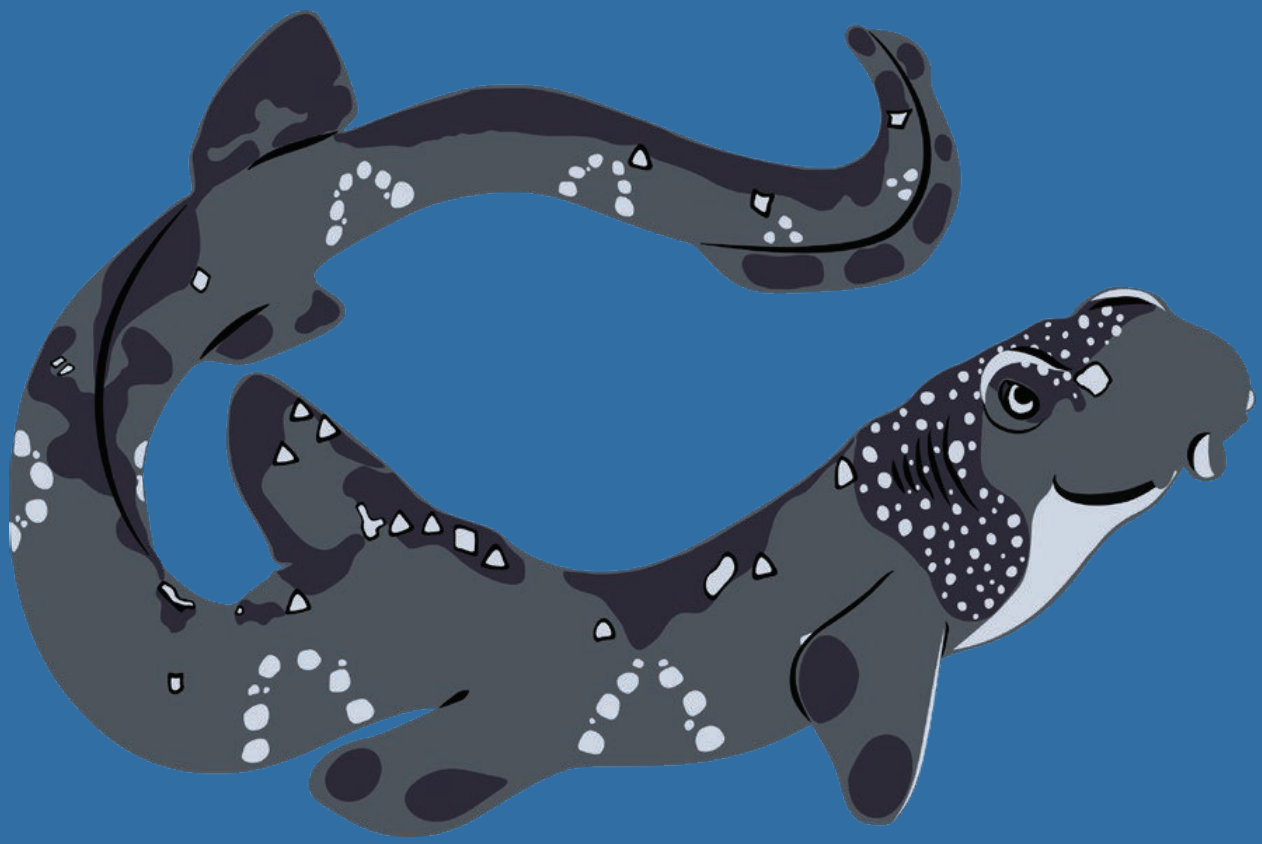
GREAT VICTORIAN FISH COUNT 2022



VICTORIAN NATIONAL PARKS ASSOCIATION

Report of the 2022
Great Victorian Fish Count

Great Victoria Fish Count 2022

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VICTORIAN NATIONAL PARKS ASSOCIATION

The Victorian National Parks Association (VNPA) is an effective and influential nature conservation organisation.

We work with local communities, scientists and government to advocate for evidence-based policy to safeguard wildlife, habitat and protected areas. We inspire connections with nature through citizen science, activities, action and education for all Victorians.

We've led the creation, oversight and defence of Victoria's natural estate for over 70 years.

reef watch

ReefWatch is VNPA's marine citizen-science program. It runs the Great Victorian Fish Count and the Sea Slug Census. It trains people to collect important information about fish, invertebrates and algae at locations across Victoria.

VNPA acknowledges the many First Peoples of the area now known as Victoria, honours their continuing connection to, and caring for, Country, and supports Traditional Owner joint-management of parks and public land and waters for conservation of natural and cultural heritage. We offer our respect to Elders past and present.

Contents

Executive summary

The Great Victorian Fish Count (GVFC) is Victoria's largest marine citizen science event, providing a unique opportunity for participants to engage with the underwater world while contributing valuable data on marine biodiversity. Now in its 21st year, the GVFC attracts a diverse range of participants, including dive clubs, environmental groups, schools, and local communities, to conduct fish diversity surveys along Victoria's coastline in November and December.

In 2022, 52 surveys were conducted by 17 groups across 34 sites, covering depths from 2 to 51 metres. Most surveys (80%) took place in and around Port Phillip Bay/Nerm and Western Port, with visibility ranging from 2 to 15 metres and water temperatures between 13 and 20°C.

Key findings

- Fish diversity: The Blue Throat Wrasse was the most observed species, appearing in 83% of surveys, followed by Magpie Perch, Zebra Fish, and Victorian Scalyfin. Other frequently recorded species included Old Wife, Dusky Morwong, and various Leatherjackets. Less commonly observed species included Shaw's Cowfish, Western Blue Groper, and Southern Blue Devil.
- Sharks and rays: Smooth Stingrays were the most frequently recorded species in this category, with sightings remaining consistent with previous years. Spotted Stingarees and Southern Eagle Rays were also observed, while the Elephant Fish was not sighted in 2022.
- Survey conditions and habitat: Most surveys were conducted in unprotected waters (85%), with a variety of habitats recorded, including rocky reefs, sand/mud substrates, and artificial structures. Vegetation types included mixed algae (70%), sponge gardens, seagrass meadows, and kelp forests.

Trends and comparisons

- The Blue Throat Wrasse continued to dominate sightings, with its numbers aligning with previous years and showing a slight increase.
- Magpie Perch sightings were higher than in the past three years, while Victorian Scalyfin reached their highest observation rate in the past seven years.
- Sightings of Six-spined and Horseshoe Leatherjackets rebounded after a decline in 2021, suggesting possible environmental recovery or population shifts.
- Smooth Stingray observations remained steady, while Spotted Stingaree sightings returned to previous levels after a dip in 2021.

Conclusions

The GVFC continues to play a vital role in engaging the community, fostering marine conservation awareness, and collecting important data for understanding changes in fish populations and habitat conditions. The event highlights the importance of long-term monitoring to assess environmental changes, particularly in the face of climate variations and human activities. Future efforts will aim to enhance participation, expand survey coverage, and incorporate additional methodologies, such as virtual fish counts, to further strengthen data collection efforts.

Senator Wrasse 'dancing' for a diver *imogenisunderwater/iNaturalist*

Safety briefing before hitting the water at Kitty Miller Bay

Port Jackson Sharks resting on the seabed *Kade Mills*

Introduction

1.1 Background

Combining the opportunity to collect real data on Victoria's marine life with the chance to dive into and experience our local underwater world, the GVFC is Victoria's largest marine citizen science event. It reconnects participants with the ocean and deepens their connection to it.

The GVFC is an excellent starting point for people with little or no experience to explore Victoria's underwater world and develop a passion for protecting our unique marine life. It also expands the knowledge and enthusiasm of experienced volunteers.

Now in its twenty-first year, the GVFC is held annually in November and December. Dive clubs, environmental groups, 'friends of' groups, local dive operators, community groups, schools, universities, and the Victorian National Parks Association's (VNPA) Wild Families and beginner groups participate in collecting a 'snapshot' of fish diversity in our coastal waters.

Victoria's coastline has a diverse range of habitats that provide homes to various species, many of which are not found anywhere else in the world. Almost a quarter of Australia's fish species are endemic, with 60% of these species living only in our southern seas (Bray, 2018a).

The fish count provides a snapshot of these species, involving 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 throughout the state's coastal waters.

The GVFC aims to engage passionate people in an event that gathers valuable marine data, promotes active learning, and offers the chance to reconnect with their local coastal environment. This, in turn, fosters understanding, awareness, and cooperation 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. Provides an opportunity for participants to learn from each other.

The GVFC brings together scientists, marine managers, divers, snorkellers and community members to increase and share our knowledge about fish found in their local waters.

In 2022, over 600 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 collect a vast amount of data, which would be extremely difficult to gather without the support of the community.

1.3 Partnerships with local communities

Over the past 21 years, VNPA 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 and we continued to partner with them in 2022.

All project partners benefit the GVFC by providing invaluable experience and knowledge of the marine environment in Victoria. 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 The 2022 fish 'face'

The 2022 GVFC's featured species was the Varied Carpetshark (*Parascyllium variolatum*), also known as the Necklace Carpetshark due to its distinctive black collar adorned with small white dots behind the head.

Endemic to southern Australia, this species remains relatively elusive despite being considered common. Sightings are rare as these sharks primarily shelter in caves, crevices, and ledges during the day, emerging to forage at night. They inhabit kelp forests, seagrass beds, and sandy areas, ranging from shallow waters to depths of 180 metres. Growing up to 90 cm in length, they are oviparous (egg-laying), with females depositing one to two elongated, horned egg capsules at a time.

Varied Carpetshark
Martin Crossley/iNaturalist

1.5 The Atlas of Living Australia

Data collected during the Great Victorian Fish Count is entered into the Atlas of Living Australia (ALA). This collaborative national project consolidates biodiversity data from multiple sources, making it accessible and usable online.

The data is submitted through BioCollect, a tool designed to support citizen scientists, ecologists, scientists, and natural resource managers. Given the limited information on the distribution of marine species in Victoria, the GVFC contributes vital data. To date, over 938,258 GVFC records have been accessed for research and educational purposes.

1.6 Unusual sightings and identification

We received reports of species outside their usual range. However, unfortunately without accompanying images we are unable to verify the sightings and report them to Redmap.

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 GVFC to help groups confirm their sightings and practice their underwater photography skills. Please contact ReefWatch at any time to organise a loan.

Methodology

2.1 Survey period

The 2022 Great Victorian Fish Count began on 19 November and finished on 18 December. The dates were chosen to coincide with national 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

Fifty-two surveys took place along the Victorian coastline (Fig. 1), with participating groups choosing their own sites. To ensure continuity in the data over time, groups are encouraged to select a site they are most familiar with and continue to monitor that same site each year.

While most sites surveyed were in and around Port Philip Bay and Western Port (80%), it is always encouraging to see more locations in the west of the state. The east of the state was hit by large rainfalls in October 2022 which impacted dive sites close to shore for several months.

2.3 Survey method

Each participating group leader is supplied with a standard GVFC Kit. 'The Kit' contains training materials to help participants learn how to conduct a count. It also contains information on how to upload the data, identification slates and survey forms (see Appendix).

The 'roving diver' technique

All participants work in buddy pairs or small groups for the entire survey period and share an identification slate. The 'roving diver' technique is employed, whereby participants swim freely through their selected site and record sightings of fish, referring to the identification guide on their monitoring slate.

Fig. 1: GVFC 2022 survey sites

Participants are encouraged to follow a route that does not overlap with other buddy pairs in order to cover a wider area. They are also advised to stop regularly to observe fish that may have been disturbed or hiding.

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

2.4 Data summary

At the conclusion of each survey, the GVFC data sheet (Fig. 3) is completed in the company of all the participating buddy pairs and groups. The survey form includes information regarding the survey site location, weather conditions, time spent completing the survey and water visibility.

The form is filled out immediately after the dive and involves consultation with all of the participants involved. The names of 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, with the category being based on the average results from all the participating buddy pairs.

Participating groups either email or post their results to ReefWatch or enter their results and photos directly to the ALA database.

Many people have commented on the ease and fast nature of submitting their results directly to the database and VNPA will continue to encourage participants to upload their results this way.

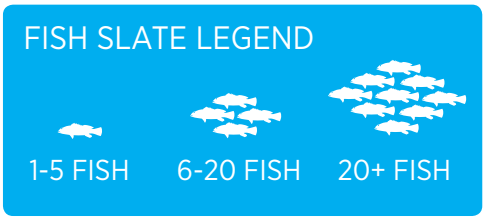


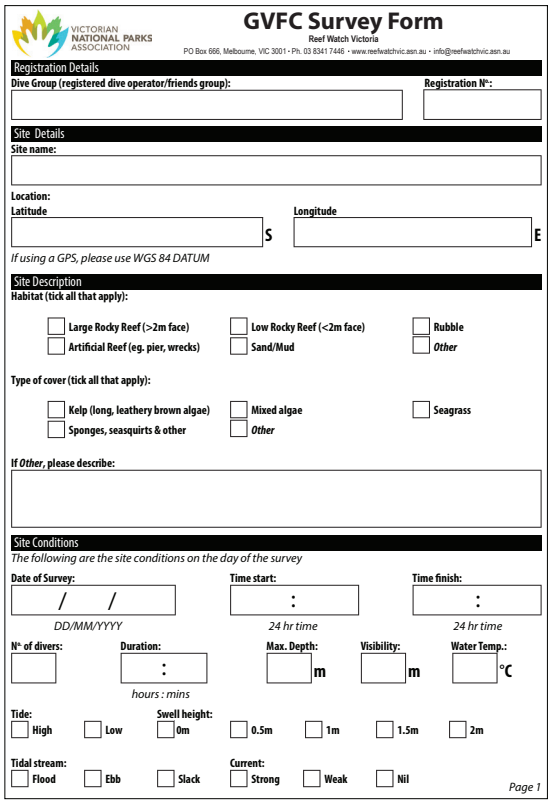
Fig. 2: Abundance categories

2.5 Data presentation

This year's results are presented to give an overview of main habitats surveyed, survey methods used and to illustrate the occurrence and abundance of species surveyed in 2022. Results are also compared to previous years.

The results are displayed as a proportion. This was calculated for each of the target species using the formula (proportion = number of surveys species sighted in/total number of surveys). With 1 representing a species being sighted in all surveys, while 0 equals a species not being sighted at all. This enables a quick overview which species were sighted more frequently during the GVFC. All GVFC data is available through the ALA (https://collections.ala.org.au/public/show/dp3777).

Each year there are some records which are not uploaded to the ALA despite groups successfully completing their surveys in the field. We encourage every participating group to make sure their data is counted towards official records, and to get in touch with the GVFC/ReefWatch coordinator if any issues are encountered when submitting results.



GVFC Survey Form

Reef Watch Victoria

PO Box 666, Melbourne, VIC 3001 • Ph. 03 8341 7446 • www.reefwatchvic.asn.au • info@reefwatchvic.asn.au

Registration Details

Dive Group (registered dive operator/friends group): | Registration N°:

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, seasquirts & 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

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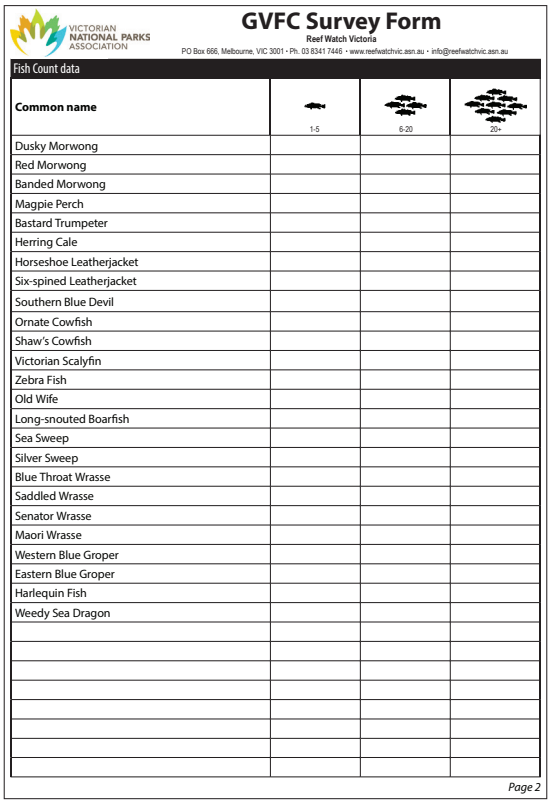


GVFC Survey Form

Reef Watch Victoria

PO Box 666, Melbourne, VIC 3001 • Ph. 03 8341 7446 • www.reefwatchvic.asn.au • info@reefwatchvic.asn.au

Fish Count data

Common name	1-5	6-20	20+
Dusky Morwong			
Red Morwong			
Banded Morwong			
Magpie Perch			
Bastard Trumpeter			
Herring Cale			
Horseshoe Leatherjacket			
Six-spined Leatherjacket			
Southern Blue Devil			
Ornate Cowfish			
Shaw's Cowfish			
Victorian Scalyfin			
Zebra Fish			
Old Wife			
Long-snouted Boarfish			
Sea Sweep			
Silver Sweep			
Blue Throat Wrasse			
Saddled Wrasse			
Senator Wrasse			
Maori Wrasse			
Western Blue Groper			
Eastern Blue Groper			
Harlequin Fish			
Weedy Sea Dragon			

Page 2

Fig. 3: Slate data forms

Results

3.1 General summary

3.1.1 Participation and conditions

Fifty-two surveys were carried out by 17 groups at 34 different sites along Victoria's coastline.

The depth of sites varied from 2–51 metres with visibility ranging from 2–15 metres. Water temperature varied from 13–20°C (Appendix B).

The number of fish counters in each participating group varied from 2–40 participants spending 15–90 minutes conducting their survey (Appendix B).

3.1.2 Survey methods

Scuba divers accounted for 56% of all surveys, with 44% undertaken by snorkellers. No surveys were conducted by both scuba divers and snorkellers (Fig. 4).

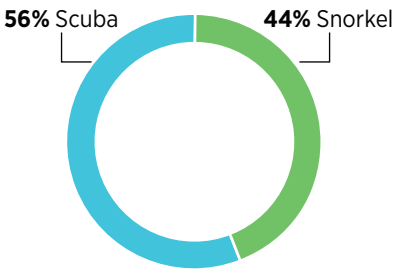


Fig. 4: Survey methods

3.1.3 Protection status of survey sites

Most surveys (85%) were conducted in unprotected waters. The remaining 15% were undertaken within marine national parks or sanctuaries (Fig. 5).

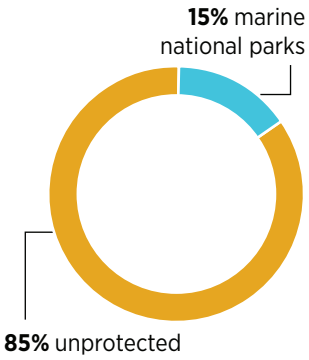


Fig. 5: Protection status of surveys

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 rocky reef. The presence of rubble was less common, as were artificial reefs/habitats (Fig. 6).

Mixed algae was the dominant vegetation type, recorded at over 70 per cent of sites. This was followed by sponge gardens, seagrass meadows and kelp forests (Fig. 7).

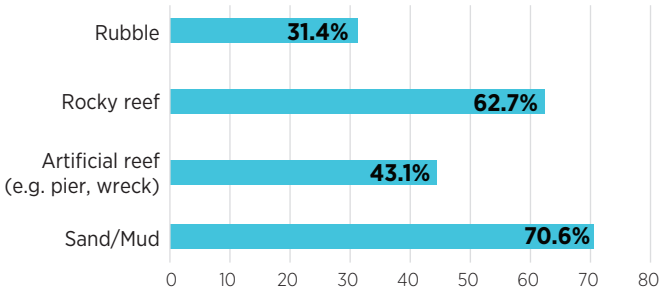


Fig.6: Habitat type fish count surveys conducted on (n=65)

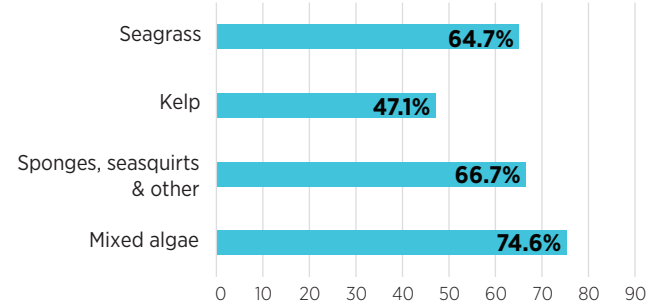


Fig. 7: Vegetation type fish count surveys conducted on (n=65)

3.2 The fish of 2022

3.2.1 Bony fish

The 'face' of the 2022 GVFC, the Varied Carpetshark was only spotted in one survey (Fig. 8).

Blue Throat Wrasse was observed in the highest proportion of surveys (0.83). Mostly occurring in abundances of 6-20 individuals (Fig .8).

Magpie Perch, Zebra Fish and Victorian Scalyfin were observed in a high proportion of surveys (0.77, 0.67 and 0.67 respectively).

Zebra Fish numbers were distributed across all abundance categories, whereas Magpie Perch and Victorian Scalyfin were mostly recorded in the lower abundance groups. (Fig. 8).

Old Wife, Dusky Morwong, Six-spined Leatherjacket, Horseshoe Leatherjacket, Sea Sweep, Senator Wrasse and Silver Sweep were all observed in proportions over 0.4 (Fig. 8).

Less common bony fish species included Shaw's Cowfish, Western Blue Groper, Southern Blue Devil, Bastard Trumpeter and the Maori Wrasse. All of which appeared in a low proportion (<0.1) of surveys conducted (Fig. 9).

Harlequin Fish, Red Morwong and Eastern Blue Groper were not sighted in any of the surveys this year.

3.2.2 Sharks and rays

The most sighted shark and ray species were the Smooth Stingray (0.46), Spotted Stingaree (0.25), Southern Fiddler Ray (0.23) and the Southern Eagle Ray (Fig. 10).

Less common shark species include Spotted Wobbegong, Draughtboard Shark and Varied Carpetshark. All of which appeared in a low proportion (<0.05) of surveys conducted.

Elephantfish were not sighted this year.

Most sharks or rays were recorded in abundances of 1-5 individuals (Fig. 10).

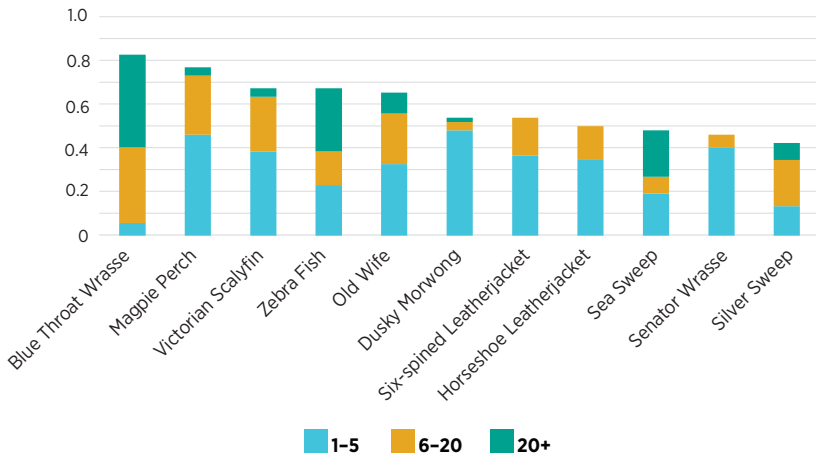


Fig.8: Most sighted bony fish

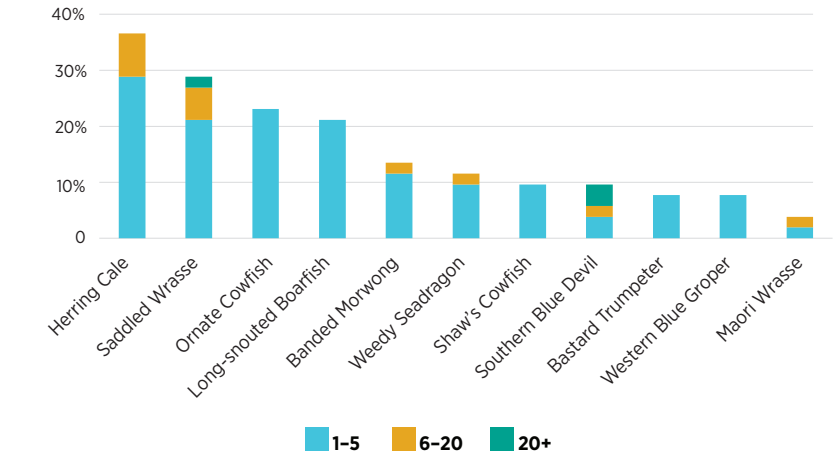


Fig.9: Less sighted bony fish

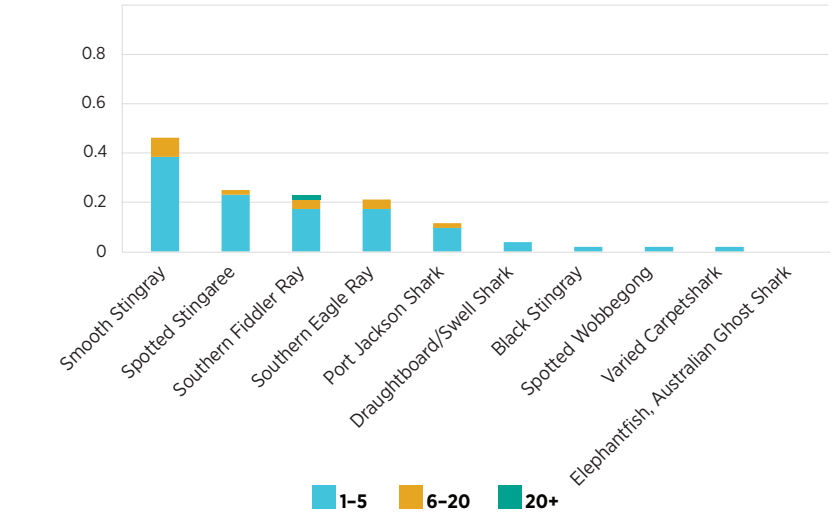


Fig.10: Most sighted sharks and rays

3.3 Comparison to previous years

3.3.1 Bony fish

The Blue Throat Wrasse continues to be the most observed species. The proportion of sightings this year is in line with what has been observed previously and up on the last couple of years (Fig. 11a).

The second most observed species, Magpie Perch was spotted more frequently this year than it has in the past three years (Fig. 11b).

Victorian Scalyfin continue to be sighted in over half of the surveys and were sighted more than they have been in the past 8 years (Fig. 11c).

Zebra Fish sightings peaked in 2019 but they are still being frequently sighted (Fig. 11d).

Sightings of both the Six-spined and Horseshoe Leatherjackets bounced back this year after decreased sharply in 2022 (Fig. 11e&f).

3.3.2 Sharks and Rays

Smooth Stingrays continue to be the most sighted shark and ray species. Sightings increased slightly this year compared to last and are within the range of previous years (Fig. 12a).

Spotted Stingaree's sighting rose this year to be inline with previous years after dipping last year (Fig. 12b). Southern Eagle Ray sightings were the highest they have been in the past 6 years (Fig. 12c).

Varied Carpetshark the 'fish face' for the 2022 GVFC was hardly sighted similar to previous years (Fig. 12d).

Blue Throat Wrasse
(Notolabrus tetricus)

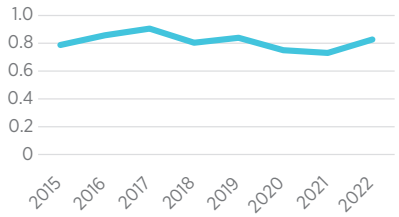


Fig. 11a

Magpie Perch
(Pseudogoniistius nigripes)

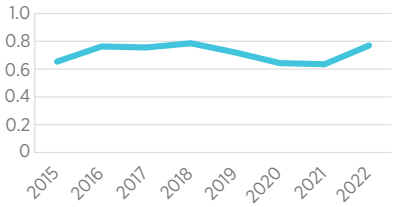


Fig. 11b

Victorian Scalyfin
(Parma victoriae)

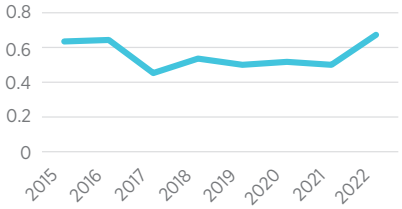


Fig. 11c

Zebra Fish
(Girella zebra)

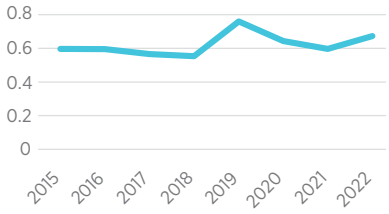


Fig. 11d

Horseshoe Leatherjacket
(Meuschenia hippocrepis)

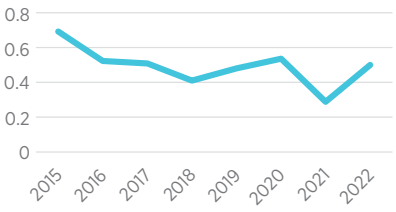


Fig. 11e

Six-spined Leatherjacket
(Meuschenia freycineti)

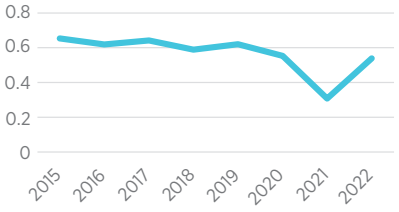


Fig. 11f

Smooth Stingray
(Bathytoshia brevicaudata)

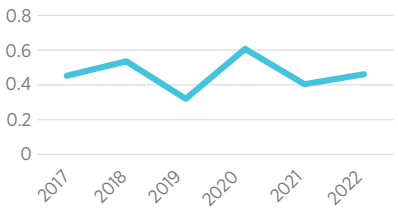


Fig. 12a

Spotted Stingaree
(Urolophus gigas)

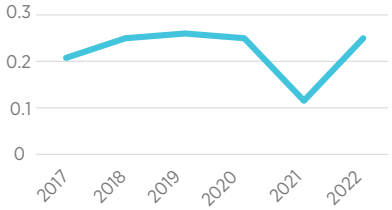


Fig. 12b

Discussion

4.1 General summary

4.1.1 Participation and conditions

Victoria's unique and dynamic coastline, is reflected in the range of site conditions encountered by participants. As you might expect groups undertaking the GVFC on exposed rocky coasts were more likely to encounter unfavourable conditions than those in more sheltered locations, such as the many sites visited throughout Port Phillip Bay. This year heavy rainfall on the east coast meant that the Friends of Beware reef were unable to dive at any of the local sites.

4.1.2 Survey technique

This year, the representation from snorkel groups participating was fantastic. Unfortunately, we were unable to do any virtual fish counts as the camera at Pope's Eye was undergoing repairs. We hope to bring back virtual fish counts in the future.

Scuba divers still represent the largest percentage of participants thanks to the continued support and enthusiasm of local dive stores and clubs.

4.1.3 Protection status

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 (VNPA, 2015). They provide people with the opportunity to experience and observe marine life in environments that are undisturbed by fishing and other extractive activities.

Despite only covering a small percentage of Victoria's marine waters, they are embraced and used widely by the diving community. This is evident from the 15% of surveys that were carried out in MPAs in comparison to the small proportion of the coastline they occupy.

4.1.4 Habitats surveyed

Surveys were conducted at sites containing a number of different habitats and/or vegetation types. More surveys were done on rocky reef sites than at artificial structures, this may be a reflection of work being done by numerous organisations to raise the profile of the Great Southern Reef by encouraging more people to explore it.

The vegetation types at sites is a reflection of the habitats surveyed. It was encouraging to see golden kelp at almost 50% of the surveys sites this year. The number of surveys done on rocky reefs has been slowly increasing, potentially as a result of the increased awareness of the importance of kelp habitats to marine life on the Great Southern Reef.

4.2 The fish of 2022

Blue Throat Wrasse

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

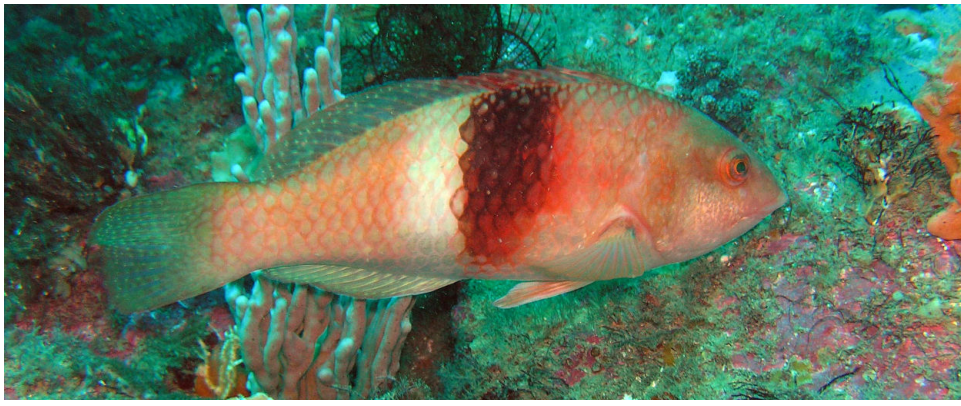
They are sexually dimorphic, this means there are differences in appearance between males and females. This is most obvious in their different shape, colour and size (McCombe & Greer, 2013). Juveniles and females are greenish to brownish, with females gradually develop a broad dark band on the sided 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, with both of these habitats commonly occurring at GVFC sites, this likely explains their frequent sighting.

Ready to count fish at Kitty Miller Bay *Kade Mills*

Male Blue Throat Wrasse *Friends of Beware Reef*



Female Blue Throat Wrasse *Friends of Beware Reef*

Zebra Fish
Sharky1066/iNaturalist

Zebra Fish

Zebra Fish *(Girella zebra)* are native to Australia and may often be seen around jetties, shallow rocky reefs and in weedy areas of Victoria (Gomon et al., 1994). Often sighted in small schools, they have small heads with pale-yellow fins and 9-10 black bars lining their bodies (Bray & Gomon, 2011)

Sightings during this years Fish Count were slightly above previous years with the exception of a spike in sightings during 2019. This was likely due to a large number of juvenile Zebra Fish (pers obs) successfully surviving long enough to be being counted during that years fish count.

Successful survival of juveniles is dependant on a whole range of factors (temperature, food availability, water quality, predator abundance etc.). When favourable conditions occur, larger than usual numbers of juveniles survive, often settling in places/habitats that are unsuitable as they mature. When this occurs they will be observed at a wide range of locations initially, then numbers will drop or even disappear from some locations due to unfavourable habitat.

This is common for fish that are group-synchronous spawners (i.e. fish that form schools then release large amounts of eggs and sperm into the water in the hope that fertilisation will occur) such as Zebra Fish.

Magpie Perch *Mark Norman*

Magpie Perch

The Magpie Perch *(Cheilodactylus nigripes)* is a member of the morwong family. Individuals can grow up to 40 cm in size and have three 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. This may explain why the magpie perch was the second most sighted species of the year.

Magpie Perch and Blue Throat Wrasse are considered bioindicators of fishing pressure, as they are both carnivorous fish and susceptible to fishing-induced mortality (Shepherd et al., 2004). It is thought that high numbers of these species are indicative of healthy reef fish assemblages (Shepherd et al., 2004).

Sightings of Magpie Perch continue to remain steady during the Great Victorian Fish Count.

Victorian Scalyfin
John Sear/iNaturalist

Victorian Scalyfin

The Victorian Scalyfin *(Parma victoriae)* 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 & Gommon 2011). 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 (Bray, 2018b).

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.

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.

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.

Sightings of Victorian Scalyfin have remained steady over the past seven years, encouragingly sightings in 2022 were the most frequent in the past seven years.

Six-spined Leatherjacket and Horseshoe Leatherjacket

The three to four pairs of spines at the base of the tail are what gives the Six-spined Leatherjacket *(Meuschenia freycineti)* its name. The spines are more prominent on males than females or juveniles. They are sexually dimorphic (males and females look different) and the colour pattern can also varies between individuals. (Bray, 2017).

The distinct black horse-shoe shape marking behind the pectoral fin makes this one of the easier to identify Leatherjackets. Adults occur around rocky reefs while juveniles can often be found in shallow waters, often seeking

shelter around artificial structures (Bray, 2020b).

The sharp decline in the proportion of Six-spined and Horseshoe Leatherjackets *(Meuschenia hippocrepis)* last year may have been due to a number of factors, including unfavourable environmental conditions for the settlement and subsequent growth of juveniles over the past couple of years which reduces abundance at popular fish count sites in shallower water and around artificial structures.

There may also be increased fishing pressure from both land and in-water fishers as leatherjackets are the fourth most commonly targeted fish by spearfishers after Flathead, Snapper and King George Whiting (VRFish, 2023). Lack of sightings may also be due to fish not being detected even though present.

It was encouraging to see the proportion of sighting rebound this year for both species, we will be keeping an eye on this over the coming years.

Smooth Stingray

The Smooth Stingray *(Dasyatis brevicaudata)* was again the most sighted of the shark and ray species in 2022. These sizeable stingrays can grow up to 4.3 metres 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.

Upon their tail lies a venomous serrated spine. When threatened, the Smooth Stingray relies upon this effective 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.

Spotted Stingaree

Spotted Stingarees *(Urolophus paucimaculatus)* are easily identified by the complex pattern of white/cream spots on their dark coloured pectoral fin disc. They are not commonly sighted and considered solitary as shown in the data collected during the GVFC. The proportion of sighting this year is in line with many previous years after dropping in 2021.

4.3 Variability of sites

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 (Prais & 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 tend to be recounted and shy fish are likely to be missed in fish counts (Pais & Cabral, 2017).

Other external factors like time of day, weather, visibility, depths of survey, tide or just pure luck can be of great influence. 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 GVFC participants to stay motivated and curious even though you might not always encounter what you're expecting.

4.4 Species not on slates

Common non-target species recorded in this year's surveys were Globefish, Moonlighters, Smooth Toadfish, Yellow Striped Leatherjackets, Barber Perch, Eastern Shovelnose Stingrays and Wide-body Pipefish.

4.5 Reports of 'fish on the move'

VNPA has continued its partnership with Redmap Victoria in 2022. Once again, participants were encouraged to keep an eye out for any fish that seemed unusual in the area.

We look forward to our ongoing role as the watchers of the Bay, 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!

Six-spined Leatherjacket
Friends of Beware Reef

Spotted Stingaree
Paul Suth/iNaturalist

Smooth Stingray *imogenisunderwater/iNaturalist*

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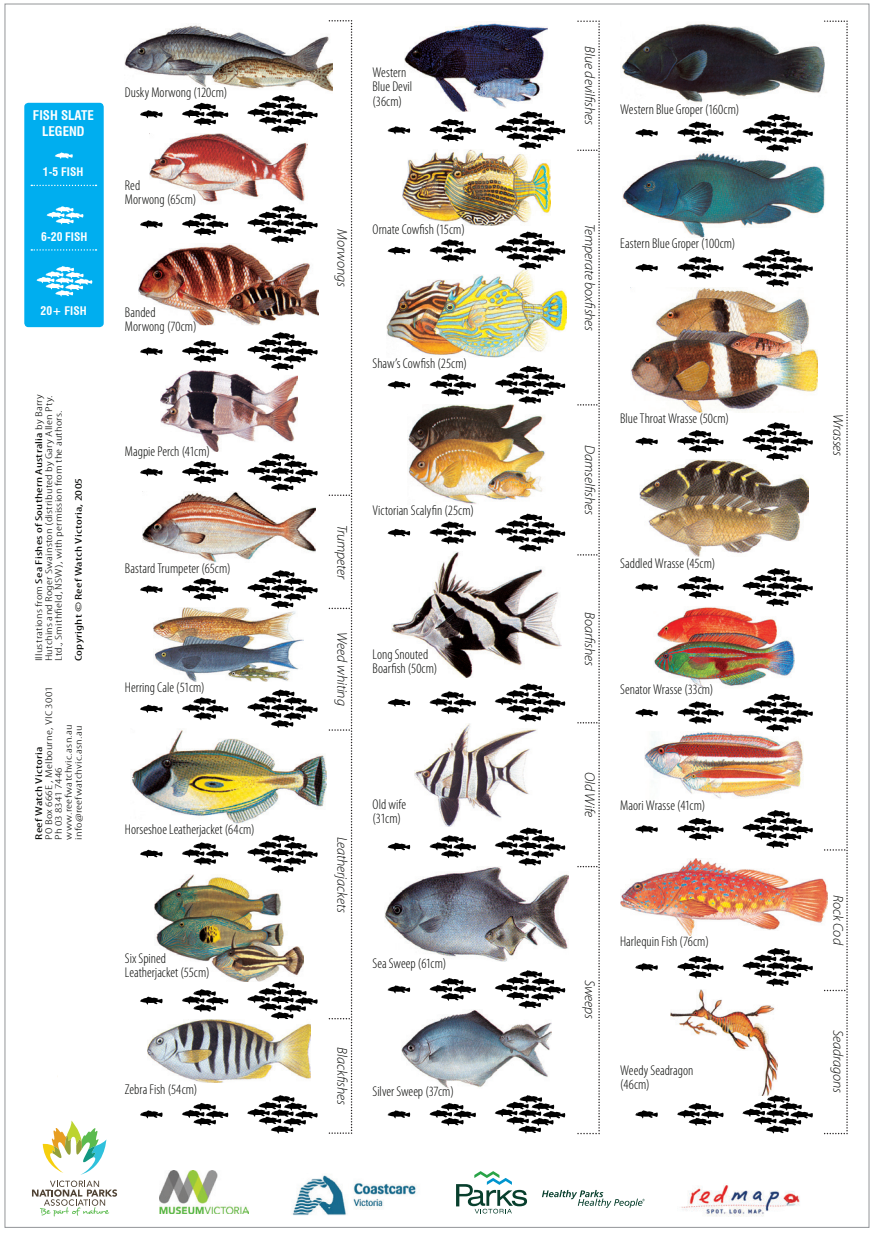
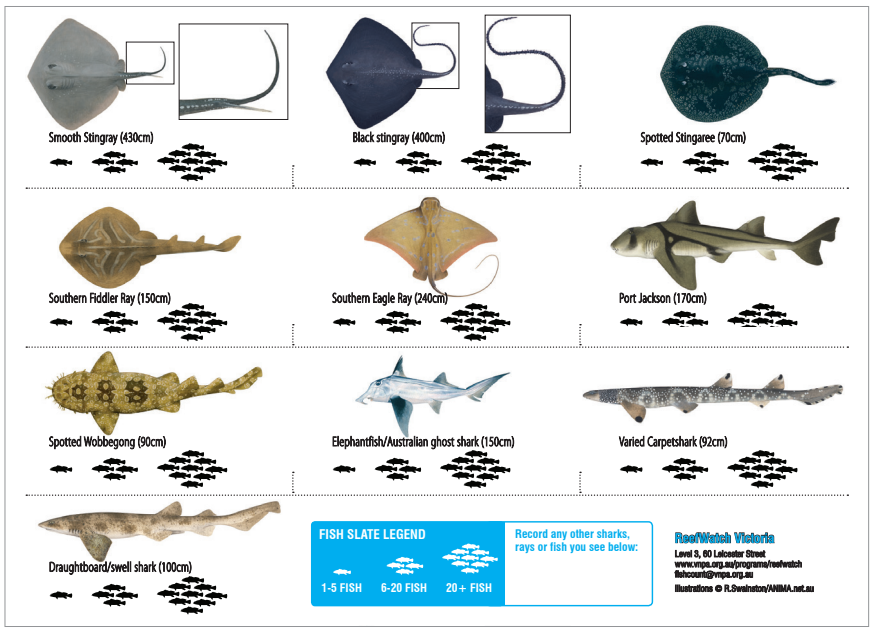
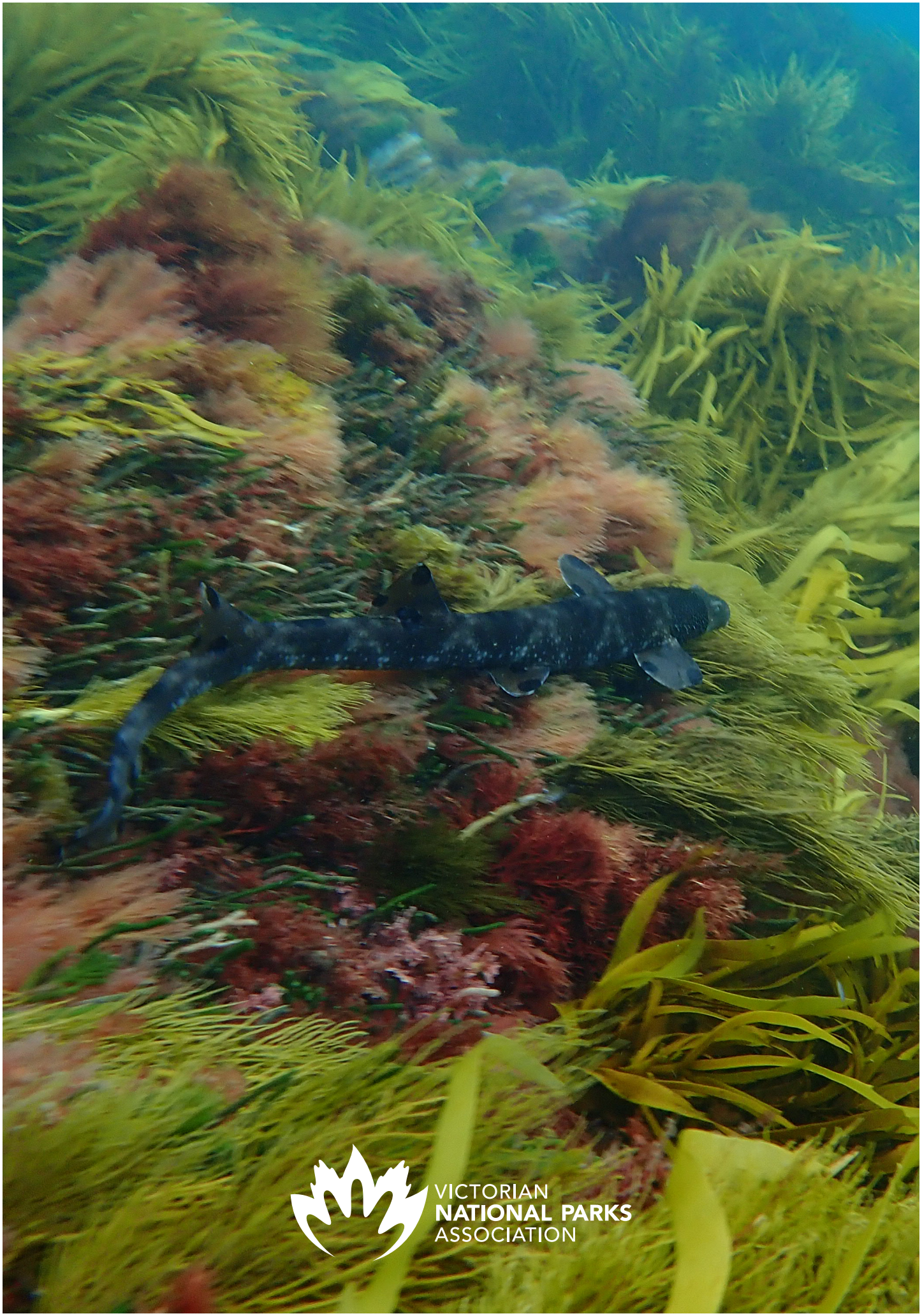
Acronyms and links

ALA	Atlas of Living Australia (ala.org.au)
GVFC	Great Victorian Fish Count (vnpa.org.au/great-victorian-fish-count)
VNPA	Victorian National Parks Association (vnpa.org.au)

Appendix: GVFC identification slates







Varied Carpetshark, Barwon Bluff Marine Sanctuary *Kade Mills*