Wudjari Country (Esperance) Bush Blitz

Recherche Archipelago Fishes

25 March – 7 April 2023

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Glenn Moore collecting fishes in typical kelp habitat on SCUBA next to shark cage at Daw Island, Magpie Perch *Pseudogoniistius nigripes;* Horseshoe Leatherjacket *Mueschenia hippocrepis* (photos: Colby James (top), Glenn Moore (bottom).

Nomenclature and taxonomy used in this report is consistent with:

Australian Faunal Directory (AFD)

Contents

List of contributors

List of contributors to this report			
Name	**Institution/affiliation**	**Qualifications/area of expertise**	**Level/form of contribution**
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Jenelle Ritchie	Western Australian Museum (WAM)	Technical Officer - Fishes	Logistics, identifications & reporting
Dr Michael Hammer	Museum and Art Gallery of the Northern Territory (MAGNT)	Curator of Fishes	Identifications & reporting

Abstract

A two week dedicated boat-based offshore fish sampling trip was undertaken to Wudjari Country in the Recherche Archipelago region of southwestern Western Australia in autumn of 2023, as part of a larger Bush Blitz expedition survey team in partnership with Tjaltjraak Rangers (including a separate land-based fish survey). A total of 22 sites were sampled for fishes, using a range of methods, primarily on SCUBA but also a variety of extractive methods. This survey targeted the most remote and isolated islands of the Recherche Archipelago with the least survey effort in the past. Collections made during this Bush Blitz resulted in 455 species site records (more than 6500 individuals) comprising 85 lots being added to public collections (WAM) and 370 species observational records. This includes 93 fish species (or putative) in 36 families. The fauna is representative of the unique, and often endemic, fish communities of temperate reefs on the southern coast of Australia. Important populations of a heavily targeted species were identified.

1. Introduction

Southwestern Western Australia supports a unique temperate fish fauna, known for high endemism in both freshwater and marine fishes (Hutchins 1994; Morgan *et al.* 1998; Hutchins and Thompson 2001; Hutchins 2001; Hutchins and Swainston 2003; Gomon *et al.* 2008; Morgan *et al.* 2011). The marine habitats in southwestern Australia are varied and include offshore islands, rocky shorelines, dense kelp stands, extensive seagrass meadows and exposed sandy beaches. The fish communities that inhabit each habitat are often different. The fish species in the southern Australia are broadly endemic, differing from those to the east of Bass Strait through multiple sundering events related to repeated glacial cycles leading to population fluctuations and speciation (Waters and Roy 2003; Moore 2012; Moore and Chaplin 2014). While knowledge of the fish fauna in southwestern Australia is generally good (eg Hutchins 1994; Hutchins 2001; Hutchins 2005), several fish groups and some regions remain poorly known or described, hence detailed surveying and taxonomic review of local fish faunas is still required to provide important biodiversity and taxonomic updates as the foundation for management and conservation, including to provide fresh tissues for ongoing and future genetic investigations.

This report presents the boat-based offshore fish survey component of a two week Bush Blitz to the Recherche Archipelago on Wudjari Country near Kepa Kurl/Esperance region of southwestern Western Australia in March/April 2023, as part of a larger Bush Blitz expedition survey team in partnership with Tjaltjraak Rangers (including a separate land-based fish survey:see Hammer *et al.* 2023). This

temperate region is dominated by large granite domed islands surrounded by fringing stands of macroalgae, predominantly kelp *Ecklonia radiata*, and seagrasses. The region is highly exposed to weather conditions developing from the Southern Ocean.

2. Methods

2.1 Site selection

Parts of the Recherche Archipelago study area with previous minimal survey effort (from literature review and search of Atlas of Living Australia records) were prioritised. Of primary interest were the two eastern most groups of islands (Daw/Pointer/New Year, and Pasley) but also the extensive island and reef habitat around Middle Island. The islands closer to Esperance (Mart and Mondrain) were sampled while returning to port.

Sites were selected based on depth, weather, swell and wind conditions, and habitat (predicted from local knowledge [Marc Payne] and the boat's sounder). As much as possible reefs with different aspects were selected but this was limited by prevailing conditions. Shallow protected bays were visited for box trawl and traps.

Overall, 22 sites were sampled for fishes between 28 March and 6 April 2023, including 15 using SCUBA diving, three using box trawl, two using fish traps, one by dipnetting and one by angling (Table 1 and Figure 1). Additional sites were sampled for crustaceans and/or molluscs and are reported elsewhere. Weather was relatively favourable given the exposed location and no sampling time was lost (although plans changed often). Visibility was generally 5-15m and water temperature was average for March (19-21^{o}C).

2.2 Survey techniques

Sampling was conducted from the vessel MV *Immortalis* and employed a rapid assessment design in order to cover as wide a spatial distribution and variety of habitats/environmental conditions as possible, and maximise efficiency:

1) **Pole Spear** is a small hand spear used to target mobile species (on SCUBA).
2) **Clove Oil** diluted with water and sprayed under ledges or towards fish and acts as an anaesthetic for small cryptic fishes (on SCUBA).
3) **Dip Net** used from the back of a boat to collect small pelagic species.
4) **Box trawl** is a small (1m wide) weighted frame with a fine mesh trailing net dragged through seagrass habitat from a dinghy.
5) **Baited traps** are collapsible mesh nets with conical openings on each end (45 x 25 x 25 cm coming in multiple colours) that were set on floated ropes in seagrass or among reef and baited with fish or berley.
6) **Angling** was used as a supplemental method at several sites and works well for opportunistic sampling of predatory species.
7) **UVC** (Underwater Visual Census) is a count of individuals of each species observed during each SCUBA dive. Given the safety constraints (see below) this should not be considered quantitative but rather an indication of relative abundance of observed species.

The methods employed at each site are shown in Table 1. Due to the potential risk from large White Sharks *Carcharodon carcharias*, SCUBA diving was conducted from a cage. Divers descended and ascended in the cage. On the seafloor, the cage was used as a base and sampling was undertaken by swimming 15-20 m from the cage before returning to it, moving it and venturing out again. The cage

operator (Marc Payne) is a highly experienced commercial diver from the region and was a non-sampling diver on watch at all times. All diving adhered to strict WA Museum Health and Safety procedures.

Environmental data including physical characteristics and habitat components were recorded for each site (Table 1).

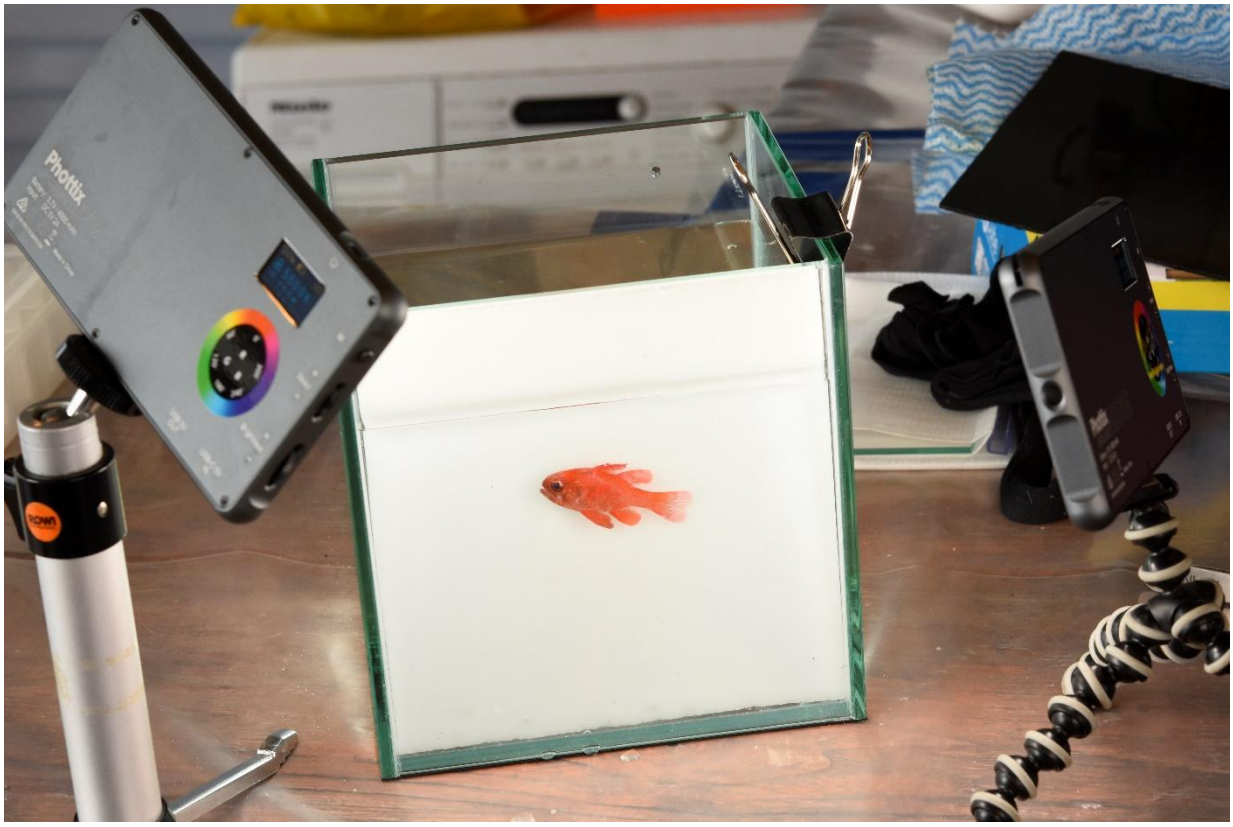
Sampling was conducted under WA Fisheries Exemption 250966222, in accordance with *Australian code for the care and use of animals for scientific purposes* 2013 and with Esperance Tjaltjraak Native Title Aboriginal Corporation approval.

2.2.1 Methods used at standard survey sites

There were no marine standard survey sites. However, fish, molluscs and crustacea were sampled at each site.

2.3 Identifying the collections

Field identifications followed several informative field guides for the region (Hutchins and Thompson 2001; Hutchins and Swainston 2003; Gomon *et al.* 2008), and specimens were then verified upon return to the laboratory of the Western Australian Museum using keys in the aforementioned text or other specialised taxonomic publications. Specimens are permanently accessioned in the WAM fish collection (registration P.35483 to P.35508) and will ultimately be available on the Atlas of Living Australia.



Tank setup for field photography small fishes during the Bush Blitz. The fish is the Orange Cardinalfish (photo G. Moore).

Figure 1. Map of Wudjari Country (Recherche Archipelago) Bush Blitz boat-based fish sites (GoogleEarth, TerraMetrics 2023).

Table 1. Details of offshore fish sampling sites from the Wudjari Country (Recherche Archipelago) Bush Blitz (GDA94).

Station	Date	Island	Specific locality	Longitude	Latitude	Methods	Habitat	Depth (m)	Time
BBR23-001	28/03/2023	New Year Island	N coast	124.1300	-33.8536	PS, CO	Kelp, seagrass, rocks	8-9	1546
BBR23-002	29/03/2023	New Year Island	N coast	124.1258	-33.8628	CO, IS	Kelp, small structure	10-11	0953
BBR23-003	29/03/2023	Daw Island	NW side	124.1299	-33.8447	PS	Walls, bommies, overhangs, kelp	15-17	1502
BBR23-004	30/03/2023	Pointer Island	Channel between Pointer & Anvil Is.	125.3386	-33.7257	CO	Kelp, basalt	16	0953
BBR23-005	30/03/2023	Anvil Island	Bay on NE corner	124.0962	-33.7335	BT	Posidonia, Amphibious, Zostera	4-5	1500
BBR23-006	31/03/2023	Daw Island	W side	124.1314	-33.8468	FT	Reef kelp	17	overnight
BBR23-007	31/03/2023	Daw Island	W side, E side of bay	124.1352	-33.8508	PS, CO	Kelp, low profile reef	9-11	0904
BBR23-009	31/03/2023	Daw Island	SE end of bay	124.134	-33.8536	BT	Seagrass, Zostera	8	1430
BBR23-012	01/04/2023	Middle Island	E side of bay	123.2136	-34.0689	PS, CO	Kelp, Sargassum, seagrass on slope	16-20	0850
BBR23-013	01/04/2023	Middle Island	NE side of bay	123.2138	-34.0686	PS, CO	Kelp, Sargassum, seagrass on slope	17-20	1319
BBR23-014	01/04/2023	Middle Island	Middle of bay	123.2058	-34.0834	DN	Back of boat	0.5	2000
BBR23-015	02/04/2023	Goose Island	W side	123.18	-34.0674	PS, IS	Kelp, huge boulders, wall	20-25	0915
BBR23-016	02/04/2023	Middle Island	SW corner of Goose Island Bay	123.1803	-34.0834	PS, CO	Kelp, small boulders, seagrass	8-12	1350
BBR23-018	03/04/2023	Middle Island	S side	123.1771	-34.1009	PS	Kelp, huge boulders, wall, bare sand	10-16	0900
BBR23-020	03/04/2023	Goose Island	Bay	123.1885	-34.0834	BT	Posidonia dominated seagrass meadow	5-8	1400
BBR23-021	03/04/2023	Middle Island	W side	123.1528	-34.1024	AN	Reef	20	1530
BBR23-022	03/04/2023	Middle Island	SW side of Goose Is.	123.1767	-34.0839	FT	Posidonia dominated seagrass meadow	5-6	overnight
BBR23-023	04/04/2023	Pasley Island	W side	123.5169	-34.0006	PS, CO	Kelp, ridges, boulders	24	0842
BBR23-024	04/04/2023	Pasley Island	Small inlet to West	123.5169	-34.0006	IS	Kelp, granite boulders	24	1300
BBR23-025	05/04/2023	Mart Island	NE corner	122.6543	-33.9974	CO	Kelp, granite boulders	20-23	1033
BBR23-026	05/04/2023	Mart Island	NE corner	122.6548	-33.9994	PS, CO	Kelp, granite boulders	10-13	1500
BBR23-027	06/04/2023	Mondrain Island	N side	122.2564	-34.1183	PS	Seagrass, kelp, boulders	8-11	1120

* PS = pole spear; CO = clove oil; BT = baited trap; FT = Fish Trap; AN = angling; DN = dip net; IS = incidental collection from substrate. Missing sites were sampled for crustaceans and/or molluscs and are reported elsewhere.

Granite domes like Middle Island dominate the vast and remote Recherche Archipelago (photo G. Moore)

Subtidal reef habitats are often dramatic boulders with steep invertebrate-encrusted walls or covered in dense stands of kelps (photos C. James).

3. Results and Discussion

Appendix 1 lists all fishes recorded from the Recherche Archipelago during the Bush Blitz, with species relative abundance by site listed in Appendix 2. These lists include collections and observations from SCUBA, traps, box trawls, angling and dipnet. Collections made during this Bush Blitz resulted in 455 species site records (more than 6500 individuals) comprising 85 lots being added to public collections (WAM) and 370 species observational records. This includes 93 fish species (or putative) in 36 families.

3.1 Un-named or not formalised taxa

Five previously recognised but as yet undescribed species were collected, including two species of weedfishes (Clinidae), two species of clingfishes (Gobiesocidae) and a goby (Gobiidae) (Table 4; see Gomon et al. 2008). Samples and tissue collections from this study will contribute to species descriptions for some species.

Table 4. Putatively un-named or not formalised taxa

Taxon	Comment
Whitley's Weedfish *Heteroclinus* sp. 2	Known undescribed species as part of a *Heteroclinus* species complex
Fewray Weedfish *Heteroclinus* sp. 5	Known undescribed species as part of a *Heteroclinus* species complex
Slender Clingfish Genus C species 3	Known undescribed genus and species (taxonomic study underway by GM)
Longhead Clingfish *Parvicrepis* sp.	Known undescribed species (taxonomic study underway by GM)
Groovecheek Goby *Nesogobious* sp. 4	Known undescribed species (taxonomic study underway by MH)

3.2 Putative new species (new to science)

In this report, 'putative new species' means an unnamed species that, as far as can be ascertained, was identified as a new species to western science as a direct result of this Bush Blitz. No obviously new species were observed on the survey, but future taxonomic investigation on museum samples may yield such species.

3.3 Exotic and pest species

No species of introduced fish were recorded from the Recherche Archipelago study area.

3.4 Threatened species

No species with conservation listing at State or Commonwealth levels were recorded.

3.5 Range extensions

Given that the eastern most islands of the Recherche Archipelago have been poorly surveyed, many species have been added to the known fauna list for the particular islands targeted or provided short, confirmed range extensions, although the species are generally known for the region.

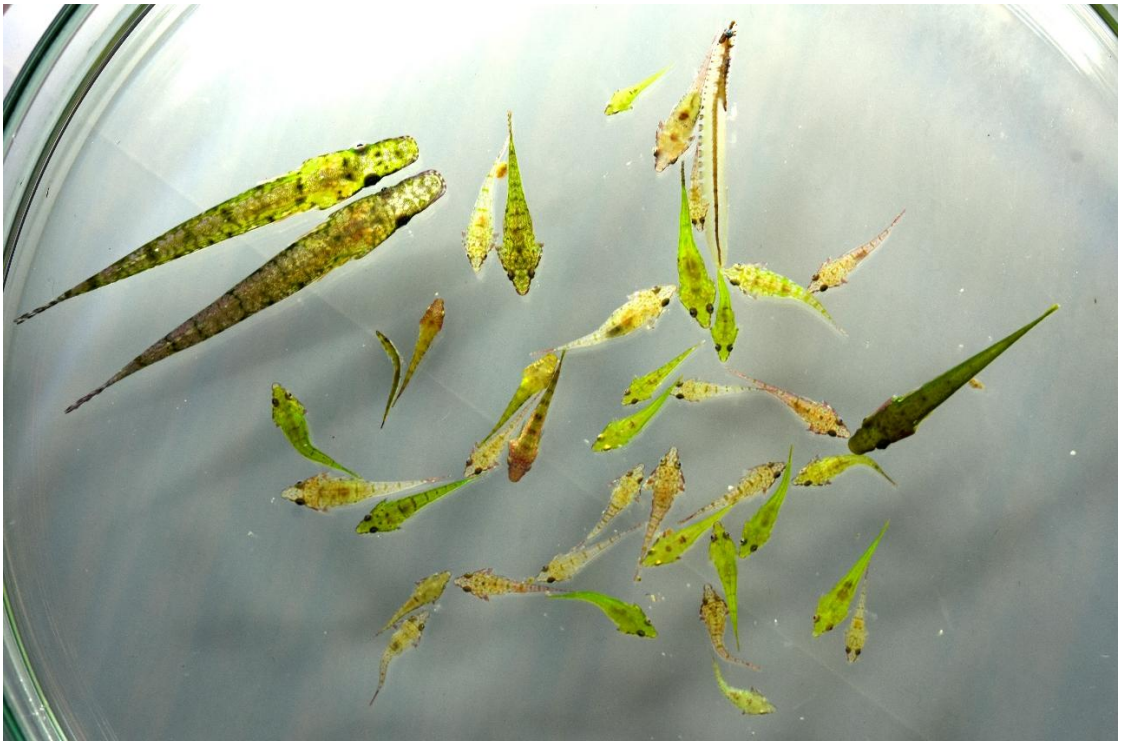
3.6 Genetic information

The Recherche Archipelago fish survey of this Bush Blitz was in partnership with the Minderoo Foundation Oceanomics program (https://www.minderoo.org/oceanomics). Tissue sampling was undertaken by the Minderoo team to build high-quality complete mitogenomes for all species and complete genomes for selected species. In addition, the Oceanomics team undertook extensive water sampling for eDNA analysis. Once complete, genetic and genomic and eDNA data will become publicly available.

4. Information on species lists

This survey provided a thorough assessment of the diversity of fish species in the eastern Recherche Archipelago. The fish fauna is typical of southern Australia and represents a significant contribution to the biomass of the Great Southern Reef as well as substantial cultural and economic importance (Hutchins 1994; Hutchins 2001; Hutchins 2005; Bennett *et al.* 2016).

However, the species list reported here is by no means complete. Sampling for cryptic species is challenging due to habitat (ie a seine net or box trawl cannot be deployed over boulders or rocky reef), safety (prolonged sampling away from the cage carries risk from sharks) and weather (safe sampling sites are often restricted to protected areas). Despite that, this survey did record some 22 species that might be considered 'cryptic' – that is small inconspicuous species not typically observed (Appendix 2).



Five species of clingfishes (Gobiesocidae) taken from seagrass at Anvil Is. (BBR23-005) using box trawl (Photo G. Moore).

Cryptic species recorded during the Wudjari Country (Recherche Archipelago) Bush Blitz. Undescribed Groovecheek Goby *Nesogobius* sp. 4 (top); Slender Clingfish Genus C sp. 3 (middle); Southern Crested Weedfish *Cristiceps australis* (bottom) (photos G. Moore)

5. Information for land managers

The remote eastern islands of the Recherche Archipelago supported largely healthy and diverse fish populations. These sites appear have been subjected to relatively low fishing pressure to date. This suggests that these areas may act as important refuges for species that typically face high levels of fishing in more populated areas, such as Esperance (see Section 6 below). Such areas provide opportunities for species to thrive and provide recruits to other areas where pressures are higher. While the fish communities around these islands have probably been visited infrequently due to their isolation and distance from urbanised areas, as resources become scarcer around population centres and boat ownership rises, managers should consider the possibility that anglers may be prepared to travel further.

The Recherche Archipelago is widely recognised for its significant biodiversity values and a jewel in the crown of the Great Southern Reef. The Rangers and traditional owners are deeply connected to the region with a strong knowledge and interest of fishes, and further sampling could add to the species baseline of marine biodiversity (and freshwater and estuarine) and monitor the condition of key sites to assess water quality and fish numbers. Likewise the local Esperance community has a strong connection to their local marine environment, including fishes and continued community engagement through field work, school visits and a community outreach is a great portal into environmental awareness and stewardship.

6. Other significant findings

Western Blue Groper *Achoerodus gouldii* is a very popular angling and spearfishing target and both the abundance and sizes of this species on reefs around the population centre of Esperance is known to be reduced (Doc Reynolds pers. comm. 2023). The eastern most island groups visited during this Bush Blitz supported robust populations including medium to very large adults (see Appendix 2). This is a very slow growing species with a life history that makes them especially vulnerable to overfishing (eg, they take 30-35 years to reach sexual maturity; Coulson *et al.* 2007; Coulson *et al.* 2009).

A large male Western Blue groper cruising over a kelp covered reef at Middle Island (Photo G. Moore).

7. Conclusions

The targeted survey for fishes during the 2023 Bush Blitz added significant spatial information on species distributions in Wudjari Country (Recherche Archipelago) across different habitat types. Fish diversity is high in the region with many new records for the islands surveyed and notable records of good numbers of large mature Western Blue Groper. There is scope for further Ranger led surveys of additional sites (both from the shore and from a vessel) and monitoring of sites deemed as key habitats, and ongoing collaborative research efforts to resolve taxonomy on problematic groups may infer additional uniqueness to the region.

Acknowledgements

We would like to acknowledge the Traditional Owners of Wudjari Country, and recognise their ongoing cultural connection to land and sea country. We pay our respects to Elders past, present and emerging. We thank Traditional Owners and the Esperance Tjaltjraak Native Title Aboriginal Corporation for allowing us to conduct our survey.

The Minderoo Foundation Oceanomics program funded the vessel and the team of Shannon Corrigan, Lara Parata, Eric Raes and Marcelle Ayad were a pleasure to work with. Colby James documented our fieldwork by photographs and video.

We thank the crew of the MV *Immortalis* for their safe and comfortable operational support and always being prepared to be flexible. Marc Payne (Esperance) provided indispensable local knowledge of the islands and reefs, managed and controlled the cage and acted as lookout, dive buddy, field assistant, and more.

Finally, as always, the Bush Blitz team for helping to coordinate another great survey.

Bush Blitz dive team of (L-R) Andrew Hosie, Lisa Kirkendale and Glenn Moore preparing to dive in the Recherche Archipelago (photo G. Moore).

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Appendices

Appendix 1. List of fishes recorded during the boat-based Wudjari Country (Recherche Archipelago) Bush Blitz. * indicates a 'cryptic' species

Family	Species	Common name
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson Shark
Carcharhinidae	*Carcharhinus brachyurus*	Bronze Whaler
Aulopidae	*Latropiscis purpurissatus*	Sergeant Baker
Platycephalidae	*Leviprora inops*	Longhead Flathead
Syngnathidae	*Lissocampus caudalis*	Smooth Pipefish *
Syngnathidae	*Stigmatopora argus*	Spotted Pipefish *
Berycidae	*Centroberyx gerrardi*	Bight Redfish
Berycidae	*Centroberyx lineatus*	Swallowtail
Trachichthyidae	*Trachichthys australis*	Southern Roughy
Moridae	*Pseudophycis breviuscula*	Bastard Red Cod *
Serranidae	*Caesioperca rasor*	Barber Perch
Serranidae	*Othos dentex*	Harlequin Fish
Serranidae	*Epinephelides armatus*	Breaksea Cod
Serranidae	*Hypoplectrodes nigroruber*	Banded Seaperch
Serranidae	*Hypoplectrodes wilsoni*	Spotty Seaperch
Plesiopidae	*Trachinops noarlungae*	Yellowhead Hulafish
Plesiopidae	*Paraplesiops meleagris*	Southern Blue Devil
Apogonidae	*Siphamia cephalotes*	Wood's Siphonfish
Apogonidae	*Vincentia punctata*	Orange Cardinalfish *
Dinolestidae	*Dinolestes lewini*	Longfin Pike
Carangidae	*Pseudocaranx georgianus*	Silver Trevally
Carangidae	*Seriola hippos*	Samsonfish
Gerreidae	*Parequula melbournensis*	Silverbelly
Arripidae	*Arripis georgianus*	Australian Herring
Arripidae	*Arripis truttaceus*	Western Australian Salmon
Mullidae	*Upeneichthys vlamingii*	Bluespotted Goatfish
Pempheridae	*Parapriacanthus elongatus*	Slender Bullseye
Pempheridae	*Pempheris klunzingeri*	Rough Bullseye
Pempheridae	*Pempheris multiradiata*	Bigscale Bullseye
Pempheridae	*Pempheris ornata*	Orangelined Bullseye
Girellidae	*Girella tephraeops*	Western Rock Blackfish
Girellidae	*Girella zebra*	Zebra Fish
Kyphosidae	*Kyphosus sydneyanus*	Silver Drummer
Microcanthidae	*Neatypus obliquus*	Footballer Sweep
Microcanthidae	*Tilodon sexfasciatus*	Moonlighter
Scorpididae	*Scorpis aequipinnis*	Sea Sweep
Scorpididae	*Scorpis georgiana*	Banded Sweep
Chaetodontidae	*Chelmonops curiosus*	Western Talma
Pentacerotidae	*Pentaceropsis recurvirostris*	Longsnout Boarfish
Pomacentridae	*Chromis klunzingeri*	Blackhead Puller
Pomacentridae	*Parma mccullochi*	McCulloch's Scalyfin
Pomacentridae	*Parma victoriae*	Scalyfin
Enoplosidae	*Enoplosus armatus*	Old Wife
Chironemidae	*Chironemus georgianus*	Western Kelpfish
Aplodactylidae	*Aplodactylus westralis*	Western Seacarp
Latridae	*Dactylophora nigricans*	Dusky Morwong
Latridae	*Nemadactylus valenciennesi*	Blue Morwong

Family	Species	Common name
Latridae	*Pseudogoniistius nigripes*	Magpie Perch
Labridae	*Achoerodus gouldii*	Western Blue Groper
Labridae	*Austrolabrus maculatus*	Blackspotted Wrasse
Labridae	*Bodianus frenchii*	Western Foxfish
Labridae	*Coris auricularis*	Western King Wrasse
Labridae	*Dotalabrus alleni*	Little Rainbow Wrasse
Labridae	*Dotalabrus aurantiacus*	Castelnau's Wrasse
Labridae	*Eupetrichthys angustipes*	Snakeskin Wrasee
Labridae	*Halichoeres brownfieldi*	Brownfield's Wrasse
Labridae	*Heteroscarus acroptilus*	Rainbow Cale
Labridae	*Notolabrus parilus*	Brownspotted Wrasse
Labridae	*Olisthops cyanomelas*	Herring Cale
Labridae	*Ophthalmolepis lineolata*	Southern Maori Wrasse
Labridae	*Pictilabrus laticlavius*	Senator Wrasse
Labridae	*Pseudolabrus biserialis*	Redband Wrasse
Labridae	*Siphonognathus beddomei*	Pencil Weed Whiting
Labridae	*Siphonognathus caninis*	Sharpnose Weed Whiting
Labridae	*Siphonognathus radiatus*	Longray Weed Whiting
Creediidae	*Limnichthys fasciatus*	Tommyfish *
Tripterygiidae	*Helcogramma decurrens*	Blackthroat Threefin *
Gobiesocidae	*Alabes occidentalis*	Western Shore Eel *
Gobiesocidae	*Cochleoceps bicolor*	Western Cleaner Clingfish *
Gobiesocidae	*Cochleoceps spatula*	Spadenose Clingfish *
Gobiesocidae	Genus C sp. 3	Slender Clingfish *
Gobiesocidae	*Parvicrepis* sp.	Longsnout Clingfish *
Gobiesocidae	*Posidonichthys hutchinsi*	Posidonia Clingfish *
Clinidae	*Cristiceps australis*	Southern Crested Weedfish *
Clinidae	*Heteroclinus adelaidae*	Adelaide Weedfish *
Clinidae	*Heteroclinus kuiteri*	Kuiter's Weedfish *
Clinidae	*Heteroclinus roseus*	Rosy Weedfish *
Clinidae	*Heteroclinus* sp. 2	Whitley's Weedfish *
Clinidae	*Heteroclinus* sp. 5	Fewray Weedfish *
Clinidae	*Ophiclinus antarcticus*	Dusky Snake Blenny *
Clinidae	*Stichariumdorsale*	Slender Snake Blenny *
Gobiidae	*Callogobius depressus*	Flathead Goby *
Gobiidae	*Eviota bimaculata*	Twospot Eviota *
Gobiidae	*Nesogobius* sp.4	Groovecheek Sandgoby *
Monacanthidae	*Cantheschenia longipinnis*	Smoothspine Leatherjacket
Monacanthidae	*Meuschenia flavolineata*	Yellowstriped Leatherjacket
Monacanthidae	*Meuschenia galii*	Bluelined Leatherjacket
Monacanthidae	*Meuschenia hippocrepis*	Horseshoe Leatherjacket
Monacanthidae	*Meuschenia scaber*	Velvet Leatherjacket
Monacanthidae	*Scobinichthys granulatus*	Rough Leatherjacket
Aracanidae	*Anoplocapros lenticularis*	Whitebarred Boxfish
Tetraodontidae	*Omegophora cyanopunctata*	Bluespotted Toadfish
Diodontidae	*Diodon nicthemerus*	Globefish

Appendix 2. List of fishes recorded by site during the boat-based Wudjari Country (Recherche Archipelago) Bush Blitz. Bold text indicates one or more specimens were collected.

Family	Species	1	2	3	4	5	6	7	9	12	13	14	15	16	18	20	21	22	23	24	25,26	27
Heterodontidae	*Heterodontus portusjacksoni*																				1	
Carcharhinidae	*Carcharhinus brachyurus*																		1	1		
Aulopidae	*Latropiscis purpurissatus*																**1**					
Platycephalidae	*Leviprora inops*																					**1**
Syngnathidae	*Lissocampus caudalis*		**1**																			
Syngnathidae	*Stigmatopora argus*								**2**													
Berycidae	*Centroberyx gerrardi*																**1**				1	
Berycidae	*Centroberyx lineatus*										**10**											
Trachichthyidae	*Trachichthys australis*										**1**											
Moridae	*Pseudophycis breviuscula*									**2**												
Serranidae	*Caesioperca rasor*												**10**						20		30	
Serranidae	*Othos dentex*												1							1		
Serranidae	*Epinephelides armatus*				1					1	**5**			2							5	
Serranidae	*Hypoplectrodes nigroruber*									**2**	**6**		1	1	1						2	
Serranidae	*Hypoplectrodes wilsoni*										2											
Plesiopidae	*Trachinops noarlungae*	**100**	100	100	30			30		50	40		30	50	10				12	10	100	20
Plesiopidae	*Paraplesiops meleagris*		1	**2**	1			1		3	3		1	5	1						1	
Apogonidae	*Siphamia cephalotes*		40						**1**		10								20			50
Apogonidae	*Vincentia punctata*				**2**			**2**					2									
Dinolestidae	*Dinolestes lewini*		10	20							10										25	
Carangidae	*Pseudocaranx georgianus*				2			10		10	**20**			8							60	5
Carangidae	*Seriola hippos*													1								
Gerreidae	*Parequula melbournensis*														**15**							2
Arripidae	*Arripis georgianus*	50	20	20								**50**										40
Arripidae	*Arripis truttaceus*														40					30		
Mullidae	*Upeneichthys vlamingii*										6				3			**1**			8	30
Pempheridae	*Parapriacanthus elongatus*												**50**						100			100
Pempheridae	*Pempheris klunzingeri*	**100**	20	200	10			10		**10**			5		2				5	10	40	
Pempheridae	*Pempheris multiradiata*												5	2								
Pempheridae	*Pempheris ornata*									**10**									30	50	8	

Family	Species	1	2	3	4	5	6	7	9	12	13	14	15	16	18	20	21	22	23	24	25,26	27
Girellidae	*Girella tephraeops*	5	5	8				4		4	5				8		**1**				10	10
Girellidae	*Girella zebra*	2	3	2	2			2		5	4		2	5						1	**30**	15
Kyphosidae	*Kyphosus sydneyanus*		5	12	5			4		10					10				6	3	5	20
Microcanthidae	*Neatypus obliquus*		**25**	30	15			10		10	20		8	10	6				10		20	
Microcanthidae	*Tilodon sexfasciatus*		**2**		5			4		6	20		10	6	8				2		2	
Scorpididae	*Scorpis aequipinnis*		**40**	50	50			40		40			40	30	20		**1**		15	10	150	20
Scorpididae	*Scorpis georgiana*				10			5		15	40			10							5	
Chaetodontidae	*Chelmonops curiosus*	3	**4**	2	4			6		8	8		6	2	2						6	2
Pentacerotidae	*Pentaceropsis recurvirostris*			1				2		1				**3**	1							
Pomacentridae	*Chromis klunzingeri*							30		**2**	25		10		25						500	100
Pomacentridae	*Parma mccullochi*														2							
Pomacentridae	*Parma victoriae*		**3**	6	10			10		5	1		10	10	15						50	20
Enoplosidae	*Enoplosus armatus*				1			2		3	**5**			3							6	4
Chironemidae	*Chironemus georgianus*																	**1**				
Aplodactylidae	*Aplodactylus westralis*		1	1										1	1							
Latridae	*Dactylophora nigricans*				1						1			1							4	1
Latridae	*Nemadactylus valenciennesi*							3		6	6		5	5							**40**	3
Latridae	*Pseudogoniistius nigripes*	**1**	6	10	10			15		15	8		8	10					7	4	40	8
Labridae	*Achoerodus gouldii*	20	12	20	8			10		12	8		8	6	5				3	1	15	6
Labridae	*Austrolabrus maculatus*				2	**3**					6			3	20				10	20	40	20
Labridae	*Bodianus frenchii*			1							**1**			3	1				2	3	10	4
Labridae	*Coris auricularis*														1						20	3
Labridae	*Dotalabrus alleni*		2																			1
Labridae	*Dotalabrus aurantiacus*		4						**1**		1				3	**2**				1		5
Labridae	*Eupetrichthys angustipes*																				3	1
Labridae	*Halichoeres brownfieldi*		**6**	6	10			5	**1**	4			5	12	40						100	30
Labridae	*Heteroscarus acroptilus*		2																2		3	
Labridae	*Notolabrus parilus*	5	**10**	6	10	**2**		10		10	10		20	25	10				6	20	40	20
Labridae	*Olisthops cyanomelas*		8	**5**	6			10		12	10		10	15	1				1	3	10	2
Labridae	*Ophthalmolepis lineolata*	**60**	60	50	45			50		50			30	40	50				40	30	100	50
Labridae	*Pictilabrus laticlavius*		**2**	1																		
Labridae	*Pseudolabrus biserialis*		4	**6**	2			8		4	4		6	10	40				25	20	60	10

Family	Species	1	2	3	4	5	6	7	9	12	13	14	15	16	18	20	21	22	23	24	25,26	27
Labridae	*Siphonognathus beddomei*														6							20
Labridae	*Siphonognathus caninis*		5																1			
Labridae	*Siphonognathus radiatus*				10	**42**		12	**2**	10			10	20		**3**						
Creediidae	*Limnichthys fasciatus*													**6**								
Tripterygiidae	*Helcogramma decurrens*																				**6**	
Gobiesocidae	*Alabes occidentalis*					**1**																
Gobiesocidae	*Cochleoceps bicolor*									**2**			4	4							20	
Gobiesocidae	*Cochleoceps spatula*					**1**			**1**							**2**						
Gobiesocidae	Genus C sp. 3								**3**													
Gobiesocidae	*Parvicrepis* sp.					**2**		1					**1**							**1**		
Gobiesocidae	*Posidonichthys hutchinsi*					**30**			**2**							**1**						
Clinidae	*Cristiceps australis*								**1**													
Clinidae	*Heteroclinus adelaidae*					**5**			**2**													
Clinidae	*Heteroclinus kuiteri*								**2**							**1**						
Clinidae	*Heteroclinus roseus*					**1**				**1**												
Clinidae	*Heteroclinus* sp. 2						**1**															
Clinidae	*Heteroclinus* sp. 5					**2**																
Clinidae	*Ophiclinus antarcticus*								**1**													
Clinidae	*Sticharium dorsale*					**1**																
Gobiidae	*Callogobius depressus*										**1**											
Gobiidae	*Eviota bimaculata*										**1**											
Gobiidae	*Nesogobius* sp. 4																				**6**	
Monacanthidae	*Cantheschenia longipinnis*															**1**						
Monacanthidae	*Meuschenia flavolineata*							2		2	**6**		4	4	2					1	15	4
Monacanthidae	*Meuschenia galii*		12	**12**	10			10		15	10		6	4	6				5	6	20	5
Monacanthidae	*Meuschenia hippocrepis*		1	1	4			6		6			6	4					1		4	3
Monacanthidae	*Meuschenia scaber*					**1**																
Monacanthidae	*Scobinichthys granulatus*															**1**					2	10
Aracanidae	*Anoplocapros lenticularis*																				1	
Tetraodontidae	*Omegophora cyanopunctata*							**1**						2					2	2	4	
Diodontidae	*Diodon nicthemerus*																					**1**