Kia ora, thanks for taking time to hear about my restoration work. First of I need to explain that I'm not a scientist. I am a designer, illustrator and photographer who does science communication. You will see lots of my work tonight as I explain some of the problems and solutions for the Gulf.

I got sucked into restoration work with New Zealand dotterel and learnt a lot about shorebirds. The species I wanted to help the most was the New Zealand fairy tern.

I made these decoys which were used by Forest & Bird to help set up an alternative breeding site for Fairy Tern in the Kiapara harbour

I did not want to test them with Fairy Tern but they did attract White fronted terns the only time I tested them. I think they are still being used but to my knowledge they haven’t helped create the new breeding site yet.

Photo by Shaun Lee

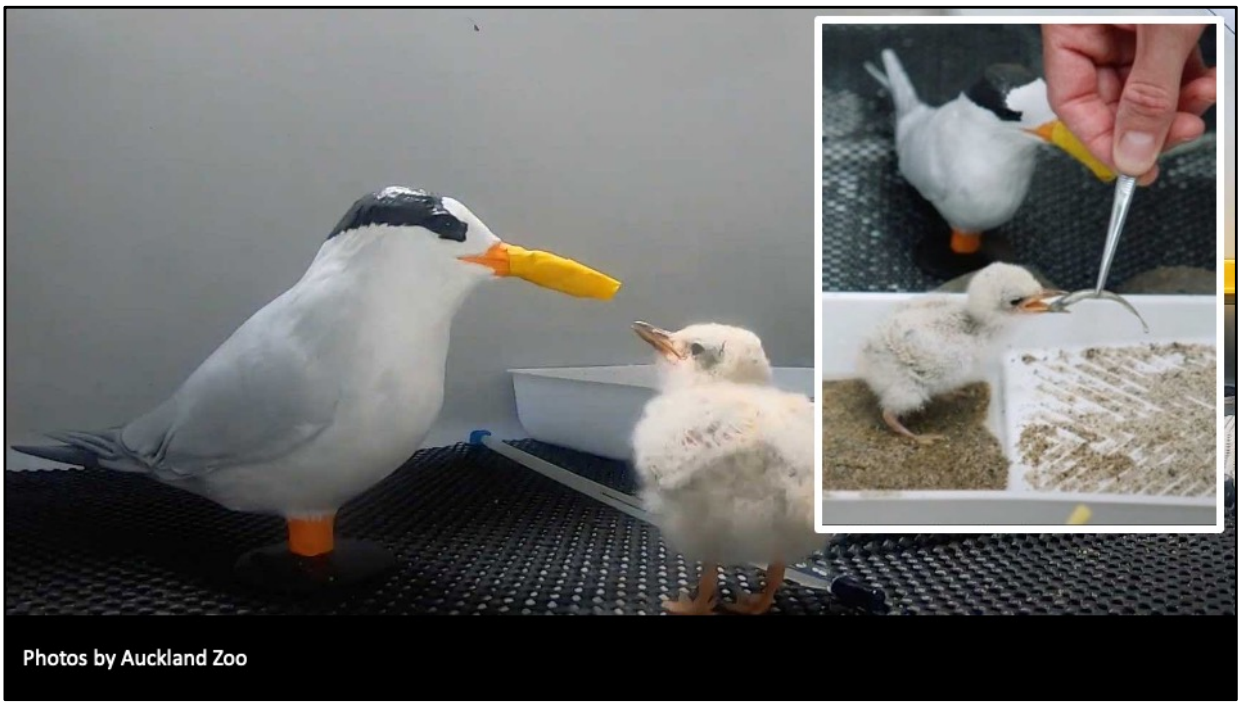
The decoys are also used for advocacy work, these ones are used to teach DOC rangers the difference in breeding plumage.

I have also made some for the Australian Defense Force, the Ozzy fairy tern is very similar looking. The Australian ones have to deal with different stresses tho.

You can see in this image the black parts of the model have melted in the heat!

I was able to fix that and supply new decoys that worked better in field tests.

I have also supplied models for a museum.



And last year they were used to help a captive chick at Auckland Zoo. It was easier to feed the chick with the models present.

The other bird I wanted to help was the Southern New Zealand Dotterel. Its related to the Northern one but much more endangered with just a few hundred left.

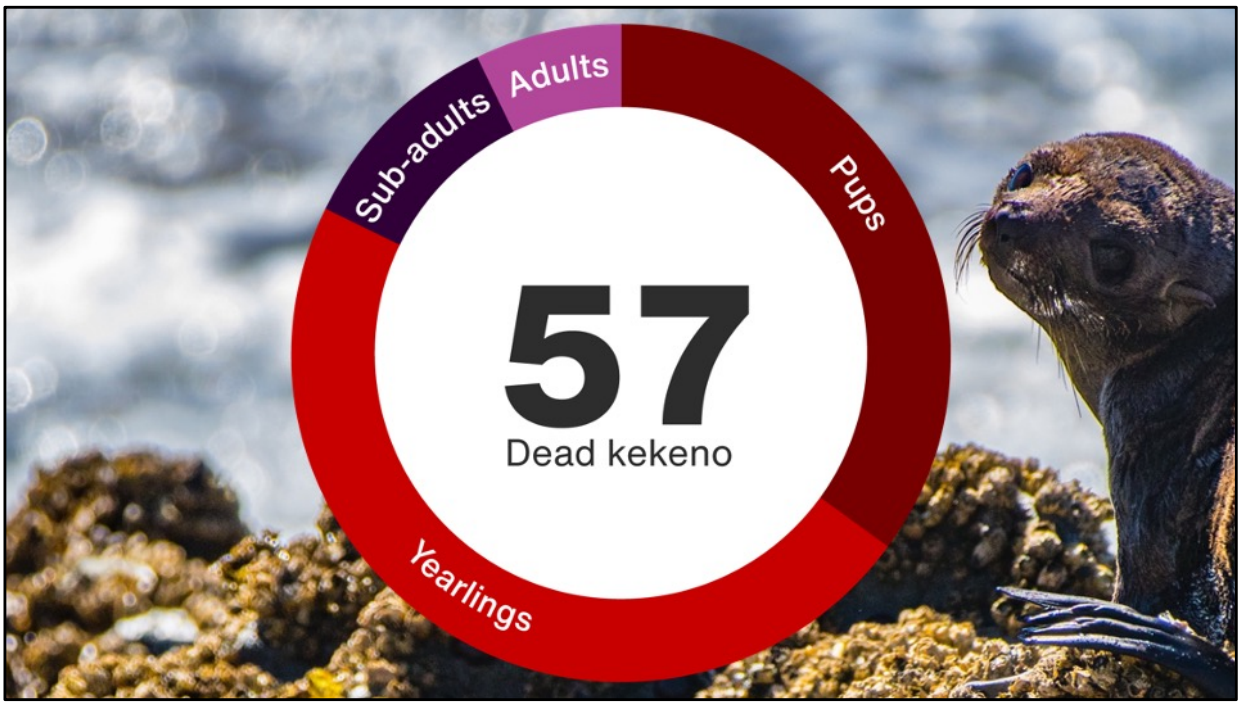
I tested the decoy with my dotterel which worked well, you can see the Southern New Zealand dotterel are about 10% bigger.

This is the flock I made.

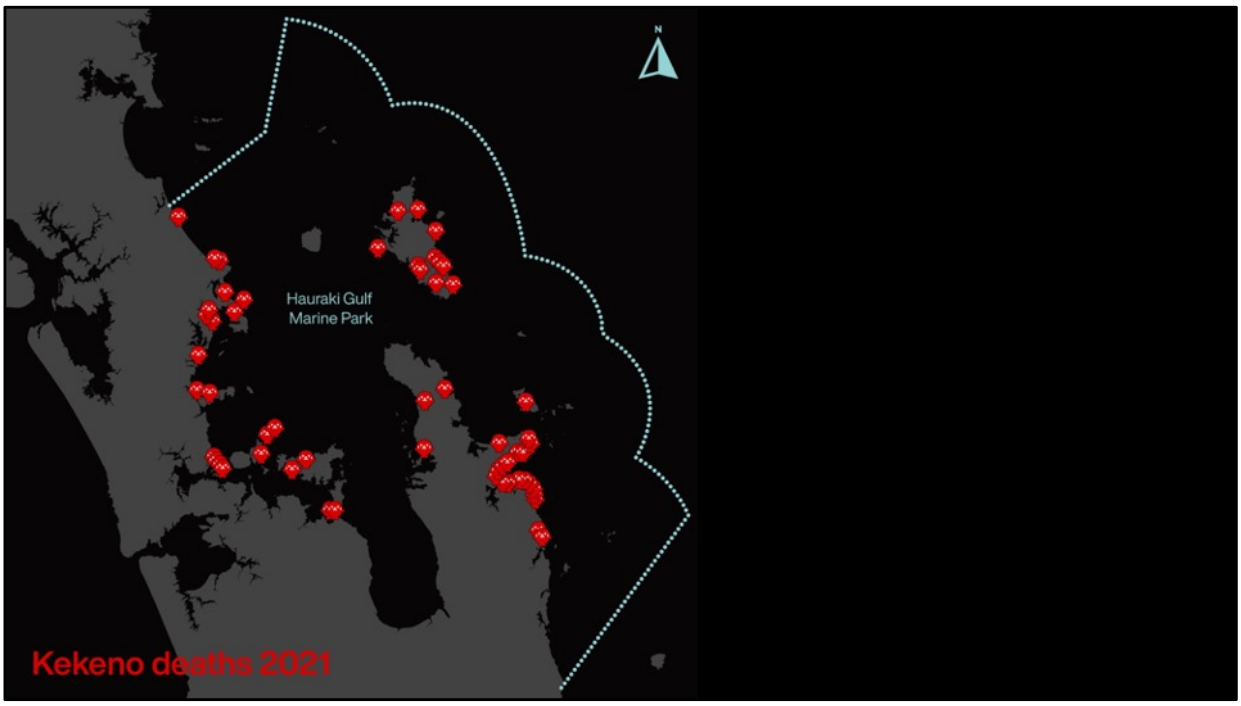
Here is how they were used, you can see the cannon net in the foreground. Unfortunately it was really windy and each real bird was hiding behind a clump of pingao, when the real birds came over to steal the decoys spot and the decoy did not move the real birds got scared and moved away.

These are some red-billed gull decoys I made to help relocate a colony that was having its habitat destroyed by the Americas Cup. I worked with Tim Lovegrove at Auckland Council to create a really robust design.

You can see they worked really well, and we moved the whole colony. It was probably the biggest colony relocation ever done in New Zealand so I am quite pleased with that.



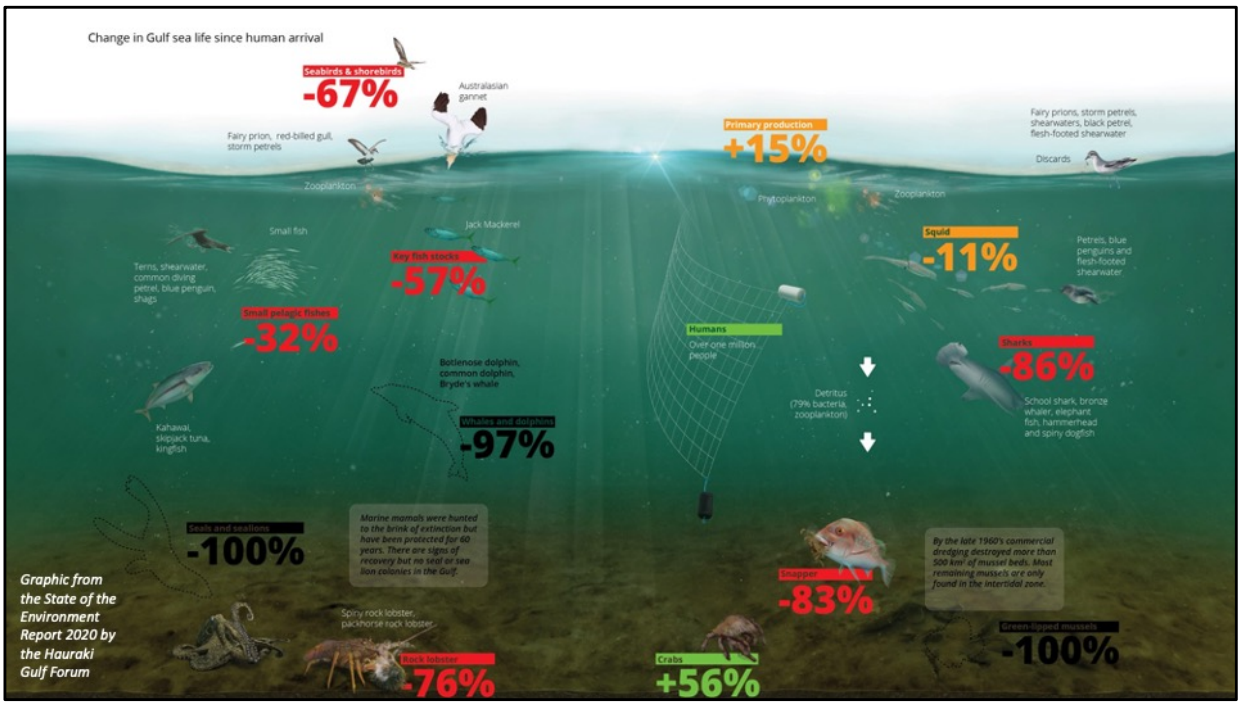
Last year I did the first ever count of dead seals in the Gulf. I'm hoping that just by acknowledging how many seals are dying we can try and get some attention here. So far DOC have been great and I will be asking for 10k for further work in this area next week.



Here is the map. You can see for some reason I had no records in the Firth of Thames which is interesting.

Dead kekeno / fur seal on Simpsons Beach. Photo by Kate Bartels.

We still don’t know what is killing the seals but we now know it's seasonal with a spike in September.



I don’t get paid for doing work like that but I do get paid for making graphics. I worked on the last three State of the Gulf reports and the latest State of our Seabirds report. As you can see the Gulf is in pretty poor shape.

The Fisheries Act 1996

The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring **sustainability**...

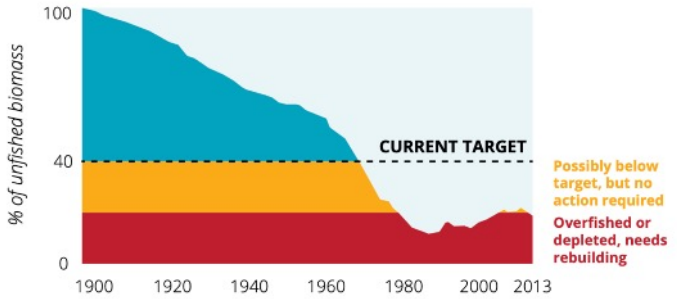


Figure 11: *Modelled tāmure biomass for the Hauraki Gulf/Bay of Plenty substock.*

Graphic from the State of the Environment Report 2020 by the Hauraki Gulf Forum

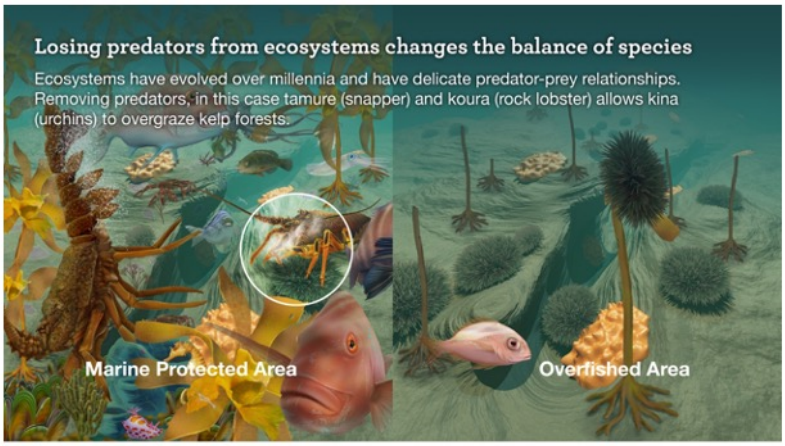
I wont spend long talking about fish but you can see that Fisheries New Zealand has no intention managing fish 'stocks' to the target.

Instead they manage populations to the limit where action is required.

The fisheries Act says they have to sustain the fishery, which they are, just at a very low baseline.

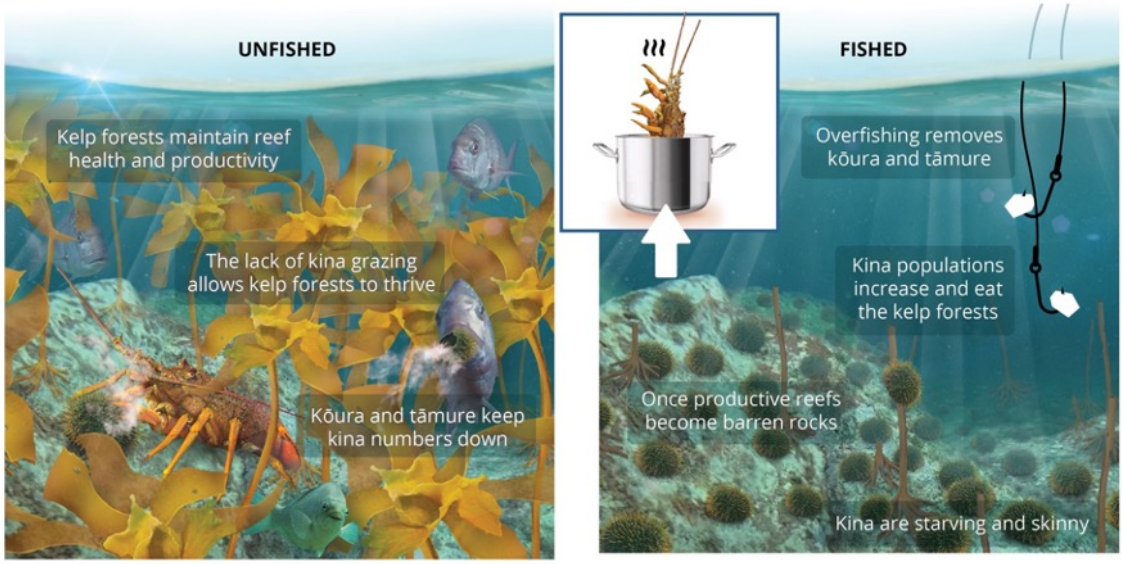
The Fisheries Act 1996

...while managing the **adverse effects** of fishing on the environment.



Department of Conservation
Te Papa Atawbai

The Fisheries Act also says that they will manage the effects of fishing. That means kina barrens, but we all know that's not happening because they manage to quota limits not ecosystem effects.



Kina barrens are created by overfishing

Graphic from the State of the Environment Report 2020 by the Hauraki Gulf Forum

And here is another graphic on kina barrens.

It's worth hammering home that kina in kina barrens are skiny and starving, they are not healthy or happy or tasty.


Kina are not a pest, removing kina treats the symptom, not the cause of a sick reef.
Photo by Shaun Lee

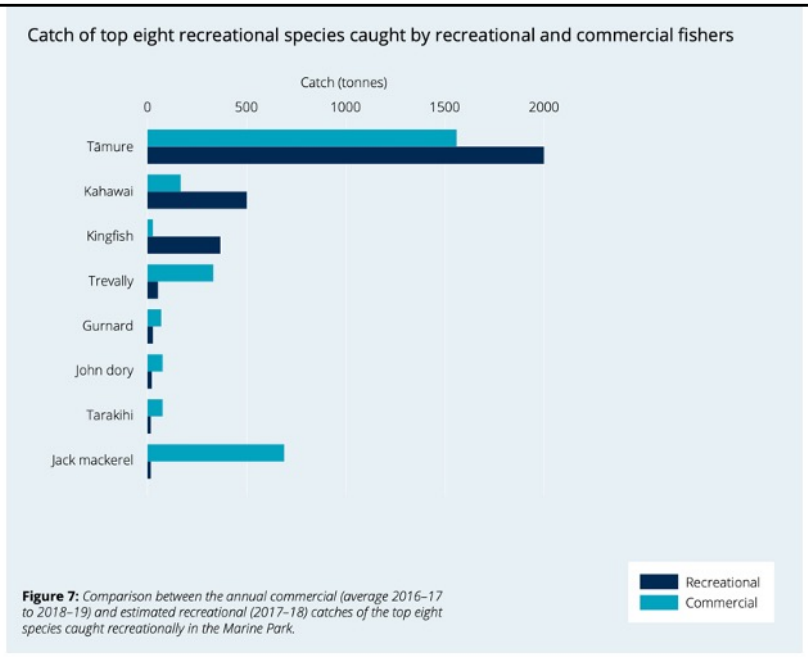
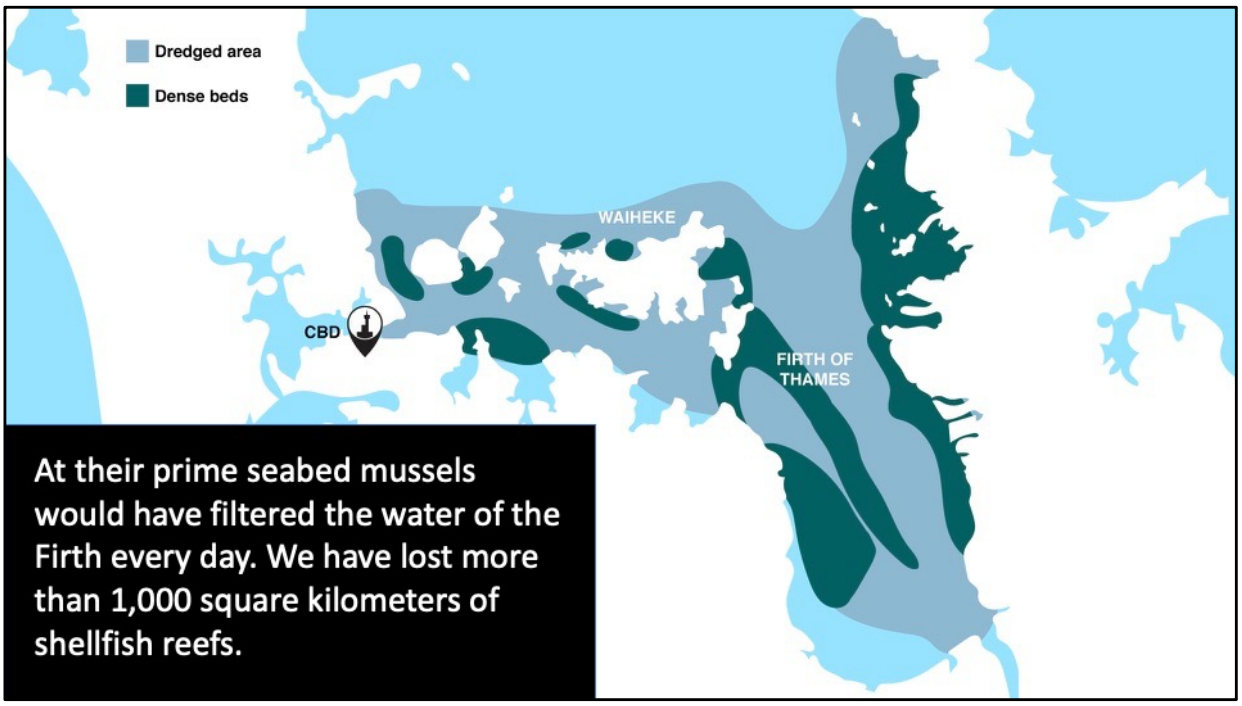


Figure 7: *Comparison between the annual commercial (average 2016–17 to 2018–19) and estimated recreational (2017–18) catches of the top eight species caught recreationally in the Marine Park.*

Graphic from the State of the Environment Report 2020 by the Hauraki Gulf Forum

We know we are eating and exporting too many of the kina predators.

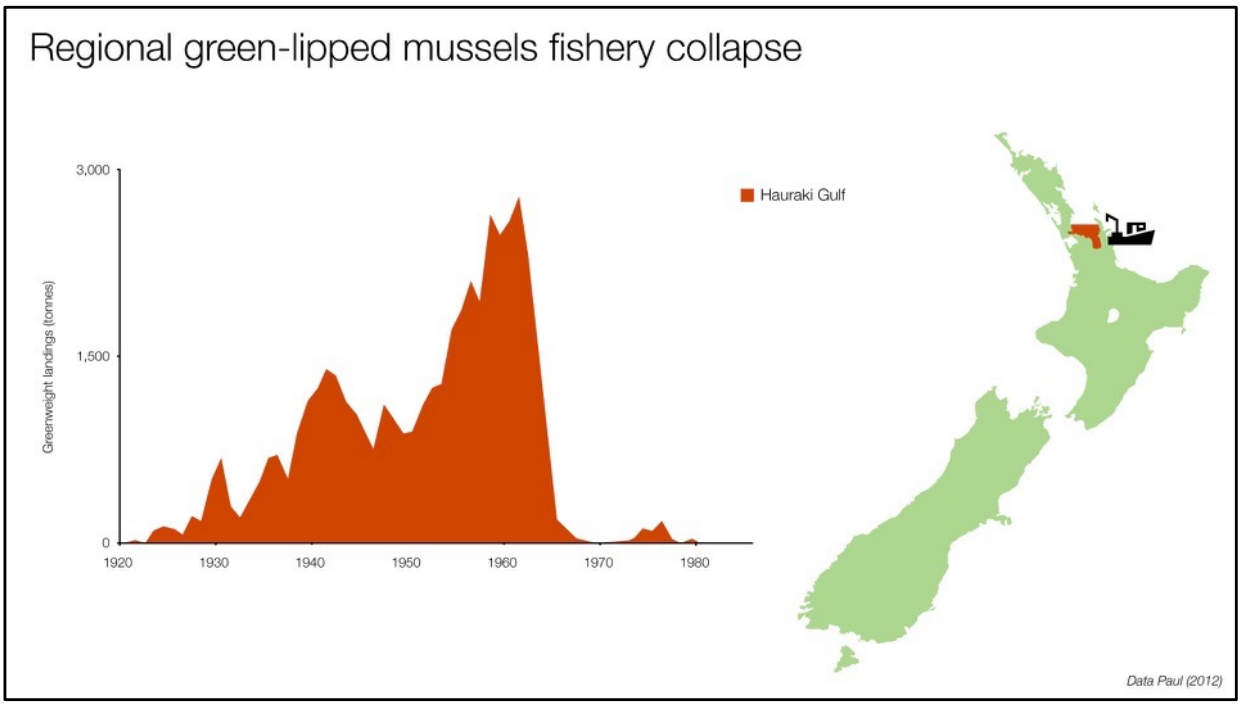
And we cant just blame commercial fisheries anymore, as you can see here, recreational catch of snapper has surpassed commercial.



What we can blame commercial fishing for is the current state of the seafloor.

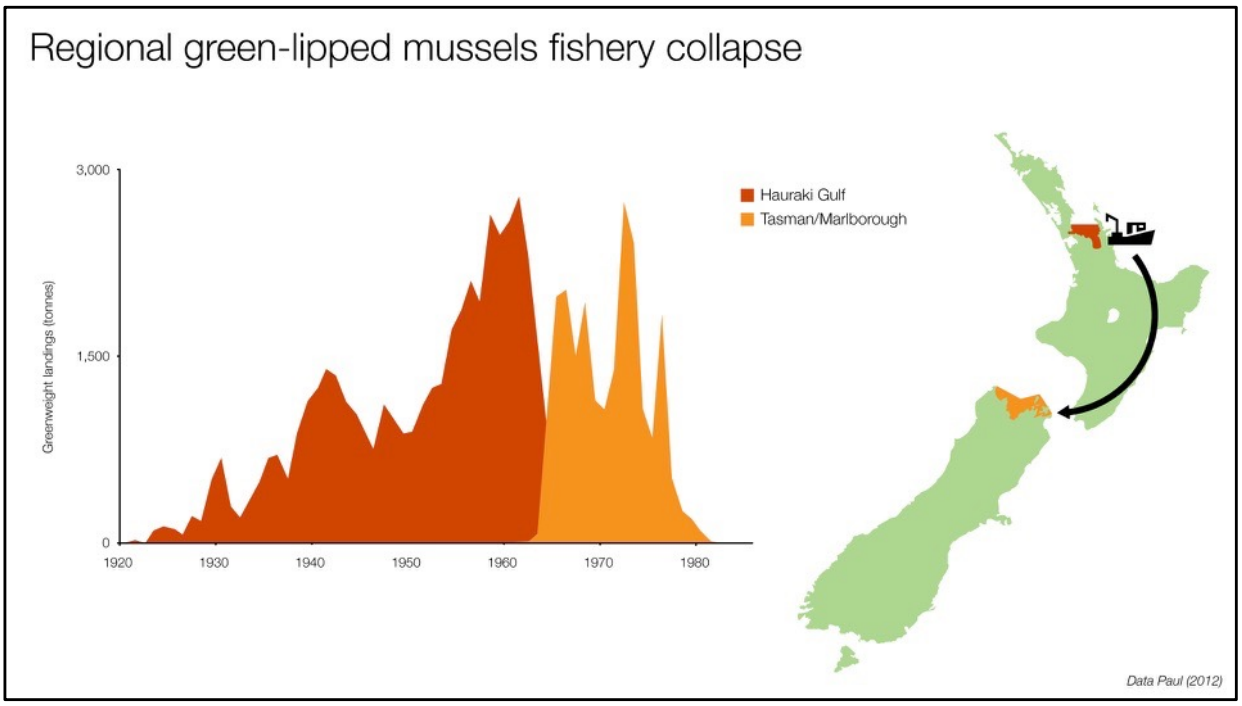
These are dredged areas from early last centaury. The dark areas are more than 1000 square kilometers of shellfish reef, mostly green lipped mussel beds.

They were so extensive they could filter all the water in the Firth of Thames in a single day. The remaining reefs would take two years to filter that much water.

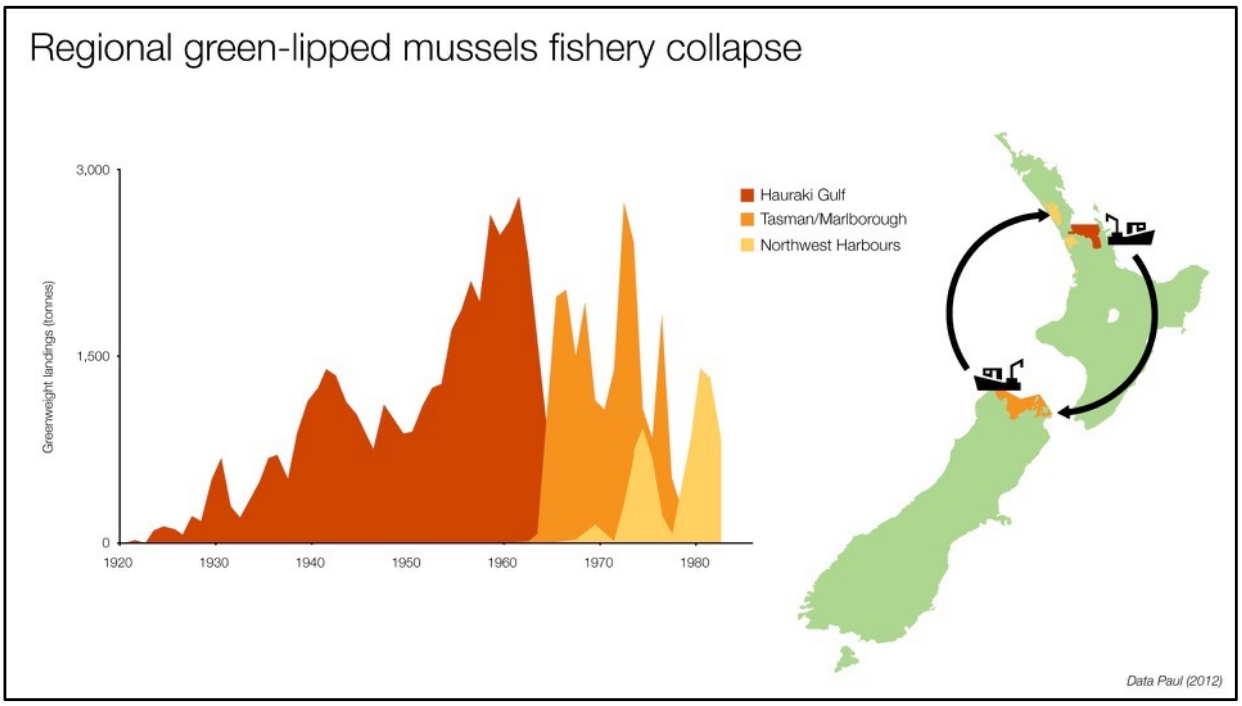


This is what happened to them, these are landings of mussels.

The scientists call this fisheries collapse, my son calls it ecocide.



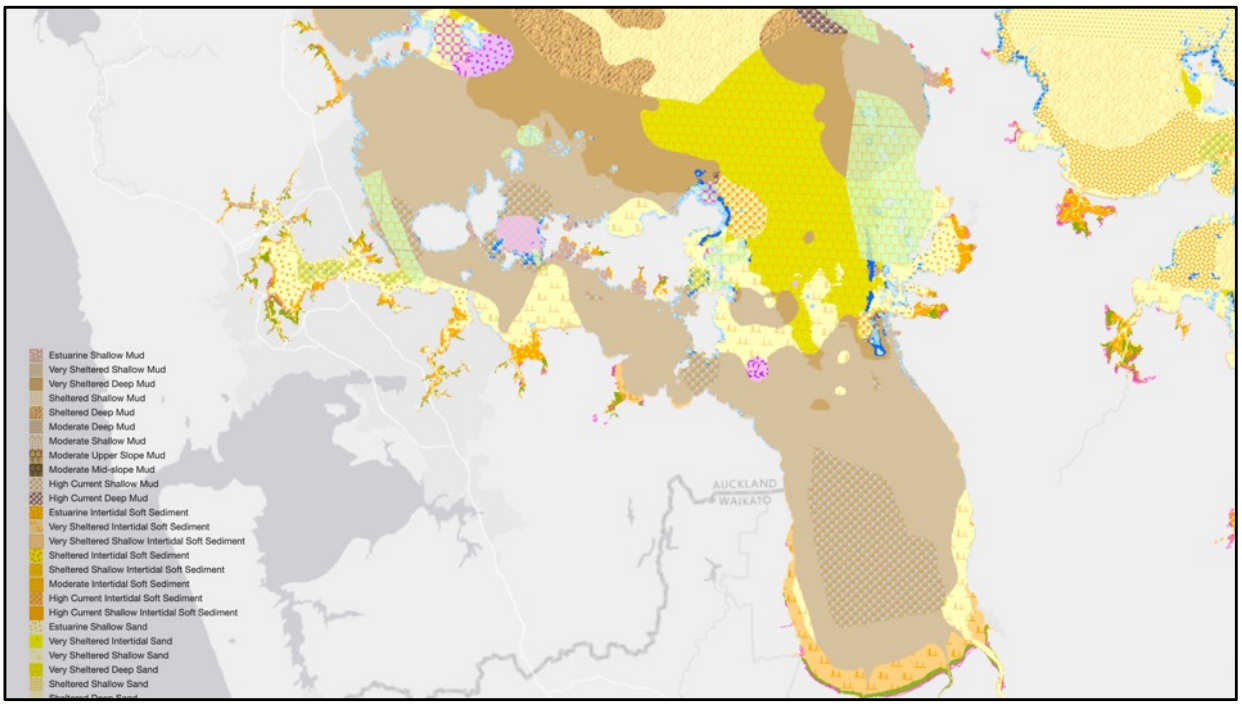
And what's really bad is that after killing the seafloor and knowing it was not growing back they moved south and killed the sounds



Then back up to West Auckland to kill the Manuakau and Kaipara Harbours.

This is what the dredges looked like, you can see the size of the mussels, they are as big as the fishers feet!

So looking at that map again, what's left now



Well it mostly mud, so not only did we destroy the Gulfs ability to clean itself, we also flooded it with sediment.

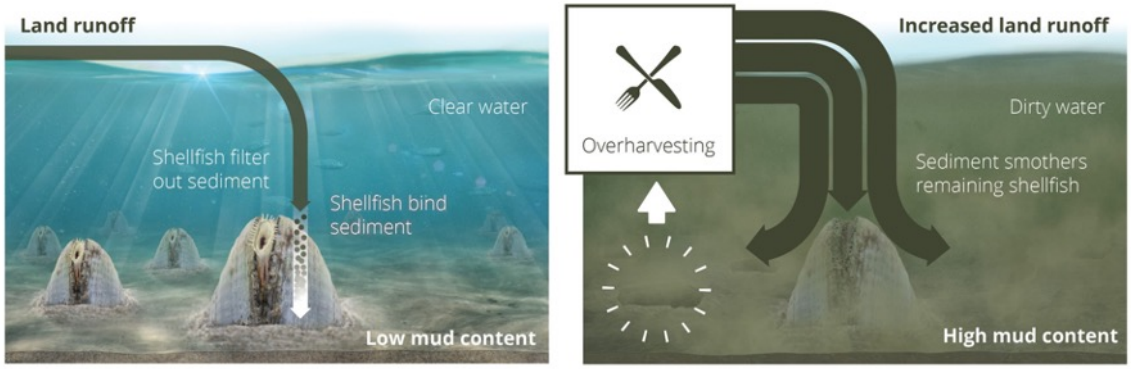
So this is what it looks like now. I took this photo yesterday where the maps indicate there is a beautiful rhodolith bed (which is obviously gone).

This is what I was expecting to find.

Here is a close up of the mud in Okahu Bay.

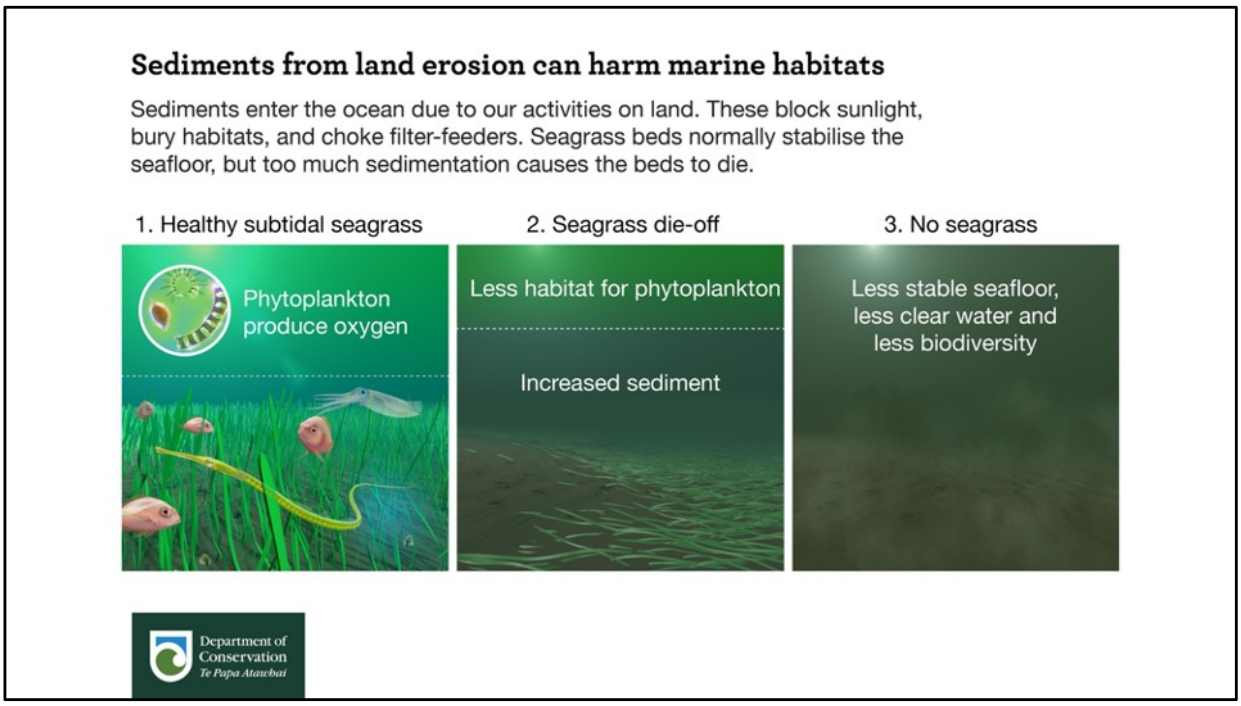
This is a selfie in one of the spots where there used to be mussels, the other diver lasted 30 seconds here but I stayed down to look around. Here you can see my arm up to here in the mud. And if I feel around I can sometimes find shells of those big old mussels.

Here is a photo of one North of Waiheke Island.



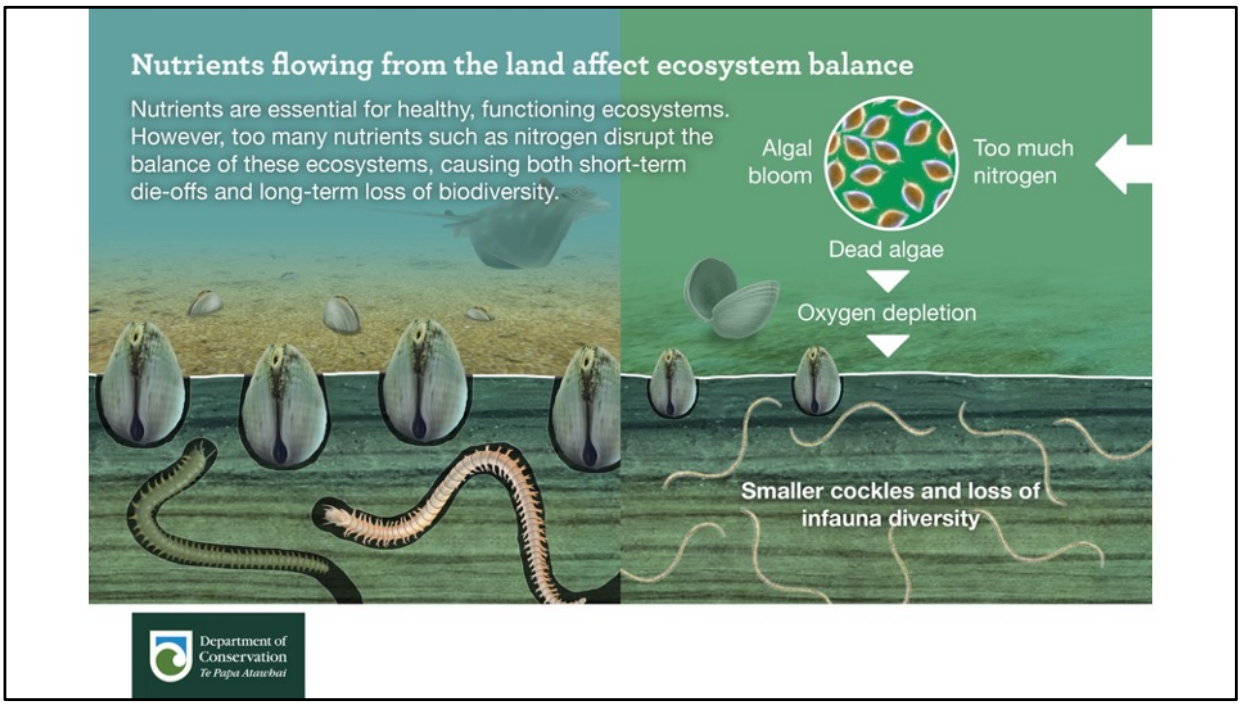
Graphic from the State of the Environment Report 2020 by the Hauraki Gulf Forum

So obviously we have mudified the seafloor. The sediment is coming from the land, it smoothers shellfish, and it can just keep getting resuspended, killing again and again.



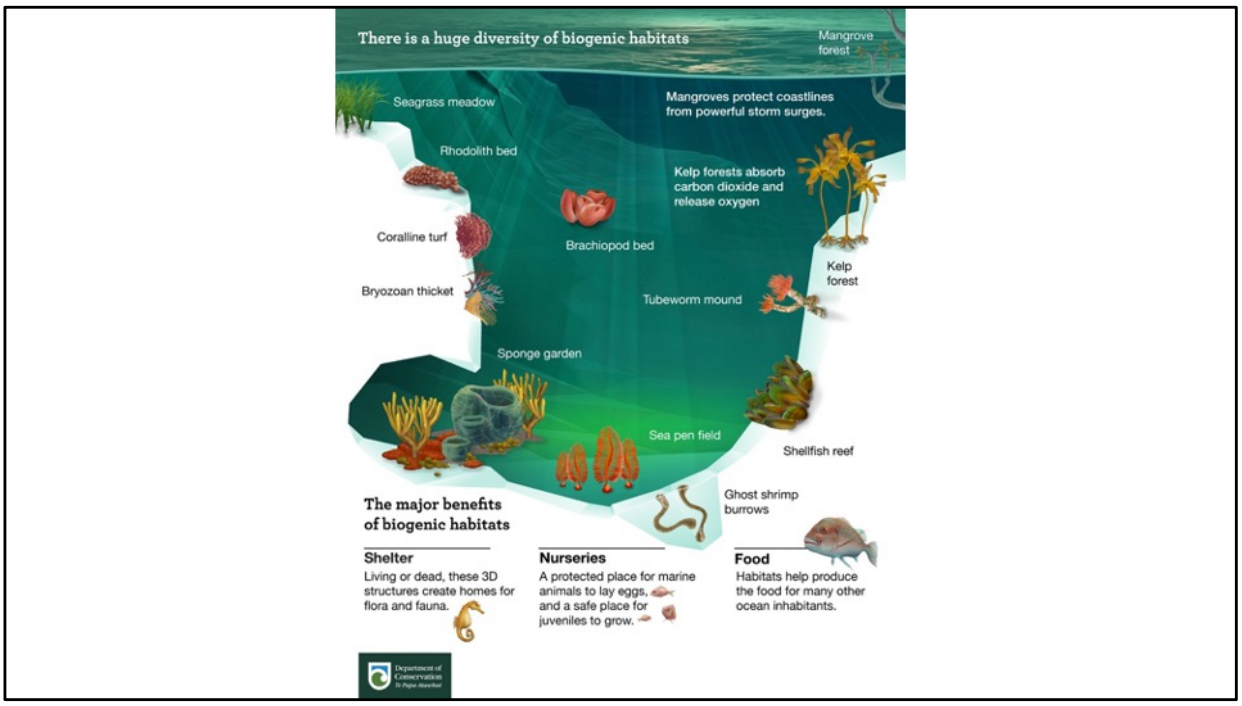
And once the water is dirty, kelp and seagrass die off at depth. Sub-tidal seagrass is functionally extinct in the Gulf.

I went for a dive in a clear spot up North last year and they had Ecklonia growing down deeper than 30m… you can really just get so much more ocean biomass with clearer water.



And I cant talk about sediment with talking about nutrients, you can have too much of a good thing.

There is nothing wrong with lots algae in the water, but when there is a n algal bloom all the algae falls to the bottom of the ocean where bacteria consume it and use up all the oxygen which kills sea life.



There are two kinds of habitat forming life that can grow on the seafloor, your either a photosynthesizing plant or a filter feeding animal.

Lets have a look at just a few of the main filter feeding animals.


Scallop beds
Photo by Javier Couper


Mussel beds
Photo by Shaun Lee


Tubeworm mounds
Photo by Shaun Lee

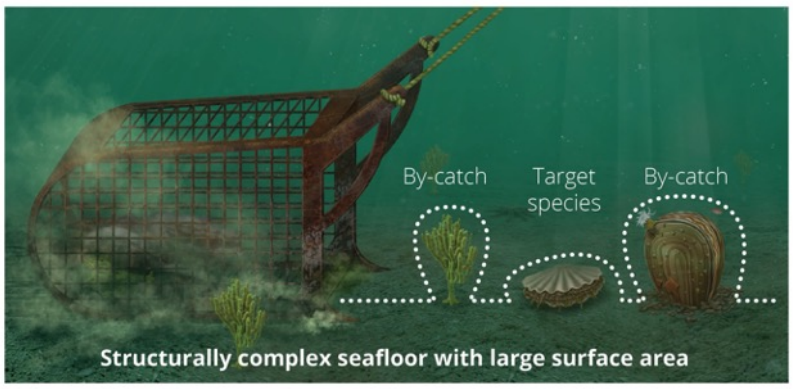

(d)
Horse mussel beds
Photo by NIWA in 1996

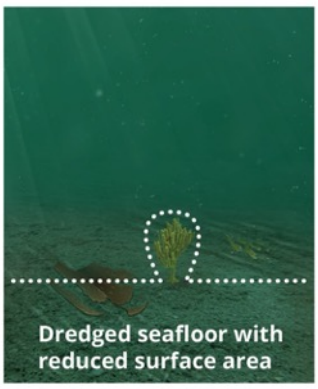

Dog cockle beds
Photo by Shaun Lee


Corals
Photo by Shaun Lee


Sponge gardens
Photo by Shaun Lee

Bryozoans, Sea pens & Brachiopods





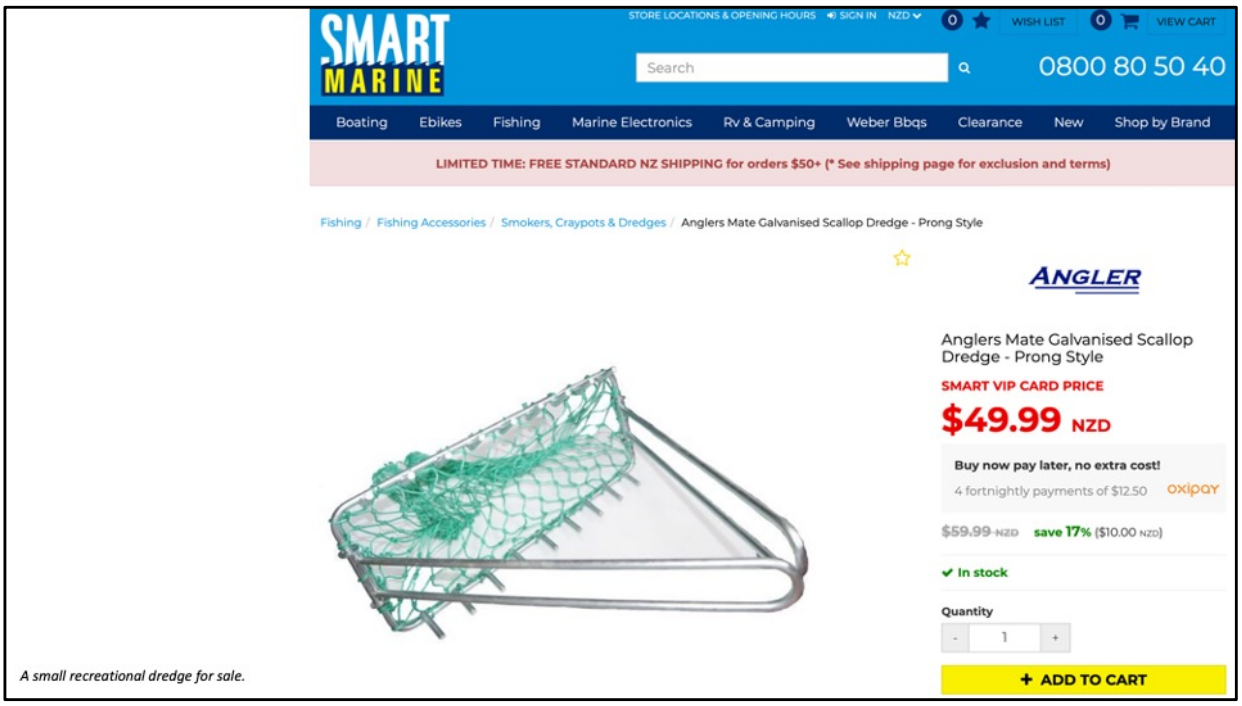
Dredging indiscriminately destroys life attached to the seafloor

Graphic from the State of the Environment Report 2020 by the Hauraki Gulf Forum

Bottom impact fishing (dredging, bottom trawling and Danish seining) does the most damage to non-target species.

By letting fishers continue to scrape the seafloor we are letting them smash down beautiful complex ecosystems that may take hundreds of years to grow back.

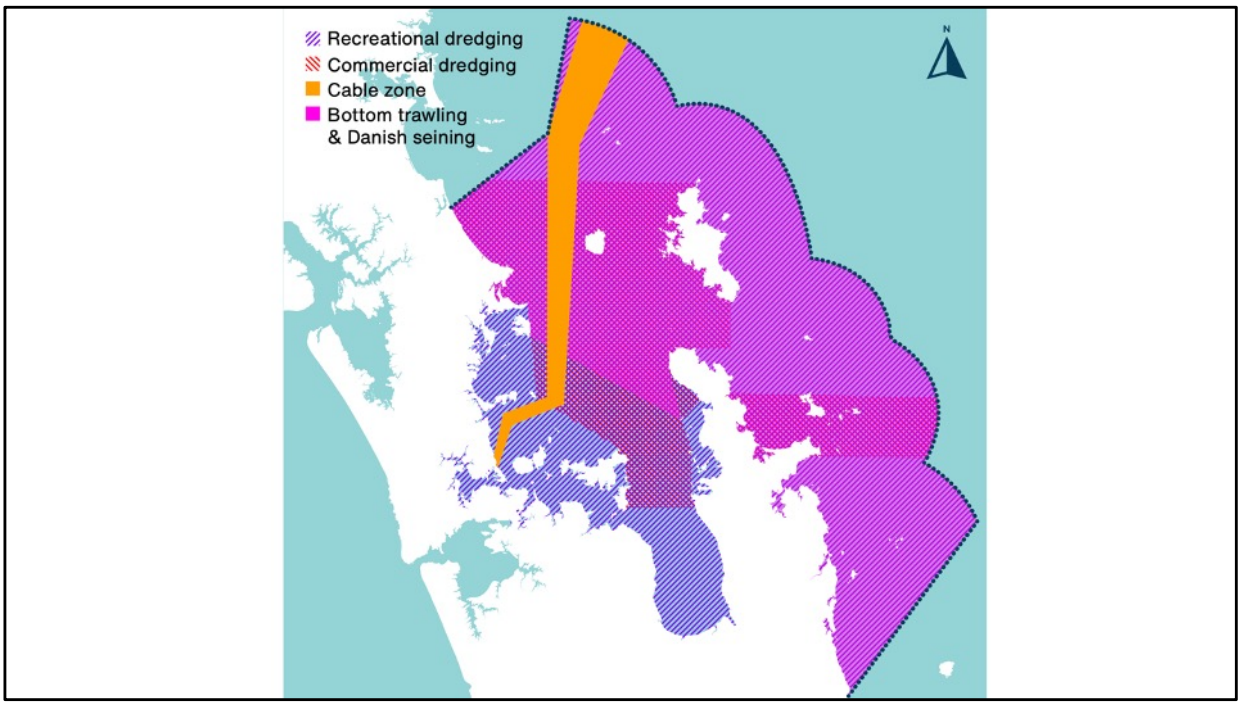
Habitat that's not killed by bottom impact fishing is left vulnerable to predation and disease.



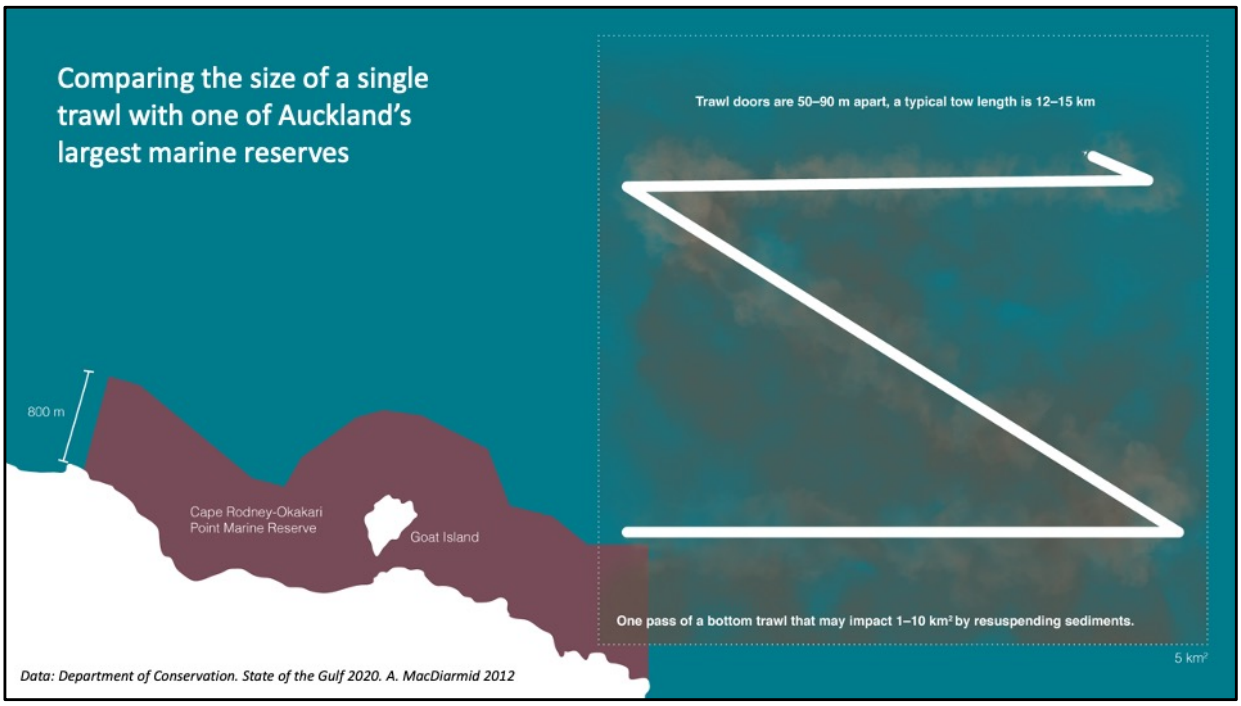
Recreational dredging is going out of fashion as fishers get wise to the impacts. Most Auckland fishing stores have now stopped selling little dredges.

A trawl door from New Zealand retailer hampidjan.co.nz *"The trawldoors will last for a long time even working the worst rock bottom"* This one weighs seven tons.

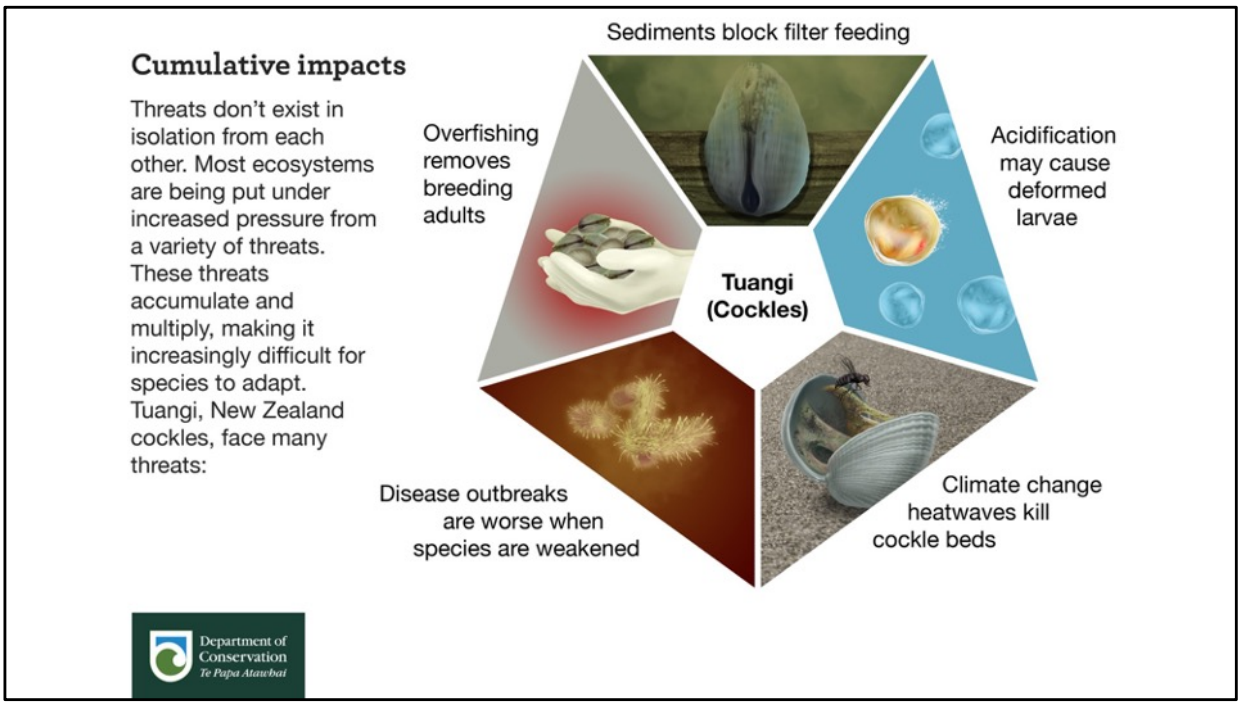
You can still buy commercial bottom impact gear, here is a trawl door that weighs seven tonnes.



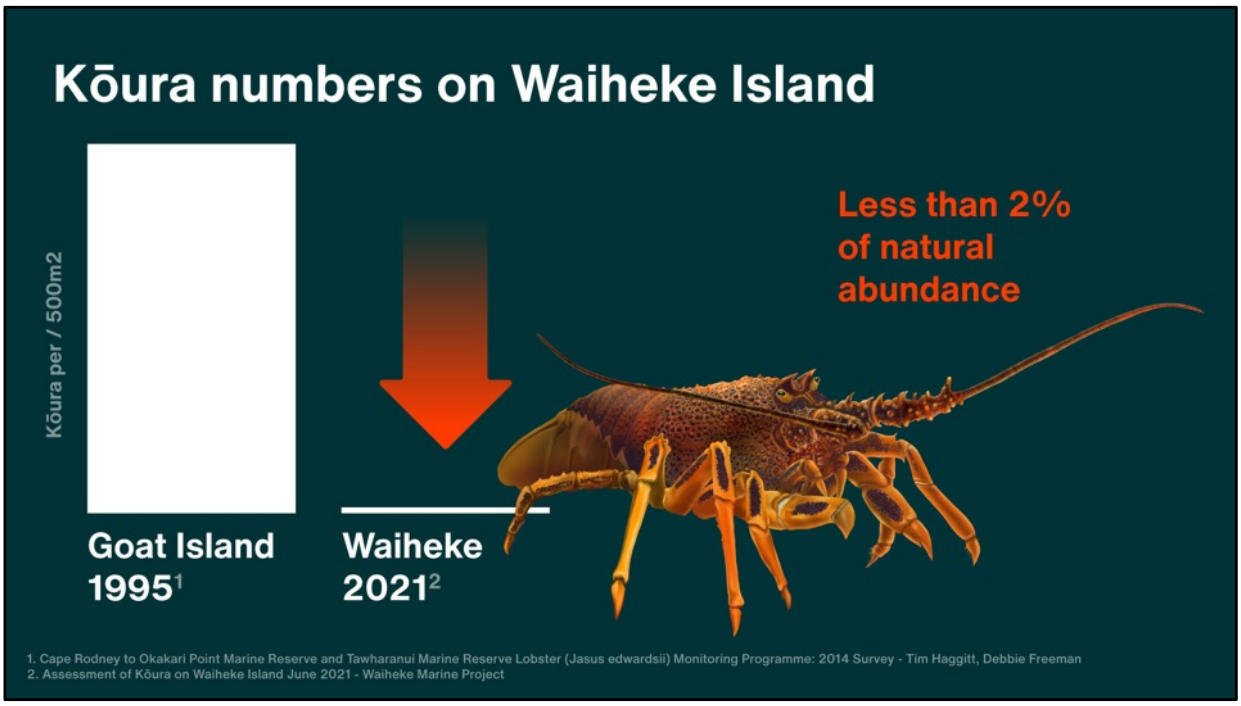
These are the areas you can dredge in the Gulf, you can see the cable zones are the best seafloor protection we have.



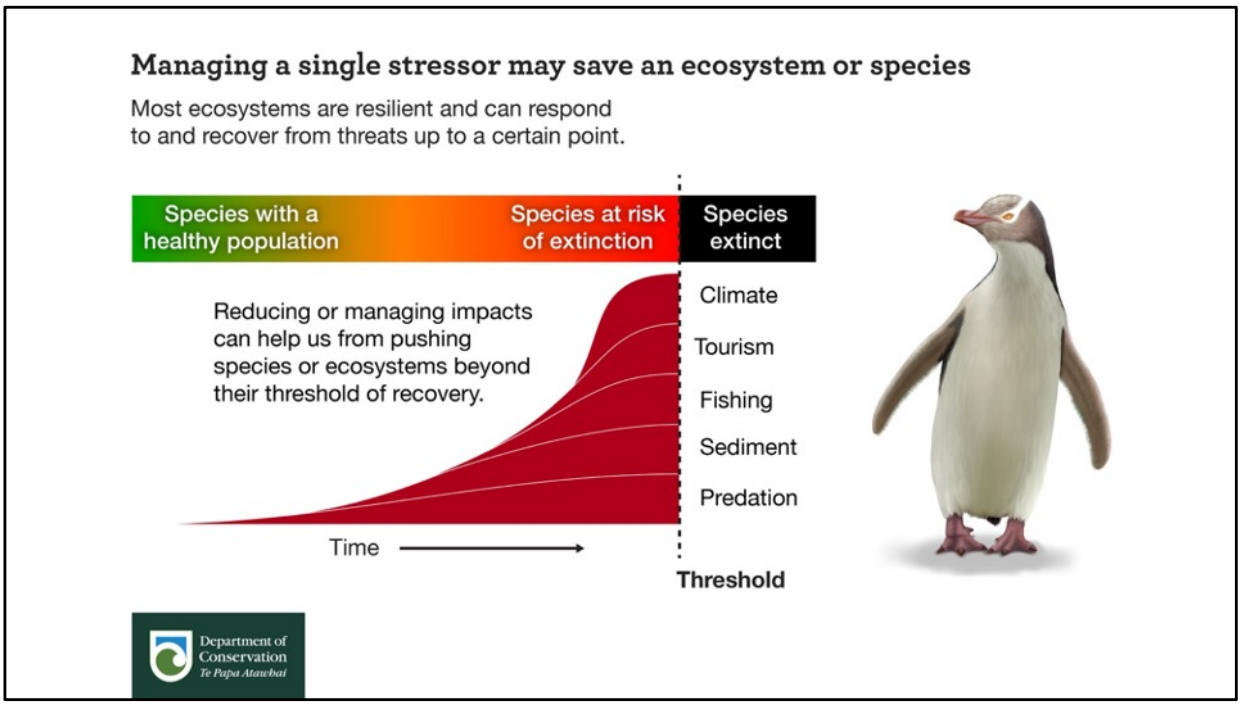
Here is an illustration that compares the scale of a single trawl with one of Auckland's largest marine reserves. Dragging gear across the seafloor kills more than just the sea life it smashes because it also re-suspends sediments. So if you're a filter feeding animal living nearby, the sediments choke you and you die and if you're a photosynthesising plant you get smothered and die. So the cumulative effects of just a few machines are massive.



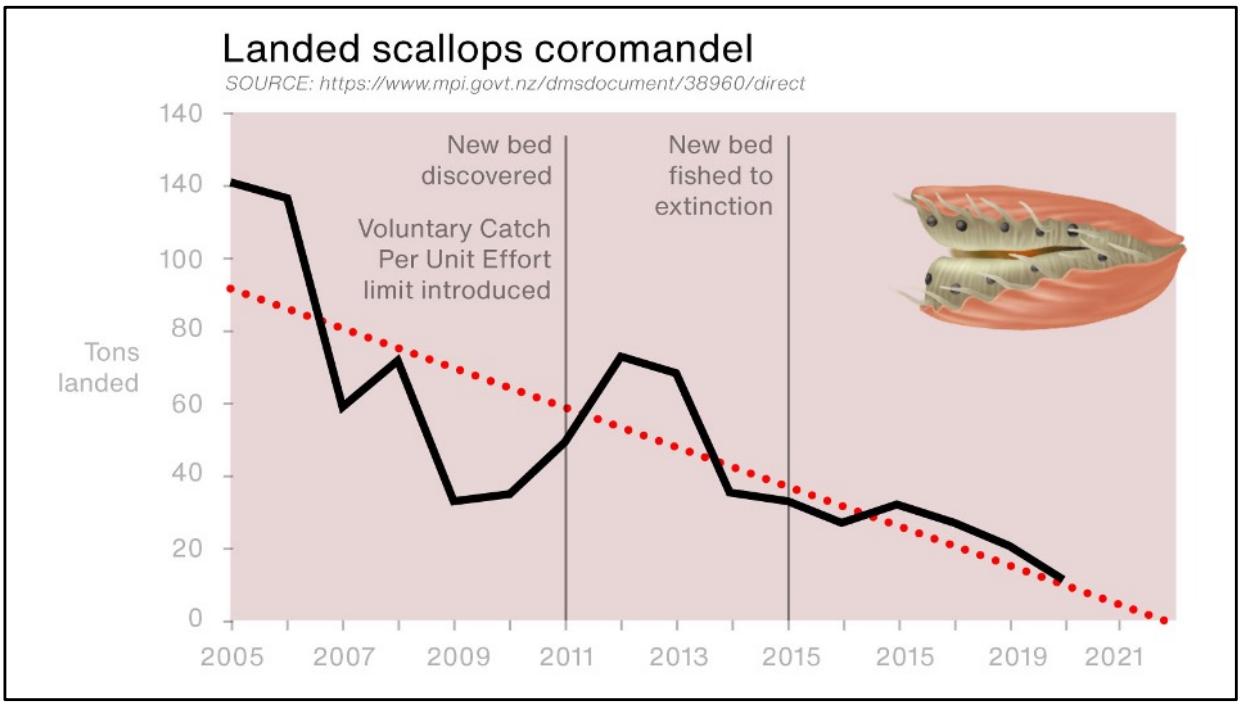
Bottom impact fishing and mudification are not the only impacts, there are lots of other issues, ocean acidification really scares me.



So we are seeing local extinctions everywhere in the Gulf and also functional extinction which is where there is not enough of a species to do the job it has in the ecosystem. Like eating kina.



But every population has a threshold from where its either growing of shrinking, sometimes it only takes the removal of one threat to tip a population back into growth.



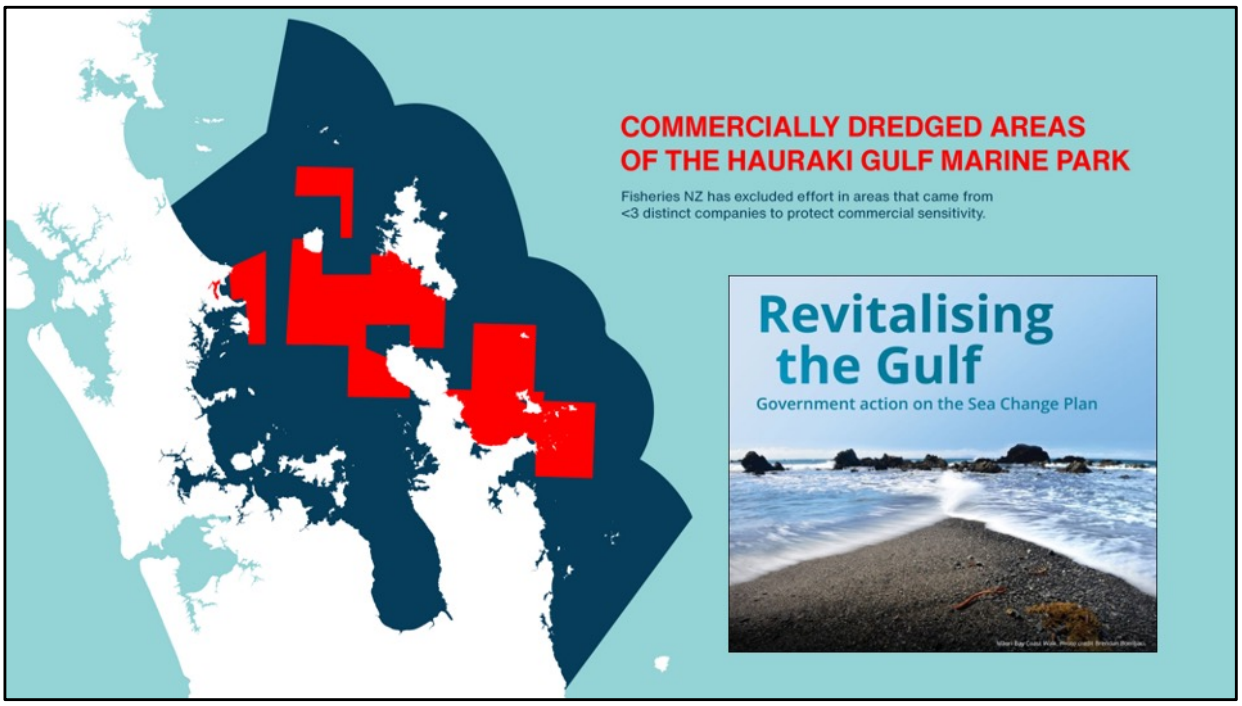
This doesn’t look like sustainable management to me, this looks like the mussel ecocide graph

c) By 2018 ban the use of scallop dredges in areas less than 20m deep within the Hauraki Gulf Marine Park.

d) By 2025, prohibit the use of scallop dredges within the entire Hauraki Gulf Marine Park.

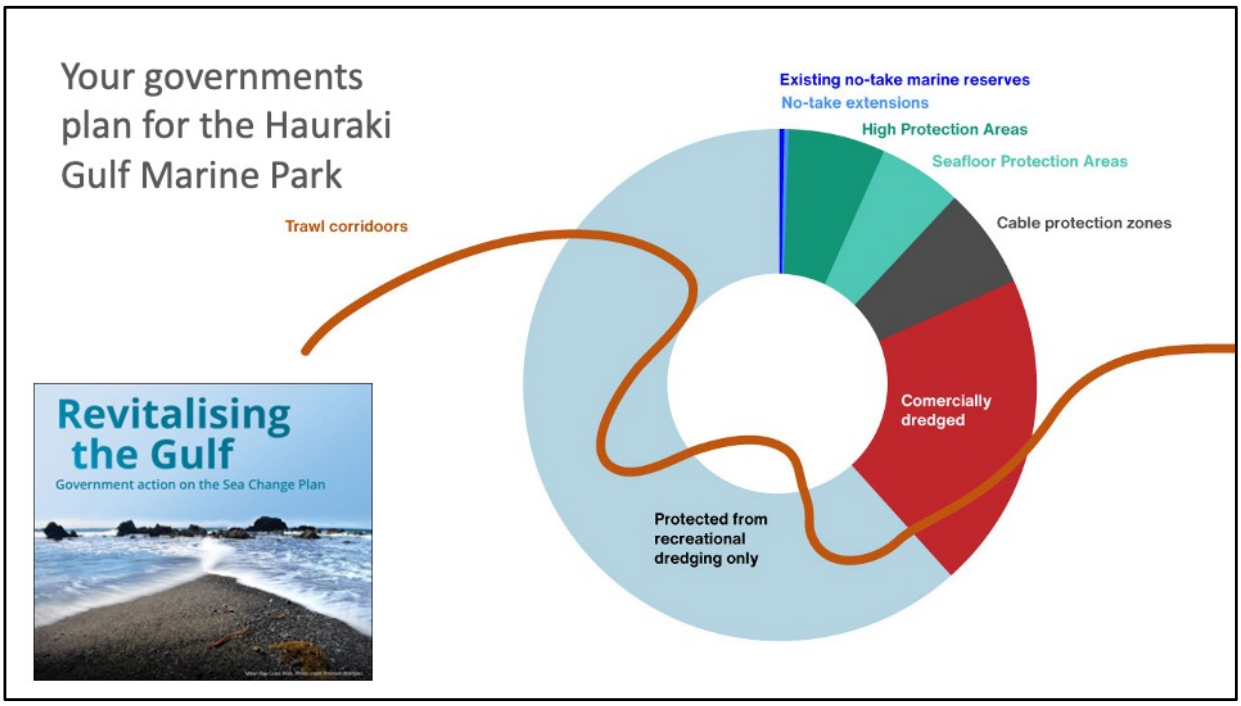
Sea Change suggested a phased approach to transition commercial and recreational scallop dredging out of the Hauraki Gulf Marine Park. It included a timeline.

The governments response is rubbish, all they propose is freezing the footprint, but even that plan is compromised by a plan to opening areas to dredging if they find new beds.

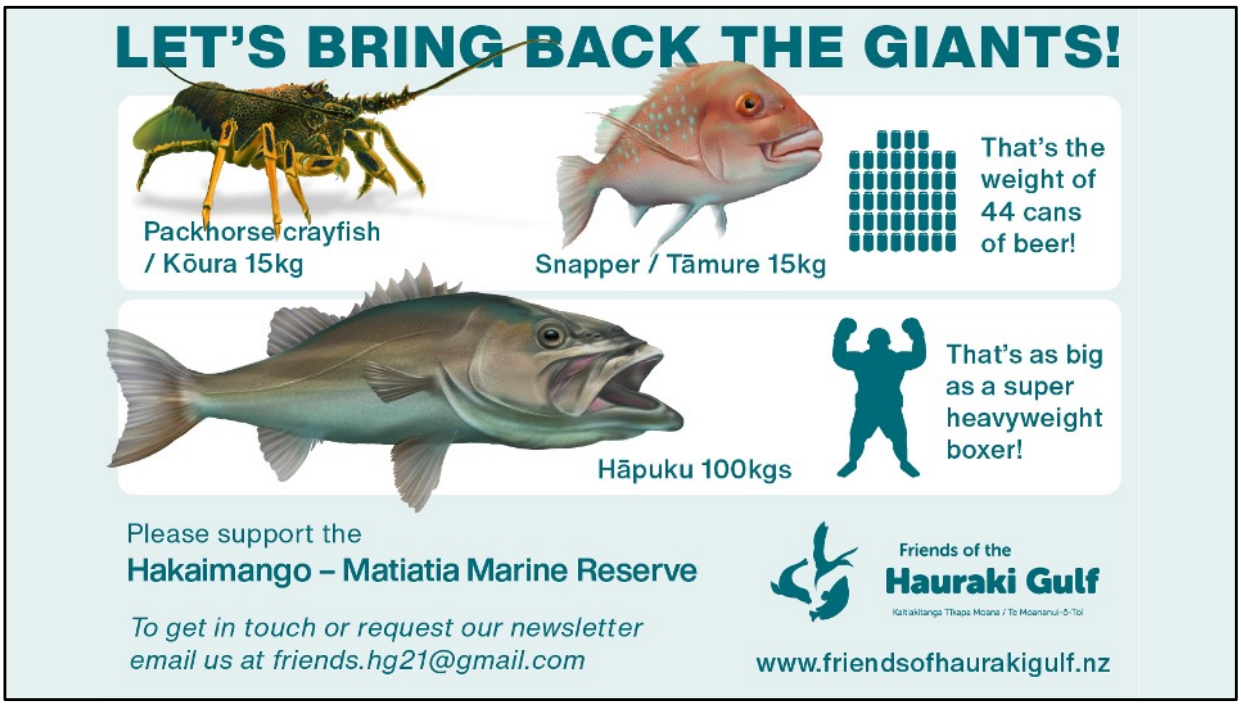


This is the current dredging footprint, its not in the plan I had to OIA to get it.

So lots of cool stuff that’s gone, and we wont get it back without doing restoration.



This is what our marine spatial plan looks like, after five years of waiting there is still stuff all no-take marine protection and no plan for bottom trawling



The government has been working on a new Marine Reserves act for maybe 20 years but nothing is happening. But that's not stopping this group on Waiheke, I'm helping them create the biggest ever marine reserve in the Gulf and we need your help.

If there is one thing you do after tonight's talk please go and make a submission supporting the marine reserve. You don’t have to say anything fancy just tell DOC why you would like to see it happen.

https://blog.shaunlee.co.nz/why-im-supporting-the-waiheke-marine-reserve-proposal/

16 reasons I'm supporting the Hākaimangō – Matiatia Marine Reserve (Northwest Waiheke Island)

1. **We don't have enough protection.** A tiny 0.33% of the Hauraki Gulf Marine Park (HGMP) is fully protected from fishing, the governments Revitalising the Gulf plan will hopefully increase this area to 0.575% by late 2024 (Revitalising the Gulf 2021). The other forms of protection suggested in the plan all involve some kind of fishing. We need places where with intact ecosystems where our taonga and heritage don't get eaten. The proposed Hākaimangō – Matiatia Marine Reserve is a significant addition at 0.195% of the HGMP. All the proposed protections need to be actioned as soon as possible to reverse the decline of biodiversity and abundance in the HGMP (State of our Gulf 2020). If all the proposals are accepted only 6.7% of the HGMP will be protected from fishing (excluding cable zones which are not designed to protect biodiversity). We will need many more proposals to meet the Hauraki Gulf Forums goal of 30% protected.

2. **It's long term.** Rāhui enacted through section 186 of the Fisheries Act only last for two years. This is not the right tool to use to sustain large breeding animals live for more than 50years. Tāmure / Snapper can live to at least 60 years of age (Parsons et. al. 2014).

3. **It's big.** For decades scientists have been telling us that our marine reserves are not big enough to protect wildlife from the edge effect. If approved at 2,350 ha Hākaimangō – Matiatia would be the largest marine reserve in the HGMP

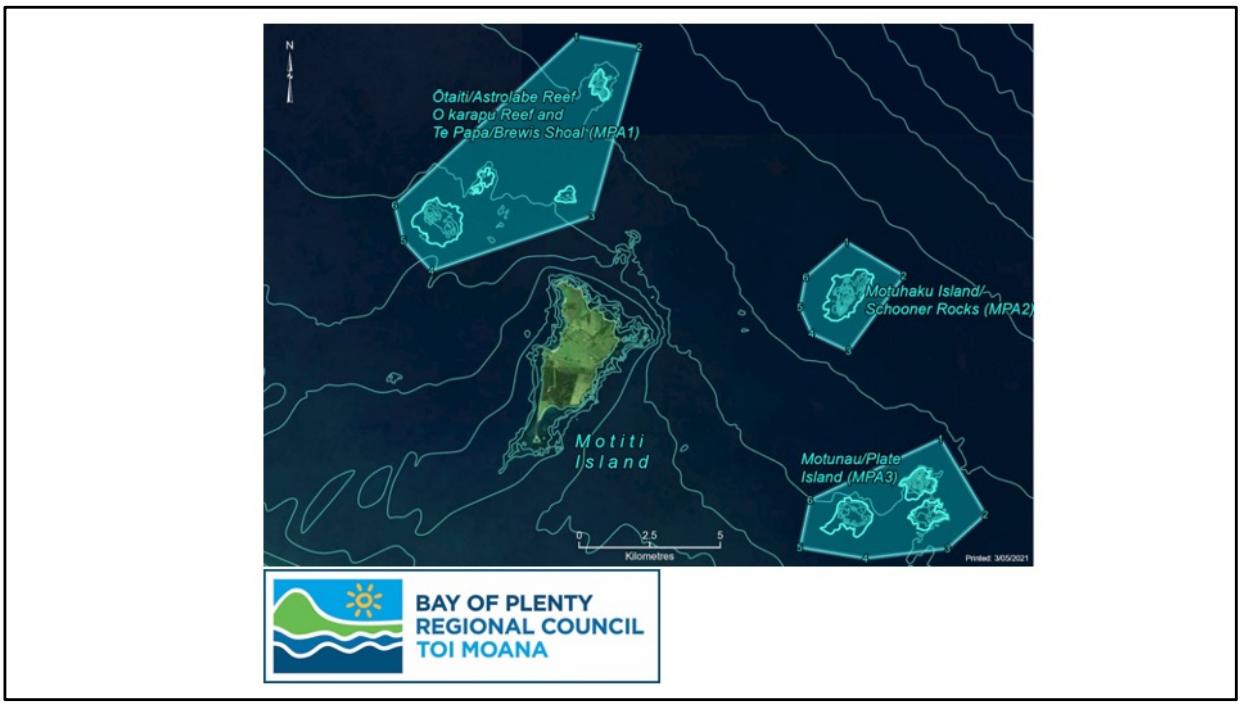
And if you have any concerns just mention them too. I have made my submission public, I have a concern that there is not enough support from iwi for the proposal. That seems to be getting resolved which is great.

There is another reason for hope. In 2011 the Rena crashed into the Astroblabe reef. There were lots of contaminants in the water and fishing was closed. The fish life increase fast and the reef was arguably healthier than it had been in decades.

MPI decided to open it up to fishing again, despite calls to keep the protection, this was led the local hapu and supported by great scientists like Roger Grace.

But MPI opened it up anyway and everything was killed.

So locals took MPI and Council to court after court until they got it protected again.



The Court of Apeal decided that the RMA and the Fisheries Act look at each other, in what is being called the Motiti decision.

Since late 2019 Auckland Council has had new responsibilities to protect indigenous biodiversity in the marine environment. They can use the Resource Management Act to control the effects of fishing provided you do not do so for Fisheries Act purposes. So if you value a fishing resource for more than just fishing, if you believe you want to preserve it for another reason, (including scientific, cultural and aesthetic values) then they can do this.

Auckland Council's consents team is applying the Motiti decision. The first thing they applied it to was mussel reef restoration. No one is now allowed to restore Auckland’s seafloor from fishing damage without a resource consent. But Auckland Council is letting anyone go smash it up in the name of fishing.

They did it in Jones Bay lagoon in 2020. There are no MPI logos on these signs.

when I asked them about it they said this…

Draft Regional Parks Management Plan

Auckland's 28 regional parks cover 41,000 hectares of public space. They are valued for their natural and heritage qualities and for the many wonderful experiences they offer us to connect to natural places.

The Regional Parks Management Plan is the council's plan that guides our

management of these parks to both pro
enjoy the parks. It was last published in 2
updated management plan to guide us o

We are now pleased to present the Draf
and look forward to your submissions. Pl
4 March 2022.

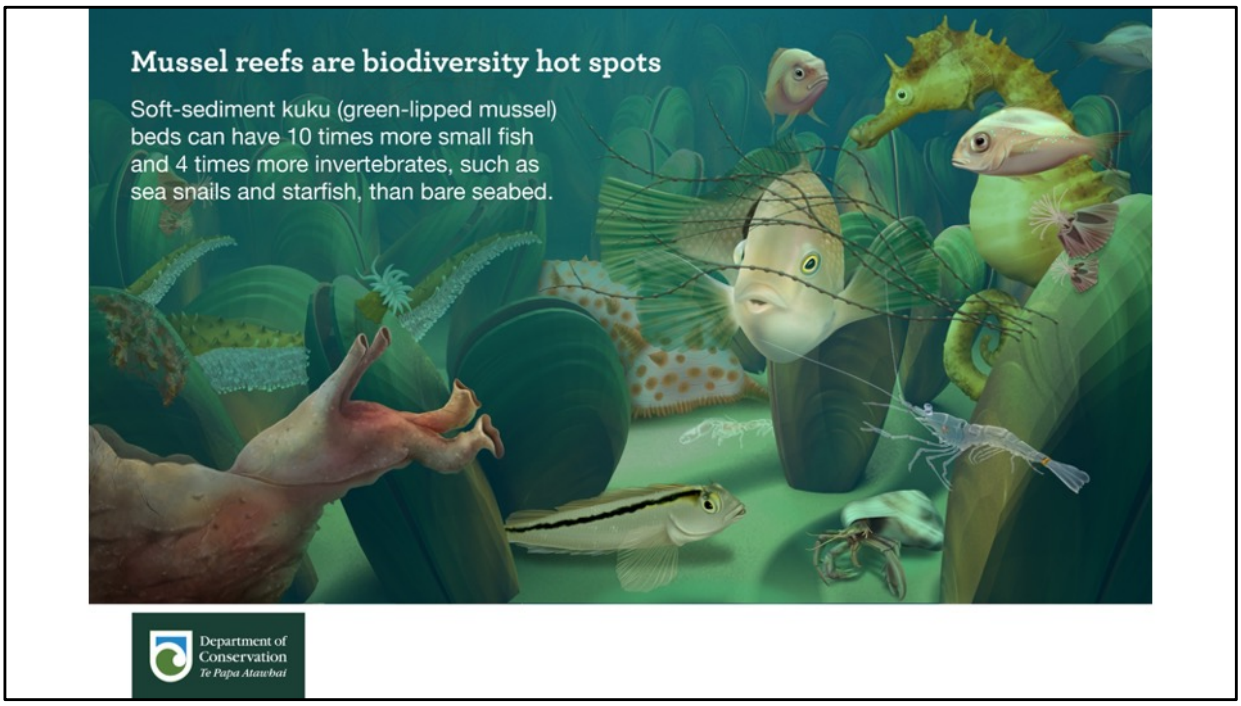
Set netting

The Ministry of Fisheries is responsible for set netting regulations. The council believes that this form of indiscriminate fishing is inappropriate in coastal waters adjoining regional parks, where the intention is to protect and enhance the natural values. We continue to intend to work with the Ministry of Fisheries to encourage their development of regulations that ban set netting in front of regional parks. We intend to discourage this activity until such time as regulations are developed, by not allowing set netters to use the park to access coastal areas.

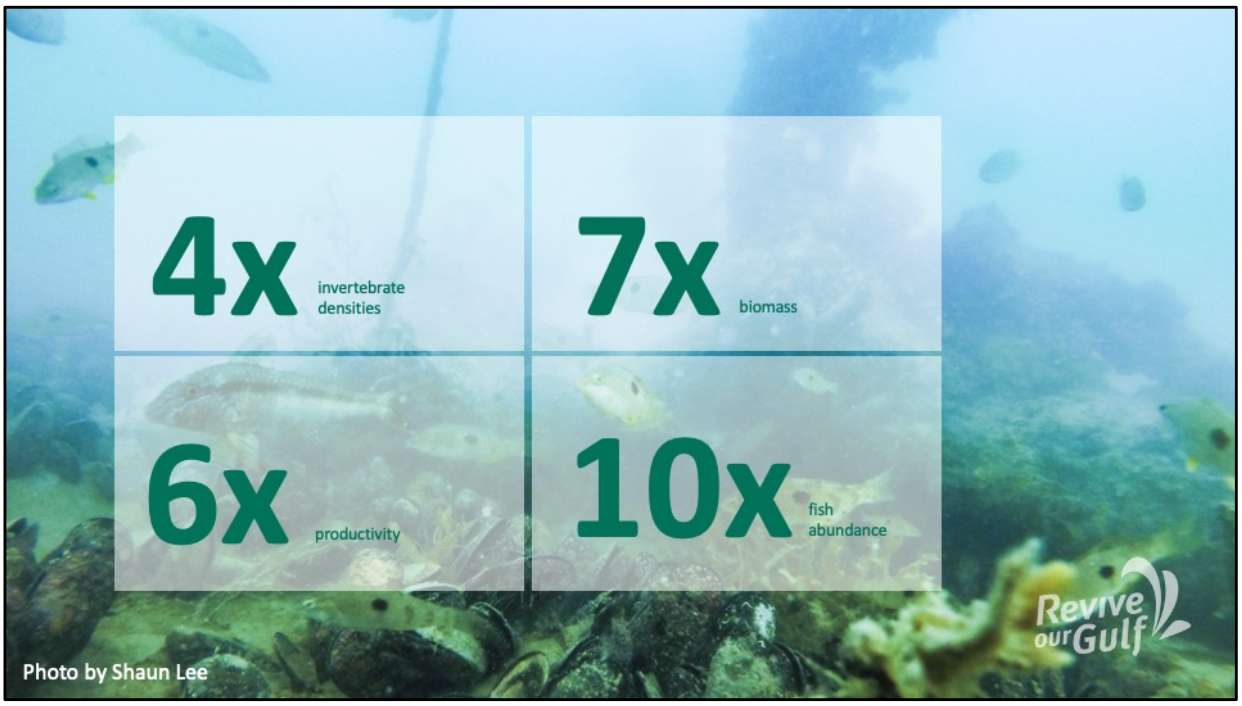
The council has identified areas and times where for public safety reasons (such as people swimming into nets) set netting should be prohibited due to the area being used by other park users. These areas are set out in bylaws about public safety and nuisance.

There is no reason that no-take philosophy could not extend to all or regional parks. The Management Plan is out now for consultation, it only includes bans for set nets, I encourage you to ask the Council to take a stronger position.

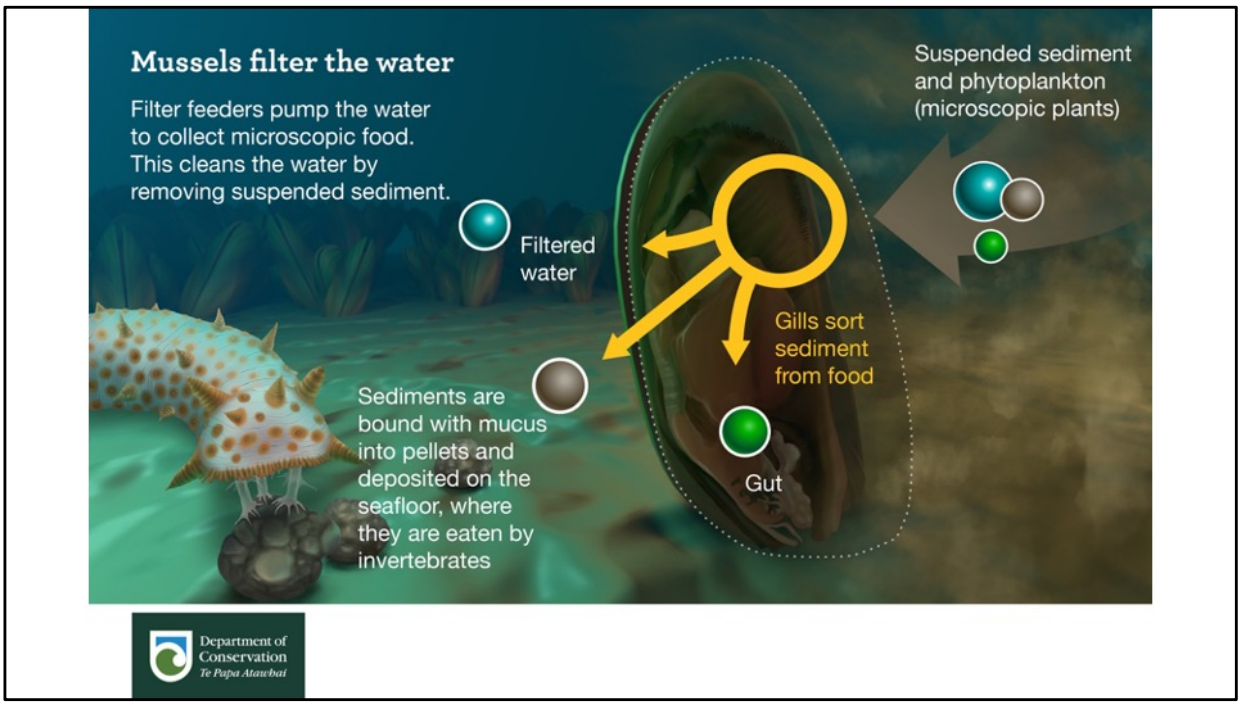
So that’s my segue into active restoration.



Mussels don’t just grow in rocks, they can grow on soft sediments where they increase biodiversity



Mussel beds can have 4 times more invertebrates, 7 times the biomass a ten times more fish than baren sediments.



They filter the water, removing sediment with the nutrirents which they bind up in little pellets, these pellets are then consumed by other invertebrates

Mussel restoration is about clearer water, a single mussel can clear a bathtub of water per day.

The result is very clean water, we haven’t made a bed big enough yet but I have heard stories from scientists that knew they were downstream from a mussel bed because the water cleared in front of them.

And of course they are food, not just the mussels themselves but all the things that live in the beds.

The diversity is much better, I don’t know how long its been since you saw a seahorse but here are two I found in the last natural, soft-sediment bed left in the Gulf.

So since 2013 we have started building mussel beds, here is the process in 2018.

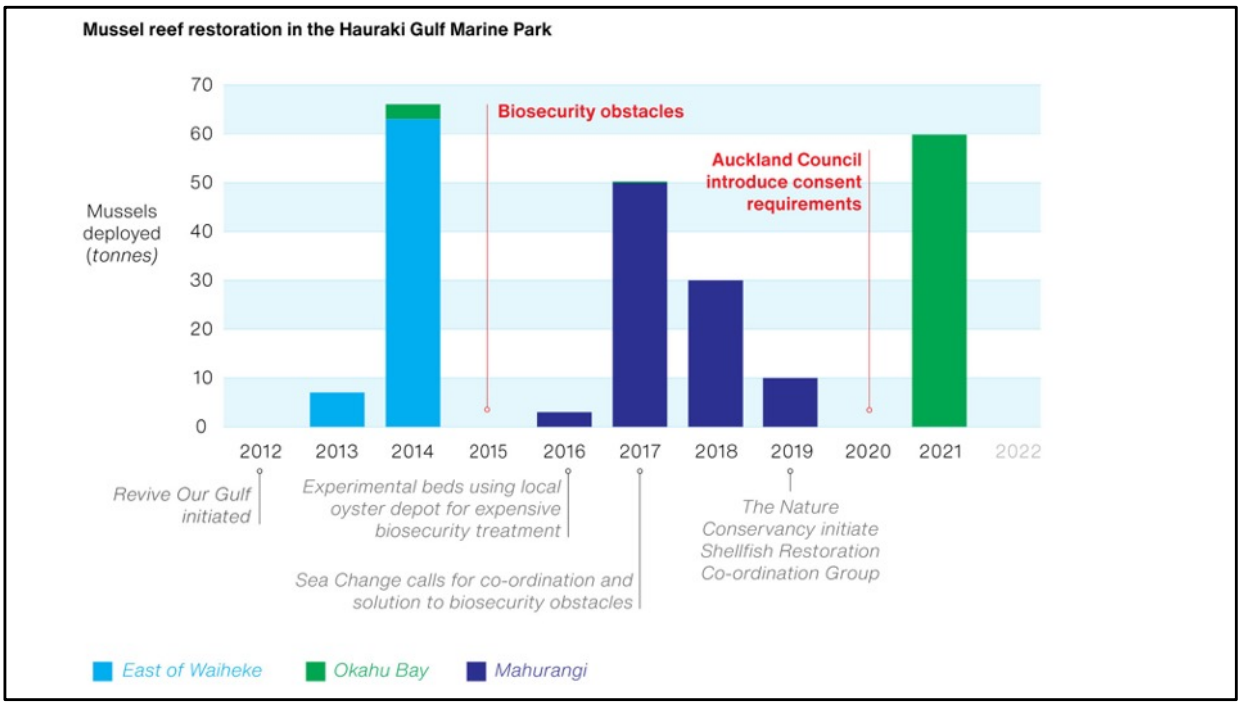
You can see its pretty complicated but buy working with MPI we are getting things more streamlined.

This is what we have just done in Okahu Bay. The barge came directly from the mussel farms which means much less stress for the mussels.

This is what they look like a few hours after going down

With a diver for scale.

And this is one week later. You can see the mussels have stitched themselves together to form a carpet. I can pick up one in the middle and the whole lot will come up like a circus tent.



This is how many we have put in. We are working with Auckland University, Auckland Council, The Nature Conservancy and iwi to create a pipeline of projects around the Gulf.

Thanks for listening, hopefully we have time for questions.