

Further Additions to the Fish Faunas of Lord Howe and Norfolk Islands, Southwest Pacific Ocean¹

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ABSTRACT: New fish records are reported from subtropical Lord Howe Island (34 species) and Norfolk Island (35 species). Most of the new records are based on few individuals of widespread tropical species. The new records increase the known *coastal* fish faunas to 433 species at Lord Howe Island and 254 at Norfolk Island.

LORD HOWE ISLAND (31.5° S, 159° E) and Norfolk Island (29° S, 168° E) are situated in the subtropical Southwest Pacific Ocean (see Francis 1991, fig. 1). Both islands are steep and volcanic. A coral reef 6 km long fringes about 25% of the western side of Lord Howe Island, protecting a shallow lagoon. Small patch and fringing reefs are present in some other shallow sheltered sites, but much of the rest of the coastline is rocky. Hermatypic corals are common, and 70 species have been recorded (Veron and Done 1979, Francis 1993; J. E. N. Veron, Australian Institute of Marine Science, Townsville, pers. comm.).

Norfolk Island's coastline is mainly volcanic and there are no true coral reefs. However, a limestone reef 1 km long capped by living hermatypic corals fringes about 3% of the coastline and encloses a small lagoon. Hermatypic corals are abundant both inside and outside the lagoon, but only 39 species have been recorded (Brook 1990).

Lord Howe and Norfolk islands are primarily influenced by the East Australian Current, which flows northeastward across the Tasman Sea. The hydrology of the islands is complicated by an annual north-south movement of the Tropical Convergence and intrusions of tropical water from the north. Francis

(1993) provided a detailed discussion of the hydrology of the Southwest Pacific.

Checklists of fishes from Lord Howe and Norfolk islands have been published (Allen et al. 1976, Hermes 1986), but there have been significant recent additions to both faunas (Francis 1991). Expeditions to both islands in 1988–1992 made it obvious that the faunas are still incompletely known. In this paper we report further additions to the fish faunas to provide a basis for their inclusion in a checklist of the fishes of Lord Howe, Norfolk, and Kermadec islands (Francis 1993).

MATERIALS AND METHODS

In February 1991 we spent 2 weeks diving at Norfolk Island, and in March 1991 and February 1992 J.E.R. spent a total of 2 weeks diving at Lord Howe Island. We collected fishes with spears and rotenone and by hand, and photographed fishes underwater. We were also given several photographs and specimens of other fishes by Norfolk Island residents D. F. Hoese (AMS; institutional acronyms follow Leviton et al. 1985) and N. Coleman (Springwood, Queensland, Australia). Where possible, we have included illustrations of our new records. In a few cases our photographs were not suitable for publication, but these may be viewed on request. Photographs were taken by the authors unless otherwise stated. A few of the new records are based only on underwater sightings. Photographic and sight records were identified after

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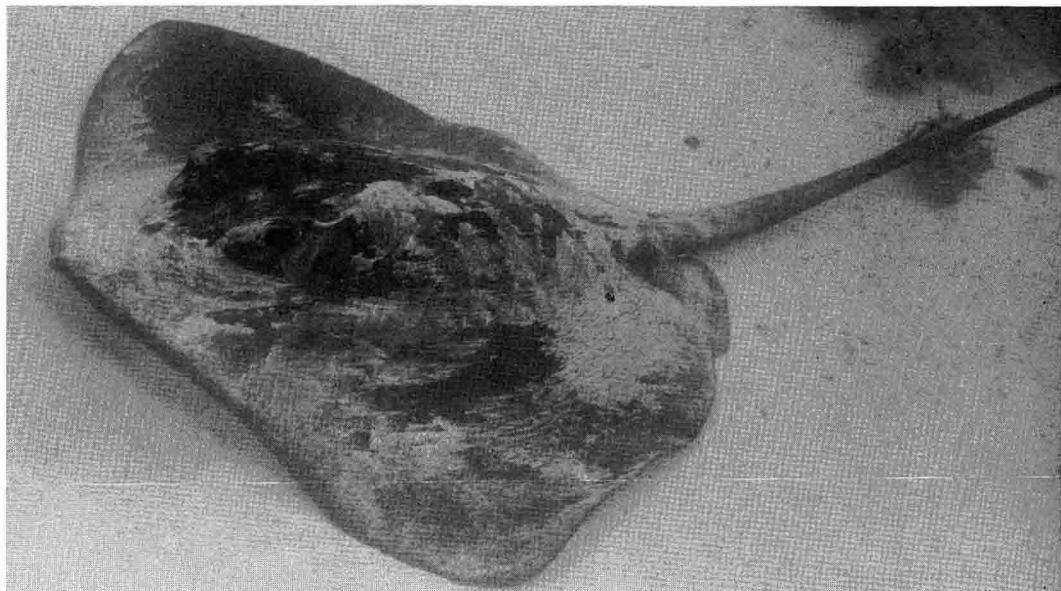


FIGURE 1. *Dasyatis thetidis*, Comet's Hole, Lord Howe I.

Randall et al. (1990a) unless otherwise stated. Total lengths of fishes seen and photographed underwater were estimated by eye. All new records were obtained during February or March 1991 unless otherwise stated. Measurements reported are total length (TL), standard length (SL), and head length (HL).

NEW RECORDS

In this paper we report 34 new fish records from Lord Howe Island and 35 new records from Norfolk Island.

LORD HOWE ISLAND

DASYATIDIDAE

Dasyatis thetidis Waite, 1899

Two rays, each about 35 cm disk length, seen in the lagoon, one in Sylph's Hole and one near Comet's Hole in 1991, and another of about 40 cm disk length in Comet's Hole

in 1992 (Figure 1). Identified by the subquadrangular shape of the disk, tail length (about twice disk length), and uniform dark gray dorsal color (Francis 1988). Recorded from South Africa, Australia, and New Zealand.

SYNODONTIDAE

Saurida gracilis (Quoy & Gaimard, 1824)

Two fish, 90 and 120 mm TL, seen at 3-m depth in Sylph's Hole (Figure 2), and another fish, 180 mm TL, seen in Comet's Hole. Two collected from Sylph's Hole in 1992 (BPBM 35021, 62–120 mm SL). Widespread in the Indo-West Pacific.

SERRANIDAE

Diplopion bifasciatum Cuvier, 1828

Two fish, 140–150 mm TL, seen in Comet's Hole (Figure 3). Widespread in the Indo-West Pacific.

Variola louti (Forsskål, 1775)

One fish photographed in Comet's Hole in December 1979 by N. Coleman (Figure 4).

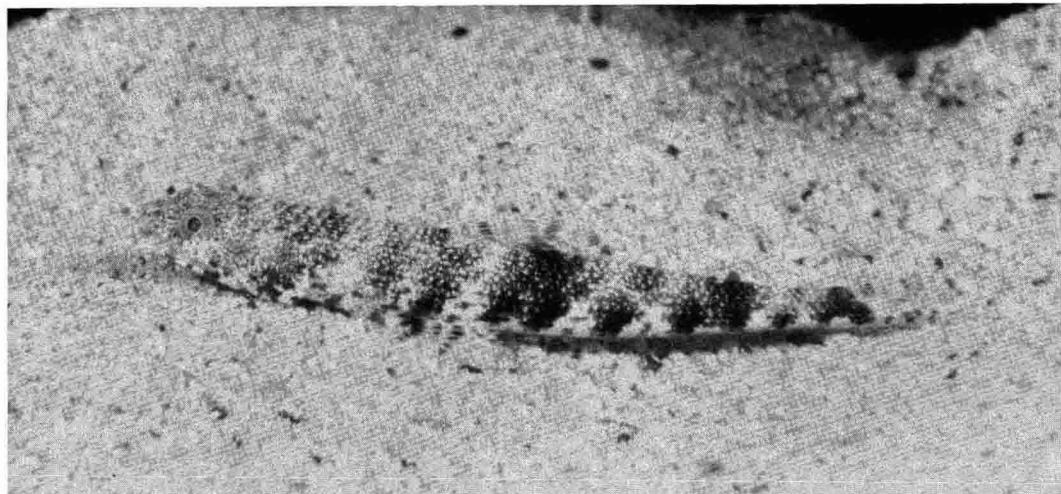


FIGURE 2. *Saurida gracilis*, Sylph's Hole, Lord Howe I.

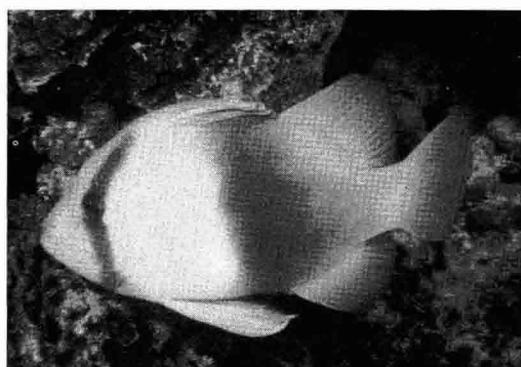


FIGURE 3. *Diplopogon bifasciatum*, Comet's Hole, Lord Howe I.

PRIACANTHIDAE

Priacanthus hamrur (Forsskål, 1775)

Several fish, 26–28 cm TL, seen in outer reef areas of the Admiralty Islands deeper than 20 m (Figure 5). Widespread in the Indo-West Pacific.

APOGONIDAE

Apogon kallopterus Bleeker, 1856

One fish, 55 mm TL, seen at night in Comet's Hole (Figure 6). Widespread in the Indo-West Pacific.

LUTJANIDAE

Aprion virescens Valenciennes, 1830

One fish, 35 cm TL, seen at 20-m depth off the west side of Roach Island. Widespread in the Indo-West Pacific.

Lutjanus fulviflamma (Forsskål, 1775)

Three fish, 25 cm TL, seen at 20-m depth off the west side of Roach Island. A similar-sized fish was seen at the same place in 1992 (Plate IA). Widespread in the Indo-West Pacific.

LETHRINIDAE

Lethrinus atkinsoni Seale, 1909

Three fish, 25 cm TL, seen at 25-m depth at Soldier's Cap Island, and one fish, 100 mm TL, seen on a weedy bottom at 3-m depth in Sylph's Hole. One fish, 18 cm TL, also seen at 3-m depth in Comet's Hole in 1992 (Plate IB). Widespread in the West Pacific.

MULLIDAE

Parupeneus barberinus (Lacepède, 1801)

Several fish, 26–28 cm TL, seen at 5-m depth in Erscott's Hole (Plate IC), and one fish, 80 mm TL, seen near Comet's Hole. Also seen in Comet's Hole and Erscott's Hole in 1992. Widespread in the Indo-West Pacific.

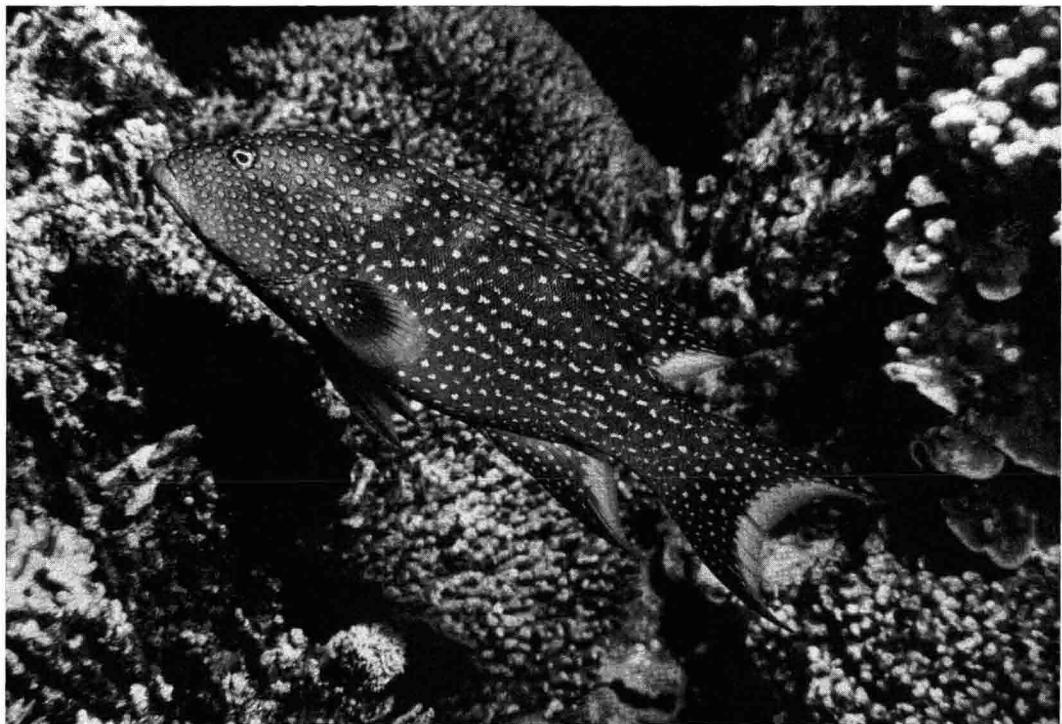


FIGURE 4. *Variola louti*, Comet's Hole, Lord Howe I. (Photo: N. Coleman.)

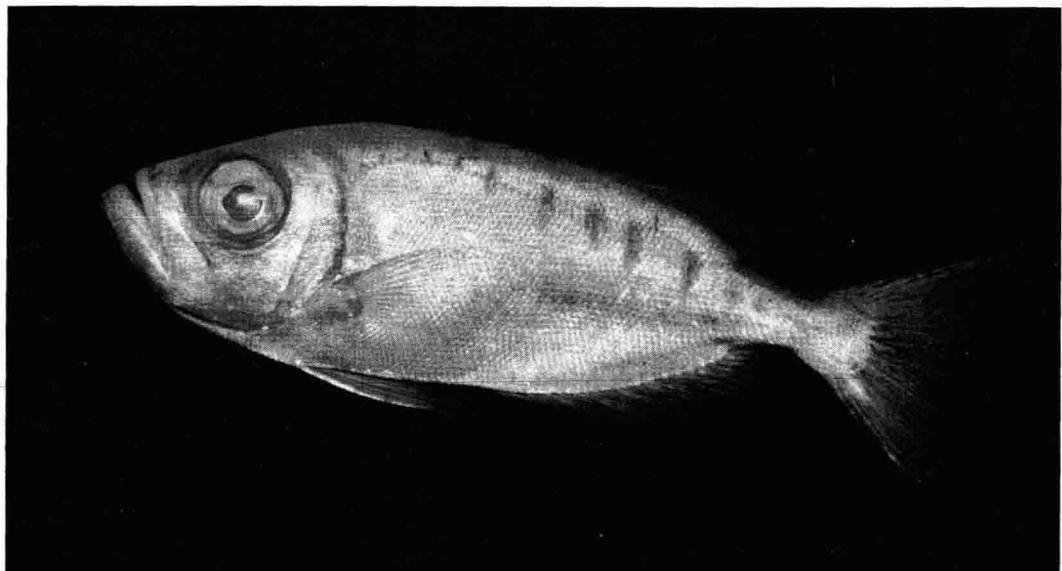


FIGURE 5. *Priacanthus hamrur*, Admiralty Is., Lord Howe I.



FIGURE 6. *Apogon kallopterus*, Comet's Hole, Lord Howe I.

CIRRHITIDAE

Paracirrhites forsteri (Schneider, 1801)

One fish, 70 mm TL, seen at 5-m depth at Malabar in 1992 (Plate IG). Widespread in the Indo-West Pacific.

LABRIDAE

Cheilinus bimaculatus Valenciennes, 1840

One fish, 90 mm TL, seen in Comet's Hole (Plate IH). Widespread in the Indo-West Pacific.

Hologymnosus doliatus (Lacepède, 1801)

One initial phase fish, 23 cm TL, seen at 23-m depth off the west side of Roach Island. One 15-cm initial phase fish seen in Erscott's Hole in 1992. Allen et al. (1976) reported the sighting of three unidentified *Hologymnosus* at Ball's Pyramid. Widespread in the Indo-West Pacific.

Labropsis australis Randall, 1981

Adults of this small wrasse were seen on three occasions in outer reef areas. A fish, 90 mm TL, was photographed at 28-m depth at South Shoal (Plate IIA). Restricted to the Southwest Pacific.

Novaculops sp.

A Lord Howe specimen in BPBM (14758, 69 mm SL, Plate IIB) collected at 25-m depth west of Mt. Lidgbird, which was reported as *Hemipteronotus* sp. by Allen et al. (1976), is an undescribed species of *Novaculops*. J. E. Randall and J. L. Earle collected three other specimens at Middleton Reef in February 1992 and plan to describe the species in a revision of the genus. Known so far only from Lord Howe Island and Middleton Reef.

Stethojulis interrupta (Bleeker, 1851)

Initial phase fish were seen twice in the lagoon. One fish, 80 mm TL, was photographed at 4-m depth near Comet's Hole (Plate IIC). Widespread in the Indo-West Pacific.

Xyrichtys aneitensis (Günther, 1862)

One collected at 2-m depth near Comet's Hole (BPBM 35032, 80 mm SL, Plate IID). Widespread in the West Pacific.

CHAETODONTIDAE

Chaetodon kleinii Bloch, 1790

One fish, 95 mm TL, seen repeatedly at a reef margin in Sylph's Hole (Plate ID). Widespread in the Indo-West Pacific.

Chaetodon ulietensis Cuvier, 1831

One subadult about 60 mm TL seen at 1.5-m depth in Comet's Hole in 1992. Widespread in the Indo-West Pacific.

POMACANTHIDAE

Chaetodontoplus meredithi Kuiter, 1990

One fish, 220 mm TL, seen at 15-m depth at the Admiralty Islands in 1992 (Plate IE). Previously known only from Queensland.

POMACENTRIDAE

Abudefduf whitleyi Allen & Robertson, 1974

Several adults seen in the lagoon; one fish, 110 mm TL, was photographed at 2-m depth in Erscott's Hole (Figure 7). Also known from the Great Barrier Reef, Coral Sea, New Caledonia, and Norfolk Island (see below).

Pomacentrus moluccensis Bleeker, 1853

One fish, 65 mm TL, seen at the reef edge in Comet's Hole (Plate IF). The color was yellow overall, and a small black spot was seen at the anus. Widespread in the Indo-West Pacific.



FIGURE 7. *Abudefdup whitleyi*, Erscott's Hole, Lord Howe I.

SCARIDAE

Scarus globiceps Valenciennes, 1840

One terminal phase fish and two initial phase fish seen at 13-m depth off Middle Beach, and a terminal phase fish, 210 mm TL, seen at 3-m depth in Erscott's Hole (Plate IIE). Widespread in the Indo-West Pacific.

Scarus niger Forsskål, 1775

One fish, 85 mm TL, seen at 2-m depth in Comet's Hole (Plate IIF). Widespread in the Indo-West Pacific.

Scarus rivulatus Valenciennes, 1840

One terminal phase fish seen in Blind Passage, and an initial phase fish, 24 cm TL, seen

in less than 1-m depth at Ned's Beach (Figure 8). Widespread in the West Pacific.

Scarus schlegeli (Bleeker, 1861)

One large terminal phase fish (Plate IIG) and two initial phase fish seen at 28-m depth at South Shoal. Widespread in the West Pacific.

GOBIIDAE

Macrodontogobius wilburi Herre, 1936

Two collected at 2- to 3-m depth in Sylph's Hole (BPBM 34610, 50–52 mm SL), one of which was photographed before collection (Figure 9). Identified by D. F. Hoese (AMS). Widespread in the Indo-West Pacific.



FIGURE 8. *Scarus rivulatus*, Ned's Beach, Lord Howe I.

Vanderhorstia ornatissima Smith, 1959

One fish, 50 mm TL, seen (Plate IIH) in Comet's Hole in 1992. This species occupies burrows with a symbiotic alpheid shrimp. Widespread in the Indo-West Pacific.

MICRODESMIDAE

Ptereleotris zebra Fowler, 1938

Five adults seen at 10- to 11-m depth on a steep rock wall off the west side of Roach Island. One fish, 90 mm TL, also seen at 6-m

depth in the same place in 1992 (Plate IIIA). Widespread in the Indo-West Pacific.

ACANTHURIDAE

Naso maculatus Randall & Struhsaker, 1981

A small group seen at 30-m depth at South Shoal; one fish, 28 cm TL, was photographed (Figure 10). Previously known only from the Hawaiian Islands and southern Japan, so its occurrence at Lord Howe Island is a surprise and suggests that the species has an anti-tropical distribution (Randall 1982).

MONACANTHIDAE

Cantherhines fronticinctus (Günther, 1867)

Three adults seen at 25-m depth off the west side of Roach Island; one fish, 160 mm TL, was photographed (Plate IIIB). Identified after Hutchins and Randall (1982). Two small Lord Howe specimens in AMS (I.4095 and I.13896) tentatively identified as *C. longicaudus* Hutchins & Randall, 1982 by Hutchins and Randall (1982) may in fact be this species (J. B. Hutchins, WAM, pers. comm.). Widespread in the Indo-West Pacific.

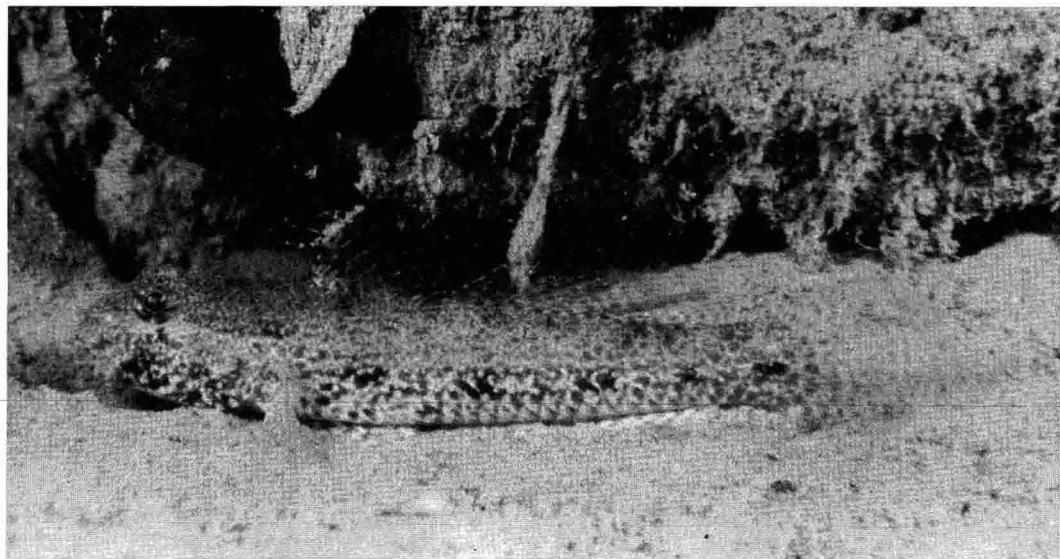


FIGURE 9. *Macrodontogobius wilburi*, Sylph's Hole, Lord Howe I.



FIGURE 10. *Naso maculatus*, South Shoal, Lord Howe I.

Oxymonacanthus longirostris (Bloch & Schneider, 1801)

One fish, 75 mm TL, seen at 1.5-m depth in North Bay (Plate IIIC), another pair seen in Erscott's Hole, and three more at Blind Passage. Widespread in the Indo-West Pacific.

OSTRACIIDAE

Ostracion meleagris Shaw, 1796

One fish photographed at 20-m depth at Sugarloaf Island in December 1979 by N. Coleman (Figure 11).

TETRAODONTIDAE

Canthigaster bennetti (Bleeker, 1854)

Two seen at 1.5-m depth in North Bay; one fish, 85 mm TL, was photographed

(Plate IIID). Widespread in the Indo-West Pacific.

NORFOLK ISLAND

LAMNIDAE

Carcharodon carcharias (Linnaeus, 1758)

A large shark hooked but not landed at Headstone in September 1990 by R. Tofts, a Norfolk Island resident, is identified from Figure 12 as this species after Compagno (1984) on the basis of tooth shape and conical snout. A photograph of another individual caught in 1928 was also shown to us by R. Tofts. Worldwide distribution.

Isurus oxyrinchus Rafinesque, 1809

We have seen one set of jaws (Figure 13), one set of loose teeth, and a photograph of a



FIGURE 11. *Ostracion meleagris*, Sugarloaf I., Lord Howe I. (Photo: N. Coleman.)



FIGURE 12. *Carcharodon carcharias*, Headstone, Norfolk I. (Photo: R. Tofts.)

specimen, all provided by R. Tofts. The photograph was of a small shark (about 1.5 m TL) caught near Phillip and Nepean islands in 1986. The set of jaws figured had a tooth

count of $13 + 13/13 + 13$. Identified after Compagno (1984). Worldwide distribution.

CARCHARHINIDAE

Carcharhinus amblyrhynchos (Bleeker, 1856)

One specimen (NMNZ, P.26898, 845 mm TL, Figure 14) caught 14 km off Cascade Wharf in January 1991 by I. Kenny, a Norfolk Island resident. Morphometric measurements agree with those listed by Garrick (1982, figs. 2–8). The specimen differs from the closely related *C. galapagensis* (Snodgrass & Heller, 1905) in having a black posterior margin on the caudal fin, notched upper teeth, a longer third gill slit, and a smaller difference between the heights of the first and second dorsal fins. It has a tooth count of $14 + 1 + 14/14 + 1 + 14$. Three other small specimens with black-edged caudal fins were caught by anglers near Cascade Wharf during our visit, and the jaws from one of these were collected (NMNZ



FIGURE 13. *Isurus oxyrinchus*, lower jaw teeth, Norfolk I.

P.27157). These three sharks, plus NMNZ P.26898, all had weak interdorsal ridges, which is unusual for *C. amblyrhynchos* (Garrett 1982). Widespread in the Indo-West Pacific.

Carcharhinus ?plumbeus (Nardo, 1827)

We tentatively identified a set of jaws from a shark caught at Norfolk Island by R. Tofts as being from this species (Figure 15). Tooth count ($13 + 1 + 12/13 + 1 + 13$) and shape place it in the *C. obscurus/plumbeus*/

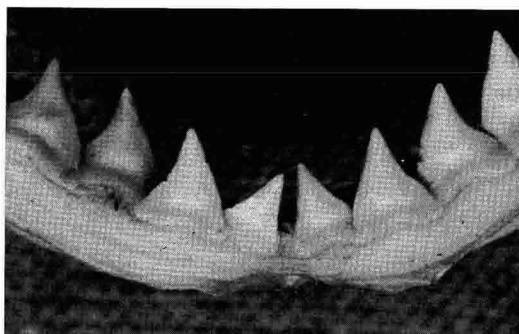


FIGURE 15. *Carcharhinus ?plumbeus*, upper jaw teeth, Norfolk I.

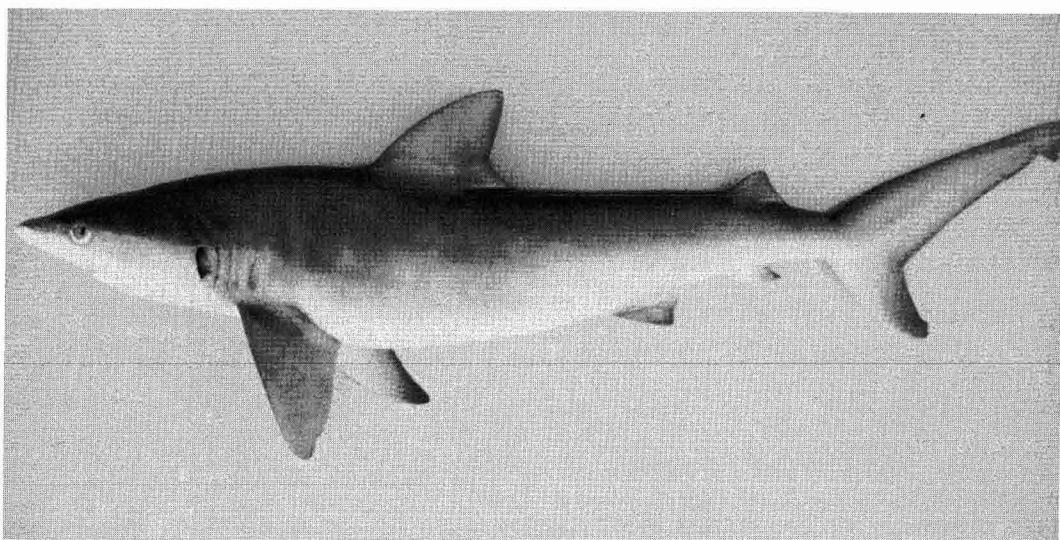


FIGURE 14. *Carcharhinus amblyrhynchos*, off Cascade Bay, Norfolk I.

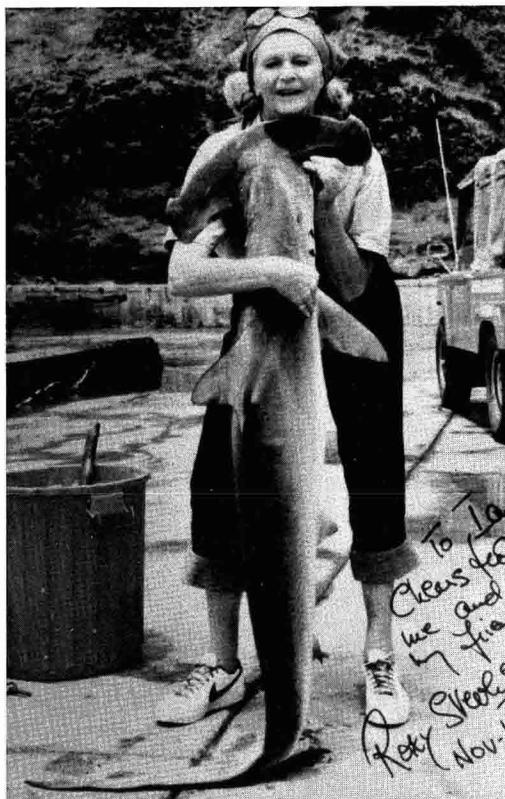


FIGURE 16. *Sphyraena zygaena*, off Cascade Bay, Norfolk I. (Photographer not known.)

galapagensis group (Garrick 1982). *Carcharhinus obscurus* (Le Sueur, 1818) is unlikely to occur at Norfolk Island because it is nearly always found on continental coastlines (Garrick 1982). The upper and lower teeth have much finer serrations than those from the jaws of three Norfolk Island specimens of *C. galapagensis* that we examined. Furthermore, the upper teeth are larger in a jaw that is 23 cm across than teeth in a 34-cm *C. galapagensis* jaw (both jaws were spread to maximum expansion on drying). However, most *C. plumbeus* have 14 upper lateral teeth, with only two out of 30 examined by Garrick (1982) having 13 upper lateral teeth (we assume that the count of 12 in the top left jaw is anomalous). Whole specimens are required to confirm this identification. Worldwide in tropical and subtropical waters.

SPHYRNIDAE

Sphyraena zygaena (Linnaeus, 1758)

One caught off Cascade Bay in November 1983 by I. Kenny. The shark was identified from Figure 16 after Compagno (1984) on the following basis: it has a long, narrow, curved "hammer" that lacks a prominent median indentation on its anterior margin; the pelvic fins originate well behind the free rear margin of the first dorsal fin; and the caudal originates well behind the free rear margin of the second dorsal. Worldwide distribution.

MURAENIDAE

Gymnothorax chilosomus Bleeker, 1865

One collected and photographed at Norfolk Island by D. F. Hoese in 1975 (Figure 17). The specimen cannot be located (M. McGrouther, AMS, pers. comm.). Widespread in the Indo-Pacific.

Gymnothorax porphyreus (Guichenot, 1848)

One collected at 1-m depth in Crystal Pool (BPBM 34584, 348 mm TL, Figure 18). Identified after Randall and McCosker (1975). Found in the subtropical South Pacific from Lord Howe Island to South America.

SYNODONTIDAE

Synodus variegatus (Lacepède, 1803)

One collected at 16-m depth near Cascade Wharf (NMNZ P.26918, 258 mm SL). The specimen has long palatine teeth in a discrete group, 5.5 scale rows above the lateral line, scaly postorbital cheeks, and small triangular nostril flaps. It keys out to *S. engelmani* Schultz, 1953 in Cressey (1981), but that species is a synonym of *S. variegatus* (Waples and Randall 1988). Four other fish, 23–28 cm TL, were seen at 15–20 m depth at "Swiss Cheese," about 1 km south of Kingston Wharf (Plate IIIE). Widespread in the Indo-West Pacific. *Synodus dermatogenys* Fowler, 1912, which also occurs at Norfolk Island, was previously reported as *S. variegatus* by Hermes (1986).

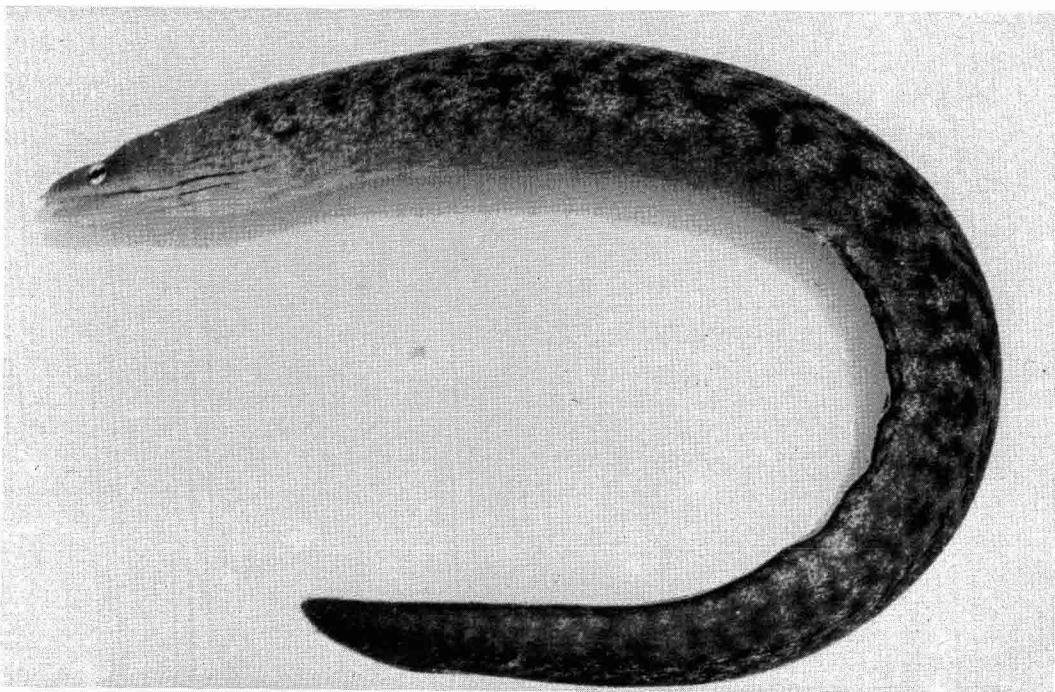


FIGURE 17. *Gymnothorax chilosilus*, Norfolk I. (Photo: D. F. Hoese.)

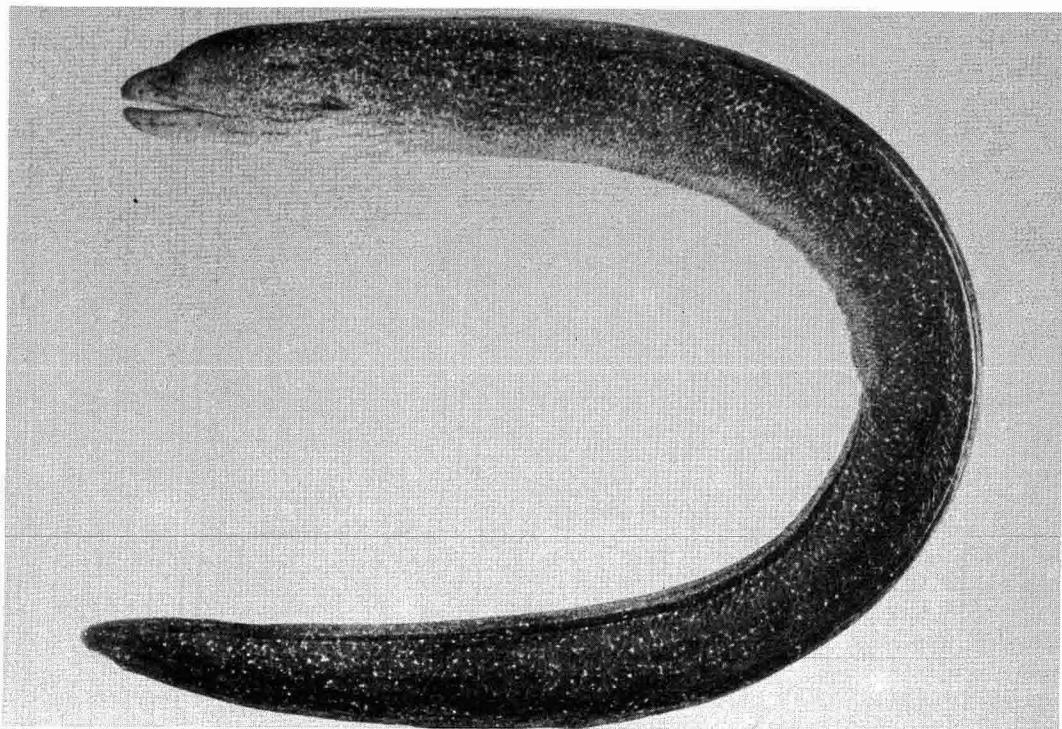


FIGURE 18. *Gymnothorax porphyreus*, Crystal Pool, Norfolk I.

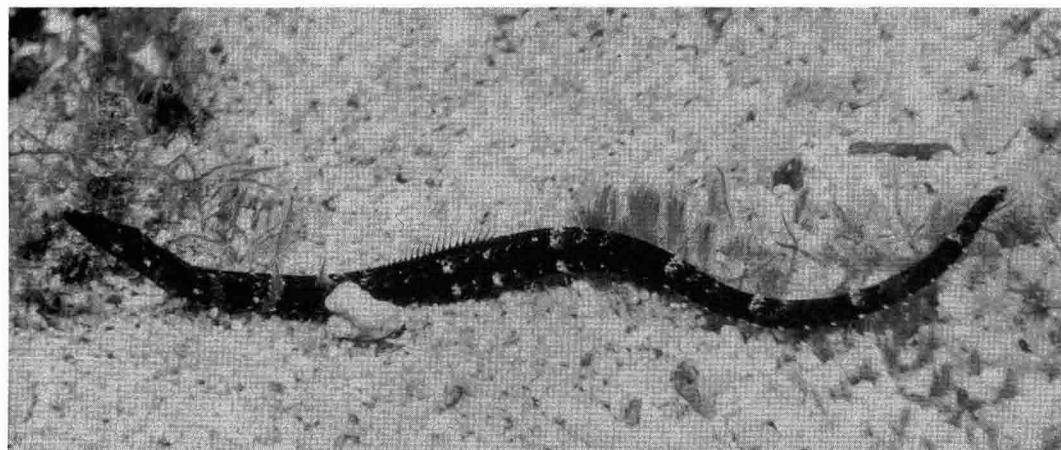


FIGURE 19. *Halicampus boothae*, Slaughter Bay, Norfolk I.

HOLOCENTRIDAE

Myripristis berndti Jordan & Evermann, 1903

One collected at 16-m depth at Swiss Cheese (NMNZ P.26916, 226 mm SL). The specimen has a single pair of symphyseal tooth patches at the tip of the lower jaw, scales in the pectoral axil, 30 lateral line scales, strongly projecting lower jaw, interorbital space 4.3 times in HL, and yellowish outer dorsal fin. It therefore fits Randall and Guézé's (1981) description. At least three others about the same size were seen in the same locality (Plate IIIF). Widespread in the Indo-Pacific.

APOGONIDAE

Apogon crassiceps Garman, 1903

One collected at 14-m depth at Swiss Cheese (NMNZ P.27172, 26 mm SL). Randall et al. (1990b) pointed out the confusion over the identity of transparent red cardinalfishes of the Indo-Pacific and gave some diagnostic characters for Rapa Island *A. crassiceps*. Our specimen agrees with Rapa *A. crassiceps* in having 13 pectoral rays, 3 + 13 gill rakers on the first arch, body depth 3.0 in SL, and caudal peduncle length 3.8 in SL. It differs in having 7 pre-dorsal scales (cf. 5–6 for Rapa specimens). Widespread in the Pacific.

SYNGNATHIDAE

Halicampus boothae (Whitley, 1964)

Two collected at 2-m depth, one in Emily Bay (NMNZ P.26917, 127 mm SL) and one in Slaughter Bay (NMNZ P.26899, 130 mm SL, Figure 19). Both specimens agree with Dawson's (1985) description, except that the Emily Bay specimen has only 35 tail rings and HL fits 17.0 times into SL, and the Slaughter Bay specimen has 12 pale bars on the body (Dawson gave 37–42 tail rings, HL 11.7–16.9 in SL, and 10–11 body bars). Several others were seen in the Emily Bay–Slaughter Bay lagoon. Widespread but scattered distribution in the Indo-West Pacific.

ECHENEIDIDAE

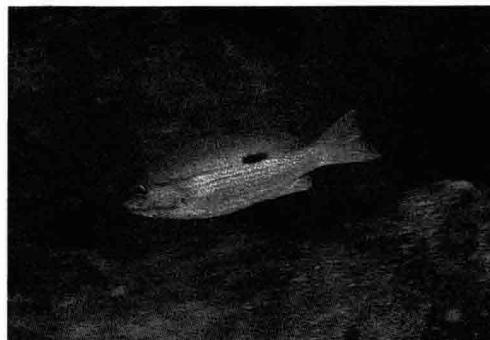
Remora remora (Linnaeus, 1758)

Two specimens collected from *Carcharhinus* sharks at Kingston by R. Tofts. One (NMNZ P.27158, 109 mm SL) had 19 disk laminae, 22 second dorsal rays, and 24 anal rays. The other (78 mm SL, Figure 20, specimen not kept) had 17 disk laminae. Identified after Paulin and Habib (1982) and Heemstra (1986). Worldwide distribution.

LETHRINIDAE

Gnathodentex aurolineatus (Lacepède, 1802)

Nine fish, 25–30 cm TL, seen at 20-m depth at Swiss Cheese (Plate IIIG). Also reported



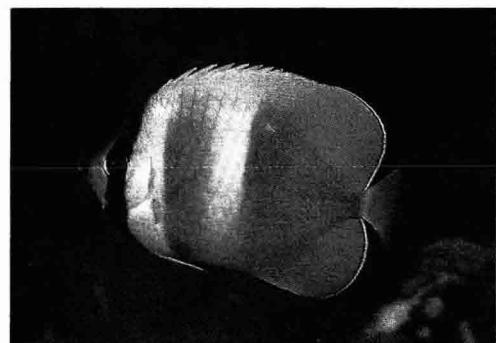
A. *Lutjanus fulviflamma*, Roach I., Lord Howe I.
(J. E. Randall)



B. *Lethrinus atkinsoni*, Comet's Hole,
Lord Howe I. (J. E. Randall)



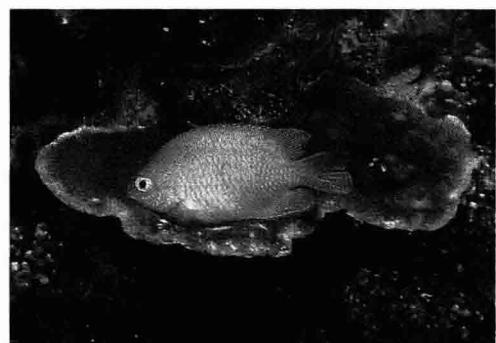
C. *Parupeneus barberinus*, Erscott's Hole,
Lord Howe I. (J. E. Randall)



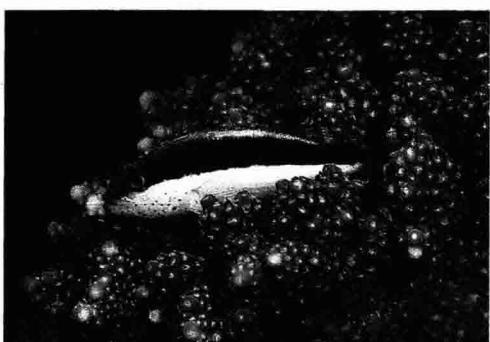
D. *Chaetodon kleinii*, Sylph's Hole, Lord Howe I.
(J. E. Randall)



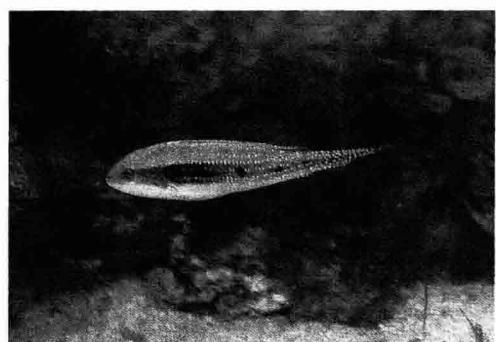
E. *Chaetodontoplus meredithi*, Admiralty Is.,
Lord Howe I. (J. E. Randall)



F. *Pomacentrus moluccensis*, Comet's Hole,
Lord Howe I. (J. E. Randall)



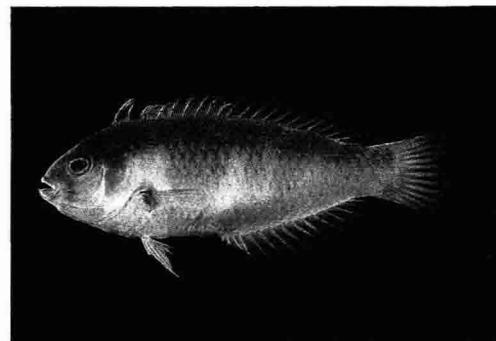
G. *Paracirrhites forsteri*, Malabar, Lord Howe I.
(J. E. Randall)



H. *Cheilinus bimaculatus*, Comet's Hole,
Lord Howe I. (J. E. Randall)



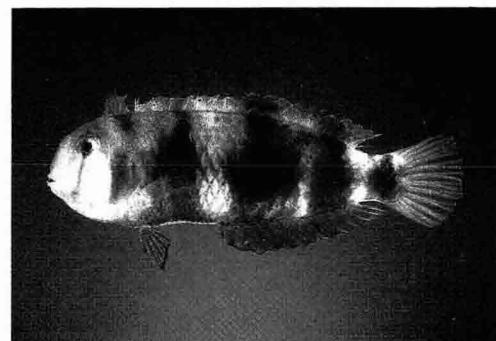
A. *Labropsis australis*, South Shoal, Lord Howe I.
(J. E. Randall)



B. *Novaculops* sp., W of Mt. Lidgbird,
Lord Howe I. (J. E. Randall)



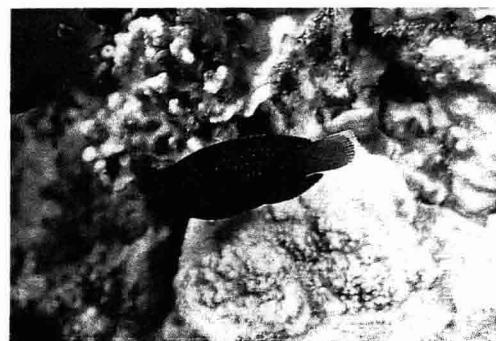
C. *Stethojulis interrupta*, Comet's Hole,
Lord Howe I. (J. E. Randall)



D. *Xyrichtys aneitensis*, Comet's Hole,
Lord Howe I. (J. E. Randall)



E. *Scarus globiceps*, Erscott's Hole, Lord Howe I.
(J. E. Randall)



F. *Scarus niger*, juvenile, Comet's Hole,
Lord Howe I. (J. E. Randall)



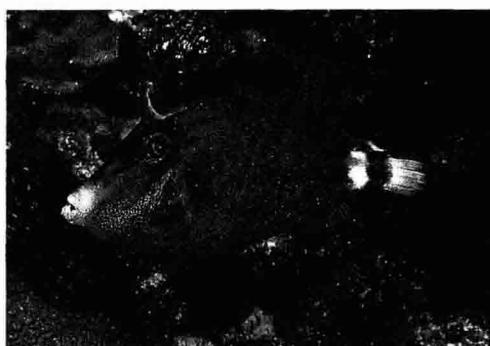
G. *Scarus schlegeli*, South Shoal, Lord Howe I.
(J. E. Randall)



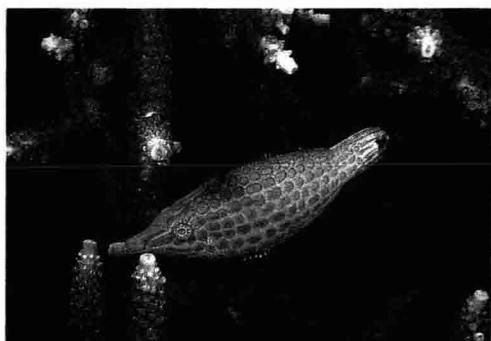
H. *Vanderhorstia ornatissima*, Comet's Hole,
Lord Howe I. (J. E. Randall)



A. *Ptereleotris zebra*, Roach I., Lord Howe I.
(J. E. Randall)



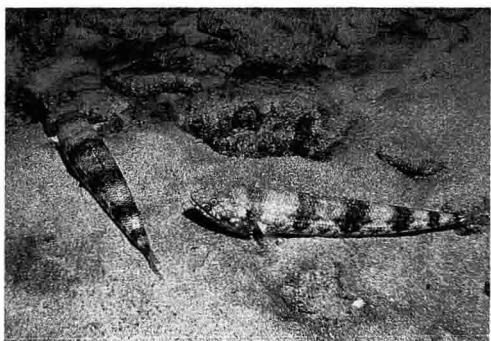
B. *Cantherhines fronticinctus*, Roach I.
Lord Howe I. (J. E. Randall)



C. *Oxymonacanthus longirostris*, North Bay,
Lord Howe I. (J. E. Randall)



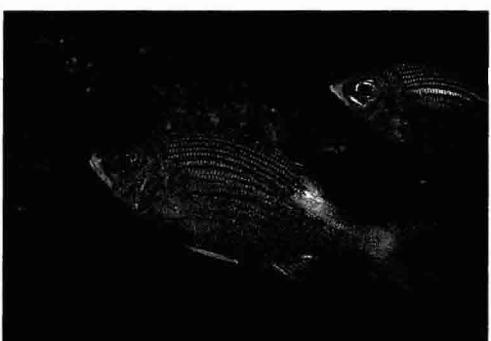
D. *Canthigaster bennetti*, North Bay,
Lord Howe I. (J. E. Randall)



E. *Synodus variegatus*, Swiss Cheese Reef,
Norfolk I. (M. P. Francis)



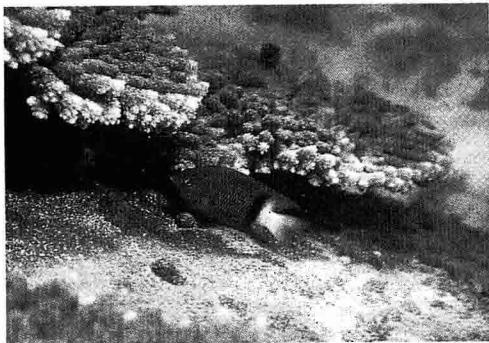
F. *Myripristis berndti*, Swiss Cheese Reef,
Norfolk I. (M. P. Francis)



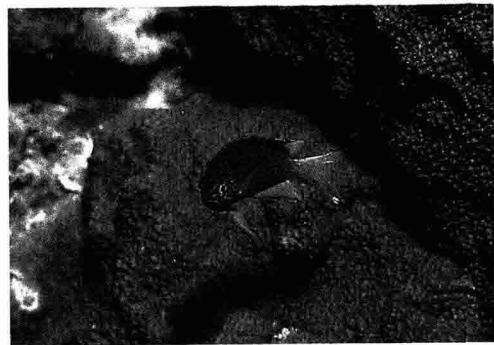
G. *Gnathodentex aurolineatus*, Swiss Cheese Reef,
Norfolk I. (M. P. Francis)



H. *Abudefduf whitleyi*, Emily Bay, Norfolk I.
(M. P. Francis)



A. *Plectroglyphidodon dickii*, Slaughter Bay,
Norfolk I. (M. P. Francis)



B. *Pomacentrus pavo*, Emily Bay, Norfolk I.
(M. P. Francis)



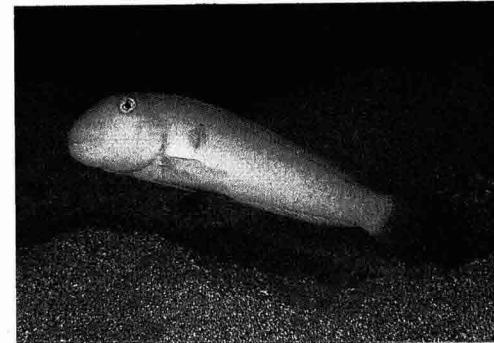
C. *Teixeirichthys* sp., Duncombe Bay, Norfolk I.
(M. P. Francis)



D. *Paracirrhites arcatus*, Duncombe Bay, Norfolk I.
(M. P. Francis)



E. *Cheilodactylus vestitus*, Emily Bay, Norfolk I.
(J. E. Randall)



F. *Cymolutes praetextatus*, Emily Bay, Norfolk I.
(J. E. Randall)



G. *Vanderhorstia* sp., Emily Bay, Norfolk I.
(J. E. Randall)



H. *Zebrasoma scopas*, Emily Bay, Norfolk I.
(J. E. Randall)

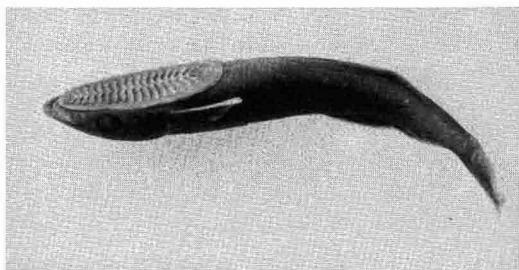


FIGURE 20. *Remora remora*, Kingston, Norfolk I.

from the same location in February 1990 by J. Marges (Bounty Divers, Norfolk Island, pers. comm.). Widespread in the Indo-West Pacific.

MULLIDAE

Parupeneus multifasciatus (Quoy & Gaimard, 1825)

Four juveniles, 60–80 mm TL, photographed by M. Williams (Leigh Marine Laboratory) and one fish, 60 mm TL, seen by M.P.F., all at 15-m depth at Cascade Wharf (photo available on request). West and Central Pacific.

Parupeneus pleurostigma (Bennett, 1830)

One fish, 150 mm TL, seen at 15-m depth and one fish, 50 mm TL, seen at 12-m depth at Cascade Wharf (photo available on request). Also seen by J. Marges (pers. comm.) at the same locality in 1990. Widespread in the Indo-West Pacific.

POMACANTHIDAE

Centropyge bispinosus (Günther, 1860)

One photographed by C. Wilson (Norfolk Island, pers. comm.) at Duncombe Bay in April 1990 (photo available on request). Widespread in the Indo-West Pacific.

POMACENTRIDAE

Abudefduf whitleyi Allen & Robertson, 1974

Two collected at 1-m depth at Crystal Pool (NMNZ P.26908, 78 mm SL; BPBM 34586, 120 mm SL). The NMNZ specimen agrees with Allen's (1991) description except that it has 21 gill rakers (Allen gave 22–25 rakers). Four

others, 80–100 mm TL, were seen at 1- to 3-m depth in Emily Bay (Plate IIIH). Also known from the Great Barrier Reef, Coral Sea, New Caledonia, and Lord Howe Island (see above).

Parma alboscopularis Allen & Hoese, 1975

One collected in less than 1-m depth at Cascade Wharf (NMNZ P.26919, 183 mm SL). The specimen agrees with the description of Allen and Hoese (1975) and displayed the distinctive white patch above the upper edge of the operculum (Francis 1988). Two other fish, 150 mm TL, were seen at the same locality. Also known from Lord Howe Island, Kermadec Islands, and New Zealand.

Plectroglyphidodon dickii (Liénard, 1839)

One fish, 90 mm TL, seen at less than 1-m depth at the western end of Slaughter Bay under an *Acropora* plate (Plate IVA). Widespread in the Indo-West Pacific.

Pomacentrus pavo (Bloch, 1787)

One fish, 60 mm TL, seen at 1-m depth in Emily Bay (Plate IVB). Widespread in the Indo-West Pacific.

Teixeirichthys sp.

Small groups of fish (at least 15 fish in total), 60 mm TL, were seen at 20-m depth in Duncombe Bay (Plate IVC). G. R. Allen (WAM, pers. comm.) has tentatively identified the fish as a species of *Teixeirichthys* from a photo. Only one species, *T. jordani* (Rutter, 1897), has been described in the genus, and it is widespread in the Indo-West Pacific (Allen 1991). However, a single specimen of an undescribed species of *Teixeirichthys* was trawled in 67- to 79-m depth about 30 km north of Norfolk Island in 1976 (Fisheries Agency of Japan 1976). It differs from *T. jordani* in the number of lateral line scales and gill rakers (G. R. Allen, pers. comm.). Specimens are required to determine the identity of the Duncombe Bay fish.

CIRRhitidae

Paracirrhites arcatus (Cuvier, 1829)

One fish, 110 mm TL, seen at 10-m depth in Duncombe Bay (Plate IVD). Widespread in the Indo-West Pacific.

CHEILODACTYLIDAE

Cheilodactylus vestitus (Castelnau, 1879)

One fish, 22 cm TL, seen regularly over a period of 1 week at 2-m depth in Emily Bay (Plate IVE). Identified after Randall (1983). Restricted to the Southwest Pacific.

SPHYRAENIDAE

Sphyraena acutipinnis Day, 1876

A specimen in AMS (I.27351-001, 335 mm SL) collected at Norfolk Island in 1988 appears to be this species. It has a single gill raker, first dorsal fin origin above the pelvic fin origin, 126 pored lateral line scales, and the body depth is contained 6.3 times in SL. A fish, 17 cm TL, seen near the surface in Emily Bay may also have been this species. Widespread in the Indo-West Pacific.

Sphyraena ?barracuda (Walbaum, 1792)

A large fish (>1 m TL) with obvious dark vertical bands on a silvery background was

seen at 20-m depth in Duncombe Bay. We tentatively identify the fish as *S. barracuda*, but a photo or specimen is required to confirm this record. *Sphyraena barracuda* has also been reported from Lord Howe Island and is widespread in the Indo-West Pacific.

LABRIDAE

Cymolutes praetextatus (Quoy & Gaimard, 1834)

Four fish (two initial phase and two terminal phase), 110–160 mm TL, seen several times at 0.5- to 4-m depth in Emily Bay (Plate IVF). Widespread in the Indo-West Pacific.

Labroides dimidiatus (Valenciennes, 1839)

One fish, 90 mm TL, seen cleaning parasites from other fishes at 15-m depth at Swiss Cheese (Figure 21). Widespread in the Indo-West Pacific.



FIGURE 21. *Labroides dimidiatus* (and host fish, *Cheilodactylus ephippium*), Swiss Cheese, Norfolk I.

PINGUIPEDIDAE

Parapercis sp.

We cannot identify a specimen collected in less than 1-m depth in Emily Bay (BPBM 34593, 82 mm SL, photo available on request). It seems most closely related to *P. biordinis* Allen, 1976, and *P. somaliensis* Schultz, 1968. The specimen may represent an undescribed species.

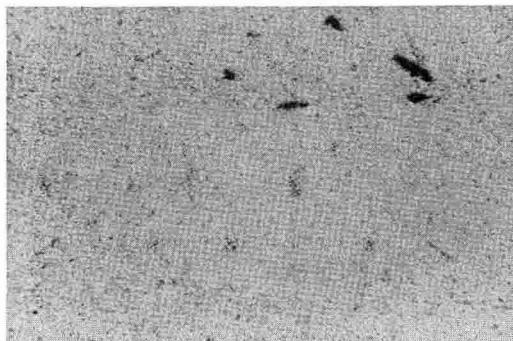


FIGURE 22. *Aseraggodes bahamondei*, Slaughter Bay, Norfolk I.

BLENNIIDAE

Entomacrodus niuafoouensis (Fowler, 1932)

A photograph of a specimen collected in 1975 by D. F. Hoese was identified by V. G. Springer (USNM, pers. comm.). Widespread in the Indo-West Pacific.

Istiblennius dussumieri (Valenciennes, 1836)

One specimen from Kingston in ANSP (75302, 99 mm SL) was identified by V. G. Springer. Widespread in the Indo-West Pacific.

GOBIIDAE

Vanderhorstia sp.

One fish seen at 1-m depth in Emily Bay (Plate IVG). It was sharing a burrow with a symbiotic alpheid shrimp. The same species has been photographed at New Caledonia by J.E.R. and may be undescribed.

ACANTHURIDAE

Zebrasoma scopas (Cuvier, 1829)

One fish, 60 mm TL, seen at 2-m depth in Emily Bay (Plate IVH). Widespread in the Indo-West Pacific.

SOLEIDAE

Aseraggodes bahamondei Randall & Meléndez, 1987

One fish, 170 mm TL, seen at 2-m depth in Slaughter Bay in November 1989 (Figure 22). We have also seen a photo of one taken at 3-m depth in Slaughter Bay in 1976 by D. Staples. Known from Lord Howe Island to Easter Island in the South Pacific.

MONACANTHIDAE

Cantheschenia longipinnis (Fraser-Brunner, 1941)

One collected in 3-m depth at Cascade Wharf (NMNZ P.27173, 145 mm SL). Identified by J. B. Hutchins (pers. comm.). Also known from Lord Howe Island and Australia.

Pervagor janthinosoma (Bleeker, 1854)

One specimen collected in 1975 from Duncombe Bay in AMS (I.20257-011, 56 mm SL). Identified after Hutchins (1986). Widespread in the Indo-West Pacific.

DISCUSSION

In an earlier paper, Francis (1991) concluded that the fish faunas of Lord Howe Island and Norfolk Island were moderately well known. Consequently it may seem surprising that our recent expeditions have increased the faunas of these islands by a total of 69 species. However, many of the new records reported here are based on few individuals of widespread Indo-Pacific species, thus fulfilling the prediction that "future additions will increasingly be of stray tropical species" (Francis 1991:219). The appearance of tropical fishes at subtropical Lord Howe and Norfolk islands probably depends on the transport of larvae from tropical areas to the north and northwest (Francis 1993). The magnitude and species composition of such larval influxes are likely to vary both seasonally and

annually. The composition of the tropical fish component of the Lord Howe and Norfolk faunas is therefore likely to be dynamic, with previously unrecorded species continuing to appear in small numbers, and previously recorded species disappearing.

The new records reported here bring the known coastal fish faunas of Lord Howe Island and Norfolk Island to 433 and 254, respectively. A detailed biogeographic analysis of the faunas is provided by Francis (1993).

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