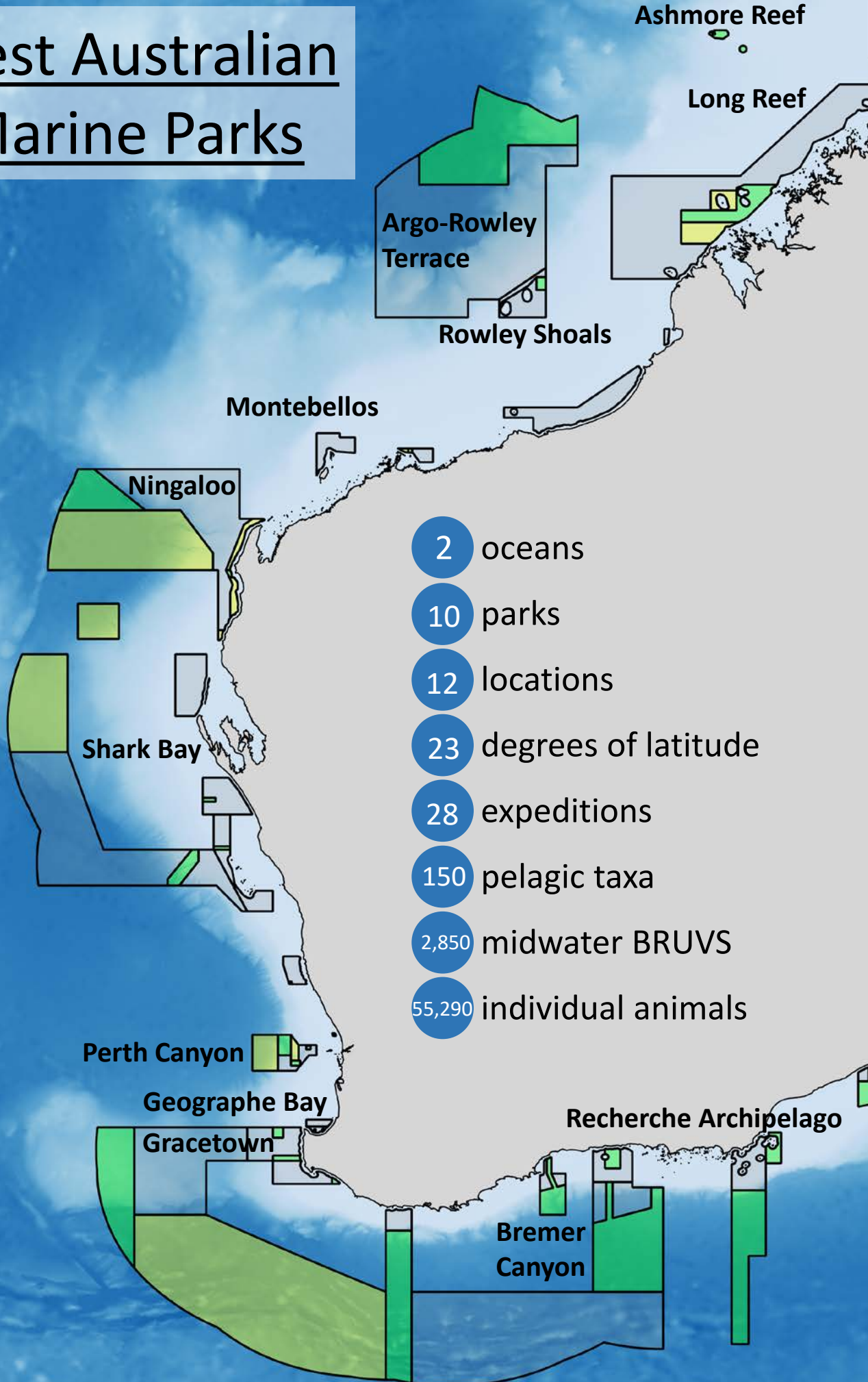


West Australian Marine Parks

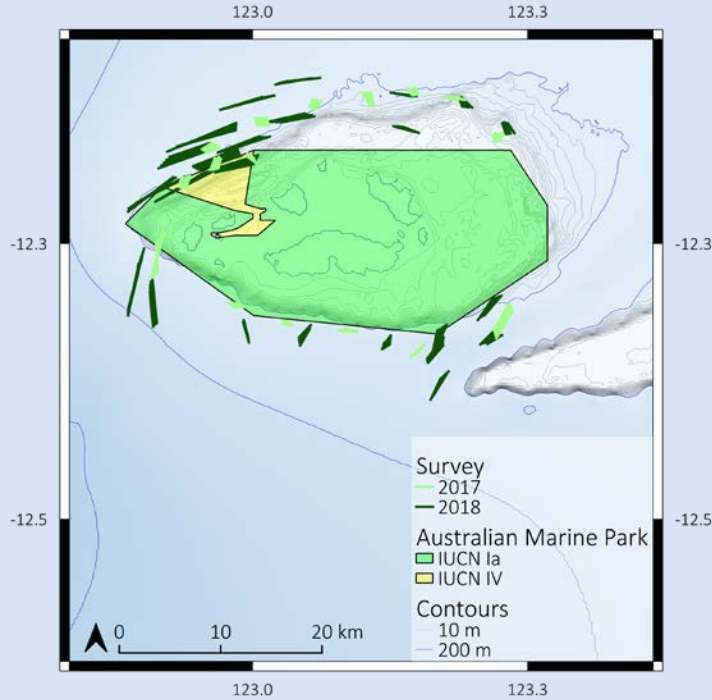


- 2 oceans
- 10 parks
- 12 locations
- 23 degrees of latitude
- 28 expeditions
- 150 pelagic taxa
- 2,850 midwater BRUVS
- 55,290 individual animals



Ashmore Reef

- Ashmore Reef Marine Park is a 583 km² combination of both sanctuary (IUCN Ia) and recreational use (IUCN IV) zones located 630 kilometres north of Broome in the Australian External Territory of Ashmore and Cartier Islands.
- These waters hold historical significance for traditional Indonesian fisherman, they retain access to resources in certain areas of the MPA.

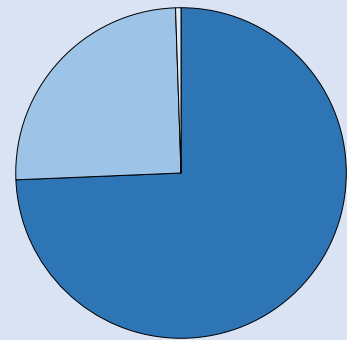


Our surveys

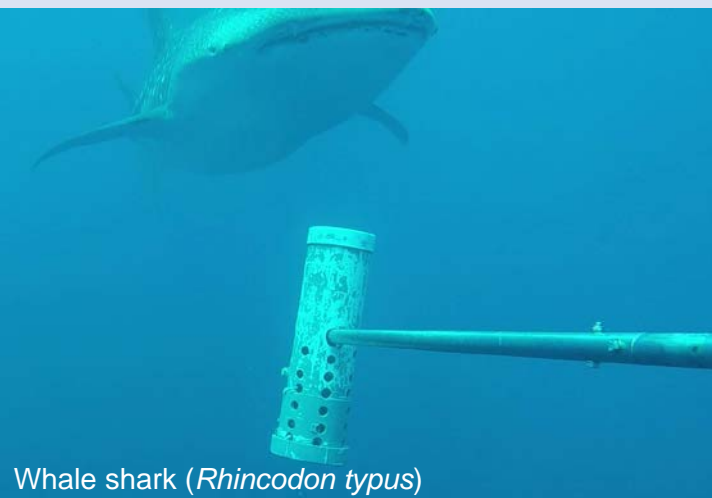
- Two surveys were conducted in the dry seasons of 2017 and 2018.
- 200 samples in waters up to 354 metres deep.
- 809 individuals counted from 42 taxa representing 19 families.
- Observations included a whale shark (*Rhincodon typus*) and an ocean sunfish (*Mola mola*).
- The waters are dominated by predators and large prey.

Key findings

- The threatened silvertip shark (*Carcharhinus albimarginatus*) is more abundant here than any other location.
- We saw a decrease in abundance on the second year of sampling, yet the average length of the animals observed almost doubled.



■ predators ■ large prey □ small prey



Whale shark (*Rhincodon typus*)

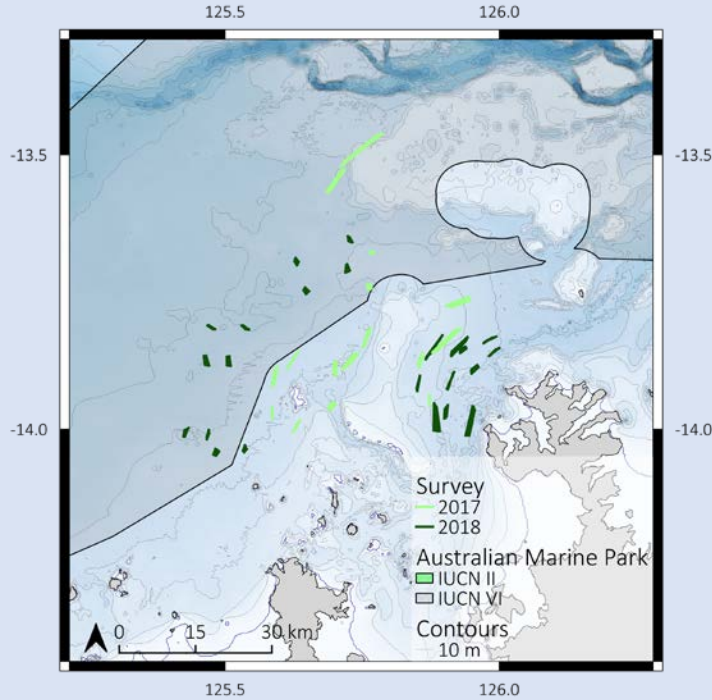
Why Ashmore Reef matters

- It is one of the 65 Australian Ramsar sites, which are locations of significant importance to seabirds, shorebirds, and other marine life they support.
- This habitat seems to be an important site for vulnerable reef-associated species of shark such as the silvertip shark.
- Ashmore Reef might act as a stopover on the migration path of whale sharks.



Long Reef

- The North Kimberley region is characterised by a large area of continental shelf and continental slope with thousands of remote reef and sand islands that attract a diverse assemblage of wildlife.
- Long Reef is situated at the northern most tip of the vast 74,469 km² IUCN VI Kimberley Marine Park, adjacent to the state managed Long Reef and East Holothuria Reef IUCN II sanctuary zone.

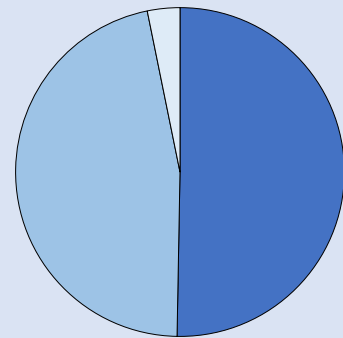


Our surveys

- Two surveys were conducted in 2017 and 2018.
- 200 samples in waters up to 59 metres deep.
- 3061 individuals counted from 43 taxa representing 15 families.
- Observations included a great hammerhead (*Sphyrna mokarran*) and a green sea turtle (*Chelonia mydas*).
- The waters are mostly shared by large prey and predators.

Key findings

- A quarter of all species observed here were not observed elsewhere including the double spotted queenfish (*Scomberoides lysan*), and the milk shark (*Rhizoprionodon acutus*).
- The blacktip shark (*Carcharhinus limbatus*) is most abundant, yet on average, much smaller at this location than anywhere else sampled.
- Diversity increased by 50% whilst biomass doubled between the years 2017 and 2018.



■ predators ■ large prey □ small prey



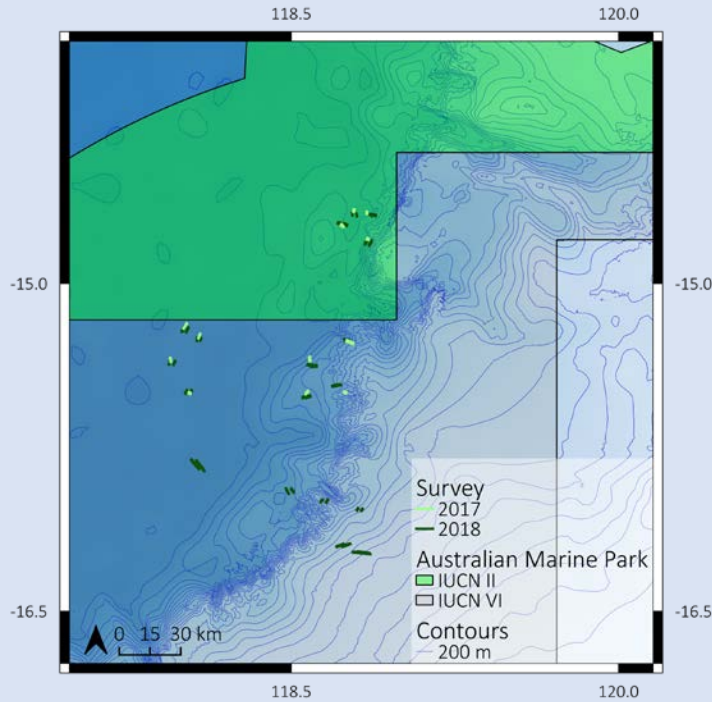
Tiger shark (*Galeocerdo cuvier*)

Why Long Reef matters

- Warm temperatures, tidal movements, and turbidity create an extreme environment leaving its inhabitants more susceptible to the adverse effects of climate change and other anthropogenic forces.
- This large, highly protected IUCN II zone may act as a refuge for some exploited pelagic species.

The Argo-Rowley Terrace

- Western Australia's largest no-take (IUCN II) zone makes up about a quarter of the Argo-Rowley Terrace Marine Park, with Multiple canyons that link the deep Argo Abyssal Plain to the shallower Rowley Terrace.
- The continental slope could be up to 50 million years old and is associated with small, periodic upwellings that result in localised higher levels of biological productivity.

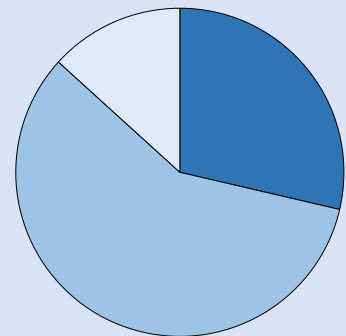


Our surveys

- Two surveys were conducted in the dry seasons of 2017 and 2018.
- 240 samples in waters up to 5727 metres deep.
- 4672 individuals counted from 24 taxa representing 14 families.
- Observations included wahoo (*Acanthocybium solandri*) and a greater amberjack (*Seriola dumerili*).
- Much of the assemblage is comprised of large prey.

Key findings

- Only observations of a tripletail (*Lobotes surinamensis*), oceanic puffer (*Lagocephalus lagocephalus*), and island trevally (*Carangoides orthogrammus*) throughout all surveys.
- Despite 240 samples, only a single shark was observed; a blue shark (*Prionace glauca*) and this was within the IUCN II zone.
- Abundance, diversity, and biomass all doubled between the surveys with average length showing no significant change.



■ predators ■ large prey □ small prey



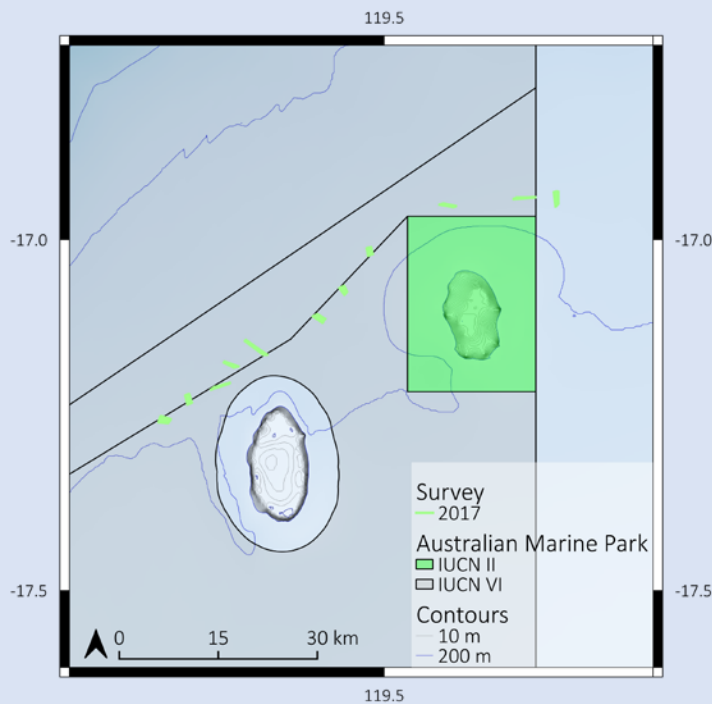
Tripletail (*Lobotes surinamensis*)

Why the Argo-Rowley Terrace matters

- These protected waters are representative of multiple ancient shelf features such as fans, aprons, canyons, and slopes.
- Canyons are an important feature in this area of the Marine Park and are generally associated with high productivity and aggregations of marine life.
- This large, highly protected IUCN II zone may act as a refuge for some exploited pelagic species.

The Rowley Shoals

- The Rowley Shoals are comprised of three atolls on the edge of the continental shelf, 300 km offshore from Broome.
- The youngest of the atolls, Mermaid Reef, is highly protected by the 146,003 km² of no-take (IUCN II) zone that is Mermaid Reef Marine Park. This is a popular recreational diving destination for its diverse demersal fish and coral assemblage.

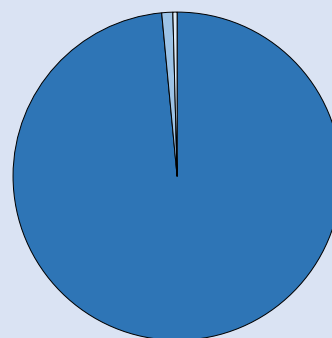


Our surveys

- A single survey was conducted in November of 2017.
- 55 samples in waters up to 446 metres deep.
- 86 individuals counted from 13 taxa representing 10 families.
- Observations included pompano dolphinfish (*Coryphaena equiselis*) and great barracuda (*Sphyrna barracuda*).
- The waters are heavily dominated by predators.

Key findings

- Silky sharks (*Carcharhinus falciformis*) are most abundant here compared to all other locations sampled.
- This location had the southern-most observations of the tropically associated rough triggerfish (*Canthidermis maculata*).
- With relatively low diversity yet high biomass, the shoals now have a baseline for pelagic monitoring.



■ predators ■ large prey □ small prey



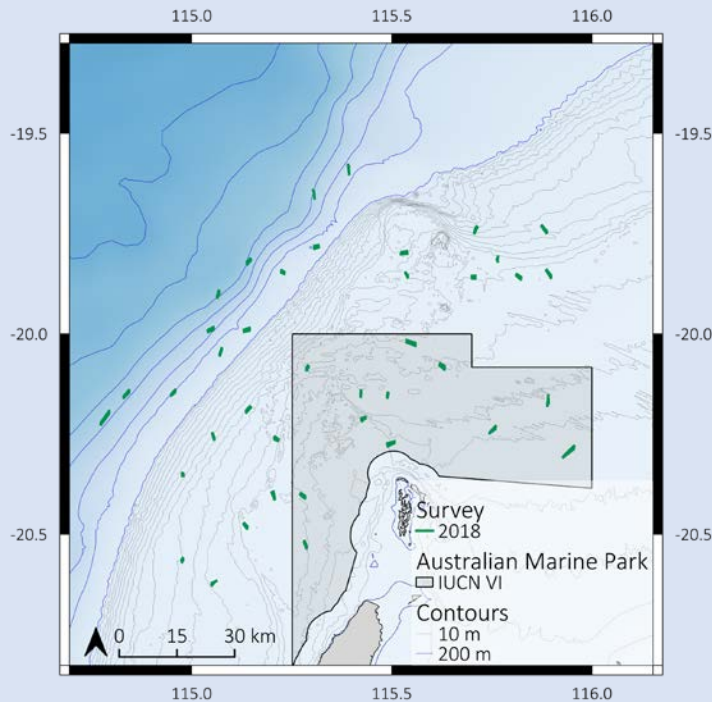
Silky shark (*Carcharhinus falciformis*)

Why the Rowley Shoals matters

- These reefs are likely ecological steppingstones for reef associated species originating in Indonesian/Western Pacific waters.
- The position of these atolls on the continental shelf makes them ideal habitats for foraging oceanic sharks such as the silky shark.

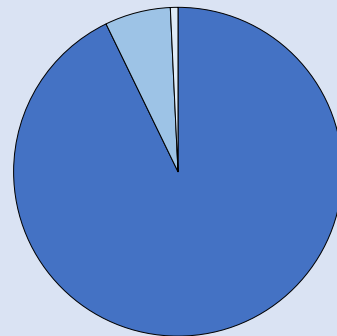
The Montebellos

- The Montebellos comprise of 174 small islands 130 km off the Pilbara coast and was the site of nuclear weapon testing in the 1950s.
- Reef flats are exposed during the low tide forming the Trial Rocks, named after the 1622 shipwreck on these islands.
- The Montebello Marine Park covers approximately 3,413 km² and is entirely IUCN VI zoning.



Our surveys

- A single survey was conducted in August of 2018
- 200 samples in waters up to 1,030 metres deep.
- 7,018 individuals counted from 59 taxa representing 20 families.
- Observations included an oceanic whitetip (*Carcharhinus longimanus*) and a sea snake (*Elapidae* sp.)
- The waters are largely dominated by predators.



■ predators ■ large prey □ small prey

Key findings

- The waters around the Montebello Islands were found to have the highest diversity of sharks with 16 of the 24 total species recorded across all locations.
- This survey produced a baseline that is both highly diverse and abundant for future pelagic studies.



Bignose shark (*Carcharhinus altimus*)

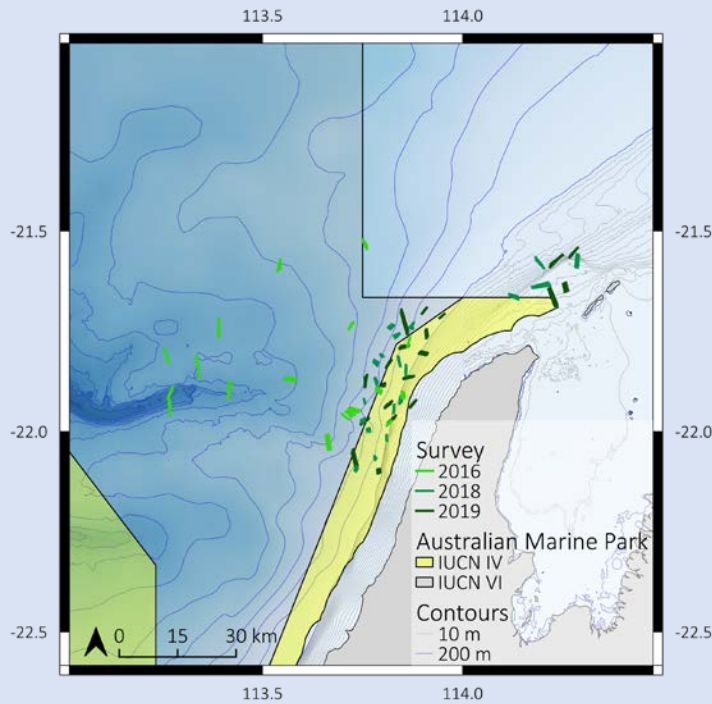
Why the Montebellos matter

- 125-m deep rocky escarpments are thought to provide biologically important habitat in areas otherwise dominated by soft sediments.
- Following the nuclear testing, the reef around the islands were untouched and became an involuntary marine park. In recent years fishing pressure has increased around these islands.
- Oil and gas drilling activities in these waters could be affecting the local pelagic wildlife and should be monitored.

Ningaloo

• Adjacent to the World Heritage listed Ningaloo reef, these productive waters are part of the annual migratory route of humpback whales and are frequented by loggerhead, hawksbill, and green turtles.

• The Ningaloo and Gascoyne Marine Parks stretch approximately 350 km along the west coast and nearly 400 km offshore of the Cape Range Peninsula.

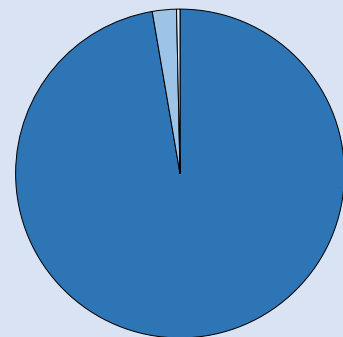


Our surveys

- Three surveys between 2016 and 2019.
- 280 samples in waters up to 2,133 metres deep.
- 3,363 individuals counted from 48 taxa representing 17 families.
- Observations included both a striped marlin (*Kajika audax*) and a black marlin (*Istiompax indica*).
- The waters are largely dominated by predators.

Key findings

- Ningaloo had more observations as well as more species diversity of billfish (Istiophoridae) than elsewhere sampled.
- Each year of sampling we saw a steady increase in biomass with diversity doubling after the first year and staying the same for subsequent surveys.



■ predators ■ large prey □ small prey



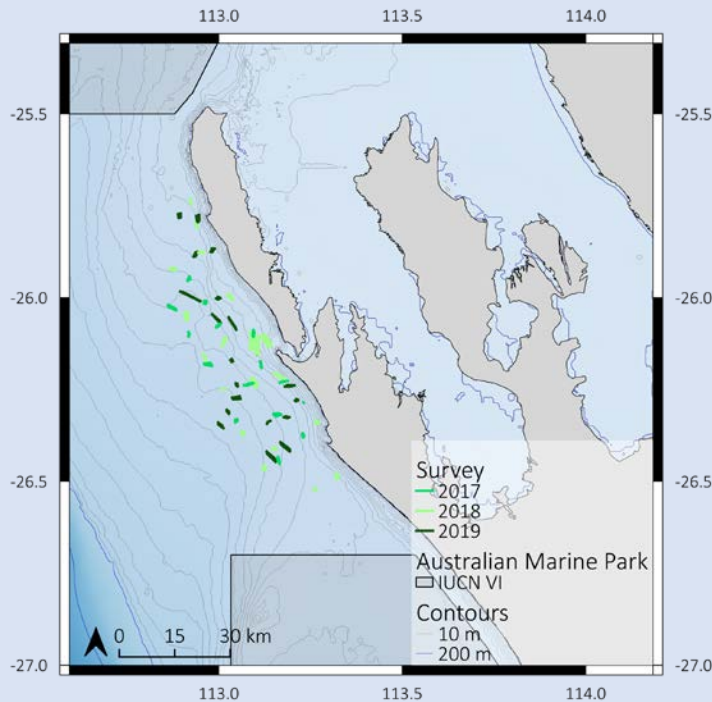
Indo-Pacific sailfish (*Istiophorous platypterus*)

Why Ningaloo matters

- The marine parks are located in a transition zone between tropical and temperate waters. Many animals will therefore be at the limit of their distribution here.
- The majority of the parks are open to fishing, allowing many recreational fishers on holiday at Exmouth to exploit these unique ecosystems.

Shark Bay

- Situated west of Shark Bay, the central western shelf is largely flat, sandy and low-nutrient, with waters depths of 50-150 m.
- A stretch of over 100 km of pelagic waters running, parallel to the coast, lie unprotected between the Shark Bay and the Abrolhos Marine Parks.

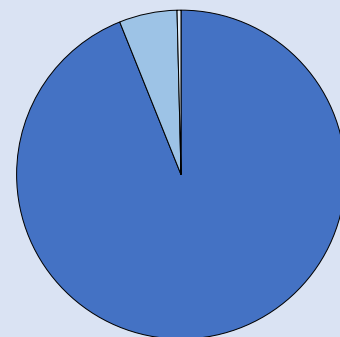


Our surveys

- Sampling took place in the dry season of 2017, 2018 and 2019.
- 275 samples in waters up to 125 metres deep.
- 3,344 individuals from 41 taxa representing 15 families.
- Observations included bigeye tuna (*Thunnus obesus*) and a spot-tail shark (*Carcharhinus sorrah*).
- The waters are largely dominated by predators.

Key findings

- A higher average abundance of dusky sharks were observed here compared to any other site sampled.
- On average, Shark Bay has the largest spinner sharks (*Carcharhinus brevipinna*), yet the smallest sandbar sharks (*Carcharhinus plumbeus*) across all locations sampled.
- The 2018 survey saw a significant decrease in abundance but 2019 saw a return to numbers similar to that of 2017.



■ predators ■ large prey □ small prey



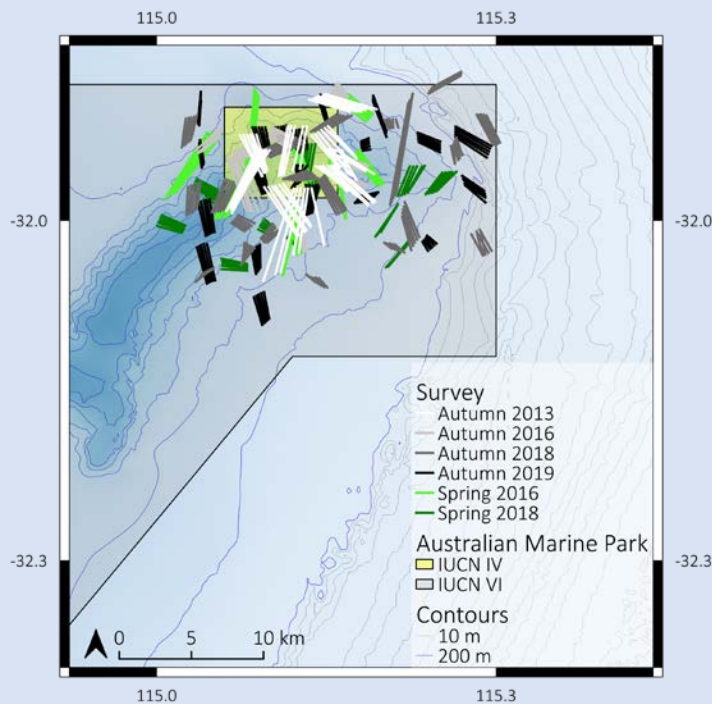
Dusky shark (*Carcharhinus obsurus*)

Why Shark Bay matters

- The pelagic waters just outside of Shark Bay support a diverse number of sub-tropical and temperate species.
- With no form of protection in place, this popular tourist destination is at risk of having its pelagic waters over-exploited by recreational fishers on top of the already heavy commercial fishing pressure.

Perth Canyon

- 7,409 km² of protection including IUCN II (no-take), IV and VI (multiple-use) zones with depths to 4,000 m.
- Cold nutrient-rich water upwells beneath the poleward flowing warm water Leeuwin Current increasing productivity.
- Whales and large predatory fish are often found at the canyon heads.

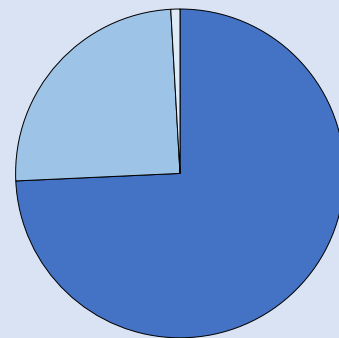


Our surveys

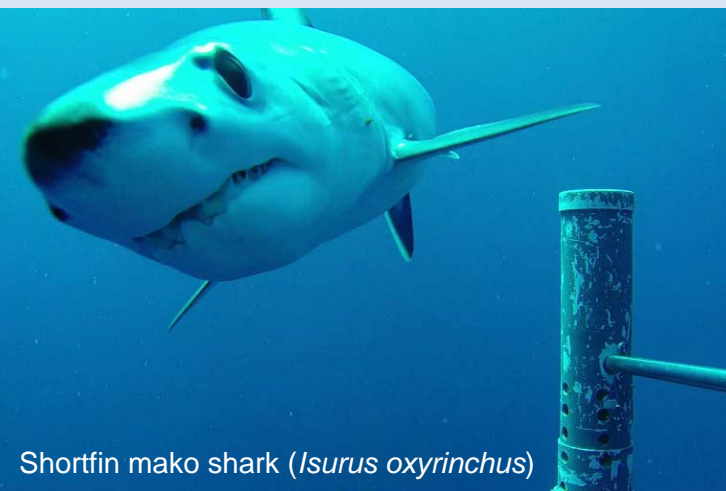
- 6 surveys between 2013 and 2019 representing both Autumn and Spring.
- 485 samples in waters up to 1,550 metres deep
- 1,682 individuals from 35 taxa representing 22 families.
- Observations included a school of 47 common dolphinfish (*Coryphaena hippurus*) as well as a solitary sunfish (*Mola mola*)
- The waters are dominated by predators and large prey.

Key findings

- Likely a shortfin mako (*Isurus oxyrinchus*) nursery with rare sightings of young of the month associated with abundant prey.
- Spatial stability in wildlife distributions through time.
- Evidence of a “race to fish” in 2018 prior to establishment of marine park zoning.



■ predators ■ large prey □ small prey



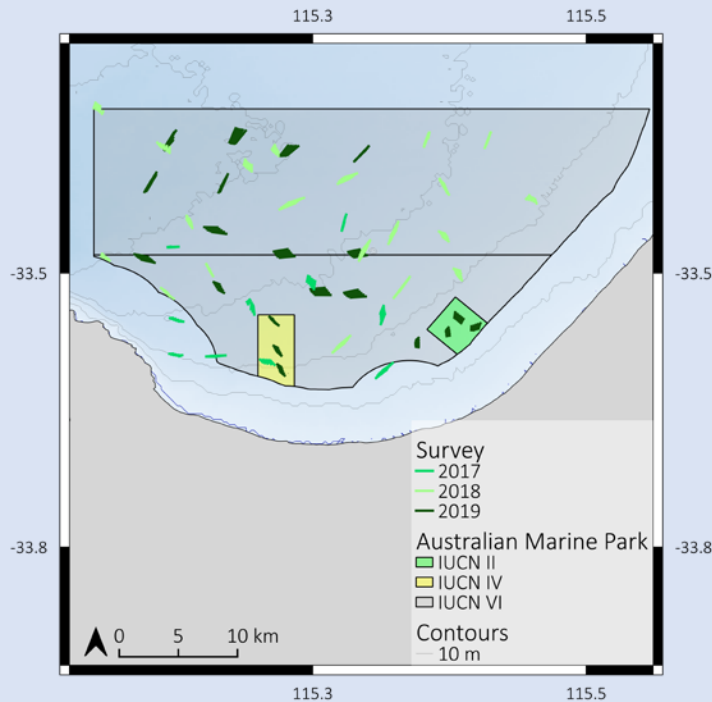
Shortfin mako shark (*Isurus oxyrinchus*)

Why the Perth Canyon matters

- Rare hotspot of productivity and biodiversity.
- Area of great significance for an endangered species – the shortfin mako.
- At risk of overexploitation due to its proximity to Perth and partial protection.

Geographe Bay

- Situated between the populous towns of Bunbury, Busselton and Dunsborough, recreational fishing, boating and diving activities are common in these waters.
- These sheltered waters boast one of the largest continuous seagrass meadows in Australia.
- The 977 km² Geographe Marine Park includes IUCN II, IV and VI zones.

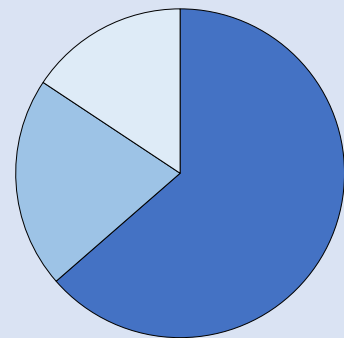


Our surveys

- Sampling took place in the early autumns of 2017, 2018, and 2019.
- 250 samples in waters up to 45 metres deep.
- 4,661 individuals from 41 taxa representing 24 families.
- Observations included a single school of over 1,000 sardine (*Clupeidae* sp.).
- Much of the assemblage is comprised of predators.

Key findings

- Popular recreationally targeted species Australian herring (*Arripis georgianus*), pink snapper (*Pagrus auratus*) and Samson fish (*Seriola hippos*) were observed exclusively at this location
- Significantly higher number of juveniles compared to anywhere else sampled in WA.
- Abundance and diversity are consistently higher than the previous sampling year.



■ predators ■ large prey □ small prey



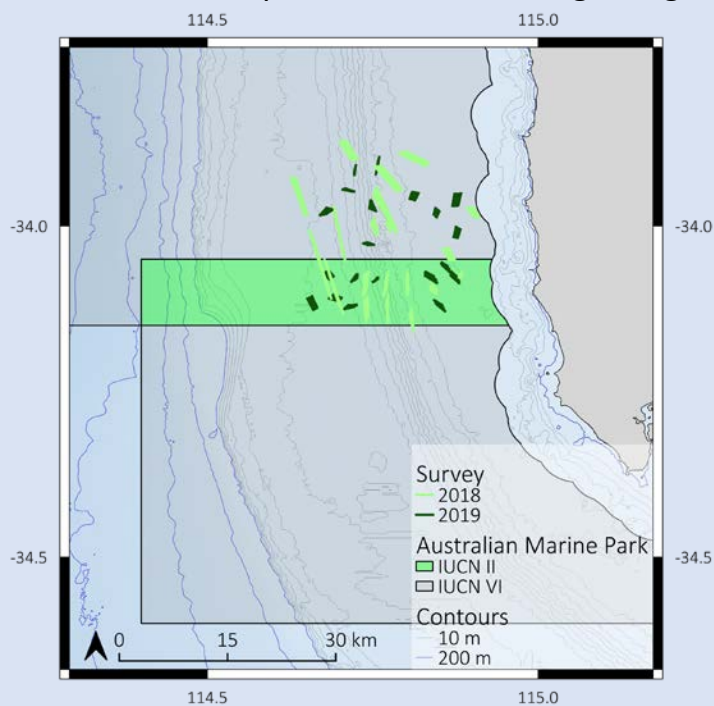
Samson fish (*Seriola hippos*)

Why Geographe Bay matters

- The seagrass meadows provide 80 per cent of the regions primary productivity as well as providing important nursery habitat for juveniles of many commercially and recreationally targeted species.
- At risk of over exploitation and susceptible to nutrient runoff given proximity to popular tourist destinations Bunbury and Busselton.
- Increased boat traffic in this area could be acoustic deterrents of cetacean life.

Gracetown

- A pair of mid-slope terraces feature off the coast of Gracetown, with depths of 50 m and 150 m.
- The IUCN II and IUCN VI zones are a small part of the expansive South-west Corner Marine Park.
- Warm, tropical waters of the Leeuwin Current mingle with the cool waters of the Capes Current, resulting in high finfish diversity.

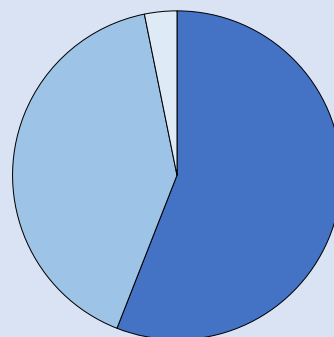


Our surveys

- Sampling took place in the early autumns of 2018 and 2019.
- 200 samples in waters up to 143 metres deep.
- 2,265 individuals from 22 taxa representing 16 families.
- Observations included a Gould's squid (*Nototodarus gouldi*) and a school of over 140 skipjack tuna (*Katsuwonus pelamis*).
- The waters were dominated by large prey and predators.

Key findings

- Across all the location sampled, the blue mackerel (*Scomber australasicus*) was smallest on average at Gracetown.
- Skipjack tuna were most abundant at this location compared to all other locations where observed.
- A significant increase in abundance but a consistently low diversity was seen between years.



■ predators ■ large prey □ small prey



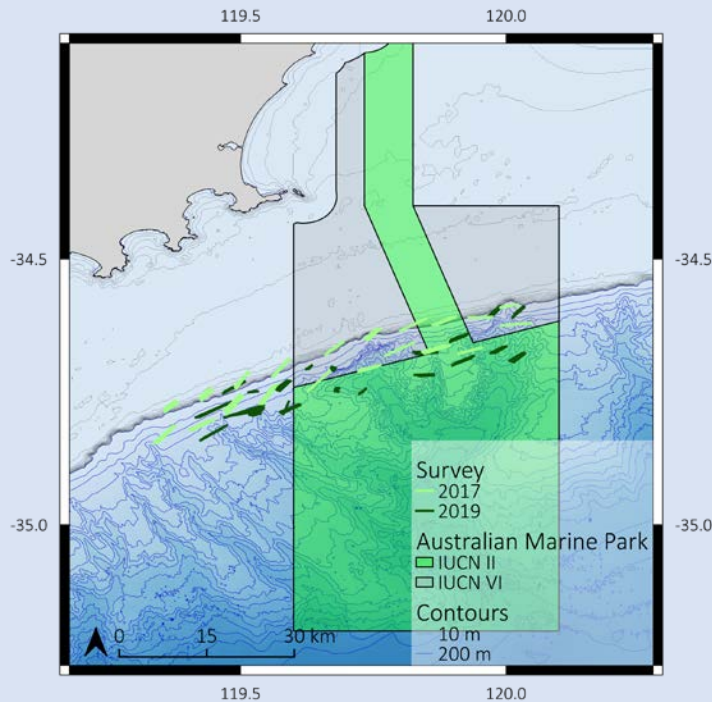
Common minke whale (*Balaenoptera acutorostrata*)

Why Gracetown matters

- Multiple species of whale migrate through these coastal waters annually.
- The South West capes area has one of the fastest growing populations in Australia and is frequently visited by tourists, and without adequate protection, may be in exploited.

Bremer Canyon

- Approximately 70 km offshore, with depths of up to 5000 m, lies the Bremer canyon.
- The 4,472 km² Bremer Marine Park includes both IUCN II and VI zones.
- Increasing numbers of whale watching boats frequent the canyon heads, driving the tourism of the small town nearby of Bremer Bay.

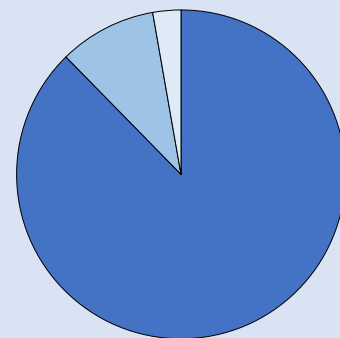


Our surveys

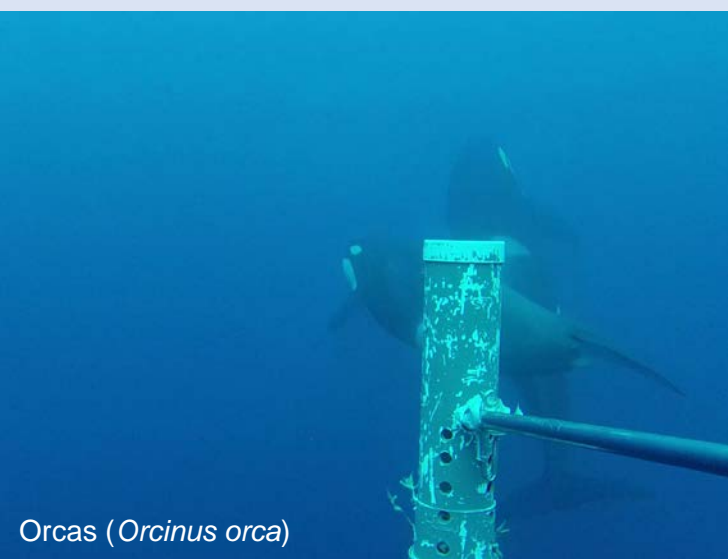
- Sampling took place in the early autumns of 2017 and 2019.
- 200 samples in waters over 2,000 metres deep
- 1,546 individuals from 20 taxa representing 12 families.
- Observations included a pod of 21 short-finned pilot whales and large schools of blue mackerel (*Scomber australasicus*).
- The waters are dominated by large predators.

Key findings

- Consistently higher abundance of blue sharks (*Prionace glauca*) compared to anywhere else sampled in Western Australia.
- Orca (*Orcinus orca*) were observed at the head of Knob canyon close to the western border of the reserve. Orcas were absent from all other locations surveyed.
- Abundance remained consistent and diversity only slightly decreased between surveys.



■ predators ■ large prey □ small prey



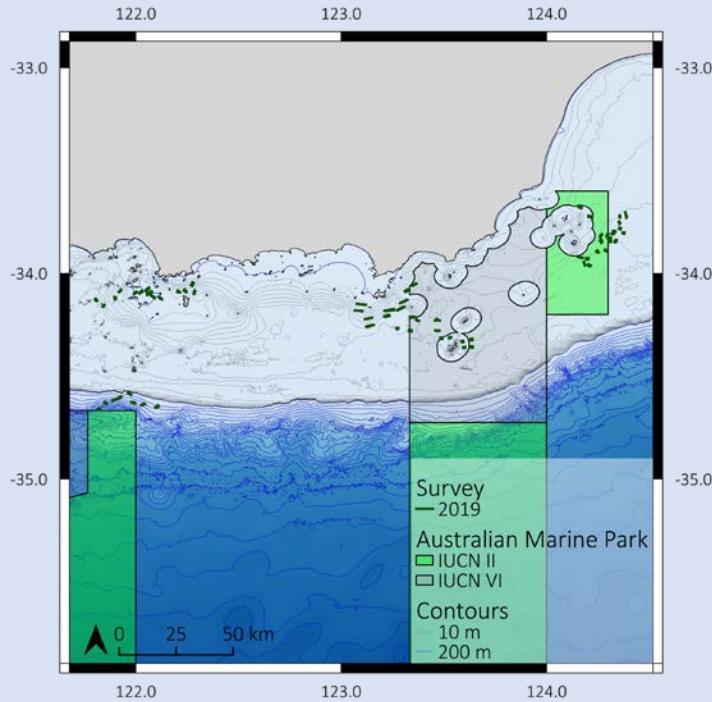
Orcas (*Orcinus orca*)

Why the Bremer Canyon matters

- Cool, nutrient-rich waters are funnelled to the surface by submarine canyons, boosting marine life.
- Seasonal aggregations of orcas and sperm whales (*Physeter microcephalus*) are observed here.
- These waters act as calving grounds of the southern right whale.

Recherche Archipelago

- Close to the main population centre, Esperance, many islands around Cape le Grande are popular targets for recreational fishing and boating activities however the eastern portion of the archipelago is both difficult to access and highly protected.
- The Esperance Canyon head, 80 km offshore, is protected by an IUCN II and IV marine park network.

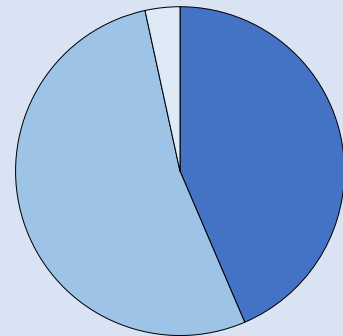


Our surveys

- A single survey was conducted in the summer of 2019.
- 330 samples in waters up to 1,927 metres deep
- 22783 individuals counted from 17 taxa representing 9 families.
- Observations included large schools of oceanic leather jacket (*Nelusetta ayraud*) and three individual great white sharks (*Carcharodon carcharias*).
- The waters are dominated by predators and large prey.

Key findings

- Highest abundance of bronze whalers (*Carcharhinus brachyurus*) and southern Bluefin tuna (*Thunnus maccoyii*) of all locations sampled in Western Australia.
- Juvenile blue sharks (*Prionace glauca*) were found exclusively at the Esperance Canyon head.
- This survey produced a baseline that is highly abundant for future pelagic studies.



■ predators ■ large prey □ small prey



Great white shark (*Carcharodon carcharias*)

Why the Recherche Archipelago matters

- Large areas of no-take marine parks might be having a spillover of large tuna for commercial offshore fisheries in this area.
- The seal pupping areas on rocky outcrops may benefit larger sharks such as the vulnerable great white shark by acting as a rich source of food.