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FISHES OF WILSONS PROMONTORY AND CORNER INLET, VICTORIA: COMPOSITION AND BIOGEOGRAPHIC AFFINITIES

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Abstract

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A diving survey of shallow-water marine fishes, primarily benthic reef fishes, was undertaken around Wilsons Promontory and in Corner Inlet in 1987 and 1988. Shallow subtidal reefs in these regions are dominated by labrids, particularly Bluethroat Wrasse (*Notolabrus tetricus*) and Saddled Wrasse (*Notolabrus fucicola*), the odacid Herring Cale (*Odax cyanomelas*), the serranid Barber Perch (*Caesioperca rasor*) and two scorpidid species, Sea Sweep (*Scorpis aequipinnis*) and Silver Sweep (*Scorpis lineolata*). Distributions and relative abundances (qualitative) are presented for 76 species at 26 sites in the region. The findings of this survey were supplemented with data from other surveys and sources to generate a checklist for fishes in the coastal waters of Wilsons Promontory and Corner Inlet. 231 fish species of 92 families were identified to species level. An additional four species were only identified to higher taxonomic levels. These fishes were recorded from a range of habitat types, from freshwater streams to marine habitats (to 50 m deep). This fish fauna can be broken into a number of components: 45% are species which occur across all of southern Australia; 25% are southern or southwestern species, at or close to their eastern limit; 19% are restricted to the southeast coasts from South Australia to at least southern New South Wales; 7% are at or close to the western limit of their range; and 6% are at or close to the southern end of their range. Two Tasmanian species are at their northern limit at Wilsons Promontory. The influence of the East Australian Current, and the geomorphology and geological history of the area are discussed in relation to the composition, affinities and origins of the fish fauna of this region.

Introduction

Until relatively recently, there has been limited information available on the composition and distributions of coastal fishes along the southern coast of Australia, particularly for Victorian waters. This situation has recently improved through a number of publications on southern Australian fishes, particularly those of Edgar et al. (1982), Last et al. (1983), Hutchins and Swainston (1986), Coleman (1987), Kuiter (1993), Hutchins (1994), Gomon et al. (1994) and Last and Stevens (1994). Kuiter (1993) and the latter two publications provide the best coverage for Victorian waters.

In April 1988, a system of marine parks and reserves was established around Wilsons Promontory in eastern Victoria, principally to conserve marine flora and fauna associated with rocky reef communities in this region. Terrestrial habitats and biota of Wilsons Promontory have been protected since 1898. The coastal strip to low water mark and the offshore islands were incorporated into the National Park in the 1920s.

In 1987 and 1988, the then Department of Conservation and Environment funded a survey of distributions and abundances of benthic reef fishes within the proposed Wilsons Promontory Marine Park system. The objectives of this survey were twofold:

to determine the composition of fishes in waters surrounding Wilsons Promontory and in Corner Inlet; and

to provide a baseline census of composition and relative abundances of reef fishes prior to implementation of marine park legislation.

Several other studies have examined the composition of the fish fauna of the Wilsons Promontory region. In 1980, Barry Hutchins of the Western Australian Museum surveyed the reef fishes of the Glennie Group and Norman Bay, recording 58 species (unpubl. data). In 1982, the Museum of Victoria undertook a survey of

marine habitats around the promontory, generating a checklist of 140 fish species (Wilson et al., 1990). In the same year, the then Marine Science Laboratories (Marine and Freshwater Resources Institute) commenced a 3-year demersal trawl survey of Eastern Bass Strait. Data from this survey was kindly provided by D. Hobday, DCNR (unpubl. data). This survey recorded 99 species from trawl sites adjacent to Wilsons Promontory. Jackson and Davies (1983) examined the freshwater and estuarine fishes of Wilsons Promontory, recording 37 species.

The results of the study reported here, combined with data from the above studies, published records and museum collections, have been used to generate a checklist of the fish fauna of this region. As Wilsons Promontory forms the most southerly point of the Australian mainland, extending well into Bass Strait, the role and position of this prominent land mass in the distributions of southern Australian fishes is worthy of examination. The components and affinities of this fauna may provide insights into the biogeographic processes occurring in this region.

Study area and methods

Study area. Wilsons Promontory (39°00'S, 146°25'E) protrudes into Bass Strait from southeastern Victoria, forming the southernmost point of the Australian mainland (Fig. 1). This promontory consists of granite mountains and valleys extending below the water line and emerging as outcrops to form offshore islands. Drowned valleys have formed bays with sandy floors and beaches. The subtidal topography is diverse, ranging from vertical walls, to large granite slabs (with or without cracks), boulder slopes (boulder diameters from 0.2 to 20 m), to the extensive sand plains which surround the Promontory at depths of 30–50 metres. Located at the northern end of Wilsons Promontory is Corner Inlet, a large shallow estuarine bay of intertidal mud flats and sea grass beds. Deeper channels fill and drain this large bay. Several rocky reefs are present, adjacent to one of the inlet's primary channels.

Twenty six sites were surveyed around the coastline of Wilsons Promontory, including three sites within Corner Inlet. All sites were granite reefs, varying in aspect, topography, slope, depth and level of exposure to surge and currents. Specific locations were chosen to include the majority of reef habitat types and aspects.

Most sites were dominated by large species of brown algae, particularly *Phyllospora comosa* and *Ecklonia radiata*. These algae often formed thick stands. The understory was principally corallinc turf algae interspersed with a mixture of brown algae (including species of *Cystophora* and *Sargassum*), green algae (including *Caulerpa* spp. and *Cladophora rugosa*) and a high diversity of smaller species of red algae. Algal growth is limited to areas of sufficient light. In the shade of overhangs and at depths greater than 20–35 metres (depending on water clarity), invertebrate communities predominated. The dominant groups are anthozoans, bryozoans and sponges. See Wilson et al. (1990) for treatment of the invertebrate fauna of the region.

Checklist sites for this survey are shown in figure 1. Site codes, location and habitat descriptions are presented in table 1 for each site.

Personnel and training. Fish surveys were undertaken by the authors in 1987 and 1988, assisted in the first year by staff and participants from *Operation Raleigh*, a British organization which provides educational and developmental experiences for young people ("Venturers"). Venturers were trained in fish identification by the authors employing photographs, illustrations, keys and reference texts. Sources for identifications were Edgar et al. (1982), Last et al. (1983), Hutchins and Swainston (1986), and Coleman (1987).

Survey techniques. Boats were used to access all sites. West coast sites were accessed using inflatable dinghies. South and east coast sites were accessed using larger boats (30 m *Blue Nabilla* and 18 m *Osprey*), provided through the National Safety Council.

At each site, two or more divers spent a minimum of 30 minutes recording all species present. Searches were made under overhangs, in caves and amongst kelp, using torches to investigate deeper caves and crevices. All fish encountered between the surface and the maximum depth (presented in table 1) were recorded. Fish identifications and numbers were recorded on acrylic slates. Illustrations and notes were made of unidentified fishes and compared to reference texts immediately following dives. Species of uncertain identity were discarded from checklists.

Approximate numbers of each fish species were recorded at each site, to provide an indication of relative abundances. As the search time, area covered and capabilities of personnel were not standardized, numbers at each site can not be directly compared. Instead, abundance of each

Table 1. Fish checklist sites around Wilsons Promontory and in Corner Inlet.

Site	Code	Location	Habitat	Maximum depth (m)	Date censused
West Coast					
Tongue Point	T1	Small cove on northern side of tip	Large boulders covered with *Phyllospora comosa* and swim-throughs at depth. Reef almost vertical without large horizontal areas. Sand at 16 m.	16	24.4.1987
Leonard Point 1	L1	Northern side of point, near tip.	*Phyllospora* covered large boulders, bommies and drop offs to sandy bottom at 22 m. Part of large reef.	22	18.4.1987
Leonard Point 2	L2	Midway between point and shore in Picnic Bay.	Heavy *Phyllospora* growth on narrow rocky slopes to sand at 12 m.	12	24.4.1987
Leonard Point 3	L3	Small sheltered cove on south side of point.	*Phyllospora* growth on granite boulders and patchy reef on sand.	5	18.4.1987
Pillar Point 1	P1	At tip of point close to deep water.	Large boulders covered in *Phyllospora* on extensive rock reef. Sand at 22 m.	22	11.4.1987, 19.4.1987
Pillar Point 2	P2	Small cove on south side, one quarter distance from point to shore.	Medium-sized boulders (~1m diameter) on narrow reef covered in *Phyllospora*. Sand at 10 m.	10	11.4.1987, 19.4.1987, 23.4.1987
Pillar Point 3	P3	On south side midway between point and shore.	Narrow rock reef with scattered boulders. Sand at 9 m.	9	12.4.1987
Pillar Point 4	P4	Midway from point to Squeaky Beach.	Boulders on rock slope to sand bottom at 10 m.	10	25.4.1987
Norman Point 1	N1	At tip of point close to deep water.	Extensive rock reef with *Phyllospora* covered ridges and gutters to sand at 18 m.	18	17.4.1987
Norman Point 2	N2	Small cove on north side, one third from point to beach.	Narrow *Phyllospora* covered reef sloping to sand at 10 m.	10	17.4.1987
Norman Point 3	N3	Midway from point to beach on northern side.	*Phyllospora* beds on narrow reef sloping to sand at 10 m.	10	26.4.1987
West Coast Islands					
Citadel Island	W1	East side of island.	Rock reef exposed to strong currents. Sand at 16 m.	16	15.4.1987
Dannevig Island	W2	North west corner of island.	Boulders to 10 m with canyons, swim-throughs and overhangs. Reef extends to at least 20 m.	20	11.5.1987
South coast					
Fenwick Bight	S1	West side of bight.	Vertical walls, slopes with caverns and large boulders. Sand at 20 m.	20	13.4.1987

Table 1. (cont.). Fish checklist sites around Wilsons Promontory and in Corner Inlet.

Site	Code	Location	Habitat	Maximum depth (m)	Date censused
Lighthouse Ramp	S2	Small bay on east side of point.	Huge boulders (>10m) and split slabs to 10 m, steep slope to 25 m.	25	14.4.1987
Prock Point	S3	At tip of point.	Extensive shallow reef with medium boulders (to 3 m diameter). Diverse algal turf.	9	13.5.1987
East Coast					
Brown Head	E1	South of Refuge Cove, close to shore.	Gradual sloping reef. Heavy *Phyllospora* and *Ecklonia* cover to 14 m.	14	8.4.1987
Larkin Cove	E2	Western shore of cove.	Medium-sized boulders (to 3 m diameter) near surface. Smaller boulders to sand bottom at 10 m.	10	8.4.1987
Refuge Cove	E3	South side of cove. Checklist made at night.	Medium-sized boulders gradually sloping to sand and seagrass beds at 9 m.	9	14.4.1987, 15.4.1987
Refuge Cove	E4	North side of cove.	Slope of small boulders near surface. Larger boulders forming overhangs and swimthroughs on sand at 15 m.	15	15.4.1987, 16.4.1987
Marker Light	E5	Navigation light between Refuge and Sealers coves.	Shallow reef covered with *Phyllospora* sloping to sand at 10 m.	10	9.4.1987
Scalers Cove	E6	South side of cove.	Small boulders on gentle slope to sand at 13 m.	13	16.4.1987
Rabbit Island	E7	North-west corner.	Shallow reef with sand floor at 6 m.	6	24.4.1987
Corner Inlet					
Tin Mine Cove	C1	Off north point of cove.	Small boulders for to 3 m, sand slope to 10 m. Large boulders from 10 to 15 m, on edge of channel with strong currents.	15	9.5.1987, 10.5.1987
Chinamans Beach	C2	North point of beach.	Scattered boulders and sand to 9 m on edge of channel.	9	10.5.1987
Freshwater Cove	C3	North point of cove.	Reef on slope of channel with strong current.	14	8.5.1987

species at each site has been placed into one of three broad categories: A: very common (>20 fish sighted); B: common/regularly encountered (5-20 fish sighted); and C: uncommon/rarely sighted (1-4 fish sighted).

As identifications were made visually (i.e., no fishes were captured and retained), certain fish groups such as flatheads (family Platycephalidae) and weedfishes (family Clinidae) were difficult to identify to species level.

Additional species were recorded by the authors in Wilsons Promontory waters outside of the checklist sites. These fishes are included in the appendix.

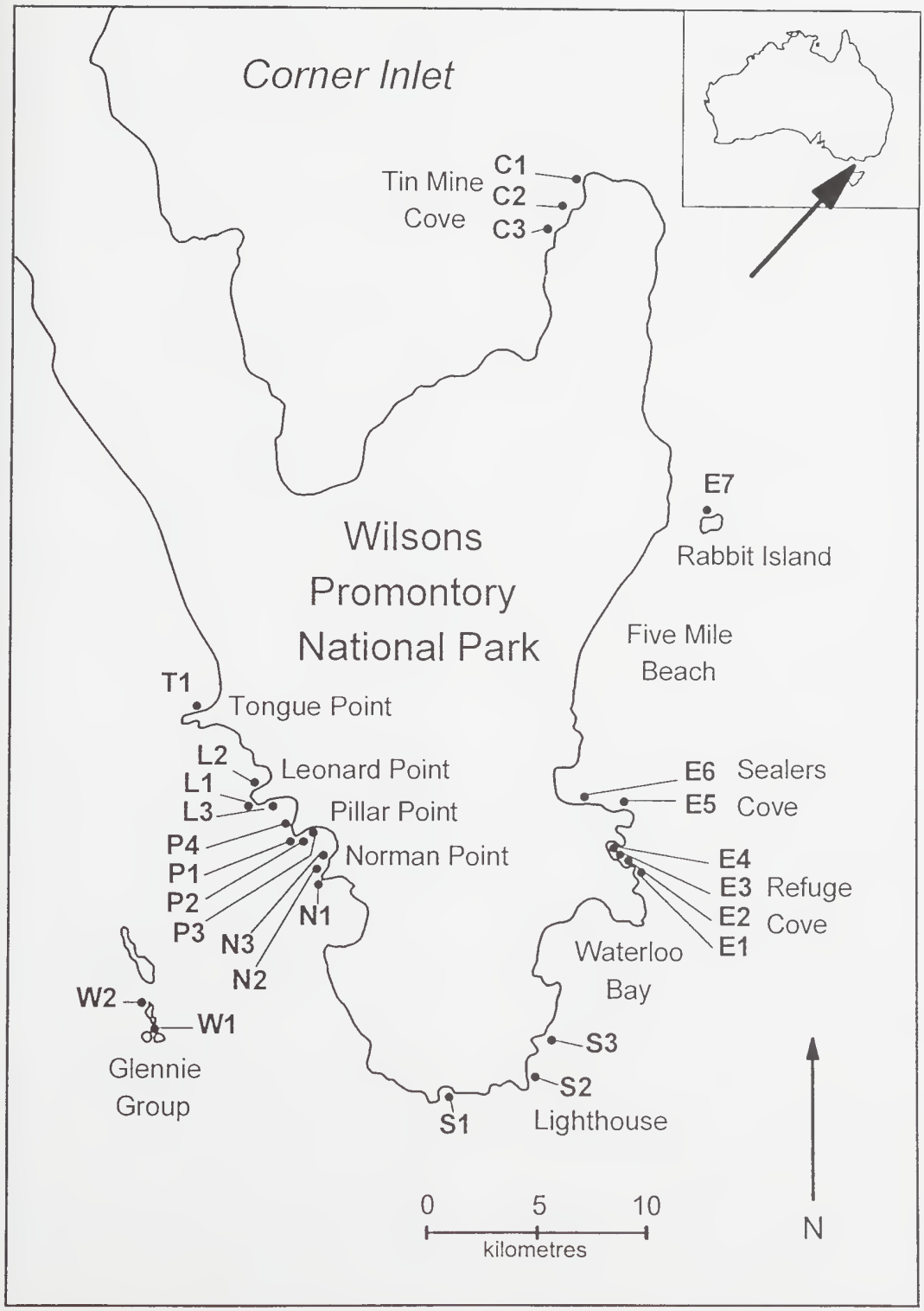

Figure 1. Fish checklist sites around Wilsons Promontory National Park and in Corner Inlet (see Table 1 for site codes).

Previous surveys. The visual census technique used in this survey primarily recorded the larger and more conspicuous species associated with shallow rocky reefs. The checklist presented here results from collation of our data with the results of previous surveys and published records. These surveys provide records of fishes from habitats not examined in this study, i.e., freshwater and estuarine systems (Jackson and Davies, 1983) and offshore soft substrates (Marine and Freshwater Resources Institute unpubl. trawl data), as well as records of cryptic and/or nocturnal species collected through different census techniques.

The Museum of Victoria survey (Wilson et al.,1990) employed observations by scuba divers, rotenone poison stations and benthic trawl stations. Two nets were used, an 18 m headrope otter trawl (at four stations) and a 6 m otter trawl (at three stations). Both nets had a 20 mm mesh size in the cod end. Trawling was undertaken primarily in shallow waters, with two stations at 50 m.

As part of a 3-year demersal trawl survey of Eastern Bass Strait, the then Marine Science Laboratories (now Marine and Freshwater Resources Institute, MAFRI) surveyed sites adjacent to Wilsons Promontory between 1982 and 1984. Sites were sampled every three months by the fisheries research vessel *Sarda*, using a wing trawl (26 m headline) fitted with a 25 mm mesh cod-end. Samples were collected off the east coast of Wilsons Promontory at depths of 13, 25 and 45 m.

Additional data were obtained through a search of the computerised records of fishes registered and housed in the collections of the Department of Ichthyology, Museum of Victoria, for material which had been collected from the Wilsons Promontory region.

With recent reviews of the taxonomy of many fish families in southern Australia (particularly reviews by Gomon et al.,1994, and Last and Stevens, 1994), a number of species names recorded from previous surveys have since been referred to other genera or synonymised with other names. Hence species names used in a number of original records are presented here under their senior synonyms. Where identifications could not be clarified, these records were dropped. The sequence of families and usage of scientific and common names follow Last and Stevens (1994) for sharks and rays, and Kuiter (1993) and Gomon et al. (1994) for all other fish families.

Results

Distributional and abundance patterns. A total of 84 fish species were recorded in this survey, of which 10 were observed by the authors outside checklist sites. Table 2 presents distributions and relative abundances of the 76 species encountered at 26 sites around Wilsons Promontory and in Corner Inlet (74 checklist species plus unidentified members of the family Platycephalidae and the genus *Pseudocaranx*).

General abundanec and distribution trends of the species encountered in this survey can be divided into four broad categories:

Widespread and very common species (>20 seen at numerous sites): Barber Perch, (*Caesioperca rasor*); Sea Sweep (*Scorpis aequipinnis*); Bluethroat Wrasse (*Notolabrus tetricus*); Saddled Wrasse (*Notolabrus fucicola*); Herring Cale (*Odax cyanomelas*).

Widespread and common species (5–20 seen at numerous sites): Old Wife (*Enoplosus armatus*); Magpie (Morwong) Perch (*Cheilodactylus nigripes*); Scalyfin (*Parma victoriae*); Senator Wrasse *(Pictilabrus laticlavius*).

Widespread and uncommon species (<5 seen/per site, recorded at numerous sites): Longsnout Boarfish (*Pentaceropsis recurvirostris*); Southern Sea Carp (*Aplodactylus arctidens*); Bastard Trumpeter (*Latridopsis forsteri*); Maori Wrasse (*Opthalmolepis lineolata*); Toothbrush Leatherjacket (*Acanthaluteres vittiger*); Sixspine Leatherjacket (*Meuschenia freycineti*); Ornate Cowfish (*Aracana ornata*); Globefish (*Diodon nichthemerus*).

Widespread species but patchy in distribution and abundance: Butterfly Perch (*Caesioperca lepidoptera*); Longfin Pike (*Dinolestes lewini*); Red Mullet (*Upeneichthys vlamingii*); Common Bulleseye (*Pempheris multiradiata*); Zebra Fish (*Girella zebra*).

Distribution patterns around Wilsons Promontory could also be divided into geographic trends. Certain fish species were more frequently observed, and in larger numbers, in particular regions around Wilsons Promontory.

Predominantly eastcoast: Silver Sweep (*Scorpis lineolata*); Mado Sweep (*Atypichthys strigatus*); Silverbelly (*Parequula melbournensis*); Slender Weed Whiting (*Siphonognathus attenuatus*); Pencil Weed Whiting (*Siphonognathus beddomei*).

Predominantly west coast: Smooth Toadfish (*Tetractenos glaber*); Longfin Pike (*Dinolestes lewini*).

Primarily at Wilsons Promontory (compared with Corner Inlet): Herring Cale (*Odax cyanomelas*); Scaly fin *(Parma victoriae)*; Old Wife (*Enoplosus armatus*); Sea Sweep (*Scorpis aequipinnis*); Barber Sea Perch (*Caesioperca rasor*).

Primarily at Corner Inlet (compared with Wilsons Promontory): Banded Stingaree (*Urolophus cruciatus*); Ornate Cowfish (*Aracana ornata*).

Total checklist. A checklist of all fishes recorded from freshwater and shallow marine waters (to 50 m) of Wilsons Promontory and Corner Inlet is presented in the appendix. This checklist is based on the results of this study, species encountered in previous surveys (Hutchins, unpubl. data; Jackson and Davies, 1983; Wilson et al., 1990; MAFRI, unpubl. data), published records specifically referring to Wilsons Promontory (Kuiter, 1993; Gomon et al., 1994) and preserved material in the collections of the Department of Ichthyology, Museum of Victoria. A total of 231 fish species were identified to species level, four other species identified only to generic or family level. They represent 92 families of cartilaginous and bony fishes.

Discussion

Patterns within Wilsons Promontory waters. The nature of the survey technique employed in this study accounts for some of the observed patterns in distribution and abundance within Wilsons Promontory waters (table 2). The visual search techniques used were primarily targeted at benthic reef fishes at depths of less than 20 metres. As such there is likely to be underrepresentation of cryptic species (such as weedfishes, family Clinidae), pelagic species (such as East Australian Salmon or Jack Mackeral), those associated with other habitats such as soft sediment substrates and seagrass beds (e.g., King George Whiting), and species more typically found at greater depths (e.g., Butterfly Perch). The single night census at Refuge Cove (E3 in table 2) demonstrated the change-over between day and night shifts. Higher numbers of several nocturnal species such as eels and Southern Cardinalfish were detected, with a corresponding loss of many day-active species such as members of the families Labridae and Odacidae (table 2), presumably sheltering deep within reef cover at night.

Distributional trends for certain species around Wilsons Promontory may reflect the distribution of specific habitat types. A number of fishes more common along the east coast are associated with sheltered habitats along this coast, protected from the prevailing westerly winds and swell. These fishes include the Silverbelly (*Parequula melbournensis*), Slender Weed Whiting (*Siphonognathus attenuatus*) and Pencil Weed Whiting (*Siphonognathus beddomei*).

Differences in the fish fauna recorded from Corner Inlet and Wilsons Promontory may also reflect differences in habitat types between these two regions. Fish found around the promontory such as Herring Cale (*Odax cyanomelas*), Scalyfin (*Parma victoriae*), Old Wife (*Enoplosus armatus*), Sea Sweep (*Scorpis aequipinnis*) and Barber Perch (*Caesioperca rasor*) are all associated with extensive rocky reefs (less common within Corner Inlet), while fishes such as the Banded Stingaree (*Urolophus cruciatus*) and Ornate Cowfish (*Aracana ornata*), more common in Corner Inlet, are associated with soft substrates and seagrass beds.

Total checklist and biogeographic affinities. Based on data from all available sources, a total of 231 species of 92 families were identified to species level from this region (Appendix). This list includes many species associated with inshore reefs and habitats but also recorded passing pelagic or open-ocean species more typically associated with deeper waters, e.g., Gemfish, *Rexea solandri*, caught in trawls at 25 and 45 m (MAFRI data) and Ribbonfish, *Trachipterus arawatae* (Museum of Victoria data). The checklist presented here enables examination of the composition and biogeographic affinities of many of the fish species of Wilsons Promontory and Corner Inlet. The majority of these fishes can be placed into one of five categories.

1. Wide-ranging southern Australian species. Almost half of the fishes recorded (104 of 231, or 45%) occur across all of southern Australia, spanning New South Wales, Victoria and Western Australia. Five of these have not been recorded from Tasmania (* in table 3c).

2. Wilsons Promontory as an eastern limit to distribution of southern species. The known distributions of 33 fish species have their eastern limit at Wilsons Promontory, these species occurring further west and/or south (table 3a). An additional 25 species reported from Wilsons Promontory reach their eastern limit between Wilsons Promontory and Cape Howe to the east, often reported in the literature as "eastern Bass Strait" (table 3b). For these species no exact records have been published of their eastern limit, however they have not been recorded in the

Table 2. Distributions and relative abundances of reef fishes at 26 sites around Wilsons Promontory and Corner Inlet. (A = Very common. >20 fish sighted: B = Common/regularly encountered: 5-20 fish sighted; C = Uncommon/rarely sighted: 1-4 fish sighted). * = night dive

Species Name	Common Name	T1	L1	L2	L3	P1	P2	P3	P4	N1	N2	N3	W1	W2	S1	S2	S3	E1	E2	E3*	E4	E5	E6	E7	C1	C2	C3
Heterodontus portusjacksoni	Port Jackson Shark					C	C		C																		
Parascyllium ferrugineum	Rusty Carpetshark																	C									
Cephaloscyllium laticeps	Draughtboard Shark																			C	C			C			
Trygonorrhina fasciata	Southern Fiddler Ray									C																	
Raja whitleyi	Melbourne Skate							C																			
Dasyatis thetidis	Black Stingray																	C									
Urolophus cruciatus	Banded Stingaree																							C	A	A	B
Gymnothorax prasinus	Green Moray Eel																			C							
Conger verreauxi	Southern Conger Eel																		C	C							
Aulopus purpurissatus	Sergeant Baker																	C									
Lotella rhacina	Largetooth Beardie	C							C		C	C							C		C	C	C		C		
Genypterus tigerinus	Rock Ling		C						C														C				
Atherinid spp.	Hardyhead																				A						
Hyporhamphus melanochir	Southern Sea Garfish																			C	C						
Optivus sp.1 (GGK, 1994)	Violet Roughy																	C	B								
Trachichthys australis	Roughy																C				B		C				
Hippocampus abdominalis	Bigbelly Sea Horse																						C	C			C
Phyllopteryx taeniolatus	Common Seadragon					C	C	C											C	C	C						
Neosebates scorpaenoides	Ruddy Gurnard Perch			C			C											C		C							C
Platycephalid spp.	flatheads																			C							
Caesioperca lepidoptera	Butterfly Perch		C										A	A	B	A	A	B	B		A						
Caesioperca rasor	Barber Perch	A	A	A	B	A	A	B	B	A	A	B	A	A	A	A	A	A	A	B	A	A	A		C		C
Hypoplectrodes nigroruber	Banded Seaperch									C											C						
Paraplesiops meleagris	Blue Devil												C														
Trachinops caudimaculatus	Southern Hulafish	C																									C

Table 2. (cont.). Distributions and relative abundances of reef fishes at 26 sites around Wilsons Promontory and Corner Inlet.

Species Name	Common Name	T1	L1	L2	L3	P1	P2	P3	P4	N1	N2	N3	W1	W2	S1	S2	S3	E1	E2	E3*	E4	E5	E6	E7	C1	C2	C3
Vincentia conspersa	Southern Cardinalfish																		B	A	C						C
Dinolestes lewini	Longfin Pike	C	B	A	B	A	A	B	A	B	A	A			B	C	C	B			C		B				
Sillaginodes punctata	King George Whiting				C																						
Pseudocaranx spp.	trevallies			C																C							
Trachurus declivis	Cowanyoung/Jack Mackeral																	A									
Parequula melbournensis	Silverbelly	C											C			C		B	C	B	C						
Upeneichthys vlamingii	Red Mullet	C		B		C	B	C		B	B	B	B	C	C	C		B	A	B	B	C	C				
Pempheris multiradiata	Common Bullseye	B	B		C	B		B		B	C		A	C	B	B	A	C	A	A	A	B	B	C			
Scorpis aequipinnis	Sea Sweep	B	B	C	B	B	B	C	A	B	B	C			A	A	A	A	A		A	A	B	A			
Scorpis lineolata	Silver Sweep				C	B				A		A			B			A	A	C	B	A	A	A	A	A	
Kyphosus sydneyanus	Silver Drummer	C										C															
Girella elevata	Black Drummer												C		C				C								
Girella zebra	Zebra Fish	B			C	C	B	C	A			B	C		B	B	C	B	A		B		C	A	B		C
Atypichthys strigatus	Mado								C									B			B		B	A	A	A	
Tilodon sexfasciatum	Moonlighter		C																		B						
Enoplosus armatus	Old Wife	A	B	B	C	C	C		B	A	B	B	B	C	B	B	A	B	A	B	A	B	B				C
Pentaceropsis recurvirostris	Long-snouted Boarfish	B	C			C	C	C	C	C	C	C	C		B		C		C		C	C	B	C			
Aplodactylus arctidens	Southern Sea Carp	C	B	C	C	C	C	B	A		C	B	C	C	B	B		C	C		C	C		C			C
Cheilodactylus nigripes	Magpie (Morwong) Perch	B	B	C	C	B	C	C	C	A	B	C	B	B	B	B	B	A	A	B	B	B	C	C	C	C	
Cheilodactylus spectabilis	Banded Morwong	C			B	C				C			C	C	C	B	C		C		B	C		C	A		
Dactylophora nigricans	Dusky Morwong	C					C		C						C					C			C				
Nemadactylus macropterus	Jackass Morwong	C														A											
Latridopsis forsteri	Bastard Trumpeter	B	C	C			C	C	B	A	B	B	B		B	C		B	B		C	C	C	C	A		
Sphyraena novaehollandiae	Shortfinned Seapike/Snook																			C	C						
Parma microlepis	White Ear							C	C						C			C						C			
Parma victoriae	Scalyfin	B	C	B	B	C	B	C	B	B	B	B	B	C	C	B	C	A	A	C	B	C	C				
Dotolabrus aurantiacus	Pretty Polly																		C								

Table 3. Limits to fish distributions in relation to Wilsons Promontory

a. Fishes at their known eastern limit at Wilsons Promontory

Phycodurus eques, Maxillacosta scabriceps, Aetapcus maculatus, Gnathanacanthus goetzeei, Caesioperca rasor, Paraplesiops alisonae, P. meleagris, Trachinops caudimaculatus, Vincentia conspersa, Tilodon sexfasciatum, Chironemus georgianus, Parma victoriae, Dotolabrus aurantiacus, Siphonognathus attenuatus, S. beddomei, S. caninus, S. tanyourus, Norfolkia incisa, Heteroclinus adelaidae, H. johnstoni, H. macropthalmus, H. puellarum, H. eckloniae, Ophiclinops varius, Ophioclinus gabrieli, O. ningulus, Eubalichthys gunnii, Meuschenia australis, M. galii, M. hippocrepis, Thamnaconus degeni, Aracana ornata, Contusus richei.

b. Fishes with an eastern limit between Wilsons Promontory and Cape Howe

Geotria australis, Pristiophorus cirratus, P. nudipinnis, Parascyllium ferrugineum, P. variolatum, Trygonorrhina fasciata, Raja sp. A (L&S), *Urolophus cruciatus, Conger verreauxi, Galaxias truttaceus, Galaxiella pusilla, Aspasmogaster tasmaniensis, Eeyorius hutchinsi, Pseudophycis bachus, Stipecampus cristatus, Neoplatycephalus aurimaculatus, Platycephalus speculator, Parequula melbournensis, Acanthopagrus butcheri, Aplodactylus arctidens, Sphryaena novaehollandiae, Siphonognathus radiatus, Trianectus buceplialus, Seriolella brama, Ammotretis lituratus.*

c. Fishes at their known southern limit at Wilsons Promontory. (* also occur in Western Australia)

Herklotsichthys castelnaui, Optivus sp. 1 (GGK), *Platycephalus fuscus, Hypoplectrodes annulatus, *Trachurus novaezelandiae, *Arripis georgiana, Achoerodus viridis, *Eupetrichthys angustipes, *Ophthalmolepis lineolata, Gobiopterus semivestitus, Synaptura nigra, *Nelusetta ayraudi.*

d. Fishes at their known western limit at Wilsons Promontory

Gobiesocidae: Genus A, sp. 2 (GGK), *Acanthistius ocellatus, Callanthias allporti, Sillago flindersi, Girella elevata.*

e. Fishes at their western limit between Wilsons Promontory and Port Phillip Bay

Anguilla reinhardtii, Neoplatycephalus richardsoni, Hypoplectrodes maccullochi, Lepidoperca pulchella, Arripis trutta, Scorpis lineolata, Atypichthys strigatus, Paristiopterus labiosus, Cheilodactylus spectabilis, Nemadactylus douglasi, Parma microlepis.

(GGK = Gomon et al., 1994; L&S = Last and Stevens, 1994)

warmer waters of southern New South Wales. Hence 58 of 231 species (or 25%) reported from Wilsons Promontory are at or close to the eastern end of their range. Certain species listed in tables 3a and 3b have also been recorded from Tasmanian waters (see Appendix).

Species which occur on rocky reefs may be limited to the east as the area between Wilsons Promontory and Cape Howe differs from the marine habitats west of the promontory. This eastern area is predominantly long sand beaches (such as Ninety Mile Beach) adjacent to large sand plains with few reefs. Only a handful of tiny reefs occur adjacent to the shore at places such as Point Hicks, Mallacoota, Wingan Inlet and Cape Conran. Most offshore reefs are small, occur at around 30–40 metres and are composed of broken reef and rubble without significant vertical structure (Greg Parry, pers. comm). Hutchins (1987) proposed that the scarcity of shallow reefs across this region may explain the eastern limits of two plesiopid species, *Paraplesiops alisonae* and *P. meleagris*. Wide distances between limited reefs may prevent step-wise dispersal to the east. As no comprehensive survey of the fish fauna of scattered reefs between Wilsons Promontory and Cape Howe has been undertaken, distributional limits presented here should be treated as preliminary.

Table 2. (cont.). Distributions and relative abundances of reef fishes at 26 sites around Wilsons Promontory and Corner Inlet.

Species Name	Common Name	T1	L1	L2	L3	P1	P2	P3	P4	N1	N2	N3	W1	W2	S1	S2	S3	E1	E2 *	E3	E4	E5	E6	E7	C1	C2	C3
Eupetrichthys angustipes	Snakeskin Wrasse																	C	B								
Notolabrus fucicola	Saddled Wrasse	A	B	C	B	C	B		B	B	B	A	A	A	B	A	A	A	B		B	B	B		C	C	B
Notolabrus tetricus	Bluethroat Wrasse	A	A	A	B	A	B	B	A	A	A	A	A	B	A	A	A	A	A		A	A	A	C	A	B	A
Ophthalmolepis lineolata	Maori Wrasse	C		C			C		C	C	C		C		B	B		B	C		C	B					
Pictilabrus laticlavius	Senator Wrasse	B	C	C	B	B	C	C	C	B	B	B	B		C	B		B	A		B	C	C				
Pseudolabrus psittaculus	Rosy Wrasse	B	C			C							C						C		C		C				
Odax acroptilus	Rainbow Cale	C			C	C			C						B			C	B								
Odax cyanomelas	Herring Cale	A	A	A	B	B	B	B	A	A	A	A	B	B	A		A	B	B		A		C				
Siphonognathus attenuatus	Slender Weed Whiting						C									B					B	C	C	C			
Siphonognathus beddomei	Pencil Weed Whiting																	C	B		B	C	C				
Bovichtus angustifrons	Dragonet		C							C	C	C									C						
Parablennius tasmanianus	Tasmanian Blenny												C														
Rhombosolea tapirina	Greenback Flounder																								C		
Acanthaluteres vittiger	Toothbrush Leatherjacket	C	C		C	C	C				C	C	B		B	B	C		C		C			C		C	
Eubalichthys gunnii	Gunns Leatherjacket												C														
Meuschenia flavolineata	Yellowstriped Leatherjacket	B	C	C			C			B								B	C		C				C		C
Meuschenia freycineti	Sixspined Leatherjacket	C	C		C	C	C								C	C			C	C	C	C	C			B	
Meuschenia hippocrepis	Horseshoe Leatherjacket				C		C			C											B						
Nelusetta ayraudi	Chinaman Leatherjacket	C			C	C															C		C				
Aracana aurita	Shaws Cowfish		C	C					C		C					C									B		C
Aracana ornata	Ornate Cowfish		C	C		C	C	C	C	C	C							C	C	B			C	C	B	A	C
Contusus richei	Barred Toadfish									C																	
Tetractenos glaber	Smooth Toadfish	C	C	C	C		C	C	C		C	C															C
Diodon nichthemerus	Globefish	C	C	C	C	C	C	C	B	B	B	C	C		C		C	C	C	C	C	C		C	B	C	C

3. Cool temperate fishes of southeastern Australia. Few species (43 of 231 or 19%) are restricted to the southeastern coasts ranging from South Australia to at least southern New South Wales.

4. Wilsons Promontory as the southern or western limit to distribution of warm temperate species. Wilsons Promontory forms the southern limit for 12 species distributed further north (table 3c). Most extend up the New South Wales coast, with five also occurring in Western Australia (* in table 3c), but not in Tasmania. One additional species not reported from Tasmania, the Manybanded Sole (*Zebrias scalaris*), reaches its southern/western limits between Wilsons Promontory and Port Phillip Bay. Hence 13 of 231 species (or 6%) reported from Wilsons Promontory are at or close to their southern limit.

Five species recorded from New South Wales and northeastern and eastern Tasmania have their most westerly records at Wilsons Promontory (table 3d). Eleven species reported from northern and eastern Tasmania reach their western limits between Wilsons Promontory and Port Phillip Bay (table 3e). Hence 16 of 231 species (or 7%) reported from Wilsons Promontory are at or close to the western end of their range.

The distributional limits of warmer-water species extending south into Victorian and Tasmanian waters are less well defined than those of southern and western species. The East Australian Current is a southerly current carrying warm waters from Queensland and the Coral Sea down the coasts of New South Wales into the Tasman Sea and eastern Bass Strait. Towards the southern end of this current (off southern New South Wales), it breaks into irregular warm eddies entering colder southern waters off eastern Victoria and Tasmania (Bunt, 1987). The East Australian Current brings occasional warm-temperate and tropical marine species into southern latitudes. Such vagrants include whale-sharks in eastern Bass Strait, sea snakes and leatherback turtles at Wilsons Promontory and hawksbill turtles in Port Phillip Bay (M. Norman, pers. obs.), as well as planktonic young of subtropical species.

The southern limits of many fishes common in the warmer waters of New South Wales may be limited by exposure to the cooler waters of Bass Strait, southern ocean currents and large swell, as well as the wide expanses of sand between Cape Howe and Wilsons Promontory.

5. Wilsons Promontory as the northern limit to distributions. Only two species, otherwise confined to Tasmania, are found at Wilsons Promontory. There is little information available on the biology and distribution of the Flat-head Congolli (*Pseudaphritis* sp.), which is known from only a few individuals found in marine caves in western Tasmania and Wilsons Promontory (Gomon et al., 1994). The Tasmanian Mudfish (*Galaxias cleaveri*) occurs in freshwater streams and rivers in its adult stages and is reported as primarily found in Tasmania but is also recorded from Wilsons Promontory and the Otway Ranges (Gomon et al., 1994). Although the juvenile stage is marine, it is possible that the presence of this species in Victorian freshwater bodies may constitute relict populations dating back to times of lower sea levels when the Bass Strait land bridge was continuous. It is evident that Wilsons Promontory is not biogeographically linked with species primarily restricted to Tasmanian waters.

Overlap with other Australian states. Another way of examining the affinities of the fishes of Wilsons Promontory waters is as numbers of species shared with other Australian states (presence/absence data presented in Appendix).

New South Wales. 170 of 231 (or 74%) are shared with at least southern New South Wales (Kuiter, 1993; Gomon et al., 1994).

Western Australia. 140 of 231 (or 61%) extend west to at least southern Western Australia (Hutchins and Swainston, 1986; Gomon et al., 1994; Hutchins, 1994).

Southern Queensland. 58 of 231 (or 25%) extend at least as far north as southern Queensland (Kuiter, 1993; Gomon et al., 1994).

Tasmania. 207 of 231 (or 90%) are shared with at least the northern Tasmanian coast (Edgar et al., 1982; Last et al., 1983; Kuiter, 1993; Gomon et al., 1994). Very few fishes found in Tasmania do not also occur along the Victorian coastline. On the basis of published reports (Edgar et al., 1982; Last et al., 1983), the Real Bastard Trumpeter (*Mendosoma allporti*) is the only large, highly visible species common on rocky reefs in Tasmania that is not present at Wilsons Promontory. This species also occurs in New Zealand waters.

Comparisons with the fish assemblages in adjacent Victorian waters are not possible at this stage as checklists for other locations within this state, or in adjacent South Australian and New South Wales waters, are not available.

The majority of the fish species at Wilsons Promontory occur across much of southern Australia. In discussing the biogeography of Australian marine organisms, Wilson and Allen (1987) recognised the "Southern Australian Region", roughly bounded by Cape Howe in the east and Cape Leeuwin to the west. They suggested that the limits to this region could not be rigidly defined nor could it be divided into distinct biogeographic subunits. Instead they suggested that it contains four overlapping components: general southern (found from approximately Brisbane to Shark Bay); south-eastern Australian (Brisbane to the Great Australian Bight); endemic south coast (Cape Howe to Albany); and southwestern Australian (Shark Bay to Bass Strait). All four components are represented in the waters around Wilsons Promontory, as indicated by the general distributions and state records presented in Appendix.

Origins and affinities. There is high endemism in the fish fauna of southern Australia. Of the estimated 600 inshore species, around 85% of the species and 38% of the genera are endemic, compared with 13% and 9% respectively for tropical Australian waters (Wilson and Allen, 1987). The origins and affinities of the relatively isolated fish fauna of temperate Australia are poorly known. Wilson and Allen (1987) discussed two distinct origins for the marine fauna of southern Australia. Many of the fish families in this region are well-represented in tropical waters to the north and are likely to have originated from ancestral incursions south into cooler waters. These families include the syngnathids (seahorses and pipefishes), serranids (seaperches and relatives), labrids (wrasses) and gobies. Several groups underwent explosive radiations on reaching cooler waters, e.g., the monacanthids (leatherjackets) are represented by more than 25 species on the south coast with 17 recorded at Wilsons Promontory. Parallel processes are evident in the temperate fish fauna of southern Africa, where different families underwent such explosive radiations, e.g., the sparids (breams and snappers) are represented by 23 species, filling many of the niches occupied by other families in Australian temperate waters where only three sparid species exist.

Other fishes of southern Australia may have ancestry dating back to the break-up of the Gondwanan landmass in the Late Cretaceous and the subsequent long isolation and gradual passage of the Australian continent north into warmer latitudes. Biota carried on the continental shores and shelf of this migrating land mass are considered "palaeoaustral" and have been recognised in many marine invertebrate groups, particularly the shelled molluscs with strong fossil records (Wilson and Allen, 1987). Of the marine fishes reported from Wilsons Promontory (Appendix), four families (Enoplosidae, Dinolestidae, Pataecidae and Gnathanacanthidae) are restricted to southern Australia, while 62 of 156 genera are found only in temperate Australia, or both temperate Australia and New Zealand. The distributions of many of these groups may reflect such southern palaeoaustral ancestry, however the scarcity of fish fossils from this region prevent further speculation.

Overall, the fish fauna of the Wilsons Promontory region is composed primarily of wide-ranging southern Australian endemic species with a much smaller proportion of warmer-water temperate species towards the southern limits of their range. This study provides baseline data on composition and preliminary data on relative abundances of fish populations in the Wilsons Promontory region. The authors hope that such data will provide a useful basis for assessment of future marine park, fisheries and management decisions in the region.

In conjunction with the survey described here, two additional projects were carried out at Wilsons Promontory. The first was a baseline quantitative study of the population densities of twelve key species of benthic reef fishes carried out by the authors in 1987 and 1988. The results of that study will be presented elsewhere. The second project was the production of a layperson guide to flora, fauna, habitat and dive locations around Wilsons Promontory (O'Toole and Turner, 1990).

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Appendix. Checklist of marine, estuarine and freshwater fishes of Wilsons Promontory
Source codes: 1: this study; 2: Museum of Victoria 1982 survey (Wilson et al., 1990); 3: MAFRI unpublished trawl data; 4: Jackson and Davies estuarine and freshwater survey (1983); 5: specific records from Wilsons Promontory in Gomon, Glover and Kuiter (GGK), 1994; 6: specific records from Wilsons Promontory in Kuiter (1993); 7: records from Museum of Victoria fish database; 8: Hutchins unpublished data. Distributions: E = eastern Australia (north of Cape Howe), S = southern Australia (Cape Howe to Cape Leeuwin), W = western Australia (north of Cape Leeuwin). A = absent, P = present. # = species recorded in this study outside checklist sites; L&S, 1994 = Last and Stevens (1994); * = from Paulin (1986).

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Petromyzontidae							
Geotria australis	Pouched Lamprey	4 7	S/W	P	A	P	A
Mordacia mordax	Shorthead Lamprey	4	S/E	P	P	A	A
Pristiophoridae							
Pristiophorus cirratus	Common Sawshark	2 3	S/W	P	A	P	A
Pristiophorus nudipinnis	Southern Sawshark	2 3 5	S	P	A	A	A
Heterodontidae							
Heterodontus portusjacksoni	Port Jackson Shark	1 2 3	E/S/W	P	P	P	P
Parascyllidae							
Parascyllium ferrugineum	Rusty Carpetshark	1 2 3	S/W	P	A	P	A
Parascyllium variolatum	Varied Carpetshark	5	S/W	P	A	P	A
Scyliorhinidae							
Asymbolus vincenti	Gulf Catshark	3	S/W	P	A?	P	A
Cephaloscyllium laticeps	Draughtboard Shark	1 3 8	E/S/W	P	P	P	A
Triakidae							
Galeorhinus galeus	School Shark	3	E/S/W	P	P	P	P
Mustelus antarcticus	Gummy Shark	3	E/S/W	P	P	P	?
Sphyrnidae							
Sphyrna zygaena	Smooth Hammerhead	1# 2 3	E/S/W	P	P	P	A
Squatinidae							
Squatina australis	Australian Angel Shark	2 3 7	E/S/W	P	P	P	A
Rhinobatidae							
Trygonorrhina fasciata	Southern Fiddler Ray	1 3	S/W	P	A	P	A
Rajidae							
Pavoraja nitida	Peacock Skate	3	S/E	P	P	A	A
Raja sp. A (L&S, 1994)	Longnose Skate	3	S	P	A	A	A
Raja gudgeri	Bight Skate	3	E/S/W	P	P	P	A
Raja lemprieri	Thornback Skate	3	S/E	P	P	A	A
Raja whitleyi	Melbourne Skate	1 2 3	E/S/W	P	P	P	A
Narcinidae							
Narcine tasmaniensis	Tasmanian Numbfish	2 3	S/E	P	P	A	A
Dasyatidae							
Dasyatis brevicaudata	Smooth Stingray	3 7	E/S/W	P	P	P	P
Dasyatis thetidis	Black Stingray	1 8	E/S/W	P	P	P	A
Urolophidae							
Urolophus bucculentus	Sandyback Stingaree	3	S/E	P	P	A	P
Urolophus cruciatus	Banded Stingaree	1 2 3	S	P	A	A	A

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Urolophus paucimaculatus	Sparsely-spotted Stingarec	2 3 7	E/S/W	P	P	P	A
Urolophus viridis	Greenback Stingaree	3	S/E	P	P	A	P
Myliobatidae							
Myliobatis australis	Southern Eagle Ray	1# 2 3 8	E/S/W	P	P	P	P
Callorhinchidae							
Callorhinchus milii	Elephant Fish	3 7	E/S/W	P	P	P	A
Ophichthidae							
Muraenichthys australis	Shortfinned Worm Eel	2 7	E/S/W	P	P	P	A
Muraenichthys breviceps	Longfinned Worm Eel	2 7	E/S/W	P	P	P	A
Anguillidae							
Anguilla australis	Shortfin Eel	4 7	S/E	P	P	A	P
Anguilla reinhardtii	Longfin Eel	4	S/E	P	P	A	P
Muraenidae							
Gymnothorax prasinus	Green Moray Eel	1	E/S/W	P	P	P	P
Congridae							
Conger verreauxi	Southern Conger Eel	1 2 7	S	P	A	A	A
Clupeidae							
Herklotsichthys castelnaui	Southern Herring	5	S/E	A	P	A	P
Sardinops neopilchardus	Pilchard	3	E/S/W	P	P	P	P
Spratelloides robustus	Blue Sprat	4	E/S/W	P	P	P	P
Engraulididae							
Engraulis australis	Australian Anchovy	3 4	E/S/W	P	P	P	P
Prototroctidae							
Prototroctes maraena	Australian Grayling	4 7	S/E	P	P	A	A
Galaxiidae							
Galaxias brevipinnis	Climbing Galaxias	4 7	S/E	P	P	A	A
Galaxias cleaveri	Tasmanian Mudfish	4 5 7	S	P	A	A	A
Galaxias maculatus	Common Jollytail	2 4 7	E/S/W	P	P	P	P
Galaxias truttaceus	Trout Galaxias	4 7	S	P	A	A	A
Galaxiella pusilla	Eastern Little Galaxias	4	S	P	A	A	A
Argentinidae							
Argentina australiae	Silverside	3	E/S/W	P	P	P	A
Aulopidae							
Aulopus purpurissatus	Sergeant Baker	1 2	E/S/W	P	P	P	P
Gobiesocidae							
Genus A, sp. 2 (GGK, 1994)	Brown-spotted Spiny Clingfish	5	S/E	P	P	A	A
Alabes dorsalis	Common Shore-eel	7	E/S/W	P	P	P	P
Aspasmogaster liorhynchus	Smoothsnout Clingfish	7	E/S/W	P	P	P	A
Aspasmogaster tasmaniensis	Tasmanian Clingfish	1# 8	S/W	P	A	P	A

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Moridae							
Eeyorius hutchinsi	Finetooth Beardie	*	S	P	A	P	A
Lotella rhacina	Largetooth Beardie	1 2 7	E/S/W	P	P	P	A
Pseudophycis bachus	Red Cod	2 3 7	S	P	A	A	A
Ophidiidae							
Genypterus blacodes	Pink Ling	3	E/S/W	P	P	P	A
Genypterus tigerinus	Rock Ling	1 7	E/S/W	P	P	P	A
Bythitidae							
Dermatopsis sp. (unidentified)	blindfish	3	-	-	-	-	-
Carapidae							
Echiodon rendahli	Messmate Fish	3	S/E	P	P	A	A
Atherinidae							
Atherinosoma microstoma	Smallmouth Hardyhead	4	S/E	P	P	A	A
Exocoetidae							
*Exocoetid (*unidentified)	flying fish	1#	-	-	-	-	-
Hemiramphidae							
Hyporhamphus melanochir	Southern Sea Garfish	1	E/S/W	P	P	P	A
Berycidae							
Centroberyx affinis	Nannygai	3	S/E	P	P	A	A
Trachichthyidae							
Optivus sp. 1 (GGK, 1994)	Violet Roughy	1 2	S/E	A	P	A	P
Trachichthys australis	Roughy	1 2 7	E/S/W	P	P	P	P
Zeidae							
Cyttus australis	Silver Dory	2 3	E/S/W	P	P	P	A
Zeus faber	John Dory	3	E/S/W	P	P	P	P
Trachipteridae							
Trachipterus arawatae	Ribbonfish	5 7	S/E	P	P	?	A
Syngnathidae							
Heraldia nocturna	Upsidedown Pipefish	8	E/S/W	P	P	P	A
Hippocampus abdominalis	Bigbelly Sea Horse	1 2 3 7	S/E	P	P	A	A
Phycodurus eques	Leafy Seadragon	6	S/W	A	A	P	A
Phyllopteryx taeniolatus	Common Seadragon	1 2	E/S/W	P	P	P	A
Stigmatopora argus	Spotted Pipefish	2 4	E/S/W	P	P	P	A
Stigmatopora nigra	Widebody Pipefish	2	E/S/W	P	P	P	P
Stipecampus cristatus	Ringback Pipefish	1#	S	A	A	A	A
Scorpaenidae							
Gymnapistes marmoratus	Soldierfish	2 3	E/S/W	P	P	P	A
Maxillacosta scabriceps	Little Scorpionfish	2 3	S/W	A	A	P	A
Neosebastes scorpaenoides	Ruddy Gurnard Perch	1 2 3	S/E	P	P	A	A
Scorpaena papillosa	Red Rock Cod	2 3 7	S/E	P	P	A	A
Triglidae							
Chelidonichthys kumu	Red Gurnard	3	E/S/W	P	P	P	P
Lepidotrigla modesta	Minor Gurnard	3	E/S/W	P	P	P	A
Lepidotrigla mulhalli	Deepwater Gurnard	3	S/E	P	P	A	A

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Lepidotrigla papilio	Spiny Gurnard	3	E/S/W	P	P	P	A
Lepidotrigla vanessa	Butterfly Gurnard	3	S/E	P	P	A	A
Pterygotrigla polyommata	Latchet	3	E/S/W	P	P	P	A
Pataecidae							
Aetapcus maculatus	Warty Prowfish	5 7	S/W	P	A	P	A
Gnathanacanthidae							
Gnathanacanthus goetzeei	Red Velvetfish	2 5 6 7	S/W	P	A	P	A
Platycephalidae							
Neoplatycephalus aurimaculatus	Toothy Flathead	3	S	P	A	A	A
Neoplatycephalus richardsoni	Tiger Flathead	3	S/E	P	P	A	A
Platycephalus bassensis	Sand Flathead	2 3	S/E	P	P	A	A
Platycephalus fuscus	Dusky Flathead	4	S/E	A	P	A	P
Platycephalus laevigatus	Grassy Flathead	2	E/S/W	P	P	P	A
Platycephalus speculator	Yank Flathead	3	S/W	P	A	P	A
Serranidae							
Acanthistius ocellatus	Eastern Wirrah	5	S/E	P	P	A	P
Caesioperca lepidoptera	Butterfly Perch	1 2 3 7 8	E/S/W	P	P	P	A
Caesioperca rasor	Barber Perch	1 2 3 5 7 8	S/W	P	A	P	A
Hypoplectrodes annulatus	Blackbanded Seaperch	2 5 6	S/E	A	P	A	P
Hypoplectrodes maccullochi	Halfbanded Seaperch	2	S/E	P	P	A	A
Hypoplectrodes nigroruber	Banded Seaperch	1 2 7	E/S/W	P	P	P	A
Lepidoperca pulchella	Eastern Orange Perch	3	S/E	P	P	A	A
Callanthiidae							
Callanthias allporti	Rosy Perch	2	S/E	P	P	A	A
Percichthyidae							
Macquaria colonorum	Estuary Perch	4	S/E	P	P	A	A
Plesiopidae							
Paraplesiops alisonae	Alisons Blue Devil	5	S	P	A	A	A
Paraplesiops meleagris	Blue Devil	1	S/W	A	A	P	A
Trachinops caudimaculatus	Southern Hulafish	1 2 5 7 8	S	P	A	A	A
Apogonidae							
Vincentia conspersa	Southern Cardinalfish	1 2 5 6 7 8	S	P	A	A	A
Dinolestidae							
Dinolestes lewini	Longfin Pike	1 2 7 8	E/S/W	P	P	P	A
Kuhliidae							
Nannoperca australis	Pygmy Perch	4 7	S/E	P	P	A	A
Sillaginidae							
Sillaginodes punctata	King George Whiting	1 2 3 8	E/S/W	P	P	P	A
Sillago flindersi	School Whiting	2 3 5	S/E	P	P	A	P

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Pomatomidae							
Pomatomus saltatrix	Tailor	2 4	E/S/W	P	P	P	P
Carangidae							
Pseudocaranx dentex	White Trevally	1 2 3 4 7 8	E/S/W	P	P	P	P
Seriola lalandi	Yellowtail Kingfish	2	E/S/W	P	P	P	P
Trachurus declivis	Jack Mackeral/ Cowanyoung	1	E/S/W	P	P	P	P
Trachurus novaezelandiae	Yellowtail Horse Mackeral	2 3 7	E/S/W	A	P	P	P
Arripidae							
Arripis georgiana	Tommy Rough	1# 3	E/S/W	A	P	P	A
Arripis trutta	Eastern Australian Salmon	1# 2 4 7	S/E	P	P	A	P
Gerreidae							
Parequula melbournensis	Silverbelly	1 2 3 7 8	S/W	P	A	P	A
Sparidae							
Acanthopagrus butcheri	Black Bream	2 4 7	S/W	P	A	P	A
Chrysophrys auratus	Snapper	3	E/S/W	P	P	P	P
Mullidae							
Upeneichthys vlamingii	Red Mullet	1 2 3 5 7 8	E/S/W	P	P	P	A
Pempheridae							
Parapriacanthus elongatus	Slender Bullseye	1#	E/S/W	P	P	P	A
Pempheris multiradiata	Common Bullseye	1 2 7 8	E/S/W	P	P	P	A
Scorpididae							
Scorpis aequipinnis	Sea Sweep	1 2 7 8	E/S/W	P	P	P	A
Scorpis lineolata	Silver Sweep	1 2 7	S/E	P	P	A	P
Kyphosidae							
Kyphosus sydneyanus	Silver Drummer	1	E/S/W	P	P	P	P
Girellidae							
Girella elevata	Black Drummer	1 5	S/E	P	P	A	A
Girella tricuspidata	Luderick	1# 4	S/E	P	P	A	P
Girella zebra	Zebra Fish	1 2 8	E/S/W	P	P	P	A
Microcanthidae							
Atypichthys strigatus	Mado	1 2 7 8	S/E	P	P	A	A
Tilodon sexfasciatum	Moonlighter	1 5	S/W	P	A	P	A
Enoplosidae							
Enoplosus armatus	Old Wife	1 2 7 8	E/S/W	P	P	P	P
Pentacerotidae							
Paristiopterus labiosus	Giant Boarfish	3	S/E	P	P	A	A
Pentaceropsis recurvirostris	Long-snouted Boarfish	1 2 3 7 8	E/S/W	P	P	P	A
Chironemidae							
Chironemus georgianus	Tassled Kelpfish	5 7	S/W	P	A	P	A

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Aplodactylidae							
Aplodactylus arctidens	Southern Sea Carp	1 2 7 8	S	P	A	A	A
Cheilodactylidae							
Cheilodactylus nigripes	Magpie (Morwong) Perch	1 2 7 8	E/S/W	P	P	P	A
Cheilodactylus spectabilis	Banded Morwong	1 2 8	S/E	P	P	A	A
Dactylophora nigricans	Dusky Morwong	1 2 8	E/S/W	P	P	P	A
Nemadactylus douglasi	Blue Morwong	2 3	S/E	P	P	A	P
Nemadactylus macropterus	Jackass Morwong	1 2 3	E/S/W	P	P	P	A
Nemadactylus valenciennes	Queen Snapper	6	E/S/W	P	P	P	A
Latridiidae							
Latridopsis forsteri	Bastard Trumpeter	1 2 8	S/E	P	P	A	A
Mugilidae							
Aldrichetta forsteri	Yellow-eye Mullet	3 4 7	E/S/W	P	P	P	A
Mugil cephalus	Sea Mullet	2 4	E/S/W	P	P	P	P
Sphryaenidae							
Sphryaena novaehollandiae	Shortfin Seapike/Snook	1	S/W	P	A	P	A
Pomacentridae							
Parma microlepis	White Ear	1 2 7	S/E	P	P	A	A
Parma victoriae	Scalyfin	1 2 5 7 8	S/W	P	A	P	A
Gadopsidae							
Gadopsis marmoratus	Freshwater Blackfish	4 7	S/E	P	P	A	A
Labridae							
Achoerodus viridis	Eastern Blue Groper	2 5 8	S/E	A	P	A	P
Dotolabrus aurantiacus	Pretty Polly	1 2 7 8	S/W	P	A	P	A
Eupetrichthys angustipes	Snakeskin Wrasse	1 2 7	E/S/W	A	P	P	A
Notolabrus fucicola	Saddled Wrasse	1 2 8	S/E	P	P	A	A
Notolabrus tetricus	Bluethroat Wrasse	1 2 7 8	S/E	P	P	A	A
Ophthalmolepis lineolata	Maori Wrasse	1 2 7 8	E/S/W	A	P	P	P
Pictilabrus laticlavius	Senator Wrasse	1 2 7 8	E/S/W	P	P	P	A
Pseudolabrus psittaculus	Rosy Wrasse	1 2 3 7 8	E/S/W	P	P	P	A
Odacidae							
Neoodax balteatus	Little Rock Whiting	2	E/S/W	P	P	P	A
Odax acroptilus	Rainbow Cale	1 2 7 8	E/S/W	P	P	P	A
Odax cyanomelas	Herring Cale	1 2 8	E/S/W	P	P	P	A
Siphonognathus attenuatus	Slender Weed Whiting	1 2 6 7	S/W	P	A	P	A
Siphonognathus beddomei	Pencil Weed Whiting	1 2 6 7 8	S/W	P	A	P	A
Siphonognathus caninus	Sharpnose Weed Whiting	2 6 7	S/W	A	A	P	A
Siphonognathus radiatus	Longray Rock Whiting	2	S/W	P	A	P	A
Siphonognathus tanyourus	Long-tail Weed Whiting	5 6 7	S/W	A	A	P	A
Uranoscopidae							
Gnathagnus innotabilis	Bulldog Stargazer	5	S/E	P	P	A	A
Kathetostoma sp. (unidentified)	stargazer	3	-	-	-	-	-

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Bovichtidae							
Bovichtus angustifrons	Dragonet	1 2 7 8	S/E	P	P	A	A
Pseudaphritis urvilli	Congolli	4 7	S/E	P	P	A	A
Pseudaphritis sp. (GGK, 1994)	Flathead Congolli	5	S	P	A	A	A
Blenniidae							
Parablennius tasmanianus	Tasmanian Blenny	1	S/E	P	P	A	A
Tripterygiidae							
Norfolkia clarkei	Common Threefin	2 5 7 8	S/E	P	P	A	A
Norfolkia incisa	Notched Threefin	5 6 7	S/W	A	A	P	A
Trianectus bucephalus	Bighead Threefin	2 7	S	P	A	A	A
Clinidae							
Cristiceps australis	Southern Crested Weedfish	2 3 7	E/S/W	P	P	P	P
Heteroclinus adelaidae	Adelaide Weedfish	2	S/W	P	A	P	A
Heteroclinus eckloniae	Kelp Weedfish	5 8	S/W	A	P	P	A
Heteroclinus heptaeolus	Sevenbar Weedfish	2 7	E/S/W	P	P	P	A
Heteroclinus johnstoni	Johnstons Weedfish	2 7	S	P	A	A	A
Heteroclinus macropthalmus	Large-eye Weedfish	2 5 7	S/W	P	A	P	A
Heteroclinus puellarum	Little Weedfish	2 7	S	P	A	A	A
Heteroclinus roseus	Rosy Weedfish	8	E/S/W	P	P	P	A
Heteroclinus tristis	Longnose Weedfish	2	S/E	P	P	A	A
Heteroclinus wilsoni	Wilsons Weedfish	2 7	S/E	P	P	A	A
Heteroclinus sp. 2 (GGK, 1994)	Whitleys Weedfish	2	E/S/W	A	P	P	A
Heteroclinus sp. 4 (GGK, 1994)	Colemans Weedfish	2	S/E	A	P	A	A
Ophiclinops varius	Variegated Snakeblenny	2 5 7	S/W	P	A	P	A
Ophiclinus gabrieli	Frosted Snakeblenny	5	S	P	A	A	A
Ophiclinus gracilis	Blackback Snakeblenny	2 7 8	E/S/W	P	P	P	A
Ophiclinus ningulus	Variable Snakeblenny	2 5 7	S/W	P	A	P	A
Stichaerium dorsale	Sand Crawler	2 7	E/S/W	P	P	P	A
Callionymidae							
Eucallionymus papilio	Painted Stinkfish	2 7 8	E/S/W	P	P	P	A
Foetorepus calauropomus	Common Stinkfish	2 3 7	E/S/W	P	P	P	P
Gobiidae							
Arenigobius bifrenatus	Bridled Goby	4	E/S/W	P	P	P	P
Callogobius mucosus	Sculptured Goby	2 7 8	E/S/W	P	P	P	A
Favonigobius lateralis	Longfin Goby	2 4 7	E/S/W	P	P	P	P
Favonigobius tamarensis	Tamar River Goby	4	E/S/W	P	P	P	A
Gobiopterus semivestitus	Glass Goby	4	S/E	A	P	A	P
Nesogobius sp. (unidentified)	goby	2 4 8	-	-	-	-	-
Pseudogobius olorum	Bluespot Goby	4	E/S/W	P	P	P	P
Eleotrididae							
Philypnodon grandiceps	Flathead Gudgeon	4 7	S/E	P	P	A	P
Gempylidae							
Rexea solandri	Gemfish	3	S/E	P	P	A	A
Thyrsites atun	Barracouta	3	E/S/W	P	P	P	P

continued

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Scombridae							
Scomber australasicus	Blue mackeral	3	E/S/W	P	P	P	P
Centrolophidae							
Seriolella brama	Warehou	3	S	P	A	A	A
Seriolella punctata	Spotted Trevalla	3	S/E	P	P	A	A
Bothidae							
Arnoglossus bassensis	Bass Strait Flounder	2 7	S/E	P	P	A	A
Lophonectes gallus	Crested Flounder	3	S/E	P	P	A	P
Pleuronectidae							
Ammotretis lituratus	Spotted Flounder	3 7	S	P	A	A	A
Ammotretis rostratus	Longsnout Flounder	2 3 7	E/S/W	P	P	P	A
Rhombosolea tapirina	Greenback Flounder	1 3 4 7	E/S/W	P	P	P	A
Taratretis derwentensis	Derwent Flounder	3 7	S/E	P	P	A	A
Soleidae							
Synaptura nigra	Black Sole	4 5 6	S/E	A	P	A	P
Zebrias scalaris	Manybanded Sole	3 5	S/E	A	P	A	P
Monacanthidae							
Acanthaluteres vittiger	Toothbrush Leatherjacket	1 2 3 7 8	E/S/W	P	P	P	A
Brachaluteres jacksonianus	Southern Pygmy Leatherjacket	1# 2 3 7	E/S/W	P	P	P	P
Eubalichthys gunnii	Gunns Leatherjacket	1 2 5 6 8	S	P	A	A	A
Eubalichthys mosaicus	Mosaic Leatherjacket	2 3	E/S/W	P	P	P	P
Meuschenia australis	Brownstriped Leatherjacket	2 5 8	S	P	A	A	A
Meuschenia flavolineata	Yellowstriped Leatherjacket	1 8	E/S/W	P	P	P	A
Meuschenia freycineti	Sixspine Leatherjacket	1 2 3 6 7 8	E/S/W	P	P	P	A
Meuschenia galii	Blue-lined Leatherjacket	6	S/W	A	A	P	A
Meuschenia hippocrepis	Horseshoe Leatherjacket	1 5 6 8	S/W	P	A	P	A
Meuschenia scaber	Velvet Leatherjacket	2 3 7	E/S/W	P	P	P	A
Meuschenia venusta	Stars-&-Stripes Leatherjacket	2	E/S/W	P	P	P	A
Nelusetta ayraudi	Chinaman Leatherjacket	1 2	E/S/W	A	P	P	P
Scobinichthys granulatus	Rough Leatherjacket	2 3	E/S/W	P	P	P	P
Thamnaconus degeni	Degens Leatherjacket	2 3 5 6 7	S/W	P	A	P	A
Aracanidae							
Aracana aurita	Shaws Cowfish	1 2 3 7 8	E/S/W	P	P	P	A
Aracana ornata	Ornate Cowfish	1 2 3 5 6 7	S	P	A	A	A
Tetraodontidae							
Arothron firmamentum	Starry Toadfish	2 3	S/E	P	P	A	P
Contusus brevicaudus	Prickly Toadfish	2 3 4 7	E/S/W	P	P	P	A

Appendix — *continued*

Family and species name	Common name	Source	Distr-bution	Tas	NSW	WA	Qld
Tetraodontidae (cont):							
Contusus richei	Barred Toadfish	1 2 3 5 6 7	S	P	A	A	A
Omegophora armilla	Ringed Toadfish	2 3 7	E/S/W	P	P	P	A
Tetractenos glaber	Smooth Toadfish	1 2 3 4 7 8	S/E	P	P	A	P
Diodontidae							
Allomycterus pilatus	Australian Burrfish	2 3	E/S/W	P	P	P	A
Diodon nichthemerus	Globefish	1 2 3 7 8	E/S/W	P	P	P	A