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**Evaluation of the Condition of Prince William Sound
Shorelines Following the Exxon Valdez Oil Spill and
Subsequent Shoreline Treatment:**

Volume III Appendices to 1991 Biological Monitoring Survey

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**Evaluation of the 1991 Condition of Prince William Sound
Shorelines Following the Exxon Valdez Oil Spill and
Subsequent Shoreline Treatment**

Volume III 1991 Biological Monitoring Survey Appendices

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LIST OF APPENDICES

<u>Appendix</u>	<u>Table/Figure</u>	<u>Title</u>
A	Physical Characteristics	
	A-1	<i>Exxon Valdez</i> shoreline monitoring program site treatment history summary.
	A-2	Sampling completed by location, site, station, habitat type, and tidal height—1990-91.
	A-3	Coordinates of sampling stations in Prince William Sound, 1991.
	A-4	Water temperature (°C) and salinity (‰) at sampling locations in Prince William Sound, 1991.
A-5	Grain size analysis raw data by station, low mixed-soft July 1991.	
B	Sediment Hydrocarbon Data	
	B-1	Scaled display for average concentrations of PAH compounds in sediments by location, 1991.
B-2	Scaled display for average concentrations of targeted PAH compounds in <i>Mytilus</i> tissues at selected locations, 1991.	
C	Epibiota Data	
	C-1	Individual station data for epibiota, May 1991.
	C-2	Individual station data for epibiota, July 1991.
C-3-1	Non-metric multidimensional scaling scores for epibiota from rocky mid intertidal sites, July 1990 and July 1991.	

<u>Appendix</u>	<u>Table/Figure</u>	<u>Title</u>
C	C-3-2	Non-metric multidimensional scaling scores for epibiota from rocky mid intertidal sites, July 1990 and July 1991 (less Outside Bay and Northwest Bay rocky islet 1990 outliers).
	C-4	Individual station data for epibiota boulder/cobble, July 1991.
	C-5	Individual station data for epibiota mixed-soft, July 1991.
D	Infauna Data	
	D-1	Infauna data, middle elevation stations, July 1990.
	D-2	Infauna data, lower elevation stations, July 1991.
	D-3	Eigenvectors, percent variance, and correlation values for PCA components, selected infauna stations, July 1990 and July 1991.
	D-4	Eigenvectors, percent variance, and correlation values for PCA components, all infauna stations, July 1990 and July 1991.
	D-5	Eigenvectors, percent variance, and correlation values for PCA components for PAHs of all infauna stations, July 1990 and July 1991.
E	Mollusk Studies Data	
	E-1.1	<i>Mytilus edulis</i> size data, May-September 1991.
	E-1.2	<i>Mytilus edulis</i> length-frequency histograms from collection locations, 1991.
	E-1.3	<i>Mytilus edulis</i> length vs. soft tissue dry weight by category and at locations, 1991.

<u>Appendix</u>	<u>Table/Figure</u>	<u>Title</u>
E	E-2.1	<i>Protothaca staminea</i> age and growth from all locations, July 1991.
	E-2.2	<i>Protothaca staminea</i> growth by year, class, and category.
	E-3.1	<i>Littorina</i> size data, May-September 1991.
	E-3.2	<i>Littorina</i> length-frequency histograms from collection locations, 1991.
	E-4.1	<i>Nucella lamellosa</i> growth-frequency distributions.
F	Northwest Bay West Arm Rocky Special Study Site	
	F-1A	Northwest Bay West Arm, rocky site; Category 3 station on left, reference station on right (July 10, 1990).
	F-1B	Northwest Bay West Arm, rocky site; Category 3 station on left, reference station on right (July 11, 1991).
	F-1	Northwest Bay, West Arm, rocky site, middle intertidal epibiota, July 1991.
	F-2	Abundances of dominant epibiota at adjacent middle rocky unknown category and Category 3 stations sampled at Northwest Bay West Arm, July 1991.
	F-3	Quadrat photographs from Northwest Bay, West Arm rocky stations.

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Appendix A-Treatment History Data

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APPENDIX A-1

SUMMARY OF SITE TREATMENT HISTORY

It is clear that defining the nature of treatment at sites for this study represents a consideration of fundamental importance for this program. In recognition of this fact, a significant effort was made to obtain the most complete information on treatment activities at each study site.

As a first step in the process, locations of sites within defined shoreline segments were identified on maps used in 1989 and in the Spring Shoreline Assessment Team (SSAT) and Alaska Shoreline Assessment Program (ASAP) surveys of 1990. Although this was conceptually a straightforward goal, in practice it was somewhat more difficult and involved reviewing photo and video documentation to accurately place a site within a designated segment or subdivision.

Once site locations were verified, treatment records were solicited from the U.S. Coast Guard (USCG) archives in Anchorage, Exxon USA, the Alaska Department of Environmental Conservation (ADEC), and the National Oceanic and Atmospheric Administration (NOAA) computer-based records. The work orders, segment treatment summaries, and other materials subsequently received helped to provide a general framework of potential treatments, and in some cases, more specific information relevant to individual sites.

In late 1990, the ADEC Oil Spill Response Center was requested to provide to the NOAA shoreline monitoring program, the highest resolution and most detailed information on cleanup activities that occurred at study sites. ADEC daily shoreline activity reports and Federal On-Scene Coordinator (FOSC) work orders were reviewed daily to provide assessments of treatments undertaken at the sites in 1989 and 1990. In 1989, shoreline segments were not well defined (i.e., into subdivisions) and records were not as detailed as in 1990. As a consequence, it was sometimes not possible to pinpoint the precise nature of treatment activities that took place *at a specific beach* within a segment. However, activities occurring in the segment as a whole could be listed, and those activities are referenced below as "potential" treatment methods for a site. In some cases, study sites were distinctive enough that 1989 treatment at a given beach could be specified, but this was the exception rather than the norm. In 1990 and 1991, treatment was based on site-specific recommendations that were well documented in Technical Advisory Group (TAG) documents and elsewhere; therefore, it was more likely that activities at specific beaches could be listed with some degree of confidence.

The referencing of two efforts by ADEC may prove confusing in the summaries that follow. The first effort (November 23, 1990) was a more generic and less site-specific examination of State records. The subsequent reference (January 7, 1991) became available after a meeting in late December 1990 between

NOAA and ADEC personnel, during which maps and other information were provided. ADEC agreed to concentrate search efforts on specific site locations within established segments.

In February 1992, NOAA was permitted access to archived State information on shoreline assessment and treatment, following review by the Alaska Attorney General's office. Field notes recorded by ADEC personnel in 1989 during the initial response and cleanup effort were thought to hold the greatest potential for site-specific treatment information; time constraints did not permit a thorough perusal of all archived materials, which included photographic and videotape documentation as well as original field notes made by ADEC monitoring personnel. Although no significant new insights resulted from the initial examination of these field observations, information at this level was consistent with conclusions derived from other sources. That is, the observations of cleanup monitors at specific sites did not contradict assignments of treatment categories made for this study.

More anecdotal information was also solicited from field personnel affiliated with the State of Alaska, the USCG, and contractors who may have visited and worked the sites in question. This elicited site-specific recollections of some importance for locations such as Crafton Island and Mussel Beach.

During 1989, there was extensive photographic documentation of activities in Prince William Sound (PWS) by NOAA field assessment personnel and others. A review of archived photographs has elicited extremely important information relative to determining treatment activities at specific sites. Although this review is ongoing, to date, information on the oiling and treatment histories for Block Island and Northwest Bay West Arm has been discovered.

Field notes of members of the shoreline monitoring field team were also used as a source of information for treatment activities that may have taken place during 1990 and 1991. In some cases, specifics of treatment at certain sites (e.g., Bay of Isles) would have been unavailable without this source.

However, for the purposes of reporting and analyzing in this study, *it is the 1989 treatment information that is of greatest importance, as it was during this period that both oiling and treatment impacts could have been expected to have been most profound.*

As available, a summary of this information is provided below and organized by site. Following each statement of activities that potentially occurred or were known to have occurred is an operational, or working, definition of treatment at the site. This is an assessment of treatment taking place at a site within a given segment *in 1989*. This operational definition is the basis for treatment groupings that will be used for subsequent analysis of research results. Exceptional circumstances or classifications for specific tidal elevations or samples within a site are discussed, with supporting evidence presented.

Bainbridge Bight (BS-505)

Bainbridge Bight is a relatively new site for this program, having been sampled for the first time in 1991. It is located in a small indentation at the northwest end of Bainbridge Passage. It is considered to be an unoiled, untreated site in this study. The shoreline sampled was part of a very broad, low-angle tidal flat. One lower intertidal station was established here in cobble/pebble/granule/sand substrate.

No agency oiling and treatment records are available for this segment/site.

Operational assessment of treatments: No treatment.

Category: 1

Bass Harbor (NA-27A)

Bass Harbor is considered to be an unoiled, untreated site in this study. There were two substrate types sampled at Bass Harbor: middle and lower intertidal elevations were sampled on boulder-cobble substrate; and, an upper intertidal station was located on rocky substrate.

Available information confirmed the designation of the site:

The Shoreline Oil Evaluation form, dated August 16, 1989, documented no oil.

The Shoreline Cleanup Program Record for the segment, dated August 23, 1989, recommended no cleanup at that time due to absence of oil.

No treatment was documented by ADEC (Bauer, 1990) for 1989 at the specified segment.

No treatment for 1989 was documented by Exxon (Coulter, 1990) for the segment.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) concurred that no treatment occurred along the entire segment in 1989 and 1990.

Operational assessment of treatments: No treatment.

Category: 1

Bay of Isles (KN-07A)

The Bay of Isles site, located in the West Arm of the bay, is designated as oiled/untreated for the study. The sample site is located near, but not within, a defined "set-aside" site; it is 200 meters (m) west of the set-aside site where a NOAA geomorphological site is located. Two substrate types were sampled: a middle intertidal elevation station was defined on a bedrock outcrop; and upper and lower intertidal stations were established in mixed cobble/pebble/granule substrate.

The Shoreline Oil Evaluation form, dated May 8, 1989 (Stoker, 1989), documented that the segment was heavily to moderately oiled in the splash zone to middle intertidal elevation, with 50 percent of the segment continuously oiled and 50 percent sporadically oiled. Pooled and free oil constituted 45 percent of the total. Comments by the observer on this form included, "Heavy oiling, pooled oil, mousse at or near point in band \pm 10 m wide, 50 m long...recommend cleanup at this area only, using hot water under pressure, with flooding." The point referred to in the commentary was on the north side of the entrance to the lagoon, west of the designated study site.

The Shoreline Cleanup Program record, dated May 16, 1989, recommended the following cleanup activities: warm water under pressure with cold water flushing and skimmers; cleanup to follow tide level.

The Segment Inspection Record, dated July 27, 1989, documented that hot water wash and non-mechanical methods (snare wipe) were completed on the segment. The USCG monitor noted that "eastern portion of segment which had medium oiling also had some subsurface oil." ADEC comments included "ADEC rep Lewis Sharman (Envir FO2 - Valdez) made following statement 'Substantial mobil oil remaining in E1/2 of segment, especially in the 'neck' area. In W1/2 mousse patches $0.1\text{m}^2 > 1.0\text{m}^2$ in gravel/cobble..."

The Ecological Evaluation Form, dated May 8, 1989 (Stoker, 1989), documented the presence of a number of intertidal organisms and under "cleanup precautions" noted "Vigorous cleanup recommended only for vicinity of point where mousse and pooled oil present."

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hot-water moderate pressure wash
2. Hot-water, high-pressure wash
3. Hand wiping

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment KN-07 are:

1. Hot water wash

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) showed no treatment history for 1989. In 1990, Inipol and Customblen were applied on June 21, 1990. According to the ADEC records, the area was not raked at this application. On August 28, 1990, and August 29, 1990, manual removal of material occurred as part of ASAP follow-up work.

A NOAA contractor (Michel, 1991) concurred that it was likely that very little treatment occurred at the site in 1989. Some manual removal may have been done; but manual removal did occur in 1990.

The focus of many of the early observations along this segment is the entrance to the the lagoon at the head of the arm, which is west of the study site for this program. Although hot water washing was recommended and used on

the segment as a whole, the available documentation and recollections of field personnel suggest that the specific study site was not treated in this way.

On September 5, 1990, the shoreline monitoring field assessment team found that the upper and supratidal zone immediately above the monitored site was tilled and treated with Customblen. Photo documentation exists. Study transects, however, did not appear to be directly impacted.

Operational assessment of treatments: No treatment.

Category: 2

Block Island (EL-11A)

The Block Island site encompasses a broad raised tidal flat bordered by large bedrock outcrops. The profile is long and flat, extending nearly 100 m on low spring tides. According to Michel and Hayes (1991), this is one of the few wide tidal flats in PWS. Four stations have been established at this site: at upper and middle elevations on the major bedrock outcrop and upper and lower elevations on the pebble/granule/sand tidal flat. All stations, with the exception of that located at the lower tidal flat, are considered to be oiled and treated with high-pressure hot water.

The Shoreline Oil Evaluation form dated April 15, 1989 (Sergy, 1989), documented a continuous 15-m band of oiling over the splash, upper, and middle intertidal zones. Both pooled and free oil were noted as being present, at thicknesses < 0.5 centimeters (cm). Penetration into the substrate was estimated at 8 cm.

Two Shoreline Cleanup Program forms are in the archived records. The first, dated April 15, 1989, recommended the use of Vikovak as a test; flood-wash; steam cleaning; and medium-/high-pressure washing. The following was included under "Ecological Constraints:" "None except do not dislodge rockweed holdfasts or mussels." A subsequent form, dated April 21, 1989, recommended the following cleanup activities: Washing/flooding; warm water at moderate/high-pressure; low/high-pressure washing. The crews were again directed (under the "Ecological Constraints" section) to not dislodge rockweed holdfasts or mussels.

The Segment Inspection Record, dated July 18, 1989, documented that hot-water wash, warm-water wash, water deluge, mechanical, and non-mechanical methods were completed on the segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood
2. Warm-/hot-water, moderate-pressure wash
3. Hot-/steam-water, high pressure wash
4. Cold-water, high-pressure wash

5. Omni-boom
6. Maxi barge

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment EL-11 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) indicated hot- and cold-water wash, header-hose flood, steam wands, and Omni-boom as potential treatments between May 21, 1989, and July 19, 1989. According to the ADEC records, the site was located outside of 1990 designated work areas, although treatment did occur in the vicinity.

An important piece of treatment documentation found in a review of NOAA photo archives in December 1991, showed that the broad tidal flat at this site was in fact hydraulically treated by a large crew on July 17, 1989. In this aerial photo, a 15-person crew is seen washing oil off the beach. A large pool of oil can be seen contained within a boom, and a large sediment plume is visible in nearby waters offshore.

Operational assessment of treatments: Hot-water wash, cold-water wash, header hose flood, steam wands, Omni-boom.

Category: 3 (rocky upper and middle); 2 (pebble/granule/sand lower)

Crab Bay (EV-500A)

Crab Bay, located on Evans Island near the village of Chenega, has been considered an unoiled control site for the study. In November 1990, ADEC was concerned that in fact Crab Bay had been oiled in 1989. An ADEC representative recounted oil being blown into trees along the shoreline during storm events in 1989, a phenomenon not documented elsewhere and not reflected in subsequent on-site examinations or surveys. In order to justify the classification of Crab Bay as an unoiled control, this site was specifically discussed with ADEC in December 1990. Comments included: "On (September 28, 1989), light sheens were observed in Crab Bay...Shoreline oiling, if it occurred, would be expected to have been light." Survey information collected by ADEC in 1989 was forwarded to NOAA and the oiling map from the October 14, 1989, survey showed that both rocky and cobble/gravel study sites were in areas recorded as having no oil.

Treatments information from ADEC (Bauer, 1990) for 1989 at the specified segment was not available.

Treatments information for 1989 from Exxon (Coulter, 1990) for 1989 at the specified segment was not available.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) yielded no record of any treatment along the segment.

Operational assessment of treatments: No treatment.

Category: 1

Crafton Island (CR-05B)

This site is located in the central portion of the west side of Crafton Island in a small, circular indentation in the shoreline. Predominant sediment types are angular cobble and pebbles. Three stations (upper, middle, lower intertidal) have been established at this site. All are in the cobble/pebble/granule substrate. This site is considered to have been oiled but not treated with high-pressure hot water.

Michel and Hayes (1991) portrayed the degree of oiling at this site as moderate to heavy, and further noted that any oil coming ashore in this area would have been effectively trapped by the narrow entrance to the lagoon.

The Shoreline Oil Evaluation form, dated May 7, 1989 (Dugan, 1989), documented that the northern two-thirds of the west side of Crafton Island (approximately 1200-m long) was continuously oiled. An estimated 95 percent was heavily/moderately oiled in a 5- to 30-m band over the high (50 percent), middle (40 percent), and lower intertidal (5 percent).

The Ecological Evaluation for the segment, dated May 7, 1989, noted that "...most muscle (*sic*) beds & *fucus* at low-mid tide zone completely oil coated".

The Shoreline Cleanup Program record, dated May 17, 1989, recommended the following cleanup activities: Hot-water pressure wash and back flushing of granular zones. There were three high to medium priority considerations listed: the south beach, a popular camping area; the set net sites nearby; and the fact that the island is a low energy coast and cleanup by natural wave action would be limited. The form is stamped "BIOREMEDIATION". Hand-written directives note that the marsh was not to be treated, and that Alaska Department of Fish and Game (ADF&G) and Resource Advisory Team (RAT) were to be notified 48 hours prior to treatment near the marsh.

The Segment Inspection Record, dated August 24, 1989, documented that hot-water wash, warm-water wash, water deluge, and mechanical methods were completed on the segment. Another record from August 30, 1989 showed that the segment was bioremediated.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Header-hose flood
3. Cold-water, high-pressure wash

4. Warm-/hot-water, moderate-pressure wash
5. Hot-/steam-water, high-pressure wash
6. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment CR-05 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Mechanical
5. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) listed Maxi barges, Omni-boom, hot- and cold-water wash, and hand wiping as potential treatments between July 30, 1989, and August 21, 1989. On August 21, 1989, a field report noted that washing in the area was dislodging eelgrass. On May 28, 1990, one supersack of asphalt and tarball material was removed from the site. On June 6, 1990, and August 14, 1990, 37 pounds of Customblen were applied.

Although hot-water washing was performed along the segment containing this site, (Michel and Hayes, 1991) the USCG monitor responsible for 1989 cleanup work along the segment noted specifically that the beach in question was not washed with hot water out of concern for biological resources present. Only manual removal was authorized because of the perceived sensitivity of the site.

Operational assessment of treatments: Manual removal.

Category: 2

Eshamy Bay (EB-07A)

This site, located on the mainland due west of the northern end of Knight Island, is considered to be an unoiled control. The site itself is primarily a large bedrock outcrop with small pocket beaches of angular cobble. Three stations have been established at this site, on rocky substrate at upper, middle, and lower intertidal elevations.

The Shoreline Oil Evaluation form, dated May 27, 1989 (Gillie, 1989), showed that the degree of oiling was light to none, with less than 1 percent sporadically oiled, located in the upper intertidal. Under "comments": "—very small oiling, almost none" and "—rare, small tarballs".

The Shoreline Cleanup Program form for the segment, dated May 30, 1989, and the Ecological Evaluation form dated May 27, 1989 (Penn, 1989), recommended no cleanup, as no oil was visible.

The Segment Inspection Record for segment EB-7, dated August 4, 1989, documented the completion of treatment there. The only technique listed was non-mechanical (non-specific).

No treatment was documented by ADEC (Bauer, 1990) for 1989 at the specified segment.

No treatment for 1989 was documented by Exxon (Coulter, 1990) for the segment.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) concurred that no treatment occurred along the entire segment in 1989 or 1990.

Operational assessment of treatments: No treatment.

Category: 1

Herring Bay (KN-5000A)

The Herring Bay site is located along the central portion of the eastern shoreline of the bay. The site is comprised of three rather distinct substrate types, including angular boulder/cobble rubble, bedrock outcrop, and cobble/pebble. Four stations have been designated at this location: rocky upper and middle intertidal elevation; and cobble/pebble upper and lower elevation. The site is located within a designated set-aside site and was not treated in 1989.

Michel and Hayes (1991) defined the initial degree of oiling as moderate.

The Shoreline Oil Evaluation for KN-5000, dated June 3, 1989, documented the following oiling conditions: "In place fucus oiled on rocky vertical cliffs. Oiling varies from heavy at the entrance to the cove to light at the back of the cove. Oil accumulation is in the high and middle intertidal zones." The segment was documented as being 100 percent oiled, in a 4-m band. This was distributed as coat, with 80 percent in the high, 20 percent in the middle, and 100 percent fresh oil.

The Shoreline Cleanup Program form, dated June 6, 1989, recommended the use of high-pressure hot water (up to 140° F) to wash oil from vertical rocks. The form is also stamped "BIOREMEDIATION". However, clearly hand written at the bottom of the page is "Do not treat setaside sites. See attached map."

The segment inspection record, dated August 20, 1989, showed that warm-water wash was employed and completed along the segment. A later inspection record from August 31, 1989, documented the completion of bioremediation on the segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Warm-/hot-water, moderate-pressure wash
2. Hot-/steam-water, high-pressure wash
3. Maxi barge

4. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment KN-5000 are:

1. Warm-water wash
2. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) noted that both soft and rocky sites were not disturbed, due to their proximity to and/or inclusion in documented set-aside areas.

Operational assessment of treatments: No treatment.

Category: 2

Hogg Bay (BA-09A)

This site is located on the west side of Bainbridge Island. The area sampled is a bedrock outcrop. Three stations were established there at upper, middle, and lower intertidal elevations and have been regularly sampled in the program. No information was available on oiling or treatment at this site.

Operational assessment of treatments: No treatment.

Category: 1

Ingot Island (IN-24B)

The Ingot Island site is a boulder/cobble/pebble substrate beach located on the northwest side of Ingot Island. The portion of the site north of a small stream was used in a test of Coexit 7664 as a chemical beach cleaner in 1989. A middle intertidal elevation station was established in boulder cobble substrate within the Corexit test zone, and a lower intertidal station was located in cobble-pebble substrate bordering the stream bed and outside of the test area.

The Shoreline Oil Evaluation dated April 17, 1989 (Holbrook and Mattson, 1989), documented a continuous 1- to 30-m band of oiling in the splash, upper, and middle intertidal portions of the shoreline segment. Estimated oil thickness was listed as 0.25- to 0.5-cm on rock faces, with oil penetrating to a depth of 20 cm on gravel beaches. The character of the oil was described as both pooled and free oil. Holbrook commented further: "Also note that moose (*sic*) has washed onto the shore in a 1 meter band in many places. This moose is up to 10 cm deep. One of the sand beaches i.e. Fubar Cove has very very heavy oil with 30" of penetration."

On the Ecological Evaluation form dated April 17, 1989, the following comments were noted: "All biota within the oil zone is dead or dying, biota not covered by oil are alive but weak...Heavy oiling has occurred and additional oil is washing up all along this transect. Fubar Creek is totally destroyed and all life is dead." Under "cleanup precautions," Holbrook noted that *Fucus* holdfasts and mussel clumps were to be left intact.

The Shoreline Cleanup Program record, dated April 28, 1989, recommended the following treatment activities on the segment: flooding/low-pressure washing on gravel beaches; low/high-pressure washing on boulders and rock faces, with warm water recommended if oil was weathered and tightly adhered. Under "Ecological Constraints," it was noted that rockweed and mussels were not to be dislodged unless already dead, and streams and stream banks were to be avoided unless the RAT biologist authorized cleanup on a site-specific basis.

The Segment Inspection Record, dated August 23, 1989, showed that hot-water wash, warm-water wash, water deluge, mechanical, and non-mechanical (snare boom) were all used on this segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood
2. Warm-/hot-water, moderate-pressure wash
3. Hot-/steam-water, high-pressure wash
4. Maxi barge
5. Bioremediation
6. Corexit 7664 test

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment IN-24 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Mechanical
5. Snare boom

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) listed maxi barge as a potential 1989 treatment, on August 22, 1989. In 1990, the site was treated with both Inipol and Customblen (July 8, 1990, and September 8, 1990).

This site was the test area for an assessment of the effects of Corexit 7664 and washing in 1989. Adjacent portions of the intertidal were treated in one of two ways: soaking with a Corexit 7664 solution followed by an ambient temperature (8°C) flood and a warm (32°C) wash and a high-pressure rinse of ambient seawater; or, soaking with hot (60°C) followed by high-pressure washing at the same temperature. The test area schematic in Dames & Moore (1991) shows that the areas treated probably overlapped the middle cobble/gravel station areas for the present NOAA study, but not the lower elevation gravel station, which is somewhat laterally displaced along the beach.

It is possible that the lower station was subsequently treated with hot water outside of the Corexit test program.

Operational assessment of treatments: Corexit 7664, hot water/high pressure, warm water/moderate pressure, header-hose flood, mechanical, snare boom.

Category: 3

"Mussel Beach" (EL-13A)

The site called "Mussel Beach" was named by the principal investigators in 1989 and describes a spit connecting a small unnamed island in Upper Passage to Eleanor Island. Geomorphologists term this physical arrangement a tombolo, a depositional spit-like feature occurring in the lee of an offshore obstruction (Michel and Hayes, 1991). In this case, the obstruction is the small island. The unofficial name for this site derives from a large mussel bed that continuously covers the surface of the depositional material in the middle to upper intertidal elevations. Three stations have been established at this site: an upper intertidal elevation on rocky substrate along the eastern shore of the small island and middle and lower intertidal elevations on the depositional spit between the islands. Treatment classification is not consistent over the site as a whole, based on information made available to date. That is, the rocky portions of the segment were known to have been high-pressure, hot-water washed, as was most of the rest of the segment. However, the unique biological consideration represented by the extensive mussel bed mandated that treatment here be mediated. The middle and lower stations on the pebble/granule substrate are considered to be oiled and not treated with high pressure, hot water.

The Shoreline Oil Evaluation dated April 5, 1989, (Holbrook and Mattson, 1989), documented that oiling on the segment was continuous in a 3- to 10-m band from the supratidal zone to the middle intertidal zone. Pooled and free oil were noted at a thickness of 5+ cm, with estimated oil penetration 12 cm.

The Shoreline Cleanup Program record, dated April 21, 1989, recommended the following activities for the segment as a whole: washing/flooding; warm water at moderate/high-pressure; and low/high-pressure washing. However, under "Ecological Constraints," the following notation is made: "Leave fucus and mytilus in place. No high-pressure washing on spit—protect and preserve mytilus."

The Segment Inspection Record, dated July 4, 1989, documented that the following treatments had been completed on the segment: hot-water wash, warm-water wash, water deluge, and non-mechanical (wiping and snare booms). The ADEC representative commented that "Gross contamination removed. Monitor snares around mussel test site to see if any mobile oil exists." The USCG representative noted "No mobile oil. Exxon mussel test sight (*sic*) moderately oil (*sic*). Because of the large (unreadable) of mussels Exxon will tend oil snares in an effort to preserve mussel beds."

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood

2. Cold-water, high-pressure wash
3. Warm-/hot-water, moderate-pressure wash
4. Hot-/steam-water, high-pressure wash
5. Omni-boom
6. Maxi barge

Treatments 1989 listed by Exxon (Coulter, 1990) for segment EL-11 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) documented that on June 3, 1989, the site was scheduled to be treated with steam wands. The ADEC representative questioned the use of hot water on the extensive mussel beds present, but left the site before the wash began. According to ADEC records, there was no confirmation that the site was sprayed and if so, if hot water was used. Between June 14, 1989, and July 2, 1989, cold- and hot-water washing, steam wands, hand wiping, header-hose flooding, Omni-booms, beach crews, and maxi barges were listed as potential treatment methods at the site. It was noted that beach reiling from contaminated boom material washed across the green zone, although the green zone was protected by a snareline. On July 13 and 14, 1990, manual removal and Customblen application occurred at the site, a large sheen was lost before being boomed, and pooled oil was noted within 1 foot of the mussel bed. Customblen was applied on August 6, 1990, and August 29, 1990, with amounts listed as 0.5 and 4.5 pounds, respectively. ADEC records also documented raking and tilling on September 5, 1990, though of limited extent.

ADEC field notes from monitors observing the beach treatments confirmed that extensive mussel beds at this site were a source of concern to agency representatives. These notes included the following observations on June 3, 1989 (Munson, 1989): "Crew is not working, still setting up for hot water from the M/V *Brittany*. Dave Thompson informs us that they plan to use a water temp of 140° F to wash the mussel bed. As far as Ken and I know they shouldn't be treating the mussel bed at all." Another ADEC monitor (Smith, 1989) observed on the same day at 10:49 a.m., "Crews are in the process of setting up. They have backed in the Britney (*sic*) and are pulling the hot water hoses off...The site is on the ismas (*sic*) between Eleanor (*sic*) and a small island. A muscle (*sic*) bed is present. According to David Tompson (*sic*) (VECO) the plan is to wash the muscle (*sic*) bed with 120° F + water. With David Thompson was Tom O'Niel (*sic*) (Exxon)...According to my memory, the Exxon pre-assessment form says that the muscle bed in the area was not to be touched. Later today I will follow up to see what the report said. As that report is presently on the *Denali*, we cannot run back and get it now."

An ADEC representative (Munson, 1989) recalled that the work crew foreman, in recognition of the concerns expressed by the ADEC monitors concerning this mussel bed, agreed to moderate the water temperature used for washing to a sub-lethal level. However, the ADEC monitors were not present when washing actually occurred at the bed.

Anecdotal information from other personnel on-site during cleanup activities supports the idea that concern for the well-being of the mussel beds resulted in mediation of the washing techniques used. The reports held that the temperature of the water used for washing was lowered to 5° above ambient.

Operational assessment of treatments:

1. ***Rocky shoreline: Hot-water wash, cold-water wash, header-hose flood, steam wands, Omni-boom.***

Category: 3

2. ***Mussel beds: Header-hose flood, cold-/warm-water, moderate-pressure wash.***

Category: 2

Northeast Latouche Island (LA-15C)

This site, located on the northeastern shoreline of Latouche Island, is a boulder/cobble pocket beach, heavily oiled and subjected to a number of treatments between 1989-91. Two stations have been established here in rounded boulder/cobble substrate, at middle and lower intertidal elevations. The site is classified in this study as oiled/treated with high-pressure hot water.

The Shoreline Oil Evaluation, dated June 16, 1989 (MacDonald, 1989), documented heavy oiling primarily in the splash zone, upper, and middle intertidal portions of the segment. Greater than 75 percent of the segment was recorded as continuously oiled in a band less than or equal to 30 m wide. Pooled oil comprised >15 percent of the total and free oil >10 percent. Comments included "Exposed wave-cut platform w/rocky promontories & occasional cobble pocket beaches; v. heavily oiled, to depths of over 1 m. @ storm berms; mainly mousse w/pronounced tar coating; mousse pooling common; wave washing evident; bedrock often exposed & acting as oil trap in southern segment."

Field notes were included with the oil evaluation, and the monitoring site could be located from the hand-drawn map. His comments on the specific beach subsequently sampled for the present shoreline monitoring program were as follows: "cobble beach - heavily oiled m>UHWL self-cleaning through L -Mid tide zone thick "wet mousse" in storm berm v. high water table - flushes mid - lower beach; oily seaweed; storm berm logs oiled only on lower, seaward scarp of berm. Pooled mousse at SE end below rock bluff. Mousse coating rocks at underwater in stream; heavy concentration of oiled debris at stream exit through storm berm."

The Shoreline Cleanup Program form, dated June 17, 1989, recommended manual removal of contaminated drift material (*Fucus* and driftwood); flooding/flushing with warm to hot water (up to 140° F) on low-angle beaches; the use of moderate- to high-pressure washing on rock and oiled logs; "other methods as appropriate." "BIOREMEDIATION" is stamped across the bottom of the form.

The Site Inspection Record for LA-15, dated September 14, 1989, indicates that the segment was hot-water washed, warm-water washed, and water deluged. An Exxon representative noted under "comments" that "Segment was repeatedly washed. Request approval for bio application." Comments by monitors from ADEC and USCG suggested that the segment retained a considerable amount of oil after being washed: "Recommend more treatment. Gross contamination still exists;" "Treatment not completed, excessive heavy oil remains."

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Removal of oiled *Fucus*
3. Substrate removal
4. Debris pickup
5. Header-hose flood
6. Cold-water, high-pressure wash
7. Warm-/hot-water, high-pressure wash
8. Hot-/steam-water, high-pressure wash
9. Omni-boom
10. Maxi barge

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment LA-15 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Bioremediation

Site specific examination by ADEC in early 1991 (Bauer, 1991) indicated that between July 6, 1989, and August 23, 1989, maxi barge, Omni-boom, steam wands, header-hose flood, mopping, and hand wiping occurred along the segment. Field notes documented that washing did not occur on some days when the green zone was exposed. Green portions of the intertidal zone were protected with snare boom on some days, while on other days it was not protected. Oiled boom was sometimes left overnight. Between June 28 and September 9, 1990, manual removal, berm relocation, tilling, and agitation took place on the target beach. Removal occurred next to the stream bed, while relocation and tilling

occurred on the remainder of the beach. Scheduled mechanical work was apparently not completed. On September 11, 1990, 250 gallons of Inipol and 120 pounds of Customblen were applied. No Inipol was permitted near the stream.

The shoreline monitoring field assessment team flew over the site on July 6, 1990, and noted a large amount of activity, apparently associated with berm relocation (photo documentation available). The site was revisited on September 7, 1990, and at that time a cleanup crew was working the beach. Boom material was present on the upper and mid intertidal, and heavy equipment was relocating the berm.

On July 14, 1991, a NOAA monitoring team visited the site and found it being extensively worked by a bioremediation crew. The work was focused on the upper intertidal and supratidal and consisted of application of Customblen to exposed substrate and preparation for application of Inipol. A fair amount of oiled debris had been collected and was awaiting removal by helicopter.

Operational assessment of treatments: Hot-water wash, steam, header-hose flood, manual removal, berm relocation, manual tilling, bioremediation.

Category: 3

Northwest Bay Islet (EL-55A)

This site is located on the southern shoreline of a small island along the central shoreline of Northwest Bay on Eleanor Island. The substrate is primarily bedrock outcrop, although small pockets of cobble and gravel exist. Three stations have been established on the bedrock substrate at this site: upper, middle, and lower intertidal. This site is considered to have been thoroughly washed with high-pressure, hot water.

The Shoreline Oil Evaluation dated April 23, 1989, focused on the portion of EL-55 around Cabin Point, and not on the small island containing the monitoring site. Nevertheless, the degree of oiling documented is likely to be applicable since the island is separated from the remainder of the segment by only a small channel. The Oil Evaluation noted a 5- to 25-m band of continuous medium to heavy oiling across the upper and middle intertidal elevations along 100 percent of the segment. Estimated thickness of pooled oil was 1 cm, with oil penetration (illegible on the copy reviewed but thought to be) >25 cm. Unfortunately, many of the handwritten comments attached to the oil evaluation are also not legible. On the attached Ecological Evaluation, the only cleanup precautions noted were "Use minimum pressure needed to remove oil, if high pressure needed to remove oil do so."

The Shoreline Cleanup Program form, dated April 28, 1989, recommended the use of the following techniques: flooding and washing with moderate/high pressure and warm water if necessary to remove oil from sandy beach and adjacent rock reefs; "appropriate techniques to remove oil from pocket beaches...as well as adjacent rocks." It was specified under "Ecological

Constraints" to use "minimum effective pressure for washing in large, dense algae (fucus) patches".

The Segment Inspection Record, dated July 30, 1989, noted that hot water washing, water deluge, and hand wiping/snare booms were used and completed on site. Another record dated August 23, 1989, documented the completion of bioremediation.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Header-hose flood
3. Omni-boom
4. Cold-water, high-pressure wash
5. Warm-/hot-water, moderate-pressure wash
6. Hot-/steam-water, high-pressure wash
7. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment EL-55 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Bioremediation

Site specific examination by ADEC in early 1991 (Bauer, 1991) showed that hand wiping and steam wands were employed on May 23, 1989, on the island. On June 24, 1990, and July 31, 1990, both Inipol and Customblen were applied.

Confirmation of the designation of this site as having been washed with high pressure hot water was provided by a field monitor for the area. An ADEC representative spent much of the summer of 1989 in Northwest Bay monitoring cleanup activities for the State, and recalled (Montesano, personal communication, February 21, 1992) that the small island, and particularly the south central shoreline, was extensively washed by Omni barge (Omni # 11) and that a new, more efficient wash head had been installed on this unit just prior to deployment at the site.

Operational assessment of treatments: Hand wiping, snare booms, hot-water washing, steam wands, bioremediation.

Category: 3

Northwest Bay, West Arm "soft" (EL-52B)

This site is located at the head of the West Arm of Northwest Bay on Eleanor Island. It is a boulder/cobble/pebble/granule beach on the west side of a stream

that bisects the segment subdivision. Two stations have been established here in substrate that ranges in size from boulder to granule: middle and lower intertidal.

There were two independent Shoreline Oil Evaluations performed for this segment. One, dated April 22, 1989, (Dillon, 1989) documented a continuous band of oil across upper/middle/lower intertidal zones 3- to 10-m wide. Oil thickness was estimated as >0.5 cm, with a penetration of >1 cm. Under comments, it was noted "Light oiling on most of innermost cove area becoming moderate with larger size sediment/rocks along eastern stretch of segment."

The other Shoreline Oil Evaluation is somewhat illegible in the archived copy, but it is believed to have been filled out by Robilliard and dated April 22, 1989. Encouragingly, the general estimate of oil coverage agreed with that expressed in the other evaluation written the same date: a 20- to 30-m continuous band of oil over the upper/middle/lower intertidal, with 2 cm penetration into substrate. Although an Ecological Evaluation form was included with Robilliard's report, it too is largely illegible.

The Shoreline Cleanup Program record for segment EL-52, dated April 26, 1989, recommended the following: warm-/cold-water washing and flooding; warm water at moderate-/high-pressure; and low-/high-pressure washing. The "Ecological Constraints" section noted "Fucus in local, dense patches on rocks at medium/low tide. Use low pressure if practical and minimize walking on, or dragging hoses over large boulders. Avoid streams across beach."

The Segment Inspection Record, dated June 14, 1989, documented that warm-water wash, water deluge, and hand wiping took place on segment EL-52. A later record, from August 22, 1989, showed that bioremediation was completed on the segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood
2. Cold-water, high-pressure wash
3. Warm-/hot-water, moderate-pressure wash
4. Hot-/steam-water, high-pressure wash
5. Maxi barges
6. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment EL-52 are:

1. Warm-water wash
2. Water deluge
3. Hand wiping
4. Bioremediation

A treatment history summary for EL-52B produced by Exxon for media representatives detailed the following activities:

May 20-June 14, 1989, warm-water washing and deluge using LCVs, manual cleaning with absorbents;

August 21, 1989, Inipol;

May 22, 1990, manual pickup and tarmat removal;

June 28, 1990, Inipol and Customblen;

August 21, 1990, Customblen;

May 28, 1991, manual pickup, tilling, and raking.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) listed hot- and cold-water wash, flood, steam wands, and maxi barge as potential treatments between May 23, 1989, and June 20, 1989. Steam wands were used without flooder hoses on some days. Manual raking and manual removal took place on May 22, 1990, with debris and sediments removed. Both Customblen and Inipol were applied on June 28, August 21, and September 4, 1990. It was noted that no Inipol was sprayed near the anadromous stream.

Operational assessment of treatments: Hot-/cold-water wash, header-hose flood, steam, bioremediation.

Category: 3

Northwest Bay West Arm "rocky" (EL-54A)

This site is located along the western shoreline of the West Arm in Northwest Bay. It is a rocky site, largely steep bedrock. The area is of particular interest because it may be a site where adjacent sections of shoreline were treated differently. Specifically, it is believed that this half of this site was intrusively treated with high-pressure hot water, while the other half was not. Two stations have been established at this site: middle and lower intertidal elevations. As described, this site is considered to have been oiled, and both treated and not treated with high pressure hot water.

A Shoreline Cleanup Program record for segment EL-54, dated April 26, 1989, recommended the following: warm/cold water washing and flooding; warm water at moderate/high-pressure; low/high-pressure washing. Under "Ecological Constraints (from site survey)," there was a directive to use low pressure "as practical" on dense *Fucus* areas. "BIOREMEDIATION" was stamped across the form.

Another Shoreline Cleanup Program form, this one dated April 28, 1989, recommended a larger suite of cleanup activities: "Primary cleanup at three pocket beaches on north end of segment. Rest of vertical rocky face should be cleaned only if large amounts of oil are visible at low tide. High-pressure

washing on rocks may be used. Low-pressure washing on gravel/pebble beaches." Under "Ecological Constraints," there was a directive to "Use minimum effective pressure for washing in large dense algae (fucus)."

The Site Inspection Record, dated June 28, 1989, showed that hot-water wash, warm-water wash, and non-mechanical means (sorbents and snare booms) were used on Segment EL-54. Comments by the USCG representative were ""Found gross contamination in a 75-yard stripe. Moderate oil found between rocks, on side, and place where using a boom could not reach. Also found between 25-50 cubic yards of oiled fucus." A later record, dated July 27, 1989, documented that hot-water wash and mechanical (pom pom and snare boom) were employed as treatment on the segment.

A Shoreline Daily Summary (a standard form used by USCG monitors on work crews), dated July 12, 1989, documented that high-pressure, warm-water washing was performed over a 630-square yard section of the segment between 0830 and 1800. A total of 24 workers, using one maxi barge and two skimmers, were noted. The monitors estimated that three more days were necessary to complete the given phase of treatment.

An interview with an ADEC representative, who spent much of the summer of 1989 in Northwest Bay monitoring cleanup activities, elicited two observations about this particular site: first, oiling along the length of this segment was not necessarily constant; and, second, it was possible, given the nature of the work that was performed, that a section of shoreline could have been differentially treated (i.e., one with high pressure, hot water and an adjacent one not treated in this fashion).

Operational assessment of treatments: South side—hot-water, high-pressure wash; north side—unknown.

Category: 3 (south side); 2 (north side).

Outside Bay "soft" site 1 (NA-26B)

There are three discrete sites located in Outside Bay that have been sampled for this program. The first, designated "soft" site 1, is a small pocket beach along the southern shoreline of the bay. It is located just to the east of the outlet for a tidal lagoon. Three stations have been established at this site in cobble/pebble/granule substrate at upper, middle, and lower intertidal elevations. This site is considered to be unoiled and untreated.

The Shoreline Oil Evaluation for NA-26 dated August 15, 1989 (MacDonald , 1989), documented only trace amounts of oil on the entire 12 kilometers (km) of this lengthy segment. This was found sporadically over < 5 percent of the segment in the supra, splash, and upper intertidal zones. Under "comments," it was written, "Trace tar drips, splats and v. thin lines at mid high supra zone; discontinuous and often faint." The shoreline oiling map that accompanied the form indicated no oiling was observed at the specific site of interest.

The Ecological Evaluation that accompanied the Shoreline Oil Evaluation, noted "Minimum amount of oil present—i.e., only traces. This does not warrant disturbance/damage to healthy intertidal & subtidal plants & animals. Therefore no cleanup is recommended (Dearn, 1989)."

The Shoreline Cleanup Program record, dated August 22, 1989, recommended no cleanup due to discontinuous, light oil and high wave exposure. Part of the rationale for the no cleanup recommendation stemmed from the observation under Ecological Constraints, that "rich intertidal life may be adversely effected (*sic*) by cleaning activities..."

The Segment Inspection Record, dated September 10, 1989, showed that bioremediation (Inipol EAP 22) was used on the segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Bioremediation

No treatment for 1989 was documented by Exxon (Coulter, 1990) for the segment.

Examination of site-specific records by ADEC in early 1991 (John Bauer, personal communication, January 7, 1991) suggested that no treatment occurred along the entire segment in 1989 and 1990.

Operational assessment of treatments: No treatment

Category: 1

Outside Bay "soft" site 2 (NA-26A)

The second site located in Outside Bay is a boulder/cobble/pebble/granule/sand beach situated north of the first site, in the northeast corner of the bay. A small anadromous stream (pink salmon) drains out across the beach. No stations have been established for this program at this site; however, it has been a collection site as well as a transplant site for mussels.

Because this area is located in the same segment as the first site, the shoreline oiling and treatment discussions above apply to this site as well. The shoreline map accompanying the Shoreline Oil Evaluation indicated that no oil was observed at this particular section of the segment during the August 15, 1989, survey.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) suggested that no treatment occurred along the entire segment in 1989 and 1990.

Operational assessment of treatments: No treatment

Category: 1

Outside Bay "rocky" (NA-26B)

This site, also located within Outside Bay, is a rocky (bedrock) shoreline on the southwestern portion of the bay and is the closest point of land to the anchorage used by the *Exxon Valdez* in April and May of 1989. Three stations have been established at this site, all on bedrock or very large boulder substrate and at upper, middle, and lower intertidal elevations.

Remnants of dried tar observed by the NOAA shoreline monitoring team in July and September 1991, indicate that this site received some oiling in 1989.

The Shoreline Cleanup Program record, dated August 22, 1989, recommended no cleanup due to discontinuous, light oil, and high wave exposure. Part of the rationale for the no cleanup recommendation stemmed from the observation under "Ecological Constraints", that "rich intertidal life may be adversely effected (*sic*) by cleaning activities..."

The Segment Inspection Record, dated September 10, 1989, showed that bioremediation (Inipol EAP 22) was used on the segment.

Although Outside Bay is located within segment NA-26, in 1989 a Shoreline Oil Evaluation (MacDonald, 1989) for NA-27 noted: "Outside Bay has a sheltered cove at its head and a small lagoon. Barely a trace of oil as rare thin tar line @ HITZ, ≤ 5 cm wide."

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Bioremediation

No treatment was documented for 1989 by Exxon (Coulter, 1990) for the segment.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) listed only debris removal on July 8, 1990, as the only treatment for 1989 and 1990. It was noted that subdivision oiling indicated in the SSAT survey could not be located by cleanup crew.

Operational assessment of treatments: No treatment

Category: 1

Point Helen (KN-405A)

This site is located in a segment of some notoriety, KN-405. This section of the southeastern shoreline of Knight Island was not only heavily oiled, but also was of a substrate type (i.e., boulder/cobble) that permitted oil to penetrate deeply.

The Shoreline Oil Evaluation, dated June 19, 1989 (Gillie, 1989), documented both heavy (10- to 20-m band) and moderate (20- to 30-m band) continuous oiling in the upper and middle intertidal. Surface oil was described as a coat located 80 percent in the upper intertidal and 20 percent in the middle intertidal. Estimated

penetration of the oil into the substrate (pebble berms in upper high tide zone) was estimated as >30 cm.

The Ecological Evaluation that accompanied the Shoreline Oiling Evaluation explicitly noted no Ecological Constraints on cleanup.

The Shoreline Cleanup Program form, dated June 21, 1989, recommended the following cleanup activities: Manual removal of contaminated drift material (*Fucus*); flood/flush with warm to hot water (up to 140°F) in the middle to high intertidal zone; moderate- to high-pressure washing on boulders; other approved methods as appropriate. Hand written as an addition was the following phrase: "All areas, including study sites, should be treated, unless otherwise directed by SCOT." Under "Ecological Constraints" was the directive to "Work at mid tide and/or take appropriate measures to protect lower intertidal zone."

The Segment Inspection Record, dated September 4, 1989, documented the completion of the following shoreline treatment activities: hot-water wash, warm-water wash, water deluge, and mechanical (unspecified). A subsequent record, dated September 14, 1989, verified the completion of bioremediation on the segment. Yet another record, dated September 30, 1989, showed that hot-water wash, warm-water wash, water deluge, steamers, snare boom, and *sorbent* boom were used on the segment. An ADEC representative commented (Munson, 1989); "Very heavy surface and subsurface oiling at high-intertidal to a depth measured to >20 inches."

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood
2. Cold-water, high-pressure wash
3. Warm-/hot-water, moderate-pressure wash
4. Hot-/steam-water, high-pressure wash
5. Omni-boom
6. Maxi barge
7. Debris pickup
8. Removal of oiled *Fucus*
9. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment KN-405 are:

1. Hot-water wash
2. Warm-water wash
3. Water deluge
4. Mechanical
5. Bioremediation

Treatment history summary information provided by Exxon to media representatives in 1991 documented the following activities at Point Helen between 1989 and 1991:

- First two weeks, September 1989, hot-water wash;
- September 14-15, 1989, Inipol and Customblen;
- July 17-20, 1990, mechanical storm berm relocation;
- July 25, 1990, Customblen;
- August 12, 1990, Customblen;
- September 7, 1990, Customblen.

Site specific examination by ADEC in early 1991 (Bauer, 1991) indicated that between August 29, 1989, and September 14, 1989, Omni-boom, hot- and cold-water wash, steam wands, header-hose flood, and maxi barge were employed along the segment in an "all out, large scale, last minute insufficient effort." Although between July 17 and July 20, 1990, storm berm relocation, manual removal, hand wiping, and Customblen were listed as having been used on the segment. ADEC also noted that there was no record of treatment at the study site, and that it was likely that it was not disturbed. Customblen was potentially applied on July 25, 1990, and August 12, 1990.

In 1991, the upper intertidal and supratidal were worked extensively to expose oiled material to weathering processes (Michel and Hayes, 1992).

Operational assessment of treatments: Omni-boom, maxi barge, hot- and cold-water wash, header-hose flood, steam wands, bioremediation (Customblen)

Category: 3

Sheep Bay (no segment number assigned)

This site is outside of the area impacted by the spill. It was assigned no segment designation and was not oiled, treated, or surveyed. The substrate type at this location is primarily pebble/granule/sand, although angular bedrock outcrops and boulder/cobble material can be commonly found there as well. Three stations have been established in pebble/granule/sand substrate, at upper, middle, and lower intertidal elevations. These are all considered to be unoiled/untreated.

Operational assessment of treatments: No treatment

Category: 1

Shelter Bay (EV-21A)

This site is located on a relatively small pocket beach about midway down the eastern shoreline of Shelter Bay. The pocket beach is primarily

pebble/granule/sand, interspersed with occasional cobble and boulders. Three stations were established here, at upper, middle, and lower intertidal elevations. This beach is considered to have been oiled and treated with high pressure hot water.

The Shoreline Oil Evaluation for this segment dated June 13, 1989, (MacDonald, 1989) documented moderate oiling in the splash, upper, middle, and lower intertidal zones. Of the oiling total, 80 percent was observed to be continuous in a ≤ 15 -m band, and 20 percent was observed to be sporadic. The character of the oil was judged to be 10 percent pooled, >10 percent free, 50 percent coat in the middle intertidal, and the remaining 30 percent coat in the lower intertidal. Penetration was observed to be ≤ 5 cm, and it was noted under "comments": "Oil as thin gravel-binding 'sheets' - negligible penetration." A copy of field notes, including a sketch of the site, was included with the Shoreline Oil Evaluation.

The Ecological Evaluation that accompanied the Shoreline Oil Evaluation, noted sparse *Mytilus* on rocks, coated with oil, and most gaping. Predation of oiled barnacles by *Nucella* also was observed. Under "cleanup precautions," was the comment: "Avoid healthy ITZ on rocks at beach margin. No constraints on gravel/pebble beach."

The Shoreline Cleanup Program record for the segment, dated June 14, 1989, recommended that the following activities take place at the site (which constitutes most of the segment): manual removal of contaminated drift *Fucus* and free/pooled oil; flood/flush with hot water (up to 140° F) on low-angle beaches; moderate- to high-pressure washing on rock and oiled logs. It was noted explicitly that this is an Exxon/Dames & Moore test site. "Treat unless otherwise notified by Coast Guard. Clean at mid tide or take appropriate measures to protect lower intertidal zone."

The Segment Inspection Record, dated July 23, 1989, indicated that hot-water washing had taken place and was completed on site.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Header-hose flood
3. Cold-water, high-pressure wash
4. Hot-/steam-water, high-pressure wash
5. LCM with hot pack

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment EV-21 are:

1. Hot-water wash

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) indicated that between May 11 and May 14, 1989, raking and manual removal

occurred at the study site. At this time, surface tar mats were removed, and the remaining oiled sediments were raked. Between July 19 and July 22, 1989, mopping, header-hose flood, steam wands, cold-water wash, and hand wiping were used on the segment (although application at the specific beach site could not be verified, this is likely since the site constitutes nearly all of the segment). It was noted that asphalt pavement was forming at this time. The lower intertidal zone was protected. On June 8, 1990, the site was raked and then treated with both Inipol and Customblen (the ADEC representative recommended further manual preparation). On August 2, 1990, the beach was again raked and treated with Customblen. On September 2, 1990, another application of Inipol and Customblen was made.

The site was visited by the Shoreline Monitoring Field Assessment Team on July 13, 1990, and at that time, the area had recently been treated with Inipol, as one of the red Inipol wildlife balloons was present along the eastern shore of the site. When the site was revisited on September 7, 1990, it showed signs of substantial physical disturbance.

Operational assessment of treatments: Mopping, hand wiping, header-hose flood, steam wand, cold-water wash, hot-water wash, manual removal, manual raking and tilling

Category: 3

Sleepy Bay (LA-18A)

Sleepy Bay is a well-known site, located at the northeast end of Latouche Island. Its orientation and substrate type caused it to be one of the most heavily oiled and aggressively treated sites in PWS. The site monitored for this program is located just to the east of the anadromous stream in the segment. Three stations have been established at Sleepy Bay in cobble/pebble/granule substrate at upper, middle, and lower intertidal elevations. This site is considered to have been oiled and treated with high-pressure hot water.

The Shoreline Oil Evaluation, dated June 14, 1989 (Gillie, 1989), documented heavy oiling in a continuous band greater than 50 m wide across the splash/upper/middle/lower intertidal zones. Oil penetration was estimated at 30 cm. The character of the oil was judged to be 90 percent fresh and 10 percent mousse.

The Shoreline Cleanup Program form, dated June 17, 1989, recommended the following activities at Sleepy Bay LA-18: manual removal of *Fucus* and driftwood from the upper intertidal; relocation of contaminated sediments into unvegetated areas in the lower intertidal above the mean lower low (MLL) mark using a front-end loader, then flushing sediments with hot water; removing contaminated stream bank sediments from the top of banks by front-end loader or backhoe; removing contaminated sediments from the channel substrate, and replacing stream bank gravels with clean sediment. Ecological Constraints

detailed on the form were related to protection of the anadromous stream bisecting the segment.

The Segment Inspection Record, dated July 16, 1989, indicated that warm-water wash, water deluge, mechanical (back hoe), and other non-mechanical means were used. Although the Exxon representative C. F. Duggins, commented that the segment was "environmentally clean," the USCG and ADEC representatives noted "heavy subsurface contamination." A subsequent inspection record dated September 14, 1989, indicated that bioremediation activities had been completed on site.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Substrate removal
3. Debris pickup
4. Header-hose flood
5. Cold-water, high-pressure wash
6. Warm-/hot-water, moderate-pressure wash
7. Mechanical (backhoe)
8. Manual (rakes & shovels)
9. Bioremediation

No information on treatment at LA-18 was received from Exxon, due to a misunderstanding regarding desired information (treatments were provided for LA-16, not LA-18).

However, the shoreline treatment history provided by Exxon to media representatives in June 1991 indicated that the following treatments took place in 1989 and 1990:

June 23-July 8, 1989, warm-water washing, cold-water flood, manual pickup of oiled vegetation, mechanical relocation of oiled stream sediments;

September 14, 1989, Inipol;

June 12-July 16, 1990, manual removal of oiled sediments, mechanical tilling;

July 17, 1990, Inipol and Customblen;

August 25, 1990, Inipol and Customblen;

September 5, 1990, manual pickup of oiled sediments;

September 9, 1990, Inipol and Customblen.

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) indicated that between June 25 and July 9, 1989, relocation of oiled sediments

with two backhoe/loaders occurred at the site, in addition to hand wiping, mopping, steam wands, and cold-water wash. Brown oil and sheens were observed at demobilization. Other treatment methods employed at the site occurred between June 16 and July 16, 1989, and included manual removal following mechanical work to expose contaminated sediments, as well as tilling, raking, cosmetic reclamation, lower level manual removal away from the anadromous stream, and application of Customblen. Inipol and Customblen were applied on July 17, 1989. The application was made no closer than 100 m to the stream. Pooled oil was still present. On September 5, 1990, manual removal took place at the site as a part of ASAP follow-up work. On September 9, 1990, Customblen was applied, with the stream area receiving granular material.

The Shoreline Monitoring Field Assessment Team sampled the site on July 6, 1990. At that time a large amount of activity was centered on the beach. Heavy excavation by means of a track-mounted backhoe was taking place on the west side of the stream. The areas adjacent to the streambed had been tilled and treated with Customblen, which was still readily visible. A substantial number of cleanup personnel were bagging oiled boom material in the area just below the NOAA study site sign.

Operational assessment of treatments: Warm-water wash, header-hose flood, mechanical relocation of stream sediments, manual pickup of oiled vegetation, bioremediation

Category: 3

Smith Island (SM-06B)

The Smith Island site consists of a boulder/cobble beach along the northwest coast of Smith Island. The island was directly in the path of the spill in the early days of the incident and its north side was heavily impacted. Three stations were established on the rounded boulder/cobble beach defining the site for the program at upper, middle, and lower intertidal elevations. The site is considered to have been oiled and treated with high-pressure hot water.

A Cleanup Assessment Report form, dated April 14, 1989, contained brief ecological considerations (Hardin, 1989a): "None for cobble/boulder beaches. On vegetated rocks do not dislodge plants or animals."

The Shoreline Oil Evaluation, dated April 14, 1989, documented a continuous band of heavy oiling 10 to >20 m wide over the splash, upper, and middle intertidal zones. Estimated thickness of pooled oil was >3 cm, with penetration into the substrate >25 cm (Hardin, 1989b). Handwritten notes included: "pools are moussy. Extensive pools leaching into the water near western point on north side of island...Boulder areas will be very difficult to clean because of dangerous footing."

The Shoreline Cleanup Program record for the segment containing the Smith Island site, dated April 19, 1989, recommended the following activities: flood -

flush; warm and cold washing; and high-/low-pressure washing. The "Ecological Constraints" listed on this form were vague: "Avoid living ecological species. Avoid high-pressure washing where invertebrates/seaweed present."

The Site Inspection Record, dated August 31, 1989, documented that hot-water wash, warm-water wash, water deluge, pom poms, and snare booms in isolated areas were used on the segment.

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Header-hose flood
2. Cold-water, high-pressure wash
3. Warm-/hot-water, moderate-pressure wash
4. Hot-/steam-water, high-pressure wash
5. Omni-boom
6. Maxi barges
7. LCM with hot pack
8. Corexit
9. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment SM-06 are:

1. Hot-water wash
2. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) determined that between August 10 and September 11, 1989, Omni-boom and cold- and hot-water washes were used on the subdivision. It was also noted that Corexit was used on the segment and that a large amount of oil was recovered. On July 18 and 19, 1990, manual vegetation removal occurred, along with manual tilling, storm berm relocation, and application of Customblen. Three supersacks of oiled vegetation were removed. On September 5, 1990, both Inipol and Customblen were applied at the site.

The geomorphological studies report released to NOAA in late 1990 contains a discussion on the extensive berm relocation that occurred at the site (Jacqui Michel, personal communication, January 9, 1991).

Operational assessment of treatments: Hot-/cold-water wash, manual removal, storm berm relocation, manual tilling, bioremediation (Inipol and Customblen)

Category: 3

Snug Harbor, "soft" (KN-401B)

The Snug Harbor "soft" substrate (i.e., cobble/granule/sand) site for the study is located along the northwest shoreline of the embayment. It falls just between two designated set-aside areas. Three stations were located there, at upper, middle, and lower intertidal elevations. The site is considered to be oiled/untreated.

The Shoreline Oil Evaluation Form, dated June 11, 1989, documented continuous oiling from the splash zone down to the lower intertidal zone, over 95 percent of the segment length of 1400 m. A map accompanying the form, although poorly reproduced, noted that the area near the study site was a "low angle gravel/cobble cove. Heavy oiling 8 m band" (rest of commentary not reproduced).

The Ecological Evaluation form, dated June 11, 1989, noted the presence of mussels: "Patchy on boulders - extensive intercobble/gravel moderate mussel beds." Also documented were continuous dense groupings of *Littorina* snails. Under "Cleanup Precautions," it was recommended that cleanup crews "Use precautions to avoid oiling uncontaminated eelgrass beds."

The Shoreline Cleanup Program record, dated June 13, 1989, recommended a number of treatment activities, including: manual removal of contaminated drift material; flood/flush with warm to hot water (up to 140° F) on low angle beaches; moderate- to high-pressure washing on rock; other approved methods as appropriate. Under "Ecological Constraints," crews were directed to "Take appropriate measures to protect uncontaminated eelgrass beds."

However, the Site Inspection Record, dated August 20, 1989, documented the use of only non-mechanical treatment ("wiping, pom poms, picking up oiled debris per RAT [Resource Advisory Team]").

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Pickup of oiled debris
3. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment KN-401 are:

1. Hot-water wash
2. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) determined that the site was not disturbed, due to its proximity to or inclusion in a posted set-aside area.

Notations made on SSAT map by TAG suggested that manual removal of pooled oil was intended in 1990. It is not clear if this actually occurred.

Operational assessment of treatments: No treatment

Category: 2

Snug Harbor, "rocky" (KN-401A)

The Snug Harbor "rocky" substrate (bedrock/boulder) site for the study is located along the northwest shoreline of the embayment, to the east of the cobble/pebble/granule/sand site. The rocky site in Snug Harbor is within a designated set-aside site. Three stations were located there at upper, middle, and lower intertidal elevations. The site is considered to be oiled/untreated.

The Shoreline Oil Evaluation Form, dated June 11, 1989, documented continuous oiling from the splash zone down to the lower intertidal zone, over 95 percent of the segment length of 1400 m. A map accompanying the form noted that the area near the study site consisted of "boulders/cobble/rock generally light to locally moderate oiling throughout the intertidal zone." Eelgrass beds were shown offshore.

The Ecological Evaluation form, dated June 11, 1989, noted under "Cleanup Precautions," that it was recommended that cleanup crews "Use precautions to avoid oiling uncontaminated eelgrass beds."

The Shoreline Cleanup Program record, dated June 13, 1989, recommended a number of treatment activities, including: manual removal of contaminated drift material; flood/flush with warm to hot water (up to 140° F) on low angle beaches; moderate- to high-pressure washing on rock; other approved methods as appropriate. Under "Ecological Constraints," crews were directed to "Take appropriate measures to protect uncontaminated eelgrass beds."

However, the Site Inspection Record, dated August 20, 1989, documented the use of only non-mechanical treatment ("wiping, pom poms, picking up oiled debris per RAT Team").

Treatments listed by ADEC (Bauer, 1990) for 1989 at the specified segment are:

1. Hand wiping
2. Pickup of oiled debris
3. Bioremediation

Treatments in 1989 listed by Exxon (Coulter, 1990) for segment KN-401 are:

1. Hot-water wash
2. Bioremediation

Examination of site-specific records by ADEC in early 1991 (Bauer, 1991) determined that the site was not disturbed, due to its inclusion in a posted set-aside area.

Video documentation by the shoreline monitoring field assessment team confirmed that the site was within the designated set-aside area.

Operational assessment of treatments: No treatment

Category: 2

Table A-2 (continued)

Location and site	Substrate	Station	Tidal Elev	Epiplota Quad	Infauna 1 mm	Infauna 0.5 mm	Infauna Excav	Litt Pop	Myt Pop	Nuc Pop	Litt Histo	Myt Histo	Nuc Histo	Litt Repr	Myt Repr	Nuc Repr	Litt Dye	Myt Dye	Nuc Tag	Proto	Litt	Myt	Sed Chem	Spec Chem	Sed Chem	Litt Chem	Myt Chem	Nuc Chem	Proto	Pycno	Grain Size	Water Qual			
																				Dye/Transpl	Seward Transpl	Seward Transpl							Chem	Chem			Chem	Chem	Chem
CATEGORY 3 - OILED, TREATED																																			
INGOT ISLAND																																			
Bould/Cob (IN-24)	Bedr/Bould	Mid	6.80	BD				BD	BD		D	D					D	D				D	D	BD			BD	BD							
Soft (IN-24)	Grav/Cob	Low	2.33	D	BD	D	BD																	BD					B	D	B	D	E		
POINT HELEN																																			
Bould/Cob (KN-405)	Bould/Cob	Up		AD																															
	Bould/Cob	Mid		D				ABD	D		D	D												ABD			AD	ABD							
	Bould/Cob	Low	-1.81	AD																			BD								AB			DE	
NORTHWEST BAY																																			
Rocky Islet (EL-55)	Bedrock	Up		ACD																							AD								
	Bedrock	Mid	3.48	ACD				ABD	ABD		D	D					D	D						ABD		ABD	ABD	B							
	Bedrock	Low	1.48	ACD				A																ABD							AB			DE	
W. Arm Rock (EL-54)																																			
	Bedrock	Mid		D																															
	Bedrock	Low																																	
W. Arm Soft (EL-52)																																			
	Grav/Cob	Mid	3.00	AD	BD	D	D	ABD	ABD															ABD		ABD	ABD							D	
	Grav/Sand	Low	0.47	ABD	ABCD	D	A																DE	ABCD					D	B			D		
SHELTER BAY																																			
Soft (EV-21)	Grav/Sand	Up		BD																															
	Grav/Sand	Mid		AD	ABD	D		D	D		D	D												ABD		ABD	ABD		D				D		
	Grav/Sand	Low	0.54	ABD	ABCD	D	AD	B																ABCD							B	D	D		
SLEEPY BAY																																			
Soft (LA-18)	Grav/Cob	Up	2.53	AD	AB																														
	Grav/Sand	Mid	0.73	AD	ABD	D		ABD	ABD		D	D												ABD			D	ABD					D		
	Grav/Sand	Low	-0.82	D	D	D	D																						D	B		D			
NE LATOUCHE																																			
Bould/Cob (LA-15)	Bould/Cob	Mid	3.20	AD				D	D		D	D												ABD		ABD	ABD							D	
	Bould/Cob	Low	0.83	BD																				B											
SMITH ISLAND																																			
Bould/Cob (SM-06)	Bould/Cob	Up	8.35	BD																															
	Bould/Cob	Mid	6.35	ABD				ABD	ABD	AB	D	D	D											ABD	D		ABD	ABD	ABD						
	Bould/Cob	Low	2.14	ABD																				ABD							AB			DE	

Table A-3. Global Positioning System (GPS) latitude and longitude coordinates of sampling stations in PWS, 1991

Station and Habitat	Station	Date	Latitude			Longitude			Location notes
			Deg	Min	Sec	Deg	Min	Sec	
CATEGORY 1 - UNOILED									
Bass Harbor - Cobble	Mid	7/7/91	60	39	11	147	23	07	
Bass Harbor - Rock	Up	9/6/91	60	39	01	147	23	13	
Outside Bay - Site 1 Soft	Mid	7/7/91	60	38	17	147	27	01	
Outside Bay - Site 1 Soft	Up	7/7/91	60	38	17	147	27	02	
Outside Bay - Site 2 Soft	Mid	9/6/91	60	39	01	147	28	20	Mytilus transplant site
Eshamy Bay - Rock	Up	7/16/91	60	28	08	147	59	52	
Eshamy Bay - Rock	Mid/Low	9/7/91	60	28	11	148	00	02	
Hogg Bay - Rock	Mid	9/8/91	60	04	42	148	11	53	On large outcrop
Sheep Bay - Soft	Up	7/7/91	60	41	06	145	56	11	On isthmus
Bainbridge Bight - Soft	Low	9/8/91	60	07	02	148	14	58	Btwn old and new transect
Crab Bay- Rock	Supra	7/13/91	60	03	41	147	59	32	On large outcrop
Crab Bay- Rock	Supra	9/9/91	60	03	39	147	59	40	On large outcrop
Crab Bay - Soft	Mid	7/12/91	60	04	19	147	59	47	
CATEGORY 2 - OILED, UNTREATED									
Herring Bay - Rock	Up	9/11/91	60	27	22	147	42	46	
Herring Bay - Soft	Mid	7/15/91	60	27	25	147	42	37	
Bay of Isles - Rock	Up	7/9/91	60	23	08	147	44	40	Set aside
Bay of Isles - Rock	Mid	7/9/91	60	23	05	147	44	51	On large outcrop
Bay of Isles - Rock	Mid	9/10/91	60	23	05	147	45	00	On large outcrop
Snug Harbor - Rock		7/12/91	60	15	48	147	45	34	75 m offshore
Snug Harbor - Rock	Mid	9/9/91	60	15	48	147	45	44	Transplant site
Snug Harbor - Soft	Mid	7/11/91	60	15	45	147	45	53	
Crafton Island - Soft	Mid	9/13/91	60	30	13	147	56	33	At head stake
Outside Bay - Rock	Mid/Up	7/7/91	60	38	19	147	27	42	
Outside Bay - Rock	Low	9/6/91	60	38	19	147	27	49	Nucella release site
CATEGORY 3 - OILED, TREATED									
Ingot Island - Cobble	Mid	9/10/91	60	31	39	147	39	35	
Ingot Island - Soft	Low	7/16/91	60	31	38	147	39	26	
Point Helen - Cobble	Mid	7/15/91	60	09	49	147	45	13	
Point Helen - Cobble	Mid	9/7/91	60	09	48	147	45	22	
Northwest Bay Islet - Rock	Mid	7/10/91	60	33	24	147	35	06	
Northwest Bay Islet - Rock	Mid	9/11/91	60	33	22	147	35	16	
Northwest Bay W. Arm - Soft	Mid	7/10/91	60	32	38	147	36	09	
Northwest Bay W. Arm - Soft	Low	9/12/91	60	32	37	147	36	13	
Shelter Bay - Soft	Mid	7/14/91	60	07	06	147	57	24	
Sleepy Bay - Soft	Mid	7/13/91	60	03	56	147	50	04	
NE Latouche - Cobble	Mid	7/14/91	60	03	44	147	49	04	
Smith Island - Cobble	Mid	9/12/91	60	31	40	147	23	05	
Mussel Beach S - Rock	Up	7/10/91	60	32	06	147	36	53	In mussel bed
Mussel Beach S - Rock	Up	9/11/91	60	32	05	147	37	01	In mussel bed
Block Island - Rock	Supra	7/9/91	60	31	48	147	36	26	
Block Island - Rock	Supra	9/11/91	60	31	44	147	36	36	

Table A-4. Water temperature (° C) and salinity (0/00) at sampling locations in PWS, 1991.

Station and Category	Substrate	Sampling Date	Temperature (° C)	Salinity (0/00)
CATEGORY 1 - UNOILED				
Bass Harbor	Bedrock	7/7/91	10.8	25.9
	Boulder/Cobble	9/5/91	12.0	13.2
Outside Bay Soft 1	Cobble/Gravel	7/7/91	10.9	28.5
		9/6/91	12.2	22.8
Eshamy Bay	Bedrock	9/7/91	13.0	18.0
Hogg Bay	Bedrock	4/30/91	4.8	28.0
		7/14/91	12.2	24.3
		9/8/91	13.0	23.0
Sheep Bay	Gravel/Sand	7/8/91	12.8	22.1
Bainbridge Bight	Gravel/Sand	5/1/91	4.9	30.0
		7/13/91	8.6	25.4
Crab Bay	Bedrock	7/12/91	11.0	25.7
		9/9/91	12.0	22.0
MEAN CATEGORY 1 STATIONS	N=2	MAY	4.85	29.00
	N=6	JULY	11.05	25.32
	N=5	SEPT	12.44	19.80
CATEGORY 2 - OILED, UNTREATED				
Herring Bay	Bedrock	7/15/91	12.8	23.0
Bay of Isles	Cobble/Gravel	7/9/91	13.0	23.0
Snug Harbor	Bedrock	7/11/91	12.5	25.1
		9/9/91	13.0	22.0
Mussel Beach	Gravel/Sand	7/10/91	12.2	25.1
Crafton Island	Cobble/Gravel	7/17/91	13.0	23.5
		9/13/91	11.0	14.0
Outside Bay Rock	Bedrock	5/3/91	5.0	29.5
		7/7/91	10.5	27.1
MEAN CATEGORY 2 STATIONS	N=1	MAY		
	N=6	JULY	12.33	24.47
	N=2	SEPT	12.00	18.00

Table A-4 (continued)

Station and Category	Habitat	Sampling Date	Temperature (° C)	Salinity (0/00)
CATEGORY 3 - OILED, TREATED				
Ingot Island	Boulder/Cobble	9/10/91	12.5	23.5
Point Helen	Boulder/Cobble	7/15/91	10.9	27.7
		9/7/91	13.8	24.0
Northwest Bay Islet	Bedrock	7/10/91	13.6	26.3
		9/12/91	13.0	23.0
Shelter Bay	Gravel/Sand	7/14/91	12.1	22.2
NE Latouche Cobble	Boulder/Cobble	7/14/91	12.0	25.0
Smith Island	Boulder/Cobble	7/15/91	14.9	26.2
		9/12/91	12.5	23.5
Mussel Beach	Bedrock	7/9/91	12.5	25.6
Block Island	Bedrock	5/1/91	4.8	31.0
		7/9/91	17.0	25.8
MEAN CATEGORY 3 STATIONS	N=1	MAY		
	N=7	JULY	13.29	25.54
	N=4	SEPT	12.95	23.50
MEAN ALL STATIONS	N=4	MAY	4.88	29.63
	N=19	JULY	12.28	25.13
	N=11	SEPT	12.55	20.82

Table A-5. Grain size analysis raw data by station, low mixed-soft, July 1991 (data presented as displacement volume for each size fraction).

CATEGORY/LOCATION	Size Fraction								
	12.5 mm	6.3 mm	2.0 mm	1.0 mm	500 u	250 u	125 u	63 u	silt/clay
Category 1									
Bainbridge Bight	187	200	187	41	33	31	55	39	87
Category 2									
Bay of Isles	235	80	113	67	81	44	17	10	43
Block Island	160	48	73	61	52	70	45	19	190
Crafton Island	188	150	250	175	175	163	175	105	238
Herring Bay	105	245	210	85	89	85	75	57	375
Ingot Island	350	77	80	8	8	6	9	7	16
Mussel Beach	330	109	152	47	18	12	5	3	19
Snug Harbor	558	89	62	19	18	15	22	20	57
Category 3									
NW Bay W. Arm	108	134	142	55	51	22	4	3.5	3.5
Shelter Bay	210	90	163	91	115	144	30	13	39
Sleepy Bay	162	48	104	86	58	19	19	6	11

Appendix B-Hydrocarbon Studies Data

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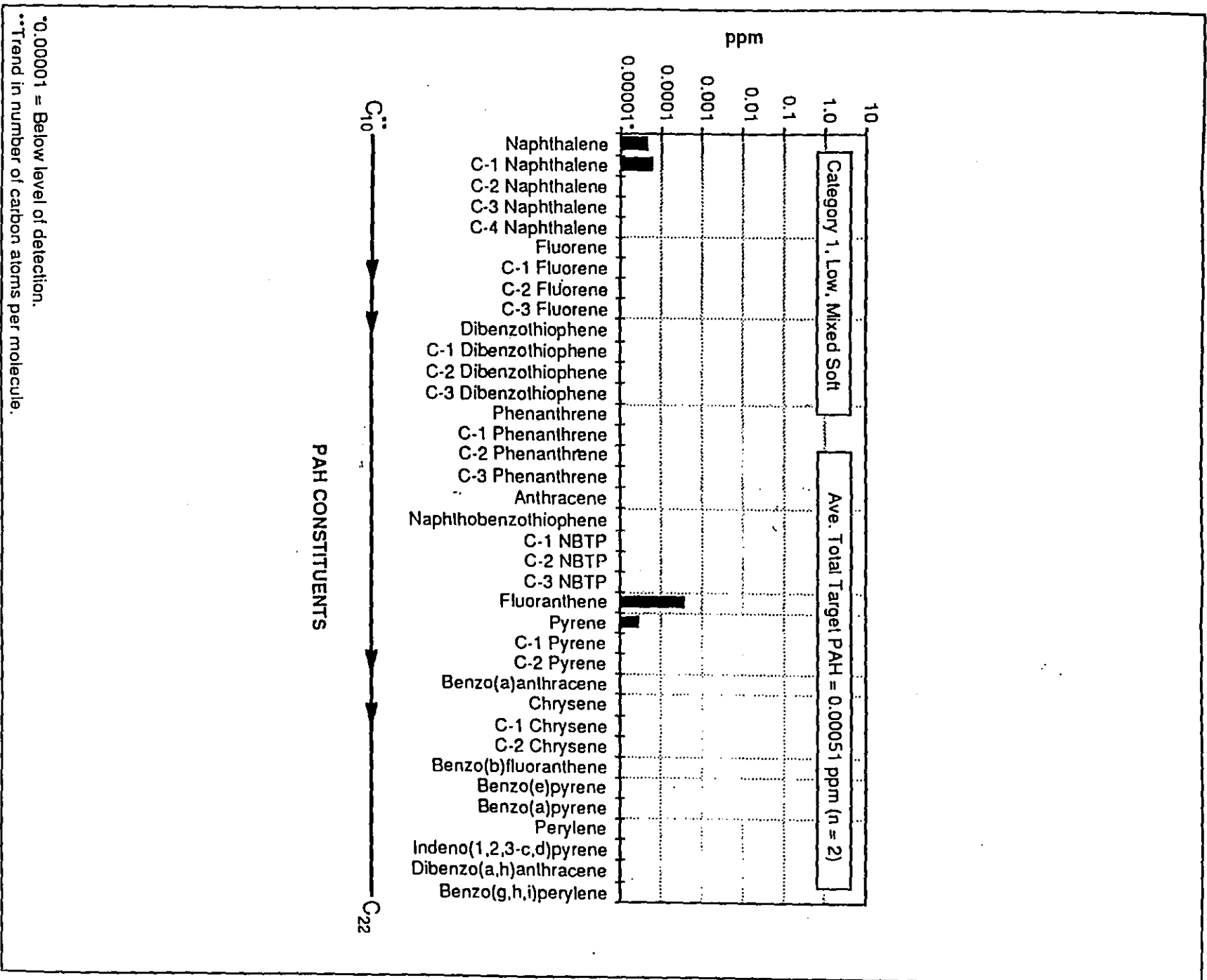
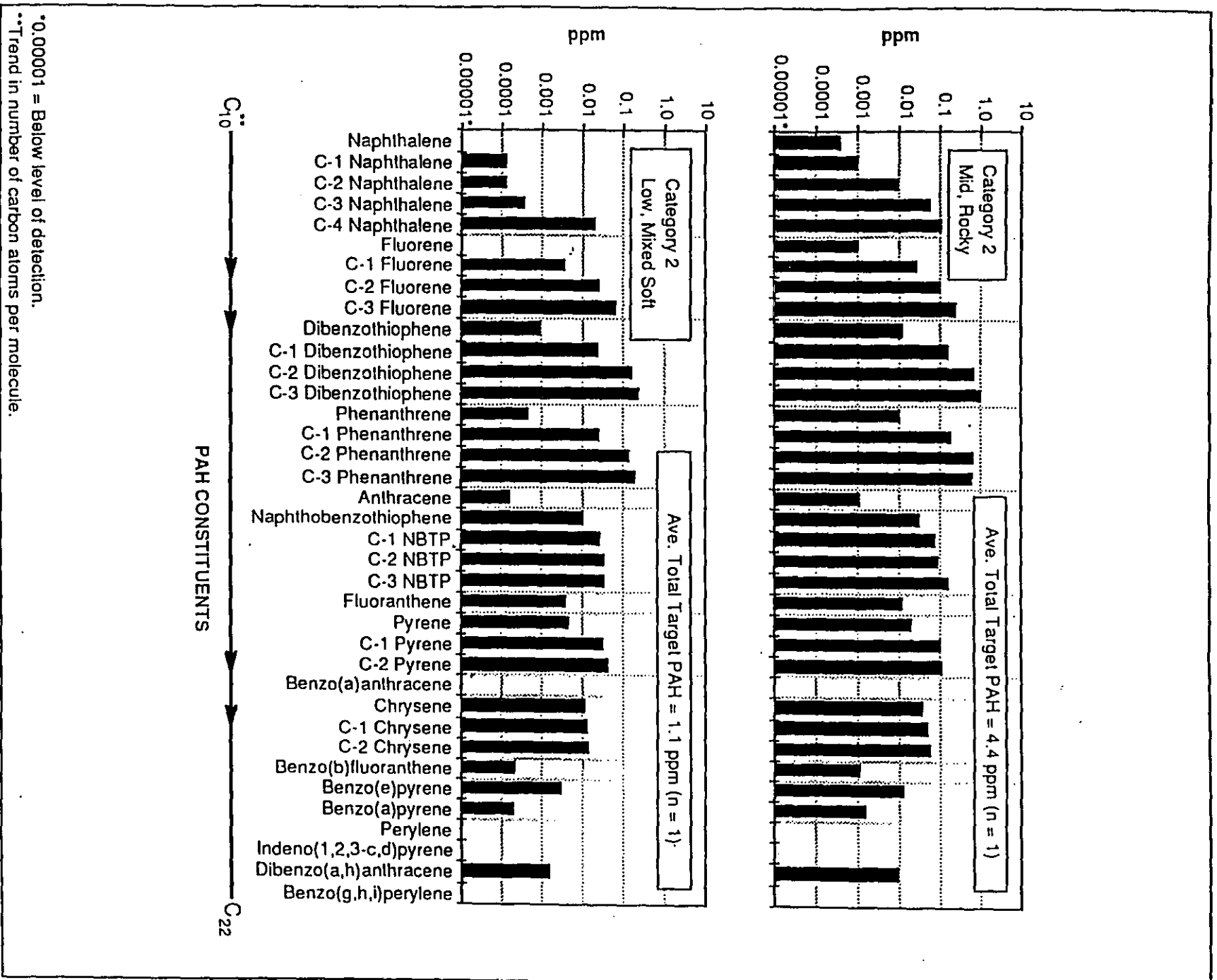


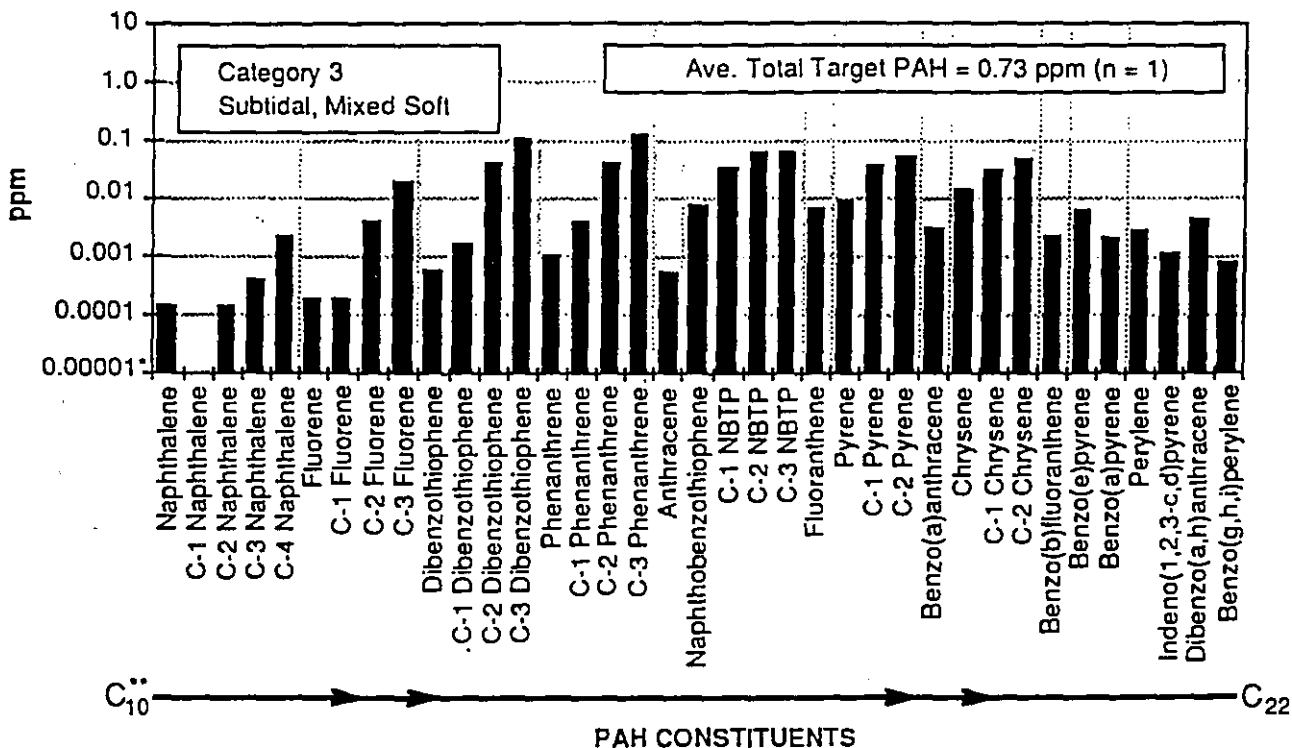
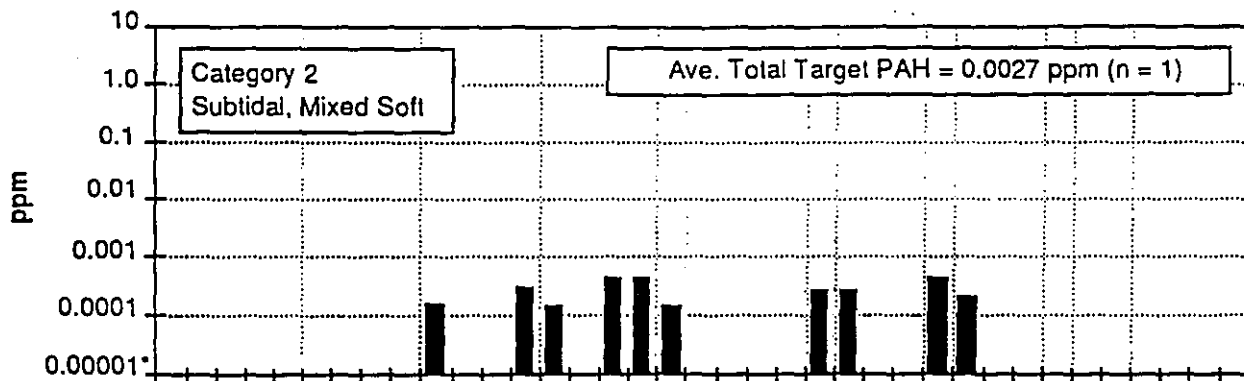
Figure B-1.1. Scaled display for average concentrations of PAH compounds in sediments at Bainbridge Bight during 1991.



*0.00001 = Below level of detection.

**Trend in number of carbon atoms per molecule.

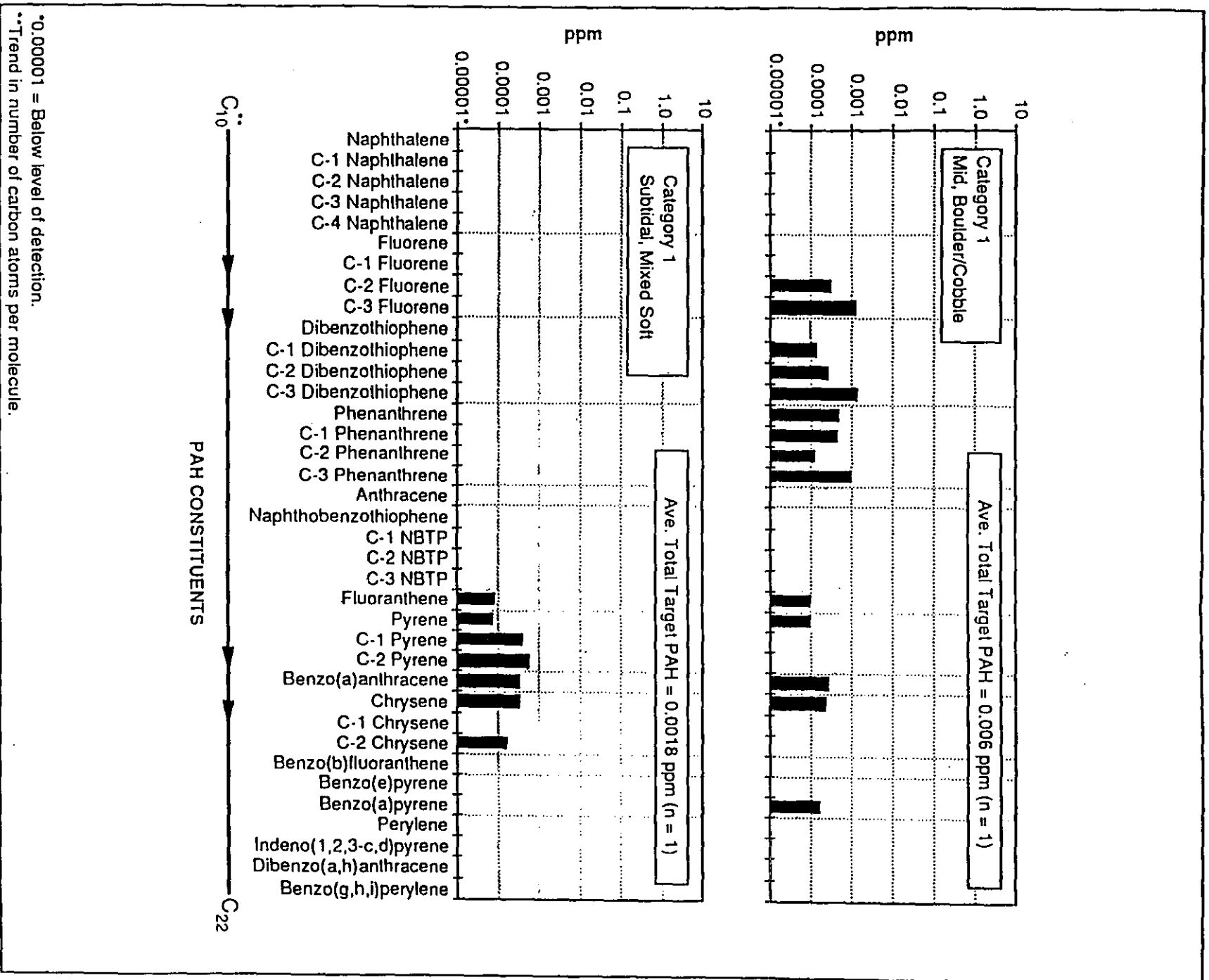
Figure B-1.2. Scaled display for average concentrations of PAH compounds in sediments at Bay of Isles during 1991.



*0.00001 = Below level of detection.

**Trend in number of carbon atoms per molecule.

Figure B-1.3. Scaled display for average concentrations of PAH compounds in sediments at Bay of Isles during 1991.



*0.00001 = Below level of detection.

**Trend in number of carbon atoms per molecule.

Figure B-1.4. Scaled display for average concentrations of PAH compounds in sediments at Bass Harbor during 1991.

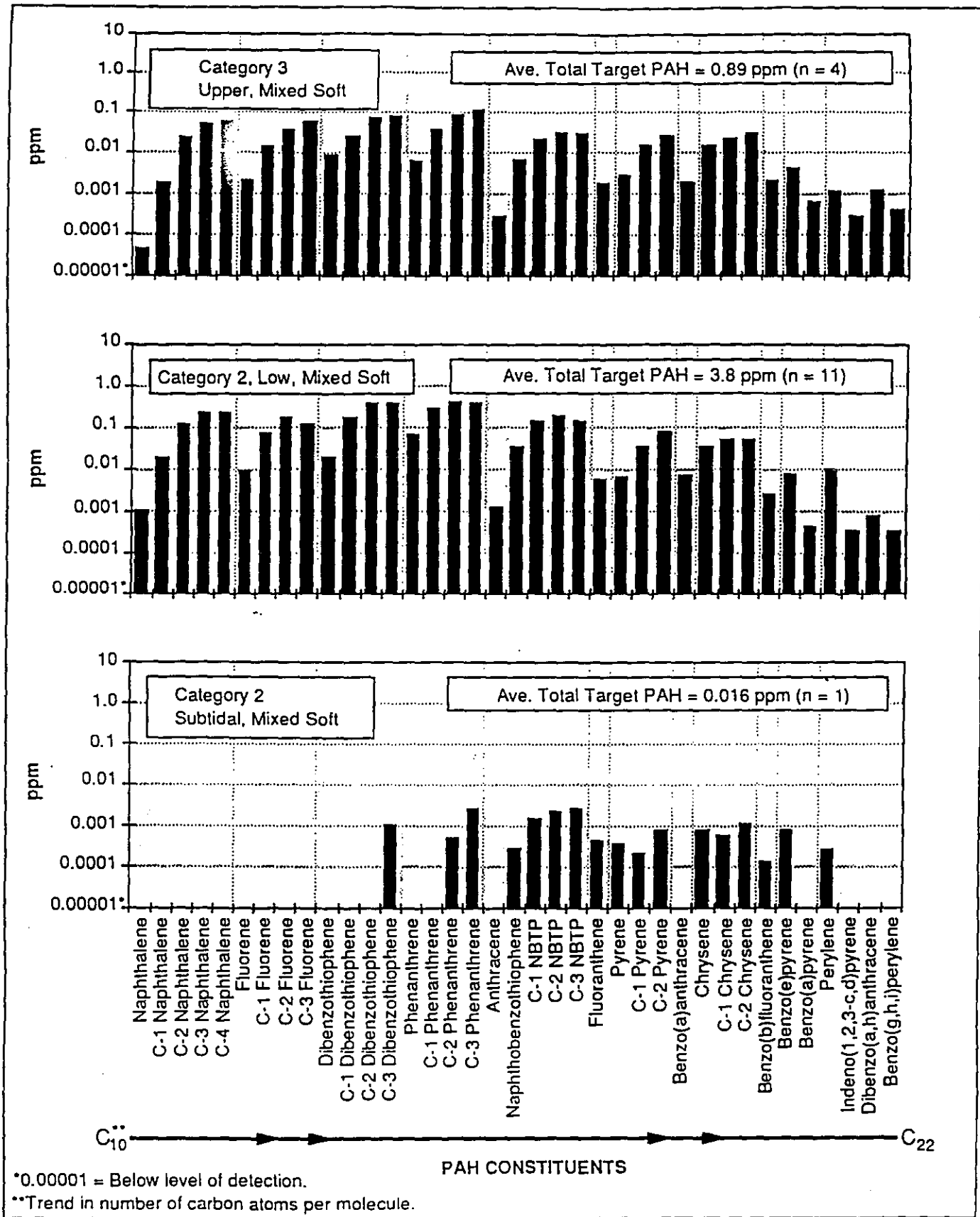
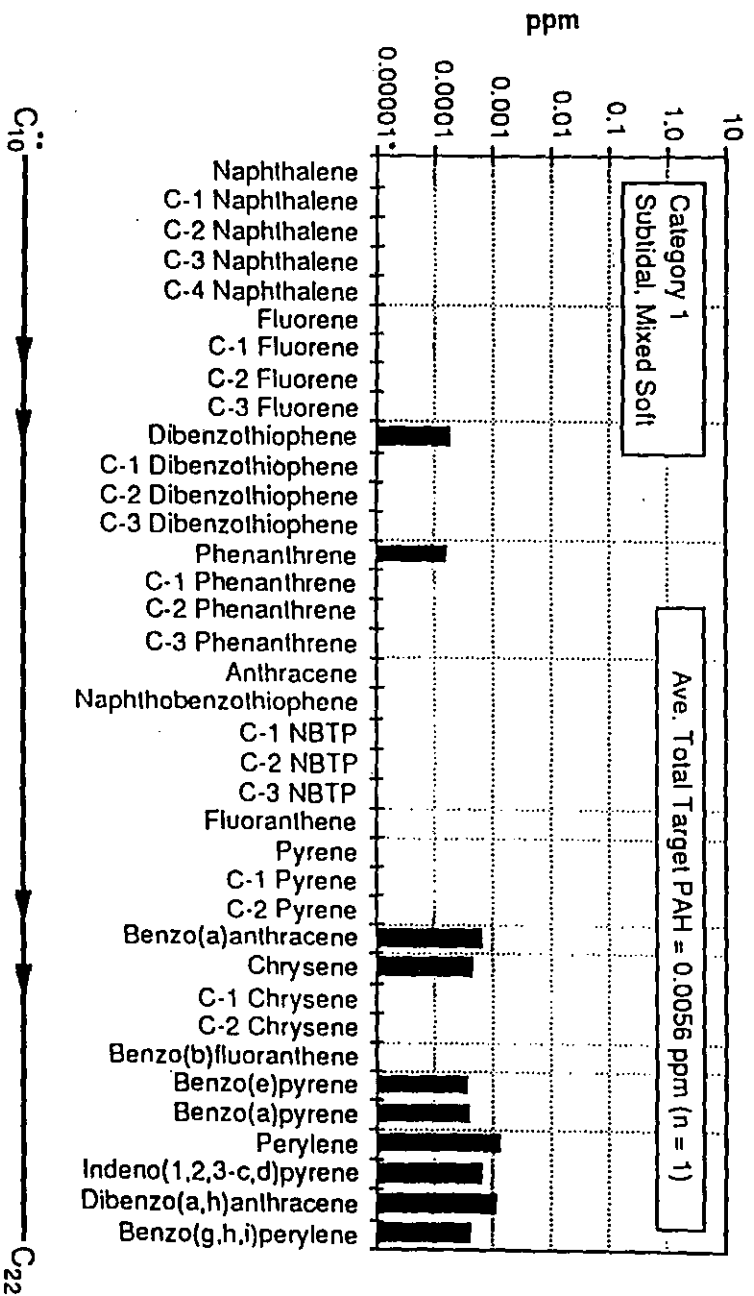


Figure B-1.5. Scaled display for average concentrations of PAH compounds in sediments at Block Island during 1991.



*0.00001 = Below level of detection.

**Trend in number of carbon atoms per molecule.

Figure B-1.7. Scaled display for average concentrations of PAH compounds in sediments at Eshamy Bay during 1991.

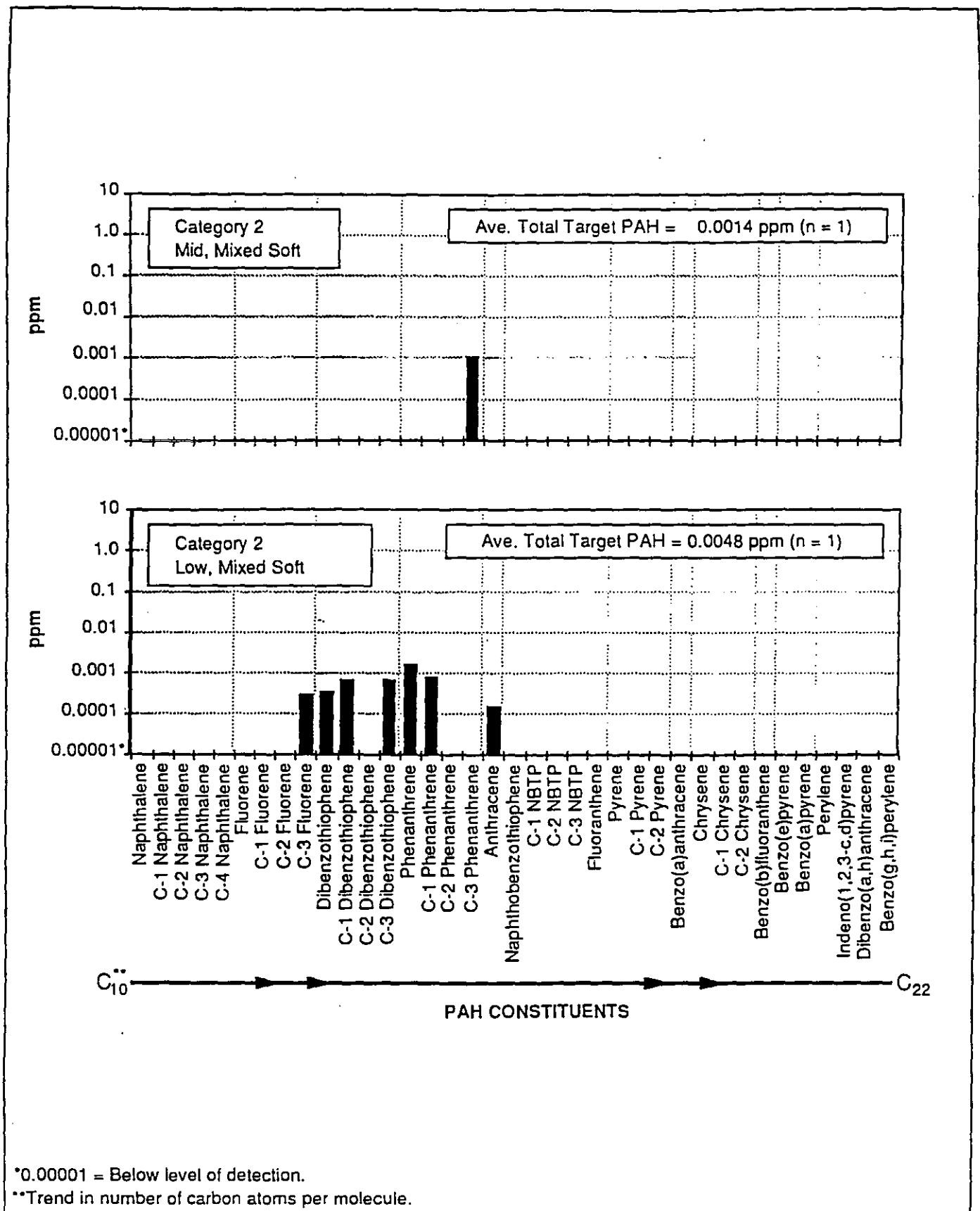


Figure B-1.8. Scaled display for average concentrations of PAH compounds in sediments at Herring Bay during 1991.

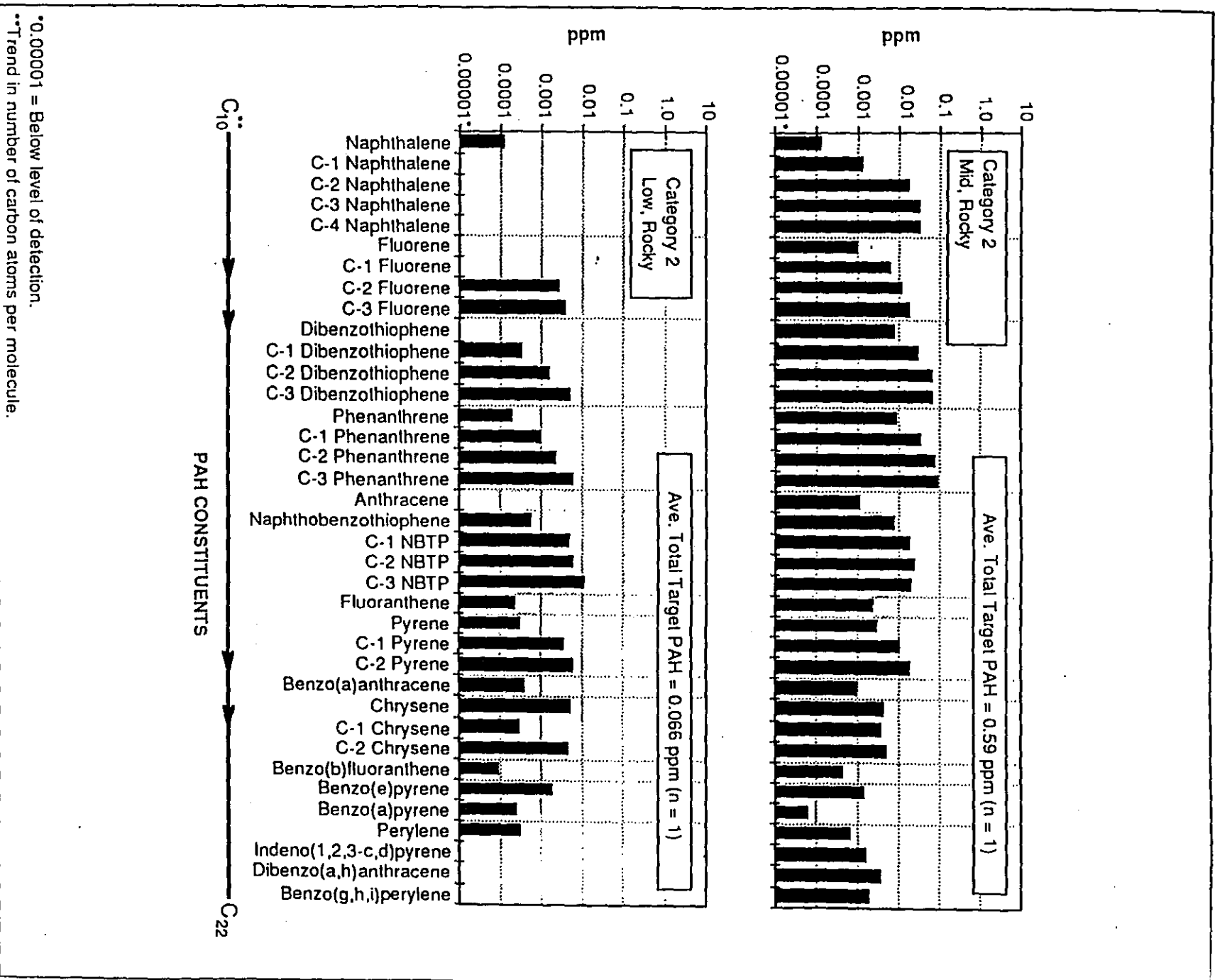


Figure B-1.9. Scaled display for average concentrations of PAH compounds in sediments at Herring Bay during 1991.

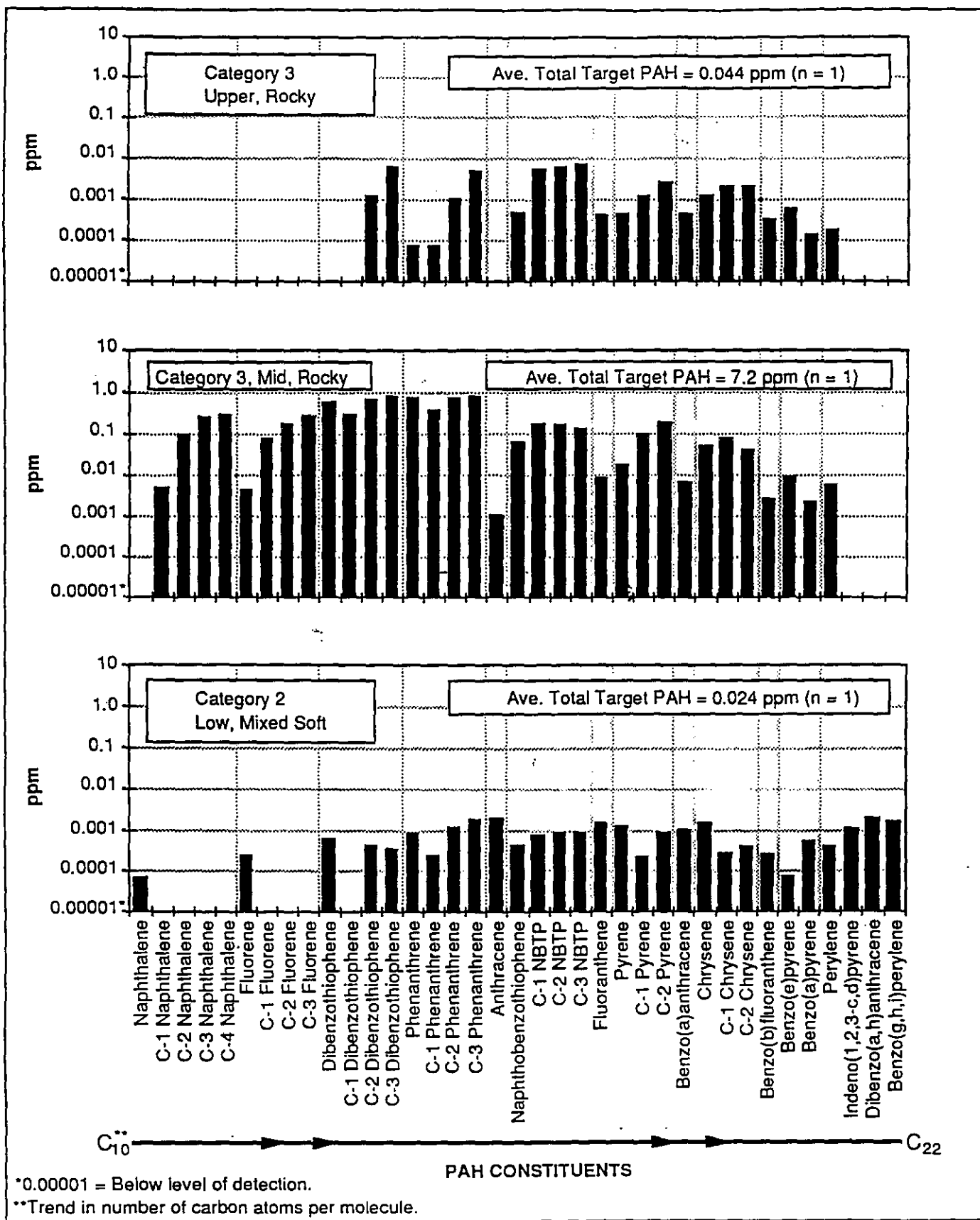
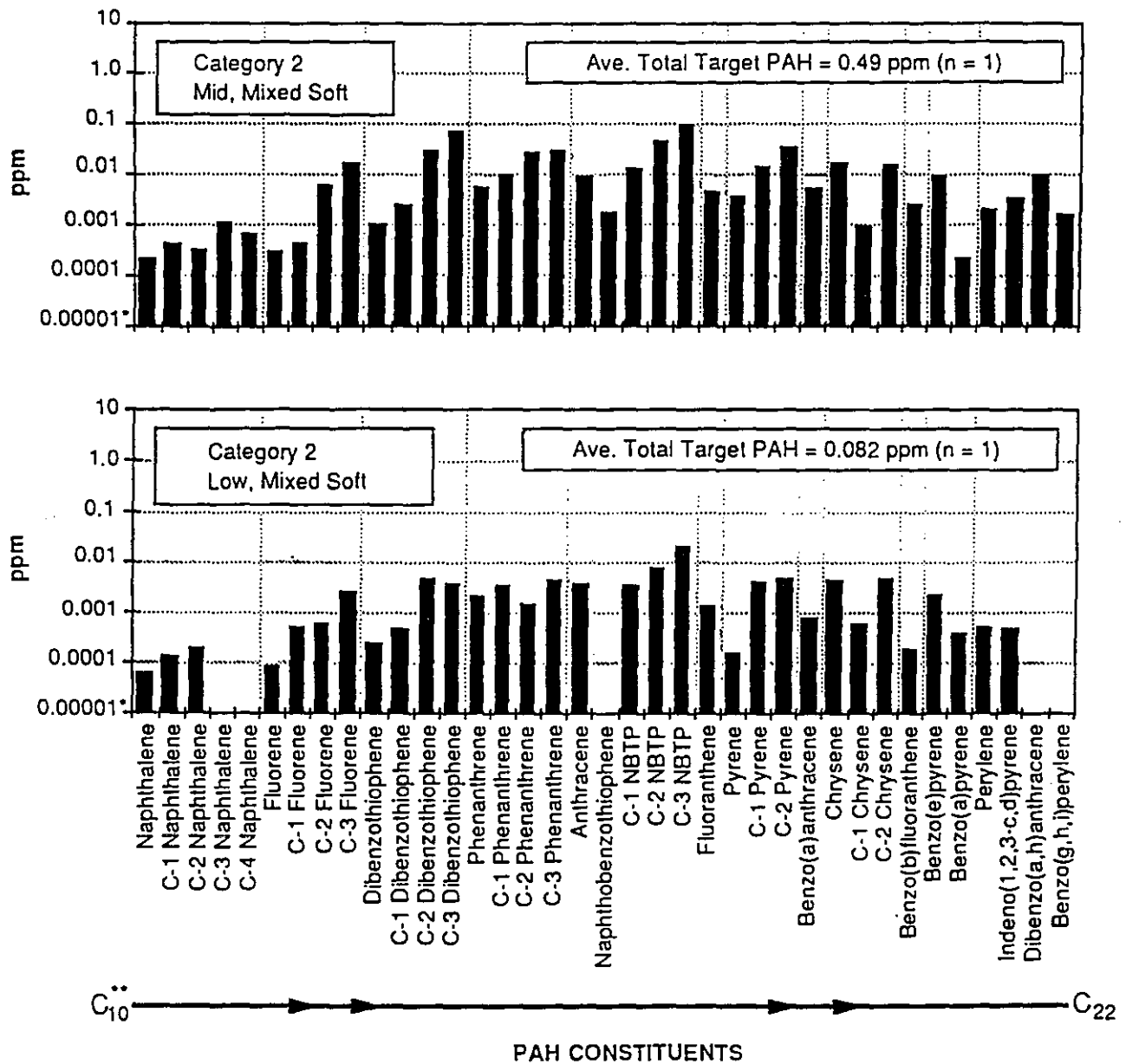
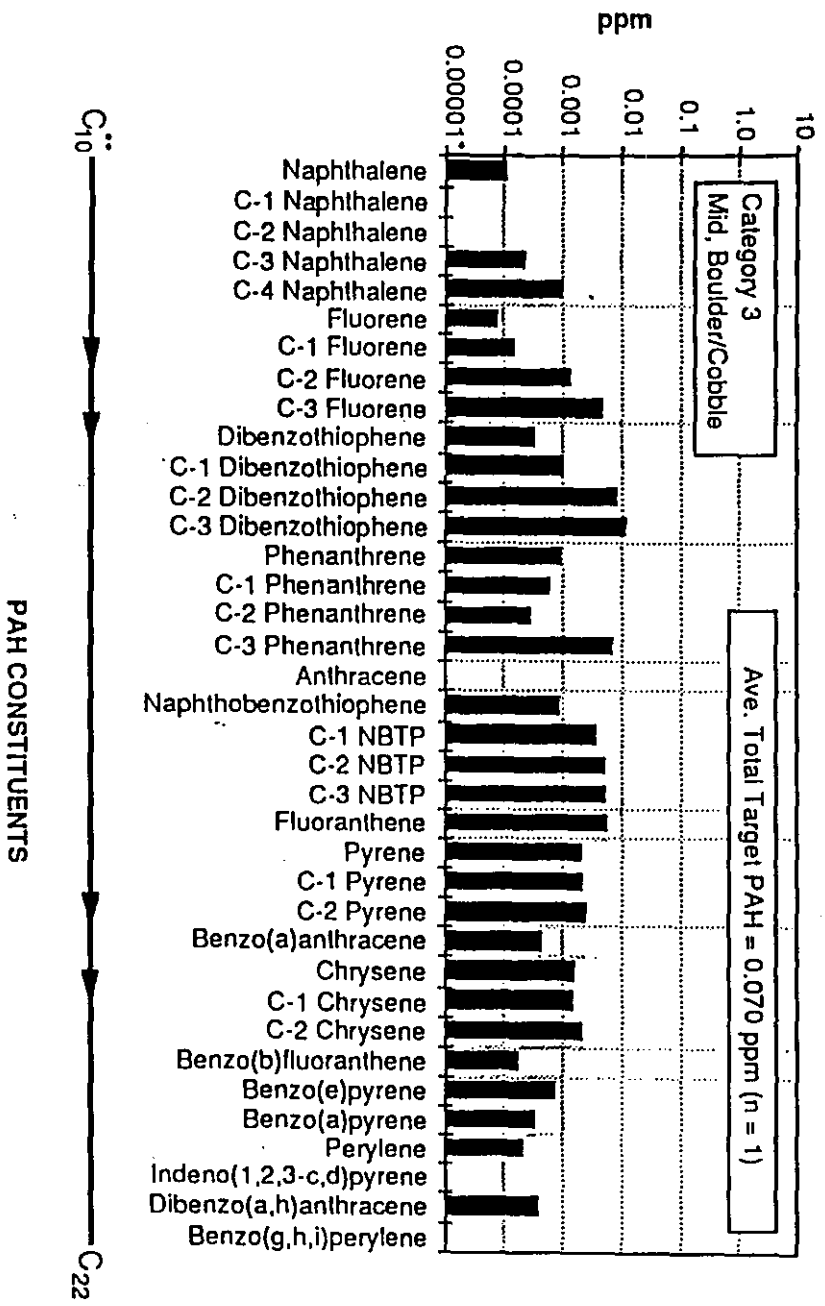


Figure B-1.10. Scaled display for average concentrations of PAH compounds in sediments at Ingot Island during 1991.



*0.00001 = Below level of detection.
 **Trend in number of carbon atoms per molecule.

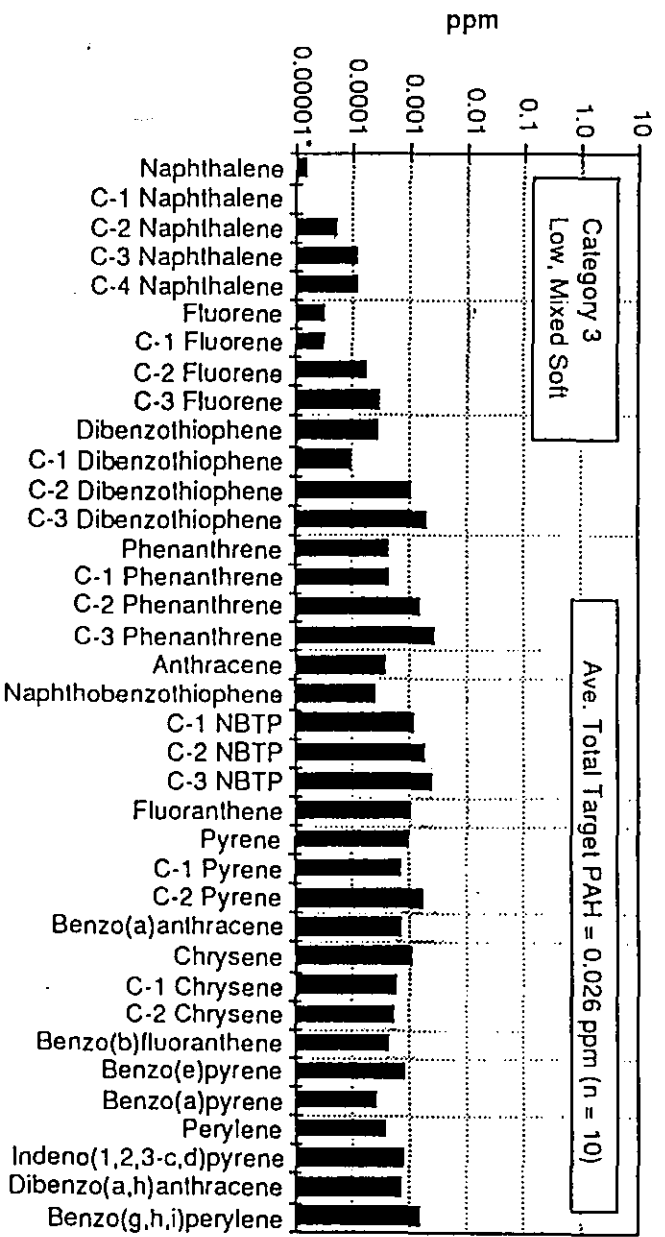
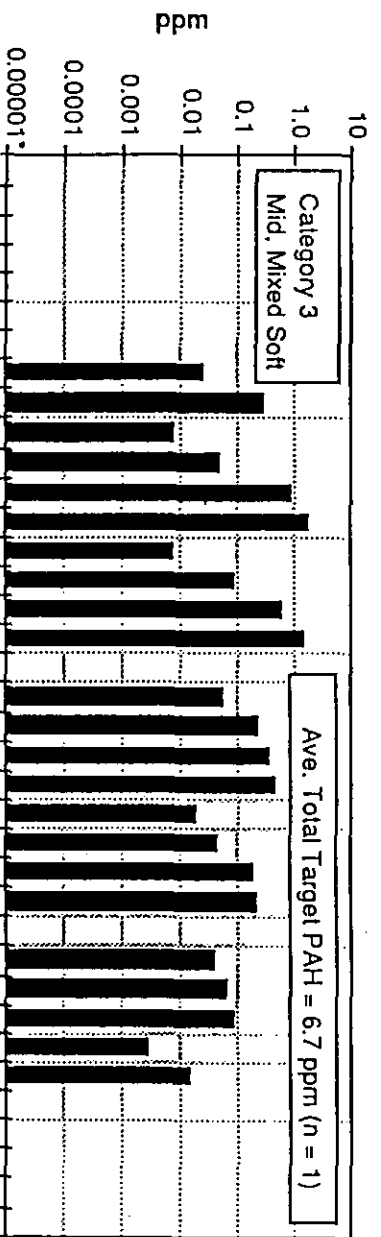
Figure B-1.11. Scaled display for average concentrations of PAH compounds in sediments at Mussel Beach during 1991.



*0.00001 = Below level of detection.

**Trend in number of carbon atoms per molecule.

Figure B-1.12. Scaled display for average concentrations of PAH compounds in sediments at Northeast Latouche during 1991.



PAH CONSTITUENTS

C₁₀ ← → C₂₂

*0.00001 = Below level of detection.
 **Trend in number of carbon atoms per molecule.

Figure B-1.13. Scaled display for average concentrations of PAH compounds in sediments at Northwest Bay West Arm during 1991.

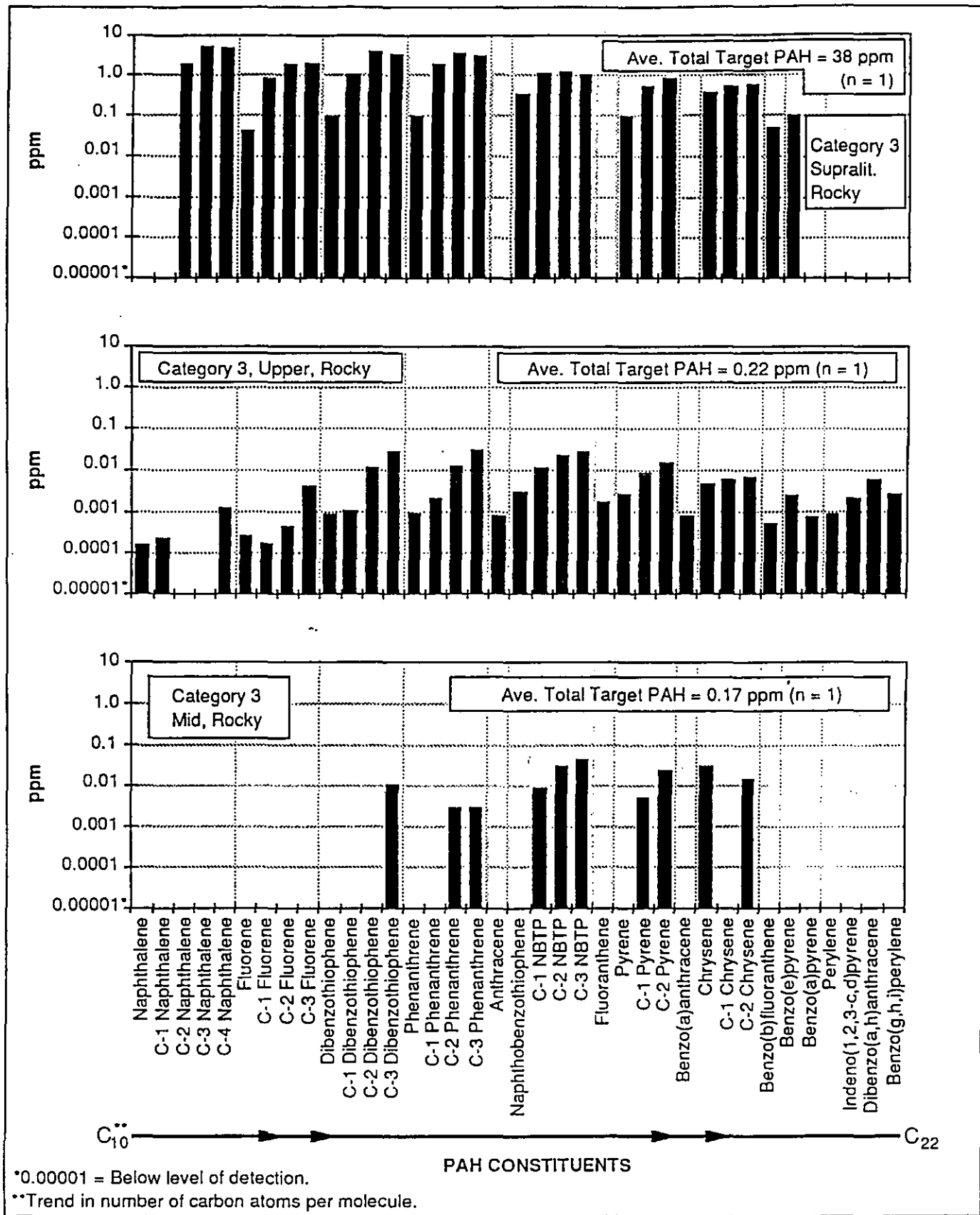


Figure B-1.14. Scaled display for average concentrations of PAH compounds in sediments at Northwest Bay Islet during 1991.

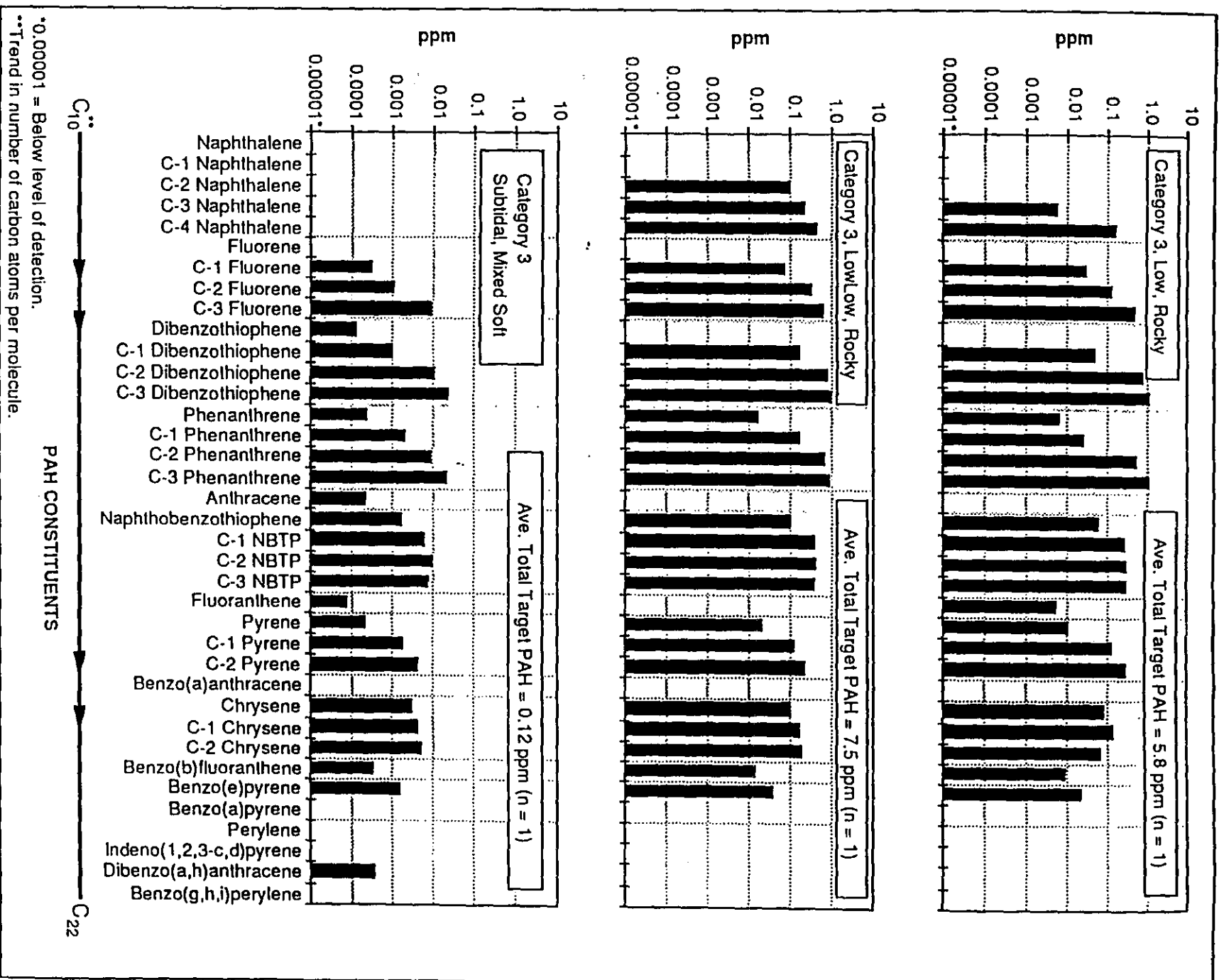


Figure B-1.15. Scaled display for average concentrations of PAH compounds in sediments at Northwest Bay Islet during 1991.

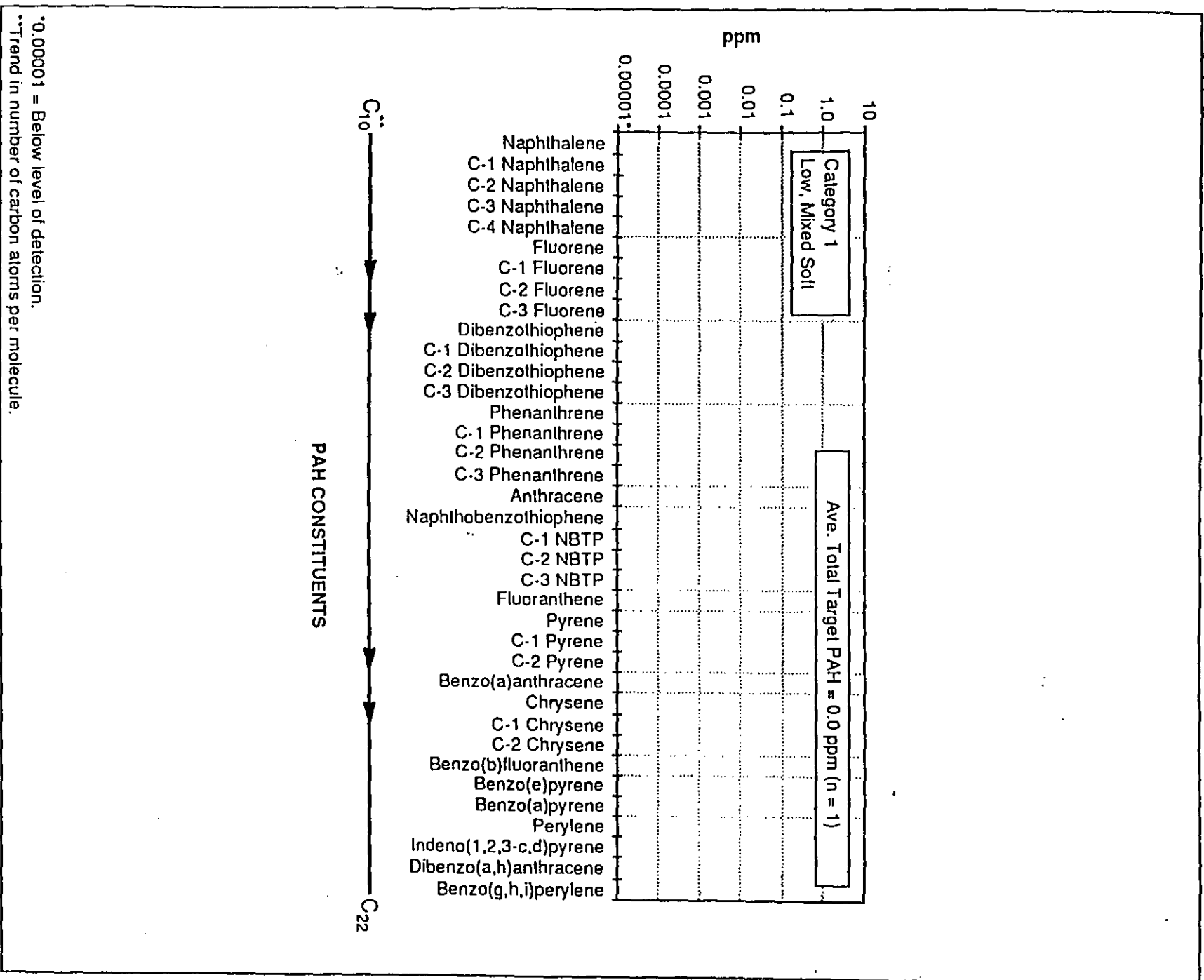
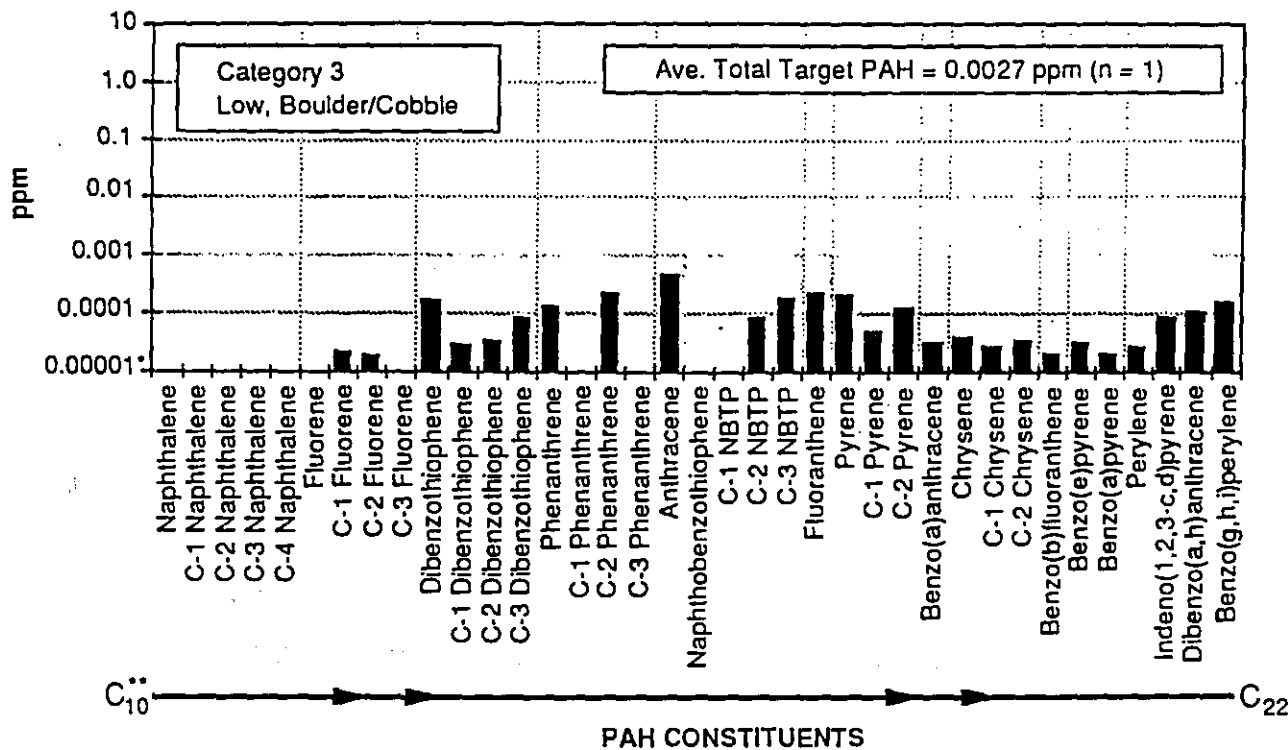
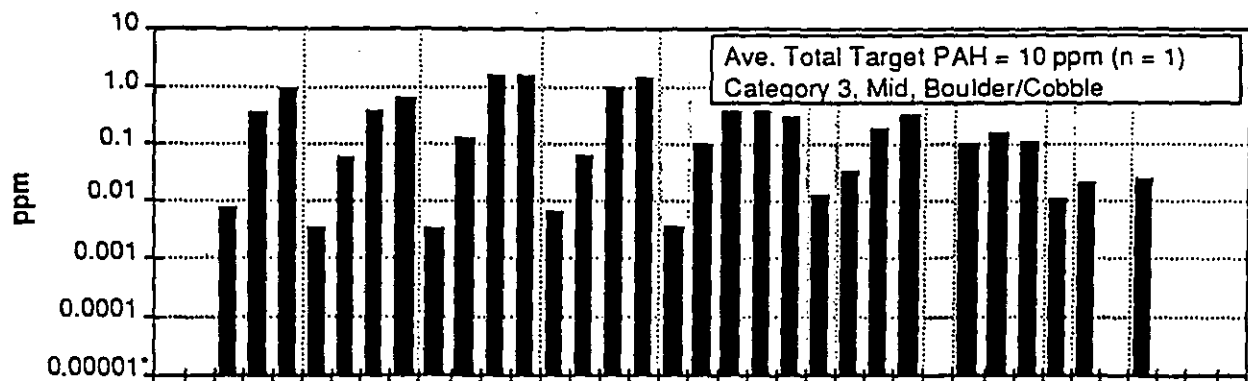


Figure B-1.16. Scaled display for average concentrations of PAH compounds in sediments at Outside Bay during 1991.



*0.00001 = Below level of detection.
**Trend in number of carbon atoms per molecule.

Figure B-1.17. Scaled display for average concentrations of PAH compounds in sediments at Point Helen during 1991.

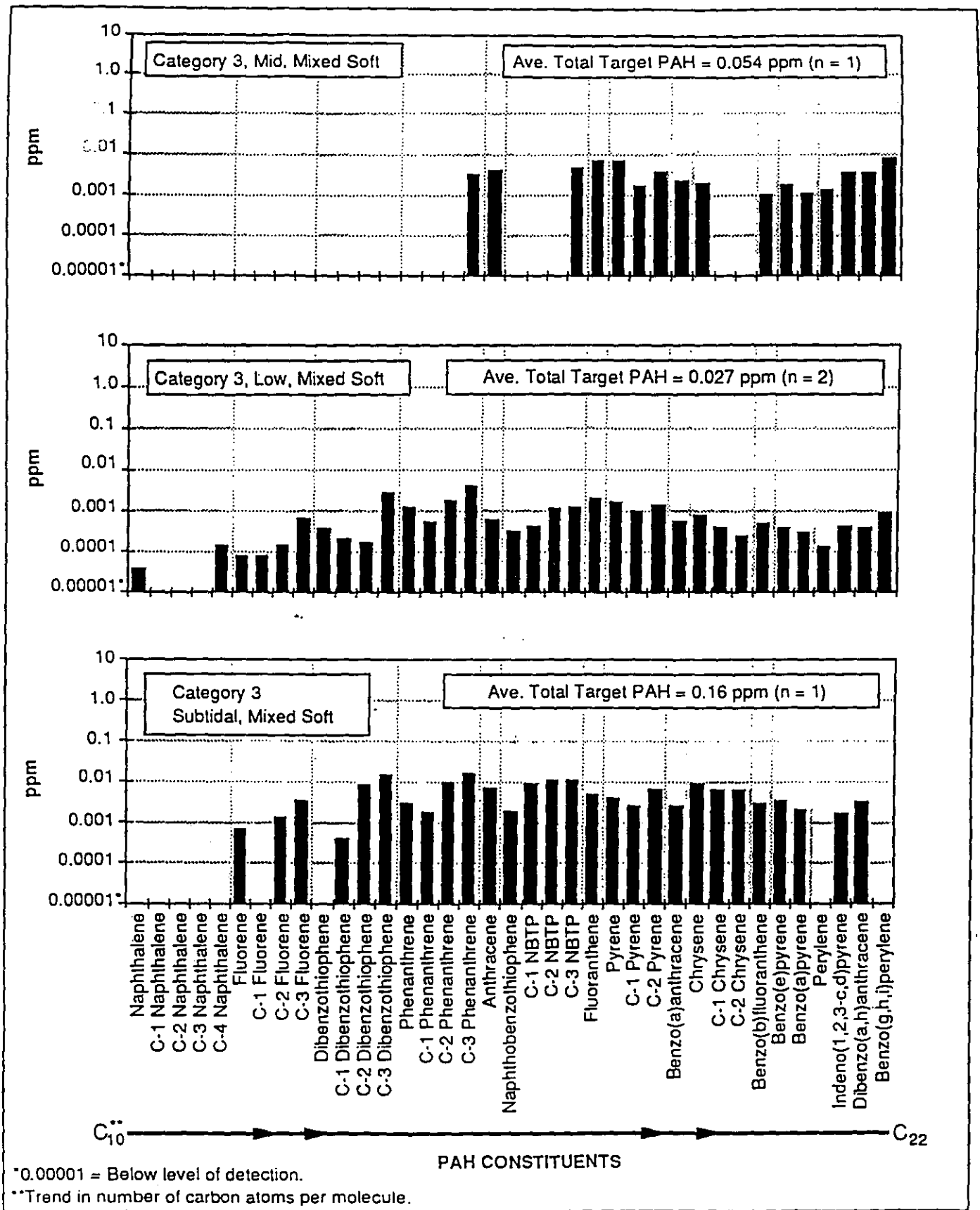


Figure B-1.18. Scaled display for average concentrations of PAH compounds in sediments at Shelter Bay during 1991.

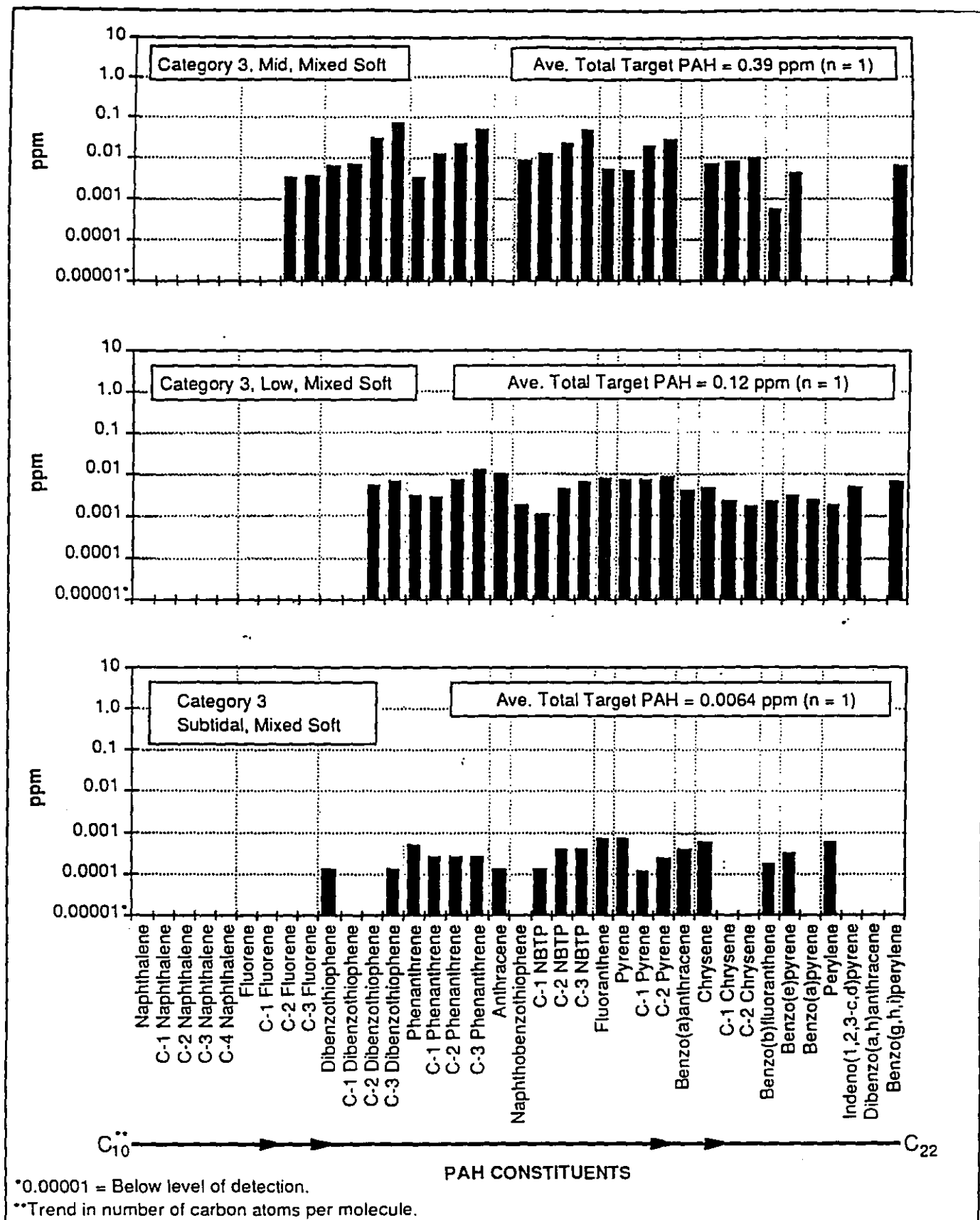


Figure B-1.19. Scaled display for average concentrations of PAH compounds in sediments at Sleepy Bay during 1991.

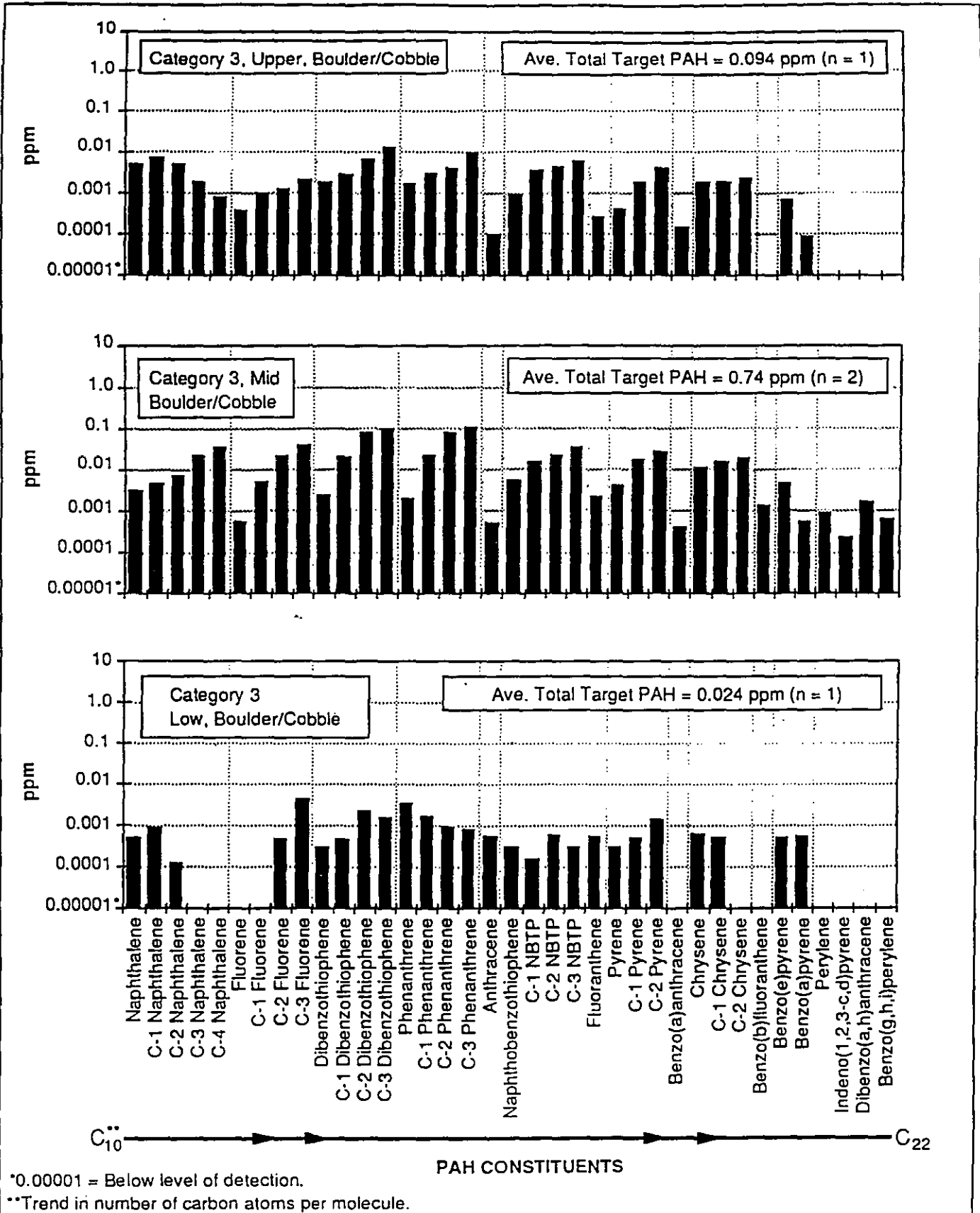


Figure B-1.20. Scaled display for average concentrations of PAH compounds in sediments at Smith Island during 1991.

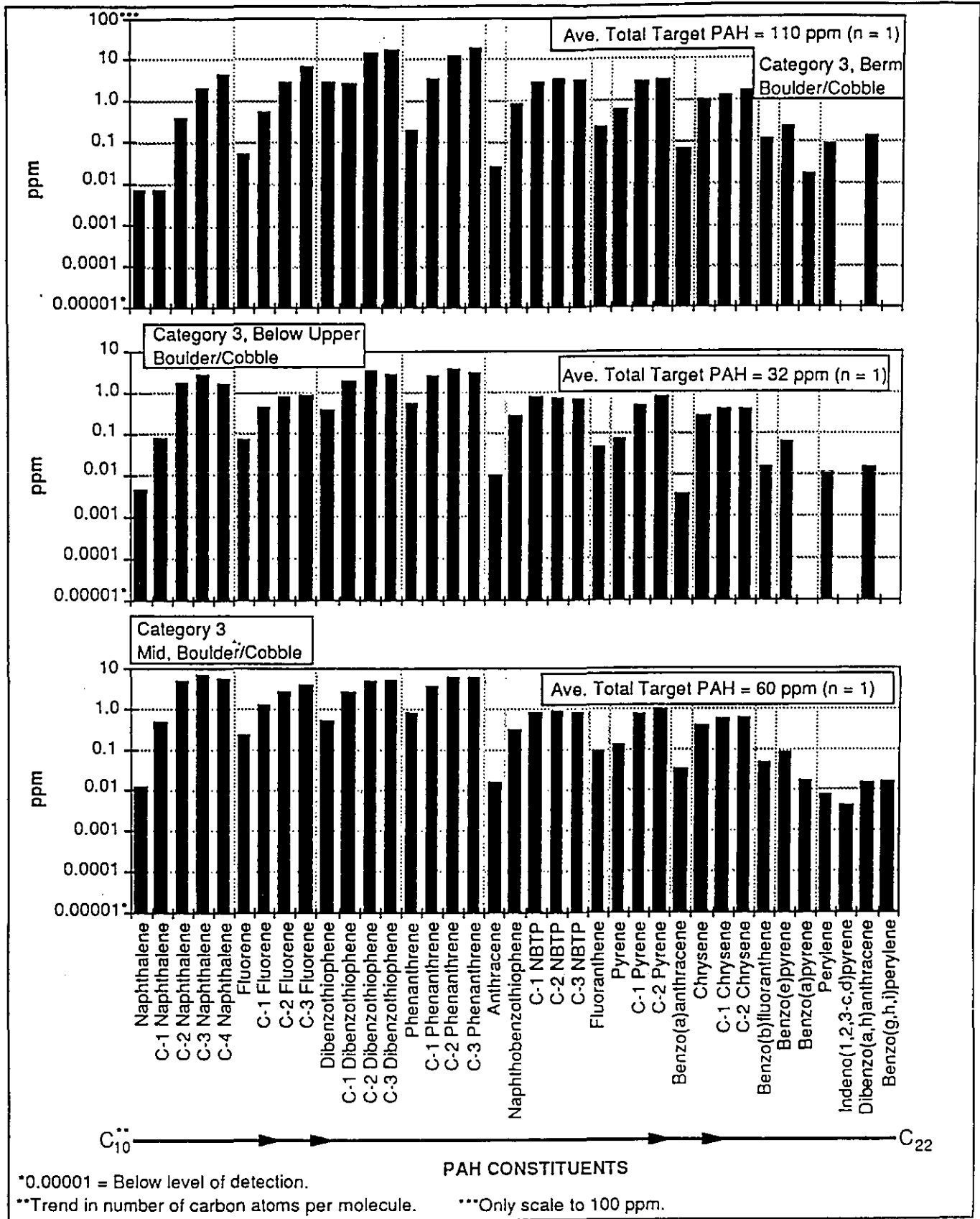


Figure B-1.21. Scaled display for average concentrations of PAH compounds in subsurface oil at Smith Island during 1991.

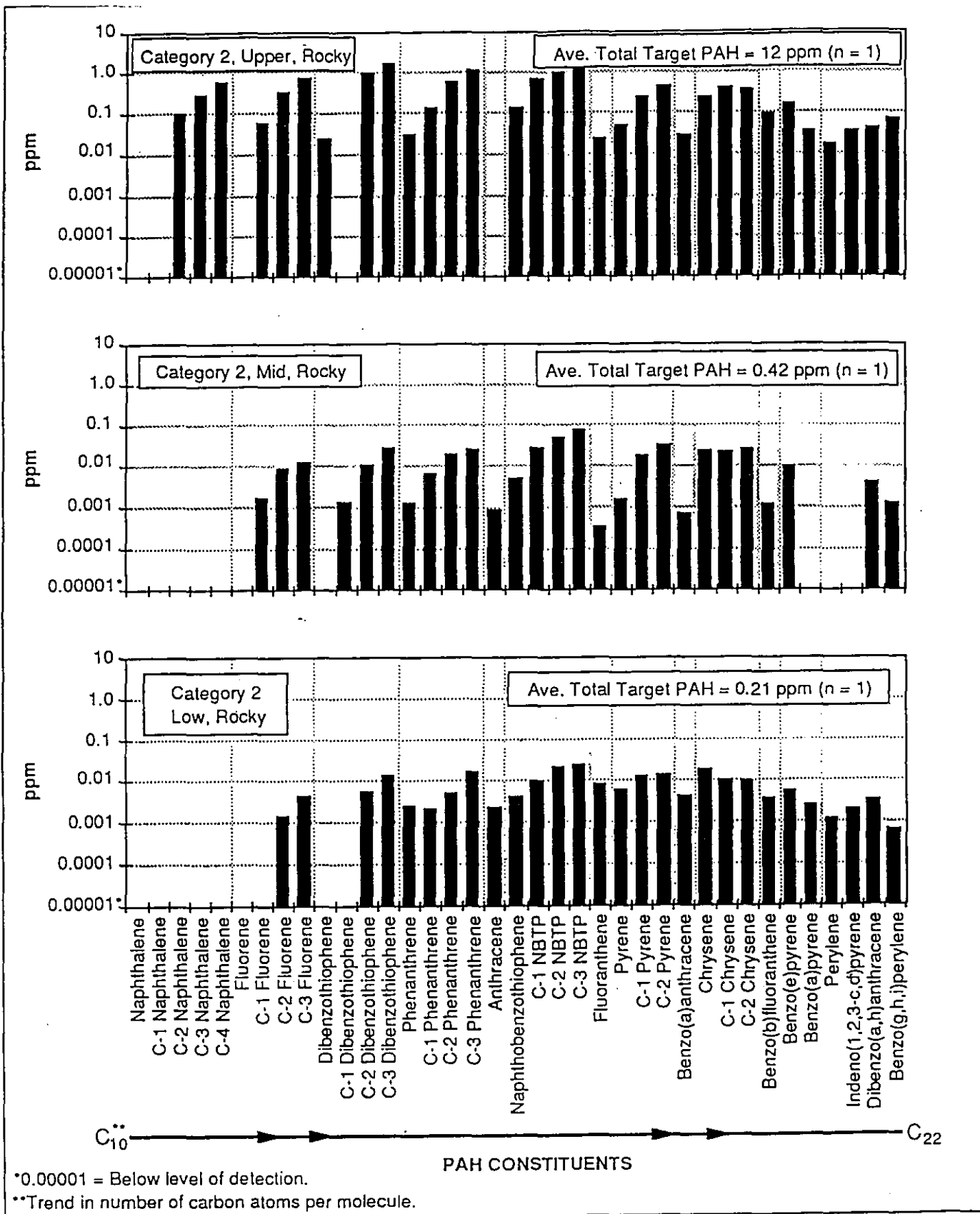


Figure B-1.22. Scaled display for average concentrations of PAH compounds in sediments at Snug Harbor during 1991.

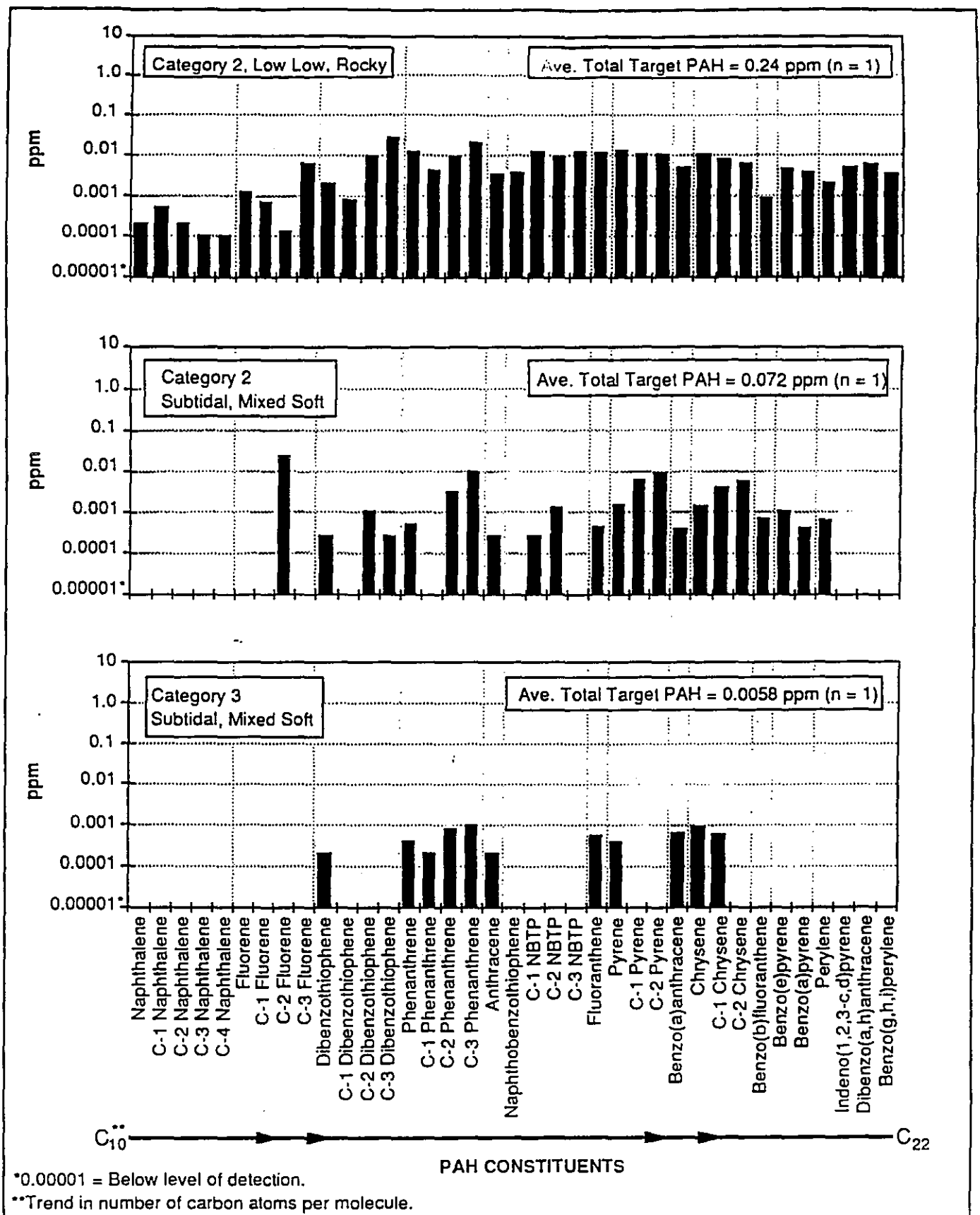


Figure B-1.23. Scaled display for average concentrations of PAH compounds in sediments at Snug Harbor during 1991.

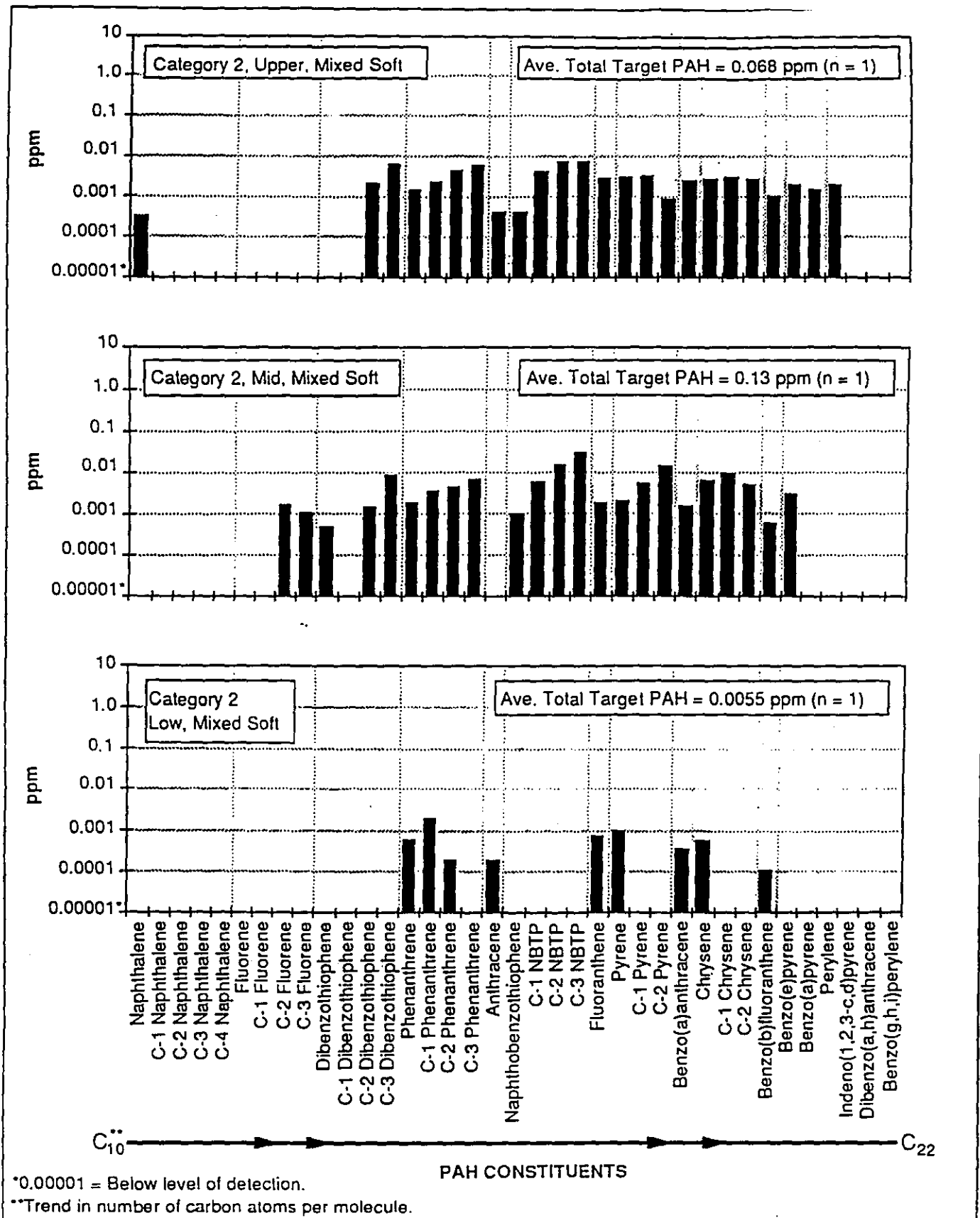
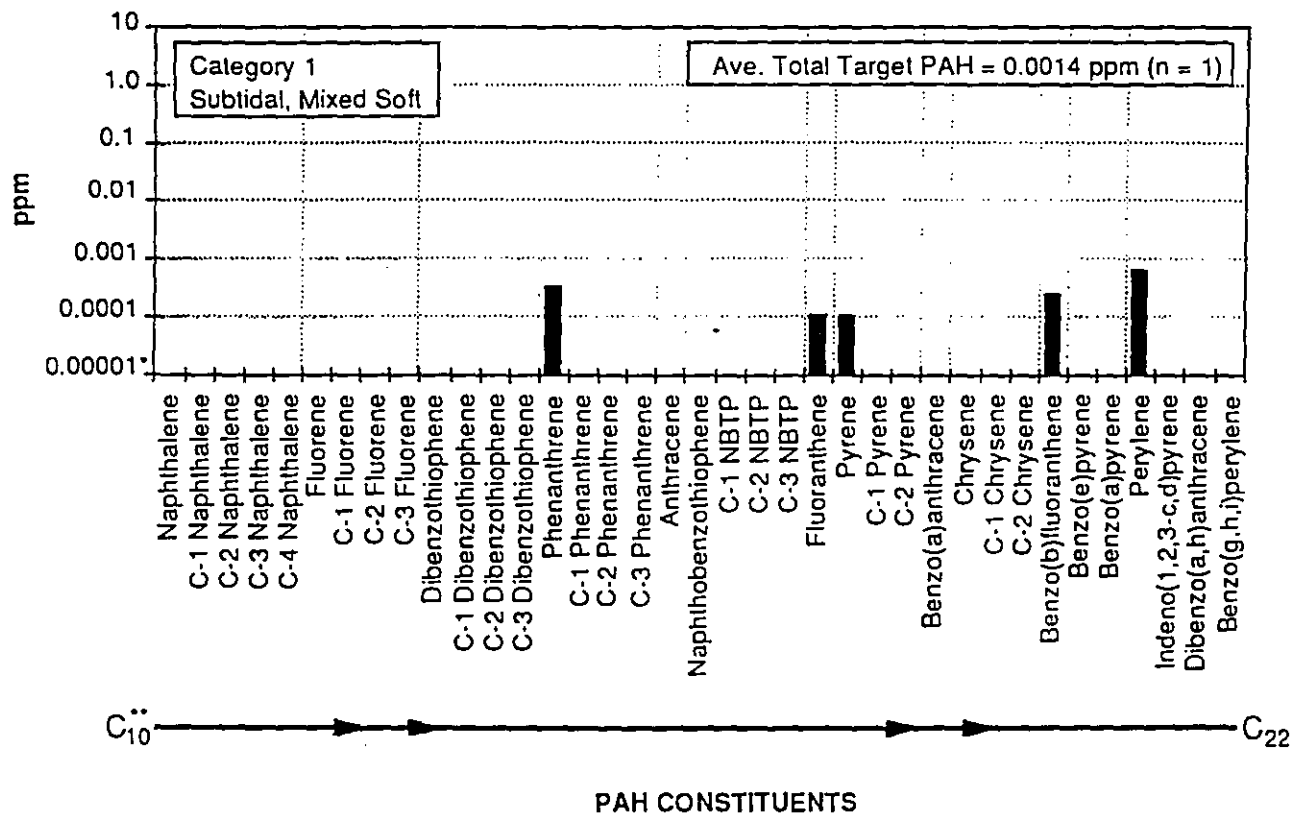


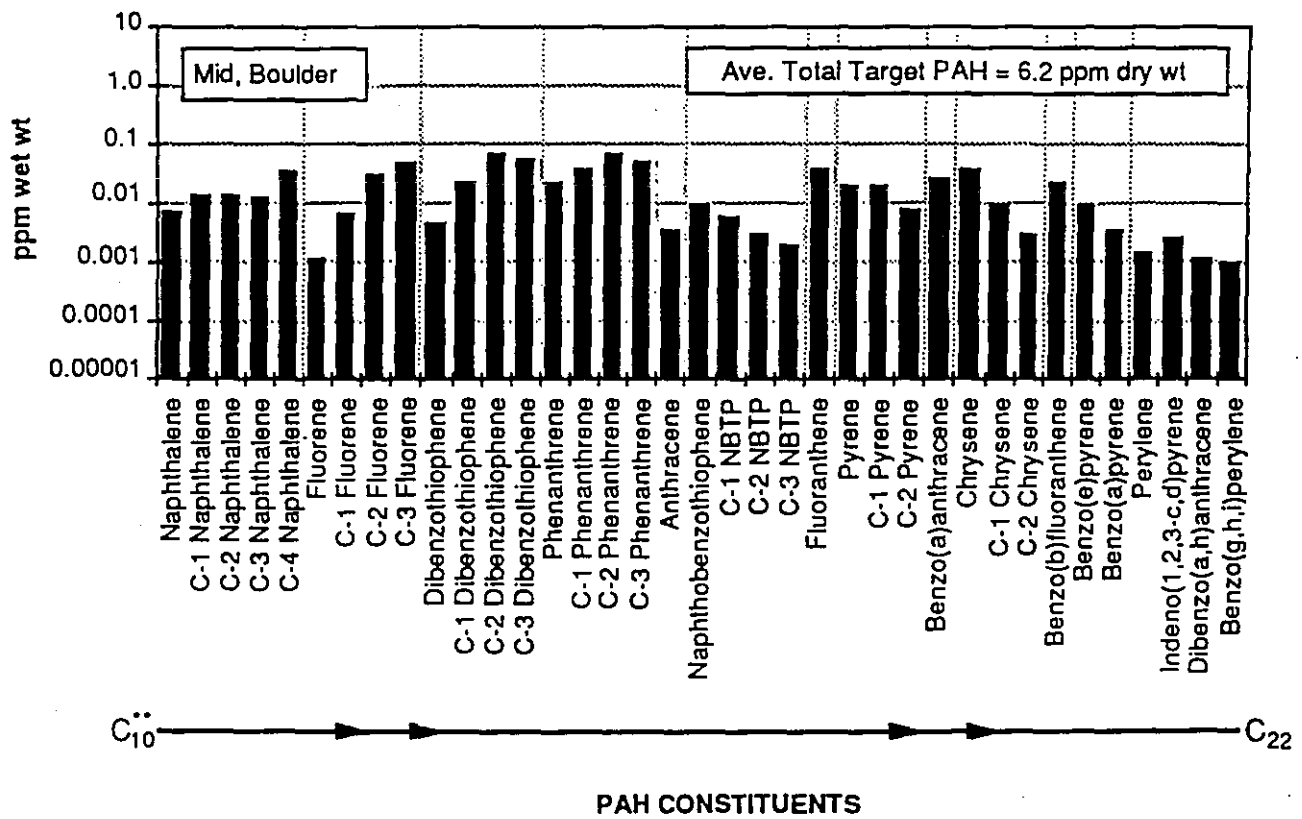
Figure B-1.24. Scaled display for average concentrations of PAH compounds in sediments at Snug Harbor during 1991.



*0.00001 = Below level of detection.
 **Trend in number of carbon atoms per molecule.

Figure B-1.25. Scaled display for average concentrations of PAH compounds in sediments at Stockdale Harbor during 1991.





Absence of bar indicates constituent was below level of detection.
 **Trend in number of carbon atoms per molecule.

Figure B-2-1. Scaled display for average concentrations of targeted PAH compounds in *Mytilus* tissues of outplant animals from Seward, collected for reference in May 1991.

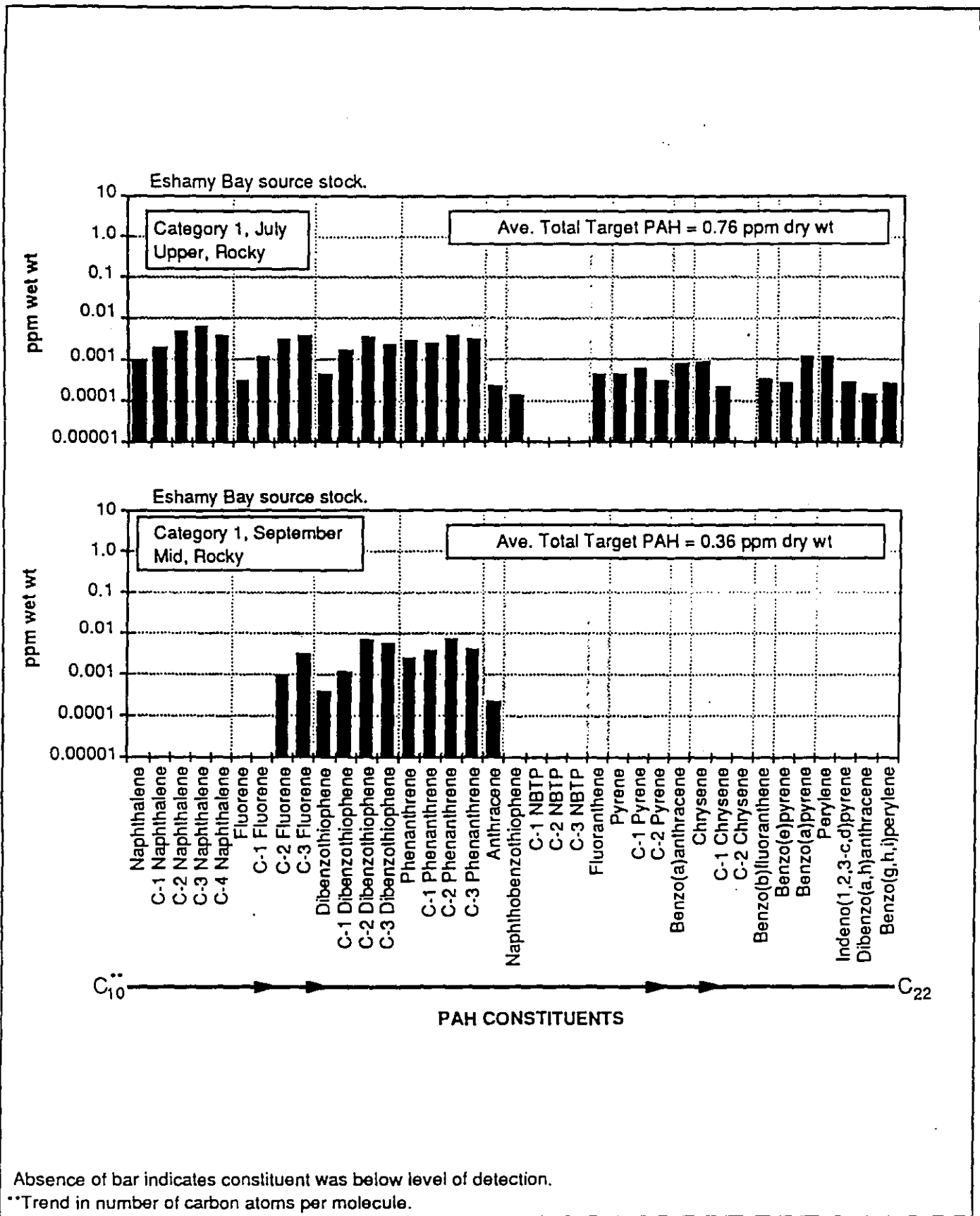


Figure B-2-2. Scaled display for average concentrations of targeted PAH compounds in *Mytilus* tissues at Eshamy Bay during 1991.

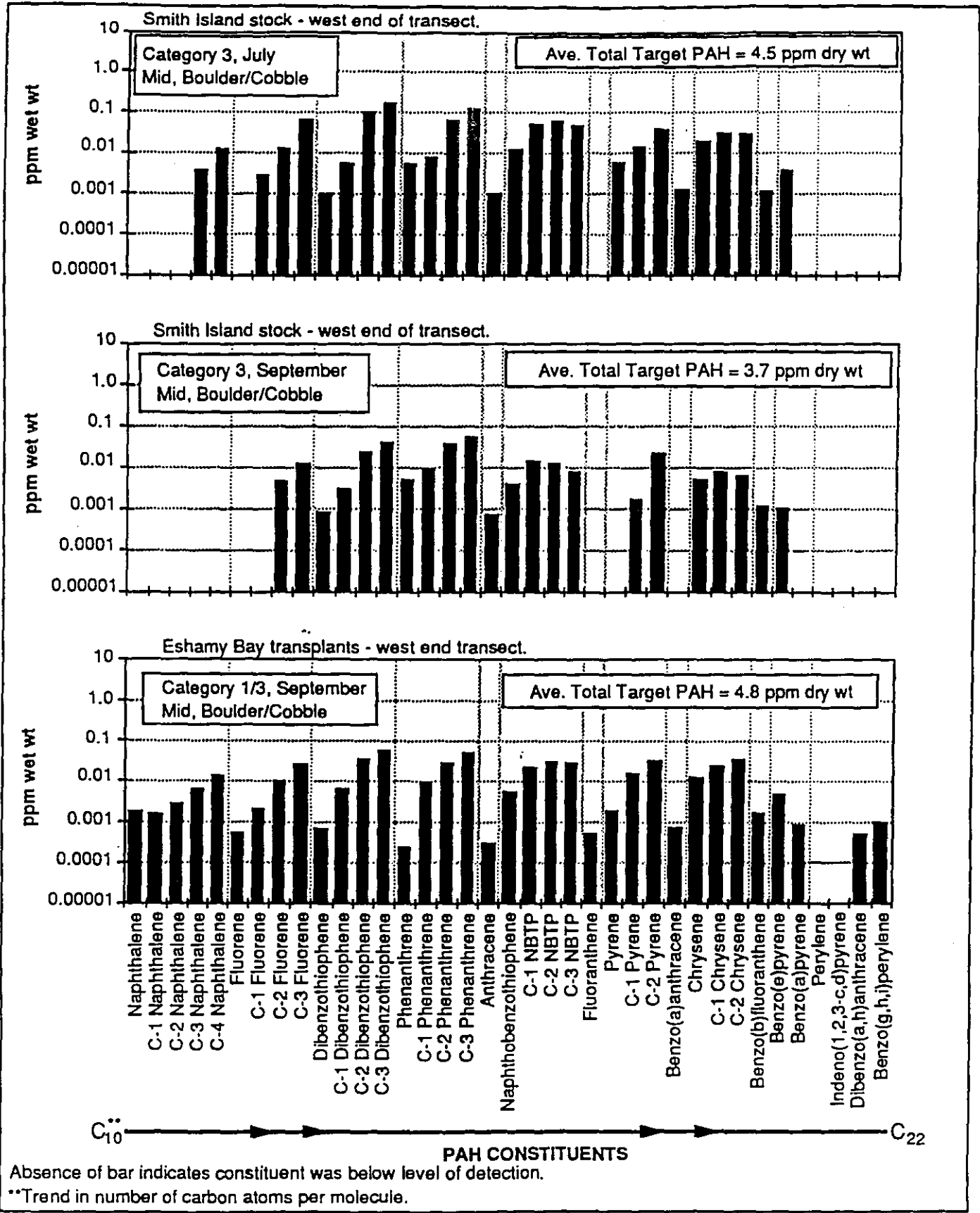


Figure B-2-4. Scaled display for average concentrations of targeted PAH compounds in *Mytilus* tissues at Smith Island during 1991.

Appendix C-Epibiota Studies Data

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Table C-1-1. Rocky upper intertidal epibiota, May 1991.

Taxon	Bass			Block			Herring			Hogg			Mussel			NW Islet			Outside Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Blidingia minima</i>	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5
<i>Bangia</i> sp.	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.42	5	0.00	0.00	5	0.90	1.19	5
Blue-green algae, crust	0.00	0.00	5	0.00	0.00	5	3.60	2.19	5	0.00	0.00	5	0.00	0.00	5	82.60	19.14	5	48.00	34.21	5	0.00	0.00	5
Diatoms	0.00	0.00	5	1.00	2.24	5	11.00	12.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Encrusting non-coralline algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5
<i>Endocladia muricata</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.30	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Enteromorpha intestinalis</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.10	0.22	5
Filamentous green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5
<i>Fucus gardneri</i>	0.00	0.00	5	0.30	0.45	5	0.00	0.00	5	0.60	0.42	5	0.90	1.75	5	0.00	0.00	5	3.30	4.24	5	3.40	6.50	5
<i>Fucus gardneri</i> (sporelings)	0.40	0.22	5	0.20	0.27	5	0.00	0.00	5	0.60	0.42	5	0.20	0.27	5	0.20	0.27	5	0.80	0.67	5	0.60	0.22	5
<i>Gloiopeltis furcata</i>	8.10	15.18	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	3.00	6.71	5	0.70	0.84	5
<i>Hildenbrandia rubra</i>	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	2.00	3.08	5	13.00	18.57	5	0.50	0.87	5	0.00	0.00	5	1.10	0.82	5
<i>Melanosiphon intestinalis</i>	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5
<i>Monostroma grevillei</i>	0.00	0.00	5	2.10	4.42	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Monostroma/Kormmannia</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
<i>Pilayella littoralis</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.50	0.87	5
<i>Porphyra</i> sp.	0.00	0.00	5	0.30	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5	0.20	0.27	5	0.00	0.00	5
<i>Porphyra fucicola</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.89	5	0.00	0.00	5
<i>Ralfsia</i> sp.	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Rhodochorton purpureum</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Ulothrix flacca</i>	0.00	0.00	5	27.00	18.91	5	0.00	0.00	5	0.00	0.00	5	14.00	31.30	5	0.20	0.45	5	0.00	0.00	5	20.20	18.25	5
<i>Verrucaria</i> sp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	83.00	6.71	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Balanus crenatus</i> (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Balanus glandula</i> (%)	0.60	0.22	5	1.00	0.61	5	0.40	0.42	5	0.80	0.27	5	0.10	0.22	5	0.00	0.00	5	0.20	0.27	5	0.20	0.27	5
<i>Chthamalus dalli</i> (% set)	0.90	0.74	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.10	0.22	5	0.10	0.22	5	0.30	0.45	5	0.00	0.00	5
<i>Chthamalus dalli</i> (%)	3.00	1.22	5	0.00	0.00	5	0.20	0.27	5	0.10	0.22	5	0.20	0.27	5	0.00	0.00	5	0.50	0.00	5	0.10	0.22	5
<i>Mytilus edulis</i> (%)	0.10	0.22	5	0.10	0.22	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	1.00	1.17	5
<i>Mytilus edulis</i> (% spat)	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
<i>Semibalanus balanoides</i> (%)	1.30	0.67	5	1.20	2.14	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.40	0.42	5	0.00	0.00	5	1.40	0.82	5
<i>Littorina scutulata</i>	20.40	23.78	5	6.80	7.85	5	1.40	2.07	5	0.00	0.00	5	0.40	0.55	5	0.00	0.00	5	2.60	3.71	5	1.00	1.73	5
<i>Littorina sitkana</i>	37.80	35.32	5	1.60	2.07	5	0.00	0.00	5	0.00	0.00	5	1.00	1.22	5	1.60	1.67	5	0.00	0.00	5	0.40	0.55	5

C-1-1

Table C-1-1 (continued)

Taxon	Bass			Block			Herring			Hogg			Mussel			NW Islet			Outside Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Lottia pelta	0.40	0.55	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5
Lottia strigatella	4.40	4.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottiidae, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5
Lottiidae, unid. (juv.)	1.60	2.30	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Nucella lima	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Oligochaeta, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.60	0.55	5
Tectura persona	16.20	11.52	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Tectura scutum	0.40	0.89	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Balanus glandula (% dead)	0.20	0.27	5	0.10	0.22	5	0.20	0.27	5	0.30	0.27	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5
Balanus/Semibalanus spp. (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.50	0.00	5
Chthamalus dalli (% dead)	0.60	0.22	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5
Boulder/Cobble (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	49.00	45.06	5	0.40	0.89	5	0.00	0.00	5	86.00	8.94	5
Fertilizer pellets (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	3
Gravel/Sand(%)	0.00	0.00	5	0.00	0.00	5	3.00	6.71	5	0.00	0.00	5	10.00	10.61	5	0.00	0.00	5	0.00	0.00	5	9.00	2.24	5
Oil Scale (primary)	0.00	0.00	5	3.60	3.29	5	3.00	0.00	5	0.00	0.00	5	6.00	0.00	5	1.40	2.61	5	0.00	0.00	5	1.80	1.64	5
Oil cover (%) (primary)	0.00	0.00	5	8.20	17.78	5	50.60	29.82	5	0.00	0.00	5	5.60	4.10	5	0.50	0.87	5	0.00	0.00	5	8.60	10.24	5
Rock (%)	100.00	0.00	5	100.00	0.00	5	77.00	43.53	5	99.80	0.45	5	41.00	53.90	5	99.60	0.89	5	#####	0.00	5	5.00	11.18	5
Water (%)	0.00	0.00	5	3.00	6.71	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	2.40	2.07	5	0.00	0.00	5	2.20	3.49	5
Clean up debris	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
Oil Scale (secondary)	0.00	0.00	5	0.00	0.00	5	4.80	0.45	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5
Oil cover (% secondary)	0.00	0.00	5	0.00	0.00	5	29.00	32.29	5	0.00	0.00	5	0.00	0.00	5	0.40	0.89	5	0.00	0.00	5	0.00	0.00	5

Table C-1-2. Rocky middle intertidal epibiota, May 1991

Taxon	Block Island			Crab Bay			Herring Bay			Hogg Bay			NW Bay Islet			Outside Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.20	0.45	5	1.00	2.24	5	0.19	0.26	8	0.00	0.00	4
<i>Bangia</i> sp.	19.40	19.67	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	1.50	1.41	5	0.00	0.00	8	0.00	0.00	4
<i>Blidingia minima</i>	1.10	1.14	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.13	0.23	8	0.00	0.00	4
Blue-green algae, crust	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	3.00	6.71	5	0.00	0.00	5	30.00	35.86	8	0.00	0.00	4
Blue-green algae, spheroids	0.10	0.22	5	0.00	0.00	5	0.70	0.27	5	0.20	0.27	5	0.20	0.27	5	0.00	0.00	8	0.38	0.25	4
<i>Caulacanthus ustulatus</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	1.10	2.19	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Cryptosiphonia woodii</i>	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Elachista fucicola</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	2.80	4.09	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Encrusting coralline algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.06	0.18	8	0.00	0.00	4
<i>Endocladia muricata</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.30	0.45	5	0.00	0.00	5	0.13	0.23	8	0.00	0.00	4
<i>Enteromorpha intestinalis</i>	0.60	0.82	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	11.20	21.79	5	0.00	0.00	8	0.13	0.25	4
Filamentous green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.06	0.18	8	0.00	0.00	4
<i>Fucus gardneri</i>	6.40	4.51	5	37.20	32.05	5	43.00	24.90	5	46.00	22.75	5	5.60	8.56	5	9.44	8.77	8	4.00	2.94	4
<i>Fucus gardneri</i> (sporelings)	0.40	0.42	5	1.90	2.38	5	0.00	0.00	5	0.40	0.89	5	0.30	0.27	5	0.50	0.65	8	0.50	0.00	4
<i>Gloiopeltis furcata</i>	0.40	0.42	5	0.50	0.87	5	0.40	0.42	5	0.10	0.22	5	0.10	0.22	5	2.38	5.20	8	0.63	0.48	4
Green algal film	0.00	0.00	5	0.00	0.00	5	5.80	6.57	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Halosaccion glandiforme</i>	0.40	0.42	5	0.00	0.00	5	0.00	0.00	5	2.00	3.37	5	0.00	0.00	5	1.25	2.12	8	0.00	0.00	4
<i>Hildenbrandia rubra</i>	0.30	0.27	5	0.10	0.22	5	0.00	0.00	5	19.00	19.81	5	0.00	0.00	5	0.00	0.00	8	4.25	7.23	4
<i>Kornmannia leptoderma</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Mastocarpus papillatus</i>	0.10	0.22	5	0.30	0.45	5	0.10	0.22	5	1.30	1.20	5	0.00	0.00	5	0.44	0.68	8	0.00	0.00	4
<i>Melanosiphon intestinalis</i>	4.70	5.07	5	0.10	0.22	5	2.20	3.35	5	0.40	0.22	5	0.60	0.42	5	0.75	0.85	8	0.13	0.25	4
<i>Monostroma grevillei</i>	10.80	8.76	5	1.20	2.14	5	17.10	18.80	5	0.20	0.45	5	1.50	2.12	5	0.69	1.00	8	0.13	0.25	4
<i>Neorhodomela oregona</i>	1.00	1.73	5	0.50	0.87	5	0.80	1.79	5	0.20	0.27	5	0.60	1.34	5	0.13	0.23	8	0.75	1.50	4
<i>Neorhodomela</i> spp.	0.00	0.00	5	0.00	0.00	5	1.00	1.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Palmaria callophyloides</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	3.10	6.66	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Petrocellis</i> sp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	1.25	3.54	8	0.00	0.00	4
<i>Pilayella littoralis</i>	4.80	3.11	5	1.00	1.41	5	18.70	24.29	5	0.00	0.00	5	2.60	3.29	5	2.13	2.53	8	0.38	0.25	4
<i>Porphyra fucicola</i>	1.00	0.61	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	5.30	8.45	5	0.94	1.08	8	0.00	0.00	4
<i>Porphyra</i> spp.	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.13	0.23	8	0.00	0.00	4
<i>Pterosiphonia bipinnata</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.06	0.18	8	0.00	0.00	4
<i>Ralfsia</i> sp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	35.40	48.84	5	0.44	1.05	8	0.00	0.00	4
Red algal film	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Rhodochorton purpureum</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.13	0.23	8	0.13	0.25	4
<i>Ulothrix flacca</i>	26.40	26.26	5	0.00	0.00	5	1.40	3.13	5	0.00	0.00	5	11.40	9.45	5	7.88	11.10	8	0.00	0.00	4
<i>Ulva/Ulvaria</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.25	0.38	8	0.00	0.00	4

C-1-3

Table C-1-2 (continued)

Taxon	Block Island			Crab Bay			Herring Bay			Hogg Bay			NW Bay Islet			Outside Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Balanus glandula</i> (%)	1.30	1.57	5	0.30	0.27	5	21.00	5.48	5	1.60	2.30	5	0.10	0.22	5	0.13	0.23	8	0.25	0.29	4
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.13	0.25	4
<i>Chthamalus dalli</i> (% set)	0.50	0.00	5	0.10	0.22	5	0.20	0.27	5	1.50	0.71	5	0.20	0.27	5	0.19	0.37	8	0.63	0.25	4
<i>Chthamalus dalli</i> (%)	0.20	0.45	5	0.60	0.82	5	0.20	0.27	5	5.30	5.83	5	0.40	0.22	5	7.69	12.36	8	0.25	0.29	4
<i>Emplectonema gracile</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.55	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Gammaridea, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	3	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Littorina scutulata</i>	20.20	11.73	5	11.80	9.28	5	79.40	19.92	5	23.40	26.88	5	32.60	56.23	5	1.63	3.11	8	21.00	16.69	4
<i>Littorina sitkana</i>	6.60	9.24	5	57.20	35.88	5	30.40	14.59	5	26.80	7.76	5	9.60	10.21	5	0.25	0.71	8	9.25	7.72	4
<i>Littorina</i> spp. (juv.)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	4
<i>Lottia limatula</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Lottia pelta</i>	0.80	1.79	5	1.80	2.49	5	0.00	0.00	5	1.40	2.07	5	3.00	6.71	5	0.25	0.71	8	0.25	0.50	4
Lottiidae, unid.	0.40	0.55	5	12.20	8.32	5	26.40	9.07	5	3.80	6.83	5	0.40	0.89	5	0.00	0.00	8	4.75	4.43	4
Lottiidae, unid. (juv.)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	4.38	9.65	8	0.00	0.00	4
<i>Mytilus edulis</i> (% spat)	0.00	0.00	5	0.30	0.27	5	0.00	0.00	5	0.10	0.22	5	0.10	0.22	5	0.00	0.00	7	0.00	0.00	4
<i>Mytilus edulis</i> (%)	3.00	3.54	5	0.30	0.45	5	3.80	3.70	5	1.60	3.03	5	0.20	0.27	5	0.00	0.00	8	2.88	3.47	4
<i>Nucella lamellosa</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.63	1.06	8	0.00	0.00	4
<i>Nucella lima</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.25	0.50	4
<i>Pagurus</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Platyhelminthes unid., red	0.00	0.00	5	0.40	0.89	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Prosobranchia, eggs	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Semibalanus balanoides</i> (% set)	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Semibalanus balanoides</i> (%)	3.60	1.95	5	0.20	0.27	5	0.00	0.00	5	0.70	0.84	5	3.30	4.24	5	0.00	0.00	8	4.50	2.65	4
<i>Semibalanus cariosus</i> (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	22.00	16.81	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Siphonaria thersites</i>	0.00	0.00	5	1.60	1.52	5	0.00	0.00	5	10.20	10.01	5	0.00	0.00	5	0.13	0.35	8	0.00	0.00	4
Spirorbidae, unid. (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	4
<i>Tectura persona</i>	0.00	0.00	5	1.20	2.17	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
<i>Tectura scutum</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.89	5	0.00	0.00	5	0.50	1.07	8	0.75	0.50	4
Encrusting coralline algae (dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.25	0.71	8	0.00	0.00	4
<i>Fucus gardneri</i> (dead)	0.60	0.82	5	0.30	0.45	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.13	0.23	8	0.00	0.00	4
<i>Balanus glandula</i> (% dead)	0.30	0.45	5	0.00	0.00	5	0.00	0.00	5	0.30	0.45	5	0.10	0.22	5	0.00	0.00	8	0.00	0.00	4
<i>Balanus/Semibalanus</i> spp. (% dead)	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.50	0.00	4
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.30	0.45	5	0.00	0.00	5	0.31	0.26	8	0.00	0.00	4
<i>Mytilus edulis</i> (dead)	0.00	0.00	5	0.20	0.45	5	0.10	0.22	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	8	1.25	2.50	4
<i>Semibalanus balanoides</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5	0.30	0.45	5	0.00	0.00	8	0.00	0.00	4
<i>Semibalanus cariosus</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4

Table C-1-2 (continued)

Taxon	Block Island			Crab Bay			Herring Bay			Hogg Bay			NW Bay Islet			Outside Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Boulder/cobble (%)	0.00	0.00	5	24.40	37.54	5	2.00	4.47	5	15.00	7.71	5	0.80	1.79	5	7.25	11.61	8	71.50	37.60	4
Gravel/sand(%)	0.00	0.00	5	20.20	36.41	5	2.00	4.47	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	12.75	14.73	4
Oil scale (primary)	0.80	1.79	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Oil cover (%) (primary)	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	8	0.00	0.00	4
Rock (%)	100.00	0.00	5	55.40	51.14	5	96.00	8.94	5	85.00	7.71	5	#####	0.00	5	93.75	11.88	8	15.75	29.53	4
Water (%)	0.00	0.00	5	1.00	2.24	5	0.00	0.00	5	1.00	2.24	5	0.20	0.45	5	0.00	0.00	8	0.75	1.50	4

Table C-1-3. Rocky lower intertidal epibiota, May 1991.

Taxon	Hogg Bay			NW Bay Islet			Outside Bay		
	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n
<i>Acrosiphonia arcta</i>	0.10	0.22	5	2.50	2.89	4	6.83	7.42	3
Blue-green algae, spheroids	0.10	0.22	5	0.00	0.00	4	0.00	0.00	3
<i>Rhizoclonium</i> spp.	0.10	0.22	5	0.00	0.00	4	0.00	0.00	3
<i>Corallina</i> spp.	0.00	0.00	5	0.00	0.00	4	0.50	0.00	3
<i>Cryptosiphonia woodii</i>	0.00	0.00	5	2.00	2.45	4	8.00	10.44	3
Encrusting coralline algae	0.00	0.00	5	0.00	0.00	4	2.00	2.65	3
<i>Enteromorpha intestinalis</i>	0.00	0.00	5	0.75	1.50	4	0.00	0.00	3
<i>Enteromorpha linza</i>	0.00	0.00	5	0.13	0.25	4	0.00	0.00	3
Filamentous green algae	1.50	2.12	5	0.00	0.00	4	0.00	0.00	3
<i>Fucus gardneri</i>	67.60	23.59	5	53.75	26.26	4	12.33	9.29	3
<i>Halosaccion glandiforme</i>	1.50	1.58	5	0.25	0.29	4	1.83	1.26	3
<i>Hildenbrandia rubra</i>	0.50	0.71	5	0.00	0.00	4	0.00	0.00	3
<i>Mastocarpus papillatus</i>	3.00	4.12	5	0.13	0.25	4	15.67	4.04	3
<i>Melanosiphon intestinalis</i>	0.00	0.00	5	0.25	0.50	4	0.33	0.58	3
<i>Monostroma grevillei</i>	10.20	9.01	5	17.50	15.55	4	11.67	11.55	3
<i>Neorhodomela larix</i>	0.00	0.00	5	0.00	0.00	4	0.67	1.15	3
<i>Neorhodomela oregona</i>	0.00	0.00	5	6.25	9.46	4	4.83	3.88	3
<i>Odonthalia floccosa</i>	7.60	4.28	5	0.00	0.00	4	0.00	0.00	3
<i>Palmaria callophyloides</i>	0.70	1.30	5	0.00	0.00	4	0.00	0.00	3
<i>Palmaria hecatensis</i>	0.80	1.79	5	0.00	0.00	4	50.00	10.00	3
<i>Pilayella littoralis</i>	15.60	6.27	5	13.75	11.09	4	3.33	2.89	3
<i>Polysiphonia/Pterosiphonia</i> spp.	13.20	21.53	5	0.00	0.00	4	0.00	0.00	3
<i>Porphyra</i> spp.	0.00	0.00	5	3.75	7.50	4	0.00	0.00	3
<i>Pterosiphonia bipinnata</i>	0.00	0.00	5	0.00	0.00	4	20.00	13.23	3
<i>Ptilota filicina</i>	4.60	8.65	5	0.00	0.00	4	1.67	1.15	3
<i>Ralfsia</i> sp.	0.20	0.45	5	0.25	0.50	4	0.00	0.00	3
<i>Rhodochorton purpureum</i>	0.00	0.00	5	0.00	0.00	4	0.17	0.29	3
<i>Scytosiphon lomentaria</i>	1.60	1.67	5	0.00	0.00	4	0.00	0.00	3
<i>Tokidodendron kurilensis</i>	3.20	6.61	5	0.00	0.00	4	15.67	12.50	3
<i>Ulothrix flacca</i>	2.50	3.28	5	0.13	0.25	4	0.00	0.00	3
<i>Ulva/Ulvaria</i> spp.	0.00	0.00	5	6.50	12.34	4	0.50	0.50	3

Table C-1-3 (continued)

Taxon	Hogg Bay			NW Bay Islet			Outside Bay		
	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n
Alcyonidium spp. (%)	0.20	0.27	5	0.00	0.00	4	0.00	0.00	3
Anthopleura artemisia	0.60	1.34	5	0.00	0.00	4	0.00	0.00	3
Balanomorpha	0.20	0.27	5	0.00	0.00	4	0.00	0.00	3
Chthamalus dalli (% set)	0.10	0.22	5	0.00	0.00	4	0.00	0.00	3
Chthamalus dalli (%)	0.70	0.84	5	2.00	3.37	4	5.83	7.97	3
Crisia spp. (%)	0.40	0.89	5	0.00	0.00	4	0.00	0.00	3
Gammaridea, unid.	0.00	0.00	3	0.00	0.00	4	0.00	0.00	2
Lacuna spp.	0.20	0.45	5	0.00	0.00	4	0.00	0.00	3
Leptasterias hexactis	0.80	1.79	5	0.00	0.00	4	0.00	0.00	3
Littorina scutulata	0.40	0.89	5	22.00	15.43	4	0.00	0.00	3
Littorina scutulata (juv.)	0.80	1.79	5	806.00	872.00	4	0.00	0.00	3
Littorina sitkana	0.20	0.45	5	3.25	4.57	4	0.00	0.00	3
Lottia pelta	0.00	0.00	5	0.00	0.00	4	0.33	0.58	3
Lottiidae, unid.	0.60	1.34	5	21.00	17.22	4	0.00	0.00	3
Lottiidae, unid. (juv.)	16.60	13.39	5	2.00	4.00	4	1.33	1.53	3
Margarites marginatus	3.20	3.96	5	0.00	0.00	4	0.00	0.00	3
Mytilus edulis (% spat)	27.30	30.41	5	0.25	0.29	4	0.00	0.00	3
Mytilus edulis (%)	0.00	0.00	5	0.38	0.25	4	0.00	0.00	3
Nucella lamellosa	9.60	6.54	5	0.00	0.00	4	5.00	5.57	3
Onchidella borealis	0.60	1.34	5	0.00	0.00	4	0.00	0.00	3
Pagurus hirsutiusculus	1.80	2.05	5	0.50	0.58	4	0.00	0.00	3
Pholis taeta	0.20	0.45	5	0.00	0.00	4	0.00	0.00	3
Rhynchozoon bispinosum (%)	5.20	7.26	5	0.00	0.00	4	0.00	0.00	3
Semibalanus balanoides (%)	0.00	0.00	5	10.25	16.64	4	0.00	0.00	3
Semibalanus cariosus (%)	41.80	40.86	5	0.00	0.00	4	0.00	0.00	3
Siphonaria thersites	7.20	8.29	5	0.00	0.00	4	0.00	0.00	3
Spirorbidae, unid. (%)	0.10	0.22	5	0.00	0.00	4	P	---	3
Balanus/Semibalanus spp. (% dead)	3.10	6.66	5	0.00	0.00	4	0.00	0.00	3
Mytilus edulis (dead)	0.40	0.89	5	0.00	0.00	4	0.00	0.00	3
Semibalanus balanoides (% dead)	0.00	0.00	5	1.75	2.22	4	0.00	0.00	3
Boulder/cobble (%)	0.00	0.00	5	0.00	0.00	4	10.00	13.23	3
Oil scale (primary)	0.00	0.00	5	0.00	0.00	4	0.00	0.00	3
Oil cover (%) (primary)	0.00	0.00	5	0.00	0.00	4	0.00	0.00	3
Rock (%)	100.00	0.00	5	100.00	0.00	4	90.00	13.23	3

Table C-2-1. Rocky upper intertidal epibiota, July 1991.

TAXON	Bass Harbor			Mussel Beach South			NW Bay Islet			Snug Harbor			Hogg Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Blue-green algae, crust	0.00	0.00	5	0.00	0.00	5	44.00	30.70	5	66.00	19.17	5	0.00	0.00	5
Bryophyta, unid.	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Elachista fucicola	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5
Encrusting green algae	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Endozoic green algae	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Enteromorpha intestinalis	0.00	0.00	5	0.00	0.00	5	0.40	0.89	5	0.60	0.42	5	0.00	0.00	5
Enteromorpha spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Filamentous green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Fucus gardneri	0.00	0.00	5	0.40	0.89	5	0.00	0.00	5	4.60	8.65	5	0.20	0.45	5
Fucus gardneri (sporelings)	0.20	0.27	5	0.10	0.22	5	0.10	0.22	5	0.60	0.42	5	0.60	0.22	5
Glolopeltis furcata	10.20	22.25	5	0.00	0.00	5	0.00	0.00	5	0.90	1.24	5	0.00	0.00	5
Green algal film	0.00	0.00	5	10.00	22.36	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Hildenbrandia rubra	0.30	0.45	5	0.00	0.00	5	0.00	0.00	5	1.00	1.22	5	0.70	1.30	5
Melanosiphon intestinalis	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Neorhodomela oregona	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Ralfsia sp.	3.00	6.71	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Verrucaria spp.	0.00	0.00	5	0.00	0.00	5	15.00	33.54	5	0.00	0.00	5	89.00	19.07	5
Balanus glandula (%)	0.40	0.42	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5	1.10	1.64	5
Balanus/Semibalanus spp., (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5
Buccinum baeri	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Chthamalus dalli (% set)	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Chthamalus dalli (%)	3.60	2.61	5	0.00	0.00	5	0.10	0.22	5	0.20	0.27	5	0.00	0.00	5
Gobiosox spp.	4.10	6.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Isopoda, unid.	0.60	1.34	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Leptasterias hexactis	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Ligia spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.55	5	0.00	0.00	5
Littorina scutulata	69.80	44.42	5	20.20	36.04	5	11.40	16.44	5	0.40	0.89	5	8.00	10.95	5
Littorina sitkana	7.60	3.65	5	85.20	58.53	5	0.40	0.55	5	1.20	1.10	5	45.40	42.13	5
Littorina sitkana (juv.)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottia pelta	17.40	11.01	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottia strigatella	17.00	23.54	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottiidae, unid.	1.00	1.41	5	1.20	2.17	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5
Mytilus edulis (% spat)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Mytilus edulis (%)	1.50	3.08	5	0.20	0.45	5	0.00	0.00	5	1.40	2.04	5	0.00	0.00	5

C-18

Table C-2-1 (continued)

TAXON	Bass Harbor			Mussel Beach South			NW Bay Islet			Snug Harbor			Hogg Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Nucella lamellosa</i>	0.80	0.84	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Nucella lima</i>	10.80	18.38	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Oligochaeta</i> , unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	4	0.00	0.00	5
<i>Pagurus</i> spp.	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% set)	9.00	13.42	5	0.20	0.45	5	0.20	0.45	5	0.20	0.27	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (%)	3.10	3.97	5	0.30	0.45	5	0.30	0.45	5	2.10	1.88	5	0.00	0.00	5
<i>Semibalanus cariosus</i> (%)	0.40	0.89	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Tectura persona</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Tectura scutum</i>	4.20	4.55	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Tectura testudinalis</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Balanus glandula</i> (% dead)	0.20	0.27	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.20	0.27	5
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Mytilus edulis</i> (dead)	1.80	3.49	5	0.00	0.00	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% dead)	0.40	0.22	5	0.00	0.00	5	0.20	0.27	5	0.50	0.00	5	0.00	0.00	5
<i>Semibalanus cariosus</i> (% dead)	0.20	0.45	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% set, dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Boulder/cobble (%)	0.00	0.00	5	44.00	51.77	5	100.00	0.00	5	88.00	11.51	5	0.00	0.00	5
Gravel/sand(%)	0.00	0.00	5	2.00	4.47	5	0.00	0.00	5	12.00	11.51	5	0.00	0.00	5
Oil scale (primary)	0.00	0.00	5	3.40	1.82	5	2.40	3.29	5	6.00	0.00	5	0.00	0.00	5
Oil cover (%) (primary)	0.00	0.00	5	14.40	13.37	5	0.30	0.45	5	0.50	0.00	5	0.00	0.00	5
Rock (%)	100.00	0.00	5	54.00	49.80	5	0.00	0.00	5	0.00	0.00	5	100.00	0.00	5
Water (%)	0.00	0.00	5	0.00	0.00	5	1.00	1.41	5	0.40	0.89	5	0.00	0.00	5
Oil scale (secondary)	0.00	0.00	5	0.60	0.89	5	0.00	0.00	5	0.60	1.34	5	0.00	0.00	5
Oil cover (%) (secondary)	0.00	0.00	5	5.40	10.99	5	0.00	0.00	5	0.20	0.45	5	0.00	0.00	5

C-19

Table C-2-1 (continued)

TAXON	Outside Bay			Block Island			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Blue-green algae, crust	0.10	0.22	5	59.80	40.76	5	41.00	24.08	5	0.00	0.00	5
Bryophyta, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Elachista fucicola	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Encrusting green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Endozoic green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Enteromorpha intestinalis	0.00	0.00	5	0.40	0.42	5	0.00	0.00	5	0.00	0.00	5
Enteromorpha spp.	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Filamentous green algae	0.00	0.00	5	3.00	6.71	5	0.00	0.00	5	0.00	0.00	5
Fucus gardneri	1.90	1.14	5	0.20	0.45	5	0.00	0.00	5	0.60	0.55	5
Fucus gardneri (sporelings)	0.60	0.22	5	0.20	0.27	5	0.00	0.00	5	0.50	0.35	5
Gloiopeltis furcata	5.20	11.07	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Green algal film	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Hildenbrandia rubra	0.60	0.82	5	1.60	2.30	5	0.20	0.27	5	0.20	0.27	5
Melanosiphon intestinalis	0.10	0.22	5	0.40	0.89	5	0.00	0.00	5	0.00	0.00	5
Neorhodomela oregona	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Ralfsia sp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Verrucaria spp.	21.40	17.24	5	4.00	8.94	5	0.00	0.00	5	6.00	8.94	5
Balanus glandula (%)	0.80	1.25	5	4.70	8.58	5	0.00	0.00	5	0.00	0.00	5
Balanus/Semibalanus spp., (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Buccinum baeri	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Chthamalus dalli (% set)	0.00	0.00	5	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5
Chthamalus dalli (%)	0.30	0.27	5	0.30	0.27	5	0.10	0.22	5	0.20	0.45	5
Gobiesox spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Isopoda, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Leptasterias hexactis	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Ligia spp.	5.20	8.93	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Littorina scutulata	21.20	22.93	5	35.00	34.53	5	42.40	37.19	5	13.20	13.52	5
Littorina sitkana	47.60	98.06	5	11.40	15.26	5	17.00	14.27	5	24.80	18.51	5
Littorina sitkana (juv.)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.40	0.89	5
Lottia pelta	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottia strigatella	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Lottiidae, unid.	4.40	9.84	5	1.20	2.68	5	0.00	0.00	5	2.60	5.81	5
Mytilus edulis (% spat)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
Mytilus edulis (%)	0.00	0.00	5	0.20	0.27	5	0.00	0.00	5	0.60	1.34	5

Table C-2-1 (continued)

TAXON	Outside Bay			Block Island			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Nucella lamellosa</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Nucella lima</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Oligochaeta</i> , unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Pagurus</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% set)	0.10	0.22	5	0.10	0.22	5	0.00	0.00	5	0.30	0.27	5
<i>Semibalanus balanoides</i> (%)	0.00	0.00	5	0.30	0.45	5	0.90	1.19	5	0.40	0.22	5
<i>Semibalanus cariosus</i> (%)	0.10	0.22	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Tectura persona</i>	0.00	0.00	5	0.00	0.00	5	1.00	2.24	5	3.00	4.24	5
<i>Tectura scutum</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Tectura testudinalis</i>	0.00	0.00	5	0.20	0.45	5	0.60	1.34	5	0.00	0.00	5
<i>Balanus glandula</i> (% dead)	0.20	0.27	5	0.10	0.22	5	0.10	0.22	5	0.00	0.00	5
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
<i>Mytilus edulis</i> (dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.40	0.42	5	0.10	0.22	5
<i>Semibalanus cariosus</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
<i>Semibalanus balanoides</i> (% set, dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.10	0.22	5
Boulder/cobble (%)	0.00	0.00	5	0.00	0.00	5	2.00	4.47	5	20.00	41.98	5
Gravel/sand(%)	0.00	0.00	5	0.00	0.00	5	3.00	4.47	5	1.00	2.24	5
Oil scale (primary)	0.00	0.00	5	6.00	0.00	5	5.80	0.45	5	0.00	0.00	5
Oil cover (%) (primary)	0.00	0.00	5	4.60	8.61	5	9.80	11.73	5	0.00	0.00	5
Rock (%)	100.00	0.00	5	100.00	0.00	5	95.00	5.00	5	79.00	44.22	5
Water (%)	0.40	0.89	5	5.10	11.13	5	0.00	0.00	5	0.10	0.22	5
Oil scale (secondary)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5
Oil cover (%) (secondary)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5	0.00	0.00	5

Table C-2-2. Rocky middle intertidal epibiota, July 1991.

Taxon	NW Bay Islet			Ingot Island			Snug Harbor			Crab Bay			Hogg Bay			Outside Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Acrosiphonia spp.	1.50	3.37	10	0.00	0.00	8	2.10	6.29	10	0.05	0.16	10	0.45	0.64	10	1.30	1.69	10
Anatipus japonicus	0.05	0.16	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Articulated coralline algae	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Blue-green algae, crust	14.00	21.71	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.05	0.16	10
Blue-green algae, spheroids	0.05	0.16	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
Cladophora sericea	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Cryptosiphonia woodii	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Diatoms	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.00	3.16	10
Elachista fucicola	0.10	0.21	10	0.00	0.00	8	0.25	0.26	10	0.00	0.00	10	0.65	0.91	10	3.95	4.34	10
Encrusting coralline algae	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.63	10
Encrusting green algae	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.05	0.16	10	0.20	0.35	10	0.00	0.00	10
Endocladia muricata	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.75	1.23	10	0.20	0.35	10
Endozoic green algae	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.30	0.35	10	0.00	0.00	10
Enteromorpha intestinalis	4.15	6.90	10	0.00	0.00	8	1.15	1.11	10	0.00	0.00	10	0.35	0.63	10	1.35	1.36	10
Enteromorpha linza	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
Enteromorpha prolifera	0.00	0.00	10	0.00	0.00	8	0.70	2.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Fucus gardneri	10.70	16.04	10	0.06	0.18	8	16.70	13.68	10	49.70	29.57	10	46.60	33.04	10	34.20	21.34	10
Fucus gardneri (sporelings)	0.55	0.60	10	0.00	0.00	8	1.40	1.45	10	1.15	1.47	10	0.80	0.71	10	0.65	0.53	10
Gloiopeltis furcata	0.40	0.66	10	0.50	0.65	8	1.65	1.80	10	0.75	0.92	10	0.65	1.20	10	1.65	1.90	10
Halosaccion glandiforme	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.95	2.49	10	1.75	2.96	10
Hildenbrandia rubra	0.05	0.16	10	1.00	0.96	8	0.50	1.08	10	0.15	0.34	10	9.70	10.91	10	5.20	5.24	10
Leathesia difformis	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Mastocarpus papillatus	0.00	0.00	10	0.00	0.00	8	0.05	0.16	10	0.05	0.16	10	1.30	1.20	10	0.45	0.50	10
Melanosiphon intestinalis	0.35	0.67	10	0.00	0.00	8	0.55	0.80	10	0.00	0.00	10	0.05	0.16	10	1.80	3.28	10
Monostroma grevillei	0.00	0.00	10	0.00	0.00	8	3.40	6.19	10	0.00	0.00	10	0.15	0.34	10	0.00	0.00	10
Neorhodomela larix	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Neorhodomela oregona	0.10	0.32	10	0.00	0.00	8	0.65	1.89	10	0.50	1.58	10	0.15	0.24	10	0.20	0.26	10
Palmaria callophytioides	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	1.00	3.16	10	0.00	0.00	10
Pilayella littoralis	9.75	21.71	10	0.00	0.00	8	1.85	3.16	10	0.10	0.21	10	0.50	0.85	10	1.65	3.10	10
Porphyra spp.	0.05	0.16	10	0.00	0.00	8	0.25	0.26	10	0.00	0.00	10	0.20	0.35	10	0.05	0.16	10
Pterosiphonia bipinnata	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
Ralfsia sp.	0.00	0.00	10	0.06	0.18	8	0.40	0.94	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Rhodochorton purpureum	0.00	0.00	10	0.00	0.00	8	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Scytosiphon lomentaria	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
Soranthera ulvoidea	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
Sphacelaria rigidula	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
Ulva/Ulvaria spp.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.55	0.80	10

C-1-12

Table C-2-2 (continued)

Taxon	NW Bay Islet			Ingot Island			Snug Harbor			Crab Bay			Hogg Bay			Outside Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Anthopleura artemisia</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Anthopleura elegantissima</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus crenatus</i> (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (% set)	0.00	0.00	10	0.00	0.00	8	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (%)	2.10	4.79	10	0.19	0.26	8	0.60	0.21	10	0.10	0.21	10	3.25	9.41	10	0.05	0.16	10
<i>Balanus rostratus</i> (%)	0.00	0.00	10	0.06	0.18	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.00	0.00	10
<i>Buccinum baeri</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% set)	0.10	0.21	10	0.06	0.18	8	0.35	0.24	10	0.00	0.00	10	0.00	0.00	10	1.25	1.50	10
<i>Chthamalus dalli</i> (%)	1.30	1.14	10	0.50	0.00	8	0.50	0.24	10	0.50	0.58	10	5.20	5.95	10	28.00	22.55	10
Cottidae, unid.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Emplectonema gracile</i>	0.00	0.00	10	0.00	0.00	8	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting bryozoan (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
Gammaridea, unid.	0.00	0.00	9	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	7
<i>Gnorimosphaeroma oregonensis</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Hemigrapsus oregonensis</i>	0.10	0.32	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Hiatella arctica</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Isopoda, unid.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Katharina tunicata</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Lacuna</i> spp.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Leptasterias hexactis</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
<i>Littorina scutulata</i>	316.60	245.64	10	16.25	15.29	8	46.90	18.53	10	24.10	19.55	10	57.00	59.52	10	2.40	3.27	10
<i>Littorina scutulata</i> (juv.)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Littorina sitkana</i>	71.30	81.11	10	42.75	43.57	8	16.70	7.63	10	91.70	83.11	10	68.90	100.34	10	0.50	0.97	10
<i>Littorina sitkana</i> (juv.)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	4.10	12.97	10	0.00	0.00	10	0.00	0.00	10
<i>Littorina</i> spp., eggs (%)	0.05	0.16	10	0.00	0.00	8	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Lottia limatula</i>	0.00	0.00	10	0.00	0.00	8	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Lottia pelta</i>	0.80	2.53	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.60	0.70	10
Lottidae, unid.	6.60	9.30	10	18.75	10.18	8	7.40	6.88	10	22.90	20.84	10	22.60	21.71	10	12.20	15.70	10
Mites, red	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.80	1.32	10
<i>Musculus</i> spp.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mytilus edulis</i> (% spat)	0.25	0.35	10	0.06	0.18	8	0.30	0.26	10	0.10	0.21	10	7.30	12.28	10	0.00	0.00	10
<i>Mytilus edulis</i> (%)	2.30	3.16	10	1.75	1.96	8	2.90	3.71	10	0.40	0.32	10	0.00	0.00	10	0.00	0.00	10
Nemertea, white	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Nereidae, unid.	0.10	0.32	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Nucella lamellosa</i>	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	8.60	12.38	10	2.40	2.80	10
<i>Nucella lamellosa</i> (juv.)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10

C-1-13

Table C-2-2 (continued)

Taxon	NW Bay Islet			Ingot Island			Snug Harbor			Crab Bay			Hogg Bay			Outside Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Nucella lima	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Onchidella borealis	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	4.20	7.16	10	0.00	0.00	10
Pagurus beringanus	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.50	0.85	10	0.00	0.00	10
Pagurus granosimanus	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Pagurus hirsutiusculus	0.80	1.93	10	1.38	2.77	8	2.40	3.63	10	8.00	7.24	10	1.30	1.57	10	0.40	0.70	10
Pagurus spp.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Paranemertes peregrina	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	2.20	3.55	10	0.00	0.00	10
Pentidotea wosnesenskii	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Polychaeta, unid.	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Semibalanus balanoides (% set)	1.70	3.30	10	1.94	1.64	8	3.00	3.12	10	0.15	0.34	10	4.10	3.21	10	0.10	0.21	10
Semibalanus balanoides (%)	8.15	11.25	10	0.44	0.32	8	8.70	5.72	10	0.90	1.05	10	3.75	7.74	10	0.45	0.28	10
Semibalanus cariosus (% set)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
Semibalanus cariosus (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.20	0.26	10	24.20	27.78	10	0.05	0.16	10
Serpula vermicularis	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Siphonaria thersites	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	1.10	1.29	10	10.40	14.03	10	8.70	6.06	10
Siphonaria thersites, eggs (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Spirorbidae, unid. (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.34	10
Tectura persona	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
Tectura scutum	0.00	0.00	10	0.00	0.00	8	0.10	0.32	10	0.00	0.00	10	0.10	0.32	10	4.80	5.09	10
Tectura testudinalis	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.60	1.35	10
Tonicella lineata	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Encrusting coralline algae (dead)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Fucus gardneri (dead)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10
Balanus glandula (% dead)	0.05	0.16	10	0.06	0.18	8	0.00	0.00	10	0.05	0.16	10	0.15	0.24	10	0.00	0.00	10
Balanus/Semibalanus spp. (% dead)	0.00	0.00	10	0.13	0.35	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Chthamalus dalli (% dead)	0.05	0.16	10	0.13	0.23	8	0.00	0.00	10	0.10	0.21	10	0.15	0.34	10	0.05	0.16	10
Mytilus edulis (dead)	0.00	0.00	10	0.38	0.74	8	1.10	1.66	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Semibalanus balanoides (% dead)	0.35	0.34	10	0.31	0.26	8	0.45	0.28	10	0.30	0.26	10	0.20	0.35	10	0.35	0.34	10
Semibalanus cariosus (% dead)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.65	1.56	10	0.00	0.00	10
Semibalanus balanoides (% set, dead)	0.00	0.00	10	0.19	0.26	8	0.00	0.00	10	0.00	0.00	10	0.30	0.42	10	0.00	0.00	10
Boulder/cobble (%)	0.20	0.63	10	76.50	17.41	8	91.20	5.16	10	58.40	40.68	10	23.40	40.83	10	7.00	11.35	10
Gravel/sand(%)	1.00	3.16	10	23.50	17.41	8	8.80	5.16	10	21.60	28.94	10	0.10	0.32	10	0.00	0.00	10
Mud (%)	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil scale (primary)	0.00	0.00	10	4.50	2.78	8	0.30	0.95	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	0.00	0.00	10	0.44	0.32	8	0.50	1.58	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

C-1-14

Table C-2-2 (continued)

Taxon	NW Bay Islet			Ingot Island			Snug Harbor			Crab Bay			Hogg Bay			Outside Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Rock (%)	98.80	3.16	10	0.00	0.00	8	0.00	0.00	10	20.00	42.16	10	76.50	41.03	10	93.00	11.35	10
Water (%)	2.50	7.91	10	4.00	8.83	8	0.30	0.95	10	0.10	0.32	10	0.50	1.58	10	0.00	0.00	10
Oil scale (secondary)	0.00	0.00	10	0.25	0.46	8	0.60	1.90	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (secondary)	0.00	0.00	10	0.31	0.70	8	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

Table C-2-2 (continued)

Taxon	Bay of Isles			Block Island			NW Bay, W Arm			NW Bay, W Arm			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Acrosiphonia spp.	0.00	0.00	10	2.30	4.70	10	2.00	3.08	5	1.20	2.14	5	2.75	3.22	10	2.25	3.29	10
Analipus japonicus	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Articulated coralline algae	0.00	0.00	10	0.00	0.00	10	0.10	0.22	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Blue-green algae, crust	0.20	0.63	10	0.10	0.32	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Blue-green algae, spheroids	0.05	0.16	10	0.20	0.26	10	0.00	0.00	5	0.10	0.22	5	0.55	0.28	10	0.15	0.24	10
Cladophora sericea	0.00	0.00	10	0.60	1.58	10	0.00	0.00	5	0.00	0.00	5	0.40	1.26	10	0.00	0.00	10
Cryptosiphonia woodii	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.40	0.89	5	0.00	0.00	10	0.00	0.00	10
Diatoms	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Elachista fucicola	0.00	0.00	10	0.25	0.42	10	0.10	0.22	5	3.80	6.30	5	1.35	2.43	10	0.15	0.34	10
Encrusting coralline algae	0.00	0.00	10	0.00	0.00	10	0.20	0.27	5	4.60	8.64	5	0.05	0.16	10	0.00	0.00	10
Encrusting green algae	0.00	0.00	10	0.15	0.24	10	0.50	0.87	5	0.10	0.22	5	0.15	0.34	10	0.00	0.00	10
Endocladia muricata	0.00	0.00	10	0.05	0.16	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Endozoic green algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Enteromorpha intestinalis	0.00	0.00	10	2.00	2.35	10	0.30	0.27	5	0.00	0.00	5	0.00	0.00	10	0.25	0.63	10
Enteromorpha linza	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Enteromorpha prolifera	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.15	0.24	10
Fucus gardneri	72.50	16.54	10	32.40	29.95	10	34.40	24.89	5	88.00	10.37	5	50.70	24.80	10	48.55	34.41	10
Fucus gardneri (sporelings)	0.40	0.61	10	0.90	1.13	10	2.40	1.67	5	2.40	4.34	5	4.60	4.69	10	1.85	2.30	10
Gloiopeltis furcata	4.10	6.01	10	1.40	2.49	10	7.20	4.97	5	0.70	0.84	5	0.55	0.37	10	1.55	1.92	10
Halosaccion glandiforme	0.00	0.00	10	0.15	0.34	10	0.00	0.00	5	2.10	3.32	5	0.05	0.16	10	0.00	0.00	10
Hildenbrandia rubra	4.00	5.51	10	3.00	3.13	10	9.40	10.36	5	18.00	24.07	5	0.40	0.94	10	0.05	0.16	10
Leathesia difformis	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.15	0.24	10	0.00	0.00	10
Mastocarpus papillatus	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	1.40	1.64	5	0.05	0.16	10	0.00	0.00	10
Melanosiphon intestinalis	0.00	0.00	10	2.75	2.35	10	0.50	0.87	5	0.50	0.87	5	1.15	1.70	10	0.00	0.00	10
Monostroma grevillei	0.00	0.00	10	2.30	3.97	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Neorhodomela larix	0.00	0.00	10	1.30	3.20	10	0.10	0.22	5	5.60	10.88	5	0.00	0.00	10	0.00	0.00	10
Neorhodomela oregona	0.00	0.00	10	2.30	4.60	10	3.40	6.49	5	11.40	6.69	5	2.20	2.93	10	2.75	7.84	10
Palmaria callophyloides	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Pilayella littoralis	0.00	0.00	10	4.65	8.04	10	0.10	0.22	5	8.40	7.09	5	21.90	14.47	10	0.05	0.16	10
Porphyra spp.	0.00	0.00	10	0.00	0.00	10	0.10	0.22	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Pterosiphonia bipinnata	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.05	0.16	10
Ralfsia sp.	0.00	0.00	10	0.05	0.16	10	0.00	0.00	5	0.00	0.00	5	0.60	1.58	10	0.00	0.00	10
Rhodochorton purpureum	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.10	0.22	5	0.00	0.00	10	0.00	0.00	10
Scytosiphon lomentaria	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Soranthra ulvoidea	0.00	0.00	10	0.00	0.00	10	1.00	2.24	5	0.20	0.27	5	0.00	0.00	10	0.35	0.63	10
Sphacelaria rigidula	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Ulva/Ulvaria spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.60	0.82	5	0.00	0.00	10	0.00	0.00	10

Table C-2-2 (continued)

Taxon	Bay of Isles			Block Island			NW Bay, W Arm			NW Bay, W Arm			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Anthopleura artemisia</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.30	0.67	10
<i>Anthopleura elegantissima</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	5	0.40	0.55	5	0.00	0.00	10	0.00	0.00	10
<i>Balanus crenatus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.10	0.22	5	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (%)	0.20	0.35	10	10.10	7.31	10	0.40	0.22	5	0.10	0.22	5	0.15	0.34	10	0.25	0.35	10
<i>Balanus rostratus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Buccinum baeri</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.30	0.67	10
<i>Chthamalus dalli</i> (% set)	0.00	0.00	10	0.15	0.24	10	0.10	0.22	5	0.60	0.82	5	0.00	0.00	10	0.05	0.16	10
<i>Chthamalus dalli</i> (%)	0.00	0.00	10	0.30	0.35	10	15.40	6.91	5	23.00	5.70	5	0.50	0.33	10	1.45	1.96	10
Cottidae, unid.	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Emplectonema gracile</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Encrusting bryozoan (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Gammaridea, unid.	0.00	0.00	9	0.00	0.00	10	0.00	0.00	5	0.00	0.00	4	0.00	0.00	10	0.00	0.00	10
<i>Gnorimosphaeroma oregonensis</i>	0.20	0.42	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.10	0.32	10	0.00	0.00	10
<i>Hemigrapsus oregonensis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Hiatella arctica</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.20	0.63	10
Isopoda, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Katharina tunicata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Lacuna</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Leptasterias hexactis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Littorina scutulata</i>	24.50	21.56	10	39.30	38.97	10	41.80	48.15	5	9.20	7.85	5	182.40	166.60	10	73.30	57.65	10
<i>Littorina scutulata</i> (juv.)	0.00	0.00	10	0.30	0.95	10	271.00	368.28	5	1.00	2.24	5	25.00	67.46	10	3.60	7.65	10
<i>Littorina sitkana</i>	122.20	50.65	10	39.50	31.23	10	9.40	8.88	5	62.60	70.23	5	42.10	28.36	10	211.20	213.05	10
<i>Littorina sitkana</i> (juv.)	0.00	0.00	10	0.00	0.00	10	2.20	3.03	5	0.00	0.00	5	0.80	2.53	10	0.00	0.00	10
<i>Littorina</i> spp., eggs (%)	0.00	0.00	10	0.15	0.34	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Lottia limatula</i>	0.00	0.00	10	0.00	0.00	10	0.40	0.55	5	0.40	0.89	5	0.30	0.67	10	0.60	1.26	10
<i>Lottia pelta</i>	11.40	10.44	10	0.50	0.97	10	4.60	6.27	5	2.80	2.17	5	1.70	2.71	10	3.50	4.17	10
Lottidae, unid.	9.90	7.80	10	7.90	6.82	10	15.40	12.97	5	42.20	52.33	5	44.10	30.69	10	23.60	25.11	10
Mites, red	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.20	0.45	5	0.00	0.00	10	0.00	0.00	10
<i>Musculus</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.10	0.32	10
<i>Mytilus edulis</i> (% spat)	0.30	0.26	10	0.45	0.16	10	0.50	0.00	5	0.40	0.42	5	0.60	0.39	10	1.05	0.98	10
<i>Mytilus edulis</i> (%)	4.25	4.04	10	6.35	5.35	10	0.00	0.00	5	0.00	0.00	5	3.60	3.20	10	9.15	11.85	10
Nemertea, white	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.10	0.32	10
Nereidae, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Nucella lamellosa</i>	0.00	0.00	10	0.00	0.00	10	0.40	0.89	5	7.00	5.34	5	0.00	0.00	10	0.10	0.32	10
<i>Nucella lamellosa</i> (juv.)	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10

Table C-2-2 (continued)

Taxon	Bay of Isles			Block Island			NW Bay, W Arm			NW Bay, W Arm			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Nucella lima</i>	0.90	1.29	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.30	0.67	10
<i>Onchidella borealis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Pagurus beringanus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Pagurus granosimanus</i>	0.10	0.32	10	0.10	0.32	10	0.40	0.55	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Pagurus hirsutiusculus</i>	3.60	5.89	10	2.20	5.09	10	1.80	2.49	5	11.20	8.47	5	2.60	3.10	10	1.90	2.13	10
<i>Pagurus</i> spp.	0.20	0.63	10	0.90	1.85	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Paranemertes peregrina</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.10	0.32	10	0.20	0.42	10
<i>Pentidotea wosnesenskii</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Polychaeta, unid.	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.20	0.45	5	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.35	0.24	10	2.10	2.07	10	7.20	9.58	5	0.40	0.42	5	1.45	1.42	10	2.30	3.33	10
<i>Semibalanus balanoides</i> (%)	6.40	6.86	10	12.90	9.29	10	11.70	14.54	5	0.30	0.27	5	20.50	7.25	10	19.50	13.63	10
<i>Semibalanus cariosus</i> (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.10	0.22	5	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus cariosus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.70	0.84	5	0.00	0.00	10	0.00	0.00	10
<i>Serpula vermicularis</i>	0.00	0.00	10	0.00	0.00	10	0.40	0.89	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Siphonaria thersites</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	21.20	13.55	5	0.00	0.00	10	0.00	0.00	10
<i>Siphonaria thersites</i> , eggs (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.50	0.35	5	0.00	0.00	10	0.00	0.00	10
Spirorbidae, unid. (%)	0.00	0.00	10	0.00	0.00	10	0.10	0.22	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Tectura persona</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Tectura scutum</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.20	0.45	5	0.00	0.00	10	0.00	0.00	10
<i>Tectura testudinalis</i>	0.00	0.00	10	0.40	0.97	10	1.80	4.02	5	1.40	1.95	5	0.20	0.42	10	0.00	0.00	10
<i>Tonicella lineata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.20	0.45	5	0.00	0.00	10	0.00	0.00	10
Encrusting coralline algae (dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.05	0.16	10	0.00	0.00	10
<i>Fucus gardneri</i> (dead)	0.00	0.00	10	0.10	0.21	10	0.30	0.27	5	0.20	0.27	5	0.10	0.32	10	0.00	0.00	10
<i>Balanus glandula</i> (% dead)	0.10	0.21	10	0.25	0.26	10	0.10	0.22	5	0.00	0.00	5	0.00	0.00	10	0.05	0.16	10
<i>Balanus/Semibalanus</i> spp. (% dead)	0.00	0.00	10	0.00	0.00	10	0.20	0.45	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	10	0.00	0.00	10	0.20	0.27	5	0.10	0.22	5	0.00	0.00	10	0.10	0.21	10
<i>Mytilus edulis</i> (dead)	0.50	0.85	10	0.80	1.03	10	0.20	0.45	5	0.80	1.79	5	1.30	2.31	10	3.00	2.36	10
<i>Semibalanus balanoides</i> (% dead)	0.40	0.21	10	0.30	0.35	10	0.20	0.27	5	0.00	0.00	5	0.50	0.00	10	0.55	0.28	10
<i>Semibalanus cariosus</i> (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.30	0.27	5	0.00	0.00	10	0.00	0.00	10
Boulder/cobble (%)	33.10	45.80	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	5.80	12.26	10	45.40	42.51	10
Gravel/sand(%)	1.60	1.96	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	1.50	3.24	10	3.10	4.04	10
Mud (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.10	0.32	10	0.00	0.00	10
Oil scale (primary)	0.00	0.00	10	6.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	0.00	0.00	10	1.85	1.75	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10

Table C-2-2 (continued)

Taxon	Bay of Isles			Block Island			Treated NW Bay, W Arm			Untreated NW Bay, W Arm			Herring Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Rock (%)	65.30	45.93	10	100.00	0.00	10	100.00	0.00	5	100.00	0.00	5	92.60	15.36	10	51.50	43.34	10
Water (%)	0.00	0.00	10	3.20	6.25	10	7.60	12.70	5	3.20	4.32	5	1.10	1.91	10	0.00	0.00	10
Oil scale (secondary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (secondary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	5	0.00	0.00	5	0.00	0.00	10	0.00	0.00	10

Table C-2-3. Rocky lower intertidal epibiota, July 1991.

Taxon	Outside Bay			NW Bay Islet			Snug Harbor			Crab Bay			Hogg Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Acrosiphonia spp.	6.10	11.11	10	3.85	3.59	10	51.40	33.45	10	15.20	11.78	10	2.00	2.47	9	11.80	10.71	10
Articulated coralline algae	0.35	0.63	10	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10	0.00	0.00	9	0.90	1.56	10
Beggiatoa spp.	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Blue-green algae, spheroids	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.05	0.16	10
Chaetomorpha melagonium	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Constantinea subulifera	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10
Cryptosiphonia woodii	6.80	4.42	10	0.25	0.35	10	1.90	2.08	10	1.40	1.49	10	0.89	1.36	9	0.40	0.97	10
Diatoms	0.00	0.00	10	6.50	15.99	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Dictyosiphon foeniculaceus	0.00	0.00	10	0.05	0.16	10	10.10	12.61	10	0.30	0.95	10	0.00	0.00	9	0.00	0.00	10
Elachista fucicola	0.00	0.00	10	1.05	1.86	10	0.60	0.91	10	0.15	0.34	10	4.56	3.32	9	3.65	3.73	10
Encrusting coralline algae	0.60	0.88	10	0.25	0.63	10	0.00	0.00	10	0.25	0.35	10	0.00	0.00	9	1.80	1.78	10
Encrusting green algae	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Endocladia muricata	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
Enteromorpha intestinalis	0.00	0.00	10	0.85	0.85	10	0.25	0.26	10	0.00	0.00	10	0.06	0.17	9	0.00	0.00	10
Enteromorpha linza	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.06	0.17	9	0.00	0.00	10
Enteromorpha prolifera	0.05	0.16	10	0.00	0.00	10	0.75	1.62	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Filamentous red algae	11.40	10.96	10	0.15	0.34	10	0.05	0.16	10	0.00	0.00	10	1.33	3.27	9	0.40	0.61	10
Fucus gardneri	9.80	8.05	10	56.70	19.58	10	25.00	13.54	10	32.20	18.67	10	71.11	34.31	9	51.00	27.37	10
Fucus gardneri (sporelings)	0.00	0.00	10	0.30	0.26	10	0.25	0.26	10	0.15	0.34	10	0.06	0.17	9	0.55	0.83	10
Giropeltis furcata	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Halosaccion glandiforme	3.00	2.87	10	0.20	0.35	10	0.00	0.00	10	17.50	13.39	10	0.67	0.25	9	11.95	12.05	10
Hildenbrandia rubra	0.05	0.16	10	5.05	9.31	10	0.20	0.26	10	0.00	0.00	10	2.83	8.31	9	0.00	0.00	10
Iridaea heterocarpa	2.00	1.70	10	0.20	0.42	10	0.00	0.00	10	2.10	6.30	10	1.06	1.18	9	0.40	1.26	10
Leathesia difformis	0.55	0.28	10	0.05	0.16	10	0.00	0.00	10	0.15	0.24	10	0.17	0.25	9	2.00	2.78	10
Mastocarpus papillatus	6.00	4.24	10	0.45	0.96	10	0.20	0.35	10	0.00	0.00	10	0.22	0.67	9	1.05	3.15	10
Melanosiphon intestinalis	0.00	0.00	10	0.10	0.21	10	0.95	1.23	10	0.15	0.34	10	0.17	0.25	9	0.00	0.00	10
Monostroma grevillei	3.80	2.70	10	4.10	3.63	10	12.95	13.14	10	4.95	6.38	10	4.94	6.30	9	0.10	0.21	10
Nemalion helminthoides	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Neorhodomela larix	15.70	20.61	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.28	0.67	9	13.70	20.01	10
Neorhodomela oregona	7.30	10.41	10	2.80	4.77	10	23.70	19.03	10	6.05	8.00	10	3.28	4.70	9	3.05	6.46	10
Neorhodomela spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	2.40	6.22	10
Odonthalia floccosa	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.30	1.77	10	3.44	4.16	9	0.00	0.00	10
Palmaria calophylloides	0.15	0.24	10	0.00	0.00	10	0.20	0.26	10	5.50	5.96	10	0.17	0.35	9	2.45	2.91	10
Palmaria hecatensis	17.40	13.62	10	0.00	0.00	10	0.00	0.00	10	11.70	14.75	10	1.06	2.10	9	0.00	0.00	10
Palmaria mollis	0.10	0.32	10	0.00	0.00	10	0.10	0.21	10	0.20	0.42	10	0.06	0.17	9	0.00	0.00	10
Palmaria spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Petrocellis sp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.06	0.17	9	0.45	0.83	10
Phycodrys riggii	1.65	1.67	10	0.00	0.00	10	0.00	0.00	10	0.75	1.23	10	0.33	0.43	9	0.10	0.32	10

Table C-2-3 (continued)

Taxon	Outside Bay			NW Bay Islet			Snug Harbor			Crab Bay			Hogg Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Pilayella littoralis</i>	1.55	3.10	10	25.60	17.86	10	16.35	13.86	10	3.80	2.94	10	1.61	3.30	9	0.00	0.00	10
<i>Polysiphonia</i> sp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.50	1.58	10
<i>Porphyra</i> spp.	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.35	0.67	10	0.11	0.22	9	0.00	0.00	10
<i>Pterosiphonia bipinnata</i>	12.10	14.38	10	0.00	0.00	10	2.15	1.86	10	4.95	5.34	10	16.06	24.34	9	0.00	0.00	10
<i>Pterosiphonia</i> spp.	0.00	0.00	10	0.20	0.63	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.20	0.63	10
<i>Ptilota filicina</i>	1.10	1.07	10	0.00	0.00	10	0.10	0.32	10	0.50	1.08	10	0.00	0.00	9	0.00	0.00	10
<i>Punctaria serrata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	9	0.00	0.00	10
<i>Ralfsia</i> sp.	0.05	0.16	10	1.05	1.61	10	0.05	0.16	10	0.15	0.34	10	0.00	0.00	9	3.50	4.45	10
<i>Rhodochorton purpureum</i>	0.00	0.00	10	0.05	0.16	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Rhodoglossum/Mastocarpus</i>	0.20	0.63	10	0.00	0.00	10	0.45	0.37	10	4.80	7.42	10	1.28	2.08	9	0.20	0.63	10
<i>Scagelia pylaisaai</i>	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Scytosiphon lomentaria</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	9	0.00	0.00	10
<i>Soranthra ulvoidea</i>	0.70	0.59	10	0.00	0.00	10	0.00	0.00	10	0.20	0.35	10	0.33	0.66	9	0.85	0.97	10
<i>Sphacelaria rigidula</i>	3.70	3.80	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Spongonema tomentosum</i>	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Tokidodendron kurilensis</i>	8.25	9.27	10	0.05	0.16	10	0.00	0.00	10	0.25	0.35	10	0.72	1.09	9	0.10	0.21	10
<i>Ulothrix flacca</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	2.20	4.66	10	0.00	0.00	9	0.00	0.00	10
<i>Ulva/Ulvaria</i> spp.	1.25	0.72	10	5.35	10.75	10	2.10	2.23	10	8.40	8.80	10	3.94	3.79	9	0.20	0.35	10
Acarina	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.00	0.00	9	0.00	0.00	10
<i>Alcyonidium</i> spp. (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.89	1.17	9	0.00	0.00	10
Anthozoa, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.67	1.32	9	0.00	0.00	10
Asteriidae spp. (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.40	0.84	10
<i>Balanus crenatus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Balanus glandula</i> (%)	0.00	0.00	10	0.20	0.35	10	0.35	0.67	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Balanus rostratus</i> (% set)	0.00	0.00	10	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Balanus rostratus</i> (%)	0.00	0.00	10	3.75	7.60	10	0.45	0.60	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.05	0.16	10	0.15	0.24	10	0.00	0.00	10	0.06	0.17	9	0.00	0.00	10
Campanulariidae spp. (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.65	1.56	10
<i>Cancer oregonensis</i>	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Caulibugula</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.22	0.67	9	0.00	0.00	10
<i>Chthamalus dalli</i> (% set)	0.00	0.00	10	0.25	0.35	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.35	0.67	10
<i>Chthamalus dalli</i> (%)	0.85	1.38	10	2.30	4.72	10	0.20	0.26	10	0.05	0.16	10	0.11	0.22	9	2.25	4.73	10
<i>Dermasterias imbricata</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9	0.30	0.67	10
Doridacea, unid. brown	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10
Encrusting bryozoan (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.44	0.88	9	2.75	4.73	10
<i>Evasterias troschelli</i>	0.10	0.32	10	0.10	0.32	10	0.00	0.00	10	0.30	0.67	10	0.11	0.33	9	0.30	0.95	10
Gammaridea, unid.	0.00	0.00	3	0.00	0.00	7	0.00	0.00	10	0.00	0.00	7	0.00	0.00	3	0.00	0.00	10

Table C-2-3 (continued)

Taxon	Outside Bay			NW Bay Islet			Snug Harbor			Crab Bay			Hogg Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Gnorimosphaeroma oregonensis</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Gobiesox</i> spp.	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Halichondria panicea</i> (%)	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.11	0.33	9	0.00	0.00	10
<i>Hiatella arctica</i>	0.20	0.63	10	0.60	1.26	10	0.00	0.00	10	0.40	0.84	10	0.00	0.00	9	0.00	0.00	10
<i>Katharina tunicata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9	0.10	0.32	10
<i>Lacuna</i> spp.	4.11	6.86	9	4.50	8.25	10	0.00	0.00	10	1.80	2.62	10	1.33	2.69	9	459.10	481.12	10
<i>Lacuna</i> spp. (set)	0.00	0.00	10	2.60	8.22	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Leptasterias hexactis</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.90	1.29	10	1.00	1.32	9	0.00	0.00	10
<i>Leptasterias</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Littorina scutulata</i>	0.00	0.00	10	55.20	85.20	10	7.60	11.61	10	0.00	0.00	10	0.11	0.33	9	2.00	6.32	10
<i>Littorina scutulata</i> (juv.)	0.00	0.00	10	0.30	0.95	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Littorina sitkana</i>	0.00	0.00	10	7.80	8.66	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Lottia pelta</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.95	10
Lottiidae, unid.	1.90	3.28	10	36.30	36.93	10	9.10	13.65	10	15.20	23.20	10	15.67	12.30	9	15.00	21.31	10
Lottiidae, unid. (juv.)	0.60	1.90	10	0.20	0.63	10	0.00	0.00	10	0.90	2.85	10	0.00	0.00	9	0.60	1.90	10
<i>Margarites marginatus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	2.70	3.09	10	4.56	9.25	9	0.40	0.84	10
<i>Margarites pupillus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.20	1.81	10	0.00	0.00	9	1.00	2.21	10
<i>Mitrella gausapata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.70	1.06	10	0.00	0.00	9	0.00	0.00	10
<i>Mitrella</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.89	2.32	9	0.00	0.00	10
<i>Musculus</i> spp.	0.00	0.00	10	0.00	0.00	10	0.30	0.48	10	0.20	0.42	10	0.00	0.00	9	0.30	0.67	10
<i>Mytilus edulis</i> (% spat)	0.10	0.21	10	0.65	0.58	10	0.60	0.21	10	0.25	0.35	10	9.61	15.94	9	0.35	0.67	10
<i>Mytilus edulis</i> (%)	0.00	0.00	10	3.15	4.00	10	0.30	0.35	10	0.00	0.00	10	0.00	0.00	9	0.10	0.21	10
Nemertea, pink	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.22	0.67	9	0.00	0.00	10
Nemertea, white	0.30	0.48	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Nereidae, unid.	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Nucella lamellosa</i>	3.70	3.65	10	0.00	0.00	10	0.10	0.32	10	1.80	3.43	10	36.89	49.99	9	1.70	2.36	10
<i>Nucella lamellosa</i> (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	51.56	42.52	9	0.00	0.00	10
<i>Nucella</i> spp. (% eggs)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.06	0.17	9	0.00	0.00	10
<i>Nucella</i> spp. (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	30.90	72.58	10
<i>Onchidella borealis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.33	1.00	9	0.00	0.00	10
<i>Onchidoris bilamellata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10
<i>Pagurus beringanus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.11	0.33	9	0.20	0.63	10
<i>Pagurus granosimanus</i>	1.20	2.39	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.30	0.67	10
<i>Pagurus hirsutiusculus</i>	0.50	0.71	10	11.20	13.25	10	3.10	2.96	10	0.70	0.67	10	5.56	4.22	9	3.60	3.10	10
<i>Paranemertes peregrina</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.89	1.69	9	0.00	0.00	10
<i>Pentidotea wosnesenskii</i>	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Pholidae/Stichaeidae	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
<i>Pholis laeta</i>	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10

Table C-2-3 (continued)

Taxon	Outside Bay			NW Bay Islet			Snug Harbor			Crab Bay			Hogg Bay			Eshamy Bay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Phytichthys spp.	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Porifera, unid. orange (%)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Protothaca staminea	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Pugettia dalli	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Pycnopodia helianthoides	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Rhynchozoon bispinosum (%)	3.80	6.40	10	0.00	0.00	10	0.00	0.00	10	6.80	7.80	10	8.22	16.44	9	0.00	0.00	10
Searlesia dira	0.00	0.00	10	0.20	0.63	10	0.20	0.42	10	4.90	4.38	10	0.00	0.00	9	0.00	0.00	10
Semibalanus balanoides (% set)	0.00	0.00	10	2.30	6.29	10	0.15	0.34	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Semibalanus balanoides (%)	0.00	0.00	10	4.10	9.32	10	2.15	3.27	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Semibalanus cariosus (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	4.56	8.33	9	0.00	0.00	10
Semibalanus cariosus (%)	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	40.89	43.00	9	0.00	0.00	10
Siphonaria thersites	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	3.33	4.77	9	0.00	0.00	10
Spirorbidae, unid. (%)	0.90	1.49	10	0.10	0.21	10	0.05	0.16	10	0.70	0.54	10	0.00	0.00	9	0.50	0.41	10
Strongylocentrotus droebachien	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	9	0.30	0.67	10
Tectura testudinalis	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10
Tonicella lineata	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.33	1.00	9	0.20	0.63	10
Balanus crenatus (% dead)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Balanus glandula (% dead)	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Balanus rostratus (% dead)	0.00	0.00	10	0.45	0.69	10	0.20	0.26	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Balanus rostratus (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Balanus/Semibalanus spp. (% dead)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Balanus/Semibalanus spp. (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Chthamalus dalli (% dead)	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	9	2.00	4.61	10
Hiatella arctica (dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	4.00	9.10	10	0.00	0.00	9	0.00	0.00	10
Mytilus edulis (dead)	0.63	1.06	8	1.30	1.42	10	0.50	1.08	10	7.30	11.44	10	142.50	#####	4	0.50	1.27	10
Semibalanus balanoides (% dead)	0.00	0.00	10	0.15	0.24	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10
Semibalanus cariosus (% dead)	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.50	0.87	9	0.00	0.00	10
Spirorbidae (% dead)	0.25	0.35	10	0.05	0.16	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	9	0.00	0.00	10
Boulder/cobble (%)	89.50	31.49	10	0.00	0.00	10	87.00	30.72	10	13.00	22.51	10	20.22	40.24	9	2.20	6.29	10
Gravel/sand(%)	0.00	0.00	10	0.70	1.64	10	3.00	3.27	10	7.50	23.72	10	2.00	4.97	9	0.50	1.58	10
Mud (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.33	1.00	9	0.00	0.00	10
Rock (%)	0.50	1.58	10	99.30	1.64	10	0.00	0.00	10	69.50	42.59	10	77.44	43.92	9	97.30	7.86	10
Tidepool (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.00	2.11	10
Water (%)	0.00	0.00	10	0.00	0.00	10	0.90	1.73	10	0.00	0.00	10	0.00	0.00	9	1.00	3.16	10

Table C-3-1. Non-metric multidimensional scaling scores for epibiota from rocky mid-intertidal sites, July 1990 and 1991.

Site	1	2	3	4
1990				
Crab	-0.042	-0.155	0.567	-0.123
Eshamy	-0.309	-0.329	0.255	0.131
Hogg	0.533	0.413	0.355	0.352
Herring	-0.313	0.059	-0.063	-0.618
Bay of Isles	-0.734	-0.357	0.463	0.090
Outside	1.515	0.721	0.408	0.033
Snug	-0.566	0.094	0.149	0.149
Block	-0.766	0.483	-0.160	0.531
NW Bay Rocky Islet	-0.814	1.916	-0.088	-0.246
1991				
Crab	-0.096	-0.176	0.497	-0.335
Eshamy	-0.289	-0.364	-0.083	-0.118
Hogg	0.747	-0.215	0.185	0.414
Herring	-0.169	-0.433	-0.447	-0.200
Bay of Isles	-0.533	-0.478	0.279	-0.107
NW Bay W Arm "Untreated"	0.731	-0.715	-0.197	-0.319
Outside	1.661	-0.009	-0.335	-0.031
Snug	-0.240	0.043	-0.338	0.180
Block	-0.173	-0.427	-0.374	0.456
NW Bay West Arm Rocky	0.261	0.065	-0.446	-0.423
NW Bay Rocky Islet	-0.403	-0.137	-0.625	0.172

Ordination for 20 sites from 58 species

Table C-3-2. Non-metric multidimensional scaling scores for epibiota from rocky mid-intertidal sites, July 1990 and 1991 (less Outside Bay and Northwest Bay rocky islet 1990 outliers).

Site	1	2	3	4
1990				
Crab	0.172	-0.797	0.018	-0.094
Eshamy	-0.190	-0.372	-0.011	0.242
Hogg	0.959	-0.389	-0.939	-0.279
Herring	-0.245	-0.023	0.327	-0.859
Bay of Isles	-0.684	-0.716	0.151	0.381
Snug	-0.656	-0.147	-0.291	-0.022
Block	-0.981	0.344	-0.958	-0.275
1991				
Crab	0.091	-0.736	0.209	-0.313
Eshamy	-0.139	0.065	0.338	0.030
Hogg	1.105	0.053	-0.638	0.394
Herring	0.052	0.545	0.558	0.033
Bay of Isles	-0.441	-0.429	0.488	0.303
NW Bay W Arm "Untreated"	1.193	0.148	0.862	0.285
Snug	-0.297	0.507	-0.175	0.004
Block	-0.008	0.528	-0.189	0.649
NW Bay West Arm Rocky	0.471	0.581	0.132	-0.744
NW Bay Rocky Islet	-0.402	0.839	0.116	0.266

Ordination for 17 sites from 30 species

NMDS using Bray-Curtis similarity index on log transformed data.

Plot the first 3 axes scores to produce figures 4-5 through 4-8.

Table C-4-1. Boulder-cobble upper intertidal epibiota, July 1991.

Taxon	Bass Harbor			Smith Island			Pt Helen		
	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	n
Endozoid green algae	0.30	0.26	10	0.00	0.00	5	0.00	0.00	10
Fucus gardneri (sporelings)	0.00	0.00	10	0.00	0.00	5	0.05	0.16	10
Balanus glandula (%)	0.65	0.58	10	0.00	0.00	5	0.15	0.24	10
Balanus/Semibalanus spp., (% set)	0.80	0.48	10	0.00	0.00	5	0.00	0.00	10
Chthamalus dalli (% set)	0.20	0.26	10	0.00	0.00	5	0.05	0.16	10
Chthamalus dalli (%)	0.55	0.16	10	0.00	0.00	5	0.65	0.24	10
Littorina scutulata	2.00	4.94	10	0.00	0.00	5	1.70	1.95	10
Littorina scutulata (juv.)	0.00	0.00	10	0.00	0.00	5	42.30	60.30	10
Littorina sitkana	34.00	16.87	10	55.80	32.09	5	30.40	31.11	10
Littorina sitkana (juv.)	0.10	0.32	10	0.00	0.00	5	438.10	463.24	10
Lottia pelta	4.80	2.66	10	0.00	0.00	5	0.10	0.32	10
Lottiidae, unid.	0.20	0.42	10	0.20	0.45	5	9.30	11.20	10
Mytilus edulis (% spat)	0.00	0.00	10	0.00	0.00	5	0.05	0.16	10
Mytilus edulis (%)	0.90	0.61	10	0.00	0.00	5	0.05	0.16	10
Semibalanus balanoides (% set)	0.00	0.00	10	0.00	0.00	5	0.55	0.28	10
Semibalanus balanoides (%)	4.25	4.61	10	0.00	0.00	5	4.40	3.16	10
Semibalanus cariosus (%)	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10
Tectura scutum	7.40	5.15	10	0.00	0.00	5	0.00	0.00	10
Tectura testudinalis	0.00	0.00	10	0.00	0.00	5	0.10	0.32	10
Balanus glandula (% dead)	0.10	0.21	10	0.00	0.00	5	0.15	0.24	10
Mytilus edulis (dead)	0.10	0.32	10	0.00	0.00	5	0.05	0.16	10
Semibalanus balanoides (% dead)	0.20	0.26	10	0.00	0.00	5	0.40	0.32	10
Encrusting bryozoan (% dead)	0.00	0.00	10	0.00	0.00	5	0.10	0.21	10
Boulder/cobble (%)	93.10	5.76	10	95.80	6.06	5	93.50	18.86	10
Gravel/sand(%)	6.90	5.76	10	4.20	6.06	5	1.50	3.37	10
Oil scale (primary)	0.00	0.00	10	4.80	2.68	5	1.20	2.53	10
Oil cover (%) (primary)	0.00	0.00	10	0.70	0.45	5	0.15	0.34	10
Rock (%)	0.00	0.00	10	0.00	0.00	5	5.00	15.81	10
Cleanup debris	0.00	0.00	10	0.00	0.00	5	0.05	0.16	10
Oil scale (secondary)	0.00	0.00	10	1.00	2.24	5	0.00	0.00	10
Oil cover (%) (secondary)	0.00	0.00	10	0.10	0.22	5	0.00	0.00	10

Table C-4-2. Boulder-cobble middle intertidal epibiota, July 1991

Taxon	Bass Harbor			Smith Island			NE Latouche Is			Pt Helen		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Blue-green algae, spheroids	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
Fucus gardneri	0.50	0.82	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10
Fucus gardneri (sporelings)	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Gloiopeltis furcata	1.70	4.72	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Hildenbrandia rubra	0.00	0.00	10	2.85	6.12	10	4.95	6.09	10	0.00	0.00	10
Ralfsia sp.	0.75	0.86	10	0.85	1.73	10	0.00	0.00	10	0.00	0.00	10
Balanus glandula (%)	0.20	0.35	10	0.70	0.82	10	0.15	0.34	10	0.15	0.34	10
Balanus/Semibalanus spp., (% set)	0.00	0.00	10	0.05	0.16	10	0.50	0.24	10	0.00	0.00	10
Chthamalus dalli (% set)	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Chthamalus dalli (%)	1.15	1.11	10	1.55	1.36	10	1.10	1.39	10	0.60	0.61	10
Gammaridea, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10
Littorina scutulata	49.50	60.12	10	56.50	23.62	10	17.50	11.84	10	11.60	8.37	10
Littorina scutulata (juv.)	0.00	0.00	10	0.00	0.00	10	1.80	3.55	10	8.40	16.05	10
Littorina sitkana	23.40	36.16	10	#####	96.84	10	180.70	56.24	10	676.40	#####	10
Littorina sitkana (juv.)	0.00	0.00	10	0.00	0.00	10	5.30	7.69	10	4.00	9.24	10
Lottia limatula	0.00	0.00	10	0.00	0.00	10	3.20	4.10	10	0.20	0.42	10
Lottia pelta	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10	0.00	0.00	10
Lottidae, unid.	90.70	30.27	10	6.10	5.80	10	12.60	12.81	10	8.50	8.51	10
Musculus spp.	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.20	0.42	10
Mytilus edulis (% spat)	0.25	0.26	10	0.05	0.16	10	0.20	0.26	10	0.15	0.24	10
Mytilus edulis (%)	4.60	2.63	10	0.20	0.35	10	0.60	0.91	10	0.05	0.16	10
Pagurus hirsutiusculus	0.60	0.70	10	0.00	0.00	10	0.60	0.84	10	0.00	0.00	10
Polychaeta, unid.	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
Semibalanus balanoides (% set)	0.95	0.76	10	1.45	3.11	10	0.45	0.28	10	1.75	1.36	10
Semibalanus balanoides (%)	9.75	9.69	10	6.45	7.72	10	8.70	4.85	10	12.45	8.08	10
Semibalanus cariosus (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Tectura testudinalis	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10	0.00	0.00	10
Porphyra spp. (dead)	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Balanus glandula (% dead)	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10	0.00	0.00	10
Chthamalus dalli (% dead)	0.05	0.16	10	0.20	0.26	10	0.15	0.24	10	0.05	0.16	10
Mytilus edulis (dead)	0.20	0.63	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Semibalanus balanoides (% dead)	0.45	0.16	10	0.30	0.26	10	0.20	0.26	10	0.15	0.24	10
Semibalanus balanoides (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
Encrusting bryozoan (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Boulder/cobble (%)	95.10	3.57	10	99.00	1.41	10	100.00	0.00	10	87.60	13.01	10
Gravel/sand(%)	4.90	3.57	10	1.00	1.41	10	0.00	0.00	10	12.40	13.01	10
Oil scale (primary)	0.00	0.00	10	5.40	1.90	10	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	0.00	0.00	10	0.50	0.24	10	0.00	0.00	10	0.00	0.00	10

Table C-4-3. Boulder-cobble lower intertidal epibiota, July 1991.

Taxon	Bass Harbor			Smith Island			NE Latouche Is			Pt Helen		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	3.80	4.57	10	3.10	3.78	10	3.45	4.68	10	11.45	11.38	10
<i>Alaria taeniata</i>	0.00	0.00	10	1.10	3.14	10	0.00	0.00	10	1.00	3.16	10
Articulated coralline algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.35	0.34	10
Blue-green algae, crust	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Chordaria flagelliformis</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Cladophora sericea</i>	1.00	3.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Cryptosiphonia woodii</i>	3.80	3.43	10	0.10	0.21	10	0.00	0.00	10	0.10	0.32	10
<i>Cymathere triplicata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Desmarestia aculeata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	3.50	3.33	10
<i>Dictyosiphon foeniculaceus</i>	0.25	0.26	10	0.00	0.00	10	0.45	0.64	10	0.00	0.00	10
<i>Elachista fucicola</i>	2.25	4.64	10	5.70	3.06	10	0.00	0.00	10	0.00	0.00	10
<i>Elachista lubrica</i>	0.00	0.00	10	0.20	0.26	10	0.00	0.00	10	0.00	0.00	10
Encrusting coralline algae	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.20	0.26	10
<i>Enteromorpha intestinalis</i>	1.00	1.67	10	0.15	0.24	10	3.20	2.69	10	1.40	2.37	10
<i>Enteromorpha linza</i>	3.05	3.79	10	0.05	0.16	10	2.20	3.63	10	6.90	10.99	10
<i>Enteromorpha prolifera</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Eudesme virescens</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	4.90	4.36	10
Filamentous red algae	0.70	1.06	10	0.00	0.00	10	0.00	0.00	10	1.55	4.73	10
<i>Fucus gardneri</i>	40.50	28.34	10	76.30	23.83	10	0.35	0.94	10	0.00	0.00	10
<i>Fucus gardneri</i> (sporelings)	0.00	0.00	10	0.25	0.35	10	0.15	0.24	10	0.15	0.24	10
<i>Gloiopeltis furcata</i>	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Halosaccion glandiforme	0.10	0.21	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
<i>Hildenbrandia rubra</i>	0.05	0.16	10	1.90	3.24	10	6.25	9.10	10	5.90	5.55	10
<i>Iridaea heterocarpa</i>	2.10	2.81	10	0.20	0.63	10	0.00	0.00	10	0.30	0.63	10
<i>Laminaria</i> spp.	0.00	0.00	10	0.00	0.00	10	0.15	0.34	10	0.30	0.63	10
<i>Leathesia difformis</i>	0.45	0.28	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Mastocarpus papillatus</i>	0.20	0.26	10	0.45	0.69	10	0.05	0.16	10	0.00	0.00	10
<i>Melanosiphon intestinalis</i>	0.25	0.35	10	0.95	2.17	10	1.20	0.75	10	0.90	1.51	10
<i>Monostroma grevillei</i>	0.35	0.67	10	0.60	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Nemalion helminthoides</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Neorhodomela larix</i>	0.55	1.07	10	0.25	0.26	10	0.00	0.00	10	0.00	0.00	10
<i>Neorhodomela oregona</i>	6.30	6.00	10	0.85	1.49	10	0.00	0.00	10	0.00	0.00	10
<i>Odonthalia floccosa</i>	0.05	0.16	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
<i>Odonthalia kamschatica</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Odonthalia</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Palmaria callophyloides</i>	0.15	0.34	10	0.00	0.00	10	0.00	0.00	10	4.05	4.55	10
<i>Palmaria hecatensis</i>	0.15	0.34	10	10.60	10.98	10	0.05	0.16	10	0.30	0.42	10
<i>Palmaria mollis</i>	0.10	0.21	10	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10
<i>Petalonia fascia</i>	0.60	0.91	10	0.40	0.61	10	0.00	0.00	10	0.00	0.00	10
<i>Petrocelis</i> spp.	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Pilayella littoralis</i>	1.40	3.16	10	2.85	4.58	10	0.00	0.00	10	0.65	1.56	10
<i>Polysiphonia/Pterosiphonia</i> spp.	0.00	0.00	10	1.00	1.31	10	0.00	0.00	10	0.05	0.16	10
<i>Porphyra</i> spp.	1.25	1.16	10	0.10	0.21	10	0.20	0.42	10	0.30	0.26	10
<i>Pterosiphonia bipinnata</i>	2.10	1.73	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Ptilota filicina</i>	0.40	0.66	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Ralfsia fungiformis</i>	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Ralfsia</i> spp.	0.55	0.90	10	10.20	15.48	10	6.50	9.14	10	0.00	0.00	10
<i>Rhodochorton purpureum</i>	0.20	0.35	10	0.80	1.21	10	0.00	0.00	10	0.00	0.00	10
<i>Rhodoglossum/Mastocarpus</i>	0.75	1.03	10	0.80	1.30	10	0.00	0.00	10	0.45	0.50	10
<i>Saundersella simplex</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Scytosiphon lomentaria</i>	0.10	0.21	10	0.20	0.26	10	0.00	0.00	10	0.10	0.32	10
<i>Soranthera ulvoidea</i>	1.45	1.36	10	0.00	0.00	10	0.00	0.00	10	0.35	0.34	10
<i>Sphacelaria rigidula</i>	4.75	5.98	10	0.20	0.35	10	0.00	0.00	10	0.00	0.00	10
<i>Spongonema tomentosum</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Tokidadendron kurilensis</i>	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10

Table C-4-3 (continued)

Taxon	Bass Harbor			Smith Island			NE Latouche Is			Pt Helen		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Ulva/Ulvaria</i> spp.	4.40	3.63	10	0.25	0.26	10	0.00	0.00	10	11.90	12.71	10
<i>Alcyonidium</i> spp. (%)	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Anthopleura artemisia</i>	0.30	0.67	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Anthozoa, unid.	0.00	0.00	10	0.70	1.34	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus crenatus</i> (% set)	1.00	3.16	10	0.00	0.00	10	0.00	0.00	10	0.40	0.21	10
<i>Balanus crenatus</i> (%)	7.50	9.38	10	0.00	0.00	10	0.45	0.28	10	0.80	0.48	10
<i>Balanus glandula</i> (%)	0.50	1.58	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Balanus rostratus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Balanus/Semibalanus</i> spp. (%)	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.00	0.00	10	1.20	1.77	10	0.20	0.26	10
<i>Chthamalus dalli</i> (%)	0.60	0.84	10	1.25	1.74	10	0.75	0.49	10	0.20	0.63	10
Cottidae, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Cryptobranchia concentrica</i>	0.30	0.48	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting bryozoan (%)	0.30	0.67	10	3.80	6.69	10	0.00	0.00	10	1.85	1.16	10
Foliose bryozoan (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.26	10
Gammaridea, unid.	0.00	0.00	10	0.00	0.00	6	0.00	0.00	10	0.00	0.00	7
<i>Halichondria panicea</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.34	10
Hydroids unid. (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Lacuna</i> spp.	0.00	0.00	10	3.50	5.85	10	0.00	0.00	10	4.70	7.48	10
<i>Lacuna</i> spp. (set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	354.40	283.15	10
<i>Littorina scutulata</i>	0.00	0.00	10	0.10	0.32	10	9.40	23.72	10	0.30	0.67	10
<i>Littorina scutulata</i> (juv.)	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
<i>Littorina sitkana</i>	0.00	0.00	10	0.10	0.32	10	1.60	3.75	10	0.10	0.32	10
<i>Lottia limatula</i>	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10
Lottiidae, unid.	25.60	32.58	10	38.60	32.09	10	24.90	33.06	10	0.40	0.70	10
<i>Margarites marginatus</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.50	0.97	10
<i>Margarites pupillus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Modiolus modiolus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	10.60	6.35	10
<i>Musculus</i> spp.	0.00	0.00	10	0.00	0.00	10	0.80	0.92	10	0.00	0.00	10
<i>Mytilus edulis</i> (% spat)	0.05	0.16	10	0.00	0.00	10	0.05	0.16	10	0.10	0.21	10
<i>Pagurus beringanus</i>	0.00	0.00	10	0.30	0.48	10	0.00	0.00	10	0.00	0.00	10
<i>Pagurus granosimanus</i>	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pagurus hirsutiusculus</i>	1.30	1.42	10	8.70	6.25	10	0.00	0.00	10	0.00	0.00	10
<i>Pentidotea wosnesenskii</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Pycnopodia helianthoides</i>	0.20	0.42	10	0.30	0.48	10	0.00	0.00	10	0.10	0.32	10
<i>Rhynchozoon bispinosum</i> (%)	0.80	1.75	10	1.30	1.83	10	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (%)	0.00	0.00	10	0.00	0.00	10	0.50	0.91	10	0.00	0.00	10
<i>Semibalanus cariosus</i> (% set)	0.05	0.16	10	0.15	0.24	10	0.00	0.00	10	0.05	0.16	10
<i>Semibalanus cariosus</i> (%)	0.30	0.26	10	0.10	0.21	10	0.00	0.00	10	0.05	0.16	10
<i>Serpula vermicularis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
Serpulidae, unid.	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Spirorbidae, unid. (%)	0.80	1.46	10	1.95	1.91	10	0.00	0.00	10	1.45	0.90	10
<i>Tectura testudinalis</i>	0.00	0.00	10	0.00	0.00	10	0.40	0.70	10	0.00	0.00	10
<i>Acrosiphonia</i> sp. (dead)	0.00	0.00	10	0.00	0.00	10	2.20	3.39	10	0.00	0.00	10
<i>Ulva/Ulvaria</i> spp. (dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Laminaria</i> spp. (dead)	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
<i>Balanus crenatus</i> (% dead)	0.40	0.39	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	10	0.35	0.24	10	0.10	0.21	10	0.00	0.00	10
Gammaridea (dead)	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10
Spirorbidae (% dead)	0.00	0.00	10	0.05	0.16	10	0.05	0.16	10	0.30	0.26	10
Encrusting bryozoan (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10

Table C-4-3 (continued)

Taxon	Bass Harbor			SD			NE Latouche Is			Pt Helen		
	Mean	SD	n	Mean	S.D.	n	Mean	SD	n	Mean	SD	n
Balanus crenatus (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10
Boulder/cobble (%)	61.80	43.32	10	99.30	1.57	10	100.00	0.00	10	95.50	7.25	10
Gravel/sand(%)	8.20	9.48	10	0.70	1.57	10	0.00	0.00	10	4.50	7.25	10
Water (%)	4.00	4.45	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

Table C-5-2. Middle mixed-soft intertidal epibiota, July 1991.

Taxon	Block Island			Crab Bay			Crafton Island			Mussel Beach			NW Bay W Arm		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	0.30	0.45	5	0.50	0.35	5	0.71	0.91	7	0.10	0.21	10	0.05	0.16	10
<i>Bangia</i> sp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Blue-green algae, spheroids	0.30	0.27	5	0.30	0.27	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Blue-green algae, crust	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Cryptosiphonia woodii</i>	0.10	0.22	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Elachista fucicola</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.15	0.34	10	0.00	0.00	10
Encrusting coralline algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Encrusting green algae	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.05	0.16	10	0.00	0.00	10
<i>Enteromorpha intestinalis</i>	0.40	0.42	5	0.00	0.00	5	0.00	0.00	7	1.55	1.86	10	0.05	0.16	10
<i>Enteromorpha prolifera</i>	0.40	0.89	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.15	0.24	10
Filamentous green algae	61.00	34.17	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Fucus gardneri</i>	3.80	3.90	5	0.00	0.00	5	1.29	2.98	7	9.05	12.77	10	1.35	3.06	10
<i>Fucus gardneri</i> (sporelings)	0.60	0.42	5	0.50	0.00	5	0.14	0.24	7	0.15	0.24	10	0.50	0.24	10
<i>Gloiopeltis furcata</i>	0.00	0.00	5	4.00	1.73	5	1.93	3.56	7	0.00	0.00	10	1.50	1.49	10
<i>Halosaccion glandiforme</i>	0.20	0.27	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Hildenbrandia rubra</i>	0.30	0.45	5	0.00	0.00	5	1.07	2.19	7	0.00	0.00	10	0.90	1.17	10
<i>Leathesia difformis</i>	0.00	0.00	5	0.00	0.00	5	0.07	0.19	7	0.00	0.00	10	0.00	0.00	10
<i>Mastocarpus papillatus</i>	0.10	0.22	5	0.10	0.22	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Melanosiphon intestinalis</i>	1.10	0.89	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.10	0.21	10
<i>Monostroma grevillei</i>	4.60	5.86	5	0.00	0.00	5	0.00	0.00	7	0.10	0.32	10	0.20	0.35	10
<i>Neorhodomela larix</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.40	1.26	10
<i>Neorhodomela oregona</i>	0.60	1.34	5	0.00	0.00	5	4.43	5.16	7	0.00	0.00	10	0.00	0.00	10
<i>Pilayella littoralis</i>	9.00	10.84	5	0.00	0.00	5	0.00	0.00	7	0.05	0.16	10	0.25	0.42	10
<i>Porphyra</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	1.80	3.79	10	0.05	0.16	10
<i>Pterosiphonia bipinnata</i>	0.00	0.00	5	0.00	0.00	5	0.14	0.24	7	0.00	0.00	10	0.00	0.00	10
<i>Soranthera ulvokoea</i>	0.10	0.22	5	0.00	0.00	5	0.07	0.19	7	0.00	0.00	10	0.05	0.16	10
<i>Balanus glandula</i> (%)	0.20	0.27	5	2.90	2.66	5	0.00	0.00	7	0.15	0.34	10	1.00	1.41	10
<i>Balanus glandula</i> (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.10	0.21	10
<i>Chthamalus dalli</i> (%)	0.10	0.22	5	0.00	0.00	5	0.00	0.00	7	0.25	0.35	10	0.40	0.84	10
<i>Mytilus edulis</i> (%)	4.80	3.96	5	19.20	7.56	5	22.14	12.86	7	57.30	37.65	10	1.35	1.58	10
<i>Mytilus edulis</i> (% spat)	0.30	0.45	5	0.50	0.35	5	0.21	0.27	7	0.40	0.39	10	0.35	0.34	10
<i>Nucella</i> spp. (% eggs)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.30	0.45	5	2.10	1.75	5	1.14	0.85	7	0.10	0.21	10	2.00	1.39	10
<i>Semibalanus balanoides</i> (%)	4.10	5.25	5	11.60	3.78	5	0.71	0.57	7	1.00	1.67	10	13.80	8.44	10

C-1-30

Table C-5-2 (continued)

Taxon	Block Island			Crab Bay			Crafton Island			Mussel Beach			NW Bay W Arm		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Nucella</i> spp. (% eggs)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.30	0.45	5	2.10	1.75	5	1.14	0.85	7	0.10	0.21	10	2.00	1.39	10
<i>Semibalanus balanoides</i> (%)	4.10	5.25	5	11.60	3.78	5	0.71	0.57	7	1.00	1.67	10	13.80	8.44	10
<i>Semibalanus cariosus</i> (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus cariosus</i> (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.05	0.16	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Littorina</i> spp., eggs (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.05	0.16	10
<i>Emplectonema gracile</i>	0.00	0.00	5	1.00	1.73	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Gammaridea, unid.	0.00	0.00	4	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Gnorimosphaeroma oregonensis</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Hemigrapsus oregonensis</i>	0.20	0.45	5	0.00	0.00	5	0.00	0.00	7	0.10	0.32	10	0.00	0.00	10
<i>Littorina scutulata</i>	4.60	4.45	5	19.60	10.81	5	101.57	70.55	7	27.20	45.51	10	41.00	27.08	10
<i>Littorina sitkana</i>	16.20	8.17	5	46.40	18.84	5	121.00	76.31	7	0.70	1.49	10	91.70	58.69	10
<i>Lottia pelta</i>	1.40	1.14	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.80	1.14	10
<i>Lottia strigatella</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Lottiidae, unid.	8.20	5.81	5	35.20	17.08	5	18.00	18.73	7	62.40	27.58	10	3.60	4.40	10
Lottiidae, unid. (juv.)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.30	0.95	10
Mites, red	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Musculus</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.10	0.32	10	0.00	0.00	10
Nemertea, unid.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Nucella lamellosa</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Nucella lima</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Onchidella borealis</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.90	2.23	10	0.00	0.00	10
<i>Pagurus granosimanus</i>	0.00	0.00	5	0.00	0.00	5	0.57	1.51	7	0.70	1.57	10	0.00	0.00	10
<i>Pagurus hirsutiusculus</i>	0.40	0.55	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Pagurus</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Paranemertes peregrina</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Pentidotea wosnesenskii</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Protothaca staminea</i>	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Tectura persona</i>	1.80	2.17	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Littorina sitkana</i> (juv.)	0.00	0.00	5	6.40	7.13	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Littorina scutulata</i> (juv.)	0.00	0.00	5	391.20	101.76	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Tectura testudinalis</i>	0.00	0.00	5	0.40	0.89	5	0.00	0.00	7	0.00	0.00	10	7.45	7.00	10
Platyhelminthes unid., red	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.10	0.32	10	0.00	0.00	10
<i>Gobiesox</i> spp.	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.05	0.16	10	0.00	0.00	10

Table C-5-2 (continued)

Taxon	Block Island			Crab Bay			Crafton Island			Mussel Beach			NW Bay W Arm		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Balanus crenatus</i> (% dead)	0.00	0.00	5	0.10	0.22	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.10	0.21	10
<i>Balanus/Semibalanus</i> spp. (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.05	0.16	10	0.00	0.00	10
<i>Mytilus edulis</i> (dead)	0.40	0.89	5	4.20	2.28	5	3.43	3.26	7	8.00	10.34	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% dead)	0.20	0.27	5	0.40	0.22	5	0.21	0.27	7	0.00	0.00	10	0.55	0.37	10
<i>Semibalanus balanoides</i> (% set, dead)	0.00	0.00	5	0.00	0.00	5	0.21	0.27	7	0.00	0.00	10	0.05	0.16	10
Boulder/Cobble (%)	30.40	19.26	5	59.00	21.62	5	37.86	19.76	7	8.50	11.32	10	55.20	27.84	10
Gravel/Sand(%)	69.60	19.26	5	41.00	21.62	5	62.14	19.76	7	91.50	11.32	10	29.80	27.41	10
Oil Scale (primary)	2.60	3.13	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	3.20	4.32	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Rock (%)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	15.00	25.50	10
Water (%)	10.00	22.36	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.50	1.58	10
Clean up debris	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.05	0.16	10
Shell hash in mud	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	1.10	3.14	10	0.00	0.00	10
Oil Scale (secondary)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Oil cover (% secondary)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10
Oil cover (% secondary)	0.00	0.00	5	0.00	0.00	5	0.00	0.00	7	0.00	0.00	10	0.00	0.00	10

Table C-5-2 (continued)

Taxon	Outside Bay Site 1			Sheep Bay			Sheller Bay			Sleepy Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Bangia</i> sp.	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Blue-green algae, spheroids	0.25	0.26	10	0.45	0.16	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Blue-green algae, crust	0.35	0.24	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Cryptosiphonia woodii</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Elachista fucicola</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting coralline algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
Encrusting green algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha intestinalis</i>	0.00	0.00	10	0.25	0.26	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha prolifera</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Filamentous green algae	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Fucus gardneri</i>	1.45	3.03	10	2.40	3.62	10	2.60	3.49	10	0.60	1.58	10	57.90	25.23	10
<i>Fucus gardneri</i> (sporelings)	0.45	0.16	10	0.90	1.13	10	0.50	0.24	10	0.00	0.00	10	1.45	1.66	10
<i>Gloiopeltis furcata</i>	0.75	0.26	10	0.10	0.32	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
<i>Halosaccion glandiforme</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Hildenbrandia rubra</i>	0.10	0.32	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.20	0.26	10
<i>Leathesia difformis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mastocarpus papillatus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
<i>Melanosiphon intestinalis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Monostroma grevillei</i>	0.10	0.21	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.10	0.32	10
<i>Neorhodomela larix</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Neorhodomela oregona</i>	1.15	3.13	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pilayella littoralis</i>	0.10	0.32	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Porphyra</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pterosiphonia bipinnata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Soranthera ulvoidea</i>	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (%)	0.30	0.26	10	0.90	0.81	10	0.00	0.00	10	0.15	0.24	10	0.05	0.16	10
<i>Balanus glandula</i> (% set)	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (%)	0.50	0.24	10	0.05	0.16	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Mytilus edulis</i> (%)	1.65	2.16	10	4.70	3.27	10	1.05	2.13	10	1.70	1.46	10	33.00	13.58	10
<i>Mytilus edulis</i> (% spat)	0.55	0.64	10	0.00	0.00	10	0.25	0.26	10	0.25	0.26	10	0.70	0.48	10
<i>Nucella</i> spp. (% eggs)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.20	0.26	10	0.80	0.26	10	0.60	1.56	10	0.45	0.28	10	1.30	0.79	10
<i>Semibalanus balanoides</i> (%)	11.50	8.15	10	12.20	7.51	10	7.50	15.59	10	1.50	1.53	10	10.40	7.03	10

Table C-5-2 (continued)

Taxon	Outside Bay Site 1			Sheep Bay			Shelter Bay			Sleepy Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Nucella spp. (% eggs)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Semibalanus balanoides (% set)	0.20	0.26	10	0.80	0.26	10	0.60	1.56	10	0.45	0.28	10	1.30	0.79	10
Semibalanus balanoides (%)	11.50	8.15	10	12.20	7.51	10	7.50	15.59	10	1.50	1.53	10	10.40	7.03	10
Semibalanus cariosus (% set)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Semibalanus cariosus (%)	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
Balanus/Semibalanus spp., (% set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10	0.00	0.00	10
Littorina spp., eggs (%)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.05	0.16	10	0.10	0.21	10
Emplectonema gracile	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Gammaridea, unid.	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	4	0.00	0.00	5
Gnorimosphaeroma oregonensis	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.20	0.42	10
Hemigrapsus oregonensis	0.50	0.71	10	0.40	0.52	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Littorina scutulata	14.60	5.30	10	317.40	170.47	10	15.70	24.52	10	163.20	103.31	10	112.40	77.70	10
Littorina sitkana	13.10	11.11	10	1.60	0.97	10	11.10	7.69	10	83.00	40.48	10	68.60	32.36	10
Lottia pelta	1.40	2.67	10	0.10	0.32	10	0.20	0.42	10	0.10	0.32	10	0.50	1.08	10
Lottia strigatella	0.40	0.97	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Lottiidae, unid.	22.00	15.61	10	1.90	2.33	10	8.10	10.71	10	4.40	11.17	10	2.00	1.76	10
Lottiidae, unid. (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Mites, red	0.00	0.00	10	0.00	0.00	10	0.50	0.85	10	0.00	0.00	10	0.00	0.00	10
Musculus spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	4.20	6.01	10	0.00	0.00	10
Nemertea, unid.	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Nucella lamellosa	0.40	0.97	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Nucella lima	0.50	1.08	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Onchidella borealis	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Pagurus granosimanus	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Pagurus hirsutiunculus	5.30	3.97	10	0.30	0.48	10	0.00	0.00	10	0.80	1.23	10	0.10	0.32	10
Pagurus spp.	0.00	0.00	10	0.50	0.71	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Paranemertes peregrina	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Pentidotea wosnesenskii	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.00	0.00	10
Protothaca staminea	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Tectura persona	0.00	0.00	10	0.60	1.26	10	0.00	0.00	10	0.00	0.00	10	2.10	2.56	10
Littorina sitkana (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	10.80	7.32	10	3.80	4.47	10
Littorina scutulata (juv.)	0.00	0.00	10	0.00	0.00	10	11.60	33.24	10	39.00	48.47	10	28.80	29.85	10
Tectura testudinalis	5.70	9.53	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Platyhelminthes unid., red	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Gobiesox spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

C-1-34

Table C-5-2 (continued)

Taxon	Outside Bay Site 1			Sheep Bay			Shelter Bay			Sleepy Bay			Snug Harbor		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Balanus crenatus (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Balanus glandula (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
Balanus/Semibalanus spp. (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10
Chthamalus dalli (% dead)	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Mytilus edulis (dead)	1.20	1.75	10	0.50	0.97	10	0.80	1.48	10	0.10	0.32	10	4.90	3.28	10
Semibalanus balanoides (% dead)	0.25	0.26	10	0.10	0.21	10	0.15	0.24	10	0.00	0.00	10	0.15	0.24	10
Semibalanus balanoides (% set, dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Boulder/Cobble (%)	50.00	26.77	10	1.50	4.74	10	25.70	27.62	10	52.50	15.86	10	19.30	8.39	10
Gravel/Sand(%)	50.00	26.77	10	98.50	4.74	10	74.30	27.62	10	47.50	15.86	10	80.70	8.39	10
Oil Scale (primary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Rock (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Water (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Clean up debris	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Shell hash in mud	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil Scale (secondary)	0.00	0.00	10	0.00	0.00	10	0.40	1.26	10	0.00	0.00	10	0.00	0.00	10
Oil cover (% secondary)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Oil cover (% secondary)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10

Table C-5-3. Mixed-soft lower intertidal epibiota, July 1991.

Taxon	Outside Bay Site 1			Balnbridge Blight			Herring Bay			Crafton Island			Sheep Bay			Bay of Isles			Block Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	1.00	3.16	10	2.30	4.32	5	56.45	31.54	10	1.06	1.78	9	0.15	0.24	10	0.05	0.16	10	0.83	0.94	9
<i>Alaria</i> sp.	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Analipus japonicus</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9
Articulated coralline algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Blue-green algae, crust	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.10	0.32	10	0.00	0.00	10	0.06	0.17	9
Blue-green algae, spheroids	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.20	0.26	10	0.00	0.00	9
<i>Chordaria flagelliformis</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	2.90	6.21	10	2.35	4.71	10	0.00	0.00	9
<i>Cryptosiphonia woodii</i>	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Desmarestia</i> sp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Dictyosiphon foeniculaceus</i>	5.95	9.58	10	0.00	0.00	5	5.95	5.97	10	0.00	0.00	9	0.10	0.21	10	0.00	0.00	10	0.67	1.66	9
<i>Dumontia contorta</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Ectocarpus siliculosus</i>	57.00	27.10	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Elachista fucicola</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Encrusting coralline algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.06	0.17	9
Encrusting green algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.33	1.00	9
<i>Enteromorpha intestinalis</i>	0.00	0.00	10	0.40	0.42	5	0.00	0.00	10	0.00	0.00	9	0.20	0.26	10	0.00	0.00	10	0.06	0.17	9
<i>Enteromorpha linza</i>	0.00	0.00	10	0.10	0.22	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Enteromorpha prolifera</i>	0.00	0.00	10	0.00	0.00	5	0.20	0.35	10	0.00	0.00	9	0.30	0.42	10	0.00	0.00	10	0.06	0.17	9
<i>Enteromorpha</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.55	1.57	10	0.00	0.00	9
<i>Eudesme virescens</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Filamentous brown algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Filamentous green algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	2.20	4.66	10	0.00	0.00	10	0.00	0.00	9
Filamentous red algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.15	0.34	10	0.00	0.00	9
Flagelliform brown algae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.25	0.63	10	0.00	0.00	10	0.00	0.00	9
<i>Fucus gardneri</i>	8.30	10.09	10	2.20	2.28	5	3.85	5.94	10	5.56	8.19	9	0.10	0.21	10	5.75	7.41	10	1.61	3.26	9
<i>Fucus gardneri</i> (sporelings)	0.15	0.24	10	0.40	0.22	5	0.00	0.00	10	0.06	0.17	9	0.15	0.24	10	0.65	0.24	10	0.50	0.35	9
<i>Gloiopeltis furcata</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.28	0.36	9	0.00	0.00	10	0.05	0.16	10	0.06	0.17	9
<i>Halosacclon glandiforme</i>	0.00	0.00	10	0.40	0.22	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.22	0.36	9
<i>Hildenbrandia rubra</i>	0.10	0.32	10	3.70	3.93	5	0.00	0.00	10	0.06	0.17	9	0.00	0.00	10	0.10	0.21	10	0.89	1.24	9
<i>Leathesia difformis</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.39	0.33	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Mastocarpus papillatus</i>	0.10	0.21	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.05	0.16	10	0.00	0.00	10	0.06	0.17	9
<i>Melanosiphon intestinalis</i>	0.00	0.00	10	0.00	0.00	5	0.45	1.26	10	0.11	0.22	9	0.00	0.00	10	2.40	2.27	10	6.00	6.18	9
<i>Monostroma grevillei</i>	0.30	0.48	10	0.40	0.55	5	1.55	1.80	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Monostroma/Ulva/Ulvaria</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	1.56	2.64	9
<i>Neorhodomela larix</i>	0.20	0.63	10	0.00	0.00	5	0.00	0.00	10	0.33	0.71	9	1.65	2.65	10	0.00	0.00	10	0.00	0.00	9
<i>Neorhodomela oregona</i>	0.00	0.00	10	0.00	0.00	5	0.20	0.35	10	6.78	8.31	9	7.70	10.10	10	0.00	0.00	10	0.00	0.00	9

C-1-36

Table C-5-3 (continued)

Taxon	Outside Bay Site 1			Balnbridge Bight			Herring Bay			Crafton Island			Sheep Bay			Bay of Isles			Block Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Cucumaria vegae</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Dermasterias imbricata</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Encrusting bryozoan (%)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Evasterias troschellii</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Gammaridea, unid.	0.10	0.32	10	0.00	P	1	0.00	0.00	10	0.00	0.00	8	0.00	0.00	10	0.00	0.00	7	0.00	0.00	7
<i>Gnorimosphaeroma oregonensis</i>	0.00	0.00	10	2.40	2.70	5	0.10	0.32	10	0.00	0.00	9	0.00	0.00	10	0.80	1.03	10	0.00	0.00	9
<i>Halichondria panicea</i> (%)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Hemigrapsus oregonensis</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	1.60	1.51	10	0.00	0.00	10	0.00	0.00	9
<i>Hiatella arctica</i>	0.30	0.48	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Ischnochitonidae (juv.)	0.00	0.00	10	0.00	0.00	5	0.10	0.32	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Lacuna</i> spp.	27.80	64.90	10	0.00	0.00	5	0.00	0.00	10	0.56	1.33	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9
<i>Lacuna</i> spp. (set)	0.00	0.00	10	0.00	0.00	5	6.20	8.23	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Leptasterias hexactis</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Leptasterias</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Littorina scutulata</i>	0.00	0.00	10	38.40	16.53	5	0.10	0.32	10	68.00	51.71	9	189.30	67.28	10	230.00	77.91	10	5.33	8.49	9
<i>Littorina scutulata</i> (juv.)	0.00	0.00	10	0.00	0.00	5	0.40	0.97	10	0.00	0.00	9	0.00	0.00	10	11.00	13.64	10	0.44	1.01	9
<i>Littorina sitkana</i>	0.00	0.00	10	47.80	25.43	5	0.00	0.00	10	154.44	175.37	9	0.80	1.32	10	2.80	2.57	10	3.89	8.34	9
<i>Littorina sitkana</i> (juv.)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Littorina</i> spp., eggs (%)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.06	0.17	9
<i>Lottia pelta</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.20	0.42	10	0.10	0.32	10	1.33	2.18	9
Lottiidae, unid.	5.80	7.00	10	2.80	3.03	5	2.00	3.37	10	53.89	53.71	9	27.50	26.93	10	113.70	63.72	10	11.67	12.77	9
Lottiidae, unid. (juv.)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	3.56	10.67	9	0.00	0.00	10	0.00	0.00	10	0.56	1.67	9
<i>Macoma balthica</i>	0.00	0.00	10	0.00	0.00	5	0.60	1.58	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Margarites marginatus</i>	0.20	0.42	10	0.00	0.00	5	0.20	0.63	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Margarites pupillus</i>	0.00	0.00	10	0.40	0.55	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9
<i>Modiolus modiolus</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Mopalia ciliata</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Mopalia lignosa</i>	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Mopalia</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Musculus</i> spp.	0.10	0.32	10	0.00	0.00	5	0.29	0.76	7	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Mytilus edulis</i> (% spat)	0.00	0.00	10	0.10	0.22	5	0.45	0.16	10	0.28	0.26	9	0.20	0.26	10	0.40	0.21	10	0.22	0.26	9
<i>Mytilus edulis</i> (%)	0.20	0.26	10	0.90	0.65	5	1.85	2.93	10	11.22	7.66	9	0.55	0.37	10	1.65	1.49	10	2.83	4.93	9
Nemertea, red	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Nemertea, unid.	1.00	2.83	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Nucella lamellosa</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Nucella lima</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.10	0.32	10	1.70	3.74	10	0.00	0.00	9

C-1-37

Table C-5-3 (continued)

Taxon	Outside Bay Site 1			Bainbridge Blight			Herring Bay			Crafton Island			Sheep Bay			Bay of Isles			Block Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Neorhodomela</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.50	1.58	10	0.00	0.00	9
<i>Palmaria callophyloides</i>	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Palmaria hecatensis</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Palmaria mollis</i>	0.20	0.35	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Petalonia fascia</i>	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.05	0.16	10	0.00	0.00	10	0.00	0.00	9
<i>Pilayella littoralis</i>	0.00	0.00	10	0.80	1.30	5	0.90	1.73	10	0.00	0.00	9	5.50	9.26	10	4.25	5.96	10	72.00	28.94	9
<i>Polysiphonia</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.28	0.44	9
<i>Polysiphonia/Pterosiphonia</i> spp.	4.55	6.26	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	4.45	4.06	10	0.00	0.00	10	0.00	0.00	9
<i>Porphyra</i> spp.	0.00	0.00	10	13.80	15.32	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Pterosiphonia bipinnata</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	2.22	4.02	9	0.00	0.00	10	0.00	0.00	10	0.17	0.35	9
<i>Ralfsia</i> sp.	0.00	0.00	10	0.00	0.00	5	0.80	0.98	10	0.22	0.26	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Rhizoclonium</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.06	0.17	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Rhodochorton purpureum</i>	0.00	0.00	10	0.10	0.22	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Rhodoglossum/Mastocarpus</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Scagelia pylaisaei</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Scytosiphon lomentaria</i>	0.25	0.35	10	0.10	0.22	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.20	0.63	10	0.00	0.00	9
<i>Soranthera ulvoidea</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.11	0.22	9	0.20	0.26	10	0.05	0.16	10	1.06	1.59	9
<i>Sphacelaria rigidula</i>	0.00	0.00	10	0.00	0.00	5	0.05	0.16	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Ulothrix flacca</i>	0.00	0.00	10	3.00	6.71	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Ulva/Ulvaria</i> spp.	4.00	2.26	10	0.40	0.89	5	1.25	3.14	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Zostera marina</i>	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9
<i>Amphissa</i> spp.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Anthopleura artemisia</i>	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Balanus crenatus</i> (% set)	0.10	0.21	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.30	0.35	10	0.00	0.00	10	0.00	0.00	9
<i>Balanus crenatus</i> (%)	0.60	0.77	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.20	0.26	10	0.15	0.24	10	0.00	0.00	9
<i>Balanus glandula</i> (% set)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.15	0.24	10	0.00	0.00	10	0.00	0.00	9
<i>Balanus glandula</i> (%)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.40	0.39	10	0.50	0.00	10	0.06	0.17	9
<i>Balanus rostratus</i> (%)	0.30	0.26	10	0.00	0.00	5	0.25	0.26	10	0.00	0.00	9	0.30	0.35	10	0.20	0.26	10	0.00	0.00	9
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Cancer oregonensis</i>	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Caprellidae	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Chthamalus dalli</i> (%)	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.15	0.24	10	0.22	0.26	9
<i>Clinocardium ciliatum</i>	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Cottidae, unid.	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
<i>Cryptobranchia concentrica</i>	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9

Table C-5-3 (continued)

Taxon	Outside Bay Site 1			Bainbridge Blight			Herring Bay			Crafton Island			Sheep Bay			Bay of Isles			Block Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Nucella spp. (% eggs)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.15	0.24	10	0.30	0.26	10	0.00	0.00	9
Onchidoris bilamellata	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.10	0.32	10	0.00	0.00	10	0.00	0.00	9
Pagurus granosimanus	0.30	0.48	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.20	0.42	10	0.00	0.00	10	0.00	0.00	9
Pagurus hirsutiusculus	0.00	0.00	10	0.20	0.45	5	0.00	0.00	10	60.11	98.35	9	0.10	0.32	10	2.70	1.49	10	1.11	2.32	9
Pagurus spp.	0.10	0.32	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	1.20	1.23	10	2.70	2.83	10	0.22	0.44	9
Paranemertes peregrina	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pentidotea wosnesenskii	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pholidae/Stichaeidae	2.00	2.11	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pholidae/Stichaeidae (juv.)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pholis laeta	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pholis ornata	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Pisaster ochraceus	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Polynoidea, unid.	0.20	0.42	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Protothaca staminea	1.40	0.97	10	0.00	0.00	5	1.30	1.49	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Searlesia dira	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9
Semibalanus balanoides (% set)	0.00	0.00	10	0.20	0.27	5	0.00	0.00	10	0.83	1.20	9	0.05	0.16	10	0.30	0.35	10	0.00	0.00	9
Semibalanus balanoides (%)	0.00	0.00	10	8.60	9.63	5	0.00	0.00	10	0.83	1.22	9	1.05	0.98	10	9.55	6.44	10	0.28	0.26	9
Semibalanus cariosus (%)	0.05	0.16	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Spirorbidae, unid. (%)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Strongylocentrotus droebachien	0.20	0.42	10	0.00	0.00	5	0.00	0.00	10	0.11	0.33	9	0.00	0.00	10	0.00	0.00	10	0.22	0.67	9
Tectura persona	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	2.33	2.92	9
Tectura scutum	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Tectura testudinalis	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.60	0.84	10	0.00	0.00	10	0.22	0.67	9
Telmessus cheiragonus	1.50	1.18	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Tonicella lineata	0.80	1.48	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9
Balanus crenatus (% dead)	0.15	0.24	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.15	0.24	10	0.00	0.00	10	0.00	0.00	9
Balanus glandula (% dead)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.10	0.21	10	0.15	0.24	10	0.00	0.00	9
Balanus rostratus (% dead)	0.20	0.26	10	0.00	0.00	5	0.05	0.16	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Balanus/Semibalanus spp. (% dead)	0.00	0.00	10	0.10	0.22	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Chthamalus dalli (% dead)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.22	9
Mytilus edulis (dead)	0.10	0.32	10	0.40	0.89	5	0.00	0.00	10	4.33	4.92	9	0.20	0.42	10	0.40	0.70	10	0.22	0.44	9
Nucella lamellosa (dead)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.11	0.33	9
Semibalanus balanoides (% dead)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.06	0.17	9	0.20	0.26	10	0.35	0.34	10	0.00	0.00	9
Semibalanus balanoides (% set, deac)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Spirorbidae (% dead)	0.00	0.00	10	0.00	0.00	5	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	9
Boulder/cobble (%)	14.60	9.00	10	1.40	1.95	5	6.50	12.26	10	20.00	20.77	9	7.70	7.93	10	42.00	12.52	10	21.22	20.43	9
Gravel/sand(%)	86.40	6.75	10	98.60	1.95	5	93.50	12.26	10	57.78	37.09	9	92.30	7.93	10	58.00	12.52	10	78.78	20.43	9

C-1-39

Table C-5-3 (continued)

Taxon	Mussel Beach			NW Bay W Arm			Snug Harbor			Sleepy Bay			Shelter Bay			Ingot Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Acrosiphonia arcta</i>	0.70	0.79	10	3.95	5.21	10	36.00	16.12	10	2.80	3.36	10	16.20	26.98	10	0.00	0.00	10
<i>Alaria</i> sp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Analipus japonicus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Articulated coralline algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
Blue-green algae, crust	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Blue-green algae, spheroids	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Chordaria flagelliformis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10	0.00	0.00	10
<i>Cryptosiphonia woodii</i>	0.60	0.81	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Desmarestia</i> sp.	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Dictyosiphon foeniculaceus</i>	2.70	3.53	10	0.70	1.55	10	14.10	7.17	10	0.20	0.63	10	12.50	9.83	10	0.05	0.16	10
<i>Dumontia contorta</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Ectocarpus siliculosus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Etachista fucicola</i>	0.25	0.42	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting coralline algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting green algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha intestinalis</i>	0.05	0.16	10	0.50	0.41	10	0.25	0.35	10	0.15	0.24	10	0.55	0.93	10	0.00	0.00	10
<i>Enteromorpha linza</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	2.70	4.49	10	0.00	0.00	10	0.00	0.00	10
<i>Enteromorpha prolifera</i>	0.80	0.71	10	0.00	0.00	10	0.20	0.63	10	1.95	2.47	10	0.10	0.21	10	0.00	0.00	10
<i>Enteromorpha</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Eudesme virescens</i>	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	1.45	3.15	10	0.00	0.00	10	0.00	0.00	10
Filamentous brown algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10
Filamentous green algae	0.00	0.00	10	0.00	0.00	10	45.50	25.65	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Filamentous red algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Flagelliform brown algae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Fucus gardneri</i>	22.50	10.07	10	27.50	21.55	10	6.35	6.06	10	0.50	0.85	10	9.45	13.36	10	0.00	0.00	10
<i>Fucus gardneri</i> (sporelings)	0.20	0.26	10	0.85	0.82	10	0.35	0.34	10	0.10	0.21	10	0.35	0.24	10	0.00	0.00	10
<i>Gloiopeltis furcata</i>	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.30	0.26	10
<i>Halosaccion glandiforme</i>	1.55	1.54	10	0.25	0.42	10	0.00	0.00	10	0.05	0.16	10	0.15	0.24	10	0.00	0.00	10
<i>Hildenbrandia rubra</i>	1.40	1.22	10	1.15	1.49	10	0.00	0.00	10	0.05	0.16	10	0.30	0.35	10	8.25	11.76	10
<i>Leathesia difformis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.15	0.24	10
<i>Mastocarpus papillatus</i>	0.15	0.24	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Melanosiphon intestinalis</i>	2.10	1.45	10	0.70	0.92	10	0.05	0.16	10	0.40	0.61	10	1.20	3.16	10	0.00	0.00	10
<i>Monostroma grevillei</i>	0.00	0.00	10	0.65	1.56	10	11.80	6.16	10	0.50	0.97	10	3.90	7.57	10	0.00	0.00	10
<i>Monostroma/Ulva/Ulvaria</i> spp.	4.20	4.77	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Neorhodomela larix</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Neorhodomela oregona</i>	0.05	0.16	10	1.05	1.54	10	0.10	0.21	10	1.70	3.95	10	4.30	7.87	10	9.00	14.68	10

C-141

Table C-5-3 (continued)

Taxon	Mussel Beach			NW Bay W Arm			Snug Harbor			Sleepy Bay			Shelter Bay			Ingot Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Cucumaria vegae</i>	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Dermasterias imbricata</i>	0.20	0.42	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Encrusting bryozoan (%)	0.20	0.26	10	0.05	0.16	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10
<i>Evasterias troschellii</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Gammaridea, unid.	0.00	0.00	5	0.00	0.00	4	0.00	0.00	3	0.00	0.00	5	0.00	0.00	8	0.00	0.00	6
<i>Gnorimosphaeroma oregonensis</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.50	0.71	10	0.00	0.00	10	0.30	0.67	10
<i>Halichondria panicea</i> (%)	0.00	0.00	10	0.00	0.00	10	0.35	0.34	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Hemigrapsus oregonensis</i>	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Hiatella arctica</i>	0.10	0.32	10	0.10	0.32	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Ischnochitonidae (juv.)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Lacuna</i> spp.	4.10	5.65	10	0.20	0.42	10	0.00	0.00	10	1.50	2.12	10	0.20	0.63	10	0.00	0.00	10
<i>Lacuna</i> spp. (set)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Leptasterias hexactis</i>	0.00	0.00	10	0.00	0.00	10	1.20	1.48	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Leptasterias</i> spp.	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Littorina scutulata</i>	0.50	1.08	10	41.80	19.72	10	0.00	0.00	10	1.90	2.47	10	9.50	5.58	10	40.80	11.40	10
<i>Littorina scutulata</i> (juv.)	3.20	5.57	10	267.20	116.70	10	0.10	0.32	10	0.20	0.63	10	0.10	0.32	10	0.60	1.35	10
<i>Littorina sitkana</i>	0.00	0.00	10	1.50	2.22	10	0.00	0.00	10	10.00	15.61	10	1.10	1.45	10	31.20	43.94	10
<i>Littorina sitkana</i> (juv.)	0.20	0.42	10	2.00	4.00	10	0.00	0.00	10	1.70	1.77	10	0.00	0.00	10	0.00	0.00	10
<i>Littorina</i> spp., eggs (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Lottia pelta</i>	0.10	0.32	10	2.60	3.47	10	0.00	0.00	10	0.70	1.89	10	0.00	0.00	10	0.40	0.70	10
Lottiidae, unid.	41.10	21.99	10	56.20	42.78	10	0.20	0.63	10	1.60	2.46	10	4.30	9.10	10	30.30	14.90	10
Lottiidae, unid. (juv.)	1.30	2.41	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Macoma balthica</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Margarites marginatus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
<i>Margarites pupillus</i>	0.30	0.67	10	0.00	0.00	10	0.00	0.00	10	0.40	0.70	10	0.00	0.00	10	0.00	0.00	10
<i>Modiolus modiolus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	22.20	19.61	10	0.00	0.00	10	0.10	0.32	10
<i>Mopalia cillata</i>	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mopalia lignosa</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mopalia</i> spp.	0.00	0.00	10	0.00	0.00	10	0.20	0.42	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Musculus</i> spp.	0.00	0.00	10	0.00	0.00	10	0.30	0.67	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mytilus edulis</i> (% spat)	0.45	0.16	10	0.50	0.00	10	1.05	0.69	10	0.25	0.26	10	0.45	0.28	10	0.45	0.16	10
<i>Mytilus edulis</i> (%)	0.25	0.26	10	1.35	1.42	10	0.30	0.26	10	0.15	0.24	10	0.20	0.26	10	0.25	0.26	10
Nemertea, red	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
Nemertea, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Nucella lamellosa</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Nucella lima</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.70	0.95	10

Table C-5-3 (continued)

Taxon	Mussel Beach			NW Bay W Arm			Snug Harbor			Sleepy Bay			Shelter Bay			Ingot Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Neorhodomeia</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Palmaria callophyloides</i>	1.75	3.17	10	0.00	0.00	10	0.30	0.42	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Palmaria hecatensis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.90	2.51	10	0.00	0.00	10	0.00	0.00	10
<i>Palmaria mollis</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Petalonia fascia</i>	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Pilayella littoralis</i>	23.30	28.21	10	13.90	14.85	10	60.50	29.10	10	2.40	3.66	10	3.90	2.88	10	0.00	0.00	10
<i>Polysiphonia</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Polysiphonia/Pterosiphonia</i> spp.	0.00	0.00	10	0.85	1.29	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Porphyra</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Pterosiphonia bipinnata</i>	1.45	3.03	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Ralfsia</i> sp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	1.50	3.81	10	0.00	0.00	10	0.00	0.00	10
<i>Rhizoclonium</i> spp.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Rhodochorton purpureum</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.21	10	0.00	0.00	10
<i>Rhodoglossum/Mastocarpus</i>	0.40	0.66	10	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Scagelia pylaisaei</i>	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Scytosiphon lomentaria</i>	0.85	1.29	10	0.00	0.00	10	0.00	0.00	10	0.90	1.29	10	0.00	0.00	10	0.35	0.67	10
<i>Soranothera ulvoidea</i>	0.35	0.24	10	0.10	0.21	10	0.00	0.00	10	0.05	0.16	10	0.10	0.21	10	0.10	0.21	10
<i>Sphacelaria rigidula</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Ulothrix flacca</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Ulva/Ulvaria</i> spp.	0.00	0.00	10	0.35	0.47	10	2.25	3.99	10	0.30	0.95	10	0.00	0.00	10	0.00	0.00	10
<i>Zostera marina</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Amphissa</i> spp.	0.40	0.70	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Anthopleura artemisia</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Balanus crenatus</i> (% set)	0.75	0.49	10	0.05	0.16	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus crenatus</i> (%)	1.70	1.40	10	1.15	1.81	10	0.10	0.21	10	0.25	0.26	10	0.35	0.24	10	0.00	0.00	10
<i>Balanus glandula</i> (% set)	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (%)	0.15	0.34	10	0.70	1.18	10	0.05	0.16	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
<i>Balanus rostratus</i> (%)	0.30	0.26	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10	0.70	0.26	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp., (% set)	0.00	0.00	10	0.00	0.00	10	0.35	0.24	10	0.55	0.28	10	0.30	0.26	10	0.00	0.00	10
<i>Cancer oregonensis</i>	0.60	1.26	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Caprellidae	0.00	0.00	9	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (%)	0.05	0.16	10	0.25	0.63	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.40	0.32	10
<i>Clinocardium ciliatum</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Cottidae, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10
<i>Cryptobranchia concentrica</i>	1.00	1.33	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

Table C-5-3 (continued)

Taxon	Mussel Beach			NW Bay W Arm			Snug Harbor			Sleepy Bay			Shelter Bay			Ingot Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
<i>Nucella</i> spp. (% eggs)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10
<i>Onchidoris bilamellata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pagurus granosimanus</i>	0.00	0.00	10	0.10	0.32	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pagurus hirsutiusculus</i>	0.10	0.32	10	2.30	2.83	10	0.10	0.32	10	0.40	0.70	10	1.80	1.48	10	4.90	5.00	10
<i>Pagurus</i> spp.	0.20	0.42	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Paranemertes peregrina</i>	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pentidotea wosnesenskii</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.20	0.63	10	0.00	0.00	10	0.00	0.00	10
Pholidae/Stichaeidae	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Pholidae/Stichaeidae (juv.)	0.50	0.53	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pholis laeta</i>	0.20	0.63	10	0.10	0.32	10	0.20	0.42	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Pholis ornata</i>	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Pisaster ochraceus</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
Polynoidae, unid.	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Protothaca staminea</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Searlesia dira</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set)	0.10	0.21	10	0.50	0.24	10	0.05	0.16	10	0.05	0.16	10	0.30	0.48	10	0.05	0.16	10
<i>Semibalanus balanoides</i> (%)	0.25	0.26	10	6.05	4.92	10	0.10	0.21	10	0.35	0.63	10	3.05	4.19	10	0.15	0.24	10
<i>Semibalanus cariosus</i> (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10
Spirorbidae, unid. (%)	0.30	0.26	10	0.30	0.35	10	0.25	0.26	10	0.25	0.35	10	0.10	0.21	10	0.00	0.00	10
<i>Strongylocentrotus droebachien</i>	0.30	0.67	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Tectura persona</i>	0.10	0.32	10	1.30	2.83	10	0.40	0.70	10	0.00	0.00	10	0.00	0.00	10	0.80	0.92	10
<i>Tectura scutum</i>	0.20	0.63	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Tectura testudinalis</i>	0.00	0.00	10	1.80	3.12	10	0.00	0.00	10	0.10	0.32	10	0.70	0.82	10	0.60	1.26	10
<i>Telmessus cheiragonus</i>	0.50	0.53	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Tonicella lineata</i>	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.10	0.32	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus crenatus</i> (% dead)	0.15	0.24	10	0.35	0.67	10	0.05	0.16	10	0.15	0.24	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus glandula</i> (% dead)	0.05	0.16	10	0.05	0.16	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10	0.00	0.00	10
<i>Balanus rostratus</i> (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.00	0.00	10
<i>Balanus/Semibalanus</i> spp. (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Chthamalus dalli</i> (% dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Mytilus edulis</i> (dead)	2.20	2.35	10	0.80	1.03	10	1.30	0.95	10	0.90	1.10	10	0.30	0.67	10	2.10	1.20	10
<i>Nucella lamellosa</i> (dead)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% dead)	0.00	0.00	10	0.00	0.00	10	0.05	0.16	10	0.10	0.21	10	0.10	0.21	10	0.00	0.00	10
<i>Semibalanus balanoides</i> (% set, dead)	0.00	0.00	10	0.35	0.24	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Spirorbidae (% dead)	0.10	0.21	10	0.00	0.00	10	0.05	0.16	10	0.20	0.26	10	0.00	0.00	10	0.05	0.16	10
Boulder/cobble (%)	28.00	20.03	10	64.00	32.64	10	37.50	30.57	10	68.00	27.20	10	24.50	25.65	10	24.00	10.22	10
Gravel/sand(%)	72.00	20.03	10	23.50	25.06	10	62.50	30.57	10	32.00	27.20	10	75.50	25.65	10	76.00	10.22	10

Table C-5-3 (continued)

Taxon	Mussel Beach			NW Bay W Arm			Snug Harbor			Sleepy Bay			Shelter Bay			Ingot Island		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n
Oil scale (primary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Oil cover (%) (primary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Rock (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Subsurface oil (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Water (%)	0.00	0.00	10	12.50	24.41	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10
Wood chips (%)	0.00	0.00	10	0.00	0.00	9	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	6
Otter feeding pits (%)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	24.00	32.73	10	28.00	42.04	10
Oil scale (secondary)	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10	0.00	0.00	10

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Appendix D–Infauna Studies Data

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Table D-1. Infauna data from 0.009 square meters by 15 cm cores (all n = 5) mid intertidal, July 1990.

Taxon	Block Island		Crab Bay		Shelter Bay		Sleepy Bay		Snug Harbor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Turbellaria	0.00	0.00	0.00	0.00	0.20	0.45	0.40	0.55	2.20	2.17
Nemertea	0.60	0.55	1.60	1.52	0.00	0.00	0.20	0.45	0.20	0.45
Nematoda	3.40	4.34	2.00	2.74	1.20	1.64	7.20	12.83	0.00	0.00
Pholoe minuta	0.00	0.00	0.00	0.00	0.00	0.00	6.80	10.16	0.00	0.00
Nereidae	1.80	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nereis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Nereis vexillosa	0.00	0.00	0.00	0.00	0.00	0.00	0.80	1.30	0.00	0.00
Spionidae	0.00	0.00	0.20	0.45	0.20	0.45	0.00	0.00	0.00	0.00
Scolelepis squamatus	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opheliidae	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Armandia brevis	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capitella capitata	1.80	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barantolla americana	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pectinaria	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oligochaeta	6.00	12.86	7.00	6.40	10.60	9.34	22.80	45.43	19.00	8.94
Gastropoda	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Bivalvia	0.80	1.10	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Macoma	1.00	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Macoma balthica	0.40	0.89	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00
Protothaca staminea	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hiatella arctica	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Pseudoscorpionida	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.89
Harpacticoida	4.80	10.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ianiropsis kincaidii	0.00	0.00	0.00	0.00	0.00	0.00	0.60	1.34	0.00	0.00
Paramoera sp. 1	0.00	0.00	0.00	0.00	0.80	1.79	0.60	0.89	0.00	0.00
Spinulogammarus subcarinatus	0.00	0.00	0.00	0.00	0.00	0.00	1.40	3.13	0.00	0.00
Gammaroporeia alaskensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	10.34
Insecta	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.20	0.45
Diptera	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Chironomidae	0.80	1.30	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Total Abundance (N)	22.60	32.12	12.80	5.54	13.00	11.77	41.00	71.47	37.20	20.58
Number of Species (S)	6.20	4.32	3.60	1.14	2.00	1.00	4.00	2.35	3.20	1.48
Diversity (H')	1.448	0.431	0.971	0.401	0.402	0.374	1.041	0.387	0.759	0.437

D-1-1

Table D-2. Infauna, mixed-soft, lower intertidal, July 1991.

Taxon	Bainbridge Bight		Bay of Isles		Block Island		Crafton Island		Herring Bay		Ingot Island	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Porifera	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ceriantharia	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nemertea	7.00	6.16	0.20	0.45	2.00	1.73	4.40	5.46	5.60	5.73	2.40	1.82
Nematoda	5.20	4.87	0.20	0.45	39.60	25.79	0.20	0.45	4.40	2.79	1.60	2.07
Polychaeta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polynoidae	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.40	0.55	0.00	0.00
Lepidonotus squamatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sigalionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pholoe minuta	37.40	33.06	0.40	0.89	0.60	1.34	0.60	0.55	0.20	0.45	0.40	0.55
Palaenotus bellis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anaitides multiseriata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eteone longa	3.60	4.51	0.00	0.00	1.60	1.52	0.80	0.84	2.20	1.79	1.40	2.61
Eulalia viridis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syllidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syllis	0.60	1.34	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Syllis elongata	0.60	0.89	0.00	0.00	3.00	3.54	0.20	0.45	0.00	0.00	0.60	0.89
Exogone	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Exogone gemmifera	0.00	0.00	0.00	0.00	0.20	0.45	0.80	1.10	0.00	0.00	0.00	0.00
Exogone verugera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaerosyllis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nereidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Chelionereis	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nereis	0.40	0.89	1.00	0.71	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Nephtys ferruginea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaerodoropsis sphaerulifer	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glycera capitata	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Hemipodus borealis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glycinde picta	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orbinidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Leitoscoloplos pugettensis	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.20	0.45	0.00	0.00
Naineris quadricuspida	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orbinella nuda	10.20	17.53	0.00	0.00	0.60	1.34	0.20	0.45	0.00	0.00	0.00	0.00
Protoariciella	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spionidae	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Laonice	5.00	11.18	0.00	0.00	3.60	5.68	0.00	0.00	0.00	0.00	0.00	0.00
Polydora	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Polydora quadrilobata	16.00	30.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polydora brachycephala	0.00	0.00	0.00	0.00	0.20	0.45	0.80	1.30	0.00	0.00	0.00	0.00
Prionospio	0.00	0.00	0.00	0.00	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00
Prionospio cirrifera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prionospio steenstrupi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

D-1-2

Table D-2 (continued)

Taxon	Bainbridge Bight		Bay of Isles		Block Island		Crafton Island		Herring Bay		Ingot Island	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spio filicornis	0.00	0.00	0.00	0.00	0.80	1.79	0.00	0.00	0.00	0.00	0.00	0.00
Rhynchospio	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Cirratulidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tharyx multifilis	1.40	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Armandia brevis	0.00	0.00	0.00	0.00	2.20	2.86	2.40	3.36	0.00	0.00	2.60	3.71
Ophelia limacina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capitellidae	1.20	2.68	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Capitella capitata	1.80	2.49	0.00	0.00	1.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00
Heteromastus filiformis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mediomastus	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Barantolla americana	0.00	0.00	0.00	0.00	0.40	0.55	3.80	3.49	0.20	0.45	0.60	0.89
Abarenicola	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00
Maldanidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Owenia fusiformis	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Pectinaria granulata	0.00	0.00	0.00	0.00	0.60	0.89	0.20	0.45	0.20	0.45	0.00	0.00
Fabriciella berkeleyi	0.60	1.34	0.00	0.00	0.00	0.00	0.80	1.79	0.00	0.00	0.00	0.00
Serpulidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saccocirrus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oligochaeta	17.60	19.01	0.40	0.89	6.80	8.17	20.60	33.29	3.80	4.66	3.20	5.63
Gastropoda	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rissoidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.12	0.00	0.00
Alvania compacta	0.00	0.00	0.00	0.00	3.80	3.63	0.00	0.00	5.40	7.40	0.20	0.45
Cingula	23.00	20.99	0.00	0.00	0.40	0.89	0.60	1.34	54.80	74.68	0.20	0.45
Fartulum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.40	0.55
Odostomia	0.60	0.55	0.00	0.00	0.40	0.55	0.00	0.00	0.60	0.89	1.40	1.67
Acteocina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diaphana minuta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Modiolus	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.20	0.45
Mysella tumida	2.00	2.35	0.00	0.00	3.00	3.32	0.00	0.00	3.60	5.90	3.20	2.77
Turtonia minuta	0.20	0.45	0.40	0.55	0.60	0.89	8.60	13.79	15.40	16.65	0.00	0.00
Macoma	0.00	0.00	0.00	0.00	11.60	11.76	2.00	3.46	2.00	2.35	0.00	0.00
Macoma inquinata	1.00	1.00	0.00	0.00	4.40	2.70	0.80	1.79	0.80	0.84	0.00	0.00
Macoma balthica	0.00	0.00	0.00	0.00	7.80	13.14	7.20	11.17	2.20	1.48	0.00	0.00
Saxidomus gigantea	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.60	0.89	0.20	0.45
Compsomyx subdiaphana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Protothaca staminea	0.20	0.45	2.80	2.49	6.40	5.22	0.00	0.00	0.20	0.45	2.60	2.07
Mya arenaria	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Hiatella arctica	0.60	1.34	0.20	0.45	1.40	1.67	0.20	0.45	0.40	0.89	0.40	0.55
Crustacea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.89
Podocopina	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table D-2 (continued)

Taxon	Bainbridge Blight		Bay of Isles		Block Island		Crafton Island		Herring Bay		Ingot Island	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Harpacticoida	7.20	15.01	0.00	0.00	168.20	160.48	1.40	3.13	0.00	0.00	0.00	0.00
Harpacticus uniremis	1.40	3.13	0.00	0.00	12.60	16.30	0.00	0.00	0.00	0.00	0.00	0.00
Dactylopodia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oithona similis	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Cumella vulgaris	2.40	2.19	0.00	0.00	0.20	0.45	0.20	0.45	0.20	0.45	0.00	0.00
Leptochelia savignyi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ianiropsis	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gammaridea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.20	0.45
Ampithoe	0.00	0.00	0.00	0.00	1.40	1.52	5.80	12.97	1.60	3.58	0.20	0.45
Ampithoe kussakina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corophium	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dexamonica reduncans	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paramoera sp. 2	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Paramoera sp. 1	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	9.80	7.05
Anisogammarus pugettensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	1.34
Melita desdichada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spinulogammarus subcarinatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Allorchestes	0.40	0.89	0.00	0.00	1.60	1.82	0.00	0.00	0.00	0.00	0.00	0.00
Jassa	0.80	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Decapoda (arthropoda)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.20	0.45
Hippolytidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Insecta	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.55	0.00	0.00	0.00	0.00
Anurida maritima	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diptera	0.80	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chironomidae	0.40	0.89	0.00	0.00	0.80	0.84	0.00	0.00	0.40	0.89	0.00	0.00
Golfingia procera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.55
Echiurus echiurus alaskanus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asteroldea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ophiuridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Holothuroidea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	1.79	0.00	0.00
Leptosynapta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asciacea	1.60	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Abundance	156.00	119.54	6.00	3.08	292.40	197.56	63.20	51.15	110.40	103.97	34.20	20.14
Total Taxa	17.80	6.46	3.60	1.14	20.60	4.39	9.40	3.91	13.20	5.07	11.00	3.24
Diversity (H')	2.125	0.217	1.097	0.287	1.685	0.428	1.553	0.356	1.771	0.411	1.986	0.294

Table D-2 (continued)

Taxon	Mussel Beach		NW Bay West Arm		Outside Bay		Sheep Bay		Shelter Bay		Sleepy Bay		Snug Harbor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Porifera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ceriantharia	0.00	0.00	0.00	0.00	1.40	2.19	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Nemertea	0.60	0.89	2.00	3.39	4.60	6.54	3.80	3.56	1.00	2.24	1.80	2.49	0.80	0.84
Nematoda	13.20	14.74	7.40	6.84	15.60	16.10	0.20	0.45	11.40	16.95	0.40	0.89	0.20	0.45
Polychaeta	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polynoidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lepidonotus squamatus	0.00	0.00	0.00	0.00	0.80	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sigalionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.24
Pholoe minuta	0.20	0.45	0.00	0.00	0.60	0.89	0.20	0.45	0.00	0.00	0.20	0.45	0.80	0.45
Palaenotus bellis	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anaitides multiseriata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Eteone longa	5.80	7.56	0.60	0.55	7.00	6.32	0.00	0.00	0.00	0.00	0.00	0.00	3.20	4.49
Eulalia viridis	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syllidae	0.00	0.00	0.00	0.00	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syllis	0.40	0.55	0.00	0.00	0.20	0.45	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Syllis elongata	0.00	0.00	0.00	0.00	0.20	0.45	0.60	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Exogone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exogone gemmifera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exogone verugera	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaerosyllis	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nereidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cheilonereis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nereis	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	1.60	2.30	0.00	0.00	0.00	0.00
Nephtys ferruginea	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaerodoropsis sphaerullifer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glycera capitata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hemipodus borealis	0.20	0.45	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glycinde picta	0.00	0.00	0.00	0.00	0.20	0.45	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Orbinidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leitoscolopios pugettensis	0.00	0.00	0.00	0.00	1.20	2.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Naineris quadricuspida	0.00	0.00	0.00	0.00	0.80	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orbinella nuda	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Protoariciella	1.60	3.58	0.00	0.00	1.80	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laonice	0.00	0.00	0.00	0.00	1.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polydora	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polydora quadrilobata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polydora brachycephala	0.20	0.45	0.00	0.00	0.60	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Prionospio	0.20	0.45	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prionospio cirrifera	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prionospio steenstrupi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00

Table D-2 (continued)

Taxon	Mussel Beach		NW Bay West Arm		Outside Bay		Sheep Bay		Shelter Bay		Sleepy Bay		Snug Harbor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spio	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Spio filicornis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhynchospio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cirratulidae	0.00	0.00	0.00	0.00	1.80	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tharyx multifilis	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Armandia brevis	0.60	1.34	0.00	0.00	0.20	0.45	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Ophelia limacina	0.40	0.55	0.00	0.00	2.80	4.09	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Capitellidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capitella capitata	0.20	0.45	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.20	0.45
Heteromastus filiformis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00
Mediomastus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Barantolla americana	0.00	0.00	0.00	0.00	0.20	0.45	0.80	1.79	0.60	1.34	0.00	0.00	0.00	0.00
Abarenicola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maldanidae	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Owenia fusiformis	0.00	0.00	0.00	0.00	0.20	0.45	0.80	1.10	0.00	0.00	0.20	0.45	0.00	0.00
Pectinaria granulata	0.00	0.00	0.00	0.00	0.20	0.45	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Fabriciella berkeleyi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Serpulidae	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saccocirrus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Oligochaeta	2.20	3.49	0.20	0.45	2.00	1.73	0.20	0.45	6.80	7.05	0.40	0.55	0.00	0.00
Gastropoda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Rissoidae	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Alvania compacta	3.40	1.52	0.60	0.89	3.00	3.46	0.60	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Cingula	0.20	0.45	0.40	0.55	58.00	85.52	0.20	0.45	0.20	0.45	0.00	0.00	0.00	0.00
Fartulum	2.20	2.95	0.00	0.00	1.60	2.61	0.00	0.00	0.00	0.00	0.20	0.45	1.80	2.49
Odostomia	0.60	0.55	0.00	0.00	1.80	1.92	0.80	1.10	0.00	0.00	0.00	0.00	0.20	0.45
Acteocina	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diaphana minuta	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Modiolus	1.60	2.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Mysella tumida	8.40	5.32	0.00	0.00	20.60	13.89	0.40	0.55	0.00	0.00	0.00	0.00	0.80	1.10
Turtonia minuta	1.40	1.67	0.00	0.00	1.80	1.30	0.40	0.55	0.00	0.00	0.00	0.00	5.00	5.39
Macoma	0.80	0.45	0.00	0.00	0.80	1.79	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00
Macoma inquinata	0.40	0.89	0.00	0.00	1.20	1.30	2.40	2.51	0.00	0.00	0.00	0.00	0.00	0.00
Macoma balthica	0.00	0.00	0.40	0.89	0.80	1.79	1.40	2.61	0.00	0.00	0.00	0.00	0.00	0.00
Saxidomus gigantea	1.00	1.73	0.00	0.00	0.20	0.45	0.40	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Compsomyx subdiaphana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Protothaca staminea	3.00	2.00	0.40	0.55	2.40	1.52	2.20	2.68	0.00	0.00	0.20	0.45	1.00	1.22
Mya arenaria	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hiatella arctica	4.00	7.87	4.80	5.12	2.00	2.55	0.40	0.89	0.60	0.89	1.20	1.30	0.60	0.55
Crustacea	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Podocopina	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

D-1-6

Table D-2 (continued)

Taxon	Mussel Beach		NW Bay West Arm		Outside Bay		Sheep Bay		Shelter Bay		Sleepy Bay		Snug Harbor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Harpacticoida	0.40	0.55	0.00	0.00	1.00	1.73	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00
Harpacticus uniremis	0.80	1.79	0.00	0.00	6.00	12.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dactylopodia	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Oithona similis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cumella vulgaris	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.40	0.55	0.00	0.00	0.20	0.45
Leptochelia savignyi	3.20	6.61	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	1.60	3.05
Ianiropsis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gammaridea	0.00	0.00	0.60	0.55	0.00	0.00	0.00	0.00	0.20	0.45	0.20	0.45	0.00	0.00
Ampithoe	0.00	0.00	0.00	0.00	0.20	0.45	1.00	1.73	0.20	0.45	0.20	0.45	0.00	0.00
Ampithoe kussakina	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00
Corophium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dexamonica reduncans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paramoera sp. 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paramoera sp. 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.58	0.80	1.79	0.00	0.00
Anisogammarus pugettensis	0.00	0.00	0.00	0.00	0.00	0.00	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00
Maera	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melita desdichada	0.40	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spinulogammarus subcarinatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60	7.80	0.00	0.00
Allorchestes	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00
Jassa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Decapoda (arthropoda)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00
Hippolytidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insecta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anurida maritima	2.60	4.34	0.00	0.00	0.20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.55
Diptera	0.40	0.89	0.00	0.00	0.60	1.34	0.00	0.00	0.00	0.00	0.20	0.45	0.00	0.00
Chironomidae	0.60	0.89	0.40	0.55	0.60	0.89	0.00	0.00	1.20	1.30	0.00	0.00	2.80	6.26
Golfingia procera	5.40	9.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Echiurus echiurus alaskanus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.45
Asteroidea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.55
Ophiuridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Holothuroidea	0.00	0.00	0.00	0.00	0.60	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leptosynapta	1.00	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ascidacea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.89
Total Abundance	69.00	34.29	18.60	7.16	149.60	142.12	20.60	12.10	27.20	23.06	11.00	9.06	23.00	10.07
Total Taxa	16.00	6.16	5.80	2.59	19.80	4.66	10.20	4.15	6.20	3.27	4.20	1.10	9.40	4.28
Diversity (H')	2.176	0.325	1.156	0.463	2.178	0.346	2.015	0.497	1.374	0.086	1.181	0.230	1.785	0.525

Table D-3 (continued)

Axes	1	2	3	4	Total variance
Eigenvalues	.396	.273	.140	.065	1.000
Cumulative percentage variance of species data	39.6	66.9	80.8	87.4	
Sum of all unconstrained eigenvalues					1.000

Species scores (adjusted for species variance)				
	AX1	AX2	AX3	AX4
EIG	.3956	.2729	.1398	.0653
Nemertea	-.0102	-.1285	-.5508	-.6923
Hiatella arctica	.0592	.7865	-.4714	.2217
Protothaca staminea	.3448	.8789	-.1723	-.0319
Eteone longa	.4181	.6091	.5043	-.2767
Pholoe minuta	-.4466	.2106	.2517	-.3453
Turtonia minuta	.0871	-.8700	.4191	-.0506
Chironomidae	-.0362	.2019	.8541	.3536
Cingula	.9641	-.2464	.0553	.0079
Mysella tumida	.7229	.6362	-.2559	-.0299
Macoma	.4328	-.3601	-.5465	-.4131
Ampithoe	.0334	-.8560	-.1137	.1709
Macoma balthica	.0395	-.7061	-.5380	-.3818
Alvania compacta	.8234	.1535	-.0283	-.2738
Armandia brevis	-.2289	-.3383	-.7879	.1467
Odostomia	.7766	-.0001	.2115	.1450
Macoma inquinata	.4923	-.5972	-.1818	.4064
Pectinaria granulata	-.2176	-.3974	-.5780	.2169
Capitella capitata	-.2669	-.1216	-.5603	.2733
Barantolla americana	-.4421	-.6397	-.5475	-.1103
Syllis elongata	.0202	.5456	-.5774	.0666
Cumella vulgaris	-.1399	-.4340	.1642	-.3852
Nereis	-.1978	.2278	-.4460	.5863
Saxidomus gigantea	.1314	.7076	-.1961	-.2170
Fartulum	-.2189	.4115	.6900	-.4012
Modiolus	-.1194	.8331	-.1321	.1743
Orbiniella nuda	-.3730	-.2760	-.6406	.0664
Polydora brachycephalus	-.1219	-.1397	.0390	-.5252
Spionidae	.2793	-.2856	-.4785	.0795
Syllis	.4611	.4318	-.1520	-.0602
Glycinde picta	.1101	-.2133	-.5263	.0563
Paramoera sp. 1	-.3500	.0273	.5164	-.2831
Leptochelia savignyi	-.2299	.6654	.2622	.0042
Owenia fusiformis	.2394	.5586	-.3281	-.1546
Leitoscoloplos pugettensis	.8017	.0394	-.0185	-.2012
Mediomastus	-.2378	.0969	.5347	-.1635
Harmothoe imbricata	.3757	-.3140	.0321	.8271
Insecta	.0807	-.2188	-.6360	.1721
Allorchestes	-.3500	.0273	.5164	-.2831
Gammaridea	.3798	-.3060	.0875	-.3979
Glycera capitata	.3742	.2528	-.4252	.1597

Table D-3 (continued)

Site scores				
	AX1	AX2	AX3	AX4
ElG	.3956	.2729	.1398	.0653
1990				
Outside Bay	1.3428	.0989	-.8064	.3361
Crafton Island	-1.1303	-1.0342	-1.3504	.5652
Herring Bay	.7689	-.7896	.9788	2.3562
Mussel Beach	-.4759	1.7616	-1.3131	.4080
Snug Harbor	-1.0499	.0818	1.5491	-.8494
1991				
Outside Bay	1.4333	.4729	.0005	-1.0265
Crafton Island	-.8850	-1.4284	-.8083	-.7784
Herring Bay	1.1395	-.9180	.2624	-1.1938
Mussel Beach	-.2478	1.3973	.1890	-.0243
Snug Harbor	-.8955	.3576	1.2984	.2069
ORIGIN	-1.0459	.0320	.4605	.9912

Figure 4-17 can be constructed by plotting the scores of the first 3 axes

Cumulative fit per species as fraction of variance of species					
	AX1	AX2	AX3	AX4	VAR(y)
FR FITTED	.3956	.2729	.1398	.0653	
Nemertea	.0001	.0166	.3200	.7993	1.27
Hiatella arctica	.0035	.6221	.8443	.8935	2.52
Protohaca staminea	.1189	.8913	.9210	.9220	1.00
Eteone longa	.1748	.5459	.8002	.8768	.97
Phloe minuta	.1995	.2438	.3072	.4264	.95
Turtonia minuta	.0076	.7645	.9402	.9428	2.00
Chironomidae	.0013	.0421	.7716	.8967	.59
Cingula	.9294	.9901	.9932	.9933	11.27
Mysella tumida	.5226	.9274	.9929	.9938	4.64
Macoma	.1873	.3169	.6156	.786	2.51
Ampithoe	.0011	.7339	.7468	.7760	1.35
Macoma balthica	.0016	.5001	.7896	.9354	1.59
Alvania compacta	.6780	.7015	.7023	.7773	1.75
Armandia brevis	.0524	.1669	.7877	.8093	1.17
Odostomia	.6031	.6031	.6478	.6689	.37
Macoma inquinata	.2424	.5991	.6321	.7973	.51
Pectinaria granulata	.0473	.2053	.5393	.5864	.64
Capitella capitata	.0713	.0860	.4000	.4746	.32
Barantolla americana	.1954	.6047	.9045	.9166	1.31
Syllis elongata	.0004	.2980	.6315	.6359	.31
Cumella vulgaris	.0196	.2079	.2349	.3833	.02
Nereis	.0391	.0910	.2899	.6337	.04
Saxidomus gigantea	.0173	.5179	.5564	.6035	.23
Fartulum	.0479	.2172	.6934	.8543	1.13
Modiolus	.0143	.7084	.7258	.7562	.48

Table D-3 (continued)

Cumulative fit per species as fraction of variance of species (continued)					
	AX1	AX2	AX3	AX4	VAR(y)
Orbiniella nuda	.1391	.2153	.6256	.6301	.14
Polydora brachycephalus	.0149	.0344	.0359	.3117	.13
Spionidae	.0780	.1596	.3885	.3948	.09
Syllis	.2126	.3991	.4222	.4258	.06
Glycinde picta	.0121	.0576	.3346	.3378	.04
Paramoera sp. 1	.1225	.1232	.3899	.4700	.01
Leptochelia savignyi	.0528	.4955	.5643	.5643	.70
Owenia fusiformis	.0573	.3694	.4771	.5010	.02
Leitoscoloplos pugettensis	.6427	.6443	.6446	.6851	.19
Mediomastus	.0566	.0660	.3519	.3786	.04
Harmothoe imbricata	.1412	.2397	.2408	.9248	.93
Insecta	.0065	.0544	.4589	.4885	.61
Allorchestes	.1225	.1232	.3899	.4700	.01
Gammaridea	.1443	.2379	.2456	.4039	.01
Glycera capitata	.1400	.2039	.3847	.4102	.07

Squared residual length per sample with s axes (s=1...4)						
FR FITTED	.3956	.2729	.1398	.0653		
1990						
Outside Bay	.2890	.2863	.1954	.1880	1.00	81.24
Crafton Island	.6904	.3985	.1436	.1228	1.20	89.73
Herring Bay	.7006	.5304	.3965	.0340	.93	96.36
Mussel Beach	1.2481	.4012	.1602	.1493	1.34	88.84
Snug Harbor	.5057	.5039	.1685	.1214	.94	87.11
1991						
Outside Bay	.2543	.1933	.1933	.1245	1.07	88.33
Crafton Island	.8041	.2473	.1560	.1164	1.11	89.55
Herring Bay	.4503	.2203	.2107	.1176	.96	87.80
Mussel Beach	.7631	.2303	.2253	.2252	.79	71.40
Snug Harbor	.3382	.3033	.0677	.0649	.66	90.10

Squared residual length per sample with s axes (s=1...4)						
	AX1	AX2	AX3	AX4	SQLENG	% fit
FR FITTED	.3956	.279	.1398	.0653		
1990						
Outside Bay	.2890	.2863	.1954	.1880	1.00	81.24
Crafton Island	.6904	.3985	.1436	.1228	1.20	89.73
Herring Bay	.7006	.5304	.3965	.0340	.93	96.36
Mussel Beach	1.2481	.4012	.1602	.1493	1.34	88.84
Snug Harbor	.5057	.5039	.1685	.1214	.94	87.11
1991						
Outside Bay	.2543	.1933	.1933	.1245	1.07	88.33
Crafton Island	.8041	.2473	.1560	.1164	1.11	89.55
Herring Bay	.4503	.2203	.2107	.1176	.96	87.80
Mussel Beach	.7631	.2303	.2253	.2252	.79	71.40
Snug Harbor	.3382	.3033	.0677	.0649	.66	90.10

Table D-4 (continued)

Axes	1	2	3	4	Total variance
Eigenvalues	.306	.156	.147	.097	1.000
Cumulative percentage variance of species data	30.6	46.1	60.8	70.5	
Sum of all unconstrained eigenvalues					1.000

Species scores (adjusted for species variance)					
	AX1	AX2	AX3	AX4	Weight
EIG	.3055	.1558	.1470	.0965	
Nemertea	.2717	.1542	.1608	.4386	.00
Hiatella arctica	.1990	.4282	-.5576	.0136	1.00
Protothaca staminea	.1420	.8137	-.1668	.1330	1.00
Eteone longa	.7256	-.0049	-.3048	.0226	1.00
Pholoe minuta	.2193	-.3143	-.2093	.6711	1.00
Turtonia minuta	.4612	-.3993	.4667	-.3766	1.00
Chironomidae	.0210	-.4169	-.0738	.0580	1.00
Cingula	.9236	-.2855	.0597	.0147	1.00
Mysella tumida	.7680	.5108	-.2985	.0901	1.00
Macoma	.2931	.6814	.5143	.0540	1.00
Ampithoe	.2661	-.1400	.6967	-.3208	1.00
Macoma balthica	-.0078	.3992	.8417	.1550	1.00
Alvania compacta	.7295	.2971	.0243	-.2260	1.00
Armandia brevis	.0587	.6586	.4354	-.0139	1.00
Odostomia	.6685	.0283	-.1065	-.0657	1.00
Macoma inquinata	.5027	.2431	.4483	.0529	1.00
Pectinaria granulata	.0585	.4709	.4508	.0551	1.00
Capitella capitata	.0650	.1601	.3897	.6526	1.00
Barantolla americana	-.2126	.2178	.6359	-.1493	1.00
Syllis elongata	.1435	.7424	.0117	.4039	1.00
Cumella vulgaris	-.0362	-.1544	.2667	.7859	1.00
Nereis	-.2986	-.1070	-.2119	.1054	1.00
Saxidomus gigantea	.3193	.5684	-.3210	-.0266	1.00
Fartukum	.1482	-.1156	-.3879	-.1958	1.00
Modiolus	.2533	.3852	-.4825	-.0387	1.00
Orbiniella nuda	-.0104	-.2874	.2934	.8066	1.00
Polydora brachycephalus	.1282	.1718	.2699	-.1533	1.00
Spionidae	.1199	-.1582	.4415	.3968	1.00
Syllis	.4340	.0577	-.1392	.4109	1.00
Glycinde picta	.1453	.3589	.2535	.2687	1.00
Paramoera sp. 1	-.2634	-.0080	-.2922	-.1172	1.00
Leptochelia savignyi	.1241	.1479	-.4474	-.1615	1.00
Owenia fusiformis	-.0160	.5020	.0051	.1165	1.00
Leitoscoloplos pugettensis	.7611	.1621	.0129	-.0826	1.00
Mediomastus	.0397	.4178	.0924	.1211	1.00
Harmothoe imbricata	.4267	.0384	.2243	-.1877	1.00
Insecta	.2818	.1236	.2560	-.0743	1.00
Allorchestes	-.0015	.1487	.0993	.3298	1.00
Gammaridea	-.1690	-.1334	-.2153	-.2305	1.00
Glycera capitata	.3651	.5806	.0603	.1237	1.00

Table D-4 (continued)

Site scores				
	AX1	AX2	AX3	AX4
EIG	.3055	.1558	.1470	.0965
1990				
Crab Bay	-.8340	-.7969	1.5516	1.8878
Outside Bay	2.1547	.5872	.1182	-.1578
Sheep Bay	-.0061	2.0913	.3847	.7616
Crafton Island	-.5810	.0781	1.6253	-.1692
Herring Bay	1.4116	-1.3020	.4479	-1.3155
Mussel Beach	.0527	1.4559	-1.8898	.5977
Snug Harbor	-.3449	-1.2226	-.5830	-.1702
Block Island	-.6958	1.1105	.8920	.1105
Northwest Bay West Arm	-.7808	-.2885	.1446	-.4655
Shelter Bay	-.7518	-.7813	-.6222	-.0689
1991				
Bainbridge Bight	.9961	-1.6530	-.4973	3.5510
Outside Bay	2.1899	.1233	-.6673	-.1309
Sheep Bay	-.5729	.2557	.2841	-.2165
Bay of Isles	-.9544	-.3126	-.5204	-.2824
Crafton Island	-.3129	-.1727	2.1329	-.8282
Herring Bay	1.8382	-.8632	.9580	-1.1231
Mussel Beach	.4059	1.0041	-1.4332	-.5736
Snug Harbor	-.3641	-.6992	-.6689	-.5984
Block Island	.2786	2.0715	1.1649	.6938
Ingot Island	-.4297	.5731	-.9374	-.2572
Northwest Bay West Arm	-.7023	-.2186	-.7554	-.4101
Shelter Bay	-.9994	-.6008	-.4744	-.4192
Sleepy Bay	-.9976	-.4396	-.6551	-.4157
ORIGIN	-1.0284	-.5891	-.4091	-.4474

Figure 4-18 can be constructed by plotting the scores of the first 3 axes.

Table D-4 (continued)

Cumulative fit per species as fraction of variance of species					
	AX1	AX2	AX3	AX4	VAR(y)
FR FITTED	.3055	.1558	.1470	.0965	
Nemertea	.0738	.0976	.1235	.3158	1.19
Hiatella arctica	.0396	.2229	.5339	.5341	1.64
Protothaca staminea	.0202	.6823	.7101	.7278	1.26
Eteone longa	.5266	.5266	.6195	.6200	1.57
Pholoe minuta	.0481	.1469	.1907	.6410	2.12
Turtonia minuta	.2127	.3721	.5899	.7317	2.68
Chironomidae	.0004	.1742	.1797	.1830	.67
Cingula	.8530	.9345	.9381	.9383	7.52
Mysella tumida	.5898	.8508	.9399	.9480	3.85
Macoma	.0859	.5502	.8147	.8176	1.43
Ampithoe	.0708	.0904	.5758	.6787	.91
Macoma balthica	.0001	.1594	.8680	.8920	2.27
Alvania compacta	.5322	.6205	.6211	.6721	1.28
Armandia brevis	.0034	.4373	.6268	.6270	1.20
Odostomia	.4469	.4477	.4590	.4633	.33
Macoma inquinata	.2527	.3118	.5127	.5155	.83
Pectinaria granulata	.0034	.2251	.4284	.4314	.55
Capitella capitata	.0042	.0299	.1818	.6076	.39
Barantolla americana	.0452	.0926	.4970	.5192	.78
Syllis elongata	.0206	.5717	.5718	.7350	.50
Cumella vulgaris	.0013	.0252	.0963	.7139	.56
Nereis	.0892	.1006	.1455	.1567	.22
Saxidomus gigantea	.1019	.4250	.5281	.5288	.18
Fartulum	.0220	.0353	.1858	.2241	.68
Modiolus	.0642	.2125	.4453	.4468	.31
Orbiniella nuda	.0001	.0827	.1688	.8193	2.16
Polydora brachycephalus	.0164	.0459	.1188	.1423	.10
Spionidae	.0144	.0394	.2343	.3918	.11
Syllis	.1884	.1917	.2111	.3799	.07
Glycinde picta	.0211	.1499	.2141	.2864	.06
Paramoera sp. 1	.0694	.0694	.1548	.1686	.95
Leptocheilia savignyi	.0154	.0373	.2374	.2635	.40
Owenia fusiformis	.0003	.2522	.2523	.2658	.10
Leitoscoloplos pugettensis	.5793	.6056	.6058	.6126	.11
Mediomastus	.0016	.1761	.1846	.1993	.07
Harmothoe imbricata	.1820	.1835	.2338	.2690	.54
Insecta	.0794	.0947	.1602	.1657	.33
Allorchestes	.0000	.0221	.0320	.1408	.18
Gammaridea	.0286	.0463	.0927	.1458	.04
Glycera capitata	.1333	.4704	.4740	.4893	.04

Table D-4 (continued)

Squared residual length per sample with s axes (s=1...4)						
	AX1	AX2	AX3	AX4	SOLENG	%FIT
FR FITTED	.3055	.1558	.1470	.0965		
1990						
Crab Bay	1.3711	1.2722	.9183	.5742	1.58	63.74
Outside Bay	.2745	.2208	.2187	.2163	1.69	87.22
Sheep Bay	1.0388	.3575	.3358	.2798	1.04	73.07
Crafton Island	.8877	.8867	.4984	.4957	.99	49.97
Herring Bay	.7540	.4899	.4604	.2933	1.36	78.47
Mussel Beach	1.2364	.9062	.3812	.3467	1.24	71.98
Snug Harbor	.8938	.6610	.6110	.6082	.93	34.61
Block Island	.5657	.3736	.2566	.2555	.71	64.20
Northwest Bay West Arm	.1814	.1684	.1653	.1444	.37	60.72
Shelter Bay	.2912	.1961	.1392	.1387	.46	70.09
1991						
Bainbridge Bight	1.8174	1.3918	1.3554	.1380	2.12	93.49
Outside Bay	.2623	.2599	.1944	.1928	1.73	88.84
Sheep Bay	.3005	.2904	.2785	.2740	.40	31.65
Bay of Isles	.2412	.2260	.1862	.1785	.52	65.64
Crafton Island	1.0092	1.0045	.3357	.2695	1.04	74.06
Herring Bay	.5522	.4362	.3013	.1795	1.58	88.67
Mussel Beach	.8791	.7221	.4201	.3884	.93	58.22
Snug Harbor	.5212	.4451	.3793	.3448	.56	38.63
Block Island	1.2724	.6040	.4045	.3580	1.30	72.38
Ingot Island	.7696	.7185	.5893	.5829	.83	29.44
Northwest Bay West Arm	.3297	.3223	.2384	.2222	.48	53.75
Shelter Bay	.3094	.2532	.2201	.2032	.61	66.94
Sleepy Bay	.2145	.1844	.1213	.1046	.52	79.82

Table D-5. Principal component analysis of polycyclic aromatic hydrocarbons (PAHs) at infauna sites—1990 and 1991.

Axes	1	2	3	4	Total variance
Eigenvalues	.763	.111	.029	.023	1.000
Cumulative percentage variance of species data	: 76.3	87.4	90.2	92.5	
Sum of all unconstrained eigenvalues					1.000

Species scores (adjusted for species variance)					
	AX1	AX2	AX3	AX4	WEIGHT
EIG	.7627	.1108	.0290	.0230	
Ln TPAH	.9355	.0389	.0551	.0545	.01
Naphthalene	.4924	.1271	-.1861	-.6230	1.00
C1Naphthalene	.6169	-.2628	.0549	-.5594	1.00
C2Naphthalene	.4536	-.5038	-.1492	-.6170	1.00
C3Naphthalene	.6218	-.6841	-.1158	-.1594	1.00
C4Naphthalene	.6983	-.6397	.0515	.0934	1.00
Fluorene	.6769	.3754	-.1741	-.3577	1.00
C1Fluorene	.9105	-.2197	.1006	-.0560	1.00
C2Fluorene	.9415	-.2399	.0366	.0369	1.00
C3Fluorene	.9138	-.2607	.1354	.0137	1.00
Dibenzothiophene	.8045	.2268	.4015	-.0793	1.00
C1Dibenzothiophene	.8860	-.2522	.3259	-.0184	1.00
C2Dibenzothiophene	.9314	-.2715	-.0169	-.0033	1.00
C3Dibenzothiophene	.9558	-.1317	.1174	.0294	1.00
Phenanthrene	.7858	.3475	.2425	.0822	1.00
C1Phenanthrene	.8899	.0555	.3360	.0840	1.00
C2Phenanthrene	.9825	-.0202	.0039	.0896	1.00
C3Phenanthrene	.9877	-.0262	-.0690	.0380	1.00
Naphthobenzothiophene	.9731	-.0441	-.0431	.1074	1.00
C1Naphthobenzothiophene	.9794	-.0943	-.1262	-.0062	1.00
C2Naphthobenzothiophene	.9789	-.0539	-.1532	-.0236	1.00
C3Naphthobenzothiophene	.9515	-.0104	-.1398	-.0389	1.00
Fluoranthene	.8745	.4139	.0370	.0881	1.00
Pyrene	.8564	.3762	.0123	.1865	1.00
C1Pyrene	.9845	.0460	-.0330	.0136	1.00
C2Pyrene	.9804	.0278	-.1197	.0271	1.00
Benzo(a)anthracene	.4766	.8298	-.0951	-.0401	1.00
Chrysene	.9485	.1274	-.1007	.0780	1.00
C1Chrysene	.9788	-.0570	-.1438	.0129	1.00
Benzo(b)fluoranthene	.8968	.3051	-.1414	.0684	1.00
Benzo(e)pyrene	.7870	.4008	.3109	-.1595	1.00
Benzo(a)pyrene	.9203	.1351	-.2907	-.0512	1.00
Perylene	.7102	.4765	-.0418	-.3239	1.00
Indeno(1,2,3-c,d)pyrene	.5034	.6601	.0723	-.3780	1.00
Dibenzo(a,h)anthracene	.5967	.6581	.1929	-.0184	1.00
Benzo(g,h,i)perylene	.6265	.4832	-.4376	.1976	1.00

Table D-5 (continued)

Site scores				
	AX1	AX2	AX3	AX4
EIG	.7627	.1108	.0290	.0230
1990				
Crab Bay	-.5170	.4394	-.3596	-.1516
Outside Bay	-1.2326	-.2249	-.0033	-.2912
Sheep Bay	-1.1207	-.3219	.0913	-.1073
Crafton Island	.7422	-.3841	-1.5931	.9367
Herring Bay	-.9661	-.4350	-.3559	.0054
Mussel Beach	.4923	-.9889	-1.8611	-.0894
Snug Harbor	-.6607	-.2651	-.1784	-1.4172
Block Island	1.3750	-1.6121	.7208	-1.9233
Northwest Bay West Arm	-.2938	-.5323	-1.7833	-.8723
Shelter Bay	1.1206	-1.6610	-.8223	2.5451
1991				
Bainbridge Bight	-1.2911	-.2702	.0788	.0293
Outside Bay	-1.2911	-.2702	.0788	.0293
Sheep Bay	-1.2911	-.2702	.0788	.0293
Bay of Isles	1.4592	-1.3043	1.7647	1.3425
Crafton Island	1.2383	1.9025	.3339	-.0653
Herring Bay	-.9592	-.3078	2.5397	.3462
Mussel Beach	.6584	.7213	.2199	-1.2738
Snug Harbor	-.9167	.5720	.8477	1.2879
Block Island	1.5715	-.5501	.7961	-1.7568
Ingot Island	.1031	1.6971	-1.0539	-.0390
Northwest Bay West Arm	.3114	1.1649	.2235	.6568
Shelter Bay	.5776	1.0045	.2642	.4791
Sleepy Bay	.8905	1.8964	-.0272	.2997
ORIGIN	.6467	.3814	.0590	-2.6037

Figure 4-19 can be constructed by plotting the scores of the first 3 axes.

Table D-5 (continued)

Cumulative fit per species as fraction of variance of species	AX1	AX2	AX3	AX4	VAR(y)
FR FITTED	.7627	.1108	.0290	.0230	
Ln TPAH	.8752	.8767	.8797	.8827	1.91
Naphthalene	.2424	.2586	.2932	.6813	.20
C1Naphthalene	.3806	.4496	.4527	.7656	.29
C2Naphthalene	.2058	.4596	.4818	.8625	.58
C3Naphthalene	.3867	.8547	.8682	.8936	.93
C4Naphthalene	.4876	.8969	.8995	.9083	1.43
Fluorene	.4582	.5991	.6294	.7574	.34
C1Fluorene	.8290	.8772	.8873	.8905	.78
C2Fluorene	.8864	.9439	.9453	.9466	1.20
C3Fluorene	.8351	.9030	.9214	.9216	1.36
Dibenzothiophene	.6473	.6987	.8599	.8662	.70
C1Dibenzothiophene	.7851	.8486	.9548	.9552	1.02
C2Dibenzothiophene	.8675	.9412	.9415	.9415	1.56
C3Dibenzothiophene	.9135	.9308	.9446	.9455	1.74
Phenanthrene	.6175	.7382	.7970	.8038	.75
C1Phenanthrene	.7919	.7950	.9079	.9149	1.11
C2Phenanthrene	.9652	.9656	.9657	.9737	1.53
C3Phenanthrene	.9756	.9763	.9810	.9825	1.81
Naphthobenzothiophene	.9470	.9489	.9508	.9623	.96
C1Naphthobenzothiophene	.9592	.9681	.9840	.9840	1.30
C2Naphthobenzothiophene	.9583	.9612	.9847	.9853	1.49
C3Naphthobenzothiophene	.9053	.9054	.9249	.9264	1.40
Fluoranthene	.7647	.9360	.9374	.9451	.97
Pyrene	.7335	.8750	.8752	.9100	.90
C1Pyrene	.9692	.9713	.9724	.9726	1.27
C2Pyrene	.9612	.9620	.9763	.9771	1.35
Benzo(a)anthracene	.2272	.9158	.9248	.9264	.68
Chrysene	.8996	.9158	.9260	.9321	1.00
C1Chrysene	.9581	.9613	.9820	.9822	1.09
Benzo(b)fluoranthene	.8042	.8972	.9172	.9219	.52
Benzo(e)pyrene	.6194	.7800	.8766	.9021	.82
Benzo(a)pyrene	.8470	.8652	.9497	.9523	.67
Perylene	.5044	.7314	.7331	.8380	.56
Indeno(1,2,3-c,d)pyrene	.2535	.6892	.6944	.8373	.84
Dibenzo(a,h)anthracene	.3561	.7892	.8264	.8267	.91
Benzo(g,h,i)perylene	.3925	.6259	.8174	.8565	.92

Table D-5 (continued)

Squared residual length per sample with s axes (s=1...4)						
	AX1	AX2	AX3	AX4	SQLENG	% FIT
FR FITTED	.7627	.1108	.0290	.0230		
1990						
Crab Bay	.1527	.1313	.1276	.1270	.36	64.37
Outside Bay	.0324	.0268	.0268	.0248	1.19	97.92
Sheep Bay	.0510	.0396	.0393	.0391	1.01	96.13
Crafton Island	.1804	.1641	.0905	.0704	.60	88.28
Herring Bay	.0544	.0334	.0297	.0297	.77	96.12
Mussel Beach	.2420	.1336	.0332	.0330	.43	92.26
Snug Harbor	.1313	.1235	.1226	.0764	.46	83.54
Block Island	.4543	.1662	.1512	.0662	1.90	96.51
Northwest Bay West Arm	.1990	.1676	.0755	.0580	.26	78.10
Shelter Bay	.5239	.2181	.1985	.0497	1.48	96.65
1991						
Bainbridge Bight	.0243	.0162	.0160	.0160	1.30	98.76
Outside Bay	.0243	.0162	.0160	.0160	1.30	98.76
Sheep Bay	.0243	.0162	.0160	.0160	1.30	98.76
Bay of Isles	.4596	.2710	.1808	.1394	2.08	93.31
Crafton Island	.4722	.0710	.0678	.0677	1.64	95.88
Herring Bay	.3373	.3268	.1399	.1371	1.04	86.80
Mussel Beach	.2136	.1559	.1545	.1172	.54	78.46
Snug Harbor	.3339	.2976	.2768	.2387	.97	75.52
Block Island	.2060	.1725	.1541	.0832	2.09	96.02
Ingot Island	.4635	.1442	.1120	.1120	.47	76.25
Northwest Bay West Arm	.2401	.0897	.0882	.0783	.31	75.06
Shelter Bay	.1693	.0575	.0555	.0502	.42	88.16
Sleepy Bay	.4687	.0700	.0700	.0679	1.07	93.67

Appendix E-Mollusk Studies Data

Computations of Growth and Mortality Rates for Mussels and Littorines

The size structure of a population contains a record of recent past history of survival, individual growth, and recruitment. With certain assumptions, it is possible to use attributes of size distributions to estimate growth and survival parameters. Required assumptions focus on growth and survival models, periodicity of recruitment, and stability.

A reasonable assumption for most species is that recruitment is periodic. In Alaska, settlement of many marine species probably takes place in late spring; thus, recruitment of individuals large enough to be collected by hand probably takes place sometime during the summer (Morris et al., 1980). As a consequence, average size of individuals in a population will be smallest sometime during the summer and will increase during the rest of the year when no further small individuals are added and individuals of all sizes are growing.

Average size at time i following annual recruitment, \bar{S}_i , is the sum of all sizes, S , divided by the total number, N :

$$\bar{S}_i = \frac{\sum S}{N} \quad \text{Eq. 1)}$$

However, average size can also be viewed as the sum of all individuals of age $t + i$ times the number that have survived to age $t + i$ divided by the total number measured. Time i varies from 0 to 1 and is the time after annual recruitment; $i = 0$ at the time when recruitment occurs. There are various year classes in the sample, and these have ages of t years plus the fractional year t ; thus their ages are $t + i$:

$$\bar{S}_i = \frac{\sum_{t=0} N_{t+i} S_{t+i}}{\sum_{t=0} N_{t+i}} \quad \text{Eq. 2)}$$

Equation 2 can be expanded by replacing S and N with growth and survival functions. A reasonable model for growth is the Richards function (Ebert, 1980):

$$S_t = S_{\infty} (1 - b e^{-K(t+i)})^{-n} \quad \text{Eq. 3)}$$

where

- S_t = size at time t
- S_{∞} = asymptotic size
- K = the growth constant
- n = a shape parameter

$$b = \frac{S_{\infty} - S_R}{S_{\infty}}$$

S_R = size at $t=0$

The shape parameter is -1 for the Brody-Bertalanffy growth equation, +1 for the logistic equation, and, as x_{∞} approaches ∞ , the Gompertz equation becomes the appropriate model (Ebert, 1982). A reasonable model for survival is a simple decaying exponential in which survival is constant, that is, independent of age:

$$N_{t+i} = N_0 e^{-Z(t+i)} \quad \text{Eq. 4}$$

where

Z = the mortality constant

With the Richards function to describe size at $t + i$ and Equation 4 to describe population numbers at $t + i$, equation 2 can be written (Ebert 1987):

$$\bar{S}_i = S_{\infty} (1 - e^{-Z})^{\sum_{j=0}^{i-1} e^{-Zj}} e^{-Zi} (1 - b e^{-K(t+i)})^{-n} \quad \text{Eq. 5}$$

Mean size has been written as a function of growth and survival parameters, and therefore mean size can be used to estimate survival parameters. It is possible to estimate as many parameters as one has measurements of mean size, or, if there are more estimates of mean size than parameters to be estimated, standard errors also can be estimated. The technique for doing this is non-linear regression (Ebert, 1987).

In addition to assumptions of growth and survival models, it is necessary to assume that the populations being analyzed are seasonally stable. That means the fraction of individuals in each age or size class will always be the same if the population is sampled at the same time of year. Furthermore, it is necessary to assume that the population is seasonally stationary, which means that population growth rate per individual is 0: the population is neither increasing nor decreasing.

Table E-1.1.1 Size data for *Mytilus cf. edulis* from intertidal sites in Prince William Sound, 1991.

Location	May			July			September			
	Sample Size (N)	Mean Length (mm)	SD	Sample Size (N)	Mean Length (mm)	SD	Sample Size (N)	Mean Length (mm)	SD	
Block Is. Rocky	91	191	22.8	7.1	328	27.2	7.8	435	16.6	8.2
Block Is. Soft	91	126	29.0	5.2				339	32.9	6.5
Crab Bay Rocky	91				297	18.0	4.7	352	14.4	5.4
Eshamy Bay	91				433	15.6	6.1	319	18.3	8.6
Herring Bay	91	190	23.0	5.1	453	14.2	5.6	314	24.3	6.7
Hogg Bay	91	328	19.2	8.6	357	13.4	7.3	351	13.6	6.7
Ingot Is.	91	242	24.9	8.0	460	20.3	7.4	366	17.9	8.7
Mussel Beach	91	262	21.7	8.1	1305	20.5	10.2	454	24.1	10.5
Northwest Bay	91	271	25.6	7.2	102	21.6	4.6	285	19.1	7.6
Smith Island	91				602	8.7	5.8	513	8.9	5.2
Snug Harbor Soft	91	252	26.6	8.5	975	21.2	8.8	300	27.9	8.6

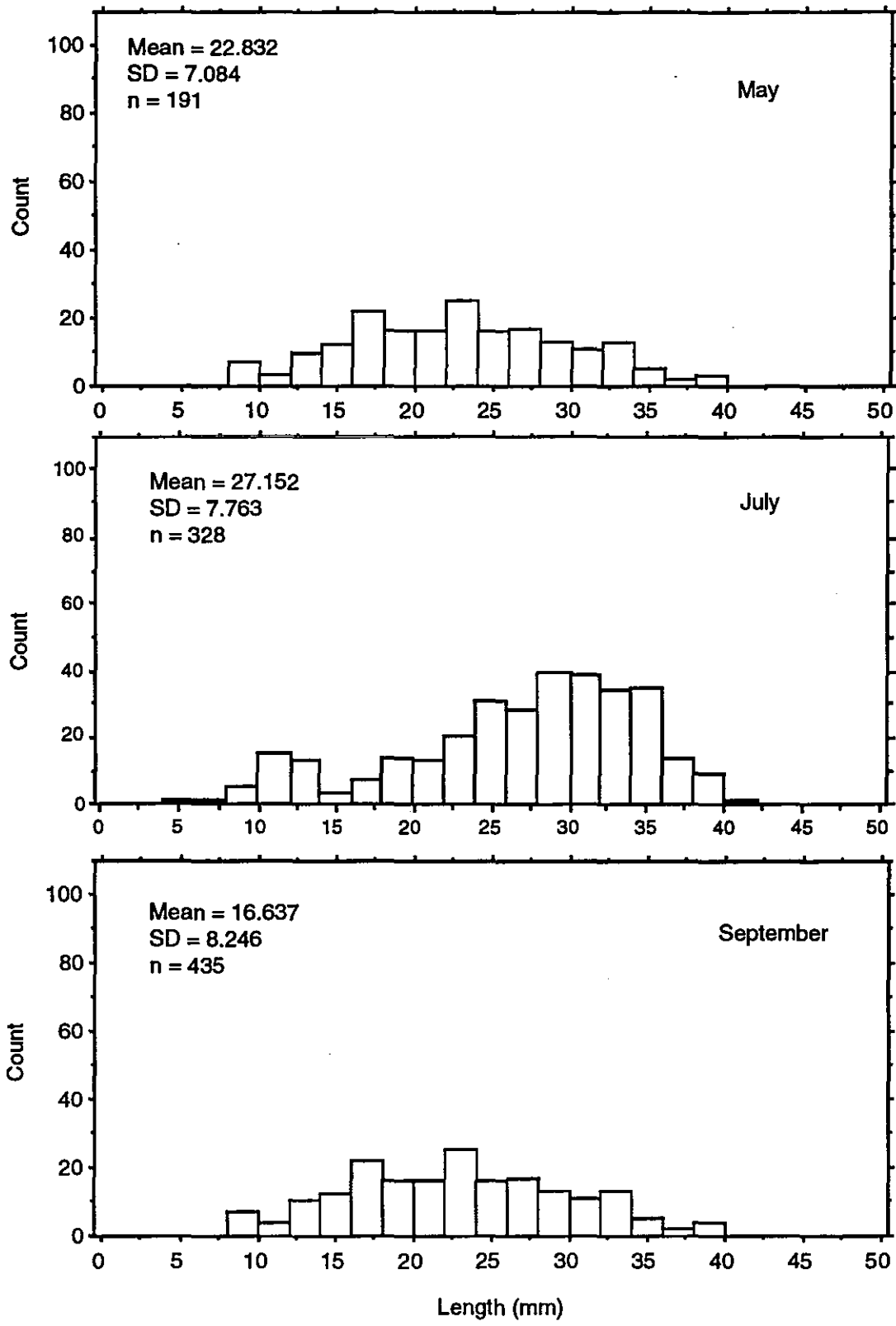


Figure E-1.2.1. Length-frequency histogram of *Mytilus cf. edulis* from Block Island, rocky site, 1991.

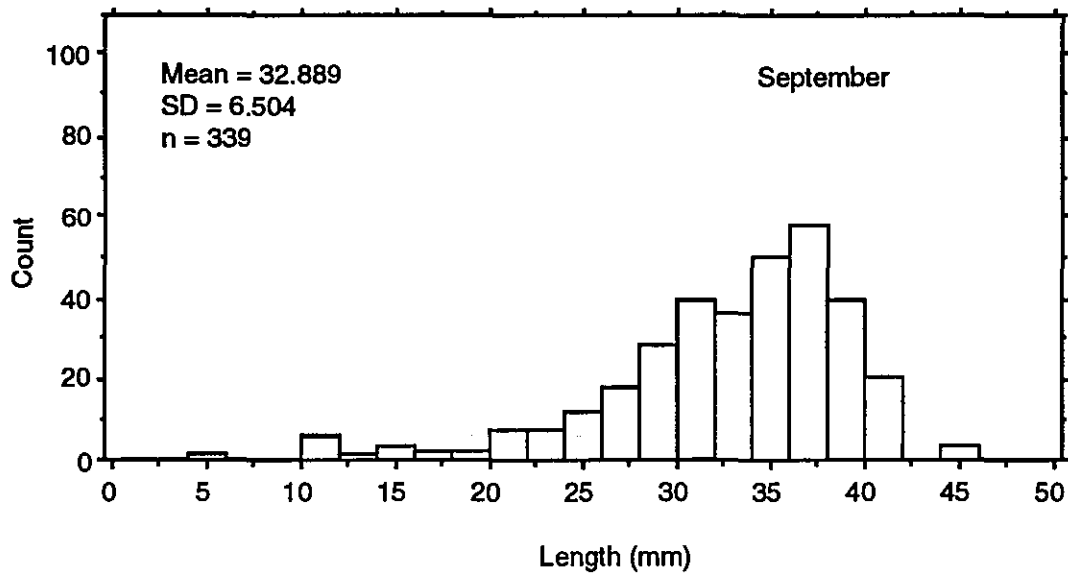
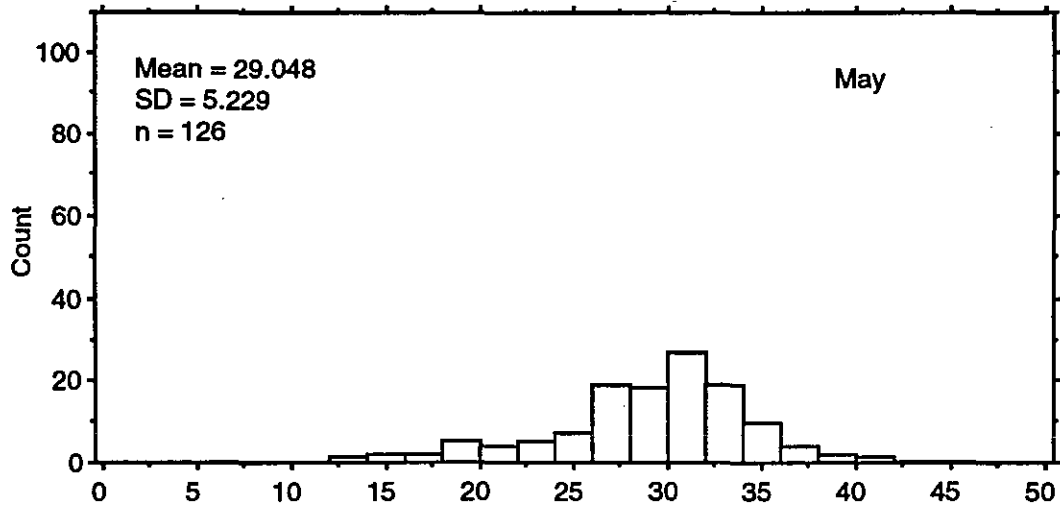


Figure E-1.2.2. Length-frequency histogram of *Mytilus cf. edulis* from Block Island, soft site, 1991.

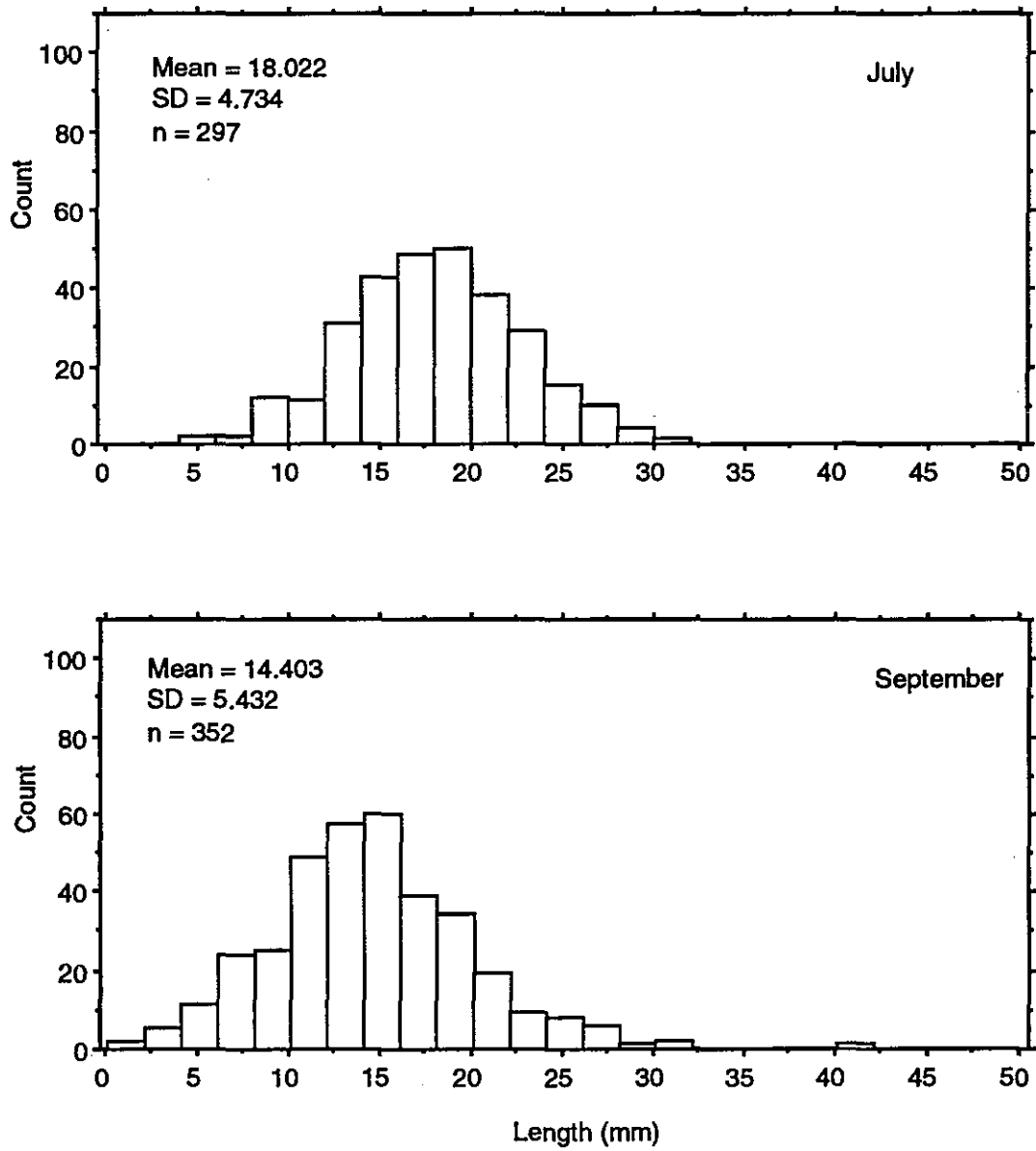


Figure E-1.2.3. Length-frequency histogram of *Mytilus cf. edulis* from Crab Bay, rocky site, 1991.

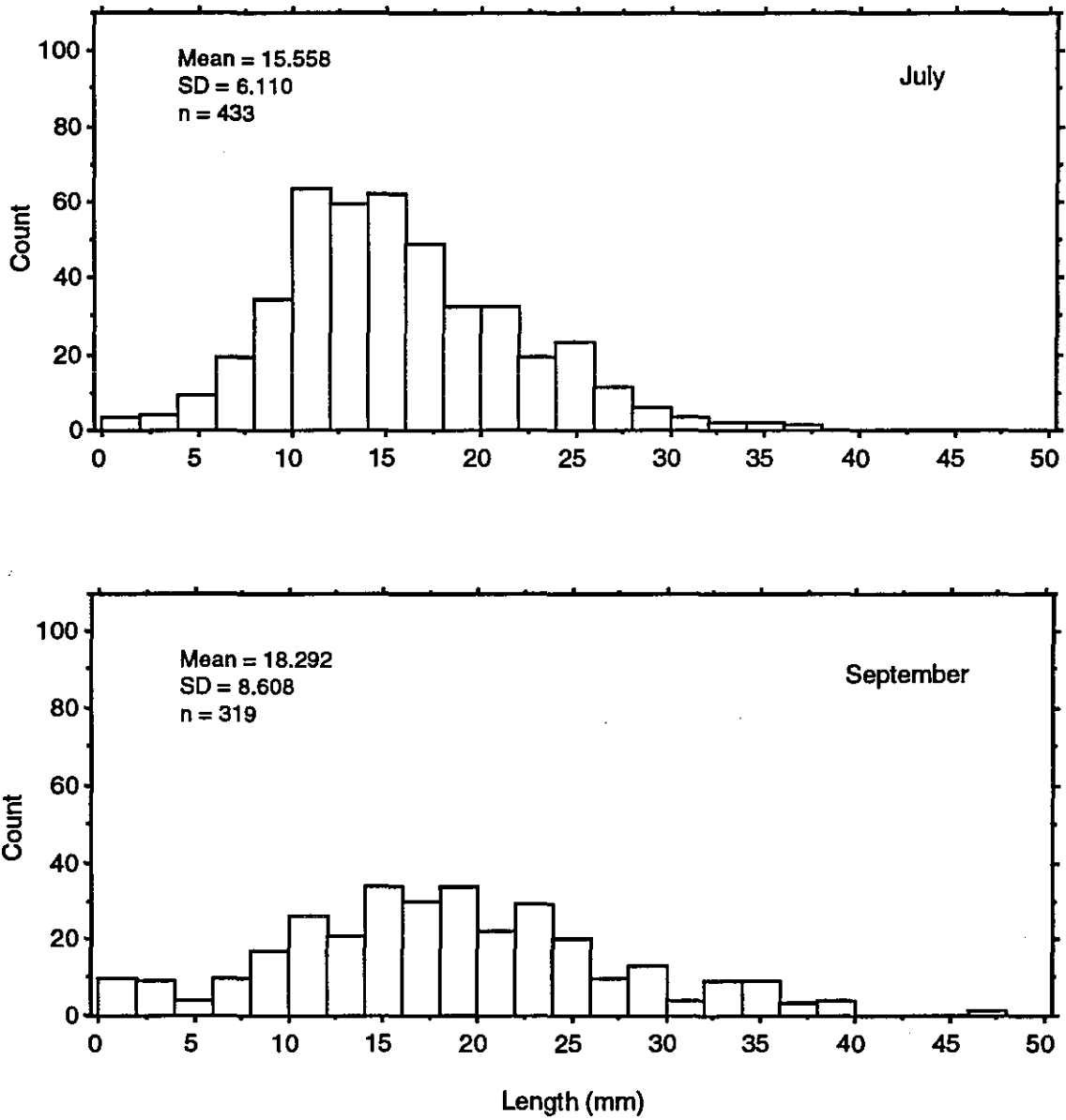


Figure E-1.2.4. Length-frequency histogram of *Mytilus cf. edulis* from Eshamy Bay, 1991.

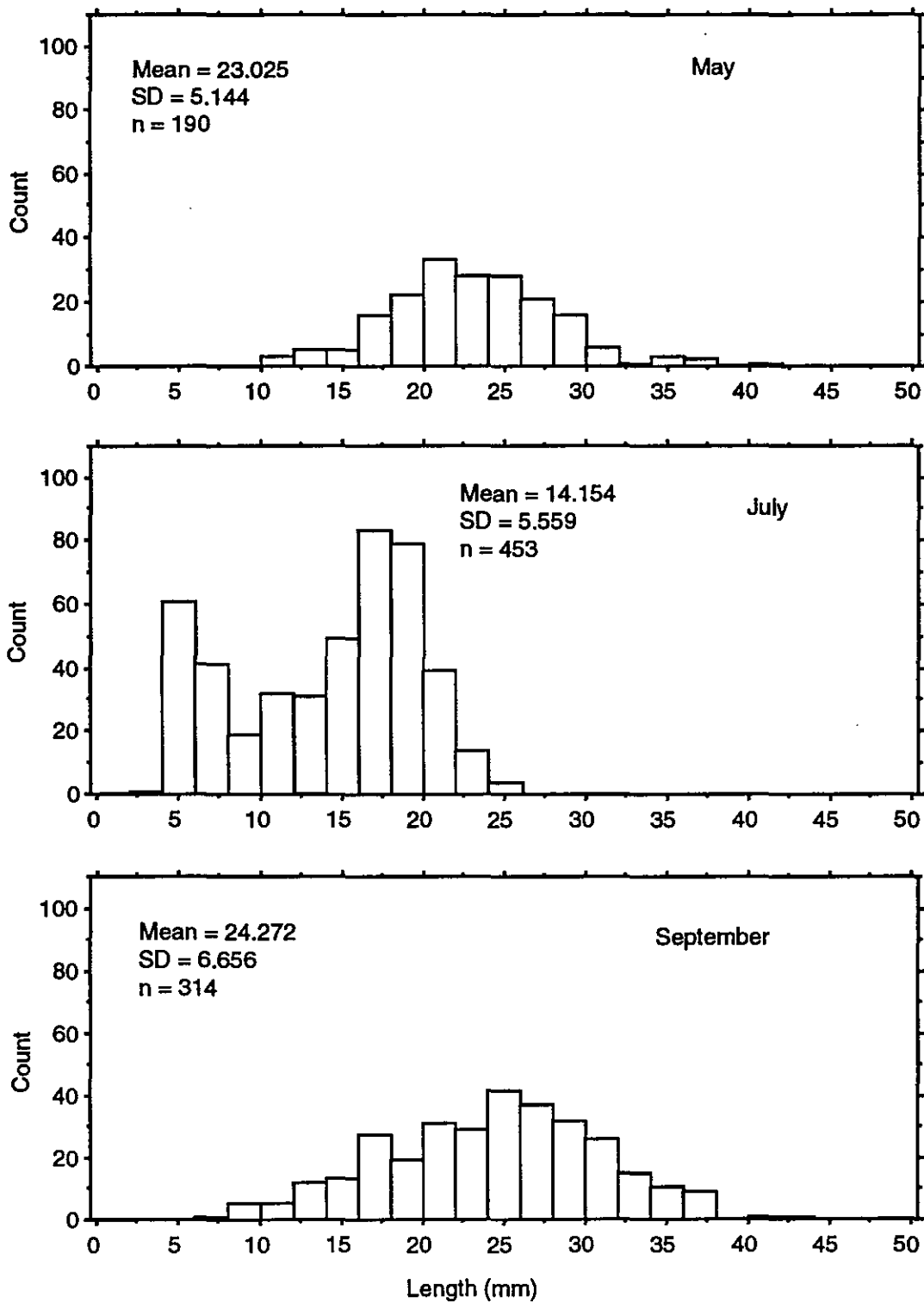


Figure E-1.2.5. Length-frequency histogram of *Mytilus cf. edulis* from Herring Bay, 1991.

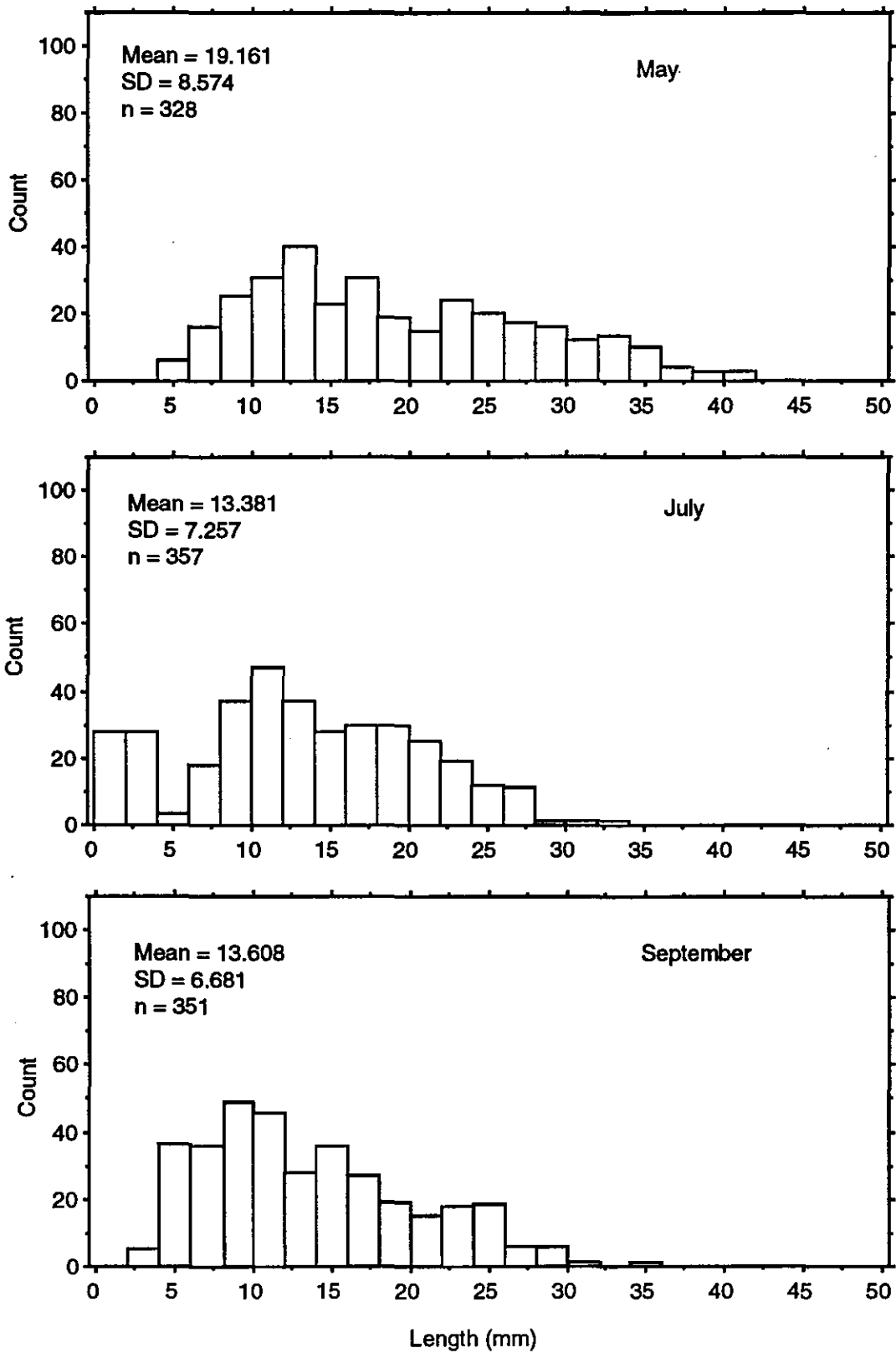


Figure E-1.2.6. Length-frequency histogram of *Mytilus cf. edulis* from Hogg Bay, 1991.

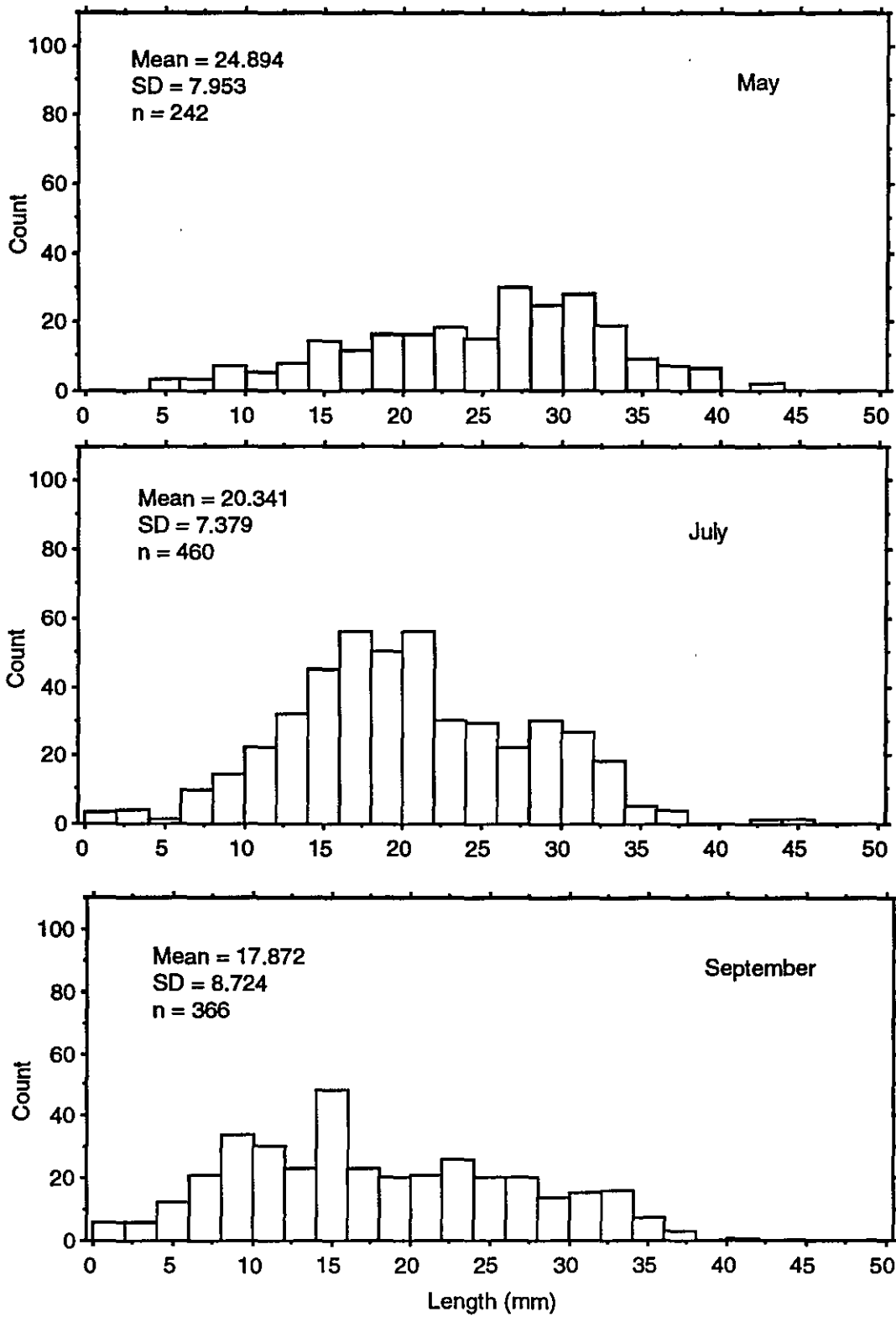


Figure E-1.2.7. Length-frequency histogram of *Mytilus cf. edulis* from Ingot Island, 1991.

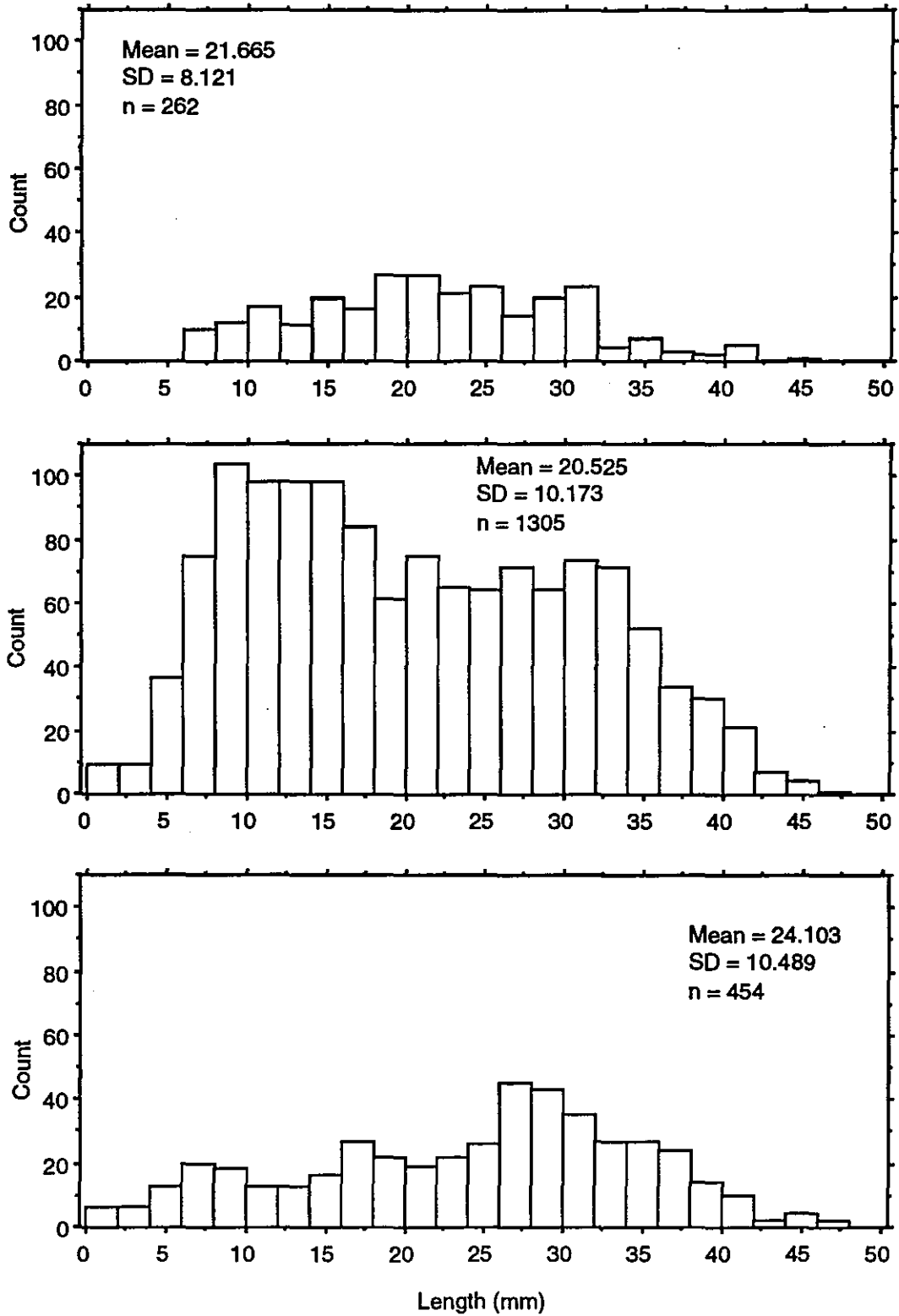


Figure E-1.2.8. Length-frequency histogram of *Mytilus cf. edulis* from Mussel Beach, 1991.

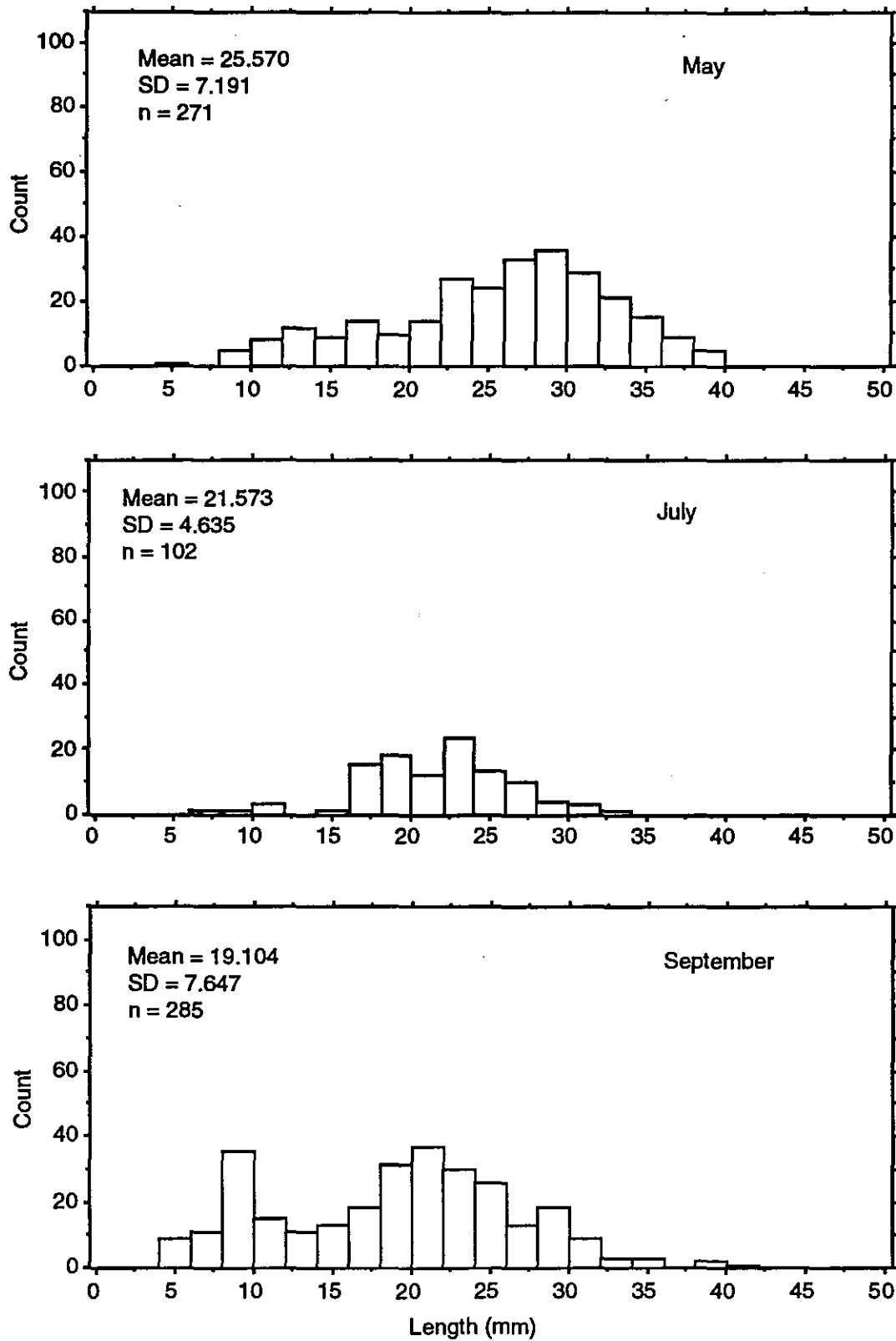


Figure E-1.2.9. Length-frequency histogram of *Mytilus cf. edulis* from Northwest Bay, 1991.

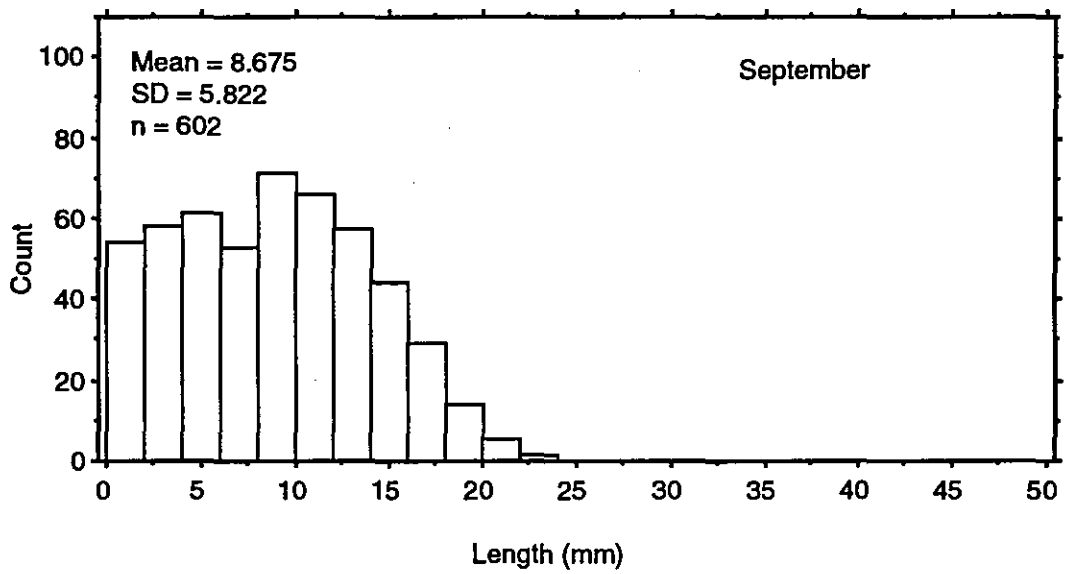
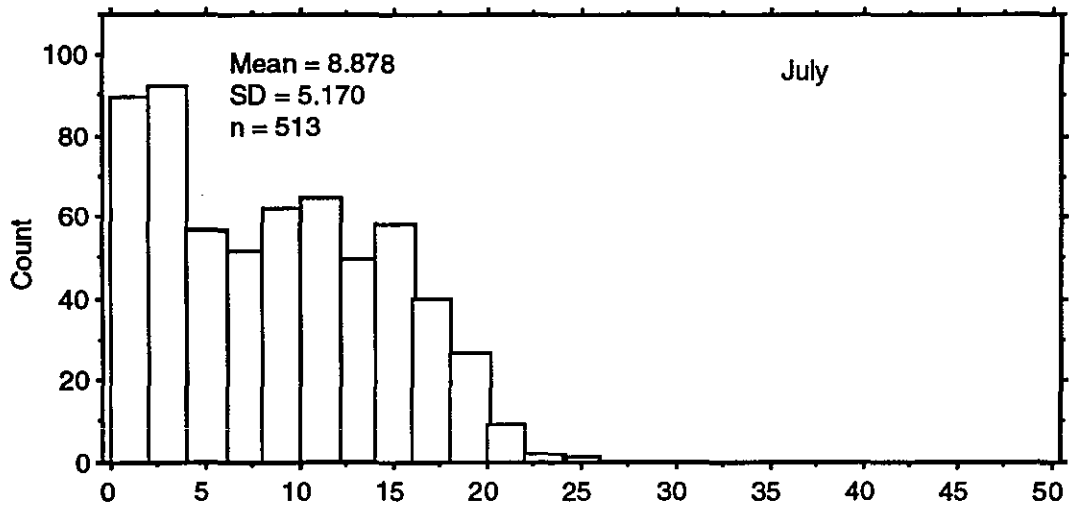


Figure E-1.2.10. Length-frequency histogram of *Mytilus cf. edulis* from Smith Island, 1991.

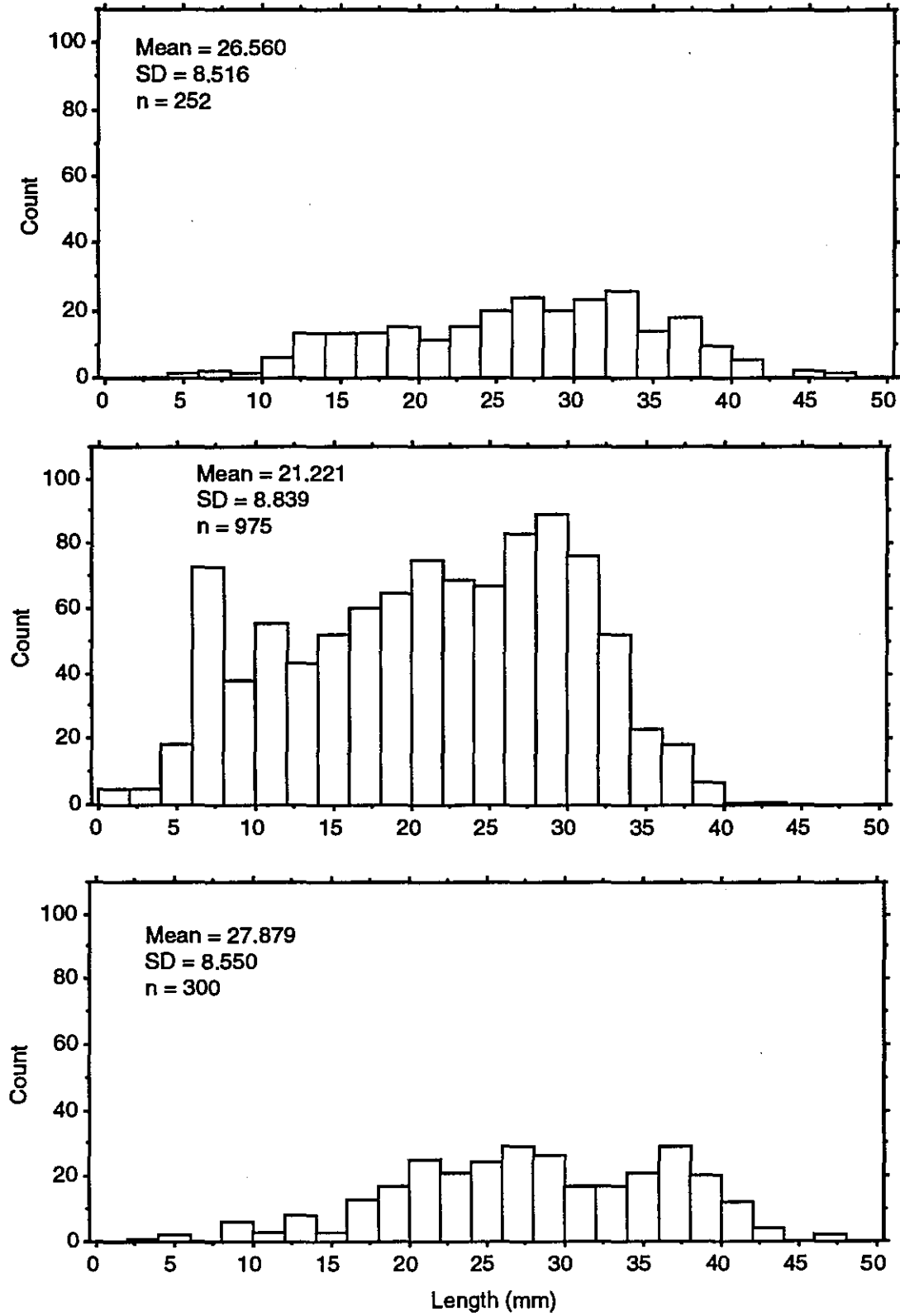


Figure E-1.2.11. Length-frequency histogram of *Mytilus cf. edulis* from Snug Harbor, soft site, 1991.

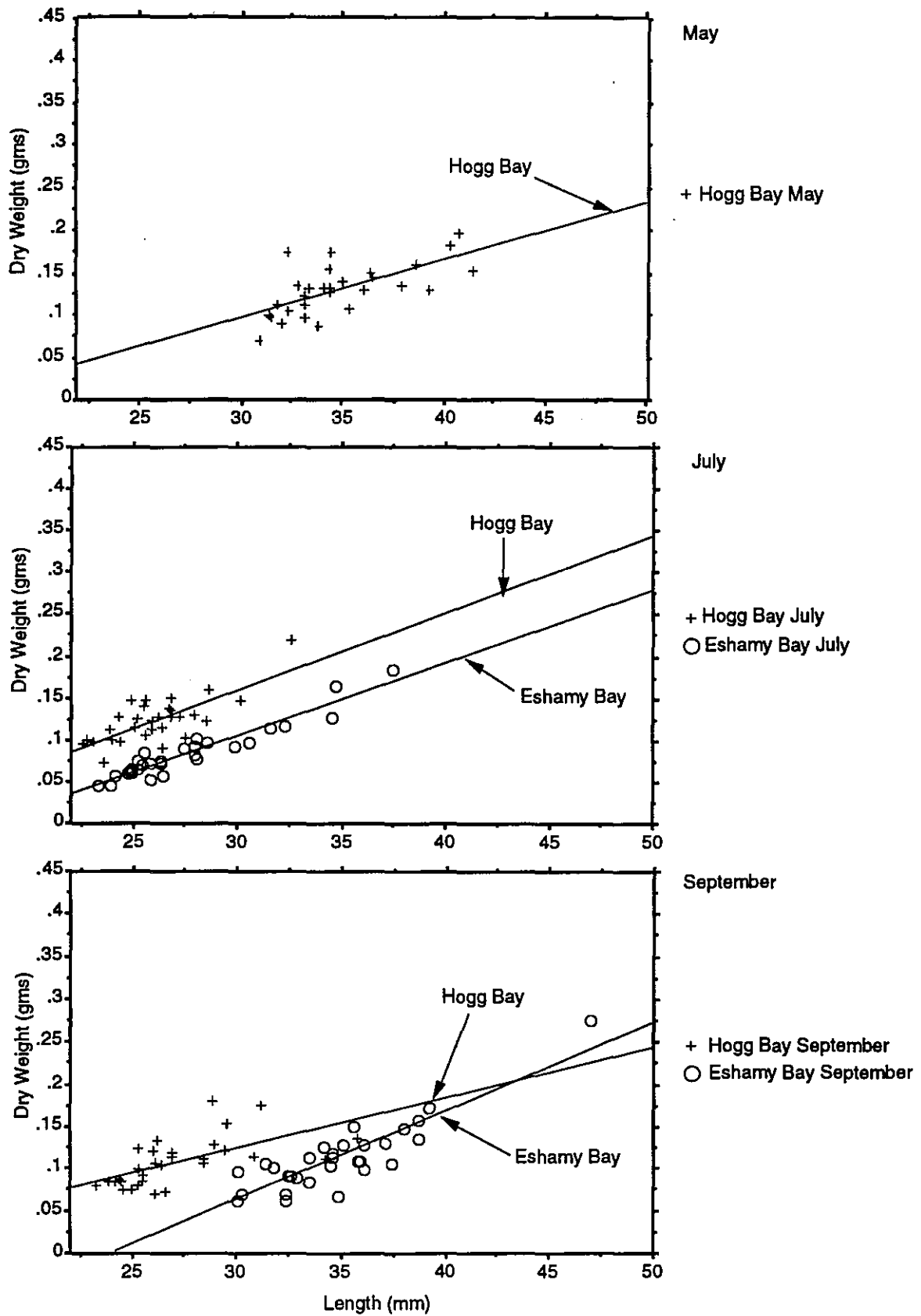


Figure E-1.3.1. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Category 1 sites, 1991.

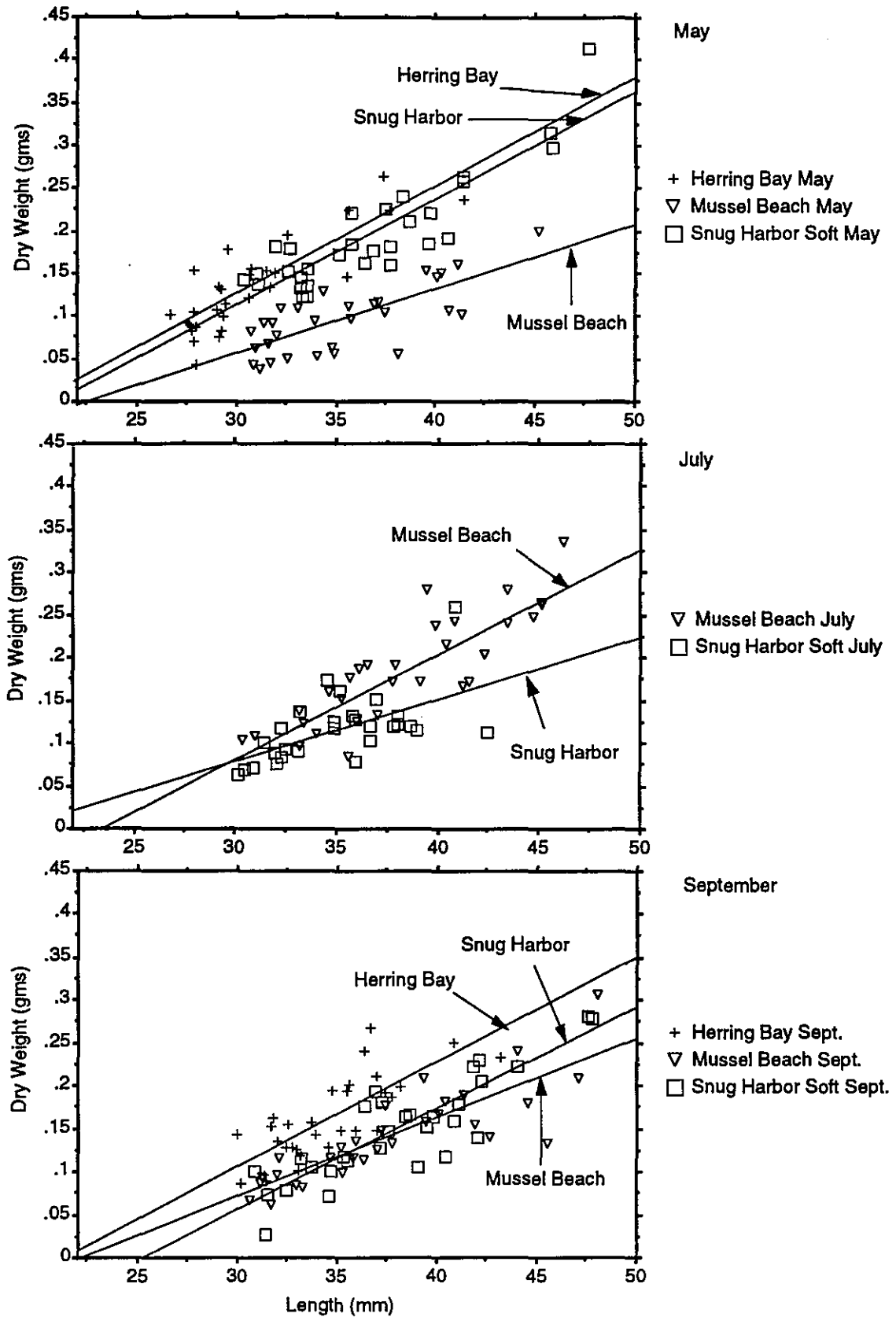


Figure E-1.3.2. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Category 2 sites, 1991.

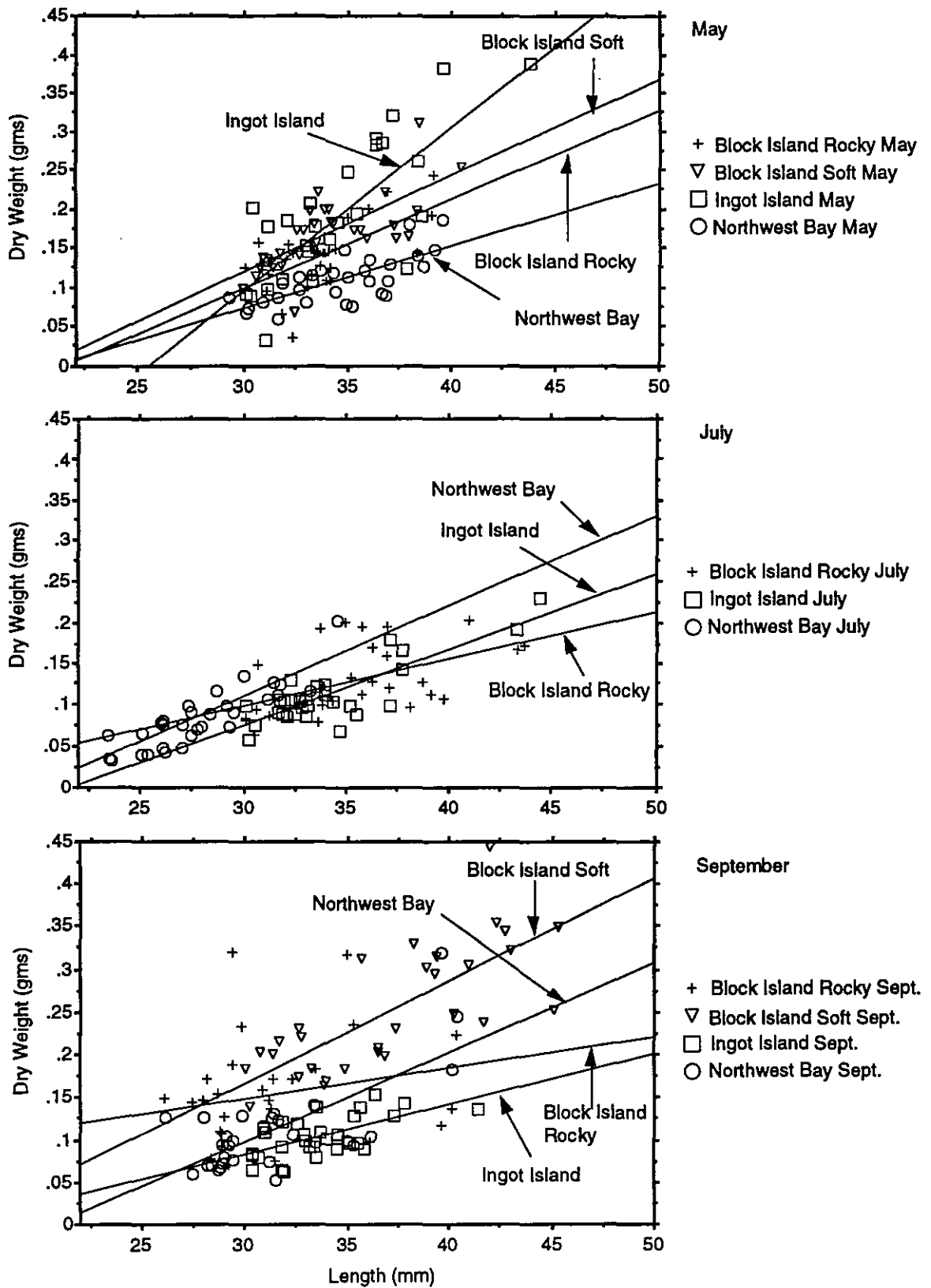


Figure E-1.3.3. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Category 3 sites, 1991.

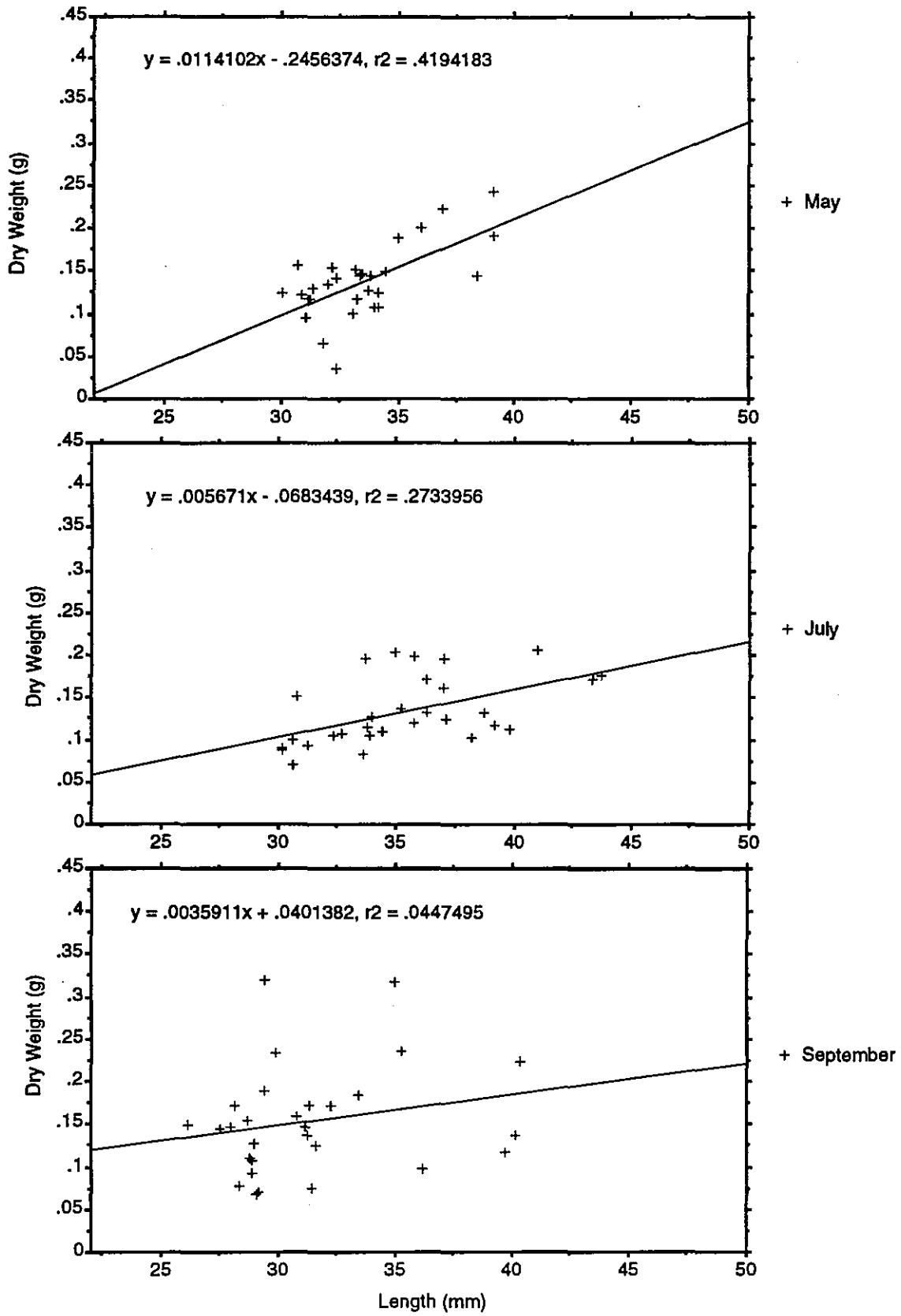


Figure E-1.3.4. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Block Island, rocky site, 1991.

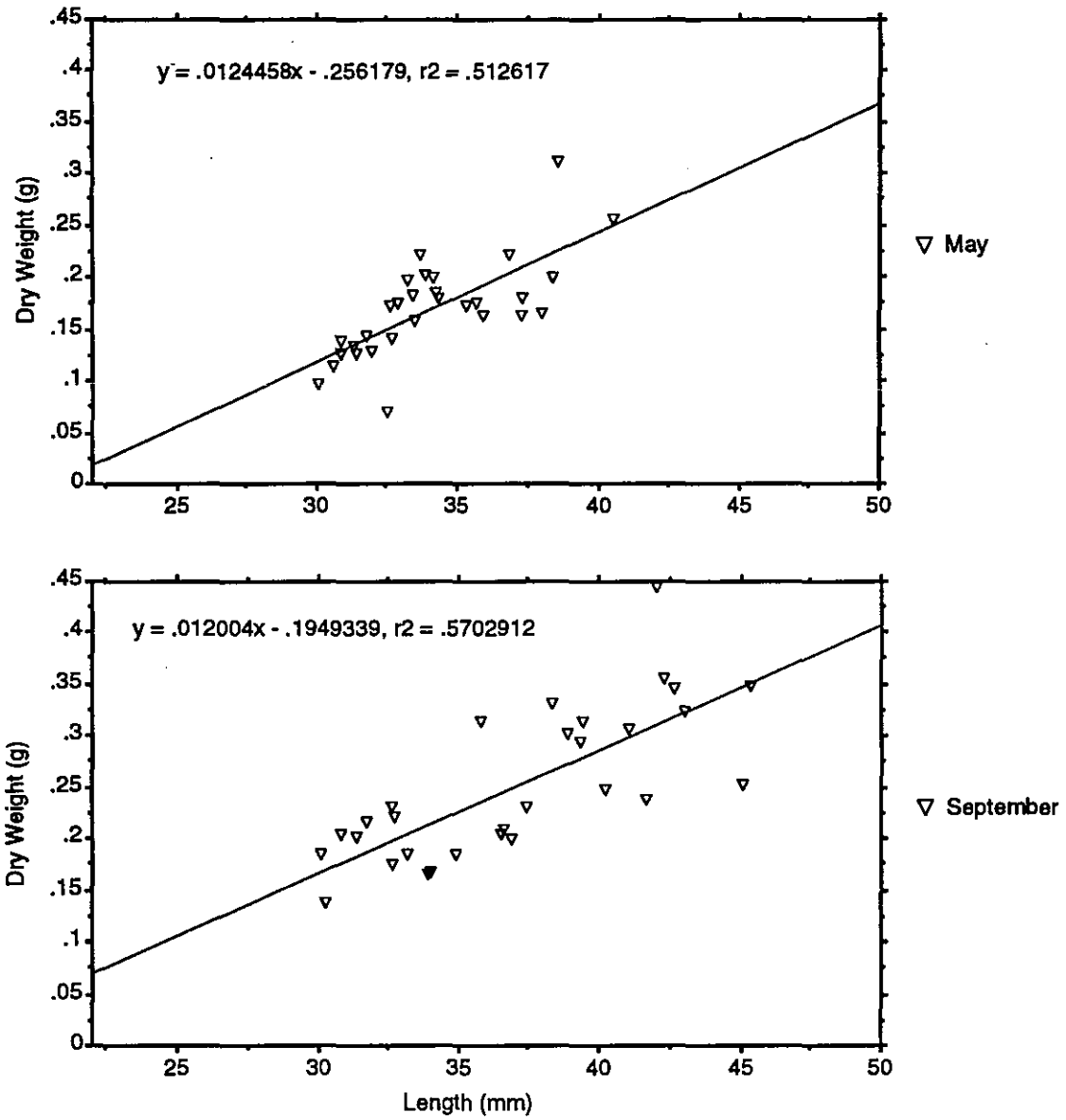


Figure E-1.3.5. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Block Island, soft site, 1991.

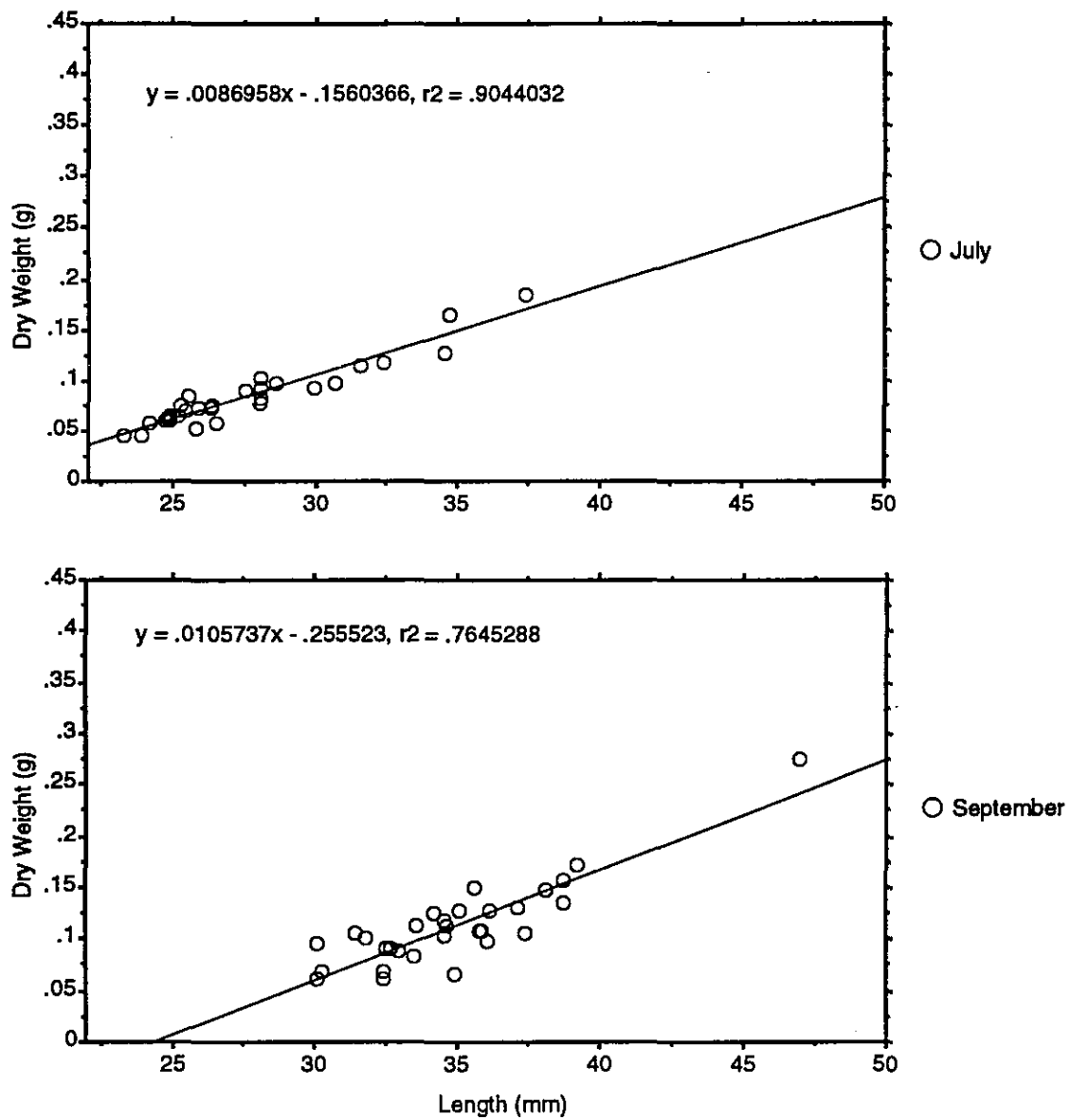


Figure E-1.3.6. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Eshamy Bay, 1991.

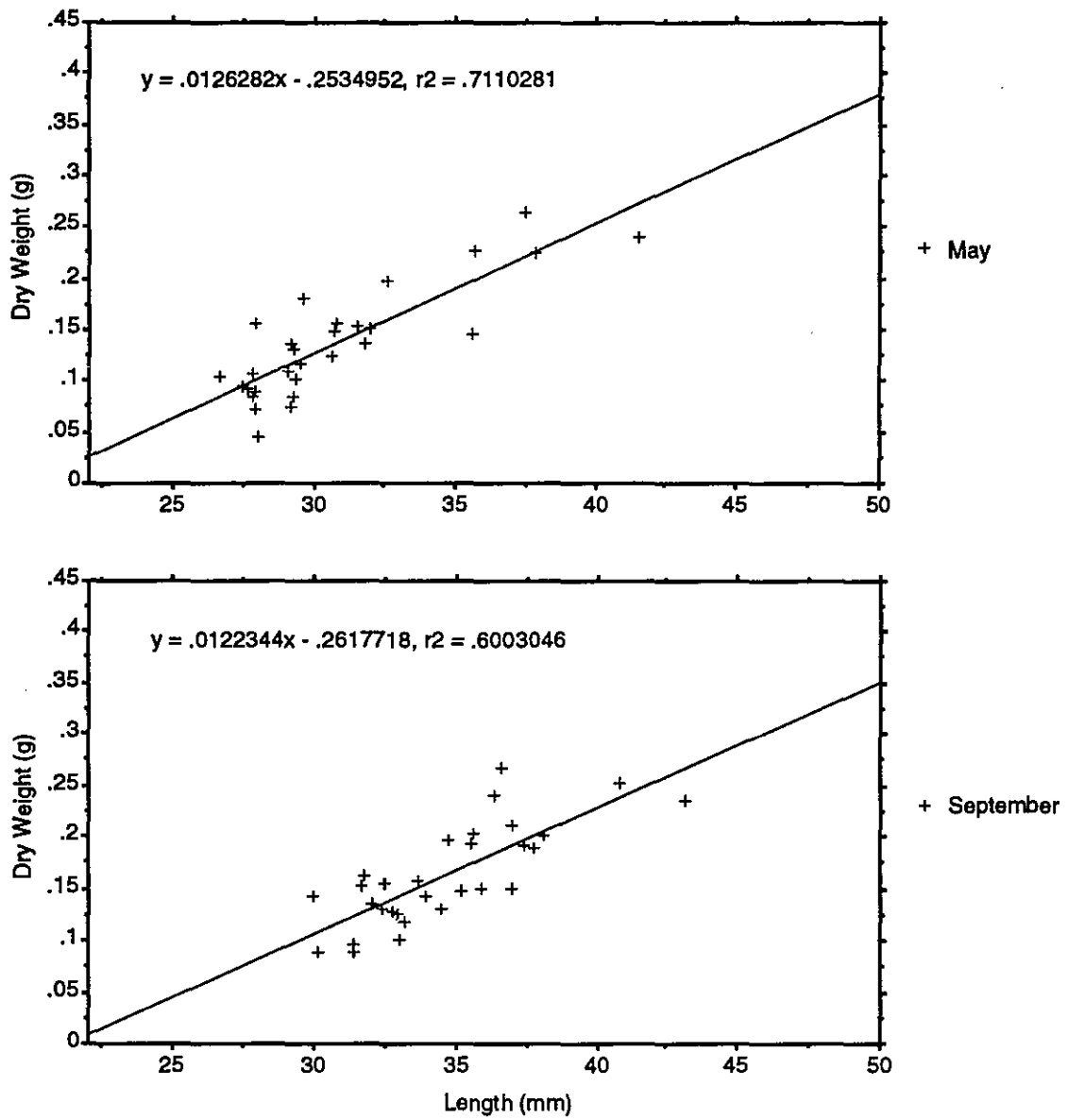


Figure E-1.3.7. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Herring Bay, 1991.

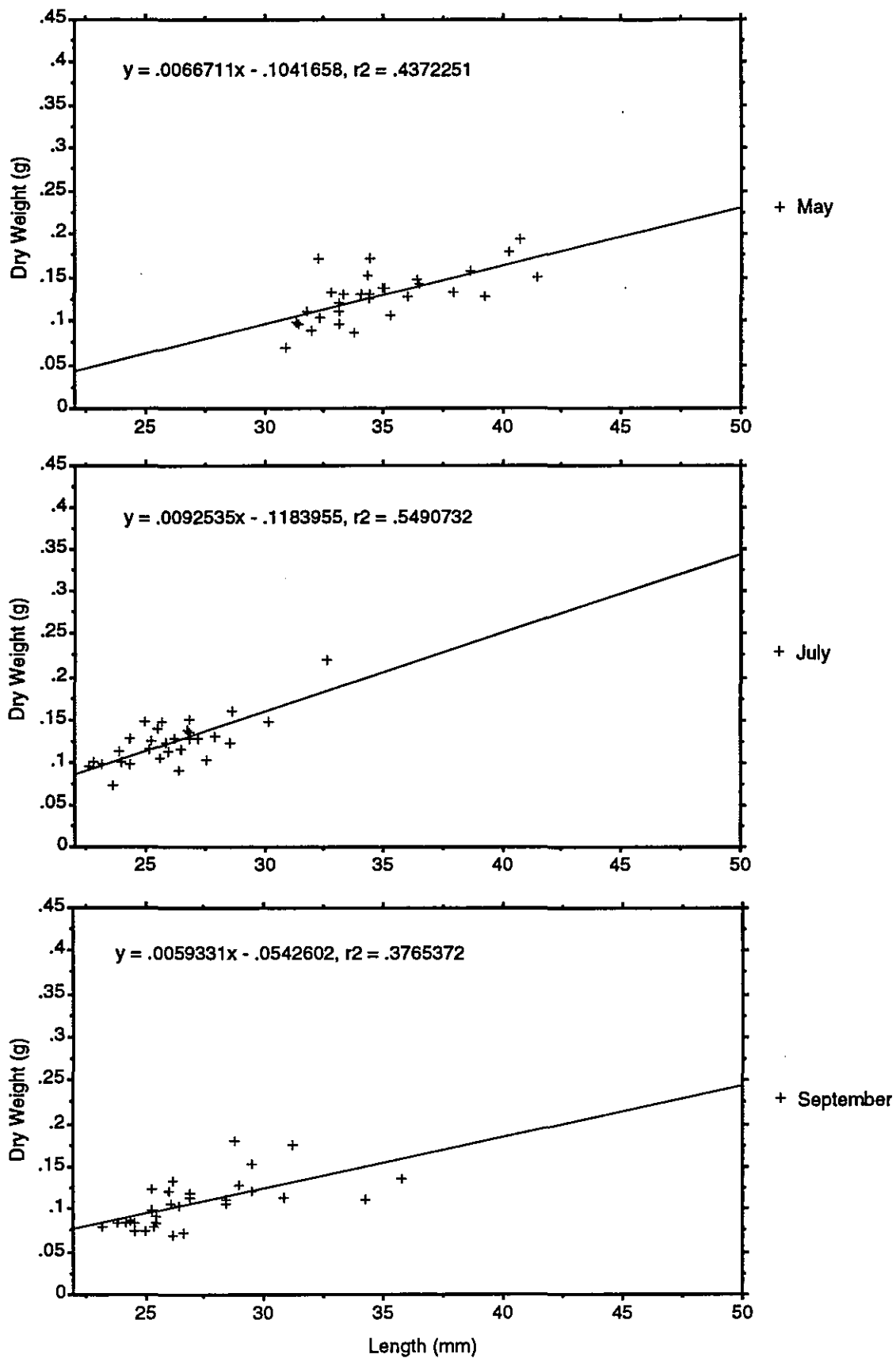


Figure E-1.3.8. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Hogg Bay, 1991.

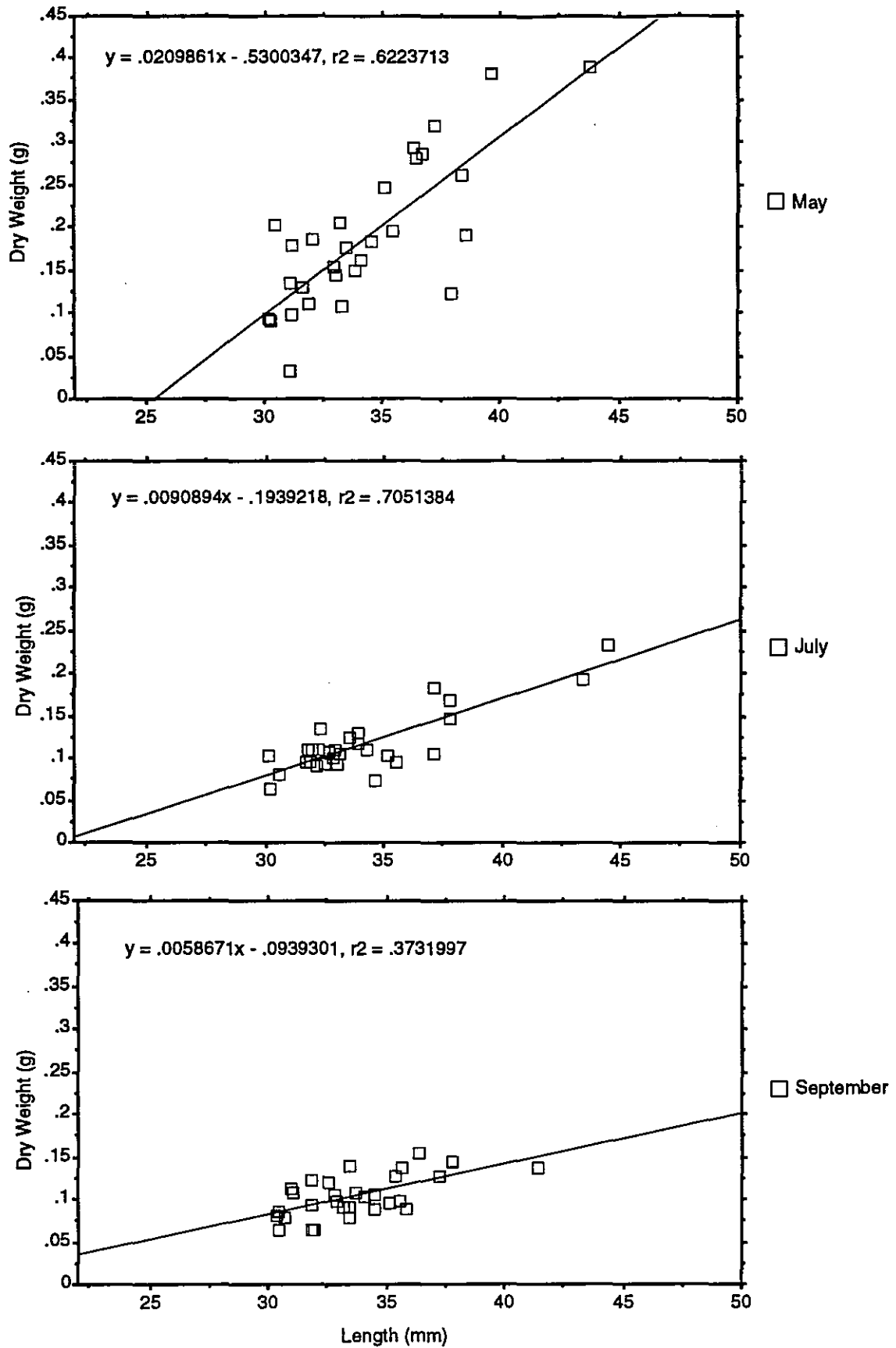


Figure E-1.3.9. Length vs soft tissue dry weight for *Mytilus* cf. *edulis* at Ingot Island, 1991.

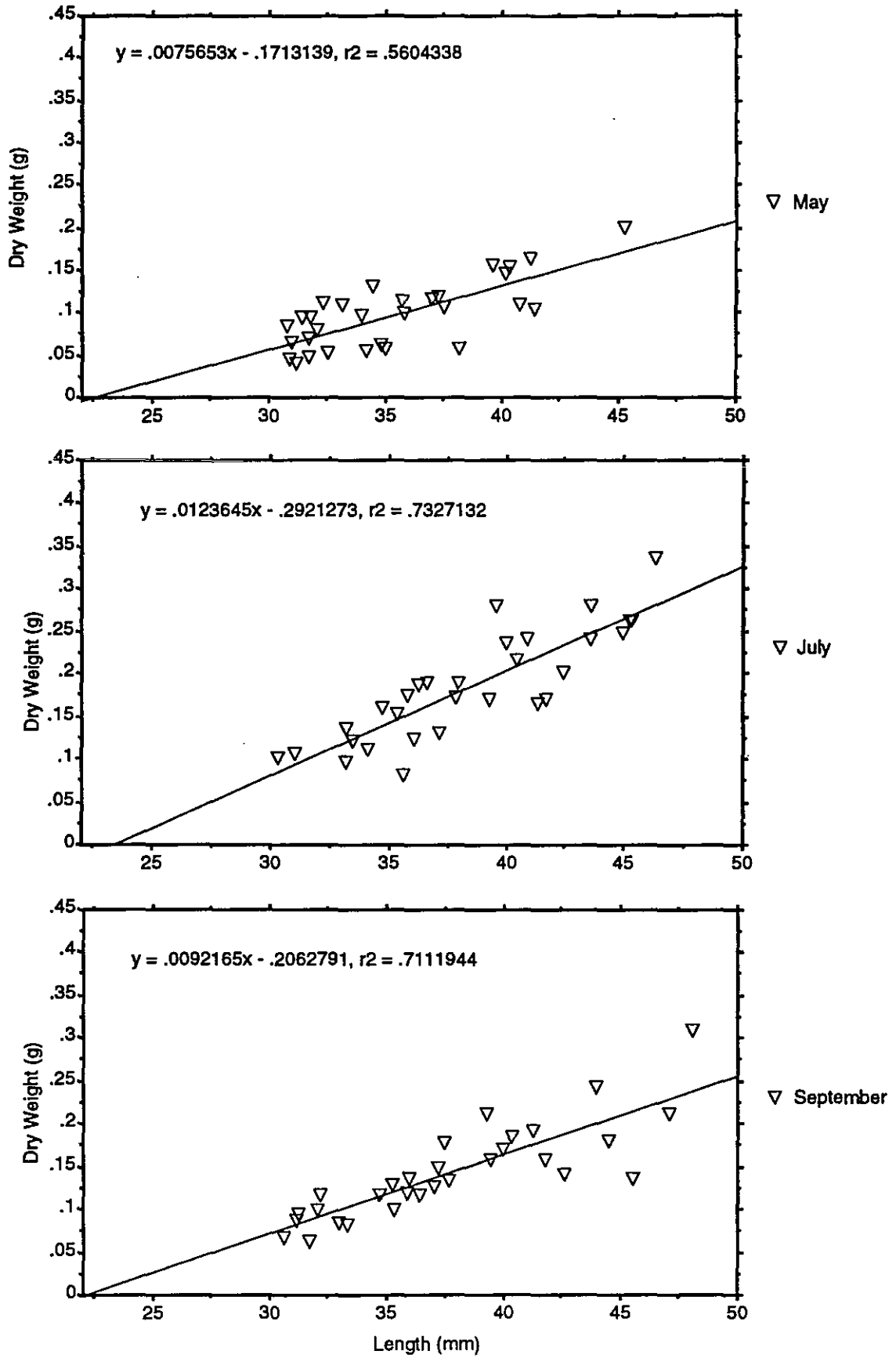


Figure E-1.3.10. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Mussel Beach, 1991.

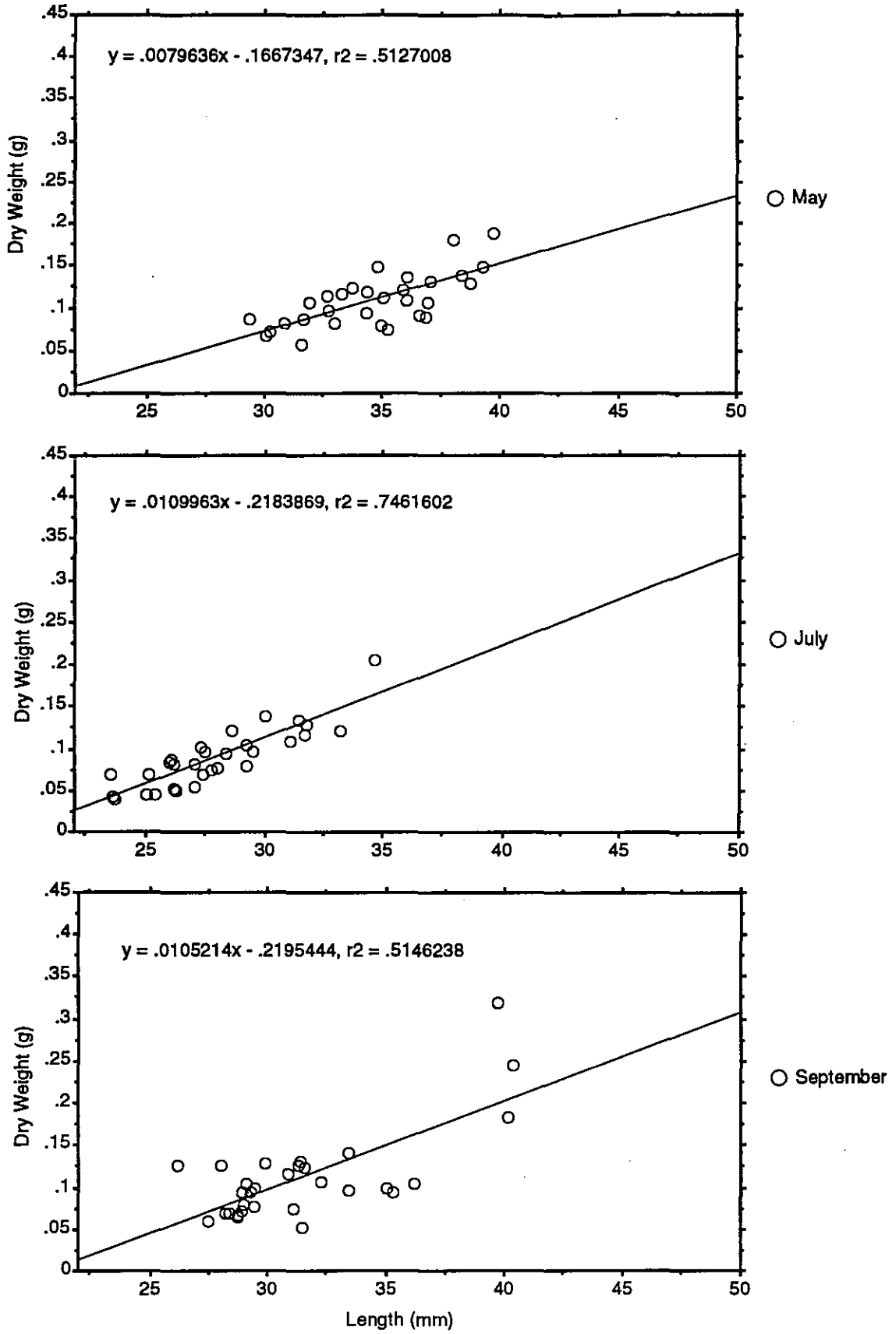


Figure E-1.3.11. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Northwest Bay, 1991.

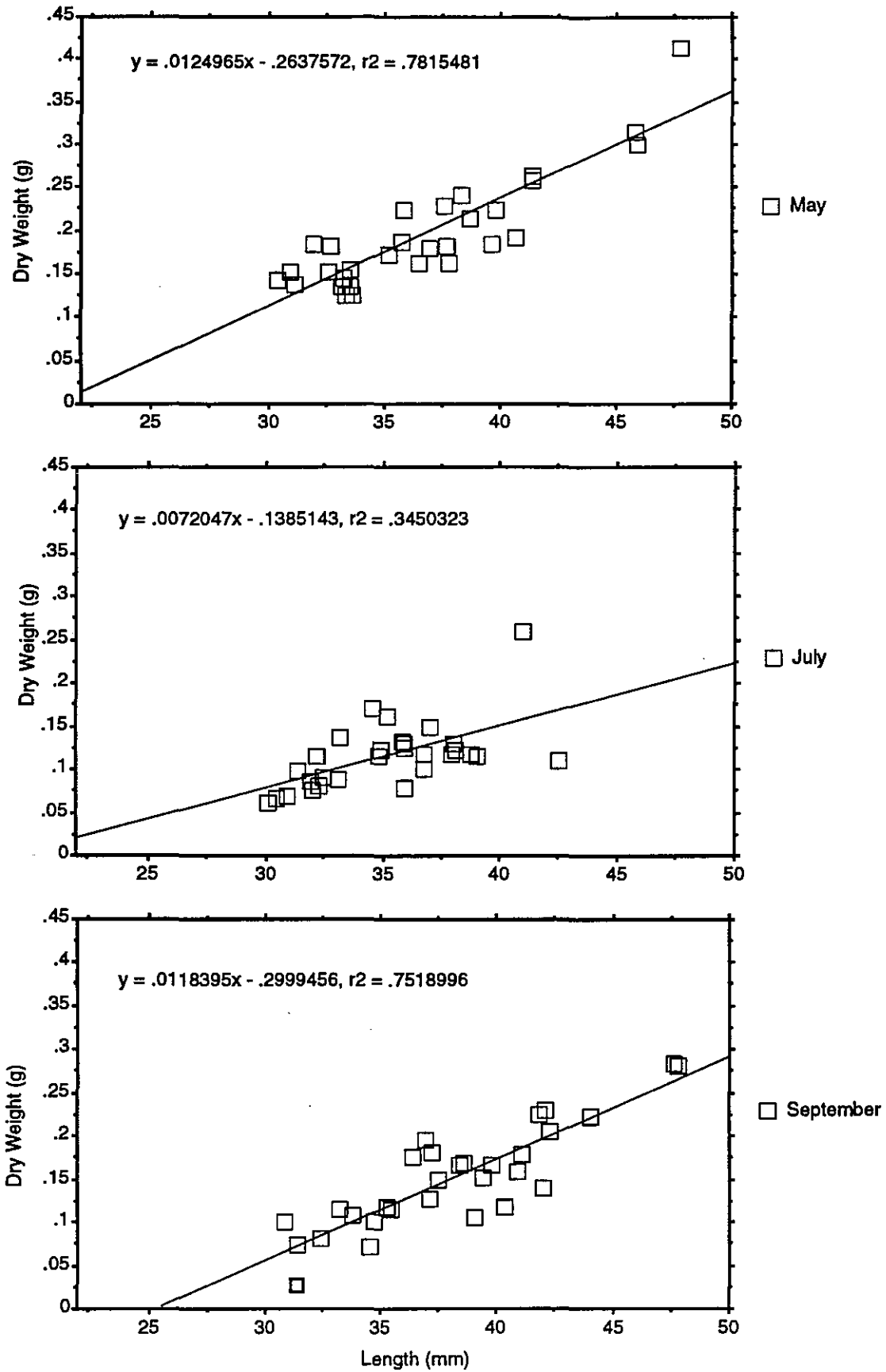


Figure E-1.3.12. Length vs soft tissue dry weight for *Mytilus cf. edulis* at Snug Harbor, soft site, 1991.

Table E-2.1. Age and growth of *Protothaca staminea* from July 1991 samples—Bay of Isles.

Age	No. Measured	Mean Length (mm)											
		Total length		Last Annulus	1991		Age-1			Age-2		1989	
		(July 1991)	SD	(1990-91)	Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD	
0	0												
1	2	9.00	0.85	5.90	3.10	0.42							
2	30	14.38	2.63	11.24	3.14	1.86	5.29	5.95	1.44				
3	91	19.15	2.71	16.66	2.50	1.23	10.15	6.51	1.71	4.87	5.28	1.12	
4	39	21.78	3.41	19.88	1.90	1.15	15.11	4.77	1.75	9.68	5.43	1.72	
5	10	25.05	2.21	22.97	2.08	1.96	18.29	4.68	1.38	14.31	3.98	0.99	
6	16	28.60	2.81	26.89	1.71	1.01	23.40	3.49	1.07	19.18	4.22	1.15	
7	17	29.75	2.89	28.78	0.97	0.77	26.21	2.57	1.18	23.01	3.20	1.03	
8	6	31.12	2.55	30.13	0.98	1.12	28.02	2.12	0.65	25.88	2.13	1.32	
9	3	33.23	3.71	31.97	1.27	1.11	30.00	1.97	0.55	27.60	2.40	0.53	
10	1	27.90		27.90	0.00		24.70	3.20		23.50	1.20		
11	1	37.20		37.10	0.10		34.60	2.50		33.20	1.40		
Total	216	21.37	5.86										

E-27

Table E-2.2. Age and growth of *Protothaca staminea* from July 1991 samples -- Block Island.

Age	No. Measured	Mean Length (mm)										
		Total length		Last Annulus			Age-1			Age-2		
		(July 1991)	SD	(1990-91)	1991 Growth	SD	(1989-90)	1990 Growth	SD	(1988-89)	1989 Growth	SD
0	1	5.10										
1	5	9.64	1.77	6.08	3.56	1.80						
2	11	15.38	2.70	13.23	2.15	1.33	6.36	6.86	1.74			
3	14	19.87	2.00	16.90	2.97	1.49	10.23	6.67	2.14	5.65	4.58	1.66
4	28	25.03	2.38	22.84	2.19	1.14	16.38	6.46	1.87	11.54	4.84	2.27
5	12	27.98	2.57	26.33	1.65	0.92	21.53	4.80	1.71	17.18	4.36	2.04
6	3	33.70	2.15	32.10	1.60	0.20	28.67	3.43	0.45	23.83	4.83	0.64
7	6	33.20	4.79	32.42	0.78	0.73	29.33	3.08	1.53	26.12	3.22	1.38
8	2	32.65	0.85	31.80	0.85	0.07	29.90	1.90	0.14	27.45	2.45	0.78
9	1	34.20		32.00	2.20		30.40	1.60		29.10		
10	1	36.00		35.40	0.60		34.00	1.40		32.20		
Total	84	23.49	7.212									

Table E-2.3. Age and growth of *Protothaca staminea* from July 1991 samples—Herring Bay.

Age	No. Measured	Mean Length (mm)												
		Total length		Last	1991		Age-1		1990		Age-2		1989	
		(July 1991)	SD	Annulus (1990-91)	Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD		
0	0													
1	5	7.10	1.19	4.68	2.42	1.19								
2	4	14.55	3.59	11.33	3.23	1.93	6.35	4.98	2.00					
3	4	22.18	3.70	19.75	2.43	0.74	12.40	7.35	2.17	7.35	5.05	1.79		
4	5	23.84	1.99	19.26	4.58	1.21	14.50	4.76	1.07	8.98	5.52	2.05		
5	5	24.46	4.32	22.46	2.00	1.70	18.90	3.56	1.38	14.52	4.38	1.39		
6	3	26.70	2.81	24.80	1.90	0.50	21.40	3.40	1.47	19.03	2.37	0.70		
7	2	32.35	0.78	29.85	2.50	0.14	27.80	2.05	0.07	23.10	4.70	1.70		
8	0													
9	1	36.30		35.10	2.10		33.00	3.00		30.00	3.80			
10	0													
Total	29	20.86	8.49											

Table E-2.4. Age and growth of *Protothaca staminea* from July 1991 samples—Ingot Island.

Age	No. Measured	Mean Length (mm)										
		Total length		Last Annulus		Age-1			Age-2		1989	
		(July 1991)	SD	(1990-91)	1991 Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD
0	6	4.72	1.36		4.72	1.36						
1	17	8.93	1.61	5.74	3.19	1.52						
2	12	11.93	2.52	9.05	2.88	1.81	4.37	4.68	1.13			
3	7	13.73	2.54	12.00	1.73	1.94	9.21	2.79	1.42	4.07	5.14	1.00
4	9	23.28	3.42	21.54	1.73	1.28	17.36	4.19	1.59	11.62	5.73	1.32
5	3	23.30	2.77	22.87	0.43	0.31	19.40	3.47	3.15	15.00	4.40	2.01
6	9	26.04	2.86	24.62	1.42	1.01	22.34	2.28	0.75	18.01	4.33	1.64
7	0											
8	1	31.60		31.50	0.10		29.50	2.00		27.00	2.50	
9	0											
10	1	30.20		29.30	0.90		29.00	0.30		26.60	2.40	
Total	65	15.31	8.04									

E-30

Table E-2.5. Age and growth of *Protothaca staminea* from July 1991 samples—Mussel Beach.

Age	No. Measured	Mean Length (mm)												
		Total length		Last Annulus		1991		Age-1			Age-2		1989	
		(July 1991)	SD	(1990-91)	Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD		
0	23	5.25	1.05		5.25	1.05								
1	17	8.61	1.46	6.06	2.55	1.09								
2	23	13.02	1.95	10.12	2.90	1.58	5.06	5.07	1.53					
3	15	17.83	2.67	15.33	2.50	1.44	10.25	5.08	1.34	5.36	4.89	1.46		
4	5	26.30	2.46	23.14	3.16	1.65	18.06	5.08	1.67	11.76	6.30	1.09		
5	7	26.50	4.37	24.24	2.26	2.17	18.87	5.37	2.34	15.14	3.73	1.41		
6	4	35.13	4.54	33.18	1.95	0.52	29.28	3.90	1.15	24.43	4.85	2.04		
7	0													
8	1	33.10		31.70	1.40		26.90	4.80		25.00	1.90			
9	0													
10	0													
Total	95	13.94	8.59											

Table E-2.6. Age and growth of *Protothaca staminea* from July 1991 samples–Northwest Bay West Arm.

Age	No. Measured	Mean Length (mm)										
		Total length		Last Annulus	1991	Age-1			1990	Age-2		1989
		(July 1991)	SD	(1990-91)	Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD
0	3	5.33	1.26		5.33	1.26						
1	3	8.23	1.15	6.57	1.67	0.87						
2	3	13.93	1.10	10.63	3.30	0.20	5.67	4.97	0.38			
3	3	20.10	0.61	16.77	3.33	0.59	9.20	7.57	0.93	4.80	4.40	0.10
4	0											
5	0											
6	1	31.10		29.40	1.70		24.50	4.90		20.20	4.30	
7	0											
8	0											
9	0											
10	0											
Total	13	13.38	7.82									

E-32

Table E-2.7. Age and growth of *Protothaca staminea* from July 1991 samples—Outside Bay.

Age	No. Measured	Mean Length (mm)													
		Total length		Last Annulus		1991		Age-1		1990		Age-2		1989	
		(July 1991)	SD	(1990-91)	Growth	SD	(1989-90)	Growth	SD	(1988-89)	Growth	SD			
0	0														
1	1	9.00		5.50	3.50										
2	3	13.23	1.85	8.67	4.57	1.01	3.67	5.00	0.75						
3	20	14.05	3.15	11.25	2.80	1.71	7.23	4.02	1.69	3.50	3.73	1.69			
4	17	18.47	4.33	16.29	2.18	1.28	12.45	3.85	1.60	7.68	4.76	2.02			
5	22	24.69	3.82	22.92	1.77	1.59	18.73	4.19	1.66	14.61	4.12	1.77			
6	26	27.67	4.04	26.24	1.43	0.98	23.15	3.10	1.57	18.79	4.36	1.37			
7	5	29.08	2.75	28.28	0.80	0.91	26.26	2.02	1.09	21.28	4.98	2.54			
8	0														
9	0														
10	0														
Total	94	21.83	6.85												

Table E-2.8. Age and growth of *Protothaca staminea* from July 1991 samples—Sheep Bay.

Age	No. Measured	Mean Length (mm)											
		Total length		Last Annulus		Age-1			Age-2				
		(July 1991)	SD	(1990-91)	1991 Growth	SD	(1989-90)	1990 Growth	SD	(1988-89)	1989 Growth	SD	
0	17	6.52	1.09		6.52	1.09							
1	55	8.25	1.67	4.81	3.44	0.88							
2	18	14.89	2.57	9.99	4.90	1.55	5.00	4.99	1.81				
3	18	19.69	3.19	15.47	4.22	1.54	9.68	5.78	1.35	4.88	4.80	1.38	
4	23	22.50	2.72	19.37	3.12	1.30	13.95	5.43	1.67	9.43	4.52	1.65	
5	18	26.72	2.48	23.61	3.11	1.27	18.99	4.62	1.84	14.98	4.01	1.70	
6	16	30.11	2.69	27.53	2.59	1.20	24.07	3.46	1.45	20.56	3.51	0.94	
7	5	30.40	2.93	28.22	2.18	1.40	25.38	2.84	0.93	21.92	3.46	0.98	
8	5	33.56	1.41	31.36	2.20	1.30	29.38	1.98	1.55	27.04	2.34	0.57	
9	1	37.10		35.90	1.20		35.80	0.10		32.50	3.30		
10	0												
Total	176	17.18	9.25										

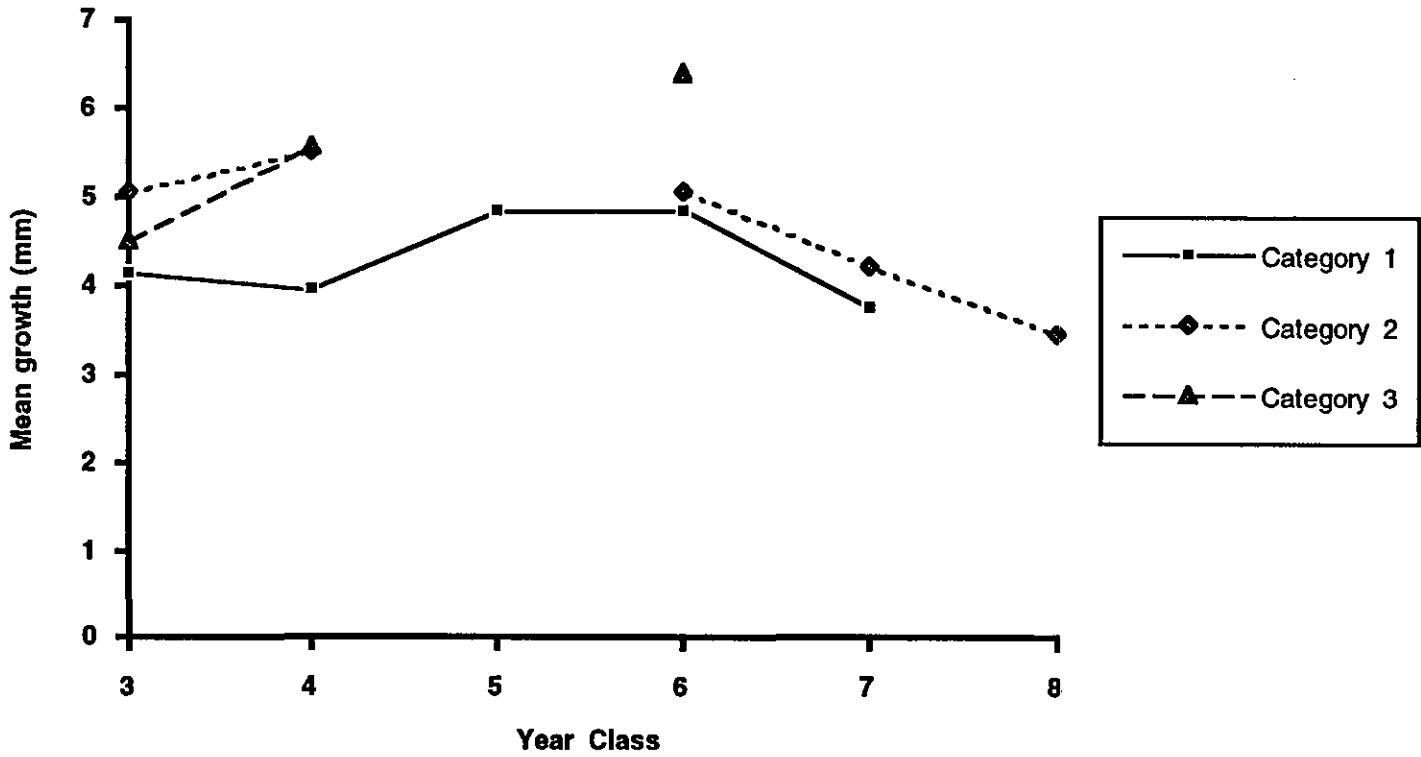
E-34

Table E-2.9. Age and growth of *Protothaca staminea* from July 1991 samples-Shelter Bay.

Age	No. Measured	Mean Length (mm)										
		Total length		Last Annulus			Age-1			Age-2		
		(July 1991)	SD	(1990-91)	1991 Growth	SD	(1989-90)	1990 Growth	SD	(1988-89)	1989 Growth	SD
0	0											
1	0											
2	1	15.90		13.20	2.70		5.20	8.00				
3	4	23.48	2.67	20.35	3.13	0.90	11.05	9.30	1.12	5.05	6.00	1.76
4	1	23.50		20.60	2.90		14.50	6.10		8.30	6.20	
5	1	32.60		32.00	0.60		26.10	5.90		21.60	4.50	
6	0											
7	1	31.80		31.30	0.50		26.20	5.10		23.10	3.10	
8	1	38.50		37.50	1.00		32.30	5.20		29.30	3.00	
9	0											
10	1	42.90		42.90	0.00		41.70	1.20		40.80	0.90	
Total	10	27.91	8.42									



Protothaca staminea
1988 growth; n>=9



E-37

Figure E-2.1. Growth of *Protothaca staminea* clams in 1988, by year class and treatment category.

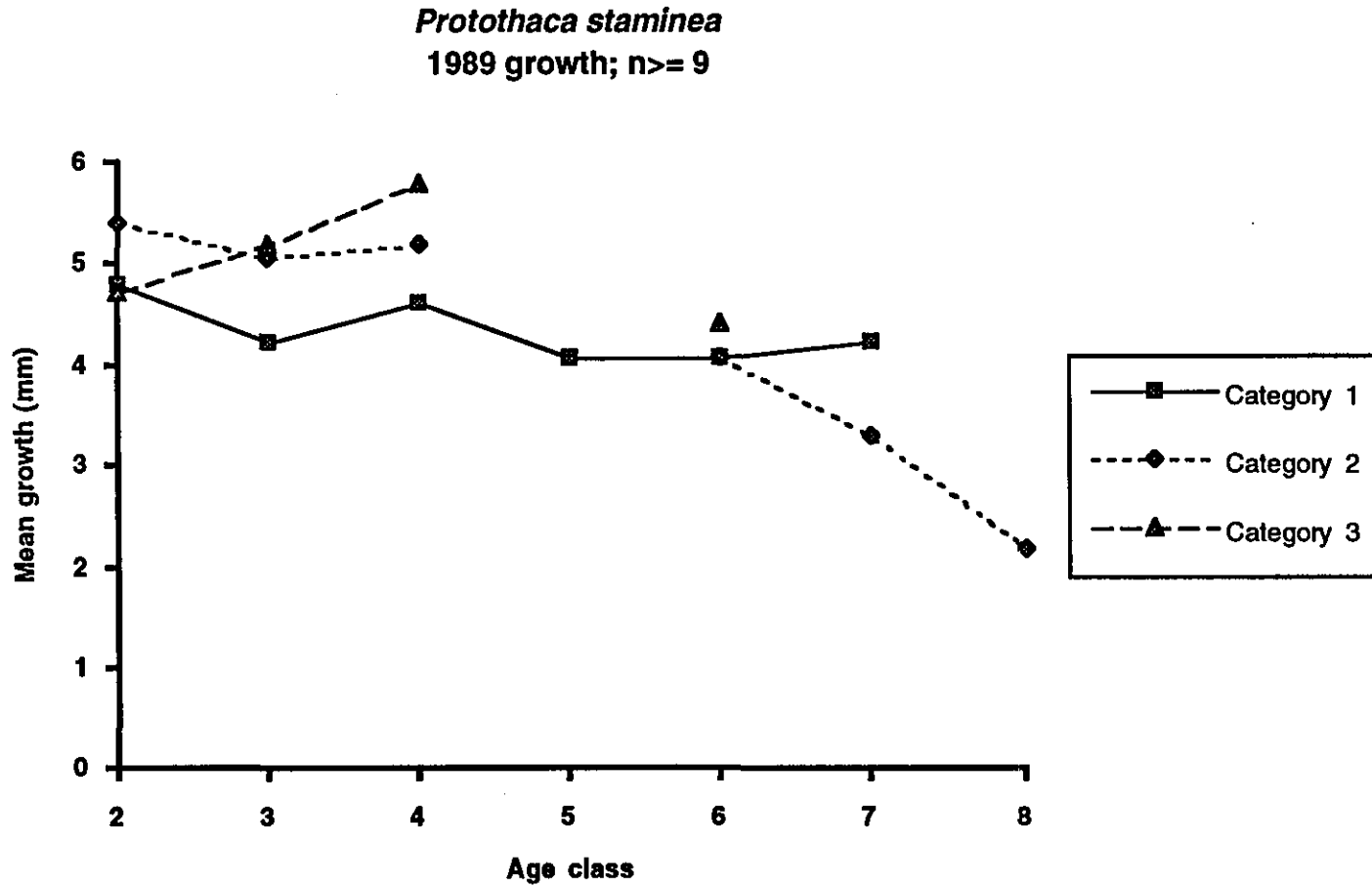


Figure E-2.2. Growth of *Protothaca staminea* clams in 1989, by year class and treatment category.

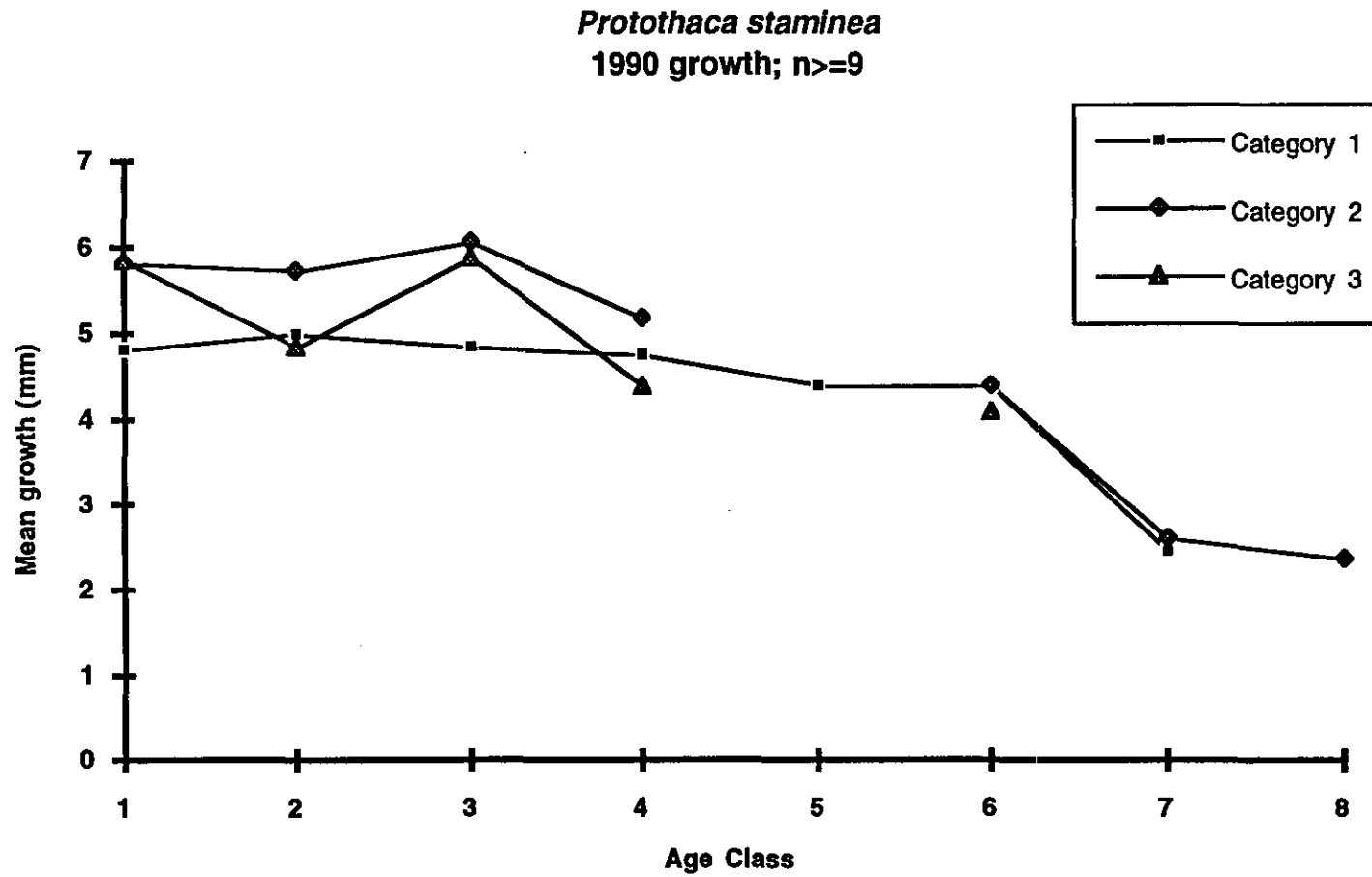


Figure E-2.3. Growth of *Protothaca staminea* clams in 1990, by year class and treatment category.

E-40

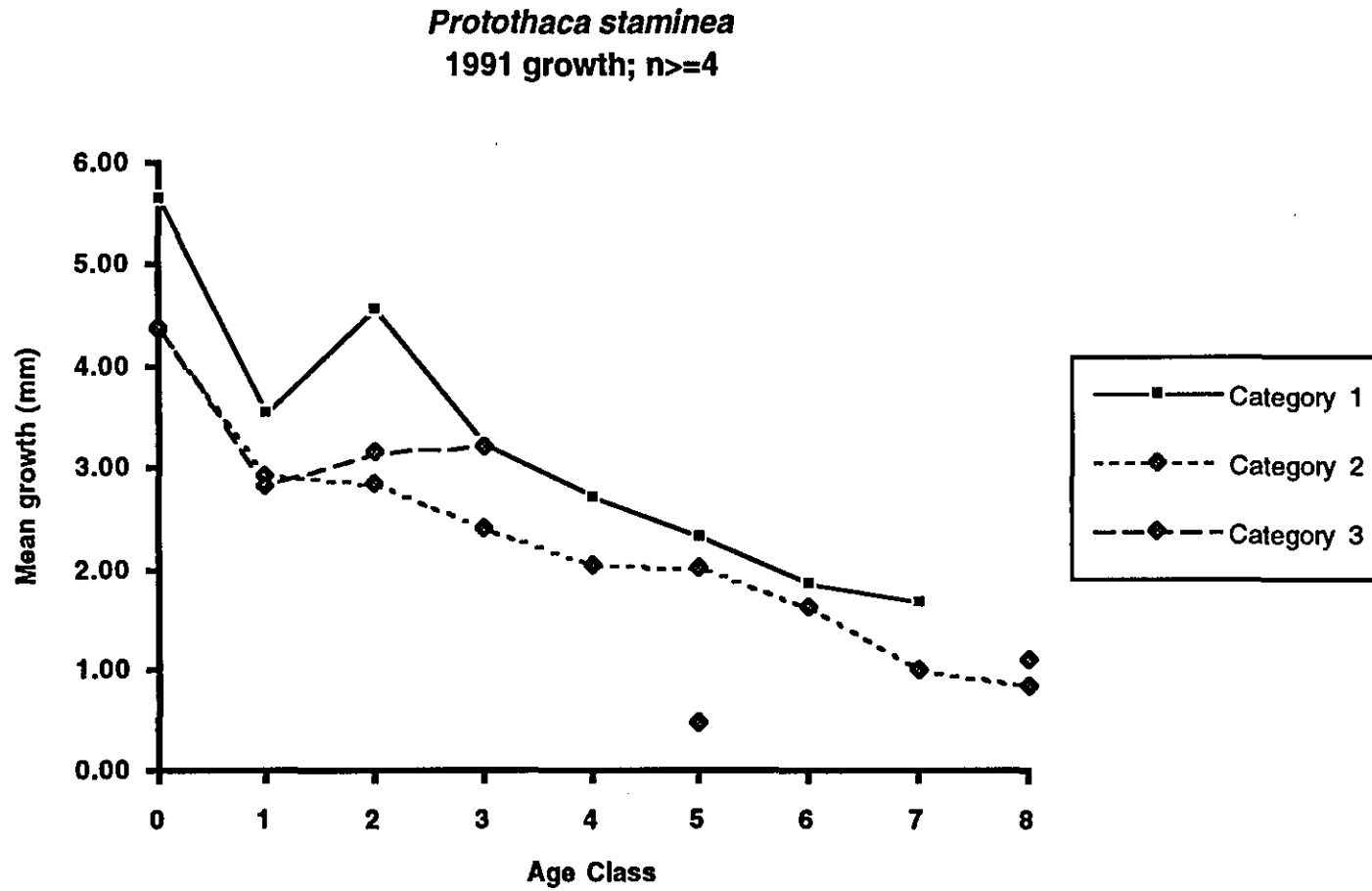


Figure E-2.4. Growth of *Protothaca staminea* clams in 1991, by year class and treatment category.

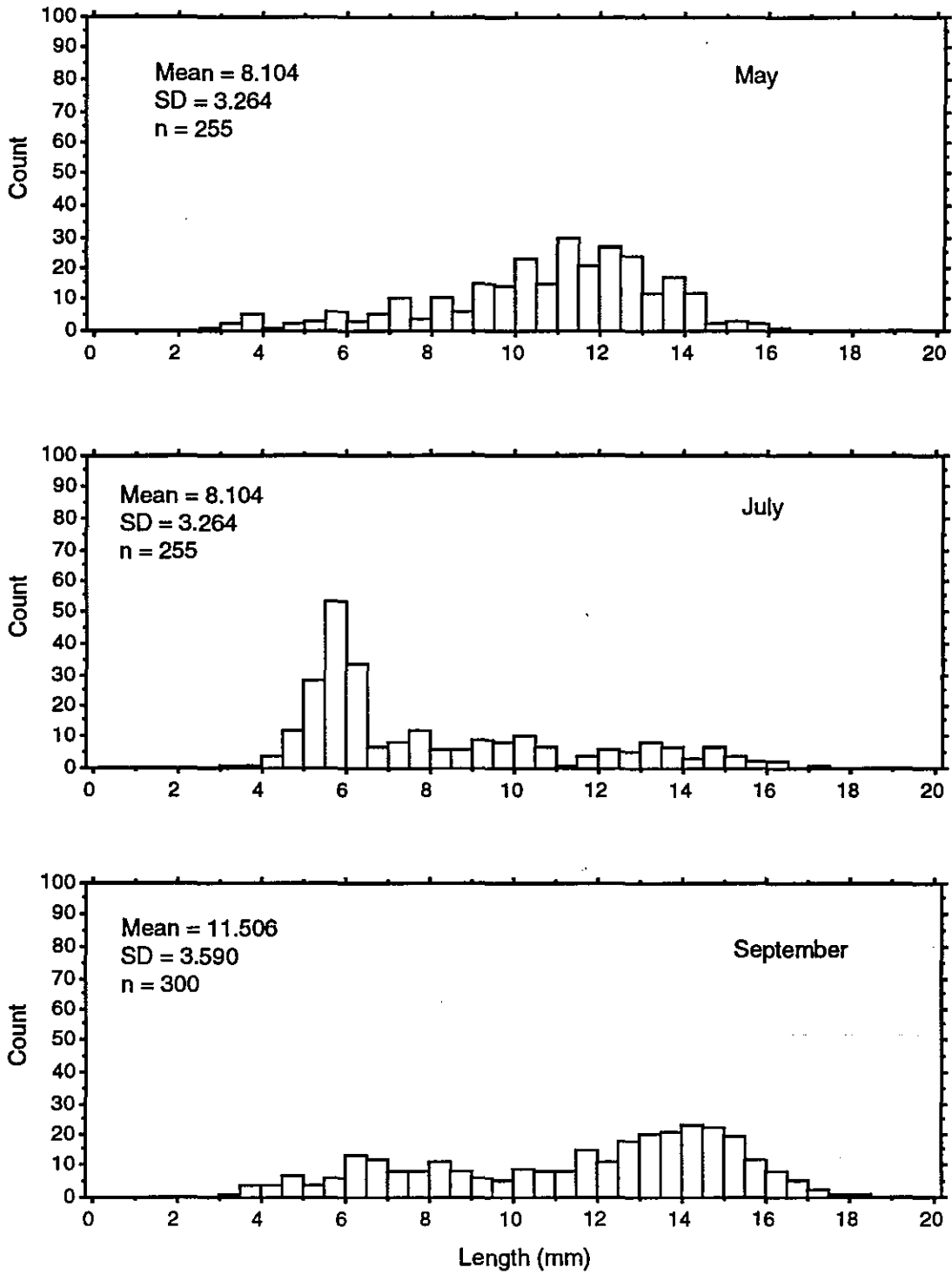


Figure E-3.2.1. Length-frequency histogram of *Littorina sitkana* from Bass Harbor, 1991.

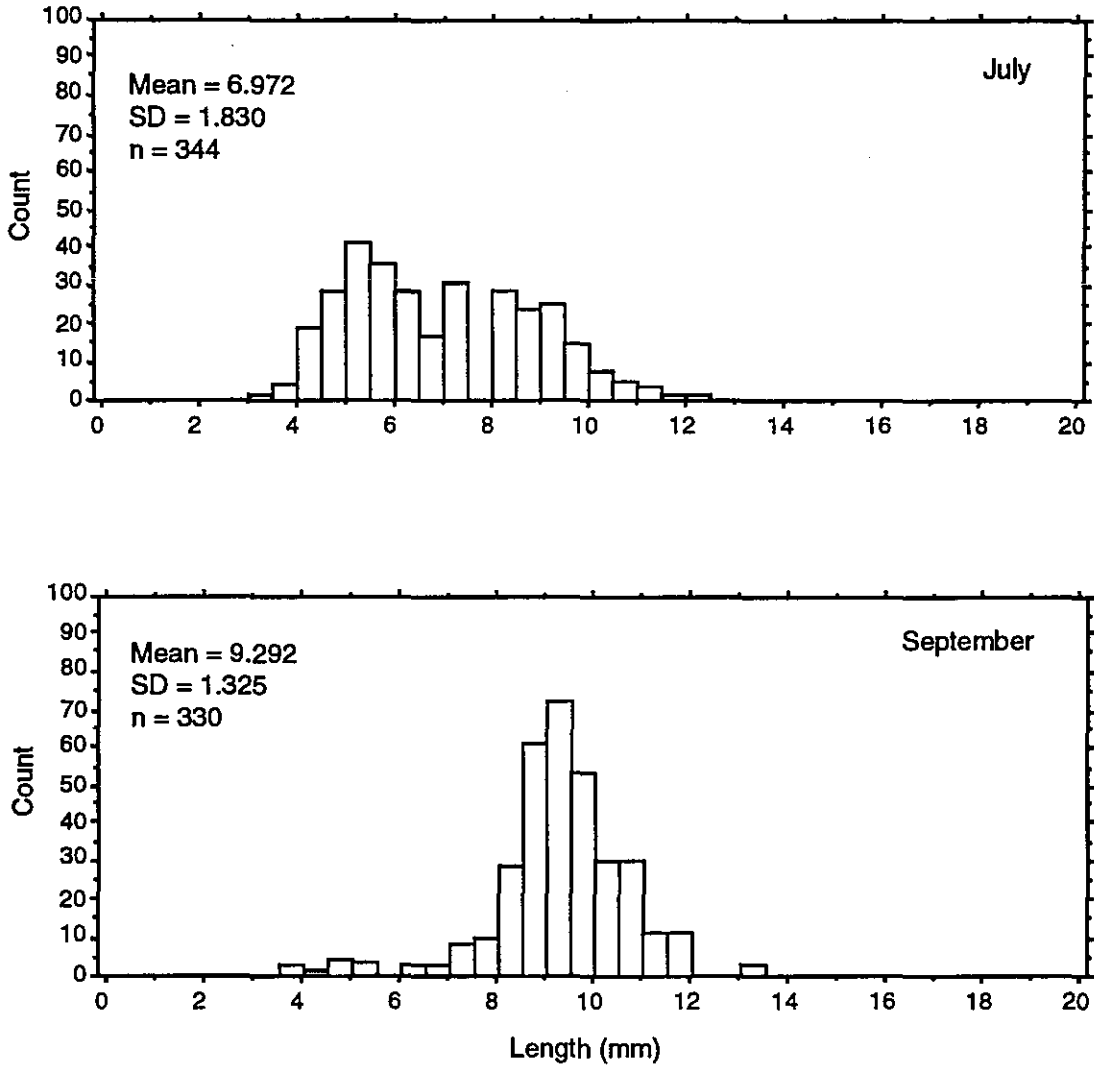


Figure E-3.2.2. Length-frequency histogram of *Littorina sitkana* from Bay of Isles, 1991.

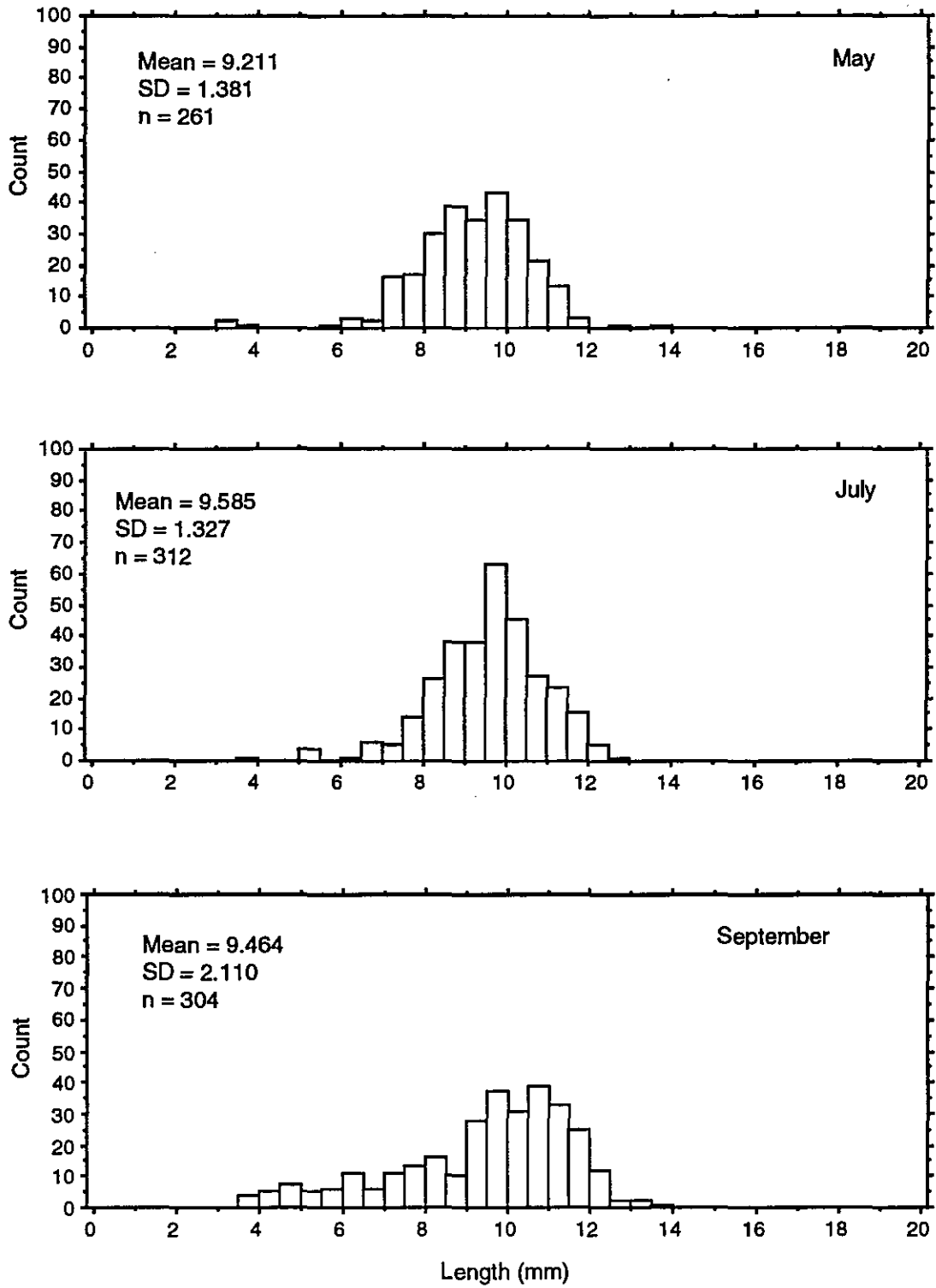


Figure E-3.2.3. Length-frequency histogram of *Littorina sitkana* from Crab Bay, 1991.

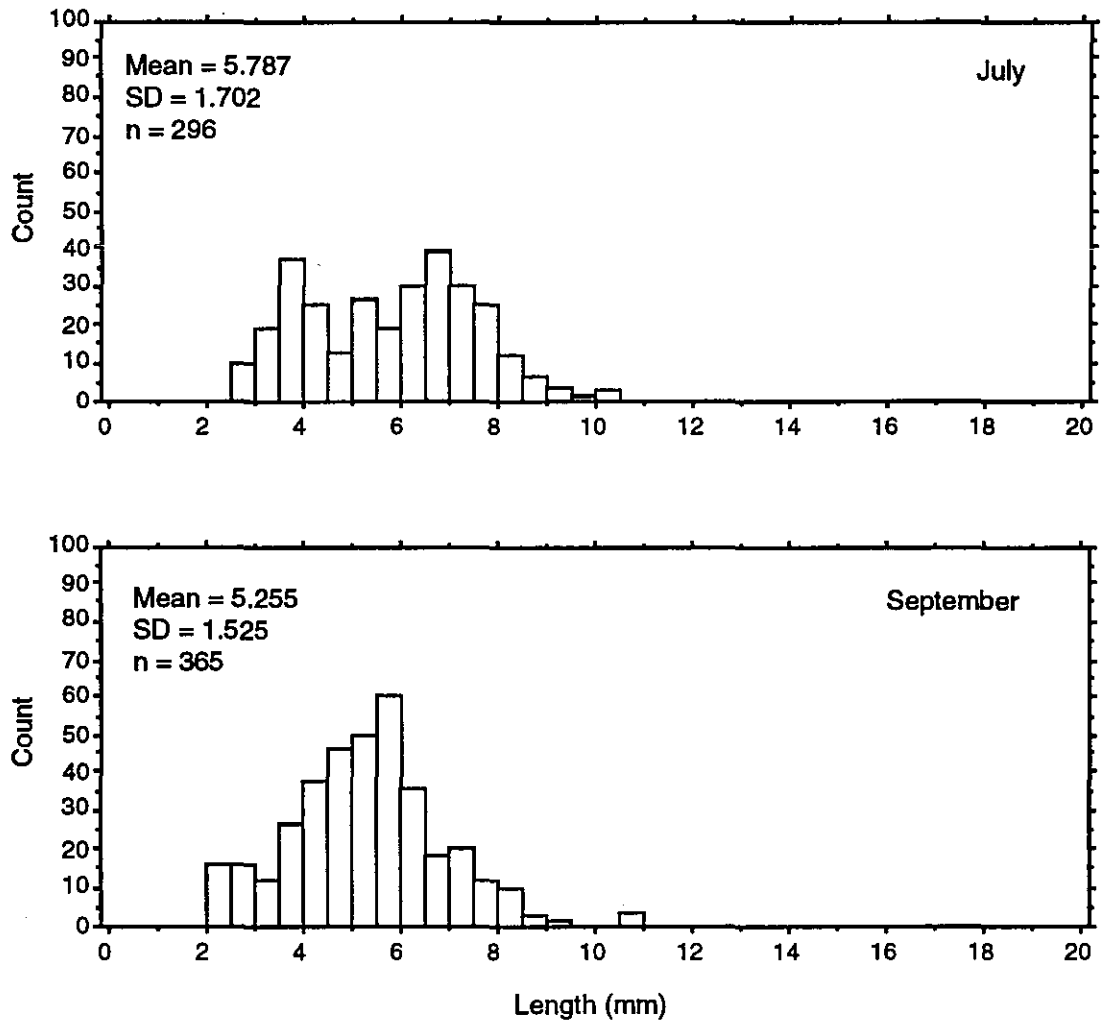


Figure E-3.2.4. Length-frequency histogram of *Littorina sitkana* from Crafton Island, 1991.

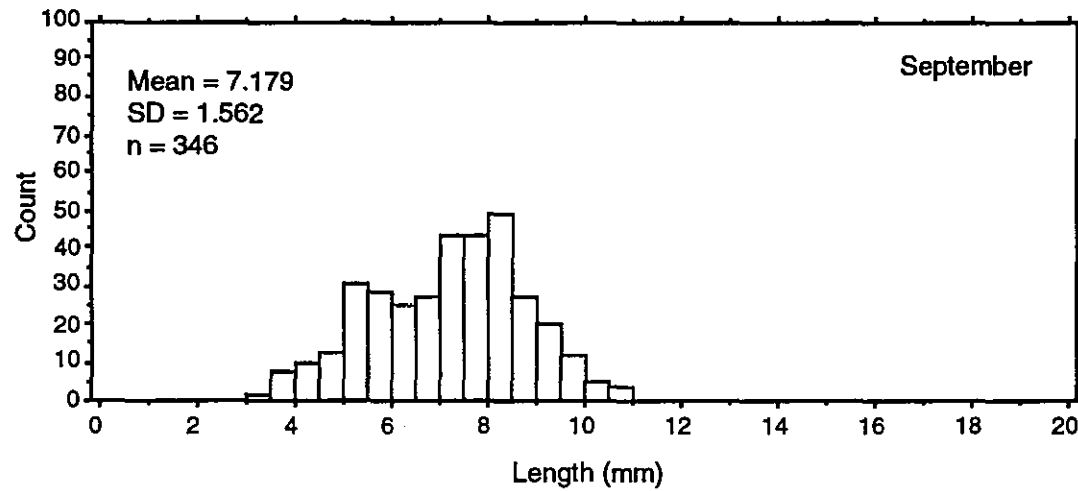
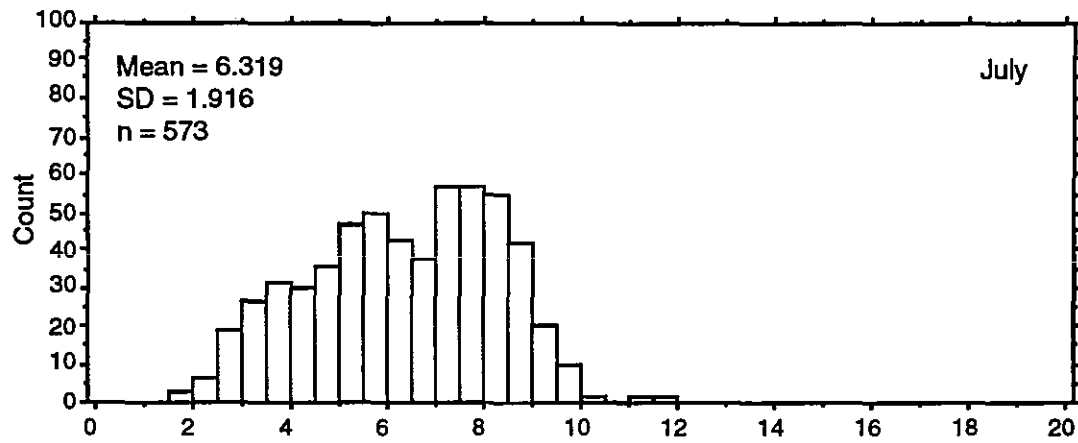


Figure E-3.2.5. Length-frequency histogram of *Littorina sitkana* from Eshamy Bay, 1991.

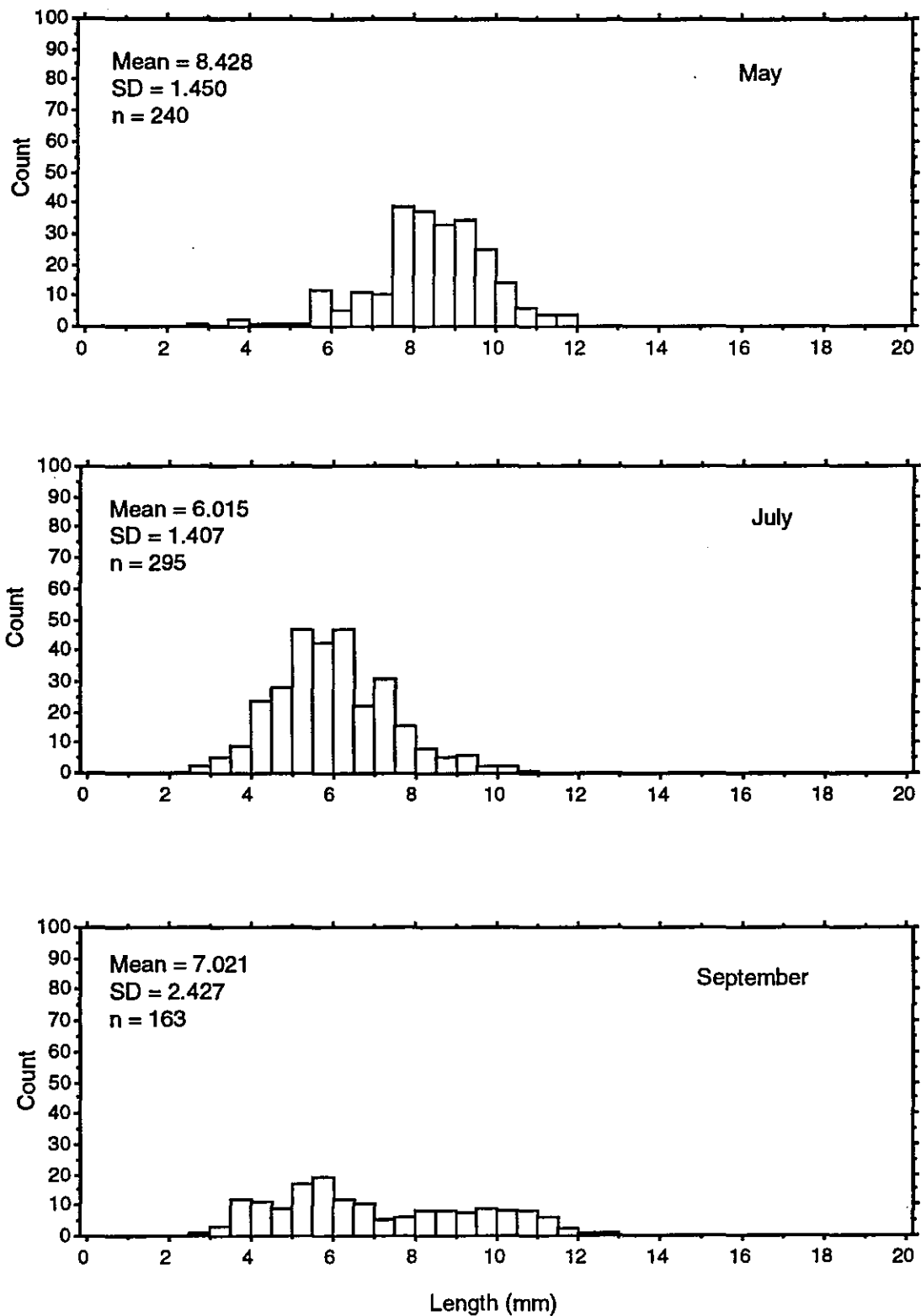


Figure E-3.2.6. Length-frequency histogram of *Littorina sitkana* from Herring Bay, 1991.

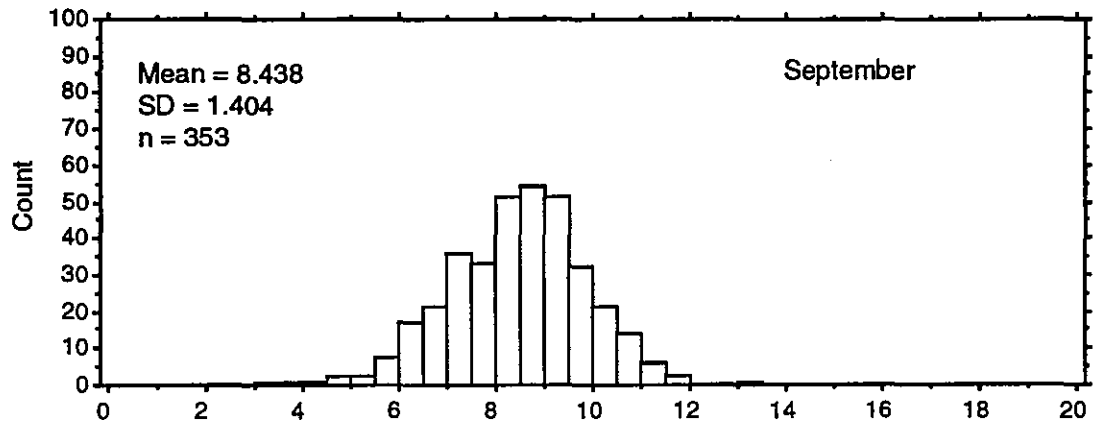
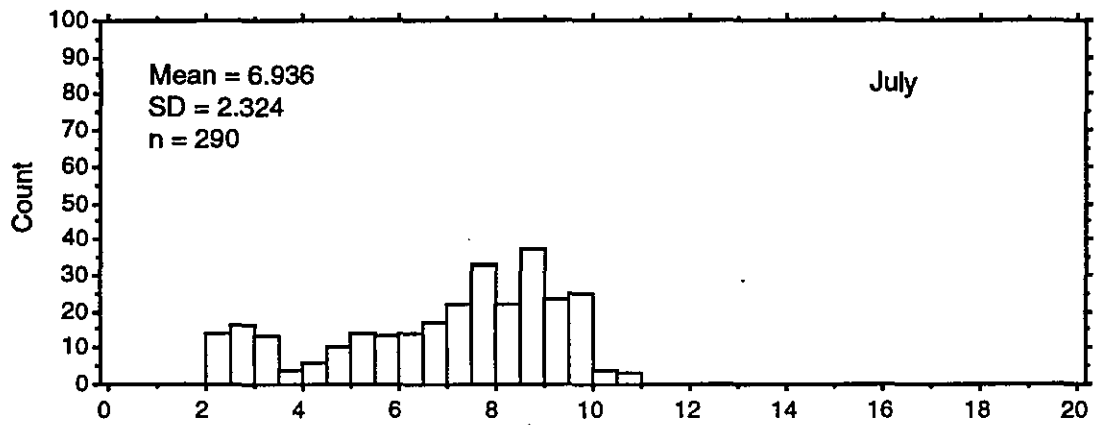
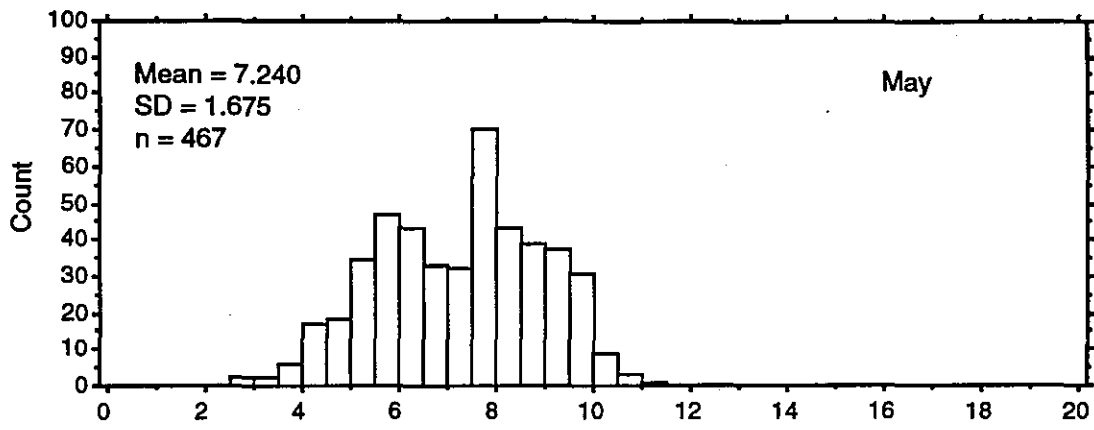


Figure E-3.2.7. Length-frequency histogram of *Littorina sitkana* from Hogg Bay, 1991.

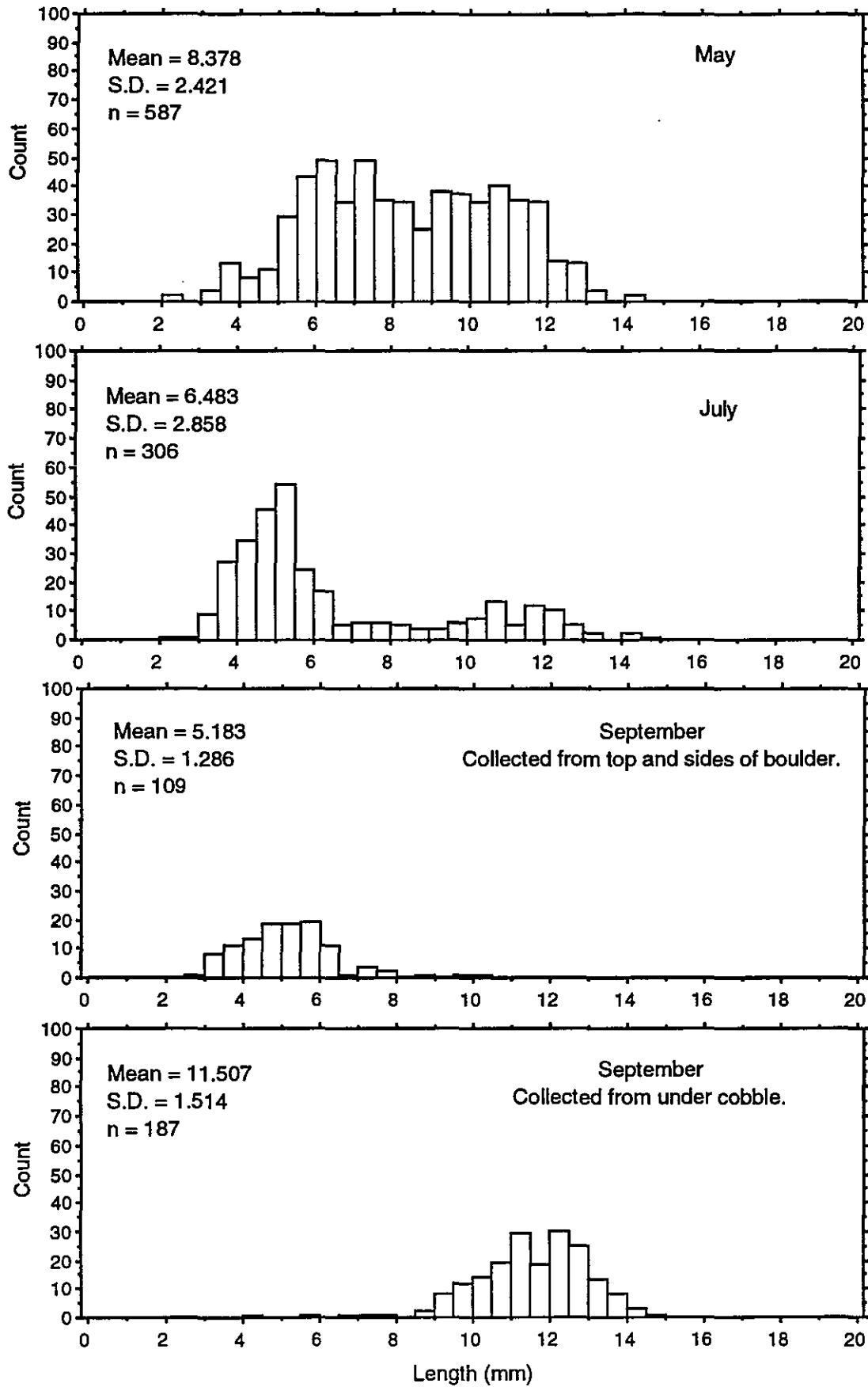


Figure E-3.2.8. Length-frequency histogram of *Littorina sitkana* from Ingot Island, 1991.

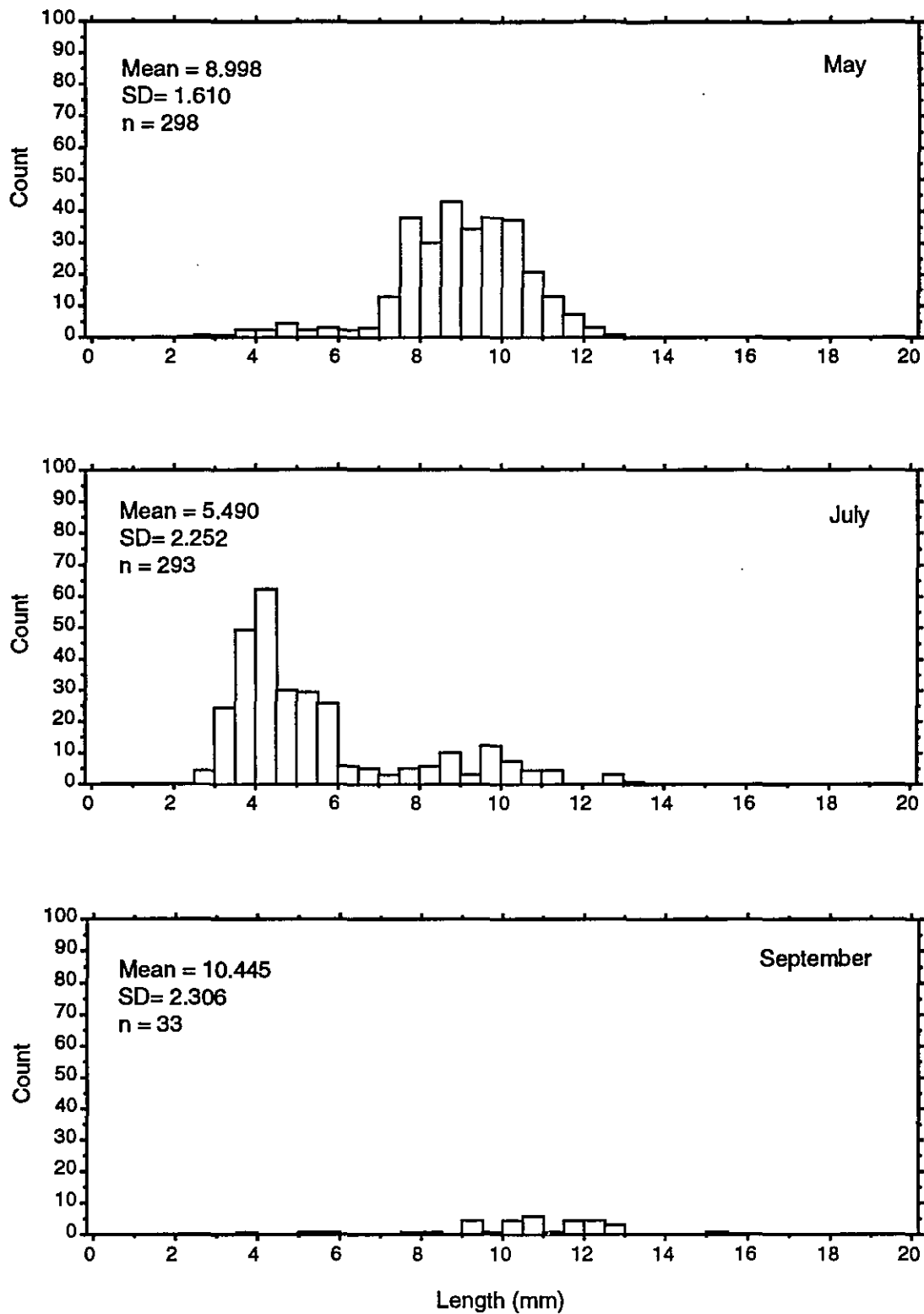


Figure E-3.2.9. Length-frequency histogram of *Littorina sitkana* from Mussel Beach, 1991.

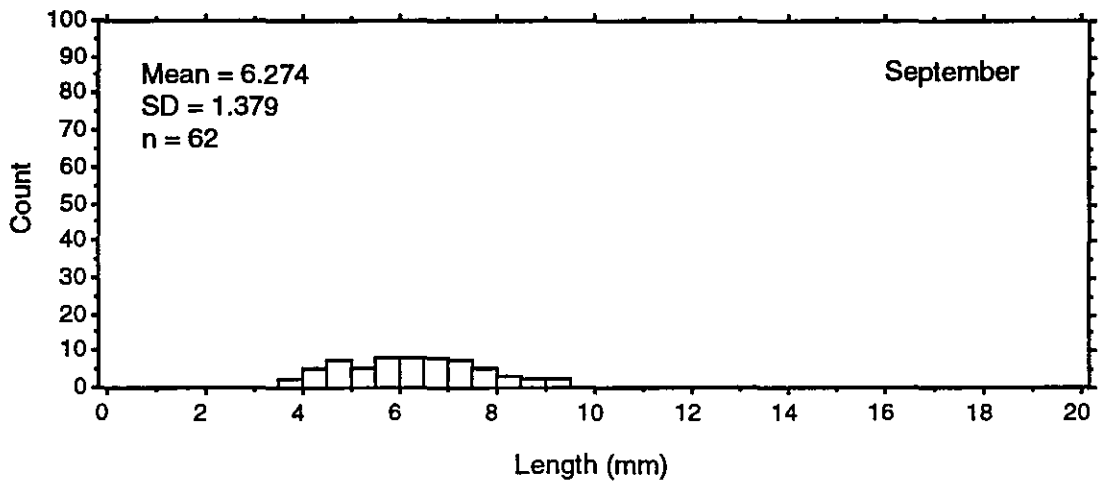
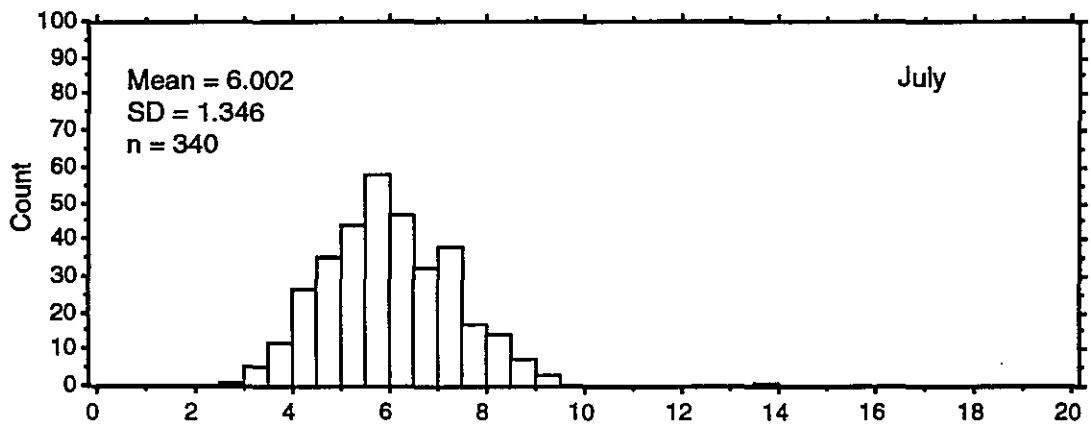
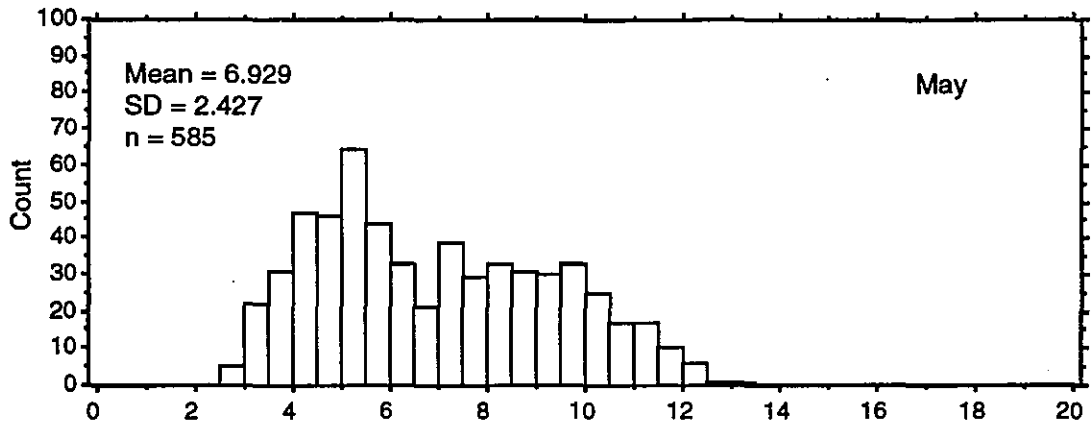


Figure E-3.2.10. Length-frequency histogram of *Littorina sitkana* from Northwest Bay, 1991.

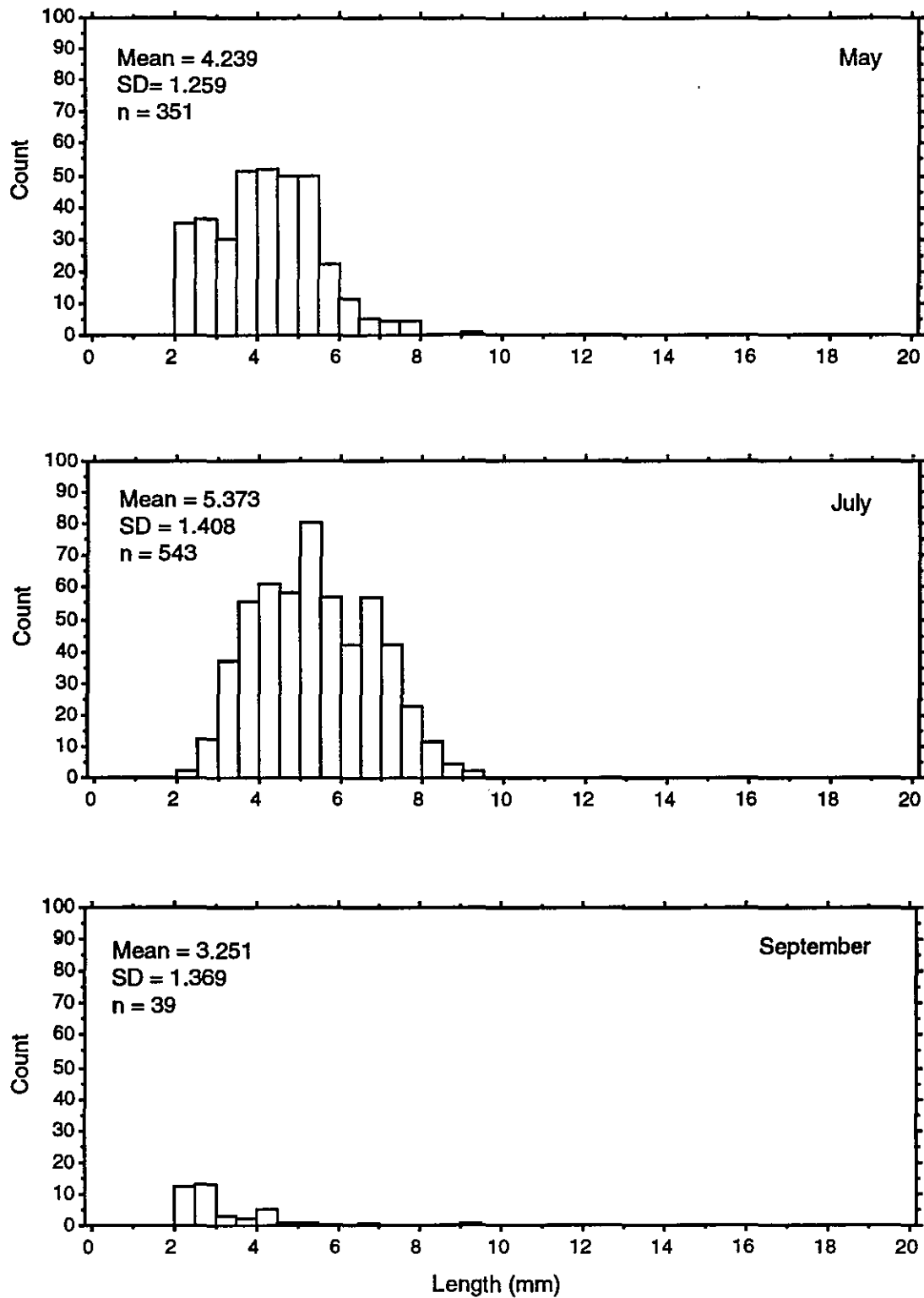


Figure E-3.2.11. Length-frequency histogram of *Littorina sitkana* from Outside Bay, 1991.

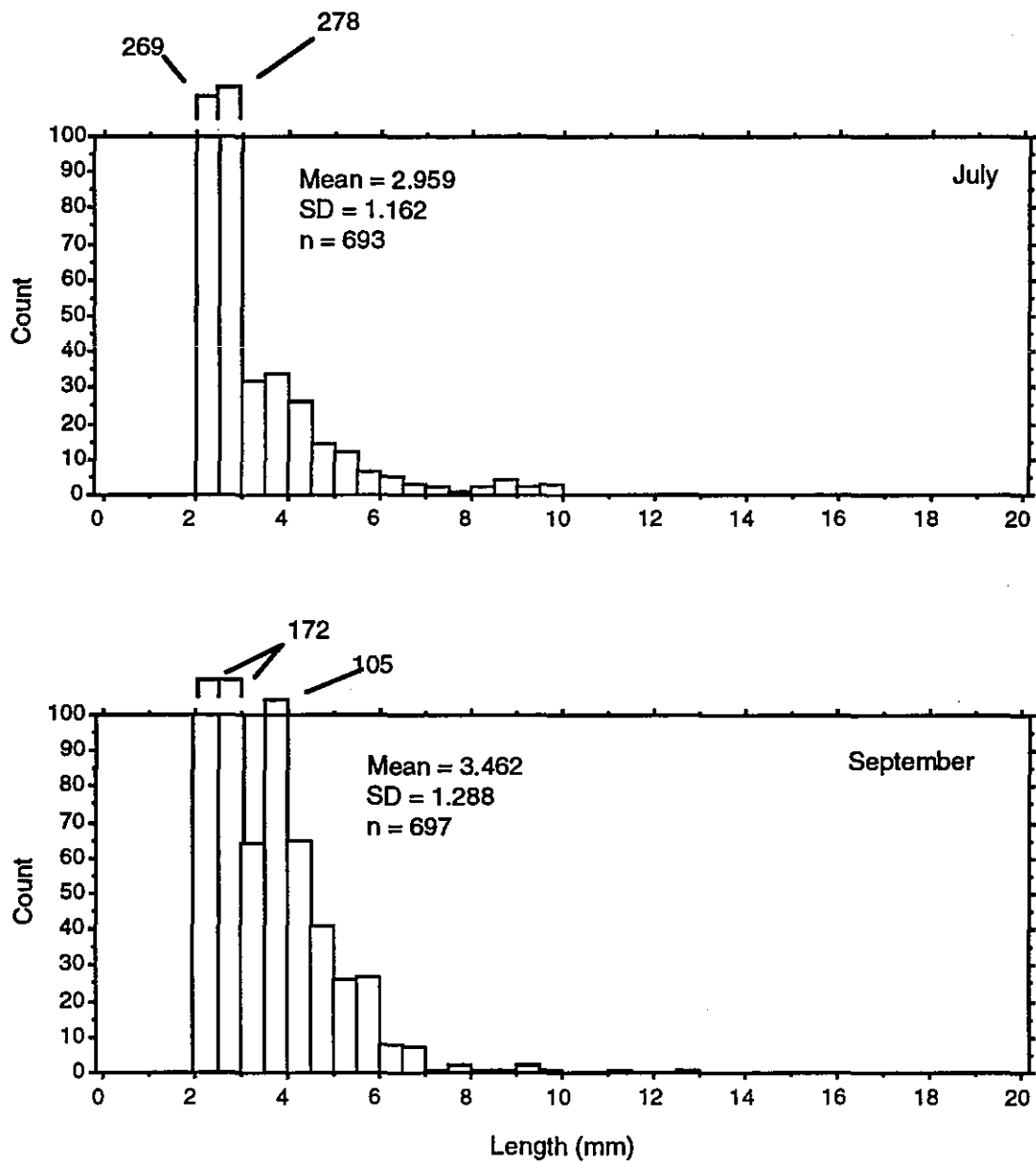


Figure E-3.2.12. Length-frequency histogram of *Littorina sitkana* from Point Helen, 1991.

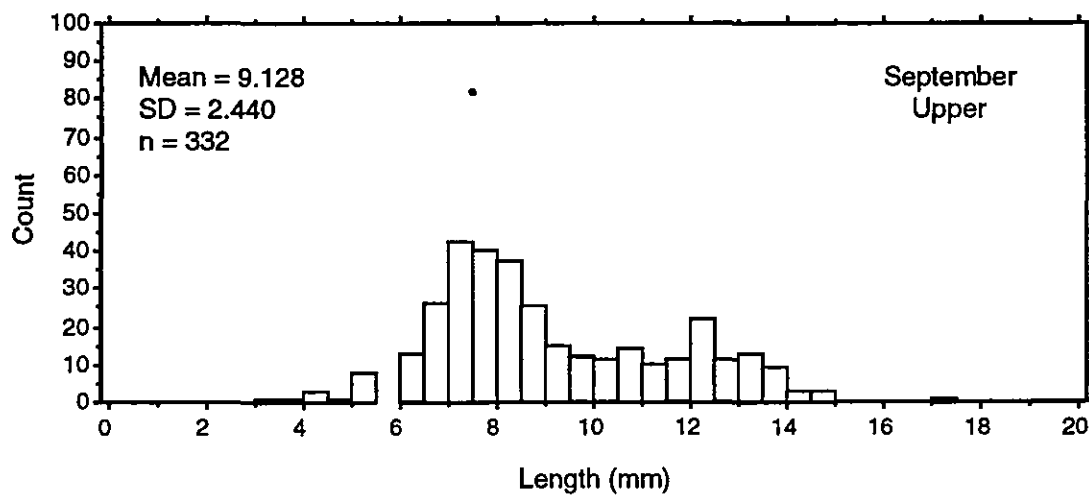
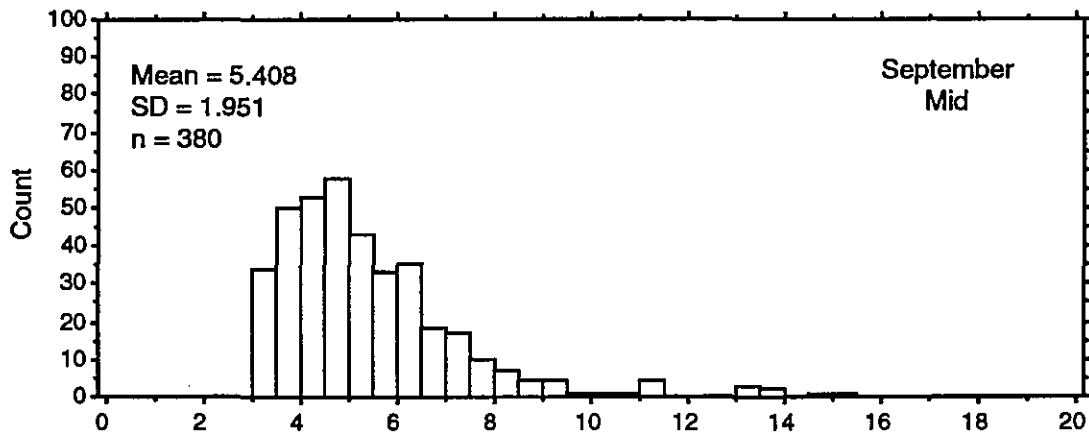
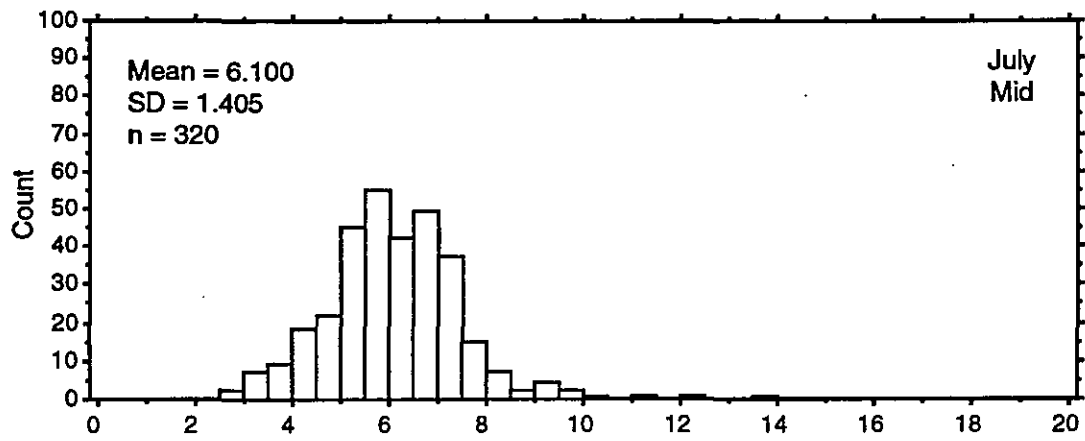


Figure E-3.2.13. Length-frequency histogram of *Littorina sitkana* from Smith Island, 1991.

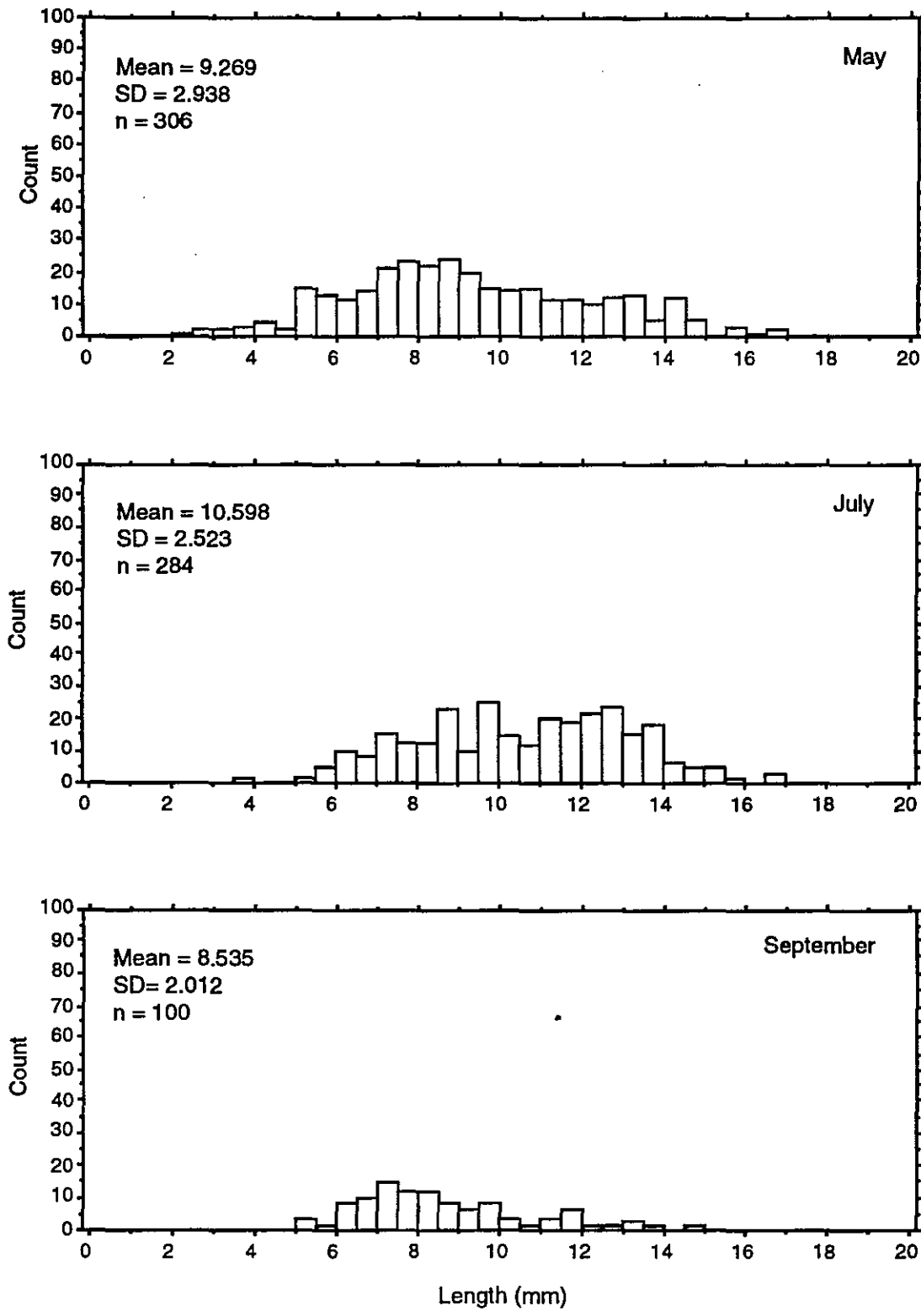


Figure E-3.2.14. Length-frequency histogram of *Littorina sitkana* from Snug Harbor, 1991.

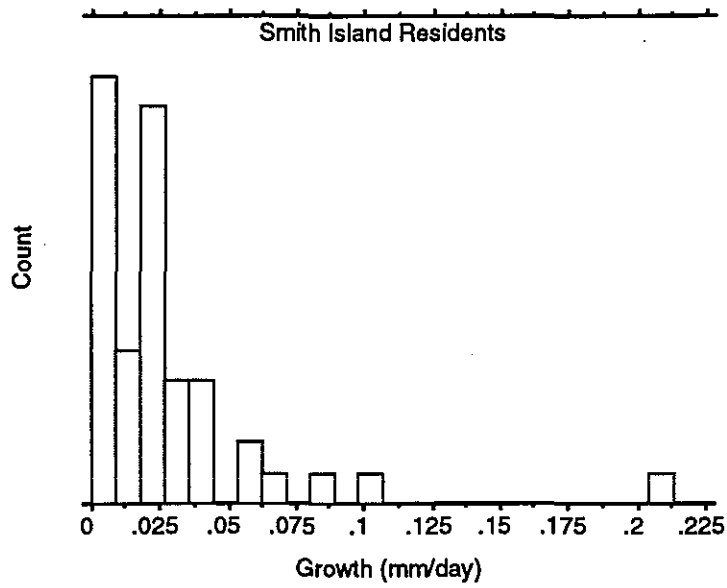


Figure E-4.1. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Smith Island residents.

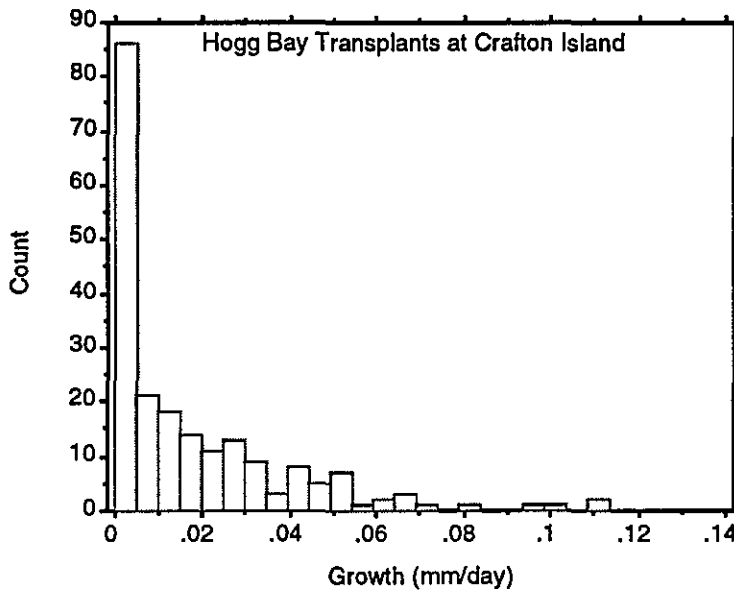


Figure E-4.2. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Hogg Bay transplants at Crafton Island.

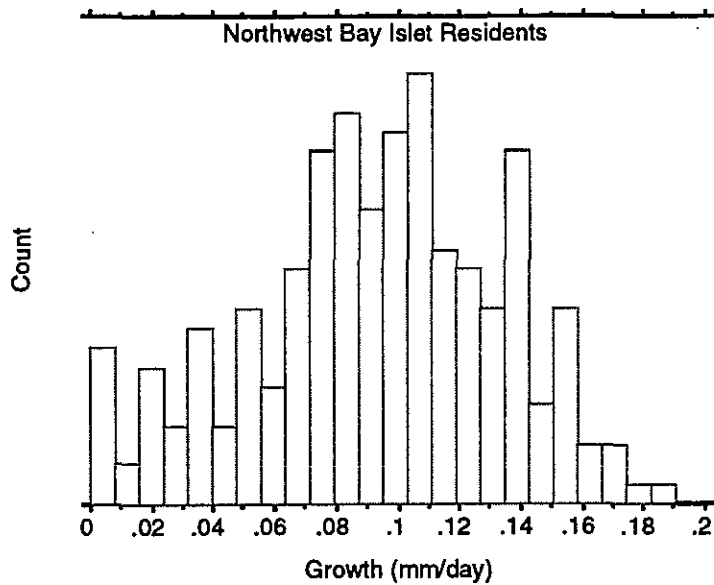


Figure E-4.3. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Northwest Bay Islet residents.

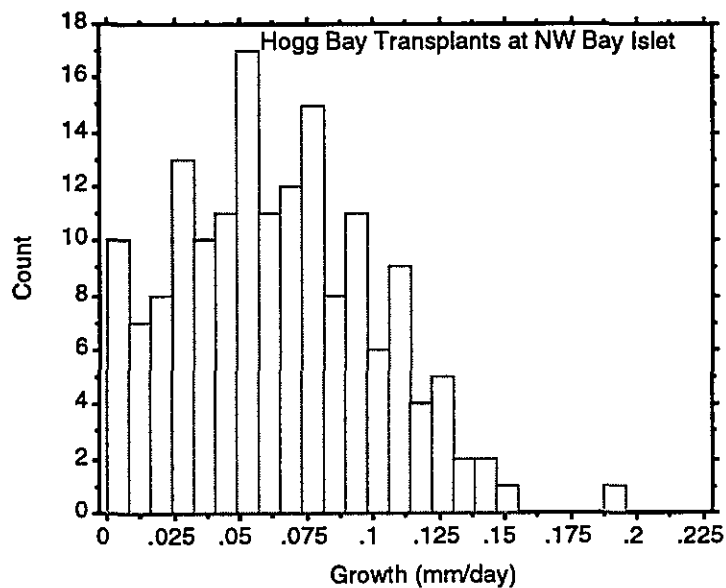


Figure E-4.4. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Hogg Bay transplants at Northwest Bay Islet.

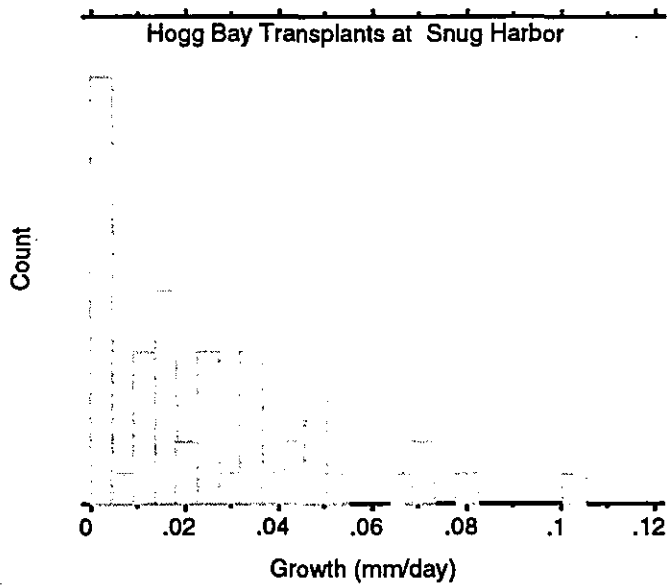


Figure E-4.5. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Hogg Bay transplants at Snug Harbor.

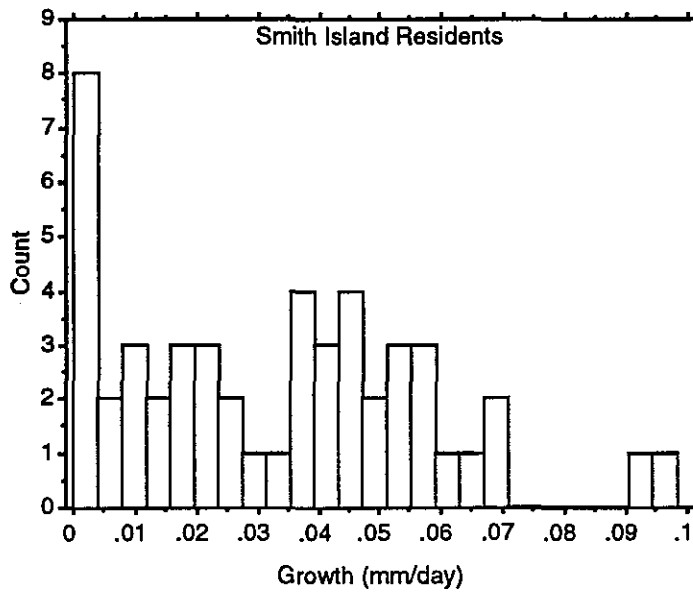


Figure E-4.6. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Outside Bay residents.

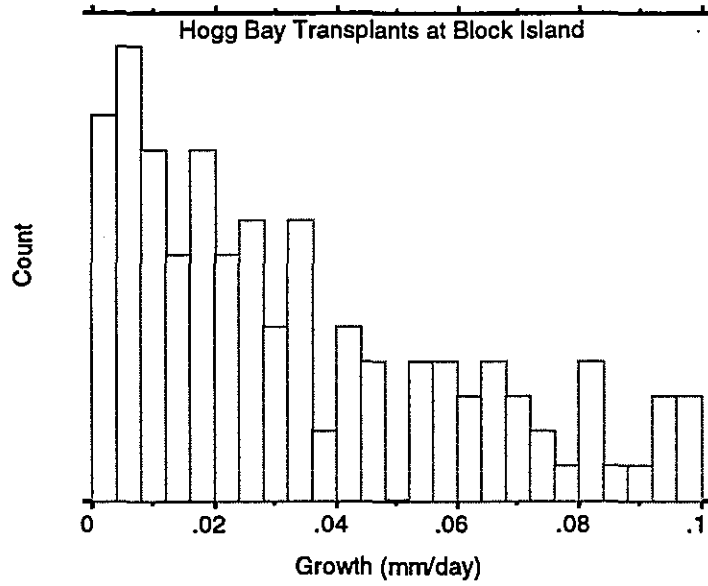


Figure E-4.7. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Hogg Bay transplants at Block Island.

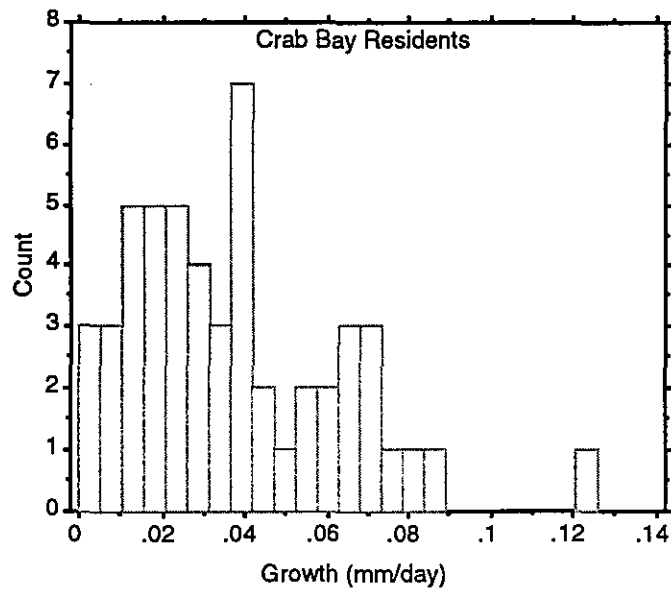


Figure E-4.8. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Crab Bay residents.

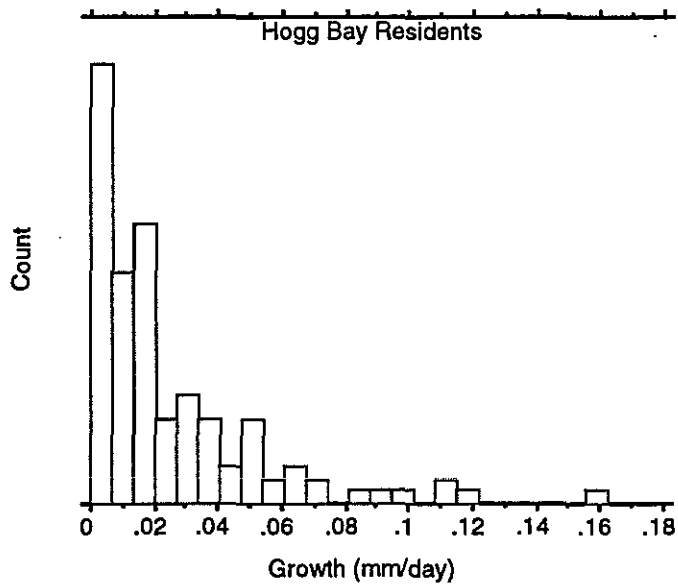


Figure E-4.9. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Hogg Bay residents.

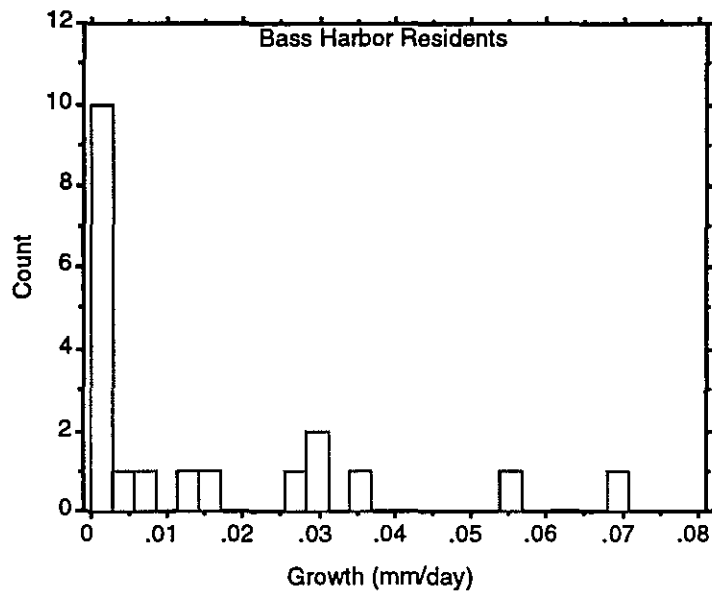


Figure E-4.10. Growth-frequency distribution for *Nucella lamellosa* during the summer of 1991—Bass Harbor residents.

Appendix F-Northwest Bay West Arm

APPENDIX F-1

NORTHWEST BAY WEST ARM ROCKY SPECIAL STUDY SITE

In 1989, in the West Arm of Northwest Bay, located on Eleanor Island, a substantial effort was expended to treat shorelines with high pressure, hot water. Although nearly all of the designated segments of the Northwest Bay West Arm shoreline were listed in official records as having been treated in such a fashion, on a smaller scale, the actual coverage may have been less consistent due to difficulties deploying equipment and other factors. According to a State of Alaska monitor who was on-scene during much of summer 1989, this variability of treatment within a given segment was not uncommon in that area (P. Montesano, Alaska Department of Environmental Conservation (ADEC), personal communication).

In 1990, many areas along the straight, steeply sloping rocky shorelines of Northwest Bay were noted where biota appeared to be reduced, exposing large areas of bare rock similar to that documented at our Northwest Bay Rocky Islet study site. Sharp vertical boundaries often separated these abiotic areas from adjacent rocky areas exhibiting abundant associated biota and a normal cover of rockweed, barnacles, and mussels. If it is assumed that oiling was continuous across these relatively smooth rocky faces and that there was no natural reason for the vertical boundaries, the differences would likely reflect differing degrees of severity of treatment. Little or no oil was visible in 1990 or 1991 on either side of these vertical boundaries. This would suggest that on this substrate type and over a longer period, reduction in surface oil concentrations was about equivalent at locations receiving treatments of substantially different intensity.

At one such site, which is referenced in this study as the Northwest Bay West Arm rocky site, two sides of a middle intertidal station were sampled in what may be considered a serendipitous "paired" experiment: one station was presumed to be hot-water washed, based on existing shoreline treatment records (Appendix A-1) and was assigned to Category 3 according to standard classification protocols for this study. Immediately adjacent to this station, an area of similar habitat was sampled that was assumed to have had a similar pre-spill biological assemblage and a similar degree of oiling (reported to be "moderate" in ADEC and Exxon mappings), but that, based on appearance in 1990, was assumed to have had a very different treatment history—i.e., less intensive or no washing. Figure F-1 shows these two stations. The left side of each photograph is presumed to represent a Category 3, or high-pressure, hot-water washed area. The right side of the area shown in the figure is presumed to have experienced a lesser degree of treatment. Because no specific treatment records could be found for the adjacent area—which constituted a relatively small portion of the designated shoreline segment used to track activities taking place—and because, in July of 1990, it did not appear to have been affected by treatments, it was not assigned to a defined treatment category. Rather, it was considered a "reference" area against which to compare recovery of the apparently treated "Category 3" side of the station in an experimental sampling separate from the broader assessment of differences among treatment categories. Because the assemblages on the two immediately adjacent areas are hypothesized to differ primarily due to the presumed difference in level of treatment, it can be assumed that as recovery occurs on the more heavily treated "Category 3" side of the station, the number of significant differences between the two sides will decrease. When no significant differences remain in any measured parameter, the "Category 3" side of the station can be said to have recovered.



Figure F-1A. Northwest Bay West Arm, rocky site; Category 3 station on left, reference station on right (July 10, 1990)



Figure F-1B. Northwest Bay West Arm, rocky site; Category 3 station on left, reference station on right (July 11, 1991).

In the biological assessment for this special site, several statistically significant differences ($p < 0.1$ in randomization t-tests) were noted between the two sides of the West Arm rocky station; coverage or density of taxa considered the dominants of the stable rockweed community were more abundant at the reference side. These taxa include rockweed; several species of red algae (e.g., *Halosaccion glandiforme* and *Neorhodomela oregona*); the epiphytic brown alga *Elachista fucicola*; a limpet, *Nucella lamellosa*; the barnacle *Chthamalus dalli*; and *Littorina sitkana* (Table F-1). The red alga *Gloiopeltis*, normally found at higher elevations, was significantly more abundant ($p < 0.02$) at the "Category 3" side along with *Littorina scutulata*, which was represented by numerous young-of-the-year animals. In addition, the extensive bare substrate observed on this side in 1990 was heavily colonized by *Semibalanus balanoides* in 1991.

Dense stands of young rockweed that had been evident only as inconspicuous sporeling mats in heavily treated areas throughout the Knight Island group in 1990 (Figure F1-A), were growing well in 1991 and gave a superficial appearance of a "normal" shoreline (Figure F1-B, left side). A more detailed examination, however, revealed that the community associated with such areas as yet bears little resemblance to that on Category 1 (unoiled) or 2 beaches (oiled but not high-pressure, hot-water washed). For example, longer-lived, more stable components of the upper rockweed zone (*Fucus*, several red algae, hermit crabs, a littorine, and drills) were more abundant on the West Arm rocky reference side of that station than on the adjacent "Category 3" side (Table F-1). The differences in assemblage dominance between the reference and adjacent side of this station (Figure F-2) bear many resemblances to the before- and after-treatment differences at the July 1989 Omni-barge test site (see Volume II, Figure 49; from data in Table 1) and may demonstrate the relatively slow pace of recovery of these hot-water-treated rocky shores. Significant recovery is under way, however. For example, on the side presumed to have received more severe treatment, two opportunistic species, *Semibalanus balanoides* and *Littorina scutulata*, as well as a species typical of the high intertidal zone, *Gloiopeltis furcata*, were significantly more abundant in 1991 compared to 1990 (Figure F-2 and Table F-1). In 1990, this side of the station had limited areas of established rockweed sporelings (Figure F1-A, left side of photograph, and Figure F3-A). By July 1991, rockweed on this side of the site was comprised predominantly of two-year-old plants that were not reproductively mature, along with a small percentage of sporelings (Figure F1-B, left side of photograph, and Figure F3-B). In contrast, the reference side of the station (Figure F1, right side of photograph) included a similar percent coverage of sporelings and an even mix of several year classes of older and reproductively mature plants. Several taxa associated with the mature rockweed community were also significantly more abundant in this area. Finally, total algal cover and animal diversity were significantly higher on the reference side of the station (Table F-1).

Differences in abundances of the two littorine species seen at the side-by-side Northwest Bay West Arm rocky stations (Figure F-2) may reflect their different habitat preferences. Planktonic larvae of *L. scutulata* would have had equal access to both stations, yet this species was far more abundant on the Category 3 station with large areas of rock that were free of macroalgal cover; large numbers of mostly small *L. scutulata* were present here in July 1991. At the adjacent reference station, with its dense cover of rockweed, this species was very poorly represented but was replaced by *L. sitkana*, mostly larger individuals living on the rockweed fronds.

Table F-1. Northwest Bay, West Arm, rocky site, middle intertidal epibiota, July 1991.

	TREATED (Category 3)							TREATMENT UNKNOWN							t-test
	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Avg	SD	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Avg	SD	
Plants (% cover)															
<i>Acrosiphonia</i> spp.	7	0	3	0	0	2.00	3.08	0	5	0.5	0.5	0	1.20	2.14	0.722
<i>Cryptosiphonia woodii</i>	0	0	0	0	0	0.00	0.00	0	0	0	0	2	0.40	0.89	1.000
<i>Elachista fucicola</i>	0	0.5	0	0	0	0.10	0.22	1	2	15	0	1	3.80	6.30	0.048
Encrusting coralline algae	0.5	0	0.5	0	0	0.20	0.27	0	0.5	0.5	2	20	4.60	8.64	0.222
Encrusting green algae	0	2	0.5	0	0	0.50	0.87	0	0.5	0	0	0	0.10	0.22	0.722
Encrusting red algae	15	25	4	1	2	9.40	10.36	60	3	2	15	10	18.00	24.07	0.659
<i>Enteromorpha intestinalis</i>	0	0.5	0.5	0	0.5	0.30	0.27	0	0	0	0	0	0.00	0.00	0.167
<i>Fucus gardneri</i>	40	12	55	5	60	34.40	24.89	95	90	90	70	95	88.00	10.37	0.008
<i>Fucus gardneri</i> (sporelings)	5	3	2	1	1	2.40	1.67	0	0	2	10	0	2.40	4.34	1.000
<i>Gloiopeltis furcata</i>	4	2	7	8	15	7.20	4.97	0.5	1	2	0	0	0.70	0.84	0.016
<i>Halosaccion glandiforme</i>	0	0	0	0	0	0.00	0.00	1	0	0.5	8	1	2.10	3.32	0.048
<i>Mastocarpus papillatus</i>	0	0	0	0	0	0.00	0.00	0	0.5	0.5	2	4	1.40	1.64	0.048
<i>Melanosiphon intestinalis</i>	0	0.5	2	0	0	0.50	0.87	0	0.5	0	2	0	0.50	0.87	1.000
<i>Monostroma grevillei</i>	0	1	0	0	0	0.20	0.45	0	0.5	0.5	2	0	0.60	0.82	0.563
<i>Neorhodomela larix</i>	0	0	0.5	0	0	0.10	0.22	0	25	0	2	1	5.60	10.88	0.167
<i>Neorhodomela oregona</i>	0.5	0.5	15	0	1	3.40	6.49	10	10	20	2	15	11.40	6.69	0.103
<i>Pilayella littoralis</i>	0.5	0	0	0	0	0.10	0.22	2	0	15	15	10	8.40	7.09	0.048
<i>Soranthra ulvoides</i>	0	0	5	0	0	1.00	2.24	0	0.5	0	0	0.5	0.20	0.27	1.000
Total Algal Coverage	72.50	47.00	95.00	15.00	79.50	61.80	31.38	169.50	139.00	148.50	130.50	159.50	149.40	15.59	0.008
Number of Taxa	7	9	11	3	5	7.00	3.16	7	13	11	11	11	10.60	2.19	0.111
Animals (% cover or no/0.25 sq m)															
<i>Anthopleura elegantissima</i>	0	0	0	0	0	0.00	0.00	0	0	1	1	0	0.40	0.55	0.444
<i>Balanus/Semibalanus/Chthamalus</i> (%)	37.5	29.5	12.5	37.5	57	34.80	16.07	33.5	21	16.5	27	28.5	25.30	6.64	0.262
<i>Littorina scutulata</i>	760	17	33	118	636	312.80	356.43	0	14	20	12	5	10.20	7.82	0.016
<i>Littorina sitkana</i>	6	2	25	17	8	11.60	9.29	180	34	72	3	24	62.60	70.23	0.087
Lottiidae, unid.	11	19	32	11	39	22.40	12.64	12	19	30	35	139	47.00	52.22	0.444
<i>Mytilus edulis</i> spat (%)	0.5	0.5	0.5	0.5	0.5	0.50	0.00	0	1	0	0.5	0.5	0.40	0.42	1.000
<i>Nucella lamellosa</i>	1	0	2	0	0	0.60	0.89	3	7	6	3	16	7.00	5.34	0.008
<i>Pagurus granosimanus</i>	1	0	0	0	1	0.40	0.55	0	0	0	0	0	0.00	0.00	0.444
<i>Pagurus hirsutiusculus</i>	1	0	6	0	2	1.80	2.49	26	8	7	5	10	11.20	8.47	0.016
<i>Siphonaria thersites</i>	0	1	0	0	0	0.20	0.45	40	9	26	7	24	21.20	13.55	0.008
Number of Individuals	780	39	98	146	686	349.80	353.42	261	91	162	66	218	159.60	82.41	0.389
Number of Taxa	8	6	7	5	7	6.60	1.14	6	8	8	9	8	7.80	1.10	0.198
Diversity (H')	0.08	0.38	0.56	0.29	0.16	0.29	0.19	0.42	0.70	0.66	0.62	0.52	0.58	0.11	0.032
Dead organisms (% cover or no/0.25 sq m)															
<i>Fucus gardneri</i> (dead)	0.5	0	0.5	0	0.5	0.30	0.27	0	0	0	0.5	0.5	0.20	0.27	1.000
<i>Balanus/Semibalanus</i> spp. (dead) (%)	1.5	0	0	0.5	1.5	0.70	0.76	0	1	0.5	0.5	0	0.40	0.42	0.619
<i>Mytilus edulis</i> (dead)	0	0	1	0	0	0.20	0.45	0	0	0	0	4	0.80	1.79	1.000
Substrate (%)															
Rock (%)	100	100	100	100	100	100.00	0.00	100	100	100	100	100	100.00	0.00	
Water (%)	0	0	0	0	0	0.00	0.00	1	10	5	0	0	3.20	4.32	

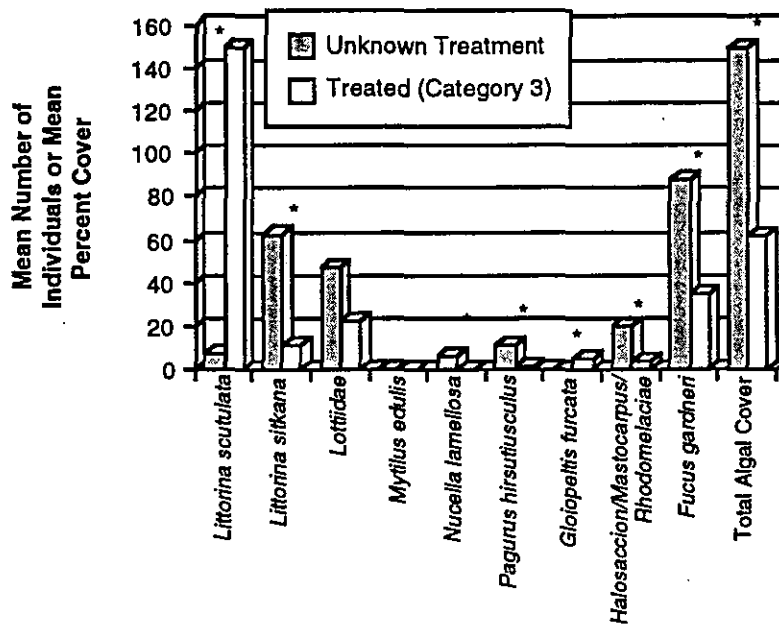
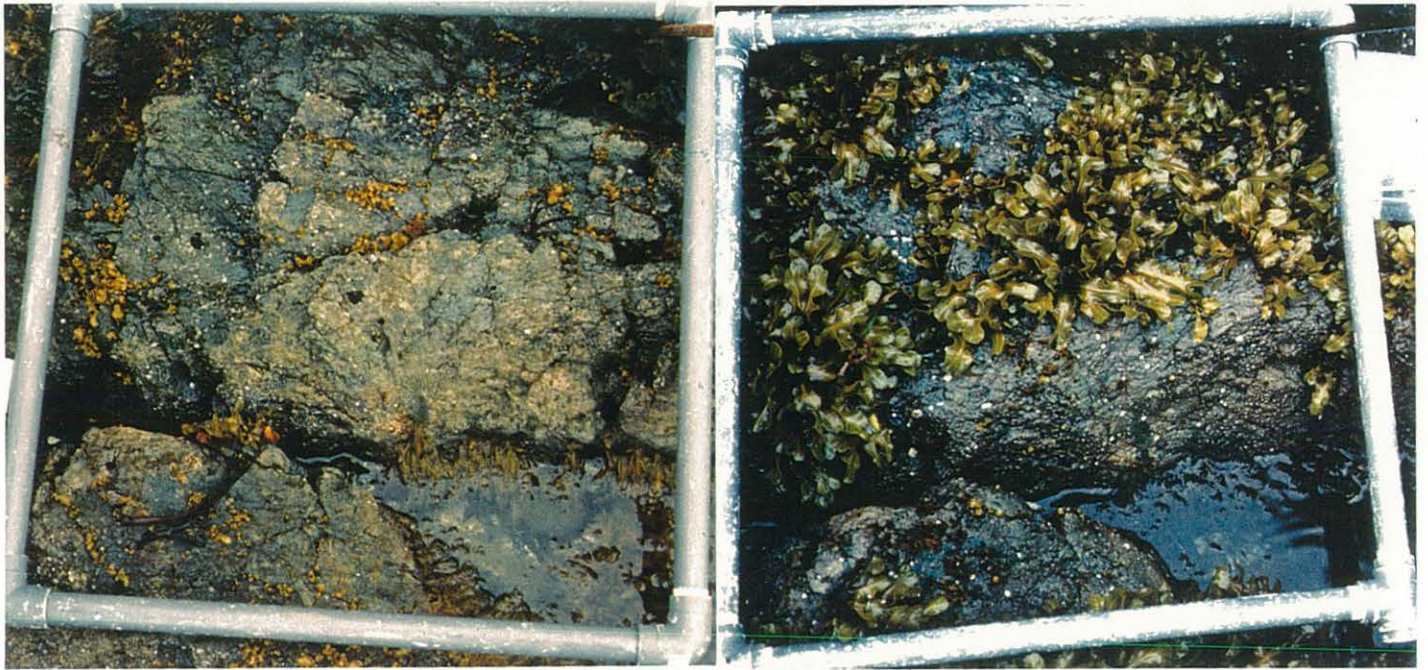


Figure F-2. Abundances of dominant epibiota at adjacent middle rocky unknown category and Category 3 stations sampled at Northwest Bay West Arm, July 1991 (* = significant difference, $p < 0.1$).

As is mentioned in the discussion of mollusk studies, it has been observed at the site of a previous spill that recovery of drills at oiled locations follows that of barnacle populations, which increase rapidly following the spill event due, presumably, to absence of barnacle predators. At the Northwest Bay West Arm rocky sites, *Nucella lamellosa* was relatively abundant in the "normal" assemblage on the reference side of the vertical dividing line (Figure F-1). Interestingly, despite a lack of preferred prey in this mature assemblage, few of these drills moved even a few meters to exploit the dense cover of *S. balanoides*, a favored prey item that had colonized the adjacent treated area (Figure F-3).

In summary, although interpretation of results from this site in Northwest Bay must be qualified because of uncertainties about the nature of treatment occurring at a finer scale than was the case at other sites, we believe that those results still provide relevant insights into intertidal recovery processes. It is possible that a further examination of written or photographic treatment records, or the release of information presently restricted because of litigation, may subsequently permit direct comparison of the data from the Northwest Bay West Arm rocky site with other rocky sites in this monitoring effort.



A. Category 3 station, Quadrat 3
July 10, 1990.

B. Category 3 station, Quadrat 3
July 11, 1991.



C. Reference station, Quadrat 2
July 10, 1990.

Figure F-3. Quadrat photographs from Northwest Bay West Arm rocky stations.

ABBREVIATIONS AND ACRONYMS

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ASAP	Alaska Shoreline Assessment Program
cm	centimeter
FOSC	Federal On-Scene Coordinator
GPS	Global Positioning System
HITZ	high intertidal zone
ITZ	intertidal zone
km	kilometer
LCV	landing craft vessel
m	meter
MLL	mean lower low
NOAA	National Oceanic and Atmospheric Administration
PWS	Prince William Sound
RAT	Resource Advisory Team
SCOT	Shoreline Cleanup Oversight Team
SD	standard deviation
SE	standard error
SSAT	Spring Shoreline Assessment Team
TAG	Technical Advisory Group
USCG	United States Coast Guard

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