An underwater photograph of a seabed. The bottom is covered in light-colored sand and small rocks. There are several dark, textured rocks scattered across the scene. A prominent feature is a large, dark, vertical rock formation in the center-right. To its left, there is a cluster of orange and yellow coral. Other smaller coral and shells are visible on the left and right sides. The water is slightly hazy, giving the scene a soft, natural light.

**NIWA fish-habitat
focused research
programmes: Efforts in
the Kaipara Harbour**

A quick overview

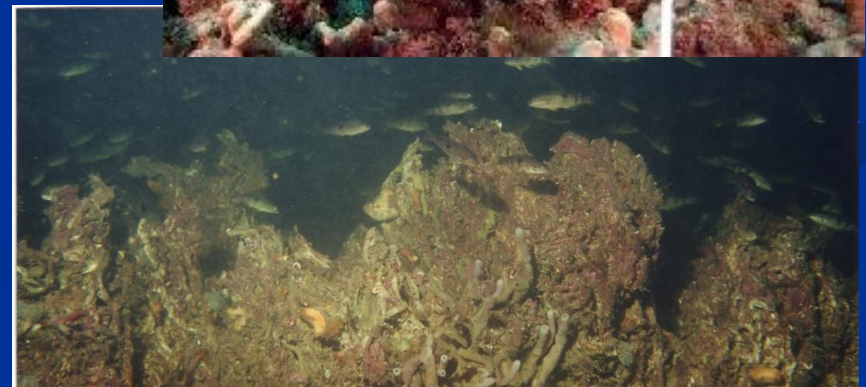
Coastal Conservation Management: protecting the functions of marine coastal habitats that support fish assemblages at local, regional and national scales

- Phase 1: Integration of existing biophysical, fish, and habitat information

- Phase 2: survey and quantify fish–habitat associations across large-scale environmental gradients (North and South Island regions)

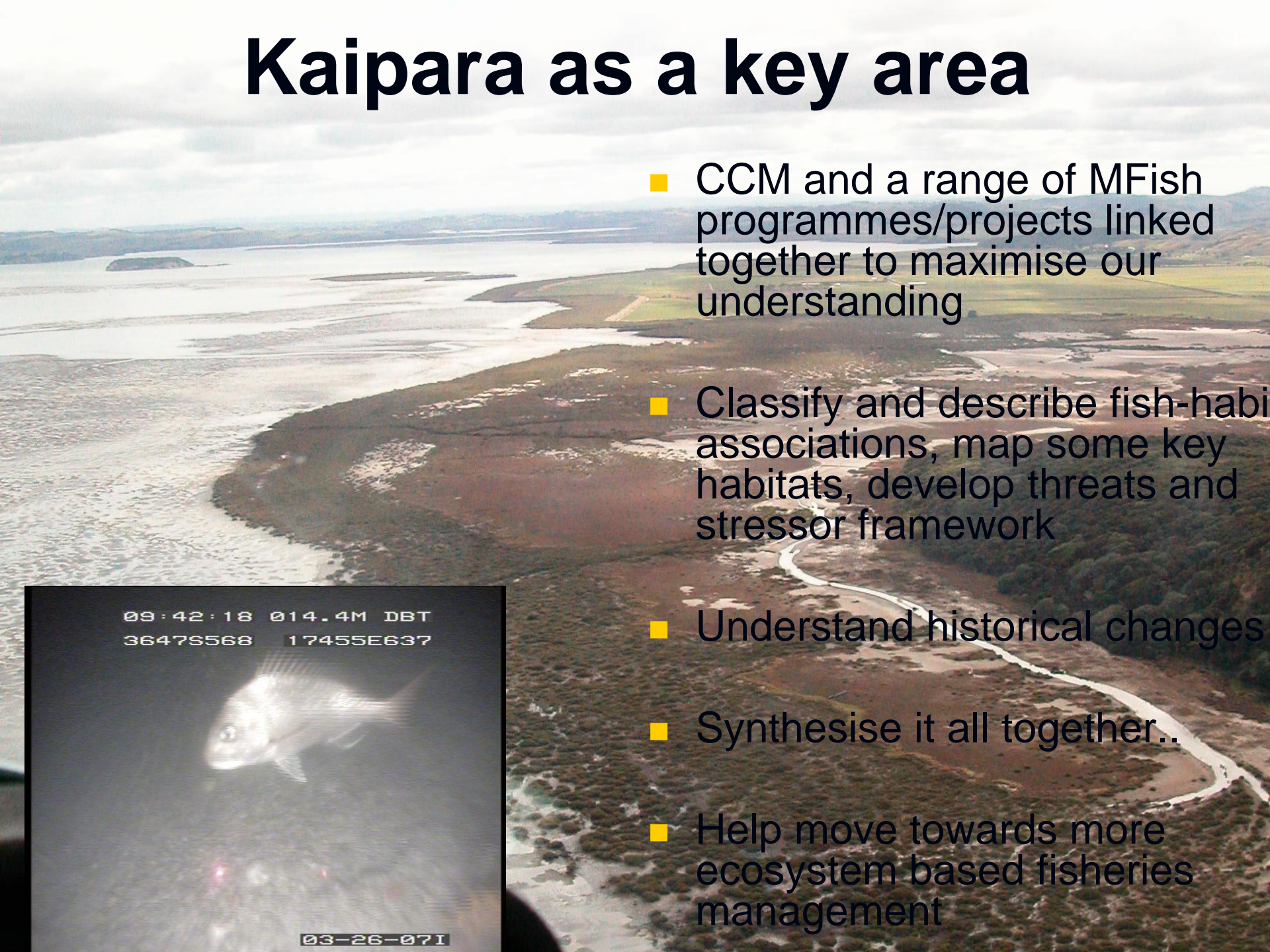
- Phase 3: measure connectivity (fish movement) across habitats and habitat landscapes (inter-linked with phase 2)

- Phase 4: synthesise phases 1–3 into a national framework of habitat/habitat values and associated fish population dynamics, which includes stressors and other relevant factors

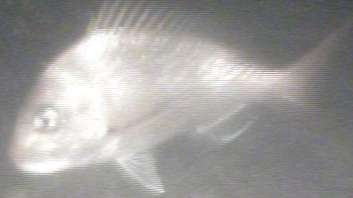


Kaipara as a key area

- CCM and a range of MFish programmes/projects linked together to maximise our understanding
- Classify and describe fish-habitat associations, map some key habitats, develop threats and stressor framework
- Understand historical changes
- Synthesise it all together..
- Help move towards more ecosystem based fisheries management

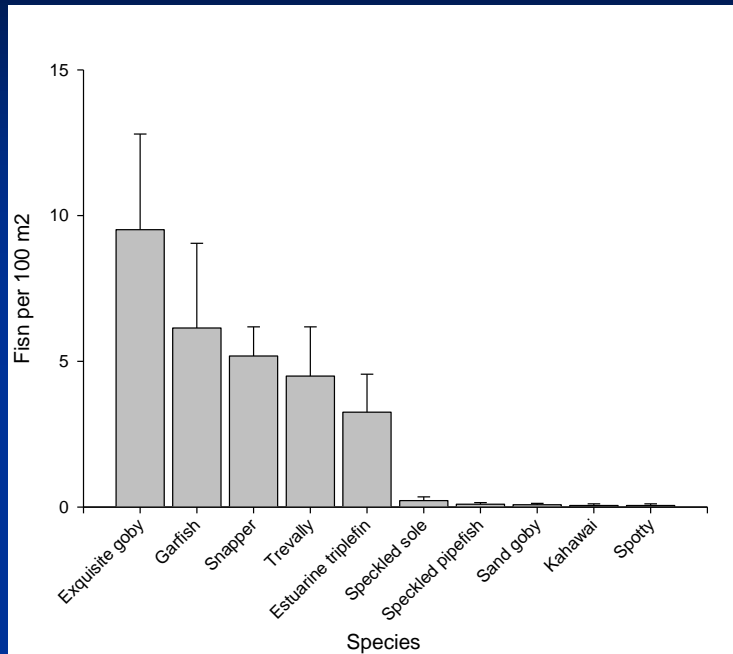


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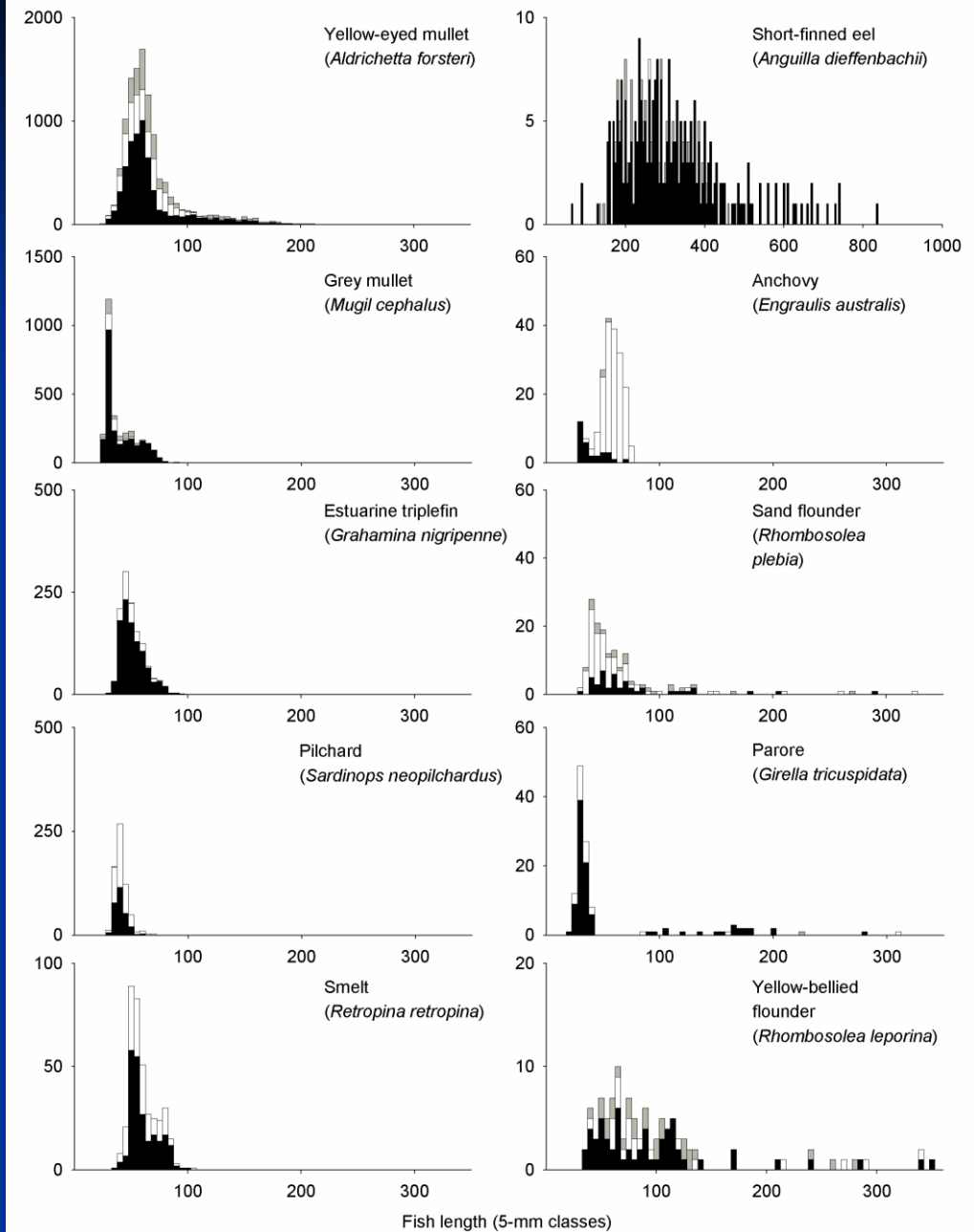
Different 'fringing' habitats



Kaipara Harbour seagrass meadows



Small fish in mangroves



Subtidal habitat fish survey

- Low fish abundances at harbour entrance, much lower snapper numbers and biogenic structure in northern Kaipara
- Higher numbers of snapper on banks within sheltered arms
- Hotspots- Port Albert, Tinopai, shallows off Orongo Point
- Strong environmental gradients



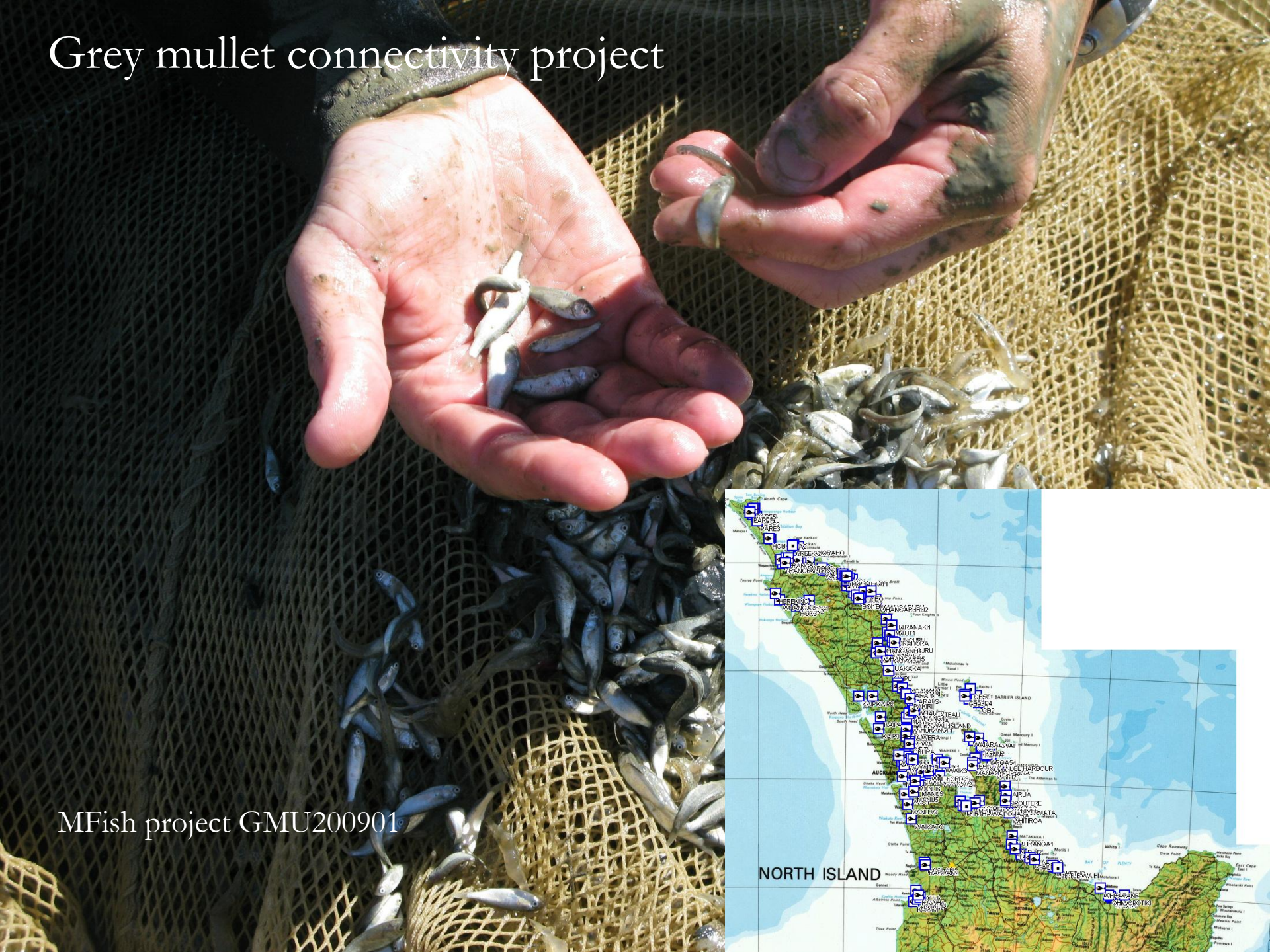


Larger fish and habitats

- Night time towed camera survey using 'CoastCam'
- Circa 80 sites for fish and seafloor habitats – subset of larger survey
- Completed in March
- Now to be analysed



Grey mullet connectivity project



MFish project GMU200901

The past

Helping keep the Kaipara Harbour healthy – can you help?



NIWA is currently researching the Kaipara Harbour, in particular fish populations, and the habitats fish rely on. We want to discover how the harbour's environment has changed over the years, and what effect these changes have had on fish and other species. Ultimately we want to help ensure that the Kaipara Harbour is kept healthy in perpetuity.

What is special about the Kaipara Harbour?

We know that the Kaipara Harbour is a critical part of the North Island west coast ecosystem. It contains a diverse range of habitats, as well as many species of plants, invertebrates, and fish. It is also known to hold very important nursery grounds for snapper, trevally, grey mullet, flatfish, and other fish, as well as a wide range of other species that are important as food for larger fish, birds, and mammals.

We are interested in how different habitats such as seagrass meadows, horse-mussel beds, mangrove forests and so on, support fish populations, and how human activities may affect the health and productivity of these various habitats. We are especially interested in how things in the harbour have changed over time.

What sort of things are we looking at?

We would like to build a detailed picture of what habitats and fish populations are in the Kaipara Harbour, how they function and interact, and what the likely threats are to their continuing function and health. Some of the questions we want to answer include:

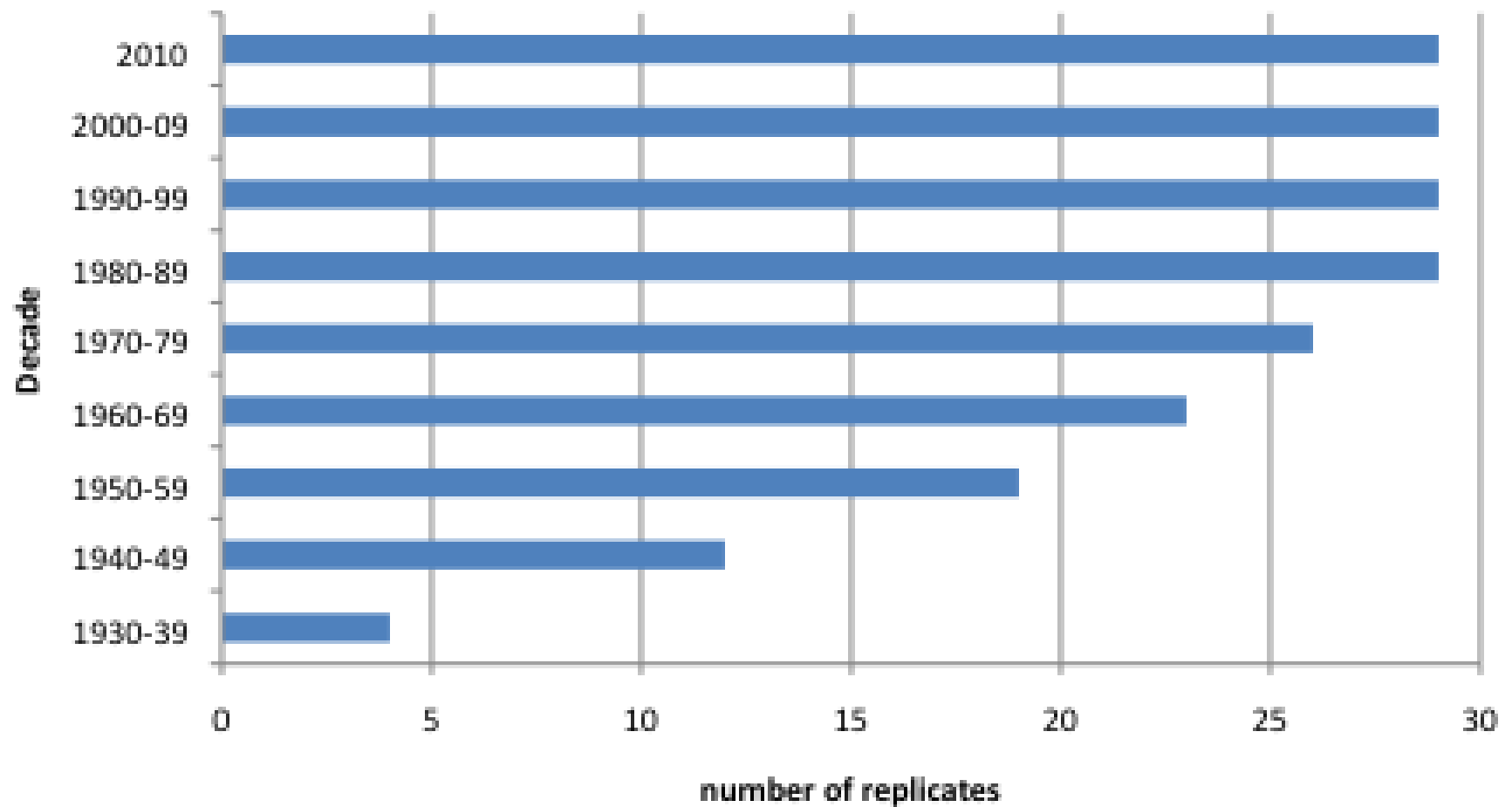
- Where are different habitats found, how common or rare are they, and what fish populations are associated with them, especially juvenile fish?
- What sort of seasonal migrations and other movements do the various fish populations make? How have fish abundances and sizes changed over time?
- How have habitats changed over time? Can we pin down the reasons for any changes – for example, storms, changes in surrounding land use, or changes in fishing activities?
- How has the appearance of the harbour changed? For example, have there been changes in adjacent land use, the extent of mangroves and seagrass, areas of oysters and mussels, water clarity and seafloor 'muddiness', the amounts of logs and debris, and other interactions with the land such as large inputs of wind blown insect swarms (to name a few)?



Interview status

- 31 participants now interviewed and recorded..
- Database development, data entry, and digitising is currently underway

Kaipara Harbour Temporal Extent of Knowledge



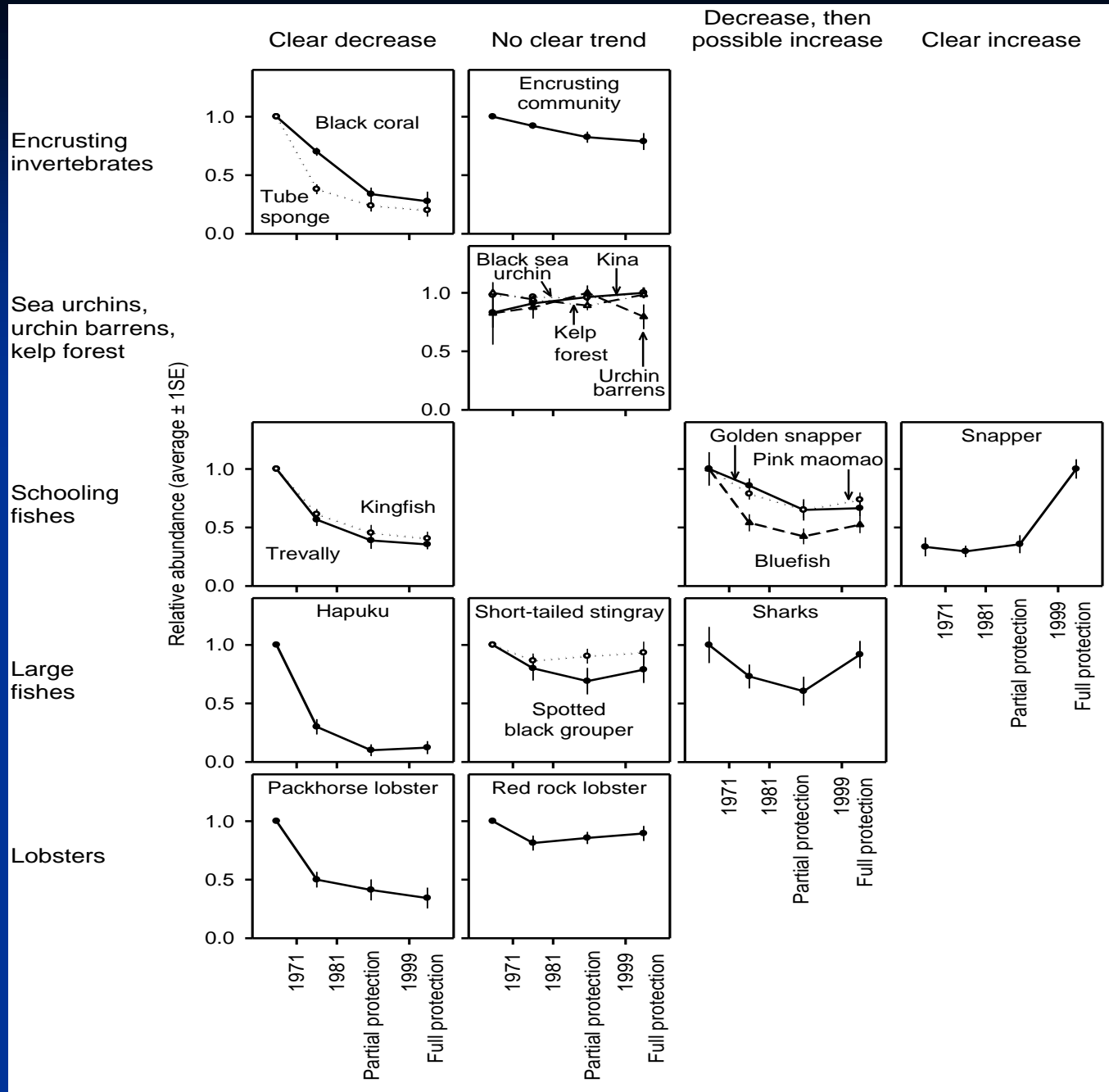
Common comments:

- *“Its changed so much since I started fishing...”* [participants 1-31]
- *“..shellfish, like pipi, scallop and cockle are not here anymore....mud is there now...”* [participants 4-6, 9-15, 17-20, 22-23, 25-26, 30-31]
- *“scallops used to be like the size of dinner plates...”* [participants 1-4, 6, 16, 19-20, 26]
- *“Yeah, we used to go diving for crays, there was a fair current running, but we’d drop in off Pouto there and get a feed.....not anymore....”* [Participant 8, 11, 12, 13]
- *“The Kaipara is a breeding ground for all types of sharks...great whites, they’re resident here...there used to be lots more of them....you only get the females here in the Kaipara and juveniles...the males are never seen...”*
[participants 3, 30, 27, 13, 11, 8, 29]

- Parore – example of a now relatively rare species fished down as unwanted bycatch historically – shifting baseline syndrome for this biologist
- Loss of seagrass from the north Kaipara, and southern depth and range contractions
- Scallop bed losses including past habitat associations, and reductions in sizes and densities
- Shellfish bed loss (pipi, cockles) spatially, associated with habitat change
- Big increases in mangrove extents, and reductions in channel access and depths, and water visibility
- Arrival of invasives including Pacific oysters, Asian date mussels, and large mantid shrimp
- Changes in charismatic mega-fauna – e.g. great whites
- Seasonal fish migrations, including large school sharks for pupping
- Historical video footage and documentaries e.g. great whites, and school shark fishery (interviewees appear as kids)
- Personal photograph histories, in surprisingly crisp detail – black and white
- Changes in fisheries practises from older to more modern, and targeting of species and markets

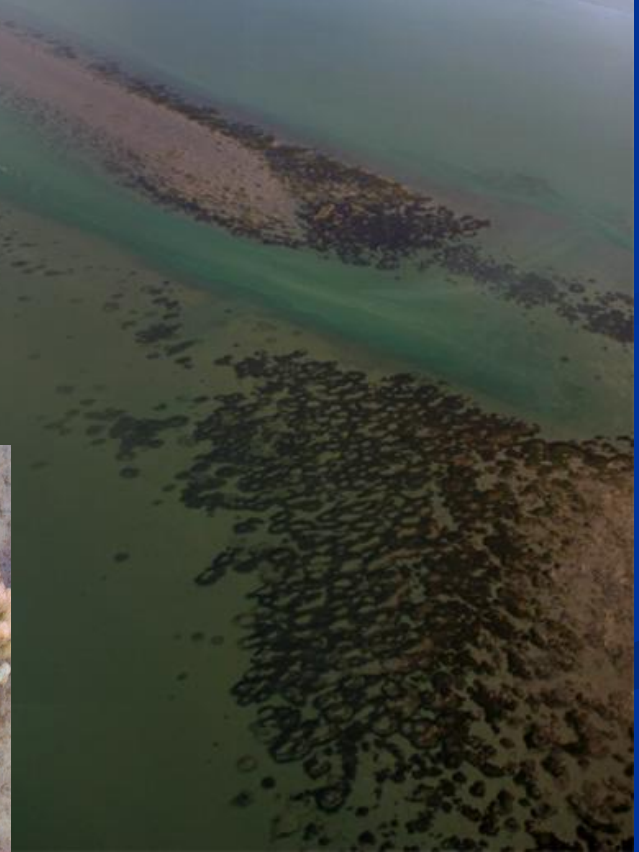
Poor Knights example

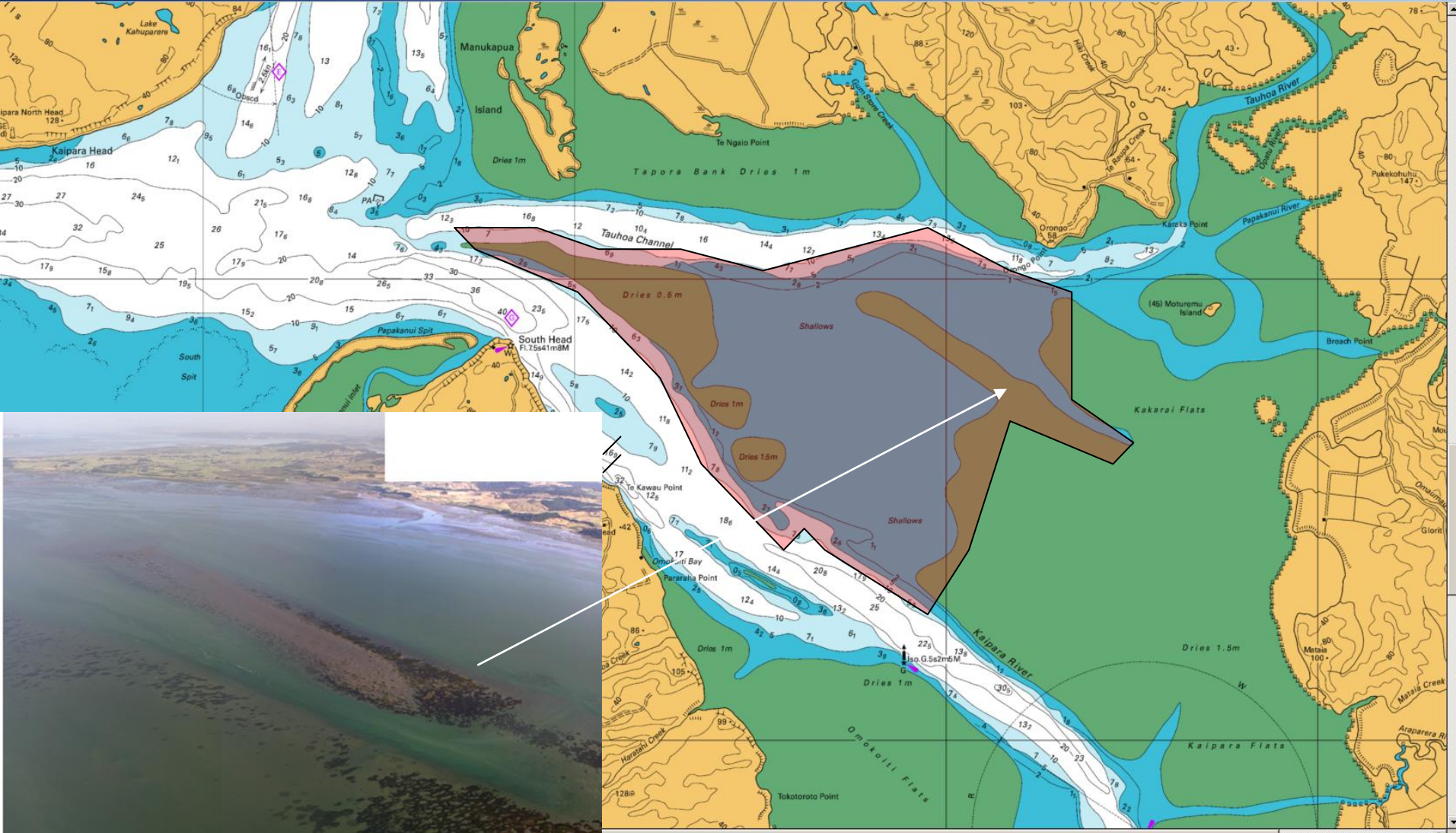
(unpubl. data, R. Taylor & M. Morrison)



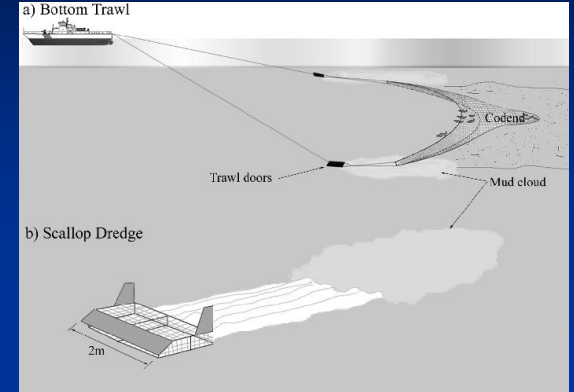
Mapping and monitoring critical habitats

Seagrass – especially
subtidal





Stressors...



Outcomes

- Identification of critical fish habitats in the Kaipara Harbour – including their locations.
Rankings of relative importance for these habitats
- Identification of stressors and threats to these habitats, and their relative importance
- A reconstruction of past environments – fish habitats and species – as a view of what the harbour may have once been like – and as possible use for setting restoration targets
- Commencement of ‘critical fish-habitat’ monitoring programme
- Subsequent targeting and implementation of research towards information gaps

- Use as support for, and predictions about the consequences of, active/adaptive land and marine-based management, which is what will make the ultimate difference. Monitoring will help evaluate the consequences (for fish populations and their habitats) of such management through time

