REEF FISHES OF THE PHOENIX ISLANDS, CENTRAL PACIFIC OCEAN

BY

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ABSTRACT

Visual inventories and fish collections were conducted at the Phoenix Islands during June-July 2002. A list of fishes was compiled for 57 sites. The survey involved 163 hours of scuba diving to a maximum depth of 57 m. A total of 451 species were recorded, including 212 new records. The total known fish fauna of the Phoenix Islands now stands at 516 species. A formula for predicting the total reef fish fauna based on the number of species in six key indicator families indicates that at least 576 species can be expected to occur at this location. Wrasses (Labridae), groupers (Serranidae), gobies (Gobiidae), damselfishes (Pomacentridae), and surgeonfishes (Acanthuridae) were the most speciose families with 53, 40, 36, 36, and 32 species respectively. Species numbers at visually sampled sites during the survey ranged from 17 to 166, with an average of 110. Leeward outer reefs contained the highest diversity with an average of 135.5 species per site. Other major habitats included windward outer reefs (123.7 per site), passages (113.5), and lagoon reefs (38.5). The Napoleon Wrasse (*Cheilinus undulatus*) was extraordinarily abundant, providing excellent baseline information on the natural abundance of this species in the absence of fishing pressure.
Conservation recommendations include protection of certain large predatory fishes including the Napoleon Wrasse, Bumphead Parrotfish, and reef sharks.

INTRODUCTION

The primary goal of the fish survey was to provide a comprehensive inventory of reef fishes inhabiting the Phoenix Islands. This segment of the fauna includes fishes living on or near coral reefs down to the limit of safe sport diving or approximately 55 m depth. It therefore excludes most deepwater and offshore pelagic species such as flyingfishes, tunas, and billfishes. We did, however, record several species at depths between 60-183 m that were observed with the ROV and Dropcam.

Historical Background

The remote Phoenix Islands have attracted relatively little attention from ichthyologists. The first significant fish collections were made by Leonard Schultz from

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the United States National Museum, who visited the islands in 1939 during an extensive cruise aboard the US naval ship "Bushnell." The expedition departed San Diego on 1 April and terminated at Honolulu on 27 July after having made extensive fish collections at the Phoenix and Samoan islands. Approximately one month was spent at four islands in the Phoenix Group, including Kanton, McKean, Enderbury, and Hull (Orona). These collections, containing 184 species, were reported by Schultz (1943). A total of seven species, including *Echidna letucotaenia, Uropterygius cantonensis, Aporops bilinearis, Cirrhitops hubbardi, Kuhlia petit, Plectroglyphidodon phoenixenis,* and *Oplopomus diacanthus*, were described as new species from the Phoenix Islands in this publication.

The only other collections prior to the present expedition were obtained during a marine biological survey of the Phoenix Islands by the New England Aquarium and associates between 24 June and 15 July 2000. Collections were reported by Stone et al. (2001 and see Stone et al., this volume) and consisted of approximately 80 coral reef species, that were mainly identified by K.E. Hartel of the Museum of Comparative Zoology, Harvard University. In addition, underwater photographs of approximately 109 species were obtained by M.J. Adams. The combination of collected specimens, recorded observations, and photographic records accounted for a species total of 188 species, including 107 new records for the Phoenix Islands.

METHODS

The fish portion of this survey involved approximately 163 hours of scuba diving by G. Allen and S. Bailey to a maximum depth of 57 m. A comprehensive list of fishes was compiled for 57 sites (see Obura, this volume for site codes). The basic method consisted of underwater observations made during a single dive at each site with an average duration of about 65 minutes. The name of each observed species was recorded in pencil on a plastic sheet attached to a clipboard. The technique usually involved rapid descent to 30-55 m, then a slow, meandering ascent back to the shallows (Obura, this volume). The majority of time was spent in the 2-15 m depth zone, which consistently harbors the highest number of species. Each dive included a representative sample of all major bottom types and habitat situations.

Fishes were photographed underwater while scuba diving with a Nikon SLR camera in aluminum housing and a Nikonos. Photographs were obtained of approximately 130 species. We also utilized video images obtained with an ROV and Dropcam at depths between about 60-183 m. This equipment is described in Stone et al. 2000 and Stone et al. (this volume).

The visual survey was supplemented with occasional collections procured with rotenone, qiuinaldine-sulphate, and rubber-propelled, multi-prong spears. The purpose of the rotenone collections was to flush out small, crevice and sand-dwelling fishes (for example eels and tiny gobies) that are difficult to record with visual techniques. A total of 1853 specimens were collected, representing approximately 180 species. Most of these were deposited at the Museum of Comparative Zoology, Harvard University. A small collection (123 specimens) were also lodged at the Western Australian Museum, Perth.

RESULTS

A total of 451 species were recorded during the present expedition, including 212 new distribution records. Therefore, the total known fauna of the Phoenix Islands now stands at 516 species, in 217 genera and 67 families consisting of the following elements: 185 species originally recorded by Schultz (1943), 107 species recorded by the Primal Oceans Expedition 2000, 212 species from the current expedition, and 10 species recorded in various generic revisions (Jewett and Lachner, 1983; Randall, 1956 and 2000; Randall and Clements, 2001; Randall and Heemstra, 1991; Springer, 1967; Randall and Randall, 2001; Schwarzhans et al., 2005; Moller & Schwarzhans, 2008). Two of the species recorded by Schultz, *Plectropomus leopardus* and *Parapercis tetracanthus*, most likely represent misidentifications of *Plectropomus areolatus* and *Parapercis lata*. Consequently they do not appear on the overall checklist if Phoenix Islands reef fishes presented in Appendix I.

General Faunal Composition

The fish fauna of the Phoenix Islands consists mainly of species associated with coral reefs. The most abundant families in terms of number of species are wrasses (Labridae), groupers (Serranidae), gobies (Gobiidae), damselfishes (Pomacentridae), surgeonfishes (Acanthuridae), moray eels (Muraenidae), butterflyfishes (Chaetodontidae), blennies (Blenniidae), squirrelfishes (Holocentridae), and cardinalfishes (Apogonidae). These 10 families collectively account for 62 percent of the total reef fish fauna (Fig. 1).

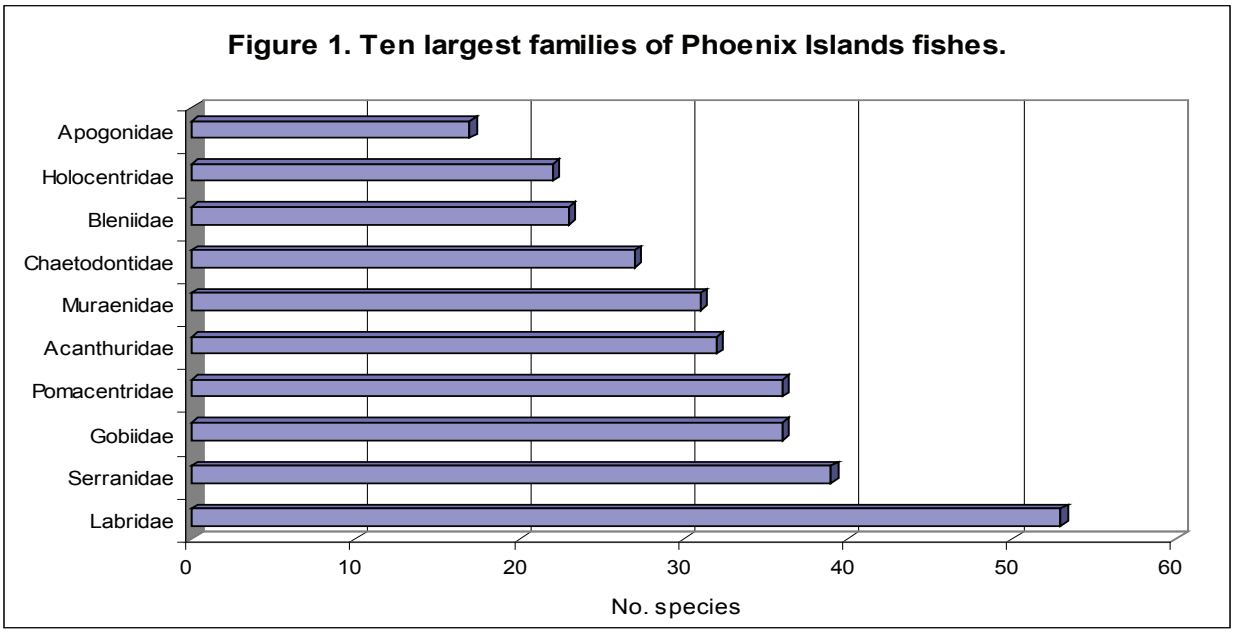

Figure 1. The ten largest families of Phoenix Islands fishes.

The relative abundance of Phoenix fish families is similar to other reef areas in the Indo-Pacific, although the ranking of individual families is variable depending on locality. The Phoenix rankings differ from those obtained on recent Conservation International

surveys in the "Coral Triangle" (Indonesia, Philippines, and Papua; Allen, 2000; Allen, 2002a and b) most markedly in relation to the position of the Serranidae, Muraenidae, and Holocentridae. The Serranidae generally ranks about fifth at coral triangle localities, while Muraenidae and Holocentridae do not feature in the top 10 families (Allen, 2002). Muraenidae no doubt deserves a higher ranking in the coral triangle, but is difficult to visually survey due to the cryptic habits of most morays.

Fish Community Structure

The composition of local reef fish communities in the Indo-Pacific region is largely dependent on habitat variability and consequent availability of food and shelter. The relatively limited fauna of the Phoenix Islands compared to areas further to the west is primarily due to two factors: 1) the distance from the "coral triangle", which is generally acknowledged as the center of Indo-Pacific coral reef fish diversity, and 2) the relatively homogenous nature of the reef environment. Phoenix Island reefs are generally characterised by a lack of habitat diversity (Obura, this volume), and are consequently inhabited mainly by fishes typical of atoll seaward reefs, with the exception of the 26 lagoon species listed in Table 1. The few islands that contain substantial lagoons (Nikumaroro, Kanton,and Orona) possess relatively impoverished lagoon faunas due to poor circulation, extensive shallows, lack of reef structure, or combination of these factor

Similar to other reef areas in the Indo-Pacific, most fishes at the Phoenix Islands are benthic (or at least living near the bottom) diurnal carnivores (Table 2). A relatively small portion of the community is herbivorous, but this element is slightly higher than at recently sampled areas in the coral triangle. Certain herbivorous species were

Table 1. Fishes mainly found in lagoons at the Phoenix Islands.

Atherinidae
Atherinosoma lacunosa
Mugilidae
Neomyxus leuciscus
Crenimugil crenilabis
Liza vaigiensis
Serranidae
Epinephelus merra
Apogonidae
Cheilodipterus quinquelineatus
Fowleria punctulata
Gerreidae
Gerres argyreus
Pomacentridae
Chromis viridis
Dascyllus aruanus
Pomacentrus pavo
Stegastes nigricans
Labridae
Cymolutes praetextatus
Halichoeres trimaculatus
Thalassoma trimaculatus
Callionymidae
Callionymus simplicornis
Gobiidae
Amblygobius nocturnus
Amblygobius phalaena
Ctenogobiops sp.
Eviota cometa
Fusigobius neophytus
Macrodontigobius wilburi
Oplopomus diacanthus
Oplopomus oplopomus
Ptereleotridae
Ptereleotris microlepis
Balistidae
Rhinecanthus aculeatus

Table 2. Percentage of species in major dietary categories at the Phoenix Islands compared to the average value for 4 locations (Calamianes Islands, Philippines; Komodo Islands, Indonesia; Togean/Banggai Islands, Indonesia; Raja Ampat Islands, Indonesia) in the coral triangle (data from Conservation International surveys).

Dietary category	Phoenix Islands	Coral Triangle
Carnivore	61.0 %	60.1 %
Omnivore	14.2 %	16.4 %
Planktivore	13.2 %	15.1 %
Herbivore	11.6 %	8.5 %

particularly common, occurring in much higher densities than at many localities in the Indo-Pacific region. These included various surgeonfishes (*Acanthurus guttatus, A. nigricans, A. triostegus, A. xanthopterus*, *Naso lituratus,* and *Zebrasoma veliferum*) and parrotfishes (*Hipposcarus longiceps* and *Scarus ghobban*), which were frequently sighted in extraordinarily large aggregations.

The number of species recorded at each site is indicated in Table 3. Totals ranged from 17 to 166, with an average of 110 per site**.** Outer reefs were the richest areas for fish diversity, with leeward reefs (135.5 species per site) containing more species than windward reefs (123.7 species). Lagoon reefs were relatively impoverished with 38.5 species per site. Although passages were surveyed on only two occasions, the average number of species was 113.5.

Table 3. Number of fish species recorded at each site.

Site	Species	Site	Species	Site	Species
1	137	25	126	50	126
2	135	26	37	52	71
3	120	27	158	54	102
4	103	28	17	55	57
5	103	29	17	62	142
6	107	30	72	63	116
7	133	31	155	64	156
8	98	32	155	65	120
11	31	33	138	66	132
14	108	34	155	67	161
15	140	36	17	68	161
17	112	37	18	69	116
18	134	38	166	71	138
19	110	39	129	72	50
20	126	40	71	73	33
21	154	41	140	74	46
22	117	42	150	76	124
23	150	43	155	77	34
24	125	46	142	80	144

The 10 richest sites for fishes are indicated in Table 4. The total species at a particular site is ultimately dependent on the availability of food and shelter and the diversity of substrata. Significantly, the most species (166) for a single dive was recorded in the vicinity of the President Taylor shipwreck at Kanton Island. Considering the relative habitat homogeneity at the Phoenix Islands, this site was relatively diverse. It is located next to the main passage leading into the lagoon, and therefore exposed to strong currents that support a wealth of plankton feeders. The site also incorporates an impressive dropoff, extensive rubble bottom, reasonable coral growth, and an extensive shallow reef top with additional shelter provided by the shipwreck.

Table 4. Ten richest fish sites.

Site No.	Location	Total fish spp.
38	President Taylor, Kanton I.	166
67	Puff Magic, Birnie I.	161
68	Algae Corner, Orona I.	161
27	British Gas, Kanton I.	158
64	Lone Palm, Enderbury I.	156
31	Satellite Beach, Kanton I.	155
32	Weird Eddie, Kanton I.	155
34	President Taylor, Kanton I.	155
43	Satellite Beach, Kanton I.	155
21	Stillwater, Phoenix I.	154

Coral Fish Diversity Index (CFDI)

Allen (1998) devised a convenient method for assessing and comparing overall reef fish diversity. The technique essentially involves an inventory of six key families: Chaetodontidae, Pomacanthidae, Pomacentridae, Labridae, Scaridae, and Acanthuridae. The number of species in these families is totalled to obtain the Coral Fish Diversity Index (CFDI) for a single dive site, relatively restricted geographic areas (eg. Phoenix Islands) or countries and large regions (eg. western Pacific Ocean).

CFDI values can be used to make a reasonably accurate estimate of the total coral reef fish fauna of a particular locality by means of regression formulas. The latter were obtained after analysis of 35 Indo-Pacific locations for which reliable, comprehensive species lists exist. The data were first divided into two groups: those from relatively restricted localities (surrounding seas encompassing less than 2,000 km^2) and those from much larger areas (surrounding seas encompassing more than 50,000 km^2). Simple regression analysis revealed a highly significant difference ($P = 0.0001$) between these two groups. Therefore, the data were separated and subjected to additional analysis. The Macintosh program Statview was used to perform simple linear regression analyses on each data set in order to determine a predictor formula, using CFDI as the predictor variable (x) for estimating the independent variable (y) or total coral reef fish fauna. The resultant formulae were obtained: 1. total fauna of areas with surrounding seas

encompassing more than 50,000 km^2 = 4.234(CFDI) - 114.446 (d.f = 15; R^2 = 0.964; P = 0.0001); 2. total fauna of areas with surrounding seas encompassing less than 2,000 km^2 = 3.39 (CFDI) - 20.595 (d.f = 18; R^2 = 0.96; P = 0.0001).

CFDI is useful for short term surveys such as the present one because it is capable of accurately predicting the overall faunal total. The main premise of the CFDI method is that short term surveys of only 3-4 weeks duration are sufficient to record nearly all members of the six indicator families due to their conspicuous nature. The CFDI for the Phoenix Islands is 176, composed of the following elements: Chaetodontidae (27), Pomacanthidae (13), Pomacentridae (36), Labridae (53), Scaridae (15), and Acanthuridae (32). The resultant predicted faunal total is 576 species, indicating that approximately 63 additional species of shallow reef fishes can be expected from the islands.

Zoogeographic Affinities And Comparison Of Faunal Totals

Table 5 presents the major zoogeographic categories for reef fishes of the Phoenix Islands. The largest segment of the fauna consists of species that are broadly distributed in the Indo-west and central Pacific region from East Africa to the islands of Oceania. This is not surprising as nearly all coral reef fishes have a pelagic larval stage of variable duration, depending on the species. Dispersal capabilities and length of larval life of a given species are usually reflected in its geographic distribution.

Table 5. Major Zoogeographic Categories for fishes of the Phoenix Islands.

General distribution	No. species	% of fauna
Indo-west and central Pacific	325	63.2
Western and central Pacific	94	18.3
Central Pacific	41	8.0
Indo-Pacific to the Americas	36	7.0
Circumtropical	12	2.3
Undetermined	6	1.2

Reef fish diversity is greatest in the Indonesian region, and there is a more or less predictable attenuation of the fauna as one travels away from this area (Table 6). The rate of attenuation is affected by both distance from the Indonesian center and latitude. Although the Society Islands lie much further to the east than the Phoenix Group, they are inhabited by more species because there is much greater habitat diversity associated with high islands.

Table 6. Comparison of total number of reef fishes for various locations in the western and central Pacific Ocean (adapted from Allen, 2002).

Location	Total species
Indonesia	2027
Papua New Guinea	1494
New Caledonia	1097
Marshall Islands	795
Phoenix Islands	516
Society Islands	560

Perhaps the most interesting segment of the Phoenix fauna is the group of species that are largely restricted to the central Pacific. Springer (1982) provided ample evidence for a discrete Pacific Plate province characterized by a high degree of endemism, particularly for shore fishes. Allen (in press) estimated that approximately 19 percent of the overall Pacific Plate fauna is endemic, based on an analysis of 17 common reef fish families. A list of species that are either Pacific Plate endemics or mainly distributed on the Plate is presented in Table 7.

Table 7. List of Phoenix Island fishes that are mainly confined to the Pacific Plate (see Springer, 1982).

Muraenidae	**Pomacentridae**
Anarchias leucotaenia	*Chrysiptera albata*
Anarchias leucurus	*Stegastes aureus*
	Labridae
Hemiramphidae	*Bodianus prognathus*
Hyporhamphus acutus	*Coris centralis*
Holocentridae	*Labropsis polynesica*
Myripristis earlei	*Pseudocheilinus tetrataenia*
Serranidae	**Creediidae**
Epinephelus socialis	*Crystallodytes cookei*
Pseudanthias olivaceus	**Tripterygiidae**
Pseudochromidae	*Helcogramma hudsoni*
Pseudoplesiops revellei	**Bleniidae**
Cirrhitidae	*Cirripectes jenningsi*
Cirrhititops hubbardi	*Cirripectes variolosus*
Paracirrhitus nisus	*Entomacrodus cymatobiotus*
Paracirrhitus xanthus	*Entomacrodus sealei*
Kuhliidae	*Rhabdoblennius rhabdotrachelus*
Kuhlia petit	**Gobiidae**
Mullidae	*Ctenogobiops* sp.
Upeneus arge	*Priolepis ailina*
Chaetodontidae	**Acanthuridae**
Chaetodon declivus	*Acanthurus achilles*
Chaetodon quadrimaculatus	*Acanthurus nigroris*
Hemitaurichthys thompsoni	*Ctenochaetus flavicauda*
Pomacanthidae	*Ctenochaetus marginatus*
Apolemichthys xanthopunctatus	*Zebrasoma rostratum*
Centropyge multicolor	**Soleidae**
Centropyge nigriocella	*Aseraggodes melanostictus*

Endemism

Considering the broad dispersal capabilities via the pelagic larval stage of most reef fishes it is unlikely that any reef fish species are endemic to the Phoenix Group. The recently described damselfish (*Chrysiptera albata*) and goby (*Trimma squamicanta*) are

currently known only from the Phoenix Islands. However, they can be expected at other areas in the central Pacific such as the Line Islands. The damselfish, which inhabits the steep outer reef on the windward side of Nikumaroro Island, has no doubt escaped attention due to its small size, drab coloration, and relatively deep-dwelling habits. It was collected for the first time on this expedition and forms part of a select group of 12 species that have highly restricted distributions on the Pacific Plate (Table 8).

Table 8. Phoenix Islands fishes with apparent restricted distributions.

Species	General Distribution
Myripristis earlei (Holocentridae)	Marquesas and Phoenix Islands
Paracirrhitus nisus (Cirrhitidae)	Tuamotus and Phoenix Islands
Kuhlia petit (Kuhliidae)	Marquesas and Phoneix Islands
Chaetodon declivis (Chaetodontidae)	Marquesas, Line Is., and Phoenix Is.
Apolemichthys xanthopunctatus (Pomacanthidae)	Gilbert, Phoenix, and Line Islands
Chrysiptera albata (Pomacentridae)	Nikumaroro Atoll
Bodianus prognathus (Labridae)	Line and Phoenix Islands
Coris centralis (Labridae)	Line and Phoenix Islands
Parapercis lata (Pinguipedidae)	Line and Phoenix Islands
Ctenogobiops sp. (Gobiidae)	Line and Phoenix Islands
Priolepis ailina (Gobiidae)	Society and Phoenix Islands
Trimma squamicana (Gobiidae)	Phoenix Islands

ROV Camera Results

The ROV camera was deployed at several outer reef sites providing an opportunity to extend our observations below the depths of conventional scuba diving to about 180 m. These investigations, unfortunately, were greatly hampered by persistent equipment malfunctions. Although our list (Table 9) of ROV species is very limited, at least two species, *Paracaesio xanthurus* and *Chaetodon declivus* were exclusively recorded with this method. The deep outer reef habitat was characterized by a steep slope with a mixture of rubble and soft sediment, with occasional ledges.

Table 9. Fishes recorded with the ROV camera at depths between 90 and 180 m.

Carcharinus amblyrhynchos (Carcharinidae)
Triaenodon obesus (Carcharhinidae)
Caranx lugubris (Carangidae)
Lutjanus bohar (Lutjanidae)
Paracaesio xanthurus (Lutjanidae)
Lethrinus olivaceus (Lethrinidae)
Chaetodon declivis (Chaetodontidae)
Forcipiger flavissimus (Chaetodontidae)
Heniochus acuminatus (Chaetodontidae)
Apolemichthys griffisi (Pomacanthidae)
Odonus niger (Balistidae)
Xanthichthys auromarginatus (Balistidae)

Unfortunately it was not possible to detect smaller species such as damselfishes and fairy basslets (*Pseudanthias*), due to the limitations of the wide angle lens. The most common larger species on the deep slope included *Triaenodon obesus, Caranx lugubris, Lutjanus bohar*, and *Odonus niger*. Although there is scant published information on the distribution of deep reef fishes, the work of Chave and Mundy (1994), dealing with the Hawaiian Archipelago and Johnston Island, showed that numerous species usually found on shallow coral reefs, are capable of penetrating considerable depths. For example, these authors recorded respective maximum depths of 275 m, 291 m, 128 m, and 161 m, for *C. amblyrhnchos, C. lugubris, F. flavissimus,* and *X. auromarginatus*, four of the same species seen on deep slopes at the Phoenix Islands.

New Species and Notable Range Extensions

Four new species were collected during the 2002 expedition, which have been recently described. The holocentrid *Myripristis earlei* Randall, Allen, and Robertson (2003) was first thought to be a color variant of *M. berndti*, but specimens collected during the expedition revealed distinctive differences. The species is also known from the Marquesas Islands. *Chrysiptera albata* Allen and Bailey (2002), a small pomacentrid that frequents the steep outer slopes of Nikumaroro Atoll at depths below 45 m, was collected on the last diving day of the expedition. We also collected two new gobiids that were subsequently described by Winterbottom (2004) as *Trimma sostra* and *T. squamicana*. The latter species is known only from the Phoenix Group, but *T. sostra* is also found at the Solomon Islands, Caroline Islands, Fiji, and the Gilbert and Ellice islands (Kiribati).

A total of 219 new records for the Phoenix Islands were recorded during the current expedition (Appendix I) Most of these are widespread species, whose occurrence at the Phoenix Islands was predictable. Nevertheless, several notable range extensions were recorded including species previously known from isolated outposts in the central Pacific such as the Line Islands, Society Islands, Tuamotus, and Marquesas (Table 8). Other notable extensions include those for the caesionid, *Ptereleotris lativittata* (Chagos to Palau), and the labrids *Halichoeres pallidus* (common in the Indonesian area, but rarely reported from the central Pacific), and *Labropsis polynesica* (Austral Islands, Society Islands, and Tuamotus).

Inter-island Comparisons

Although general diving conditions between the various islands were similar due to the relatively homogenous atoll environment, each island possessed distinctive faunal characteristics. In view of the brief nature of our visit, it is difficult to assess the validity of these differences. They may be real, or simply false impressions based on a limited number of dives. Nevertheless, it seems worthwhile to mention some of the most obvious faunal highlights or peculiarities of each island.

Nikumaroro Island. – Huge numbers of surgeonfishes were certainly one of the most impressive faunal features of the Phoenix Islands in general and some of the

largest aggregations were witnessed at dive sites 1 and 2. Schooling species included *Acanthurus triostegus, A. guttatus, A. nigroris, A. xanthopterus*, and *Zebrasoma veliferum*. Nikumaroro was also the best location for sharks, including *Charcharhinus amblyrhynchos, C. melanopterus*, and *Triaenodon obesus*. As many as 15-20 sharks were seen on each dive. Other highlights included large schools of *Lutjanus fulvus* and an inordinate number of hawkfishes, which were generally abundant throughout the Phoenix Group.

Manra Island. – Manra was notable for its abundance of the surgeonfish *Acanthurus guttatus*, which formed large feeding shoals in shallow, wave-affected gutters. In addition, an extensive sand patch at dive site 18 yielded about 20 individuals of *Malacanthus brevirostris* as well as numerous *Coris centralis*. Other extraordinarily abundant fishes included *Kyphosus cinerascens* and *Mulloidichthys mimicus*.

Phoenix Island. – Plectognaths (triggerfishes, puffers, and allies) were generally abundant. The most puffers (*Arothron meleagris*) were seen at this island, including up to 15-20 fish in a single aggregation. There was also an abundance of the relatively rare *Xanthichthys* triggerfishes (*X. auromarginatus* and *X. caeruleolineatus*).

Kanton Island. – The relatively wide, deep passage and interconnected lagoon habitat were unique physical features associated with a number of fish species that were seen here and nowhere else in the Phoenix Islands: *Heteroconger haasi, Atherinomorus lacunosa, Doryhamphus dactyliophorus, Epinephelus socialis, Kuhlia petit, K, mugil, Gerres argyreus, Centropyge bicolor, Heniochus acuminatus, Chromis ternatensis, Amblygobius nocturnus, Ctenogobiops sp.,* and *Pleurosicya micheli*. In addition, the following species were sighted only on the outer reef at Kanton: *Belonoperca chabanaudi, Apogon taeniopterus, A. semiornatus, Fowleria punctulata, Chromis weberi, Halichoeres chrysus, H. pallidus, Hologymnosus doliatus, Ptereleotris evides,* and *Siganus argenteus*. Parrotfishes were generally more numerous at Kanton compared to the other islands. Especially notable in this regard were huge spawning aggregations of *Hipposcarus longiceps*, encountered on the outer reef at the entrance to the main passage. Spectacular early morning (during outgoing spring tides) spawning episodes were witnessed on two occasions. Also, with the exception of one sighting at Birnie Island, *Scarus altipinnis* was confined to Kanton, and present in large numbers. Other fishes with unusually high abundance included *Caranx lugubris, Chaetodon lunula* (a school of 70 individuals seen in the lagoon), and *C. trifascialis* (confined to the lagoon).

Birnie Island. – This small island was subject to strong surge, and consequently exhibited relatively low coral relief and a lower level of fish diversity. One notable observation was the presence of the normally deeper dwelling *Paracentropyge multifasciatus* and *Xanthichthys auromarginatus* in only 8-9 m depth. Conversely, *Myripristis woodsi*, usually found in less than 12 m, was seen as deep as 32 m. This soldierfish was exceptionally common. Other species that were seen in higher than usual numbers included *Epinephelus polyphekadion* and *Bodianus prognathus*.

Orona Island. – Large shoals of Bumphead Parrotfish (*Bulbometopon muricatus*), included up to 200 or more individuals. This impressive fish was seen on most dives at Orona, both in the lagoon and on outer reefs. Kanton and Nikumaroro were the only other locations where it was sighted, but only small groups were encountered. The lagoon at Orona was also notable for its population of juvenile Napoleon Wrasse (*Cheilinus undulatus*), with observations of as many as 20-25 per dive.

CONSERVATION RECOMMENDATIONS

The first author has dived extensively on reefs of the Indo-Pacific region over the past 35 years. This experience provides an excellent basis of comparison, which encompasses a huge variety of reefs from the coast of the Americas to East Africa. Although unremarkable with regards to total fish species, percentage of endemics, or habitat diversity, the Phoenix Group is certainly one of the best examples of a near-pristine atoll environment. Moreover, the islands seem to have escaped coral-bleaching episodes up until the event of late 2002 (see Alling et al, this volume, Obura and Mangubhai, in review). Therefore, there is excellent justification for establishing a conservation reserve that incorporates at least a portion of these islands. Nikumaroro seems especially well suited for this purpose. It is large enough to have a full range of atoll-associated habitats, and because it is uninhabited there is virtually no fishing pressure. The shark population is also healthy, compared to other places in the Phoenix Group where these animals have been recently decimated by foreign shark-fin fishing (Obura and Stone 2003).

Certainly consideration should be given to protecting the remaining shark populations. The apparent damage to shark stocks by foreign fishing vessels underlines their fragility. Intense fishing over a relatively short period can due considerable harm due to the territoriality of reef sharks, their slow growth rate, and low fecundity.

We also recommend that the government protects two of the largest reef fish species, the Napoleon Wrasse and Bumphead Parrotfish. This could conceivably be accomplished without sacrificing an important item in the local diet. Our limited observations at Kanton and Orona indicate that neither of these species was important in the artisanal fishery, especially since the closure of the settlement at Orona. The Napoleon Wrasse, in particular, is increasingly threatened across the Indo-Pacific, as a consequence of its high value in the live-fish trade associated with the restaurant industry in South-east Asia. Stocks of this fish are severely depleted over much of its range. As more easily accessed fishing grounds in the Philippines and Indonesia are being depleted, there is more pressure on outlying regions to supply the demand for this fish. The Phoenix Islands population of Napoleon Wrasse is exceptional compared to most other locations (Table 10). As many as 20-25 individuals were seen on each dive. The population could be quickly devastated if foreign or local ventures started fishing operations. This species is presently protected under Appendix II of CITES and although it is not necessarily threatened by extinction, it could easily vanish if the trade is not closely controlled.

Table 10. Frequency of Napoleon Wrasse (*Cheilinus undulatus*) for various locations in the Indo-Pacific previously surveyed by Conservation International.

Location	No. sites where seen	% of total sites	Approx. no. seen
Phoenix Islands 2002	47	83.92	412
Milne Bay, PNG – 2000	28	49.12	90
Milne Bay, PNG – 1997	28	52.83	85
Raja Ampat Islands – 2001	7	15.55	7
Togean/Banggai Islands – 1998	6	12.76	8
Weh Island, Sumatra – 1999	0	0.00	0
Calamianes Is., Philippines – 1998	3	7.89	5

Protection of the Bumphead Parrotfish would be focused at Orona Island, the only place it was common. This would obviously involve coordination of the local community, who could provide an opportunity for strict law enforcement. The lack of people at most localities in the Phoenix Group provides an opportunity for clandestine illegal poaching, an obstacle that needs to be considered in framing any conservation initiatives.

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Appendix I. List of the reef fishes of the Phoenix Islands.

This list includes all species of coral reef fishes known from the Phoenix Islands at 10 July 2002. The list is based on the following sources: 1) collections reported by Schultz (1943); 2) fishes collected, photographed, or observed during the Primal Oceans 2000 Expedition.; 3) observations and collections made during the current Expedition., and 4) a few species reported in recent literature such as the review of *Ctenochaetus* by Randall and Clements (2001). The family classification follows that of Eschmeyer (1998) except for the placement of Cirrhitidae. Genera and species are arranged alphabetically within each family.

Terms relating to relative abundance are as follows: *Abundant* - Common at most sites in a variety of habitats with up to several hundred individuals being routinely observed on each dive. *Common* - seen at the majority of sites in numbers that are relatively high in relation to other members of a particular family, especially if a large family is involved. *Moderately common* - not necessarily seen on most dives, but may be relatively common when the correct habitat conditions are encountered. *Occasional* - infrequently sighted and usually in small numbers, but may be relatively common in a very limited habitat. *Rare* - less than 10, often only one or two individuals seen on all dives. Species that lack abundance and site record information were not recorded during the 2002 survey. An asterisk (*) after the species citation indicates that it was photographed by G. Allen during the 2002 survey. Site records correspond to site numbers in Obura, this volume.

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
GINGLYMOSTOMATIDAE			
Nebrius ferrugineus (Lesson, 1830)	New record.	Rare, only one seen.	44
CARCHARHINIDAE			
Carcharhinus albimarginatus (Rüppell, 1837)	New record.	Rare.	One seen by Paul Nicklin at Enderbury Island.
C. amblyrhynchos (Bleeker, 1856)*	2000 Expedition.	Locally common.	1-8, 14, 15, 19, 21, 23, 31, 33, 42, 62, 63, 64-67, 69, 76
C. melanopterus (Quoy and Gaimard, 1824)*	Schultz, 1943; 2000 Expedition.	Locally common.	1-5, 7, 8, 10, 11, 15, 17, 19, 21, 27, 31, 38, 41, 43, 46, 63-67
Triaenodon obesus (Rüppell, 1835)*	Schultz, 1943; 2000 Expedition.	Locally common.	1, 2, 14, 17, 20-23, 33, 38, 41, 42, 46, 50, 62-68
DASYATIDAE			
Taeniura myeni Müller & Henle, 1841	New record.	Rare, only one seen.	21
MYLIOBATIDAE			
Aetobatis narinari (Euphrasen, 1790)	New record.	Rare, only one seen.	50
Manta birostris (Walbaum, 1792)*	2000 Expedition.	About 10 sighted.	4, 24, 34, 42, 50, 52, 68

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
MORINGUIDAE			
Moringua ferruginea (Bliss, 1883)	2000 Expedition.	Collected with rotenone.	17, 20, 61, 64, 79, 81
M. macrochir Bleeker, 1853	Schultz, 1943.	Collected with rotenone.	11
M. microchir Bleeker, 1853	Schultz, 1943.		
CHLOPSIDAE			
Kaupichthys atronasus Schultz, 1953	New record.	Collected with rotenone.	44
K. diodonatus (Schultz, 1953)	New record.	Collected with rotenone.	20. 44. 61. 64. 79
MURAENIDAE			
Anarchias cantonensis (Schultz, 1943)	Schultz, 1943.		
Anarchias. leucurus (Snyder, 1904)	Schultz, 1943.		
A. seychellensis (Smith, 1962)	New record.	Collected with rotenone.	20, 44, 61, 64, 79,
Echidna leucotaenia Schultz, 1943	Schultz, 1943; Enderbury I. is type locality.		
E. nebulosa (Thünberg, 1789)	Schultz, 1943.	Collected with rotenone.	10, 29
Enchelycore bayeri Schultz, 1953	New record.	Collected with rotenone.	20
E. pardalis (Schlegel, 1846)	Schultz, 1943.		
E. schismatorhynchus (Bleeker, 1853)	Schultz, 1943.	Collected with rotenone.	79
Gymnothorax atolli Pietschmann, 1835	New record.	Collected with rotenone.	20
G. buroensis (Bleeker, 1857)	Schultz, 1943.	Collected with rotenone.	61, 64
G. chilospilus (Bleeker, 1865)	2000 Expedition.		
G. fimbriatus (Bennett, 1831)	Schultz, 1943.		
G. flavimarginatus (Rüppell, 1828)*	Schultz, 1943; 2000 Expedition.	Occasional.	10, 20, 21, 33, 42, 46, 50, 62, 69
G. gracilicaudus (Jenkins, 1903)	Schultz, 1943.		
G. javanicus (Bleeker, 1865)*	Schultz, 1943; 2000 Expedition.	Occasional.	27, 30-32, 42, 50, 72, 80
G. margaritophorus Bleeker, 1864	Schultz, 1943.		
G. melatremus Schultz, 1953	New record.	Collected with rotenone.	34
G. meleagris (Shaw & Nodder, 1795)	2000 Expedition.	Rare, only 3 seen.	2, 8, 20
G. monostigmus (Regan, 1909)	Schultz, 1943.		
G. pictus (Ahl, 1789)	Schultz, 1943.	Locally common.	10, 52, 81
G. pseudothyrsoideus (Bleeker, 1852)	Schultz, 1943.		
G. ruepelliae (McClelland, 1845)	Schultz, 1943.		17
G. thyrsoideus (Richardson, 1844)	Schultz, 1943.		
G. undulatus (Lacepède, 1803)	New record.	Collected with rotenone.	79
G. zonipectus Seale, 1906	Schultz, 1943.	Collected with rotenone.	79
U. concolor Rüppell, 1837	New record.	Collected with rotenone.	64
U. fasciolatus (Regan, 1909)*	New record.	Collected with rotenone.	44, 64, 79
U. marmoratus (Lacepède, 1803)	Schultz, 1943.		
U. micropterus (Bleeker, 1852)	Schultz, 1943.		

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
U. supraforatus (Regan, 1909)	2000 Expedition.		
U. xanthopterus Bleeker, 1859	Schultz, 1943.		
OPHICHTHIDAE			
Callechelys marmoratus (Bleeker, 1853)	Schultz, 1943.		
C. melanotaenia Bleeker, 1864	Schultz, 1943.		
Leiuranus semicinctus (Lay and Bennett, 1839)	Schultz, 1943.		
Muraenichthys. macropterus Bleeker, 1857	Schultz, 1943.		
M. schultzei Bleeker, 1857	Schultz, 1943.		
Myrichthys colubrinus (Boddaert,1781)	Schultz, 1943.		
M. maculosus (Cuvier, 1817)	Schultz, 1943.	Collected with rotenone.	17
CONGRIDAE			
Conger cinereus Rüppell, 1828	2000 Expedition.		
Heteroconger haasi (Klausewitz & Eibl-Eibesfeldt, 1959)	New record.	Several seen on 3 occasions.	24, 30. 52
CHANDIDAE			
Chanos chanos (Forsskål, 1775)	New record.	Occasional.	8, 18, 24, 25, 27, 38, 39, 41-43, 46, 50, 52, 71
CLUPEIDAE			
Spratelloides delicatulus (Bennett, 1832)	Schultz, 1943.		
SYNODONTIDAE			
Saurida gracilis (Quoy & Gaimard, 1824)	2000 Expedition.		
Synodus jaculum Russell and Cressy, 1979	2000 Expedition.		
S. variegatus (Lacepède, 1803)	Schultz, 1943; 2000 Expedition.		
OPHIDIIDAE			
Brotula multbarbata Temminck & Schlegel, 1846	2000 Expedition.	Collected with rotenone.	20, 64
BYTHITIDAE			
Alionematichthys piger (Alcock, 1890)	Schultz, 1943 as *Dinematichthys iluocoeteoides*		
Diancistrus atollorum Schwarzhans, Møller, and Nielsen, 2005	2000 Expedition		
Diancistrus mennei Schwarzhans, Møller, and Nielsen, 2005	2000 Expedition	Collected with rotenone	17, 20, 44
ANTENNARIIDAE			
A. nummifer Cuvier, 1817	2000 Expedition.	Collected with rotenone.	61
ATHERINIDAE			
Atherinomorus lacunosa (Forster, 1801)	New record.	Common at one site in Canton lagoon.	35

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Hypoatherina ovalaua (Herre, 1935)	Schultz, 1943.		
MUGILIDAE			
Neomyxus leuciscus (Günther, 1871)	Schultz, 1943.	Locally common in lagoons.	10, 11, 81
Crenimugil crenilabis (Forsskål, 1775)	Schultz, 1943.	Locally common in lagoons.	11, 20, 54, 74
Liza vaigiensis (Quoy and Gaimard, 1825)	Schultz, 1943.	Locally common in lagoons.	11, 52, 54
BELONIDAE			
Ablennes hians (Valenciennes, 1846)	Schultz, 1943.		
Platybelone platyura (Bennett, 1832)	Schultz, 1943.	Occasional.	
HEMIRAMPHIDAE			
Hyporhamphus acutus (Günther, 1871)*	Schultz, 1943.		7, 8, 31, 34, 38, 80
ANOMALOPIDAE			
Photoblepharon palpebratus (Boddaert, 1781)	New record.	Observed on one night dive.	40
HOLOCENTRIDAE			
Myripristis adusta Bleeker, 1853*	Schultz, 1943; 2000 Expedition.	Common.	1-3, 7, 25, 27, 31-34, 38,-43, 46, 50, 68, 62, 71, 79, 80
M. amaena (Castelnau, 1873)	2000 Expedition.	Occasional.	18, 21, 27, 31-33, 38, 40, 43, 46, 50, 67
M. berndti Jordan and Evermann, 1902*	2000 Expedition.	Common	1-8, 14, 15, 17-23, 25, 27, 31-34, 38-43, 46, 50, 62-69, 71, 76, 79, 80
M. earlei Randall, Allen & Robertson, 2003*	New record.	Moderately common.	38, 39, 42, 43, 50, 62-64, 66-68
M. kuntee Valenciennes, 1831*	New record.	Occasional.	5, 25, 27, 31-34, 39, 40, 42, 46, 50, 63, 66, 67
M. pralinia Cuvier, 1829	New record.	Locally common, but usually seen at night.	6, 20, 31, 40, 46, 79
M. violacea Bleeker, 1851	Schultz, 1943.	Occasional.	27, 39, 40, 42, 50, 71, 72
M. vittata Valenciennes, 1831	New record.	Common below 25 m.	1-3, 6, 7, 14, 15, 18, 19, 21-23, 25, 27, 31-3438-43, 46, 62-67
M. woodsi Greenfield, 1974*	Schultz, 1943 as *M. murdja*n.	Moderately common.	4, 6, 18, 20, 21, 54, 62, 64, 66-68
Neoniphon argenteus (Valenciennes, 1831)	Schultz, 1943.		
N. opercularis (Valenciennes, 1831)	New record.	Occasional.	14, 17, 23, 25, 27, 29, 42, 46, 67, 71, 80
N. sammara (Forsskål, 1775)	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 7, 11, 22, 24, 25, 27, 30, 32, 25, 39, 40, 42, 43, 46, 50, 55, 63, 66-68, 73
Plectrypops lima (Valenciennes, 1831)	New record.	One collected with rotenone.	20
Sargocentron caudimaculatum (Rüppell, 1835)	2000 Expedition.	Common.	1, 2, 5, 7, 8, 15, 17-23, 25, 27, 32-34, 38-42, 62, 65, 67-69
S. diadema (Lacepède, 1801)	New record.		
S. iota Randall, 1998	New record.	Three specimens collected with rotenone.	31, 64
S. microstoma (Günther, 1859)	Schultz, 1943.	Rarely seen, but nocturnal.	40, 67
S. punctatissimum (Cuvier, 1829)	Schultz, 1943.	Collected with rotenone.	20

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
S. spiniferum (Forsskål, 1775)*	Schultz, 1943; 2000 Expedition.	Moderately common.	1-4, 7, 18, 19, 21, 24-27, 31-34, 38-43, 46, 50, 54, 55, 68, 69, 74, 80
S. tiere (Cuvier, 1829)*	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 4-8, 14, 15, 17-23, 25, 27, 31-34, 39-43, 46, 50, 62-65, 68, 69, 71, 76, 79
S. tiereoides (Bleeker, 1853)	2000 Expedition.	One collected with rotenone.	55
S. violaceum (Bleeker, 1853)	Schultz, 1943.		
AULOSTOMIDAE			
Aulostomus chinensis (Linnaeus, 1766)	Schultz, 1943.	Occasional.	1, 2, 24, 39, 50, 68, 71, 76
FISTULARIIDAE			
Fistularia commersoni Rüppell, 1835	Schultz, 1943.	Occasional.	7, 24, 25, 40, 46, 64, 69, 72, 74, 80
SYNGNATHIDAE			
Choeroichthys sculptus (Günther, 1870)	Schultz, 1943.		
Corythoichthys flavofasciatus (Rüppell, 1838)	New record.	Collected with rotenone.	11, 26
Doryrhamphus dactyliophorus (Bleeker, 1853)	New record.	Collected with rotenone.	34, 55
D. excisus Kaup 1856	New record.	Rare, only 2 seen.	26, 64
SCORPAENIDAE			
Dendrochirus biocellatus (Fowler, 1938)	New record.	One collected with rotenone.	44
Pterois antennata (Bloch, 1787)	2000 Expedition.	Rare	20, 42, 68
P. radiata Cuvier, 1829	Schultz, 1943.	Rare.	7, 20, 40, 52, 69, 79
Scorpaenodes guamensis (Quoy and Gaimard, 1824)	Schultz, 1943; 2000 Expedition.	Two collected with rotenone.	61, 79
S. hirsutus (Smith, 1957)	2000 Expedition.	Several collected with rotenone.	17, 20, 44, 61, 64
S. varipinnis Smith, 1957	New record.	Collected with rotenone.	38, 39, 61
Sebastapistes cyanostigma (Bleeker, 1856)	2000 Expedition.	Common.	5, 23, 25, 27, 41, 42, 50, 62-65, 69, 71
Taenianotus triacanthus Lacepède, 1802	Schultz, 1943; 2000 Expedition.		
CARACANTHIDAE			
Caracanthus maculatus (Gray, 1831)	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 5, 8, 14, 15, 21-23, 25, 27, 31, 32, 38, 41-43, 50, 62-69, 71, 76, 80
C. unipinna (Gray, 1831)	New record.	One collected with rotenone.	79
SERRANIDAE			
Aethaloperca rogaa (Forsskål, 1775)	New record.	Rare.	6, 34, 46
Anyperodon leucogrammicus (Valenciennes, 1828)*	Schultz, 1943.	Common.	1, 2, 5, 7, 14, 15, 18-25, 27, 28, 30-33, 38-43, 46, 50, 63-69, 71, 80
Aporops bilinearis Schultz, 1943	Schultz, 1943; 2000 Expedition.; Orona is type locality	Collected with rotenone.	17

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Belonoperca chabanaudi Fowler & Bean, 1930	New record.	Rare, only 3 seen.	25-46
Cephalopholis argus Bloch and Schneider, 1801*	Schultz, 1943; 2000 Expedition.	Common.	1-8, 14, 15, 18-25, 27, 31-34, 38-43, 46, 50, 52, 62-69, 71, 72, 74, 76, 77, 80, 81
C. leopardus (Lacepède, 1802)	Schultz, 1943; 2000 Expedition.	Common.	1-8, 11, 14, 15, 17-23, 25, 27, 31-34, 38-43, 46, 50, 52, 61-64, 66-69, 72, 79, 80
C. miniata (Forsskål, 1775)*	2000 Expedition.	Moderately common.	1-3, 5-8, 14, 15, 17-25, 27, 31-34, 38-43, 46, 50, 62-64, 66-69, 76, 80
C. sexmaculata (Rüppell, 1828)	New record.	Occasional.	6, 7, 42, 62, 67
C. sonnerati (Valenciennes, 1828)*	New record.	Occasional.	8, 21, 25, 34, 43, 62, 68
C. spiloparaea (Valenciennes, 1828)	New record.	Moderately common below 20 m.	4, 6, 18, 21, 23, 27, 32, 34, 38, 39, 41-43, 46, 52, 61, 67, 68, 71, 80
C. urodeta (Schneider, 1801)	Schultz, 1943; 2000 Expedition.	Common.	1-8, 11, 14, 15, 17-19, 21- 25, 27, 31, 33, 34, 38-43, 46, 50, 52, 61-69, 71, 76, 79, 80
Epinephelus fasciatus (Forsskål, 1775)*	2000 Expedition.	Occasional.	1-5, 7, 18, 21, 50, 68, 71
E. fuscoguttatus (Forsskål, 1775)*	New record.	Moderately common.	1, 2, 6, 7, 24-27, 30-34, 38, 39, 40, 42, 50, 52, 54, 68-69, 71, 72, 73, 76, 77, 80
E. hexagonatus (Bloch & Schneider, 1801)*	Schultz, 1943.	Moderately common.	1, 2, 4, 7, 14, 15, 17, 18, 20, 21, 27, 31, 34, 38, 43, 46, 64, 71, 76
E. howlandi (Günther, 1873)	New record.	Rare.	76, 79, 80
E. lanceolatus (Bloch, 1790)	New record.	Rare, only one seen.	One filmed at President Taylor shipwreck by R. Barrel.
E. macrospilos (Bleeker, 1855)	New record.	Occasional.	21, 39, 42, 43, 46, 52
E. melanostigma Schultz, 1953	2000 Expedition.	Occasional.	5, 10, 40, 41, 65, 69, 71
E. merra Bloch, 1793	Schultz, 1943.	Common in lagoons.	10, 11, 24, 26, 28-30, 35-37, 52, 72,-74, 77, 81
E. polyphekadion (Bleeker, 1849)*	New record.	Moderately common.	1, 2, 5, 31, 38-43, 46, 50, 52, 54, 55, 68, 69, 76, 80
E. socialis (Günther, 1873)*	Schultz, 1943.	Rare.	54
E. spilotoceps Schultz, 1953*	New record.	Occasional.	1-3, 5, 7, 8, 42, 43, 50, 69
E. tauvina s (Forsskål, 1775)	New record.	Rare.	21, 25, 31, 32
Gracila albomarginata (Fowler & Bean, 1930)*	New record.	Common.	1-4, 6, 7, 14, 15, 18, 19, 22, 23, 25, 27, 31-34, 38-43, 46, 50, 62-69, 71, 76, 80
Liopropoma mitratum Lubbock & Randall, 1978	New record.	Collected with rotenone.	3 1
L. susumi (Jordan & Seale, 1906)	New record.	Collected with rotenone.	44
Luzonichthys whitleyi (Smith, 1955)	Schultz, 1943.		6, 7, 14, 15, 18, 38, 39, 41, 46, 62, 65, 67-69
Plectranthias nanus Randall, 1980*	2000 Expedition.	Collected with rotenone.	27, 33, 34, 39, 44
Plectropomus areolatus Rüppell, 1830	Randall & Heemstra, 1991	Moderately common.	24, 25, 31-33, 38-43, 50, 54, 55, 68, 69, 71, 76, 80
Pseudanthias bartlettorum (Randall & Lubbock, 1981)*	2000 Expedition.	Abundant.	1-3, 5-8, 14, 15, 18-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 61-69, 71. 76, 80
P. cooperi (Regan, 1902)*	New record.	Rare, but moderately common at site 18.	18, 34, 38
P. dispar (Herre, 1955)	New record.	Occasional.	1, 21, 23, 25, 27, 31, 32, 34, 38, 39, 41-43, 46, 62-64
P. lori (Lubbock & Randall, 1976)	New record.	Rare, only one seen in 55 m.	68

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
P. olivaceus Randall & McCosker, 1982*	New record.	Occasional in 4-10 m on windward reefs.	3-5, 7, 8, 15, 19, 22, 27, 33, 41, 42, 46, 65, 66
P. pascalus (Jordan & Tanaka, 1927)*	New record.	Moderately common, usually below 20 m.	3, 4, 6, 14, 15, 19, 21-23, 25, 27, 32-34, 39, 41, 42, 46, 63, 65-69, 71, 76, 80
P. smithvanizi (Randall & Lubbock, 1981)*	New record.	Abundant below 30 m.	25, 32-34, 38, 39, 41, 46, 62-64, 71, 76, 80
Pseudogramma polyacanthum (Bleeker, 1856)	2000 Expedition.	Collected with rotenone.	
Suttonia lineata Gosline, 1960	2000 Expedition.		
Variola louti (Forsskål, 1775)	2000 Expedition	Occasional.	4, 18, 22, 24, 27, 32, 38, 46
PSEUDOCHROMIDAE			
Pseudoplesiops revellei Schultz, 1953	2000 Expedition.		
PLESIOPIDAE			
Plesiops corallicola Bleeker, 1853	Schultz, 1943.		
CIRRHITIDAE			
Cirrhitichthys oxycephalus (Bleeker, 1855)	2000 Expedition.	Moderately common.	1. 2. 7. 15, 17, 18, 20-24, 27, 31, 32, 34, 38, 39, 41-43, 50, 61-69, 71, 79, 80
Cirrhitops hubbardi (Schultz, 1943)*	Schultz, 1943; 2000 Expedition.; Enderbury I. is type locality.	Rare.	3. 4, 25, 41, 64, 65
Cirrhitus pinnulatus (Schneider, 1801)	Schultz, 1943.	Occasional.	3, 4, 21, 31, 43, 62, 76
Neocirrhites armatus Castelnau, 1873	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 14, 15, 21, 23, 25, 27, 31-34, 38, 41-43, 50, 62-69, 71, 76, 80
Paracirrhites arcatus (Cuvier, 1829)*	2000 Expedition.	Common.	1-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 50, 62-69, 71, 76, 79, 80
P. forsteri (Schneider, 1801)*	2000 Expedition.	Common.	1-3, 5-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 61. 63-69, 71, 76, 79, 80
P. hemistictus (Güntehr, 1874)*	Schultz, 1943; 2000 Expedition.	Moderately common.	1-8, 14, 15, 17-19, 21-23, 27, 31-34, 39, 41, 43, 46, 50, 62-69, 71
P. nisus Randall, 1963*	2000 Expedition.	Occasional.	1-3, 5, 8, 15, 17, 22, 25, 38, 65-67, 69, 76
P. xanthus Randall, 1963*	2000 Expedition.	Moderately common.	1-5, 8, 14, 15, 18-23, 25, 27, 31-33. 39, 41-43, 50, 62-69, 71, 76
KUHLIIDAE			
Kuhlia petiti Schultz, 1943*	Schultz, 1943; Orona I. is type locality.	Locally common at one site.	54
K. mugil (Forster, 1801)	Schultz, 1943 as *K. sandvicensis*.	Rare, one seen.	54
APOGONIDAE			
Apogon angustatus (Smith and Radcliffe, 1911)	2000 Expedition.	Occasional.	18, 31, 34, 40, 61, 79
A. crassiceps Garman, 1903	New record.	Collected with rotenone.	17, 20, 40, 44, 61, 79
A. doryssa (Jordan & Seale, 1906)	Schultz, 1943.	One collected with rotenone.	79
A. exostigma Jordan and Starks, 1906	2000 Expedition.	Occasional.	26, 55, 72

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
A. fraenatus Valenciennes, 1832	Schultz, 1943.		
A. kallopterus Bleeker, 1856	New record.	Occasional.	26, 40, 72, 79
A. novemfasciatus Cuvier, 1828	Schultz, 1943.		
A. savayensis Günther, 1871	Schultz, 1943, as *A. bandanensis*; 2000 Expedition. as *A. fuscus*.	Occasional. More common at night.	40, 55, 61
A. semiornatus Peters, 1876	New record.	One collected with rotenone.	38
A. taeniopterus (Bennett, 1835)	New record.	Moderately common at night.	40
Cercamia eremia (Allen, 1987)	New record.	Collected with rotenone.	39, 55
Cheilodipterus macrodon (Lacepède, 1802)	New record.	Rare.	
C. quinquelineatus Cuvier, 1828	Schultz, 1943; 2000 Expedition.	Moderately common in lagoons.	26, 36, 37, 52, 55, 67, 72-74, 77
Fowleria punctulata (Rüppell, 1838)	Schultz, 1943 as *F. isostigma.*	Collected with rotenone.	55
Gymnapogon urospilotus Lachner, 1953	2000 Expedition.		
Pseudamiops gracilicauda (Lachner, 1953)	New record.	Collected with rotenone.	20
MALACANTHIDAE			
Malacanthus brevirostris Guichenot, 1848	2000 Expedition.	Occasional.	15, 18, 20, 21, 23, 38, 52, 62, 67
M. latovittatus (Lacepède, 1801)	New record.	Rare.	8, 62
ECHENEIDAE			
Echeneis naucrates Linnaeus, 1758	New record.	Rare, only one seen.	66
CARANGIDAE			
Carangoides ferdau (Forsskål, 1775)*	New record.	Occasional.	4, 7, 31, 32, 39, 46, 52, 64, 67
C. orthogrammus (Jordan & Gilbert, 1881)*	New record.	Occasional.	3, 4, 7, 15, 17-20, 23, 24, 31, 38, 42, 54, 63
Caranx ignobilis (Forsskål, 1775)*	New record..	Occasional.	4, 6, 21-24, 27, 34, 42, 43, 46, 50, 52, 54, 63, 65, 66
C. lugubris Poey, 1861*	2000 Expedition.	Common to locally abundant.	1-4, 6-8, 14, 15, 17, 19-25, 27, 31-34, 38-43, 46, 5062-68, 80
C. melampygus Cuvier, 1833*	Schultz, 1943.	Common to locally abundant.	1-8, 10, 11, 14, 15, 17-28, 30-35, 38-43, 46, 50, 52, 54, 55, 62-69, 71, 72, 74, 76, 77, 80
C. sexfasciatus Quoy and Gaimard, 1825*	2000 Expedition.	Locally common.	3. 5. 7. 8, 14, 19, 21-24, 32-34, 50, 54
Elegatis bipinnulatus (Quoy and Gaimard, 1825)	Schultz, 1943.	Locally common.	3, 8, 17, 24, 32, 33, 63, 66, 68,76, 80
Gnathanodon speciosus (Forsskål, 1775)	New record.	rare	One seen in Kanton passage by C. Holloway
Scomberoides lysan (Forsskål, 1775)*	New record.	Occasional.	1, 2, 5, 6, 27, 31-34, 42, 54, 80
Selar crumenophthalmus (Bloch, 1793)	New record.	Rarely seen, but locally common.	18, 20, 62
Trachinotus baillonii (Lacepède, 1802)*	Schultz, 1943.	Common at 2 sites.	20, 54

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
LUTJANIDAE			
Aphareus furca (Lacepède, 1801)*	New record.	Common.	1-3, 6, 7, 14, 15, 18-25, 27, 31-34, 38-43, 46, 50, 55, 62-69, 71, 76, 80
Aprion virescens Valenciennes, 1830	New record.	Moderately common, but always in low numbers.	1, 2, 8, 14, 17, 18, 21-25, 32-34, 38, 43, 62, 63, 65, 66, 68-79
Lutjanus bohar (Forsskål, 1775)*	Schultz, 1943; 2000 Expedition.	Common.	1-8, 11, 14, 15, 17-25, 27, 28, 30-34, 38-43, 46, 50, 52, 54, 55, 62-69, 71, 72, 74, 76, 77, 80
L. fulvus (Schneider, 1801)*	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 4, 6-8, 10, 11, 15, 17-23, 35, 46, 52, 54, 71, 73, 76
L. gibbus (Forsskål, 1775)	Schultz, 1943.	Abundant.	1, 2, 6-8, 21-25, 27, 28, 30-43, 46, 50, 52, 54, 66-69, 71, 72-74, 76, 77, 80
L. kasmira (Forsskål, 1775)	2000 Expedition.	Moderately common.	14, 15, 17, 18, 19, 20-25, 35, 38, 40, 46, 52, 62, 64-67
L. monostigma (Cuvier, 1828)*	Schultz, 1943.	Moderately common.	1-8, 11, 14, 15, 17-25, 27, 28, 30-35, 38-43, 46, 50, 52, 54, 55, 62-69, 71, 72, 74, 76, 77, 80
Macolor macularis Fowler, 1931	2000 Expedition.	Occasional.	4, 6, 7
M. niger (Forsskål, 1775)	New record.	Occasional.	7, 20, 21, 23, 24, 40, 64-66, 68, 80
Paracaesio xanthurus (Bleeker, 1869)	New record.	Seen below 80 m with remote video.	
CAESIONIDAE			
Caesio teres Seale, 1906*	2000 Expedition.	Common.	1, 2, 5, 7, 8, 18-20, 24, 27, 31-34, 40, 41, 43, 46, 50, 54, 62, 64, 66, 67, 71
Pterocaesio lativittatus Carpenter, 1987*	New record.	Occasional, but locally common.	1, 2, 6, 14, 41, 46, 57, 66
P. tile (Cuvier, 1830)*	New record.	Locally abundant.	1-4, 6, 7, 14, 21-25, 28, 32-34, 39-42, 46, 65-67
GERREIDAE			
Gerres argyreus (Forster, 1801)	New record.	About 200 seen at one site.	52
LETHRINIDAE			
Gnathodentex aurolineatus (Lacepède, 1802)*	New record.	Moderately common.	7, 21, 23, 25, 27, 31, 33, 34, 39, 40, 42, 43, 46, 63-67
Lethrinus erythracanthus Valenciennes, 1830	New record.	Occasional.	5, 6, 17, 20, 21, 33, 38, 50, 63-69, 71, 76, 80
L. obsoletus (Forsskål, 1775)	Schultz, 1943.	Occasional.	5, 7, 11, 24, 30, 38, 39, 42, 43, 46, 55, 62, 74
L. olivaceus Valenciennes, 1830*	New record.	Moderately common.	1, 2, 5, 7, 14, 15, 17-24, 27, 31-33, 38, 42, 43, 50, 54, 63-69, 71, 72, 74, 76, 80
L. xanthochilus Klunzinger, 1870	New record.	Moderately common.	3, 6-8, 15, 24, 27, 31-34, 40, 43, 50, 52, 63, 64, 68, 76, 80
Monotaxis grandoculis (Forsskål, 1775)	New record.	Common.	1-2, 4-6, 7, 8, 15, 17-27, 30-35, 38-43, 46, 50, 54, 55, 62-64, 66-69, 71, 72-74, 76, 77, 80
MULLIDAE			
Mulloidichthys flavolineatus (Lacepède, 1802)	Schultz, 1943.	Occasional.	11, 15, 18, 23, 35, 52, 67
M. mimicus Randall & Guézé, 1980*	New record.	Occasional.	20, 23, 52, 66, 67
M. vanicolensis (Valenciennes, 1831)*	Schultz, 1943.	Occasional.	1, 2, 5, 17, 18, 20, 23, 27, 42, 64-67

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Parupeneus barberinus (Lacepède, 1801)	2000 Expedition.	Occasional.	11, 15, 24-26, 30, 31, 34, 38, 41, 42, 54, 68, 71, 72, 74, 77
P. cyclostomus (Lacepède, 1801)	New record.	Occasional.	15, 21-24, 39, 54
P. multifasciatus (Quoy & Gaimard, 1825)	New record.	Common.	1-8, 14, 15, 17-25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54. 55, 62-69, 71, 76, 80
P. rubrioculatus Randall & Myers, 2002*	Schultz, 1943.	Common.	1-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 62-66, 68-69, 71, 76, 80
Upeneus arge (Jordan & Evermann, 1902)	Schultz, 1943 as *U. taeniopterus.*		
PEMPHERIDAE			
Pempheris otaitensis Lesson, 1830 *	Schultz, 1943 as *P.oualensis.*	Moderately common.	4, 5, 14, 18-23, 27, 31, 40-43, 46, 62-65, 67-69
KYPHOSIDAE			
K. cinerascens (Forsskål, 1775)	New record.		1, 2, 4, 7, 8, 14, 15, 18, 19, 21, 23, 24, 27, 28, 31-34, 38, 39, 42, 43, 46, 50, 54, 62-64, 66-69, 71, 80
K. vaigiensis (Quoy & Gaimard, 1825)*	New record.		20, 21, 27, 31, 42, 50, 54, 62, 63,
CHAETODONTIDAE			
Chaetodon auriga Forsskål, 1775*	Schultz, 1943; 2000 Expedition.	Common.	1-5, 7, 8, 10, 11, 15, 17-43, 46, 50, 52, 54. 55, 63-69, 71, 72-74, 76, 77, 80
C. bennetti Cuvier, 1831	Schultz, 1943; 2000 Expedition.	Common.	3, 7, 14, 15, 19, 22-25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54, 62, 65-68, 72, 74, 76, 77, 80
C. citrinellus Cuvier, 1831	Schultz, 1943.	Occasional.	21, 23, 32, 34, 38, 54
C. declivus Randall, 1975	New record.	Seen below 80 m with remote video.	
C. ephippium Cuvier, 1831	Schultz, 1943; 2000 Expedition.	Common.	1-3, 5, 7, 8, 11, 14, 15, 17-28, 30-35, 37, 38, 39, 40-43, 50, 52, 54. 55, 64, 67-69, 71, 72-74, 77, 80
C. kleinii Bloch, 1790	2000 Expedition.	Moderately common.	15, 18, 19, 21-25, 30, 34, 38, 50, 62, 63, 80
C. lineolatus Cuvier, 1831	New record.	Rare, less than 10.	31, 32, 39, 74
C. lunula Lacepède, 1803*	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 5, 7, 8, 11, 14, 15, 17, 18, 20-25, 27, 30-34, 38, 39, 41-43, 46, 50, 54. 55, 62-69, 71, 72, 74, 76, 77, 80
C. lunulatus Quoy and Gaimard, 1824	2000 Expedition. as *C. trifasciatus*	Moderately common.	3, 7, 24, 25, 27, 30, 32-34, 38-43, 46, 55, 69, 71, 73, 74, 76, 77
C. meyeri Schneider, 1801	Schultz, 1943; 2000 Expedition.	Common.	1, 2, 6, 7, 14, 15, 18-25, 27, 30-34, 38-43, 46, 50, 62-69, 71, 76, 80
C. ornatissimus Cuvier, 1831*	Schultz, 1943; 2000 Expedition.	Common.	1-8, 14, 15, 17-23, 25, 27, 30-34, 38-43, 46, 50, 62-69, 76, 80
C. pelewensis Kner, 1867	2000 Expedition.	Occasional.	3, 4, 6, 18, 19, 25, 34, 41, 64, 67, 69, 71, 76, 80
C. punctatofasciatus Cuvier, 1831	Schultz, 1943; 2000 Expedition.		
C. quadrimaculatus Gray, 1831*	Schultz, 1943; 2000 Expedition.	Occasional.	1-5, 7, 8, 14, 15, 17-24, 32, 34, 38, 63-69, 71
C. reticulatus Cuvier, 1831*	2000 Expedition.	Occasional.	1-8, 15, 17-19, 22, 23, 65, 67-69, 71, 76, 80
C. semion Bleeker, 1855	2000 Expedition.	Rare, less than 10.	3, 11, 68, 69, 74, 77

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
C. trifascialis Quoy and Gaimard, 1824	Schultz, 1943; 2000 Expedition.	Generally scarce, but common at Kanton lagoon.	1, 2, 6, 7, 15, 23-27, 30-35, 38-43, 46, 50, 52, 54, 55, 73
C. ulietensis Cuvier, 1831*	2000 Expedition.	Common.	1-8, 11, 15, 17-25, 27, 30-34, 38-40, 42, 43, 46, 52, 54, 62-69, 71, 72-74, 77, 80
C. unimaculatus Bloch, 1787*	2000 Expedition.	Occasional.	3, 15, 19, 21-23, 39, 41, 65-67
C. vagabundus Linneaeus, 1758	2000 Expedition.	Occasional.	1, 2, 7, 24, 27, 32, 34, 38, 43, 50, 54, 68
Forcipiger flavissimus Jordan and McGregor, 1898	2000 Expedition.	Common.	1-8, 14, 15, 17-25, 27, 30-33, 38-43, 46, 50, 54. 55, 62-69, 71, 80
F. longirostris (Broussonet, 1782)*	2000 Expedition.	Occasional.	1, 2, 8, 15, 66
Hemitaurichthys thompsoni Fowler, 1923*	New record.	Locally common on steep dropoffs.	4, 6, 8, 14, 18, 19, 21-23, 32, 62, 68, 76
Heniochus acuminatus (Linnaeus, 1758)*	2000 Expedition.	Moderately common.	24, 25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54, 55
H. chrysostomus Cuvier, 1831*	2000 Expedition.	Moderately common.	23, 25, 27, 31-34, 38, 41-43, 46, 50, 54, 62, 64, 67-69, 71, 76, 80
H. monoceros Cuvier, 1831*	2000 Expedition.	Occasional.	1, 2, 5, 7, 15, 21, 25, 32, 34, 41-43, 67-69, 71, 80
H. varius (Cuvier, 1829)*	2000 Expedition.	Occasional.	1-3, 7, 23, 25, 31-34, 38, 39, 41-43, 50, 62, 68, 71, 80
POMACANTHIDAE			
Apolemichthys griffisi Carlson & Taylor, 1981)*	2000 Expedition.	Common.	1-8, 14, 15, 17-23, 25, 27, 32, 34, 38, 41, 43, 46, 62-69, 71, 76, 80
A. xanthopunctatus Burgess, 1974*	New record.	Occasional.	8, 15, 24, 27, 33, 34, 39, 42, 65
Centropyge bicolor (Bloch, 1798)	2000 Expedition.	Rare, only a few seen on one dive.	24
C. bispinosa (Günther, 1860)	2000 Expedition.		
C. flavicauda Fraser-Brunner, 1933	Schultz, 1943; 2000 Expedition.	Seen at only 2 sites, but locally common.	50, 62
C. flavissima (Cuvier, 1831)	2000 Expedition.	Abundant	1-5, 7, 8, 14, 15, 17-27, 30-34, 38, 39, 41-43, 46, 50, 54, 63-69, 71, 73, 76, 80
C. heraldi Woods & Schultz, 1953	New record.	Occasional, usually below 30 m.	6, 18, 34, 62, 71, 80
C. loricula (Günther, 1874)*	2000 Expedition.	Abundant.	1-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 61-69, 71, 76, 80
C. multicolour Randall & Wass, 1974	New record.	Rare, only 3 seen in 55 m.	68
C. nigriocella Schultz, 1953	2000 Expedition.		
Paracentropyge multifasciatus (Smith & Radcliffe, 1911)*	2000 Expedition.	Moderately common, usually below 20 m.	1, 2, 6, 7, 21, 23, 25, 27, 31, 38, 43, 46, 63, 65, 66-68, 71, 76, 80
Pomacanthus imperator (Bloch, 1787)*	2000 Expedition.	Occasional.	14, 15, 18-23, 27, 30-34, 38, 39, 41, 42, 50, 55, 62-67
Pygoplites diacanthus (Boddaert, 1772)*	2000 Expedition.	Rare.	6, 24, 25, 33, 43, 72
Abudefduf notatus (Day, 1869)*	New record.	Occasional.	10, 18, 20, 38, 52
A. septemfasciatus (Cuvier, 1830)*	Schultz, 1943.	Occasional in shallow surge zone.	10, 52, 54
A. sexfasciatus Lacepède, 1802	Schultz, 1943.		

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
A. sordidus (Forsskäl, 1775)*	Schultz, 1943.	Occasional in shallow surge zone.	21, 23, 52, 54, 68
Abudefduf vaigiensis (Quoy & Gaimard, 1825)*	New record.	Occasional on windward slopes.	3, 19, 21, 66, 67
Amphiprion chrysopterus Cuvier, 1830*	2000 Expedition.	Common.	1. 2, 5, 6, 14, 21, 23, 25, 27, 31-34, 38-40, 42, 43, 46, 62, 64-69, 76
A. perideraion Bleeker, 1855*	2000 Expedition.	Common only at Nikumaroro.	1, 6, 8
Chromis acares Randall & Swerdloff, 1973	2000 Expedition.	Abundant.	1-8, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 62-69, 71, 76, 79, 80
C. agilis Smith, 1960	New record.	Occasional.	1, 2, 4, 6, 7, 15, 17-23, 27, 39, 44, 62, 67, 69
C. alpha Randall, 1988*	New record.	Moderately common below 30 m.	4, 6, 7, 14, 18, 19, 21-23, 25, 27, 32-34, 41, 43, 63, 66, 76, 80
C. atripes Fowler & Bean, 1928*	New record.	Rare, about 5 seen.	67
C. caudalis Randall, 1987*	New record.	Abundant below 15 m.	1, 2, 6, 14, 21, 23, 25, 27, 31-34, 38-40, 42, 43, 46, 62-69, 71, 76, 80
C. lepidolepis Bleeker, 1877	New record.	Rare, only a few small groups seen.	18, 24
C. margaritifer Fowler, 1946	2000 Expedition.	Common above 15 m.	3-8, 15, 17-23, 25, 27, 31-34, 38-43, 50, 52, 54, 61-69, 71, 76, 79, 80
C. ternatensis (Bleeker, 1856)	New record.	Rare, only a few small groups seen.	24
C. vanderbilti (Fowler, 1941)	2000 Expedition.	Common.	3-8, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 62-69, 71, 76, 80
C. viridis (Cuvier, 1830)	Schultz, 1943.	Common in Kanton lagoon.	11, 24, 26, 29, 30, 35, 54, 55, 72-74, 77
C. weberi Fowler & Bean, 1928*	New record.	Rare, only one seen.	38, 54
C. xanthura (Bleeker, 1854)*	New record.	Common.	4-8, 14, 15, 17-25, 27, 31-34, 38-43, 46, 50, 54, 62-69, 71, 80
Chrysiptera albata Allen & Bailey, 2002*	New record.	Common at one site in 42-55 m.	85
C. brownriggii (Bennett, 1828)	Schultz, 1943; 2000 Expedition., as *C. leucopoma*.		1, 2, 4, 10, 14, 15, 17, 18, 21, , 27, 31-34, 38, 41, 43, 54, 62-64, 67, 68, 71, 76, 80
C. glauca (Cuvier, 1830)	Schultz, 1943.	Common in tide pools and shallow passages.	10, 11, 72, 81
Dascyllus aruanus (Linnaeus, 1758)*	Schultz, 1943.	Common around lagoon corals.	11, 24, 26, 30, 35-37, 52, 54, 55, 72-74, 77
D. auripinnis Randall & Randall, 2001*	Randall & Randall, 2001	Common.	1, 2, 4-8, 15, 17-25, 27, 31-34, 38-43, 46, 62-68, 71
Lepidozygus tapeinosoma (Bleeker, 1856)	Schultz, 1943; 2000 Expedition.	Abundant.	1-5, 8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 62-69, 71, 76, 80
Plectroglyphidodon dickii (Liénard, 1839)	Schultz, 1943; 2000 Expedition.	Common.	1-5, 7, 8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 62-69, 71, 80
P. imparipennis (Vaillant & Sauvage, 1875)	Schultz, 1943.	Moderately common in shallow surge zone.	1, 2, 4, 14, 15, 18, 21, 25, 27, 31, 32, 38, 41, 43, 62, 64, 67, 71, 76, 80

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
P. johnstonianus Fowler & Ball, 1924	2000 Expedition.	Common.	1-8, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 62-69, 71, 76, 80
P. leucozonus (Bleeker, 1859)	Schultz, 1943.	Occasional in shallow surge zone.	1, 2, 14, 18, 27, 31-34, 38, 41, 43, 52, 54, 63, 64, 80
P. phoenixensis (Schultz, 1943)	Schultz, 1943; Enderbury I. is type locality	Moderately common in shallow surge zone.	3, 4, 15, 17, 18, 21, 23, 27, 31, 41, 43, 54, 62-64, 66, 67, 69, 76, 80
Pomacentrus coelestis Jordan & Starks, 1901	New record.	Moderately common.	4, 5, 18, 19, 21, 23, 27, 41, 50, 52, 54, 62, 64, 67, 68, 71, 76
P. pavo (Bloch, 1878)*	Schultz, 1943; 2000 Expedition.	Common in lagoons.	10, 26, 28-31, 34, 36-38, 52, 54, 55, 63, 72-74, 77, 80
Stegastes albifasciatus (Schlegel and Müller, 1839)*	Schultz, 1943.	Occasional.	10, 11, 24, 26, 30, 52, 54, 67, 72
S. aureus (Fowler, 1927)*	Schultz, 1943; 2000 Expedition.	Moderately common just below surge zone.	1-5, 7, 8, 14, 15, 17-23, 25, 27, 31-34, 38, 41-43, 46, 50, 62-64, 66-69, 71, 76, 80
S. fasciolatus (Ogilby, 1889)	New record.	Moderately common just below surge zone.	1, 2, 4, 7, 8, 14, 15, 17, 18, 20-23, 25, 27, 31-34, 38, 41, 43, 54, 62-65, 67-69, 71, 76, 80
S. nigricans (Lacepède, 1802)*	Schultz, 1943.	Moderately common in lagoons.	11, 24, 26, 30, 37, 54, 55, 72-74, 77
LABRIDAE			
Anampses caeruleopunctatus Rüppell, 1828	Schultz, 1943.	Occasional.	1, 2, 5, 8, 15, 34, 38, 39, 41, 43, 62, 64, 67, 68, 71, 76
A. melanurus Bleeker, 1857	New record.	Rare, only a few seen.	18, 38, 46, 63, 66
A. meleagrides Valenciennes, 1839*	New record.	Occasional.	21-23, 25, 34, 38, 39, 47, 65, 67, 71, 80
A. twistii Bleeker, 1857	New record.	Moderately common.	1-3, 5, 6, 8, 14, 18, 19, 21-23, 25, 27, 32, 38, 41, 42, 46, 50, 64-69, 71, 76, 80
Bodianus anthioides (Bennett, 1831)*	New record.	Rare, only one seen.	80
B. axillaris (Bennett, 1831)*	2000 Expedition.	Occasional.	7, 18, 22-25, 33, 34, 42, 46, 66-68
B. diana (Lacepède, 1802)*	New record.	Occasional.	1, 2, 6, 7, 25, 27, 31-34, 38, 41, 42, 46, 50, 62-65
B. loxozonus (Snyder, 1908)*	New record.	Rare.	8, 14, 15, 18, 20, 41, 68
B. prognathus Lobel, 1981*	New record.	Generally rare, but several seen at Birnie and Enderbury.	64-68, 76
Cheilinus oxycephalus Bleeker, 1853*	New record.	Occasional.	19, 33, 39, 46, 65, 68, 71, 80
C. undulatus Rüppell, 1835*	Schultz, 1943.	Common.	1-3, 5, 7, 8, 14, 15, 17-25, 27, 30-34, 38-43, 46, 50, 52, 54, 55, 63-69, 71, 72-74, 76, 77, 80
Cirrhilabrus exquistius Smith, 1957	New record.	Occasional, but locally common.	4, 5, 23, 24, 33, 38, 50, 52, 54, 62, 71, 76
Coris aygula Lacepède, 1801*	Schultz, 1943; 2000 Expedition.	Occasional.	4, 18-25, 27, 33, 34, 50, 54, 62, 67-69, 71, 80
Coris centralis Randall, 1999*	New record.	Occasional.	18, 21, 23-25, 27, 31-34, 38, 39, 41-43, 46, 66-68, 71
C. gaimardi (Quoy & Gaimard, 1824)	New record.	Moderately common.	1-7, 14, 15, 17-25, 27, 31-34, 38, 41-43, 46, 50, 54, 62-69, 71, 76, 80
Cymolutes praetextatus (Quoy & Gaimard, 1834)	Schultz, 1943.	Rare, only seen at one site by S. Bailey	52

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Epibulus insidiator (Pallas, 1770)	Schultz, 1943.	Moderately common.	24, 25, 30-34, 38, 39, 41-43, 46, 50, 54, 55, 62, 68, 69, 71, 72-74, 76, 77, 80
Gomphosus varius Lacepède, 1801*	Schultz, 1943.	Common.	1-8, 14, 15, 17-25, 27, 30-34, 38, 39, 41-43, 46, 50, 54, 55, 62-69, 71, 72, 74, 76, 80
Halichoeres chrysus Randall, 1981	New record.	Rare.	24, 27, 42
H. hortulanus (Lacepède, 1802)	Schultz, 1943; 2000 Expedition.	Common.	1-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 52, 54, 62-69, 71, 76, 80
H. margaritaceus (Valenciennes, 1839)	Schultz, 1943.	Occasional.	15, 21, 67
H. melasmopomus Randall, 1980*	2000 Expedition.	Moderately common.	3, 4, 6, 14, 15, 19, 21-23, 25, 27, 32-34, 38, 39, 41-43, 46, 62-69, 71, 76, 80
H. ornatissimus (Garrett, 1863)	2000 Expedition.	Common.	1-8, 14, 15, 17-19, 21-25, 27, 31-34, 38, 39, 41-43, 46, 50, 52, 54, 62-69, 71, 76, 80
H. pallidus Kuiter & Randall, 1994*	New record.	Rare, about 8 seen below 40 m.	38, 46
H. trimaculatus (Quoy & Gaimard, 1834)	Schultz, 1943.	Occasional, mainly in lagoons.	11, 18, 21, 23, 24, 26, 29, 30, 36, 37, 52, 54, 55, 67, 68, 72-74, 77
Hemigymnus fasciatus Bloch, 1792	2000 Expedition.	Moderately common.	1-7, 14, 15, 17-19, 21-25, 27, 30-34, 39, 42, 43, 46, 62, 64-69, 71, 76, 80
H. melapterus (Bloch, 1791)	New record.	Occasional.	32. 50, 52, 72-74, 76, 77
Hologymnosus doliatus (Lacepède, 1801)	New record.	Rare.	27, 50
Labroides bicolor Fowler & Bean, 1928	New record.	Moderately common.	4, 6, 14, 18, 20-25, 30-34, 38, 39, 43, 46, 50, 62, 65-69, 71, 72, 76, 77, 79, 80
L. dimidiatus (Valenciennes, 1839)*	Schultz, 1943; 2000 Expedition.	Moderately common.	3-8, 14, 15, 17, 18, 20-25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54, 55, 62-69, 71, 72, 76, 80
L. rubrolabiatus Randall, 1958	2000 Expedition.	Common.	1-8, 14, 15, 17-25, 27, 31-34, 39, 41-43, 46, 50, 54, 62-69, 71, 76, 80
Labropsis polynesica Randall, 1981	New record..	Rare, one male seen.	64
L. xanthonota Randall, 1981	New record.	Moderately common.	1-3, 5, 14, 18, 21-25, 27, 32-34, 38, 39, 41-43, 46, 65-69, 71, 76, 80
Macropharyngodon meleagris (Valenciennes, 1839)	Schultz, 1943.	Moderately common.	1, 2, 4, 14, 15, 19, 21-25, 31, 34, 38, 41-43, 54, 62, 63, 65, 67-69, 71, 76, 80
Novaculichthys taeniourus (Lacepède, 1802)	Schultz, 1943; 2000 Expedition.	Occasional.	4, 15, 18, 24, 27, 30, 38, 42, 54, 67, 76, 80
Oxycheilinus arenatus (Valenciennes, 1840)*	New record.	Rare, only one seen.	21
O. unifasciatus (Streets, 1877)*	2000 Expedition.	Moderately common.	1-4, 6-8, 14, 15, 17-23, 25, 27, 31, 33, 34, 41-43, 46, 62, 63, 65-69, 71, 76, 80
Pseudocheilinus evanidus Jordan & Evermann, 1903	New record.	Rare.	24, 41

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
P. hexataenia (Bleeker, 1857)	Randall, 1999	Moderately common.	1-3, 7, 14, 21-25, 27, 31-34, 38, 39, 41-43, 46, 55, 63-69, 71, 76, 79, 80
P. ocellatus Randall, 1999*	New record.	Occasional, usually below 40 m.	14, 25, 68, 76, 79
P. octotaenia Jenkins, 1900	2000 Expedition.	Common.	3, 4, 6, 7, 14, 15, 17-20, 22, 23, 25, 27, 31-34, 38, 39, 41-43, 46, 62-69, 71, 76, 79, 80
P. tetrataenia Schultz, 1969	New record.	Occasional.	15, 17, 18, 42, 66, 76
Pseudodax moluccensis (Valenciennes,1839)	New record.	Occasional.	6, 15, 17-19, 21, 23, 25, 31, 34, 38, 42, 43, 66-68
Stethojulis bandanensis (Bleeker, 1851)	Schultz, 1943.	Occasional.	21, 34, 36, 54, 64, 67, 68, 71,
S. strigiventer (Bennett, 1833)	Randall, 2000		
Thalassoma amblycephalum (Bleeker, 1856)	Schultz, 1943.	Common.	1, 2, 4, 15, 17-21, 23-25, 27, 31-33, 38, 39, 41-43, 46, 50, 52, 54, 62-65, 67-69, 71, 72, 74, 76, 80
T. hardwicke (Bennett, 1828)	Schultz, 1943.	Rare, except Orona lagoon.	30, 72, 73, 74
T. lunare (Linnaeus,1758)*	New record.	Occasional.	11, 24, 26, 30, 50, 52, 54, 55, 66-68, 72
T. lutescens (Lay & Bennett, 1839)*	Schultz, 1943.	Rare, less than 10 seen.	33, 65, 67
T. purpureum (Forsskål, 1775)	Schultz, 1943.	Moderately common in shallow surge zone.	1, 3, 7, 18, 20, 21, 25, 27, 31, 32, 41, 43, 46, 54, 62, 63, 66-68, 80
T. quinquevittatum (Lay & Bennett, 1839)	New record.	Common.	1-4, 6-8, 14, 15, 17-23, 25, 27, 31-34, 38, 41, 43, 46, 50, 54, 62-69, 71, 72, 74, 76, 80
T. trilobatum (Lacepède 1801)	New record.	Occasional in shallow surge zone.	27, 31, 32, 41, 43, 62, 64, 67, 68
Wetmorella nigropinnata (Seale, 1900)	New record.	Three specimens collected with rotenone.	44
SCARIDAE			
Bulbometopon muricatum (Valenciennes, 1840)*	New record.	Generally rare, but common at Orona.	33, 68, 69, 71, 72, 74, 76, 80
Calotomus carolinus (Valenciennes, 1839)	New record.	Occasional.	3-6. 15, 19, 23, 62, 64, 65, 69, 76, 80
Cetoscarus bicolor (Rüppell, 1828)*	Schultz, 1943.	Occasional.	8, 30, 71, 80
Chlorurus frontalis Valenciennes, 1839	New record.	Rare, only 5 seen.	80
C. microrhinos (Bleeker, 1854)*	Schultz, 1943.	Common.	1-8, 14, 15, 17-25, 27, 28, 30-34, 38-43, 46, 50, 54, 62-64, 66-69, 71, 72, 74, 76, 80
C. sordidus (Forsskål, 1775)	2000 Expedition.	Common.	3, 5, 7, 24, 25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54, 55, 67, 68, 71, 76, 80
Hipposcarus longiceps (Bleeker, 1862)*	2000 Expedition.	Abundant in passage at Kanton.	3, 8, 24-27, 30-34, 39, 42, 43, 46, 50, 52, 54, 55, 67, 68, 71, 73, 74, 76, 77, 80
Leptoscarus vaigiensis (Quoy & Gaimard, 1824)	Schultz, 1943.		
Scarus altipinnis (Steindachner, 1879)*	New record.	Common at Kanton.	24, 30-34, 38, 39, 41, 43, 50, 52, 54, 67
S. frenatus Lacepède, 1802	Schultz, 1943.	Moderately common.	3, 14, 15, 18, 21, 24, 25, 30, 32-34, 38, 39, 42, 43, 46, 54, 62, 64, 66-68, 71, 76, 80

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
S. ghobban Forsskål, 1775	Schultz, 1943.	Common.	1-7, 24-28, 30-32, 34, 37-39, 42, 43, 50, 52, 54, 55, 68, 69, 71-74, 76, 77, 80
S. oviceps Valenciennes, 1839	New record.	Moderately common.	7, 24, 25, 27, 30-34, 38, 39, 41-43, 46, 50, 54, 55, 71, 74, 76
S. psittacus Forsskål, 1775	Schultz, 1943.	Occasional.	3, 11, 24, 54, 55
S. rubroviolaceus Bleeker, 1849	New record.	Moderately common.	1-8, 14, 15, 17-25, 27, 30-34, 38, 39, 41-43, 46, 50, 52. 54, 62-69, 71, 76, 80
S. tricolor Bleeker, 1847*	New record.	Moderately common.	1-3, 6, 7, 14, 15, 17-24, 27, 31-34, 38, 41-43, 46, 62-69, 71, 76, 80
PINGUIPEDIDAE			
Parapercis lata Randall & McCosker, 2002*	Schultz, 1943 and 2000 Expedition. as *P. tetracanthus.*	Occasional.	23, 24, 27, 32, 38, 41, 50, 62, 64
Parapercis millepunctata (Günther, 1860)*	2000 Expedition.	Occasional.	25, 38, 41, 54, 67
P. schauinslandi (Steindachner, 1900)	New record.	Occasional.	24, 38, 41, 43
CREEDIIDAE			
Chalixodytes tauensis Schultz, 1943	New record.	Collected with rotenone.	17
Crystallodytes cookei Fowler, 1923	Schultz, 1943.		
TRIPTERYGIIDAE			
Enneapterygius minutus (Günther, 1877)	2000 Expedition.		
E. nigricauda Fricke, 1997	2000 Expedition.	Collected with rotenone.	6
E. tutuilae Jordan & Seale, 1906	2000 Expedition.	Collected with rotenone.	17, 20, 44, 61, 64, 79
Helcogramma capidatum Rosenblatt, 1960	2000 Expedition.	Collected with rotenone.	17, 20, 44
H. chica Rosenblatt, 1960	2000 Expedition.		
H. hudsoni (Jordan & Seale, 1906)	Schultz, 1943.		
BLENNIIDAE			
Aspidontus taeniatus Quoy & Gaimard, 1834	New record.	Occasional.	46, 64, 66, 67, 69
Blenniella caudolineata (Günther, 1877)*	New record.	Collected with rotenone.	10
B. gibbifrons (Quoy & Gaimard, 1824)	Schultz, 1943; 2000 Expedition.		
B. paula (Bryan & Herre, 1903)*	Schultz, 1943.	Collected with rotenone.	10, 81
Cirripectes auritus Carlson, 1981	2000 Expedition.		
C. jenningsi Schultz, 1943	2000 Expedition.		
C. polyzona (Bleeker, 1868)	Schultz, 1943.	Rare, only one seen.	38
C. quagga (Fowler & Ball, 1924)	2000 Expedition.		
C. variolosus (Valenciennes, 1836)	Schultz, 1943; 2000 Expedition.	Common.	1-4, 8, 14, 15, 18, 20, 21, 23-25, 27, 28, 32-34, 38, 39, 41-43, 62, 64-67, 69, 71, 76, 79, 80
Ecsenius midas Starck, 1969	2000 Expedition.		

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Entomacrodus caudofasciatus (Regan, 1909)*	Springer, 1967		
E. cymatobiotus Schultz & Chapman, 1960	Springer, 1967		
E. sealei Byan & Herre, 1903	Springer, 1967		
E. striatus (Quoy and Gaimard, 1836)	Schultz, 1943.		
E. thalassinus (Jordan & Seale, 1906)	Schultz, 1943.		
Exallias brevis (Kner, 1868)	New record.	Rare, only a few seen.	5, 27, 62
Istiblennius edentulus Bloch and Schneider, 1801*	Schultz, 1943.	Common in intertidal.	10, 81
I. lineatus (Valenciennes, 1836)*	Schultz, 1943.	Common in intertidal.	10, 81
Petroscirtes xestus Jordan & Seale, 1906	Schultz, 1943 as *P. mitratus*		
Plagiotremus rhinorhynchus (Bleeker, 1852)	2000 Expedition.	Rare, only two seen and one collected.	32, 79
P. tapeinosoma (Bleeker, 1857)	2000 Expedition.		
Rhabdoblennius rhabdotrachelus (Fowler & Ball, 1934)	Schultz, 1943.		
R. snowi (Fowler, 1928)	New record.	Common in intertidal.	10, 81
CALLIONYMIDAE			
Callionymus simplicornis Valenciennes, 1837	New record.	Collected with quinaldine.	29, 36
Synchiropus morrisoni Schultz, 1960	New record.	Rare, only one seen.	38
GOBIIDAE			
Amblygobius nocturnus (Herre, 1945)	New record.	Moderately common in Kanton lagoon.	26, 29, 36
A. phalaena (Valenciennes, 1837)	Schultz, 1943; 2000 Expedition.	Occasional.	26, 28, 29, 35-37, 52, 72-74, 77
Asterropteryx semipunctatus Rüppell, 1830	New record.	Occcasional in lagoons.	11, 26, 37, 52
Bathygobius coalitus (Bennett, 1832)*	New record.	Collected with rotenone.	81
B. cotticeps (Steindachner, 1880)	New record.	Collected with rotenone.	10
Cabillus tongarevae (Fower, 1927)	Schultz, 1943.		
Callogobius hasselti (Bleeker, 1851)?	New record.	Collected with rotenone.	17
C. plumatus (Smith, 1959)	2000 Expedition.	Collected with rotenone.	64
C. sclateri (Steindachner, 1880)	2000 Expedition.	Collected with rotenone.	17, 44, 61, 64
Ctenogobiops sp.	2000 Expedition.		24, 26, 37, 52
Eviota cometa Jewett & Lachner, 1983	Jewett & Lachner, 1983	Common in lagoon at Kanton & Orona.	29, 36, 37, 55, 72-74, 77
E. latifascata Jewett & Lachner, 1983	New record.	Common; collected with rotenone.	17, 20, 31, 44, 61, 64
E. prasites Jordan & Seale, 1906	Schultz, 1943.		
E. sp. 1	New record.	Collected with rotenone.	17, 20, 79

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
E. sp. 2*	New record.	Collected with rotenone.	17, 20, 31, 55, 61, 79
E. zonura Jordan & Seale, 1906	Schultz, 1943.	Collected with rotenone.	6, 81
Fusigobius neophytus (Günther, 1877)	Schultz, 1943.	Rare in lagoons.	30, 74
Gnatholepis anjerensis Bleeker, 1851	Schultz, 1943.		
G. cauerensis Bleeker, 1853	2000 Expedition.	Common on fines sand bottoms.	11, 15, 18, 24-26, 28-31, 38, 40, 46, 52, 54, 55, 61, 62, 64, 67, 68, 72-74, 77, 79
Gobiopsis exigua Lachner & McKinney, 1983*	New record.	Collected with rotenone.	61
Lotilia gracillosa Klausewitz, 1960	New record.	One photgraphed by M.J. Adams	43
Macrodontogobius wilburi Herre, 1936	Schultz, 1943.	Occasional in lagoons.	26, 29, 72, 73
Oplopomus diacanthus Schultz, 1943	Kanton I. is type locality	Occasional in lagoons.	11, 29, 37
Oplopomus oplopomus Valenciennes, 1837	New record.	Occasional in lagoons.	29, 37, 72
Oxyurichthys papuensis (Valenciennes, 1837)	Schultz, 1943.		
Paragobiodon modestus (Regan, 1908)	Schultz, 1943; 2000 Expedition.		
Pleurosicya micheli Fourmanoir, 1971*	New record.	Collected with rotenone.	55
Priolepis ailina Winterbottom & Burridge, 1993*	New record.	Collected with rotenone.	64
P. cincta (Regan, 1908)	Schultz, 1943.		17
P. nocturna (Smith, 1957)	Schultz, 1943.		
P. semidoliatus (Valenciennes, 1837)	Schultz, 1943.	One specimen collected with rotenone.	81
Sueviota sp.*	New record.	Collected with rotenone.	20, 39, 55, 61, 79
Trimma sostra Winterbottom, 2004	New record.	Collected with rotenone.	32, 34, 38, 39, 41, 44, 76
Trimma squamicana Winterbottom, 2004*	New record.	Collected with rotenone.	6, 17, 20, 27, 32, 34, 38, 39, 41, 44, 55, 61, 64, 79
Trimmatom eviotops (Schultz, 1945)*	New record.	Collected with rotenone.	20
Valenciennea strigata (Broussonet, 1782)	New record.	Occasional.	15, 21, 23, 52, 62
PTERELEOTRIDAE			
Nemateleotris decora Randall & Allen, 1973*	New record.	Rare, one seen in 42 m.	46
Ptereleotris evides (Jordan & Hubbs, 1925)	New record.	Rare, only 3 seen on one dive	33
P. heteroptera (Bleeker, 1855) 18 m	New record.	Rare, only 2 seen.	62
P. microlepis Bleeker, 1856	Schultz, 1943.	Occasional.	26, 73, 74
P. zebra (Fowler, 1938)	New record.	Occasional.	4, 15, 27, 52, 68
EPHIPPIDAE			
Platax orbicularis (Forsskål, 1775)*	New record.	Rare, only 2 seen.	63
P. teira (Forsskål, 1775)	New record.	Rare,less than 10 seen.	25, 30, 65

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
SIGANIDAE			
Siganus argentatus (Quoy & Gaimard, 1925)	New record.	Occasional.	25, 27, 33
ZANCLIDAE			
Zanclus cornutus Linnaeus, 1758	2000 Expedition.	Common.	1-8, 14, 15, 17-25, 27, 30-34, 38-43, 46, 50, 54, 55, 62, 64-69, 71, 76, 80
ACANTHURIDAE			
Acanthurus achilles Shaw, 1803*	Schultz, 1943.	Common.	1-4, 6, 7, 15, 17-23, 25, 32-34, 38, 41, 62-64, 66-69, 71, 72, 76, 80
A. blochi Valenciennes, 1835*	New record.	Occasional.	5, 18, 24, 28, 30, 34, 38, 52, 68, 74
A. guttatus Bloch & Schneider, 1801	Schultz, 1943; 2000 Expedition.	Common.	1, 2, , 4, 6, 7, 15, 18, 20, 21, 27, 31, 38, 43, 54, 62-65, 67, 68, 71, 80
A. leucocheilus Herre, 1927*	New record.	Occasional.	21, 30-32, 34, 38, 41-43, 46, 50, 54, 55, 62-64
A. lineatus (Linnaeus, 1758)*	Schultz, 1943; 2000 Expedition.	Common.	1-4, 6-8, 14, 15, 17-25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 62-64, 66-69, 71, 80
A. maculiceps (Ahl, 1923)	New record.	Rare, only 5 seen.	23, 41
A. mata (Cuvier, 1829)	New record.	Occasional.	1, 2, 15, 46
A. nigricans (Linnaeus, 1758)	Schultz, 1943; 2000 Expedition.	Common.	1-5, 7, 8, 14, 15, 17-25, 27, 30-34, 38, 39, 41-43, 46, 50, 54, 62-69, 71, 74, 76, 80
A. nigricaudus Duncker & Mohr, 1929	New record.	Moderately common.	1, 2, 7, 15, 18, 20-22, 24-27, 30-33, 41, 43, 46, 50, 52, 55, 67, 68, 71, 76, 80
A. nigrofuscus (Forsskål, 1775)	2000 Expedition.	Occasional.	7, 27, 31, 34, 67, 68, 76, 80
A. nigroris Valenciennes, 1835*	Randall, 1956;	Moderately common.	1, 2, 4, 6, 7, 15, 17, 19-21, 23-25, 27, 30, 31, 34, 38, 39, 41-43, 50, 67, 68, 71, 76, 80
A. nubilus (Fowler & Bean, 1929)*	New record.	Rare, only one seen.	23
A. olivaceus Bloch and Schneider, 1801	2000 Expedition.	Moderately common.	5, 7, 15, 17-25, 27, 30, 32-34, 38, 50, 52, 54, 62, 67-69, 71, 76, 80
A. pyroferus Kittlitz, 1834*	New record.	Occasional.	14, 15, 19, 21, 68
A. thompsoni (Fowler, 1923)	New record.	Moderately common.	3, 4, 6, 7, 14, 15, 8, 19, 21-23, 25, 27, 32, 38, 39, 41, 43, 46, 62-69, 76, 80
A. triostegus (Linnaeus, 1758)*	Schultz, 1943; 2000 Expedition.	Abundant	1-7, 14, 15, 17-21, 23-27, 31-34, 36, 38; 40, 42, 43, 46, 50, 52, 67-69, 71, 80, 81
A. xanthopterus Valenciennes, 1835*	New record.	Abundant	1, 2, 4-7, 10, 11, 15, 20-28, 30-35, 38-43, 46, 50, 52, 54, 55, 62-69, 71, 72-74, 76, 77, 80
C. cyanocheilus Randall & Clements, 2001*	Schultz, 1943; 2000 Expedition.	Common.	3-8, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 55, 62-69, 71, 76, 80
C. flavicauda Fowler, 1938*	New record.	Moderately common.	1, 2, 5, 6, 8, 14, 15, 18-23, 25, 27, 31-34, 38-43, 46, 62-69, 71, 76, 80
C. marginatus (Valenciennes, 1835)*	2000 Expedition.; Randall & Clements, 2001	Abundant	1-8, 14, 15, 17-25, 27, 30-34, 38-43, 46, 50, 54, 62-69, 71, 76, 80
C. striatus (Quoy & Gaimard, 1825)	Randall & Clements, 2001	Occasional.	1, 2, 24, 25, 27, 30-35, 38, 39, 41-43, 46, 50, 52, 54, 55, 68, 69, 71, 72

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Naso annulatus (Quoy & Gaimard, 1825)	New record.	Rare, only one seen.	24
N. brevirostris (Valenciennes, 1835)	New record.	Occasional.	5, 8, 24, 25, 30-34, 38, 39, 41-43, 46, 50, 63, 65, 66, 71, 80
N. caesius Randall & Bell, 1992*	New record.	Rare, one photographed.	67
N. hexacanthus (Bleeker, 1855)	New record.	Occasional.	1-3, 5, 6, 14, 15, 19, 23, 32, 40, 42, 64, 65, 67
N. lituratus (Bloch & Schneider, 1801)	New record.	Common.	1-8, 14, 15, 17, 18, 20, 22, 23, 25, 27, 30-34, 38, 39, 41-43, 46, 50, 52, 54, 55, 63, 64, 66-69, 71, 76, 80
N. unicornis (Forsskål, 1775)	New record.	Rare, less than 10 seen.	7
N. vlamingii Valenciennes, 1835*	2000 Expedition.	Common.	1, 2, 5, 6, 14, 15, 19, 22-25, 27, 31, 32, 34, 38, 40, 43, 46, 62-65, 67, 69, 71
Paracanthurus hepatus (Linnaeus, 1766)	New record.	Occasional.	7, 42, 68, 80
Zebrasoma rostratum Günther, 1875*	New record.	Moderately common.	1-8, 14, 15, 17, 19, 20, 22, 31, 32, 43, 46, 64-66, 69, 76, 80
Z. scopas Cuvier, 1829	2000 Expedition.	Common.	1-8, 14, 15, 17-22; 24, 25, 27, 30-34, 38-43, 46, 50, 54, 55, 62-69, 71, 76, 80
Z. veliferum Bloch, 1797	Schultz, 1943.	Common.	1, 2, 7, 24-27, 30, 31, 33, 34, 38-43, 46, 54, 55, 68, 69, 71, 72-74, 76, 77, 80
SPHYRAENIDAE			
Sphyraena acutipinnis Day, 1876*	New record.	Occasional large schools.	27, 40, 43, 69
S. barracuda (Walbaum, 1792)	Schultz, 1943.	Moderately common.	1, 2, 3, 7, 14, 15, 21, 23, 24, 26, 31, 32, 40, 41, 65-68, 71, 76, 80
S. qenie Klunzinger, 1870	New record.	Occasional large schools.	
SCOMBRIDAE			
Euthynnus affinis (Cantor, 1849)	2000 Expedition.		
Gymnosarda unicolor (Rüppell, 1838)	New record.	Rare, only a few seen.	1-3, 40, 41, 50
Thunnus albacares (Bonnaterre, 1788)	New record.	Rare, only one seen.	57
BOTHIDAE			
Bothus mancus Broussonet, 1782	Schultz, 1943.	Rare, but cryptic.	43, 52, 76
B. pantherinus (Rüppell, 1830)	Schultz, 1943.		
SOLEIDAE			
Aseraggodes melanostictus (Peters, 1876)	New record.	Collected with rotenone.	31
A, whitakeri Woods, 1966	New record.	Collected with rotenone.	64
SAMARIDAE			
Samariscus triocellatus Woods, 1966	2000 Expedition.	Collected with rotenone.	20, 62
BALISTIDAE			
Balistapus undulatus (Park, 1797)	Schultz, 1943; 2000 Expedition.	Common.	1-8, 14, 15, 17-27, 30-34, 38, 39, 41-43, 46, 50, 55, 62, 64-69, 71, 76, 79, 80
Balistoides viridescens (Bloch & Schneider, 1801)	New record.	Occasional.	1-5, 22-24, 31-34, 38, 41-43, 50, 63-69, 76, 80
Melichthys niger (Bloch, 1786)	New record.	Common.	1-8, 14, 15, 17-23, 27, 31-34, 38, 41-43, 46, 50, 62-69, 71, 76, 80
M. vidua (Solander, 1844)	New record.	Common.	1-8, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 62-69, 71, 76, 80

SPECIES	SOURCE	ABUNDANCE	SITE RECORDS
Odonus niger (Rüppell, 1837)	New record.	Moderately common, but locally abundant.	4, 14, 15, 18, 21, 23, 33, 34, 38, 41-43, 46, 62-68
Pseudobalistes flavimarginatus (Rüppell, 1829)	New record.	Occasional.	1-3, 6, 7, 14, 17, 20-24, 29-31, 33, 34, 36, 38, 41, 42, 50, 52, 54, 55, 63, 67, 68, 69, 73, 74, 77
Rhinecanthus aculeatus (Linnaeus, 1758)	Schultz, 1943.	Occasional in lagoons.	11, 26, 29, 36, 37, 52, 54, 72, 74
R. rectangulus (Bloch & Schneider, 1801)	Schultz, 1943.	Occasional in shallow surge zone.	1, 2, 6, 14, 15, 17, 18, 21, 24, 25, 27, 31, 32, 34, 38, 43, 50, 54, 62, 64, 66-69, 71, 76
Sufflamen bursa (Bloch & Schneider, 1801)	2000 Expedition.	Common.	1-7, 14, 15, 17-23, 25, 27, 31-34, 38, 39, 41-43, 46, 50, 54, 62-69, 71, 76, 80
S. chrysoptera (Bloch & Schneider, 1801)	New record.	Moderately common.	1, 15, 18, 21, 24, 25, 27, 31, 32, 38, 43, 52, 54, 62-64, 67, 68, 69
Xanthichthys auromarginatus (Bennett, 1831):	New record.	Occasional, usually below 15 m.	15, 19, 22, 23, 38, 46, 62, 64-67
X. caeruleolineatus Randall, Matsuura, & Zama, 1978*	New record.	Rare, usually below 30 m.	22, 64
MONACANTHIDAE			
Aluterus scriptus (Osbeck, 1765)	New record.	Occasional.	6, 7, 24, 31, 32, 41, 50, 64, 68
Amanses scopas (Cuvier, 1829)	New record.	Occasional.	5, 7, 8, 32, 33, 41, 46, 67
Cantherines dumerilii (Hollard, 1854)	New record.	Moderately common.	3-5, 8, 15, 21, 22, 27, 30-34, 38, 39, 42, 43, 50, 62, 64-67, 71
C. pardalis (Rüppell, 1837)	New record.	Rare, less than 10 seen.	1, 22, 63, 66
OSTRACIIDAE			
Ostracion meleagris Shaw, 1796	2000 Expedition.	Occasional.	1-3, 6, 14, 15, 17-21, 23, 27, 33, 39, 43, 62, 64-68, 76
TETRAODONTIDAE			
Arothron hispidus (Linnaeus, 1758)*	New record.	Rare, less than 10 seen.	2, 6, 29, 37, 66
A. meleagris (Lacepède, 1798)*	2000 Expedition.	Occasional, but common at site 22.	14, 21-23, 62, 64, 65, 67
A. nigropunctatus (Bloch and Schneider, 1801)	2000 Expedition.		
Canthigaster amboinensis (Bleeker, 1865)	New record.	Occasional.	3, 15, 21, 25, 62, 64, 67
C. janthinopera (Bleeker, 1855)	New record.	Occasional.	14, 17, 18, 20, 31, 43, 67
C. solandri (Richardson, 1844)	Schultz, 1943; 2000 Expedition.		
DIODONTIDAE			
Diodon holocanthus Linnaeus, 1758*	New record.	Occasional.	22, 23, 27, 64, 65, 67-69
D. hystrix Linnaeus, 1758	New record.	Occasional.	21, 32, 50, 66, 69