



Frequently Asked Questions about the PADI AWARE Global Shark and Ray Census

What is the Global Shark and Ray Census (GSRC)?

The GSRC is a global initiative to connect the valuable knowledge and experience scuba divers and the ocean community has their dive logs, SD cards, and hard drives with shark and ray research and conservation. Through the GSRC, ocean people such as snorkellers, scuba divers, PADI Pros, and dive shops - people who know their patch of the ocean far better than a visiting scientist - can support a global effort to collect crucial information about shark and ray diversity and populations, data that is directly useful for management and conservation efforts including the Convention on the Conservation of Migratory Species (CMS) and the Convention on the International Trade of Endangered Species (CITES); and the IUCN Important Shark and Ray Areas (ISRA) initiative.

Why is this important?

The GSRC is helping to build the knowledge and information we need to protect sharks and rays from extinction. Sharks and rays are in trouble. Scientists fear that over a third of these species may go extinct. However, the number of scientists and conservationists working on shark conservation is limited. Very limited. They simply cannot be in all the places they need to be to keep an eye on shark and ray populations.

Meanwhile, ocean enthusiasts and local experts know their patch very well and hold valuable and useful information for shark and ray conservation. In some places, divers have been working with scientists to build shark and ray species lists; describe new species, and

even to ‘rediscover’ species’ scientists thought were lost ^{1,2,3}. These ‘citizen scientists’ are especially important in places where there is no other shark and ray science happening.

By tapping into the PADI AWARE network, the GSRC is levelling up these citizen science efforts to a global level. The GSRC can connect diver observations from around the globe to scientists to shed light on shark species and behaviour where there is no shark research happening; to record fishing impacts and marine debris in places where nobody else is looking; to start monitoring a local population where no other monitoring is taking place.

To halt and reverse the decline of sharks and rays, we need to know what species occur where, where the important places are, and the specific threats that need to be tackled. The GSRC can help answer those questions at a scale that nobody else can.

I’ve heard a lot of ‘green-washing’ about this sort of stuff before. How exactly will this information benefit sharks and rays?

This is a fair question. There are many examples of citizen science projects that don’t live up to the hype. The GSRC cannot promise that the decline of sharks and rays will magically halt and reverse. However, the GSRC can commit that the data provided by divers will directly end up in the hands of people fighting for sharks and rays, and help give them the crucial information they need. For example, the GSRC can help:

- document what species occur where (to protect something, you need to know where it lives)
- Record behaviours and phenomena that scientists might never see; for example, identify breeding periods or pupping grounds
- document impacts such as fishing gear, boat strikes, strandings (dead animals washing up on shore); or entanglement in marine debris, or other impacts
- collect baseline population data from places that may never have been surveyed by scientists.

¹ Chin, A., Rigby, C., Short, A., and White, W.T. (2019) Verified records of Kuhl’s devil ray (*Mobula kuhlii*) in the Solomon Islands from citizen scientists. *Pacific Conservation Biology* 26, 100-101.

² McDavitt, M.T. and Kyne, P.M. (2020) Social media posts reveal the geographic range of the Critically Endangered clown wedgetfish, *Rhynchobatus cooki*. *Journal of Fish Biology* 97(6), 1846-1851.

³ Nunis, T., Grant, M.I., and Chin, A. (2024) Sharks and rays of the Samoan archipelago: a review of their biological diversity, social and cultural values, and conservation status. *Pacific Conservation Biology* 30(4).

In places where there are repeated surveys over time, the GSRC can help build population trend data so scientists can track how populations trends.

To make this happen, GSRC data has to go somewhere where it can be used. The GSRC is partnering with James Cook University (JCU) to make sure the data are high-quality, reliable, and used for good. The JCU team is deeply connected with global research and conservation efforts, including the Convention on the Conservation of Migratory Species of Wild Animals (CMS); the Convention on the International Trade of Endangered Species (CITES); and the International Union for the Conservation of Nature Shark Specialist Group (IUCN SSG). They can link GSRC data to management.

For example, the CMS needs data on vessel strike and marine debris impact on migratory sharks and rays like the whale shark and manta rays - the GSRC can help provide that. CITES is interested in documenting impacts on CITES listed species - the GSRC can help deliver that. The IUCN SSG needs information on where sharks and rays repeatedly aggregate for important biological events, such as mating, pupping, and feeding aggregations, to identify areas for the global Important Shark and Ray Areas (ISRA) Initiative. Divers (and the GSRC) are best placed to collect these observations. At a local level, GSRC data can be used to document illegal fishing (if you dive in an MPA and all the sharks have fishing gear, you have a compliance problem), or indicate issues that need attention (e.g., water pollution impacts like red eyes photographed in bull sharks⁴).

These are real examples of how the GSRC data can be used, and this data is especially valuable in places where no other scientific efforts exist.

How do we know GSRC data will be any good?

When done properly, citizen science can collect high-quality, extremely valuable information that scientists cannot otherwise collect⁵. However, for citizen science to be useful, the programme needs to be carefully designed, and the data need to go through clear quality control steps.

⁴ Glaus, K., Genter, F., and Brunnschweiler, J.M. (2024) Red eyes in juvenile bull sharks (*Carcharhinus leucas*) from Fiji. *Pacific Conservation Biology* 30(1).

⁵ Chin, A. and Pecl, G. (2018) Citizen science in shark and ray research and conservation: Strengths, opportunities, considerations, and pitfalls. In *Shark Research: Emerging Technologies and Applications for the Field and Laboratory*. (Eds. JC Carrier, MR Heithaus and CA Simpfendorfer) pp. 299-318. (CRC Press, Taylor and Francis Group: Boca Raton, FL)

The GSRC Science Team at James Cook University helped design the programme and identified the types of information that would be most useful for shark and ray conservation. The team also advised on the quality control processes required. Part of this design includes having built-in data validation processes in the data system such as automated checks within the app to catch data errors; and separating data into different types as it is collected and analysed to ensure that data are used appropriately.

GSRC records that have photos or videos attached are especially valuable as the species can be confirmed and verified. Using techniques developed for existing shark science programmes⁶, each photo or video will be analysed by JCU scientists who will verify each visual image. Once enough data has accumulated, the JCU team will also run analyses and generate reports on trends and patterns in the data. As an independent science team that has been working on sharks, rays, and fisheries (and citizen science) for over 30 years, the JCU partnership will ensure that GSRC data are reliable and trustworthy.

How will we see the data being used?

Once enough data has accumulated, the GSRC will periodically publish reports that summarise patterns and trends emerging from the GSRC data. These periodic reports will also show case studies of how the data are being used, document new discoveries, and profile the divers or dive shops that are leading the effort to collect GSRC data.

Where sufficient data exists, the JCU team will also work with divers to directly publish scientific records. For example, JCU scientists have published papers expanding the known range of Kuhl's devil ray to the Solomon Islands⁷ and on unusual stingray behaviours⁸, with the divers and photographers being included as authors on the papers.

Meanwhile, in the PADI AWARE app, you will be able to see all of the surveys you have logged in the past. The App also includes a global Impact map where you can see surveys that have been uploaded from around the world. However, to protect special places and shark populations, the GSRC **will not publish specific location details** that could compromise shark or rays species, for example; giving away information on where sharks

⁶ Hari, K., Jaiteh, V., and Chin, A. (2021) The sharks and rays of Palau: Biological diversity, status, and social and cultural dimensions. *Pacific Conservation Biology* 28(5), 398-413.

⁷ Chin, A., Rigby, C., Short, A., and White, W.T. (2019) Verified records of Kuhl's devil ray (*Mobula kuhlii*) in the Solomon Islands from citizen scientists. *Pacific Conservation Biology* 26, 100-101.

⁸ Meekan, M.G., Trevitt, L., Simpfendorfer, C.A., and White, W. (2016) The piggybacking stingray. *Coral Reefs*, 1-1.

could be targeted by fishing, or where certain species could be targeted for the aquarium trade.

How can I add my knowledge to the GSRC?

The PADI AWARE mobile App is the main conduit to the GSRC. Download the app to your Android or iOS device, install the app, and register your account. The App will guide you through a process to log your shark and ray sightings and to upload your photos.

I dived but I didn't see any sharks or rays. Is this important?

This is **really important!** In scientific terms, going on a dive and seeing no sharks and rays gives scientists invaluable 'zero data'. We need to know where divers are **not seeing sharks** or rays; this tells us where these animals might be missing and could indicate conservation problems. Zero data is also really important for monitoring trends. Without zero data, we wouldn't know whether sharks and rays have suddenly disappeared from a spot where they're usually seen, or whether we have any baseline for management. For example, if effective protections were put in place, it would be really useful to know how long it takes for shark numbers to increase from zero. **Zero data are hero data**, we need it!

I'm on a dive with a group; how many of us should submit data?

There should only be one survey entered per dive. We suggest that at the start of the dive, everyone be reminded to keep a watch out for sharks and rays, and at the end of the dive, the group get together and agree on how many individuals of each species was seen on that dive. Then one nominated person enters data for that dive on behalf of the whole group. Remember that photos are especially important, so it may be easiest for the person who has the photos to be the person to upload the data. Whichever way your group decides to do it is up to you, as long as only one set of information is logged per dive. Remember – one survey = one activity!

I did three dives today, and saw three different species and different numbers during my dives, how do I record all of this?

Each dive is a separate activity and thus should have a single, unique *survey* submitted via using the PADI AWARE App. If you did three dives in one day, that's three unique surveys to submit. For each survey, the App will guide you through entering the start and end time for your activity, and how many sharks or rays each species you saw, and guide you through attaching image files if you have them.

Remember: recording 'zero data' (a dive where you saw no sharks or rays) is also really important, it tells us where sharks and rays might be missing and thus indicate potential conservation issues.

I'm already collecting data for my local dive shop, do you really expect me to upload my data twice?

The GSRC is here to **supplement and collaborate, not to compete**. If you are already involved in monitoring sharks and rays for your local dive shop or a local non-government organisation (NGO), **keep going!** We support divers contributing data where it has the most immediate impact. While it would be great for you to also upload the same data to the GSRC, we know that's extremely unlikely to happen - and we don't expect you to do so.

Also note that the GSRC is focused on collecting data where no other monitoring exists, and it is not designed to record fine-scale information about unique individuals from spot or marking patterns. If you are already taking photographs of unique markings or patterns to identify whale sharks, manta rays, or leopard sharks for local programmes, we encourage you to keep doing this and submit your photos and records to those local or species-specific programmes. In the meantime, the GSRC will take steps to connect the data we collect on these species to the local researchers and organisations who might be interested in the data.

How do I see my data?

You will be able to view the data you have submitted by logging into the PADI AWARE App. If you submit an image or video, you will also receive feedback confirming the species identifications you have made, or suggestions about what species it might be. Your data will

be combined with the GSRC global data set to produce periodic reports about what is being seen and recorded around the world.

I'm a researcher; dive shop owner; NGO scientist, and I want to find out more about collaboration with the GSRC.

The GSRC is here to supplement and collaborate, so we welcome researchers and NGOs getting in touch with us. If you would like to find out more about collaborating to share data, visit the GSRC Science [project webpage](#) and download the **How to collaborate with us** information sheet. If you would like to get in touch with us about a research collaboration, you can also contact [Dr Andrew Chin](#) and [Dr Eva McClure](#) from the JCU science team.

In the meantime, keep diving, looking, photographing, and reporting. Sharks and rays need help from all of us. Download the PADI AWARE App today and join the community of divers taking action to help preserve the oceans where we work and play.

If you have further feedback or concerns

If there is anything else you would like the GSRC Science Team to be aware of, or if you have feedback you'd like to share with the science team, please contact us at fisherieslab@jcu.edu.au and ensure you include the words "**GSRC feedback**" in the subject line of your email.