

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 tetraoideus*) and Saddled Wrasse (*Notolabrus fucicola*), the odacid Herring Goby (*Odax cyanomelas*), the serranid Barber Perch (*Caesioperca rasor*) and two scorpidid species, Sea Sweep (*Scorpius aequipinnis*) and Silver Sweep (*Scorpius 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), Kuitert (1993), Hutchins (1994), Gomon et al. (1994) and Last and Stevens (1994). Kuitert (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 coralline 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 <i>Phyllospora comosa</i> 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.	<i>Phyllospora</i> 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 <i>Phyllospora</i> 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.	<i>Phyllospora</i> 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 <i>Phyllospora</i> 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 <i>Phyllospora</i> . 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 <i>Phyllospora</i> 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 <i>Phyllospora</i> covered reef sloping to sand at 10 m.	10	17.4.1987
Norman Point 3	N3	Midway from point to beach on northern side.	<i>Phyllospora</i> 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 <i>Phyllospora</i> and <i>Ecklonia</i> 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 <i>Phyllospora</i> 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.

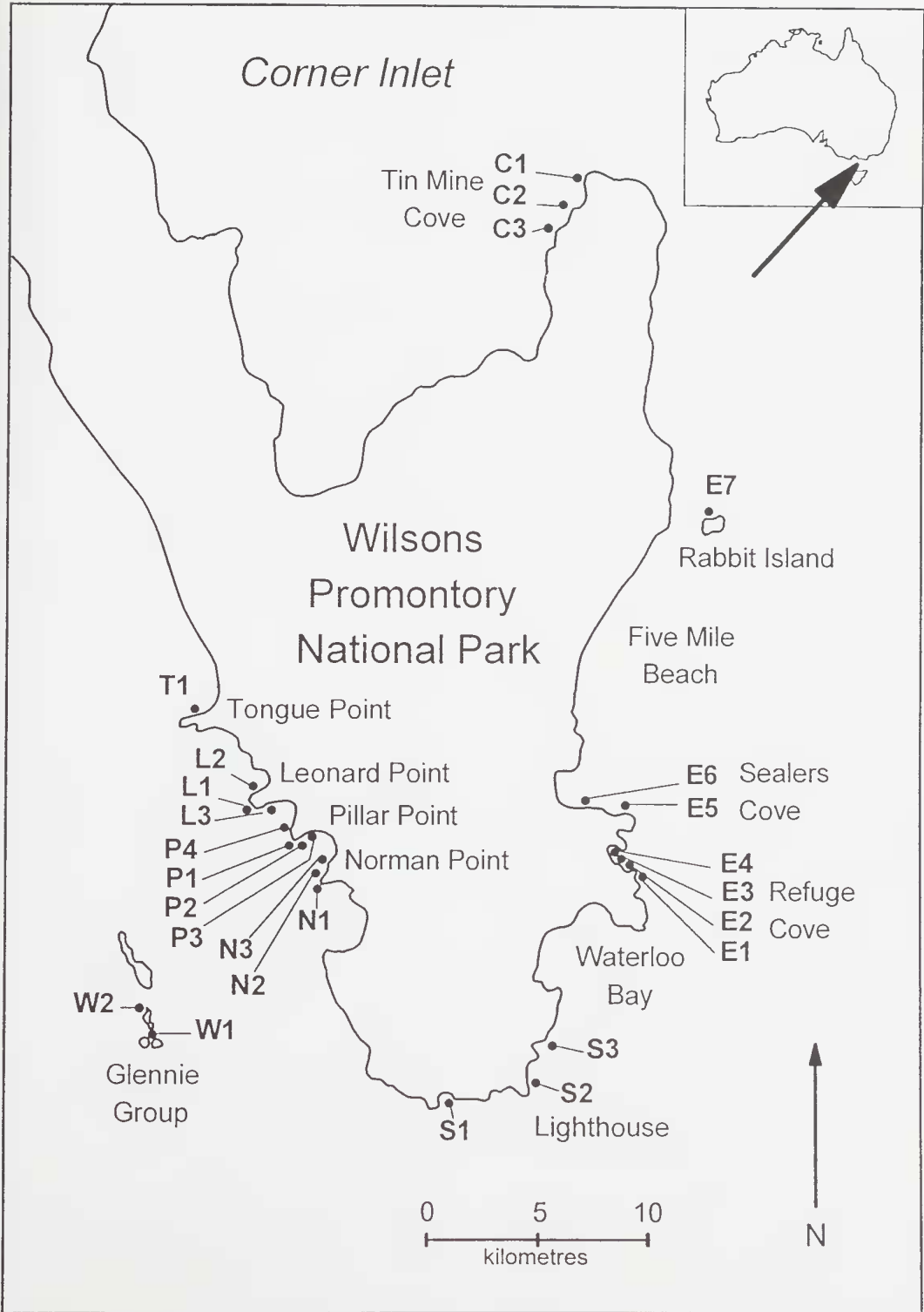


Figure 1. Fish checklist sites around Wilsons Promontory National Park and in Corner Inlet (see Table 1 for site codes).

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 Kuitert (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 abundance 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 raso*); Sea Sweep (*Scorpius aequipinnis*); Bluethroat Wrasse (*Notolabrus tetricus*); Saddled Wrasse (*Notolabrus fucicola*); Herring Gale (*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 latidavus*).

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 (*Ophthalmolepis 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 east coast: Silver Sweep (*Scorpius 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 (*Scorpius 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 under-representation of cryptic species (such as weed-fishes, family Clinidae), pelagic species (such as East Australian Salmon or Jack Mackerel), 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 (*Scorpius 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 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 goetzei*, *Caesioperca rasor*, *Paraplesiops alisonae*, *P. meleagris*, *Trachinops caudimaculatus*, *Vincentia conspersa*, *Tilodon sexfasciatus*, *Chironemus georgianus*, *Parma victoriae*, *Dotolabrus aurantiacus*, *Siphonognathus attenuatus*, *S. beddomei*, *S. caninus*, *S. tanyourus*, *Norfolkia incisa*, *Heteroclinus adelaidae*, *H. johnstoni*, *H. macrophthalmus*, *H. puellarum*, *H. eckloniae*, *Ophioclinops varius*, *Ophioclinus gabrieli*, *O. ningulus*, *Eubalichthys gunnii*, *Meuschenia australis*, *M. galii*, *M. hippocrepsis*, *Thamniaconus degeni*, *Aracana ornata*, *Contusus richiei*.

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

Geotria australis, *Pristioplhorus 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 bucephalus*, *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 novaehollandiae*, **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*, *Scorpiis lineolata*, *Ayypichthys 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.

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

Appendix — continued

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

Appendix — continued

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

Appendix — continued

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

Appendix — continued

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

Appendix — continued

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

continued

Appendix — continued

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

Appendix — continued

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

Appendix — continued

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