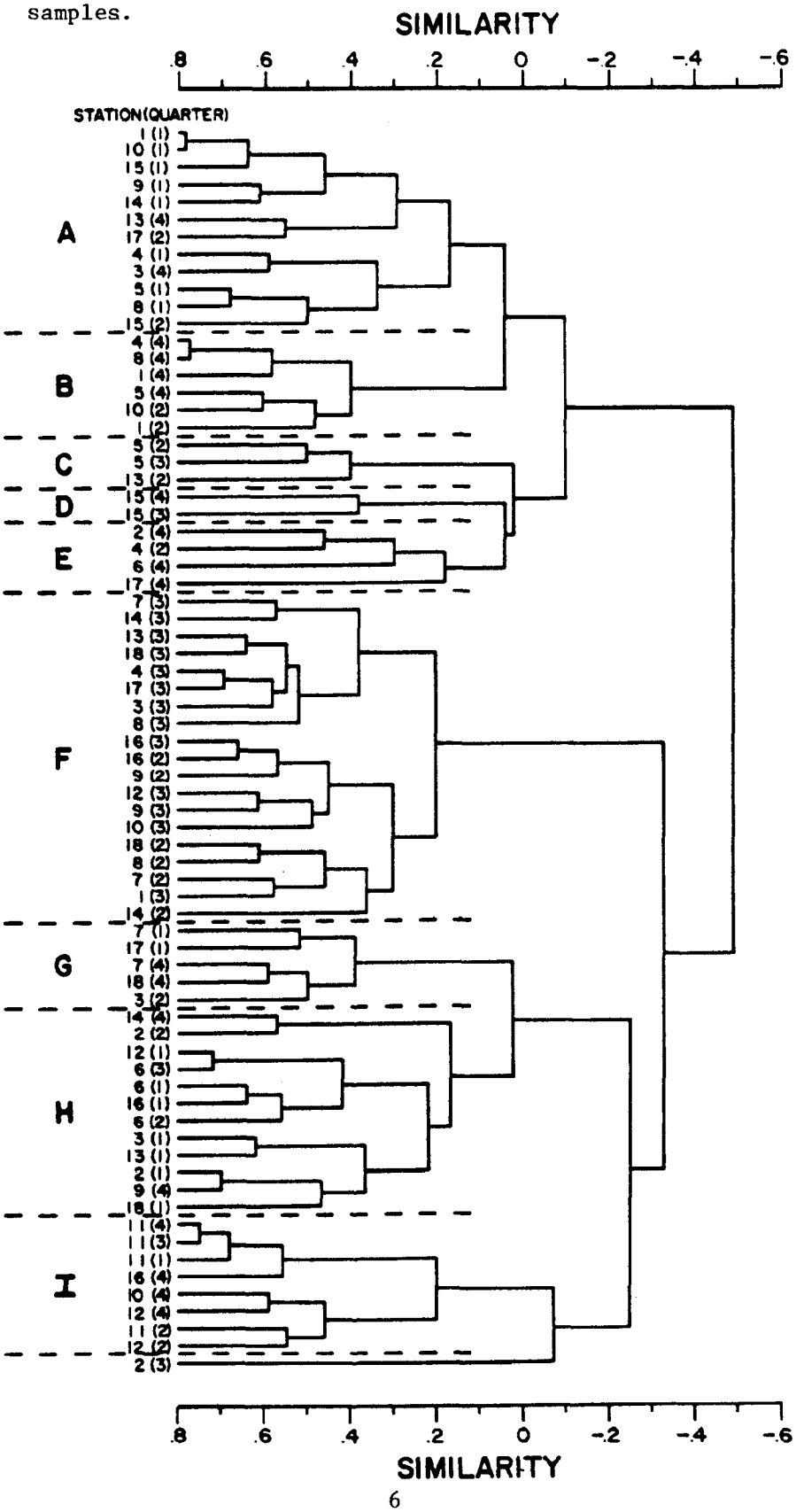
Stations SB06, SB11, and SB16, on the other hand, were not noticeably affected by deposition of dredged material (Tables 20, 25, 30). All of these stations were separated from the disposal sites by short projections of land which may have deflected much of the dredged sediments. In addition, many of the species at these stations have been categorized as pollution resistant (Wass, 1967; Saila, et al., 1972; Maurer, et al., 1978) and could have survived the deposition which did occur. The Bray-Curtis coefficient analysis of these stations indicated that the species composition was similar throughout the year at SB11, and similar during the first three sampling quarters at SB06 (Fig. 2). The decline in community complexity and density during the fourth quarter sampling period at SB06 (Table 20) was probably not due to disposal effects as similar decreases were not observed in the third quarter sampling effort. At station SB16, community structure was dissimilar throughout most of the study period (Fig. 2). However, it is unlikely that dredged material had much influence as a strong tidal current was present and spoil deposits were never observed.

The communities at stations located in the middle of Sewee Bay (SB03, SB07, SB12, SB17) were not severely affected by spoil deposition. During the initial sampling period (August, 1977), the community at SB03 was depauperate and dominated by L. tenuis. After spoil deposition, the community sampled was much more complex (Table 17) and remained diverse throughout the rest of the study period, although species composition was dissimilar on each sampling date (Fig. 2). Paraprionospio pinnata, which was present at the last three sampling quarters, may have been introduced to the community through deposition as it was not present in the first quarter. Stations SB07, SB12 and SB17 showed trends similar to SB03 although initial community structure was more complex. Spoil deposits were present at SB17 in the second and third sampling quarters and may account for some of the changes observed (Fig. 2). However, sediment characteristics were not visibly altered at SB07 and SB12, and community structure was different during equivalent seasons at SB12 but similar at SB07 (Fig. 2). Therefore, it is likely that much of the variation in species composition at all of these stations is due to a combination of seasonal effects and sampling variability resulting from patchy community distribution.

Stations farthest from the disposal sites (SB04, SB08, SB13, and SB18) also showed changes in community structure immediately after, and three months after, deposition of dredged material. Soft, oozy sediments were present at stations SB04, SB08, and SB18 on these sampling dates and probably accounted for some of the changes observed. For example, P. pinnata was a dominant species at two of these stations immediately after deposition, although it was not present before. As this species was common in the channel prior to dredging, it may have been introduced with the spoil. However, it is unlikely that spoil disposal severely influenced the communities through smothering since a diverse assemblage of species was always present. Six months after dredging, the species composition at these stations was slightly similar to pre-dredge species composition (Fig. 2). The community structure at SB13, on the other hand, was dissimilar on every sampling date (Fig. 2). Even so, no decline in community complexity at SB13 occurred as a result of spoil deposition.

Two stations which were not influenced by the dredging operation were SB09 and SB14. Both of these stations were out of the channel and on the opposite side of the waterway with respect to the disposal sites. Thus, changes which occurred at these stations were most likely

Figure 2. Bray-Curtis analysis of the Sewee Bay benthic grab collections. First Quarter = samples collected before dredging; Second Quarter = samples collected immediately after dredging; Third Quarter = samples collected 3 months after dredging; Fourth Quarter = samples collected 6 months after dredging and 1 year after first quarter samples.



due to seasonal effects. Station SB09 was dominated by L. tenuis throughout the study period except in January (second quarter) when M. lateralis was the dominant species (Table 23). Sporadic increases in M. lateralis densities at this time of the year have also been noted in previous studies (Boesch, 1973; Stickney and Perlmutter, 1975). The community structure at SB14 was variable, partly due to seasonal effects. However, this station had an extremely hard bottom with strong currents present, and much of the variability is attributable to poor grab samples. At both stations, the community was similar in the second and third quarters but dissimilar in the first and fourth quarters (Fig. 2).

Species Diversity--The analysis of species diversity (H'), evenness (J') and species richness (SR) of benthic communities in Sewee Bay did not reflect any widespread changes resulting from the dredging operation (Table 33).

H' values increased immediately after dredging at two of the channel stations (SB05, SB15) and all channel stations had higher H' values three months after the dredge had passed through the area. This increase was primarily due to increased species richness and evenness at stations SB01, SB10 and SB15 and increased evenness at station SB05. Six months after dredging, H' had decreased at all channel stations to values which were approximately equivalent to those observed in the first quarter sampling period.

Species diversity patterns were more varied at stations nearest the disposal sites. The communities at all of these stations (SB02, SB06, SB11, SB16) were more diverse immediately after dredged material disposal when compared with the pre-dredge, August sampling period. H' values continued to increase at station SB11 and SB16 during the third quarter sampling period before declining to values approaching those observed initially. H' values at station SB06 remained the same throughout the year with the exception of the increase noted in January. Diversity values for station SB02, on the other hand, reflected the demise of this community through smothering as H', J' and SR values were quite low three months after spoil deposition. However, by the end of the study period, all three indices had increased at station SB02 to values higher than those observed prior to the dredging operation.

Species diversity (H') was consistently higher after spoil deposition at all of the stations located in the middle of Sewee Bay (SB03, SB07, SB12) except station SB17. This was primarily due to increased species richness. At station SB17, H' values also increased in January but later declined to very low values by the end of this study. These values are probably an artifact of sampling variability, however, as similar values should have been observed in April if deposition of dredged material was the cause for this decline.

Diversity values varied at the stations farthest from the disposal sites. H' increased at stations SB13, SB14 and SB18 after the dredging operation, and remained higher throughout the rest of the study period. The observed increase was the result of increases in both evenness and species richness. H' values fluctuated at stations SB04 and SB08 and had declined to relatively low values by the fourth quarter sampling period due to decreased evenness and species richness. H' values at SB09 remained similar throughout this study although species richness did increase during the winter and spring months.

Abundance - An analysis of the mean abundance of the benthic communities at each station (Table 34) indicated that the dredging operation had some short term, localized effects in Sewee Bay. As expected, mean densities at all channel stations (SB01, SB05, SB10, SB15) declined immediately after dredging, whereas densities had increased during this period at most of the stations farthest from the dredging activity (SB04, SB08, SB09, SB14, SB18). The percent of decrease at the channel stations varied, ranging from a minimum of 49% at SB10 to a maximum of 85.2% at SB15. However, declines in abundance were only significant ($P<0.05$ ANOVA test) at three of the channel stations (SB05, SB10, SB15) and, at all but one station (SB15), abundance had increased to pre-dredge levels by April.

Significant density changes ($P<.05$, ANOVA test) were also observed at two other stations. The community at station SB16 increased during the second quarter sampling period, and the community at station SB17 decreased in abundance during the fourth quarter sampling period. These changes were probably due to seasonal effects or sampling variability as discussed previously. Fluctuations in mean densities at all other stations were not significant during the study period ($P>.05$, ANOVA test).

Biomass - Wet-weight biomass estimates (Table 35) varied from a low of 0.06 gms at stations SB02 and SB03 (August 1977, 1978) to a high of 7.02 gms at station SB15 (August, 1977) with no significant patterns discernable. The observed variability is due to (1) the low biomass present at these stations on any sampling date, (2) high variability between replicate samples, and (3) the occasional presence of large bivalves, gastropods, anemones, etc. in the samples. The effects of these factors are best exemplified by an analysis of two stations. Previous data indicated that SB02 was the most severely affected station in Sewee Bay through smothering from deposition of dredged material which resulted in a substantial decline in community complexity and diversity by April, 1978. However, by April biomass had increased to the highest values observed due to the presence of several relatively large N. succinea. The community at station SB14, on the other hand, was not significantly influenced by the dredging operation because of its location. Nonetheless, biomass decreased from a high initial value of 2.89 gms in August, 1977 to a low of 0.27 gms by April, 1978. Thus, it is difficult to interpret changes in biomass with respect to effects of dredging and disposal of dredged material.

CONCLUSIONS

In summary, the effects of dredging and unconfined disposal of dredged material on epifaunal macroinvertebrate communities were detectable at five of the 13 stations sampled with an oyster dredge in Sewee Bay. Disruption of the epibenthos by channel dredging was apparent at each of the four

stations located in the AIWW. However, the epifauna was not especially rich at any of these four stations before dredging, and faunal composition at the end of the study approached that observed during the baseline survey conducted in the summer of 1977. Of the eight stations in Sewee Bay proper where dredge tows were made, a severe impact on the benthos was noted only at SB04. Evidently, dredged material from the disposal area was carried by water currents into the creek where SB04 was located. Some recovery was noted at this station six months after dredging. Species numbers were generally lower at all stations in the winter after dredging when compared with samples collected during the summer. This was attributed largely to normal seasonal differences in community composition. The wide annual range of water temperature influenced the activity patterns of several epifaunal species. A number of sponges, hydroids, entoprocts, and ascidians were observed in a dormant state during the winter sampling period. These species returned to activity with the return of warmer water temperatures in spring.

The effects of dredging on the infaunal communities in Sewee Bay were short term and localized. Immediately after dredging, the community structure at most channel stations was different when compared with pre-dredge samples. Total animal abundance and biomass had also decreased. Although some of these changes are due to seasonal effects, dredging obviously affected the channel communities through bottom disturbance. However, this disruption did not adversely affect species diversity which increased after dredging due to a decline in P. pinnata dominance, and a concomitant increase in species richness. Six months after the dredge had passed through the area, all stations showed indications of returning to pre-dredge conditions. The lack of any long term, adverse effects in the channel correlates well with studies on the intracoastal waterway in Georgia (Stickney and Perlmutter, 1975) and in Delaware Bay (Maurer, et al., 1974).

The effects of unconfined disposal on the infauna in Sewee Bay were varied and somewhat dependent on distance from the points of deposition. The intertidal station, SB02, was the most severely affected through smothering which altered community structure and decreased species diversity, but did not affect community biomass and numerical abundance. Other stations in close proximity to the disposal sites did not appear to be adversely affected by deposition. The community composition at stations further from the spoil sites changed during the study period, but many changes observed were due to normal seasonal variability.

In conclusion, the influence of dredging operations on benthic communities in Sewee Bay were short term and isolated. Furthermore, it is unlikely that dredged material disposal had a profound effect at any station in terms of the ecological interactions of benthic communities with higher trophiclevels. These results differ from other studies in which larger areas were noticeably smothered and subsequently recolonized (Saila, et al., 1972; Maurer, et al., 1974; Bingham, 1978). The absence of widespread, long-term effects in this study may be due to several factors. These include:

1) The use of several disposal sites in Sewee Bay which spread dredged material more evenly over the area.

2) Good flushing patterns present at many Sewee Bay stations, as well as flow diversion by land and oyster hummocks which protected other areas where stations were located.

3) The presence of species at several stations that are resistant to spoil deposition or unhealthy conditions.

4) The presence of several ubiquitous species in Sewee Bay, permitting rapid recolonization in areas which were affected.

5) The similarity of sediment composition present in the channel and disposal areas of Sewee Bay.

6) Seasonal effects, which minimized adverse water quality conditions during the winter dredging period, and caused increased community diversity at most stations afterwards; thereby countering dredge and disposal effects.

RECOMMENDATIONS

Disposal of dredged material can be managed to minimize adverse effects in the estuarine environment. Depending upon the timing and frequency of disturbance, Rhoads, et al. (1978) suggested that the productivity of benthic communities could actually be enhanced by dredge-spoil disposal operations. Although the following recommendations may not enhance benthic productivity, adverse effects should be minimized in Sewee Bay if:

1) Dredging and disposal of dredged material are undertaken in late fall and/or early winter to reduce adverse effects on recruitment patterns.

2) Dredging operations are conducted relatively often, so that the volume of dredged material is not large at any given time.

3) The practice of using several disposal sites is continued in any future operations.

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Table 1. Hydrographic data collected at subtidal stations in the Sewee Bay area, South Carolina.

STATION	DATE	STATION DEPTH	DEPTH	TEMP. (C)	SALINITY (°/oo)	D.O. (mg/1)	TURBIDITY (FTU)	SOLIDS (mg/1) TOTAL	SOLIDS (mg/1) SETTLEABLE
SB01	10-19-77	4	Surface	17.1	34.53	7.1	16.0	110.4	38.8
			Bottom	16.9	34.58	7.4	19.0	110.4	80.8
	1-17-78		Surface	7.0	30.62	9.2	14.0	-	-
			Bottom	6.9	31.89	9.4	68.0	189.2	39.2
	4-24-78		Surface	20.9	32.94	7.3	9.0	96.8	13.2
			Bottom	19.1	32.94	6.9	26.0	165.6	28.0
	7-24-78		Surface	30.2	34.10	5.6	12.0	103.2	76.4
			Bottom	30.1	34.15	5.8	17.0	137.2	75.6
SB03	10-18-77	1	Surface	16.6	34.66	7.3	12.0	104.4	28.0
			Bottom	16.5	34.73	7.6	12.0	126.8	28.4
	1-17-78		Surface	6.9	32.01	9.4	30.0	131.2	30.4
			Bottom	6.9	32.09	9.5	44.0	179.2	80.0
	4-24-78		Surface	19.0	32.98	7.0	21.0	-	-
			Bottom	19.0	32.89	6.9	19.0	-	-
	7-24-78		Surface	32.0	34.07	5.5	16.0	120.4	31.6
			Bottom	32.0	34.07	5.6	18.0	138.0	41.6
SB04	10-18-77	3	Surface	16.8	34.69	7.7	11.0	101.2	30.4
			Bottom	16.8	34.74	7.7	34.0	106.4	24.8
	1-17-78		Surface	6.5	32.07	9.6	34.0	134.4	56.0
			Bottom	6.4	*	*	*	*	*
	4-24-78		Surface	20.1	32.98	7.2	12.0	103.6	10.4
			Bottom	19.8	33.00	7.2	16.0	131.6	14.4
	7-24-78		Surface	29.9	34.00	5.4	20.0	127.6	60.8
			Bottom	29.9	34.02	5.2	21.0	86.8	21.2
SB05	10-19-77	4	Surface	17.4	34.31	7.2	12.0	115.2	30.4
			Bottom	16.9	35.48	7.2	17.0	-	-
	1-17-78		Surface	6.9	32.16	9.7	23.0	154.8	58.8
			Bottom	6.7	32.09	9.7	45.0	-	-
	4-24-78		Surface	20.3	32.99	7.2	7.5	-	-
			Bottom	20.1	33.00	6.9	15.0	-	-
	7-24-78		Surface	29.8	34.31	5.6	11.0	-	-
			Bottom	29.5	34.31	5.2	18.0	121.2	30.0
SB07	10-18-77	2	Surface	16.6	34.61	7.5	8.9	108.8	36.0
			Bottom	16.5	34.58	7.5	11.0	121.6	40.8
	2-1-78		Surface	4.8	30.57	10.7	16.0	82.0	2.4
			Bottom	4.7	30.62	-	17.0	77.0	1.8
	4-24-78		Surface	19.7	32.97	6.9	13.0	116.0	19.2
			Bottom	19.7	33.02	6.9	13.0	135.6	10.4
	7-24-78		Surface	29.8	34.26	5.5	15.0	138.4	19.6
			Bottom	29.8	34.30	5.5	19.0	107.6	29.6
SB08	10-18-77	2	Surface	16.5	34.61	7.6	14.0	117.2	21.2
			Bottom	16.5	34.61	7.8	15.0	134.4	9.2
	2-1-78		Surface	4.9	30.62	10.9	18.0	88.0	25.2
			Bottom	5.0	30.60	10.7	17.0	96.0	34.4
	4-24-78		Surface	20.0	32.90	6.9	17.0	-	-
			Bottom	20.0	33.01	6.9	19.0	160.0	27.6
	7-24-78		Surface	30.0	34.03	5.1	21.0	150.0	43.2
			Bottom	30.0	34.05	5.0	24.0	147.2	2.0
SB10	8-22-77	4	Surface	27.4	33.66	6.4	12.0	-	-
			Bottom	27.0	33.62	6.1	38.0	139.2	18.0
	2-1-78		Surface	4.9	30.87	10.9	11.0	66.4	0.0
			Bottom	5.0	30.88	10.7	12.0	77.2	6.8
	4-24-78		Surface	20.9	33.01	7.8	18.0	125.6	38.4
			Bottom	19.8	33.00	6.9	22.0	154.8	18.0
	7-24-78		Surface	30.3	34.38	5.5	17.0	132.8	62.8
			Bottom	29.3	34.35	5.6	10.0	115.6	51.6

Table 1. (Cont.)

STATION	DATE	STATION DEPTH	DEPTH	TEMP. (C)	SALINITY (°/oo)	D.O. (mg/1)	TURBIDITY (FTU)	SOLIDS TOTAL	SOLIDS SETTLEABLE
SB12	10-19-77	1	Surface	14.9	34.77	7.2	19.0	109.6	15.2
			Bottom	14.9	34.71	7.4	23.0	-	-
	2-1-78		Surface	4.9	30.61	10.6	21.0	124.8	33.2
			Bottom	4.9	30.65	10.4	22.0	163.2	77.2
	4-25-78		Surface	21.9	33.14	7.2	17.0	114.8	47.6
			Bottom	21.9	33.15	6.9	64.0	232.0	58.4
	7-24-78		Surface	30.0	34.18	5.5	14.0	-	-
			Bottom	29.9	34.18	5.5	20.0	105.6	13.6
SB13	10-19-77	3	Surface	16.6	34.60	7.2	13.0	-	-
			Bottom	16.5	34.60	7.5	12.0	-	-
	2-1-78		Surface	5.0	30.53	10.7	16.0	-	-
			Bottom	4.8	30.57	10.6	21.0	-	-
	4-24-78		Surface	21.0	33.04	7.2	24.0	-	-
			Bottom	19.9	33.00	7.1	33.0	174.8	25.6
	7-24-78		Surface	30.0	32.30	5.2	13.0	83.2	0.8
			Bottom	30.0	34.16	5.3	17.0	103.6	6.8
SB14	10-19-77	2	Surface	17.8	34.35	7.3	14.0	95.6	10.0
			Bottom	17.5	34.35	7.4	19.0	127.6	24.8
	2-1-78		Surface	5.3	30.89	10.6	9.7	-	-
			Bottom	5.3	30.93	10.5	10.0	77.2	4.8
	4-25-78		Surface	21.3	34.11	6.9	12.0	139.2	23.6
			Bottom	21.0	32.92	7.0	12.0	128.4	21.6
	7-24-78		Surface	29.4	34.29	6.0	17.0	122.8	29.2
			Bottom	29.4	34.27	6.1	17.0	126.0	17.2
SB15	8-22-77	4	Surface	27.8	33.73	7.3	13.0	109.6	31.2
			Bottom	27.0	33.57	5.6	30.0	178.4	34.8
	2-1-78		Surface	4.9	30.87	10.4	11.0	95.2	18.0
			Bottom	4.8	30.80	10.6	11.0	100.0	16.8
	4-24-78		Surface	20.8	33.01	7.0	11.0	77.6	10.8
			Bottom	19.9	33.00	6.9	33.0	188.4	49.2
	7-24-78		Surface	29.7	34.33	5.8	12.0	114.8	8.6
			Bottom	29.3	34.24	6.1	13.0	133.6	7.6
SB17	10-19-77	1	Surface	16.3	34.71	7.0	18.0	115.6	28.0
			Bottom	16.3	34.72	7.2	17.0	135.6	12.0
	2-1-78		Surface	4.9	30.70	10.3	29.0	-	-
			Bottom	4.9	30.73	10.3	32.0	-	-
	4-25-78		Surface	21.8	32.79	6.5	16.0	125.2	10.0
			Bottom	21.8	33.13	6.8	20.0	151.6	16.0
	7-24-78		Surface	30.1	34.07	5.2	18.0	122.0	21.2
			Bottom	30.1	34.03	5.0	42.0	176.8	24.8
SB18	10-19-77	2	Surface	16.8	34.72	7.2	17.0	120.4	29.6
			Bottom	16.7	34.73	7.1	21.0	152.0	22.4
	2-1-78		Surface	4.9	30.59	10.6	17.0	78.0	12.4
			Bottom	4.7	30.42	10.6	17.0	-	-
	4-24-78		Surface	19.6	33.10	6.8	-	135.6	20.4
			Bottom	19.6	33.06	6.9	22.0	146.8	13.2
	7-24-78		Surface	30.1	33.99	5.2	25.0	-	-
			Bottom	30.0	33.97	5.0	51.0	181.2	30.4

*Samples contained too much silt to make an accurate analysis possible.

Table 2. Occurrence of epifaunal invertebrates in dredge collections from station SB01, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	Late July
Phylum Porifera				
Halichondria bowerbanki			+	
Cliona sp.	+			
Phylum Cnidaria				
Bougainvillia rugosa				+
Pandeidae (undet.)	+		+	+
Eudendrium carneum				+
Campanulina sp.			+	
Clytia kincaidi				+
Obelia bidentata	+		+	+
Schizotricha tenella				+
Leptogorgia virgulata	+		+	+
Actiniaria (undet.)				
Phylum Entoprocta				
Barentsia laxa				+
Phylum Bryozoa				
Alcyonidium hauffi			+	
Alcyonidium polyoum				
Anguinella palmata	+	+	+	+
Amathia distans			+	
Bowerbankia gracilis			+	
Membranipora tenuis	+	+	+	+
Electra monostachys	+	+	+	
Bugula neritina	+		+	
Schizoporella errata	+		+	+
Hippoporina verrilli	+		+	+
Parasmittina nitida			+	+
Cryptosula pallasiana		+	+	+
Phylum Annelida				
Nereis succinea			+	+
Sabellaria vulgaris	+	+	+	+
Hydroides dianthus	+			
Phylum Mollusca				
Acanthodoris pilosa			+	
Brachidontes exustus			+	
Ostrea equestris	+			+
Phylum Arthropoda				
Balanus venustus	+			+
Balanus improvisus	+	+		
Neopanope sayi			+	
Panopeus herbstii				+
Phylum Echinodermata				
Sclerodactyla briareus	+			
Ophiothrix angulata			+	+
Phylum Chordata				
Didemnum candidum				+
Molgula manhattensis		+		+
No. Species	16	7	23	23
Sorensen Coefficient		.43	.51	.51

Table 3. Occurrence of epifaunal invertebrates in dredge collections from station SB03, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	April	Late July
Phylum Porifera				
Lissodendoryx carolinensis	+			+
Microciona prolifera	+		+	+
Halichondria bowerbanki	+	+	+	+
Cliona sp.	+	+	+	+
Phylum Cnidaria				
Turritopsis nutricula	+			
Bougainvillia rugosa				+
Pandeidae (undet.)	+		+	
Eudendrium carneum	+		+	+
Campanulina sp.			+	
Clytia cylindrica			+	
Clytia kincaidi				+
Obelia bidentata			+	+
Obelia dichotoma			+	
Campanopsis sp.			+	
Dynamena cornicina	+			
Sertularia stookeyi	+		+	+
Schizotricha tenella	+		+	+
Plumularia floridana				+
Leptogorgia virgulata	+	+	+	+
Actiniaria (undet.)	+			+
Phylum Platyhelminthes				
Stylochus ellipticus	+			
Phylum Rhynchocoela				
Nemertean (undet.)		+		
Phylum Entoprocta				
Loxosomella sp.			+	
Pedicellina cernua			+	
Barentsia laxa	+			+
Phylum Bryozoa				
Alcyonidium hauffi	+	+	+	
Anguinella palmata	+	+	+	+
Amathia distans	+		+	+
Bowerbankia gracilis		+	+	+
Aeverrillia setigera	+		+	+
Membranipora arborescens			+	
Membranipora tenuis	+	+	+	+
Electra monostachys	+		+	
Synnotum aegyptiacum	+		+	+
Bugula neritina	+	+		
Schizoporella errata	+	+		+
Hippoporina verrilli	+	+	+	+
Microporella ciliata	+	+	+	+
Parasmittina nitida	+	+	+	+
Phylum Annelida				
Nereis succinea	+	+	+	
Sabellaria vulgaris	+	+	+	+
Hydroides dianthus	+	+	+	+
Phylum Mollusca				
Diodora cayenensis	+			
Cerithiopsis greeni			+	+
Crepidula fornicata			+	+
Crepidula plana		+		
Mitrella lunata				+
Opisthobranchs (undet.)			+	
Acanthodoris pilosa	+	+	+	+
Chaetopleura apiculata			+	
Ostrea equestris	+	+	+	+
Crassostrea virginica		+		+
Phylum Arthropoda				
Tanystylum orbiculare	+		+	
Callipallene brevirostrum				+
Balanus venustus		+	+	+
Balanus galeatus	+	+	+	
Balanus improvisus		+	+	+

Caprellidae (undet.)	+	+	+	+
Palaemonetes vulgaris		+		
Periclimenes longicaudatus	+			
Alpheus normanni	+	+		+
Clibanarius vittatus		+		
Pagurus longicarpus			+	
Callinectes ornatus				+
Callinectes sapidus		+		
Menippe mercenaria	+			+
Neopanope sayi	+	+	+	+
Eurypanopeus depressus		+	+	
Panopeus herbstii		+	+	+
Libinia sp.	+			
Phylum Echinodermata				
Asterias forbesi			+	
Hemipholis elongata	+			
Ophiothrix angulata	+	+		+
Phylum Chordata				
Didemnum candidum	+			+
Perophora viridis	+			+
Molgula manhattensis	+		+	+
No. Species	45	32	47	46
Sorensen Coefficient		.55	.61	.68

Table 4. Occurrence of epifaunal invertebrates in dredge collections from station SB04, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	April	Late July
Phylum Porifera				
Microciona prolifera	+			
Halichondria bowerbanki	+			
Cliona sp.	+			+
Phylum Cnidaria				
Hydractiniidae (undet.)	+			
Eudendrium carneum	+			+
Clytia kincaidi				+
Dynamena cornicina				+
Sertularia stookeyi	+			
Schizotricha tenella	+			+
Plumularia floridana				+
Leptogorgia virgulata	+		+	+
Actiniaria (undet.)	+			
Phylum Platyhelminthes				
Stylochus ellipticus	=			
Phylum Entoprocta				
Loxosomella sp.				+
Barentsia laxa	+			+
Phylum Bryozoa				
Nolella stipata	+			
Anguinella palmata	+			+
Amathia distans	+			
Bowerbankia gracilis	+			+
Aeverrillia setigera				+
Membranipora tenuis	+			
Synnotum aegyptiacum	+			+
Bugula neritina	+			+
Schizoporella errata	+			+
Hippoporina verrilli	+			+
Microporella ciliata	+			+
Parasmittina nitida	+			+
Phylum Annelida				
Nereis succinea		+		
Sabellidae (undet.)	+			
Hydroides dianthus				+
Oligochaeta (undet.)		+		
Phylum Mollusca				
Crepidula fornicata	+			+
Simnia uniplicata	+			
Anachis avara	+			
Busycon canaliculatum			+	
Ilyanassa obsoleta		+		
Acanthodoris pilosa	+			+
Ostrea equestris	+			+
Crassostrea virginica	+			
Phylum Arthropoda				
Balanus venustus				+
Balanus galeatus	+		+	
Caprellidae (undet.)			+	+
Alpheus normanni	+			+
Callinectes sapidus		+	+	
Eurypanopeus depressus	+			
Panopeus herbstii	+			
Neopanope sayi	+			
Libinia sp.	+			
Phylum Echinodermata				
Sclerodactyla briareus		+		+
Hemipholis elongata	+	+		
Ophiothrix angulata	+			
Phylum Chordata				
Didemnum candidum	+			+
Perophora viridis				+
Molgula manhattensis	+			+
Ascidiacea (undet.)	+			
No. Species	40	6	5	29
Sorensen Coefficient		.04	.09	.55

Table 5. Occurrence of epifaunal invertebrates in dredge collections from station SB05, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	Late July
Phylum Porifera				
Halichondria bowerbanki			+	
Cliona sp.	+		+	
Phylum Cnidaria				
Ectopleura dumortieri	+			
Pandeidae (undet.)				+
Eudendrium carneum	+			
Clytia kincaidi	+			
Obelia bidentata	+		+	
Sertularia stookeyi	+			
Schizotricha tenella			+	+
Leptogorgia virgulata	+			+
Actiniaria (undet.)	+			+
Phylum Entoprocta				
Loxosomella sp.			+	
Phylum Bryozoa				
Alcyonidium hauffi	+		+	
Alcyonidium polyoum	+			
Anguinella palmata	+	+	+	+
Amathia distans	+		+	
Bowerbankia gracilis	+		+	+
Aeverrillia setigera	+	+		
Membranipora arborescens	+			
Membranipora tenuis	+		+	+
Electra monostachys			+	
Bugula neritina	+			+
Schizoporella errata	+		+	+
Hippoporina verrilli	+		+	
Microporella ciliata				+
Parasmittina nitida	+		+	+
Cryptosula pallasiana			+	+
Phylum Annelida				
Lepidonotus sublevis	+			
Sabellaria vulgaris	+		+	+
Hydroides dianthus	+			+
Phylum Mollusca				
Crepidula fornicata	+			
Crepidula plana	+			
Phylum Arthropoda				
Balanus venustus	+			
Penaeus aztecus				+
Pagurus longicarpus			+	
Neopanope sayi		+	+	
Eurypanopeus depressus			+	
Phylum Echinodermata				
Sclerodactyla briareus	+			
Ophiothrix angulata	+		+	+
Phylum Chordata				
Perophora viridis	+			
Molgula manhattensis	+			
Ascidiacea (undet.)	+			
No. Species	31	3	20	16
Sorensen Coefficient		.12	.47	.47

Table 6. Occurrence of epifaunal invertebrates in dredge collections from station SB07, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	September
Phylum Porifera				
Lissodendoryx carolinensis	+		+	+
Microciona prolifera	+		+	
Halichondria bowerbanki			+	
Cliona sp.		+	+	+
Porifera (undet.)	+			
Phylum Cnidaria				
Pandeidae (undet.)			+	+
Eudendrium carneum	+		+	+
Cuspidella humilis	+			
Lovenella grandis			+	+
Clytia kincaidi	+		+	+
Clytia paulensis	+			+
Obelia bidentata	+			+
Campanopsis sp.			+	
Dynamena cornicina	+			
Sertularia stookeyi	+			
Schizotricha tenella			+	+
Leptogorgia virgulata	+	+	+	+
Actiniaria (undet.)	+	+	+	+
Phylum Entoprocta				
Loxosomella sp.			+	
Barentsia laxa	+		+	+
Phylum Bryozoa				
Alcyonidium hauffi		+	+	
Anguinella palmata	+	+	+	+
Amathia distans	+	+	+	
Bowerbankia gracilis		+	+	+
Aeverrillia setigera	+	+		+
Membranipora arborescens			+	
Membranipora tenuis	+	+		+
Electra monostachys		+	+	
Synnotum aegyptiacum	+		+	
Bugula neritina	+	+	+	
Schizoporella errata	+	+	+	+
Hippoporina verrilli	+	+	+	+
Microporella ciliata		+	+	+
Parasmittina nitida	+	+	+	+
Phylum Annelida				
Nereis succinea		+		+
Sabellidae (undet.)		+		
Sabellaria vulgaris	+	+	+	+
Hydroides dianthus	+	+	+	+
Phylum Mollusca				
Crepidula fornicata			+	
Eupleura caudata			+	
Cerithiopsis greeni			+	
Ilyanassa obsoleta				+
Acanthodoris pilosa			+	+
Chaetopleura apiculata			+	
Brachidontes exustus		+		
Ostrea equestris	+	+	+	
Crassostrea virginica		+		+
Phylum Arthropoda				
Callipallene brevirostrum			+	
Balanus galeatus				+
Balanus improvisus		+	+	+
Anthuridae (undet.)		+		
Caprellidae (undet.)		+	+	
Penaeus duorarum	+			
Alpheus armillatus		+		
Alpheus normanni			+	+
Pagurus longicarpus			+	
Callinectes sapidus			+	
Hexapanopeus angustifrons		+		

Table 6. (cont.)

Species	August	February	May	September
Neopanope sayi		+	+	+
Eurypanopeus depressus			+	
Panopeus herbstii	+		+	
Libinia sp.		+	+	
Phylum Echinodermata				
Ophiothrix angulata	+	+	+	+
Phylum Chordata				
Didemnum candidum			+	+
Perophora viridis	+		+	+
Molgula manhattensis	+	+	+	+
No. Species	30	31	48	34
Sorensen Coefficient		.49	.54	.59

Table 7. Occurrence of epifaunal invertebrates in dredge collections from station SB08, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	Late July
Phylum Porifera				
Lissodendoryx carolinensis	+			+
Microciona prolifera	+	+	+	+
Halichondria bowerbanki		+	+	+
Cliona sp.	+	+	+	+
Phylum Cnidaria				
Turritopsis nutricula			+	
Bougainvillia rugosa				+
Pandeidae (undet.)			+	
"*Perigonimus*" sp.	+			
Eudendrium carneum	+		+	+
Lovenella grandis		+		
Clytia kincaidi	+		+	+
Obelia bidentata	+			+
Schizotricha tenella	+		+	+
Plumularia floridana				+
Leptogorgia virgulata	+		+	+
Actiniaria (undet.)				+
Phylum Entoprocta				
Loxosomella sp.				+
Pedicellina cernua			+	
Barentsia laxa	+		+	+
Barentsia sp.			+	
Phylum Bryozoa				
Crisia sp.			+	
Anguinella palmata	+	+	+	
Bowerbankia gracilis	+	+	+	+
Aeverrillia setigera	+			+
Membranipora arborescens				+
Membranipora tenuis	+	+	+	+
Conopeum tenuissimum				+
Electra monostachys		+		
Synnotum aegyptiacum	+			
Bugula neritina	+		+	+
Schizoporella errata	+	+	+	+
Hippoporina verrilli	+	+	+	+
Microporella ciliata	+	+	+	+
Parasmittina nitida	+	+	+	+
Phylum Annelida				
Nereis succinea		+	+	
Lepidonotus sublevis			+	
Sabellaria vulgaris	+	+	+	
Hydroides dianthus	+		+	+
Polydora sp.		+		
Phylum Mollusca				
Crepidula fornicata	+	+		+
Crepidula plana		+		
Simnia uniplicata			+	
Urosalpinx cinerea			+	
Acanthodoris pilosa				+
Ostrea equestris	+	+		+
Crassostrea virginica	+	+	+	+
Phylum Arthropoda				
Tanystylum orbiculare				+
Balanus venustus	+		+	
Balanus improvisus		+	+	+
Caprellidae (undet.)			+	+
Penaeus aztecus				+
Penaeus duorarum	+			
Portunus gibbesii	+			
Callinectes ornatus	+			
Callinectes sapidus	+			
Menippe mercenaria	+		+	
Hexapanopeus angustifrons		+		
Neopanope sayi			+	
Eurypanopeus depressus	+		+	+
Panopeus herbstii		+	+	+

Table 7. (cont.)

Species	August	February	May	Late July
Phylum Echinodermata				
Sclerodactyla briareus			+	
Ophiothrix angulata	+	+	+	
Phylum Chordata				
Perophora viridis	+		+	+
Molgula manhattensis	+	+	+	
No. Species	35	24	40	36
Sorensen Coefficient		.51	.67	.65

Table 8. Occurrence of epifaunal invertebrates in dredge collections from station SB10, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	Feburary	April	Late July
Phylum Porifera				
Microciona prolifera				+
Halichondria bowerbanki	+			+
Cliona sp.	+			
Phylum Cnidaria				
Turritopsis nutricula				+
Pandeidae (undet.)	+			
Eudendrium carneum				+
Clytia kincaidi	+			+
Obelia bidentata	+			
Dynamena cornicina	+			+
Sertularia stookeyi	+			
Schizotricha tenella			+	
Leptogorgia virgulata	+			+
Actiniaria (undet.)	+			
Phylum Entoprocta				
Barentsia laxa	+			+
Phylum Bryozoa				
Anguinella palmata	+			+
Amathia distans	+			
Bowerbankia gracilis	+		+	+
Aeverrillia setigera	+			+
Membranipora arborescens	+			
Membranipora tenuis	+	+		+
Electra monostachys			+	
Bugula neritina	+			+
Schizoporella errata	+			+
Hippoporina verrilli	+			+
Microporella ciliata	+			+
Parasmittina nitida	+			
Cryptosula pallasiana	+			
Phylum Annelida				
Sabellaria vulgaris	+			+
Hydroides dianthus	+			+
Phylum Mollusca				
Simnia uniplicata	+			
Ilyanassa obsoleta		+		
Ostrea equestris				+
Phylum Arthropoda				
Balanus venustus	+			+
Balanus improvisus				+
Pagurus longicarpus		+		
Eurypanopeus depressus	+		+	+
Phylum Echinodermata				
Hemipholis elongata				+
Ophiothrix angulata				+
Phylum Chordata				
Perophora viridis				+
Molgula manhattensis	+			+
No. Species	28	3	4	26
Sorensen Coefficient		.06	.13	.67

Table 9. Occurrence of epifaunal invertebrates in dredge collections from station SB12, Sewee Bay. Collections were taken before, immediately after and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	September
Phylum Mollusca				
Nassarius vibex	+			
Ilyanassa obsoleta		+		+
Phylum Arthropoda				
Penaeus aztecus			+	
Callinectes sapidus	+	+		
Phylum Chordata				
Molgula manhattensis	+			
No. Species	3	2	1	1
Sorensen Coefficient		0.40	0.00	0.00

Table 10. Occurrence of epifaunal invertebrates in dredge collections from station SB13, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	April	Late July
Phylum Porifera				
Lissodendoryx carolinensis	+			
Microciona prolifera	+			
Cliona sp.	+	+	+	+
Phylum Cnidaria				
Ectopleura dumortieri		+		
Hydractiniidae (undet.)	+		+	
Pandeidae (undet.)	+	+	+	+
Amphinema dinema			+	
Eudendrium carneum	+		+	+
Campanulina sp.				+
Lovenella grandis				+
Clytia kincaidi	+		+	+
Clytia paulensis			+	
Obelia bidentata				+
Obelia dichotoma				+
Dynamena cornicina				+
Schizotricha tenella	+		+	+
Leptogorgia virgulata	+	+		+
Actiniaria (undet.)	+			+
Phylum Entoprocta				
Pedicellina cernua		+	+	
Barentsia laxa	+		+	+
Phylum Bryozoa				
Alcyonidium hauffi				+
Anguinella palmata	+	+	+	+
Bowerbankia gracilis	+	+	+	+
Aeverrillia setigera	+			+
Membranipora arborescens			+	
Membranipora tenuis	+	+	+	+
Electra monostachys			+	
Synnotum aegyptiacum	+			
Schizoporella errata	+	+	+	+
Hippoporina verrilli	+	+	+	+
Microporella ciliata	+	+	+	+
Parasmittina nitida	+			+
Phylum Annelida				
Nereis succinea		+	+	
Lepidonotus sublevis				+
Sabellaria vulgaris				
Hydroides dianthus	+		+	+
Sabellidae (undet.)	+	+		
Phylum Mollusca				
Littorina irrorata				+
Crepidula fornicata		+		
Crepidula plana				+
Simnia uniplicata				+
Urosalpinx cinerea	+			
Ilyanassa obsoleta		+	+	
Acanthodoris pilosa	+			+
Ostrea equestris	+	+		+
Crassostrea virginica	+			
Phylum Arthropoda				
Callipallene brevirostrum	+			
Balanus galeatus				+
Balanus improvisus			+	+
Cyathura burbancki		+		
Penaeus aztecus				+
Clibanarius vittatus		+		
Callinectes sapidus		+		
Menippe mercenaria	+			
Hexapanopeus angustifrons		+		
Panopeus herbstii	+			
Phylum Echinodermata				
Sclerodactyla briareus		+		
Ophiothrix angulata	+			+

Table 10. (cont.)

Species	August	February	April	Late July
Phylum Chordata				
Didemnum candidum				+
Perophora viridis				+
Molgula manhattensis	+	+	+	+
No. Species	31	22	25	37
Sorensen Coefficient		.45	.57	.62

Table 11. Occurrence of epifaunal invertebrates in dredge collections from station SB14, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	April	Late July
Phylum Porifera				
Microciona prolifera	+	+	+	+
Cliona sp.	+	+	+	+
Phylum Cnidaria				
Ectopleura dumortieri				+
Bougainvillia rugosa				+
Pandeidae (undet.)			+	
Eudendrium carneum			+	+
Campanulina sp.		+	+	+
Lovenella gracilis			+	+
Lovenella grandis		+	+	+
Clytia kincaidi	+			+
Obelia bidentata	+			+
Obelia dichotoma				+
Campanopsis sp.				+
Schizotricha tenella	+			+
Leptogorgia virgulata	+	+	+	+
Actiniaria (undet.)		+	+	+
Phylum Platyhelminthes				
Stylochus ellipticus	+	+		
Phylum Rhynchocoela				
Nemertean (undet.)		+		
Phylum Entoprocta				
Barentsia laxa	+	+	+	+
Phylum Bryozoa				
Alcyonidium hauffi			+	
Alcyonidium mammillatum		+		
Anguinella palmata	+	+	+	+
Amathia distans	+	+		
Bowerbankia gracilis	+	+	+	+
Aeverrillia setigera	+	+	+	+
Membranipora arborescens	+			
Membranipora tenuis	+	+	+	+
Electra monostachys		+	+	
Bugula neritina	+		+	+
Schizoporella errata	+	+	+	+
Hippoporina verrilli	+	+	+	+
Parasmittina nitida	+	+	+	+
Cryptosula pallasiana			+	+
Phylum Annelida				
Nereis succinea		+		
Sabellaria vulgaris	+	+	+	+
Hydroides dianthus	+	+	+	+
Polydora sp.		+		
Phylum Mollusca				
Crepidula fornicata		+		+
Simnia uniplicata	+			
Acanthodoris pilosa		+	+	+
Brachidontes exustus		+	+	
Ostrea equestris	+	+	+	+
Crassostrea virginica	+	+		
Phylum Arthropoda				
Tanystylum orbiculare	+			
Balanus venustus	+	+		
Balanus galeatus	+			
Balanus improvisus	+	+	+	+
Caprellidae (undet.)		+	+	
Penaeus aztecus	+			+
Palaemonetes vulgaris			+	
Clibanarius vittatus	+			
Callinectes sapidus		+	+	

Table 11. (cont.)

Species	August	February	April	Late July
Neopanope sayi			+	
Eurypanopeus depressus		+	+	
Panopeus herbstii		+	+	
Phylum Echinodermata				
Ophiothrix angulata			+	
Phylum Chordata				
Didemnum candidum	+	+	+	
Perophora viridis			+	+
Molgula manhattensis	+	+	+	+
No. Species	31	36	38	34
Sorensen Coefficient		.63	.55	.65

Table 12. Occurrence of epifaunal invertebrates in dredge collections from station SB15, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	Late July
Phylum Porifera				
Microciona prolifera	+			
Halichondria bowerbanki	+		+	+
Cliona sp.	+		+	+
Phylum Cnidaria				
Turritopsis nutricula				+
Pandeidae (undet.)				+
Eudendrium album			+	
Campanulina sp.		+		+
Clytia kincaidi			+	+
Obelia bidentata	+			+
Dynamena cornicina	+			
Sertularia stookeyi	+		+	
Schizotricha tenella	+		+	+
Leptogorgia virgulata	+		+	+
Astrangia danae	+			
Actiniaria (undet.)	+		+	+
Phylum Entoprocta				
Barentsia laxa	+		+	+
Phylum Bryozoa				
Alcyonidium hauffi	+		+	+
Alcyonidium polyoum				+
Anguinella palmata	+	+	+	+
Bowerbankia gracilis	+	+		
Aeverrillia setigera	+		+	+
Membranipora arborescens	+			
Membranipora tenuis	+	+	+	+
Electra monostachys		+	+	
Bugula neritina	+		+	+
Schizoporella errata	+		+	+
Hippoporina verrilli	+		+	
Microporella ciliata	+		+	
Parasmittina nitida	+	+	+	
Cryptosula pallasiana			+	
Phylum Annelida				
Nereis succinea			+	
Lepidonotus sublevis			+	
Sabellaria vulgaris	+	+		
Hydroides dianthus	+			
Phylum Mollusca				
Simnia uniplicata	+			
Anadara transversa	+			
Brachidontes exustus	+			
Pteria colymbus	+			
Ostrea equestris	+			+
Phylum Arthropoda				
Balanus venustus	+			
Balanus galeatus			+	
Balanus improvisus	+	+	+	+
Penaeus aztecus	+			
Penaeus duorarum		+		
Alpheus normanni			+	
Pagurus longicarpus	+			
Neopanope sayi			+	
Eurypanopeus depressus			+	+
Squilla empusa				+
Phylum Echinodermata				
Hemipholis elongata		+		
Ophiothrix angulata	+		+	+
Phylum Chordata				
Didemnum candidum			+	
Perophora viridis				+
Molgula manhattensis	+	+	+	
Ascidiacea (undet.)	+		+	
No. Species	36	11	31	24
Sorensen Coefficient		.30	.60	.53

Table 13. Occurrence of epifaunal invertebrates in dredge collections from station SB17, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	May	September
Phylum Porifera				
Microciona prolifera			+	
Phylum Cnidaria				
Pandeidae (undet.)	+			
Eudendrium carneum	+			+
Lovenella grandis	+			
Clytia kincaidi	+			
Schizotricha tenella	+			+
Leptogorgia virgulata	+			+
Phylum Bryozoa				
Victorellidae (undet.)				+
Anguinella palmata	+	+		+
Amathia distans		+	+	
Bowerbankia gracilis	+		+	+
Aeverrillia setigera				+
Membranipora tenuis	+			
Parasmittina nitida	+			
Phylum Mollusca				
Ilyanassa obsoleta		+	+	
Phylum Arthropoda				
Callinectes sapidus	+	+		
Panopeus herbstii			+	
Phylum Echinodermata				
Ophiothrix angulata			+	
Phylum Chordata				
Perophora viridis				+
Molgula manhattensis	+	+		
No. Species	12	5	6	8
Sorensen Coefficient		0.35	0.11	0.50

Table 14. Occurrence of epifaunal invertebrates in dredge collections from station SB18, Sewee Bay. Collections were taken before, immediately after, and three months after dredging, as well as one year after the pre-dredge survey.

Species	August	February	April	Late July
Phylum Porifera				
Lissodendoryx carolinensis	+	+		
Microciona prolifera	+		+	
Halichondria bowerbanki	+	+		+
Cliona sp.	+	+	+	+
Porifera (undet.)		+		+
Phylum Cnidaria				
Ectopleura dumortieri		+		
Turritopsis nutricula	+			
Pandeidae (undet.)			+	+
Eudendrium carneum	+			+
Campanulina sp.	+		+	
Lovenella gracilis			+	
Lovenella grandis			+	+
Clytia cylindrica		+		
Clytia kincaidi	+		+	+
Obelia bidentata				+
Schizotricha tenella	+		+	+
Plumularia floridana	+			
Leptogorgia virgulata				
Actiniaria (undet.)	+	+	+	+
Phylum Entoprocta				
Pedicellina cernua	+		+	
Barentsia laxa	+		+	+
Phylum Bryozoa				
Alcyonidium hauffi		+		
Anguinella palmata	+	+	+	+
Amathia distans	+	+	+	+
Bowerbankia gracilis	+	+	+	+
Aeverrillia setigera	+			
Membranipora arborescens			+	
Membranipora tenuis	+	+	+	+
Electra monostachys		+	+	
Synnotum aegyptiacum	+	+		+
Bugula neritina				+
Schizoporella errata	+	+	+	+
Hippoporina verrilli	+	+	+	+
Microporella ciliata	+	+	+	+
Parasmittina nitida	+	+	+	+
Phylum Annelida				
Nereis succinea		+		
Lepidonotus sublevis		+	+	
Sabellaria vulgaris		+	+	+
Hydroides dianthus	+	+	+	+
Phylum Mollusca				
Crepidula fornicata	+		+	
Simnia uniplicata			+	
Eupleura caudata		+		
Fasciolaria lilium hunteria	+			+
Nassarius vibex			+	
Acanthodoris pilosa	+	+	+	
Anadara transversa		+		
Ostrea equestris	+			+
Phylum Arthropoda				
Tanystylum orbiculare	+			+
Balanus galeatus	+		+	
Balanus improvisus		+	+	+
Caprellidae (undet.)	+		+	
Penaeus duorarum	+			
Trachypenaeus constrictus			+	
Alpheus heterochaelis	+			
Alpheus normanni				+
Portunus gibbesii	+			
Callinectes sapidus		+	+	
Neopanope sayi		+		
Eurypanopeus depressus				+
Panopeus herbstii				+

Table 14. (cont.)

Species	August	February	April	Late July
Phylum Echinodermata				
Ophiothrix angulata	+	+	+	
Phylum Chordata				
Didemnum candidum				+
Perophora viridis				+
Molgula manhattensis	+	+	+	+
Ascidiacea (undet.)		+		
No. Species	37	32	36	34
Sorensen Coefficient		.52	.66	.62

Table 15. Macroinvertebrate species collected from the Sewee Bay channel station, SB01. (A = Amphipoda; C = Cumacea; D = Decapoda; H = Hemichordata; I = Isopoda; M = Mollusca; My = Mysidacea; O = Ophiuroidea; P = Polychaeta).

	SB01				
Species	Total Number	Number/0.05 m^2 $\bar{x}$	SD	Estimated Number/m^2	Rank by Number
Collection Date = 23 August 1977					
Paraprionospio pinnata (P)	38	12.7	2.3	230	1.0
Ogyrides limicola (D)	10	3.3	1.2	61	2.0
Lumbrineris tenuis (P)	6	2.0	1.0	36	3.0
Notomastus lobatus (P)	4	1.3	1.5	24	4.0
Glycinde solitaria (P)	3	1.0	1.0	18	5.0
Aricidea fragilis (P)	2	0.7	0.6	12	6.0
Saccoglossus kowalevskii (H)	1	0.3	0.6	6	8.0
Glycera americana (P)	1	0.3	0.6	6	8.0
Haploscoloplos fragilis (P)	1	0.3	0.6	6	8.0
Collection Date = 16 January 1978					
Paraprionospio pinnata (P)	14	4.7	2.5	85	1.0
Ogyrides limicola (D)	11	3.7	2.3	67	2.0
Gattyana cirrosa (P)	2	0.7	1.2	12	3.5
Aricidea fragilis (P)	2	0.7	1.2	12	3.5
Mysidopsis bigelowi (My)	1	0.3	0.6	6	6.0
Amphiodia planispina (O)	1	0.3	0.6	6	6.0
Glycera americana (P)	1	0.3	0.6	6	6.0
Collection Date = 28 April 1978					
Melita appendiculata (A)	26	8.7	15.0	158	1.0
Paraprionospio pinnata (P)	15	5.0	6.0	91	2.0
Nereis succinea (P)	4	1.3	2.3	24	3.0
Eurypanopeus depressus (D)	2	0.7	1.2	12	7.5
Paracaprella tenuis (A)	2	0.7	1.2	12	7.5
Ophiothrix angulata (O)	2	0.7	1.2	12	7.5
Mulinia lateralis (M)	2	0.7	1.2	12	7.5
Scoloplos sp. (P)	2	0.7	0.6	12	7.5
Lumbrineris tenuis (P)	2	0.7	1.2	12	7.5
Haploscoloplos fragilis (P)	2	0.7	1.2	12	7.5
Sabella microphthalma (P)	2	0.7	1.2	12	7.5
Ogyrides limicola (D)	1	0.3	0.6	6	19.5
Neopanope texana (D)	1	0.3	0.6	6	19.5
Ampelisca vadorum (A)	1	0.3	0.6	6	19.5
Lembos websteri (A)	1	0.3	0.6	6	19.5
Leucon americanus (C)	1	0.3	0.6	6	19.5
Cyathura burbanki (I)	1	0.3	0.6	6	19.5
Actiniaria (undet.)	1	0.3	0.6	6	19.5
Glycera americana (P)	1	0.3	0.6	6	19.5
Heteromastus filiformis (P)	1	0.3	0.6	6	19.5
Glycinde solitaria (P)	1	0.3	0.6	6	19.5
Marphysa sanguinea (P)	1	0.3	0.6	6	19.5
Diopatra cuprea (P)	1	0.3	0.6	6	19.5
Arabella iricolor (P)	1	0.3	0.6	6	19.5
Drilonereis magna (P)	1	0.3	0.6	6	19.5
Aricidea fragilis (P)	1	0.3	0.6	6	19.5
Cirratulidae (undet.) (P)	1	0.3	0.6	6	19.5
Collection Date = 3 August 1978					
Ogyrides limicola (D)	21	7.0	4.4	127	1.0
Heteromastus filiformis (P)	2	0.7	0.6	12	3.0
Lumbrineris tenuis (P)	2	0.7	0.6	12	3.0
Haploscoloplos fragilis (P)	2	0.7	1.2	12	3.0
Mytilidae (undet.) (M)	1	0.3	0.6	6	6.0
Nereis succinea (P)	1	0.3	0.6	6	6.0
Paraprionospio pinnata (P)	1	0.3	0.6	6	6.0

Table 16. Macroinvertebrate species collected from the Sewee Bay intertidal station, SB02. (A = Amphipoda; D = Decapoda; I = Isopoda; M = Mollusca; P = Polychaeta).

Species	SB02 Total Number	Number/0.05m^2 $\bar{x}$	SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	17	5.7	3.5	103	1.0
Aricidea fragilis (P)	15	5.0	2.0	91	2.0
Glycera americana (P)	3	1.0	1.0	18	3.0
Alpheus normanni (D)	2	0.7	1.2	12	4.0
Scoloplos sp. (P)	1	0.3	0.6	6	6.0
Glycinde solitaria (P)	1	0.3	0.6	6	6.0
Haploscoloplos fragilis (P)	1	0.3	0.6	6	6.0
Collection Date = 16 January 1978					
Heteromastus filiformis (P)	8	2.7	2.1	48	1.0
Lumbrineris tenuis (P)	7	2.3	2.1	42	2.0
Mercenaria mercenaria (M)	5	1.7	0.6	30	3.0
Glycera americana (P)	4	1.3	0.6	24	4.0
Tellinidae (undet.) (M)	2	0.7	0.6	12	5.0
Nemertina (undet.)	1	0.3	0.6	6	7.5
Turbonilla sp. (M)	1	0.3	0.6	6	7.5
Paraprionospio pinnata (P)	1	0.3	0.6	6	7.5
Maldanidae (undet.) (P)	1	0.3	0.6	6	7.5
Collection Date = 25 April 1978					
Nereis succinea (P)	88	29.3	19.3	533	1.0
Uca sp. (D)	1	0.3	0.6	6	2.5
Cyathura burbanki (I)	1	0.3	0.6	6	2.5
Collection Date = 3 August 1978					
Scoloplos rubra (P)	3	1.0	1.0	18	1.5
Heteromastus filiformis (P)	3	1.0	1.7	18	1.5
Alpheus heterochaelis (D)	2	0.7	1.2	12	4.0
Lumbrineris tenuis (P)	2	0.7	1.2	12	4.0
Haploscoloplos fragilis (P)	2	0.7	1.2	12	4.0
Gammarus palustris (A)	1	0.3	0.6	6	7.5
Glycera americana (P)	1	0.3	0.6	6	7.5
Scoloplos sp. (P)	1	0.3	0.6	6	7.5
Drilonereis magna (P)	1	0.3	0.6	6	7.5

Table 17. Macroinvertebrate species collected from the Sewee Bay channel station, SB03. (A = Amphipoda; C = Cumacea; D = Decapoda; I = Isopoda; M = Mollusca; P = Polychaeta).

Species	SB03 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	26	8.7	3.1	158	1.0
Diptera (undet.)	1	0.3	0.6	6	2.5
Glycera americana (P)	1	0.3	0.6	6	2.5
Collection Date = 16 January 1978					
Heteromastus filiformis (P)	4	1.3	0.6	24	1.5
Lumbrineris tenuis (P)	4	1.3	1.2	24	1.5
Caprella equilibra (A)	3	1.0	1.7	18	3.5
Paraprionospio pinnata (P)	3	1.0	0.0	18	3.5
Melita dentata (A)	2	0.7	1.2	12	5.5
Nereis succinea (P)	2	0.7	0.6	12	5.5
Alpheus heterochaelis (D)	1	0.3	0.6	6	11.0
Pinnixa sayana (D)	1	0.3	0.6	6	11.0
Cyathura burbanki (I)	1	0.3	0.6	6	11.0
Mitrella lunata (M)	1	0.3	0.6	6	11.0
Glycera americana (P)	1	0.3	0.6	6	11.0
Glycinde solitaria (P)	1	0.3	0.6	6	11.0
Arabella iricolor (P)	1	0.3	0.6	6	11.0
Aricidea fragilis (P)	1	0.3	0.6	6	11.0
Cirratulidae (undet.) (P)	1	0.3	0.6	6	11.0
Collection Date = 24 April 1978					
Ampelisca vadorum (A)	18	6.0	1.0	109	1.0
Lumbrineris tenuis (P)	16	5.3	2.3	97	2.0
Streblospio benedicti (P)	5	1.7	2.9	30	3.0
Mulinia lateralis (A)	4	1.3	0.6	24	5.0
Tellinidae (undet.)(M)	4	1.3	1.5	24	5.0
Mediomastus californiensis (P)	4	1.3	2.3	24	5.0
Erichthonius brasiliensis (A)	3	1.0	1.7	18	8.5
Glycera americana (P)	3	1.0	1.7	18	8.5
Tharyx marioni (P)	3	1.0	1.0	18	8.5
Haploscoloplos sp. (P)	3	1.0	1.0	18	8.5
Ogyrides limicola (D)	2	0.7	0.6	12	13.5
Oxyurostylis smithi (C)	2	0.7	0.6	12	13.5
Nemertina (undet.)	2	0.7	0.6	12	13.5
Pelecypoda (undet.) (M)	2	0.7	0.6	12	13.5
Glycinde solitaria (P)	2	0.7	0.6	12	13.5
Paraprionospio pinnata (P)	2	0.7	0.6	12	13.5
Portunidae (undet.) (D)	1	0.3	0.6	6	20.0
Caprellidae (undet.) (A)	1	0.3	0.6	6	20.0
Acteocina canaliculata (M)	1	0.3	0.6	6	20.0
Heteromastus filiformis (P)	1	0.3	0.6	6	20.0
Nereis succinea (P)	1	0.3	0.6	6	20.0
Aricidea fragilis (P)	1	0.3	0.6	6	20.0
Maldanidae (undet.) (P)	1	0.3	0.6	6	20.0
Collection Date = 17 August 1978					
Ogyrides limicola (D)	5	1.7	0.6	30	1.0
Paraprionospio pinnata (P)	3	1.0	1.7	18	2.0
Callianassa atlantica (D)	2	0.7	1.2	12	5.0
Glycera americana (P)	2	0.7	0.6	12	5.0
Glycinde solitaria (P)	2	0.7	0.6	12	5.0
Aricidea fragilis (P)	2	0.7	1.2	12	5.0
Clymenella torquata (P)	2	0.7	0.6	12	5.0
Stomatopoda (undet.)	1	0.3	0.6	6	10.5
Pelecypoda (undet.) (M)	1	0.3	0.6	6	10.5
Scoloplos sp. (P)	1	0.3	0.6	6	10.5
Lumbrineris tenuis (P)	1	0.3	0.6	6	10.5
Notomastus sp. (P)	1	0.3	0.6	6	10.5
Asychis carolinae (P)	1	0.3	0.6	6	10.5

Table 18. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB04. (A = Amphipoda; D = Decapoda; H = Hemichordata; M = Mollusca; O = Ophiuroidea; S = Stomatopoda; P = Polychaeta).

Species	SB04 Total Number	Number/0.05m^2 $\bar{x}$	SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Scoloplos rubra (P)	7	2.3	1.5	42	1.0
Ogyrides limicola (D)	4	1.3	1.5	24	3.0
Lumbrineris tenuis (P)	4	1.3	1.2	24	3.0
Glycinde solitaria (P)	4	1.3	0.6	24	3.0
Glycera americana (P)	3	1.0	0.0	18	5.5
Aricidea fragilis (P)	3	1.0	1.7	18	5.5
Squilla empusa (S)	1	0.3	0.6	6	9.5
Hemipholis elongata (O)	1	0.3	0.6	6	9.5
Anadara ovalis (M)	1	0.3	0.6	6	9.5
Diplodonta sp. (M)	1	0.3	0.6	6	9.5
Nereis succinea (P)	1	0.3	0.6	6	9.5
Drilonereis magna (P)	1	0.3	0.6	6	9.5
Collection Date = 16 January 1978					
Paraprionospio pinnata (P)	17	5.7	2.1	103	1.0
Heteromastus filiformis (P)	5	1.7	0.6	30	2.0
Ogyrides limicola (D)	3	1.0	0.0	18	3.0
Lumbrineris tenuis (P)	2	0.7	0.6	12	4.0
Batea catharinensis (A)	1	0.3	0.6	6	9.0
Caprella equilibra (A)	1	0.3	0.6	6	9.0
Saccoglossus kowalevskii (H)	1	0.3	0.6	6	9.0
Mulinia lateralis (M)	1	0.3	0.6	6	9.0
Scoloplos rubra (P)	1	0.3	0.6	6	9.0
Arabella iricolor (P)	1	0.3	0.6	6	9.0
Drilonereis magna (P)	1	0.3	0.6	6	9.0
Eteone heteropoda (P)	1	0.3	0.6	6	9.0
Haploscoloplos robustos (P)	1	0.3	0.6	6	9.0
Collection Date = 24 April 1978					
Ampelisca vadorum (A)	12	4.0	1.7	73	1.0
Lumbrineris tenuis (P)	10	3.3	3.5	61	2.0
Paraprionospio pinnata (P)	9	3.0	1.0	55	3.0
Ogyrides limicola (D)	2	0.7	0.6	12	5.0
Tellinidae (undet.) (M)	2	0.7	0.6	12	5.0
Drilonereis magna (P)	2	0.7	0.6	12	5.0
Pelecypoda (undet.) (M)	1	0.3	0.6	6	10.5
Mulinia lateralis (M)	1	0.3	0.6	6	10.5
Acteocina canaliculata (M)	1	0.3	0.6	6	10.5
Glycera americana (P)	1	0.3	0.6	6	10.5
Heteromastus filiformis (P)	1	0.3	0.6	6	10.5
Glycinde solitaria (P)	1	0.3	0.6	6	10.5
Aricidea fragilis (P)	1	0.3	0.6	6	10.5
Haploscoloplos sp. (P)	1	0.3	0.6	6	10.5
Collection Date = 17 August 1978					
Ogyrides limicola (D)	36	12.0	3.0	218	1.0
Paraprionospio pinnata (P)	10	3.3	3.2	61	2.0
Haploscoloplos fragilis (P)	6	2.0	1.7	36	3.0
Lumbrineris tenuis (P)	3	1.0	1.0	18	4.0
Aricidea fragilis (P)	2	0.7	0.6	12	5.0
Tellinidae (undet.) (M)	1	0.3	0.6	6	7.5
Glycera americana (P)	1	0.3	0.6	6	7.5
Glycinde solitaria (P)	1	0.3	0.6	6	7.5
Diopatra cuprea (P)	1	0.3	0.6	6	7.5

Table 19. Macroinvertebrate species collected from the Sewee Bay channel station, SB05. (A = Amphipoda; C = Cumacea; D = Decapoda; I = Isopoda; M = Mollusca; O = Ophiuroidea; P = Polychaeta).

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
		SB05			
Collection Date = 23 August 1977					
Paraprionospio pinnata (P)	27	9.0	2.7	164	1.0
Lumbrineris tenuis (P)	5	1.7	0.6	30	2.0
Glycera americana (P)	3	1.0	1.0	18	3.0
Hemipholis elongata (O)	2	0.7	0.6	12	4.5
Scoloplos rubra (P)	2	0.7	0.6	12	4.5
Ogyrides limicola (D)	1	0.3	0.6	6	8.5
Polinices duplicatus (M)	1	0.3	0.6	6	8.5
Mulinia lateralis (M)	1	0.3	0.6	6	8.5
Ilyanassa obsoleta (M)	1	0.3	0.6	6	8.5
Glycinde solitaria (P)	1	0.3	0.6	6	8.5
Aricidea fragilis (P)	1	0.3	0.6	6	8.5
Collection Date = 30 January 1978					
Mulinia lateralis (M)	7	2.3	1.5	42	1.0
Ogyrides limicola (D)	3	1.0	1.0	12	2.0
Leucon americanus (C)	2	0.6	0.6	12	3.5
Nereis succinea (P)	2	0.6	1.2	12	3.5
Palaemonetes vulgaris (D)	1	0.3	0.6	6	9.0
Callinectes ornatus (D)	1	0.3	0.6	6	9.0
Caprella equilibra (A)	1	0.3	0.6	6	9.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	9.0
Abra aequalis (M)	1	0.3	0.6	6	9.0
Pectinaria gouldii (P)	1	0.3	0.6	6	9.0
Heteromastus filiformis (P)	1	0.3	0.6	6	9.0
Arabella iricolor (P)	1	0.3	0.6	6	9.0
Paraprionospio pinnata (P)	1	0.3	0.6	6	9.0
Collection Date = 28 April 1978					
Haploscoloplos sp. (P)	10	3.3	4.9	61	1.0
Mulinia lateralis (M)	8	2.7	2.9	48	2.0
Ogyrides limicola (D)	4	1.3	1.2	24	3.0
Heteromastus filiformis (P)	3	1.0	1.0	18	4.5
Paraprionospio pinnata (P)	3	1.0	1.7	18	4.5
Leucon americanus (C)	2	0.7	0.6	12	6.5
Glycera americana (P)	2	0.7	0.6	12	6.5
Ampelisca vadorum (A)	1	0.3	0.6	6	9.5
Edotea montosa (I)	1	0.3	0.6	6	9.5
Polinices duplicatus (M)	1	0.3	0.6	6	9.5
Tharyx marioni (P)	1	0.3	0.6	6	9.5
Collection Date = 3 August 1978					
Ogyrides limicola (D)	3	1.0	1.7	18	1.0
Glycera americana (P)	2	0.7	0.6	12	3.0
Heteromastus filiformis (P)	2	0.7	0.6	12	3.0
Paraprionospio pinnata (P)	2	0.7	1.2	12	3.0
Lumbrineris tenuis (P)	1	0.3	0.6	6	5.5
Drilonereis magna (P)	1	0.3	0.6	6	5.5

Table 20. Macroinvertebrate species collected from the Sewee Bay intertidal station, SB06. (I = Isopoda; M = Mollusca; P = Polychaeta).

Species	SB06 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	12	4.0	1.0	73	1.0
Nereis succinea (P)	7	2.3	1.2	42	2.0
Aricidea fragilis (P)	4	1.3	0.6	24	3.0
Drilonereis magna (P)	2	0.7	0.6	12	4.0
Cyathura burbanki (I)	1	0.3	0.6	6	6.5
Mulinia lateralis (M)	1	0.3	0.6	6	6.5
Ilyanassa obsoleta (M)	1	0.3	0.6	6	6.5
Glycera americana (P)	1	0.3	0.6	6	6.5
Collection Date = 30 January 1978					
Lumbrineris tenuis (P)	6	2.0	2.0	36	1.0
Ilyanassa obsoleta (M)	4	1.3	1.5	24	2.5
Heteromastus filiformis (P)	4	1.3	0.6	24	2.5
Glycera americana (P)	2	0.7	1.2	12	5.0
Aricidea fragilis (P)	2	0.7	0.6	12	5.0
Haploscoloplos sp. (P)	2	0.7	0.6	12	5.0
Cyathura polita (I)	1	0.3	0.6	6	8.5
Mercenaria mercenaria (M)	1	0.3	0.6	6	8.5
Mulinia lateralis (M)	1	0.3	0.6	6	8.5
Nereis succinea (P)	1	0.3	0.6	6	8.5
Collection Date = 25 April 1978					
Haploscoloplos fragilis (P)	27	9.0	10.4	164	1.0
Lumbrineris tenuis (P)	17	5.7	6.4	103	2.0
Aricidea fragilis (P)	8	2.7	2.3	48	3.0
Streblospio benedicti (P)	3	1.0	1.0	18	4.0
Glycera americana (P)	2	0.7	0.6	12	5.5
Mediomastus californiensis (P)	2	0.7	1.2	12	5.5
Edotea montosa (I)	1	0.3	0.6	6	8.0
Heteromastus filiformis (P)	1	0.3	0.6	6	8.0
Nereis succinea (P)	1	0.3	0.6	6	8.0
Collection Date = 24 July 1978					
Mulinia lateralis (M)	1	0.3	0.6	6	3.0
Glycera americana (P)	1	0.3	0.6	6	3.0
Heteromastus filiformis (P)	1	0.3	0.6	6	3.0
Drilonereis magna (P)	1	0.0	0.0	6	3.0
Aricidea fragilis (P)	1	0.3	0.6	6	3.0

Table 21. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB07. (A = Amphipoda; C = Cumacea; D = Decapoda; I = Isopoda; M = Mollusca; O = Ophiuroidea; P = Polychaeta; S = Stomatopoda).

Species	SB07 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 25 August 1977					
Nereis succinea (P)	7	2.3	2.1	42	1.0
Glycera americana (P)	4	1.3	1.5	24	2.0
Lumbrineris tenuis (P)	3	1.0	1.0	18	3.0
Scoloplos rubra (P)	2	0.7	1.2	12	4.5
Tharyx marioni (P)	2	0.7	0.6	12	4.5
Alpheus normanni (D)	1	0.3	0.6	6	9.5
Batea catharinensis (A)	1	0.3	0.6	6	9.5
Hemipholis elongata (O)	1	0.3	0.6	6	9.5
Crepidula fornicata (M)	1	0.3	0.6	6	9.5
Notomastus lobatus (P)	1	0.3	0.6	6	9.5
Glycinde solitaria (P)	1	0.3	0.6	6	9.5
Arabella iricolor (P)	1	0.3	0.6	6	9.5
Drilonereis magna (P)	1	0.3	0.6	6	9.5
Collection Date = 30 January 1978					
Mulinia lateralis (M)	10	3.3	3.5	61	1.0
Nereis succinea (P)	5	1.7	1.5	30	2.0
Paraprionospio pinnata (P)	4	1.3	1.5	24	3.0
Glycera americana (P)	3	1.0	1.0	18	4.0
Xanthidae (undet.) (D)	2	0.7	1.2	12	7.0
Ampelisca vadorum (A)	2	0.7	0.6	12	7.0
Cyathura polita (I)	2	0.7	1.2	12	7.0
Streblospio benedicti (P)	2	0.7	1.2	12	7.0
Cirratulidae (undet.) (P)	2	0.7	1.2	12	7.0
Palaemonetes vulgaris (D)	1	0.3	0.6	6	18.5
Upogebia affinis (D)	1	0.3	0.6	6	18.5
Gammaridae (undet.) (A)	1	0.3	0.6	6	18.5
Melitidae (undet.) (A)	1	0.3	0.6	6	18.5
Nemertina sp. A	1	0.3	0.6	6	18.5
Nemertina sp. B	1	0.3	0.6	6	18.5
Mitrella lunata (M)	1	0.3	0.6	6	18.5
Macoma sp. (M)	1	0.3	0.6	6	18.5
Lumbrineris tenuis (P)	1	0.3	0.6	6	18.5
Glycinde solitaria (P)	1	0.3	0.6	6	18.5
Marphysa sanguinea (P)	1	0.3	0.6	6	18.5
Arabella iricolor (P)	1	0.3	0.6	6	18.5
Haploscoloplos fragilis (P)	1	0.3	0.6	6	18.5
Oligochaeta (undet.)	1	0.3	0.6	6	18.5
Aricidea fragilis (P)	1	0.3	0.6	6	18.5
Lysidice ninetta (P)	1	0.3	0.6	6	18.5
Subadyte pellucida (P)	1	0.3	0.6	6	18.5
Pholoe minuta (P)	1	0.3	0.6	6	18.5
Collection Date = 24 April 1978					
Ampelisca vadorum (A)	12	4.0	2.0	73	1.5
Lumbrineris tenuis (P)	12	4.0	2.0	73	1.5
Oxyurostylis smithi (C)	11	3.7	4.0	67	3.0
Glycera americana (P)	4	1.3	1.2	24	4.5
Nereis succinea (P)	4	1.3	0.6	24	4.5
Drilonereis magna (P)	3	1.0	1.0	18	6.0
Xanthidae (undet.) (D)	2	0.7	0.6	12	8.5
Gammaridae (undet.) (A)	2	0.7	1.2	12	8.5
Nemertina (undet.)	2	0.7	0.6	12	8.5
Haploscoloplos sp. (P)	2	0.7	0.6	12	8.5
Pagurus longicarpus (D)	1	0.3	0.6	6	17.5
Squilla empusa (S)	1	0.3	0.6	6	17.5
Caprella equilibra (A)	1	0.3	0.6	6	17.5
Nucula proxima (M)	1	0.3	0.6	6	17.5
Mercenaria mercenaria (M)	1	0.3	0.6	6	17.5
Abra aequalis (M)	1	0.3	0.6	6	17.5
Pelecypoda (undet.) (M)	1	0.3	0.6	6	17.5
Acteocina canaliculata (M)	1	0.3	0.6	6	17.5
Tellinidae (undet.) (M)	1	0.3	0.6	6	17.5

Table 21. (Cont.)

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
		SB07			
Scoloplos rubra (P)	1	0.3	0.6	6	17.5
Pectinaria gouldii (P)	1	0.3	0.6	6	17.5
Scoloplos sp. (P)	1	0.3	0.6	6	17.5
Paraprionospio pinnata (P)	1	0.3	0.6	6	17.5
Mediomastus californiensis (P)	1	0.3	0.6	6	17.5
----------Collection Date = 17 August 1978----------					
Lumbrineris tenuis (P)	15	5.0	1.0	91	1.0
Panopeus herbstii (D)	6	2.0	1.0	36	2.0
Podarke obscura (P)	4	1.3	1.2	24	3.0
Cyathura burbanki (I)	3	1.0	1.0	18	5.0
Heteromastus filiformis (P)	3	1.0	1.0	18	5.0
Aricidea fragilis (P)	3	1.0	1.0	18	5.0
Melita sp. (A)	2	0.7	0.6	12	9.0
Drilonereis magna (P)	2	0.7	0.6	12	9.0
Lepidonotus sublevis (P)	2	0.7	0.6	12	9.0
Diplocirrus capensis (P)	2	0.7	0.6	12	9.0
Cirratulidae (undet.) (P)	2	0.7	1.2	12	9.0
Alpheus normanni (D)	1	0.3	0.6	6	15.5
Nucula proxima (M)	1	0.3	0.6	6	15.5
Glycera americana (P)	1	0.3	0.6	6	15.5
Scoloplos rubra (P)	1	0.3	0.6	6	15.5
Nereis succinea (P)	1	0.3	0.6	6	15.5
Glycinde solitaria (P)	1	0.3	0.6	6	15.5
Arabella iricolor (P)	1	0.3	0.6	6	15.5
Syllis spongicola (P)	1	0.3	0.6	6	15.5

Table 22. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB08. (A = Amphipoda; C = Cumacea; D = Decapoda; H = Hemichordata; I = Isopoda; M = Mollusca; O = Ophiuroidea; P = Polychaeta).

Species	SB08 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 25 August 1977					
Lumbrineris tenuis (P)	6	2.0	2.0	36	1.5
Paraprionospio pinnata (P)	6	2.0	2.7	36	1.5
Glycera americana (P)	3	1.0	0.0	18	3.5
Scoloplos rubra (P)	3	1.0	1.0	18	3.5
Cyathura burbanki (I)	1	0.3	0.6	6	7.0
Hemipholis elongata (O)	1	0.3	0.6	6	7.0
Saccoglossus kowalevskii (H)	1	0.3	0.6	6	7.0
Glycinde solitaria (P)	1	0.3	0.6	6	7.0
Drilonereis magna (P)	1	0.3	0.6	6	7.0
Collection Date = 30 January 1978					
Paraprionospio pinnata (P)	11	3.7	4.7	67	1.0
Mulinia lateralis	7	2.3	2.5	42	2.0
Lumbrineris tenuis (P)	6	2.0	1.7	36	3.0
Nereis succinea (P)	5	1.7	0.6	30	4.5
Haploscoloplos robustos (P)	5	1.7	0.6	30	4.5
Heteromastus filiformis (P)	4	1.3	1.2	24	6.0
Ogyrides limicola (D)	3	1.0	1.7	18	7.5
Mitrella lunata (M)	3	1.0	1.0	18	7.5
Pinnixa sp. (D)	2	0.7	1.2	12	11.0
Ampelisca vadorum (A)	2	0.7	0.6	12	11.0
Cyathura burbanki (I)	2	0.7	1.2	12	11.0
Tellinidae (undet.) (M)	2	0.7	1.2	12	11.0
Lysidice ninetta (P)	2	0.7	1.2	12	11.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	16.0
Glycera americana (P)	1	0.3	0.6	6	16.0
Glycinde solitaria (P)	1	0.3	0.6	6	16.0
Oligochaeta (undet.)	1	0.3	0.6	6	16.0
Polydora sp. (P)	1	0.3	0.6	6	16.0
Collection Date = 24 April 1978					
Haploscoloplos fragilis (P)	36	12.0	9.0	218	1.0
Ampelisca vadorum (A)	12	4.0	1.0	73	2.0
Spionidae (undet.) (P)	6	2.0	2.0	36	3.0
Heteromastus filiformis (P)	5	1.7	2.1	30	4.5
Lumbrineris tenuis (P)	5	1.7	0.6	30	4.5
Tellinidae (undet.) (M)	4	1.3	1.2	24	6.0
Melita nitida (A)	3	1.0	1.7	18	8.0
Nereis succinea (P)	3	1.0	1.7	18	8.0
Glycinde solitaria (P)	3	1.0	1.0	18	8.0
Leucon americanus (C)	2	0.7	0.6	12	10.0
Xanthidae (undet.) (D)	1	0.3	0.6	6	14.5
Nucula proxima (M)	1	0.3	0.6	6	14.5
Pelecypoda (undet.) (M)	1	0.3	0.6	6	14.5
Glycera americana (P)	1	0.3	0.6	6	14.5
Tharyx marioni (P)	1	0.3	0.6	6	14.5
Drilonereis magna (P)	1	0.3	0.6	6	14.5
Eteone heteropoda (P)	1	0.3	0.6	6	14.5
Tharyx setigera (P)	1	0.3	0.6	6	14.5
Collection Date = 3 August 1978					
Ogyrides limicola (D)	33	11.0	8.0	200	1.0
Haploscoloplos fragilis (P)	6	2.0	2.7	36	2.0
Lumbrineris tenuis (P)	5	1.7	1.2	30	3.0
Paraprionospio pinnata (P)	3	1.0	1.7	18	4.0
Glycera americana (P)	1	0.3	0.6	6	5.5
Notomastus sp.	1	0.3	0.6	6	5.5

Table 23. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB09. (A = Amphipoda; H = Hemichordata; I = Isopoda; M = Mollusca; P = Polychaeta; Py = Pycnogonida).

Species	Total Number	Number/0.05m² $\bar{x}$	Number/0.05m² SD	Estimated Number/m²	Rank by Number
SB09					
Collection Date = 23 August 1977					
Lumbrineris tenuis (P)	49	16.3	11.6	297	1.0
Paraprionospio pinnata (P)	26	8.7	14.2	158	2.0
Aricidea fragilis (P)	14	4.7	3.1	85	3.0
Sacoglossus kowalevskii (H)	6	2.0	1.7	36	4.0
Mulinia lateralis (M)	5	1.7	1.2	30	5.5
Glycinde solitaria (P)	5	1.7	1.5	30	5.5
Glycera americana (P)	3	1.0	1.0	18	7.0
Heteromastus filiformis (P)	2	0.7	1.2	12	9.0
Haploscoloplos fragilis (P)	2	0.7	0.6	12	9.0
Haploscoloplos foliosus (P)	2	0.7	1.2	12	9.0
Collection Date = 31 January 1978					
Mulinia lateralis (M)	74	24.7	11.9	449	1.0
Lumbrineris tenuis (P)	19	6.3	9.3	115	2.0
Edotea montosa (I)	5	1.7	2.9	30	4.5
Odostomia sp. (P)	5	1.7	2.9	30	4.5
Heteromastus filiformis (P)	5	1.7	2.9	30	4.5
Haploscoloplos sp. (P)	5	1.7	2.1	30	4.5
Nereis succinea (P)	4	1.3	2.3	24	7.0
Glycera americana (P)	3	1.0	1.0	18	8.0
Tellinidae (undet.) (M)	2	0.7	0.6	12	10.5
Eteone heteropoda (P)	2	0.7	0.6	12	10.5
Mediomastus californiensis (P)	2	0.7	0.6	12	10.5
Aricidea fragilis (P)	2	0.7	1.2	12	10.5
Paraphoxus spinosus (A)	1	0.3	0.6	6	20.0
Gammarus mucronatus (A)	1	0.3	0.6	6	20.0
Tanystylum calicirostre (Py)	1	0.3	0.6	6	20.0
Actinaria (undet.)	1	0.3	0.6	6	20.0
Polinices lacteus (M)	1	0.3	0.6	6	20.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	20.0
Acteocina canaliculata (M)	1	0.3	0.6	6	20.0
Streblospio benedicti (P)	1	0.3	0.6	6	20.0
Marphysa sanguinea (P)	1	0.3	0.6	6	20.0
Drilonereis magna (P)	1	0.3	0.6	6	20.0
Leptdonotus sublevis (P)	1	0.3	0.6	6	20.0
Polydora ligni (P)	1	0.3	0.6	6	20.0
Paraprionospio pinnata (P)	1	0.3	0.6	6	20.0
Thelepus setosus (P)	1	0.3	0.6	6	20.0
Nereinides unidentata (P)	1	0.3	0.6	6	20.0
Collection Date = 25 April 1978					
Lumbrineris tenuis (P)	51	17.0	10.0	309	1.0
Haploscoloplos fragilis (P)	21	7.0	4.0	127	2.0
Heteromastus filiformis (P)	16	5.3	4.5	97	3.0
Streblospio benedicti (P)	12	4.0	5.3	73	4.5
Cirratulidae (undet.) (P)	12	4.0	4.6	73	4.5
Tellinidae (undet.) (M)	7	2.3	3.2	42	6.0
Aricidea fragilis (P)	5	1.7	0.6	30	7.0
Glycera americana (P)	3	1.0	1.0	18	8.0
Glycinde solitaria (P)	2	0.7	1.2	12	10.0
Oligochaeta (undet.)	2	0.7	1.2	12	10.0
Clymenella torquata (P)	2	0.7	1.2	12	10.0
Ampelisca vadorum (A)	1	0.3	0.6	6	13.5
Edotea montosa (I)	1	0.3	0.6	6	13.5
Nemertina (undet.)	1	0.3	0.6	6	13.5
Eteone heteropoda (P)	1	0.3	0.6	6	13.5
Collection Date = 24 July 1978					
Lumbrineris tenuis (P)	12	4.0	3.0	73	1.0
Glycera americana (P)	3	1.0	1.0	18	2.5
Aricidea fragilis (P)	3	1.0	1.0	18	2.5
Cyathura burbanki (I)	1	0.3	0.6	6	5.5
Nemertina (undet.)	1	0.3	0.6	6	5.5
Mulinia lateralis (M)	1	0.3	0.6	6	5.5
Glycinde solitaria (P)	1	0.3	0.6	6	5.5

Table 24. Macroinvertebrate species collected from the Sewee Bay channel station, SB10. (A = Amphipoda; C = Cumacea; D = Decapoda; H = Hemicordata; M = Mollusca; P = Polychaeta).

Species	SB10 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 23 August 1977					
Paraprionospio pinnata (P)	43	14.3	11.9	261	1.0
Lumbrineris tenuis (P)	10	3.3	1.2	61	2.0
Ogyrides limicola (D)	8	2.7	1.2	48	3.0
Notomastus lobatus (P)	5	1.7	1.5	30	4.0
Caprella equilibra (A)	3	1.0	1.7	18	5.5
Glycinde solitaria (P)	3	1.0	1.0	18	5.5
Batea catharinensis (A)	2	0.7	1.2	12	8.0
Glycera americana (P)	2	0.7	0.6	12	8.0
Tharyx annulosus (P)	2	0.7	1.2	12	8.0
Alpheus heterochaelis (D)	1	0.3	0.6	6	11.5
Ampelisca vadorum (A)	1	0.3	0.6	6	11.5
Sacoglossus kowalevskii (H)	1	0.3	0.6	6	11.5
Maldanidae (undet.) (P)	1	0.3	0.6	6	11.5
Collection Date = 30 January 1978					
Ogyrides limicola (D)	8	2.7	1.5	48	1.0
Heteromastus filiformis (P)	2	0.7	1.2	12	2.5
Paraprionospio pinnata (P)	2	0.7	0.6	12	2.5
Leucon americanus (C)	1	0.3	0.6	6	4.5
Abra aequalis (M)	1	0.3	0.6	6	4.5
Collection Date = 28 April 1978					
Heteromastus filiformis (P)	67	22.3	5.5	406	1.0
Paraprionospio pinnata (P)	20	6.7	1.5	121	2.0
Gemma gemma (M)	12	4.0	6.1	73	3.5
Nereis succinea (P)	12	4.0	3.6	73	3.5
Haploscoloplos fragilis (P)	11	3.7	3.2	67	5.0
Ogyrides limicola (D)	9	3.0	3.6	55	6.0
Lumbrineris tenuis (P)	6	2.0	2.0	36	8.5
Drilonereis magna (P)	6	2.0	1.0	36	8.5
Clymenella torquata (P)	6	2.0	2.0	36	8.5
Streblospio benedicti (P)	6	2.0	2.0	36	8.5
Tellinidae (undet.) (M)	5	1.7	1.5	30	11.0
Mulinia lateralis (M)	4	1.3	0.6	24	12.5
Nereidae (undet.) (P)	4	1.3	1.5	24	12.5
Ampelisca vadorum (A)	3	1.0	0.0	18	15.5
Nemertina (undet.)	3	1.0	1.0	18	15.5
Haploscoloplos fragilis (P)	3	1.0	0.0	18	15.5
Aricidea fragilis (P)	3	1.0	0.0	18	15.5
Oxyurostylis smithi (C)	2	0.7	1.2	12	19.0
Polinices lacteus (M)	2	0.7	0.6	12	19.0
Mediomastus californiensis (P)	2	0.7	1.2	12	19.0
Solen viridis (M)	1	0.3	0.6	6	24.0
Abra aequalis (M)	1	0.3	0.6	6	24.0
Pelecypoda (undet.) (M)	1	0.3	0.6	6	24.0
Tellinidae (undet.) (M)	1	0.3	0.6	6	24.0
Glycera americana (P)	1	0.3	0.6	6	24.0
Pectinaria gouldii (P)	1	0.3	0.6	6	24.0
Cirratulidae (undet.) (P)	1	0.3	0.6	6	24.0
Collection Date = 3 August 1978					
Ogyrides limicola (D)	64	21.3	4.0	388	1.0
Heteromastus filiformis (P)	24	8.0	3.6	145	2.0
Haploscoloplos fragilis (P)	19	6.3	3.1	115	3.5
Paraprionospio pinnata (P)	19	6.3	6.8	115	3.5
Glycera americana (P)	2	0.7	0.6	12	6.0
Nereis succinea (P)	2	0.7	1.2	12	6.0
Glycinde solitaria (P)	2	0.7	1.2	12	6.0
Pinnixa sayana (D)	1	0.3	0.6	6	10.0
Sigambra tentaculata (P)	1	0.3	0.6	6	10.0
Lumbrineris tenuis (P)	1	0.3	0.6	6	10.0
Diopatra cuprea (P)	1	0.3	0.6	6	10.0
Oligochaeta (undet.)	1	0.3	0.6	6	10.0

Table 25. Macroinvertebrate species collected from the Sewee Bay intertidal station, SB11. (M = Mollusca; P = Polychaeta).

Species	SB11 Total Number	Number/0.05m^2 $\bar{x}$	SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Heteromastus filiformis (P)	91	30.3	13.8	552	1.0
Nereis succinea (P)	37	12.3	10.4	224	2.0
Gemma gemma (M)	11	3.7	1.5	67	3.0
Aricidea fragilis (P)	10	3.3	4.9	61	4.0
Lumbrineris tenuis (P)	6	2.0	3.5	36	5.0
Laeonereis culveri (P)	3	1.0	1.0	18	6.0
Glycera americana (P)	1	0.3	0.6	6	8.0
Diopatra cuprea (P)	1	0.3	0.6	6	8.0
Drilonereis magna (P)	1	0.3	0.6	6	8.0
Collection Date = 10 February 1978					
Heteromastus filiformis (P)	47	15.7	10.1	285	1.0
Gemma gemma (M)	42	14.0	13.2	255	2.0
Paraprionospio pinnata (P)	16	5.3	5.5	97	3.0
Nereidae (undet.) (P)	5	1.7	1.2	30	4.0
Lumbrineris tenuis (P)	2	0.7	1.2	12	5.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	8.5
Tagelus plebeius (P)	1	0.3	0.6	6	8.5
Glycera americana (P)	1	0.3	0.6	6	8.5
Nereis succinea (P)	1	0.3	0.6	6	8.5
Diopatra cuprea (P)	1	0.3	0.6	6	8.5
Haploscoloplos sp. (P)	1	0.3	0.6	6	8.5
Collection Date = 28 April 1978					
Heteromastus filiformis (P)	51	17.0	6.1	309	1.0
Gemma gemma (M)	12	4.0	6.1	73	2.5
Nereis succinea (P)	12	4.0	3.6	73	2.5
Haploscoloplos fragilis (P)	11	3.7	3.2	67	4.0
Lumbrineris tenuis (P)	6	2.0	2.0	36	5.5
Drilonereis magna (P)	6	2.0	1.0	36	5.5
Nereidae (undet.) (P)	4	1.3	1.5	24	7.0
Nemertina (undet.)	3	1.0	1.0	18	8.5
Aricidea fragilis (P)	3	1.0	0.0	18	8.5
Polinices lacteus (M)	2	0.7	0.6	12	10.5
Streblospio benedicti (P)	2	0.7	1.2	12	10.5
Tellinidae (undet.) (M)	1	0.3	0.6	6	12.0
Collection Date = 18 August 1978					
Nereis succinea (P)	48	16.0	8.7	291	1.0
Heteromastus filiformis (P)	24	8.0	6.1	145	2.0
Gemma gemma (M)	19	6.3	1.5	115	3.0
Haploscoloplos fragilis (P)	18	6.0	4.4	109	4.0
Aricidea fragilis (P)	3	1.0	1.0	18	5.0
Nemertina (undet.)	1	0.3	0.6	6	7.0
Lumbrineris tenuis (P)	1	0.3	0.6	6	7.0
Drilonereis magna (P)	1	0.3	0.6	6	7.0

Table 26. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB12. (A = Amphipoda; I = Isopoda; M = Mollusca; P = Polychaeta).

Species	SB12 Total Number	Number/0.05m² $\bar{x}$	Number/0.05m² SD	Estimated Number/m²	Rank by Number
Collection Date = 30 August 1977					
Haploscoloplos robustos (P)	41	13.7	3.8	249	1.0
Lumbrineris tenuis (P)	11	3.7	3.8	67	2.0
Heteromastus filiformis (P)	9	3.0	2.7	55	3.0
Aricidea fragilis (P)	8	2.7	3.1	48	4.0
Cyathura burbanki (I)	1	0.3	0.6	6	5.5
Streblospio benedicti (P)	1	0.3	0.6	6	5.5
Collection Date = 31 January 1978					
Nereis succinea (P)	34	11.3	7.1	206	1.0
Heteromastus filiformis (P)	18	6.0	3.0	109	2.0
Paraprionospio pinnata (P)	13	4.3	4.0	79	3.0
Haploscoloplos fragilis (P)	6	2.0	1.0	36	4.0
Glycera americana (P)	3	1.0	1.0	18	5.5
Nereidae (undet.) (P)	3	1.0	1.0	18	5.5
Mulinia lateralis (M)	1	0.3	0.6	6	8.0
Tellinidae (undet.) (M)	1	0.3	0.6	6	8.0
Oligochaeta (undet.)	1	0.3	0.6	6	8.0
Collection Date = 25 April 1978					
Haploscoloplos fragilis (P)	21	7.3	9.3	127	1.0
Streblospio benedicti (P)	18	5.0	8.7	109	2.0
Mediomastus californiensis (P)	10	3.3	3.2	61	3.0
Heteromastus filiformis (P)	8	2.7	1.2	48	4.0
Paraprionospio pinnata (P)	4	1.3	1.5	24	5.0
Lumbrineris tenuis (P)	3	1.0	1.7	18	6.0
Ampelisca vadorum (A)	2	0.7	1.2	12	7.5
Glycera americana (P)	2	0.7	0.6	12	7.5
Ogyrides limicola (D)	1	0.3	0.6	6	12.5
Ilyanassa obsoleta (M)	1	0.3	0.6	6	12.5
Tellinidae (undet.) (M)	1	0.3	0.6	6	12.5
Nereis succinea (P)	1	0.3	0.6	6	12.5
Eteone heteropoda (P)	1	0.3	0.6	6	12.5
Oligochaeta (undet.)	1	0.3	0.6	6	12.5
Aricidea fragilis (P)	1	0.3	0.6	6	12.5
Cirratulidae (undet.) (P)	1	0.3	0.6	6	12.5
Collection Date = 18 August 1978					
Haploscoloplos fragilis (P)	24	8.0	7.6	145	1.0
Heteromastus filiformis (P)	8	2.7	1.5	48	2.0
Paraprionospio pinnata (P)	5	1.7	1.5	30	3.0
Lumbrineris tenuis (P)	3	1.0	0.0	18	4.0
Oligochaeta (undet.)	2	0.7	0.6	12	5.0
Sigambra tentaculata (P)	1	0.3	0.6	6	7.0
Glycinde solitaria (P)	1	0.3	0.6	6	7.0
Aricidea fragilis (P)	1	0.3	0.6	6	7.0

Table 27. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB13. (A = Amphipoda; C = Cumacea; D = Decapoda; Ho = Holothuroidea; I = Isopoda; M = Mollusca; P = Polychaeta).

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
SB13					
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	42	14.0	23.4	255	1.0
Ogyrides limicola (D)	6	2.0	2.0	36	2.0
Nereis succinea (P)	2	0.7	1.2	12	3.0
Sclerodactyla briareus (Ho)	1	0.3	0.6	6	5.5
Glycera americana (P)	1	0.3	0.6	6	5.5
Heteromastus filiformis (P)	1	0.3	0.6	6	5.5
Diopatra cuprea (P)	1	0.3	0.6	6	5.5
Collection Date = 30 January 1978					
Mulinia lateralis (M)	9	3.0	1.7	55	1.0
Heteromastus filiformis (P)	3	1.0	1.0	18	2.5
Lumbrineris tenuis (P)	3	1.0	1.0	18	2.5
Nucula proxima (M)	2	0.7	1.2	12	4.0
Edotea montosa (I)	1	0.3	0.6	6	8.0
Pelecypoda (undet.) (M)	1	0.3	0.6	6	8.0
Nereis succinea (P)	1	0.3	0.6	6	8.0
Lepidonotus sublevis (P)	1	0.3	0.6	6	8.0
Paraprionospio pinnata (P)	1	0.3	0.6	6	8.0
Sabellidae (undet.) (P)	1	0.3	0.6	6	8.0
Sabella microphthalma (P)	1	0.3	0.6	6	8.0
Collection Date = 24 April 1978					
Ampelisca vadorum (A)	42	14.0	4.4	255	1.0
Lumbrineris tenuis (P)	13	4.3	1.5	79	2.0
Haploscoloplos fragilis (P)	12	4.0	3.0	73	3.0
Leucon americanus (C)	4	1.3	1.5	24	4.0
Glycinde solitaria (P)	3	1.0	1.0	18	5.0
Ogyrides limicola (D)	2	0.7	0.6	12	7.0
Oxyurostylis smithi (C)	2	0.7	0.6	12	7.0
Paraprionospio pinnata (P)	2	0.7	0.6	12	7.0
Mulinia lateralis (M)	1	0.3	0.6	6	10.5
Turridae (undet.) (M)	1	0.3	0.6	6	10.5
Glycera americana (P)	1	0.3	0.6	6	10.5
Drilonereis magna (P)	1	0.3	0.6	6	10.5
Collection Date = 17 July 1978					
Glycinde solitaria (P)	8	2.7	1.5	48	1.0
Haploscoloplos fragilis (P)	7	2.3	3.2	42	2.0
Paraprionospio pinnata (P)	3	1.0	0.0	18	3.0
Ogyrides limicola (D)	1	0.3	0.6	6	6.0
Callianassa atlantica (D)	1	0.3	0.6	6	6.0
Glycera americana (P)	1	0.3	0.6	6	6.0
Sigambra tentaculata (P)	1	0.3	0.6	6	6.0
Lumbrineris tenuis (P)	1	0.3	0.6	6	6.0

Table 28. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB14. (A = Amphipoda; C = Cumacea; D = Decapoda; I = Isopoda; M = Mollusca; P = Polychaeta).

SB14					
Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 23 August 1977					
Paraprionospio pinnata (P)	52	17.3	17.9	315	1.0
Lumbrineris tenuis (P)	10	3.3	4.9	61	2.0
Glycinde solitaria (P)	4	1.3	2.3	24	3.0
Periclimenes longicaudatus (D)	3	1.0	1.7	18	4.5
Nereis succinea (P)	3	1.0	1.7	18	4.5
Haploscoloplos fragilis (P)	2	0.7	1.2	12	6.0
Panopeus herbstii (D)	1	0.3	0.6	6	9.0
Melita nitida (A)	1	0.3	0.6	6	9.0
Paraphoxus oculatus (A)	1	0.3	0.6	6	9.0
Mulinia lateralis (M)	1	0.3	0.6	6	9.0
Heteromastus filiformis (P)	1	0.3	0.6	6	9.0
Collection Date = 31 January 1978					
Streblospio benedictii (P)	58	19.0	19.1	352	1.0
Sabellaria vulgaris (P)	43	14.3	22.2	261	2.0
Lumbrineris tenuis (P)	21	7.0	2.7	127	3.0
Heteromastus filiformis (P)	8	2.7	2.1	48	4.0
Mulinia lateralis (M)	5	1.7	2.1	30	5.0
Eteone heteropoda (P)	4	1.3	1.5	24	6.0
Ampelisca vadorum (A)	3	1.0	0.0	18	9.0
Macoma sp. (M)	3	1.0	1.0	18	9.0
Tharyx marioni (P)	3	1.0	1.7	18	9.0
Nereis succinea (P)	3	1.0	1.7	18	9.0
Paraprionospio pinnata (P)	3	1.0	1.0	18	9.0
Melita nitida (A)	2	0.7	0.6	12	12.5
Leucon americanus (C)	2	0.7	1.2	12	12.5
Callinectes sapidus (D)	1	0.3	0.6	6	17.5
Caprella equilibra (A)	1	0.3	0.6	6	17.5
Corophium sp. (A)	1	0.3	0.6	6	17.5
Glycera americana (P)	1	0.3	0.6	6	17.5
Scoloplos rubra (P)	1	0.3	0.6	6	17.5
Drilonereis magna (P)	1	0.3	0.6	6	17.5
Thelepus setosus (P)	1	0.3	0.6	6	17.5
Sabella microphthalma (P)	1	0.3	0.6	6	17.5
Collection Date = 25 April 1978					
Lumbrineris tenuis (P)	33	11.0	5.3	200	1.0
Ampelisca vadorum (A)	14	4.7	1.2	85	2.5
Spiophanes bombyx (P)	14	4.7	5.7	85	2.5
Cirratulidae (undet.) (P)	11	3.7	4.7	67	4.0
Paraprionospio pinnata (P)	7	2.3	1.5	42	5.5
Mediomastus californiensis (P)	7	2.3	0.6	42	5.5
Streblospio benedicti (P)	6	2.0	2.7	36	7.0
Nereis succinea (P)	4	1.3	2.3	24	8.0
Nucula proxima (M)	3	1.0	1.7	18	9.5
Heteromastus filiformis (P)	3	1.0	1.0	18	9.5
Oxyurostylis smithi (C)	2	0.7	1.2	12	11.5
Drilonereis magna (P)	2	0.7	0.6	12	11.5
Paguridea (undet.) (D)	1	0.3	0.6	6	21.5
Uca sp. (D)	1	0.3	0.6	6	21.5
Unciola serrata (A)	1	0.3	0.6	6	21.5
Edotea montosa (I)	1	0.3	0.6	6	21.5
Actinaria (undet.)	1	0.3	0.6	6	21.5
Nemertina (undet.)	1	0.3	0.6	6	21.5
Mercenaria mercenaria (M)	1	0.3	0.6	6	21.5
Lyonsia hyalina (M)	1	0.3	0.6	6	21.5
Acteocina canaliculata (M)	1	0.3	0.6	6	21.5
Tellinidae (undet.) (M)	1	0.3	0.6	6	21.5
Sabellaria vulgaris (P)	1	0.3	0.6	6	21.5
Pectinaria gouldii (P)	1	0.3	0.6	6	21.5
Glycinde solitaria (P)	1	0.3	0.6	6	21.5
Diopatra cuprea (P)	1	0.3	0.6	6	21.5
Eteone heteropoda (P)	1	0.3	0.6	6	21.5
Exogone dispar (P)	1	0.3	0.6	6	21.5
Thelepus setosus (P)	1	0.3	0.6	6	21.5
Haploscoloplos sp. (P)	1	0.3	0.6	6	21.5

Table 28.(Cont.)

SB14

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
----------Collection Date = 18 August 1978----------					
Lumbrineris tenuis (P)	8	2.7	2.9	48	1.0
Heteromastus filiformis (P)	4	1.3	0.6	24	2.0
Marphysa sanguinea (P)	2	0.7	1.2	12	3.0
Nemertina (undet.)	1	0.3	0.6	6	5.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	5.0
Mulinia lateralis (M)	1	0.3	0.6	6	5.0

Table 29. Macroinvertebrate species collected from the Sewee Bay channel station, SB15. (A = Amphipoda; D = Decapoda; M = Mollusca; O = Ophiuroidea; P = Polychaeta).

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
		SB15			
----------Collection Date = 23 August 1977----------					
Paraprionospio pinnata (P)	131	43.7	11.8	794	1.0
Glycinde solitaria (P)	10	3.3	2.1	61	2.0
Lumbrineris tenuis (P)	8	2.7	3.8	48	3.0
Ogyrides limicola (D)	1	0.3	0.6	6	7.0
Ampelisca verrilli (A)	1	0.3	0.6	6	7.0
Anadara ovalis (M)	1	0.3	0.6	6	7.0
Glycera americana (P)	1	0.3	0.6	6	7.0
Notomastus lobatus (P)	1	0.3	0.6	6	7.0
Scoloplos rubra (P)	1	0.3	0.6	6	7.0
Diopatra cuprea (P)	1	0.3	0.6	6	7.0
----------Collection Date = 30 January 1978----------					
Paraprionospio pinnata (P)	9	3.0	3.6	55	1.0
Glycera americana (P)	3	1.0	1.7	18	2.5
Scoloplos rubra (P)	3	1.0	1.0	18	2.5
Streblospio benedicti (P)	2	0.7	1.2	12	4.0
Melita sp. (A)	1	0.3	0.6	6	7.5
Amphiuridae (undet.) (O)	1	0.3	0.6	6	7.5
Mulinia lateralis (M)	1	0.3	0.6	6	7.5
Heteromastus filiformis (P)	1	0.3	0.6	6	7.5
Oligochaeta (undet.)	1	0.3	0.6	6	7.5
Aricidea fragilis (P)	1	0.3	0.6	6	7.5
----------Collection Date = 28 April 1978----------					
Pelecypoda (undet.) (M)	4	1.3	2.3	24	1.0
Tellinidae (undet.) (M)	2	0.7	1.2	12	3.0
Haploscoloplos fragilis (P)	2	0.7	1.2	12	3.0
Clymenella torquata (P)	2	0.7	0.6	12	3.0
Ampelisca vadorum (A)	1	0.3	0.6	6	8.5
Erichthonius brasiliensis (A)	1	0.3	0.6	6	8.5
Glycera americana (P)	1	0.3	0.6	6	8.5
Streblospio benedicti (P)	1	0.3	0.6	6	8.5
Spiophanes bombyx (P)	1	0.3	0.6	6	8.5
Heteromastus filiformis (P)	1	0.3	0.6	6	8.5
Nereis succinea (P)	1	0.3	0.6	6	8.5
Paraprionospio pinnata (P)	1	0.3	0.6	6	8.5
----------Collection Date = 31 July 1978----------					
Paraprionospio pinnata (P)	18	6.0	2.7	109	1.0
Clymenella torquata (P)	3	1.0	1.7	18	2.0
Turbonilla sp. (M)	2	0.7	1.2	12	3.0
Pinnixa sayana (D)	1	0.3	0.6	6	6.0
Acteocina canaliculata (M)	1	0.3	0.6	6	6.0
Tellinidae (undet.) (M)	1	0.3	0.6	6	6.0
Glycera americana (P)	1	0.3	0.6	6	6.0
Glycinde solitaria (P)	1	0.3	0.6	6	6.0

Table 3Q. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB16. (D = Decapoda; I = Isopoda; M = Mollusca; P = Polychaeta).

Species	SB16 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	36	12.0	7.6	218	1.0
Haploscoloplos fragilis (P)	13	4.3	4.2	79	2.0
Nereis succinea (P)	5	1.7	0.6	30	3.0
Glycera americana (P)	4	1.3	2.3	24	4.0
Aricidea fragilis (P)	3	1.0	1.7	18	5.0
Gemma gemma (M)	2	0.7	1.2	12	6.0
Cyathura burbanki (I)	1	0.3	0.6	6	10.0
Mercenaria mercenaria (M)	1	0.3	0.6	6	10.0
Tagelus divisus (M)	1	0.3	0.6	6	10.0
Mulinia lateralis (M)	1	0.3	0.6	6	10.0
Heteromastus filiformis (P)	1	0.3	0.6	6	10.0
Drilonereis magna (P)	1	0.3	0.6	6	10.0
Maldanidae (undet.) (P)	1	0.3	0.6	6	10.0
Collection Date = 10 February 1978					
Laeonereis culveri (P)	82	27.3	13.6	497	1.0
Nereis succinea (P)	44	14.7	11.0	267	2.0
Heteromastus filiformis (P)	25	8.3	5.5	152	3.0
Lumbrineris tenuis (P)	21	7.0	2.0	127	4.0
Glycera americana (P)	6	2.0	1.0	36	5.5
Eteone heteropoda (P)	6	2.0	2.7	36	5.5
Haploscoloplos sp. (P)	5	1.7	2.1	30	7.0
Macoma extenuata (M)	4	1.3	2.3	24	9.0
Paraprionospio pinnata (P)	4	1.3	1.5	24	9.0
Cirratulidae (undet.) (P)	4	1.3	2.3	24	9.0
Mercenaria mercenaria (M)	2	0.7	0.6	12	12.0
Mulinia lateralis (M)	2	0.7	0.6	12	12.0
Streblospio benedicti (P)	2	0.7	1.2	12	12.0
Gemma gemma (M)	1	0.3	0.6	6	14.5
Pectinaria gouldii (P)	1	0.3	0.6	6	14.5
Collection Date = 25 April 1978					
Lumbrineris tenuis (P)	18	6.0	4.6	109	1.0
Heteromastus filiformis (P)	8	2.7	1.5	48	2.5
Mediomastus californiensis (P)	8	2.7	2.1	48	2.5
Streblospio benedicti (P)	7	2.3	2.5	42	4.5
Nereis succinea (P)	7	2.3	4.0	42	4.5
Haploscoloplos fragilis (P)	6	2.0	2.0	36	6.5
Paraprionospio pinnata (P)	6	2.0	1.0	36	6.5
Tellinidae (undet.) (M)	4	1.3	1.5	24	8.5
Cirratulidae (undet.) (P)	4	1.3	2.3	24	8.5
Nemertina (undet.)	2	0.7	0.6	12	11.0
Mercenaria mercenaria (M)	2	0.7	0.6	12	11.0
Glycera americana (P)	2	0.7	0.6	12	11.0
Pinnixa sayana (D)	1	0.3	0.6	6	16.5
Gemma gemma (M)	1	0.3	0.6	6	16.5
Mulinia lateralis (M)	1	0.3	0.6	6	16.5
Acteocina canaliculata (M)	1	0.3	0.6	6	16.5
Scoloplos rubra (P)	1	0.3	0.6	6	16.5
Glycinde solitaria (P)	1	0.3	0.6	6	16.5
Drilonereis magna (P)	1	0.3	0.6	6	16.5
Notomastus sp. (P)	1	0.3	0.6	6	16.5
Collection Date = 18 August 1978					
Heteromastus filiformis (P)	38	12.7	21.9	230	1.0
Uca pugilator (D)	12	4.0	5.3	73	2.0
Lumbrineris tenuis (P)	6	2.0	3.5	36	3.0
Gemma gemma (M)	5	1.7	1.5	30	4.0
Nereis succinea (P)	4	1.3	1.5	24	5.0
Cirratulidae (undet.) (P)	2	0.7	1.2	12	6.0
Palaemonetes sp. (D)	1	0.3	0.6	6	7.0

Table 31. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB17. (A = Amphipoda; C = Cumacea; D = Decapoda; Ho = Holothoroidea; I = Isopoda; M = Mollusca; O = Ophiuroidea; P = Polychaeta).

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
SB17					
Collection Date = 30 August 1977					
Lumbrineris tenuis (P)	49	16.3	4.5	297	1.0
Caprella equilibra (A)	4	1.3	2.3	24	2.0
Glycera americana (P)	3	1.0	1.0	18	3.5
Nereis succinea (P)	3	1.0	1.0	18	3.5
Hemipholis elongata (O)	2	0.7	1.1	12	7.0
Macoma sp. (M)	2	0.7	1.1	12	7.0
Scoloplos rubra (P)	2	0.7	1.1	12	7.0
Arabella iricolor (P)	2	0.7	1.1	12	7.0
Aricidea fragilis (P)	2	0.7	0.6	12	7.0
Upogebia affinis (D)	1	0.3	0.6	6	13.5
Pagurus pollicaris (D)	1	0.3	0.6	6	13.5
Xanthidae (undet.) (D)	1	0.3	0.6	6	13.5
Sclerodactyla briareus (Ho)	1	0.3	0.6	6	13.5
Nucula proxima (M)	1	0.3	0.6	6	13.5
Eunice websteri (P)	1	0.3	0.6	6	13.5
Diopatra cuprea (P)	1	0.3	0.6	6	13.5
Drilonereis magna (P)	1	0.3	0.6	6	13.5
Collection Date = 10 February 1978					
Haploscoloplos sp. (P)	11	3.7	1.5	67	1.0
Ogyrides limicola (D)	4	1.3	2.3	24	2.5
Ilyanassa obsoleta (M)	4	1.3	2.3	24	2.5
Lumbrineris tenuis (P)	3	1.0	1.0	18	5.0
Nereis succinea (P)	3	1.0	1.0	18	5.0
Paraprionospio pinnata (P)	3	1.0	1.0	18	5.0
Paraphoxus spinosus (A)	2	0.7	0.6	12	9.5
Ampelisca abdita (A)	2	0.7	1.2	12	9.5
Acteocina canaliculata (M)	2	0.7	1.2	12	9.5
Macoma extenuata (M)	2	0.7	1.2	12	9.5
Glycera americana (P)	2	0.7	0.6	12	9.5
Glycinde solitaria (P)	2	0.7	0.6	12	9.5
Corophium acherusicum (A)	1	0.3	0.6	6	16.0
Caprella equilibra (A)	1	0.3	0.6	6	16.0
Leucon americanus (C)	1	0.3	0.6	6	16.0
Edotea montosa (I)	1	0.3	0.6	6	16.0
Macoma sp. (M)	1	0.3	0.6	6	16.0
Laeonereis culveri (P)	1	0.3	0.6	6	16.0
Eteone heteropoda (P)	1	0.3	0.6	6	16.0
Collection Date = 25 April 1978					
Haploscoloplos fragilis (P)	17	6.0	5.0	103	1.0
Ampelisca vadorum (A)	9	3.0	1.0	55	2.0
Acteocina canaliculata (M)	5	1.7	1.2	30	3.5
Lumbrineris tenuis (P)	5	1.7	1.5	30	3.5
Tellinidae (undet.) (M)	4	1.3	1.5	24	5.0
Paraprionospio pinnata (P)	3	1.0	1.0	18	6.0
Glycera americana (P)	2	0.7	0.6	12	7.0
Ogyrides limicola (D)	1	0.3	0.6	6	11.0
Leucon americanus (C)	1	0.3	0.6	6	11.0
Heteromastus filiformis (P)	1	0.3	0.6	6	11.0
Glycinde solitaria (P)	1	0.3	0.6	6	11.0
Drilonereis magna (P)	1	0.3	0.6	6	11.0
Orbiniidae (undet.) (P)	1	0.3	0.6	6	11.0
Notomastus sp. (P)	1	0.3	0.6	6	11.0
Collection Date = 17 August 1978					
Glycera americana (P)	2	0.7	0.6	12	1.0
Lumbrineris tenuis (P)	1	0.3	0.6	6	2.0

Table 32. Macroinvertebrate species collected from the Sewee Bay subtidal station, SB18. A = Amphipoda; C = Cumacea; D = Decapoda; I = Isopoda; M = Mollusca; My = Mysidacea; O = Ophiuroidea; P = Polychaeta; S = Stomatopoda).

Species	SB18 Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 25 August 1977					
Lumbrineris tenuis (P)	47	15.7	16.1	285	1.0
Glycinde solitaria (P)	3	1.0	0.0	18	2.0
Squilla empusa (S)	1	0.3	0.6	6	6.5
Ampelisca vadorum (A)	1	0.3	0.6	6	6.5
Cyathura burbanki (I)	1	0.3	0.6	6	6.5
Scoloplos rubra (P)	1	0.3	0.6	6	6.5
Heteromastus filiformis (P)	1	0.3	0.6	6	6.5
Drilonereis magna (P)	1	0.3	0.6	6	6.5
Aricidea fragilis (P)	1	0.3	0.6	6	6.5
Syllidae (undet.) (P)	1	0.3	0.6	6	6.5
Collection Date = 31 January 1978					
Mulinia lateralis (M)	28	9.3	3.1	170	1.0
Paraprionospio pinnata (P)	22	7.3	4.7	133	2.0
Ogyrides limicola (D)	21	7.0	7.6	127	3.0
Paracaprella tenuis (A)	18	6.0	10.4	109	4.0
Erichthonius brasiliensis (A)	13	4.3	7.5	79	5.0
Tharyx marioni (P)	6	2.0	3.5	36	6.5
Heteromastus filiformis (P)	6	2.0	2.0	36	6.5
Lumbrineris tenuis (P)	5	1.7	2.1	30	8.0
Ampelisca vadorum (A)	4	1.3	1.5	24	10.0
Batea catharinensis (A)	4	1.3	2.3	24	10.0
Nereis succinea (P)	4	1.3	1.5	24	10.0
Microdeutopus gryllotalpa (A)	3	1.0	1.7	18	12.5
Oligochaeta (undet.)	3	1.0	1.0	18	12.5
Caprella equilibra (A)	2	0.7	1.2	12	15.0
Melita sp. (A)	2	0.7	1.2	12	15.0
Haploscoloplos robustos (P)	2	0.7	0.6	12	15.0
Pinnixa sp. (D)	1	0.3	0.6	6	22.5
Corophium acherusicum (A)	1	0.3	0.6	6	22.5
Leucon americanus (C)	1	0.3	0.6	6	22.5
Cyathura burbanki (I)	1	0.3	0.6	6	22.5
Abra aequalis (M)	1	0.3	0.6	6	22.5
Acteocina canaliculata (M)	1	0.3	0.6	6	22.5
Pectinaria gouldii (P)	1	0.3	0.6	6	22.5
Eteone heteropoda (P)	1	0.3	0.6	6	22.5
Odontosyllis fulgurans (P)	1	0.3	0.6	6	22.5
Aricidea fragilis (P)	1	0.3	0.6	6	22.5
Ampharetidae (undet.) (P)	1	0.3	0.6	6	22.5
Sabella microphthalma (P)	1	0.3	0.6	6	22.5
Collection Date = 24 April 1978					
Ampelisca vadorum (A)	23	7.7	1.5	139	1.0
Paraprionospio pinnata (P)	11	3.7	2.1	67	2.0
Lumbrineris tenuis (P)	7	2.3	1.5	42	3.0
Ogyrides limicola (D)	6	2.0	1.0	36	4.5
Spionidae (undet.) (P)	6	2.0	2.0	36	4.5
Neomysis americana (My)	5	1.7	2.1	30	6.5
Tellinidae (undet.) (M)	5	1.7	1.5	30	6.5
Glycera americana (P)	4	1.3	1.2	24	9.0
Glycinde solitaria (P)	4	1.3	0.6	24	9.0
Haploscoloplos sp. (P)	4	1.3	0.6	24	9.0
Batea cathariensis (A)	2	0.7	1.2	12	14.0
Paracaprella tenuis (P)	2	0.7	1.2	12	14.0
Leucon americanus (C)	2	0.7	0.6	12	14.0
Oxyurostylis smithi (C)	2	0.7	0.6	12	14.0
Gammaridae (undet.) (A)	2	0.7	0.6	12	14.0
Hemipholis elongata (O)	2	0.7	0.6	12	14.0
Polynoidae (undet.) (P)	2	0.7	0.6	12	14.0
Edotea montosa (P)	1	0.3	0.6	12	20.5
Nucula proxima (M)	1	0.3	0.6	12	20.5
Lyonsia hyalina (P)	1	0.3	0.6	12	20.5
Sabellaria vulgaris (P)	1	0.3	0.6	12	20.5
Oligochaeta (undet.)	1	0.3	0.6	12	20.5
Cirratulidae (undet.) (P)	1	0.3	0.6	12	20.5

Table 32.(Cont.)

SB18

Species	Total Number	Number/0.05m^2 $\bar{x}$	Number/0.05m^2 SD	Estimated Number/m^2	Rank by Number
Collection Date = 17 August 1978					
Lumbrineris tenuis (P)	7	2.3	0.6	42	1.0
Panopeus herbstii (D)	4	1.3	0.6	24	2.5
Tharyx marioni (P)	4	1.3	1.2	24	2.5
Melita appendiculata (A)	3	1.0	1.7	18	4.0
Cyathura burbanki (I)	2	0.7	0.6	12	6.5
Scoloplos sp. (P)	2	0.7	1.2	12	6.5
Glycinde solitaria (P)	2	0.7	0.6	12	6.5
Paraprionospio pinnata (P)	2	0.7	0.6	12	6.5
Nemertina (undet.)	1	0.3	0.6	6	13.5
Hemipholis elongata (O)	1	0.3	0.6	6	13.5
Nucula proxima (M)	1	0.3	0.6	6	13.5
Sabellaria vulgaris (P)	1	0.3	0.6	6	13.5
Pista cristata (P)	1	0.3	0.6	6	13.5
Heteromastus filiformis (P)	1	0.3	0.6	6	13.5
Nereis succinea (P)	1	0.3	0.6	6	13.5
Arabella tricolor (P)	1	0.3	0.6	6	13.5
Notomastus sp. (P)	1	0.3	0.6	6	13.5
Polynoidae (undet.) (P)	1	0.3	0.6	6	13.5

Table 33. Species diversity, evenness and richness values for Sewee Bay grab samples from August 1977 to August 1978. First Quarter = samples collected before dredging; Second Quarter = samples collected immediately after dredging; Third Quarter = samples collected 3 months after dredging; Fourth Quarter = samples collected 6 months after dredging and 1 year after first quarter samples.

	Diversity (H')				Evenness (J')				Richness (SR)				
Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Station
SB01	2.06	2.02	3.61	1.63	0.65	0.72	0.76	0.58	1.91	1.73	5.99	1.76	SB01
SB02	1.95	2.73	0.18	3.03	0.69	0.86	0.11	0.96	1.63	2.35	0.44	2.89	SB02
SB03	0.44	3.66	3.85	3.48	0.28	0.94	0.85	0.94	0.60	4.25	4.99	3.80	SB03
SB04	3.24	2.73	3.03	1.97	0.90	0.74	0.80	0.62	3.20	3.35	3.42	1.95	SB04
SB05	2.19	3.29	2.98	2.48	0.63	0.89	0.86	0.96	2.63	3.83	2.79	2.09	SB05
SB06	2.35	3.02	2.23	2.32	0.78	0.91	0.70	1.00	2.08	2.83	1.94	2.48	SB06
SB07	3.30	4.29	3.84	3.65	0.89	0.90	0.84	0.86	3.68	6.65	5.45	4.56	SB07
SB08	2.76	3.78	3.08	1.57	0.87	0.91	0.74	0.61	2.55	4.17	3.81	1.28	SB08
SB09	2.45	2.91	2.91	2.07	0.74	0.61	0.75	0.74	1.90	5.24	2.85	1.94	SB09
SB10	2.48	1.81	3.65	2.27	0.67	0.78	0.77	0.63	2.72	1.52	4.94	2.24	SB10
SB11	1.89	2.09	2.70	2.16	0.60	0.61	0.75	0.72	0.47	2.09	2.32	1.48	SB11
SB12	1.78	2.31	3.07	2.11	0.69	0.73	0.77	0.70	1.17	1.83	3.46	1.84	SB12
SB13	1.24	2.92	2.38	2.42	0.44	0.84	0.67	0.81	1.50	3.14	2.48	2.23	SB13
SB14	1.88	2.94	3.83	2.09	0.54	0.67	0.78	0.81	2.29	3.91	6.01	1.76	SB14
SB15	1.01	2.78	3.39	1.89	0.30	0.84	0.95	0.63	1.78	2.87	3.81	2.10	SB15
SB16	2.41	2.72	3.73	1.97	0.65	0.70	0.87	0.70	2.82	2.62	4.31	1.42	SB16
SB17	2.34	3.85	3.08	0.92	0.57	0.91	0.81	0.92	3.68	4.68	3.29	0.91	SB17
SB18	1.27	3.86	3.90	3.83	0.38	0.81	0.86	0.92	2.22	5.35	4.83	4.74	SB18

Table 34. Mean abundance and total number of species collected in the Sewee Bay grab samples from August 1977 to August 1978. Mean values indicate number/0.05m^2. First Quarter = samples collected before dredging; Second Quarter = samples collected immediately after dredging; Third Quarter = samples collected 3 months after dredging; Fourth Quarter = samples collected 6 months after dredging and 1 year after first quarter samples.

	FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Station	$\bar{x}$ Abundance	No. Species	$\bar{x}$ Abundance	No. Species	$\bar{x}$ Abundance	No. Species	$\bar{x}$ Abundance	No. Species
SB01	22.0	9	10.7	7	25.7	27	10.0	7
SB02	13.3	7	10.0	9	30.0	3	5.3	9
SB03	9.3	3	9.0	15	27.3	23	8.0	13
SB04	10.3	12	12.0	13	15.0	14	20.3	9
SB05	15.0	11	7.7	13	12.0	11	3.7	6
SB06	9.7	8	8.0	10	20.7	9	1.7	5
SB07	17.3	13	16.7	27	22.7	24	17.3	19
SB08	7.7	9	19.7	18	29.0	18	16.3	6
SB09	38.0	10	47.7	27	45.7	15	7.3	7
SB10	27.3	13	4.7	5	64.3	29	45.7	12
SB11	53.7	9	39.3	11	37.7	12	38.3	8
SB12	23.7	6	26.7	9	25.3	16	15.0	8
SB13	18.0	7	8.0	11	28.0	12	7.7	8
SB14	26.3	11	55.3	21	41.3	30	5.7	6
SB15	52.0	10	7.7	10	6.0	12	9.3	8
SB16	23.3	13	69.7	15	27.3	20	22.7	7
SB17	25.7	17	15.7	19	17.3	14	1.0	2
SB18	19.3	10	51.7	28	31.7	23	12.0	18

Table 35. Wet-weight biomass of Sewee Bay grab samples from August 1977 to August 1978. Values represent mean and standard deviation of biomass for all species collected/0.05m^2. First Quarter = samples collected before dredging; Second Quarter = samples collected immediately after dredging; Third Quarter = samples collected 3 months after dredging; Fourth Quarter = samples collected 6 months after dredging and 1 year after first quarter samples.

	FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Station	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
SB01	0.26	0.17	0.16	0.15	0.86	0.94	0.09	0.06
SB02	0.06	0.02	0.13	0.64	0.72	0.53	0.06	0.08
SB03	0.06	0.08	0.13	0.09	0.16	0.11	0.41	0.16
SB04	0.50	0.55	0.34	0.45	0.22	0.11	0.10	0.03
SB05	0.81	0.56	1.46	2.29	0.11	0.08	0.27	0.39
SB06	0.40	0.55	1.37	1.55	0.18	0.02	0.07	0.11
SB07	0.14	0.13	2.24	3.78	1.78	2.74	0.56	0.31
SB08	0.12	0.14	0.20	0.07	0.16	0.05	0.22	0.16
SB09	0.40	0.35	0.30	0.28	0.19	0.03	0.07	0.06
SB10	0.25	0.22	0.04	0.02	0.33	0.08	1.41	0.91
SB11	0.29	0.72	1.53	2.32	0.70	0.67	0.38	0.21
SB12	0.47	0.23	0.23	0.09	0.98	1.48	0.14	0.09
SB13	5.25	8.82	0.07	0.06	0.20	0.04	0.09	0.11
SB14	2.89	4.96	0.49	0.35	0.27	0.26	0.32	0.55
SB15	7.02	11.59	0.26	0.27	0.09	0.12	0.49	0.16
SB16	0.25	0.29	0.60	0.67	0.34	0.17	1.67	2.17
SB17	2.34	2.63	2.38	3.99	0.35	0.28	0.05	0.04
SB18	0.08	0.06	0.28	0.13	0.74	0.10	0.54	0.50