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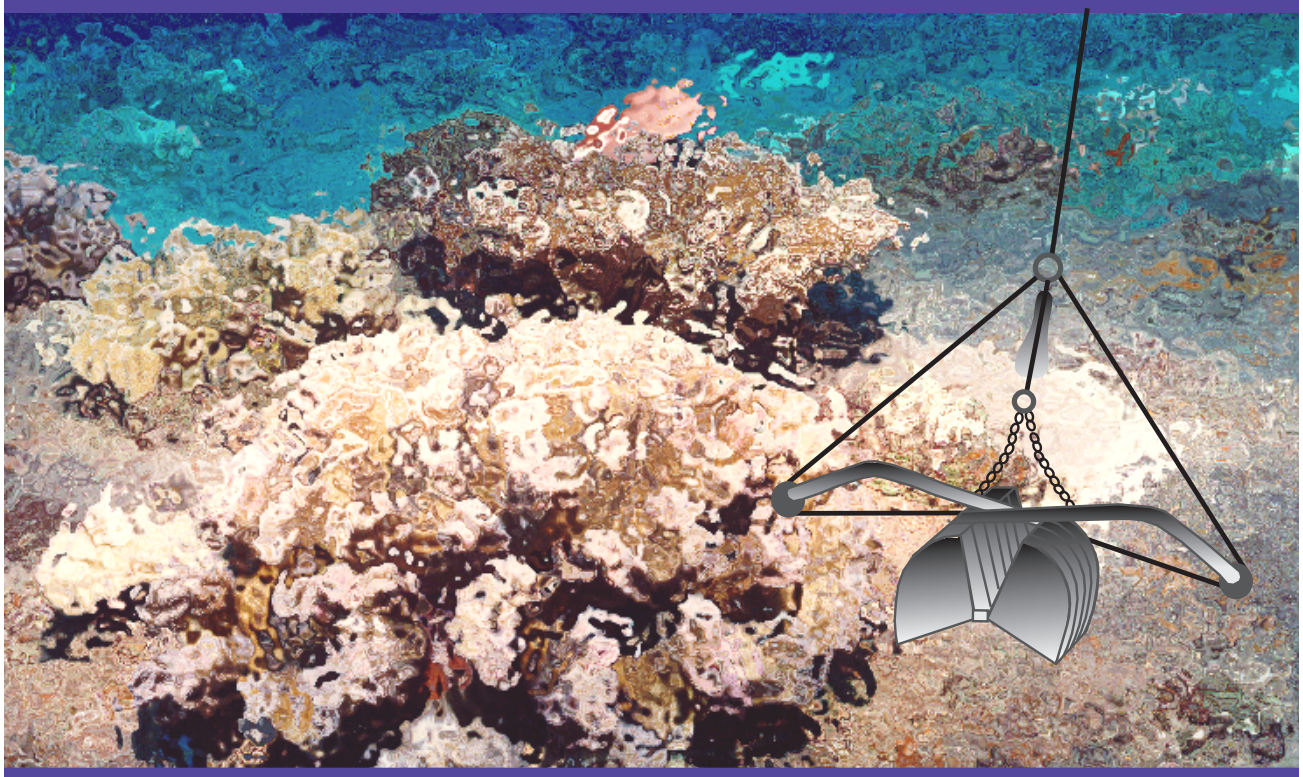

Benthic Sampling Adjacent to the Wai'anae Ocean Outfall, O'ahu, Hawai'i, June 2010

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January 2011

WATER RESOURCES RESEARCH CENTER
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[12] ABSTRACT (PURPOSE, METHOD, RESULTS, CONCLUSIONS)

In June 2010, the City and County of Honolulu Department of Environmental Services Oceanographic Team divers collected bottom-sediment samples for biological and geochemical analyses at six stations (three reference stations and three stations in the zone of initial dilution [ZID]) at a depth of approximately 34 m in the vicinity of the Waianae Wastewater Treatment Plant outfall diffuser on the leeward coast of Oahu, Hawaii. All stations had sediment fractions with >90% sand. Silt fractions were no more than 4% at any station. Oxidation-reduction-potential (ORP) and total-volatile-solids measurements of these sediments indicated a nonreducing benthic environment at all stations. In 2010, the sediments at all stations around the outfall were rich in nonmollusks (crustacean, molluscan, nematode, oligochaete, and polychaete faunas). The highest mean abundance of nonmollusks was recorded at a reference station and the lowest at the diffuser station. Mean nonmollusk taxa richness was greatest at a reference station and least at a station in the ZID. Stations in the ZID were the most similar to one another in taxa composition; reference stations were generally more similar to one another than to ZID stations. In 2010, micromollusks were very abundant at all stations. Gastropods made up >90% of the total molluscan fauna. Stations in the ZID were most similar in mollusk taxa composition to one another. Grouping by "taxa in common" resulted in three clusters; one group containing two reference stations, one composed of two ZID stations and another composed of one ZID station and one reference station. Cluster analysis, based on taxa composition, indicated no clear pattern of interaction with the effluent discharge for either the mollusks or nonmollusks. Some taxa are recognized as being particularly effective indicators of organic pollution and their distribution and abundance can be used to assess organic enrichment. None of the polychaete or crustacean taxa found at Waianae, that are considered indicators of organic pollutants, exhibited patterns that suggest an impact of effluent on the benthos. Crustacean abundances were typically low at the diffuser station. This may be because of aggregations of fish attracted to the diffuser that are benthic feeders, specializing in infaunal and epifaunal crustaceans (Russo and Brock 2009). Polychaetes, also food for some fishes, are also lowest in abundance at the diffuser station. This hypothesis needs to be tested and would be interesting for future studies. If outfall effects are operating, depressions in crustacean species richness and abundance at the diffuser should also be accompanied by sharp depressions in abundance and diversity of other components of the benthos (e.g., polychaetes, mollusks). One should also expect a buildup of total organic carbon and reducing particulates, an increased silt fraction, decreased ORP values, etc. Also, pollution tolerant species should increase in abundance while those intolerant to stress should decrease in numbers and richness. These patterns were not seen. At all stations the sediment was oxygen-rich and devoid of reducing particulates. The results of the 2010 Waianae benthic study, along with results from previous years, suggest that no negative effects from treated effluent occur to the indigenous biological populations near the outfall diffuser.

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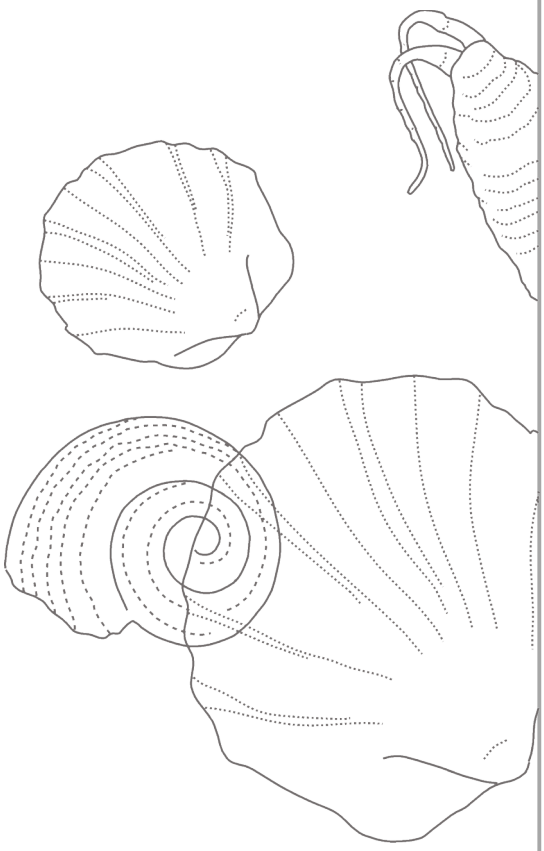

Project Report PR-2011-06

January 2011

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City and County of Honolulu
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PROJECT REPORT FOR
“Biological and Sediment Monitoring Program, with Supplementary Studies: 2007–2012”
Project No.: C64087
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Principal Investigator: Chittaranjan Ray

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Executive Summary

Marine life surrounding the island of O‘ahu may be affected by various human activities in and around the ocean. These can include boating, diving, fishing, and swimming as well as treated-effluent disposal and storm-drain or other runoff.

This report, the latest in an annual series begun in 1986, describes studies of ocean-bottom, or “benthic,” marine organisms in the vicinity of the Wai‘anae ocean outfall diffuser. This outfall diffuser discharges treated effluent from the Wai‘anae Wastewater Treatment Plant (WWTP).

The basic question to be answered by the report is whether a “balanced indigenous population” (a population essentially the same as it would be in the absence of human activities) of these ocean-bottom marine organisms continues to live and thrive near the outfall diffuser. And all of the information we have gathered tells us that these marine organisms are diverse, healthy, and plentiful—just as they would be in the absence of any treated effluent.

At the Wai‘anae outfall diffuser a little more than 0.14 cubic meters per second (3.27 million gallons per day) of treated effluent is discharged through openings, or “riser ports,” on the outfall diffuser at a depth of 34.1 m (112 ft). The ocean outfall from the wastewater treatment plant, including the outfall diffuser, runs about 1.8 km (6,000 ft, roughly a mile and a tenth) offshore.

In June 2010, the City and County of Honolulu (CCH) Department of Environmental Services Oceanographic Team divers, using scuba and working with a small core sampler, took five samples of the ocean bottom at each of the six sampling stations.

One station is very near the outfall diffuser, at the center of the “zone of initial dilution” (ZID). Two stations are located on the outer boundaries of the ZID. The remaining three are reference stations located well away from the outfall diffuser and the treated effluent.

The ocean-bottom samples mostly capture three main types of tiny organisms: polychaetes (various kinds of marine worms), mollusks (invertebrates including clams and snails), and small crustaceans (such as amphipods, crabs, and shrimp). Scientists with expertise in these organisms examine the ocean-bottom samples under microscopes, identifying and counting each individual in each sample. From their work we know, for each sampling station, how many different kinds (taxa) of organisms were there at the time of the sampling and how many there were of each kind.

Results from these examinations, along with data about the ocean-water chemistry, are sent to another scientist for analysis and reporting. Statistical tests are used to see if there are significant differences between ZID stations and reference stations in the kinds and numbers of organisms sampled. Comparisons are made of the 2010 information with the information from the same studies done for the past ten years. Results of earlier studies are archived with the CCH Department of Environmental Services and various Hawai‘i state offices and libraries and can be readily accessed by anyone wishing to examine them.

Since we’ve been studying these sampling stations for almost a quarter of a century we expect there always to be some changes in what we see. As an example, polychaete samples taken annually between 2001 and 2008 have included between 74 and 123 taxa and between 1,222 and 2,430 individuals. For 2009 there were 107 taxa of polychaetes and 2,070 individuals. This year yielded 116 taxa and 1,779 individuals. The Wai‘anae outfall area is rich in bottom dwellers. In polluted areas these animals should be severely depressed in number of taxa and abundance. This was not the case at Wai‘anae.

Some ocean-bottom marine organisms are recognized for being more sensitive than others to certain kinds of pollution. Studies of these organisms are often used to look for possible pollution problems. None of the particular

marine organisms associated with such studies showed any signs of changes indicating any possible pollution effects from the treated effluent.

After careful analysis of all the information gathered the report concludes that, basically, there is no indication of any marked alteration of the marine-bottom community composition related to station proximity to the outfall diffuser. The analyses of all the animal groups clearly demonstrate the presence of an abundant and diverse marine community near the outfall diffuser, comparable with reference stations kilometers from the treated effluent. This biological community has remained abundant and diverse throughout all the years of study.

Contents

Figures

Tables

Appendix Tables

Introduction

The Wai‘anae Wastewater Treatment Plant (WWTP) currently operates as a secondary wastewater treatment plant (previously, until January 1996, it had operated as a primary wastewater treatment plant). Wastewaters of mainly domestic origin are treated and pumped at the plant prior to the discharge of approximately 0.14 m^3/s (3.27 mgd) of secondary treated effluent through an outfall diffuser about 1.8 km (6,000 ft) offshore at a depth of 34.1 m (112 ft).

The City and County of Honolulu (CCH) Resolution 88-515 CD 1 requests that the city establish a research and monitoring program to identify any effect(s) from the treated effluent on the environment. The U.S. Environmental Protection Agency (EPA) suggests that all dischargers of municipal wastes monitor the effects of effluents on marine biota in the vicinity of the discharge.

Results of this study were derived from samples taken in June 2010. This report incorporates the results of the past ten years of ongoing studies on the macrobenthic marine community in the vicinity of the Wai‘anae outfall diffuser. Previous studies were done near the Wai‘anae WWTP outfall diffuser annually from 1989 through 2009 (see Russo et al. 1989, 1991, 2009 for examples of earlier studies). Results of earlier studies for the years between 1991 and 2001 can be reviewed at CCH Department of Environmental Services and various Hawai‘i state offices and libraries and can be readily accessed by anyone wishing to examine them (or purchased from the Water Resources Research Center).

Project Organization

Under the general supervision of Chittaranjan Ray, Interim Director, University of Hawai‘i at Mānoa Water Resources Research Center (WRRC) and project principal investigator, the primary members of the project team and their contributions to this study are as follow:

Anthony R. Russo
Sampling design, statistics, results, and final report

Julie H. Bailey-Brock
Nonmollusk analysis (excluding crustaceans)

William J. Cooke
Crustacean analysis

Cynthis L. Hunter
Micromollusk analysis

Regina K. Kawamoto
Micromollusk analysis

Timothy Steinberger
City and County of Honolulu project representative and coordinator for dive team and oxidation-reduction potential and sediment grain-size analyses.

Materials and Methods

Sampling Stations

Specific locations of the sampling stations are shown in Figure 1 and the plan and section details of stations located in and on the boundary of the zone of initial dilution (ZID) are shown in Figure 2. Six stations were established along the 34 m diffuser isobath in 1989. The stations are located, from east to west (consistent with the generally prevailing current), as follows:

Reference (non-ZID) Station W1
Located approximately 2.5 km southeast of the outfall diffuser.

Reference (non-ZID) Station W2
Located approximately 1.0 km southeast of the diffuser.

ZID Station ZE
Located on the southeast boundary of the ZID, approximately 30 m from the diffuser.

ZID Station Z
Located in the ZID at the diffuser.

ZID Station ZW
Located approximately 60 m southwest of the diffuser.

Reference (non-ZID) Station W9
Located approximately 2.5 km northwest of the diffuser.

Station Positioning

Prior to sampling, the location of each station is determined using a Garmin differential global positioning system. After anchored floats are dropped the Oceanographic Team divers reconfirm the site locations.

Sampling Methods

The sampling methodology used in this study (including handling, processing, and preservation of samples) generally follows the guidelines of the U.S. Environmental Protection Agency (1987), hereafter referred to as EPA procedures. Some procedures differ from those recommended because of the particular nature of the Wai‘anae substratum and sediments. A standard van Veen grab sampler was deemed inappropriate for use because the study area, which has a high percentage of hard limestone bottom with only a veneer of sediment, would likely damage the sampler if it were used.

Six replicate samples of approximately 227 cm^3 each were collected at each station by Oceanographic Team divers using a corer 7.6 cm in diameter by 5 cm deep. A consistent swimming pattern was used for each sediment collection.

For each location, five cores were used for benthic-fauna and oxidation-reduction-potential (ORP) analyses and one core was used for total-organic-carbon (TOC), grain-size, and primary-pollutant analyses. Oxidation-reduction potentials were measured using an Orion ORP pH Meter Model 231 with a Redox Combination Electrode. Readings were taken on the research vessel before the cores were processed for delivery to the laboratory. Laboratory sediment analyses followed methods prescribed in *Quality assurance and quality control for 301(h) monitoring programs: Guidance on field and loaboratory methods* (U.S. EPA 1987).

Samples of this relatively small volume are considered appropriate as, based on earlier studies around outfall diffusers in Hawai‘i, the benthic fauna in the nearshore region of Hawai‘i is known to be both very abundant and small in size (Nelson 1986, Russo et al. 1989). Replicated samples at each station, rather than replicated subsamples from one sample, were taken to provide information on intra-station variability.

Sample Processing

For the arthropods, micromollusks, polychaetes, and miscellaneous other taxa a variety of keys and taxonomic references were used. These references include Barrett and Bailey-Brock (2005), Bailey-Brock et al. (2003), Bailey-Brock et al. (2002), Salazar-Vallejo et al. (2007), others listed in Appendix Table G in

Nelson et al. (1987), and additional publications cited in this report.

Nonmollusks

The nonmolluscan samples were preserved in individual containers in buffered 10% formalin for 48 h or more. In the laboratory each sample was washed with freshwater through a 0.5 mm mesh screen.

At some stations sediments contained large calcium carbonate fragments. To remove these fragments the sediment was placed in a large rectangular enamel pan. The large fragments were then removed by a technician and visually examined individually and hand-processed to ensure that any external clinging organisms were removed. The fragments were then placed in a nitric acid bath for 24 h or longer to dissolve the carbonate fraction so that organisms living in burrows could be recovered. The acid-dissolution techniques used are detailed in Brock and Brock (1977).

After the removal of large calcium carbonate fragments the remaining sediment was elutriated with freshwater following the procedures of Sanders et al. (1965). The elutriate was poured through the 0.5 mm screen and recovered organisms were transferred to individual containers of 70% ethanol stained with rose bengal for storage and later sorting.

Samples were examined under a dissecting microscope and all nonmolluscan organisms were removed with forceps and grouped by phylum in vials of 70% ethanol. Arthropods were given to the appropriate taxonomic experts on the study team. All organisms were counted and then identified to the lowest taxonomic level possible using compound and dissecting microscopes and taxonomic keys.

The residue from the nitric acid bath was washed with freshwater through a 0.5 mm screen to remove the acid solution and placed in 70% ethanol stained with rose bengal. The residue was sorted under a dissecting microscope to remove all cryptofaunal organisms, previously embedded in the calcium carbonate, which had been retained on the screen. The organisms were processed as above and specimens were given to the appropriate specialists on the study team. Organisms were identified to the species level when possible. Individuals recovered from the two fractions of the sample were treated together in the analyses.

Mollusks

The micromollusks were processed as has been described in Kay (1982). The separate micromollusk sediment samples collected by the CCH Oceanographic Team divers were placed in labeled jars in the field and the jars were then packed in ice and transported to the laboratory where they were refrigerated. Samples were fixed in 95% ethyl alcohol for 48 h (during which two changes of fresh alcohol were made) and then air dried. A 25 cm^3 aliquot was removed from each sample and put through a sieve series (U.S.A. Standard Testing Sieve: #20, 40, and 50) to ease sorting.

Aliquots were sorted for micromollusks under a binocular dissecting microscope. Only fresh-looking shells (more than 60% intact with a shiny surface and good color) were selected. These were identified to the lowest taxonomic level possible using Beesley et al. (1998), Kay (1975, 1978, 1979, 1982), Kay and Kawamoto (1980, 1983), Nelson (1986), and Russo et al. (1989) and then counted. All micromollusk specimens will be archived and maintained for six years at the University of Hawaiʻi.

Data Analysis

All data were tested for normality (Kolmogorov-Smirnov test) and for homogeneity of variances (F_{max} test) prior to statistical analysis (Sokal and Rohlf 1995). If the F_{max} test was significant the data were transformed using a double-square-root or $\log_{10}$ transformation.

Comparisons of stations were made using a one-way analysis of variance (ANOVA). Following the ANOVA, the à posteriori Tukey-Kramer test was used to determine which means were significantly different. All tables and figures reflect analysis on untransformed data except where specific transformations are noted.

The Shannon-Wiener diversity index (H') and the evenness index (J) were computed for all stations for both the mollusk and nonmollusk fractions (Pielou 1984). Overall comparisons of both mollusk and nonmollusk taxa composition among stations are presented as dendrograms made on untransformed data using Euclidean distance in cluster analysis (Dietz 1983, McArtle and Anderson 2001). Multivariate techniques were developed in the software "JMP IN" cluster program (SAS Institute Inc. 1985).

To examine trends over a ten-year period (2001–2010), comparisons were made of mean values (abundance and taxa richness) among all sampling stations and all sampling dates using two-way ANOVA and à posteriori Tukey-Kramer tests.

Findings

Sediment Parameters

Results of sediment grain-size analysis are given in Appendix Table A.1. Grain-size classes (Folk 1968) included: medium and coarse sand retained on a +2 phi sieve, fine sand passed through a +2 phi sieve but retained on a +4 sieve, and silt and clay passed through a +4 sieve.

Sediments taken at all sampling stations in the vicinity of the Wai'anae outfall diffuser had >90% sand (coarse, medium, and fine) (Appendix Table A.2). Sediments at stations Z, W2, ZW, and W1 consisted of a high percentage of coarse and medium sand (79.3%, 75.3%, 73.6%, and 68.4%, respectively).

There were no major shifts in the sediment sand fractions from 2009 to 2010 except at stations ZE and W9. The coarse-and-medium sand fractions decreased significantly at station ZE from 62.8% to 29.2% and at station W9 from 76.2% to 57.7% from 2009 to 2010 (Appendix Table A.2). There was no consistent gradient or pattern of grain sizes to suggest any effect from treated effluent discharged from the outfall diffuser.

There was very little (<4.5%) silt fraction—the sediment that usually indicates effluent impact from fine particulates—at all stations (Figure 3). More detailed analysis of the ocean-bottom hydrodynamics would be necessary to better explain year-to-year shifts in sediment fractions.

The analytical results for total volatile solids (TVS), a measure of sediment organic load, showed no indication of a reducing environment in the vicinity of the outfall diffuser. TVS values were in the nonreducing range (no greater than 6.1%). TOC values were also in the nonreducing range (Appendix Table A.3).

The ORP readings, which were all positive, also indicated a nonreducing sedimentary environment (Appendix Table A.4). Because measurements were made on disturbed cores an interpretation of the results in terms of absolute oxygen available to the infauna was difficult. Nonetheless, on a relative basis using EPA procedures, there was no evidence that sediments became more reducing as they came closer to the outfall diffuser. There has been no indication of the existence of anomalously high rates of flow or abnormal effluent chemical conditions since discharge began at the diffuser of the extended outfall. Effluent flow rate and chemical data for 2001 through 2010 are provided in Appendix Table A.5. There were no major differences between 2009 and 2010 values.

Biological Parameters

Total Nonmollusk Component

The nonmolluscan fraction of the benthic fauna included anthozoans, bryozoans, a cephalochordate species, a chaetognath species, echinoderms, a kinorhynch species, nematodes, nemerteans, oligochaetes, phoronids, platyhelminths, polychaetes, a poriferan, priapulids, sipunculans, and a urochordate species. Also collected were amphipods,

copepods, cumaceans, decapods, isopods, a mysid, ostracods, pycnogonids, and tanaids. For a list of all nonmolluscan taxa collected this year see Appendix Tables D.1 through D.12.

The 5,423 nonmollusk specimens counted and identified for all stations and replicates represent 206 taxa. Nematodes (1,269) and oligochaetes (405) were fairly abundant this year representing approximately 23.4% and 7.5%, respectively, of all nonmollusks collected. Copepods were most abundant last year at station ZE while in 2010 they were most abundant at station W1. They decreased in abundance from 2009 to 2010 (from 557 to 243). Polychaetes were abundant (1,779 individuals, 32.8% of the total nonmollusk abundance). Polychaete taxa richness was 116 (up from 107 taxa in 2009), representing over 56% of all nonmollusk taxa identified. Crustaceans (including copepods) contributed 24.3% (1,320 individuals) of numerical abundance. The 67 crustacean taxa, most of which were decapod crustaceans, represented 32.5% of the total number of nonmollusk taxa.

Mean nonmollusk abundance ranged from 54.0 individuals per sample at station Z (11,880/m^2) to 242.0 individuals per sample at station W2 (53,240/m^2) (Figure 4).

According to the ANOVA on untransformed data there was a significant difference in means among stations (Appendix Table B.1). Station W2 was higher in mean abundance than stations W9, ZE, and Z. Station W1 had significantly higher abundance than stations ZE and Z. All other stations were not significantly different in abundance.

Mean number of nonmollusk taxa per sample ranged from 21.7 taxa (at station ZE) to 56.0 taxa (at station W2) (Figure 5). According to the ANOVA on untransformed data there were significant differences in the mean number of nonmollusk taxa among stations. Station W2 was significantly higher than Z, ZW, ZE, and W9 (Appendix Table B.2). Station W1 was higher in mean taxa richness than the ZID stations Z, ZE, and ZW, which themselves did not differ in mean richness. Nonmollusk abundance and taxa richness values for years 2001 through 2010 are shown in Table 1.

Nonmollusk diversity (Figure 6) ranged from 2.49 at station ZE to 3.39 at station W9. Evenness (Figure 7) ranged from 0.65 at station ZE to 0.81 at station W9. Stations W1 and ZE were the most dissimilar in taxa composition; stations Z and ZW were most similar. Station Z was also very similar in taxa composition with station W9. Clustering of sampling stations for similarity of nonmollusk taxa composition is shown in Figure 8.

Polychaetes

The 2010 polychaete abundance (1,779) is lower than that recorded in 2009 (2,070) while the number of taxa is higher (116 vs. 107 taxa) (Russo et al. 2009).

The mean number of polychaetes ranged from 23.0 individuals at station Z to 87.7 individuals at station W2 (Figure 9). Mean number of taxa ranged from 10.3 at station ZE to 28.3 to station W2 (Figure 10). Polychaetes were the most taxa-rich nonmollusk group at all stations.

The syllid *Pionosyllis heterocirrata* has been consistently dominant at both ZID and non-ZID stations from year to year. The hesionid *Micropodarke* sp. A and the sabellid *Fabricia* sp. A were also abundant, especially at stations ZW and W2, respectively.

Polychaete individuals constituted a dominant component of the nonmollusks at all stations. Abundance, community structure, and taxa richness of the various invertebrate groups may be affected by the rubble component of the benthic samples. For example there are more cryptic niches, and thus opportunities for bioeroders to form burrows in coral rubble, when larger fragments are present (Dutch 1988). The age of the rubble is also a factor in structuring the community that develops in this type of sediment grain-size regime. Disturbance of the rubble, by storms or by burrowing activities of other reef inhabitants, is yet another factor in structuring the community that develops within coral rubble (Sousa 1979, Brock and Smith 1983, Dutch 1988).

From the larger calcium carbonate fragments treated with the nitric acid bath, polychaetes were found at all six stations. Twenty taxa were found exclusively amongst the cryptofauna.

Polychaete reproductive activity was observed at all stations. Evidence of reproduction (copulatory hooks, enlarged eyes, natatory chaetae, presence of eggs in the coelom, and/or attached embryos or stolons) was found in many specimens. Individuals of *Pionosyllis heterocirrata* displaying reproductive characteristics were found at all stations.

Six polychaete taxa were newly found in the Waiʻanae ocean outfall study area this year. Five of the polychaetes: Hesionidae sp. B, *Josephella marenzelleri*, *Micropodarke* sp. B, *Sigalion* sp. A, and Sigalionidae sp. A, had been previously found in collections from the Sand Island and Barbers Point ocean outfall study areas as well as in the collection from the regional monitoring station in Māmala Bay (Swartz et al. 2002). The polychaete *Spirorbis* sp. is new to the outfall study (Bailey-Brock 1987). The species *Protodrilus* sp. A has been renamed *Protodrilus albicans* (Bailey-Brock et al. 2010).

Trophic categories. Based on Fauchald and Jumars (1979), four broad feeding categories were used to classify the polychaetes in this study: 1) suspension feeders, those which filter particles from the surrounding water; 2) detritivores, those which feed on organic material on the ocean bottom; 3) carnivores, those which feed on other animals; and 4) omnivores, those which feed on a variety of food items.

Suspension feeders were relatively minor components of the benthic infaunal community at most stations and represented the smallest percentage of polychaete individuals among the four trophic categories except at station W2 where they were the most abundant trophic category. They were the least taxa-rich category at all stations except station ZW.

Deposit-feeding detritivorous polychaetes were the most abundant of the four trophic categories at stations Z and W9 but were never the least abundant at any station. Detritivores were the most taxa-rich category at all stations.

Carnivorous polychaetes were the most abundant trophic category at station ZW, but were never the most taxa-rich at any station.

Omnivorous polychaetes were the most abundant trophic category at stations W1 and ZE and least abundant at station W2. Omnivores were the least taxa-rich trophic category at station ZW. The omnivore *Pionosyllis heterocirrata* was the dominant polychaete at most stations.

Motility categories. Again based on Fauchald and Jumars (1979), three motility categories were used to classify the polychaetes in this study: 1) motile, those polychaetes that do not form tubes; 2) discretely motile, those polychaetes that may form tubes or occupy burrows that can be vacated and new ones formed or located when conditions in the environment change—for example when they become smothered by sediment, disoriented by water motion, or disturbed by the burrowing activities of other organisms; and 3) tubicolous, those polychaetes that build tubes of calcium carbonate or sediment and typically do not leave these tubes.

Motile polychaetes were the most abundant and speciose category at all stations. The syllid *Pionosyllis heterocirrata* was the most dominant polychaete of the entire study area. Other abundant motile polychaetes were *Hesionura australiensis*, *Litocorsa acuminata*, *Micropodarke* sp. A, *Pisione* sp. A, and *Protodorvillea biarticulata*.

Discretely motile polychaetes were found in medium abundance at all stations except W2 and W9, where they were the least abundant; they were never the most or least taxa rich. The most abundant discretely motile polychaetes in this sample were the spionids *Laonice cirrata*, *Prionospio cirrifera*, *Prionospio steenstrupi*, and *Scolelepis victoriensis*. The eunicid *Nematonereis unicornis* was also abundant.

Tubicolous polychaetes were the least abundant at stations W1, ZE, Z, and ZW. Tubicolous polychaetes were the least taxa rich

at all stations. Tubicolous polychaetes encompass an ecologically influential category that includes all the suspension feeders (e.g., families Sabellidae and Serpulidae) and some deposit feeders (e.g., families Maldanidae and Oweniidae). Abundant in this sample were the sabellids *Amphiglena mediterranea*, *Euchone* sp. B, and *Fabricia* sp. A. The maldanid *Rhodine* sp. A and the oweniid *Myriochele oculata* were also abundant. For total polychaete abundance and taxa richness over the years of study (2001–2010) see Table 2.

Crustaceans

A total of 1,320 crustacean and other arthropod individuals representing 67 taxa were recorded in 2010 whereas in 2009 a total of 1,501 crustaceans and other arthropod individuals representing 61 taxa (including copepods as a single taxonomic group) were collected. Copepod abundance was 243 individuals.

Mean abundance (no./sample) ranged from 5.33 individuals per sample (1,173/m^2, at station Z) to 82.5 individuals per sample (18,150/m^2, at station W2) (Figure 11). Station Z was significantly lower in abundance than all other stations (Appendix Table B.3). Two dominant fauna, in terms of total individuals over the study area, were the isopod *Munna acarina* and the tanaid *Leptochelia dubia*. As a group, amphipods represented >15% of total crustaceans. Dominant amphipod species were *Ceradocas hawaiiensis*, *Eriopisella sechellensis*, *Konatopus paao*, and *Seba ekupuu*.

Mean number of crustacean taxa ranged from 3.83 (at station Z) to 18.0 (at station W2) (Figure 12). ANOVA indicated significant differences in mean number of taxa; station W2 was significantly higher in taxa richness than stations W9, Z, and ZE. (Appendix Table B.4).

In 2010 two new crustacean taxa were collected. A single specimen of a colorful podocopid ostracod tentatively identified as *Anchistrocheles* (?) sp. A. was collected at station W2. This ostracod appeared similar to *Anchistrocheles fumata* (Holden 1967) but since Holden provided no color notes for his live material a definitive identification cannot be made. A single specimen of the tanaid *Parapseudes pedispinus* (?) was also collected at station W2. *Parapseudes pedispinus* (?) had been collected before in at the Sand Island study area and may have been lumped within *Apseudes tropicalis* counts in earlier years. These two specimens (out of the 1,077) hardly represent any significant shift in the study area's overall crustacean community. The collection of these two taxa suggests that benthic collections, sample processing, and specimen recovery remain efficient in sampling the composition of the overall crustacean community. Apparently variations in conditions at both control and outfall stations does allow for the collection of somewhat rarer members of the crustacean community.

The actual diversity of the crustacean community present in the study area would be expected to be higher than the value reported here. Copepods, cumaceans, and mysids are not specifically identified and several taxa of each group are almost certainly present. In general the Wai'anae outfall diffuser study area remains more diverse than the somewhat deeper Honouliuli WWTP outfall diffuser study area and the much deeper Sand Island WWTP outfall diffuser study area.

It should also be noted that, given the small areal coverage (7.6 cm diameter) of the sampling replicates, larger (2 cm and up) shrimps and crabs have very low probabilities of being collected (Rathbun 1906). Nevertheless the collection of seventeen decapod taxa suggests that these decapod taxa are reasonably widespread across the study area. However, as Norling et al. (2007) have demonstrated, sometimes a particular decapod species' specific traits may override simple taxa richness in defining important ecosystem properties and functions in benthic environments. Particularly for station Z it would be interesting to see, through a different sampling scheme, if some of the locally common decapods are truly missing from outfall-diffuser-influenced stations.

For total crustacean abundance and taxa richness at each station for years 2001–2010 see Table 3. ANOVA of mean nonmollusk

abundance and mean taxa richness for stations versus years of study are shown in Appendix Tables B.5 and B.6.

Mollusks

A total of 15,507 mollusks representing 219 taxa were collected in 2010; in 2009 12,389 individuals and 209 taxa were recorded. Mean abundance of mollusks per sample (no./25 cm^3) ranged from 365.0 (at station W1) to 550.5 (at station ZW) (Figure 13). There were no significant differences in mean mollusk abundance (log_{10} transformed) among stations (ANOVA, Appendix Table C.1).

Mean number of mollusk taxa per sample ranged from 47.3 (at station W1) to 67.7 (at station ZW) (Figure 14). There were significant differences in mean mollusk taxa numbers among stations (ANOVA, Appendix Table C.2). Station W1 was significantly lower in taxa than all other stations. Stations W2, W9, ZE, Z, and ZW did not differ in taxa richness.

Mollusk diversity (H') ranged from 2.88 (at station W9) to 3.25 (at station ZE) (Figure 15). Evenness (J) ranged from 0.60 (at station W1) to 0.74 at station ZE (Figure 16). Diversity and evenness values for mollusks were generally similar for all stations.

Cluster analysis showed that stations Z and ZE were most similar to one another in mollusk taxa composition. Stations W1 and ZE were most dissimilar (Figure 17).

As in previous years, the gastropod *Cerithidium perparvulum* was very abundant in 2010. Other abundant species were *Caecum arcuatum*, *Cerithidium diplax*, *Diala semistriata*, *Lophocochlias minutissimus*, *Parashiela beetsi*, *Pusillina marmorata*, *Rissoina pulchella*, *Scaliola* spp., *Schwartziella ephamilla*, *Tricolia variabilis*, and *Triphora* spp. Gastropods represented >90% of the total abundance of mollusks. Mean mollusk abundance and taxa richness data over years 2001–2010 are shown in Table 4. The ANOVA of mollusks (both abundance and taxa richness) for stations versus years is shown in Appendix Tables C.3 and C.4.

Four new mollusk taxa were identified: a species of the family Ancylidae (Stanisic 1998) and the species *Cancilla carnicolor*, *Polinices tumidus*, and *Zebina tridentata* (Kay 1979).

Pattern of Mean Abundance and Taxa Richness

In 2010 the pattern of mean abundance among stations showed that mollusks were consistently higher in abundance over all stations than nonmollusks (Figure 18). Both mollusks and nonmollusks showed dips in abundance at station Z.

Mean taxa richness of mollusks was consistently higher than mean taxa richness of nonmollusks at all stations (Figure 19).

When data were averaged according to ZID and non-ZID station groups, mean nonmollusk abundance for both groups did not differ significantly over the years of study except in 2008 (Figure 20). Abundances of nonmollusks (especially copepods) were very high in 2008 and most were found at non-ZID stations W1 and W9. It is still unclear why, in 2008, these nonmollusks were so abundant.

Mean nonmollusk taxa richness for both ZID and non-ZID station groups did not differ very much from year to year until 2006 when taxa richness became higher for the non-ZID station group and remained higher through 2010 (Figure 21). Averaged over ten years of study (2001–2010), there were no statistically significant ($P>0.05$) differences in mean nonmollusk abundance among stations (Figure 22). When mean abundance was averaged over all stations for all years there were no significant differences among the years of study, except in 2008, when abundance was significantly higher (Figure 23).

Mean nonmollusk taxa richness differed significantly among years and among stations. Averaged over ten years of study, station W2 was significantly higher than all other stations (Figure 24). Averaged over all stations, for years 2001–2010, 2004 was the lowest in taxa richness and 2008 was the highest (Figure 25).

There were significant differences in mean mollusk abundance among stations when

averaged over ten years of study. Station W9 was significantly highest in mean abundance of all stations; station W2 was lowest (Figure 26). Averaged over all stations, there were significant differences in mean mollusk abundance among the years of study. The highest mean abundance occurred in 2004 (Figure 27).

Mean mollusk taxa richness differed significantly among stations and among years. Averaged over ten years of study, stations ZE, ZW, and W9 were higher in mean number of mollusk taxa than all other stations (Figure 28). Mean mollusk taxa richness, averaged over a ten-year period, was highest this year (2010) and lowest in 2008 (Figure 29). Mean taxa richness for 2010 (61.5) rose significantly from 2009 (49.0) levels.

Complete and detailed taxa lists of abundances for all nonmollusk and mollusk taxa are shown in Appendices D and E respectively.

Discussion

Community Structure

In 2010 there were 5,423 nonmollusks representing 206 taxa reported. In 2009, there were 5,801 individuals reported representing 192 taxa. Characteristic of sedimentary environments around O‘ahu (Nelson 1986, Nelson et al. 1987, Russo et al. 1989), the sediments around the Wai‘anae outfall diffuser were consistently rich in nematode, oligochaete, and polychaete taxa over the 2001–2010 years of sampling.

In 2010 polychaete abundance decreased from 2009 values but taxa richness increased in 2010. This year (2010) polychaetes made up approximately 32.8% of the total benthic nonmolluscan fauna. Crustaceans (including copepods), kinorhynchs, nematodes, nemerteans, oligochaetes, and sipunculans were fairly abundant and made up the remaining nonmollusk fauna. Polychaetes have been the dominant faunal group in the nonmollusk category for most sampling years.

In 2010 nonmollusks were most diverse at stations W1, W2, and W9. Diversity was lowest at ZID station ZE. Overall, mean diversity of the three ZID stations (2.84), taken as a group, was lower than that of the three non-ZID stations (3.24)—however, the difference was not statistically significant (t-test; $P>0.05$).

Benthic crustacean samples taken in 2010 from the Wai‘anae wastewater treatment plant (WWTP) outfall study area remained very diverse, in terms of taxa collected, when compared to the previous twenty years of sampling. This year’s collection of 66 discrete non-copepod taxa (acari, crustaceans, and pycnogonids) collected across the study area is very much above the average recovery of 52 taxa (1990–2009 mean). This south O‘ahu reef slope crustacean community remains dominated by the smaller crustacean forms (amphipods, copepods, isopods, ostracods, and tanaids) (Barnard 1970), with scattered collections of small decapods.

Tracking with the higher diversity, non-copepod crustacean abundance in 2010 was reasonably high, with 1,077 non-copepod specimens recovered (compared to 944 in 2000), well above typical collections of approximately 700 non-copepod specimens. In contrast, in 2002 only 447 non-copepod specimens were collected across the entire outfall study area. However compared to 2008 when 2,559 copepod specimens were recovered, a more normal 243 copepods were collected in these 2010 samples. This overall high diversity, and the large number of specimens collected, allowed a clear comparison between the sampling stations. In comparing the differences between stations, outfall station Z has often been both depauperate and less diverse than the other study area stations, and this remained true in 2010. In 2010 station Z had only 27 specimens of sixteen non-copepod taxa, significantly more diverse than in 2007 (when only eight non-

copepod taxa were collected), but still the least diverse of the six stations. The lack of non-copepod diversity seen at outfall stations Z and ZE is not seen across all outfall stations, with outfall station ZW having the second highest diversity with thirty-three non-copepod taxa.

Taxonomic diversity (expressed here simply as the number of discreetly recorded taxa) may be considered to be a better measure of the state of the crustacean communities at these stations than the abundance data. For the smaller crustaceans (amphipods, isopods, and tanaids) and pycnogonids, abundances can be strongly influenced by large numbers of juveniles released from brooding adults—even if only a few species find the conditions appropriate. This is in contrast to most marine invertebrates (many decapods, mollusks, most polychaetes, etc.) where abundance represents settlement from the plankton of a range of larvae that have found the site suitable for settlement. While high crustacean abundances (particularly if brooding juveniles are being produced) clearly indicate a site is suitable for that species; low abundance data is not necessarily indicative of unsuitability, particularly if a diverse fauna is present. This lack of abundance "symmetry" can easily confound simple statistical analysis of abundance data.

Additional Observations

In 2010 a total (nonmollusks plus mollusks) of 20,930 benthic fauna, representing 425 taxa, were collected over all stations near the Wai'anae outfall diffuser. Last year 18,190 benthic fauna representing 401 taxa were recorded.

For the ten years of benthic sampling there was no grouping of stations, for both mollusks and nonmollusks, indicating a significant dichotomy of less-diverse ZID stations and more-diverse non-ZID stations.

In 2010 the difference between nonmollusk abundance for ZID vs. non-ZID groups increased over the 2009 difference. For all years except 2007, non-ZID values were higher than ZID values for abundance. Non-ZID group mean nonmollusk taxa richness has also been consistently, but not significantly, higher over the years than ZID group values.

There was no indication that benthic taxa richness was related to outfall diffuser location. Theoretically any negative effect from the treated effluent should dramatically reduce taxa richness. Taxa richness is a better estimator of community stability than abundance because natural fluctuations between years can significantly alter the number of individuals.

The lower nonmollusk abundance and taxa richness in 2004, as compared to other years, as well as the lower ZID-station versus non-ZID-station diversity, may indicate a poor year of reproduction. In 2005 through 2010 nonmollusk abundance and taxa richness were higher than in 2004 and these were obviously better reproductive years. For all years except 2008 and 2010, the average values of abundance, taxa richness, diversity index, and evenness for ZID-stations vs. non-ZID-stations did not differ significantly.

There was no correlation between changes in the 2009 and 2010 benthic biological parameters and the physical and chemical parameters of the treated effluent for those years. Annual effluent flow rates and chemical parameters were essentially not different between these years.

Monthly records show no anomalous changes in parameters from month to month. The sediments were clean; total organic carbon and total volatile solids were low and within background levels. ORP values were positive and within a nonreducing range.

Sediment characteristics were also not significantly different between 2009 and 2010, except at station ZE, where a significant increase in medium sand was seen in 2010; most of the sediments were medium and fine sands. Silt fractions remained fairly close between years 2009 and 2010.

The patterns of abundance, distribution, and taxa richness of the benthic fauna, both temporally and spatially, did not indicate any negative effects from the treated effluent, especially according to the model of Pearson and Rosenberg (1978), affecting the marine

communities in the vicinity of the Wai‘anae outfall diffuser. The Pearson and Rosenberg model (1978) predicts a sharp decrease in taxa richness and a large increase in a few pollution-tolerant taxa in the ZID when there is a significant pollution problem. It should be pointed out that the Pearson/Rosenberg model was developed from temperate zone data that is a much different biotope than Hawai‘i. In a heavily polluted environment this model probably holds for all biotopes. It is in the light-to-medium-stressed areas where caution should be taken when evoking this model.

This pattern was not seen in 2010 or in the prior sampling years at Wai‘anae. There were no large increases in abundance of taxa considered to be “indicators” of pollution. Diversity parameters did not differ greatly among stations or among years of study. Sediments were clean, oxidation-reduction potentials were positive, total organic carbon was low, and total volatile solids were no more than 4% for all years. Thus, based on annual monitoring data for this 2001–2010 study, there is no indication that treated effluent discharged from the Wai‘anae outfall diffuser affects the indigenous biological populations at the sampling stations.

Summary and Conclusions

Based on available data, using tests recommended by EPA for sediment analysis, there is no evidence that secondary treated effluent from the outfall diffuser of the Wai‘anae WWTP ocean outfall is affecting the benthic faunal community in the vicinity of the effluent discharge. Sediments were similar at all stations and all stations had >90% sand substrate. There was no buildup of organic matter and all indications are that the sediments are nonreducing.

There was no pattern of abundance or diversity that indicated the treated effluent had a differential effect on stations closest to the outfall diffuser. The dominant taxa for both components (i.e., mollusks and nonmollusks) of the benthos were seen consistently over all the years of study, albeit with differing relative abundances. Diversity was high at all stations for both mollusk and nonmollusk fauna.

In 2010 there was no dichotomy in grouping of stations by taxonomic similarity for mollusks between ZID stations and non-ZID stations; nonmollusks also showed no such dichotomy. From 2001 through 2010 no dichotomy was seen in either faunal component, except in 2008 for the nonmollusks. In 2008 both mean nonmollusk abundance and taxa richness were higher for non-ZID stations than for the ZID group; in 2009 and 2010 the differences were statistically nonsignificant.

This nonmollusk ZID vs. non-ZID dichotomy will continue to be monitored from year to year. Differences between ZID and non-ZID station groups may reflect changes in the sedimentary environment (e.g., grain size) caused by bottom hydrodynamics that may demonstrate differential food/spatial availability and may be independent of outfall diffuser effects. We continue to see high diversity and abundances at all stations. There have been, over the years, no precipitous reductions in diversity (diversity index, equitability, taxa richness, etc.) in the ZID group vs. the non-ZID group.

In 2010, as in earlier sampling years, there was no overall indication of an interaction of treated effluent with the indigenous benthic community near the Wai‘anae WWTP outfall diffuser. The sediments continue to reflect a clean, biologically-rich, and non-reducing environment. Over all the years of study there is no indication that the stations monitored have been affected by the treated effluent discharged from the outfall diffuser.

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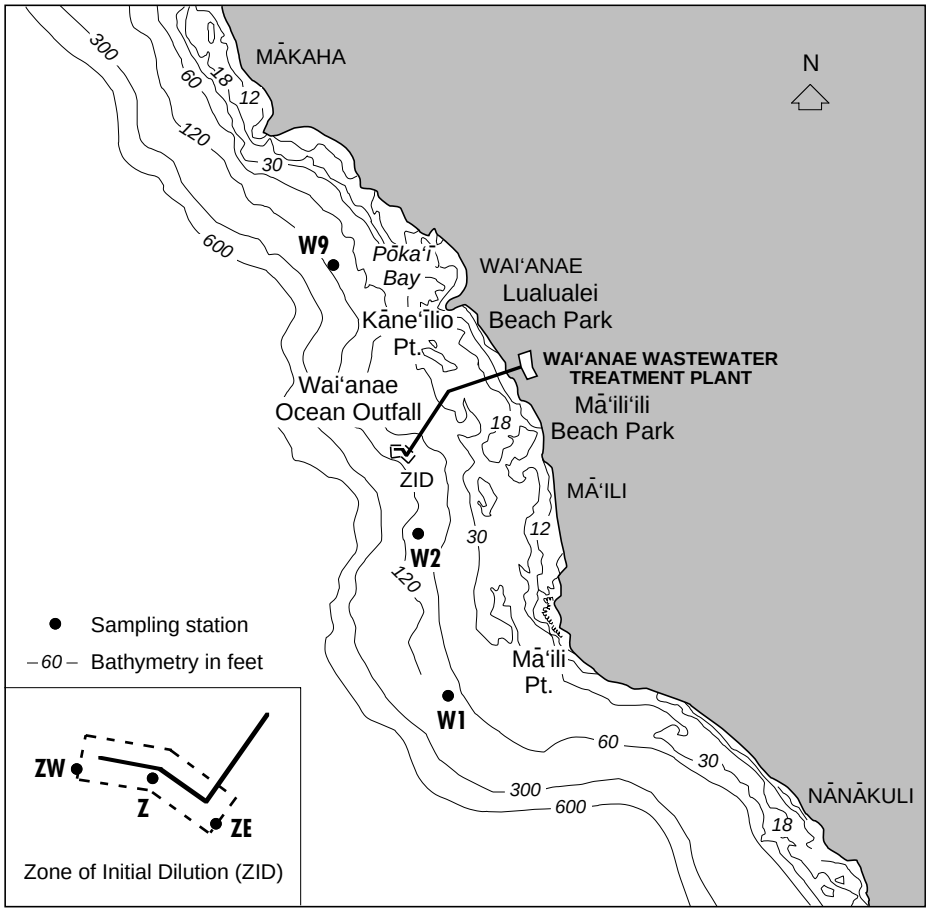
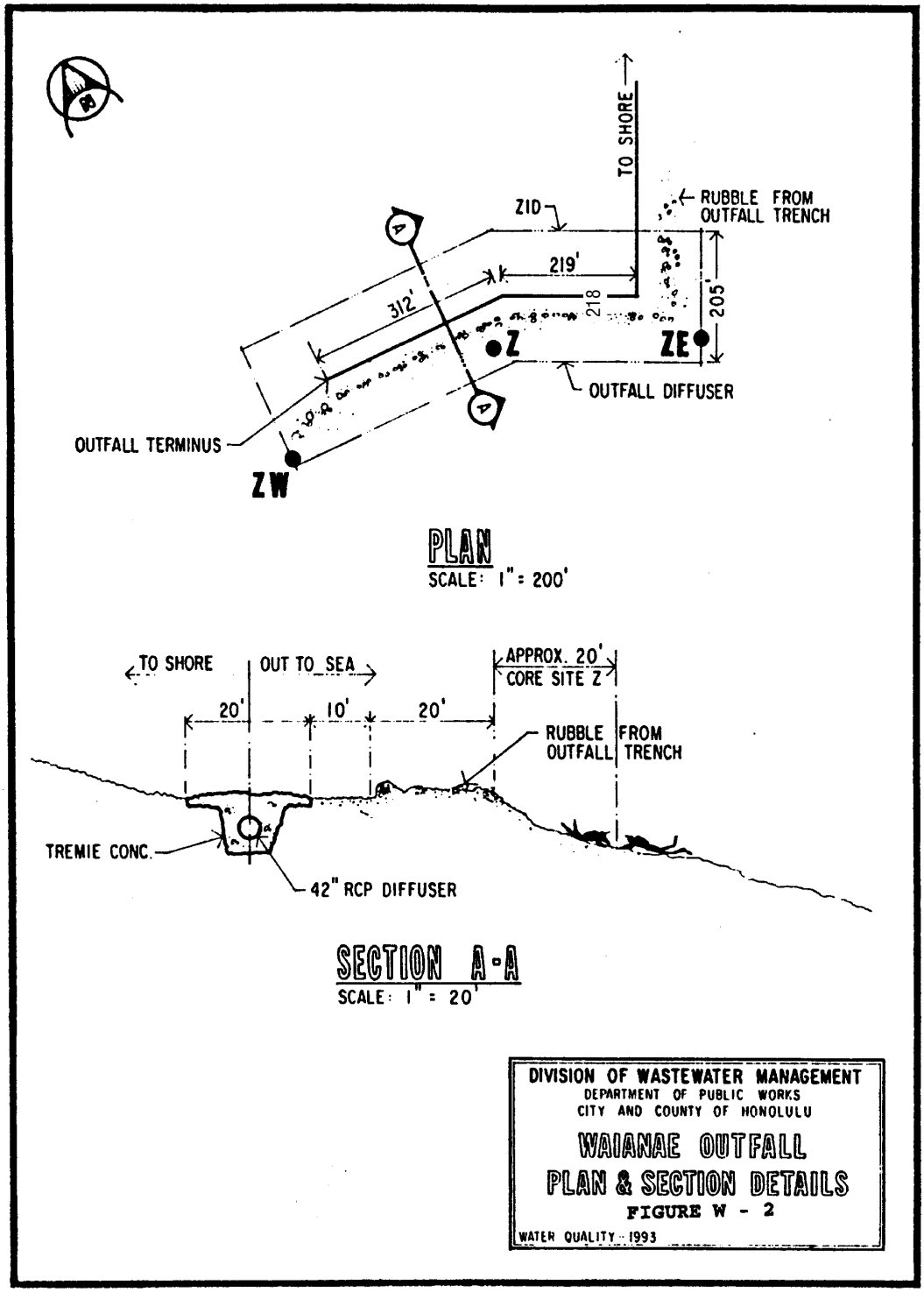
Figures



From Russo et al. (1989)

Figure 1. Benthic sampling stations, Wai‘anae ocean outfall, O‘ahu, Hawai‘i



Courtesy of City and County of Honolulu Department of Wastewater Management (1993)

Figure 2. Plan and section details of sampling stations located in and on the boundary of the zone of initial dilution, Wai‘anae ocean outfall, O‘ahu, Hawai‘i

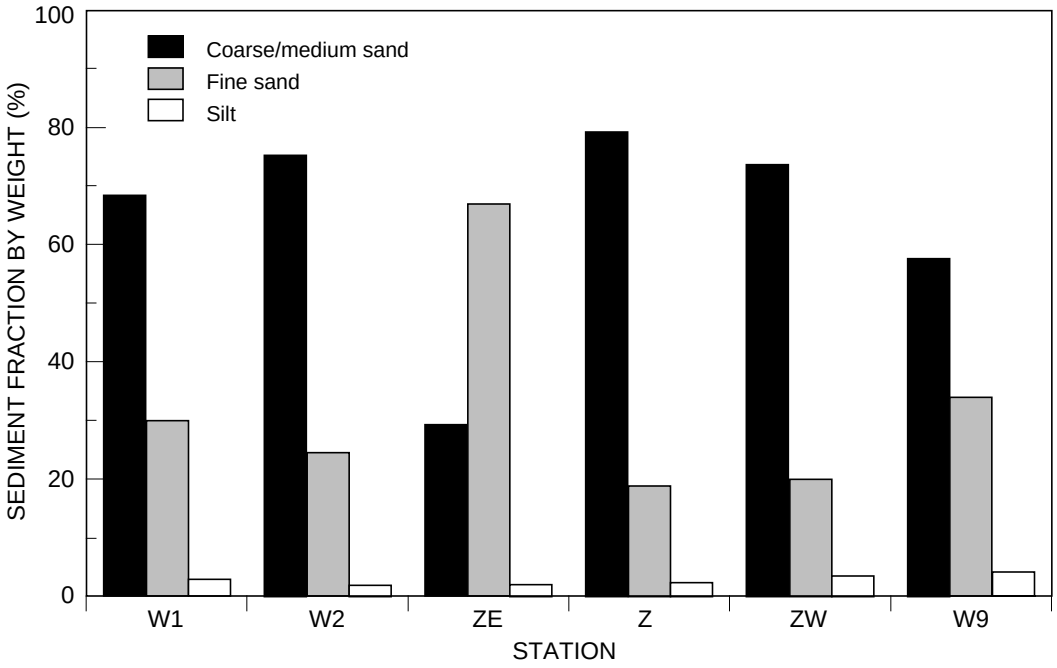


Figure 3. Percent sediment fraction (by weight), Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

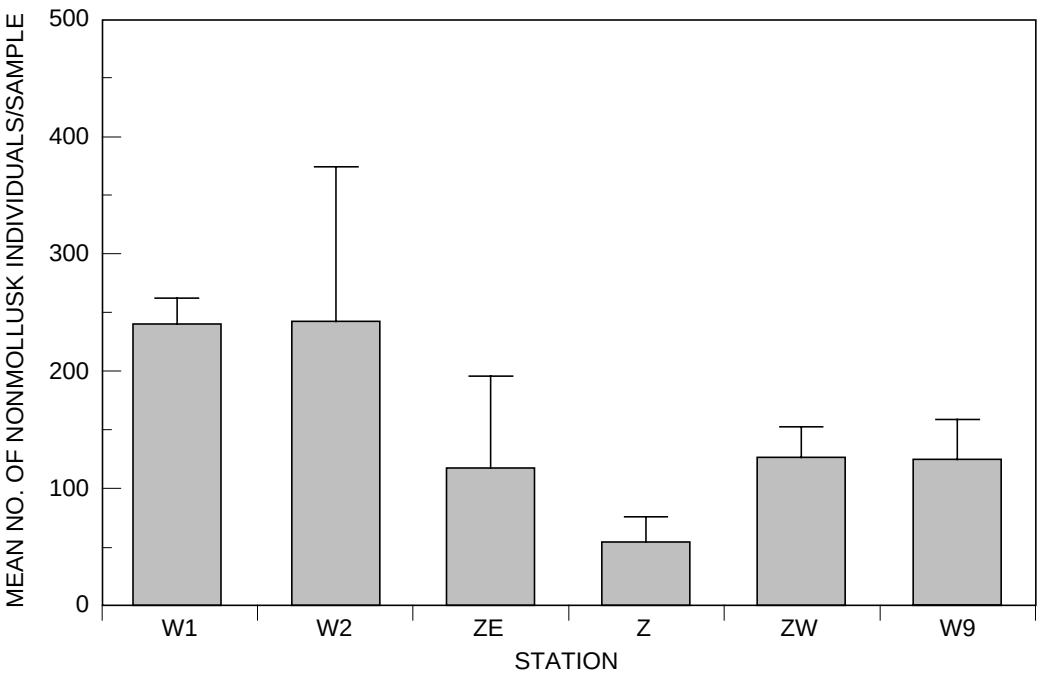


Figure 4. Mean (+1 SD) number of nonmollusk individuals per sample, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010

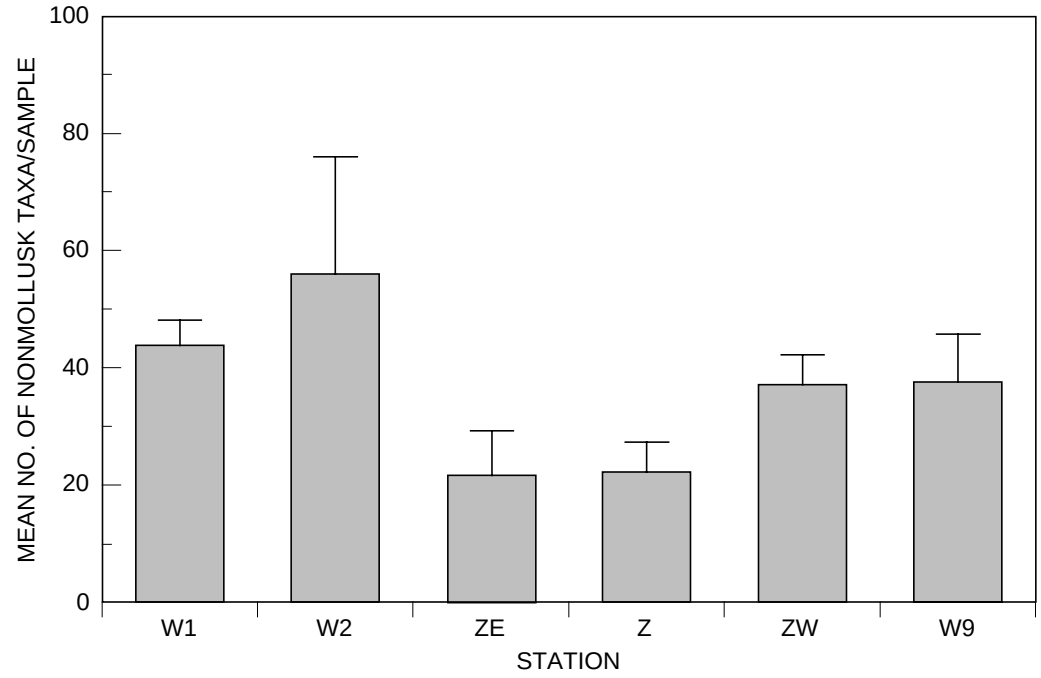


Figure 5. Mean (+1 SD) number of nonmollusk taxa per sample, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010

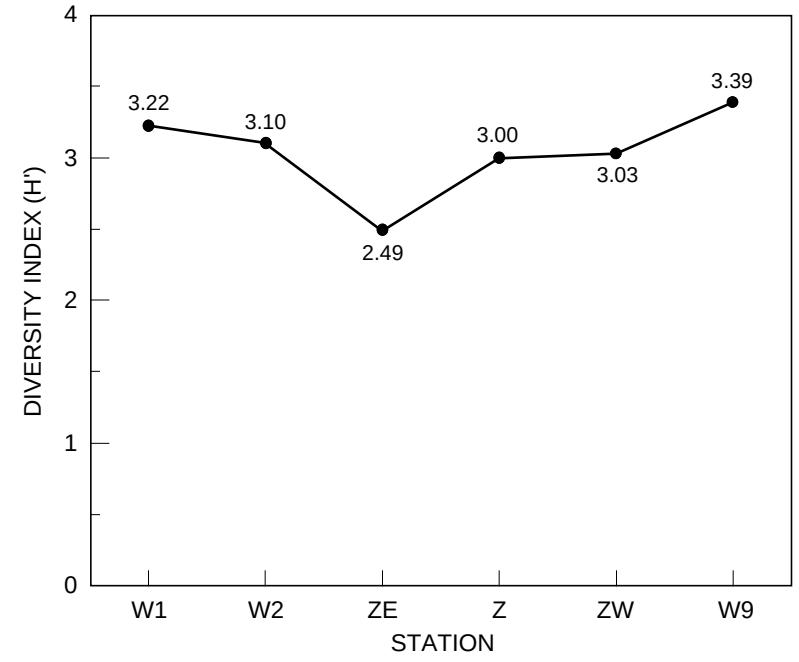


Figure 6. Shannon-Wiener diversity index (H') for nonmollusks, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

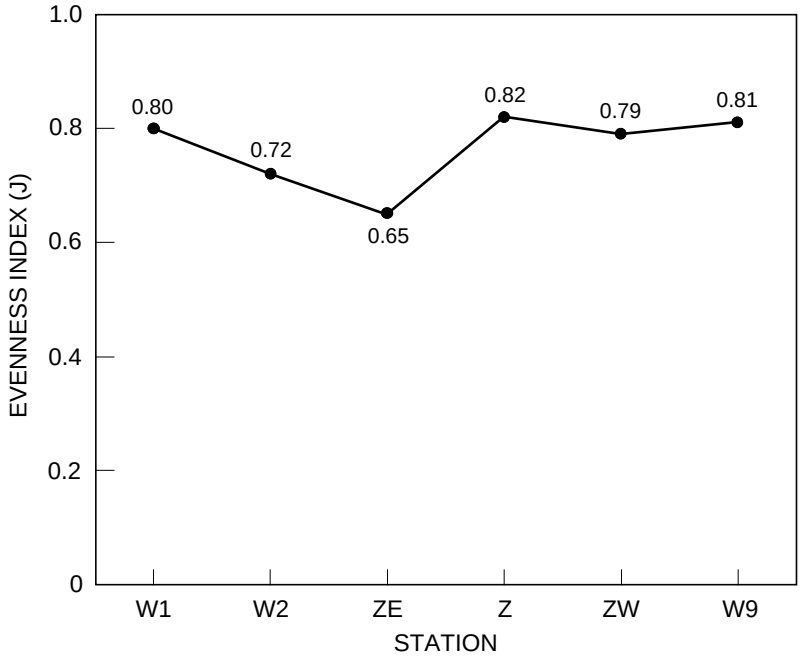
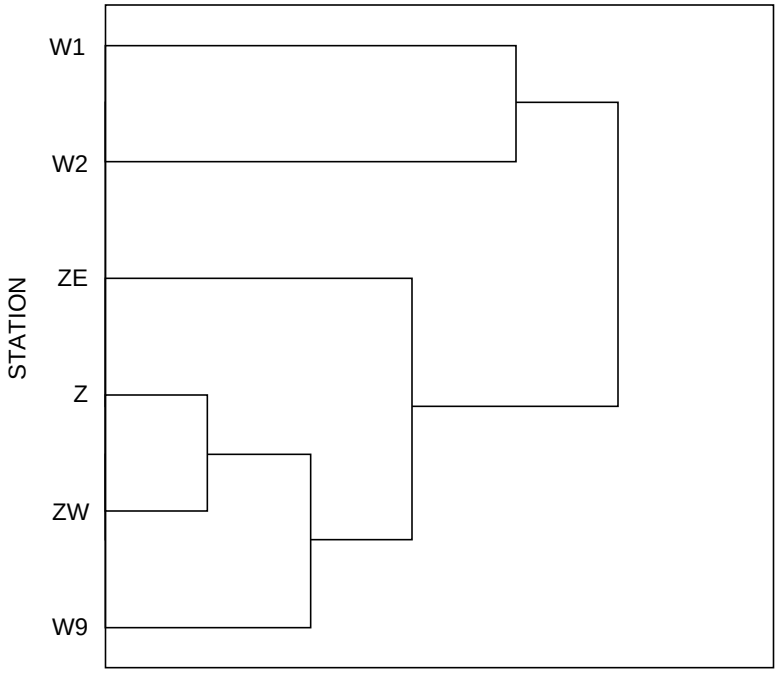


Figure 7. Evenness index (J) for nonmollusks, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010



No. of Clusters	Distance	Leader	Joiner
5	3.029411839	Z	ZW
4	3.476864068	Z	W9
3	4.559547609	ZE	Z
2	5.790974435	W1	W2
1	6.277676390	W1	ZE

Figure 8. Clustering of sampling stations for similarity of nonmollusk taxa composition, Wai‘anae ocean outfall, O‘ahu, Hawai‘i, June 2010

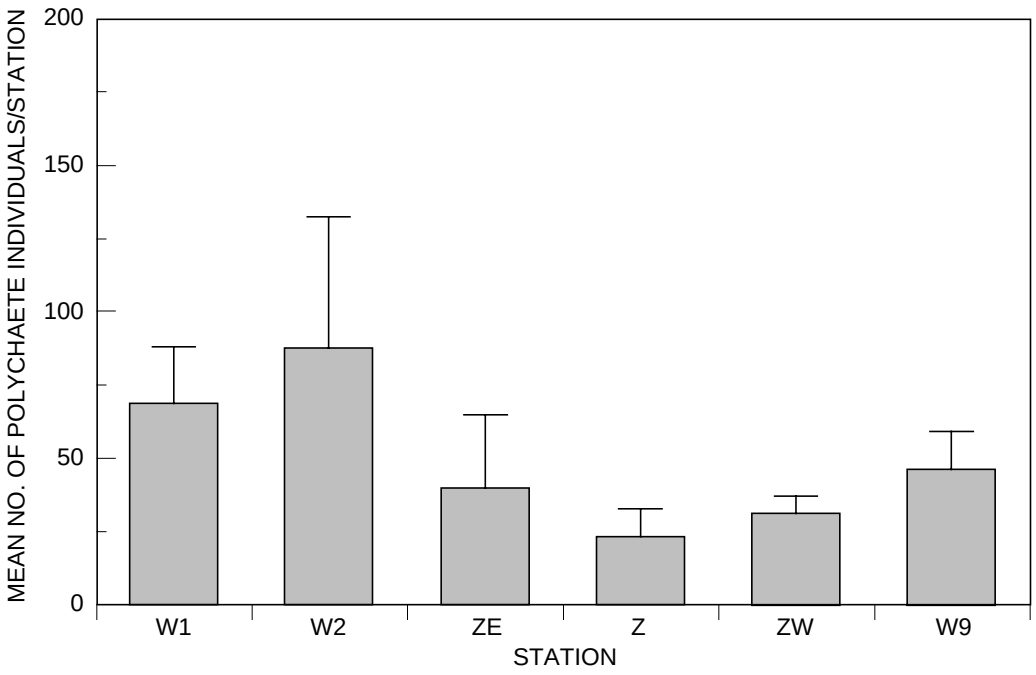


Figure 9. Mean (+1 SD) number of polychaete individuals per station, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010

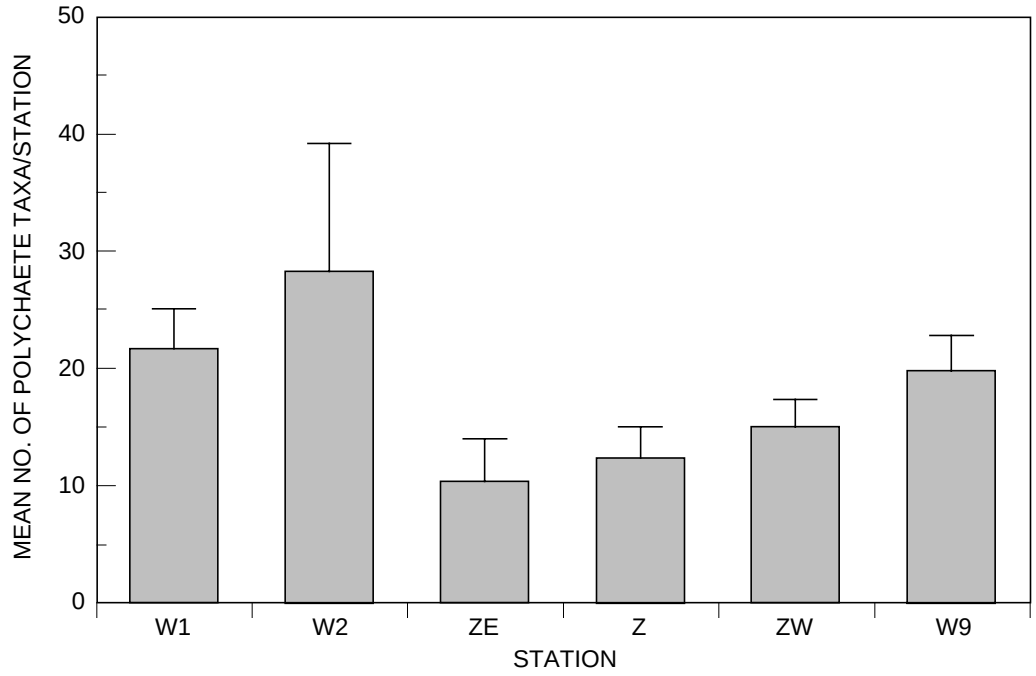


Figure 10. Mean (+1 SD) number of polychaete taxa per station, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010

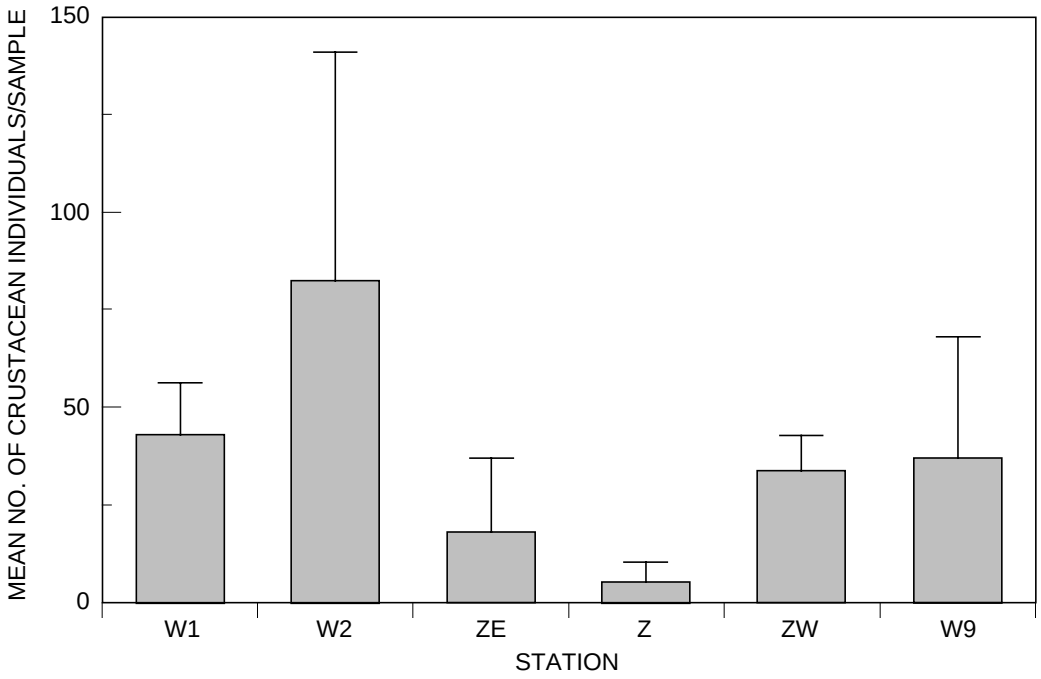


Figure 11. Mean (+1 SD) number of crustacean individuals per sample, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

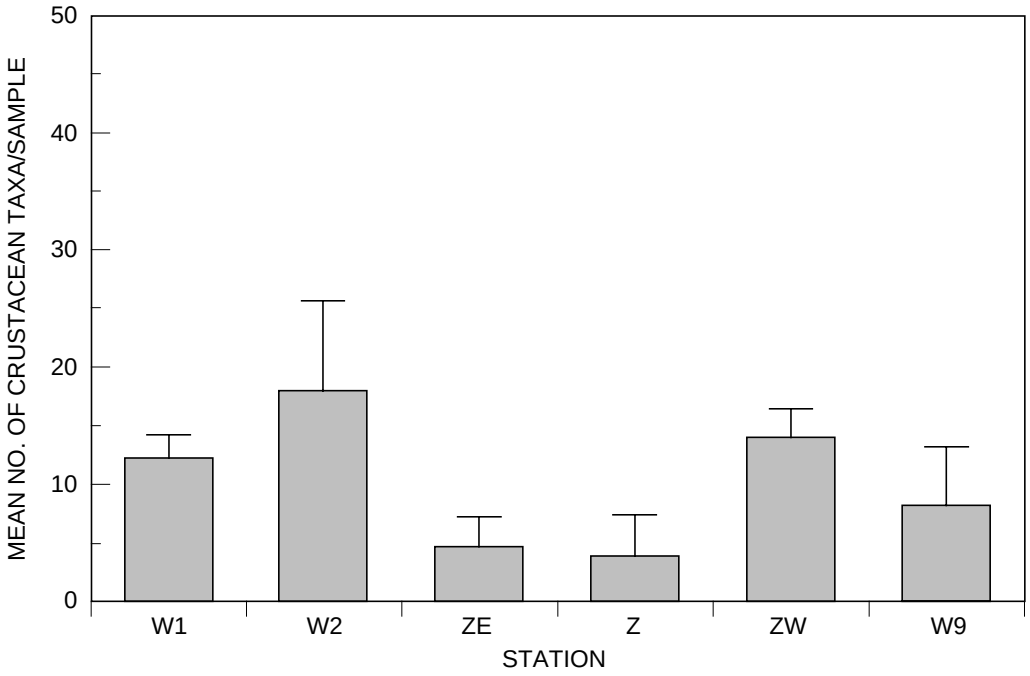


Figure 12. Mean (+1 SD) number of crustacean taxa per sample, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

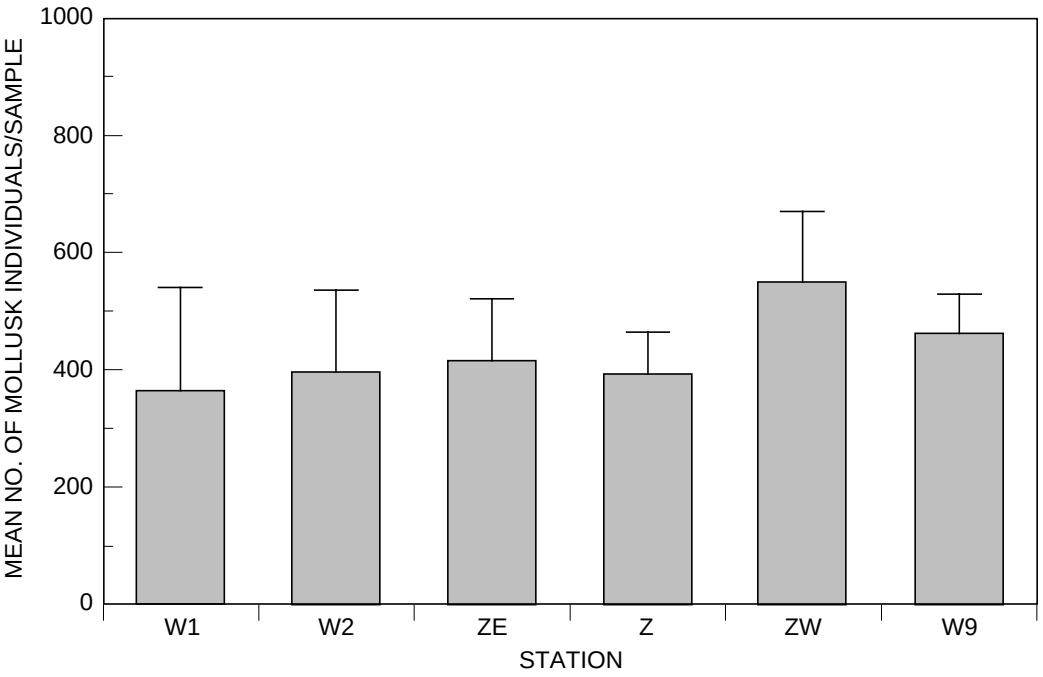


Figure 13. Mean (+1 SD) number of mollusk individuals per sample (no./25 cm^3), Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

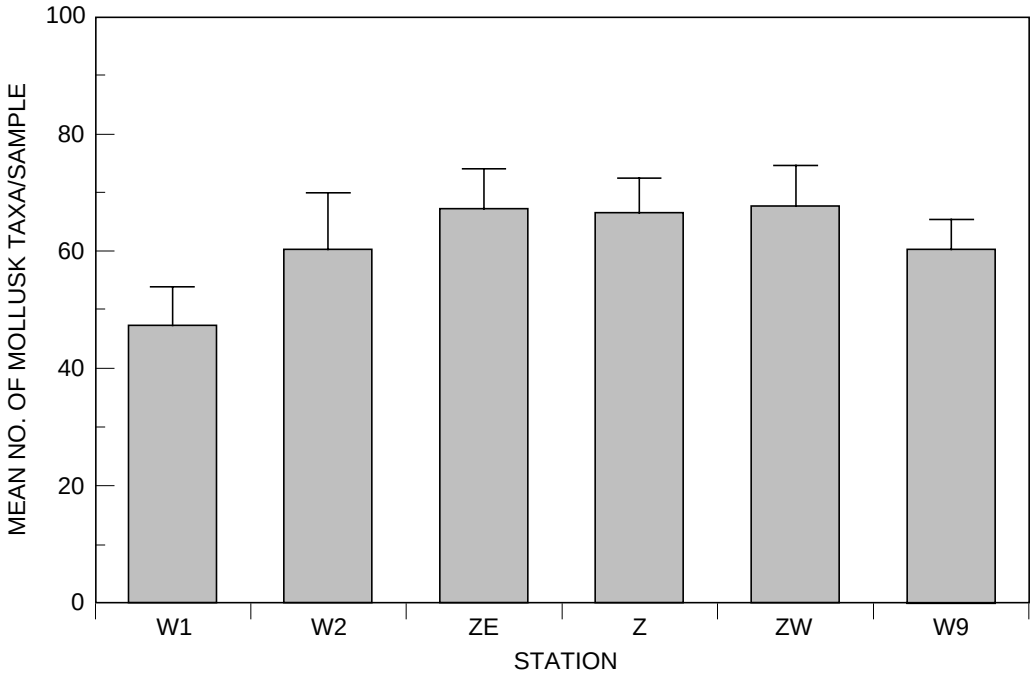


Figure 14. Mean (+1 SD) number of mollusk taxa per sample (no./25 cm^3), Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

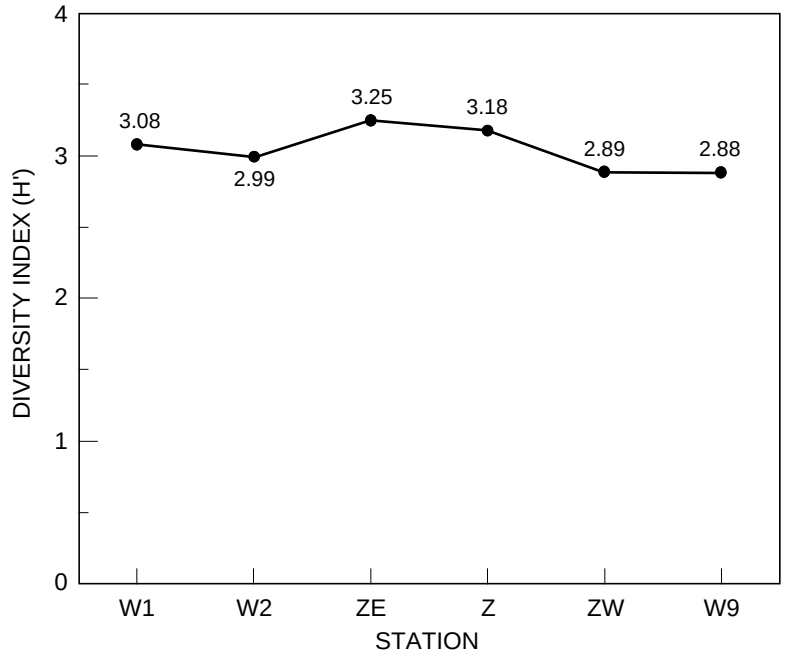


Figure 15. Shannon-Wiener diversity index (H') for mollusks, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

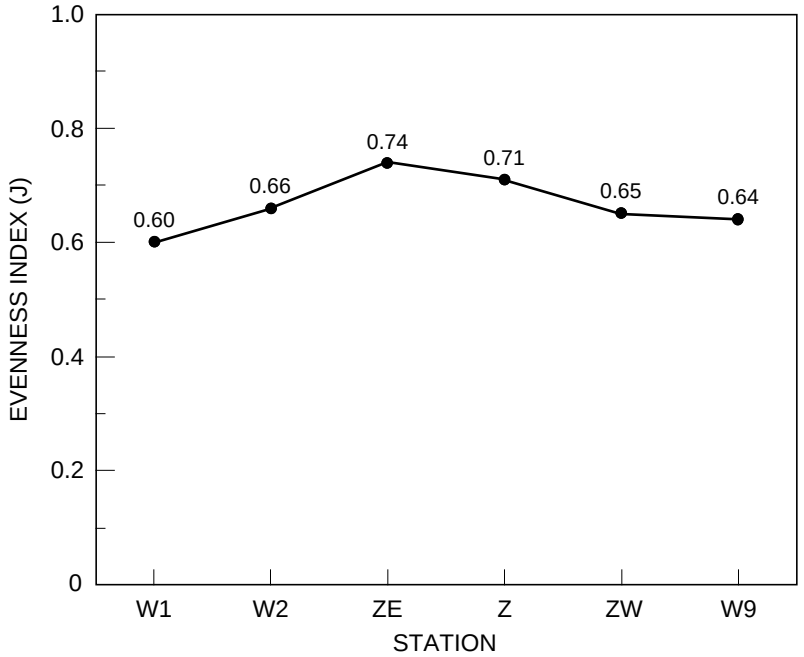
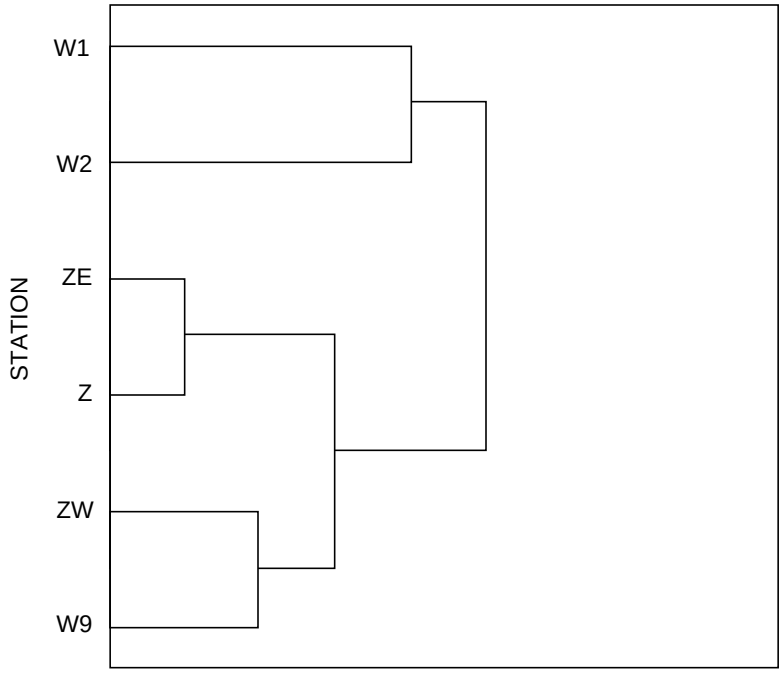


Figure 16. Evenness index (J) for mollusks, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010



No. of Clusters	Distance	Leader	Joiner
5	3.950825795	ZE	Z
4	4.360450614	ZW	W9
3	5.150288702	ZE	ZW
2	5.836415065	W1	W2
1	5.898154920	W1	ZE

Figure 17. Clustering of sampling stations for similarity of mollusk taxa composition, Wai‘anae ocean outfall, O‘ahu, Hawai‘i, June 2010

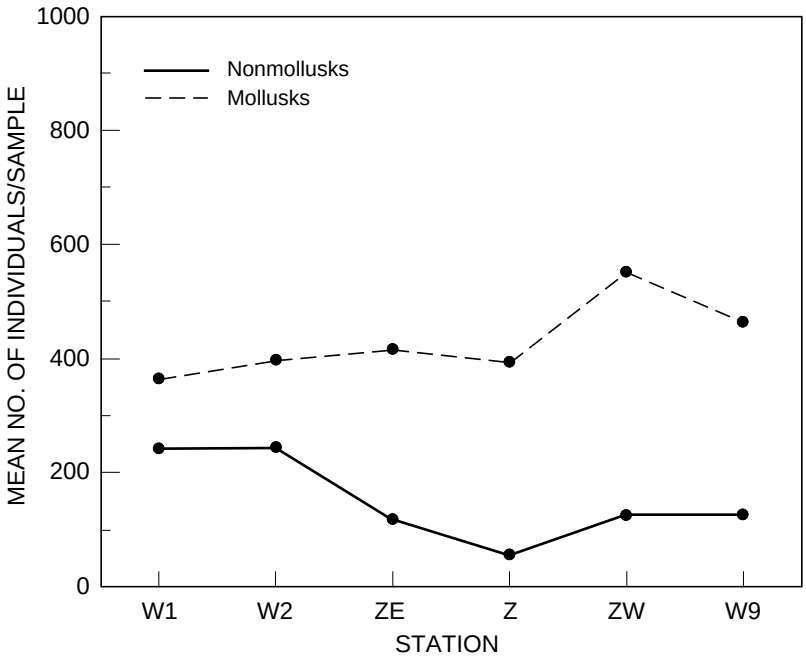


Figure 18. Pattern of mean individuals (no./sample) for nonmollusks and mollusks among Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

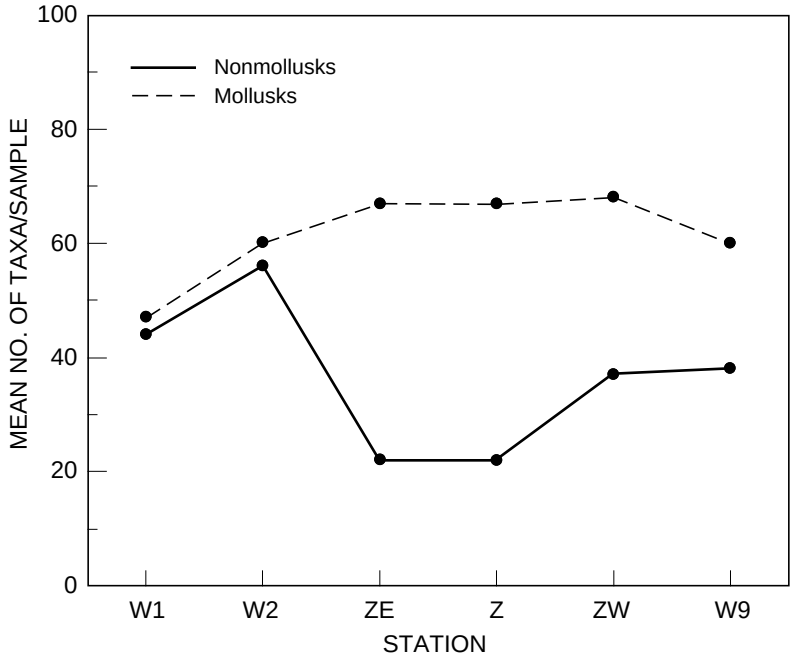


Figure 19. Pattern of mean taxa richness (no./sample) for nonmollusks and mollusks among Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

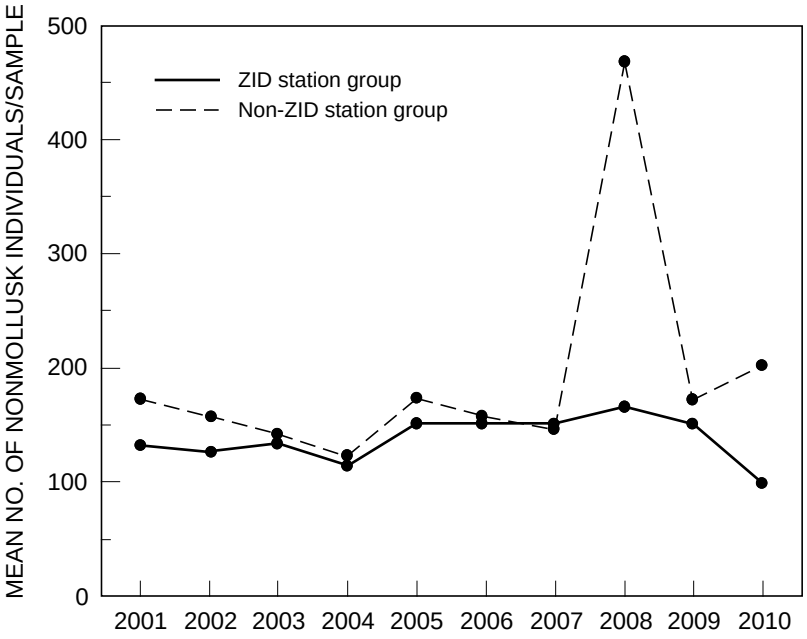


Figure 20. Mean number of nonmollusk individuals (no./sample) for ZID and non-ZID station groups, 2001 through 2010, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

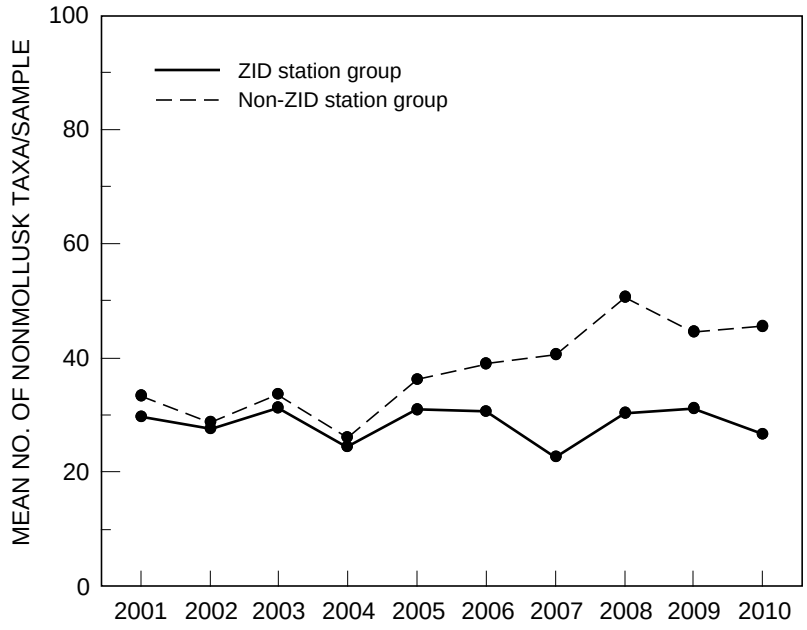


Figure 21. Mean number of nonmollusk taxa (no./sample) for ZID and non-ZID station groups, 2001 through 2010, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010

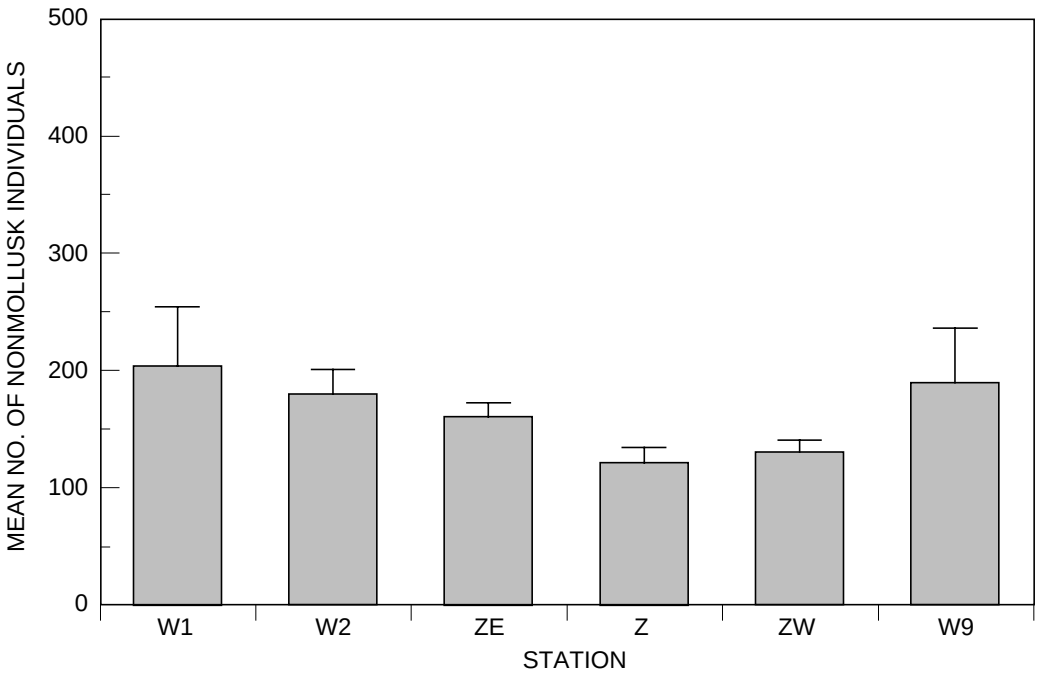


Figure 22. Mean (+1 SE) number of nonmollusk individuals compared among six sampling stations for data collected from 2001 through 2010 at Wai‘anae ocean outfall, O‘ahu, Hawai‘i

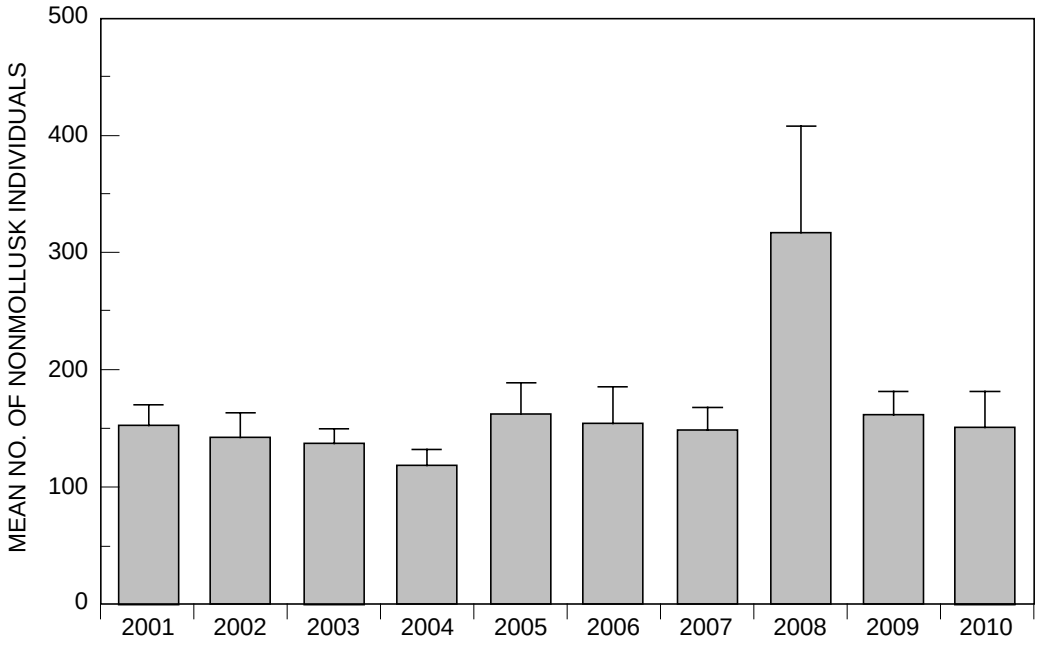


Figure 23. Mean (+1 SE) number of nonmollusk individuals compared among ten sampling dates for data collected at six Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i

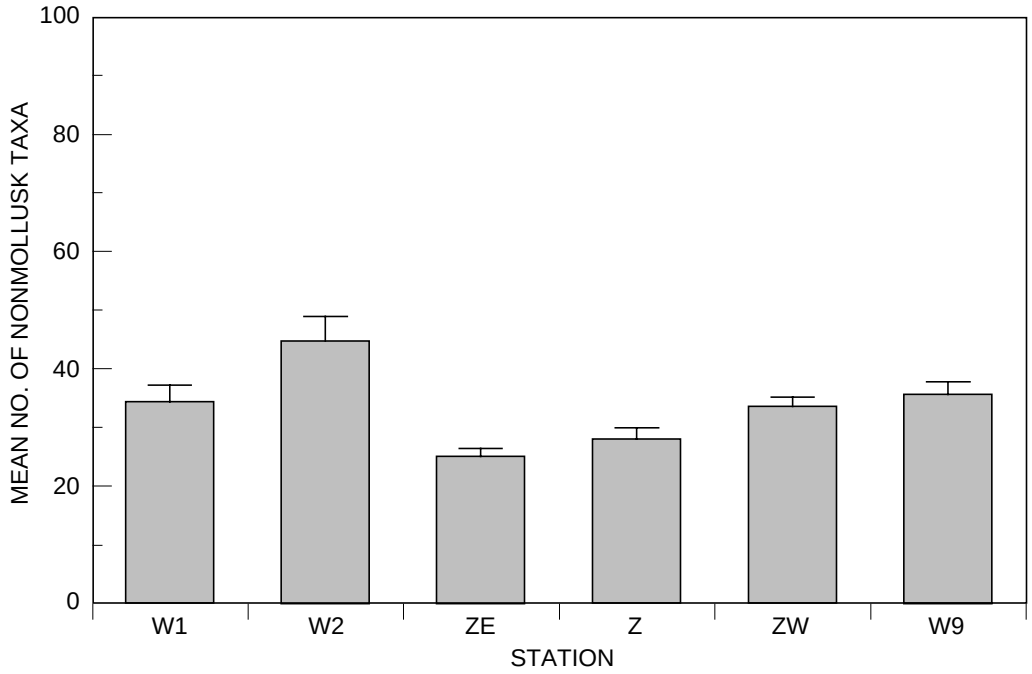


Figure 24. Mean (+1 SE) number of nonmollusk taxa compared among six sampling stations for data collected from 2001 through 2010 at Waiʻanae ocean outfall, Oʻahu, Hawaiʻi

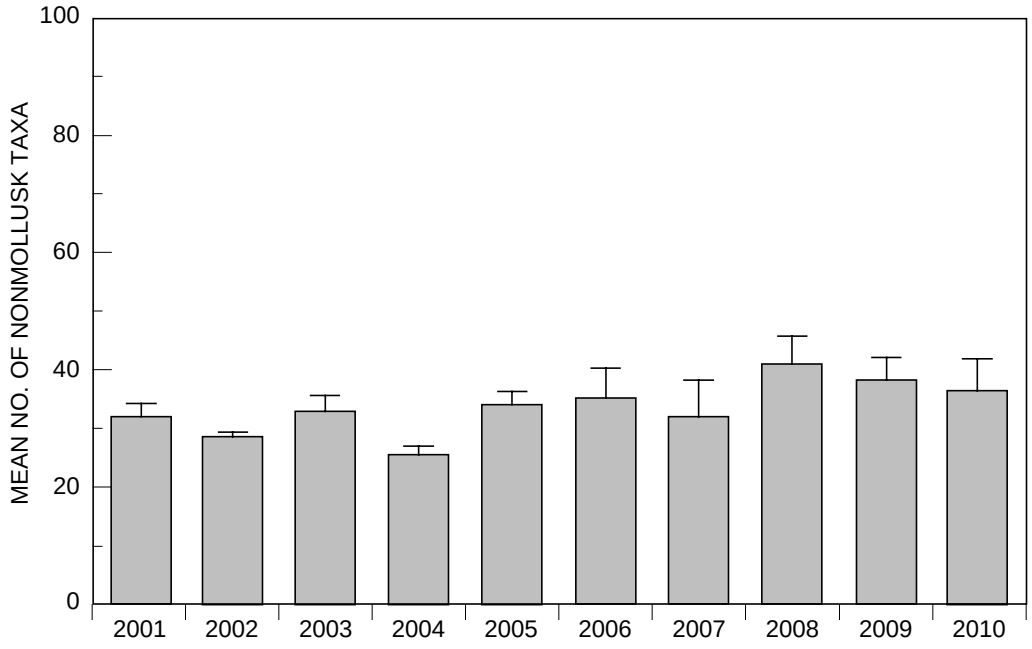


Figure 25. Mean (+1 SE) number of nonmollusk taxa compared among ten sampling dates for data collected at six Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi

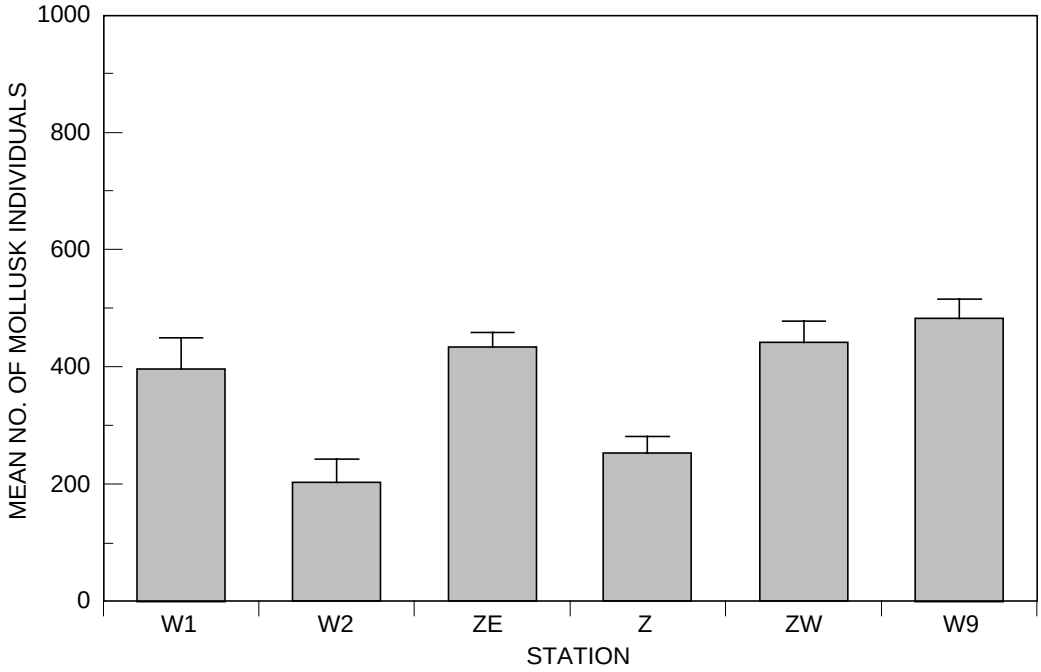


Figure 26. Mean (+1 SE) number of mollusk individuals compared among six sampling stations for data collected from 2001 through 2010 at Wai‘anae ocean outfall, O‘ahu, Hawai‘i

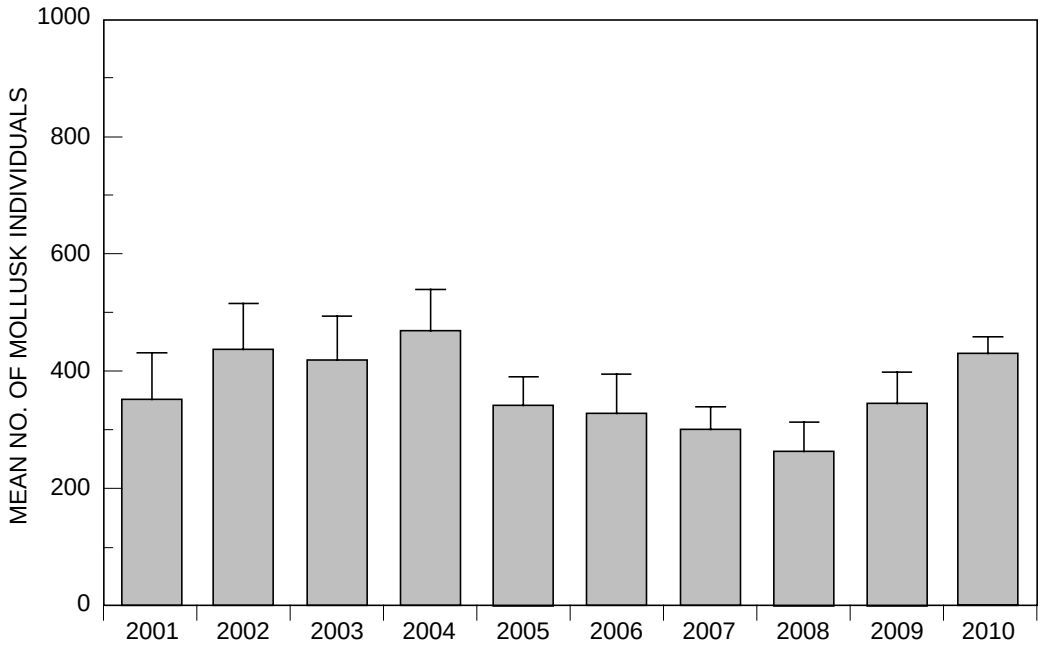


Figure 27. Mean (+1 SE) number of mollusk individuals compared among ten sampling dates for data collected at six Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i

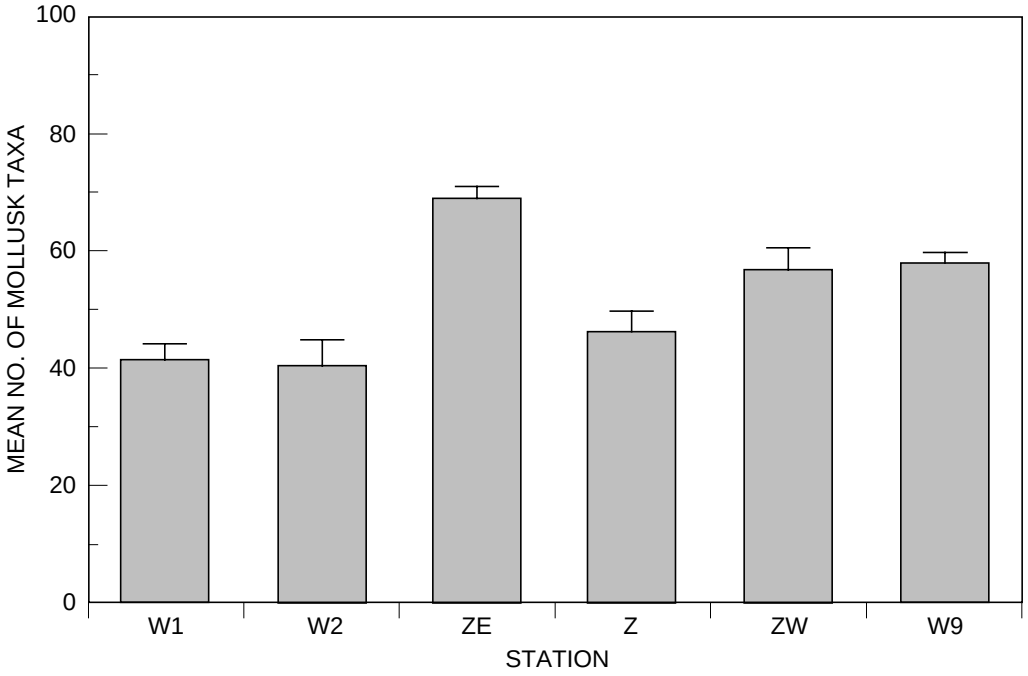


Figure 28. Mean (+1 SE) number of mollusk taxa compared among six sampling stations for data collected from 2001 through 2010 at Wai‘anae ocean outfall, O‘ahu, Hawai‘i

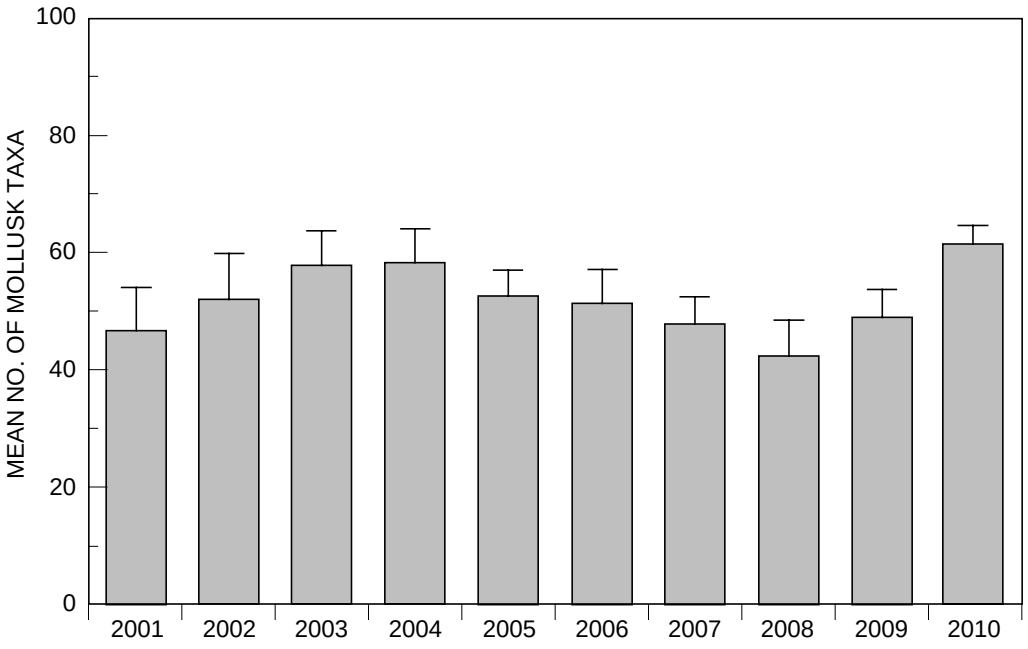


Figure 29. Mean (+1 SE) number of mollusk taxa compared among ten sampling dates for data collected at six Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i

Tables

Table 1. Mean nonmollusk abundance and taxa richness (no./sample), Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, 2001 through 2010.

Station	Abundance/No. of Taxa									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	136/33	235/27	108/28	96/23	278/37	90/32	85/24	609/51	165/44	240/44
W2	141/35	113/31	187/39	92/25	90/36	270/60	231/60	205/55	229/51	242/56
ZE	149/21	127/25	131/23	137/22	166/26	232/32	152/23	211/30	183/27	117/22
Z	125/33	162/29	156/41	93/23	169/28	126/30	156/20	83/26	91/27	54/22
ZW	122/36	90/30	113/31	112/29	117/40	95/31	144/26	201/36	177/40	126/37
W9	241/34	125/29	130/35	177/31	153/37	113/26	121/39	592/48	121/40	125/38

Note: Numbers rounded to nearest whole number.

Table 2. Total polychaete abundance and taxa richness (all stations combined), Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, 2001 through 2010.

Year	No. of Individuals	No. of Taxa
2001	1,807	97
2002	1,998	82
2003	1,756	93
2004	1,222	74
2005	1,643	84
2006	1,787	100
2007	1,668	97
2008	2,430	123
2009	2,070	107
2010	1,779	116

Table 3. Total crustacean abundance and taxa richness, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, 2001 through 2010.

Station	Abundance/No. of Taxa									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	201/27	64/16	15/7	48/15	217/22	108/26	47/18	1,156/34	348/37	259/26
W2	308/23	156/24	470/28	242/23	126/28	568/56	625/51	254/45	380/36	495/43
ZE	105/14	75/10	107/10	163/15	155/14	203/22	210/14	348/19	373/22	109/13
Z	88/22	161/15	178/26	115/14	117/22	115/21	164/9	56/14	64/19	32/17
ZW	149/25	73/20	146/19	170/21	153/27	55/18	177/21	404/29	184/28	203/34
W9	483/21	105/18	164/22	358/18	258/27	124/27	192/33	1,209/33	152/26	222/26

Note: Includes copepods; numbers rounded to nearest whole number.

Table 4. Mean mollusk abundance and taxa richness, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, 2001 through 2010.

Station	Abundance/No. of Taxa									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	563/42	637/59	472/50	613/43	372/40	218/35	306/34	248/35	171/29	365/47
W2	48/18	164/26	84/33	286/56	248/48	159/43	114/35	129/33	399/52	396/60
ZE	414/71	503/77	462/73	591/81	393/65	480/69	346/62	413/67	316/58	416/67
Z	209/40	334/53	349/58	227/45	173/45	164/39	310/48	139/26	227/41	394/67
ZW	349/51	327/33	606/69	479/61	504/65	496/61	344/57	240/44	518/60	551/68
W9	530/58	652/64	537/64	618/64	363/53	451/61	380/51	408/50	435/54	463/60

Note: Numbers rounded to nearest whole number.

Appendices

Appendix A

Sediment Data and Sample Locations

Table A.1. Sediment grain-size analysis, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Station	Sample Weight Distribution (%)							
	Phi Size							
	-2	-1	0	1	2	3	4	>4–12
W1	19.7	12.3	17.7	18.7	20.0	9.5	0.3	2.7
W2	36.1	13.5	10.8	14.9	17.3	6.1	1.0	1.8
ZE	0.2	0.7	6.0	22.3	54.5	12.2	0.3	2.0
Z	25.8	10.2	21.1	22.2	14.1	4.1	0.5	2.2
ZW	15.5	10.5	22.6	25.0	12.7	6.0	1.2	3.4
W9	10.0	11.9	15.9	19.9	19.7	12.6	1.5	4.0

Source: City and County of Honolulu Department of Environmental Services Division of Environmental Quality Water Quality Laboratory.

Note: The values listed above indicate the percentage of the estimated dry weight of the sediment samples. The coarse fraction (-2 to +4) was analyzed by the sieve method. The fine fraction (ranging from greater than 4 to 12) was analyzed by the pipette method.

Table A.2. Sediment fractions (%) by weight, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, 2001 through 2010.

Station	Fraction (%) Coarse/Medium Sand									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	73.6	63.1	77.2	87.1	37.5	80.4	66.3	56.7	63.9	68.4
W2	95.9	68.4	90.7	82.5	64.4	81.4	89.5	67.5	80.8	75.3
ZE	69.7	71.1	53.5	50.3	59.3	33.9	62.0	63.8	62.8	29.2
Z	87.2	65.9	58.9	75.3	72.9	81.8	64.0	69.8	77.6	79.3
ZW	90.6	71.0	73.3	69.9	81.0	82.9	76.4	78.3	76.4	73.6
W9	35.5	38.3	59.4	32.1	91.5	57.2	90.4	69.4	76.2	57.7

Station	Fraction (%) Fine Sand									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	24.8	34.9	16.2	11.2	59.6	12.3	29.3	43.3	31.7	29.8
W2	3.9	28.9	3.8	13.3	30.3	17.5	13.0	24.9	16.1	24.4
ZE	27.5	27.2	43.9	47.8	37.5	62.5	35.3	35.7	35.9	67.0
Z	12.4	31.9	39.4	20.9	22.5	16.3	35.9	29.6	18.0	18.7
ZW	8.7	27.7	25.4	27.2	15.3	12.9	23.0	15.4	18.7	19.9
22.3	58.1	59.9	37.5	65.4	4.8	38.3	8.8	22.8	22.3	33.8

Station	Fraction (%) Silt									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W1	3.4	2.5	2.2	2.1	2.5	1.8	2.6	3.9	3.1	2.7
W2	1.8	1.9	1.7	1.9	2.0	1.3	1.4	2.2	3.0	1.8
ZE	2.3	1.6	2.0	2.2	1.7	1.8	1.4	2.3	1.8	2.0
Z	1.9	2.1	2.7	2.0	1.5	1.1	1.3	2.5	2.0	2.2
ZW	1.6	2.0	2.5	2.4	2.5	1.3	2.7	3.4	3.2	3.4
W9	3.8	2.6	3.2	2.9	1.9	2.4	2.3	3.1	3.1	4.0

Source: City and County of Honolulu Department of Environmental Services Division of Environmental Quality Water Quality Laboratory.

Table A.3. Total organic carbon and total volatile solids, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Station	Total organic carbon (% dry weight)	Total volatile solids (%)
W1	0.33	6.1
W2	0.17	3.8
ZE	0.17	2.8
Z	0.10	2.5
ZW	0.12	3.3
W9	0.18	4.3

Source: Total organic carbon data from Columbia Analytical Services (Kelso, Washington); total volatile solids data from City and County of Honolulu Department of Environmental Services Division of Environmental Quality Water Quality Laboratory.

Table A.4. Oxidation-reduction potential (ORP), Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010.

Station	Date	Replicate	ORP Reading (mV)	Depth (m)
W1	4 June	1	113	31.4
		2	120	to
		3	118	31.7
		4	120	
		5	121	
		6	122	
W2	4 June	1	124	27.4
		2	119	to
		3	142	27.7
		4	135	
		5	101	
		6	117	
ZE	5 June	1	110	29.9
		2	108	to
		3	111	30.5
		4	111	
		5	114	
		6	116	
Z	4 June	1	71	31.7
		2	72	to
		3	88	32.3
		4	83	
		5	90	
		6	96	
ZW	5 June	1	57	33.5
		2	74	to
		3	95	34.1
		4	93	
		5	94	
		6	95	
W9	5 June	1	100	32.9
		2	102	to
		3	108	33.2
		4	110	
		5	115	
		6	118	

Source: City and County of Honolulu Department of Environmental Services Division of Environmental Quality Oceanographic Team.

Table A.5. Effluent flow rate and chemical parameters for 2001 through 2010, Wai‘anae Wastewater Treatment Plant, O‘ahu, Hawai‘i.

Year	Flow Rate		Total Suspended Solids (mg/l)	Total Kjeldahl Nitrogen (mg/l)	BOD_5 (mg/l)	Total Phosphorous (mg/l)
	(m^3/s)	(mgd)				
2001	0.14	3.26	16.0	20.53	17.0	3.33
2002	0.14	3.31	11.0	22.21	15.0	3.32
2003	0.15	3.40	11.0	19.17	14.0	3.64
2004	0.15	3.53	12.0	20.25	16.0	3.52
2005	0.15	3.52	17.0	22.18	19.0	3.82
2006	0.15	3.45	14.0	22.77	17.0	3.65
2007	0.14	3.16	13.0	24.10	17.0	3.73
2008	0.14	3.29	13.0	23.90	17.0	3.82
2009	0.14	3.24	12.0	25.17	16.0	3.71
2010	0.14	3.25	11.9	8.00	16.9	3.83[a]

Source: City and County of Honolulu Department of Environmental Services Division of Environmental Quality Water Quality Laboratory.

Note: All values are yearly averages.

[a]Data taken between July 2009 and June 2010.

Appendix B

Basic Statistics and Variances for Nonmollusk Data

Table B.1. Statistics for comparison of means for untransformed nonmollusk abundance, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	168,668.50	5	33,733.70	7.63	0.0001
Error	132,933.80	30	4,431.13		
Total	301,602.30	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean Abundance	240.17	242.00	117.17	54.00	125.83	124.67
Standard Deviation	22.05	132.87	78.42	21.11	26.35	34.03

Hartley’s F_{max} variance ratio = 39.6; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	–	*	*	–	–
W2	–	–	*	*	–	*
ZE	*	*	–	–	–	–
Z	*	*	–	–	–	–
ZW	–	–	–	–	–	–

–no significant differences, *significant differences at P = 0.05 level.

Table B.2. Statistics for comparison of means for untransformed number of nonmollusk taxa, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	5,166.22	5	1,033.24	10.34	0.0001
Error	2,998.33	30	99.94		
Total	8,164.55	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean No. of Taxa	43.83	56.00	21.67	22.17	37.00	37.67
Standard Deviation	4.40	20.09	7.47	5.19	5.29	8.12

Hartley’s F_{max} variance ratio = 6.72 not signficant; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	–	*	*	–	–
W2	–	–	*	*	*	*
ZE	*	*	–	–	–	–
Z	*	*	–	–	–	–
ZW	–	*	–	–	–	–

–no significant differences, *significant differences at P = 0.05 level.

Table B.3. Statistics for comparison of means for double-square-root transformed and untransformed crustacean abundance, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	9.8900	5	1.9800	7.07	0.0002
Error	8.4000	30	0.2800		
Total	18.2900	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean Abundance	2.55	2.87	1.84	1.25	2.40	2.30
Standard Deviation	0.19	0.61	0.62	0.69	0.15	0.63

Hartley's F_{max} variance ratio = 20.1 not significant; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	–	–	*	–	–
W2	–	–	–	*	–	–
ZE	–	–	–	–	–	–
Z	*	*	–	–	–	–
ZW	–	–	–	–	–	–

–no significant differences, *significant differences at P = 0.05 level.

Untransformed Statistics

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean Abundance	43.17	82.50	18.17	5.33	33.80	37.00
Standard Deviation	13.24	58.59	18.85	5.09	9.13	31.09

Table B.4. Statistics for comparison of means for untransformed number of crustacean taxa, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	926.47	5	185.29	9.82	0.0001
Error	565.83	30	18.86		
Total	1,492.30	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean No. of Taxa	12.17	18.00	4.67	3.83	14.00	8.17
Standard Deviation	2.04	7.69	2.58	3.55	2.45	4.96

Hartley’s F_{max} variance ratio = 14.2 not signficant; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	–	–	*	–	–
W2	–	–	*	*	—	*
ZE	–	*	–	–	*	–
Z	*	*	–	–	*	–
ZW	–	–	*	*	–	–

–no significant differences, *significant differences at P = 0.05 level.

Table B.5. Statistics for two-way analysis of variance for nonmollusk abundance, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi: Stations vs. Years.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	55,321.88	5	11,063.80	1.50	0.2110
Among Years	164,071.35	9	18,230.15	2.47	0.0220
Error	332,648.95	45	7,392.20		
Total	552,042.18	59			

Effects: Stations

Station	W1	W2	ZE	Z	ZW	W9
Mean Abundance	204.20	180.00	160.50	121.50	129.70	189.80
Standard Error	50.10	20.94	11.95	12.51	11.12	46.34

Effects: Years

Year	2001	2002	2003	2004	2005	2006	2007	2008
Mean Abundance	152.33	142.00	137.50	117.83	162.17	154.33	148.17	316.83
Standard Error	18.20	20.90	12.06	13.74	26.34	31.40	19.73	91.81

Year	2009	2010
Mean Abundance	161.00	150.67
Standard Error	19.90	30.59

Table B.6. Statistics for two-way analysis of variance for nonmollusk taxa richness, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i: Stations vs. Years.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	2,350.73	5	470.15	9.46	0.0001
Among Years	1,103.73	9	122.56	2.47	0.0221
Error	2,236.27	45	49.54		
Total	5,690.73	59			

Effects: Stations

Station	W1	W2	ZE	Z	ZW	W9
Mean No. of Taxa	34.30	44.80	25.10	27.90	33.60	35.70
Standard Error	3.00	4.11	1.16	1.91	1.53	1.98

Effects: Years

Year	2001	2002	2003	2004	2005	2006	2007	2008
Mean No. of Taxa	32.00	28.50	32.83	25.50	34.00	35.17	32.00	41.00
Standard Error	2.25	0.89	2.79	1.50	2.29	5.05	6.21	4.89

Year	2009	2010
Mean No. of Taxa	38.17	36.50
Standard Error	3.89	5.35

Appendix C

Basic Statistics and Variances for Mollusk Data

Table C.1. Statistics for comparison of means for $\log_{10}$ transformed and untransformed mollusk abundance, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	0.16	5	0.03	2.05	0.1000
Error	0.46	30	0.02		
Total	0.62	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean Abundance	2.52	2.58	2.61	2.59	2.73	2.66
Standard Deviation	0.20	0.15	0.05	0.08	0.05	0.06

Hartley’s F_{max} variance ratio = 16.0 not signficiant; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	–	–	–	–	–
W2	–	–	–	–	–	–
ZE	–	–	–	–	–	–
Z	–	–	–	–	–	–
ZW	–	–	–	–	–	–

–no significant differences, *significant differences at P = 0.05 level.

Untransformed Statistics

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean Abundance	365.00	369.17	416.33	393.83	550.50	462.67
Standard Deviation	176.21	139.19	105.58	70.46	120.23	66.32

Table C.2. Statistics for comparison of means for untransformed mollusk taxa richness, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi, June 2010.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	1,812.56	5	362.51	4.94	0.0010
Error	1,456.00	30	48.53		
Total	3,268.56	35			

Station	W1	W2	ZE	Z	ZW	W9
No. of Replicates	6	6	6	6	6	6
Mean No. of Taxa	47.33	60.33	67.33	66.67	67.67	60.33
Standard Deviation	6.59	9.67	6.86	5.82	6.89	5.09

Hartley's F_{max} variance ratio = 3.61 not signficiant; 6 groups, 5 degrees of freedom.

Comparison of Means (Tukey-Kramer test):

	W1	W2	ZE	Z	ZW	W9
W1	–	*	*	–	*	*
W2	*	–	–	–	–	–
ZE	*	–	–	–	–	–
Z	*	–	–	–	–	–
ZW	*	–	–	–	–	–

–no significant differences, *significant differences at P = 0.05 level.

Table C.3. Statistics for two-way analysis of variance for mollusk abundance, Wai‘anae ocean outfall sampling stations, O‘ahu, Hawai‘i: Stations vs. Years.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	645,038.28	5	129,007.66	11.86	0.0001
Among Years	240,539.35	9	26,726.60	2.46	0.0200
Error	489,329.60	45	10,873.99		
Total	1,374,907.23	59			

Effects: Stations

Station	W1	W2	ZE	Z	ZW	W9
Mean Abundance	396.50	202.70	433.40	252.60	441.40	483.70
Standard Error	52.99	39.39	25.13	27.79	37.26	30.96

Effects: Years

Year	2001	2002	2003	2004	2005	2006	2007	2008
Mean Abundance	352.17	436.17	418.33	469.00	342.17	328.00	300.00	262.83
Standard Error	80.19	79.12	75.43	70.70	47.46	66.84	38.81	50.86

Year	2009	2010
Mean Abundance	344.33	430.83
Standard Error	53.54	27.45

Table C.4. Statistics for two-way analysis of variance for mollusk taxa richness, Waiʻanae ocean outfall sampling stations, Oʻahu, Hawaiʻi: Stations vs. Years.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio	P
Among Stations	6,283.73	5	1,256.75	16.07	0.0001
Among Years	1,861.93	9	206.88	2.65	0.0125
Error	3,520.30	45	78.23		
Total	11,665.96	59			

Effects: Stations

Station	W1	W2	ZE	Z	ZW	W9
Mean No. of Taxa	41.40	40.40	69.00	46.20	56.90	57.90
Standard Error	2.81	4.31	2.17	3.57	3.58	1.75

Effects: Years

Year	2001	2002	2003	2004	2005	2006	2007	2008
Mean No. of Taxa	46.67	52.00	57.83	58.33	52.67	51.33	47.83	42.30
Standard Error	7.37	7.87	5.97	5.69	4.26	5.74	4.66	5.99

Year	2009	2010
Mean No. of Taxa	49.00	61.50
Standard Error	4.83	3.25

Appendix D

Taxon Abundance for Nonmollusks

Table D.1. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Wai‘anae ocean outfall sampling station W1, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri							
Amphiduros sp. A							
Amphiglena mediterranea	0	0	0	0	0	1	1
Amphiglena sp. A	0	0	0	0	4	0	4
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A	0	1	2	3	0	0	6
Aphelochaeta marioni							
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia	4	0	3	1	2	2	12
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata	1	0	0	0	0	0	1
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B							
Capitella capitata	1	0	0	0	0	0	1
Capitellidae sp.	0	1	0	1	0	0	2
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A							
Ceratonereis tentaculata	0	0	0	0	0	1	1
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava							
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A							
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B	0	1	0	0	0	0	1
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D							
Euchone cf. *rosea*							
Euchone sp. B							
Eumida sanguinea	0	0	1	0	0	0	1
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.1—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A							
Exogone longicornis							
Exogone verugera							
Exogone sp. A							
Exogone sp. C							
Exogone sp. F	0	0	0	0	0	1	1
Exogone sp. H							
Fabricia sp. A	3	1	0	1	24	13	42
Filogranula sp. A							
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata	0	0	0	0	1	1	2
Goniada emerita							
Goniada maculata							
Grubeosyllis mediodentata							
Gyptis sp. A							
Haplosyllis spongicola	0	0	0	0	2	0	2
Harmothoe sp. A	0	0	0	0	0	1	1
Hesione splendida							
Hesionidae sp. B							
Hesionidae sp. D	0	0	0	0	0	4	4
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis							
Heteropodarke sp. B	2	3	4	2	3	0	14
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri							
Lacydonia sp. A							
Laonice cirrata	0	2	4	2	0	1	9
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	2	1	1	1	1	1	7
Litocorsa acuminata	1	0	0	0	0	0	1
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata	1	0	0	0	0	0	1
Lumbrineris latreilli							
Lygdamis nesiotes							
Lysidice ninetta	0	0	0	0	1	0	1
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A							
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B							
Microphthalmus sp.	3	0	2	0	0	0	5
Micropodarke sp. A	13	7	7	12	11	13	63
Micropodarke sp. B							
Microspio granulata	0	0	0	2	1	0	3
Monticellina cf. *dorsobranchialis*							
Mooreonuphis sp. A							
Myriochele oculata							
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata	1	1	1	0	0	1	4
Neanthes succinea							
Nematonereis unicornis	0	0	0	0	0	4	4
Nereis sp. B	0	0	1	0	0	0	1
Notomastus tenuis							
Notopygos sp. A	0	0	1	0	0	0	1
Odontosyllis maculata	0	0	1	1	2	1	5
Odontosyllis sp. A							
Odontosyllis sp. B	0	0	0	0	1	0	1
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens							
Paleanotus sp. B							
Paleanotus sp. E							
Palmyra sp. A	0	0	0	1	0	0	1
Paramphinome sp. A							
Paraonella sp. A	0	0	0	0	1	0	1
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*							
Phalacrostemma sp. A							
Pholoe sp. A							
Pholoe sp. B							
Pholoe sp. C	0	0	0	0	4	0	4
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis	1	0	1	0	0	2	4
Phyllodoce sp. C							
Phyllodocidae sp. A							
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	17	15	29	12	14	9	96
Pionosyllis spinisetosa	5	2	1	0	0	0	8
Pionosyllis weismanni	0	1	0	1	3	0	5
Pionosyllis sp. C							
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H	0	1	0	1	2	2	6
Pionosyllis sp. J							
Pisione remota							

Table D.1—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	0	2	0	2	2	0	6
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata	0	0	1	0	0	0	1
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C							
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A							
Polynoidae sp. B	0	0	0	0	0	1	1
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	1	0	4	2	4	1	12
Potamilla sp. A							
Prionospio cirrifera	4	1	3	3	6	4	21
Prionospio cirrobranchiata							
Prionospio steenstrupi	2	2	0	1	1	0	6
Progoniada oahuensis							
Progoniada sp. B							
Protoaricia sp. A							
Protoaricia sp. B	0	0	1	0	1	0	2
Protodorvillea biarticulata	7	0	5	0	4	4	20
Protodorvillea egena							
Protodrilus albicans	0	0	0	1	1	0	2
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi							
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis	0	1	0	0	0	0	1
Questa caudicirra							
Questa retrospermatica							
Rhaphidrilus sp. A							
Rhodine sp. A	0	0	0	0	0	1	1
Sabella sp. A							
Saccocirrus oahuensis							
Saccocirrus waianaensis							
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta	1	0	0	0	0	0	1
Schistomeringos rudolphi							
Scolelepis victoriensis	0	1	0	0	0	0	1
Scolelepis sp. B							
Scyphoproctus djiboutiensis	0	0	0	0	1	0	1
Serpula sp. D							
Sigalion sp. A							
Sigalionidae sp. A							

Table D.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata							
Sphaerodoropsis sp. C							
Sphaerosyllis riseri							
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G	2	0	0	0	0	0	2
Sphaerosyllis sp. H							
Spio blakei							
Spio filicornis							
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.							
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini	0	1	0	0	0	0	1
Synelmis sp. B							
Terebellidae sp. A	0	0	0	0	0	1	1
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis							
Trypanosyllis sp. A							
Typosyllis aciculata orientalis	0	0	0	0	0	1	1
Typosyllis cornuta							
Typosyllis ornata							
Typosyllis variegata	0	0	0	0	1	2	3
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata	0	0	0	0	1	0	1
OLIGOCHAETA	40	34	46	14	13	27	174
NEMATODA	94	108	57	82	56	48	445
PLATYHELMINTHES	4	3	2	0	1	1	11
PORIFERA	0	0	2	0	0	0	2

Table D.1—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea	1	1	0	2	1	1	6
Holothuroidea							
Ophiuroidea	0	0	1	1	0	1	3
CNIDARIA							
Anthozoa	0	1	0	0	0	0	1
Hydrozoa							
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A	1	0	1	1	0	0	3
NEMERTEA	5	6	0	6	7	7	31
INSECTA	4	2	5	0	11	5	27
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	0	5	0	0	2	5	12
Aspidosiphon muelleri	1	0	0	0	0	19	20
Aspidosiphon sp. A							
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G							
Sipuncula sp. I							
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.							
PRIAPULA							
CHAETOGNATHA							
Spadella gaetanoi	1	2	1	3	0	2	9
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA	2	3	2	4	4	0	15
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A	3	1	5	1	0	1	11
Osteichthyes							
Total No. of Individuals/Replicate	228	211	195	164	194	190	
Total No. of Taxa/Replicate	31	30	30	28	35	36	
Total No. of Individuals Sampled							1,182
Total No. of Taxa Sampled							74

Table D.2. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Waiʻanae ocean outfall sampling station W2, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri							
Amphiduros sp. A							
Amphiglena mediterranea	5	2	6	11	0	19	43
Amphiglena sp. A	2	0	0	0	0	0	2
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A	2	0	0	1	0	3	6
Aphelochaeta marioni	1	0	0	0	0	0	1
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia	0	2	1	1	0	0	4
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata	0	2	0	1	0	0	3
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B							
Capitella capitata	1	0	0	1	0	1	3
Capitellidae sp.	0	1	3	0	0	1	5
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A							
Ceratonereis tentaculata							
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava							
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A	0	0	2	0	0	0	2
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B							
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D	1	0	5	0	0	1	7
Euchone cf. *rosea*							
Euchone sp. B							
Eumida sanguinea	0	1	0	0	0	0	1
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A	0	1	0	0	0	0	1
Exogone longicornis	4	1	2	1	0	0	8
Exogone verugera	1	2	1	1	0	0	5
Exogone sp. A							
Exogone sp. C	0	1	1	0	0	0	2
Exogone sp. F							
Exogone sp. H							
Fabricia sp. A	3	9	45	17	0	19	93
Filogranula sp. A							
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata	0	1	0	1	0	4	6
Goniada emerita							
Goniada maculata							
Grubeosyllis mediodentata	0	0	0	0	1	0	1
Gyptis sp. A	0	0	0	0	0	1	1
Haplosyllis spongicola							
Harmothoe sp. A							
Hesione splendida							
Hesionidae sp. B							
Hesionidae sp. D	0	0	0	1	0	0	1
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis							
Heteropodarke sp. B	2	1	1	2	0	0	6
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri							
Lacydonia sp. A							
Laonice cirrata	1	2	2	9	0	11	25
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	2	0	4	0	1	4	11
Litocorsa acuminata	0	0	0	1	0	0	1
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata	0	1	0	0	0	1	2
Lumbrineris latreilli							
Lygdamis nesiotes							
Lysidice ninetta	0	1	1	0	0	0	2
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A	0	0	1	0	0	0	1
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.2—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B	0	1	0	0	0	0	1
Microphthalmus sp.	0	1	0	0	0	0	1
Micropodarke sp. A	5	7	1	12	1	13	39
Micropodarke sp. B							
Microspio granulata	0	0	0	0	1	0	1
Monticellina cf. *dorsobranchialis*							
Mooreonuphis sp. A							
Myriochele oculata	0	0	0	0	0	3	3
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata							
Neanthes succinea							
Nematonereis unicornis	3	3	0	3	0	7	16
Nereis sp. B							
Notomastus tenuis	0	0	0	2	0	0	2
Notopygos sp. A	1	6	6	0	1	7	21
Odontosyllis maculata	0	0	1	0	0	0	1
Odontosyllis sp. A	2	0	0	0	0	0	2
Odontosyllis sp. B	0	2	0	0	0	0	2
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens	0	1	0	0	0	0	1
Paleanotus sp. B	0	1	0	0	0	0	1
Paleanotus sp. E							
Palmyra sp. A							
Paramphinome sp. A	2	0	0	0	0	0	2
Paraonella sp. A	2	5	1	1	0	6	15
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*							
Phalacrostemma sp. A							
Pholoe sp. A	0	3	0	0	0	1	4
Pholoe sp. B	0	2	0	0	0	0	2
Pholoe sp. C							
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis	0	0	3	1	0	2	6
Phyllodoce sp. C							
Phyllodocidae sp. A							
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	4	8	14	8	2	5	41
Pionosyllis spinisetosa							
Pionosyllis weismanni	2	1	2	1	1	1	8
Pionosyllis sp. C	0	0	0	1	0	0	1
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H	2	1	3	1	0	2	9
Pionosyllis sp. J							
Pisione remota							

Table D.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	2	1	2	0	0	1	6
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata							
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C							
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A							
Polynoidae sp. B							
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	0	0	0	0	0	1	1
Potamilla sp. A							
Prionospio cirrifera	4	8	1	1	0	6	20
Prionospio cirrobranchiata	0	0	0	0	0	1	1
Prionospio steenstrupi	2	1	1	0	0	0	4
Progoniada oahuensis							
Progoniada sp. B							
Protoaricia sp. A							
Protoaricia sp. B	0	0	2	2	0	0	4
Protodorvillea biarticulata	0	2	0	0	0	0	2
Protodorvillea egena							
Protodrilus albicans	0	0	0	1	0	3	4
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi	0	2	0	0	0	2	4
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis	0	1	0	0	0	0	1
Questa caudicirra							
Questa retrospermatica	1	1	0	0	2	0	4
Rhaphidrilus sp. A							
Rhodine sp. A	7	3	6	3	0	5	24
Sabella sp. A							
Saccocirrus oahuensis	0	1	1	0	1	0	3
Saccocirrus waianaensis							
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta							
Schistomeringos rudolphi							
Scolelepis victoriensis	0	0	1	0	0	1	2
Scolelepis sp. B							
Scyphoproctus djiboutiensis							
Serpula sp. D							
Sigalion sp. A							
Sigalionidae sp. A							

Table D.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata	0	1	0	0	0	0	1
Sphaerodoropsis sp. C							
Sphaerosyllis riseri							
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G	0	2	2	0	0	0	4
Sphaerosyllis sp. H	1	0	0	0	0	0	1
Spio blakei							
Spio filicornis							
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.	0	1	0	0	0	0	1
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini							
Synelmis sp. B							
Terebellidae sp. A							
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis							
Trypanosyllis sp. A							
Typosyllis aciculata orientalis	1	1	0	0	0	1	3
Typosyllis cornuta	0	0	0	1	0	0	1
Typosyllis ornata							
Typosyllis variegata	2	4	0	2	0	5	13
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata							
OLIGOCHAETA	15	15	15	14	2	3	64
NEMATODA	22	49	15	41	7	68	202
PLATYHELMINTHES	4	4	6	0	1	2	17
PORIFERA	0	1	0	1	0	1	3

Table D.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea	1	5	2	2	0	1	11
Holothuroidea	1	1	1	0	0	1	4
Ophiuroidea						1	1
CNIDARIA							
Anthozoa	0	20	0	0	0	0	20
Hydrozoa							
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A							
NEMERTEA	2	4	10	6	5	21	48
INSECTA	0	9	0	1	0	3	13
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	2	4	2	4	2	1	15
Aspidosiphon muelleri	0	0	7	1	0	2	10
Aspidosiphon sp. A							
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G							
Sipuncula sp. I	0	0	1	0	0	0	1
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.							
PRIAPULA							
CHAETOGNATHA							
Spadella gaetanoi	0	0	0	1	0	2	3
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA	2	3	0	2	4	7	18
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A	0	0	0	0	0	1	1
Osteichthyes							
Total No. of Individuals/Replicate	117	214	181	161	32	252	
Total No. of Taxa/Replicate	37	54	39	38	15	45	
Total No. of Individuals Sampled							957
Total No. of Taxa Sampled							86

Table D.3. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Wai‘anae ocean outfall sampling station ZE, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri	0	0	0	1	0	0	1
Amphiduros sp. A							
Amphiglena mediterranea							
Amphiglena sp. A							
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A	0	0	0	0	1	0	1
Aphelochaeta marioni							
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia							
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata							
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B							
Capitella capitata							
Capitellidae sp.							
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A							
Ceratonereis tentaculata							
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava							
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A							
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B							
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D							
Euchone cf. *rosea*							
Euchone sp. B							
Eumida sanguinea							
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A	0	0	0	0	1	0	1
Exogone longicornis							
Exogone verugera							
Exogone sp. A							
Exogone sp. C							
Exogone sp. F							
Exogone sp. H							
Fabricia sp. A							
Filogranula sp. A	1	0	0	0	0	0	1
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata							
Goniada emerita							
Goniada maculata							
Grubeosyllis mediodentata							
Gyptis sp. A							
Haplosyllis spongicola							
Harmothoe sp. A							
Hesione splendida							
Hesionidae sp. B							
Hesionidae sp. D							
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis	21	0	0	1	4	1	27
Heteropodarke sp. B	0	2	0	0	0	0	2
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri							
Lacydonia sp. A							
Laonice cirrata	0	0	0	2	0	0	2
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	1	1	0	1	0	0	3
Litocorsa acuminata	0	0	4	2	0	1	7
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata							
Lumbrineris latreilli							
Lygdamis nesiotes							
Lysidice ninetta							
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A							
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B							
Microphthalmus sp.							
Micropodarke sp. A	9	10	9	0	8	9	45
Micropodarke sp. B	1	0	0	0	0	0	1
Microspio granulata							
Monticellina cf. *dorsobranchialis*							
Mooreonuphis sp. A							
Myriochele oculata							
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata							
Neanthes succinea							
Nematonereis unicornis							
Nereis sp. B							
Notomastus tenuis							
Notopygos sp. A							
Odontosyllis maculata							
Odontosyllis sp. A							
Odontosyllis sp. B							
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens							
Paleanotus sp. B							
Paleanotus sp. E							
Palmyra sp. A							
Paramphinome sp. A							
Paraonella sp. A	0	0	0	0	0	1	1
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*							
Phalacrostemma sp. A							
Pholoe sp. A							
Pholoe sp. B							
Pholoe sp. C							
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis	0	0	0	0	0	1	1
Phyllodoce sp. C							
Phyllodocidae sp. A	1	0	0	0	0	0	1
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	29	7	10	15	25	5	91
Pionosyllis spinisetosa							
Pionosyllis weismanni							
Pionosyllis sp. C							
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H	1	0	0	0	0	0	1
Pionosyllis sp. J							
Pisione remota							

Table D.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	12	0	2	0	3	2	19
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata							
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C							
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A							
Polynoidae sp. B							
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	4	0	0	0	1	0	5
Potamilla sp. A							
Prionospio cirrifera	0	0	1	2	0	0	3
Prionospio cirrobranchiata	0	0	0	0	1	0	1
Prionospio steenstrupi	0	0	0	1	0	0	1
Progoniada oahuensis	1	0	0	0	0	0	1
Progoniada sp. B							
Protoaricia sp. A							
Protoaricia sp. B							
Protodorvillea biarticulata	0	1	0	0	0	0	1
Protodorvillea egena							
Protodrilus albicans	0	0	0	0	1	1	2
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi	0	2	0	0	2	2	6
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis							
Questa caudicirra							
Questa retrospermatica							
Rhaphidrilus sp. A							
Rhodine sp. A							
Sabella sp. A							
Saccocirrus oahuensis	1	0	0	0	0	0	1
Saccocirrus waianaensis	1	0	0	0	0	0	1
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta							
Schistomeringos rudolphi							
Scolelepis victoriensis	0	1	0	0	0	0	1
Scolelepis sp. B							
Scyphoproctus djiboutiensis							
Serpula sp. D							
Sigalion sp. A	0	0	1	0	0	0	1
Sigalionidae sp. A	1	0	0	0	0	0	1

Table D.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata							
Sphaerodoropsis sp. C	1	0	0	0	0	0	1
Sphaerosyllis riseri	1	0	0	1	0	0	2
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G	0	0	0	0	1	0	1
Sphaerosyllis sp. H							
Spio blakei	0	1	0	0	2	0	3
Spio filicornis							
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.							
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini							
Synelmis sp. B							
Terebellidae sp. A	1	0	1	0	0	0	2
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis							
Trypanosyllis sp. A							
Typosyllis aciculata orientalis							
Typosyllis cornuta							
Typosyllis ornata							
Typosyllis variegata							
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata							
OLIGOCHAETA	11	1	8	5	25	7	57
NEMATODA	85	10	29	13	46	15	198
PLATYHELMINTHES	4	0	0	0	1	1	6
PORIFERA							

Table D.3—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea	0	1	0	0	0	1	2
Holothuroidea	0	0	0	0	0	1	1
Ophiuroidea	1	0	0	0	0	1	2
CNIDARIA							
Anthozoa							
Hydrozoa	0	0	0	0	0	43	43
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A	0	2	0	0	0	0	2
NEMERTEA	9	1	4	0	5	0	19
INSECTA	2	0	0	0	0	1	3
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	0	1	2	4	2	3	12
Aspidosiphon muelleri	0	0	0	0	2	0	2
Aspidosiphon sp. A							
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G							
Sipuncula sp. I							
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.							
PRIAPULA							
CHAETOGNATHA							
Spadella gaetanoi	1	0	0	0	0	0	1
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA							
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A	2	0	2	1	0	1	6
Osteichthyes	0	0	0	0	0	1	1
Total No. of Individuals/Replicate	202	41	73	49	131	98	
Total No. of Taxa/Replicate	25	14	12	13	18	20	
Total No. of Individuals Sampled							594
Total No. of Taxa Sampled							50

Table D.4. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Waiʻanae ocean outfall sampling station Z, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri							
Amphiduros sp. A							
Amphiglena mediterranea							
Amphiglena sp. A							
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A							
Aphelochaeta marioni							
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia	0	0	0	1	1	0	2
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata	0	0	0	0	1	0	1
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B							
Capitella capitata	2	0	1	0	1	0	4
Capitellidae sp.	0	0	0	0	1	0	1
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A							
Ceratonereis tentaculata							
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava							
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A							
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B							
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D	0	0	0	1	0	0	1
Euchone cf. *rosea*							
Euchone sp. B							
Eumida sanguinea							
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A							
Exogone longicornis							
Exogone verugera							
Exogone sp. A							
Exogone sp. C							
Exogone sp. F							
Exogone sp. H							
Fabricia sp. A	0	1	0	0	0	0	1
Filogranula sp. A							
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata	0	0	1	0	0	0	1
Goniada emerita							
Goniada maculata							
Grubeosyllis mediodentata							
Gyptis sp. A							
Haplosyllis spongicola							
Harmothoe sp. A							
Hesione splendida							
Hesionidae sp. B							
Hesionidae sp. D							
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis							
Heteropodarke sp. B	0	0	0	1	1	0	2
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri							
Lacydonia sp. A							
Laonice cirrata	3	1	1	2	5	0	12
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	0	1	0	0	0	1	2
Litocorsa acuminata							
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata							
Lumbrineris latreilli							
Lygdamis nesiotes							
Lysidice ninetta							
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A							
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.4—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B							
Microphthalmus sp.							
Micropodarke sp. A	2	0	0	3	2	2	9
Micropodarke sp. B							
Microspio granulata							
Monticellina cf. *dorsobranchialis*							
Mooreonuphis sp. A							
Myriochele oculata	0	0	0	0	1	0	1
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata	0	0	1	0	0	0	1
Neanthes succinea							
Nematonereis unicornis							
Nereis sp. B							
Notomastus tenuis							
Notopygos sp. A							
Odontosyllis maculata							
Odontosyllis sp. A							
Odontosyllis sp. B							
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens							
Paleanotus sp. B							
Paleanotus sp. E							
Palmyra sp. A							
Paramphinome sp. A	1	0	0	0	0	0	1
Paraonella sp. A	0	0	0	0	1	0	1
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*							
Phalacrostemma sp. A							
Pholoe sp. A							
Pholoe sp. B							
Pholoe sp. C							
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis							
Phyllodoce sp. C							
Phyllodocidae sp. A							
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	10	2	5	6	4	3	30
Pionosyllis spinisetosa	0	0	0	0	1	0	1
Pionosyllis weismanni							
Pionosyllis sp. C							
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H							
Pionosyllis sp. J							
Pisione remota							

Table D.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	1	0	0	4	0	1	6
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata							
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C							
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A							
Polynoidae sp. B							
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	0	0	0	1	0	0	1
Potamilla sp. A							
Prionospio cirrifera	8	0	1	2	9	0	20
Prionospio cirrobranchiata	0	0	1	0	0	0	1
Prionospio steenstrupi	1	0	2	1	0	1	5
Progoniada oahuensis							
Progoniada sp. B							
Protoaricia sp. A							
Protoaricia sp. B							
Protodorvillea biarticulata	1	0	2	1	1	1	6
Protodorvillea egena	1	0	0	0	0	0	1
Protodrilus albicans	0	1	0	0	0	0	1
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi							
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis							
Questa caudicirra							
Questa retrospermatica	0	1	1	0	0	1	3
Rhaphidrilus sp. A							
Rhodine sp. A	0	0	0	0	0	2	2
Sabella sp. A							
Saccocirrus oahuensis							
Saccocirrus waianaensis							
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta							
Schistomeringos rudolphi							
Scolelepis victoriensis	2	2	1	0	1	2	8
Scolelepis sp. B	0	0	0	0	0	1	1
Scyphoproctus djiboutiensis							
Serpula sp. D							
Sigalion sp. A							
Sigalionidae sp. A	0	0	0	0	0	1	1

Table D.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata	2	0	0	1	0	0	3
Sphaerodoropsis sp. C							
Sphaerosyllis riseri							
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G	0	0	0	1	0	0	1
Sphaerosyllis sp. H							
Spio blakei	0	1	0	0	2	1	4
Spio filicornis	1	0	0	0	0	0	1
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.							
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini	0	0	0	1	0	0	1
Synelmis sp. B							
Terebellidae sp. A							
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis	0	0	0	1	0	0	1
Trypanosyllis sp. A							
Typosyllis aciculata orientalis							
Typosyllis cornuta							
Typosyllis ornata							
Typosyllis variegata							
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata							
OLIGOCHAETA	4	4	1	2	8	1	20
NEMATODA	15	12	2	16	25	10	80
PLATYHELMINTHES	2	2	0	2	0	3	9
PORIFERA							

Table D.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea							
Holothuroidea							
Ophiuroidea							
CNIDARIA							
Anthozoa							
Hydrozoa	0	1	0	0	0	0	1
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A							
NEMERTEA	6	3	2	4	5	3	23
INSECTA	0	0	0	0	2	0	2
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	0	1	0	1	3	3	8
Aspidosiphon muelleri	0	0	0	0	0	1	1
Aspidosiphon sp. A	0	0	0	0	0	1	1
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G							
Sipuncula sp. I							
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.							
PRIAPULA							
CHAETOGNATHA							
Spadella gaetanoi	0	1	0	1	0	0	2
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA	0	2	0	1	3	1	7
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A							
Osteichthyes							
Total No. of Individuals/Replicate	62	36	22	54	78	40	
Total No. of Taxa/Replicate	17	16	14	22	21	20	
Total No. of Individuals Sampled							292
Total No. of Taxa Sampled							47

Table D.5. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Wai‘anae ocean outfall sampling station ZW, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri							
Amphiduros sp. A							
Amphiglena mediterranea	0	0	3	1	1	0	5
Amphiglena sp. A							
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A	1	2	0	0	1	0	4
Aphelochaeta marioni	0	0	0	0	0	1	1
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia	0	0	2	0	1	0	3
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata							
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B							
Capitella capitata							
Capitellidae sp.	0	1	0	1	0	0	2
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A	0	0	0	1	0	0	1
Ceratonereis tentaculata							
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava	0	0	0	1	0	0	1
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A							
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B							
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D	0	0	0	0	1	0	1
Euchone cf. *rosea*							
Euchone sp. B							
Eumida sanguinea							
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.5—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A							
Exogone longicornis	0	4	0	0	0	0	4
Exogone verugera							
Exogone sp. A							
Exogone sp. C							
Exogone sp. F							
Exogone sp. H							
Fabricia sp. A	0	0	1	5	0	0	6
Filogranula sp. A							
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata	1	1	0	1	0	0	3
Goniada emerita							
Goniada maculata							
Grubeosyllis mediodentata							
Gyptis sp. A							
Haplosyllis spongicola							
Harmothoe sp. A							
Hesione splendida							
Hesionidae sp. B	0	0	0	0	1	0	1
Hesionidae sp. D	0	0	0	0	0	1	1
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis							
Heteropodarke sp. B	1	2	0	0	1	2	6
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri							
Lacydonia sp. A							
Laonice cirrata	3	4	1	0	4	1	13
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	0	0	0	0	0	1	1
Litocorsa acuminata							
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata							
Lumbrineris latreilli							
Lygdamis nesiotes							
Lysidice ninetta	0	0	0	0	1	0	1
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A							
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B							
Microphthalmus sp.							
Micropodarke sp. A	6	6	6	5	6	4	33
Micropodarke sp. B							
Microspio granulata							
Monticellina cf. *dorsobranchialis*	0	0	0	0	1	0	1
Mooreonuphis sp. A							
Myriochele oculata							
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata							
Neanthes succinea							
Nematonereis unicornis	0	0	2	3	1	0	6
Nereis sp. B							
Notomastus tenuis	0	1	0	0	0	0	1
Notopygos sp. A	1	0	0	0	1	0	2
Odontosyllis maculata							
Odontosyllis sp. A							
Odontosyllis sp. B							
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens							
Paleanotus sp. B							
Paleanotus sp. E							
Palmyra sp. A							
Paramphinome sp. A	0	1	0	0	0	0	1
Paraonella sp. A							
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*	0	0	0	1	0	0	1
Phalacrostemma sp. A							
Pholoe sp. A	1	0	0	0	0	1	2
Pholoe sp. B	0	0	0	0	0	1	1
Pholoe sp. C	0	0	0	0	0	1	1
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis	0	3	1	1	0	1	6
Phyllodoce sp. C							
Phyllodocidae sp. A							
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	8	8	1	4	7	5	33
Pionosyllis spinisetosa							
Pionosyllis weismanni							
Pionosyllis sp. C							
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H							
Pionosyllis sp. J							
Pisione remota							

Table D.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	1	4	0	0	1	0	6
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata							
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C							
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A	0	0	0	1	0	0	1
Polynoidae sp. B							
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	0	0	0	0	0	3	3
Potamilla sp. A							
Prionospio cirrifera	1	3	1	0	1	2	8
Prionospio cirrobranchiata							
Prionospio steenstrupi	3	0	1	1	0	2	7
Progoniada oahuensis							
Progoniada sp. B							
Protoaricia sp. A							
Protoaricia sp. B							
Protodorvillea biarticulata							
Protodorvillea egena	0	0	0	0	0	1	1
Protodrilus albicans	1	0	0	1	0	4	6
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi							
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis	0	0	0	0	1	1	2
Questa caudicirra							
Questa retrospermatica							
Rhaphidrilus sp. A							
Rhodine sp. A	0	0	2	0	0	0	2
Sabella sp. A							
Saccocirrus oahuensis							
Saccocirrus waianaensis							
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta							
Schistomeringos rudolphi							
Scolelepis victoriensis	1	0	0	0	0	0	1
Scolelepis sp. B							
Scyphoproctus djiboutiensis							
Serpula sp. D							
Sigalion sp. A							
Sigalionidae sp. A	1	0	0	0	0	0	1

Table D.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata							
Sphaerodoropsis sp. C	0	0	1	1	0	0	2
Sphaerosyllis riseri	0	0	0	0	0	1	1
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G							
Sphaerosyllis sp. H							
Spio blakei	0	0	0	0	1	0	1
Spio filicornis							
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.							
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini							
Synelmis sp. B							
Terebellidae sp. A							
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis							
Trypanosyllis sp. A							
Typosyllis aciculata orientalis							
Typosyllis cornuta							
Typosyllis ornata							
Typosyllis variegata	0	0	0	2	0	0	2
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata							
OLIGOCHAETA	1	5	1	7	1	1	16
NEMATODA	49	58	10	51	61	38	267
PLATYHELMINTHES	4	2	0	1	0	10	17
PORIFERA							

Table D.5—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea	0	1	2	0	0	1	4
Holothuroidea							
Ophiuroidea	1	0	0	0	1	1	3
CNIDARIA							
Anthozoa							
Hydrozoa							
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A							
NEMERTEA	5	1	4	0	1	3	14
INSECTA	2	0	0	0	2	4	8
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	1	1	0	3	0	0	5
Aspidosiphon muelleri	1	0	4	0	4	0	9
Aspidosiphon sp. A							
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G	0	0	1	0	1	0	2
Sipuncula sp. I							
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.	1	0	0	0	0	0	1
PRIAPULA	0	0	0	0	1	0	1
CHAETOGNATHA							
Spadella gaetanoi	3	2	3	3	0	5	16
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA	0	0	0	1	1	0	2
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A	0	0	0	1	0	0	1
Osteichthyes							
Total No. of Individuals/Replicate	98	110	47	97	104	96	
Total No. of Taxa/Replicate	24	20	19	23	26	26	
Total No. of Individuals Sampled							552
Total No. of Taxa Sampled							59

Table D.6. Taxon abundance from six replicates for nonmollusk components (excluding crustaceans), Waiʻanae ocean outfall sampling station W9, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
POLYCHAETA							
Amphicorina sp. B							
Amphicteis gunneri							
Amphiduros sp. A							
Amphiglena mediterranea	0	0	0	0	1	0	1
Amphiglena sp. A	1	0	0	0	0	0	1
Amphiglena sp. B							
Aonides oxycephala							
Aonides sp. A							
Aphelochaeta marioni							
Apophryotrocha sp. A							
Arabella iricolor							
Arabella multidentata							
Aricidea catherinae							
Armandia intermedia	0	2	0	0	0	2	4
Asclerocheilus sp. A							
Augeneriella dubia							
Australospio mokapu							
Axiothella quadrimaculata	0	0	2	2	0	0	4
Branchiomma nigromaculata							
Branchiosyllis exilis							
Brania rhopalophora							
Brania sp. B	0	1	0	0	0	0	1
Capitella capitata							
Capitellidae sp.	0	0	0	2	2	1	5
Caulleriella acicula							
Caulleriella bioculatus							
Caulleriella sp. A	1	0	0	0	0	0	1
Ceratonereis tentaculata							
Chaetopterus variopedatus							
Chitinopoma sp. A							
Chloeia flava							
Chloeia fusca							
Cirratulidae sp. A							
Cirratulidae sp. B							
Cirriformia punctata							
Cirrophorus sp. A							
Cossura coasta							
Demonax sp. A							
Dipolydora armata							
Dodecaceria sp. A							
Dodecaceria sp. B							
Dorvillea rubrovittata							
Dorvillea sp. B							
Dorvillea sp. D	0	0	0	0	1	0	1
Euchone cf. *rosea*							
Euchone sp. B	1	0	4	4	0	6	15
Eumida sanguinea	0	1	0	1	1	0	3
Eunice antennata							
Eunice havaica							
Eunice vittata							
Eunicidae sp. A							
Eurythoe parvecarunculata							
Eusyllis sp. A							

Table D.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Euthalenessa sp. A							
Exogone longicornis	2	0	1	0	0	0	3
Exogone verugera							
Exogone sp. A							
Exogone sp. C	0	0	0	1	0	0	1
Exogone sp. F							
Exogone sp. H							
Fabricia sp. A	1	1	4	0	2	1	9
Filogranula sp. A							
Filogranula sp. B							
Flabelliderma sp. A							
Glycera tesselata	0	0	1	0	0	0	1
Goniada emerita	0	0	0	0	1	0	1
Goniada maculata							
Grubeosyllis mediodentata							
Gyptis sp. A							
Haplosyllis spongicola							
Harmothoe sp. A							
Hesione splendida							
Hesionidae sp. B							
Hesionidae sp. D							
Hesionidae sp. G							
Hesionidae sp. H							
Hesionura australiensis							
Heteropodarke sp. B	0	0	2	0	2	2	6
Hyboscolex sp. A							
Hydroides bannerorum							
Janua pagenstecheri							
Jasmineira caudata							
Josephella marenzelleri	0	0	1	0	0	0	1
Lacydonia sp. A							
Laonice cirrata	0	0	0	2	0	1	3
Laonome sp. A							
Lepidasthenia sp. B							
Linopherus microcephala	0	0	1	0	0	1	2
Litocorsa acuminata	0	0	0	3	1	1	5
Loimia sp. A							
Lumbrineridae sp. A							
Lumbrineriopsis sp. A							
Lumbrineris dentata							
Lumbrineris latreilli	0	1	0	0	0	1	2
Lygdamis nesiotes							
Lysidice ninetta	0	0	0	0	1	0	1
Lysippe sp. A							
Magelona capensis							
Magelona sp. A							
Magelona sp. C							
Malacoceros sp. A							
Malacoceros sp. B							
Maldanidae sp. A							
Marphysa cf. *conferta*							
Megalomma intermedium							
Mesochaetopterus sp. A							
Mesochaetopterus sp. C							
Micromaldane sp. A							

Table D.6—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Micronereis sp. A							
Micronereis sp. B							
Microphthalmus sp.							
Micropodarke sp. A	0	3	1	6	3	4	17
Micropodarke sp. B							
Microspio granulata							
Monticellina cf. *dorsobranchialis*	0	0	0	0	0	1	1
Mooreonuphis sp. A							
Myriochele oculata	2	3	14	6	4	6	35
Myriochele pygidialis							
Myriochele sp. A							
Naineris sp. A							
Neanthes arenaceodentata	1	0	0	0	0	0	1
Neanthes succinea							
Nematonereis unicornis	0	4	1	4	2	0	11
Nereis sp. B							
Notomastus tenuis	0	1	0	0	0	0	1
Notopygos sp. A	0	0	0	0	1	0	1
Odontosyllis maculata							
Odontosyllis sp. A							
Odontosyllis sp. B							
Odontosyllis sp. C							
Odontosyllis sp. D							
Ophiodromus sp. A							
Ophryotrocha adherens							
Paleanotus sp. B							
Paleanotus sp. E							
Palmyra sp. A							
Paramphinome sp. A	0	0	0	1	0	0	1
Paraonella sp. A	2	1	0	1	1	0	5
Paraonella sp. B							
Paraonis sp. A							
Phalacrostemma cf. *setosa*							
Phalacrostemma sp. A							
Pholoe sp. A							
Pholoe sp. B							
Pholoe sp. C							
Pholoe sp. F							
Phyllochaetopterus socialis							
Phyllochaetopterus verrilli							
Phyllochaetopterus sp. A							
Phyllodoce madeirensis	0	1	0	1	1	0	3
Phyllodoce sp. C							
Phyllodocidae sp. A							
Phyllodocidae sp. D							
Phyllodocidae sp. G							
Pionosyllis heterocirrata	19	3	16	10	9	1	58
Pionosyllis spinisetosa	1	0	0	0	1	0	2
Pionosyllis weismanni							
Pionosyllis sp. C							
Pionosyllis sp. F							
Pionosyllis sp. G							
Pionosyllis sp. H	0	0	0	0	0	2	2
Pionosyllis sp. J							
Pisione remota							

Table D.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pisione sp. A	2	1	0	0	0	2	5
Pisionidens sp. A							
Plakosyllis quadrioculata							
Platynereis bicanaliculata							
Poecilochaetus johnsoni							
Poecilochaetus serpens							
Poecilochaetus sp. A							
Polycirrus plumosus							
Polycirrus sp. A							
Polycirrus sp. B							
Polycirrus sp. C	0	0	0	1	0	0	1
Polydora armata							
Polydora normalis							
Polydora sp. A							
Polygordius sp. A							
Polynoidae sp. B							
Polynoidae sp. C							
Polynoidae sp. D							
Polyophthalmus pictus	0	1	0	0	1	0	2
Potamilla sp. A							
Prionospio cirrifera	6	1	2	7	6	2	24
Prionospio cirrobranchiata	1	0	0	0	0	0	1
Prionospio steenstrupi	1	0	2	1	1	0	5
Progoniada oahuensis							
Progoniada sp. B							
Protoaricia sp. A	0	1	1	0	0	0	2
Protoaricia sp. B							
Protodorvillea biarticulata							
Protodorvillea egena	0	1	0	0	0	0	1
Protodrilus albicans	0	0	0	1	0	0	1
Protodrilus sp. C							
Protula atypha							
Psamathe sp. A							
Pseudexogone backstromi	1	0	0	2	0	0	3
Pseudobranchioma sp. A							
Pseudopolydora sp. A							
Pseudopotamilla reniformis							
Pseudovermilia occidentalis							
Questa caudicirra							
Questa retrospermatica							
Rhaphidrilus sp. A							
Rhodine sp. A	1	0	3	1	3	1	9
Sabella sp. A							
Saccocirrus oahuensis							
Saccocirrus waianaensis	1	0	0	0	0	0	1
Salmacina dysteri							
Scalibregmidae sp. B							
Schistomeringos macilenta							
Schistomeringos rudolphi							
Scolelepis victoriensis	1	0	0	0	1	1	3
Scolelepis sp. B	0	0	0	0	1	0	1
Scyphoproctus djiboutiensis	0	0	3	0	0	0	3
Serpula sp. D							
Sigalion sp. A							
Sigalionidae sp. A							

Table D.6—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Sigambra tentaculata	0	1	0	1	0	0	2
Sphaerodoropsis sp. C	0	0	0	0	0	1	1
Sphaerosyllis riseri							
Sphaerosyllis sp. D							
Sphaerosyllis sp. E							
Sphaerosyllis sp. G							
Sphaerosyllis sp. H	0	0	0	0	1	0	1
Spio blakei	0	0	0	1	0	0	1
Spio filicornis							
Spiochaetopterus sp. A							
Spionidae sp. B							
Spionidae sp. D							
Spionidae sp. F							
Spionidae sp. G							
Spionidae sp. H							
Spiophanes bombyx							
Spirorbinae							
Spirorbis sp.							
Streptosyllis sp. A							
Syllidae sp. C							
Syllidae sp. D							
Syllidae sp. E							
Syllidae sp. H							
Syllides bansei							
Syllides sp. B							
Syllis gracilis							
Synelmis albini							
Synelmis sp. B							
Terebellidae sp. A							
Terebellidae sp. B							
Terebellidae sp. C							
Terebellidae sp. D							
Tetreres baileyae							
Thelepus setosus							
Thelepus sp. A							
Trichobranchus glacialis							
Trypanosyllis sp. A							
Typosyllis aciculata orientalis	0	0	0	2	0	0	2
Typosyllis cornuta							
Typosyllis ornata							
Typosyllis variegata							
Typosyllis sp. A							
Typosyllis sp. H							
Typosyllis sp. J							
Vermiliopsis infundibulum							
Vermiliopsis torquata							
OLIGOCHAETA	9	20	11	10	5	19	74
NEMATODA	10	10	13	5	18	21	77
PLATYHELMINTHES	1	2	0	0	1	1	5
PORIFERA	1	0	0	0	0	0	1

Table D.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ECHINODERMATA							
Asteroidea							
Echinoidea	0	1	0	1	1	0	3
Holothuroidea	1	1	0	0	0	1	3
Ophiuroidea	1	1	0	3	0	1	6
CNIDARIA							
Anthozoa							
Hydrozoa	0	0	0	0	0	5	5
Scyphozoa							
KINORHYNCHA							
Echinoderes sp. A	1	0	0	0	0	0	1
NEMERTEA	2	8	1	5	7	5	28
INSECTA	3	2	2	0	1	0	8
ARACHNIDA							
ACARI							
SIPUNCULA							
Apionsoma misakianum	4	0	5	0	2	2	13
Aspidosiphon muelleri	0	1	2	1	3	0	7
Aspidosiphon sp. A	0	1	0	1	0	0	2
Lithacrosiphon cristatus							
Phascolosoma nigrescens							
Siphonosoma cumanense							
Sipunculus nudus							
Sipuncula sp. G							
Sipuncula sp. I							
Sipuncula sp. O							
Sipuncula sp. Q							
Sipuncula sp.							
PRIAPULA	0	1	0	0	0	0	1
CHAETOGNATHA							
Spadella gaetanoi	0	0	0	1	1	0	2
PHORONIDA							
Phoronis ovalis							
Phoronis psammophila							
BRYOZOA	1	0	0	4	2	0	7
ECHIURA							
HEMICHORDATA							
BRACHIOPODA							
TARDIGRADA							

Table D.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
CHORDATA							
Urochordata							
Branchiostoma sp. A	1	2	0	0	0	2	5
Osteichthyes							
Total No. of Individuals/Replicate	80	78	93	92	89	94	
Total No. of Taxa/Replicate	30	30	23	32	34	28	
Total No. of Individuals Sampled							526
Total No. of Taxa Sampled							73

Table D.7. Taxon abundance from six replicates for crustacean components, Wai‘anae ocean outfall sampling station W1, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus	0	0	0	0	1	0	1
Tanystylum sp. A							
ASCOTHORACICA							
COPEPODA	8	17	10	8	18	19	80
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A	0	0	0	0	1	0	1
Vargula sp. A	0	0	1	0	1	0	2
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*							
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A							
Bairdia hanaumaensis							
Bairdia kauaiensis							
Cytherelloidea monodenticulata							
Macrocypris gracilis							
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA							
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA							
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis							
Leptochelia dubia	3	3	2	2	8	16	34
Leptochelia sp. A							
Parapseudes pedispinus (?)							
Tanaissus sp. A							
Tanaid sp. A							
ISOPODA							
Apanthura inornata							
Caeciantropsis sp. A							
Carpias algicola	0	1	0	1	1	1	4
Cirolana sp. A							
Cryptoniscus form							
Dynamenella sp. A							

Table D.7—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A							
Joeropsis hawaiiensis							
Mesanthura hieroglyphica							
Metacirolana sp. A	1	0	0	1	2	1	5
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina	1	2	4	3	6	4	20
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*							
Hemiaegina minuta							
Metaprotella sandalensis							
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).							
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	2	0	5	0	1	4	12
Bemlos pualani							
Ceradocus hawaiiensis	3	1	4	3	0	6	17
Corophium sp. A							
Elasmopus piikoi	0	1	13	5	0	2	21
Ericthonius brasiliensis	2	1	0	0	0	0	3
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A							
Eriopisella sechellensis	2	0	7	0	0	2	11
Gammaropsis atlantica							
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu	0	0	0	0	1	0	1
Ischyrocerus sp. A							
Kanaloa manoa	2	2	0	2	4	4	14
Konatopus paao	2	1	0	6	0	0	9
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*							
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata	0	0	0	2	0	0	2

Table D.7—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai							
Ochlesis alii							
Pereionotus alaniphlias							
Paradexamine maunaloa							
Harpiniopsis sp. A							
Paraphoxus sp. B							
Photis kapapa	0	0	0	0	0	1	1
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu							
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus							
Alpheus paracrinitus	1	0	0	0	0	2	3
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis							
Metapenaeopsis evermanni							
Nikoides danae							
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A	2	0	0	0	0	0	2
Pontophilus cf. *sculptus*							
Processa aequimana	0	0	0	1	0	0	1
Processa cf. *coutierei*							
Processa hawaiiensis							
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus	0	0	1	0	0	0	1
Axius sp. A							
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	1	0	1	0	0	0	2
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A							
Banareia villosa							
Brusinia sp. A							
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.7—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni	0	0	0	1	0	0	1
Macrophthalmus (?) sp. A							
Micippa (?) sp. A							
Nucia (?) sp. A							
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A							
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*	3	1	0	0	2	3	9
Megalops (unid.)	1	0	0	0	0	1	2
Total No. of Individuals/Replicate	34	30	48	35	46	66	
Total No. of Taxa/Replicate	15	10	10	12	12	14	
Total No. of Individuals Sampled							259
Total No. of Taxa Sampled							26

Table D.8. Taxon abundance from six replicates for crustacean components, Wai‘anae ocean outfall sampling station W2, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus	0	1	1	0	0	1	3
Tanystylum sp. A							
ASCOTHORACICA							
COPEPODA	10	12	3	13	1	16	55
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A							
Vargula sp. A	0	1	0	1	0	1	3
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*							
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A	1	0	0	0	0	0	1
Bairdia hanaumaensis							
Bairdia kauaiensis	0	0	0	1	0	0	1
Cytherelloidea monodenticulata							
Macrocypris gracilis	11	6	0	1	0	11	29
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA	1	6	0	0	0	0	7
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA	0	0	1	0	0	0	1
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis							
Leptochelia dubia	4	10	6	1	3	5	29
Leptochelia sp. A	1	0	0	2	0	1	4
Parapseudes pedispinus (?)	0	0	1	0	0	0	1
Tanaissus sp. A							
Tanaid sp. A							
ISOPODA							
Apanthura inornata	0	2	2	0	0	4	8
Caecianiropsis sp. A							
Carpias algicola	2	10	5	2	0	4	23
Cirolana sp. A							
Cryptoniscus form	0	1	0	0	0	0	1
Dynamenella sp. A							

Table D.8—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A	0	0	0	1	0	0	1
Joeropsis hawaiiensis	2	1	3	0	0	2	8
Mesanthura hieroglyphica							
Metacirolana sp. A	0	1	0	1	0	4	6
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina	10	12	9	6	2	25	64
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*							
Hemiaegina minuta							
Metaprotella sandalensis	0	0	0	0	0	4	4
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).	0	5	0	2	2	4	13
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	0	20	6	0	0	6	32
Bemlos pualani							
Ceradocus hawaiiensis	2	8	1	4	0	17	32
Corophium sp. A							
Elasmopus piikoi							
Ericthonius brasiliensis	0	1	0	0	0	12	13
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A							
Eriopisella sechellensis	0	0	0	0	0	1	1
Gammaropsis atlantica	4	5	13	0	0	15	37
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu							
Ischyrocerus sp. A							
Kanaloa manoa	0	0	0	0	0	1	1
Konatopus paao	0	4	1	19	3	27	54
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*	5	1	0	0	0	0	6
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata							

Table D.8—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai							
Ochlesis alii	0	0	1	0	0	0	1
Pereionotus alaniphlias	0	0	2	0	0	0	2
Paradexamine maunaloa	0	0	1	0	0	0	1
Harpiniopsis sp. A	0	0	1	0	0	1	2
Paraphoxus sp. B							
Photis kapapa	0	3	0	0	1	0	4
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu	6	5	1	6	0	13	31
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus	0	0	1	1	0	1	3
Alpheus paracrinitus							
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis							
Metapenaeopsis evermanni							
Nikoides danae							
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A	0	0	0	0	0	1	1
Pontophilus cf. *sculptus*							
Processa aequimana	0	0	0	0	0	1	1
Processa cf. *coutierei*							
Processa hawaiiensis							
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus							
Axius sp. A	0	0	0	0	0	1	1
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	0	2	2	1	0	0	5
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A	0	0	1	0	0	0	1
Banareia villosa							
Brusinia sp. A							
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.8—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni							
Macrophthalmus (?) sp. A							
Micippa (?) sp. A							
Nucia (?) sp. A	0	0	0	0	0	1	1
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A							
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*	0	1	0	0	0	0	1
Megalops (unid.)	0	1	0	1	0	0	2
Total No. of Individuals/Replicate	59	119	62	63	12	180	
Total No. of Taxa/Replicate	13	24	21	17	6	27	
Total No. of Individuals Sampled							495
Total No. of Taxa Sampled							43

Table D.9. Taxon abundance from six replicates for crustacean components, Waiʻanae ocean outfall sampling station ZE, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus							
Tanystylum sp. A							
ASCOTHORACICA							
COPEPODA	22	1	0	3	19	16	61
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A							
Vargula sp. A	1	0	0	0	0	1	2
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*	1	0	0	1	0	0	2
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A							
Bairdia hanaumaensis							
Bairdia kauaiensis							
Cytherelloidea monodenticulata							
Macrocypris gracilis							
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA							
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA							
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis	0	1	0	0	0	0	1
Leptochelia dubia	1	1	0	0	0	0	2
Leptochelia sp. A							
Parapseudes pedispinus (?)							
Tanaissus sp. A	0	0	0	0	1	0	1
Tanaid sp. A							
ISOPODA							
Apanthura inornata							
Caecianiropsis sp. A							
Carpias algicola							
Cirolana sp. A							
Cryptoniscus form							
Dynamenella sp. A							

Table D.9—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A	1	0	0	0	1	0	2
Joeropsis hawaiiensis							
Mesanthura hieroglyphica							
Metacirolana sp. A							
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina							
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*							
Hemiaegina minuta							
Metaprotella sandalensis							
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).							
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	4	0	0	1	0	1	6
Bemlos pualani							
Ceradocus hawaiiensis							
Corophium sp. A							
Elasmopus piikoi							
Ericthonius brasiliensis	0	0	0	0	0	1	1
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A							
Eriopisella sechellensis							
Gammaropsis atlantica							
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu							
Ischyrocerus sp. A							
Kanaloa manoa							
Konatopus paao	0	2	0	0	1	3	6
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*							
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata							

Table D.9—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai							
Ochlesis alii							
Pereionotus alaniphlias							
Paradexamine maunaloa							
Harpiniopsis sp. A							
Paraphoxus sp. B							
Photis kapapa							
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu	20	0	1	0	1	1	23
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus							
Alpheus paracrinitus							
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis							
Metapenaeopsis evermanni	0	0	0	0	0	1	1
Nikoides danae							
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A							
Pontophilus cf. *sculptus*							
Processa aequimana							
Processa cf. *coutierei*							
Processa hawaiiensis							
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus							
Axius sp. A							
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	1	0	0	0	0	0	1
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A							
Banareia villosa							
Brusinia sp. A							
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.9—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni							
Macrophthalmus (?) sp. A							
Micippa (?) sp. A							
Nucia (?) sp. A							
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A							
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*							
Megalops (unid.)							
Total No. of Individuals/Replicate	51	5	1	5	23	24	
Total No. of Taxa/Replicate	8	4	1	3	5	7	
Total No. of Individuals Sampled							109
Total No. of Taxa Sampled							13

Table D.10. Taxon abundance from six replicates for crustacean components, Waiʻanae ocean outfall sampling station Z, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus	0	0	0	0	1	0	1
Tanystylum sp. A	1	0	0	0	0	0	1
ASCOTHORACICA							
COPEPODA	1	0	3	0	1	0	5
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A							
Vargula sp. A							
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*							
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A							
Bairdia hanaumaensis							
Bairdia kauaiensis	0	0	0	0	1	0	1
Cytherelloidea monodenticulata							
Macrocypris gracilis							
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA	0	0	0	0	1	1	2
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA							
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis							
Leptochelia dubia	0	0	0	0	1	0	1
Leptochelia sp. A							
Parapseudes pedispinus (?)							
Tanaissus sp. A							
Tanaid sp. A							
ISOPODA							
Apanthura inornata							
Caecianiropsis sp. A							
Carpias algicola							
Cirolana sp. A							
Cryptoniscus form	1	0	0	0	0	0	1
Dynamenella sp. A							

Table D.10—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A	0	0	0	0	1	0	1
Joeropsis hawaiiensis	0	0	0	0	1	0	1
Mesanthura hieroglyphica							
Metacirolana sp. A							
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina	0	1	1	0	3	0	5
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*							
Hemiaegina minuta							
Metaprotella sandalensis							
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).							
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	0	0	0	0	0	1	1
Bemlos pualani							
Ceradocus hawaiiensis							
Corophium sp. A							
Elasmopus piikoi	0	0	6	0	0	0	6
Ericthonius brasiliensis							
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A	0	0	0	0	0	1	1
Eriopisella sechellensis							
Gammaropsis atlantica							
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu							
Ischyrocerus sp. A							
Kanaloa manoa							
Konatopus paao	0	0	0	0	1	1	2
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*							
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata							

Table D.10—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai	0	0	0	0	1	0	1
Ochlesis alii							
Pereionotus alaniphlias							
Paradexamine maunaloa							
Harpiniopsis sp. A	0	0	0	0	0	1	1
Paraphoxus sp. B							
Photis kapapa							
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu							
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus							
Alpheus paracrinitus							
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis							
Metapenaeopsis evermanni							
Nikoides danae							
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A							
Pontophilus cf. *sculptus*							
Processa aequimana							
Processa cf. *coutierei*							
Processa hawaiiensis							
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus							
Axius sp. A							
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	0	0	1	0	0	0	1
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A							
Banareia villosa							
Brusinia sp. A							
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.10—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni							
Macrophthalmus (?) sp. A							
Micippa (?) sp. A							
Nucia (?) sp. A							
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A							
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*							
Megalops (unid.)							
Total No. of Individuals/Replicate	3	1	11	0	12	5	
Total No. of Taxa/Replicate	3	1	4	0	10	5	
Total No. of Individuals Sampled							32
Total No. of Taxa Sampled							17

Table D.11. Taxon abundance from six replicates for crustacean components, Waiʻanae ocean outfall sampling station ZW, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus	0	0	0	0	0	1	1
Tanystylum sp. A							
ASCOTHORACICA							
COPEPODA	3	4	1	4	1	12	25
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A							
Vargula sp. A	0	0	0	0	0	1	1
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*							
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A							
Bairdia hanaumaensis							
Bairdia kauaiensis							
Cytherelloidea monodenticulata							
Macrocypris gracilis	0	0	2	3	0	2	7
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA	3	1	0	0	0	0	4
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA							
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis							
Leptochelia dubia	1	0	2	2	3	2	10
Leptochelia sp. A	0	0	0	0	2	0	2
Parapseudes pedispinus (?)							
Tanaissus sp. A	1	2	1	1	0	0	5
Tanaid sp. A							
ISOPODA							
Apanthura inornata							
Caecianiropsis sp. A	1	3	0	0	1	0	5
Carpias algicola	0	0	3	4	0	6	13
Cirolana sp. A							
Cryptoniscus form							
Dynamenella sp. A							

Table D.11—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A	1	1	0	0	0	0	2
Joeropsis hawaiiensis	0	0	0	2	2	0	4
Mesanthura hieroglyphica							
Metacirolana sp. A	3	2	0	0	0	0	5
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina	4	1	1	1	1	12	20
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*	0	0	0	0	0	1	1
Hemiaegina minuta							
Metaprotella sandalensis							
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).	0	0	0	0	1	1	2
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	0	0	0	1	9	0	10
Bemlos pualani							
Ceradocus hawaiiensis	3	7	10	10	1	2	33
Corophium sp. A							
Elasmopus piikoi	3	0	0	0	1	0	4
Ericthonius brasiliensis	2	0	1	1	0	0	4
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A							
Eriopisella sechellensis	2	0	0	1	0	0	3
Gammaropsis atlantica	0	0	0	0	2	0	2
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu							
Ischyrocerus sp. A							
Kanaloa manoa	0	1	0	0	1	2	4
Konatopus paao	6	0	1	2	0	3	12
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*	0	2	4	0	0	2	8
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata							

Table D.11—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai							
Ochlesis alii							
Pereionotus alaniphlias							
Paradexamine maunaloa							
Harpiniopsis sp. A							
Paraphoxus sp. B							
Photis kapapa							
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu							
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus							
Alpheus paracrinitus							
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis							
Metapenaeopsis evermanni							
Nikoides danae							
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A							
Pontophilus cf. *sculptus*	0	0	0	2	0	0	2
Processa aequimana	0	0	0	0	0	1	1
Processa cf. *coutierei*							
Processa hawaiiensis	1	0	0	0	0	0	1
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus							
Axius sp. A							
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	1	0	0	0	2	0	3
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A							
Banareia villosa							
Brusinia sp. A	0	1	0	1	0	1	3
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.11—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni							
Macrophthalmus (?) sp. A							
Micippa (?) sp. A	0	0	0	0	1	0	1
Nucia (?) sp. A	0	1	0	0	0	0	1
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A	1	0	0	1	1	0	3
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*							
Megalops (unid.)	0	0	0	0	0	1	1
Total No. of Individuals/Replicate	36	26	26	36	29	50	
Total No. of Taxa/Replicate	16	12	10	15	15	16	
Total No. of Individuals Sampled							203
Total No. of Taxa Sampled							34

Table D.12. Taxon abundance from six replicates for crustacean components, Waiʻanae ocean outfall sampling station W9, Oʻahu, Hawaiʻi, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
ACARI							
Halacaridae sp. A							
PYCNOGONIDA							
Anoplodactylus projectus							
Tanystylum sp. A							
ASCOTHORACICA							
COPEPODA	2	3	2	2	6	2	17
OSTRACODA–MYODOCOPIDA							
Cylindroleberididae sp. A							
Vargula sp. A							
Ancohenia hawaiiensis							
Ancohenia cf. *hawaiiensis*	0	0	0	0	0	1	1
Philomedidiae sp. A							
Sarsiella sp. A							
Sarsiella janiceae							
OSTRACODA–PODOCOPIDA							
Anchistrocheles (?) sp. A							
Bairdia hanaumaensis							
Bairdia kauaiensis	0	0	0	1	1	0	2
Cytherelloidea monodenticulata							
Macrocypris gracilis							
Mutilus cf. *oahuensis*							
Podocope sp. A							
Podocope sp. B							
CUMACEA	0	1	0	1	0	1	3
NEBALIACEA							
Nebalia sp. A							
MYSIDACEA							
TANAIDACEA							
Anatanais insularis							
Apseudes tropicalis							
Apseudomorpha oahuensis							
Leptochelia dubia							
Leptochelia sp. A	0	0	0	1	1	0	2
Parapseudes pedispinus (?)							
Tanaissus sp. A	0	2	0	0	0	0	2
Tanaid sp. A							
ISOPODA							
Apanthura inornata							
Caecianiropsis sp. A							
Carpias algicola							
Cirolana sp. A							
Cryptoniscus form							
Dynamenella sp. A							

Table D.12—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Gnathia sp. A							
Hyssuridae sp. A							
Joeropsis hawaiiensis	0	0	0	1	1	0	2
Mesanthura hieroglyphica							
Metacirolana sp. A	0	0	0	1	0	0	1
Microcerberus sp. A							
Microcharon sp. A							
Munna acarina	0	0	0	2	3	1	6
Paranthura ostergaardi							
Pleurocope sp. A							
Santia sp. A							
AMPHIPODA–CAPRELLIDEA							
Caprella scaura							
Caprella cf. *subtilis*							
Hemiaegina minuta							
Metaprotella sandalensis							
Pseudaeginella cf. *biscaynensis*							
AMPHIPODA–GAMMARIDEA							
Amphilochidae sp(p).	0	0	0	0	0	1	1
Amphilochus likelike							
Amphilochus menehune							
Ampithoe waialua							
Anamixis stebbingi							
Aoroides nahili							
Aruga sp. A							
Atylus nani							
Bemlos intermedius							
Globosolembos leapakahi							
Bemlos macromanus	0	0	0	0	2	0	2
Bemlos pualani							
Ceradocus hawaiiensis							
Corophium sp. A	0	0	0	0	0	2	2
Elasmopus piikoi	0	6	0	0	5	2	13
Ericthonius brasiliensis							
Eriopisa laakona							
Erioisa hamakua							
Eriopisa sp. A	7	0	0	6	1	0	14
Eriopisella sechellensis	14	12	0	17	11	81	135
Gammaropsis atlantica							
Gammaropsis pokipoki							
Gitanopsis pele							
Grandidierella japonica							
Ischyrocerus oahu							
Ischyrocerus sp. A							
Kanaloa manoa	0	4	0	0	0	1	5
Konatopus paao	0	0	0	2	0	0	2
Leucothoe cf. *assimilis*							
Leucothoe hyhelia							
Maera cf. *hamigera*	0	0	0	1	0	0	1
Maera kaiulani							
Maera serrata							
Maera sp. A							
Melita appendiculata							

Table D.12—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Nuuanu amikai							
Ochlesis alii							
Pereionotus alaniphlias							
Paradexamine maunaloa							
Harpiniopsis sp. A	0	0	0	2	0	0	2
Paraphoxus sp. B							
Photis kapapa							
Podocerus brasiliensis							
Podocerus talegus							
Seba ekepuu							
Seba typica							
DECAPODA–NATANTIA							
Alpheopsis equalis							
Alpheus leptochirus	0	0	0	1	0	0	1
Alpheus paracrinitus							
Automate cf. *gardineri*							
Hippolytidae sp. A							
Leptochela hawaiiensis	0	0	0	0	1	0	1
Metapenaeopsis evermanni							
Nikoides danae	0	0	0	0	0	1	1
Nikoides steinii (?)							
Ogyrides sp. A							
Parapenaeus sp. A							
Periclimenes (?) sp. A							
Pontophilus cf. *sculptus*	0	0	0	0	1	0	1
Processa aequimana	0	0	0	0	0	1	1
Processa cf. *coutierei*							
Processa hawaiiensis							
Processa macrognatha							
Salmoneus mauiensis							
Synalpheus sp. A							
DECAPODA–ANOMURA							
Axius spinosissimus	1	1	0	0	0	0	2
Axius sp. A							
Callianassa sp. A							
Calocaris sp. A							
Pagurid sp. A	0	0	0	0	1	1	2
Pagurid sp. B							
Pomatocheles sp. A							
Pontophilus cf. *sculptus*							
DECAPODA–STOMATOPODA							
Lysiosquilla maculatus							
DECAPODA–BRACHYURA							
Actaea hawaiiensis							
Actumunus (?) sp. A							
Banareia villosa							
Brusinia sp. A							
Calappa gallus							
Calappa hepatica							
Catoptrus inaequalis							
Cryptosoma granulosum							

Table D.12—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kraussia hendersoni							
Macrophthalmus (?) sp. A							
Micippa (?) sp. A							
Nucia (?) sp. A							
Paranthranites hexagonum (?)							
Pilumnus (?) sp. A							
Portumnus sp. A							
Portunus latibrachium							
Portunus macrophthalmus							
Portunus orbicularis							
Portunus sp. A							
Tetralia (?) sp. A							
Thalamita cf. *auauensis*							
Megalops (unid.)							
Total No. of Individuals/Replicate	24	29	2	38	34	95	
Total No. of Taxa/Replicate	4	7	1	13	12	12	
Total No. of Individuals Sampled							222
Total No. of Taxa Sampled							26

Appendix E

Taxon Abundance for Mollusks

Table E.1. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station W1, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa							
Arca spp.							
Arcidae spp.							
Barbatia divaricata	1	0	0	0	1	1	3
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.							
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	2	1	0	0	1	2	6
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.							
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	3	6	1	0	1	10	21
Crenella spp.							
Ctena bella	0	0	0	0	0	1	1
Ctena transversa	0	0	0	0	1	0	1
Ctena spp.							
Cuspidaria spp.	0	0	2	0	1	0	3
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta	1	1	0	0	0	1	3
Fragum mundum	2	0	1	0	0	2	5
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica							
Irus spp.							
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.							
Kellia hawaiensis	3	0	0	1	0	0	4
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica	0	1	1	2	0	1	5
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.	0	0	0	0	0	1	1
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	0	2	0	1	0	1	4
Macoma dispar							
Macoma obliquilineata	0	1	2	0	0	6	9
Mactra thaanumi							
Malleus regula	1	1	0	8	0	0	10
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.							
Nucula hawaiensis							
Ostrea spp.	0	0	1	0	1	2	4
Pectinidae							
Pillucina hawaiiensis							
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	4	0	5	0	3	8	20
Pinna spp.[a]	0	+	+	+	+	+	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	20	14	12	40	9	26	121
Semelangulus crebrimaculatus	2	1	3	0	0	2	8
Semelangulus spp.							
Semele australis							
Septifer bryanae	9	0	8	3	4	12	36
Septifer spp.							
Spondylus spp.							
Tellina crucigera	0	0	0	0	0	1	1
Tellina hawaiensis							
Tellina oahuana							
Tellina perna							
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.							
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.							
GASTROPODA							
Aclis sp. A	0	1	0	0	0	0	1
Acteocina hawaiensis							
Acteocina sandwicensis							
Acteocina sp. A							
Acteocina spp.							
Alcyna ocellata	4	0	1	3	0	2	10
Alcyna subangulata	1	0	3	0	0	1	5
Alvania isolata							
Amathina bicarinata							
Anacithara perfecta							
Ancylidae spp. [b]							
Antisabia foliacea							
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata							
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	1	0	2	3	1	1	8
Barleeia brevilabiosa							
Barleeia labiosa							
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens							
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa							
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata							
Caecum arcuatum	5	6	3	4	3	7	28
Caecum cf. *glabella*							
Caecum glabriformis	1	0	0	1	0	1	3
Caecum oahuense							
Caecum sepimentum							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]							
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	0	0	1	0	0	0	1
Carinapex papillosa							
Carinapex spp.	0	0	0	0	1	0	1
Cephalaspidea spp.	4	0	0	1	1	1	7
Cerithidium diplax	22	13	12	26	19	39	131
Cerithidium perparvulum	110	67	54	102	43	192	568
Cerithiopsis sp. A							
Cerithiopsis spp.	1	0	0	0	0	1	2
Cerithium atromarginatum							
Cerithium columna	1	4	0	6	0	3	14
Cerithium echinatum							
Cerithium egenum							
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	13	8	6	9	1	14	51
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	1	3	1	4	1	8	18
Cerithium rostratum	0	0	2	0	1	0	3
Cerithium sp. cf. *placidum*							
Cerithium zebrum	0	1	0	1	0	0	2
Cerithium spp.	0	0	0	0	0	2	2
Ceritoturris bittium							
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi							
Clavus nodifera							
Clavus pusilla							
Clavus sp. cf. *powelli*							
Clavus spp.	0	0	0	0	1	0	1
Collonista candida	0	0	0	0	0	1	1
Columbellidae spp.							
Conus pulicarius							
Conus spp.							
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.							
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi							
Cyclostremiscus striatus							
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla	0	1	0	0	0	0	1
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.							
Dendropoma platypus							
Dendropoma spp.	0	0	1	0	0	0	1

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum	1	1	0	0	0	0	2
Diala semistriata	25	18	20	33	17	73	186
Diala spp.							
Diniatys dentifer	1	1	0	0	0	0	2
Diodora granifera							
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae							
Eatoniella pigmenta							
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta							
Epitonium spp.							
Erato sandwicensis							
Etrema acricula	0	0	1	0	0	0	1
Euchelus gemmatus							
Euchelus spp.							
Eucithara angiostoma							
Eucithara pusilla							
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis	0	0	0	0	0	0	
Evalea spp.							
Favartia garretti							
Finella pupoides							
Fossarus garretti							
Gibbula marmorea							
Granula sandwicensis	0	0	0	2	0	0	2
Granulina vitrea	0	0	0	0	1	0	1
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum							
Haminoea spp.	1	0	1	0	0	0	2
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus							
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	0	0	0	0	2	4	6
Herviera patricia							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica							
Hipponix australis	0	0	0	1	0	0	1
Hipponix imbricatus							
Hipponix pilosus							
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum							
Julia exquisita	1	1	0	0	0	1	3
Juliidae spp.							
Kermia aniani	0	1	0	0	0	0	1
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta							
Leptothyra verruca	0	0	0	0	0	2	2
Leptothyra spp.							
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi							
Lienardia spp.							
Liotiinae spp.	0	0	0	4	0	0	4
Littoraria spp.							
Lophocochlias minutissimus	23	20	12	30	7	39	131
Lophocochlias sp. A	0	1	0	1	1	1	4
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.							
Meioceras sandwichensis							
Merelina granulosa	0	0	0	3	1	0	4
Merelina hewa							
Merelina wanawana							
Merelina spp.							
Metaxia albicephala							
Metaxia brunnicephala							
Metaxia spp.							
Microdaphne morrisoni							
Microdaphne trichodes	0	0	0	1	0	0	1
Miralda paulbartschi							
Miralda scopulorum							
Miralda spp.							
Mitra saltata							
Mitra typha							
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis							
Mitrella margarita							
Mitrella rorida							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.							
Mitridae spp.							
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula							
Mitrolumna sp.							
Modulus tectum							
Morula spp.	1	0	0	0	0	0	1
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.	0	0	1	0	0	0	1
Natica gualteriana							
Natica spp.							
Nerita spp.							
Nesiodostomia quarta							
Nesiodostomia spp.							
Odostomia gulicki	0	0	0	0	0	1	1
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.							
Omalaxis spp.							
Omalogyra japonica							
Omalogyra sp. A							
Omalogyra spp.							
Opalia attenuata							
Opalia spp.							
Orbitestella regina	0	3	2	1	0	0	6
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.							
Otopleura mirabilis							
Parashiela beetsi	17	13	10	28	8	41	117
Peasiella tantilla							
Peristernia chlorostoma							
Phenacolepas scobinata	0	0	0	0	1	0	1
Phenacolepas spp.							
Philippia oxytropis	1	0	0	0	0	0	1
Philippia radiata	0	0	0	1	0	0	1
Philippia spp.							
Physidae [c] spp.							
Planaxis suturalis							
Planaxis spp.							
Plesiotrochus luteus							
Polinices tumidus [b]	0	1	1	1	0	4	7
Powellisetia fallax	0	1	1	0	0	3	5
Prodotia iostomus							
Pseudomalaxis spp.	0	0	0	1	0	0	1
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.							
Pusillina marmorata	28	12	17	20	16	32	125
Pusillina spp.							
Pyramidella sulcata							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.							
Pyramidelloides angusta							
Pyramidelloides gracilis							
Pyramidelloides miranda							
Pyramidelloides suta							
Pyrgulina oodes	0	0	0	0	1	2	3
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa	1	0	0	1	0	0	2
Rissoella longispira	6	4	5	3	3	11	32
Rissoella spp.	3	3	0	0	0	4	10
Rissoidae spp.							
Rissoina ambigua							
Rissoina cerithiiformis	0	0	0	1	0	2	3
Rissoina costata							
Rissoina imbricata	0	0	0	0	1	0	1
Rissoina pulchella	21	7	21	35	11	29	124
Rissoina spp.							
Rufodardanula conica							
Rufodardanula ponderi	1	0	0	0	0	2	3
Rufodardanula sp. A							
Rufodardanula spp.	0	3	0	0	0	0	3
Sansonia kenneyi							
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	14	19	8	10	7	26	84
Schwartziella ephamilla	9	2	3	8	3	8	33
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei	0	0	0	0	0	1	1
Seminella smithi	0	0	0	0	0	1	1
Seminella spp.							
Serpulorbis variabilis							
Serpulorbis spp.	2	0	0	0	0	0	2
Sinezona insignis	0	1	1	0	0	0	2
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense							
Strebloceras subannulatum	4	1	0	1	1	1	8
Strombus dentatus							
Strombus helli							

Table E.1—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.	1	0	0	0	0	0	1
Styliferina goniochila	1	1	0	2	2	3	9
Synaptocochlea concinna							
Subcancilla sp. cf. *flammea*							
Subcancilla spp.							
Teinostoma sulcata							
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.							
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.							
Tricolia variabilis	14	13	4	6	7	18	62
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	3	1	3	7	2	7	23
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus							
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis	0	0	1	0	0	0	1
Turbonilla cornelliana	1	0	1	0	0	0	2
Turbonilla lirata							
Turbonilla thaanumi							
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.	0	1	0	0	0	0	1
Turridae spp.	0	0	1	0	0	0	1
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia	1	0	0	0	0	0	1
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera	0	0	0	0	1	0	1
Vexillum interruptum							
Vexillum lenhilli							
Vexillum micra							

Table E.1—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum							
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.	0	0	0	0	0	1	1
Viriola cancellata							
Viriola fallax							
Viriola spp.	1	2	2	1	2	4	12
Vitrinellidae spp.							
Volvarina fusiformis							
Volvarina spp.							
Williamia radiata	2	0	3	1	0	1	7
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]							
Zebina spp.							
Gastropoda sp. A							
Gastropoda sp. B							
Gastropoda spp.	10	0	0	0	0	0	10
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.	0	0	1	0	0	0	1
Total No. of Individuals	406	263	242	418	189	672	2,190
Total No. of Individuals/cm^3	16.2	10.5	9.7	16.7	7.6	26.9	14.6
Total No. of Taxa	51	44	45	44	41	59	103

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.

[b] Taxon new to Waiʻanae ocean outfall.

[c] Freshwater mollusk.

Table E.2. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station W2, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa	0	0	0	0	1	0	1
Arca spp.							
Arcidae spp.							
Barbatia divaricata	4	2	0	3	1	3	13
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.							
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	0	3	0	1	4	4	12
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.	0	6	2	1	8	0	17
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	1	5	6	5	16	7	40
Crenella spp.	0	0	0	0	1	0	1
Ctena bella	0	0	1	0	0	0	1
Ctena transversa	0	0	0	2	0	0	2
Ctena spp.							
Cuspidaria spp.							
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta							
Fragum mundum	2	4	1	2	0	1	10
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica	1	1	0	0	0	0	2
Irus spp.							
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.							
Kellia hawaiensis	2	3	4	0	0	1	10
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica	0	0	0	0	4	2	6
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.	0	0	0	0	1	0	1
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	0	0	0	0	1	0	1
Macoma dispar							
Macoma obliquilineata	0	0	0	0	3	0	3
Mactra thaanumi							
Malleus regula	0	2	0	0	2	0	4
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.	0	2	0	0	0	0	2
Nucula hawaiensis	0	0	0	2	0	0	2
Ostrea spp.	1	17	22	5	21	18	84
Pectinidae							
Pillucina hawaiiensis	0	1	0	0	0	0	1
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	4	4	0	4	8	4	24
Pinna spp.[a]	0	+	0	0	+	+	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	4	15	6	6	11	11	53
Semelangulus crebrimaculatus	0	0	0	0	0	1	1
Semelangulus spp.							
Semele australis							
Septifer bryanae	5	22	13	8	9	12	69
Septifer spp.							
Spondylus spp.	0	0	0	0	0	3	3
Tellina crucigera							
Tellina hawaiensis							
Tellina oahuana							
Tellina perna							
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.	0	1	0	0	0	0	1
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.	0	0	0	0	0	2	2
GASTROPODA							
Aclis sp. A	0	1	0	0	0	0	1
Acteocina hawaiensis	0	0	0	0	1	0	1
Acteocina sandwicensis							
Acteocina sp. A							
Acteocina spp.							
Alcyna ocellata	5	4	4	7	5	3	28
Alcyna subangulata	1	0	1	1	2	2	7
Alvania isolata							
Amathina bicarinata	0	1	0	0	1	0	2
Anacithara perfecta							
Ancylidae spp. [b]							
Antisabia foliacea							
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata							
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	3	2	2	0	1	1	9
Barleeia brevilabiosa							
Barleeia labiosa							
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens	1	0	0	2	0	1	4
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa	0	1	0	0	0	2	3
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata	0	1	1	0	0	0	2
Caecum arcuatum	33	47	30	41	48	26	225
Caecum cf. *glabella*							
Caecum glabriformis							
Caecum oahuense							
Caecum sepimentum							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]	0	0	0	0	0	1	1
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	3	5	4	3	2	0	17
Carinapex papillosa							
Carinapex spp.	1	1	0	0	0	0	2
Cephalaspidea spp.	0	1	1	0	0	0	2
Cerithidium diplax	9	7	7	3	21	4	51
Cerithidium perparvulum	20	34	26	32	67	35	214
Cerithiopsis sp. A							
Cerithiopsis spp.	0	0	0	0	1	2	3
Cerithium atromarginatum							
Cerithium columna	4	9	5	6	11	7	42
Cerithium echinatum							
Cerithium egenum	0	1	0	0	0	0	1
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	2	2	2	4	9	7	26
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	0	0	0	0	2	0	2
Cerithium rostratum	0	0	0	0	0	1	1
Cerithium sp. cf. *placidum*							
Cerithium zebrum	0	0	2	0	0	0	2
Cerithium spp.	0	2	2	1	0	0	5
Ceritoturris bittium							
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi	0	1	0	1	1	1	4
Clavus nodifera							
Clavus pusilla							
Clavus sp. cf. *powelli*							
Clavus spp.							
Collonista candida							
Columbellidae spp.							
Conus pulicarius							
Conus spp.							
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.							
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi	0	0	0	2	2	3	7
Cyclostremiscus striatus							
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla							
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.							
Dendropoma platypus							
Dendropoma spp.	0	5	7	1	15	1	29

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum							
Diala semistriata	5	9	6	15	17	11	63
Diala spp.							
Diniatys dentifer							
Diodora granifera							
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae							
Eatoniella pigmenta	0	0	0	0	0	1	1
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta							
Epitonium spp.	0	1	0	0	0	0	1
Erato sandwicensis							
Etrema acricula	1	0	0	0	0	0	1
Euchelus gemmatus							
Euchelus spp.							
Eucithara angiostoma	0	1	0	1	0	0	2
Eucithara pusilla							
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis							
Evalea spp.							
Favartia garretti							
Finella pupoides							
Fossarus garretti							
Gibbula marmorea							
Granula sandwicensis	2	0	0	0	1	7	10
Granulina vitrea	0	0	1	0	6	0	7
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum							
Haminoea spp.							
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus	0	0	0	1	0	2	3
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	0	1	3	1	3	2	10
Herviera patricia							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica							
Hipponix australis	0	0	0	2	2	1	5
Hipponix imbricatus							
Hipponix pilosus	3	0	5	3	10	5	26
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum	0	0	0	0	2	0	2
Julia exquisita	2	2	1	2	1	3	11
Juliidae spp.							
Kermia aniani							
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta							
Leptothyra verruca	0	0	1	0	1	0	2
Leptothyra spp.							
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi							
Lienardia spp.							
Liotiinae spp.	0	0	2	0	0	0	2
Littoraria spp.							
Lophocochlias minutissimus	9	11	9	5	18	18	70
Lophocochlias sp. A							
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.	0	2	0	0	0	0	2
Meioceras sandwichensis							
Merelina granulosa	0	2	0	0	0	1	3
Merelina hewa	0	0	0	1	0	0	1
Merelina wanawana							
Merelina spp.							
Metaxia albicephala	0	0	0	0	0	2	2
Metaxia brunnicephala	1	0	0	1	0	0	2
Metaxia spp.							
Microdaphne morrisoni							
Microdaphne trichodes	0	0	0	1	0	0	1
Miralda paulbartschi							
Miralda scopulorum							
Miralda spp.							
Mitra saltata							
Mitra typha							
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis	0	0	0	0	2	0	2
Mitrella margarita							
Mitrella rorida							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.							
Mitridae spp.							
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula	0	0	0	0	0	1	1
Mitrolumna sp.	0	0	1	0	0	0	1
Modulus tectum							
Morula spp.	0	0	0	0	1	1	2
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.	0	0	1	0	0	1	2
Natica gualteriana							
Natica spp.							
Nerita spp.							
Nesiodostomia quarta							
Nesiodostomia spp.							
Odostomia gulicki							
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.	0	0	0	0	1	0	1
Omalaxis spp.							
Omalogyra japonica							
Omalogyra sp. A							
Omalogyra spp.							
Opalia attenuata							
Opalia spp.							
Orbitestella regina	2	1	1	0	6	1	11
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.							
Otopleura mirabilis							
Parashiela beetsi	10	30	21	23	64	25	173
Peasiella tantilla							
Peristernia chlorostoma	0	0	0	0	1	0	1
Phenacolepas scobinata							
Phenacolepas spp.							
Philippia oxytropis	1	1	1	0	0	2	5
Philippia radiata	0	0	0	0	2	0	2
Philippia spp.							
Physidae [c] spp.							
Planaxis suturalis							
Planaxis spp.							
Plesiotrochus luteus	1	1	0	0	1	0	3
Polinices tumidus [b]	1	0	0	2	0	1	4
Powellisetia fallax	0	0	0	0	1	0	1
Prodotia iostomus							
Pseudomalaxis spp.							
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.							
Pusillina marmorata	41	61	34	42	72	57	307
Pusillina spp.							
Pyramidella sulcata							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.							
Pyramidelloides angusta							
Pyramidelloides gracilis	0	0	0	0	0	1	1
Pyramidelloides miranda	0	1	0	0	0	0	1
Pyramidelloides suta							
Pyrgulina oodes	0	1	0	0	0	0	1
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa							
Rissoella longispira	6	5	5	4	10	4	34
Rissoella spp.	0	0	0	0	12	0	12
Rissoidae spp.							
Rissoina ambigua	1	2	0	1	0	0	4
Rissoina cerithiiformis	13	20	13	9	21	11	87
Rissoina costata							
Rissoina imbricata						2	2
Rissoina pulchella	10	14	5	10	22	7	68
Rissoina spp.	0	0	0	2	3	0	5
Rufodardanula conica							
Rufodardanula ponderi							
Rufodardanula sp. A							
Rufodardanula spp.							
Sansonia kenneyi	3	2	2	2	6	4	19
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	1	6	6	5	8	2	28
Schwartziella ephamilla	15	24	23	27	42	32	163
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei	0	0	0	1	0	1	2
Seminella smithi	0	1	0	0	0	0	1
Seminella spp.							
Serpulorbis variabilis							
Serpulorbis spp.	0	0	0	1	0	0	1
Sinezona insignis							
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense							
Strebloceras subannulatum	2	1	0	0	0	1	4
Strombus dentatus							
Strombus helli							

Table E.2—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.	0	1	0	0	0	3	4
Styliferina goniochila	2	3	3	1	5	5	19
Synaptocochlea concinna							
Subcancilla sp. cf. *flammea*							
Subcancilla spp.							
Teinostoma sulcata							
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.							
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.	0	0	0	0	0	1	1
Tricolia variabilis	2	4	4	2	8	4	24
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	5	7	8	10	7	2	39
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus	0	0	2	0	1	1	4
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis	0	0	0	0	3	0	3
Turbonilla cornelliana	0	0	0	1	0	0	1
Turbonilla lirata							
Turbonilla thaanumi	0	0	0	0	0	3	3
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.	1	1	1	0	1	0	4
Turridae spp.	0	0	0	1	0	0	1
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia							
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera	1	3	0	0	0	0	4
Vexillum interruptum							
Vexillum lenhilli							
Vexillum micra							

Table E.2—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum							
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.	0	1	1	0	0	1	3
Viriola cancellata							
Viriola fallax							
Viriola spp.	4	1	2	3	0	1	11
Vitrinellidae spp.							
Volvarina fusiformis							
Volvarina spp.							
Williamia radiata	1	4	1	1	3	7	17
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]	0	1	0	0	0	0	1
Zebina spp.	0	1	0	0	0	0	1
Gastropoda sp. A	1	0	0	0	1	0	2
Gastropoda sp. B							
Gastropoda spp.	1	0	0	0	1	0	2
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.							
Total No. of Individuals	254	440	312	324	646	401	2,377
Total No. of Individuals/cm^3	10.2	17.6	12.5	13.0	25.8	16.0	15.8
Total No. of Taxa	50	69	50	55	69	69	128

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.

[b] Taxon new to Waiʻanae ocean outfall.

[c] Freshwater mollusk.

Table E.3. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station ZE, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa							
Arca spp.							
Arcidae spp.							
Barbatia divaricata	0	0	0	0	1	0	1
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.	0	1	0	0	0	0	1
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	0	0	1	0	0	0	1
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.							
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	11	5	3	0	9	3	31
Crenella spp.							
Ctena bella							
Ctena transversa	0	0	0	0	1	0	1
Ctena spp.							
Cuspidaria spp.							
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta	3	2	1	0	1	1	8
Fragum mundum	1	5	3	1	6	4	20
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica							
Irus spp.							
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.							
Kellia hawaiensis	2	0	2	0	0	0	4
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica							
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.							
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	0	0	0	0	0	1	1
Macoma dispar							
Macoma obliquilineata	0	0	0	2	0	0	2
Mactra thaanumi							
Malleus regula	0	1	0	0	0	0	1
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.							
Nucula hawaiensis							
Ostrea spp.	3	1	0	0	0	0	4
Pectinidae							
Pillucina hawaiiensis							
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	0	2	0	0	0	1	3
Pinna spp.[a]	0	+	0	+	0	0	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	3	2	1	1	3	2	12
Semelangulus crebrimaculatus	1	1	0	0	0	0	2
Semelangulus spp.							
Semele australis							
Septifer bryanae	10	5	3	1	2	7	28
Septifer spp.							
Spondylus spp.							
Tellina crucigera	0	0	0	0	1	0	1
Tellina hawaiensis							
Tellina oahuana	1	0	2	1	0	0	4
Tellina perna	2	0	0	0	0	0	2
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.	0	2	0	0	0	0	2

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.							
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.	1	0	0	1	0	0	2
GASTROPODA							
Aclis sp. A	0	1	0	0	0	0	1
Acteocina hawaiensis	1	0	0	0	0	1	2
Acteocina sandwicensis	4	2	1	0	1	2	10
Acteocina sp. A							
Acteocina spp.							
Alcyna ocellata	3	2	5	4	10	2	26
Alcyna subangulata	4	1	0	0	0	2	7
Alvania isolata	0	0	0	2	0	1	3
Amathina bicarinata							
Anacithara perfecta							
Ancylidae spp. [b]							
Antisabia foliacea	2	3	0	1	1	0	7
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata	3	0	1	0	0	0	4
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	1	5	2	5	4	2	19
Barleeia brevilabiosa							
Barleeia labiosa	0	0	1	1	0	1	3
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens	1	3	0	2	6	4	16
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa	0	1	0	0	0	0	1
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata							
Caecum arcuatum	4	1	2	2	3	3	15
Caecum cf. *glabella*							
Caecum glabriformis							
Caecum oahuense							
Caecum sepimentum							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]							
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	3	3	0	2	2	1	11
Carinapex papillosa	0	0	0	0	0	1	1
Carinapex spp.							
Cephalaspidea spp.							
Cerithidium diplax	18	14	9	12	18	15	86
Cerithidium perparvulum	84	77	44	67	85	59	416
Cerithiopsis sp. A							
Cerithiopsis spp.	1	1	2	2	3	0	9
Cerithium atromarginatum							
Cerithium columna	1	3	3	2	0	1	10
Cerithium echinatum							
Cerithium egenum							
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	4	3	1	2	10	5	25
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	5	7	2	0	1	3	18
Cerithium rostratum	0	1	0	1	0	0	2
Cerithium sp. cf. *placidum*							
Cerithium zebrum	8	0	4	2	7	10	31
Cerithium spp.	2	4	0	6	5	3	20
Ceritoturris bittium	0	1	0	0	0	0	1
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi	0	0	0	0	0	1	1
Clavus nodifera							
Clavus pusilla							
Clavus sp. cf. *powelli*							
Clavus spp.	2	0	0	1	0	0	3
Collonista candida	0	0	3	1	1	0	5
Columbellidae spp.							
Conus pulicarius							
Conus spp.							
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.							
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi	5	1	0	0	1	1	8
Cyclostremiscus striatus	1	0	0	0	0	0	1
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla							
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.							
Dendropoma platypus							
Dendropoma spp.	13	2	0	3	11	9	38

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum	0	0	0	0	0	1	1
Diala semistriata	50	29	35	37	40	25	216
Diala spp.							
Diniatys dentifer	0	0	2	0	0	0	2
Diodora granifera	1	0	0	0	0	1	2
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae	0	0	1	0	0	0	1
Eatoniella pigmenta							
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta							
Epitonium spp.							
Erato sandwicensis							
Etrema acricula	0	0	0	0	1	0	1
Euchelus gemmatus							
Euchelus spp.	4	0	0	0	2	1	7
Eucithara angiostoma							
Eucithara pusilla							
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis							
Evalea spp.							
Favartia garretti							
Finella pupoides							
Fossarus garretti							
Gibbula marmorea	0	1	0	0	7	1	9
Granula sandwicensis	1	0	0	0	0	0	1
Granulina vitrea							
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum							
Haminoea spp.							
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus	0	0	1	0	0	0	1
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	4	2	3	4	8	2	23
Herviera patricia							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica							
Hipponix australis	0	0	0	0	1	0	1
Hipponix imbricatus							
Hipponix pilosus	1	1	0	0	0	1	3
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum	7	8	5	11	8	7	46
Julia exquisita	0	1	0	0	1	0	2
Juliidae spp.	0	0	0	0	0	1	1
Kermia aniani							
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta	3	0	1	0	0	1	5
Leptothyra verruca	1	1	2	1	1	2	8
Leptothyra spp.							
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi							
Lienardia spp.							
Liotiinae spp.	0	0	1	0	0	0	1
Littoraria spp.							
Lophocochlias minutissimus	27	24	9	27	32	21	140
Lophocochlias sp. A	3	0	0	3	2	2	10
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.	0	1	0	0	3	0	4
Meioceras sandwichensis							
Merelina granulosa	1	2	2	3	1	1	10
Merelina hewa	2	3	0	0	1	2	8
Merelina wanawana	0	1	0	0	0	1	2
Merelina spp.	0	0	3	0	0	0	3
Metaxia albicephala	1	1	1	0	0	3	6
Metaxia brunnicephala	0	2	0	0	0	0	2
Metaxia spp.							
Microdaphne morrisoni							
Microdaphne trichodes	0	0	0	0	1	0	1
Miralda paulbartschi	0	0	0	0	1	0	1
Miralda scopulorum	3	1	0	4	2	0	10
Miralda spp.							
Mitra saltata							
Mitra typha							
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis							
Mitrella margarita							
Mitrella rorida							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.							
Mitridae spp.							
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula							
Mitrolumna sp.	2	0	0	0	0	0	2
Modulus tectum	0	1	0	0	0	0	1
Morula spp.	0	0	0	0	1	0	1
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.							
Natica gualteriana							
Natica spp.							
Nerita spp.							
Nesiodostomia quarta							
Nesiodostomia spp.							
Odostomia gulicki							
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.							
Omalaxis spp.							
Omalogyra japonica	0	0	0	1	0	0	1
Omalogyra sp. A							
Omalogyra spp.							
Opalia attenuata							
Opalia spp.							
Orbitestella regina	3	1	1	5	8	3	21
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.							
Otopleura mirabilis							
Parashiela beetsi	18	12	13	14	17	14	88
Peasiella tantilla							
Peristernia chlorostoma							
Phenacolepas scobinata							
Phenacolepas spp.							
Philippia oxytropis							
Philippia radiata							
Philippia spp.							
Physidae [c] spp.							
Planaxis suturalis	0	0	0	2	1	0	3
Planaxis spp.							
Plesiotrochus luteus	4	1	1	1	3	0	10
Polinices tumidus [b]	3	1	0	1	1	3	9
Powellisetia fallax							
Prodotia iostomus							
Pseudomalaxis spp.							
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.	1	1	0	1	0	1	4
Pusillina marmorata	43	33	22	21	35	28	182
Pusillina spp.							
Pyramidella sulcata							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.	4	0	0	0	0	0	4
Pyramidelloides angusta							
Pyramidelloides gracilis	0	2	0	1	1	0	4
Pyramidelloides miranda							
Pyramidelloides suta							
Pyrgulina oodes	2	1	0	0	1	0	4
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa	0	0	1	0	0	0	1
Rissoella longispira	1	3	3	2	2	0	11
Rissoella spp.	0	1	0	0	2	2	5
Rissoidae spp.	0	0	0	0	1	2	3
Rissoina ambigua	0	0	1	0	0	1	2
Rissoina cerithiiformis	2	3	4	5	5	8	27
Rissoina costata	0	0	0	0	0	2	2
Rissoina imbricata							
Rissoina pulchella	13	14	2	5	17	8	59
Rissoina spp.							
Rufodardanula conica	1	0	0	0	0	0	1
Rufodardanula ponderi	0	0	0	4	7	0	11
Rufodardanula sp. A							
Rufodardanula spp.	0	2	1	0	0	0	3
Sansonia kenneyi	11	7	3	7	9	9	46
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	15	12	9	5	6	16	63
Schwartziella ephamilla	8	9	7	10	14	12	60
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei							
Seminella smithi							
Seminella spp.	0	0	0	1	0	0	1
Serpulorbis variabilis							
Serpulorbis spp.							
Sinezona insignis	0	0	0	0	1	0	1
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense	1	0	0	0	0	0	1
Strebloceras subannulatum	1	0	0	0	2	0	3
Strombus dentatus							
Strombus helli							

Table E.3—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.							
Styliferina goniochila	6	1	3	4	6	1	21
Synaptocochlea concinna	1	0	0	0	1	0	2
Subcancilla sp. cf. *flammea*							
Subcancilla spp.							
Teinostoma sulcata							
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.	0	1	1	0	0	3	5
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.							
Tricolia variabilis	59	44	18	38	56	34	249
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	23	12	6	9	12	12	74
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus	1	0	1	1	1	0	4
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis	1	0	2	0	1	1	5
Turbonilla cornelliana							
Turbonilla lirata							
Turbonilla thaanumi							
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.	1	0	1	1	0	0	3
Turridae spp.	0	0	1	1	0	0	2
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia	0	0	0	1	0	0	1
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera							
Vexillum interruptum							
Vexillum lenhilli							
Vexillum micra							

Table E.3—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum	0	0	1	1	0	0	2
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.							
Viriola cancellata							
Viriola fallax							
Viriola spp.	7	3	7	1	4	1	23
Vitrinellidae spp.							
Volvarina fusiformis							
Volvarina spp.							
Williamia radiata	0	1	1	0	1	2	5
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]							
Zebina spp.							
Gastropoda sp. A	2	2	0	0	3	0	7
Gastropoda sp. B							
Gastropoda spp.							
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.	2	0	0	0	0	0	2
Total No. of Individuals	553	409	272	358	524	382	2,498
Total No. of Individuals/cm^3	22.1	16.4	10.9	14.3	21.0	15.3	16.7
Total No. of Taxa	76	72	59	60	71	66	131

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.
[b] Taxon new to Waiʻanae ocean outfall.
[c] Freshwater mollusk.

Table E.4. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station Z, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa							
Arca spp.							
Arcidae spp.	0	0	0	0	0	1	1
Barbatia divaricata	1	0	0	2	0	0	3
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.							
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	2	1	2	1	1	1	8
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.							
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	0	3	2	0	4	3	12
Crenella spp.							
Ctena bella							
Ctena transversa							
Ctena spp.							
Cuspidaria spp.	1	0	0	1	0	0	2
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta	0	0	0	1	0	0	1
Fragum mundum	2	0	2	1	1	6	12
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica							
Irus spp.	1	0	0	0	0	0	1
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.	0	0	0	0	0	2	2
Kellia hawaiensis	0	0	1	3	2	0	6
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica	0	1	0	2	1	0	4
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.							
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	0	1	1	0	0	3	5
Macoma dispar							
Macoma obliquilineata	1	0	0	0	0	0	1
Mactra thaanumi							
Malleus regula							
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.	1	1	0	1	0	0	3
Nucula hawaiensis	0	0	1	3	3	0	7
Ostrea spp.	5	1	0	2	5	2	15
Pectinidae							
Pillucina hawaiiensis							
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	0	5	0	4	2	0	11
Pinna spp.[a]	0	0	0	0	0	+	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	4	11	6	0	3	8	32
Semelangulus crebrimaculatus	1	0	0	0	0	0	1
Semelangulus spp.							
Semele australis							
Septifer bryanae	5	6	4	6	3	6	30
Septifer spp.							
Spondylus spp.	0	0	0	0	2	0	2
Tellina crucigera							
Tellina hawaiensis							
Tellina oahuana							
Tellina perna							
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.							

Table E.4—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.							
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.	0	1	0	0	0	1	2
GASTROPODA							
Aclis sp. A	1	1	0	0	1	0	3
Acteocina hawaiensis							
Acteocina sandwicensis							
Acteocina sp. A							
Acteocina spp.							
Alcyna ocellata	2	13	4	9	4	8	40
Alcyna subangulata							
Alvania isolata							
Amathina bicarinata							
Anacithara perfecta							
Ancylidae spp. [b]							
Antisabia foliacea	0	1	0	0	0	0	1
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata	0	0	1	0	1	0	2
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	5	8	2	6	5	1	27
Barleeia brevilabiosa							
Barleeia labiosa							
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens	3	2	0	3	1	6	15
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa	0	0	2	1	0	0	3
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata							
Caecum arcuatum	8	8	3	1	10	6	36
Caecum cf. *glabella*							
Caecum glabriformis	1	3	0	0	0	0	4
Caecum oahuense							
Caecum sepimentum							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]							
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	7	0	2	5	6	4	24
Carinapex papillosa	0	0	0	0	0	1	1
Carinapex spp.	0	4	6	0	0	0	10
Cephalaspidea spp.	1	0	1	0	1	1	4
Cerithidium diplax	4	9	4	7	4	8	36
Cerithidium perparvulum	67	72	68	58	66	98	429
Cerithiopsis sp. A							
Cerithiopsis spp.	2	1	2	0	1	5	11
Cerithium atromarginatum							
Cerithium columna	8	8	8	9	10	15	58
Cerithium echinatum							
Cerithium egenum							
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	7	11	4	1	4	5	32
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	0	1	0	0	0	1	2
Cerithium rostratum	1	3	0	0	1	0	5
Cerithium sp. cf. *placidum*							
Cerithium zebrum	0	0	2	1	1	2	6
Cerithium spp.	0	1	1	1	2	2	7
Ceritoturris bittium							
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi	0	0	0	0	1	1	2
Clavus nodifera							
Clavus pusilla							
Clavus sp. cf. *powelli*							
Clavus spp.	0	0	0	0	0	1	1
Collonista candida	1	2	1	2	3	0	9
Columbellidae spp.							
Conus pulicarius							
Conus spp.	0	0	0	1	0	0	1
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.							
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi	1	0	0	0	0	0	1
Cyclostremiscus striatus	0	0	0	0	0	1	1
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla							
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.	0	0	0	0	0	1	1
Dendropoma platypus							
Dendropoma spp.	1	8	5	2	3	8	27

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum							
Diala semistriata	23	29	30	28	36	40	186
Diala spp.							
Diniatys dentifer	2	2	0	5	3	2	14
Diodora granifera							
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae	0	0	0	4	0	0	4
Eatoniella pigmenta							
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta	0	0	0	1	0	0	1
Epitonium spp.	0	0	0	1	1	0	2
Erato sandwicensis							
Etrema acricula	0	1	1	0	0	1	3
Euchelus gemmatus	0	1	2	0	1	0	4
Euchelus spp.	1	0	0	1	0	2	4
Eucithara angiostoma	0	1	0	0	0	0	1
Eucithara pusilla							
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis							
Evalea spp.							
Favartia garretti							
Finella pupoides							
Fossarus garretti							
Gibbula marmorea	1	0	0	0	0	0	1
Granula sandwicensis							
Granulina vitrea	0	2	1	0	0	0	3
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum							
Haminoea spp.	1	0	0	0	0	0	1
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus	0	0	1	0	0	0	1
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	3	3	0	1	1	6	14
Herviera patricia							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica	0	0	0	0	1	0	1
Hipponix australis	1	1	3	3	3	1	12
Hipponix imbricatus							
Hipponix pilosus	1	3	3	3	4	4	18
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum							
Julia exquisita	1	3	0	0	1	1	6
Juliidae spp.							
Kermia aniani	0	1	0	0	1	2	4
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta	0	0	1	0	1	0	2
Leptothyra verruca	0	0	0	0	0	1	1
Leptothyra spp.	0	2	0	0	0	0	2
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi							
Lienardia spp.							
Liotiinae spp.							
Littoraria spp.							
Lophocochlias minutissimus	18	31	21	20	20	29	139
Lophocochlias sp. A							
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.	1	0	0	4	0	2	7
Meioceras sandwichensis							
Merelina granulosa	0	0	0	0	0	1	1
Merelina hewa	0	0	1	0	0	2	3
Merelina wanawana							
Merelina spp.	4	0	0	0	1	0	5
Metaxia albicephala							
Metaxia brunnicephala	0	0	1	0	1	0	2
Metaxia spp.	0	3	0	0	0	0	3
Microdaphne morrisoni							
Microdaphne trichodes	0	0	0	0	1	1	2
Miralda paulbartschi							
Miralda scopulorum							
Miralda spp.							
Mitra saltata							
Mitra typha							
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis							
Mitrella margarita							
Mitrella rorida							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.	1	0	0	0	0	0	1
Mitridae spp.	0	0	0	1	0	0	1
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula							
Mitrolumna sp.	0	0	0	1	0	0	1
Modulus tectum	0	0	0	0	0	2	2
Morula spp.	0	3	1	0	0	1	5
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.	1	0	0	0	0	1	2
Natica gualteriana							
Natica spp.	2	0	0	0	0	0	2
Nerita spp.							
Nesiodostomia quarta	0	0	1	1	0	0	2
Nesiodostomia spp.							
Odostomia gulicki							
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.	0	1	2	2	5	0	10
Omalaxis spp.							
Omalogyra japonica	0	0	0	0	0	1	1
Omalogyra sp. A							
Omalogyra spp.	0	0	0	0	1	0	1
Opalia attenuata							
Opalia spp.							
Orbitestella regina	2	3	0	0	1	0	6
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.							
Otopleura mirabilis							
Parashiela beetsi	9	21	10	9	8	19	76
Peasiella tantilla							
Peristernia chlorostoma	0	0	0	1	0	0	1
Phenacolepas scobinata							
Phenacolepas spp.							
Philippia oxytropis							
Philippia radiata							
Philippia spp.							
Physidae [c] spp.							
Planaxis suturalis	0	0	0	1	0	0	1
Planaxis spp.							
Plesiotrochus luteus	2	1	1	0	2	2	8
Polinices tumidus [b]	0	0	0	0	0	1	1
Powellisetia fallax	0	0	1	1	0	0	2
Prodotia iostomus							
Pseudomalaxis spp.							
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.							
Pusillina marmorata	26	28	37	20	34	31	176
Pusillina spp.							
Pyramidella sulcata							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.	0	0	1	0	0	0	1
Pyramidelloides angusta							
Pyramidelloides gracilis							
Pyramidelloides miranda							
Pyramidelloides suta							
Pyrgulina oodes							
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa	0	0	0	0	0	1	1
Rissoella longispira	2	8	0	0	4	5	19
Rissoella spp.	0	0	3	0	0	0	3
Rissoidae spp.	0	0	1	0	0	1	2
Rissoina ambigua	0	0	1	2	2	2	7
Rissoina cerithiiformis	4	10	8	6	5	8	41
Rissoina costata	0	1	0	0	0	0	1
Rissoina imbricata	0	0	0	0	1	1	2
Rissoina pulchella	18	29	20	17	18	23	125
Rissoina spp.							
Rufodardanula conica	0	0	0	1	0	0	1
Rufodardanula ponderi	0	1	0	1	0	1	3
Rufodardanula sp. A							
Rufodardanula spp.							
Sansonia kenneyi	5	7	4	7	13	11	47
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	5	6	12	8	8	14	53
Schwartziella ephamilla	8	16	35	19	19	34	131
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei	0	2	0	1	0	0	3
Seminella smithi	0	1	0	0	0	1	2
Seminella spp.							
Serpulorbis variabilis							
Serpulorbis spp.							
Sinezona insignis							
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense	0	0	0	1	0	0	1
Strebloceras subannulatum	3	2	0	0	0	1	6
Strombus dentatus							
Strombus helli							

Table E.4—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.	0	0	0	1	0	0	1
Styliferina goniochila	5	4	2	3	2	0	16
Synaptocochlea concinna							
Subcancilla sp. cf. *flammea*							
Subcancilla spp.							
Teinostoma sulcata							
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.	0	1	0	0	0	0	1
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.							
Tricolia variabilis	10	12	18	4	9	11	64
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	12	10	12	7	8	21	70
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus	0	0	1	1	0	1	3
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis	1	0	0	0	1	0	2
Turbonilla cornelliana	0	0	1	1	0	1	3
Turbonilla lirata							
Turbonilla thaanumi	0	0	0	1	0	0	1
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.	0	0	0	1	1	2	4
Turridae spp.	0	0	0	0	0	3	3
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia							
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera	1	1	1	0	0	0	3
Vexillum interruptum							
Vexillum lenhilli							
Vexillum micra							

Table E.4—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum	0	0	0	1	1	0	2
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.	0	0	1	0	0	1	2
Viriola cancellata							
Viriola fallax							
Viriola spp.	4	1	2	0	1	3	11
Vitrinellidae spp.							
Volvarina fusiformis	0	0	0	0	1	0	1
Volvarina spp.							
Williamia radiata	7	3	0	4	1	2	17
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]							
Zebina spp.							
Gastropoda sp. A	0	2	0	0	2	0	4
Gastropoda sp. B							
Gastropoda spp.							
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.							
Total No. of Individuals	329	444	376	329	376	509	2,363
Total No. of Individuals/cm^3	13.2	17.8	15.0	13.2	15.0	20.4	15.8
Total No. of Taxa	61	67	60	67	69	76	139

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.

[b] Taxon new to Waiʻanae ocean outfall.

[c] Freshwater mollusk.

Table E.5. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station ZW, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa	0	0	1	1	0	0	2
Arca spp.							
Arcidae spp.							
Barbatia divaricata	0	0	2	1	0	3	6
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.							
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	0	3	2	1	4	0	10
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.							
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	6	8	10	12	1	6	43
Crenella spp.	0	0	0	0	0	2	2
Ctena bella							
Ctena transversa							
Ctena spp.							
Cuspidaria spp.	0	1	1	0	0	0	2
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta	1	0	0	0	0	0	1
Fragum mundum	2	3	2	3	3	2	15
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica							
Irus spp.							
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.							
Kellia hawaiensis	3	3	3	0	1	1	11
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica	0	1	0	1	0	0	2
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.	0	0	0	0	1	0	1
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	1	0	2	2	2	0	7
Macoma dispar							
Macoma obliquilineata	0	1	0	0	0	0	1
Mactra thaanumi							
Malleus regula	0	0	1	1	0	0	2
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.	0	0	0	2	0	0	2
Nucula hawaiensis	2	1	1	1	0	2	7
Ostrea spp.	3	7	2	11	2	11	36
Pectinidae							
Pillucina hawaiiensis							
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	1	3	6	4	2	0	16
Pinna spp.[a]	+	+	+	+	0	+	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	14	18	29	30	13	30	134
Semelangulus crebrimaculatus	0	0	1	0	0	0	1
Semelangulus spp.							
Semele australis							
Septifer bryanae	5	12	5	4	8	5	39
Septifer spp.							
Spondylus spp.	2	0	1	3	0	2	8
Tellina crucigera							
Tellina hawaiensis							
Tellina oahuana							
Tellina perna							
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.							
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.							
GASTROPODA							
Aclis sp. A	1	2	0	0	1	2	6
Acteocina hawaiensis	1	0	0	1	0	0	2
Acteocina sandwicensis							
Acteocina sp. A							
Acteocina spp.							
Alcyna ocellata	1	6	9	6	2	5	29
Alcyna subangulata	0	0	0	0	1	0	1
Alvania isolata							
Amathina bicarinata							
Anacithara perfecta	0	0	0	0	0	1	1
Ancylidae spp. [b]	0	0	1	1	0	0	2
Antisabia foliacea							
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata	2	0	0	1	2	0	5
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	1	3	2	5	3	0	14
Barleeia brevilabiosa							
Barleeia labiosa							
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens	1	0	1	0	0	1	3
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa	0	0	0	0	2	1	3
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata							
Caecum arcuatum	11	9	13	15	8	12	68
Caecum cf. *glabella*							
Caecum glabriformis	0	1	2	0	0	2	5
Caecum oahuense							
Caecum sepimentum							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]							
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	2	2	2	0	3	1	10
Carinapex papillosa							
Carinapex spp.	0	0	1	0	0	0	1
Cephalaspidea spp.	1	2	0	1	0	0	4
Cerithidium diplax	15	22	12	13	5	17	84
Cerithidium perparvulum	75	152	110	129	100	113	679
Cerithiopsis sp. A							
Cerithiopsis spp.	0	3	1	1	1	1	7
Cerithium atromarginatum							
Cerithium columna	15	12	11	25	10	16	89
Cerithium echinatum							
Cerithium egenum							
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	3	11	7	9	5	11	46
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	0	0	1	0	0	0	1
Cerithium rostratum	0	2	3	2	0	0	7
Cerithium sp. cf. *placidum*							
Cerithium zebrum							
Cerithium spp.	2	1	0	0	2	0	5
Ceritoturris bittium							
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi							
Clavus nodifera							
Clavus pusilla							
Clavus sp. cf. *powelli*							
Clavus spp.	1	0	0	0	0	0	1
Collonista candida							
Columbellidae spp.							
Conus pulicarius							
Conus spp.							
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.	0	0	0	0	0	3	3
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi	0	0	0	0	1	0	1
Cyclostremiscus striatus							
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla	0	0	0	0	1	0	1
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.							
Dendropoma platypus							
Dendropoma spp.	0	1	2	3	1	1	8

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum	0	0	0	0	0	1	1
Diala semistriata	42	70	46	58	38	38	292
Diala spp.							
Diniatys dentifer	0	2	2	5	0	1	10
Diodora granifera							
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae	0	2	0	0	0	2	4
Eatoniella pigmenta							
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta							
Epitonium spp.	1	0	0	1	0	0	2
Erato sandwicensis							
Etrema acricula	0	0	0	1	0	0	1
Euchelus gemmatus	1	3	0	1	0	0	5
Euchelus spp.							
Eucithara angiostoma							
Eucithara pusilla							
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis							
Evalea spp.							
Favartia garretti							
Finella pupoides							
Fossarus garretti							
Gibbula marmorea	0	1	0	0	0	0	1
Granula sandwicensis	2	0	0	2	3	0	7
Granulina vitrea	0	4	0	3	0	2	9
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum	1	0	0	0	0	0	1
Haminoea spp.	0	0	0	0	2	1	3
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus	0	0	0	2	0	0	2
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	2	4	1	4	3	4	18
Herviera patricia							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica							
Hipponix australis	3	2	1	3	1	3	13
Hipponix imbricatus							
Hipponix pilosus	3	2	1	1	1	0	8
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum	0	0	0	1	0	0	1
Julia exquisita	1	5	1	0	0	2	9
Juliidae spp.	0	0	0	5	0	0	5
Kermia aniani	1	0	0	0	1	1	3
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta	2	0	0	0	0	0	2
Leptothyra verruca	0	1	1	0	0	0	2
Leptothyra spp.							
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi	0	0	0	1	0	0	1
Lienardia spp.							
Liotiinae spp.	0	0	1	1	0	0	2
Littoraria spp.							
Lophocochlias minutissimus	17	43	31	30	14	16	151
Lophocochlias sp. A							
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.							
Meioceras sandwichensis							
Merelina granulosa	0	3	2	2	0	0	7
Merelina hewa	0	0	1	0	0	0	1
Merelina wanawana							
Merelina spp.	0	0	0	0	0	1	1
Metaxia albicephala							
Metaxia brunnicephala	0	0	1	0	0	0	1
Metaxia spp.	1	1	0	1	0	0	3
Microdaphne morrisoni							
Microdaphne trichodes							
Miralda paulbartschi							
Miralda scopulorum							
Miralda spp.							
Mitra saltata							
Mitra typha							
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis	0	0	0	0	0	1	1
Mitrella margarita							
Mitrella rorida							

Table E.5—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.	0	1	0	0	1	0	2
Mitridae spp.	0	0	0	0	1	0	1
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula							
Mitrolumna sp.	0	0	2	0	2	1	5
Modulus tectum	0	0	1	1	0	0	2
Morula spp.	2	1	3	0	0	0	6
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.	0	0	0	0	1	0	1
Natica gualteriana							
Natica spp.							
Nerita spp.							
Nesiodostomia quarta							
Nesiodostomia spp.							
Odostomia gulicki							
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.	0	2	0	0	0	0	2
Omalaxis spp.							
Omalogyra japonica	0	0	2	0	0	2	4
Omalogyra sp. A							
Omalogyra spp.							
Opalia attenuata							
Opalia spp.							
Orbitestella regina	0	0	3	2	0	0	5
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.							
Otopleura mirabilis							
Parashiela beetsi	23	39	39	27	20	28	176
Peasiella tantilla							
Peristernia chlorostoma	1	0	1	0	0	0	2
Phenacolepas scobinata							
Phenacolepas spp.							
Philippia oxytropis							
Philippia radiata							
Philippia spp.							
Physidae [c] spp.	1	2	0	0	1	1	5
Planaxis suturalis							
Planaxis spp.							
Plesiotrochus luteus	0	1	5	5	3	2	16
Polinices tumidus [b]	0	0	0	0	0	1	1
Powellisetia fallax	2	3	2	3	0	5	15
Prodotia iostomus							
Pseudomalaxis spp.							
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.							
Pusillina marmorata	39	61	47	55	35	67	304
Pusillina spp.							
Pyramidella sulcata							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.							
Pyramidelloides angusta							
Pyramidelloides gracilis							
Pyramidelloides miranda	0	0	2	0	0	0	2
Pyramidelloides suta							
Pyrgulina oodes	0	1	0	0	0	0	1
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa							
Rissoella longispira	5	5	4	7	0	6	27
Rissoella spp.	0	0	4	7	3	5	19
Rissoidae spp.	0	1	0	0	0	0	1
Rissoina ambigua	1	0	0	0	0	0	1
Rissoina cerithiiformis	2	2	0	4	1	6	15
Rissoina costata							
Rissoina imbricata	0	0	0	0	1	0	1
Rissoina pulchella	18	44	42	34	26	38	202
Rissoina spp.							
Rufodardanula conica							
Rufodardanula ponderi	0	0	1	0	0	0	1
Rufodardanula sp. A							
Rufodardanula spp.	0	1	0	0	0	0	1
Sansonia kenneyi	3	7	1	6	0	3	20
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	11	19	13	17	11	12	83
Schwartziella ephamilla	15	24	20	17	18	18	112
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei	1	0	1	2	1	0	5
Seminella smithi	0	1	1	0	0	1	3
Seminella spp.							
Serpulorbis variabilis							
Serpulorbis spp.							
Sinezona insignis							
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense							
Strebloceras subannulatum	2	0	3	1	3	5	14
Strombus dentatus							
Strombus helli							

Table E.5—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.	0	0	0	0	0	1	1
Styliferina goniochila	2	6	11	4	1	1	25
Synaptocochlea concinna							
Subcancilla sp. cf. *flammea*							
Subcancilla spp.	0	0	1	0	0	0	1
Teinostoma sulcata	0	0	1	0	0	0	1
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.	2	0	0	1	0	0	3
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.	0	0	0	0	0	1	1
Tricolia variabilis	8	20	15	21	13	14	91
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	4	10	9	12	13	17	65
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus	0	0	1	0	0	0	1
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis	1	0	0	1	0	0	2
Turbonilla cornelliana	0	1	0	0	0	1	2
Turbonilla lirata							
Turbonilla thaanumi	2	1	0	2	0	0	5
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.	0	0	1	0	1	0	2
Turridae spp.	0	2	0	0	0	0	2
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia							
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera	0	0	1	0	0	1	2
Vexillum interruptum	0	0	0	1	0	0	1
Vexillum lenhilli							
Vexillum micra							

Table E.5—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum							
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.							
Viriola cancellata							
Viriola fallax							
Viriola spp.	2	1	1	7	3	0	14
Vitrinellidae spp.							
Volvarina fusiformis	2	0	1	0	0	2	5
Volvarina spp.							
Williamia radiata	5	2	4	3	1	0	15
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]							
Zebina spp.	0	0	0	0	3	0	3
Gastropoda sp. A	0	0	2	2	1	0	5
Gastropoda sp. B							
Gastropoda spp.							
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.							
Total No. of Individuals	403	691	581	653	412	563	3,303
Total No. of Individuals/cm^3	16.1	27.6	23.2	26.1	16.5	22.5	22.0
Total No. of Taxa	64	68	78	73	59	64	136

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.

[b] Taxon new to Waiʻanae ocean outfall.

[c] Freshwater mollusk.

Table E.6. Taxon abundance from six replicates for mollusk components, Wai‘anae ocean outfall sampling station W9, O‘ahu, Hawai‘i, June 2010.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
BIVALVIA							
Acar sp. cf. *plicata*							
Adipicola sp. cf. *crypta*							
Amygdalum spp.							
Anisodonta angulata							
Anisodonta lutea							
Anomia nobilis							
Arca kauaia							
Arca ventricosa							
Arca spp.							
Arcidae spp.							
Barbatia divaricata	1	0	0	0	1	0	2
Barbatia lima							
Barbatia nuttingi							
Barbatia spp.							
Bentharca sp. cf. *decorata*							
Brachidontes crebristriatus							
Cardita aviculina							
Cardita thaanumi							
Cardita spp.							
Carditella hawaiensis	0	2	4	2	1	1	10
Carditella spp.							
Chama spp.							
Chlamydella sp. A							
Chlamydella spp.							
Chlamys coruscan hawaiensis							
Chlamys kauaiensis							
Chlamys sp. B							
Chlamys spp.							
Codakia spp.							
Cosa waikikia	11	11	5	15	10	19	71
Crenella spp.							
Ctena bella	1	0	0	0	0	0	1
Ctena transversa							
Ctena spp.							
Cuspidaria spp.	0	0	1	2	1	0	4
Dendostrea sandvicensis							
Dimya mimula							
Epicodakia sp. cf. *pygmaea*							
Epicodakia sp. A							
Epicodakia spp.							
Ervilia bisculpta	0	0	1	3	1	2	7
Fragum mundum	0	0	0	1	0	0	1
Grammatomya kanaka							
Haumea juddi							
Hiatella arctica							
Irus spp.							
Isognomon californicum							
Isognomon sp. cf. *incisum*							
Isognomon perna							
Isognomon spp.							
Kellia hawaiensis	0	2	3	0	3	1	9
Kellia sp. cf. *rosea*							
Kona bucki							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Kona symmetrica	0	1	0	0	0	2	3
Kona spp.							
Laevichlamys irregularis							
Lasaea hawaiensis							
Lasaeidae spp.							
Leiochasmea elongata							
Leptonacea spp.							
Lima spp.	0	0	0	0	1	0	1
Limopsis spp.							
Lioconcha hieroglyphica							
Lioconcha spp.							
Lonoa hawaiensis							
Lucina edentula							
Lucinidae spp.	2	0	0	0	0	3	5
Macoma dispar							
Macoma obliquilineata	1	1	0	0	0	0	2
Mactra thaanumi							
Malleus regula							
Malleus spp.							
Modiolus matris							
Modiolus spp.							
Mytilidae sp. A							
Mytilidae sp. B							
Mytilidae sp. C							
Mytilidae sp. D							
Mytilidae spp.	0	0	0	1	0	0	1
Nucula hawaiensis	1	2	0	2	2	4	11
Ostrea spp.	1	1	0	3	0	0	5
Pectinidae	0	0	1	1	0	0	2
Pillucina hawaiiensis							
Pillucina spaldingi							
Pillucina spp.							
Pinctada spp.	1	0	0	0	2	0	3
Pinna spp.[a]	+	+	0	frag+	+	+	+
Poromya transversa							
Psammobiidae							
Pteria spp.							
Rochefortina sandwichensis	12	7	10	16	5	17	67
Semelangulus crebrimaculatus	0	0	1	1	0	1	3
Semelangulus spp.							
Semele australis							
Septifer bryanae	5	18	8	6	5	10	52
Septifer spp.							
Spondylus spp.							
Tellina crucigera	0	0	1	1	0	0	2
Tellina hawaiensis							
Tellina oahuana							
Tellina perna							
Tellina robusta							
Tellina sp. A							
Tellina sp. B							
Tellina sp. C							
Tellina sp. D							
Tellina sp. E							
Tellina spp.	0	0	0	0	2	0	2

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Teredinidae spp.							
Veneridae spp.							
Bivalvia sp. A							
Bivalvia sp. B							
Bivalvia sp. C							
Bivalvia spp.							
GASTROPODA							
Aclis sp. A	0	0	2	0	2	1	5
Acteocina hawaiensis							
Acteocina sandwicensis							
Acteocina sp. A							
Acteocina spp.	0	1	0	0	0	0	1
Alcyna ocellata	3	6	2	9	5	15	40
Alcyna subangulata	0	0	0	0	1	0	1
Alvania isolata							
Amathina bicarinata							
Anacithara perfecta							
Ancylidae spp. [b]							
Antisabia foliacea							
Aplysiidae spp.							
Architectonicidae spp.							
Argyropeza spp.							
Aspella producta							
Aspella spp.							
Atys debilis							
Atys kuhnsi							
Atys semistriata	1	0	0	1	0	0	2
Atys spp.							
Balcis acanthyllis							
Balcis aciculata							
Balcis cf. *brunnimaculata*							
Balcis conoidalis							
Balcis letsonae							
Balcis spp.	6	5	0	5	3	2	21
Barleeia brevilabiosa							
Barleeia labiosa							
Barleeia spp.							
Benthonella spp.							
Berthella spp.							
Bittium impendens	1	1	2	2	1	1	8
Bittium spp.							
Brookula iki							
Buccinidae spp.							
Bulla vernicosa							
Bulla spp.							
Bullina scabra							
Bursa rhodostoma							
Bursa spp.							
Caducifer decapitata							
Caecum arcuatum	17	18	12	11	7	16	81
Caecum cf. *glabella*							
Caecum glabriformis	0	0	1	0	0	1	2
Caecum oahuense							
Caecum sepimentum							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Caecum spp.							
Cancilla carnicolor [b]							
Cancilla granatina							
Cancilla spp.							
Carinapex minutissima	4	1	0	4	1	2	12
Carinapex papillosa							
Carinapex spp.	0	0	0	0	1	3	4
Cephalaspidea spp.	1	0	0	0	0	0	1
Cerithidium diplax	6	7	4	10	8	7	42
Cerithidium perparvulum	147	130	79	112	116	162	746
Cerithiopsis sp. A							
Cerithiopsis spp.	0	3	1	1	0	2	7
Cerithium atromarginatum							
Cerithium columna	4	7	10	8	12	15	56
Cerithium echinatum							
Cerithium egenum							
Cerithium glareosum							
Cerithium gracilis							
Cerithium interstriatum	11	8	7	6	7	7	46
Cerithium matukense							
Cerithium morus							
Cerithium nesioticum	0	1	1	0	2	1	5
Cerithium rostratum	1	0	0	0	0	0	1
Cerithium sp. cf. *placidum*							
Cerithium zebrum	0	0	1	0	0	0	1
Cerithium spp.	0	1	0	1	0	0	2
Ceritoturris bittium							
Cheilea equestris							
Circulus spp.							
Cirsotrema varicosa							
Clavus mighelsi							
Clavus nodifera							
Clavus pusilla	0	1	0	0	0	0	1
Clavus sp. cf. *powelli*							
Clavus spp.							
Collonista candida							
Columbellidae spp.	1	0	0	0	0	0	1
Conus pulicarius							
Conus spp.							
Coralliophila spp.							
Coralliophilidae spp.							
Costellariidae spp.							
Crucibulum spinosum							
Cycloscala hyalina							
Cyclostremiscus emeryi							
Cyclostremiscus striatus							
Cyclostremiscus sp. A							
Cyclostremiscus spp.							
Cylichna pusilla							
Cymatiidae spp.							
Cypraea spp.							
Cystiscus huna							
Daphnellinae spp.							
Dendropoma platypus							
Dendropoma spp.	0	1	1	3	1	0	6

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Dentimargo pumila							
Diala scopulorum	0	1	0	0	0	0	1
Diala semistriata	77	49	44	58	61	69	358
Diala spp.							
Diniatys dentifer	0	1	0	0	0	0	1
Diodora granifera							
Diodora octogona							
Diodora ruppelli							
Drupella ochrostoma							
Drupella spp.							
Duplicaria gouldi							
Eatoniella janetaylorae							
Eatoniella pigmenta							
Eatoniella spp.							
Echineulima spp.							
Elachisina robertsoni							
Elacorbis callusa							
Emarginula dilecta							
Engina albocincta							
Epitonium spp.	0	0	1	2	0	0	3
Erato sandwicensis							
Etrema acricula	1	0	0	0	0	0	1
Euchelus gemmatus	1	0	3	4	0	2	10
Euchelus spp.	0	2	0	0	0	0	2
Eucithara angiostoma	0	0	0	1	0	0	1
Eucithara pusilla	0	1	0	1	0	0	2
Eucylotoma albomacula							
Eulima peasei							
Eulimidae spp.							
Euplica varians							
Euplica spp.							
Evalea peasei							
Evalea waikikiensis							
Evalea spp.							
Favartia garretti							
Finella pupoides	0	0	0	0	2	0	2
Fossarus garretti							
Gibbula marmorea							
Granula sandwicensis							
Granulina vitrea	2	1	0	0	0	0	3
Granulina spp.							
Gyrineum spp.							
Haminoea curta							
Haminoea cymbalum							
Haminoea spp.							
Hastula albula							
Hastula inconstans							
Hastula lanceata							
Hastula matheroniana							
Heliacus implexus	0	1	0	2	0	0	3
Heliacus sterkii							
Heliacus sp. A							
Heliacus spp.							
Herviera gliriella	4	0	6	6	7	6	29
Herviera patricia							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Herviera spp.							
Hinemoa indica							
Hipponix australis	0	1	1	1	0	1	4
Hipponix imbricatus							
Hipponix pilosus	0	1	1	1	0	0	3
Hipponix spp.							
Imbricaria olivaeformis							
Iniforis ordinata							
Ittibittium parcum							
Julia exquisita	0	1	0	0	1	0	2
Juliidae spp.							
Kermia aniani	0	0	0	0	0	1	1
Kermia brunnea							
Kermia cylindrica							
Kermia daedalea							
Kermia melanoxytum							
Kermia spp.							
Koloonella hawaiiensis							
Koloonella spp.							
Leptothyra rubricincta							
Leptothyra verruca							
Leptothyra spp.							
Lienardia apiculata							
Lienardia crassicostata							
Lienardia mighelsi							
Lienardia spp.							
Liotiinae spp.	1	0	0	0	1	0	2
Littoraria spp.							
Lophocochlias minutissimus	13	17	8	14	15	15	82
Lophocochlias sp. A							
Lophocochlias spp.							
Lovellona peaseana							
Lovellona spp.							
Macteola segesta							
Marginellidae spp.	0	0	0	1	0	0	1
Meioceras sandwichensis							
Merelina granulosa	0	0	0	0	1	2	3
Merelina hewa	0	0	1	0	0	0	1
Merelina wanawana							
Merelina spp.							
Metaxia albicephala	0	0	1	1	0	0	2
Metaxia brunnicephala	0	0	1	0	1	0	2
Metaxia spp.	0	0	0	1	1	0	2
Microdaphne morrisoni							
Microdaphne trichodes	0	0	0	0	0	1	1
Miralda paulbartschi							
Miralda scopulorum	0	0	0	2	0	1	3
Miralda spp.							
Mitra saltata							
Mitra typha	0	0	0	1	0	0	1
Mitra spp.							
Mitrella bella							
Mitrella loyaltensis							
Mitrella margarita							
Mitrella rorida							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Mitrella spp.	0	0	1	0	0	0	1
Mitridae spp.	0	0	1	0	0	0	1
Mitrolumna alphonsiana							
Mitrolumna iki							
Mitrolumna metula							
Mitrolumna sp.							
Modulus tectum							
Morula spp.	0	2	0	0	0	0	2
Muricidae spp.							
Nassarius crematus							
Nassarius dermestina							
Nassarius spp.	0	1	0	1	0	0	2
Natica gualteriana							
Natica spp.							
Nerita spp.							
Nesiodostomia quarta							
Nesiodostomia spp.							
Odostomia gulicki							
Odostomia oxia							
Odostomia stearnsiella							
Odostomia spp.	1	0	2	1	3	1	8
Omalaxis spp.							
Omalogyra japonica	0	0	1	0	0	1	2
Omalogyra sp. A							
Omalogyra spp.							
Opalia attenuata							
Opalia spp.							
Orbitestella regina	1	8	2	6	3	6	26
Orbitestella sp. A							
Orbitestella sp. B							
Orbitestella spp.	0	0	0	0	1	0	1
Otopleura mirabilis							
Parashiela beetsi	10	15	20	17	18	20	100
Peasiella tantilla							
Peristernia chlorostoma	0	0	1	1	0	0	2
Phenacolepas scobinata							
Phenacolepas spp.							
Philippia oxytropis	0	0	0	0	1	0	1
Philippia radiata							
Philippia spp.							
Physidae [c] spp.							
Planaxis suturalis							
Planaxis spp.							
Plesiotrochus luteus	1	2	1	1	1	3	9
Polinices tumidus [b]	1	1	1	0	0	0	3
Powellisetia fallax	2	1	1	1	1	0	6
Prodotia iostomus							
Pseudomalaxis spp.							
Pterygia pudica							
Pupa pudica							
Pupa tessellata							
Pupa spp.	0	0	0	1	0	0	1
Pusillina marmorata	17	14	16	16	14	21	98
Pusillina spp.							
Pyramidella sulcata							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Pyramidella sp. A							
Pyramidella sp. B							
Pyramidella sp. C							
Pyramidella sp. D							
Pyramidella spp.							
Pyramidellidae sp. A							
Pyramidellidae sp. B							
Pyramidellidae sp. C							
Pyramidellidae sp. D							
Pyramidellidae spp.	1	0	0	0	0	0	1
Pyramidelloides angusta							
Pyramidelloides gracilis							
Pyramidelloides miranda							
Pyramidelloides suta							
Pyrgulina oodes	2	1	0	0	0	0	3
Pyrgulina spp.							
Rastodens spp.							
Rhinoclavis articulata							
Rissoella confusa confusa							
Rissoella longispira	4	6	1	0	4	4	19
Rissoella spp.	0	0	0	0	2	0	2
Rissoidae spp.	0	0	0	0	2	0	2
Rissoina ambigua							
Rissoina cerithiiformis	7	12	3	12	5	7	46
Rissoina costata							
Rissoina imbricata	0	0	1	0	0	0	1
Rissoina pulchella	8	20	16	19	13	17	93
Rissoina spp.							
Rufodardanula conica							
Rufodardanula ponderi	0	0	0	1	0	0	1
Rufodardanula sp. A							
Rufodardanula spp.	0	0	0	0	0	1	1
Sansonia kenneyi	0	0	0	0	0	1	1
Sansonia sp. A							
Sansonia spp.							
Scabricola newcombii							
Scalenostoma spp.							
Scaliola spp.	17	18	18	18	17	15	103
Schwartziella ephamilla	23	27	17	22	17	23	129
Schwartziella triticea							
Scissurella coronata							
Scissurella pseudoequatoria							
Scissurella spp.							
Seminella peasei	1	1	2	3	0	2	9
Seminella smithi	2	2	0	0	0	0	4
Seminella spp.							
Serpulorbis variabilis							
Serpulorbis spp.							
Sinezona insignis							
Smaragdia bryanae							
Stilifer spp.							
Stosicia hiloense							
Strebloceras subannulatum	1	0	2	1	0	0	4
Strombus dentatus							
Strombus helli							

Table E.6—*Continued.*

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Strombus maculata							
Strombus spp.	0	0	0	1	0	1	2
Styliferina goniochila	3	5	0	3	3	3	17
Synaptocochlea concinna							
Subcancilla sp. cf. *flammea*							
Subcancilla spp.							
Teinostoma sulcata							
Teinostoma spp.							
Terebra affinis							
Terebra nodularis							
Terebra spp.	0	1	0	1	0	1	3
Terenolla sp. cf. *pygmaea*							
Thala milium							
Thala spp.							
Tricolia variabilis	10	5	3	9	7	17	51
Triphora coralina							
Triphora peasei							
Triphora tessellata							
Triphora spp.	18	7	15	16	11	11	78
Tritonoturris cumingii							
Tritonoturris spp.							
Trivia hordacea							
Trivia pellucida							
Trivia globosa pilula							
Trivia spp.							
Trochus intextus	0	0	0	1	0	0	1
Trochus spp.							
Tugali oblonga							
Tugali spp.							
Turbo sandwicensis							
Turbonilla cornelliana	1	1	1	0	0	1	4
Turbonilla lirata							
Turbonilla thaanumi	0	0	3	1	0	0	4
Turbonilla sp. A							
Turbonilla sp. B							
Turbonilla sp. C							
Turbonilla sp. D							
Turbonilla sp. E							
Turbonilla sp. F							
Turbonilla sp. G							
Turbonilla spp.							
Turridae spp.	0	0	1	0	0	0	1
Turridrupa consobrina							
Umbraculum spp.							
Vanikoro cancellata							
Vanikoro spp.							
Veprecula brunonia	0	1	0	0	0	0	1
Vermetidae spp.							
Vexillum adamsianum							
Vexillum approximatum							
Vexillum cosmani							
Vexillum diutenera							
Vexillum interruptum							
Vexillum lenhilli							
Vexillum micra							

Table E.6—*Continued*.

Taxon	No. of Individuals						Total
	Replicate						
	1	2	3	4	5	6	
Vexillum pacificum							
Vexillum patriarchalis							
Vexillum piceum							
Vexillum rubrum	0	0	0	0	1	1	2
Vexillum rufofilosum							
Vexillum suavis							
Vexillum sp. A							
Vexillum spp.	0	0	0	0	1	0	1
Viriola cancellata							
Viriola fallax							
Viriola spp.	3	4	5	4	1	3	20
Vitrinellidae spp.							
Volvarina fusiformis							
Volvarina spp.	1	0	0	0	0	0	1
Williamia radiata	0	4	4	4	1	3	16
Xenuroturris spp.							
Zebina bidentata							
Zebina tridentata [b]							
Zebina spp.	0	0	0	0	0	1	1
Gastropoda sp. A	1	0	0	1	0	0	2
Gastropoda sp. B							
Gastropoda spp.	0	0	1	1	0	4	6
SCAPHOPODA							
Scaphopoda spp.							
CEPHALOPODA							
POLYPLACOPHORA							
Chiton spp.	0	0	0	1	0	0	1
Total No. of Individuals	474	471	365	487	418	561	2,776
Total No. of Individuals/cm^3	19.0	18.8	14.6	19.5	16.7	22.4	18.5
Total No. of Taxa	55	60	60	70	58	59	126

[a] *Pinna* are indicated by a "+" or "++" for larval shells and by "frag" for shell fragments.

[b] Taxon new to Waiʻanae ocean outfall.

[c] Freshwater mollusk.