

**Preliminary Assessment and Recommendations for Long-term Monitoring
of Reef Fish Populations in the Proposed National Park on Ofu Island,
American Samoa.**

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INTRODUCTION

The coral reefs of Ofu Island, American Samoa contain a high diversity of reef fishes and coral (Itano and Buckley, 1988). The U.S. Congress has authorized the Department of the Interior to enter into a lease agreement with the Governor of American Samoa to establish the National Park of American Samoa (Congressional Record, 1988), a park which would include the marine inshore area along the southern coast of the island of Ofu. A fringing reef along the southern shore provides a natural lagoon habitat which is uncommon in American Samoa. This area supports a local subsistence fishery and provides excellent opportunities for SCUBA diving and snorkeling. This area covers approximately __ km of shoreline out to the reef edge.

The subsistence shoreline fisheries in American Samoa accounts for the majority of the total catch and value of the domestic fishery resources (Ponwith, 1991). Principal fishing methods include rod/reel, handlining, free diving, gillnetting, reef gleaning, and throw netting (Craig *et al.*, 1992). Jacks (Carangidae), surgeonfishes (Acanthuridae), mullet (Mugilidae), octopus (*Octopus* sp), and groupers (Serranidae) account for the majority of the species catch by weight.

Samoa has experienced substantial population growth and extensive coastal development in recent years (Wass, 1982). Increased fishing effort and improved gear

efficiency as well as habitat loss have placed tremendous pressures on the coastal marine resources. The nearshore ecosystem has deteriorated because of land clearing, coastal road development, increased cannery waste and expanded fishing effort. Per capita catch per unit effort for reef-resident species has declined by over 50% since 1979 (Ponwith, 1991). Reef fishes are vulnerable to overfishing due to their slow growth, long life spans, and small home ranges (Munro, 1983; Ralston, 1987). Additionally, reduction of live coral cover and reef structural heterogeneity by habitat alteration and destructive fishing techniques can reduce the amount of habitat available for reef fishes, particularly juveniles (Russ, 1991).

Marine parks, reserves and other protected areas have been established in a number of locations worldwide in an attempt to protect reef fish populations from fishing and habitat degradation (Bohnsack, 1990; Polunin, 1990; Roberts and Polunin, 1991). The Great Barrier Reef Marine Park Authority has established special use zones within the park to accommodate a wide variety of activities ranging from commercial fishing to scientific research (Craik, 1981; Murdoch, 1989). Protective management of marine reserves in the Philippines was shown to increase fish abundance in the reserve and export biomass to the adjacent non-reserve fishing areas (Alcala, 1988). Densities of target species, primarily piscivorous predators, increased following protection from spearfishing in Looe Key Reef, Florida (Bohnsack, 1982; Clark *et al.*, 1989). Approximately 200 coral reef habitats worldwide are now under some form of protective status (WCMC/IUCN, 1991).

Monitoring programs have been developed throughout the tropics in order to develop research and management strategies for coral reef areas. The U.S. National Park Service has established long-term monitoring programs at the four National Park Service units which

have coral reef ecosystems (Virgin Islands National Park, Buck Island Reef National Monument, Fort Jefferson National Monument, and Biscayne National Park) (Rogers, 1988). The objectives of these programs are to develop standardized assessment methods, establish baseline information on coral and reef fish populations and determine natural rates of change (Rogers, 1991). Long-term monitoring of coral reef fishes within the Virgin Islands National Park-Biosphere Reserve, St. John, U.S. Virgin Islands has revealed differences in fish assemblages between habitat types and locations as well as documenting the effects and recovery of fish assemblages following a major hurricane (Beets and Friedlander, 1990).

The research team involved in this investigation included Cynthia Hunter (Hawaii Institute of Marine Biology), William Macgruder (Bishop Museum), Karin Meier (Coriel, Inc.), and Alan Friedlander (Hawaii Cooperative Fisheries Research Unit). The purpose of this study is to identify fish species and estimate species abundance in select locations around Ofu Island as well as develop recommendations for long-term monitoring of these resources within and surrounding the proposed park area.

METHODS

The survey of nearshore coral reef resources in the proposed national park on Ofu, American Samoa was conducted from 7-12 September, 1992. Ten meter long permanent transects were established by the research team using stainless steel eyebolts at six locations for monitoring of corals and macro invertebrates (Hunter, 1992). Stations were located along the southeast (Sites C, E, G, H, and K) and northeast shores (Site N) (Figure 1).

These sites were located in back reef/lagoon habitats with a high percentage of live coral cover bisected by numerous sand channels. These habitats consisted of a mosaic of microhabitats including coral rubble, *Acropora* thickets, and micro atolls. Sites C and E are those described by Itano and Buckley (1988) (Table 1). Additional sites were selected based on previous studies and habitat descriptions. Three offshore sites were included in the study. The site in front of Ofu Village (Site OV) consisted of a steep reef slope with spur and groove formations. This site was previously censused by Itano and Buckley (1988). Another site was selected offshore from the airport (Site OA) which was flat featureless substrate of consolidated limestone in 9 to 17 m of water. The third location (Site G/H) was offshore from sites G and H in 5-17 m of water on a reef slope.

Visual censuses were determined to be the best non-destructive method to obtain information on the reef fish assemblages. All visual censuses were referenced to the permanent transect pins when possible to facilitate repeatability in the future. Precise locations of censuses appear in Appendix I.

Stationary point counts were conducted at all locations and consisted of counting all fishes within a defined area for a specified period of time (Bohnsack and Bannerot, 1986). The method is simple, fast, objective, repeatable, and easy to use. Stationary counts require less time than belt transects to set up and can be repeated easily with large sample sizes obtained at a minimum of effort (Thresher and Gunn, 1986). The stationary point count method was recently used to assess the shallow water reef fish stocks of Western Samoa (Samoilys and Carlos, 1991) as well as Fiji and Australia (Samoilys and Carlos, 1992). A fiberglass measuring tape was laid out and all species observed within a 10 m diameter

cylinder (78.5 square meters) were counted during a 15 minute time period (Kimmel, 1992; Kimmel, 1993). Preprinted data sheets were developed from previous visual census data obtained by Wass (n.d.) and Itano and Buckley (1988). These consisted of 2 sheets of Nalgene polypaper containing 119 common species most likely to be encountered along with a brief description of each species to aid in identification. A double wide clip board was used to reduce handling time underwater. Lengths were estimated to the nearest cm for all species. A ruler attached to the clipboard aided in length estimations. The author has extensive prior experience with this method and had previously verified length estimates. Some small wrasses (Labridae) were not easily identified to species and were pooled as juveniles. Several species of parrotfishes (Scaridae) form mixed schools when feeding and are extremely difficult to identify to species in the field (Randall *et al.*, 1990; Myers, 1991). Therefore, these individuals were grouped into a single taxon (Scaridae).

Each census was analyzed to obtain community information on fish abundance, species richness, species diversity, evenness, and size class distributions. Species diversity (H') was calculated using the Shannon-Weiner diversity index ($H' = - \sum p_i \ln p_i$) and evenness (J') was calculated using H'/H'_{\max} (Zar, 1984). Comparisons of community data among sites were performed using a Kruskal-Wallis single factor analysis of variance by rank (Zar, 1984). Dunn's multiple comparison procedure for unequal sample sizes (Hollander and Wolfe, 1973) was used to identify differences between sites. Mean length of fishes among sites were analyzed using a one way analysis of variance with 95% confidence intervals calculated for comparisons among sites. Data were $\ln(X+1)$ transformed to conform to the assumptions of homogeneity of variances and normal distributions. Inshore and offshore

censuses were pooled and community parameters compared using Mann-Whitney tests (Hollander and Wolfe, 1973).

Similarities of fish assemblages among sites were compared using the Bray-Curtis similarity coefficient:

$$D = \sum_{j=1}^s \left| \frac{x_{1j} - x_{2j}}{(x_{1j} + x_{2j})} \right|$$

where x_{1j} , x_{2j} are the abundances of species j in sites 1 and 2, and s is the number of species. A flexible clustering strategy of $\beta = -0.1$ was used in the analysis (Ludwig and Reynolds, 1988; Gauch, 1991). The 25 most abundant species were used in these analyses as rare species provide little information on the basic patterns of community structure (Ludwig and Reynolds, 1988). An index of relative dominance (IRD) was calculated by multiplying the relative frequency of occurrence and the relative abundance of each species over all censuses pooled (Bohnsack *et al.*, 1992).

RESULTS

A total of 288 species of fishes from 47 families were observed during all stationary point counts and subsequent random searches (Appendix II). Thirty-four censuses were conducted at the nine different sites during the study. The majority of the censuses (73.5%) were conducted in the shallow back reef/lagoon habitat where water depth averaged less than 2 m.

The total number of species observed during stationary point counts was 173 with a mean of 28.4 (S.D. = 6.1) per census (Table 2). The offshore airport site (Site OA) had the highest mean abundance of fishes per census (mean = 342.0, S.D. = 52.0) but the lowest mean diversity (mean = 1.713, S.D. = 0.340) and evenness (mean = 0.539, S.D. = 0.108) of any sites censused. The blackfin dartfish (*Ptereleotris evides*) was numerically dominant and extremely abundant at this site which yielded a high mean abundance of fish but low diversity and evenness.

The two other offshore locations, Site G/H and Ofu Village (Site OV), had the highest number of species per census (mean = 38.0, S.D. = 3.0; mean = 35.0, S.D. = 1.7; respectively) along with the inshore park site OE (mean = 35.3, S.D. = 2.5). Comparisons of community statistics among sites appear in Table 3.

Mean length of fishes were significantly different among sites (ANOVA, $F = 315.11$ d.f. = 8, $P < 0.001$). The offshore site G/H had the largest mean fish lengths observed during visual censuses (Figure 2) while the offshore airport site (OA) had the smallest mean fish size (mean = 4.607, S.D. = 2.270) followed by the backreef site N on the northeast end of the island. Fish were most numerous in the 5-10 cm size class for all sites combined, followed by those in 10-15 cm size class and those less than 5 cm (Table 4).

Cluster analysis showed that most replicate censuses conducted at sites were more similar to one another than those from other locations (Figure 3). The inshore sites E, H, and G clustered together as one group. Another group was formed with censuses conducted at inshore sites K and N. The inshore site C in front of the airport appeared to be unique relative to the other back reef areas. The three offshore forereef census locations had

distinctive fish assemblage structures compared to the inshore back reef areas with censuses conducted at the offshore airport site (OA) having the greatest dissimilarity among sites.

Eleven of the 25 most abundant species observed during visual censuses were damselfishes (Pomacentridae) (Table 5). The wrasses (Labridae - 4 species), surgeonfishes (Acanthuridae - 4 species), and parrotfishes (Scaridae - 3 species) followed in abundances. The south seas demoiselle (*Chrysiptera taupou*) was the most abundant species observed when all censuses were combined, this was followed by the blackfin dartfish (*P. evides*), the dusky gregory (*Stegastes nigricans*), the lined bristletooth (*Ctenochaetus striatus*), and the bullethead parrotfish (*Scarus sordidus*), respectively.

Relative frequency of occurrence, relative abundance, and an index of relative dominance (IRD) were calculated for all species. The top 25 species as ordered by IRD appear in Table 6. These indices gave similar trends to those observed by ordering based on individual abundance by species.

Abundance of fishes and number of species were significantly higher on offshore than inshore sites ($W = 362.5$, $P = 0.0036$; $W = 385.5$, $P = 0.0438$, respectively) (Table 6). Species diversity and evenness were not significantly different between these habitats ($W = 415.0$, $P = 0.3904$; $W = 456.5$, $P = 0.4701$, respectively). The average size of fishes was significantly larger on the inshore sites ($t = 15.01$, $P < 0.001$).

DISCUSSION

This initial survey has identified differences in diversity, abundance, and size of fishes among habitats within and adjacent to the boundaries of the proposed national park on Ofu, American Samoa. The sampling strategy employed recorded a large number of commercially and recreationally important species which can be used to evaluate changes in the reef fish community over time.

Wass (1984) identified 991 species of fish from American Samoa. He collected in a wide variety of habitats and depths using ichthyocides and other destructive methods. In a two year study around the island of Tutuila, American Samoa, Wass (n.d.) observed 356 species of fishes in transects and subsequent 20 minute searches in surveys conducted at 57 sites around the island. The lower number of species observed during the present study on Ofu Island (288 species) resulted from sampling in a restricted number of habitats and primarily in shallow water (<5 m). Using only visual census techniques underestimates cryptic and nocturnal species (Sale and Douglas, 1981). Despite these shortcomings, non-destructive visual assessment is the best method for repeated censusing of fishes.

The majority of the back reef sites appeared similar to one another in fish assemblage structure based on cluster analysis. Several of the back reef sites had species richness and diversity comparable to the two rich offshore locations, Ofu Village (OV) and Site G/H. These inshore sites were dominated by small damselfishes (Pomacentridae) and wrasses (Labridae) while more commercially and recreationally important species such as groupers (Serranidae), snappers (Lutjanidae) and large parrotfishes (Scaridae) were present at the

offshore sites.

The Offshore Airport (OA) and backreef site N were observed to have the smallest fish censused. The Offshore Airport site was composed mainly of small individuals (< 5 cm) and dominated by the blackfin dartfish (*P. evides*), the white-belly damselfish (*Amblyglyphidodon leucogaster*), and the south seas demoiselle (*C. taupou*). Site N was a shallow coral rubble habitat where small wrasses (Labridae) were abundant. Although the offshore Ofu Village site (OV) contained a number of large important fisheries species, the overall size of fishes was similar to the inshore locations due to the presence of large numbers of planktivorous damselfishes (primarily, the midget chromis, *Chromis acares* and the pale-tail chromis, *C. xanthura*). Overall mean fish length was greater on the inshore sites compared to the offshore locations due primarily to the high abundance and small size of fishes at the Offshore Airport site.

Groupers, primarily the peacock grouper (*Cephalopholis argus*) and the dwarf spotted grouper (*Epinephelus merra*), were commonly observed in the back reef areas. These individuals were typically small (< 15 cm) and appeared extremely wary of divers, quickly taking refuge in the reef. This behavior is frequently associated with species subjected to heavy fishing pressure. Groupers (Serranidae) are extremely vulnerable to fishing due to their curious and sedentary behavior. The abundance and size of large predatory species commonly targeted by fishers is a good indicator of fishing pressure (Bohnsack, 1982; Russ, 1985; Russ and Alcala, 1989)

RECOMMENDATIONS

Information on the status of the fish stock and the fishery is necessary in developing proper management strategies. The Great Barrier Reef Marine Park Authority (GBRMPA, 1978) considered commercial and recreational fishing to have the most important impact on the Great Barrier Reef fish populations. Fish stocks are dependent on recruitment, growth rates, natural mortality, and fishing mortality. All these factors need to be considered when managing fish resources. The levels of harvest as well as the abundance of fishes need to be monitored in order to effectively manage these stocks. The questions to be addressed include the present condition of the stocks, trends, and possible causes. Long-term monitoring should be formulated to best address these management objectives including biological as well as physical and chemical factors which may influence population abundance.

Visual censusing - Censusing has to be conducted with the financial resources available. Initial sampling should be as comprehensive as possible in order to detect seasonal changes, recruitment events, and other natural fluctuations. At a minimum, quarterly sampling at permanent sites is recommended. Once these natural variations are identified, the sampling program can be scaled back as needed by personnel and financial constraints. A stratified random sampling design should be established based on mapping and identification of important and unique habitats. This should be expanded to other sites as necessary and stratified by microhabitat. Sample size should be determined statistically based on preliminary samples for which variances can be measured (Kimmel, 1992, Bohnsack *et*

al., 1992). Visual censuses should be conducted in habitats on a proportional basis to the overall microhabitat variation. Two or more observers should be used during visual censusing to increase sample size, reduce spatial variability, and improve statistical power. When possible, the same person/persons should conduct the monitoring to reduce observer bias over time. Censuses of offshore populations should be included to track changes in the larger fisheries-related species and to determine differences in assemblage structure among locations.

Data analysis - The primary objective of data analysis should be to establish baseline information on existing conditions, including natural fluctuations. All previous data should be entered on electronic medium and incorporated in baseline estimates. Base-line data should be analyzed to examine variations among seasons, locations, and years. Long-term monitoring will help to detect changes in fisheries species resulting from habitat degradation and/or fishing pressure.

Fisheries sampling - Sampling of fishing activity will provide information on relative abundance of the resources, species composition, and trends in the fishery. This data set should include information on catch and effort by species, area, and gear type. Additional information on individual species, such as length, weight, age and growth, and reproductive state will help to develop stock assessment models that are needed for effective management of the resources.

Due to the small area covered by the proposed park, comprehensive sampling of

fishing effort, catch, and species composition could be performed under a modest sampling program. Interviews with fishers should be conducted on a regular basis to obtain catch and effort information. Monitoring of fishing effort could be accomplished in conjunction with other activities such as ranger patrols or during biological sampling trips through direct observations. Positive interaction with the local fishing community is essential in obtaining cooperation and accuracy in fisheries data collection.

CONCLUSIONS

One of the goals of the National Park of American Samoa should be to effectively monitor and manage the shallow-water reef fishes within its jurisdiction. The park should function as a protected area and provide a framework for demonstration of successful fisheries management strategies (Beets and Rogers, 1991). Management of the resources should include some types of restrictions on fishing effort within the park area. These restrictions, however, should not adversely affect the local community. Management options include gear restrictions (minimum mesh size, banning of destructive gears such as poisons, chemicals, and explosives), closed seasons once spawning periodicity of target species is known, restrictions to insure spawning success, and closed areas that can act as refuges and accumulate fish through high survival of recruits as well as immigration and retention (Parrish *et al.*, 1990).

Limiting fishing within the park should be based on high quality data and should only be undertaken with the participation and cooperation of the local fishers (Beets and Rogers,

1991). Management strategies should attempt to respect local cultures and traditions while ensuring conservation of the natural resources. The most effective marine reserves have had local involvement, public input, and education programs (Alcala, 1988; Kenchington, 1988; Bohnsack, 1990). Fisheries management was traditionally practiced throughout Oceania prior to the arrival of European culture (Johannes, 1978, 1981; Titcomb, 1972). Principles of conservation were very strong in these cultures. Traditional village fisheries management practices included closed fishing areas and seasons along with prohibition of wanton waste. Management strategies were patterned as much as possible after local customs and beliefs in order to elicit public support (Johannes, 1978). Westernization and changes in traditional cultural norms will require public education at all levels to sustain the fisheries and the resources.

The establishment of a National Marine Sanctuary at Fagatele Bay on Tutuila and the associated public education program has helped to identify the cultural, historical, and biological links between Samoans and their marine environment (Thomas, 1988). Traditional social structure and use patterns were incorporated into the sanctuary process by respecting lineage and hierarchial social structure (Friske, 1992). This has made the implementation of the sanctuary at Fagatele Bay more acceptable to all parties concerned.

It is essential that local fishers be integrated into the management process (Rogers and Teytaud, 1988; Koester, 1986; Moore, 1992). Their incorporation into the research process, information exchange and management strategies will help to insure accuracy of information, sensitivity to cultural needs and cooperation with regulations for the National Park of American Samoa.

Literature Cited

- Alcala, A.C. 1988. Effects of marine reserves on coral reef fish abundance and yields of Philippine coral reefs. *Ambio* 17, 194-199.
- Allen, G.R. 1991. Damsel fishes of the world. Mergus Publishers Hans A. Baensch. Melle, Germany. 271 pp.
- Beets, J. and Friedlander, A. 1990. Long-term monitoring of fisheries in the Virgin Islands National Park: impact of Hurricane Hugo. Report to the National Park Service, 23 pp.
- Beets, J. and Rogers, C.S. 1991. Shallow-water fisheries in the Virgin Islands National Park: are they declining? FY 91 Proposal to the National Park Service. 7 pp.
- Bohnsack, J.A. 1982. Effects of piscivorous predator removal on coral reef fish community structure. In "Gutshop '81. Fish Food Habit Studies" (G.M. Caillet and C.A. Simenstad, eds.). pp 258-267. Washington Sea Grant Publication. University of Washington, Seattle.
- Bohnsack, J.A. 1990. The potential of marine fishery reserves for reef fish management in the U.S. southern Atlantic. NOAA Tech. Memo. NMFS-SEFC-261, 40 p.
- Bohnsack, J.A. and Bannerot, S.P. 1986. A stationary visual technique for quantitatively assessing community structure of coral reef fishes. NOAA Tech. Rep. NMFS 41, 1-15.
- Bohnsack, J.A., Harper, D.E., McClellan, D.B., Hulsbeck, M.W., Rutledge, T.N., Pickett, M.H. and Eklund, A. 1992. Quantitative visual assessment of fish community structure in Biscayne National Park. Draft Final Report. NOAA/NMFS-SEFS, 45 p.
- Clark, J.R., Causey, B. and Bohnsack, J.A. 1989. Benefits from coral reef protection: Looe Key Reef, Florida. In "Coastal Zone '89: Proceedings of the Sixth Symposium on Coastal and Ocean Management, Charleston 11-14 July 1989" (O.T. Magoon, H. Converse, D. Miner, L.T. Tobin and D. Clark, eds.), pp. 3076-86. American Society of Civil Engineers, New York.
- Craig, P., Ponwith, B., Aitaoto, F. and Hamm, D. 1992. The commercial, subsistence and recreational fisheries of American Samoa. Report to the Dept. Marine and Wildlife Resources, American Samoa. 26 p.
- Craik, G.J.S. 1981. Recreational fishing on the Great Barrier Reef. Proc. Int. Coral Reef Symp., 4th 1, 159-172.

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- Congressional Record, 1988. An act to establish the national park of American Samoa. Public Law 100-571, October 31, 1988. H.R. 4818. 5 pp.
- Fiske, S.J. 1992. Sociocultural aspects of establishing marine protected areas. *Ocean and Coastal Manag.* 18, 25-46.
- Gauch, H.G. Jr. 1991. *Multivariate analysis in community ecology*. Cambridge University Press, Cambridge, U.K. 298 pp.
- GBRMPA, 1978. Workshop on reef fish assessment and monitoring. Workshop Series No.2. Great Barrier Reef Marine Park Authority, Australia. 64 pp.
- Hollander, M. and Wolfe, D.A. 1973. *Nonparametric statistical methods*. John Wiley and Sons, New York. 503 pp.
- Hunter, C.L. 1992. Ofu reef survey: general reef characteristics, corals, and macro-invertebrates. Draft report to National Park Service, American Samoa. 41 p.
- Itano, D. and Buckley, T. 1988. The coral reefs of the Manu'a Islands, American Samoa. Report to the Department of Marine and Wildlife Resources, American Samoa Government. 26 pp.
- IUCN/WCMC. 1990. Draft list of protected areas with coral habitats. Protected Areas Data Unit, World Conservation Monitoring Centre, Cambridge, U.K. and Commission on National Parks and Protected Areas, IUCN, Gland, Switzerland.
- Johannes, R.E. 1978. Traditional marine conservation methods in Oceania and their demise. *Annu. Rev. Ecol. Syst.* 9, 349-364.
- Johannes, R.E. 1981. *Words of the lagoon: fishing and marine lore in the Palau District of Micronesia*. University of California Press. Berkeley, California. 245 pp.
- Kenchington, R.A. 1988. Managing reefs and interreefal environments and resources for sustained exploitative, extractive and recreational uses. *Proc. Int. Coral Reef Symp.*, 1, 81-87.
- Kimmel, J.J. 1992. NPS coral reef assessment Program: preliminary assessment of fishes in the Dry Tortugas, Florida. Report to the National Park Service, 4 pp.
- Kimmel, J.J. 1993. Suggested modifications to diver-oriented point counts for fishes. *Amer. Soc. Ichth. Herpetol.*, 73rd Annual Meeting, Austin, Tx (abstract).

- Koester, S. 1986. Socioeconomic and cultural role of fishing and shellfishing in the Virgin Islands Biosphere Reserve. Biosphere Reserve Research Report no. 12, VIRMC/NPS, 24 pp.
- Ludwig, J.A. and Reynolds, J.F. 1988. Statistical ecology: a primer on methods and computing. John Wiley and Sons, New York. 377 pp.
- Myers, R.F. 1991. Micronesian reef fishes: a practical guide to the identification of the coral reef fishes of the tropical central and western Pacific. Coral Graphics. Barrigada, Guam. 298 pp.
- Moore, D. R. 1992. Self-regulation by artisanal fishermen in the Caribbean. Proc. Gulf Caribb. Fish. Instit. 41:304-309.
- Munro, J.L (ed.). 1983. Caribbean Coral Reef Fishery Resources. ICLARM Stud. Rev. 7, 1-276.
- Murdoch, L. 1989. Discover the Great Barrier Reef Marine Park. Bay Books. Kensington, Australia. 96 p.
- Parrish, J.D., Smith, G.C. and Norris, J.E. 1990. Resources of the marine waters of Kaloko-Honokohau National Historical Park. Technical Report no. 74. Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa. 115 pp.
- Polunin, N.V.C. 1990. Marine regulated areas: an expanded approach for the tropics. Resource Manage. Optimiz. 7, 283-99.
- Ponwith, B. 1991. The shoreline fishery of American Samoa: a 12-year comparison. Dept. Marine and Wildlife Resources (American Samoa), Biol. Rept. Ser. No. 22. 51 p.
- Ralston, S. 1987. Mortality rates of snappers and groupers. In "Tropical Snappers and Groupers: Biology and Fisheries Management" (J.J. Polovina and S. Ralston, eds.), pp. 375-404. Westview, Boulder, Colorado.
- Randall, J.E., Allen, G.R. and Steene, R.C. 1990. Fishes of the great barrier reef and coral sea. University of Hawaii Press, Honolulu. 507 pp.
- Roberts, C.M. and Polunin, N.V.C. 1991. Are marine reserves effective in management of reef fisheries? Reviews in Fish Biol. and Fisheries, 1, 65-91.
- Rogers, C.S. 1988. Recommendations for long-term assessment of coral reefs: U.S. National Park Service initiates regional program. Proc. Int. Coral Reef Symp., 6th 2, 399-403.

- Rogers, C.S. 1991. U.S. National Park Service coral reef assessment programme. Reef Encounters 10: 8-9.
- Rogers, C.S. and Teytaud, R. 1988. Marine and terrestrial ecosystems of the Virgins Islands National Park and Biosphere Reserve. Biosphere Reserve Report no. 29, VIRMC/NPS. 112 pp.
- Russ, G.R., 1985. Effects of protective management on coral reef fishes in the central Philippines. Proc. Int. Coral Reef Symp., 5th 4, 219-224.
- Russ, G.R. 1991. Coral reef fisheries: Effects and yield. In "The Ecology of Fishes on Coral Reefs" (P. Sale, ed.), pp. 601-635. Academic Press, San Diego.
- Russ, G.R. and Alcala, A.C. 1989. Effects of intense fishing pressure on an assemblage of coral reef fishes. Mar. Ecol. Prog. Ser. 56, 13-27.
- Sale, P.F. and Douglas, W.A. 1981. Precision and accuracy of visual census techniques for fish assemblages on coral patch reefs. Environ. Biol. Fishes 6, 333-339.
- Samoilys, M. and Carlos, G. 1991. A survey of reef fish stocks in Western Samoa: applications of underwater visual census methods for fisheries personnel. A report prepared for the Forum Fisheries Agency, Honaira, Solomon Islands and the Fisheries Division, Dept. of Agriculture, Apia, Western Samoa. 26 p.
- Samoilys, M. and Carlos, G. 1992. Development of an underwater visual census method for assessing shallow water reef fish stocks in the south west Pacific. Final Report, Australian Centre for International Agricultural Research Project PN 8545. 100 p.
- Thomas, W.J. Fagatele Bay: a sanctuary in Samoa. Oceanus 31, 18-24.
- Thresher, R.E. and Gunn, J.S. 1986. Comparative analysis of visual census techniques for highly mobile, reef-associated piscivores (Carangidae). Envir. Biol. Fishes 17(2),93-116.
- Titcomb, M. 1972. Native use of fish in Hawaii. University of Hawaii Press, Honolulu. 175 pp.
- Wass, R.C. 1982. The shoreline fishery of American Samoa-Past and present. In "Ecological Aspects of Coastal Zone Management" (J.L. Munro, ed.), Proc. Semin. Mar. Coastal Processes Pac. pp. 51-83. UNESCO, Jakarta, Indonesia.
- Wass, R.C. n.d.. Characterization of inshore Samoan fish communities. Report to the Department of Marine and Wildlife Resources, American Samoa Government. 42 pp.

Wass, R.C. 1984. An annotated checklist of the fishes of Samoa. NOAA Tech. Rep. NMFS SSRF-781, 1-43.

Zar, J.H. 1984. Biostatistical analysis. Prentice-Hall, Inc. Englewood Cliffs, N.J. 718 pp.

Table 1. Locations of visual censuses conducted during September, 1992 on Ofu Island, American Samoa. Asterisks denote location codes within proposed national park.

Location Code	Depth (m)	Number of censuses	Habitat type	Distance from shore (m)
<u>Inshore</u>				
C	2	5	Back reef lagoon	40
E*	2	4	Back reef lagoon	90
H*	2	5	Back reef lagoon	75
G*	2	5	Back reef lagoon	80
K*	2	3	Back reef lagoon	10
N	2	3	Back reef lagoon	100
<u>Offshore</u>				
OA	9-17	3	Flat landscape consolidated limestone	
G/H	5-17	3	Reef slope	
OV	9-17	3	Reef slope spur and groove	

Table 2. Reef fish community statistics for visual censuses conducted on Ofu Island, American Samoa. Numbers are mean values for censuses performed at each location. Standard deviations are in parentheses. Diversity is the Shannon-Weiner diversity index ($H' = - \sum p_i \log p_i$). Evenness ($J' = H'/H'_{\max}$). Asterisks denote location codes within proposed national park boundaries.

Location Code	No. of Censuses	Total Number of Species	Abundance of Fishes	Species Richness	Diversity (H')	Evenness (J')
C	5	62	111.8 (13.3)	25.8 (4.6)	2.535 (0.154)	0.783 (0.045)
E*	4	71	184.5 (13.8)	35.3 (2.5)	2.676 (0.145)	0.751 (0.031)
G*	5	53	162.0 (76.8)	24.4 (4.2)	2.323 (0.252)	0.731 (0.086)
H*	5	51	166.0 (26.0)	23.2 (2.7)	2.114 (0.241)	0.672 (0.063)
K*	3	49	161.7 (9.9)	30.3 (3.8)	2.470 (0.087)	0.725 (0.027)
N	3	37	149.0 (19.5)	24.7 (1.2)	2.176 (0.287)	0.678 (0.079)
Offshore:						
AO	3	43	342.0 (52.0)	24.0 (1.0)	1.713 (0.340)	0.539 (0.108)
G/H	3	64	187.3 (78.1)	38.0 (3.0)	2.854 (0.234)	0.748 (0.057)
OV	3	65	34.7 (46.5)	35.0 (1.7)	2.596 (0.057)	0.730 (0.024)
Total	34	173	181.2 (71.4)	28.4 (6.1)	2.382 (0.361)	0.715 (0.087)

Table 3. Kruskal-Wallis Rank Sums statistics for reef fish community statistics. Dunn's multiple comparison procedure ($\alpha = 0.1$). Underlined medians are not significantly different. Asterisks denote location codes within proposed national park.

Number of fishes

Location	C	G*	N	G/H	K*	H*	E*	OV	OA
Avg. Rank	4.8	13.8	12.5	17.7	16.0	18.1	23.4	26.8	33.0
N	5	5	3	3	3	5	4	3	3
Median	<u>108.0</u>	<u>140.0</u>	<u>156.0</u>	<u>157.0</u>	<u>157.0</u>	<u>164.0</u>	<u>186.0</u>	<u>261.0</u>	314.0

H = 20.98 d.f. = 8 p = 0.008

Number of species

Location	H*	G*	C	N	OA	K*	E*	OV	G/H
Avg. Rank	8.8	12.1	13.5	12.0	10.0	21.5	28.2	28.5	31.3
N	5	5	5	3	3	3	4	3	3
Median	22.0	24.0	26.0	<u>24.0</u>	<u>24.0</u>	<u>32.0</u>	<u>35.5</u>	<u>36.0</u>	<u>38.0</u>

H = 23.44 d.f. = 8 p = 0.003

Species diversity

Location	OA	H*	N	G*	K*	OV	C	E*	G/H
Avg. Rank	3.7	8.4	10.3	15.0	17.7	25.3	21.3	26.9	31.0
N	3	5	3	5	3	3	5	4	3
Median	<u>1.60</u>	<u>2.16</u>	<u>2.08</u>	<u>2.33</u>	<u>2.44</u>	<u>2.61</u>	<u>2.52</u>	<u>2.67</u>	<u>2.87</u>

H = 23.48 d.f. = 8 p = 0.003

Evenness

Location	OA	H*	N	K*	OV	G*	E*	G/H	C
Avg. Rank	3.7	10.4	13.2	16.0	16.3	19.4	22.2	26.2	26.2
N	3	5	3	3	3	5	4	3	5
Median	<u>0.512</u>	<u>0.671</u>	<u>0.656</u>	<u>0.735</u>	<u>0.729</u>	<u>0.750</u>	<u>0.757</u>	<u>0.772</u>	<u>0.761</u>

H = 16.2 d.f. = 8 p = 0.041

Table 4. Mean abundance of fishes by size class from visual census data. Standard deviations are in parentheses. Asterisks denote location codes within proposed national park.

Location	< 5 cm	5-10 cm	10-15 cm	15-20 cm	20-25 cm	> 25 cm
<u>Inshore</u>						
C	10.4 (10.9)	69.2 (9.3)	28.6 (14.3)	2.8 (2.3)	0.8 (0.8)	0.0 (0.0)
E*	0.0 (0.0)	79.0 (36.4)	83.0 (36.0)	10.8 (4.3)	10.8 (20.2)	1.0 (0.8)
H*	4.6 (4.5)	115.6 (32.0)	43.2 (16.7)	2.6 (1.5)	0.0 (0.0)	0.0 (0.0)
G*	24.4 (54.0)	55.6 (16.8)	54.6 (7.1)	17.0 (18.4)	0.8 (1.1)	9.6 (19.8)
K*	55.3 (12.0)	46.3 (23.9)	46.3 (11.9)	13.7 (15.9)	0.0 (0.0)	0.0 (0.0)
N	31.7 (28.0)	111.3 (20.2)	5.7 (3.5)	0.3 (0.6)	0.0 (0.0)	0.0 (0.0)
<u>Offshore</u>						
OA	247.0 (32.4)	75.7 (41.2)	15.3 (3.8)	4.0 (1.7)	0.0 (0.0)	0.0 (0.0)
G/H	7.7 (11.6)	52.7 (28.9)	48.7 (9.9)	73.0 (57.7)	5.3 (4.9)	0.0 (0.0)
OV	74.7 (28.4)	79.0 (25.2)	63.3 (11.0)	13.7 (4.7)	3.3 (1.2)	0.7 (0.6)
Grand mean	42.5 (72.3)	76.8 (33.6)	44.2 (26.2)	13.8 (25.4)	2.3 (7.2)	1.6 (7.7)

Table 5. Mean abundance of the 25 most common species based on total number of individuals by location. Species are listed in phylogenetic order. Common names from Randall et al. (1990). Asterisks denote location codes within proposed national park.

Location code	C	E*	H*	G*	K*	N	OA	G/H	OV
<i>Mulloidés vanicolensis</i> Yellowfin goatfish	-	0.8	-	9.0	10.0	-	-	-	-
<i>Amblyglyphidodon leucogaster</i> White-belly damsel	-	-	-	-	-	-	41.7	-	-
<i>Chromis acares</i> Midget chromis	-	-	-	-	-	-	-	5.3	48.3
<i>Chromis viridis</i> Blue-green chromis	-	-	2.6	26.0	-	-	-	-	-
<i>Chromis xanthura</i> Pale-tail chromis	-	-	-	-	-	-	-	-	20.3
<i>Chrysiptera glauca</i> Grey damsel	1.0	-	3.4	-	10.0	16.0	-	-	-
<i>Chrysiptera leucopoma</i> Surge demoiselle	3.6	0.5	2.8	0.4	8.3	4.7	6.0	-	0.3
<i>Chrysiptera taupou</i> South sea demoiselle	29.8	2.8	7.0	10.4	28.7	31.3	35.7	17.0	-
<i>Plectroglyphidodon dickii</i> Dick's damsel	0.4	-	-	-	-	-	-	10.7	7.7
<i>Pomacentrus vaiuli</i> Princess damsel	1.2	-	1.6	1.6	3.0	3.7	1.3	2.7	0.3
<i>Stegastes albifasciatus</i> Whitebar gregory	7.2	1.8	4.8	5.0	19.0	24.3	-	-	-
<i>Stegastes nigricans</i> Dusky gregory	5.0	1.8	44.0	19.2	0.3	0.3	-	0.3	-
<i>Halichoeres trimaculatus</i> Threespot wrasse	6.8	0.3	6.2	3.8	5.7	12.7	-	-	-
<i>Stethojulis bandanensis</i> Bluelined wrasse	2.0	-	3.6	0.4	2.7	14.3	-	-	-
<i>Thalassoma amblycephalum</i> Blunthead wrasse	-	-	-	-	12.0	0.3	31.7	-	24.7
<i>Thalassoma hardwicke</i> Sixbar wrasse	2.2	0.3	6.8	3.4	3.0	6.3	-	-	-
<i>Scarus oviceps</i> Egghead parrotfish	-	0.3	2.0	2.4	-	-	-	13.0	2.0
<i>Scarus sordidus</i> Bullethead parrotfish	4.6	1.8	15.0	23.0	-	-	0.3	26.0	-
<i>Scarus species</i> Juvenile parrotfish	7.8	1.0	28.6	8.6	2.3	1.7	0.0	7.3	-
<i>Valenciennesa strigata</i> Blueband goby	6.6	-	-	-	-	1.0	5.0	-	-
<i>Ptereleotris evides</i> Twotone dartfish	-	-	-	-	-	-	166.7	-	-
<i>Acanthurus nigricans</i> Whitecheek surgeonfish	0.2	-	-	-	-	-	-	6.3	21.7
<i>Acanthurus nigrofuscus</i> Brown surgeonfish	0.4	-	0.2	4.0	7.7	6.0	0.7	0.3	2.0
<i>Acanthurus triostegus</i> Convict surgeonfish	1.2	0.3	9.8	1.0	-	0.7	-	-	-
<i>Ctenochaetus striatus</i> Lined bristletooth	9.2	2.0	6.0	15.4	9.0	1.7	6.7	15.3	20.3

Table 6. Index of relative dominance (IRD = relative frequency * relative abundance), frequency of occurrence, and abundance for the top 25 species observed during visual censuses conducted at Ofu Island, American Samoa. Species are ordered by IRD. Common names from Randall et al. (1990). Relative frequency based on 34 visual point counts, relative abundance based on N = 6161.

SPECIES	Frequency of occurrence	Relative frequency	Frequency rank	Abundance	Relative abundance	Abundance rank	IRD	IRD rank
<i>Chrysiptera taupou</i> South sea demoiselle	30	88.24%	2	686	11.13%	1	98.25	1
<i>Ctenochaetus striatus</i> Lined bristletooth	31	91.18%	1	395	6.41%	4	58.46	2
<i>Stegastes nigricans</i> Dusky gregory	20	58.82%	11	421	6.83%	3	40.20	3
<i>Scarus sordidus</i> Bullethead parrotfish	20	58.82%	10	362	5.88%	5	34.56	4
<i>Scarus species</i> Juvenile parrotfish	22	64.71%	8	307	4.98%	6	32.24	5
<i>Stegastes albifasciatus</i> Whitebar gregory	22	64.71%	9	286	4.64%	7	30.04	6
<i>Halichoeres trimaculatus</i> Threespot wrasse	22	64.71%	6	149	2.42%	10	15.65	7
<i>Chrysiptera leucopoma</i> Surge demoiselle	23	67.65%	4	114	1.85%	13	12.52	8
<i>Thalassoma hardwicke</i> Sixbar wrasse	25	73.53%	3	100	1.62%	16	11.93	9
<i>Thalassoma amblycephalum</i> Blunthead wrasse	8	23.53%	41	206	3.34%	8	7.87	10
<i>Stethojulis bandanensis</i> Bluelined wrasse	18	52.94%	13	84	1.36%	18	7.22	11
<i>Ptereleotris evides</i> Twotone dartfish	3	8.82%	102	500	8.12%	2	7.16	12
<i>Acanthurus nigrofuscus</i> Brown surgeonfish	19	55.88%	12	78	1.27%	20	7.07	13
<i>Scarus oviceps</i> Egghead parrotfish	17	50.00%	15	80	1.30%	19	6.49	14
<i>Pomacentrus vaiuli</i> Princess damsel	22	64.71%	7	58	0.94%	24	6.09	15
<i>Chrysiptera glauca</i> Grey damsel	11	32.35%	23	101	1.64%	15	5.30	16
<i>Halichoeres hortulanus</i> Checkerboard wrasse	23	67.65%	5	44	0.71%	28	4.83	17
<i>Acanthurus triostegus</i> Convict surgeonfish	12	35.29%	18	78	1.27%	21	4.47	18
<i>Acanthurus nigricans</i> Whitecheek surgeonfish	10	29.41%	28	88	1.43%	17	4.20	19
<i>Chromis acares</i> Midget chromis	5	14.71%	56	161	2.61%	9	3.84	20
<i>Chromis viridis</i> Blue-green chromis	5	14.71%	58	143	2.32%	11	3.41	21
<i>Valenciennesa strigata</i> Blueband goby	12	35.29%	21	58	0.94%	25	3.32	22
<i>Acanthurus lineatus</i> Striped surgeonfish	13	38.24%	17	50	0.81%	26	3.10	23
<i>Plectroglyphidodon dickii</i> Dick's damsel	9	26.47%	36	61	0.99%	23	2.62	24
<i>Chaetodon citrinellus</i> Speckled butterflyfish	17	50.00%	14	32	0.52%	35	2.60	25

Table 7. Comparison of reef fish community statistics for inshore and offshore sites. Results of Mann-Whitney tests except for t-test results for average length of fishes (Ln(X+1) transformation).

	Inshore	Offshore
<u>Number of censuses</u>	25	9
<u>Number of fishes</u>	157	262
W = 362.5 P = 0.0036**	median	
<u>Number of species</u>	26	35
W = 385.5 P = 0.0438*	median	
<u>Species Diversity</u>	2.435	2.613
W = 415.0 P = 0.3904 ns	median	
<u>Evenness</u>	0.740	0.729
W = 456.5 P = 0.4701 ns	median	
<u>Average size</u>	N = 3864	N = 2297
	mean	2.001
	S.D.	0.541
t = 15.01 P < 0.001***		

ns = not significant (P > 0.05)

* = P < 0.05

** = P < 0.01

*** = P < 0.001

Figure 1. Locations of visual censuses conducted on Ofu Island, American Samoa. Asterisks denote location codes within proposed national park.

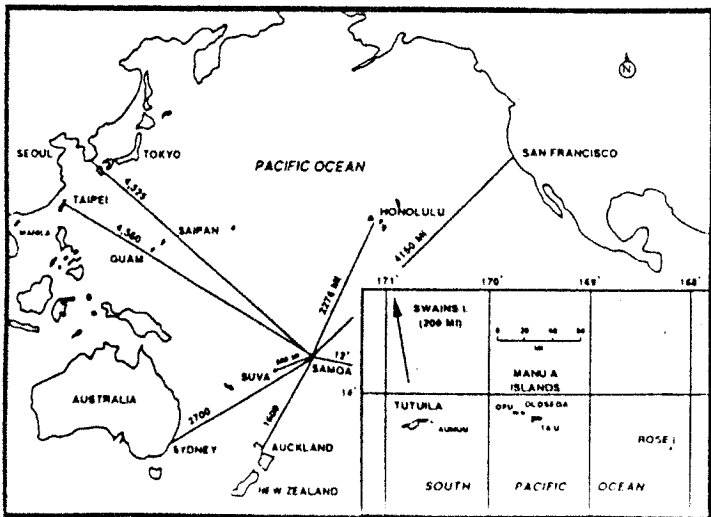
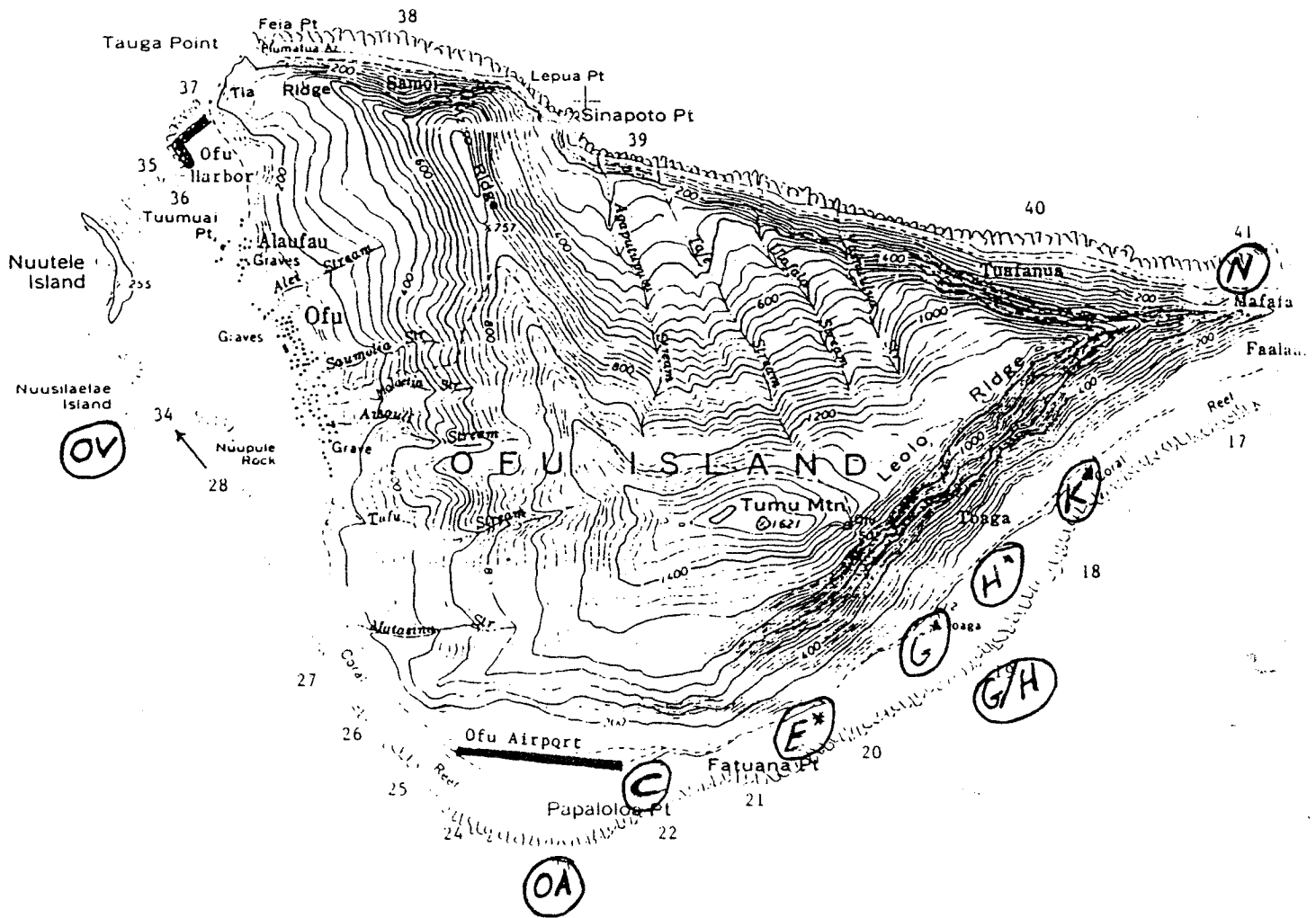


Figure 2. Mean length of fishes (cm) from visual census data. Codes for locations are given in Table 1. Error bars are standard deviations for each site. Asterisks denote location codes within proposed national park.

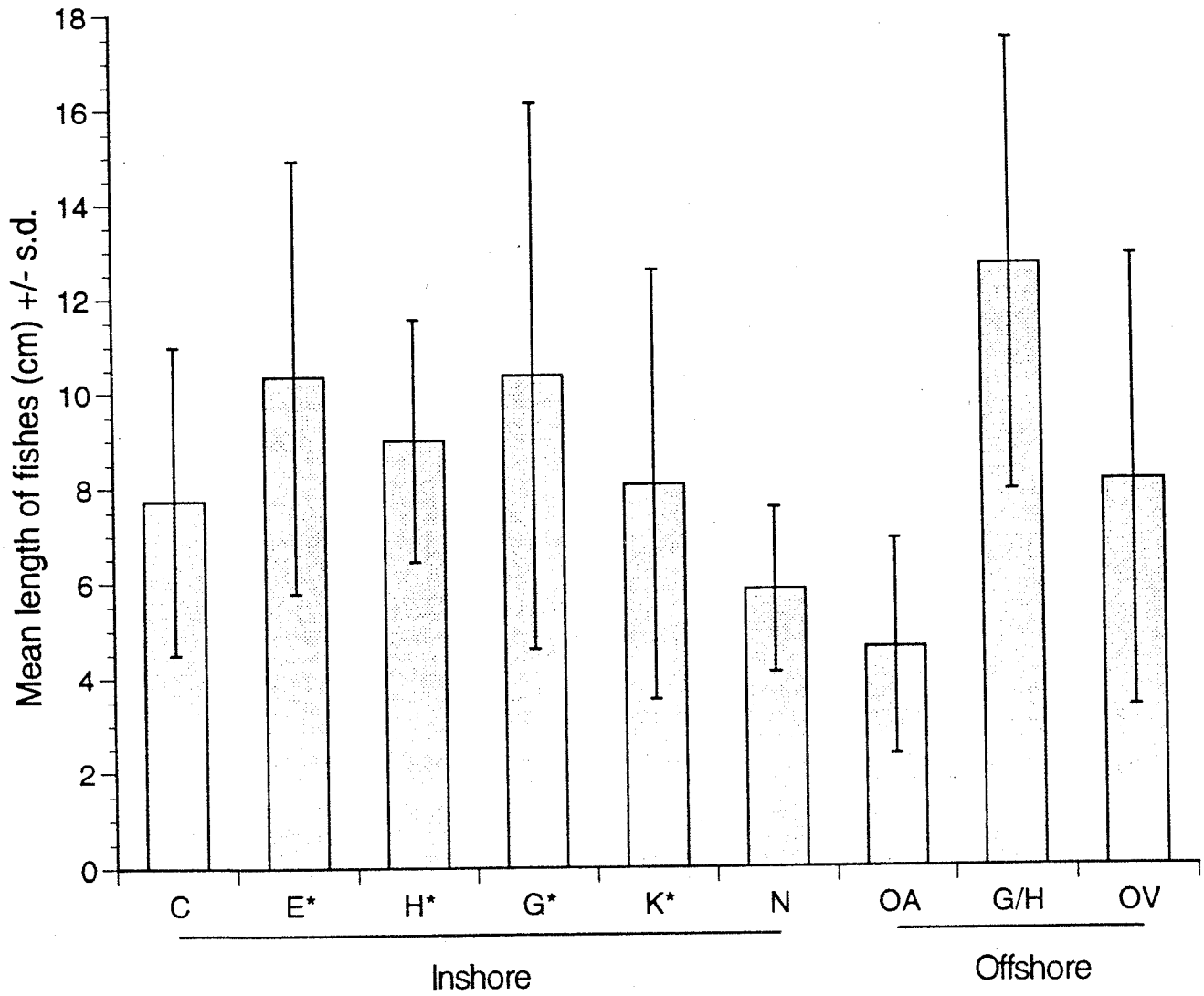
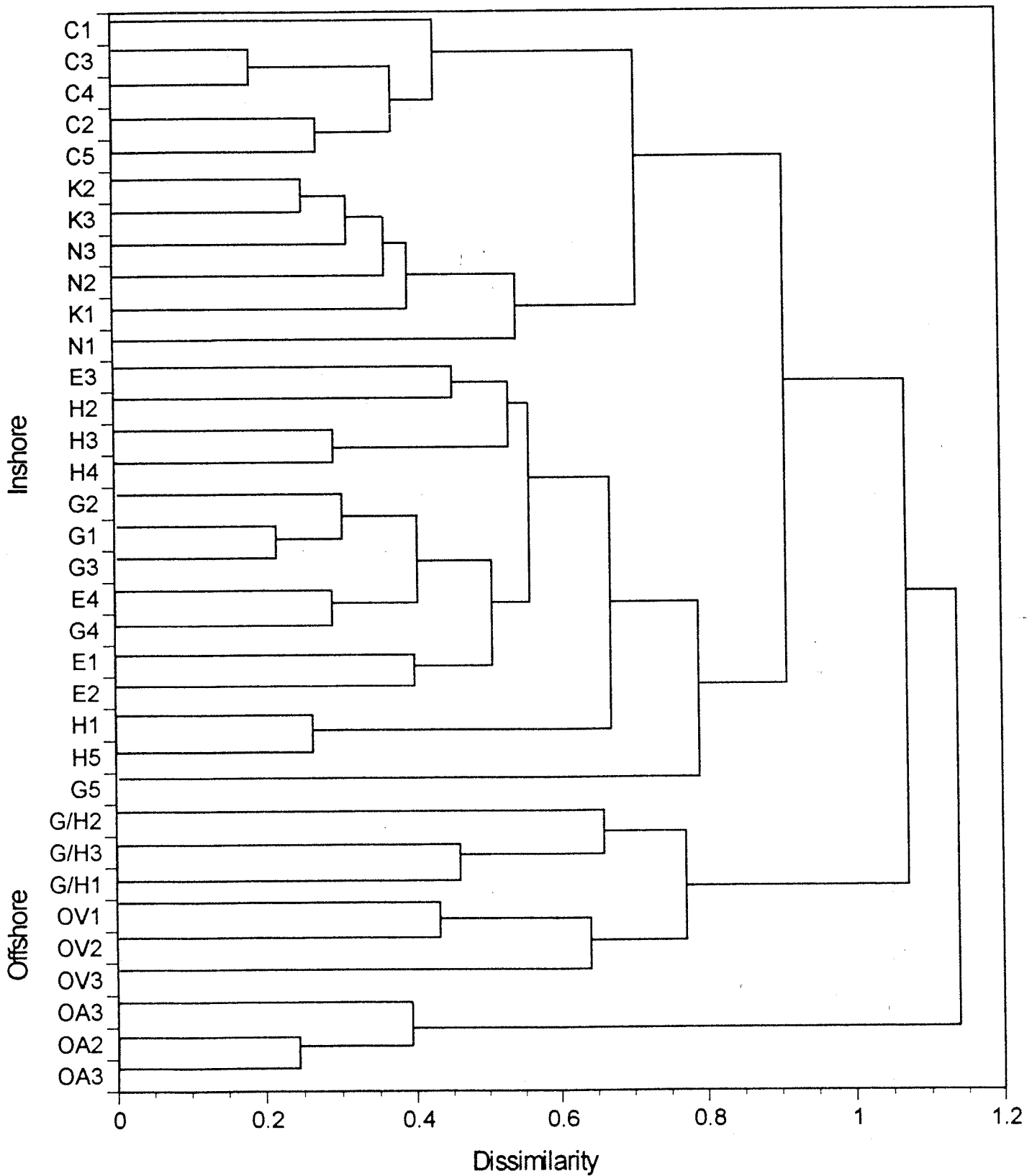


Figure 3. Dendrogram for cluster analysis of 34 stationary point counts conducted on Ofu Island, American Samoa. Bray-Curtis similarity coefficients with a flexible clustering strategy of Beta = -0.1. Details of location codes and number of censuses are given in Appendix I.



Appendix I. Locations of individual censuses conducted on Ofu Island, American Samoa. Censuses are referenced into sites where permanent transect are present. The second letter of the transect code refers to the east (E) or west (W) end of the transect. Asterisks denote location codes within proposed national park.

Location code	Census Number	Location relative to transect
<u>Inshore</u>		
C	1	At transect
C	2	10m 315° from CE
C	3	10m 210° from CE
C	4	10m 30° from CW
C	5	10m 90° from CW
E*	6	15m 210° from EE
E*	7	10m 50° from EE
E*	8	At transect
E*	9	10m 40° from EW
H*	10	10m 270° from HW
H*	11	10m 180° from HW
H*	12	10m 150° from HE
H*	13	10m 130° from HW
H*	14	At transect
G*	15	At transect
G*	16	10m 150° from GE
G*	17	15m 230° from GW
G*	18	10m 120° from GE
G*	19	10m 10° from GE
K*	20	10m 150° from KE
K*	21	10m 180° from KE
K*	22	10m 260° from KW
N	23	10m 70° from NE
N	24	10m 100° from NE
N	25	At transect
<u>Offshore</u>		
Offshore airport (OA)	26	N/A
Offshore airport (OA)	27	N/A
Offshore airport (OA)	28	N/A
G/H	29	N/A
G/H	30	N/A
G/H	31	N/A
Ofu Village (OV)	32	N/A
Ofu Village (OV)	33	N/A
Ofu Village (OV)	34	N/A

Appendix II. Fish species observed during underwater stationary point counts and subsequent searches at Ofu, American Samoa. Phylogenetic order based on Randall et al. (1990). Scientific and common names from Randall et al. (1990), Myers (1991) and Allen (1991). Samoan names from Wass (1984). Families are listed in capital letters with numbers of species in parentheses.

FAMILY / Species	Common name	Samoan Name
CARCHARCHINIDAE (N=2)	REQUIEM SHARKS	Malie
<i>Carcharhinus amblyrhynchos</i>	Grey reef shark	Malie-aloalo
<i>Carcharhinus melanopterus</i>	Blacktip reef shark	Apeape, malie-alamata
MYLIOBATIDIDAE (N=1)	EAGLE RAYS	
<i>Aetobatus narinari</i>	Spotted eagle ray	Fai-pe'a, fai-manu
MURAENIDAE (N=4)	MORAYS	Pusi
<i>Echidna nebulosa</i>	Starry moray	Ai'aigua
<i>Gymnothorax flavimarginatus</i>	Yellowmargin moray	Tafi-laotalo, pusi-gatala
<i>Gymnothorax meleagris</i>	Whitemouth moray	Puali'i, 'ai'aiivi
<i>Gymnothorax undulatus</i>	Undulated moray	Pusi-pulepule
CONGRIDAE (N=1)	CONGER EELS	
<i>Conger cinereus</i>	Black-edged conger	I'au, pusi-solasulu
CLUPEIDAE (N = 1)	HERRINGS	Pelupelu
<i>Spratelloides gracilis</i>	Silver sprat	Poi, nefu
SYNODONTIDAE (N=3)	LIZARDFISHES	Ta'oto
<i>Saurida gracilis</i>	Slender lizardfish	
<i>Synodus binotatus</i>	Twospot lizardfish	
<i>Synodus variegatus</i>	Reef lizardfish	
ANTENNARIIDAE (N=1)	FROGFISHES	La'otale, nofu
<i>Antennarius coccineus</i>	Freckled anglerfish	
HOLOCENTRIDAE (N=10)	SQUIRRELFISHES	Malau
<i>Myripristis adusta</i>	Shadowfin soldierfish	Malau-tuavela, malau-'uo
<i>Myripristis berndti</i>	Bigscale soldierfish	Malau-ugatele, malau-va'ava'a
<i>Myripristis hexagona</i>	Doubletooth soldierfish	
<i>Myripristis kuntee</i>	Epaulette soldierfish	Malau-pu'u
<i>Myripristis murdjan</i>	Blotcheye soldierfish	
<i>Neoniphon sammara</i>	Spotfin squirrelfish	Malau-tui, malau-pe'ape'a
<i>Sargocentron diadema</i>	Crown squirrelfish	Malau-tui, malau-talapu'u, malau-tusitusi, mala-pauli
<i>Sargocentron microstoma</i>	Smallmouth squirrelfish	Malau-ti'aniu

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
<i>Sargocentron spiniferum</i>	Sabre squirrelfish	Tamalau, mu-malau, malau-toa
<i>Sargocentron tiere</i>	Tahitian squirrelfish	
AULOSTOMIDAE (N=1)	TRUMPETFISHES	
<i>Aulostomus chinensis</i>	Trumpetfish	Taoto-ena, taoto-sama, 'au'aulauti, taotito
FISTULARIIDAE (N=1)	FLUTEMOUTHS	
<i>Fistularia commersonii</i>	Smooth flutemouth	Taoto-ama, taotao
SCORPAENIDAE (N=3)	SCORPIONFISHES	La'otale, nofu, i'atala
<i>Pterois volitans</i>	Red firefish	Sausau-lele
<i>Scorpaenopsis diabolus</i>	False stonefish	
<i>Scorpaenopsis macrochir</i>	Flasher scorpionfish	
CARACANTHIDAE (N=1)	CROUCHERS	
<i>Caracanthus maculatus</i>	Spotted croucher	Tapua
SERRANIDAE (N=11)	GROUPERS	Gatala, 'ata'ata, vaolo
<i>Cephalopholis argus</i>	Peacock rockcod	Gatala-uli, loi
<i>Cephalopholis leopardus</i>	Leopard rockcod	Gatala-sina, mata'ele
<i>Cephalopholis minitatus</i>	Coral cod	
<i>Cephalopholis urodeta</i>	Flagtail rockcod	Mata'ele
<i>Epinephelus fuscoguttatus</i>	Flowery cod	Gatala-aloalo
<i>Epinephelus hexagonatus</i>	Hexagon rockcod	Gatala-a'au
<i>Epinephelus maculatus</i>	Trout cod	Gatala-puleuli
<i>Epinephelus merra</i>	Dwarf spotted rockcod	Gatala-aloalo, gatala-pulepule
<i>Epinephelus tauvina</i>	Greasy rockcod	Gatala-tane
<i>Variola louti</i>	Coronation trout	Papa-tuauli, velo, papa
<i>Grammistes sexlineatus</i>	Sixline soapfish	Taili, tusiloa
KUHLIIDAE (N=1)	FLAGTAILS	
<i>Kuhlia mugil</i>	Fiveband flagtail	Safole
PRIACANTHIDAE (N=1)	BIGEYES	Matapula
<i>Heteropriacanthus cruentatus</i>	Glasseye	
APOGONIDAE (N=4)	CARDINALFISHES	Fo
<i>Apogon kallopterus</i>	Iridescent cardinalfish	Fo-aialo
<i>Apogon nigrofasciatus</i>	Blackstripe cardinalfish	Fo-tuauli
<i>Apogon taeniophorus</i>	Reef-flat cardinalfish	
<i>Cheilodipterus quinquelineata</i>	Five-lined cardinalfish	Fo-tusiloloa
CARANGIDAE (N=4)	JACKS	Lupo, lupota, ma'lauli, ulua, sapo'anae
<i>Caranx ignobilis</i>	Giant trevally	Sapo'anae

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
<i>Caranx melampygus</i>	Bluefin trevally	Malauli-apamoana, atugaloloa
<i>Decapterus macarellus</i>	Mackerel scad	Atuleau, namuauli
<i>Scomberoides lysan</i>	Double-spotted queenfish	Lai
LUTJANIDAE (N=9)	SNAPPERS	Mu, palu
<i>Aphareus furca</i>	Small-toothed jobfish	Palu-aloalo
<i>Aprion virescens</i>	Green jobfish	Asoama, utu
<i>Lutjanus argentimaculatus</i>	Mangrove jack	Mu-taiva
<i>Lutjanus bohar</i>	Red bass	Mu-a'a, mu-mea
<i>Lutjanus fulvus</i>	Yellow-margined seapearch	Tamala, taiva
<i>Lutjanus gibbus</i>	Paddletail	Mala'i
<i>Lutjanus kasmira</i>	Bluestripe seapearch	Savane
<i>Lutjanus monostigmus</i>	Onespot seapearch	Taiva, feloitega
<i>Macolor niger</i>	Black and white seapearch	Matala'oa
CAESIONIDAE (N=2)	FUSILIERS	Atule-toto, ulisega
<i>Pterocaesio marri</i>	Marr's fusilier	
<i>Pterocaesio tile</i>	Neon fusilier	
GERREIDAE (N=1)	SILVER BIDDIES	Matu
<i>Gerres species</i>	Silver biddy species	
HAEMULIDAE (N=1)	GRUNTS	
<i>Plectorhinchus orientalis</i>	Oriental sweetlip	Mutumutu, ava'ava-moana
LETHRINIDAE (N=2)	EMPERORS	Mata'ele'ele, ulamalosi, filoa
<i>Gnathodentex aurolineatus</i>	Gold-liner sea bream	Mumu, tolai
<i>Monotaxis grandoculus</i>	Big-eye bream	Mu-matavaivai, matamu, matamu, loalia, mata matamu
NEMIPTERIDAE (N=1)	CORAL BREAMS	
<i>Scolopsis lineatus</i>	Lined monocle bream	
MULLIDAE (N=7)	GOATFISHES	
<i>Mulloidides flavolineatus</i>	Yellowstripe goatfish	I'asina, vete, a fulu, afolu
<i>Mulloidides vanicolensis</i>	Yellowfin goatfish	I'asina, vete, afulu, afolu
<i>Parupeneus bifasciatus</i>	Doublebar goatfish	Matulau-moana
<i>Parupeneus cyclostomus</i>	Goldsaddle goatfish	
<i>Parupeneus indicus</i>	Indian goatfish	Ta'uuleia
<i>Parupeneus multifasciatus</i>	Manybar goatfish	Matulau, moana
<i>Parupeneus pleurostigma</i>	Sidespot goatfish	Matulau-ilamutu
PEMPHERIDAE (N=1)	SWEEPERS	

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
<i>Pempheris oualensis</i>	Copper sweeper	Manifi
KYPHOSIDAE (N=2)		
<i>Kyphosus cinerascens</i>	Topsail drummer	Nanue, mata-mutu, mutumutu
<i>Kyphosus vaigiensis</i>	Long-finned drummer	
CHAETODONTIDAE (N=23)		
<i>Chaetodon auriga</i>	Threadfin butterflyfish	Tifitifi
<i>Chaetodon citrinellus</i>	Speckled butterflyfish	Si'u, i'usamasama
<i>Chaetodon ephippium</i>	Saddled butterflyfish	Tifitifi-moamanu
<i>Chaetodon lineolatus</i>	Lined butterflyfish	Tifitifi-tuauli
<i>Chaetodon lunula</i>	Raccoon butterflyfish	Tifitifi-lau'i'a
<i>Chaetodon ornatissimus</i>	Ornate butterflyfish	Tifitifi-laumea
<i>Chaetodon oxycephalus</i>	Spotnape butterflyfish	Tifitifi-'ava'ava
<i>Chaetodon pelewensis</i>	Dot-and-dash butterflyfish	Tifitifi-tusiloloa
<i>Chaetodon quadrimaculatus</i>	Fourspot butterflyfish	Tifitifi-segasega
<i>Chaetodon rafflesi</i>	Latticed butterflyfish	Tifitifi-pule
<i>Chaetodon reticulatus</i>	Reticulated butterflyfish	Tifitifi-maona
<i>Chaetodon trifascialis</i>	Chevroned butterflyfish	Tifitifi-sae'u
<i>Chaetodon trifasciatus</i>	Redfin butterflyfish	Tifitifi-manifi
<i>Chaetodon ulietensis</i>	Double-saddled butterflyfish	Tifitifi-gutu'uli
<i>Chaetodon unimaculatus</i>	Teardrop butterflyfish	Tifitifi-pulesama
<i>Chaetodon vagabundus</i>	Vagabond butterflyfish	Tifitifi-matapua'a
<i>Forcipiger flavissimus</i>	Forcepsfish	Gutumanu
<i>Forcipiger longirostris</i>	Longnose butterflyfish	Gutumanu
<i>Hemitaurichthys polylepis</i>	Pyramid butterflyfish	Alosina
<i>Heniochus acuminatus</i>	Longfin bannerfish	Laulaufau-laumea
<i>Heniochus chrysostomus</i>	Pennant bannerfish	Laulaufau-laumea
<i>Heniochus monoceros</i>	Masked bannerfish	Laulaufau-laumea
<i>Heniochus varius</i>	Humphead bannerfish	Laulaufau-laumea
POMACANTHIDAE (N=7)		
<i>Apolemichthys trimaculatus</i>	Three-spot angelfish	Tu'u'u
<i>Centropyge bicolor</i>	Bicolor angelfish	Tu'u'u-matamalu
<i>Centropyge bispinosus</i>	Two-spined angelfish	Tu'u'u-alomu
<i>Centropyge flavissimus</i>	Lemmonpeel angelfish	Tu'u'u-sama, tu'u'u-lega
<i>Centropyge loriculus</i>	Flame angelfish	Tu'u'u-tusiuli
<i>Pomacanthus imperator</i>	Emperor angelfish	Tu'u'u-vaolo, tu'u'u-moana
<i>Pygoplites diacanthus</i>	Regal angelfish	Tu'u'u-moana
POMACENTRIDAE (N=42)		
<i>Abudefduf septemfasciatus</i>	Banded sergeant	Tu'u'u
<i>Abudefduf sexfasciatus</i>	Scissor-tail sergeant	Mutu
<i>Abudefduf sordidus</i>	Blackspot sergeant	Mamo
<i>Abudefduf vaigiensis</i>	Indo-pacific sergeant	Mutu

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
<i>Amblyglyphidodon leucogaster</i>	White-belly damsel	Tu'u'u-mamo
<i>Amphiprion chrysopterus</i>	Orange-fin anemonefish	Tu'u'u-lumane
<i>Amphiprion clarkii</i>	Clark's anemonefish	
<i>Amphiprion melanopus</i>	Red-and-black anemonefish	Tu'u'u-lumane
<i>Chromis acares</i>	Midget chromis	Tu'u'u-fo
<i>Chromis agilis</i>	Agile chromis	
<i>Chromis amboinensis</i>	Ambon chromis	Tu'u'u-palevai
<i>Chromis atripectoralis</i>	Black-tail chromis	Tu'u'u-segasega
<i>Chromis iomelas</i>	Half-and-half chromis	Tu'u'u-i'usina
<i>Chromis margaritifer</i>	Bicolor chromis	Tu'u'u-i'usina
<i>Chromis ternatensis</i>	Ternate chromis	
<i>Chromis vanderbilti</i>	Vanderbilt's chromis	Tu'u'u-fo
<i>Chromis viridis</i>	Blue-green chromis	I'alanumoana, tu'u-segasega
<i>Chromis xanthura</i>	Pale-tail chromis	Tu'u'u-i'usina
<i>Chrysiptera biocellata</i>	Twospot demoiselle	Tu'u'u-ulavapua
<i>Chrysiptera caeruleolineatus</i>	Blueline demoiselle	
<i>Chrysiptera glauca</i>	Grey damsel	
<i>Chrysiptera leucopoma</i>	Surge demoiselle	Tu'u'u-tulisegasega, tu'u'u-alamu
<i>Chrysiptera taupou</i>	South seas demoiselle	Tu'u'u-mo'o, vaiuli-sama
<i>Dascyllus aruanus</i>	Humbug dascyllus	Mamo
<i>Dascyllus reticulatus</i>	Reticulated dascyllus	Tu'u'u-koko
<i>Dascyllus trimaculatus</i>	Three-spot dascyllus	Tu'u'u-pulelua
<i>Neopomacentrus metallicus</i>	Metallic demoiselle	Tu'u'u-segi, pipi
<i>Plectroglyphidodon dickii</i>	Dick's damsel	Tu'u'u-i'usina
<i>Plectroglyphidodon imparipennis</i>	Brighteye damsel	
<i>Plectroglyphidodon johnstonianus</i>	Johnston damsel	Tu'u'u-i'uuli
<i>Plectroglyphidodon lacrymatus</i>	Jewel damsel	Tu'u'u-lau, i'usamasama
<i>Plectroglyphidodon leucozonus</i>	Whiteband damsel	Tu'u'u-si'ugutusina
<i>Plectroglyphidodon phoenixensis</i>	Phoenix damsel	Tu'u'u-popouli
<i>Pomacentrus brachialis</i>	Charcoal damsel	Tu'u'u-faga
<i>Pomacentrus coelestis</i>	Neon damsel	Tu'u'u-segasega
<i>Pomacentrus pavo</i>	Blue damsel	Tu'u'u-segasega, teatea
<i>Pomacentrus vaiuli</i>	Princess damsel	Tu'u'u-vaiuli
<i>Pomachromis richardsoni</i>	Richardson's reef-damsel	Tu'u'u-malaumataputa
<i>Stegastes albifasciatus</i>	Whitebar gregory	Tu'u'u-pa, ulavapuna
<i>Stegastes fasciolatus</i>	Pacific gregory	Tu'u'u-palea
<i>Stegastes lividus</i>	Bluntsnout gregory	Tu'u'u-moi
<i>Stegastes nigricans</i>	Dusky gregory	Tu'u'u-moi
CIRRHITIDAE (N=5)	HAWKFISHES	
<i>Amblycirrhitus bimacula</i>	Twinspot hawkfish	La'o
<i>Cirrhitus pinnulatus</i>	Stocky hawkfish	Ulutu'i
<i>Paracirrhites arcatus</i>	Arc-eye hawkfish	Lausiva
<i>Paracirrhites forsteri</i>	Blackside hawkfish	Lausiva
<i>Paracirrhites hemistictus</i>	Halfspotted hawkfish	Lausiva, a'a

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
BOTHIDAE (N=1) <i>Bothus mancus</i>	LEFTEYED FLOUNDERS Flowery flounder	Ali
BALISTIDAE (N=11) <i>Balistapus undulatus</i> <i>Balistoides viridescens</i> <i>Melichthys niger</i> <i>Melichthys vidua</i> <i>Odonus niger</i> <i>Pseudobalistes fuscus</i> <i>Rhinecanthus aculeatus</i> <i>Rhinecanthus rectangulus</i> <i>Sufflamen bursa</i> <i>Sufflamen chrysopterus</i> <i>Sufflamen fraenatus</i>	TRIGGERFISHES Orange-lined triggerfish Titan triggerfish Black triggerfish Pinktail triggerfish Redtooth triggerfish Yellow-spotted triggerfish Whitebanded triggerfish Wedge-tail triggerfish Scimitar triggerfish Flagtail triggerfish Bridled triggerfish	Sumu Sumu-aimaunu Sumu-laulau, umu Sumu-uli Sumu-'apa'apasina, sumu- si'umumu Sumu-pe'a Sumu-laulau, umu Sumu-uo'uo Sumu-aloalo Sumu-pa'epa'e Sumu-gasemoana Sumu-gase'ele'ele
MONACANTHIDAE (N=5) <i>Cantherhinus dumerilii</i> <i>Cantherhinus pardalis</i> <i>Oxymonacanthus longirostris</i> <i>Pervagor janthinosoma</i> <i>Pervagor melanocephalus</i>	LEATHERJACKETS Yelloweye leatherjacket Honeycomb leatherjacket Beaked leatherjacket Gill-blotch leatherjacket Black-headed leatherjacket	Pa'umalo Pa'umalo Pa'umalo, falala, aimeo Pa'umalo-gutuumi Pa'umalo, falala
OSTRACIIDAE (N=1) <i>Ostracion meleagris</i>	BOXFISHES Spotted boxfish	Moamo Moamo-uli, moamo-sama
TETRAODONTIDAE (N=5) <i>Arothron hispidus</i> <i>Arothron meleagris</i> <i>Arothron nigropunctatus</i> <i>Canthigaster amboinensis</i> <i>Canthigaster solandri</i>	PUFFERS Stars and stripes puffer Guineafowl puffer Blackspotted puffer Ambon toby Solander's toby	Sue Sue-vaolo Sue-puleuli, sue-lega Sue-uli, sue-lega Sue-lape Sue-mimi
DIODONTIDAE (N=1) <i>Diodon hystrix</i>	PORCUPINEFISHES Porcupinefish	Tauta, tautu

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
GOBIIDAE (N=4)	GOBIES	Mano'o
<i>Amblyeleotris fasciata</i>	Red-banded prawn goby	Mano'o-popo
<i>Gobiodon citrinus</i>	Fourbar goby	Mano'o-ulutu'i, moemimi
<i>Valenciennesa sexguttata</i>	Sixspot goby	Mano'o-sina
<i>Valenciennesa strigata</i>	Blueband goby	Mano'o-sina
MICRODESMIIDAE (N=2)	DARTFISHES	
<i>Nemateleotris magnifica</i>	Fire dartfish	Mano'o-sugale
<i>Ptereleotris evides</i>	Twotone dartfish	Ma'ulu
ACANTHURIDAE (N=25)	SURGEONFISHES	
<i>Acanthurus achilles</i>	Achilles tang	Pone, palagi, ume, 'ili'ilia, umelei Maikolama, kolama, pone-i'umumu
<i>Acanthurus blochii</i>	Ringtail surgeonfish	
<i>Acanthurus guttatus</i>	Whitespotted surgeonfish	Maogo
<i>Acanthurus lineatus</i>	Striped surgeonfish	Alogo
<i>Acanthurus maculiceps</i>	White-freckled surgeonfish	
<i>Acanthurus mata</i>	Elongate surgeonfish	
<i>Acanthurus nigricans</i>	Whitecheek surgeonfish	
<i>Acanthurus nigricauda</i>	Blackstreak surgeonfish	
<i>Acanthurus nigrofuscus</i>	Brown surgeonfish	Ponepone
<i>Acanthurus nigroris</i>	Bluelined surgeonfish	Ponepone
<i>Acanthurus olivaceus</i>	Orangeband surgeonfish	Pone-apasama, afinamea
<i>Acanthurus thompsoni</i>	Thompson's surgeonfish	Pone-i'usina
<i>Acanthurus triostegus</i>	Convict surgeonfish	Manini
<i>Acanthurus xanthopterus</i>	Yellowfin surgeonfish	
<i>Ctenochaetus binotatus</i>	Twospot bristletooth	
<i>Ctenochaetus hawaiiensis</i>	Black bristletooth	
<i>Ctenochaetus striatus</i>	Lined bristletooth	Pone, pala'ia, logoulia
<i>Ctenochaetus strigosus</i>	Goldring bristletooth	
<i>Naso annulatus</i>	Whitemargin unicornfish	
<i>Naso brevirostris</i>	Spotted unicornfish	Ume-ulutao
<i>Naso lituratus</i>	Orangespine unicornfish	Ili'ilia, umelei
<i>Naso tuberosus</i>	Humpnose unicornfish	Ume-uluto'i
<i>Naso unicornis</i>	Bluespine unicornfish	Ume-isu
<i>Zebrasoma scopas</i>	Brushtail tang	Pitopito, pe'ape'a
<i>Zebrasoma veliferum</i>	Sailfin tang	Iliu
ZANCLIDAE (N=1)	MORRISH IDOL	
<i>Zanclus cornutus</i>	Morrish idol	Pe'ape'a, laulaufau
SIGNIDAE (N=3)	RABBITFISHES	
<i>Siganus argenteus</i>	Forktail rabbitfish	Lo
<i>Siganus punctatus</i>	Goldspotted rabbitfish	Loloa, 'ofe'ofe, malava
<i>Siganus spinus</i>	Spiny rabbitfish	Tito, loele'ele Anefe, pa'ulu

Appendix II. continued.

FAMILY / Species	Common name	Samoa Name
MUGILIDAE (N=2)	MULLETS	'anae
<i>Crenimugil crenilabis</i>	Warty-lipped mullet	
<i>Liza vaigiensis</i>	Diamond-scale mullet	Fuitogo, 'afa, 'anaeafa
SPHYRAENIDAE (N=1)	BARRACUDAS	Sapatu
<i>Sphyrna barracuda</i>	Great barracuda	Saosao
LABRIDAE (N=42)	WRASSES	Sugale
<i>Anampses caeruleopunctatus</i>	Bluespotted wrasse	Sugale-mafalaugutu
<i>Anampses meleagrides</i>	Spotted wrasse	Sugale-tatanu
<i>Anampses twistii</i>	Yellowbreasted wrasse	Sugale-tatanu
<i>Bodianus loxozonus</i>	Blackfin hogfish	Sugale-a'a
<i>Chelinus digrammus</i>	Cheeklined maori wrasse	Lalafi-gutu'umi
<i>Chelinus fasciatus</i>	Redbreasted maori wrasse	Lalafi-pulepule
<i>Chelinus oxycephalus</i>	Snooty maori wrasse	
<i>Chelinus trilobatus</i>	Tripletail maori wrasse	Lalafi-matamumu
<i>Chelinus undulatus</i>	Humphead maori wrasse	Lalafi, tagafa, malakea
<i>Chelinus unifasciatus</i>	Ringtail maori wrasse	Lalafi
<i>Cirrhilabrus species</i>	Cirrhilabrus species	
<i>Coris aygula</i>	Clown coris	Sugale-uluto'i
<i>Coris gaimard</i>	Yellowtail coris	Sugale-mumu, sugale-tala'ula
<i>Epibulus insidiator</i>	Slingjaw wrasse	Lapega, lalafi-tua'au
<i>Gomphosus varius</i>	Bird wrasse	Gutusi'o, gutu'umi, sugale-lupe
<i>Halichoeres biocellatus</i>	Biocellate wrasse	
<i>Halichoeres hortulanus</i>	Checkerboard wrasse	Sugalea'au, sugale-pagota, ifigi
<i>Halichoeres margaritaceus</i>	Pink-belly wrasse	Sugale-uluveta
<i>Halichoeres marginatus</i>	Dusky wrasse	Sugale-lalafi
<i>Halichoeres melanurus</i>	Tailspot wrasse	
<i>Halichoeres miniatus</i>	Circle-cheek wrasse	
<i>Halichoeres nebulosus</i>	Nebulous wrasse	
<i>Halichoeres ornatissimus</i>	Ornate wrasse	
<i>Halichoeres trimaculatus</i>	Threespot wrasse	Lape, sugale-pagota
<i>Hemigymnus fasciatus</i>	Barred thicklip	Sugale-gutumafia
<i>Hemigymnus melapterus</i>	Blackeye thicklip	Sugale-laugutu, sugale-uli, sugale-aloa, sugale-lupe
<i>Labrichthys unilineatus</i>	Tubelip wrasse	Sugale-tafuti, atamamala
<i>Labroides bicolor</i>	Bicolor cleaner wrasse	Sugale-i'usina
<i>Labroides dimidiatus</i>	Cleaner wrasse	Sugale-mo'otai
<i>Macropharyngodon meleagris</i>	Blackspotted wrasse	Sugale-puletasi
<i>Novaculichthys taeniourus</i>	Rockmover wrasse	Sugale-la'o, sugale-taili, sugale-gasufi
<i>Pseudochelinus hexataenia</i>	Sixstripe wrasse	Sugale-tusitusi
<i>Pseudochelinus octotaenia</i>	Eightstripe wrasse	Sugale-tusitusi
<i>Stethojulis bandanensis</i>	Bluelined wrasse	Lape-a'au
<i>Stethojulis strigiventer</i>	Stripebelly wrasse	Lape-a'au

Appendix II. continued.

FAMILY / Species	Common name	Samoan Name
<i>Stethojulis trilineata</i>	Three-ribbon wrasse	Lape-a'au
<i>Thalassoma amblycephalum</i>	Bluntheaded wrasse	Sugale-aloama
<i>Thalassoma hardwicke</i>	Sixbar wrasse	Sugale-a'au, lape-ele'ele
<i>Thalassoma lutescens</i>	Sunset wrasse	Sugale-samasama
<i>Thalassoma purpureum</i>	Surge wrasse	Uloulo-gatala, patagaloa
<i>Thalassoma quinquevittatum</i>	Fivestripe wrasse	Lape-moana
<i>Thalassoma trilobatum</i>	Ladder wrasse	Uloulo-gatala, pata'ota'o
SCARIDAE (N=20)	PARROTFISHES	Fuga, laea, galo
<i>Calotomus carolinus</i>	Stareye parrotfish	
<i>Cetoscarus bicolor</i>	Bicolor parrotfish	Fuga-sina, mamanu, laea-mamanu, laea-usi
<i>Hipposcarus longiceps</i>	Longnose parrotfish	Ulapokea, laea-ulapokea
<i>Scarus altipinnis</i>	Minifin parrotfish	Laea-sina
<i>Scarus dimidiatus</i>	Yellowbarred parrotfish	Fuga-alosama
<i>Scarus forsteni</i>	Whitespot parrotfish	Fuga-alomu
<i>Scarus frenatus</i>	Bridled parrotfish	Laea-mea, laea-si'umoana
<i>Scarus frontalis</i>	Reefcrest parrotfish	
<i>Scarus ghobban</i>	Bluebarred parrotfish	Fuga-alova
<i>Scarus globiceps</i>	Globehead parrotfish	
<i>Scar microrhinos</i>	Steephead parrotfish	Fugausi, laea, ulumato, galo
<i>Scar niger</i>	Swarthy parrotfish	Fuga-pala, laea-pala
<i>Scarus oviceps</i>	Egghead parrotfish	Fuga-alosina, laea-tuavela
<i>Scarus psittacus</i>	Palenose parrotfish	Fuga-matapua'a, fugausi-matapua'a, laea-matapua'a
<i>Scarus pyrrhurus</i>	Redtail parrotfish	
<i>Scarus rivulatus</i>	Surf parrotfish	
<i>Scarus rubroviolaceus</i>	Ember parrotfish	Laea-mea, laea-mala
<i>Scarus schlegeli</i>	Schlegel's parrotfish	Fuga-matapua'a, laea-tusi
<i>Scarus sordidus</i>	Bullethead parrotfish	Fuga-gutumumu, fugausi-tuavela, laea-tuavela
<i>Scarus spinus</i>	Greensnout parrotfish	Fuga-a'au
PINGUIPEDIDAE (N=2)	SANDPERCHES	
<i>Parapercis clathrata</i>	Latticed sandperch	Ta'oto
<i>Parapercis millipunctata</i>	Redbarred sandperch	Ta'oto
BLENNIDAE (N=9)	BLENNIES	Mano'o
<i>Meiacanthus atrodorsalis</i>	Yellowtail fangblenny	Mano'o-si'umaga
<i>Meiacanthus ditrema</i>	Doublepore fangblenny	
<i>Plagiotremus rhinorhynchos</i>	Bluestripe fangblenny	Mano'o-to'ito'i
<i>Plagiotremus tapeinosoma</i>	Piano fangblenny	Mano'o-to'ito'i
<i>Cirripectes polyzona</i>	Barred blenny	Mano'o-la'o
<i>Cirripectes stigmaticus</i>	Reticulated blenny	Mano'o-la'o
<i>Cirripectes variolosus</i>	Red-speckled blenny	
<i>Exallias brevis</i>	Shortbodied blenny	Mano'o-lau, mano'o-gatala
<i>Istiblennius chrysospilos</i>	Goldspotted rockskipper	Mano'o-a'au