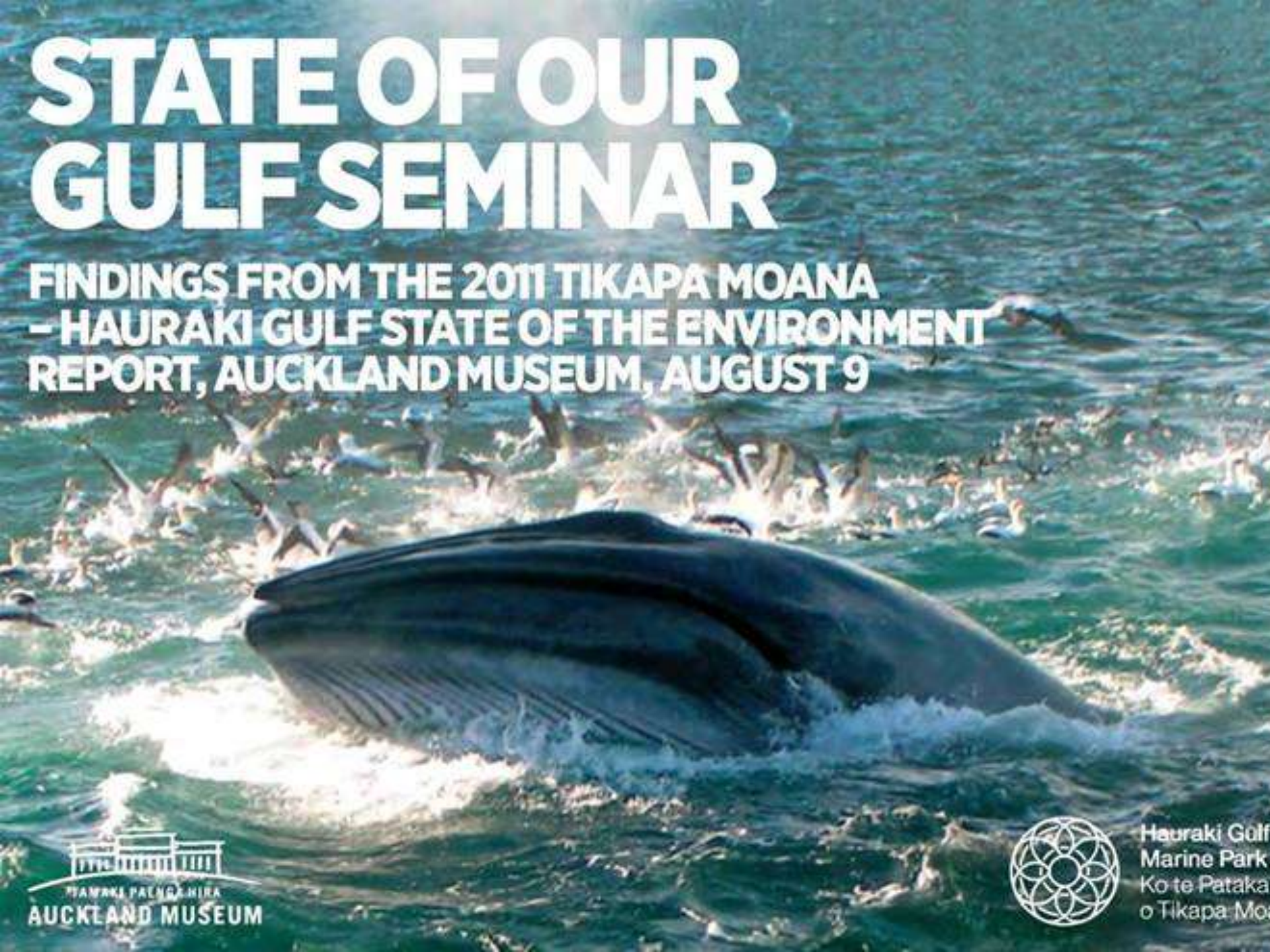
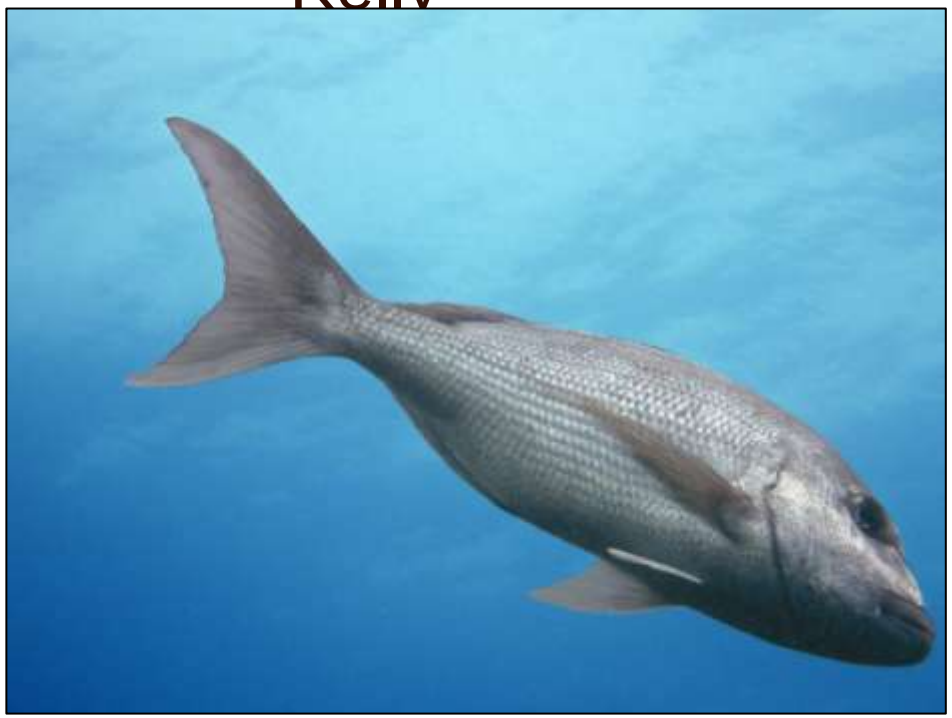

STATE OF OUR GULF SEMINAR
FINDINGS FROM THE 2011 TIKAPA MOANA – HAURAKI GULF STATE OF THE ENVIRONMENT REPORT, AUCKLAND MUSEUM, AUGUST 9
AUCKLAND MUSEUM
Hauraki Gulf
Marine Park
Ko te Pataka
o Tikapa Mo

State of the Hauraki Gulf

Shane Kelly



Key considerations

- Hauraki Gulf Marine Park includes CMA, islands, DoC coastal reserves, a few private and council reserves
- Act recognised link between catchment and CMA and promotes integrated management
- Emphasis on protection and enhancement
  - State of the environment not state of the fishery
  - Higher standard than avoid, remedy and mitigate
- Sliding baseline and legacy impacts
- Spatial context

Coast & Catchment Ltd
Environmental Consultants

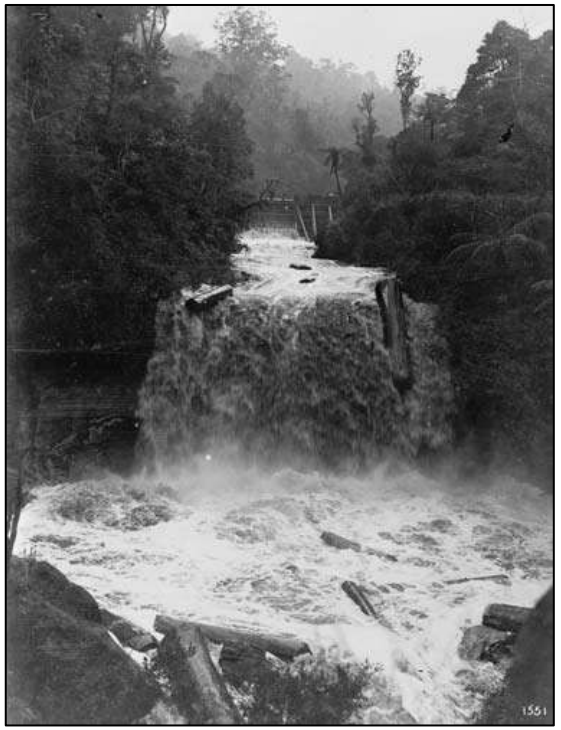
Environmental Issues

1. Fishing
2. Sediment
3. Toxic chemicals
4. Nutrients
5. Microbial pollution of bathing beaches
6. Introduced marine species
7. Harmful algae, pathogens and mass mortalities
8. Litter
9. Maintenance and recovery of biodiversity
10. Coastal development

Coast & Catchment Ltd
Environmental Consultants

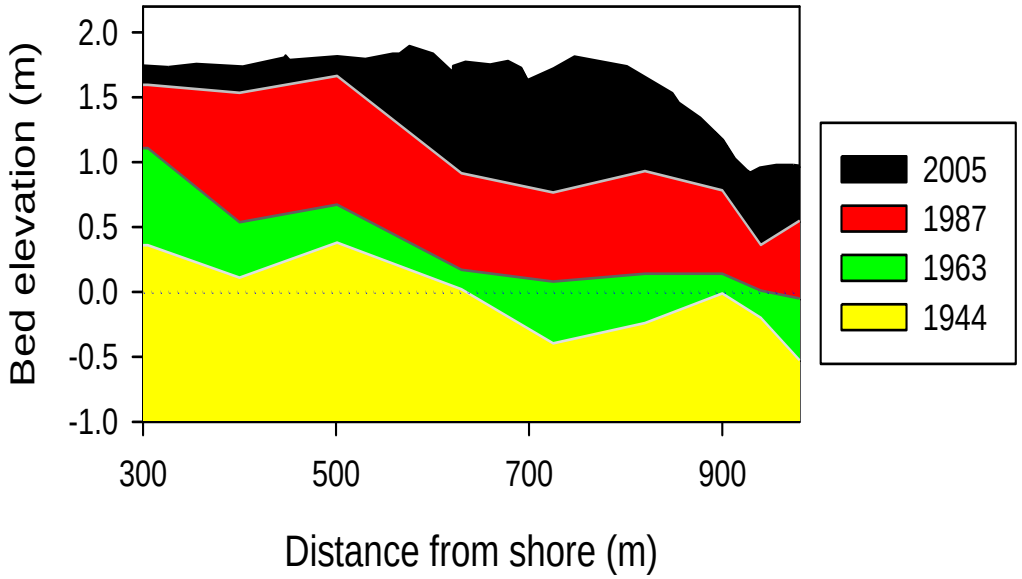
A legacy of impacts: Firth of Thames

- Hauraki Plains once contained largest wetland in NZ
- Kahikatea logged, land drained and converted to dairy farms
- Mining for gold and other metals
- Ohinemuri and Waihou Rivers declared as sludge channels by government proclamation
- Kauri logged and dams used to flush logs down rivers
- Fishing



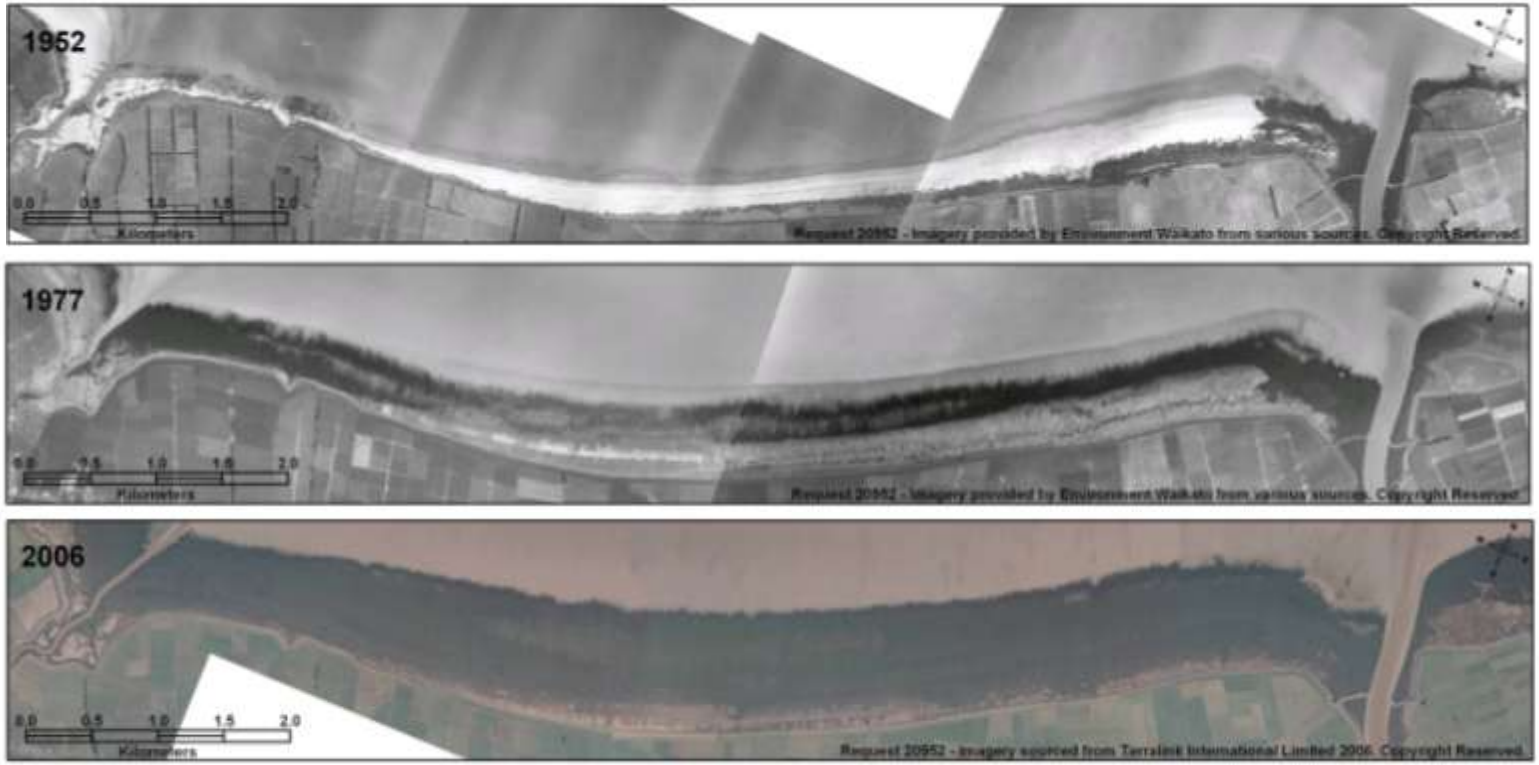
Sediment accumulation

- Sediment accumulation in southern FoT
  - 800 m band were the seabed has been raised by 1-1.5 m
- Change from sandy-mud to muddy sand



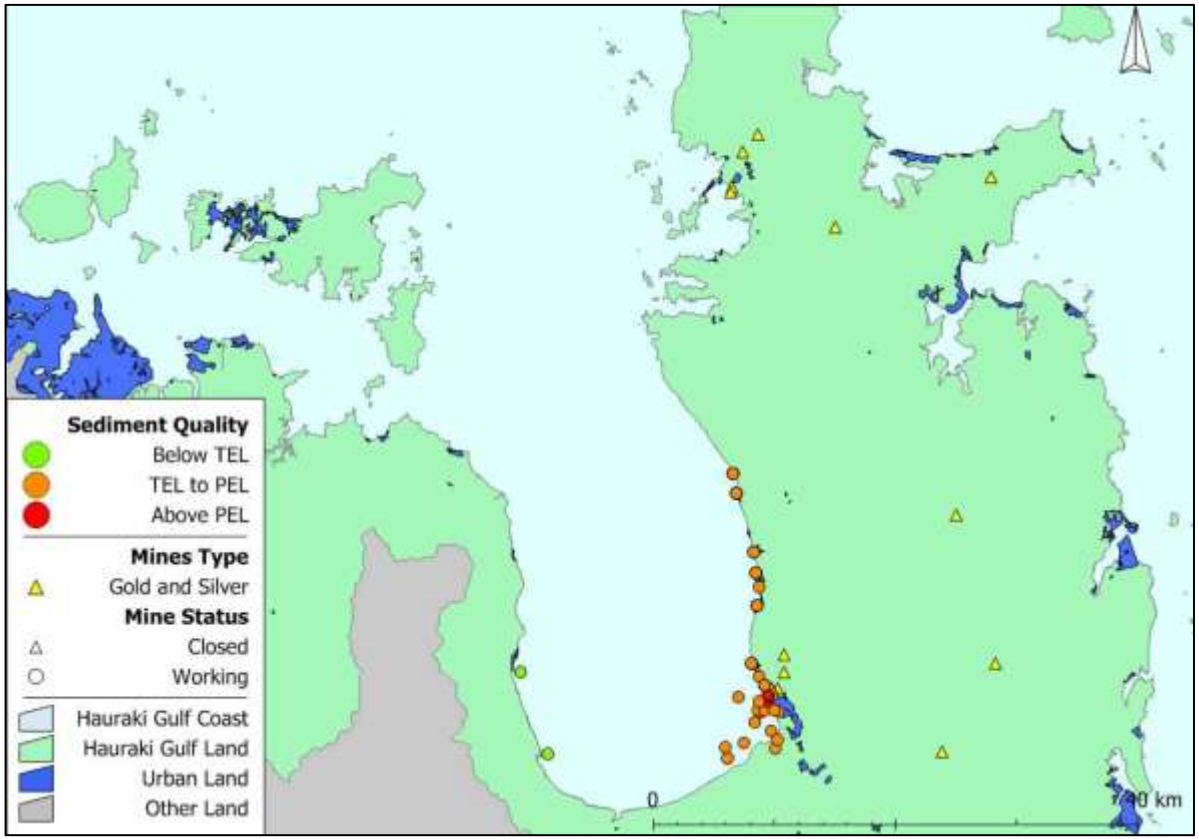
Coast & Catchment Ltd
Environmental Consultants

Mangrove expansion



Coast & Catchment Ltd
Environmental Consultants

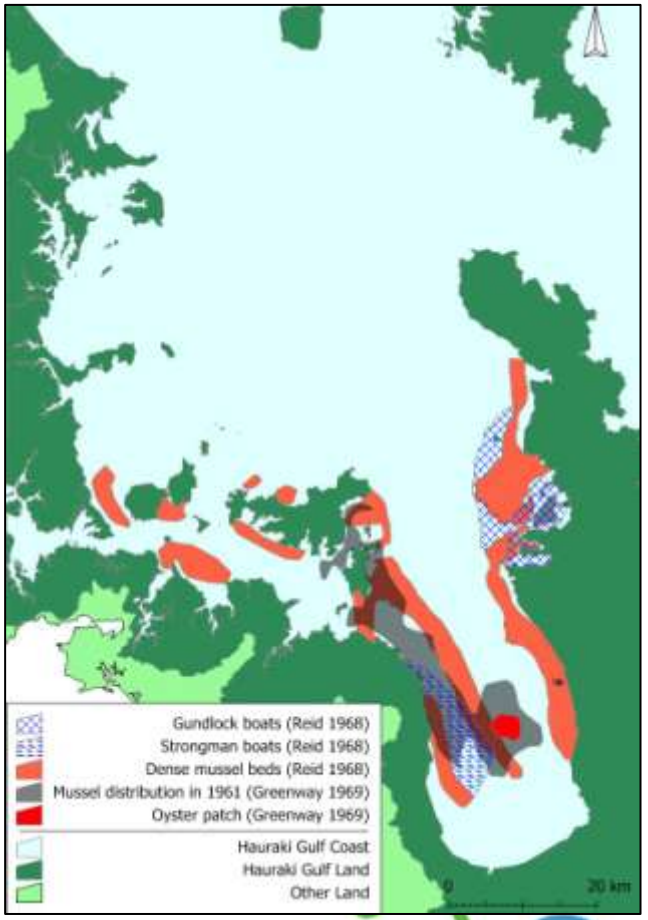
Sediment contamination



Coast & Catchment Ltd
Environmental Consultants

Mussel dredging

- Elimination of mussel beds
  - Highest secondary productivity rates
  - supported 200 – 16,000 tonnes of small predatory fish per year
  - Possibly filtered FoT in < 1 day c.f. 2 years today.



Coast & Catchment Ltd
Environmental Consultants

Baseline Auckland

- Urbanisation
- Wastewater
- Sediment
- Stormwater contamination
- Reclamation
- Foreshore development

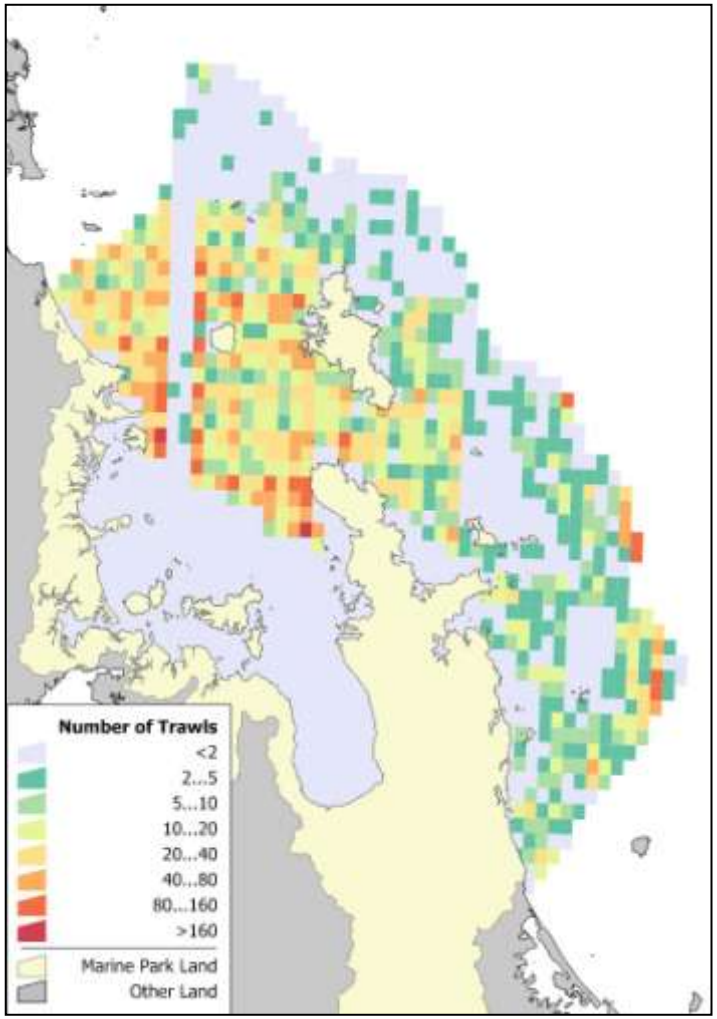
& Catchment Ltd
Environmental Consultants

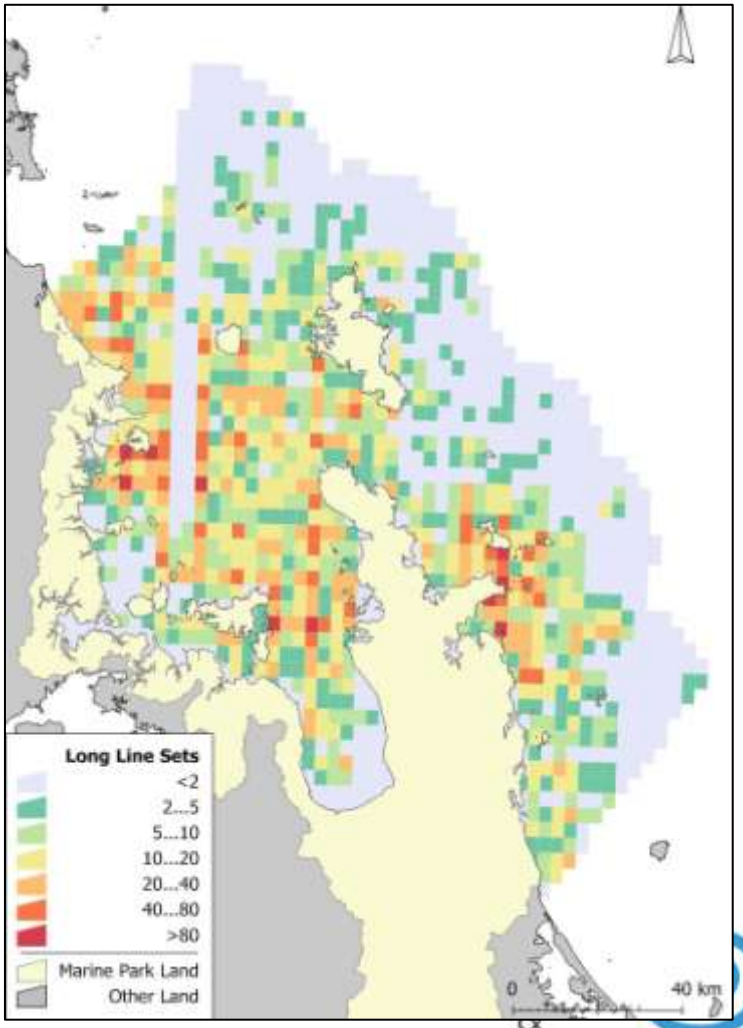
Implications:

- Starting from a degraded environmental baseline
- Protection and enhancement of remaining ecosystem values, functions and services seem appropriate objectives

Coast & Catchment Ltd
Environmental Consultants

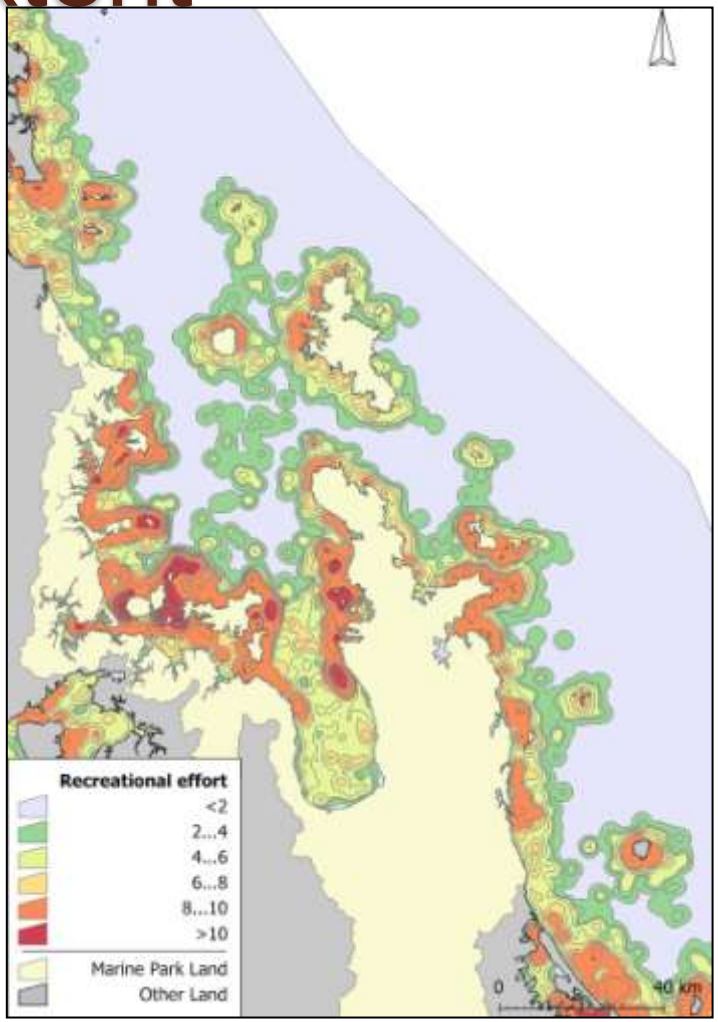
Fishing: Commercial Extent



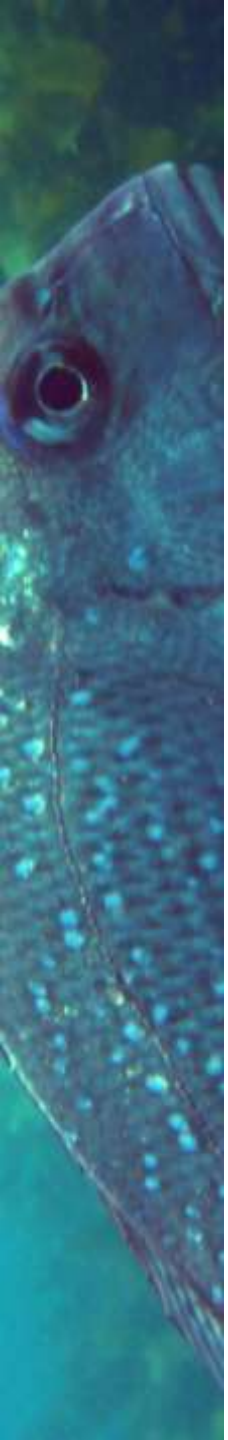


Catchment Ltd
Environmental Consultants

Fishing Impact: Recreational Extent



Coast & Catchment Ltd
Environmental Consultants

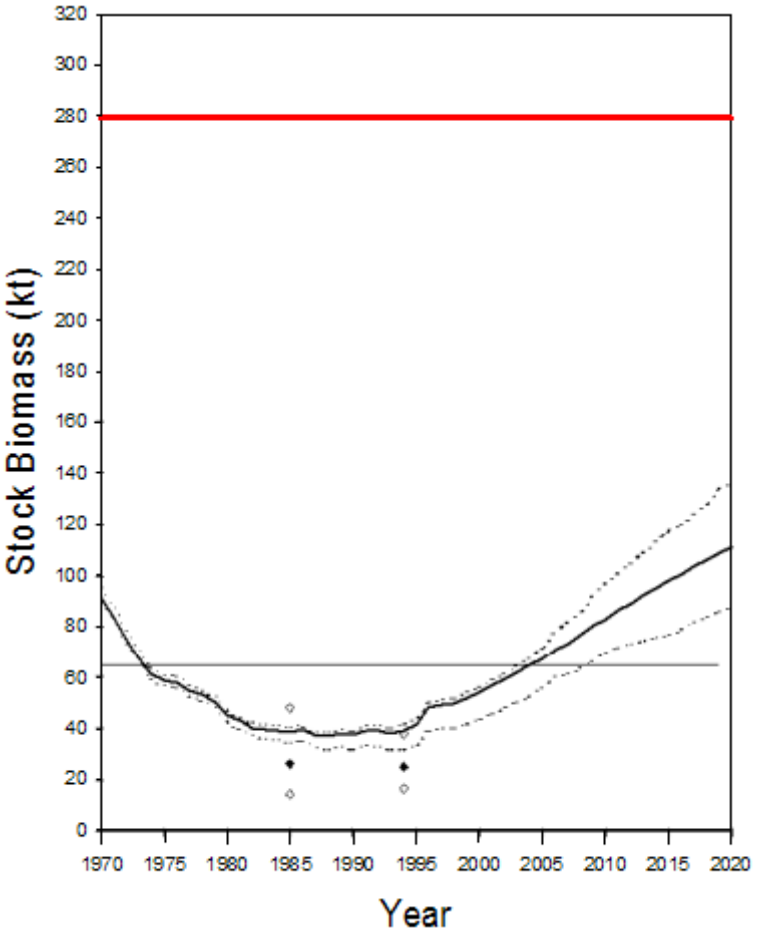


Fishing: Current status of stocks

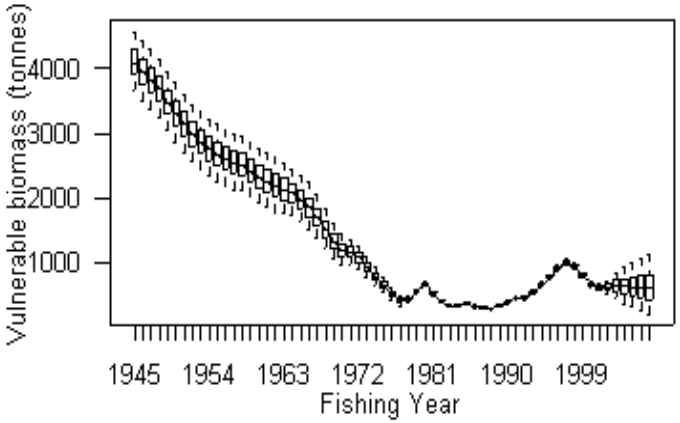
Species name	Last assessed	Quota Management Areas or Sub-stocks	At or above target levels?
Snapper	2000	SNA1	Yes
Jack mackerel	None	JMA1	?
Pilchard	None	PIL1	?
John dory	2010	JDO1E and JDOBoP	?
Gurnard	2010	GUR1E and GURBoP	?
Kahawai	2009	KAH1	Yes
Flatfish	2008	Hauraki Gulf	?
Tarakihi	2009	TAR1 East	?
Trevally	2006	TRE1	?
Yellow bellied flounder	2008	Hauraki Gulf	?
Leatherjacket	None	LEA1	?
Rig	None	SPO1	?
Baracoutta	None	BAR1	?
Grey mullet	2007	GMU1	?
Parore	None	PAR1	?

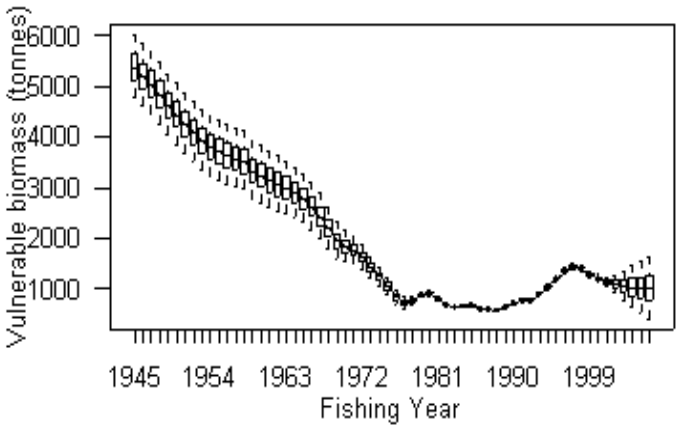
Fishing: Biomass

Snapper



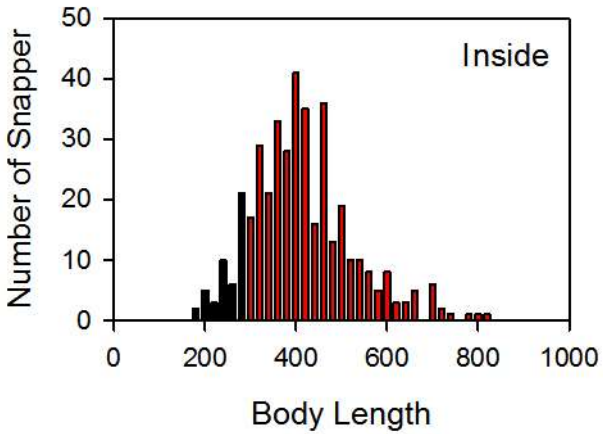
Lobsters

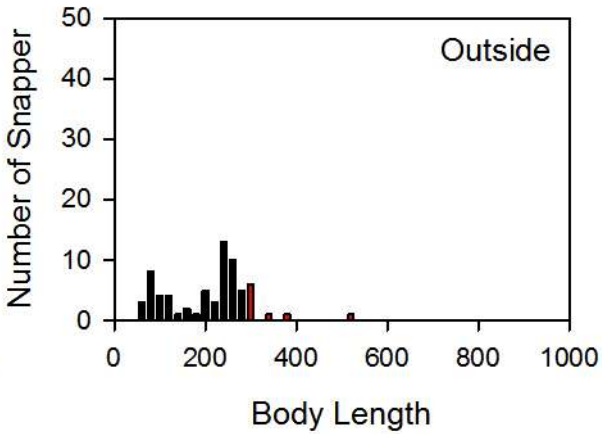


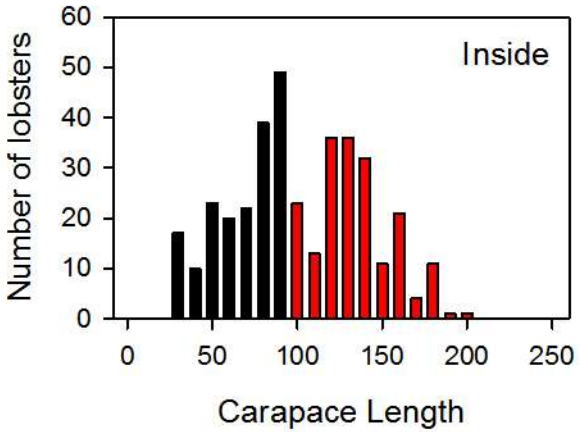


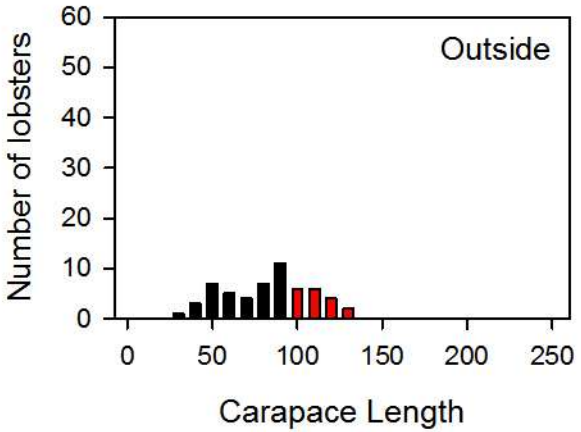
& Catchment Ltd
Environmental Consultants

Fishing: Size frequency



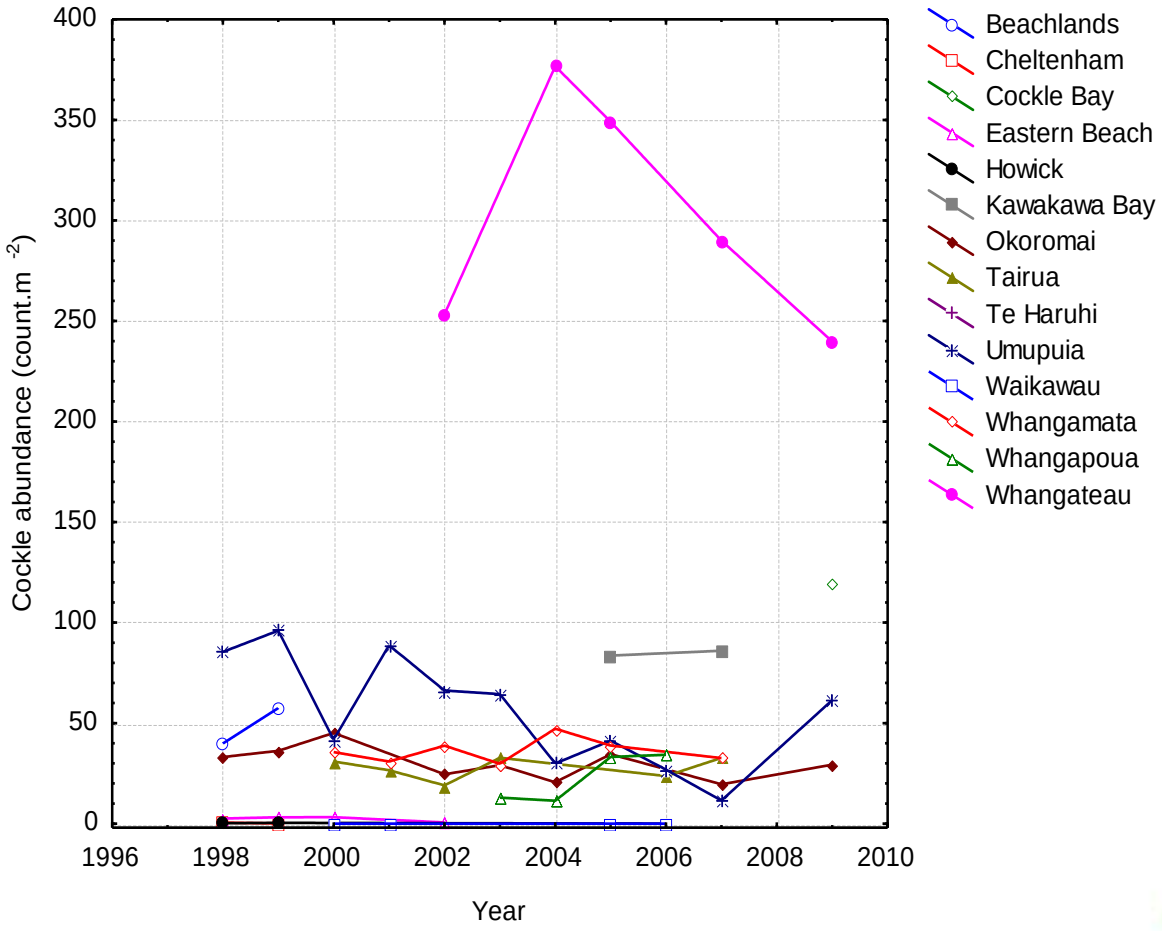






Coast & Catchment Ltd
Environmental Consultants

Fishing: Shellfish



Coast & Catchment Ltd
Environmental Consultants

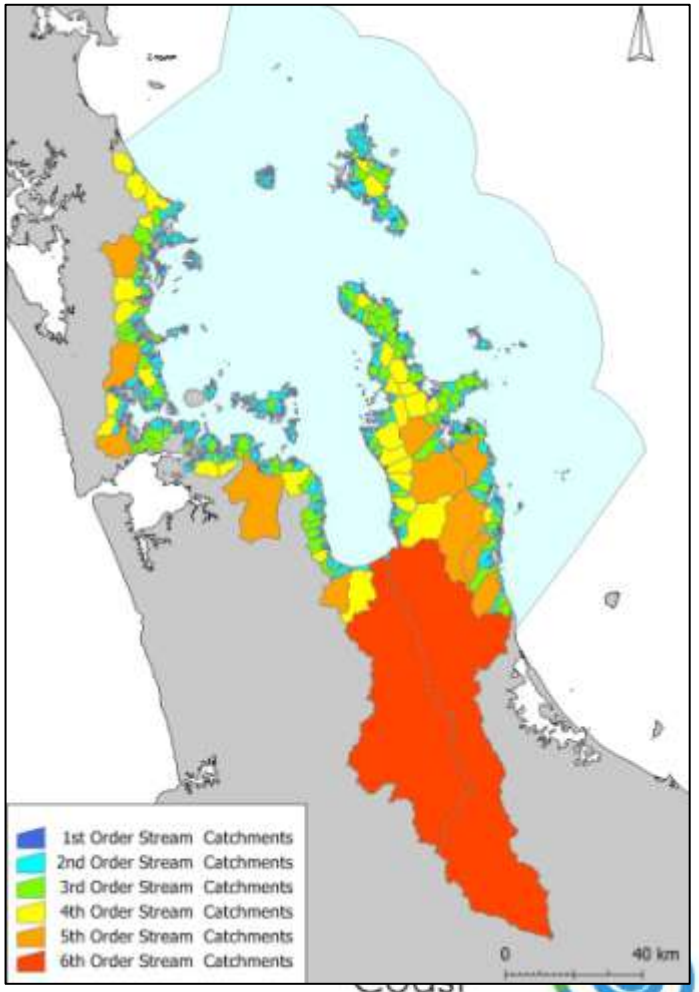
Fishing: Bottom disturbance and community interactions

?

Coast & Catchment Ltd
Environmental Consultants

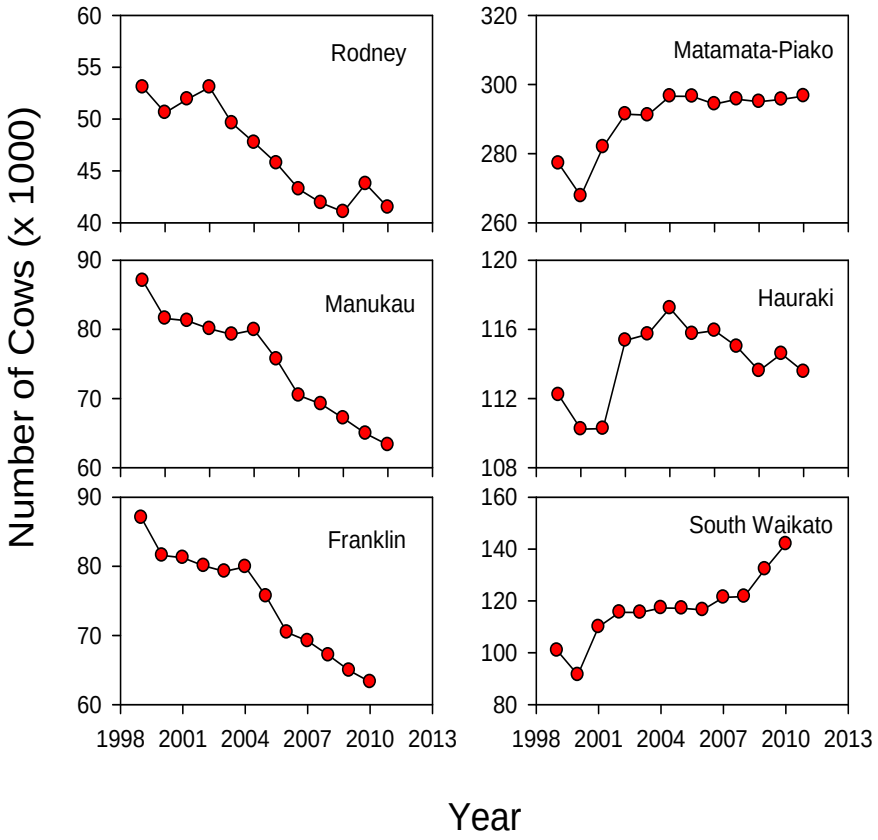
Nutrients: Extent and trends

- FoT enriched with nitrogen and riverine inputs dominate oceanic inputs
- ~ 90% of Waikato nutrient load to the Firth of Thames comes from Waihou and Piako Rivers
- Nitrogen loads from Waihou and Piako increasing by 1% per year
- Phosphorus loads declining
- Minor contribution from Auckland rivers and nutrients stable or declining



&
Catchment Ltd
Environmental Consultants

Nutrients: Causes



Coast & Catchment Ltd
Environmental Consultants

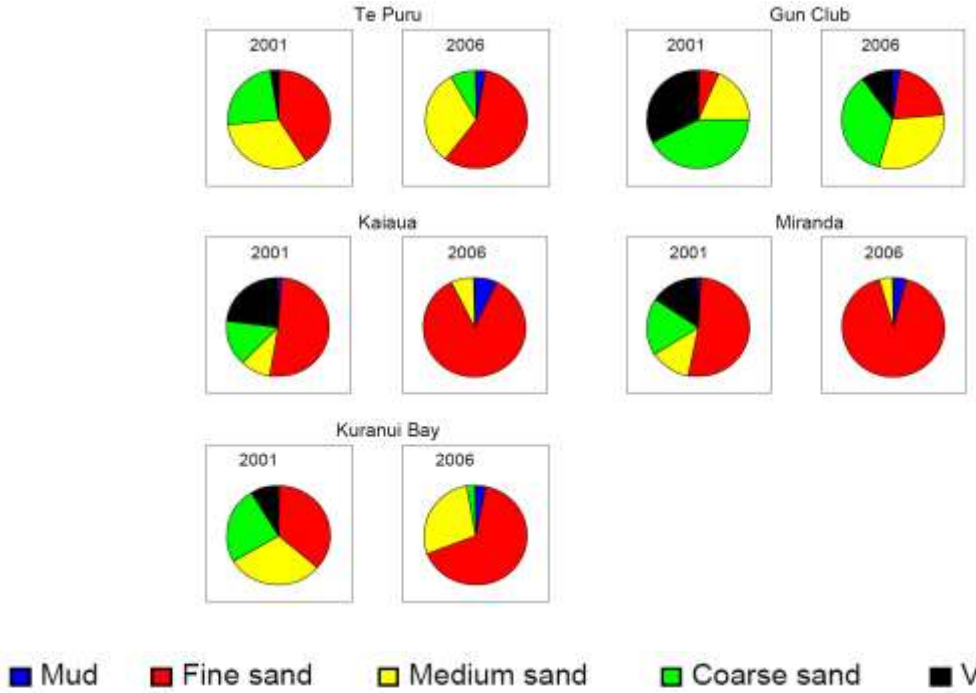
Nurients: Effects

- FoT enriched - what does this mean?
- Assimulative capacity?
- Resilience?
- New sources - fish farming?

Coast & Catchment Ltd
Environmental Consultants

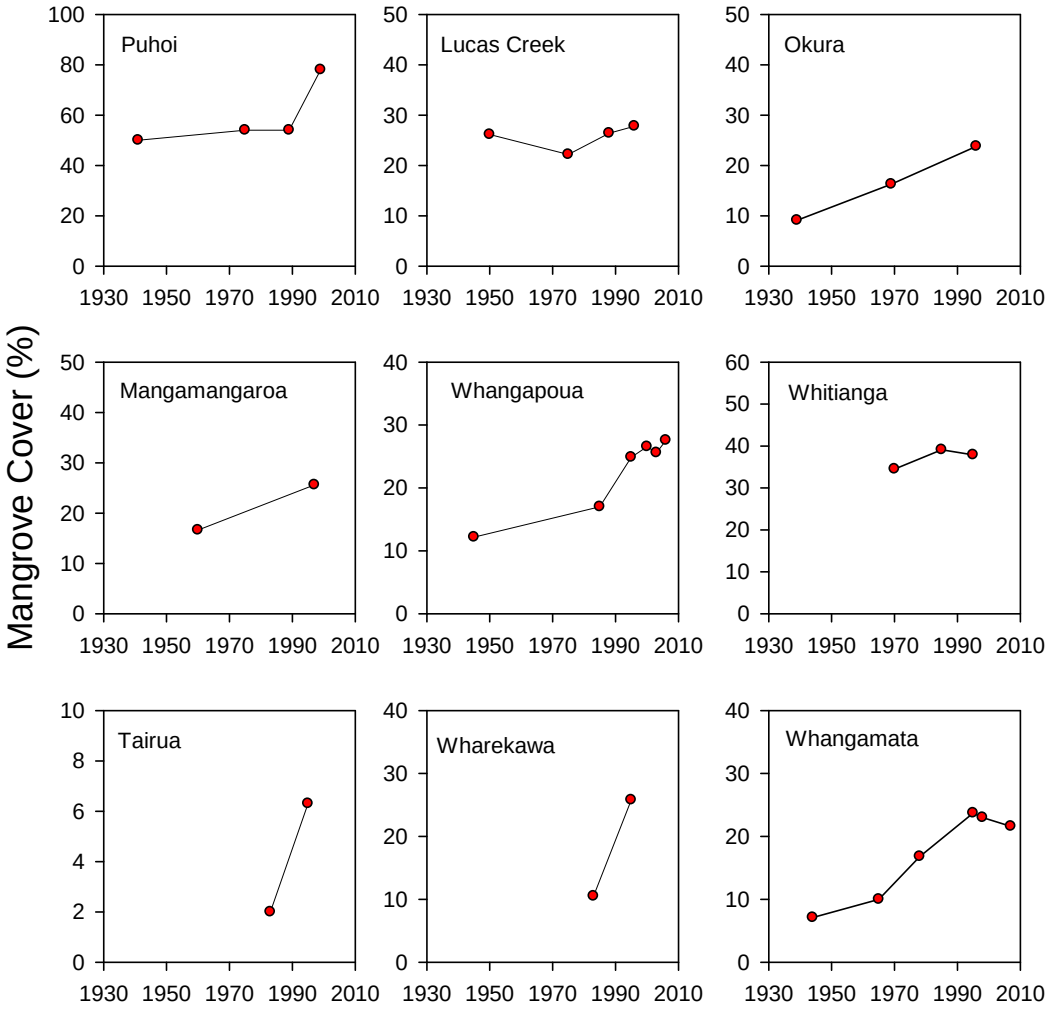
Sediment

- Extent of impact varies (estuary and nearshore)
- Effects relatively well understood
- Ecological and sediment texture changes recorded in estuaries and southern FoT



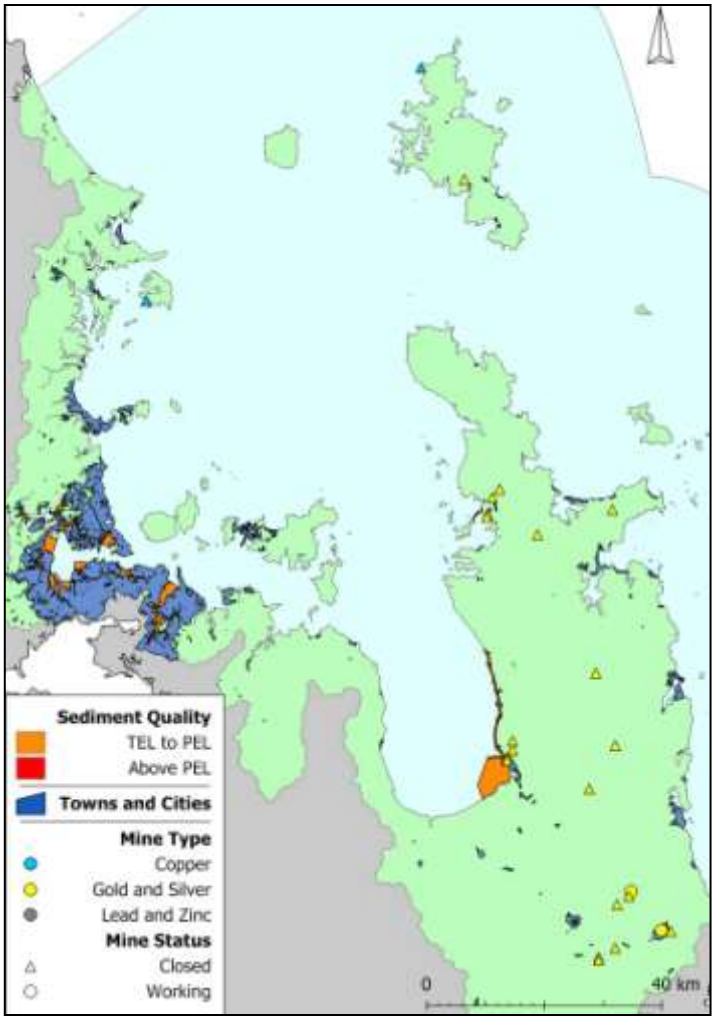
Coast & Catchment Ltd
Environmental Consultants

Sediment: Mangroves



Coast & Catchment Ltd
Environmental Consultants

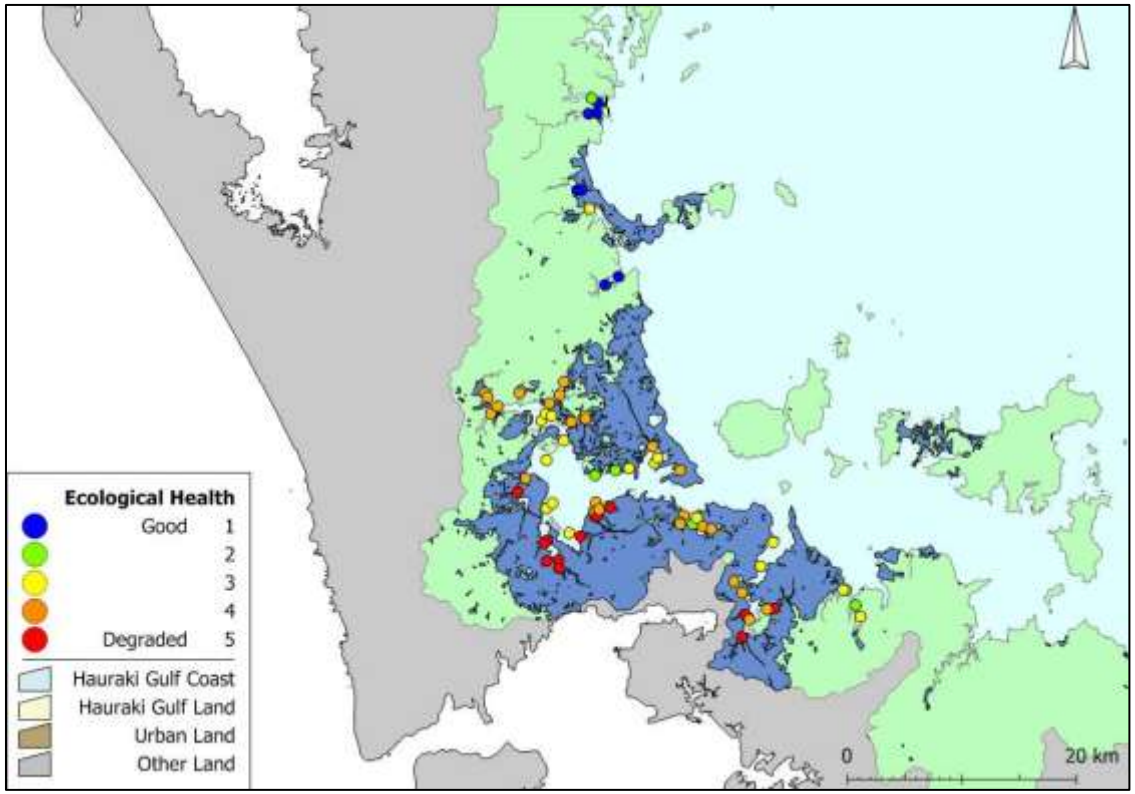
Sediment contamination: Extent



Coast & Catchment Ltd
Environmental Consultants

Contaminant Impacts on Ecological Health

- Change in community structure
- Fewer rare and large taxa



Coast & Catchment Ltd
Environmental Consultants

Introduced species: Extent and occurrence

- Gulf wide
- 139 species recorded in the Hauraki Gulf
- Four potentially serious species arrived in the Gulf in last 10 years
  - Mediterranean fanworm *Sabella spallanzanii*
  - Clubbed sea squirt *Styela clava*
  - Asian kelp *Undaria pinnatifida*
  - Japanese mud crab *Charybdis japonica*

Harmful algae, pathogens and mass mortalities: Incidence and extent

Year	Harmful algae or pathogen	Impact
1983	*Cerataulina pelagica* and *Prymnesium calathiferum*	Marine life killed: oxygen depletion and toxic effects.
1993	*Karenia concordia*	First report of human shellfish poisoning, mass mortalities of scallops.
1995	Herpesvirus	Largest mass mortality of fish (pilchards) ever recorded.
1998-99	Unknown agent	High mortality in scallops with a “black gill”.
2009	Coccidian and *Mycobacterium* infection	Mass mortalities of cockles in Whangateau Harbour.
2010	Ostreid herpesvirus OsHV-1	Mass mortality of juvenile Pacific oysters occurred on oyster farms from Parengarenga Harbour in Northland to Ohiwa in the eastern Bay of Plenty.

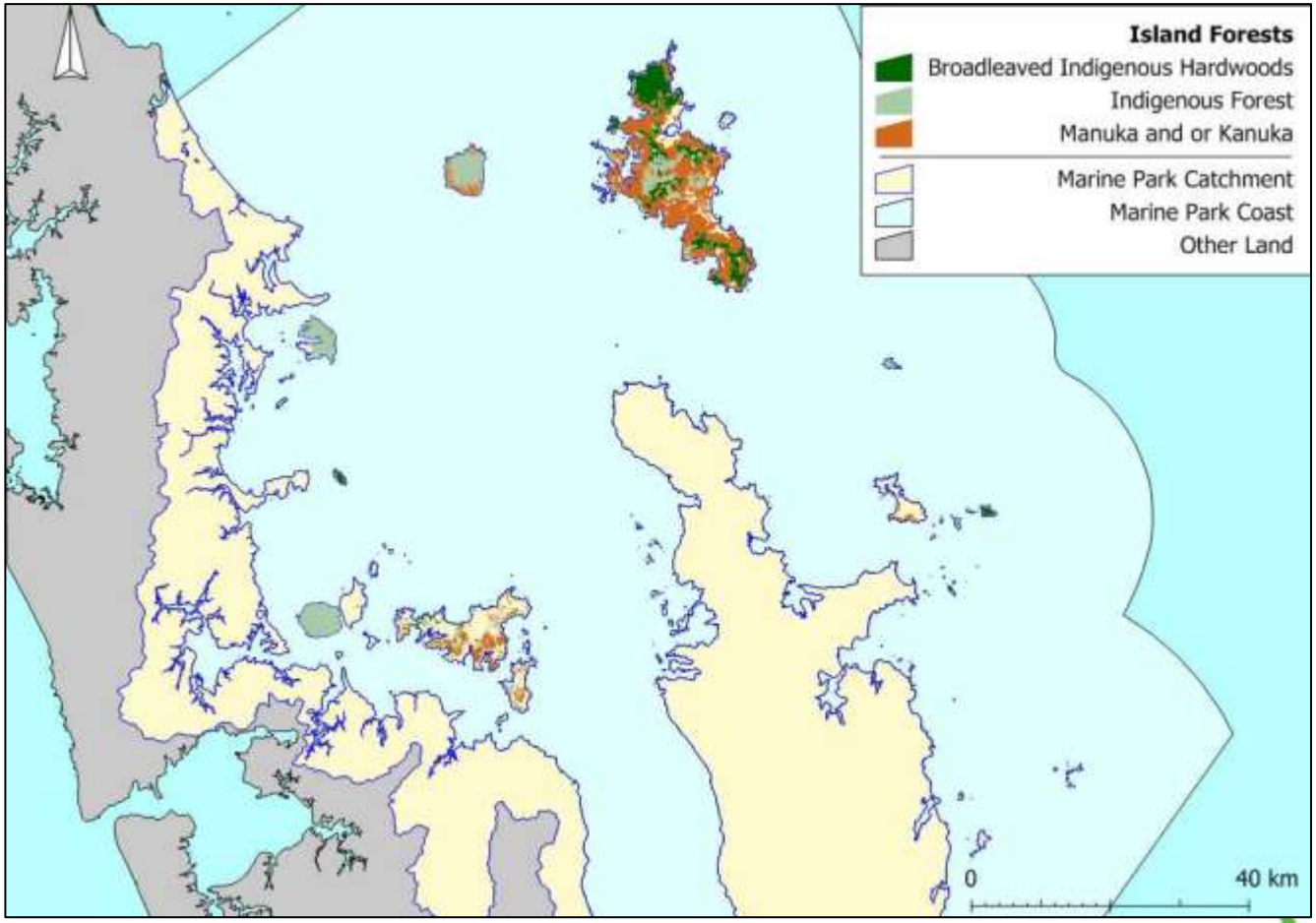
Coast & Catchment Ltd
Environmental Consultants

Seabirds and waders

- 15 common waders 1960 and 2005:
  - 4 increased
  - 4 stable
  - 7 declined
- Seabirds:
  - High proportion of species classified as at risk or threatened
  - Fairy terns – total population 43 individual birds, 10 breeding pairs.
  - Black petrel low survival rates of concern
  - Cook's petrel numbers increasing

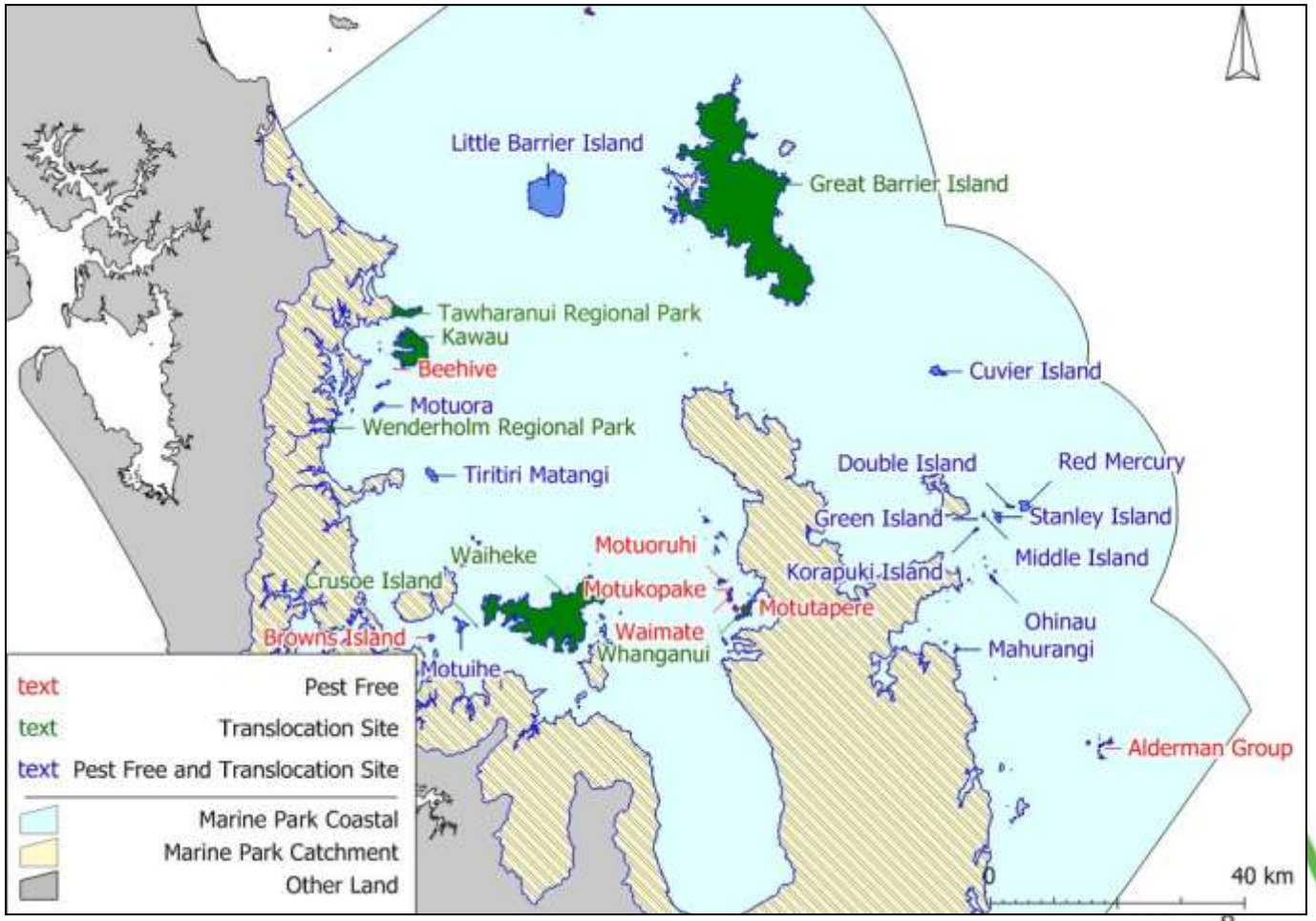
Coast & Catchment Ltd
Environmental Consultants

Island native forest cover



Coast & Catchment Ltd
Environmental Consultants

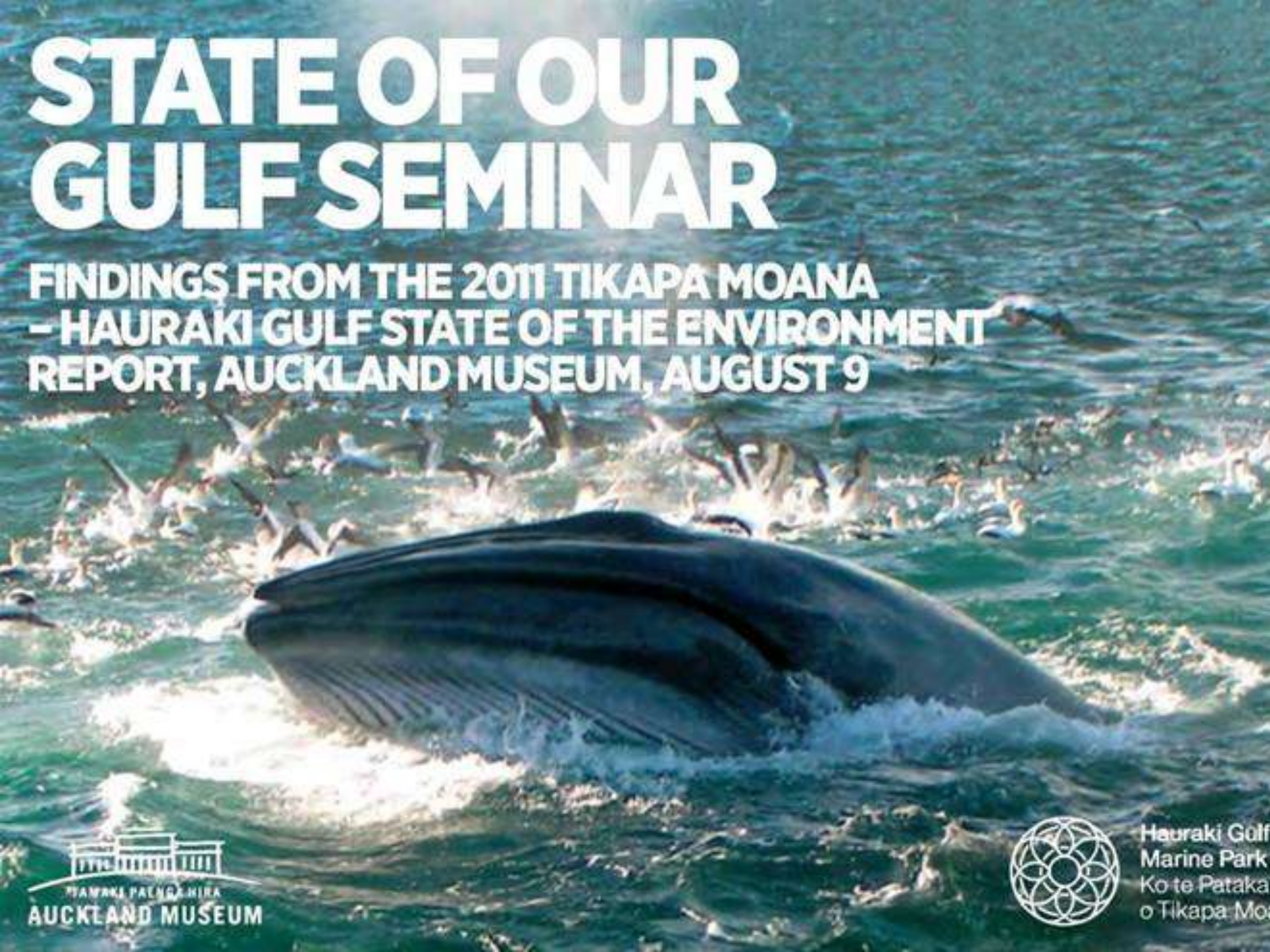
Pest free sanctuaries and translocation sites



& Catchment Ltd
Environmental Consultants

Conclusions

- Major loss of environmental quality, diversity and function
- Ongoing and progressive degradation
- Cumulative impacts
- Vision for the Gulf
- Is it possible to improve environmental outcomes without compromising social and economic


STATE OF OUR GULF SEMINAR
FINDINGS FROM THE 2011 TIKAPA MOANA – HAURAKI GULF STATE OF THE ENVIRONMENT REPORT, AUCKLAND MUSEUM, AUGUST 9
AUCKLAND MUSEUM
Hauraki Gulf
Marine Park
Ko te Pataka
o Tikapa Mo