Great Victorian *fish count 2023*

VICTORIAN NATIONAL PARKS ASSOCIATION

Report of the 2023
Great Victorian Fish Count

Great Victoria Fish Count 2023

Available online at
vnpa.org.au/publications/2023-great-victorian-fish-count

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Published by Victorian National Parks Association (VNPA)
ABN 34 217 717 593

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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, bringing together divers, snorkellers, and community members to explore, enjoy, and protect our underwater world. Held each November and December, the GVFC invites participants of all experience levels to survey fish along our coastline and contribute valuable data for marine research.

A community effort for marine science

Since 2002, the GVFC has been led by the Victorian National Parks Association (VNPA) in partnership with Museums Victoria, Parks Victoria, Coastcare Victoria, dive operators, local groups, and national citizen science initiatives such as Redmap. These collaborations provide the scientific expertise, local knowledge, and community networks that make the event possible.

In 2023, over 500 participants completed 61 surveys at 37 sites across Victoria. Sites ranged from sheltered bays to exposed rocky coasts, with surveys conducted by scuba divers (59%) and snorkellers (41%). The majority of surveys were in unprotected waters, with 10% in marine protected areas. Most sites featured a mix of habitats, often dominated by sand/mud and rocky reefs, with golden kelp, mixed algae, sponge gardens, and seagrass meadows supporting a diverse array of marine life.

Key findings from 2023

- Most sighted fish species: Blue Throat Wrasse and Magpie Perch, each recorded in 77% of surveys.
- Other common species: Zebra Fish, Dusky Morwong, Sea Sweep, Six-spined Leatherjacket, and Victorian Scalyfin.
- Sharks and rays: Smooth Stingray remained the most frequently sighted, followed by Southern Fiddler Ray and Spotted Stingaree.
- Species of concern: Sightings of Victorian Scalyfin, Longsnout Boarfish (the 2023 GVFC 'face'), and several leatherjacket species were lower than in previous years.

Why this matters

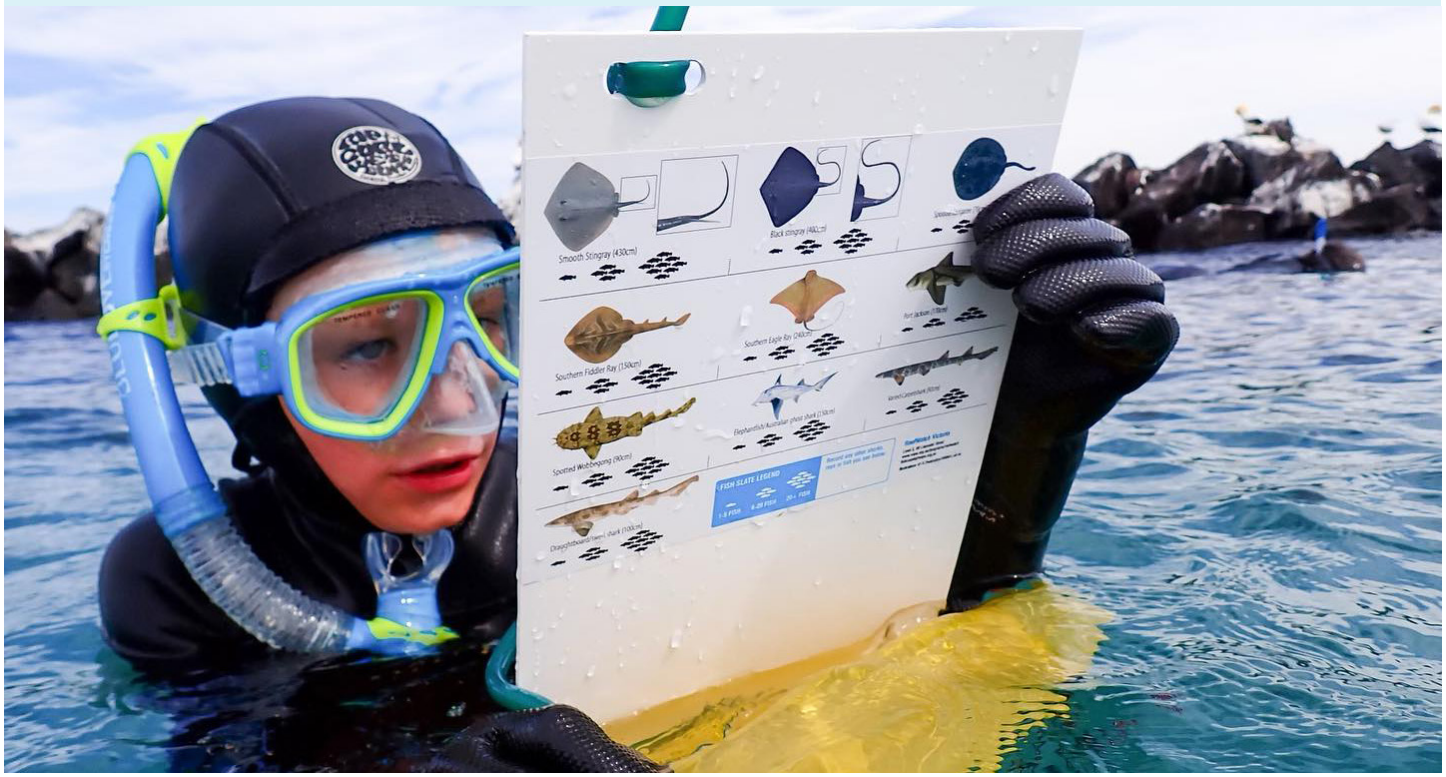
Victoria's waters are home to unique marine life, with nearly a quarter of Australia's fish species found here – many of them found nowhere else on Earth. The GVFC fills critical knowledge gaps, with all verified records uploaded to the Atlas of Living Australia (ALA), where they have been accessed more than 1.1 million times for research and education.

Long-term monitoring helps scientists detect changes in fish populations, understand environmental shifts, and guide conservation decisions.

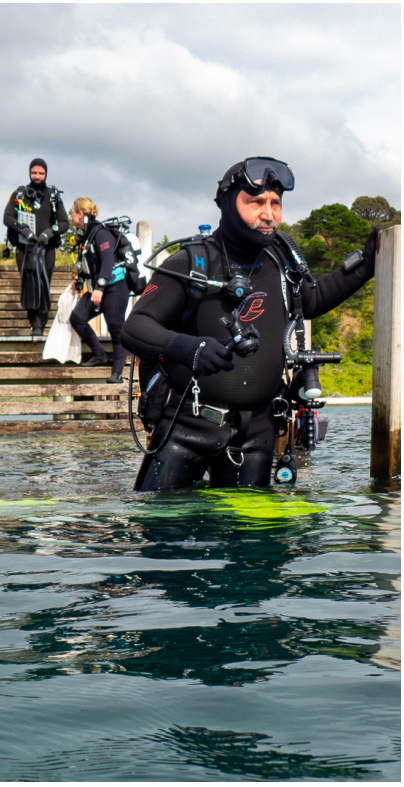
More than just counting fish

The GVFC is about connection as much as conservation. It inspires ocean lovers to learn about marine ecosystems, share their discoveries, and protect the habitats they care about. The event's success shows the power of citizen science—when the community, scientists, and local organisations work together, they can achieve research outcomes that would be impossible alone.

As we look ahead to the next GVFC, VNPA and its partners remain committed to growing this project, improving data quality through better photographic records, and engaging even more people in protecting Victoria's extraordinary marine life.



Checking the identification slate in the 2023 Great Victorian Fish Count *See All Dolphin Swims*



Diver entering the water at Flinders *Scuba Culture*

Introduction

1.1 Background

The GVFC is Victoria's largest marine citizen science event, bringing together ocean lovers of all experience levels to explore and document our incredible underwater world. Held every November and December, this event gives participants the chance to dive beneath the surface, discover local marine life, and contribute valuable data on fish species along our coastline.

Whether you're new to diving or an experienced underwater explorer, the GVFC offers a unique opportunity to connect with nature while helping to protect our marine environment. Dive clubs, environmental groups, schools, universities, community organisations, and beginner-friendly groups all take part, creating a snapshot of fish diversity across Victoria's coastal waters.

Victoria is home to a rich variety of marine life, with many species found nowhere else in the world. Nearly a quarter of Australia's fish species are unique to our waters, and 60% of these live only in the southern seas (Bray, 2018a). By recording fish sightings, volunteers help scientists track changes in species numbers and distribution over time.

More than just a fun day in the water, the GVFC encourages people to learn about marine ecosystems, contribute to important research, and build a stronger connection with our oceans. The information collected supports conservation efforts and helps scientists and government agencies better understand and protect our unique marine life.

Smooth Toadfish *Scuba Scouts*

1.2 Citizen science

Citizen science provides community members with the opportunity to contribute to scientific research by collecting data and participating in project development. It also provides a valuable opportunity for people to learn from one another while making a meaningful impact.

The GVFC brings together scientists, marine managers, divers, snorkellers, and local community members to expand our knowledge of fish species found in Victorian waters. By working together, participants help track fish populations and better understand changes in our marine environment.

In 2023, more than 500 participants took part in the GVFC, recording fish sightings along Victoria's coastline. With so many people involved, a vast amount of data was collected on fish distribution and abundance—data that would be nearly impossible to gather without community support.

The success of the GVFC highlights the power of citizen science in contributing to marine research. By working together, volunteers and scientists can gather critical information to support conservation efforts and protect Victoria's unique marine life.

1.3 Partnerships with local communities

For 22 years, VNPA has led the GVFC in collaboration with Museums Victoria, Parks Victoria, Coastcare Victoria, dive operators, and local community groups. These partnerships have been essential in expanding the reach and impact of the event.

In 2015, Redmap joined as a partner, further strengthening the project's ability to monitor marine species. This collaboration continued in 2023, adding valuable expertise to the initiative.

Each partner plays a crucial role in the success of the GVFC by contributing:

- Scientific expertise
- Communication skills and outreach knowledge
- Local, regional, and state-level understanding of coastal habitats and fish species
- Strong connections within local communities and networks
- Specialised skills and qualifications for leading diving and snorkelling trips

This collaborative approach has been key to the long-term success of the GVFC. We are grateful for the ongoing support of our partners and look forward to continuing to work together to protect and better understand Victoria's unique marine life.

1.4 The 2023 fish 'face'

With its comically long nose, tall dorsal fin, and vertical stripes that wouldn't be out of place on a zebra, the Longsnout Boarfish *(Pentaceropsis recurvirostris)* is one of southern Australia's most recognisable oddballs. Crowned the charismatic 'face' of the 2023 GVFC, this funky fish is as fascinating as it looks.

Also affectionately known as the duckfish—thanks to its distinctive beak-like snout—this species is found only in the temperate marine waters of southern Australia. These solitary, slow-moving fish typically cruise rocky reefs, sponge gardens and sandy bottoms gliding gently among kelp or hovering motionless like a miniature submarine.

Longsnout Boarfish *Sascha Schulz*

The Longsnout Boarfish is carnivorous, feasting primarily on benthic invertebrates. A known favourite are brittle stars, especially Ophiactis resiliens. These small, sneaky echinoderms often bury themselves in sediments or wedge into crevices, with just a few arms poking into the current to catch food. This may be exactly where the boarfish's 'boar-like' snout comes in handy—perfect for rooting out brittle stars from nooks and crannies. It also has a taste for polychaete worms and other reef-dwelling invertebrates.

Although not commercially targeted, Longsnout Boarfish is occasionally caught as bycatch in trawl fisheries. Fortunately, its catch rates remain low. Surprisingly long-lived for a reef fish, some individuals have been aged at over 55 years, making them one of the ocean's more senior citizens. Their slow growth and longevity underscore the importance of monitoring their populations.

1.5 The Atlas of Living Australia

Data collected during the GVFC is entered into the Atlas of Living Australia (ALA), a national database that compiles biodiversity information from various sources, making it accessible online. This allows scientists, researchers, and the public to explore and use the data to better understand Australia's biodiversity.

Submissions are made through BioCollect, a tool designed to support citizen scientists, ecologists, and natural resource managers in gathering and analysing environmental data. Given the limited information on marine species distribution in Victoria, the GVFC plays a crucial role in filling knowledge gaps.

To date, GVFC records have been accessed more than 1.1 million times for research and educational purposes, highlighting the valuable contribution of citizen science in monitoring and learning about Victoria's unique marine ecosystems.

1.6 Unusual sightings and identification

During the GVFC, we received reports of species spotted outside their usual range. However, without accompanying images, we are unable to verify these sightings or report them to Redmap, which tracks changes in marine species distribution.

To improve data accuracy, we encourage participants to submit photos with their survey data, particularly when recording uncommon species. Photographic evidence helps confirm sightings and enhances the reliability of our datasets.

To support this, ReefWatch offers underwater cameras for loan, especially during the GVFC. These cameras help groups capture clear images for verification while also providing an opportunity to practice underwater photography skills.

Methodology

2.1 Survey period

The 2024 GVFC began on 16 November and finished on 15 December.

The dates were chosen to coincide with national Coastcare Week, which is held in 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

Sixty-one 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 Phillip Bay and Western Port, it is always encouraging to see more locations in the east and west of the state.

2.3 Kit and survey method

Each participating group leader is provided with a standard GVFC Kit, which includes training materials to help participants learn how to conduct a fish count.

The kit also contains identification slates (see Appendix), survey forms, and instructions on how to upload data, ensuring a smooth and efficient survey process.

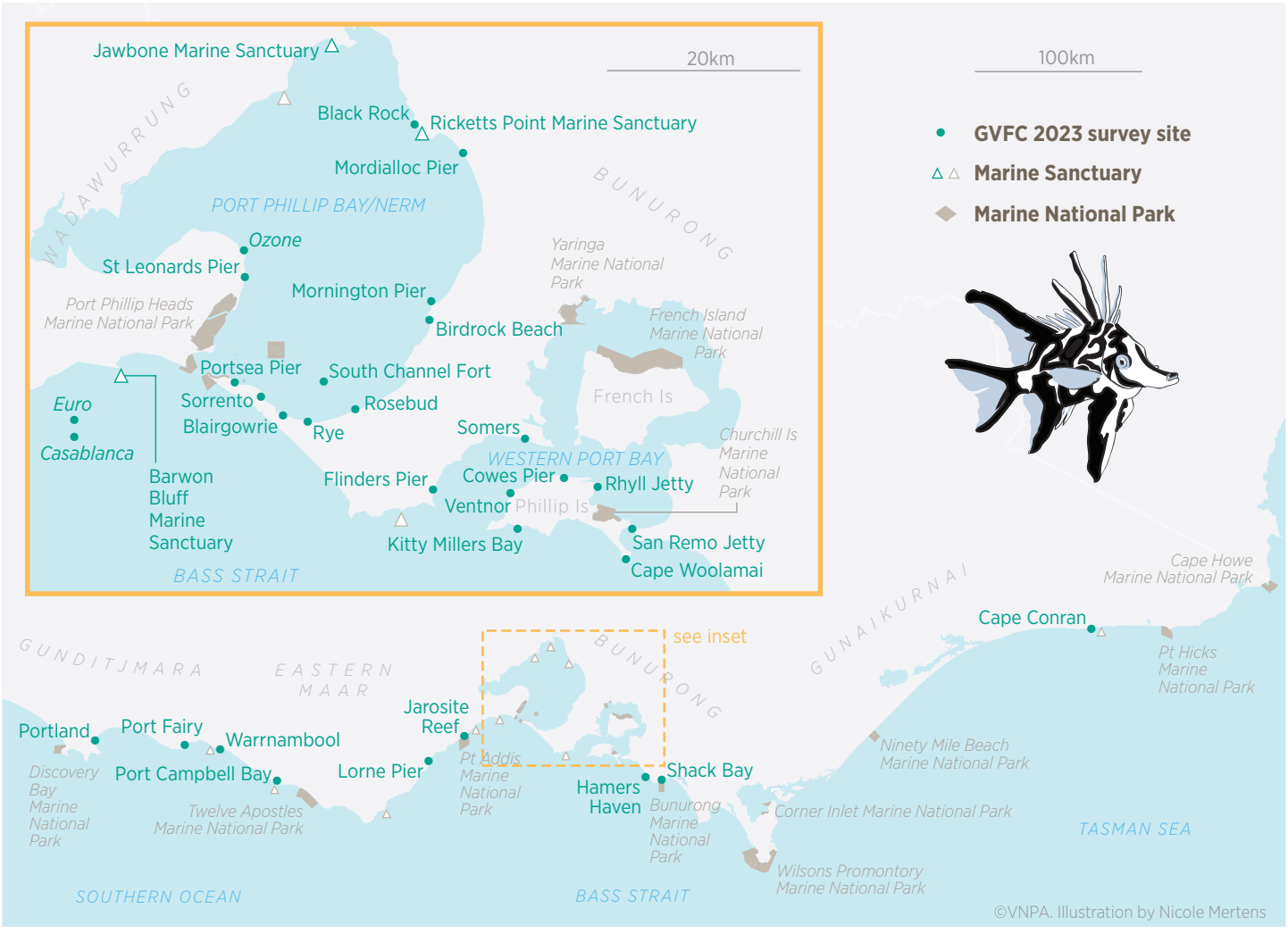
The 'roving diver' technique

Participants conduct the survey using the roving diver technique, which allows them to freely explore their chosen site while recording fish sightings.

Each buddy pair or small group shares a slate and follows these key guidelines:

- Swim through the area without a fixed path, covering a wide range of habitats.
- Avoid overlapping with other buddy pairs to maximise coverage.

Fig. 1: GVFC 2023 survey sites



- Stop regularly to observe fish that may be hiding or have been temporarily disturbed.

During the survey, observed fish species are placed into one of three abundance categories on the identification slate (Fig. 2). Each category has a corresponding symbol, which is progressively marked off as more individuals of that species are recorded.

This standardised method ensures consistency in data collection, ensuring the GVFC is a valuable tool for monitoring fish diversity along Victoria's coastline.

2.4 Recording and submitting data

At the end of each survey, all participating buddy pairs and groups come together to complete the GVFC data sheet. This form captures key details about the survey, including location, weather conditions, water visibility, and time spent conducting the count.

The data sheet lists the 35 target fish species, with space to record additional species if observed. For each species sighted, an abundance category is selected, based on the average results from all participating groups. Completing the form immediately after the dive ensures accuracy and allows participants to review their findings together.

Once completed, groups can submit results by email or directly through the ALA database, where photos can also be uploaded. Many participants find the online process quick and straightforward, and VNPA continues to encourage the use of this method to streamline data collection and analysis (Fig. 3).

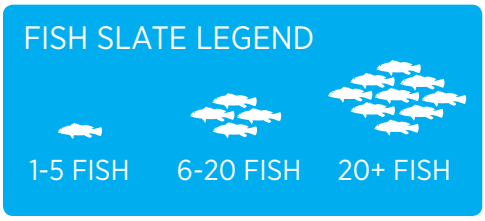


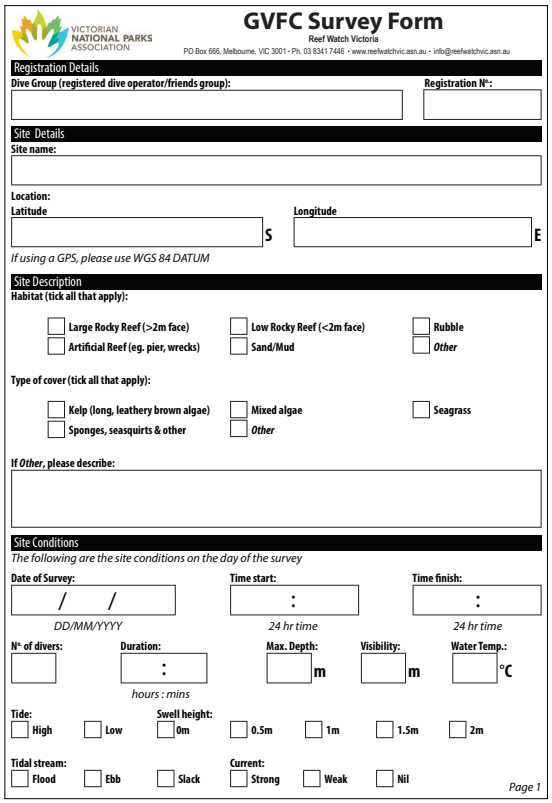
Fig. 2: Abundance categories

2.5 Understanding the 2023 GVFC results

This year's results provide an overview of the main habitats surveyed, the methods used, and the occurrence and abundance of fish species recorded in 2023. To track changes over time, these findings are also compared with data from previous years.

The results are displayed as proportions, calculated using the formula: Proportion = (number of surveys in which a species was sighted) ÷ (total number of surveys conducted). A value of 1 means a species was recorded in every survey, while 0 indicates it was not observed at all. This method allows for a quick comparison of species frequency across surveys.

All GVFC data is available through the Atlas of Living Australia (https://collections.ala.org.au/public/show/dp3777). Each year, some survey records are not uploaded to the ALA, despite being successfully completed in the field. To ensure all data contributes to official records, we encourage every participating group to submit their results and reach out to the GVFC/ReefWatch coordinator if they encounter any issues with data submission.


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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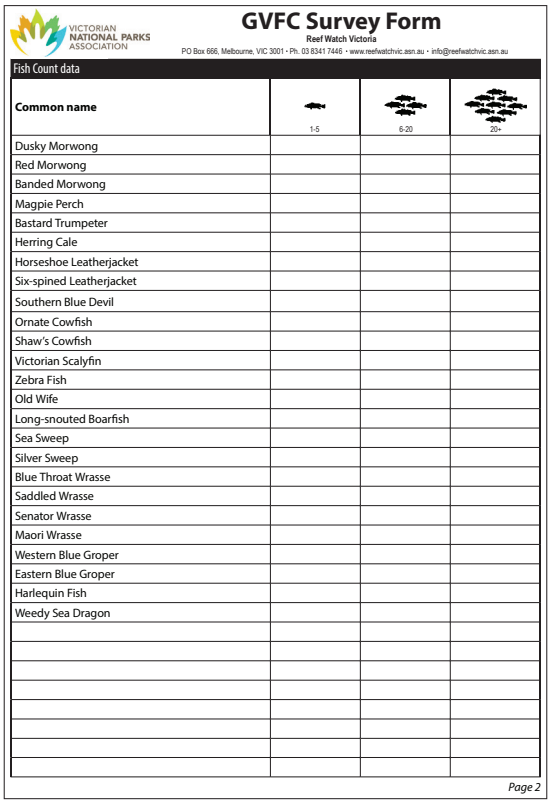
GVFC Survey Form
Reef Watch Victoria
PO Box 666, Melbourne, VIC 3001 • Ph. 03 8341 7446 • www.reefwatchvic.asn.au • info@reefwatchvic.asn.au

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			

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Fig. 3: Slate data forms

Results

3.1 General summary

3.1.1 Participation and conditions

Sixty-one surveys were carried out by 24 groups at 37 different sites along Victoria's coastline (Figure 1).

The maximum depth of sites varied from 2–57 metres with visibility ranging from 1–15 metres. Water temperature varied from 15–22°C

The number of fish counters in each participating group varied from 2 – 40 participants spending 20 – 120 minutes conducting their survey

3.1.2 Survey methods

Scuba divers accounted for 59% of all surveys, with 41% undertaken by snorkellers. (Fig. 4).

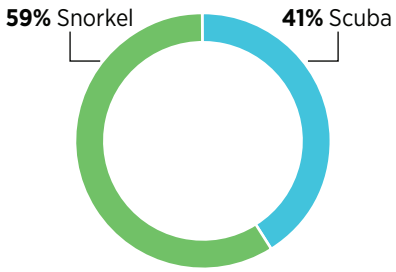


Fig. 4: Survey methods

3.1.3 Protection status of survey sites

Most surveys (90%) were conducted in unprotected waters. The remaining 10% were undertaken within marine national parks or sanctuaries (Fig. 5).

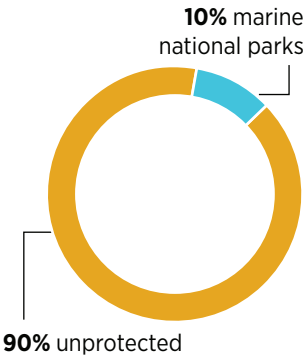


Fig. 5: Protection status of surveys

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 (present at 70% of surveys) and rocky reefs (present at 62% of surveys). The presence of rubble was less common (present at 26% of surveys), artificial reefs/habitats (present at 60% of surveys) (Fig. 6).

Mixed algae was the dominant vegetation type, recorded at over 85% of sites. This was followed by sponge gardens, seagrass meadows, and kelp forests (Fig. 7).

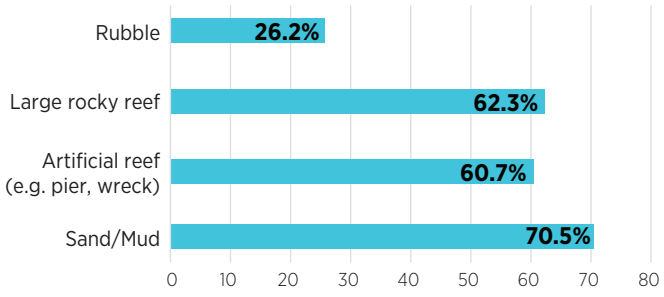


Fig.6: Habitat type fish count surveys conducted on (n=65)

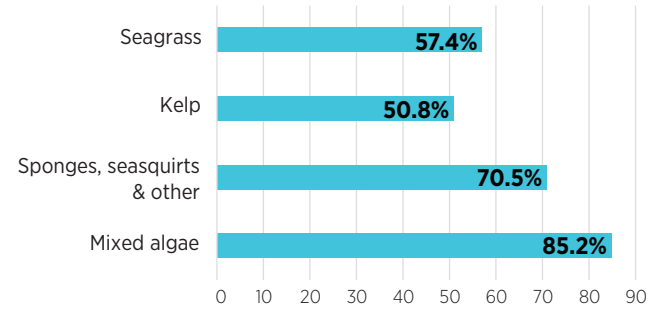


Fig. 7: Vegetation type fish count surveys conducted on (n=65)

3.2 The fish of 2023

3.2.1 Bony fish

The 'face' of the 2023 GVFC, the Longsnout Boarfish was seen in very few survey (0.06) mostly sighted only in abundances of 1-5 individuals (Fig.8).

Blue Throat Wrasse and Magpie perch were observed in the highest proportion of surveys (0.77), with Blue Throat Wrasse mostly occurring in abundances of more than 20 individuals, while Magpie Perch were mostly sighted in abundances of 1-5 individuals (Fig.8).

Zebra Fish and Dusky Morwong were observed in over half of the surveys (0.71, 0.65 and 0.6 respectively) (Fig 8).

Sea Sweep, Six spined leatherjackets and Victorian Scalyfin were all observed in proportions over 0.4 (Fig.8).

Less common bony fish species included Western and Eastern Blue Grope, Longsnout Boarfish, Shaw's Cowfish, Maori Wrasse and Bastard Trumpeter all of which appeared in a low proportion (<0.1) of surveys conducted (Fig. 9). Harlequin Fish, Red Morwong and Southern Blue Devil were not sighted in any of the surveys this year (Fig 9).

3.2.2 Sharks and rays

The most sighted shark and ray species were the Smooth Stingray (0.49), Southern Fiddler Ray (0.31) and the Spotted Stingaree (0.2) (Fig. 10).

Less common shark and ray species included the Black Stingray and Draughtboard shark each appeared in a low proportion (0.06 and 0.01 respectively) of surveys conducted.

Elephant Fish and Varied Carpetsharks were not sighted this year (Fig 10).

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

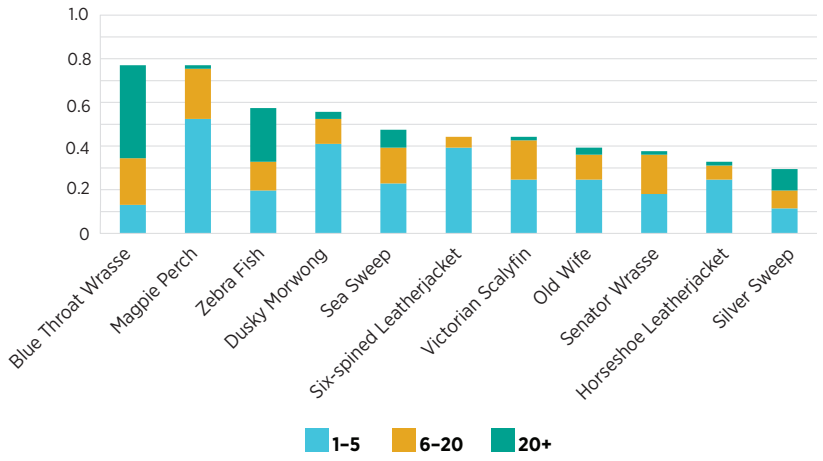


Fig.8: Most sighted bony fish

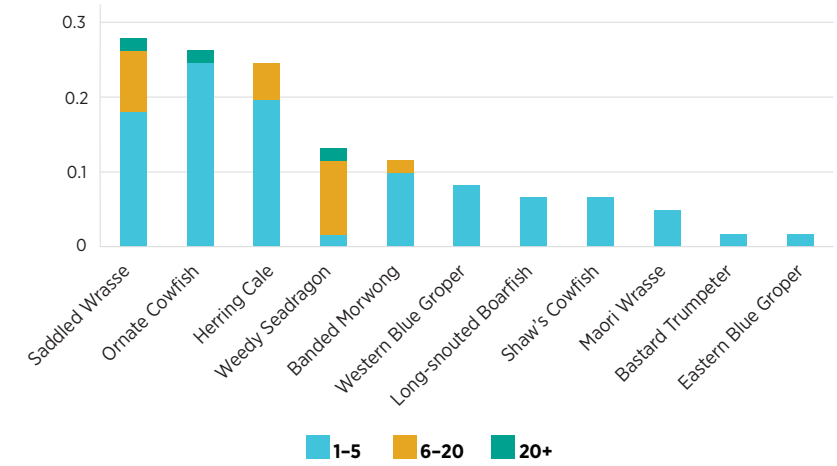


Fig.9: Less sighted bony fish

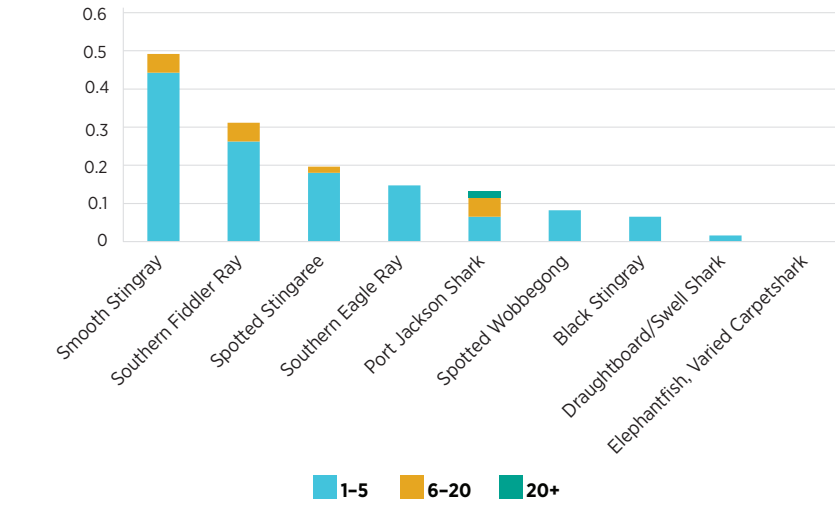


Fig.10: Most sighted sharks and rays

3.3 Comparison to previous years

3.3.1 Bony fish

The proportion of sightings of Blue Throat Wrasse this year is in line with what has been observed in previous years (Fig. 11a).

Magpie Perch was spotted in a similar proportion of surveys to the previous year and in line with recent years (Fig. 11b).

Victorian Scalyfin sightings dropped this year compared to 2023 and were sighted the lowest proportion of times since 2017(Fig. 11c).

Sightings of Longsnout Boarfish have declined since 2015 with the fewest proportion being seen this year (Fig. 11d).

Sightings of the Horseshoe and Six-spined Leatherjacket dipped this year after bouncing back in 2022 (Fig. 11e &f).

3.3.2 Sharks and Rays

Smooth Stingrays remained steady, increasing slightly this year compared to last (Fig. 12a).

Spotted Stingaree's sighting decreased slightly this year compared to 2022 but remain within the range of previous years (Fig 12b).

Blue Throat Wrasse
(Notolabrus tetricus)

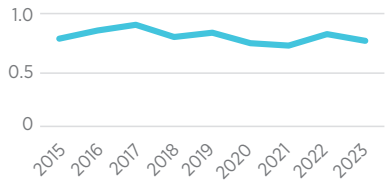


Fig. 11a

Magpie Perch
(Pseudogoniistius nigripes)

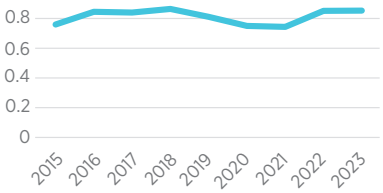


Fig. 11b

Victorian Scalyfin
(Parma victoriae)

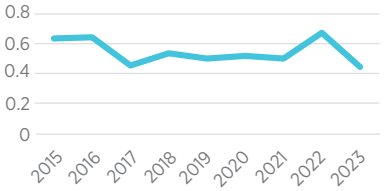


Fig. 11c

Longsnout Boarfish
(Pentaceropsis recurvirostris)

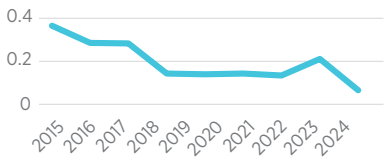


Fig. 11d

Horseshoe Leatherjacket
(Meuschenia hippocrepis)

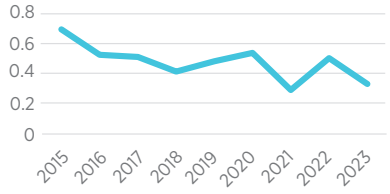


Fig. 11e

Six-spined Leatherjacket
(Meuschenia freycineti)

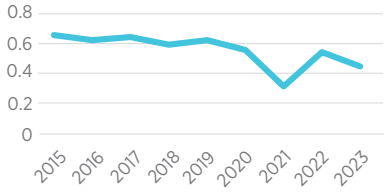


Fig. 11f

Smooth Stingray
(Bathytoshia brevicaudata)

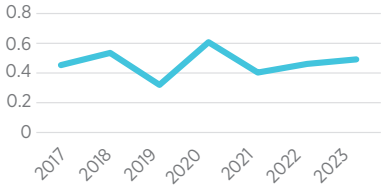


Fig. 12a

Spotted Stingaree
(Urolophus gigas)

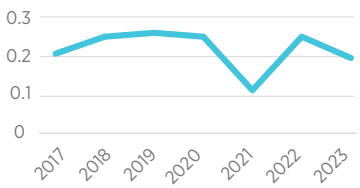


Fig. 12b

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. 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.

4.1.2 Survey technique

This year, the representation from snorkel groups participating was fantastic.

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 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 10% 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 are a reflection of the habitats surveyed. It was encouraging to see golden kelp at more than 50% of the survey 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 2023

Longsnout Boarfish

The Longsnout Boarfish *(Pentaceropsis recurvirostris)* is a distinctive temperate reef fish found only along the southern coastline of Australia, including Tasmania, from New South Wales to Western Australia (Bray, 2020c). It is most often seen near kelp-covered rocky reefs, caves, and ledges, but can also be found over adjacent sandy areas. Divers usually spot them alone or in pairs, hovering calmly close to the reef face (Bray, 2020c).

This species is instantly recognisable by its deep, flattened body, elongated 'snorkel-like' snout, and bold diagonal stripes. Adults are silver-white with two dark bands across the body, while juveniles may also have blotches or spots. Most grow to around 50 cm, though some individuals can reach 70 cm (Edgar, 2008).

Unlike some reef fishes that can change sex, the Longsnout Boarfish has separate sexes throughout its life. Research shows they spawn in the cooler autumn–winter months, rather than in spring or summer. During this period, females likely release eggs multiple times across the season, increasing the chances of successful reproduction (Coulson et al., 2016).

Longsnout Boarfish feed mainly on brittle stars, worms, and small crustaceans, occasionally taking algae. Their elongated snout allows them to pick prey from reef crevices and the seafloor, helping to control populations of small invertebrates and maintain balance in the reef ecosystem (Tasmanian Department of Natural Resources, 2023).

While not considered threatened, they are less common in heavily fished areas and may explain the decrease in sightings over time as many of the dive sites surveyed during the Great Victorian Fish Count are subjected to fishing pressures. They can be caught incidentally in trawls and gillnets, and are sometimes targeted by spearfishers, although in some regions, spearfishing for this species is banned (Tasmanian Department of Natural Resources, 2023).

Protecting kelp-rich reef habitats and maintaining marine protected areas where fishing is limited are important for ensuring their continued presence (Edgar, 2008).

Divers ready to count
Bayplay

Longsnout Boarfish
John Turnbull

Longsnout Boarfish
Ron Greer/iNaturalist

Blue Throat Wrasse
Matt Testoni/iNaturalist

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.

Magpie Perch *Sascha Schultz*

Magpie Perch

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
Julian Finn/Museum Victoria

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.

The decline in Victorian Scalyfin this year will be monitored next year to see if the trend continues.

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, 2017a).

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 decline in the proportion of Six-spined and Horseshoe Leatherjackets *(Meuschenia hippocrepis)* this 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.

Smooth Stingray

The Smooth Stingray *(Dasyatis brevicaudata)* was again the most sighted of the shark and ray species in 2023. 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 sightings this year has decreased slightly this year compared to last year an

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 Smooth Toadfish, Globefish, Blue Spotted Goatfish, Moonlighter, Longfin Pike, Little Weed Whiting, Mado and Snapper.

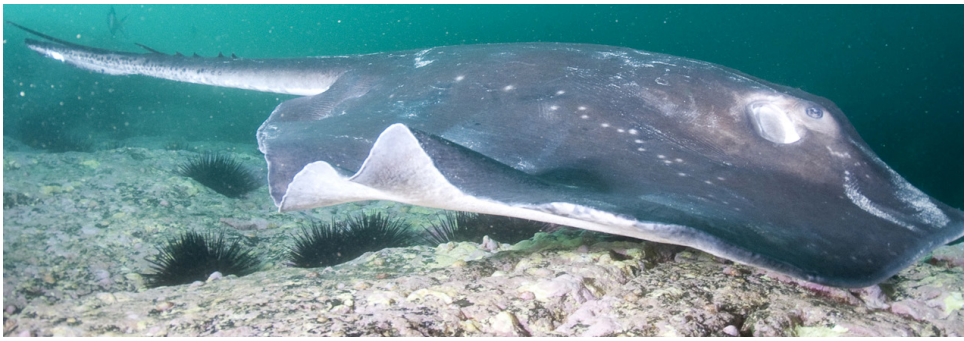
4.5 Reports of 'fish on the move'

VNPA has continued its partnership with Redmap Victoria in 2023. 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
Mark D Norman/Museums Victoria

Spotted Stingaree
Julian K Finn/Museums Victoria.



Smooth Stingray *Erik Schlogl/iNaturalist*

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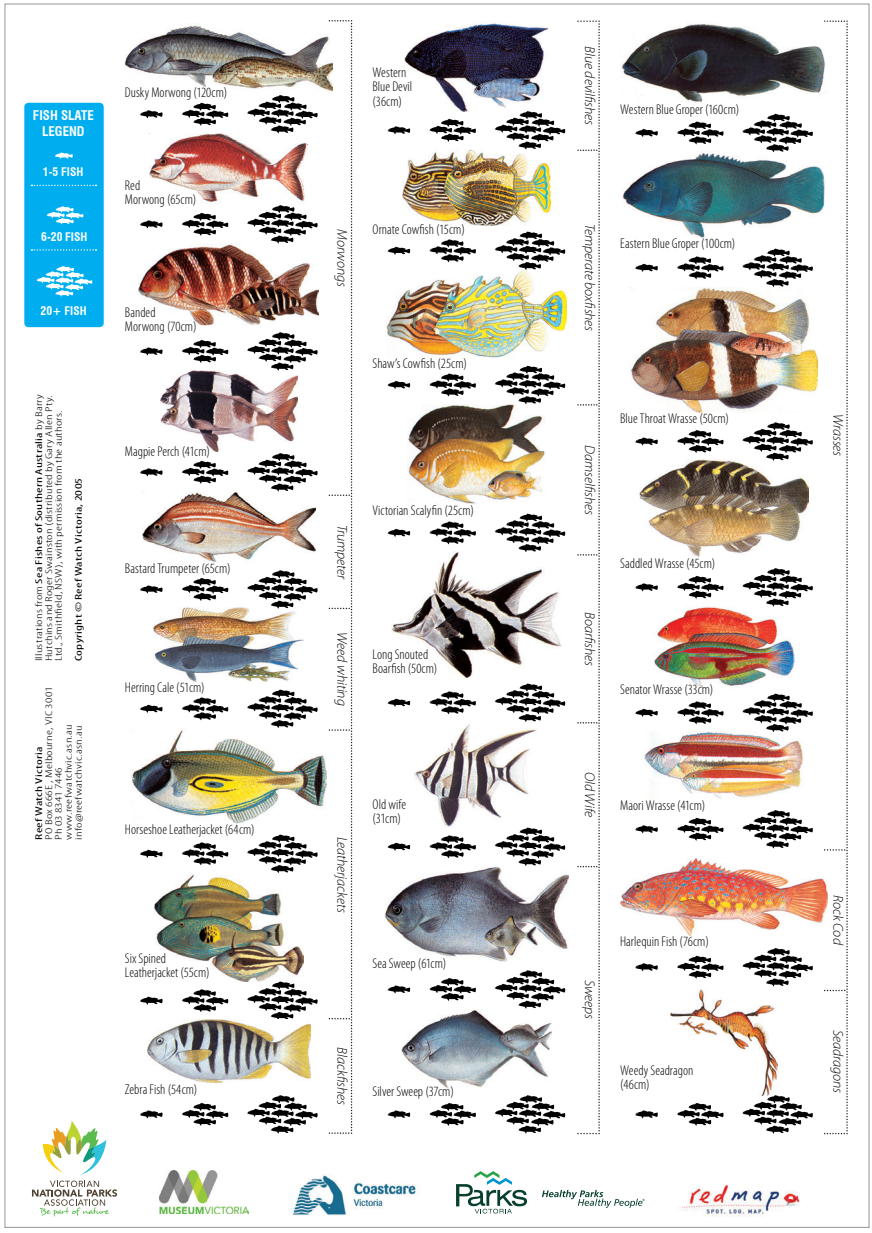
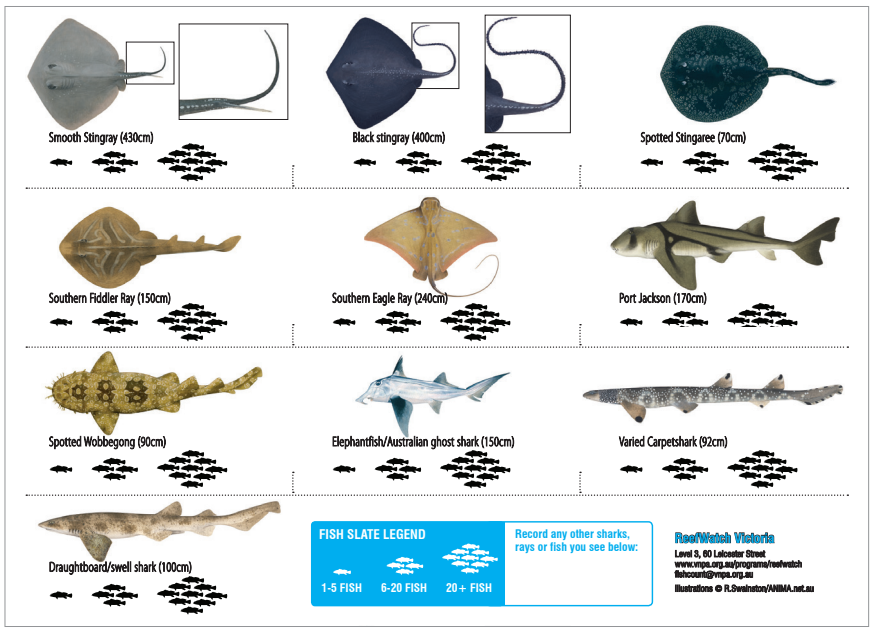
Acronyms and links

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





Longsnout Boarfish *John Turnbull*