Highly Commended

Citizen Science
Primary

Heathfield Primary School
Year 4 Class

Heathfield Primary School

SASTA Oliphant Science Awards Citizen Science entry from the year 4 class at Heathfield primary School.

Introduction

Heathfield Primary School specialises in Science and the Adelaide Hills location of the school provides a unique opportunity to research, explore and discover within that ecosystem. Over the years students have worked with Landcare organisations with a focus on bushland management so when the opportunity arose to use their scientific skills in a different ecosystem, the students were eager to engage.

CSIRO launched the Egg case Hunt initiative at the beginning of the year with a call out to the public to look for egg cases from rays, sharks and skates, underwater or washed up on beaches. CSIRO have connected with UK's Shark Trust to collect and collate data from sightings via The Shark Trust citizen science mobile phone app.

The year 4 Science curriculum for biology focusses on life cycles of living things and recognising that environmental factors can affect lifecycles. The opportunity to participate in an authentic scientific investigation provides meaning to the science understanding and inspires students to use scientific knowledge and inquiry skills in a real world context.

Year 4 class Egg case Hunt Citizen Science inquiry

Our big question:

How can we help CSIRO Scientists, Helen O'Neill and William White, collect data on shark and skate distribution in South Australia?

Our guiding questions:

Why are CSIRO collecting data on shark and skate egg cases?

What roles do Helen O'Neill and William White have in the project?

How can we help with the data collection?

What happens to the data?

What will the data tell us?

Will there be a call to action based on the data?

Success Criteria

We will be successful if we:
- Locate shark and/or skate egg cases
- Enter our findings on the Shark Trust app
- Challenge others to look for egg cases and report their sightings
- Identify patterns in the data

Limitations

We need to consider:
- That we might not find any egg cases
- We do not look carefully enough.
- The coast line that we visit might not have internet to be able to access the location on the app
- We will not have information from other sightings in South Australia on the website.
- CSIRO need time to check all of the sightings before they can put them on the website.
- We may not identify the species correctly

Our Plan

We will help CSIRO scientists by going to go on an excursion to the coast to find shark egg cases on the beach, take photos of them with the Shark Trust app and put in the GPS coordinates so that the Shark Trust community can get the coordinates and find out about where that species of shark lives.

We will identify the shark or skate species by using the identification features on the app. We will learn about the types of sharks and skates that live in South Australian waters and learn what their eggs look like.

We will meet with the scientists who are working on the project in Australia and learn about the project.

WebEx meeting with Helen O'Neill, William White and Andrea Wild. 17/05/23

The Scientists

Helen O'Neill

"My primary interests include fish population biology and ecology, anthropogenic impacts on fisheries resources, fisheries management and also fish taxonomy. I first began at CSIRO as a Volunteer Fellow at the Australian National Fish Collection in October 2016, working on the morphology of egg cases of catsharks. Soon after, I secured role at CSIRO developing and populating fishIDER - a bilingual web-based fish identification tool. fishIDER aims to improve fish identification skills and fisheries monitoring capacity in Indonesia."

William White

"My research focuses primarily on the ecology, taxonomy and and biogeography of sharks and rays, and also taxonomy and biogeography of Indo-Pacific bony fishes. I have authored descriptions of more than 50 new sharks and rays, as well as 6 new bony fishes. I also have a strong research focus on fisheries in developing countries, primarily Indonesia and Papua New Guinea."

Andrea Wild

"I am a science communicator and author at CSIRO, where I have worked in a variety of roles, from communication manager to science writer. My key areas of interest are using storytelling to engage audiences, and writing for young people. In my current role I provide communication support to CSIRO's natural history collections and CSIRO's research in species discovery, environmental genomics and eDNA. Our purpose is to discover and characterise Australia's unique biodiversity, find new resources in nature and reinvent how we measure and monitor ecosystem health."

Year 4 students connect with CSIRO scientists in Hobart via WebEx

Student Journal entries – Mahad Gillani and Jonah Brown 23/05/2023

On Wednesday we met CSIRO scientists Helen, Will and Andrea. They are the people working on the Shark Egg Hunt project. They were in Hobart so they had to talk to us on the computer screen. We learnt about different types of sharks, rays and skates. They showed us photos of sharks and then samples of their eggs which they had in their lab. They also talked to us about how the sharks and skates lay their eggs, how they hatch and what happens to the egg case. We showed them one of the Port Jackson shark egg cases that our teacher found. They showed us how the Port Jackson shark screws its eggs into the rocks so that they don't get pushed around by the tide. They said that they do not have them in Tasmania. I wonder what other sharks we have in South Australia that they don't have.

We asked lots of our questions. One of the questions we asked was; what inspired them to be a part of this project? They said that they love sharks and skates and want them to be around for years and years to come. By collecting data on the types of sharks and where they are they can monitor the different species. They said that they were worried about the impact of the change in the environment on the number and the location of sharks and skates. Over fishing can also reduce the numbers of sharks and skates in the world.

We also asked them what they do in the project. They look at the sightings that people record on the app and check the identification of the shark or skate species. They have lots of different pictures and sightings to check every day. They said that when they have enough data they will start to look at where the sharks are having their babies and if that location and environment has changed. They will also find out about the number of egg cases in different areas and where different sharks like to go to have their babies.

They asked us to help them collect some scientific data for them by looking for egg cases on the beaches near us. After the talk we made a plan to go on an excursion to the beach to help them.

Collection of data

Class excursion to Hallett Cove and O'Sullivan's beach

The year 4 class at Hallett Cove beach

Student Science Journal entries

Journal entry - O'sullivan's beach thursday 18th may 12.20 pm. it was a sandy beach. there were bad storms coming in there were 17 scientists we used the shark trust app. there was a cat shark, skate and port Jackson shark egg case

Melody

CSIRO Eggcase Hunt
Journal entry - Hallet cove, Thursday 18th May 10:15 am

The weather was freesing and windy it was very rocky and the tide was coming in there was a tiny bit of sand, We found one shark eggcase in the middle of the beach the eggcase was a port jackson eggcase. The eggcase was old with a lot of white and a little bit of brown. And there were 15 scientsts working on it.

Luka

O'sullivan's Beach, Thursday 18 May 12:20 pm in rainy weather 15 student scientists walked up and down the wide sandy beach & succeded in finding shark eggcases identifid as Rustic Carpet shark Port Jackson shark and Golf Catshark most in a good new condition but some in an old state the data we collected was sent to the Shark Trust comunity to help stop sharks from extinction.

Josh

Seb and his find on the beach

One of the Catshark egg cases found by the students

Sesa and Lizzy with a Port Jackson shark egg case found on O'Sullivan's Beach.

CSIRO Egg Case Hunt

Jornal entry-Hallet Cove thurstday 18th May 2023 10:15

The conditions was cold and partly cloudly. the tide was come ing in slowley. There were 15 student Scientists and 2 Adult Scientists. It was quite a rocky beach with v[?]erry little sand. about 10 minuts after we began the search Scientist Josh found a port jackson shark egg case. It was in porly condition but even nowing it was in bad condition we still posted it on shark trust. its condition was porly and it was starting to fall Apart.

Ellie

Journal entry-O'sallivan's Beach, Thursday 18th May 12:50pm

There was very bad stormy clouds coming in. There was 15 Scientists searching and we found a shark eggs. We notified that we found a shark eggs on shark trust and help people to find them. [?] [?]nd

We found: Golf catshark Grey spotted catshark port Jackson shark peacock skate Pygmy thornback skate. And the names that found these are: Josh sesa Ellie Mahad Seb Isabella Abby Mali

Sesa
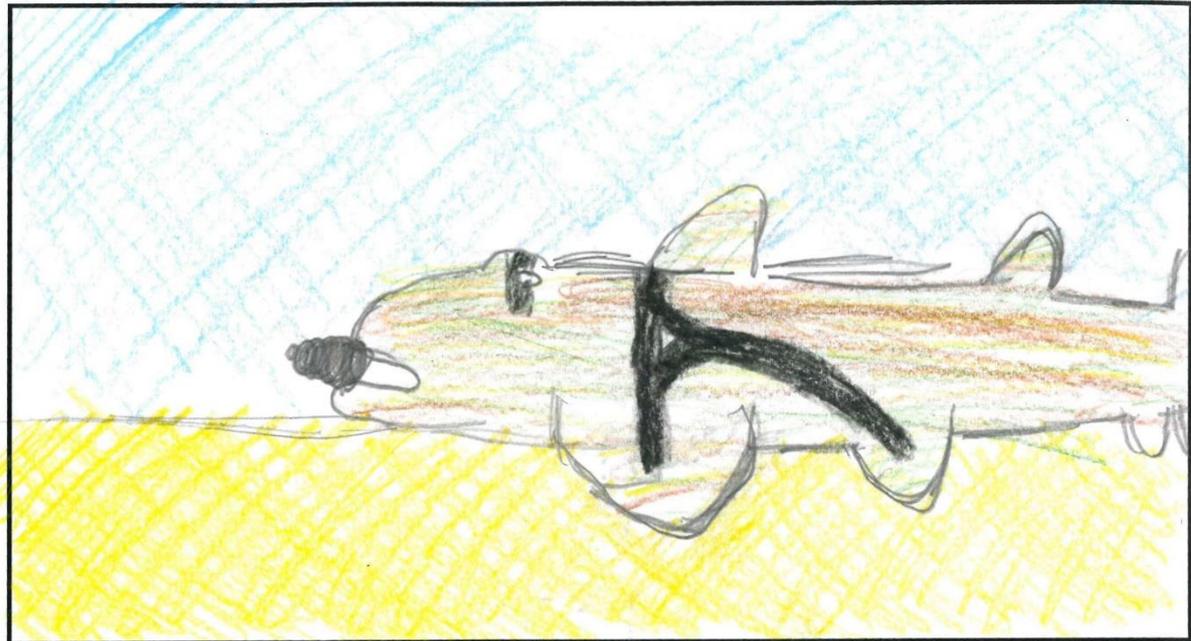
Port Jackson shark

Diet: crustations, mollasks and small fish
- - - - - - - - - - - - - -
Habitat: temporat waters off of the southern half of Austrailia
- - - - - - - - - - - - - -
sicntific name: Heterodontus portusjacksoni
- - - - - - - - - - - - - -
Maximum size: 1.65 m in length
- - - - - - - - - - - - - -
Distribution: southern Aastralia
- - - - - - - - - - - - - -
Conservation status:
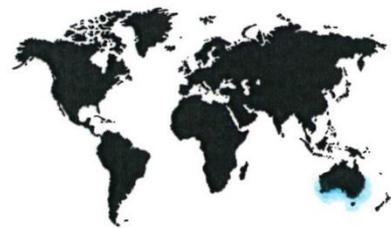
Fun Fact may eggs come out of my mouth

Pygmy Thornback Skate
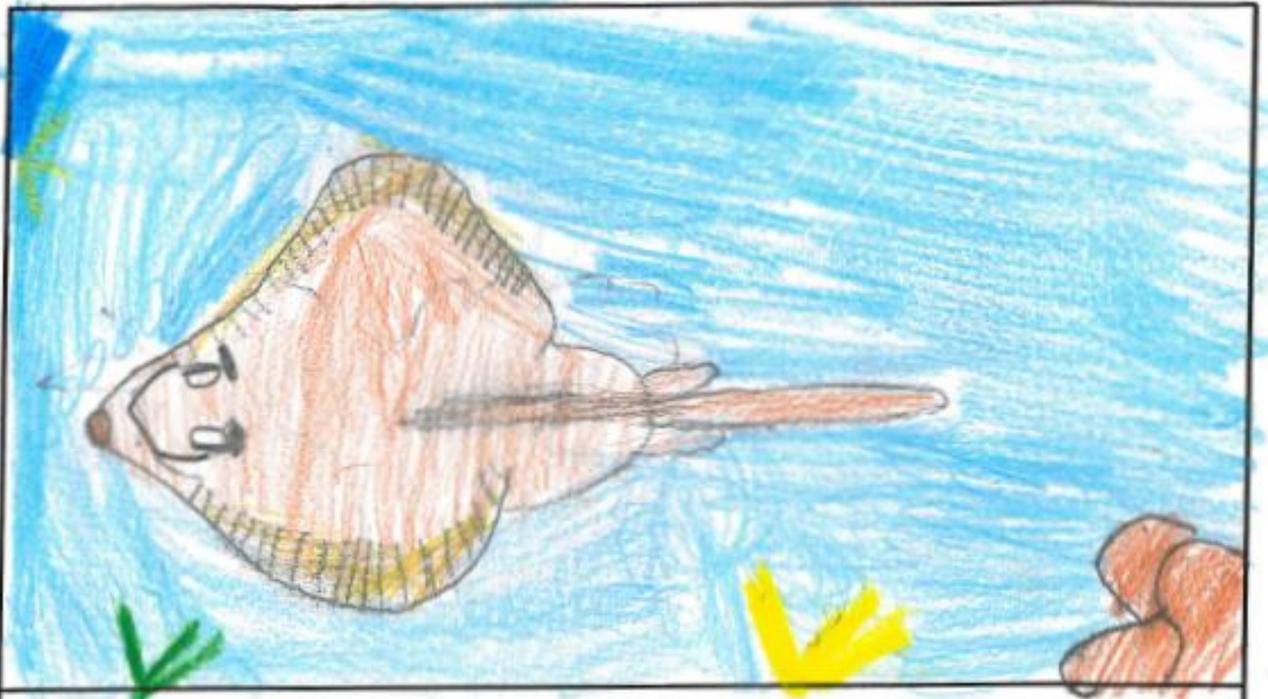
Scientific name

_ _ _ Dentiraja _ flindersi

Diet

_ Small _ crustaceans _ _ _ _ _

habitat

sea floor _ _ _ _ _ _ _ _ _ _

Maximum size

_ 32 cm _ _ _ _ _ _ _ _ _ _

Distribution

Sothern _ Australia _ _ _

capsule length
4-6 cm

Conservation Status
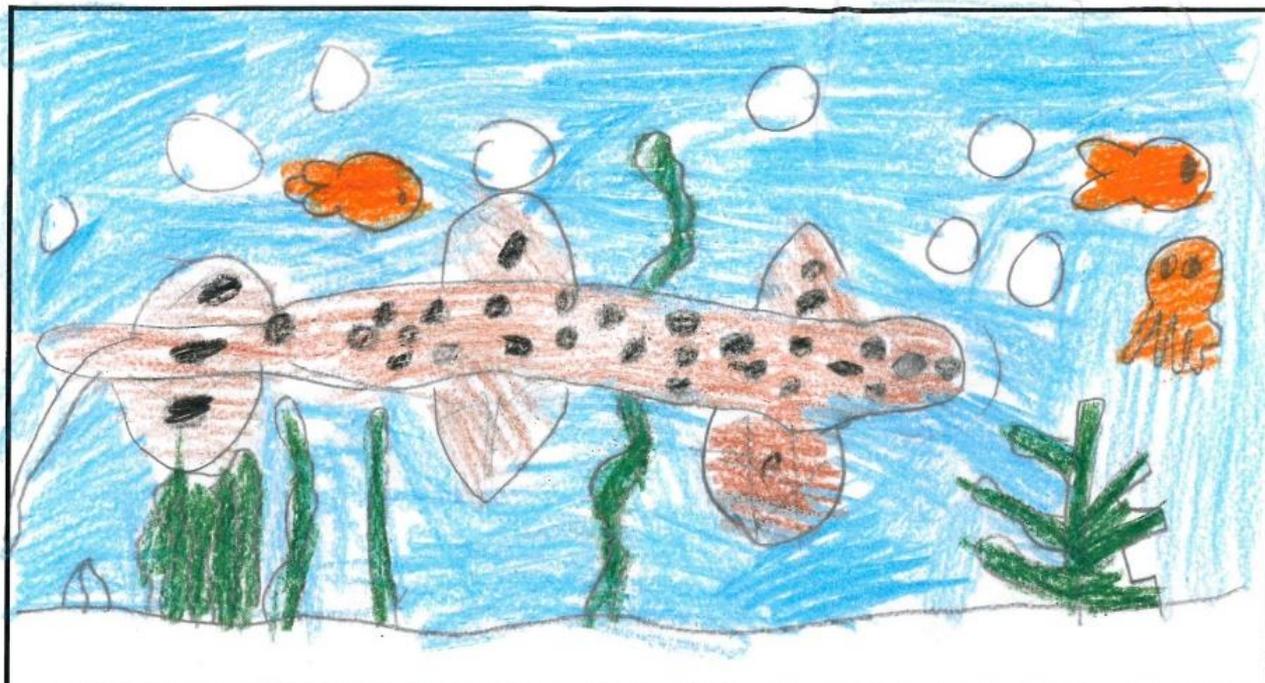
GRAY Spotted CatShark

diet
crabs, shrimp mollucuse and
sea cucumbers
enviment
this lives deep in the ocean
Disturbution
At Queenland and Australia
Maximsize
~~100 cm~~ 60 cm
sincetific name
Sq Scyliorhinsc
~~cecul~~ caniucal.

LC Lest consem

thay are
is restrictive

~~The gray cat shark cat grow to 60 cm~~
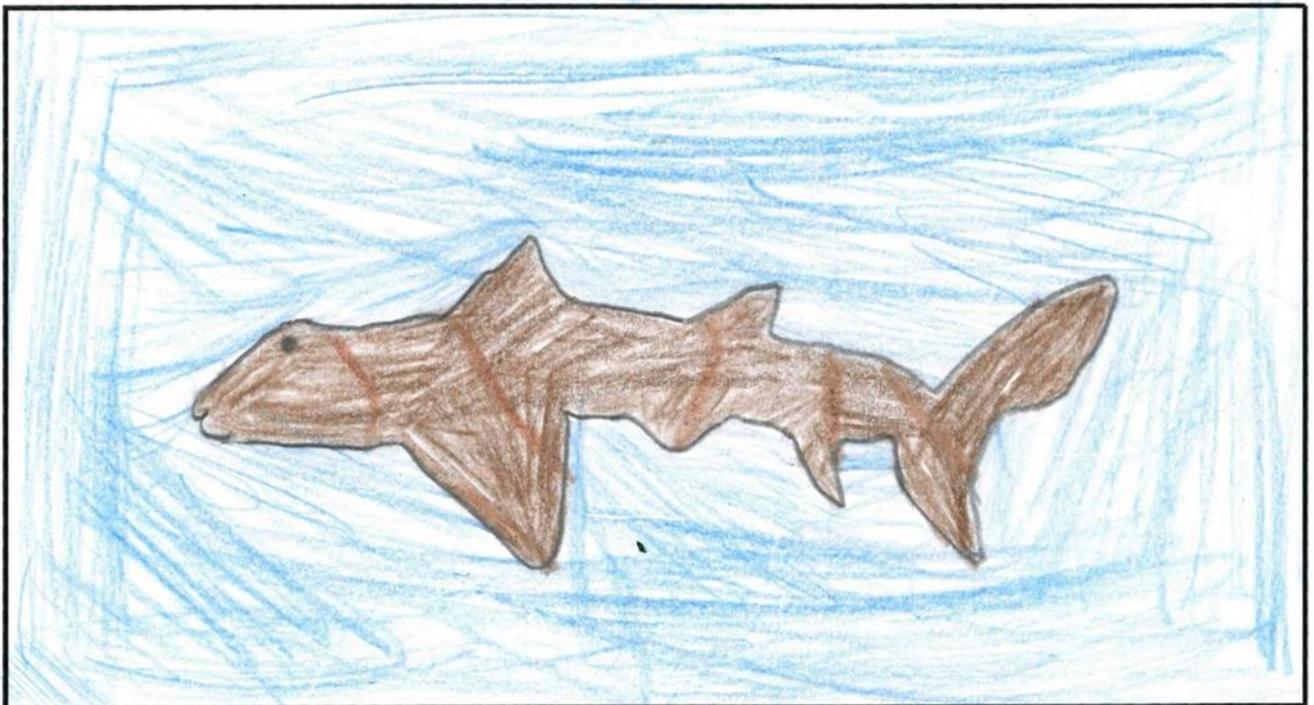
port Jackson Shark

Sintific name:
Heterodontus portusjacksoni
maximum size:

1.65 m in length

Diet: echinodems, crustaceans,

mollusks, and some small fish.

Distrubution:

Sothern Astralia Sothern Queensland.

habitat:

rocky enviroment near the bottom.

LC least consernd

fun fact
They can eat and
breath at the same
time.

Pygmy Thornback skate

Denticajaflindersi
maximum size
32cm
- - - - - - - - - - -
Distribution
Sothern Australia
Habitat
Sedimentary sea beds
Diet:
Small crustation
- - - - - - - - - -
conservation status
Near threatend

fun fact
egg case
4 - 6 cm

Recording the data

Location	Image	Species	Notes	Scientist
Hallett Cove		Port Jackson Shark	Very old egg case. It was very damaged.	Josh
O'Sullivan's Beach		Gulf Catshark	It was much smaller than I thought it would be. It was much smaller than the other egg cases that we found.	Mahad
O'Sullivan's Beach		Variegated Catshark	It was very light and round. It had pointy horns	Abby
O'Sullivan's Beach		Port Jackson Shark		Sesa
O'Sullivan's Beach		Port Jackson Shark	It looked old because it was dented. It blended in with the seaweed on the beach.	Mali

Recording the data

O'Sullivan's Beach		Port Jackson Shark	It was bigger than I thought it would be. It felt bumpy and hard.	Sesa
O'Sullivan's Beach		Peacock Skate	It was a dark colour. Much darker than the other egg cases found. It was very light and had 4 horns.	
O'Sullivan's Beach		Pygmy Thornback Skate	It was wet and squishy. I found it on the far edge of the sand.	Isabella
O'Sullivan's Beach		Rusty Carpet shark	This was my first egg case I ever found. It was up in the seaweed and felt like delicate plastic	Ellie
O'Sullivan's Beach		Varied Carpet shark	It was full of sand and felt like there was a shark in side. It was light as a feather when I tipped the sand out.	Seb

Data Evaluation

It was really hard to work out which species of shark or skate the egg cases came from. We used the Shark Trust app to help us but even then it was still tricky. It was particularly hard if the egg cases were damaged and old. We used the descriptions and the pictures to help us. *Mali*
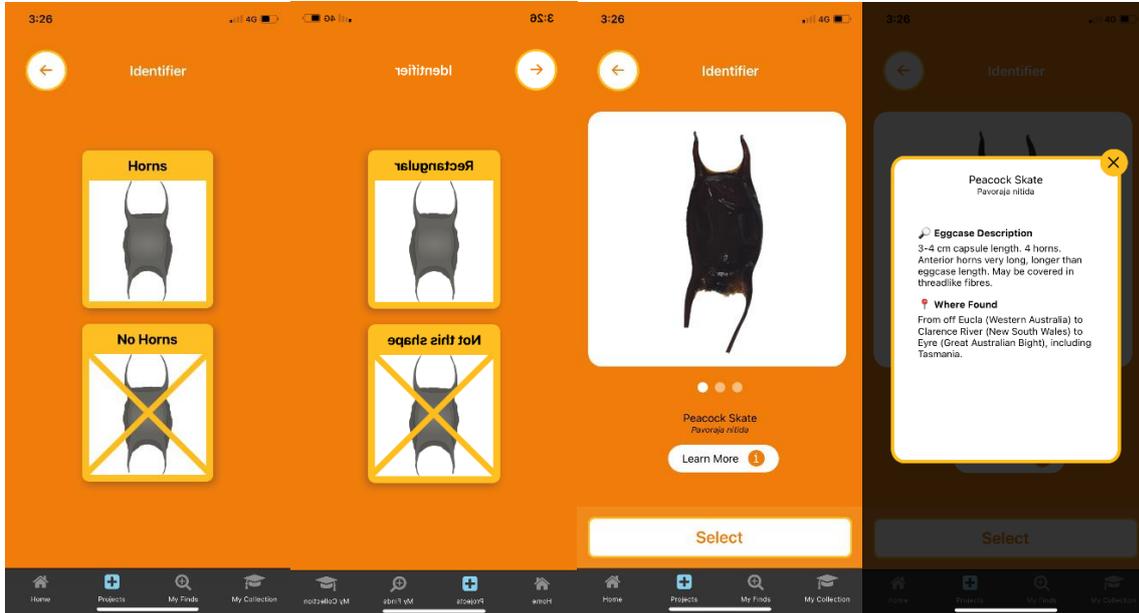
Shark Trust App Identifier Tool

We found the most egg cases at O'Sullivan's Beach, in fact we only found 1 at Hallett Cove. The beach at Hallett Cove was really rocky with only a little bit of sand at the end of the beach. Mostly there was rocks and seaweed on the beach. The beach at O'Sullivan's beach was very sandy and open with only a small amount of weed. I think that sharks and skates like to lay their eggs where the beach is sandy rather than full of rocks. *Mahad*

Rock pools at Hallett Cove

Of all of the egg cases we found most of them were Port Jackson Shark egg cases. We found 4 Port Jackson shark egg cases and only 1 of each of the other types. I think this means that there are more of these types of sharks in this area than the other sharks and skates. I also think that there must be some weed in the water so that they eggs are camouflages with seaweed like kelp because we found some kelp on the beach. *Hannah*

Kelp from O'Sullivan's Beach

The egg cases that we found were different in age and condition. I think that some of them have been on the beach for a long time. *Josh*

We found different egg cases from seven different species of shark and skate at O'Sullivan's Beach. I think this means that it is a healthy and safe place for them to lay their eggs. Helen and Will from CSIRO are trying to find out about areas where there is a nursery for sharks. I think that O'Sullivan's Beach is a better area than Hallett Cove where we only found one egg case. *Lizzy*

Further direction and questions

We found out that in 2021 there had been a project at O'Sullivan's beach to restore a 20 hectare reef made from 4000 tonnes of limestone and 3.6 million baby oysters were added to the reef which were grown on recycled oyster shells. Last year they had a look at the reef and found that the oysters had grown and that there were squid, crabs and whiting on the reef. Sharks and Skates would feed on these animals. We are wondering if this has impacted the sharks and skates that come to the area to lay their eggs because there were lots of egg cases on this beach and from lots of different species. We are also wondering if we would have found as many before the reef was built. We thought that the reason we did not find as many egg case at Hallett cove was because the beach was very rocky but maybe it is because there is not a reef with food at this place. I don't know how we would find that out but we will let the CSIRO scientist know what we found out. "We should build a reef at Hallett Cove to encourage sharks. Sharks and skates will eat small fish and crabs which come to the reef to eat the oysters." *Ellie*

As a citizen scientist I think we could use this way of collecting data after the floods of the Murray River. The last time I went to Goolwa there were lots of tiny fish that have washed up on the beach. When I went down after 2 more weeks there were much bigger fish all over the beach and were still washing up at the time. We could get people to record the fish they see in an app so that CSIRO know what fish were harmed by the floods. It could have actually been helpful to reduce the number of carp but we don't know if we don't collect data on the different fish species. This would also help us know how far the fish came down the river. After the floods they cleaned up the fish with a bulldozer but they did not know what fish were there. *Seb*

As a citizen scientist, think we could use this way of collecting data to know more about the types of shellfish that live in an area. Citizens could record the different shells that they find on the beach. If we collect data on the shells it will tell us about them and identify the types of shellfish like where they live and where there are lots of them and where there are very few. This will tell us if oceans are healthy or not. What they need to survive. We could find cockle shells, spiral shells, oyster shells or crabs and that will tell us what these species need and like, to live. *Sesa*

As a citizen scientist, I think we could use this way of collecting data to get information about birds. People could collect data from sightings of nests, feathers and egg shells in an area. This will tell us which birds live and breed in the area. We could then know where species were and how many there are. If we cannot find a bird in an area that might be because their habitat is being damaged. If there are lots of bird in an area that might means that that species is doing well in that area. We might find out that there are invasive bird species in an area and then we could catch them and take them away from the area. If a pet bird escapes we could know where to find it. *Melody*

As a citizen scientist, I think we could use this way of collecting data to identify the different types of seaweed found on the beach. This could tell us which species and how many species live in the area. That might mean that there are some seaweed species which we can get rid of because it is not supposed to be there. It would also tell us if the ocean is healthy in that area. We will learn if oxygen is in the water because of the amount of sea plants. It is also homes for sea creatures like sea snails. Some animal also camouflage in the seaweed so they do not get eaten by predators. *Isabella*

Reflection

'This project was fun because we got to go outside to the beach and help scientists to care for animals. This helped me because I want to care for animals at a shelter when I'm older.' *Melody*

'I learnt that scientists investigate to find out questions they have. This project will help me take care of the earth in the future.' *Krystina*

'We learnt that it is not easy for scientists to find data they are researching or looking for. The more data they have, the more it helps them. This project will help in the future for jobs or education throughout your life.' *Sesalina*

'This project taught me how to look for shark egg cases and how to send the data to the scientists so then they can see which species are endangered. The eggs we found blend in with the seaweed. I will always look for shark egg cases now when I am at the beach.' *Hannah*

'This project helped me learn about data, and how scientists need lots of data for their work. In the future I will look for shark egg cases whenever I walk on the beach.' *Seb*

'I got a new experience from this project. I got to make observations, work with other investigators and collect data. If everything fails for me in my future and I don't become a famous soccer player, then I would already know about this and it will be easier to become a scientist instead.' *Mahad*

'In this science investigation I learned that it is hard for scientists to go to almost every beach to just find shark egg cases. This way we could help them. Although this inspired me, I still want to be a vet. Also, it is hard to find egg cases because they blend in with the seaweed and hide in the cracks of the rocks.' *Mali*

'The Shark Trust is an App that you can log your finds of shark egg cases and see the distribution and conservation of the different shark species. We helped scientists at the Shark Trust to collect data. I really want to be a marine biologist in the future, to see what marine species are safe.' *Elizabeth*

'This project helped me learn why Shark Trust is looking for shark egg cases, conservation is really important! I also learned how to collect data.' *Isabella*

'You don't have to wear a white coat in a lab to be a scientist. We helped scientists collect data about shark egg cases. Science could be a good job for me one day!' *Will*

'This project helped me learn that you can make a career out of science doing something you enjoy. You can make money and buy food with the money to feed your family.' *Jonah*

'We learnt about conservation, collecting data, investigation and collaboration to help scientists focus on their research. It will be good for us because it's a pathway to a science job and it would help educate others.' *Josh*

'We helped scientist collect data help them know the conservation status of sharks and learned about what scientists are trying to do to help them. I learnt that anybody can be a citizen scientist.' *Ellie*

'In this science project I learned that you can investigate egg cases. I am very interested in science and I want to be a scientist in the future.' *Abby*

'I learnt that everybody can be a scientist. This will help us all learn about creatures in the future.' *Ava*