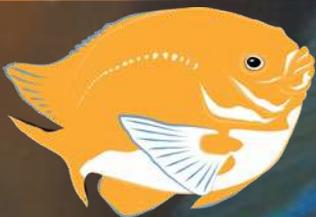


EXPLORING OUR HOME TURF

2020 GREAT VICTORIAN FISH COUNT



SHANDY MAE YAP
NICOLE MERTENS
KADE MILLS



VICTORIAN
NATIONAL PARKS
ASSOCIATION
Be part of nature

Victorian National Parks Association

Our vision is to ensure Victoria is a place with a diverse and healthy natural environment that is protected, respected and enjoyed by all.

We work with all levels of government, the scientific community and the general community to achieve long term, best practice environmental outcomes and help shape the agenda for creating and managing national parks, conservation reserves and other important natural areas across land and sea in Victoria.

We are also Victoria's largest bushwalking club and provide a range of education, citizen science and activity programs that encourage Victorians to get active for nature.

ReefWatch

ReefWatch is the Victorian National Parks Association's marine citizen science program. It provides projects that engage divers, snorkelers, rock pool rambblers and beach combers to contribute their observations, images and knowledge to expand our understanding of Victoria's unique marine life.

ReefWatch coordinates a number of marine citizen science programs, including the Melbourne Sea Slug Census, Dragon Quest and the Great Victorian Fish Count.

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Cover photo credit: Ian Scholey, VSAG. Chapter photo credits: Nicole Mertens, Karen Barwise, Bruce Ellis

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Project partners

Parks Victoria

Parks Victoria's responsibilities under the Parks Victoria Act 1998 are to manage the state's parks, reserves, waterways and other public land, including a representative system of terrestrial and marine national parks and marine sanctuaries. It is also the local port manager for Port Phillip Bay, Western Port and Port Campbell.

Parks Victoria works in close partnership with other government and non-government organisations and community groups to manage parks and reserved and encourages community participation within them

Parks Victoria's philosophy of 'Healthy Parks Healthy People' promotes involvement in activities within parks to maintain and improve the health of individuals and the community as well as contributing to a better understanding of Victoria's parks. Participation in the Great Victorian Fish count is a great example of this and for connecting people and communities with parks.

Coastcare Victoria

Coastcare Victoria is a state-wide program run by the Department of Environment, Land, Water and Planning (DELWP). Coastcare Victoria facilitators work directly with these communities and connect them with the state's coastal management system – coastal and natural resource management planners, managers of public land, local government and government programs targeting issues in coastal areas.

Redmap

Redmap (Range Extension Database and Mapping project) is a national 'citizen science' site that captures data and maps marine species that may be extending their range in Australia in response to changes in the marine environment. In Victoria, Redmap is hosted by Museums Victoria and all recorded sightings are verified by marine scientists.

Museums Victoria

Museums Victoria is Australia's largest public museum organisation. As the state museum for Victoria it is responsible for looking after a collection of nearly 12 million objects, documents, photographs and specimens. Its research, in the fields of science and humanities, uses the museum's collections and expert staff to further what we know about the social and natural history of Victoria and beyond.

The Great Victorian Fish Count is supported by the Victorian Government.





The 2020 Great Victorian Fish Count looked a little different from most years, but the passion and dedication from dive clubs and community groups was as strong as ever | Corinne Telford, Australian Diving Instruction



Executive summary

The Great Victorian Fish Count is Victoria's largest marine citizen science event, and each year it continues to connect communities to our coast. It is supported by numerous community and dive groups throughout the state. The theme for 2020 was 'Exploring our home turf', and at a time where many of us found our home range significantly limited, it aimed to remind us that right along Victoria's coastline we have an amazing blue backyard to explore and many iconic marine species that are found nowhere else in the world.

In total, 25 participating groups completed 56 surveys of the beautiful coastal waters across the state, with over 450 citizen scientists taking part in the 'dive that counts'. It was little surprise that overall participation was slightly lower than the previous few years, but nonetheless a testament to the dedication of our Fish Counters and their ability to rise to the unique challenges of 2020.

Key findings were:

- This year's face of the Fish Count, the Victorian Scalyfin, was recorded in 45% of all surveys, which is similar to the previous two years. 14 participating groups spotted a Scalyfin at least once.
- The Blue Throat Wrasse was again the most sighted species, recorded in over 75% of surveys. For the sharks and rays, the Smooth Stingray continues to be the most sighted species (61% of surveys).
- The second most observed species were the Zebra Fish and the Magpie Perch, with both appearing in 64% of all surveys.

- Other frequently recorded species included:
 - Six-spined leatherjacket
 - Dusky morwong
 - Horseshoe leatherjacket
 - Sea sweep
- Shaw's Cowfish, both species of Blue Groper, Weedy Seadragon, and Red Morwong were all sighted in less than 10% of surveys.
- Choice of survey location continues to be heavily weighted towards Port Phillip Bay and Westernport, however, several long term contributors to the Fish Count continue to provide valuable data from the east and west coasts.
- A good variety of habitats and vegetation cover were represented in the survey locations. Piers, rocky reefs and sandy substrates continue to be popular with our snorkelers and divers. Large rocky reefs (> 2m face) were surveyed less this year than previous years, likely a result of most groups choosing to survey in shallower waters.
- Marine parks and sanctuaries continue to be popular sites for the Fish Count. Although only 5.3% of Victoria's coastal waters are protected, 29% of our surveys were done in marine protected areas.

The results of the sixteenth Great Victorian Fish Count would not be possible without the 450+ enthusiastic divers and snorkelers who took part in this large-scale citizen science research project.

Data collected during the 2020 Fish Count was entered into the Atlas of Living Australia. From here, scientists, managers and the community can access the records and learn more about Victoria's unique marine life.

GVFC 2020: Exploring our home turf



The Victorian Scalyfin, a territorial fish with a small home range and reputation for enforcing “social” distance from other fish and divers, was thought to be the perfect feature creature for 2020 | Kade Mills

Introduction

1.1 Background

Combining the opportunity to collect real data on Victoria's marine life with a chance to dive in and experience our beautiful coast, the Great Victorian Fish Count (GVFC, or Fish Count) is Victoria's largest marine citizen science event. Each year it reconnects participants with the ocean, something which was sorely needed after a challenging year where so many of us were in extended lockdown and cut off from the places and community we value.

The Fish Count is a great starting point for people with no or little experience to explore Victoria's underwater world and develop a passion for protecting our unique marine life, as well as deepening knowledge and enthusiasm in more experienced volunteers. Now in its sixteenth year, the Fish Count is held through November and December with dive clubs, environmental groups, 'friends of' marine care groups, local dive operators, local community groups, schools, universities and the VNPA's Wild Families and beginner groups hitting the water to take part in collecting a 'snapshot' of fish diversity in our coastal waters.

Victoria's coastline has a diverse range of habitats that provide homes to a variety of species, many of which are not found anywhere else in the world. Almost a quarter of Australia's fishes are endemic with 60% of these species living only in our southern seas (Bray, 2018a). The fish count provides a 'snapshot' of some of these species and involves hundreds of divers recording thousands of fish sightings along the coastline. The data collected can be used to investigate changes in species composition and relative abundance at multiple locations



Our Fish Counters rose to the challenge of 2020 | Liz Harper, Ocean Divers

throughout the state's coastal waters.

The GVFC aims to help passionate people take part in an event that gathers valuable marine data, promotes active learning and the chance to reconnect with their local coastal environment. In turn, this creates understanding, awareness and co-operation between the public, scientists and government agencies.

1.2 Citizen Science

Citizen science is the involvement of community members in scientific projects through the collection of data and/or involvement in project design. It provides an opportunity for participants to learn from each other. For example, the GVFC brings together scientists, marine managers, divers, snorkelers and community members to increase and share our knowledge about fish found in their local waters.

In 2020 approximately 450 participants collected data on fish species across the Victorian coastline. Having so many pairs of eyes in the water searching for fish provides a large amount of data on the distribution and relative abundance of Victorian fish species. The data collected shows how citizen scientists can gather a vast amount of data, which would otherwise be extremely difficult to gather without the support of the community.

1.3 Partnerships with local communities

Over the past 16 years, the Victorian National Parks Association in partnership with Museums Victoria, Parks Victoria, Coastcare Victoria, dive operators and local community groups, has led the GVFC.

In 2015, we were pleased to add Redmap to our list of partners for the first time and continued to partner with them in 2020.

All project partners benefit the GVFC by providing experience and knowledge on the Victorian marine environment. Project partners provide:

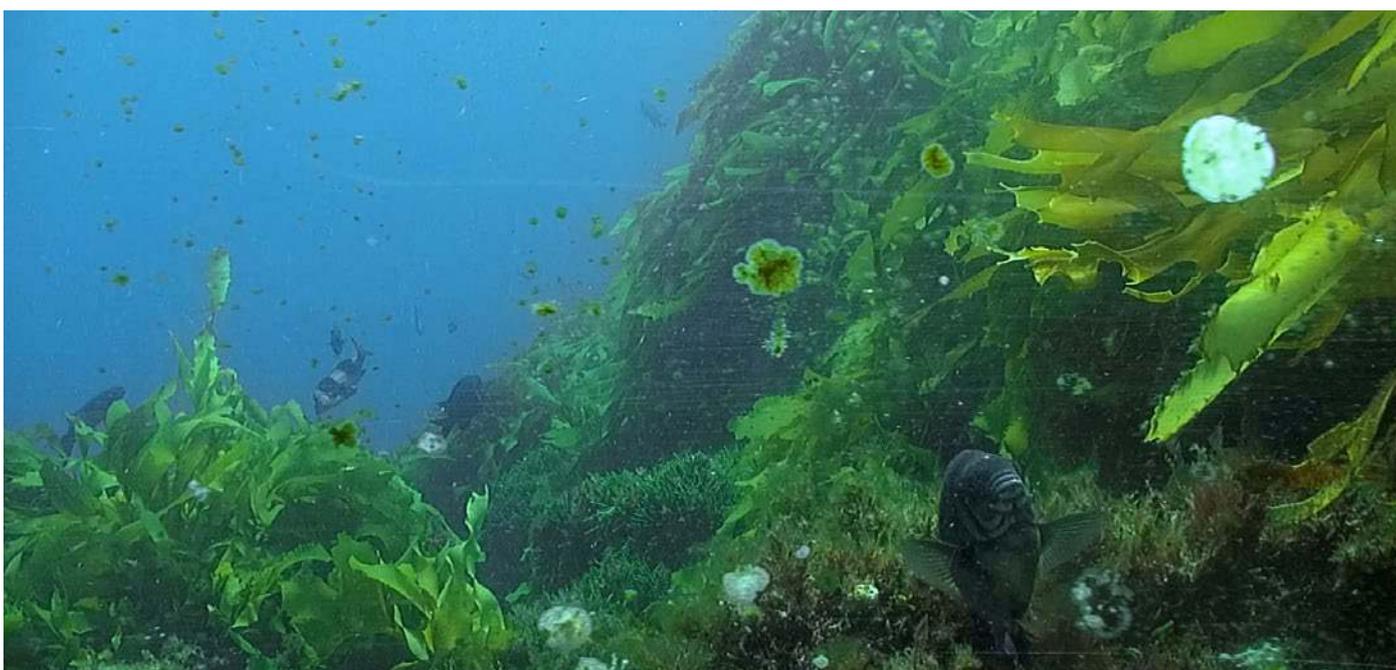
- Scientific expertise;
- Communication skills and knowledge;
- Local, regional and state-based knowledge on coasts, habitats and fish;
- Local community knowledge;
- Connection with local communities and networks;

- Skills, experience and qualifications to lead diving and snorkelling trips

This collaborative approach has made the GVFC a success and we are grateful for the continued support of all our partners and look forward to continuing to work with them.

1.4 Virtual Fish Counts at Popes Eye

In the lead up to the 2020 GVFC, it was uncertain if anyone would be able to dive in at their local site. So, to ensure at least some fish counting could go ahead, ReefWatch hosted a Virtual Fish Count every Thursday during the GVFC. People from across the state and interstate joined us online to watch the livestream of The Nature Conservancy's Reef Cam, located at Popes Eye in Port Phillip Heads Marine National Park. These "lunch break" sessions ran for 20 minutes at the top of the flood tide and were a great way to introduce the fish of the GVFC, as many of them can be found among the seaweed at Popes Eye.



In 2020 the Reef Cam at Popes Eye offered a "virtual" window into the bay for those who couldn't make it to the coast, or those just looking to catch up and talk all things Fish Count over lunch | The Nature Conservancy



A juvenile Scalyfin (*Parma victoriae*). As an adult this fish will tend to a garden of algae and defend its home turf against any intruders | Kade Mills

1.5 Exploring our home turf

With the necessary restrictions in place to protect the community in 2020, Victorians found themselves faced with limited movements. The theme for the 2020 GVFC was chosen to turn that limitation on its head and remind everyone that we could and should and enjoy our home turf now more than ever. From abundant sea grass beds to sponge gardens, rocky reefs to sandy habitats, Victoria is blessed with many diverse marine ecosystems.

Victoria's coastline is dotted with the 'Great Southern Reef' (GSR), an interconnected temperate reef system that covers 71,389 km² and stretches over five states from Western Australia to New South Wales (Bennett et al. 2015).

The GSR is biodiversity hotspot for various organisms; including seaweeds, sponges, crustaceans, chordates, bryozoans, echinoderms and molluscs. It is estimated that 30-80% of taxa found on the GSR is not found anywhere else in the world (Bennett et al. 2015).

We are lucky to have this unique environment right on our doorstep and

we encourage everyone to discover Victoria's marine life for yourself when you have the chance. Rock pool rambling, snorkelling and diving are just some of the many more to explore our home turf.

1.6 The 2020 fish 'face'

The 'face' of the 2020 GVFC was the territorial damselfish Victorian Scalyfin (*Parma victoriae*).

The Victorian Scalyfin inhabits coastal rocky reefs, harbours, estuaries and bays.

Juveniles are bright orange with neon-blue lines, spots, and a black eyespot, ringed with blue on their dorsal fin to intimidate predators, (Bray & Gomon 2011a). While adults may appear rust-coloured, with a head that varies from dusky yellow to dark grey, and sometimes even black. They have tell-tale pale spots along the lateral line of their body. They can grow up to 25cm in length (Edgar & Shepard 2013).

Scalyfins: Grumpy gardeners of the sea

When it comes to social distancing, no fish does it better than the Victorian Scalyfin.

This small (up to 25 centimetres) fish punches well above its weight and is not afraid to chase much larger fish, seals, and even divers that stray into its territory. It will attack its own reflection in the mask of a diver to ensure that nothing is encroaching upon its space.

It is a damselfish, meaning it is closely related to that most famous of fish – Nemo (a clownfish). And just like its tropical cousin it is a colourful member of its home reef.

Victorian Scalyfins change colour as they grow from juveniles of bright orange with neon-blue lines and spots, to adults that are dark greyish to black or a rusty yellow-orange. Both females and males begin life with a carnivorous diet and then become vegetarians as adults (Bray 2018b).

The territory they so aggressively defend is where they ‘farm’ the algae they eat. Victorian Scalyfin are the market gardeners of the sea – growing and harvesting seaweed on their rocky reefs, especially their prized crop of red algae. This is the superfood of seaweeds for Victorian Scalyfin, and it gives them the energy required to maintain their garden, and for the males to prepare a bare vertical surface for the females to lay eggs (Bray 2018b).

Once the females have laid the eggs in November to February, the males will guard them and aerate them until the larvae enter the water column, to begin the fight all over again (Bray 2018b).

1.7 The Atlas of Living Australia

Data collected during the Great Victorian Fish Count continues to be entered into the Atlas of Living Australia. The atlas is a collaborative, national project that brings together biodiversity data from multiple sources and makes it available and useable online. Data is entered via the BioCollect tool developed to support citizen scientists, ecologists, scientists

and natural resource managers- www.vnpa.org.au/reefwatch-biocollect. Currently there is limited information on the distribution of marine species in Victoria, so the Great Victorian Fish Count is contributing important data in this space.

To date over 21,000 Great Victorian Fish Count records have been accessed for research and education purposes.

1.8 Unusual sightings and identification

Each year we receive reports of species outside their usual range. However, unfortunately without an image we were unable to verify the sightings and report them to Redmap- www.redmap.org.au.

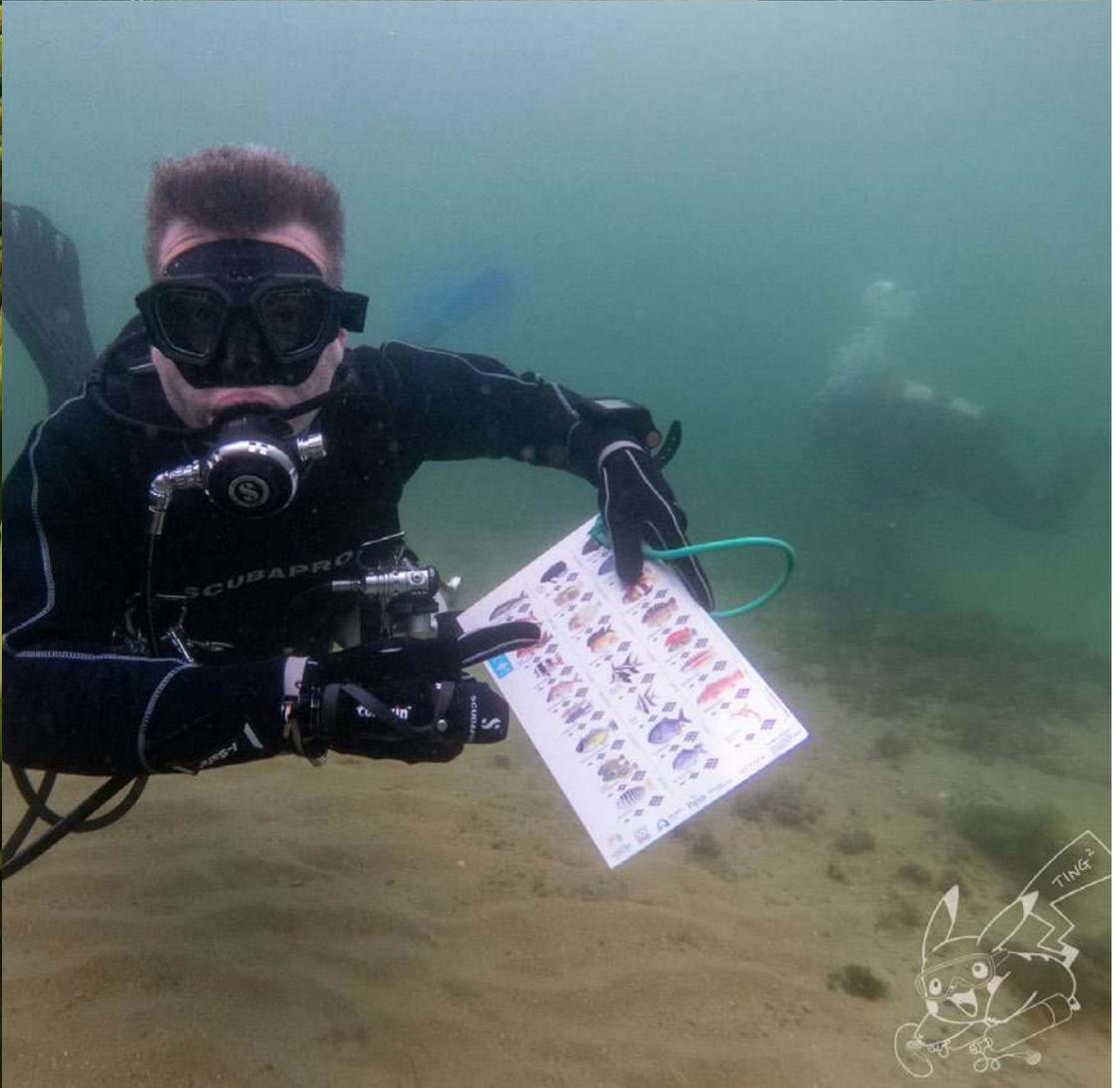
We encourage participating groups to submit photos with their survey data, especially when reporting on uncommon species, as this assists us in confirming their presence and improves the quality of our data sets. **ReefWatch has cameras it can loan to groups** at all times, but, particularly during the Great Victorian Fish Count to help groups confirm their sightings and practice their underwater photography skills. Please contact us (reefwatch@vnpa.org.au) at any time to organise a loan.



There are several ‘resident’ scalyfins that can be seen gardening, and aggressively defending, their home turf on the Reef Cam at Popes Eye | The Nature Conservancy



CHAPTER 1



The crew at Australian Diving Instruction returning from a Fish Count at Indented Head (top) and surveying at Sandringham (bottom) | Corinne Telford (top), Ting Ting Lee (bottom)



Some of the 2020 Fish Counters in action | VSAG (Ian Scholey, top), Dive2U (Jacqui Younger, middle), Ocean Divers (Liz Harper, bottom left), Australian Diving Instruction (Corinne Telford, bottom right)

Methods

2.1 Survey Period

The 2020 GVFC began on November 15 and finished on December 16.

The dates were chosen sixteen years ago to coincide with Coastcare Week, which is held on the first week of December. The fish count will continue to be held during the November/December period to allow for comparison of results with previous years.

2.2 Site selection

Surveys took place all along the Victorian coastline (Fig. 1) with participating groups choosing their own sites. To ensure continuity in data over time, groups have been encouraged to select a site they are familiar with and continue to monitor it each year.

Most sites surveyed were in Port Phillip Bay (73%), with many sights surveyed multiple times (e.g. Rye Pier, Popes Eye, Flinders and Blairgowrie).

Eastern and Western Victoria continue to have lower representation than the Bays region, but it is encouraging to see additional sites appearing in the survey data every year. The Victorian National Parks Association has continued to build stronger networks with local communities outside Port Phillip Bay to improve coverage in future Great Victorian Fish Counts. The following is a list of the sites surveyed during the 2020 GVFC:

Western Victoria

- Point Addis Marine National Park - Jarosite Reef
- Port Campbell
- Port Fairy - South Beach Bay
- Warrnambool - Stingray Bay

In and around Port Phillip Bay

- Blairgowrie
- Brighton - Old Brighton Bath
- Flinders
- Indented Heads - Ozone Wreck
- Jawbone Marine Sanctuary
- Mornington Pier
- Point Cooke Marine Sanctuary
- Port Phillip Heads Marine National Park - Nepean Bay, Popes Eye
- Portarlington
- Ricketts Point Marine Sanctuary - MacGregor Rock, Tea House Reef
- Rye Pier
- Safety Beach - Tassels Cove
- Sandringham
- Somers
- St Leonards
- Steeles Rock
- Williamstown - Beach Breakwater, Katie's Cove

Eastern Victoria

- Gippsland Lakes - South Hoptoun Channel, Nyerimilang Jetty, North Groyne, Maringa Creek, Lakes Entrance
- Hamers Haven - Wreck Bay
- Bunurong Marine National Park - Shack Bay

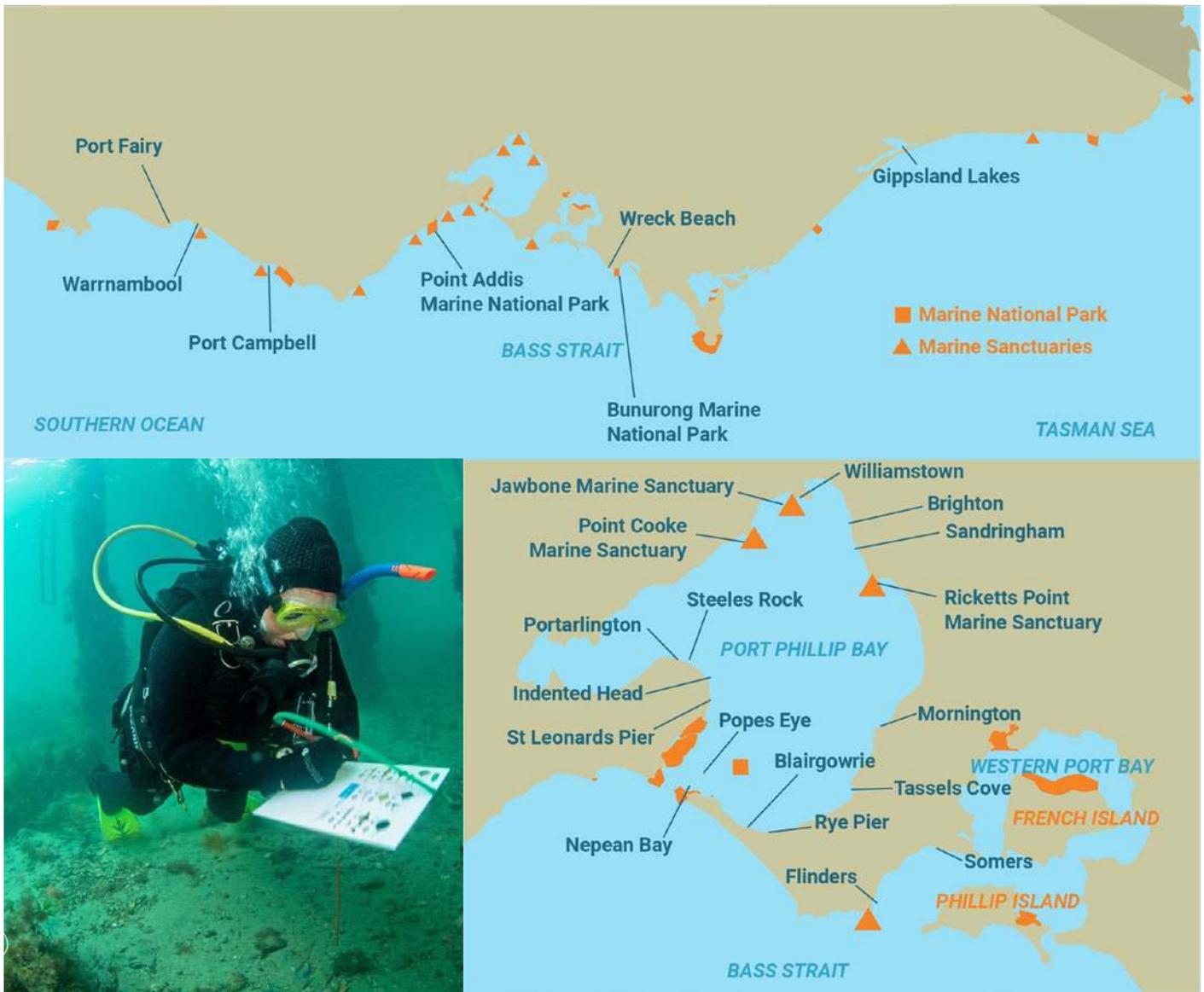


Figure 1. Areas surveyed in 2020 | Photo insert: a VSAG diver marking their survey slate (credit: Ian Scholey)

2.3 Survey Method

Each participating group leader is supplied with a standard Great Victorian Fish Count Kit. The kit contains training on how to conduct a count and where to upload the data, identification slates, and survey forms.

The ‘Roving Diver’ Technique

All participants work in buddy pairs or small groups for the entire survey and share an identification slate. The Roving Diver Technique is employed, whereby the participants swim freely through the selected site and record all the fish identified on their monitoring slate.

Participants are encouraged to follow a route that does not overlap with other

buddy pairs to cover a wider area, they are also advised to stop regularly to observe fish that may have been disturbed or had been hiding.

During the survey, participants place the observed fish species into one of three abundance categories on the identification slate. Each category has a corresponding symbol, which is crossed out progressively as increasing numbers of that particular species are observed (Figs. 2, 3).

2.4 Data Summary

At the conclusion of each survey, the GVFC data sheet (Fig. 4) is completed in the company of all the participating buddy pairs and groups. The survey form includes information regarding

the survey site location, dominant habitat and vegetation cover, weather conditions, time spent completing the survey and visibility, as these factors may influence the fish species present and observable at a survey site.

The form is filled out immediately after the dive and involves consultation with

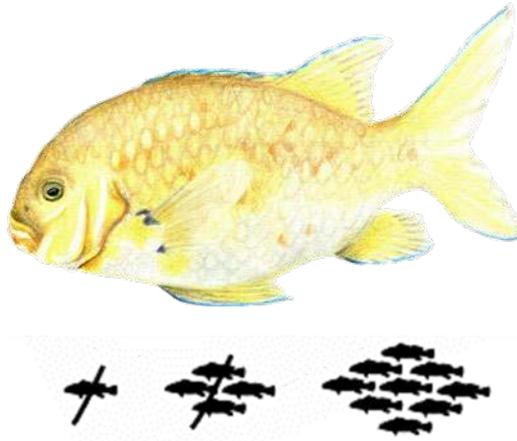


Figure 2. The abundance categories and corresponding symbols used on the Great Victorian Fish Count identification slates | Illustration by Nicole Mertens

all of the participants. The names of the 35 target species are listed on the form with additional space for any species the group would like to add. An abundance category is marked for each of the species observed by the group, based on the average abundance scores from all the participating buddy pairs.

Participating groups are encouraged to enter their results and photos directly to the Atlas of Living Australia (ALA) database www.vnpa.org.au/reefwatch-biocollect or email or post their results to the Victorian National Parks Association. Many people have commented on the ease and fast nature of submitting their results directly to the database and the Victorian National Parks Association will continue to encourage participants to upload their results this way.

2.5 Data presentation

Survey results emailed or posted to the Victorian National Parks Association are entered into the Atlas of Living Australia (ALA) database. Once all data is on ALA it is downloaded for analyses. Results from this year are presented to give an overview of main habitats surveyed, survey methods used and to illustrate the occurrence and abundance of species surveyed. Results are also compared to previous years.

Results are displayed as a percentage. This was calculated for each of the target species using the formula (percentage occurrence = number of surveys species sighted in / total number of surveys x 100). This enables a quick overview of which species were sighted more frequently during the Great Victorian Fish Count. All data is presented in the Appendices at the end of this report.

Each year some records are not uploaded to the Atlas of Living Australia despite groups successfully completing their surveys in the field. We encourage every participating group to make sure their data is counted and to get in touch with the Fish Count/ ReefWatch coordinator if any issues are encountered when submitting results.

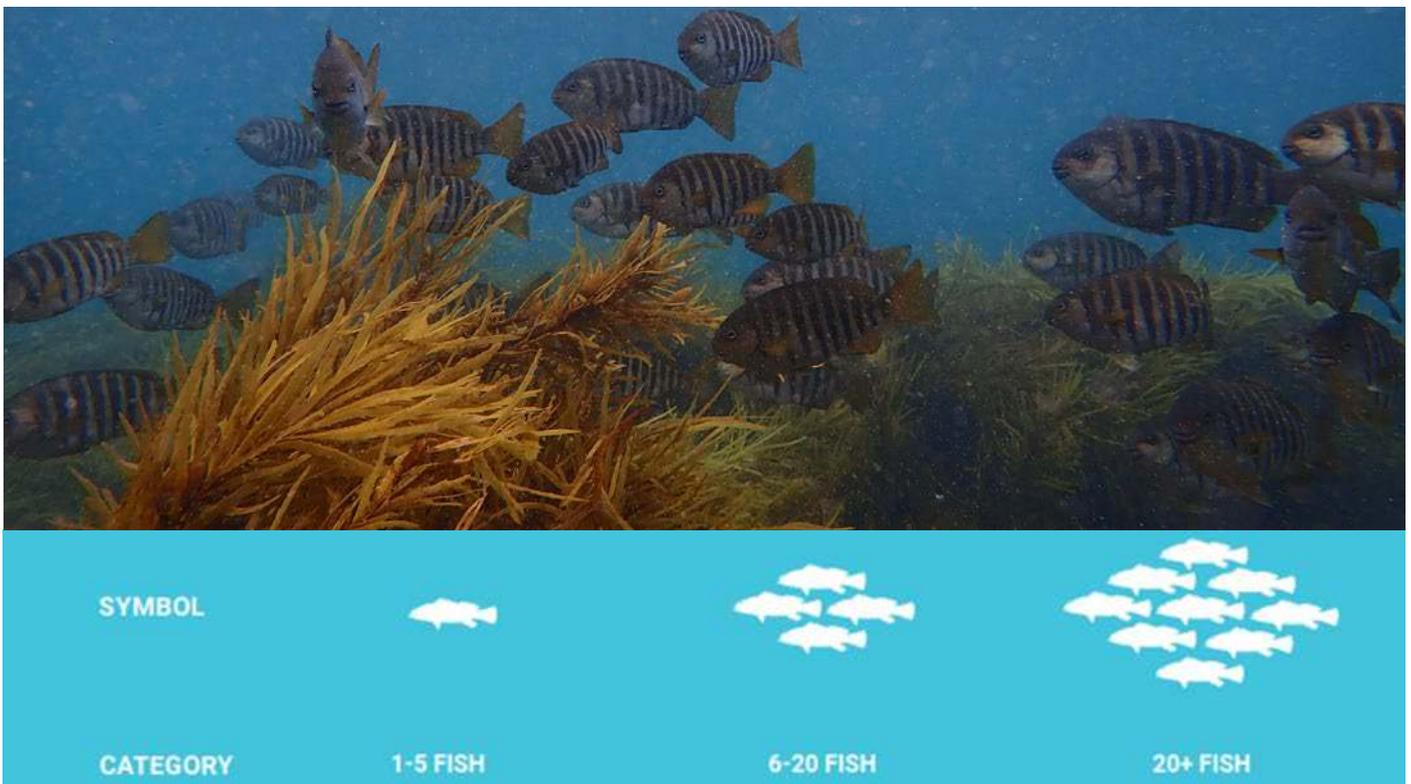


Figure 3. Key to fish abundance categories | Photo insert: a "large" sized school of Zebra Fish (Kade Mills)

GVFC Survey Form

VICTORIAN NATIONAL PARKS ASSOCIATION
The part of nature

Registration Details

Dive Group (registered dive operator/friends group):

Survey Method (SCUBA, Snorkel or SCUBA and Snorkel):

Site Details

Site name:

Location:
 Latitude: S Longitude: E
If using a GPS, please use WGS 84 DATUM

Site Description

Habitat (tick all that apply):

Large Rocky Reef (>2m face) Low Rocky Reef (<2m face) Rubble
 Artificial Reef (eg. pier, wrecks) Sand/Mud Other

Type of cover (tick all that apply):

Kelp (long, leathery brown algae) Mixed algae Seagrass
 Sponges, seaquirks & other Other

If Other, please describe:

Site Conditions

The following are the site conditions on the day of the survey

Date of Survey: / /
 DD/MM/YYYY

Time start: :
 24 hr time

Time finish: :
 24 hr time

N° of divers: Duration: :
 hours : mins

Max. Depth: m Visibility: m Water Temp.: °C

Tide: High Low Swell height: 0m 0.5m 1m 1.5m 2m

Tidal stream: Flood Ebb Slack Current: Strong Weak Nil

Page 1

GVFC Survey Form

VICTORIAN NATIONAL PARKS ASSOCIATION
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Fish Count data

Common name			
Dusky Morwong			
Red Morwong			
Banded Morwong			
Maggie Perch			
Bastard Trumpeter			
Herring Cale			
Horseshoe Leatherjacket			
Six-spined Leatherjacket			
Zebra Fish			
Southern Blue Devil			
Ornate Cowfish			
Shaw's Cowfish			
Victorian Scalyfin			
Long snouted Boarfish			
Old Wife			
Sea Sweep			
Silver Sweep			
Western Blue Groper			
Eastern Blue Groper			
Blue Throat Wrasse			
Saddled Wrasse			
Senator Wrasse			
Maori Wrasse			
Harlequin Fish			
Weedy Sea Dragon			
Smooth Stingray			
Black Stingray			
Spotted Stingaree			
Southern Fiddler Ray			
Southern Eagle Ray			
Port Jackson Shark			
Spotted Wobbegong			
Elephant Fish			
Varied Carpetshark			
Draughtboard Shark			

Page 2

Figure 4. The data sheets to be completed at the end of a dive

Results

3.1 General summary

3.1.1 Participation and conditions

Fifty six surveys were carried out by 25 groups at 24 different sites along Victoria's coastline (Fig. 1, Appendix I).

The depth of sites varied from 2 - 10m, with the majority of surveys taking place at sites of approximately 5m depth (30% of all surveys). Visibility ranged from 1-12m, with 54% of surveys reporting visibilities of 4 -5m. Water temperatures reported varied from 14 -21°C, however the vast majority (75%) of surveys reported water temperatures between 16 - 18°C. Over 90% of surveys reported swell between 0 - 0.5m. 6% of surveys were conducted in swell of at least 1.5m (Appendix II).

The number of fish counters in each participating group varied from 2 - 30 participants spending 20 to 180 minutes conducting their survey (Appendix II).

A total of 45 participants attended the virtual surveys, spending 20 minutes on each count.

3.1.2 Survey methods

Snorkelling groups conducted 25% of all surveys and 50% were undertaken by SCUBA divers. 9% of surveys were conducted with a mix of scuba divers and snorkelers with several groups hosting events that catered for both methods (Fig. 5). This year 8% of the surveys were conducted virtually using The Nature Conservancy's Reef Cam, the fixed underwater camera at Popes Eye in the Port Phillip Heads Marine National Park.

3.1.3 Protection status of survey sites

Most surveys (71%) were conducted in unprotected waters. The remaining 29% were undertaken within marine national parks or sanctuaries (Fig. 6).

3.1.4 Habitats surveyed

Most surveys were conducted at sites containing a number of different habitats and/or vegetation types. Many sites were dominated by sand or mud and contained sections of artificial reef. The presence of rubble was less common (39%), as were habitats comprised mostly of rocky reef (Fig. 7). Both low and large rocky reefs were encountered at the same location in many surveys, and the overall percentage of surveys reporting some form of rocky reef habitat was 54%.

Mixed algae was the dominant vegetation type, recorded at 89% of sites. This was followed by seagrass meadows, sponge gardens and, to a lesser extent, kelp forests (Fig. 8).

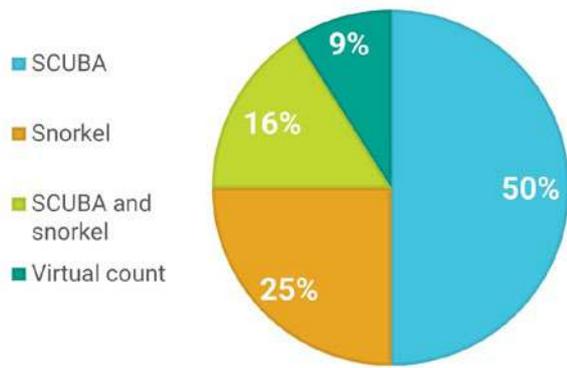


Figure 5. Survey methods used (%) (n= 56)

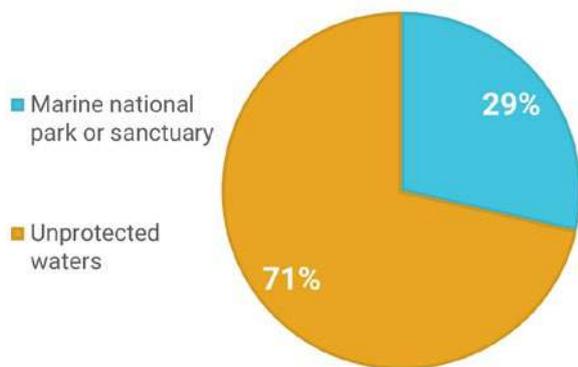


Figure 6. Protection status of survey sites (%) (n= 56)

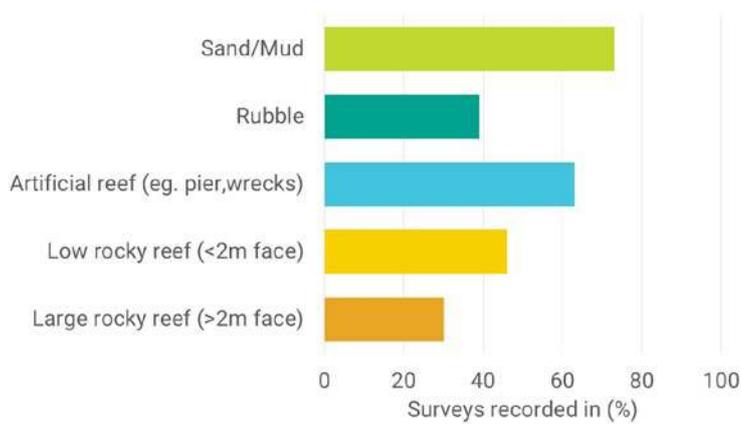


Figure 7. Habitat type surveys conducted in (%) (n=56)

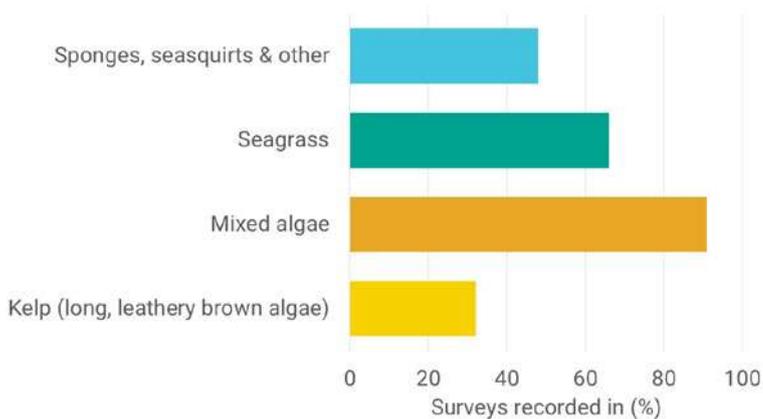


Figure 8. Vegetation type surveys conducted in (%) (n=56)



Different habitats and vegetation types can be home to different species. Top: a Horseshoe Leatherjacket on a large, rocky subtidal reef. Many of the fish of the GVFC are reef associated. Bottom: Some species, including most of the sharks and rays on the survey, are typically only found in sites with soft/muddy substrates | Karen Barwise (top), Kade Mills (bottom)

3.2 The fish of 2020

3.2.1 Bony Fish

- The 'face' of the 2020 GVFC, the Victorian Scalyfin, appeared in 52% of surveys (Fig. 9a).
- The Blue Throat Wrasse was the most observed species, sighted in 75% of surveys. This species was most often seen to occur in abundances of 20 or more individuals (Fig. 9a).
- Zebra Fish and Magpie Perch were also observed frequently (64% each). Numbers of Zebra Fish were evenly distributed across all abundance categories, whereas Magpie Perch were mostly recorded in the lower abundance groups, with none recorded in abundances of 20 or more (Fig. 9a).
- Other bony fish species observed in 50% or more of the surveys were the Six-spined Leatherjacket, the Dusky Morwong, and the Horseshoe Leatherjacket (Fig. 9a).
- Less common bony fish species included Shaw's Cowfish, both species of Blue Groper, the Weedy Seadragon and the Red Morwong, all of which appeared in less than 10% of the surveys conducted (Fig.

9b)

- The Southern Blue Devil and the Harlequin Fish were again not sighted in any of the surveys this year. Blue Devils have not been recorded since 2018, while Harlequin Fish have not been recorded in any GVFC survey to date.

3.2.2 Sharks and Rays

- The two most sighted shark and ray species were the Smooth Stingray (61%), Southern Fiddler Ray (27%) and Spotted Singaree (25%) (Fig. 10).
- Less common shark and ray species included the Spotted Wobbegong and the Varied Carpetshark, recorded in just one survey each.
- Draughtboard Sharks and Elephant Fish were not sighted this year.
- Most sharks or rays were recorded in abundances of 1-5 individuals, with only two species (Southern Fiddler Ray and Port Jackson Shark) recorded in abundances of 20 or more.



The most sighted bony fish of 2020 was the Blue Throat Wrasse (left), while the Smooth Stingray was the species most often encountered on the sharks and rays list (right) | Ian Scholey, VSAG (left) and Kade Mills (right)

TARGET BONY FISH SPECIES

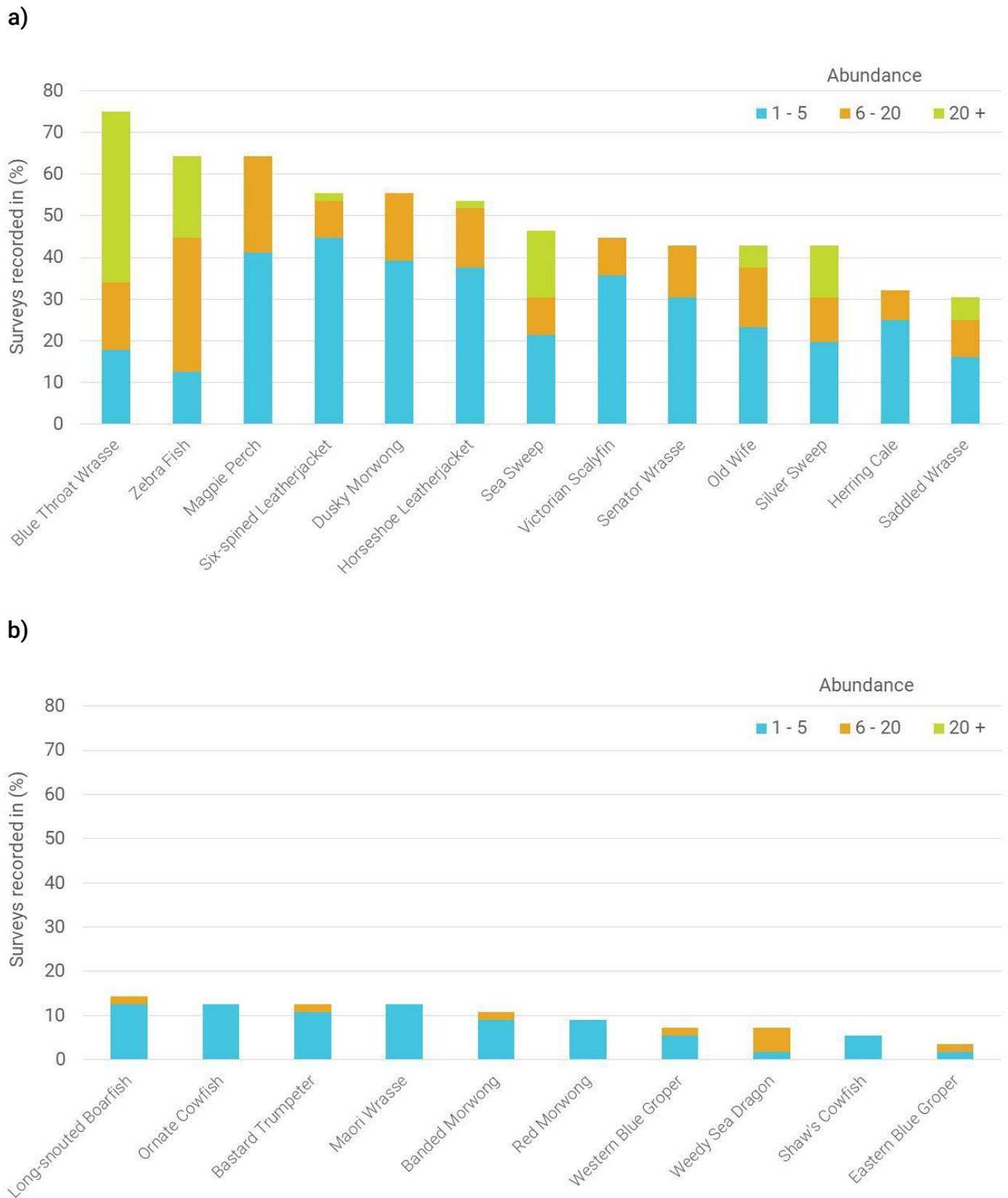


Figure 9. Percentage of surveys each bony fish species was recorded in and abundance category for a) the 12 most commonly sighted species and b) the 11 least commonly sighted species of 2020 (n=56). Note: the Harlequin Fish and Blue Devil were removed due to neither being recorded in 2020.

CHAPTER 3



Above: One of the most commonly sighted faces of 2020, the Magpie Perch, and below: one of the less sighted faces of 2019, the Weedy Seadragon. Both were spotted at Flinders | Ian Scholey, VSAG



TARGET SHARK AND RAY SPECIES

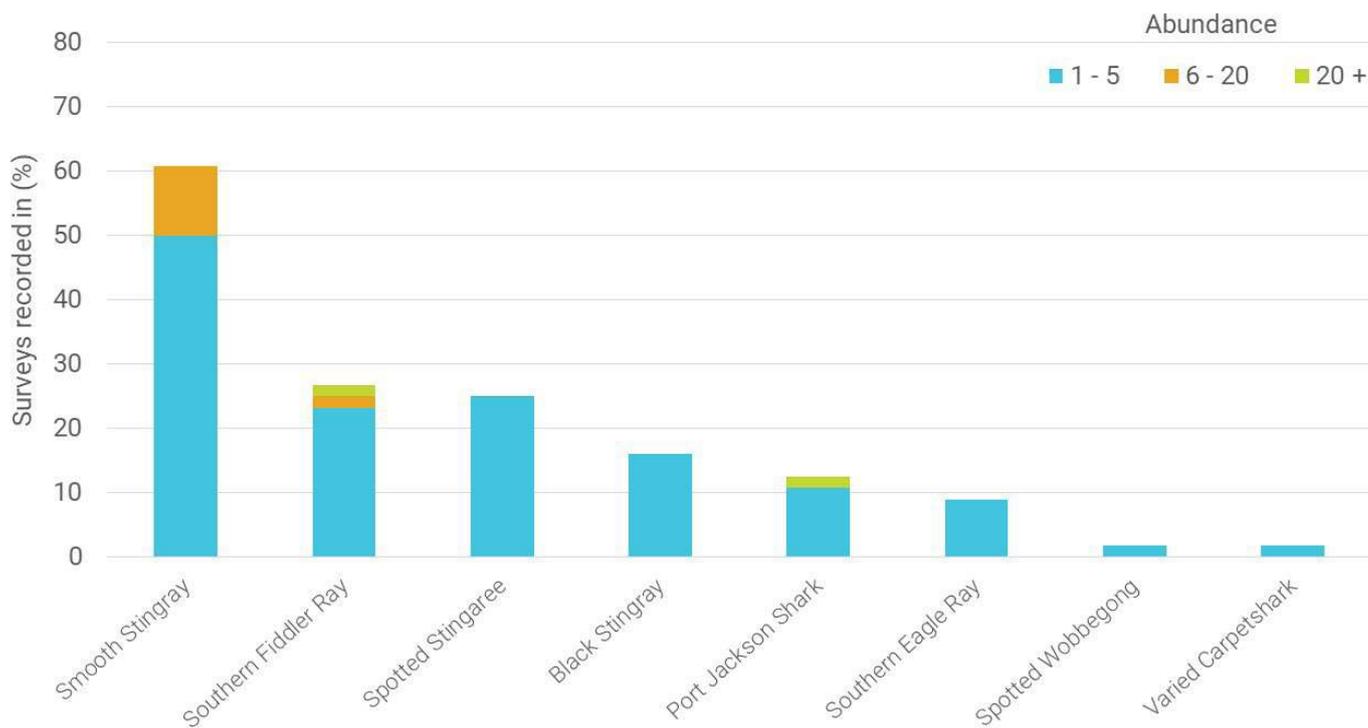
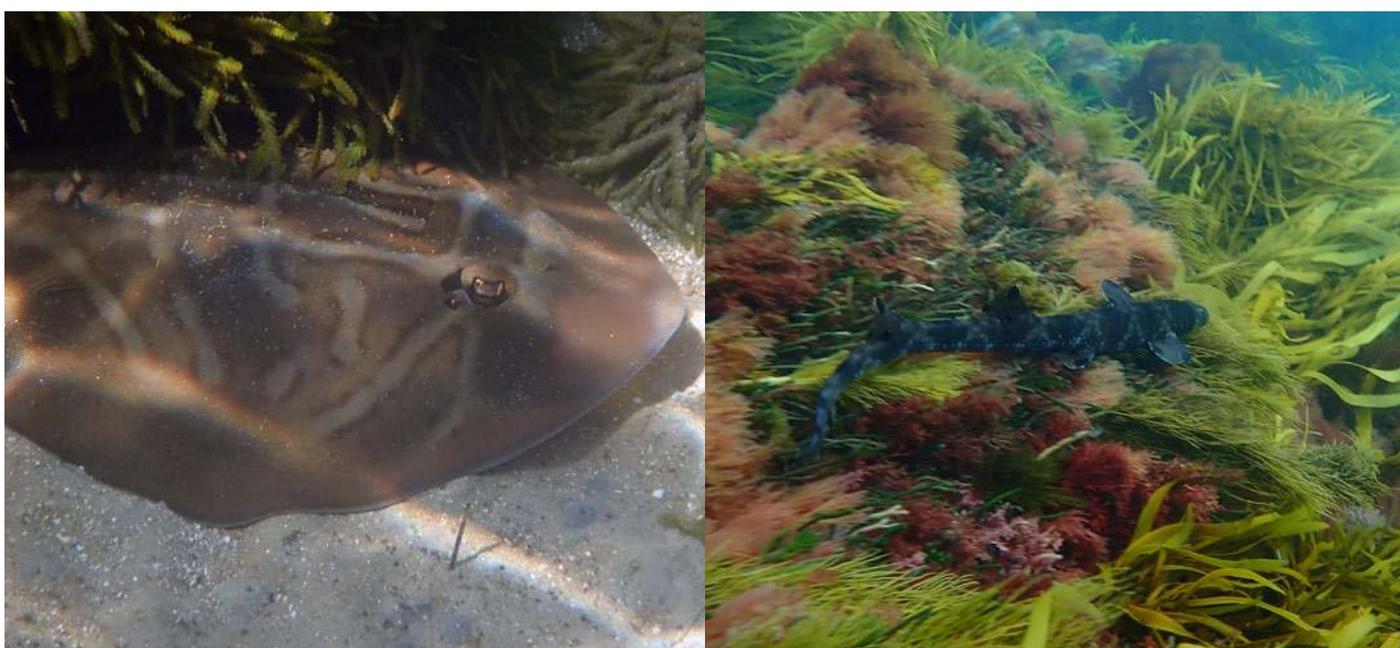


Figure 10. Percentage of surveys each shark and ray species was recorded in and abundance category (n=56). Note: the Draughtboard Shark and Elephant Fish were removed due to neither of these species being recorded in 2020.



Left: The Southern Fiddler Ray (or Banjo Shark) was one of the more commonly sighted rays for 2020. Right: the Varied Carpetshark remains a rarely sighted shark in the GVFC | Ian Scholey, VSAG

TARGET BONY FISH SPECIES

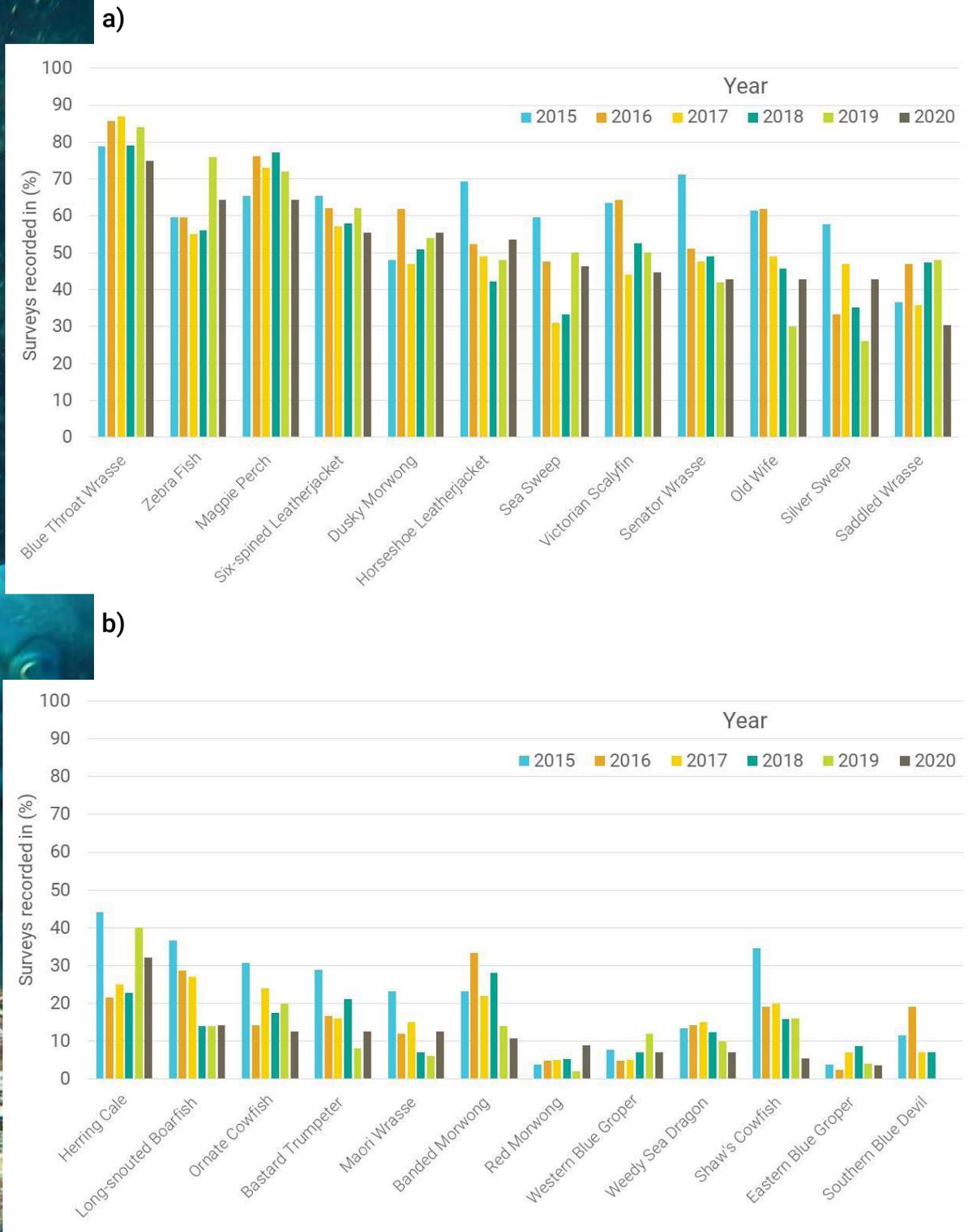


Figure 11. A comparison between the percentage occurrences of a) the most-sighted and b) the least-sighted target species of bony fishes calculated for the 2015 (n=42), 2016 (n=44), 2017 (n=55), 2018 (n=57), 2019 (n=50) and 2020 (n= 56) Fish Counts. Note: the Harlequin Fish was removed due to it not being recorded from 2015-2020.

Shark and ray target species comparisons for 2017, 2018, 2019 and 2020 are shown in Figure 12 (p. 26)

3.3 Comparison to previous years

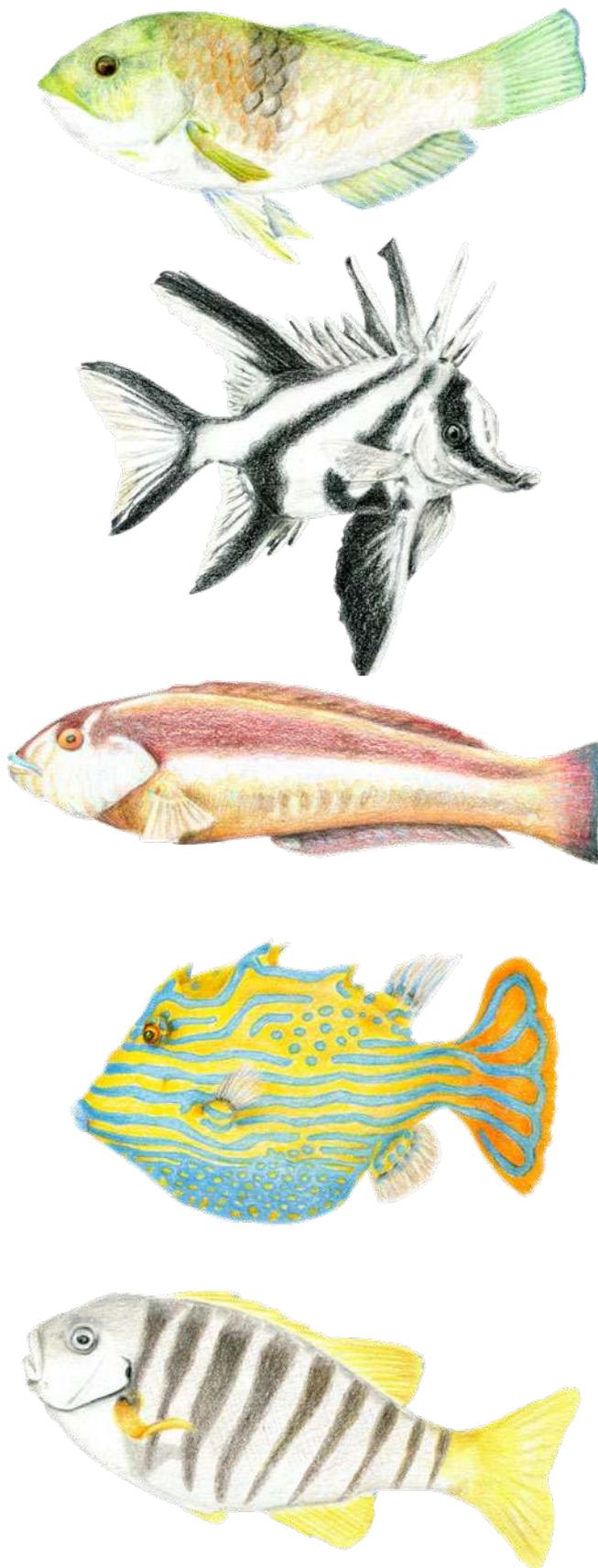
The following comparisons are based on number of surveys where this species was recorded each year between 2015-2020.

3.3.1 Bony Fish

- The Blue Throat Wrasse has been the most observed species since 2015 (Fig. 11a).
- The second most observed species were Zebra Fish and Magpie Perch, both being observed in 64% of surveys (Fig. 11a).
- Sightings of Shaw's Cowfish have declined from over 30% in 2015 to 5% in 2020 (Fig. 11b).
- Long-snouted Boarfish (14%) and Maori Wrasse (13%) sightings have remained low over the past three years, although Maori Wrasse sightings in 2020 appear to have effectively doubled compared to 2019 and 2018. (Fig. 11b). Given that the total number of surveys over the last 3 years has been between 50-57, any species appearing in less than 15% of all surveys was only sighted around half a dozen times or less through each Fish Count, making it difficult to infer any real trend.

3.3.2 Sharks and Rays

- Smooth Stingrays continue to be the most sighted shark and ray species. Sightings increased on all previous years (Fig. 12).
- Spotted Stingaree and Southern Fiddler Ray sightings have remained consistent over the past four years, appearing in 20 - 30 % of all surveys (Fig. 12).
- Port Jackson Shark sightings increased this year and were similar to those reported in 2017 & 2018 (Fig. 12).
- Southern Eagle Ray sightings have declined since 2017. This year they reached a low of appearing in only 5 surveys, or 9% of all surveys conducted (Fig. 12), which is roughly the same as the previous year.
- There were no sightings of Draughtboard Shark in 2020 (Fig. 12).



Top-bottom: Blue Throat Wrasse (female), Zebra Fish, Shaw's Cowfish, Long-snouted Boarfish, Maori Wrasse, Red Morwong | Illustrations by Nicole Mertens

TARGET SHARK AND RAY SPECIES

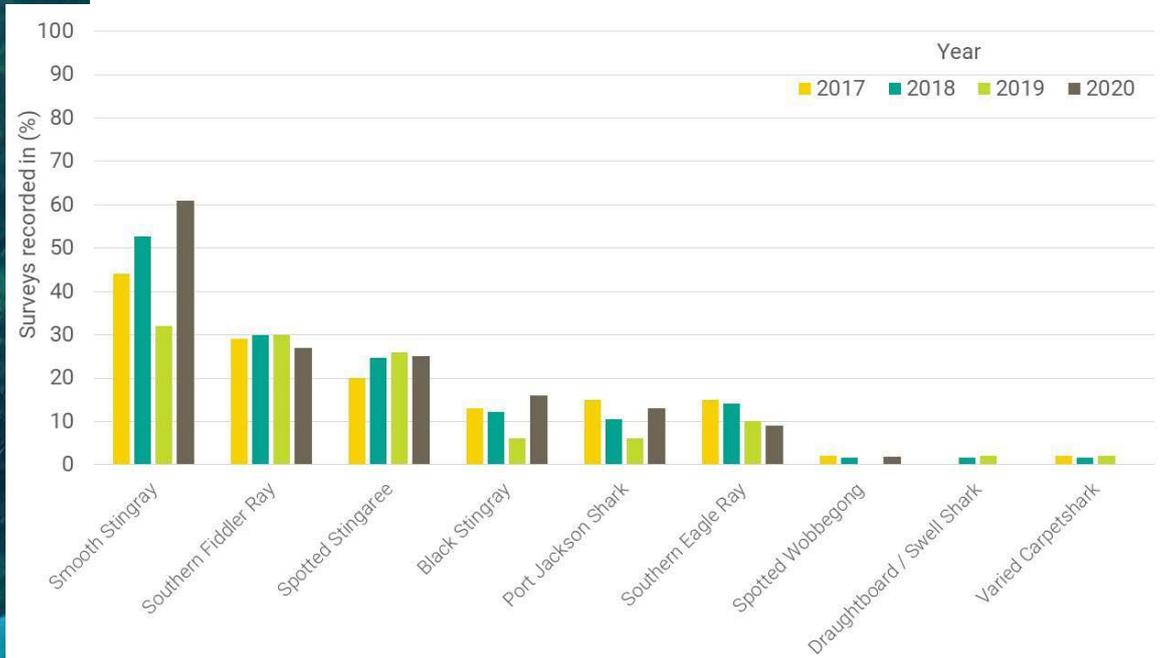
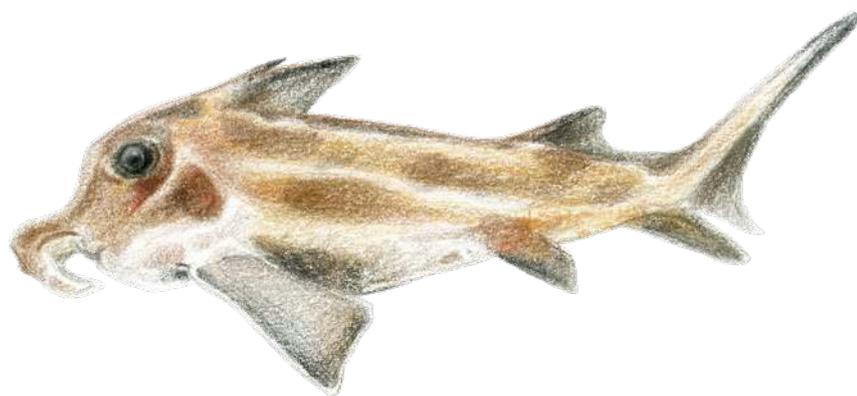


Figure 12. A comparison between the percentage occurrences of each target species* of sharks and rays calculated for the 2017 (n=55), 2018 (n=57), 2019 (n=50) and 2020 (n=56) Fish Counts. Note: the Elephant Fish was removed due to it not being recorded from 2017-2020



The Elephant Fish or Australian Ghost Shark is yet to be recorded during the GVFC | Illustration by Nicole Mertens

GVFC vs RLS: How different types of citizen science projects help address the challenges of sampling marine communities

Spotted Stingaree | Peter Beaumont



Reef Life Survey (RLS) is a non-profit citizen science program that trains SCUBA divers to undertake standardised scientific underwater visual surveys of reef biodiversity on rocky and coral reefs around the world. They use a 50 m transect line and survey in two 5 m wide by 5 m high blocks parallel to the transect line to record all fish species. Two divers swim along these 'tunnels' at approximately 1m above the seafloor and record the abundance and size of all fish species sighted. If they encounter a ledge or cave, they survey beneath or inside it. Their data is available for download online at www.reeflifesurvey.com.



Between 2015-2020, RLS conducted a total of 48 surveys at 25 locations throughout Victoria in the months of November and December (2015: n=10, 2016: n=7, 2017: n=6, 2018: n=12, and 2019: n=8 and 2020: n=0). Over the same time, the GVFC conducted 304 surveys (2015: n=42, 2016: n=44, 2017: n=55, 2018: n=57, 2019: n=50, and 2020: n=56) at 84 locations.

RLS recorded a total of 33 sharks and rays during the surveys: including four Southern Fiddler Rays, four Smooth Stingrays and three Spotted Stingarees. In 2020 no data was available for the November-December time period. The GVFC recorded sharks and rays on 195 occasions, with up to 20 individuals per site from 2017-2020.

The results highlight the ongoing ecological challenge of obtaining a 'representative' sample of marine communities. The RLS method is designed to capture information on reef fish. RLS acknowledge that their methods are not primarily designed for monitoring jetties as they require 90% of their transects to be placed on hard substratum, allowing only small sand patches to be surveyed. However, unlike many of the reef fish targeted by the RLS method, sharks and rays are highly mobile and often not found on reefs but nearby on the reef edge where there is sand or seagrass. They are also found around artificial structures, like jetties, which are frequented by divers during the GVFC.

The addition of sharks and rays to the GVFC in 2017 is helping us to learn more about some of Victoria's amazing cartilaginous fish.

Discussion

4.1 General summary

4.1.1 Participation and conditions

Victoria's unique and dynamic coastline can create challenging conditions for surveys. Locations on exposed rocky coasts are subject to environmental conditions that often make it less favourable for diving or snorkelling than those in sheltered bay areas. Of course, diver experience, site depth and other factors may also influence the decision to proceed with a Fish Count.

Taking that into consideration however, the majority of surveys reported what would be considered reasonable conditions in terms of temperature, swell, and visibility, and few groups reported the need to reschedule or outright cancel their surveys.

4.1.2 Survey technique

SCUBA divers still represent the majority of participants thanks to the continued support and enthusiasm of local dive stores and clubs. However, 2020 saw a similar numbers of snorkel and joint snorkel/SCUBA surveys as in 2019. A steady increase in participation among snorkelers in the GVFC over the last few years reflects the emerging desire of new groups of people to learn about the natural environments within their reach. Snorkelling offers an opportunity to engage with a broader audience such as families, students and culturally and linguistically diverse (CALD) groups that may not necessarily have the capacity to organise and participate in dive surveys.

The first virtual Fish Count was introduced in 2019, thanks to the Nature Conservancy's ReefCam installed at Popes Eye in the Port Phillip Marine Park. It provided us with an

opportunity to take a virtual dive into the bay. Broadcasting a live stream of one of Victoria's most fascinating reef systems opens up new opportunities for participants who cannot take part in snorkelling or diving activities. It is also great for identification and education purposes, because the whole Fish Count can be recorded. In the case of an uncertain identification the recording can be verified or used as photo proof in case of an unusual sighting for RedMap. VNPA sees the virtual counts as a great addition to classic dive and snorkel Fish Counts.

4.1.3 Protection status and habitat type

Established in 2002, Victoria's Marine Protected Areas (MPAs) are largely comprised of marine national parks and marine sanctuaries. MPAs cover an area of approximately 63,000 hectares – that's equivalent to 5.3% of the state's marine waters (DELWP 2021). They provide people with the opportunity to experience and observe marine life in environments that are undisturbed by fishing and other extractive activities. Many of Victoria's MPAs protect multiple, diverse habitat types- including seagrass beds, muddy/sandy plains and rocky reefs dominated by algal communities and sponge gardens. Despite only covering a small percentage of Victoria's marine waters, they are embraced and used widely by the diving community as well as dedicated marine Friends and Care groups. This is evident from the large percentage of surveys carried out in MPAs in comparison to the proportion of the coastline they cover.

In total, over half of all surveys were conducted on either low or large rocky reefs, or a combination of both. However, this year artificial reefs and



Reef Cam gives a window into the bay, including what the conditions are like under the waves. These four frames show what conditions were like on the Popes Eye reef during each of the lunchtime Virtual Fish Counts | The Nature Conservancy

sandy/muddy substrates occurred in a greater proportion of surveys. Piers made up the majority of artificial “reef” structures surveyed, and they are often surrounded by either sandy substrate or low rocky reef, with dominant vegetation cover of either mixed algal communities or seagrass respectively.

4.2 The fish of 2020

Blue Throat Wrasse

Blue Throat Wrasse are a dominant component of all shallow reef fish communities from South Australia to New South Wales (Hutchins & Swainston, 1999).

They are sexually dimorphic, meaning there are differences in appearance between males and females. This is most obvious in their different shape, colour and size. Juveniles and females are greenish to brownish, with females gradually develop a broad dark band on the sided behind their pectoral fin. Males on the other hand are brownish to blue-grey with a distinct white band on the side, a pale bluish head with blue chin and yellow fins (Bray, 2020a).

Blue Throat Wrasse are born female and

like many wrasse they can change from female to male during their life. This usually occurs when the dominant male leaves the harem. The most dominant female immediately changes sex to replace him. Intensive recreational fishing has been documented to reduce the number of large males in Blue Throat Wrasse populations, as less fish reach the age or size requirement to change sex from female to male (Shepherd et al. 2010).

They are strongly site-associated (stay in the one place) and long-lived (up to 15 years). Adults usually inhabit rocky reefs and can be found in harems with ratios of one male to 10-20 females. Juveniles can be found in shallow weedy areas. These habitats and vegetation types commonly occurred at GVFC sites, and likely accounts for their frequent sightings.

Zebra Fish

Zebra Fish are native to Australia and may often be seen around jetties, shallow rocky reefs and in weedy areas of Victoria (Gomon et al.1994). They were the second most sighted fish species in this year’s GVFC – a finding that may be explained by the large

number of suitable habitats at our survey sites.

Zebra Fish are omnivorous and have a diverse diet that ranges from seaweed to invertebrates. They are well-known for the 9-10 black bars lining their bodies. They have small heads with pale-yellow fins and are often sighted in small schools (Bray & Gomon, 2011b).

Magpie Perch

The Magpie Perch is a member of the Morwong family. Individuals can grow up to 40 cm in size and have 3 broad black bands on their body that make them easily recognisable. They have a red-brown tail that grows darker as they mature. Adults are found in both protected and exposed coastal reef habitats throughout Southern Australia (Bray 2021). They are often seen sheltering under rocky structures or jetties, many of which were characteristic of the sites surveyed by this year's GVFC.

Magpie Perch and Blue Throat Wrasse are considered good bioindicators of fishing pressure, as they are both carnivorous fish and are susceptible to fishing-induced mortality. High numbers of these species are indicative of healthy reef fish assemblages (Shepherd et al. 2004). It is encouraging to see high numbers of these species in our recent Fish Counts.

Maori Wrasse

Endemic to the southern half of Australia, the Southern Maori Wrasse lives in areas dominated by exposed rocky reef. It thrives in deeper waters, often residing in urchin-grazed habitats. Adults aggregate together to form large groups, whilst juveniles are more commonly solitary and live in estuaries or harbours (Bray 2019).

Increased sightings in Port Phillip Bay may be due to increased recruitment of juveniles within the bay in recent years, however as the Fish Count does not collect data on fish age class or size this would need to be confirmed through other means.

Like many wrasses this species is a protogynous hermaphrodite meaning individuals are able to change their sex from female to male during their life. Maori Wrasse have a very distinct colouration. Males are a reddish-brown and have blue spots that sometimes form into narrow, vertical bands. Females are reddish-orange in the upper half of their body, and reddish-orange and white in the lower half. They feed on worms or molluscs and are fished recreationally and commercially (Bray 2019).



A Zebra Fish (*Girella zebra*) showing its distinctive colour and markings | Nicole Mertens



The Port Jackson Shark (*Heterodontus portusjacksoni*) was spotted in higher numbers this year compared to 2019 | Jack Breedon

Smooth Stingray

The Smooth Stingray was again the most sighted of the shark and ray species in 2020, recorded in over half of all surveys. These sizeable stingrays can grow up to 4.3m and weigh up to 350kg. They are widespread in southern Australia (Bray 2018c) and reside in sandy habitats and shallow coastal bays.

Smooth Stingrays are ovoviviparous, meaning their young develop in eggs and remain inside the body of the adult until they're ready to hatch. Smooth Stingrays can give birth to 6-10 young, sized up to 36cm.

Their tail carries a venomous, serrated spine. When threatened, the Smooth Stingray relies upon this defence mechanism to ward off intruders. Their large size and tendency to frequent piers throughout Victoria make them an easily identifiable species of ray, and may account for their high rates of observation.

Southern Fiddler Ray

The Southern Fiddler Ray was the second most sighted shark and ray species in our surveys. Commonly seen in southern Australia, these rays are found in sandy habitats and around kelp beds. They possess a broad and rounded snout and are often yellowish or brownish in colour. Southern Fiddler

Rays have distinct patterned bands that radiate outwards from their eyes and across their sides, with a comparatively pale underside. They are carnivorous and mainly feed upon small fishes or crustaceans, including shrimp and crabs (Bray, 2020b).

Port Jackson Shark

Growing to about 1.5m long, the Port Jackson Shark is a nocturnal species also found in rocky reef and kelp habitats. They often shelter in caves and beneath ledges during the day and come out at night to feed (Bray 2020c).

The diet of the Port Jackson shark primarily consists of molluscs and fish. They use their unusually shaped teeth plates for grasping and crushing. Port Jackson Sharks are generally harmless to humans, however, the spines lining their dorsal fin are sharp and venomous (Bray 2020c).

We observed an increase in Port Jackson Shark numbers in 2020 compared to 2019, with most sightings reported in Port Phillip Bay and Eastern Victoria.

Elephant Fish

The Elephant Fish or Australian Ghost Shark has not been recorded during the GVFC and may never be as they are very rarely encountered by divers. However, ReefWatch would love to hear from you if you do happen across one on a dive. Verifiable photo or video records would be even more exciting.

While mature sharks are usually found in deeper offshore waters of up to 200m depths (Bray 2018d), females move into shallow waters to lay their eggs. Juveniles may remain inshore for up to three years.

4.3 Variability of conditions and impacts on sightings

Where surveys are being conducted, and the predominant habitat and vegetation type at that location will influence the species likely to be encountered during the Fish Count. Some species have known range limits to the eastern or western waters of the state. For example, the waters around Wilson's Promontory are known to be the easterly range limit of Western Blue Groper (as well as being the westerly limit for the population of Eastern Blue Groper). It is therefore unsurprising that of the two species, only Eastern Blue Groper were reported from the Lakes Entrance region (Appendix I).

Some fish associated with natural reefs were sighted in lower numbers this year compared to previous years, despite some form of rocky reef being recorded in over half of all surveys, with large rocky reefs (>2m) surveyed less than low rocky reefs (<2m). The decreased sightings of some species may also be due to the limited depth range most surveys were conducted in, as some species move to deeper water at different stages of their life.

The detection of any species is dependent on more than just the species being present. The success of reporting species and abundance has been found to be linked to the specific fish behavioural traits (Pais & Cabral, 2017). Individuals from the same population show different behavioural traits over time and across context (Bell et al. 2009). A widely accepted behavioural distinction is whether fish are shy or bold (Coleman et al. 1998). Bold fish were found to be more active, hide less and even to learn simple conditioning tasks quicker than shy fish (Sneddon, 2003). In regards to fish counts bold fish may be recounted and shy fish are more likely to be missed (Pais & Cabral, 2017).

External factors like time of day, weather, visibility, depths of survey, tide or just pure luck can also be of great influence on the species encountered. Occasionally we hear from discouraged Fish Counters who did not find any target species or species they expected to find during the Fish Count. We would like to encourage Fish Counters to stay motivated and curious even though you might not always encounter what you're expecting.

4.4 Species not on slates

A number of species were recorded that do not appear on the official identification slates (see Appendix V). Common non-target species recorded in this year's surveys were Big-bellied Seahorse, Bluespotted Flathead, Globefish, Moonlighter and Tasmanian Blenny.

4.5 Reports of 'fish on the move'

The VNPA has continued its partnership with Redmap Victoria in 2020. Once again, participants were encouraged to keep an eye out for any fish that seemed unusual in the area. Unfortunately, most reported sightings remain unconfirmed as no photos have been supplied.

We look forward to our ongoing role as ReefWatchers, keeping an eye out for 'fish on the move' in Victoria. Any recordings taken during the GVFC survey period will contribute to Redmap's growing database – just don't forget to take a photo of your lucky find!



Sightings of Bastard Trumpeter (*Latridopsis forsteri*) have been down in recent years. However, many factors can influence a whether or not fish are sighted during a dive or snorkel, including visibility, fish behaviour, habitat and cover | Peter Beaumont



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Appendices

I: Summary of fish species sightings and abundances across Victoria

II: Table of the site conditions and habitat types recorded for each survey

III: Table of fish species observed at each site surveyed in Western Victoria

IV: Table of fish species observed at each site surveyed in and around Port Phillip Bay

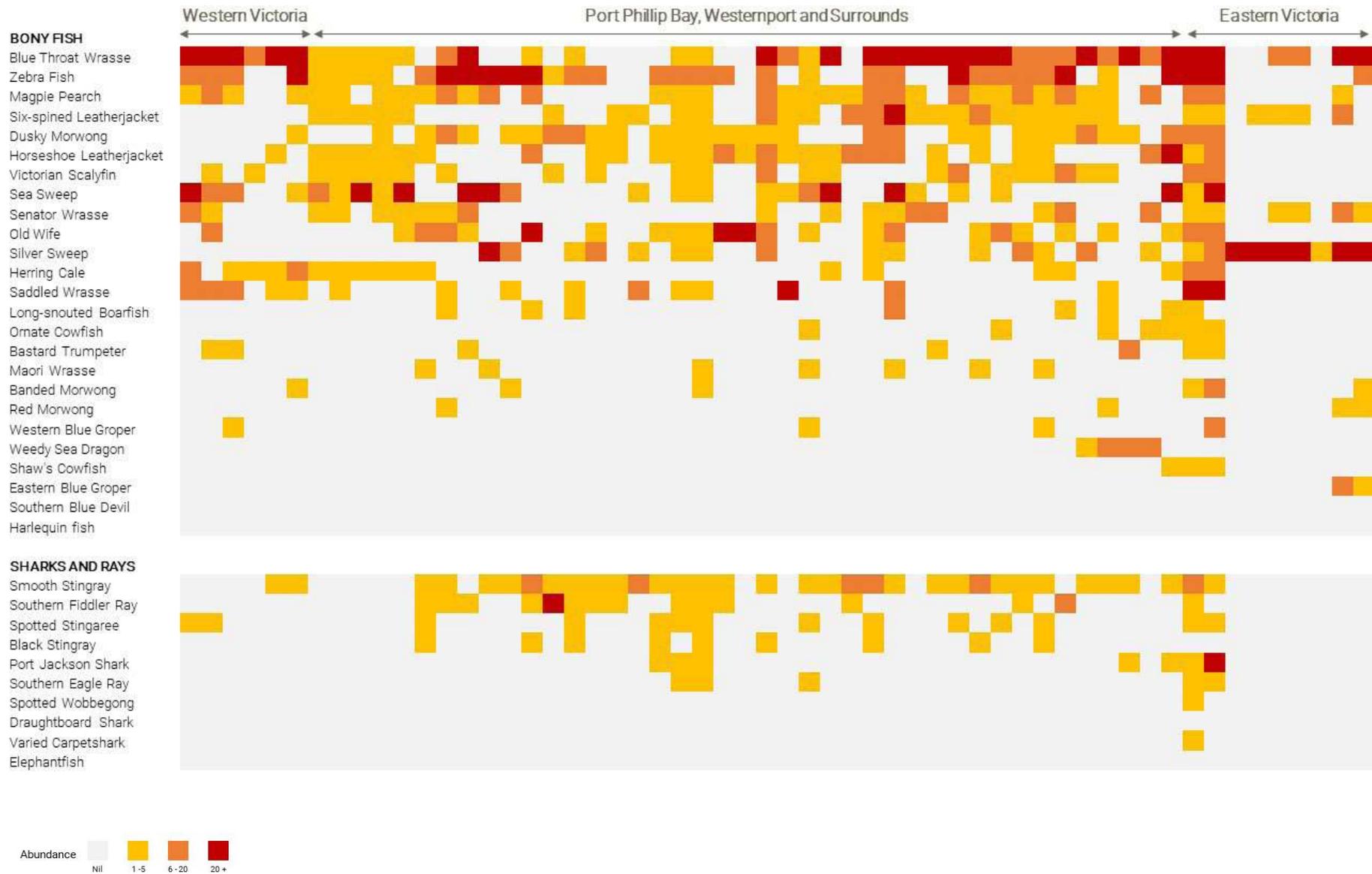
V: Table of fish species observed at each site surveyed in Eastern Victoria

VI: Table of fish not on slates



A Six-spined Leatherjacket at Popes Eye | Kade Mills

Appendix I: Summary of fish species sightings and abundances across Victoria



Appendix II: Table of the site conditions and habitat types recorded for each survey

Survey Site	Group	Survey Date	Survey method	No. of Participants	Max. Depth (m)	Visibil-ity (m)	Water Temp. (deg C)	Tide Level	Tidal stream	Swell height (m)	Current	Habitat Type
Western Victoria												
Stingray Bay, Warrnambool	Daktari Surf/ Bike/Dive	5/12/2020 9:30 AM - 10:30 AM	SCUBA and Snorkel	7	6	3	17	Low	Slack	1.5 m	Nil	Large Rocky Reef (>2), Sand/ Mud, Kelp, Mixed Algae, Sponges, Seasquirts & Other
South Beach Bay, Port Fairy	Daktari Surf/ Bike/Dive	21/11/2020 09:30 AM - 10:30 AM	SCUBA	4	5	5	17	Low	Slack	1.5 m	Weak	Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass
Port Campbell	Daktari Surf/ Bike/Dive	22/11/2020 10:15 AM - 11:15 AM	SCUBA	5	8	5	17	Low	Slack	1.5 m	Nil	Low Rocky Reef (<2), Artificial Reef, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Port Campbell	Daktari Surf/ Bike/Dive	6/12/2020 9:00 AM - 9:45 AM	Snorkel	1	4	4	16	High	Flood	0.5 m	Weak	Large Rocky Reef, Kelp, Mixed Algae, Sponges, Seasquirts & Other
Jarosite Reef, Point Addis Marine National Park	Friends of Point Addis	7/3/2021 11:30 AM - 12:30 PM	Snorkel	1	4	4	0	Low	Ebb	0.5 m	-	Large Rocky Reef (>2), Low Rocky Reef (<2), Sand/Mud, Kelp, Mixed Algae, Seagrass
Jarosite Reef, Point Addis Marine National Park	Friends of Point Addis	13/12/2020 03:30 PM - 4:30 PM	Snorkel	3	4	2	17	Low	Ebb	0 m	Nil	Large Rocky Reef (>2), Low Rocky Reef (<2), Sand/Mud, Kelp, Mixed Algae, Seagrass
Port Phillip Bay												
Blairgowrie	Diveline	13/12/2020	SCUBA	8	6	10	19	-	-	-	-	Artificial Reef, Sand/Mud, Sponges, Seasquirts & Other
Blairgowrie	Diveline	22/11/2020	SCUBA	5	5	10	0	-	-	-	-	Artificial Reef, Sand/Mud, Sponges, Seasquirts & Other
Blairgowrie	Mornington Peninsula Scuba Diving Club	18/11/2020 10:00 PM - 11:15 PM	SCUBA	4	6	8	18	High	Ebb	0 m	Weak	Artificial Reef, Mixed Algae, Sponges, Seasquirts & Other
Blairgowrie	Scuba Culture	6/02/2021 09:42 AM - 10:44 AM	SCUBA	9	5.2	6	19	Mid	Ebb	0 m	Nil	Artificial Reef, Sand/Mud, Mixed Algae, Sponges, Seasquirts & Other

Blairgowrie	Bass Strait Aquatic Club	20/12/2020 10:00 AM - 10:50 AM	SCUBA	9	5	5	18	High	Ebb	0 m	Nil	Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Flinders	Diveline	14/11/2020 10:00 AM - 10:50 AM	SCUBA	3	5	7	14	High	Flood	0 m	Weak	Artificial Reef, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Flinders	Mornington Peninsula Scuba Diving Club	28/11/2020	SCUBA	6	5	5	19					Artificial Reef, Sand/Mud, Seagrass, Sponges, Seasquirts & Other
Somers	Scout Scuba Victoria	17/11/2020 10:30 AM - 11:30 AM	SCUBA	2	5	12	18	Low	Ebb	0 m	Nil	Artificial Reef, Seagrass
Flinders	Somers Snorkellers Group	28/11/2020 09:45 PM - 11:00 PM	SCUBA	7	4.5	10	18	High	Slack	0.5 m	Nil	Artificial Reef, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Flinders	Jawbone Marine Sanctuary Care Group	22/11/2020 12:30 PM - 1:10 PM	Snorkel	2	5	3	0	Low	Ebb	0.5 m	Nil	Low Rocky Reef (<2), Rubble, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Jawbone Marine Sanctuary	Bass Strait Aquatic Club	5/12/2020 10:00 AM - 11:00 AM	SCUBA and Snorkel	15	4	1	17	Mid	Ebb	0 m	Weak	Low Rocky Reef (<2), Sand/Mud, Mixed Algae, Seagrass
Katies Cove, Williamstown	Marine Care Ricketts Point	9/12/2020 05:30 PM - 06:05 PM	SCUBA	2	3	3	19	Mid	Flood	0 m	Weak	Low Rocky Reef (<2), Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
MacGregor Rock, Ricketts Point Marine Sanctuary	Bass Strait Aquatic Club	21/11/2020 09:00 AM - 10:30 AM	Snorkel	28	6	5	16	High	Ebb	0 m	Nil	Large Rocky Reef (>2), Low Rocky Reef (<2), Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Mornington Pier and Jetty	Australian Diving Instruction	30/12/2020 01:40 PM - 02:20 PM	SCUBA	2	9	5	18	Mid	Flood	0 m	Nil	Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Mornington	Bass Strait Aquatic Club	22/11/2020 10:00 AM - 12:00 PM	SCUBA	7	8	6	17	High	Ebb	0 m	Nil	Large Rocky Reef (>2), Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Mornington	WaterMaarq	21/11/2020 11:30 AM - 12:20 PM	SCUBA	2	10	5	17	High	Ebb	0 m	Weak	Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other

Nepean Bay	Australian Diving In-struction	21/11/2020 08:45 AM - 10:15 AM	Snorkel	4	4	10	17	Low	Ebb	0.5 m	Weak	Low Rocky Reef (<2), Sand/Mud, Mixed Algae
Brighton	Australian Diving In-struction	15/11/2020 01:30 PM - 02:22 PM	SCUBA	4	5.2	5	17	High	Flood	0.5 m	Weak	Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass
Ozone Wreck, Indented Heads	Marine Care Point Cooke	14/11/2020 01:30 PM - 3:00 PM	SCUBA	7	4	5	17	High	Slack	0 m	Nil	Artificial Reef, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Point Cooke Marine Sancttuary	Point Cooke Marine Sanctuary Care and Parks Victoria	13/12/2020	Snorkel	17	3	9	20	Low	Flood	0.5 m	Weak	Low Rocky Reef (<2), Rubble, Sand/Mud, Mixed Algae, Seagrass
Popes Eye	Parks Victo-ria/VNPA ReefWatch	10:00 AM - 11:00 AM	Snorkel	13	2	1	0	High	Ebb	0 m	Weak	Low Rocky Reef (<2), Sand/Mud, Kelp, Mixed Algae, Seagrass
Popes Eye	VNPA Reef-Watch	18/01/2020	Virtual Count	9	8	5	17.7	Low	Flood	1 m	Weak	Large Rocky Reef (>2), Artificial Reef, Kelp, Mixed Algae
Popes Eye	VNPA Reef-Watch	10:30 AM - 11:30 AM	Virtual Count	6	8	10	17.5	High	Slack	0 m	Nil	Large Rocky Reef (>2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Popes Eye	VNPA Reef-Watch	11/12/2020 04:23 PM - 04:36 PM	Virtual Count	7	8	5	16	Low	Slack	0 m	Nil	Large Rocky Reef (>2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Popes Eye	VNPA Reef-Watch	26/11/2020 12:08 PM - 12:28 PM	Virtual Count	10	8	3	17	High	Slack	0.5 m	Weak	Large Rocky Reef (>2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Portarlington	Australian Diving In-struction	19/11/2020 01:08 PM - 01:28 PM	Virtual Count	10	8	10	17.2	High	Slack	1 m	Weak	Large Rocky Reef (>2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Rye Pier	Bass Strait Aquatic Club	3/12/2020 12:35 PM - 12:55 PM	SCUBA	9	4.1	5	20	Mid	Ebb	0 m	Nil	Large Rocky Reef (>2), Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Rye Pier	Bass Strait Aquatic Club	10/12/2020 10:36 AM - 10:56 AM	SCUBA	1	5	5	20	Low	Flood	0 m	Nil	Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Rye Pier	Dive and Dive	30/11/2020 08:02 PM - 09:38 PM	SCUBA	3	5	5	18	Low	Flood	0 m	Nil	Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other

Rye Pier	Mornington Peninsula Scuba Diving Club	13/12/2020 01:00 PM - 01:35 PM	SCUBA and Snorkel	9	4	5	19	Low	Ebb	0 m	Weak	Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Rye Pier	Ocean Divers	30/12/2020 08:30 AM - 09:30 AM	SCUBA	4	5	10	18	High	Ebb	0 m	Nil	Artificial Reef, Mixed Algae, Sponges, Seasquirts & Other
Rye Pier	Scuba Cul-ture	19/12/2020 11:00 AM- 11:40 AM	SCUBA	18	7	7	17	High	Ebb	0 m	Weak	Artificial Reef, Mixed Algae, Sponges, Seasquirts & Other
Rye Pier	Scuba Cul-ture	4/12/2020 10:15 PM - 11:30 PM	SCUBA	6	4.7	9	20	Low	Ebb	0.5 m	Weak	Artificial Reef, Sand/Mud, Mixed Algae, Sponges, Seasquirts & Other
Sandringham Beach	Australian Diving In-struction	14/11/2020 09:45 AM - 11:00 AM	SCUBA	7	4.4	4	21	Low	Ebb	0.5 m	Weak	Artificial Reef, Rubble, Sand/Mud, Mixed Algae, Sponges, Seasquirts & Other
St Leonards	Australian Diving In-struction	30/01/2021 10:18 AM - 11:18 AM	SCUBA	10	4	8	18	Mid	Ebb	0 m	Nil	Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
St Leonards	Bass Strait Aquatic Club	20/02/2021 09:41 AM - 10:43 AM	SCUBA	6	3.5	3	17	Mid	Ebb	0.5 m	Strong	Low Rocky Reef (<2), Artificial Reef, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Steeles Rock	Eco Connect Solutions	15/11/2020 08:55 AM - 9:55 AM	SCUBA	2	4	5	19	High	Ebb	0 m	Nil	Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Steeles Rock	Eco Connect Solutions	21/11/2020 09:45 AM - 10:30 AM	Snorkel	5	2.1	6	0	Low	-	-	Weak	Large Rocky Reef (>2), Low Rocky Reef (<2), Mixed Algae, Seagrass
Tassels Cove	Dive2U	5/12/2020 10:30 AM - 11:45 AM	Snorkel	5	2	4	0	-	-	-	-	Low Rocky Reef (<2), Mixed Algae, Seagrass
Teahouse Reef, Ricketts Point Marine Sanctuary	Marine Care Ricketts Point	29/11/2020 09:30 AM - 10:30 AM	Snorkel	10	3	5	17	Mid	Ebb	0 m	Weak	Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Kelp, Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Williamstown Beach Break-water	Bass Strait Aquatic Club	28/11/2020 10:11 AM - 11:25 AM	Snorkel	28	10	5	14.6	Low	Flood	0.5 m	Weak	Large Rocky Reef (>2), Low Rocky Reef (<2), Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other

Eastern Victoria

South Hopetoun Channel, Lakes Entrance	Friends of Beware Reef	30/11/2020 10:15 AM - 11:30 AM	SCUBA and Snorkel	3	2	4	17	Low	Flood	0 m	Nil	Sand/Mud, Seagrass
Shack Bay, Inverloch	South Gippsland Conservation Society/ Bunurong Coast Education	22/11/2020 12:30 PM - 1:00 PM	Snorkel	25	5	6	17	Low	Flood	0.5 m	Nil	Large rocky reef (>2), Rocky Reef (>2), Mixed Algae, Seagrass, Sponges, Seasquirts & Other
Nyerimilang Jetty, Lakes Entrance	Friends of Beware Reef	18/11/2020 10:00 AM - 12:00 PM	SCUBA and Snorkel	3	6	4	17	High	Flood	1 m	Strong	Low Rocky Reef (<2), Artificial Reef, Rubble, Sand/Mud, Mixed Algae
North Groyne, Lakes Entrance	Friends of Beware Reef	10/11/2020 01:30 PM - 02:45 PM	SCUBA and Snorkel	2	2	1	19	Low	Flood	0 m	Weak	Large Rocky Reef (>2), Artificial Reef, Rubble, Sand/Mud, Mixed Algae
Maringa Creek, Lakes Entrance	Friends of Beware Reef	3/11/2020 01:00 PM - 01:45 PM	SCUBA and Snorkel	3	2	3	14	Low	Flood	0 m	Nil	Low Rocky Reef (<2), Rubble, Sand/Mud, Mixed Algae, Seagrass
Drews Jetty, Lakes Entrance	Friends of Beware Reef	18/11/2020 10:00 AM - 11:30 AM	SCUBA and Snorkel	4	6	4	16	Low	Flood	0 m	Weak	Artificial Reef, Rubble, Sand/Mud, Mixed Algae
Drews Jetty, Lakes Entrance	Friends of Beware Reef	3/11/2020 10:00 AM - 11:00 AM	SCUBA and Snorkel	3	6	2	14	Low	Flood	0 m	Weak	Artificial Reef, Rubble, Sand/Mud, Mixed Algae
Harmers Haven	South Gippsland Conservation Society/ Bunurong Coast Education/ Friends of Harmers Haven	3/11/2020 10:00 AM - 11:00 AM	Snorkel	30	5	7	17	Low	Ebb	0.5 m	Nil	Large Rocky Reef (>2), Low Rocky Reef (<2), Rubble, Sand/Mud, Mixed Algae, Seagrass, Sponges, Seasquirts & Other

Appendix III: Table of fish species observed at each site surveyed in Western Victoria

Target Species	South Beach, Port Fairy (Daktari Surf/Bike/Dive)	South Beach, Port Fairy (Daktari Surf/Bike/Dive)	Stingray Bay, Warrnambool (Daktari Surf/Bike/Dive)	Port Campbell (Daktari Surf/Bike/Dive)	Jarosite Reef, Point Addis (Friends of Point Addis)	Jarosite Reef, Point Addis (Friends of Point Addis)
Blue Throat Wrasse	20 +	20 +	20 +	6 - 20	20 +	20 +
Zebra Fish	6 - 20	6 - 20	6 - 20	Nil	Nil	20 +
Magpie Perch	1 - 5	6 - 20	1 - 5	Nil	Nil	1 - 5
Six-spined Leatherjacket	Nil	Nil	Nil	Nil	Nil	Nil
Dusky Morwong	Nil	Nil	Nil	Nil	Nil	1 - 5
Horseshoe Leatherjacket	Nil	Nil	Nil	Nil	1 - 5	Nil
Victorian Scalyfin	Nil	1 - 5	Nil	1 - 5	Nil	Nil
Sea Sweep	20 +	6 - 20	6 - 20	Nil	Nil	1 - 5
Senator Wrasse	6 - 20	1 - 5	Nil	Nil	Nil	Nil
Old Wife	Nil	6 - 20	Nil	Nil	Nil	Nil
Silver Sweep	Nil	Nil	Nil	Nil	Nil	Nil
Herring Cale	6 - 20	Nil	1 - 5	1 - 5	1 - 5	6 - 20
Saddled Wrasse	6 - 20	6 - 20	6 - 20	Nil	1 - 5	1 - 5
Long-snouted Boarfish	Nil	Nil	Nil	Nil	Nil	Nil
Ornate Cowfish	Nil	Nil	Nil	Nil	Nil	Nil
Bastard Trumpeter	Nil	1 - 5	1 - 5	Nil	Nil	Nil
Maori Wrasse	Nil	Nil	Nil	Nil	Nil	Nil
Banded Morwong	Nil	Nil	Nil	Nil	Nil	1 - 5
Red Morwong	Nil	Nil	Nil	Nil	Nil	Nil
Western Blue Groper	Nil	Nil	1 - 5	Nil	Nil	Nil
Weedy Sea Dragon	Nil	Nil	Nil	Nil	Nil	Nil
Shaw's Cowfish	Nil	Nil	Nil	Nil	Nil	Nil
Eastern Blue Groper	Nil	Nil	Nil	Nil	Nil	Nil

Smooth Stingray	Nil	Nil	Nil	Nil	1 - 5	1 - 5
Southern Fiddler Ray	Nil	Nil	Nil	Nil	Nil	Nil
Spotted Stingaree	1 - 5	1 - 5	Nil	Nil	Nil	Nil
Black Stingray	Nil	Nil	Nil	Nil	Nil	Nil
Port Jackson Shark	Nil	Nil	Nil	Nil	Nil	Nil
Southern Eagle Ray	Nil	Nil	Nil	Nil	Nil	Nil
Spotted Wobbegong	Nil	Nil	Nil	Nil	Nil	Nil
Varied Carpetshark	Nil	Nil	Nil	Nil	Nil	Nil

Appendix IV: Table of fish species observed at each site surveyed in and around Port Phillip Bay

Target Species	Popes Eye (VNPA ReefWatch)	Popes Eye (VNPA ReefWatch, Parks Victoria)	St Leonards (Australian Diving Instruction)	St Leonards (Bass Strait Aquatic Club)	Indented Head (Australian Diving Instruction)	Steeles Rock (Eco Connect)	Steeles Rock (Eco Connect)			
Blue Throat Wrasse	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Nil	6 - 20	20 +	Nil	Nil
Zebra Fish	1 - 5	1 - 5	1 - 5	1 - 5	Nil	6 - 20	20 +	20 +	20 +	20 +
Magpie Perch	1 - 5	1 - 5	Nil	1 - 5	1 - 5	1 - 5	6 - 20	1 - 5	6 - 20	Nil
Six-spined Leatherjacket	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil
Dusky Morwong	Nil	Nil	Nil	1 - 5	Nil	1 - 5	6 - 20	1 - 5	Nil	1 - 5
Horseshoe Leatherjacket	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Nil	Nil	Nil	Nil
Victorian Scalyfin	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Nil	1 - 5	Nil	Nil	Nil
Sea Sweep	6 - 20	1 - 5	20 +	1 - 5	20 +	Nil	Nil	20 +	20 +	6 - 20
Senator Wrasse	1 - 5	1 - 5	Nil	1 - 5	1 - 5	1 - 5	1 - 5	6 - 20	Nil	Nil
Old Wife	Nil	Nil	Nil	Nil	1 - 5	6 - 20	6 - 20	1 - 5	Nil	Nil
Silver Sweep	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	20 +	6 - 20
Herring Cale	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	1 - 5	Nil	Nil	Nil	Nil
Saddled Wrasse	Nil	1 - 5	Nil	Nil	Nil	Nil	1 - 5	Nil	Nil	1 - 5
Long-snouted Boarfish	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5	Nil	Nil	Nil

Shaw's Cowfish	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Eastern Blue Groper	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Smooth Stingray	6 - 20	1 - 5	1 - 5	1 - 5	1 - 5	6 - 20	1 - 5	1 - 5	1 - 5	1 - 5
Southern Fiddler Ray	1 - 5	20 +	1 - 5	1 - 5	1 - 5	Nil	Nil	1 - 5	1 - 5	1 - 5
Spotted Stingaree	Nil	Nil	1 - 5	Nil	Nil	Nil	1 - 5	1 - 5	1 - 5	Nil
Black Stingray	1 - 5	Nil	1 - 5	Nil	Nil	Nil	1 - 5	Nil	1 - 5	Nil
Port Jackson Shark	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5	1 - 5	1 - 5	Nil
Southern Eagle Ray	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5	1 - 5	Nil
Spotted Wobbegong	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Varied Carpetshark	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

IV (cont) Table of fish species observed at each site surveyed in and around Port Phillip Bay

Target Species	Mornington Pier (Australian Diving Instruction)	Mornington Pier (Bass Strait Aquatic Club)	Tassels Cove (Dive2U)	Rye Pier (Ocean Divers)	Rye Pier (Mornington Peninsula Scuba Diving Club)	Rye Pier (Bass Strait Aquatic Club)	Rye Pier (Bass Strait Aquatic Club)	Rye Pier (Dive and Dive)	Rye Pier (Scuba Culture)	Rye Pier (Scuba Culture)
Blue Throat Wrasse	Nil	20 +	6 - 20	1 - 5	20 +	Nil	20 +	20 +	20 +	20 +
Zebra Fish	Nil	6 - 20	Nil	1 - 5	Nil	Nil	6 - 20	6 - 20	Nil	Nil
Magpie Perch	Nil	6 - 20	1 - 5	1 - 5	1 - 5	1 - 5	6 - 20	6 - 20	1 - 5	Nil
Six-spined Leatherjacket	Nil	6 - 20	1 - 5	1 - 5	Nil	6 - 20	6 - 20	20 +	1 - 5	1 - 5
Dusky Morwong	1 - 5	1 - 5	1 - 5	Nil	Nil	Nil	6 - 20	6 - 20	Nil	Nil
Horseshoe Leatherjacket	1 - 5	6 - 20	1 - 5	1 - 5	1 - 5	6 - 20	6 - 20	6 - 20	Nil	1 - 5
Victorian Scalyfin	Nil	6 - 20	Nil	1 - 5	1 - 5	Nil	Nil	Nil	Nil	1 - 5
Sea Sweep	Nil	1 - 5	1 - 5	6 - 20	20 +	Nil	Nil	20 +	1 - 5	Nil

Eastern Blue Groper	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Smooth Stingray	1 - 5	6 - 20	1 - 5	1 - 5	1 - 5	Nil	1 - 5	1 - 5	1 - 5	Nil	1 - 5
Southern Fiddler Ray	Nil	Nil	Nil	1 - 5	Nil	6 - 20	Nil	Nil	Nil	Nil	Nil
Spotted Stingaree	1 - 5	Nil	1 - 5	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Black Stingray	Nil	1 - 5	Nil	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Port Jackson Shark	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5	Nil	1 - 5
Southern Eagle Ray	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Spotted Wobbegong	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Varied Carpetshark	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Appendix V: Table of fish species observed at each site surveyed in Eastern Victoria

Target Species	Shack Bay, Inverloch (South Gippsland Conservation Society/ Bunurong Coast Education)	Harmers Haven (South Gippsland Conservation Society/ Bunurong Coast Education/ Friends of Harmers Haven)	Nyerimilang Jetty, Lakes Entrance (Friends of Beware Reef)	South Hopetoun Channel, Lakes Entrance (Friends of Beware Reef)	Maringa Creek, Lakes Entrance (Friends of Beware Reef)	Drews Jetty, Lakes Entrance (Friends of Beware Reef)	North Groyne, Lakes Entrance (Friends of Beware Reef)	Drews Jetty, Lakes Entrance (Friends of Beware Reef)
Blue Throat Wrasse	20 +	20 +	Nil	Nil	6 - 20	6 - 20	Nil	20 +
Zebra Fish	20 +	20 +	Nil	Nil	Nil	Nil	Nil	6 - 20
Magpie Perch	6 - 20	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil
Six-spined Leatherjacket	1 - 5	1 - 5	Nil	1 - 5	1 - 5	1 - 5	Nil	Nil
Dusky Morwong	6 - 20	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil
Horseshoe Leatherjacket	6 - 20	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Victorian Scalyfin	6 - 20	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil

Sea Sweep	20 +	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Senator Wrasse	1 - 5	1 - 5	Nil	Nil	1 - 5	1 - 5	Nil	1 - 5
Old Wife	6 - 20	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil
Silver Sweep	6 - 20	1 - 5	20 +	20 +	20 +	20 +	1 - 5	20 +
Herring Cale	6 - 20	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil
Saddled Wrasse	20 +	20 +	Nil	Nil	Nil	Nil	Nil	Nil
Long-snouted Boarfish	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Ornate Cowfish	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Bastard Trumpeter	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Maori Wrasse	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Banded Morwong	6 - 20	1 - 5	Nil	Nil	Nil	Nil	Nil	1 - 5
Red Morwong	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5
Western Blue Groper	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Weedy Sea Dragon	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Shaw's Cowfish	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Eastern Blue Groper	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1 - 5
Smooth Stingray	1 - 5	6 - 20	Nil	Nil	Nil	Nil	Nil	Nil
Southern Fiddler Ray	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Spotted Stingaree	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Black Stingray	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Port Jackson Shark	20 +	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Southern Eagle Ray	1 - 5	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Spotted Wobbegong	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil
Varied Carpetshark	Nil	1 - 5	Nil	Nil	Nil	Nil	Nil	Nil

Appendix VI: Table of fish not on slates

Survey Site	Additional Species Recorded
Western Victoria	
Jarosite Reef, Point Addis Marine National Park	Globefish (<i>Diodon nichthemerus</i>), Port Phillip Pipefish (<i>Vanacampus phillipi</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Snapper (<i>Pagrus auratus</i>), Snook (<i>Sphyræna novaehollandiae</i>), Southern Hulafish (<i>Trachinops caudimaculatus</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>),
Port Campbell Bay	Marblefish (<i>Aplodactylus arctidens</i>)
Port Phillip Bay	
Blairstown	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>)
Flinders Pier	Little Weed Whiting (<i>Neoodax balteatus</i>)
Mornington Yacht Club	Armstrong's Flounder (<i>Arnoglossus armstrongi</i>), Globefish (<i>Diodon nichthemerus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>)
Rye Pier	Bluespotted Flathead (<i>Platycephalus caeruleopunctatus</i>), Bluespotted Goatfish (<i>Upeneichthys vlamingii</i>), Eastern Australian Salmon (<i>Arripis trutta</i>), Globefish (<i>Diodon nichthemerus</i>), Little Weed Whiting (<i>Neoodax balteatus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Mosaic Leatherjacket (<i>Eubalichthys mosaicus</i>), Potbelly Seahorse (<i>Hippocampus bleekeri</i>), Southern Hulafish (<i>Trachinops caudimaculatus</i>)
St Leonards	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Common Stargazer (<i>Kathetostoma laevis</i>), Globefish (<i>Diodon nichthemerus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Sailfin Goby (<i>Nesogobius pulchellus</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Southern Bluespotted Flathead (<i>Platycephalus speculator</i>), Southern Velvetfish (<i>Aploactisoma milesii</i>)
Port Phillip Ferries (Portarlington Docklands)	Blacksaddle Goatfish (<i>Parupeneus spilurus</i>), Globefish (<i>Diodon nichthemerus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Potbelly Seahorse (<i>Hippocampus bleekeri</i>), Shorthead Seahorse (<i>Hippocampus breviceps</i>)
Pope's Eye	Barber Perch (<i>Caesioperca rasor</i>), Marblefish (<i>Aplodactylus arctidens</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Yellowstriped Leatherjacket (<i>Meuschenia flavolineata</i>)
Rye Pier	Bluespotted Goatfish (<i>Upeneichthys vlamingii</i>), Eastern Australian Salmon (<i>Arripis trutta</i>), Globefish (<i>Diodon nichthemerus</i>), Little Weed Whiting (<i>Neoodax balteatus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Mosaic Leatherjacket (<i>Eubalichthys mosaicus</i>), Potbelly Seahorse (<i>Hippocampus bleekeri</i>), Southern Bluespotted Flathead (<i>Platycephalus speculator</i>), Southern Hulafish (<i>Trachinops caudimaculatus</i>)
Sandringham Beach	Flathead Sandfish (<i>Lesueurina platycephala</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Potbelly Seahorse (<i>Hippocampus bleekeri</i>),
Somers	Sand Whiting (<i>Sillago ciliata</i>)
St Leonards	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Common Stargazer (<i>Kathetostoma laevis</i>), Globefish (<i>Diodon nichthemerus</i>), Moonlighter (<i>Tilodon sexfasciatus</i>), Sailfin Goby (<i>Nesogobius pulchellus</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Southern Bluespotted Flathead (<i>Platycephalus speculator</i>), Southern Velvetfish (<i>Aploactisoma milesii</i>)
Tassels Cove	Australian Herring (<i>Arripis georgianus</i>), Eastern Kelpfish (<i>Chironemus marmoratus</i>), Eastern Shovelnose Stingaree (<i>Trygonoptera imitata</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Globefish (<i>Diodon nichthemerus</i>), Snapper (<i>Pagrus auratus</i>), Southern Bluespotted Flathead (<i>Platycephalus speculator</i>), Sparsely-spotted Stingaree (<i>Urolophus paucimaculatus</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>), Widebody Pipefish (<i>Stigmatopora nigra</i>)

Eastern Victoria

Nyerimilang Jetty, Lakes Entrance	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Black Bream (<i>Acanthopagrus butcheri</i>), Eastern Fortescue (<i>Centropogon australis</i>), Luderick (<i>Girella tricuspidate</i>), Rough Leatherjacket (<i>Scobinichthys granulatus</i>), Ringback Pipefish (<i>Stipecampus cristatus</i>), Silver Trevally (<i>Pseudocaranx georgianus</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>), White-ear Scalyfing (<i>Parma microlepsis</i>)
South Hopetoun Channel, Lakes Entrance	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Bridled Leatherjacket (<i>Acanthaluteres spilomelanurus</i>), Greenback Flounder (<i>Rhombosolea tapirine</i>), Mado Sweep (<i>Atypichthys strigatus</i>), Luderick (<i>Girella tricuspidate</i>), Port Jackson Glassfish (<i>Ambassis jacksoniensis</i>), Silver Trevally (<i>Pseudocaranx georgianus</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Spotted Pipefish (<i>Stigmatopora argus</i>), Tommy Rough (<i>Arripis georgiana</i>), Yellow-eye Mullet (<i>Aldrichetta forsteri</i>)
Maringa Creek, Lakes Entrance	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Eastern Fortescue (<i>Centropogon australis</i>), Flathead Goby (<i>Callogobius depressus</i>), Greenback Flounder (<i>Rhombosolea tapirine</i>), Spotted Pipefish (<i>Stigmatopora argus</i>), Tamar Goby (<i>Afurgobius tamarensis</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>)
Drews Jetty, Lakes Entrance	Big-Belly Seahorse (<i>Hippocampus abdominalis</i>), Crimson Banded Wrasse (<i>Notolabrus gymnogenis</i>), Mado Sweep (<i>Atypichthys strigatus</i>), Pretty Polly (<i>Dotalabrus aurantiacus</i>), Silver Trevally (<i>Pseudocaranx georgianus</i>), Smooth Toadfish (<i>Tetractenos glaber</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>), White-ear Scalyfing (<i>Parma microlepsis</i>)
North Groyne, Lakes Entrance	Glass Goby (<i>Gobiopterus semivetitus</i>), Mado Sweep (<i>Atypichthys strigatus</i>), Tamar Goby (<i>Afurgobius tamarensis</i>), Tasmanian Blenny (<i>Parablennius tasmanianus</i>)

