



Photo: P. Caiger

Lessons from Leigh: ⁴⁴~~40~~ years since NZ's first marine reserve

- Latest research from the Gulf's three oldest MPAs
- How's the QMS working out for the Gulf?
- What about "Fishing Parks"?
- A few brief thoughts on MPA design

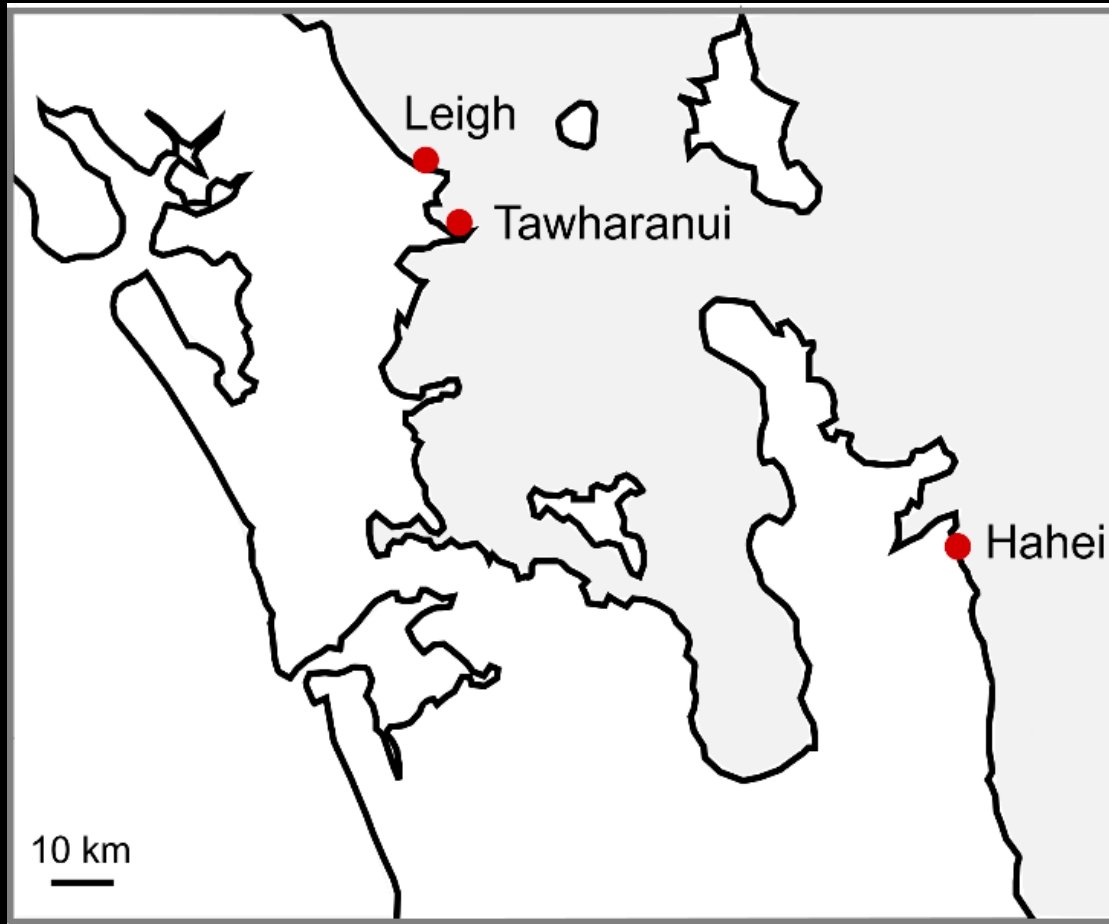


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Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Latest research from three marine reserves... (same story)



Leigh - 5km, 0.8 km offshore (1977)



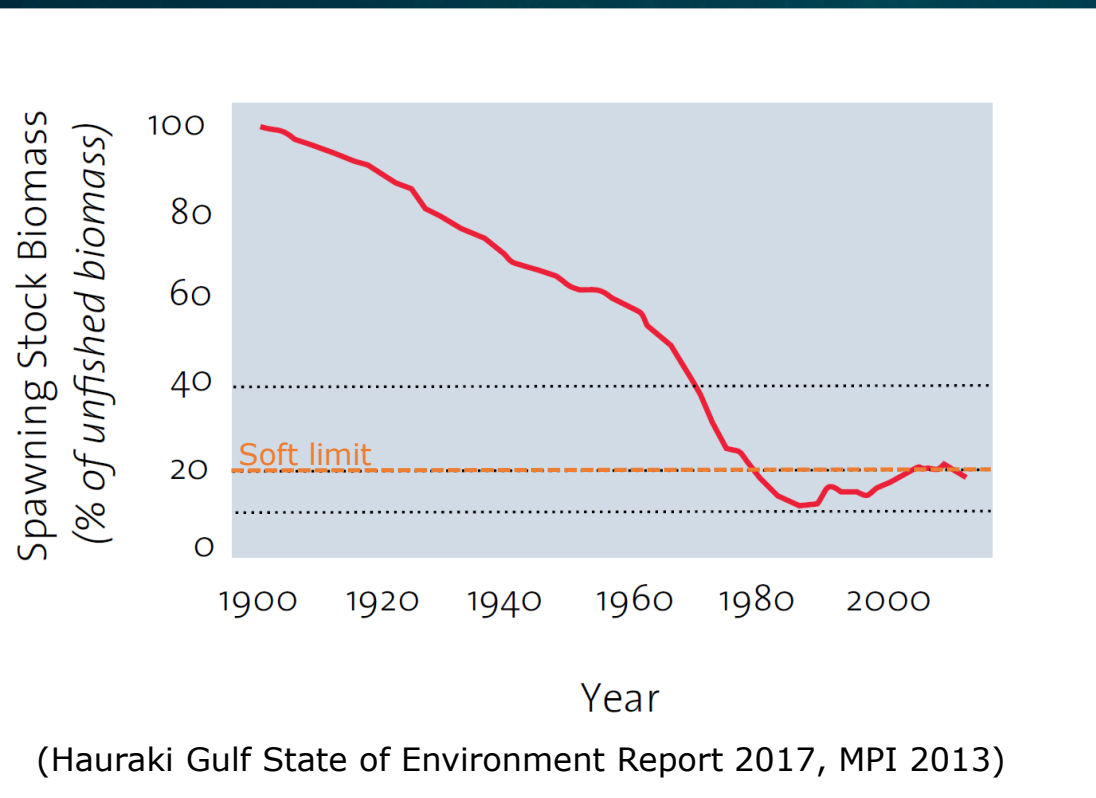
Tawharanui - 4km, 0.5-1 km offshore (1982)



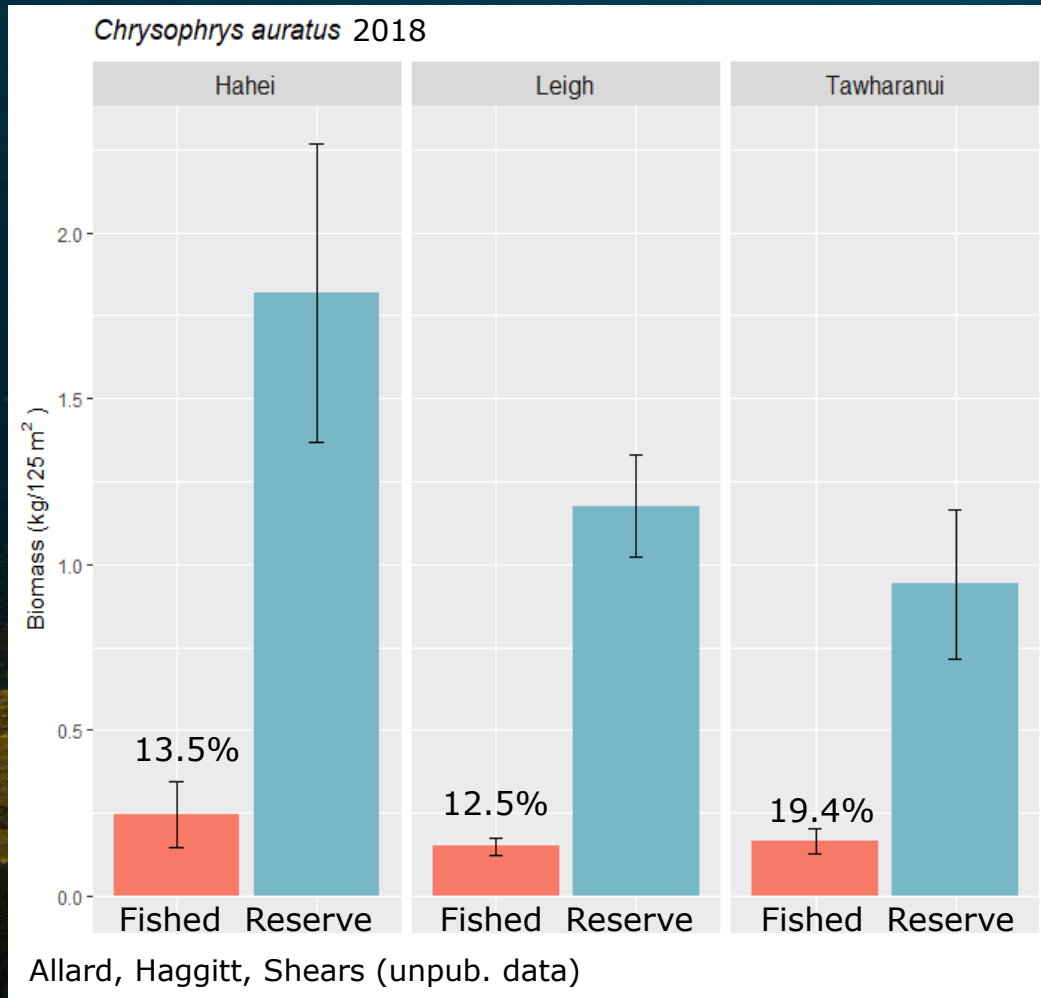
Hahei - 4km, ~2km* offshore (1993)



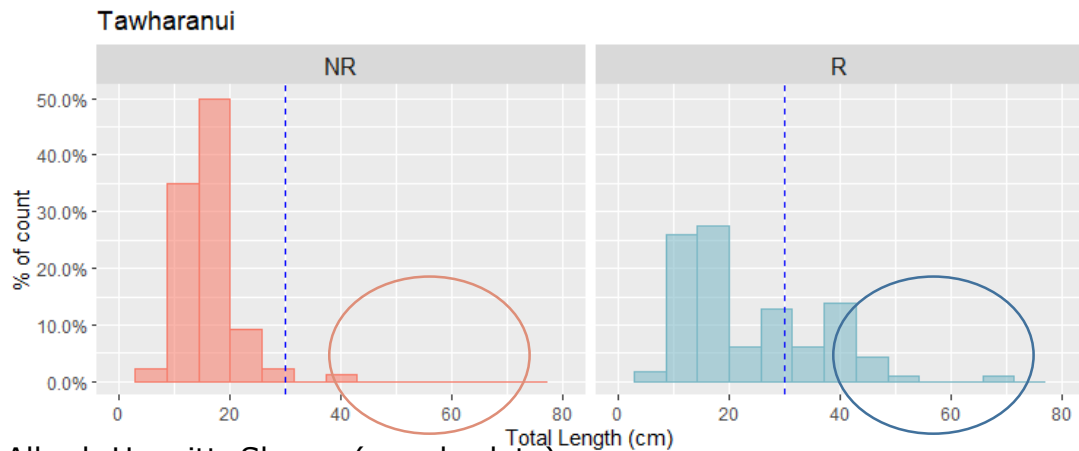
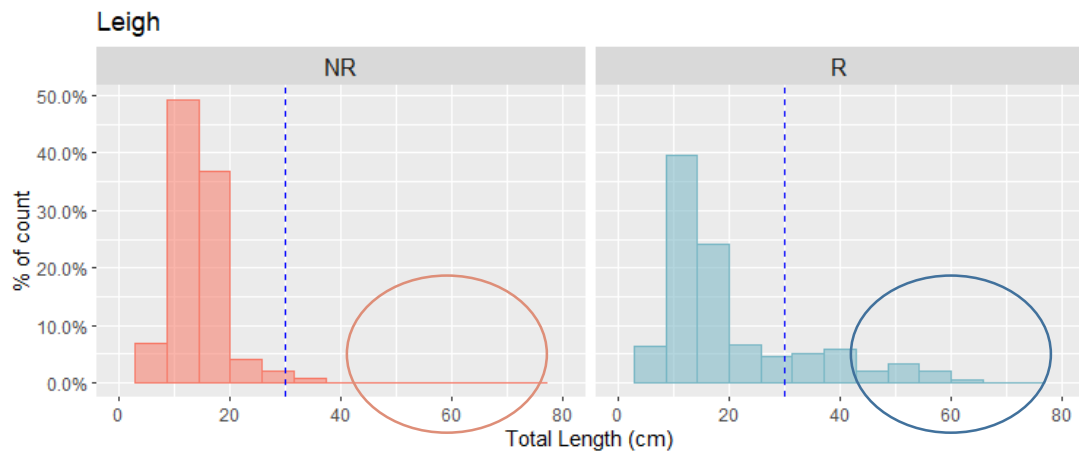
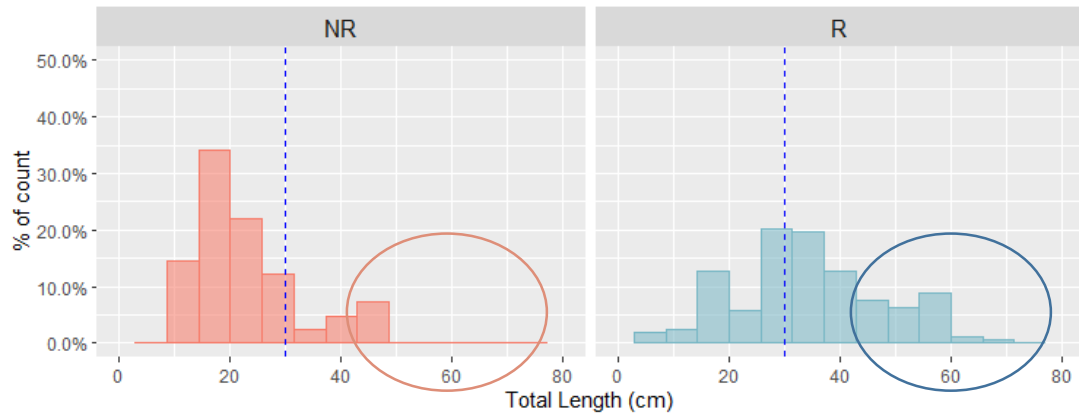
Snapper *Chrysophrys auratus*



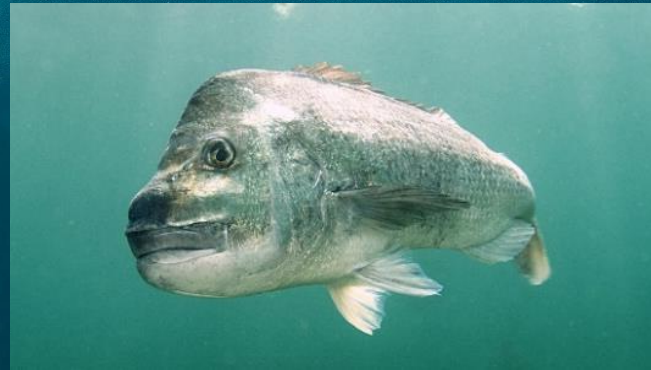
Snapper *Chrysophrys auratus*



Hahei Snapper size structure 2018



Allard, Haggitt, Shears (unpub. data)

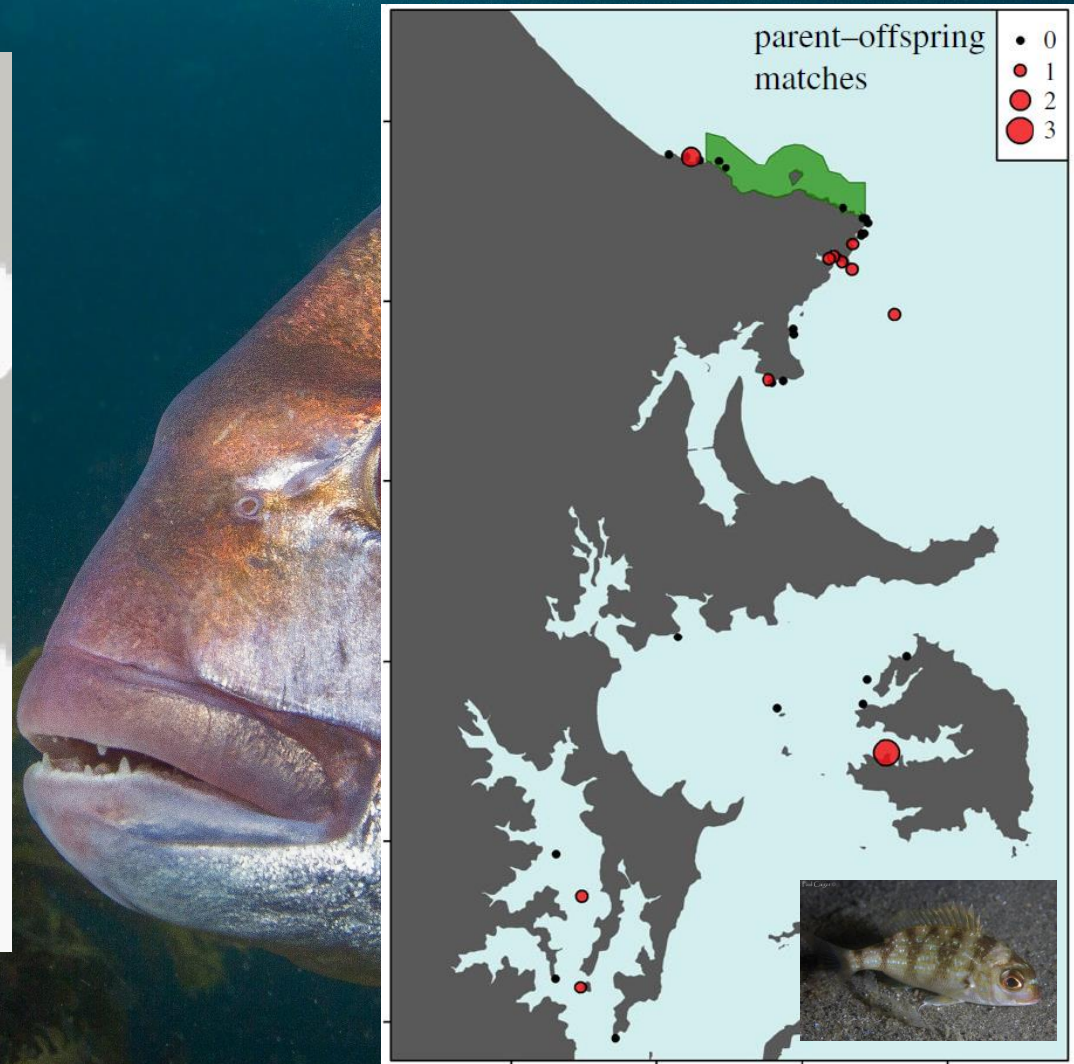


Snapper egg production ~18 x higher in marine reserves (Willis et al 2003)

How much do snapper in reserves contribute to the surrounding fishery?



Larval dispersal modelling suggest snapper larvae from the Leigh Reserve settle in the surrounding area (Le Port et al. 2014)



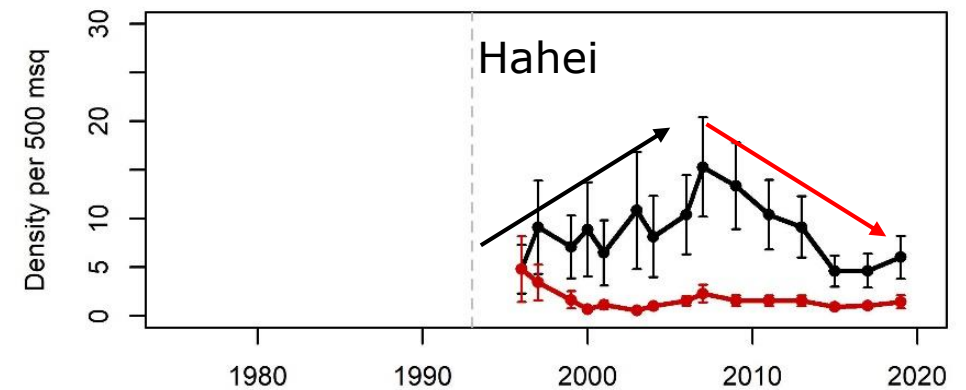
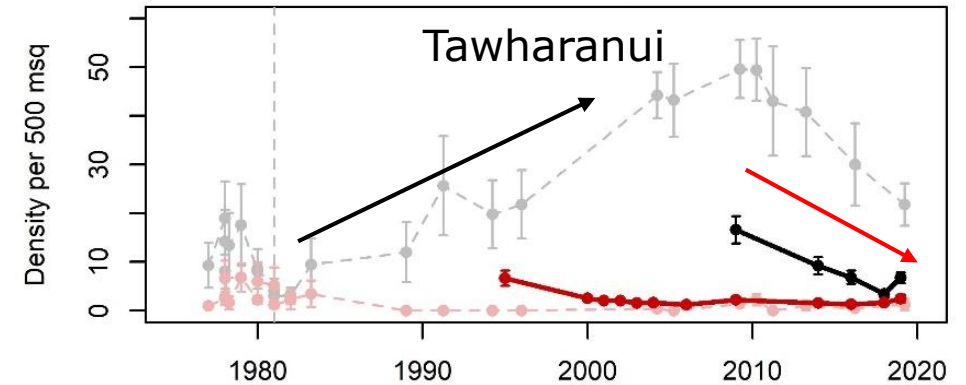
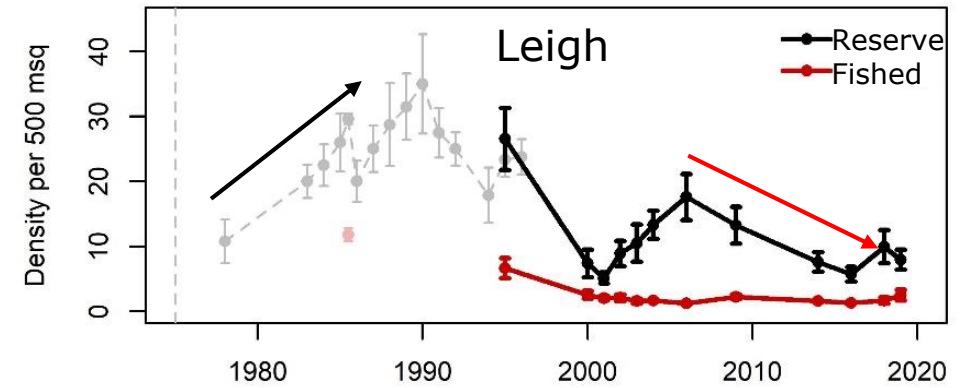
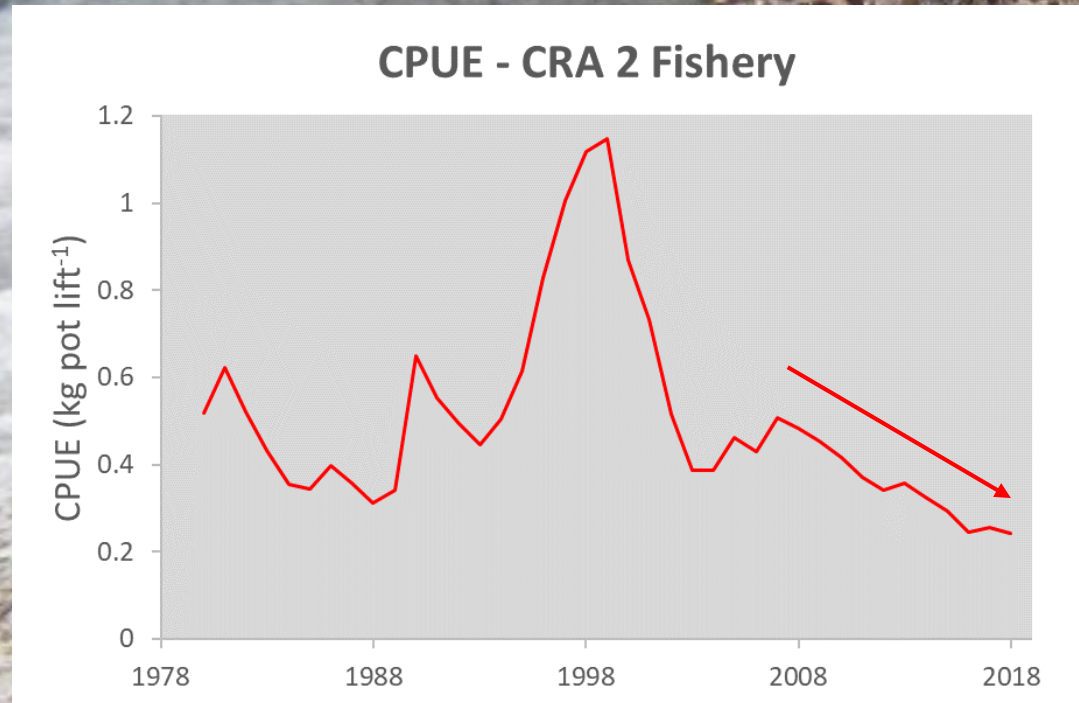
Genetic parentage analysis indicates 10.6% of juvenile snapper in surrounding area originate from reserve (Le Port et al. 2017)

Crayfish *Jasus edwardsii*



Crayfish *Jasus edwardsii*

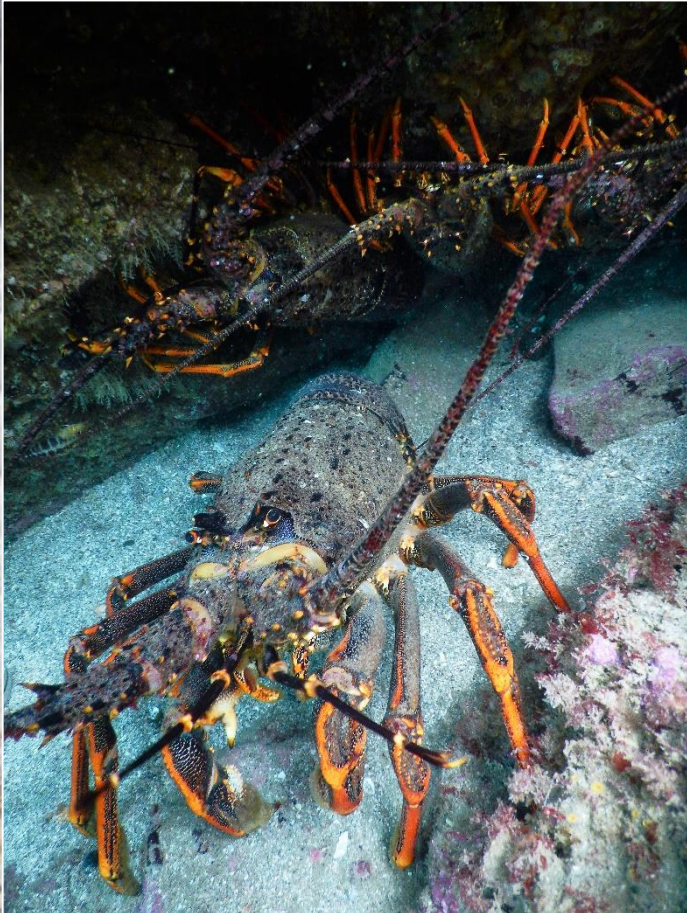
- Recent declines in reserves follow wider trends in fishery; due to movement beyond boundaries combined with period of low recruitment
- Density legal-sized individuals at fished populations <10% of that found in reserves



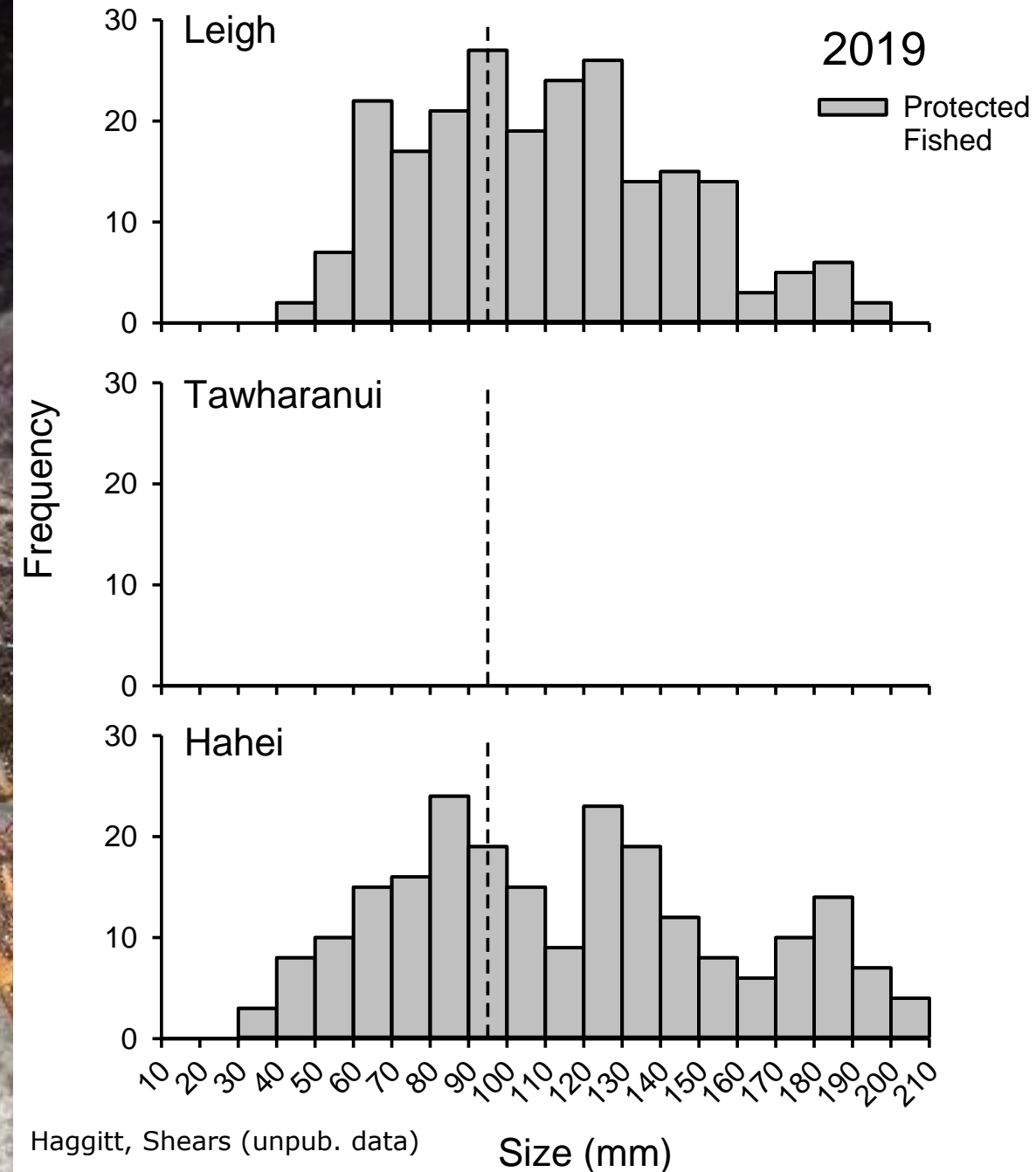
Haggitt, Grace, Kelly, MacDiarmid, Ayling, Shears (unpub. data)

Crayfish *Jasus edwardsii*

- Egg production in reserves currently 15-23 times higher than in fished areas
- Likely a conservative estimate



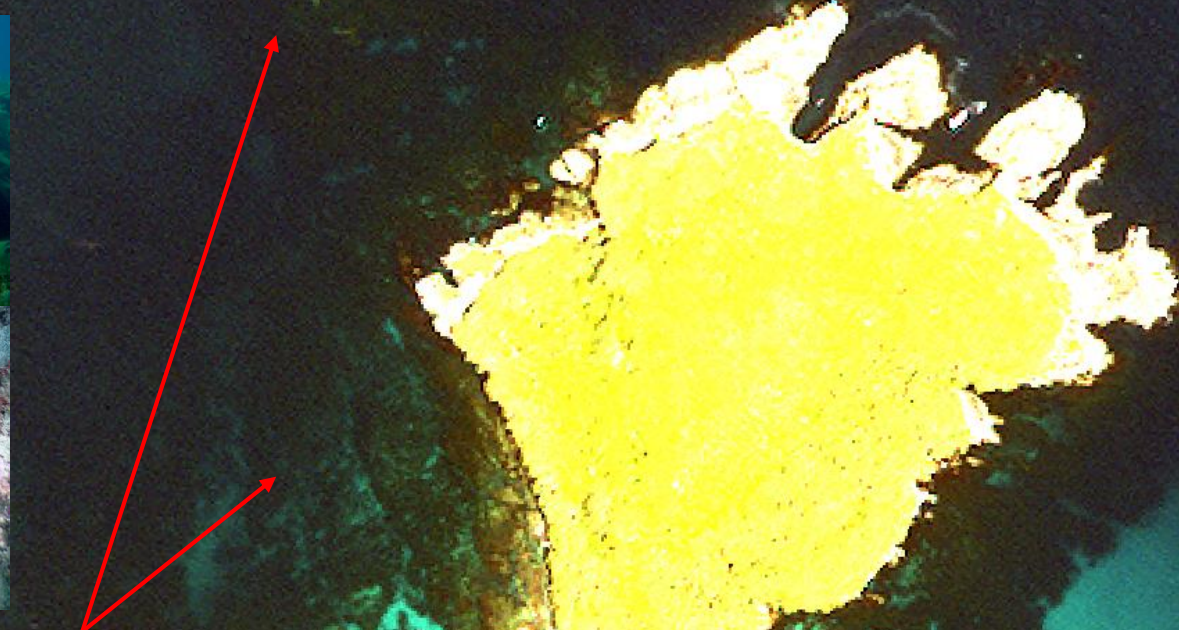
"The mating systems of overfished lobster populations now persist as a scramble competition for mates among barely mature individuals that mate at most once before capture by fishers" (Butler et al. 2015)



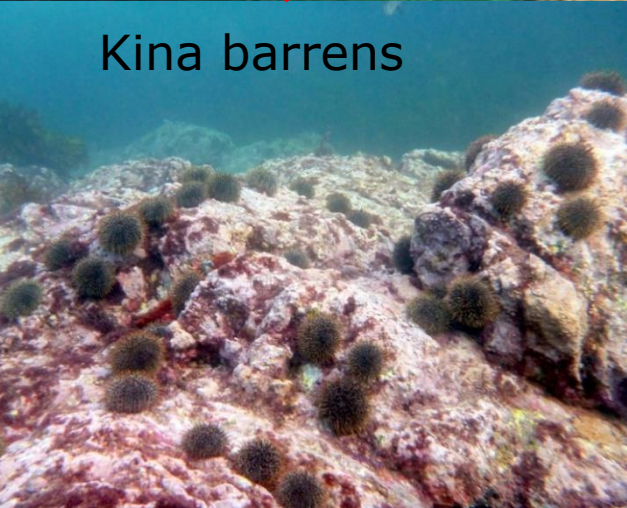
Large-scale ecological changes in marine reserves

1975

2015

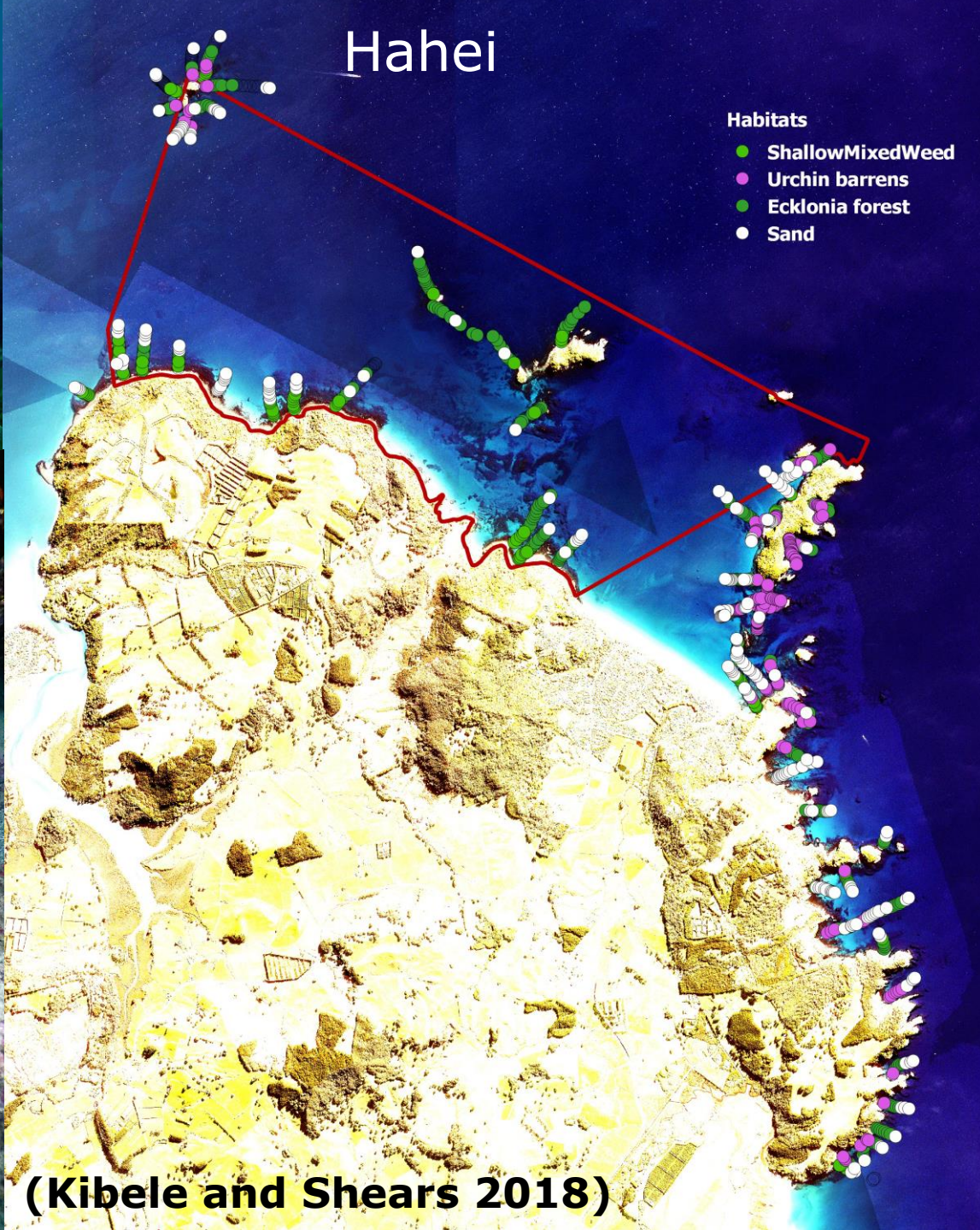


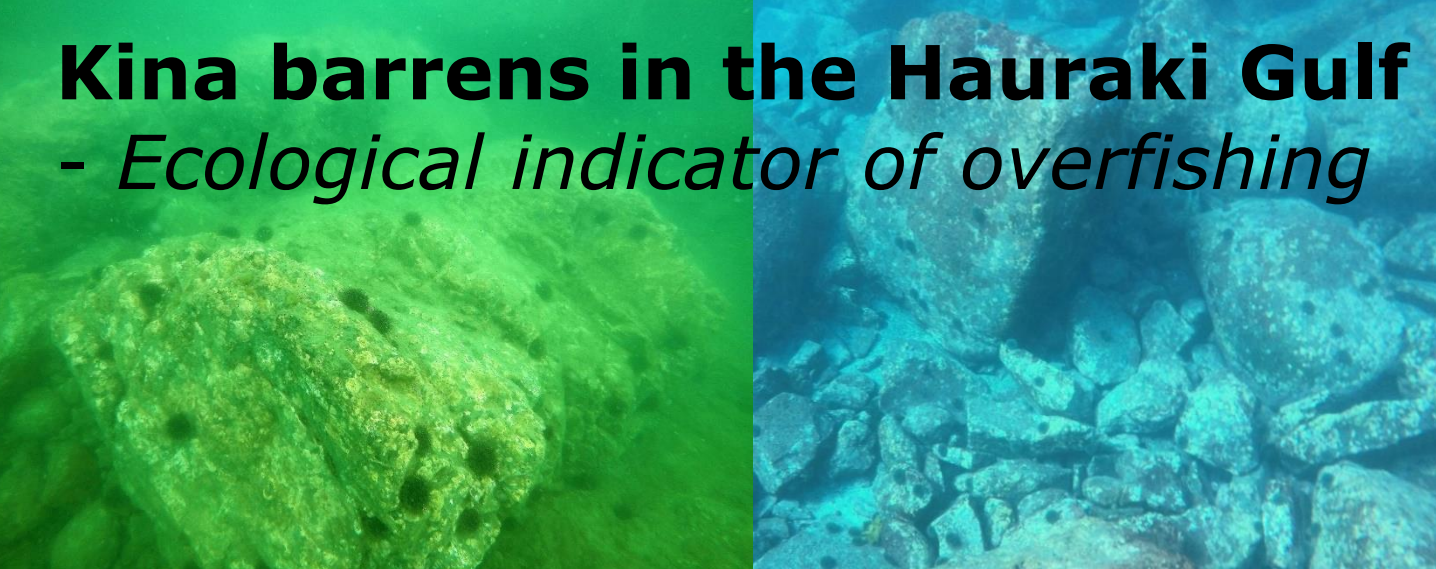
Kina barrens



Kelp forest

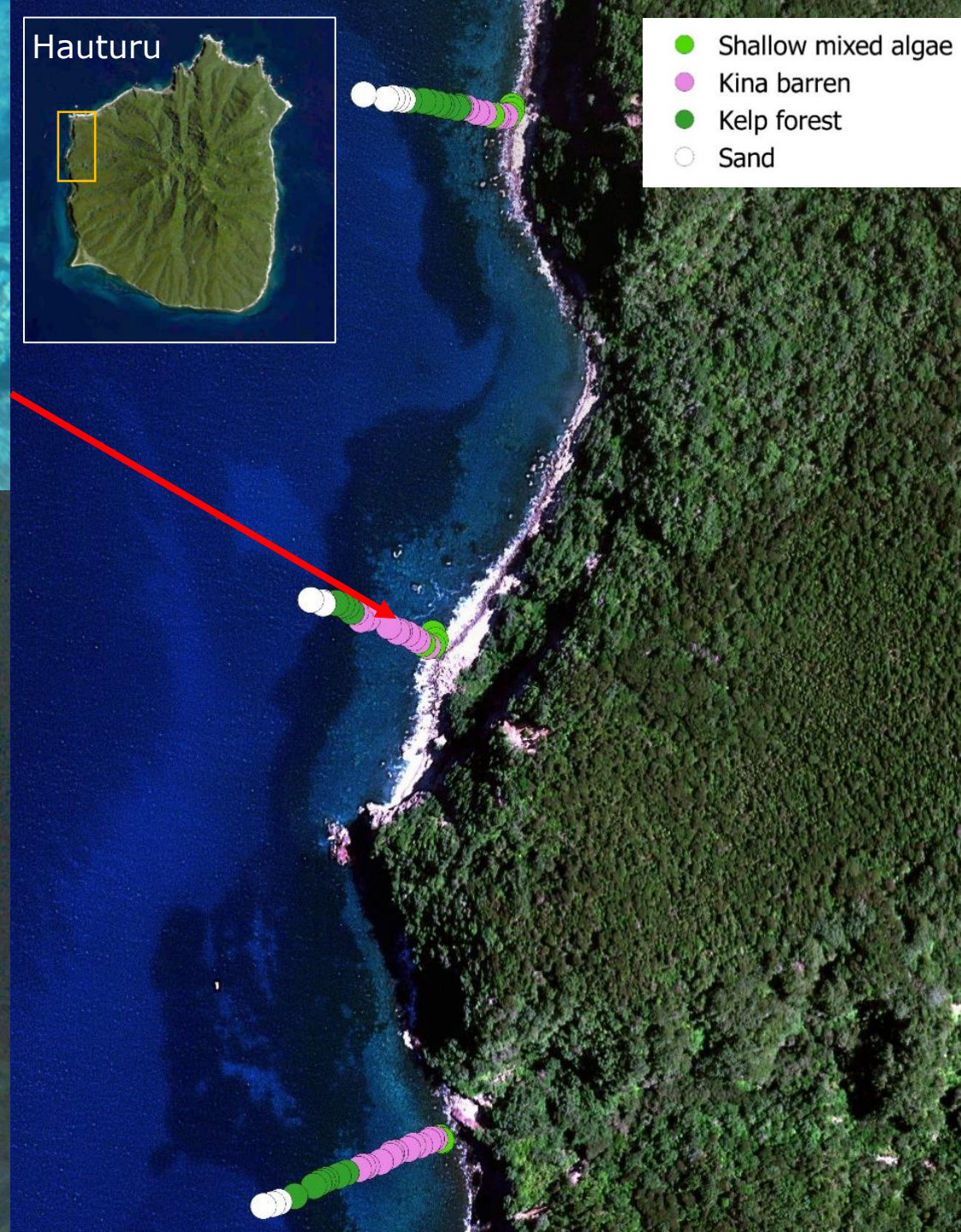
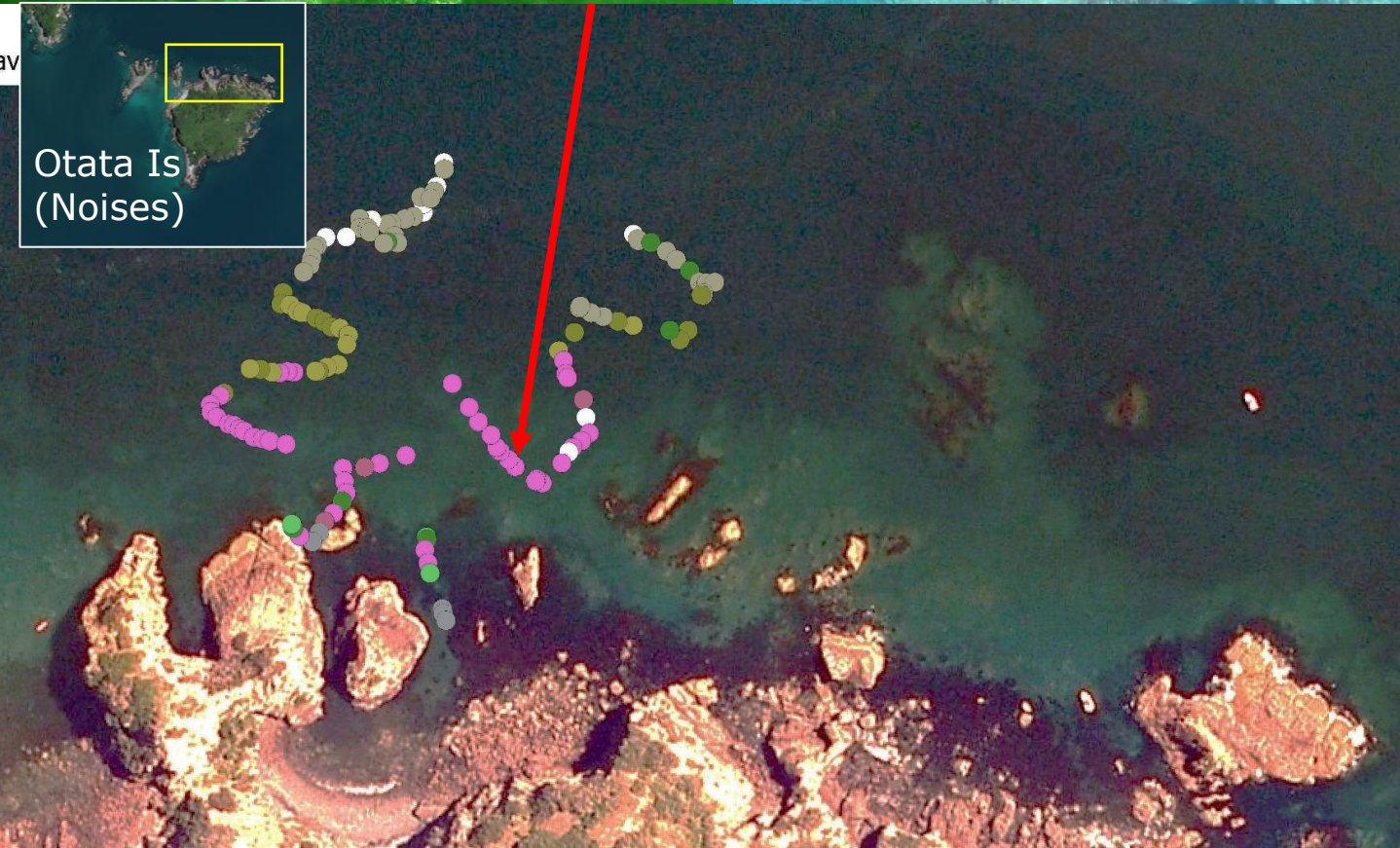




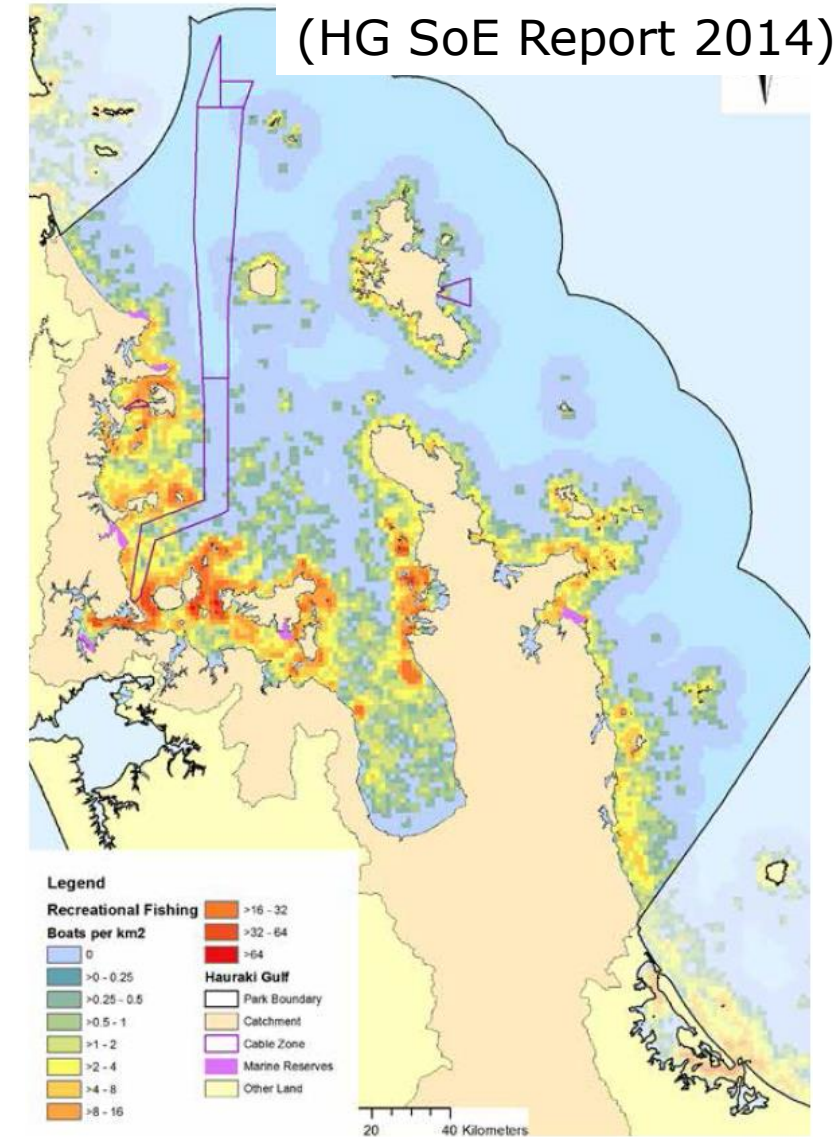
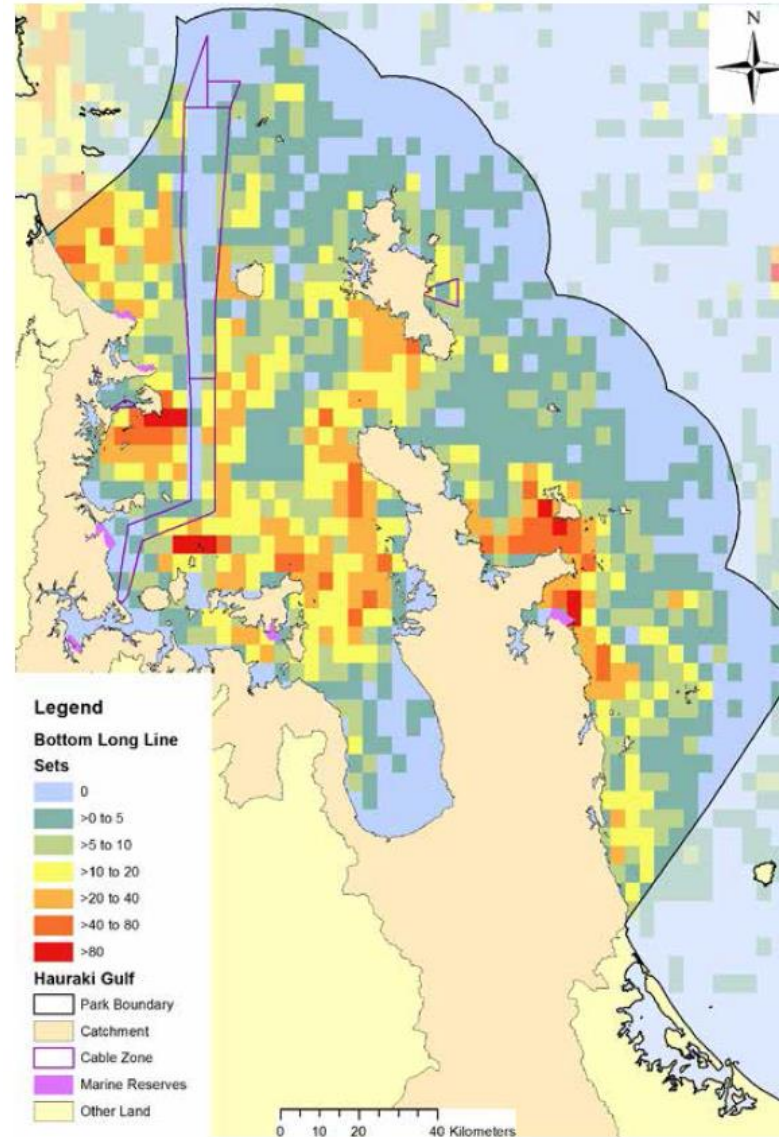
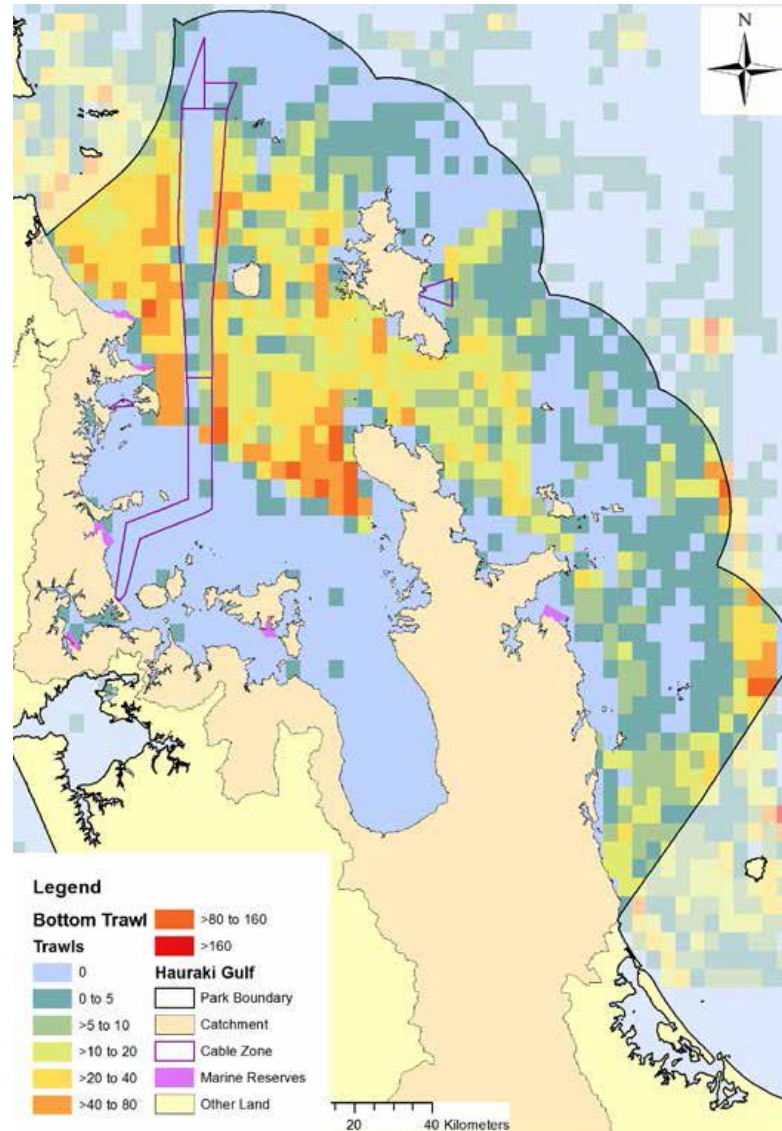


Kina barrens in the Hauraki Gulf

- *Ecological indicator of overfishing*



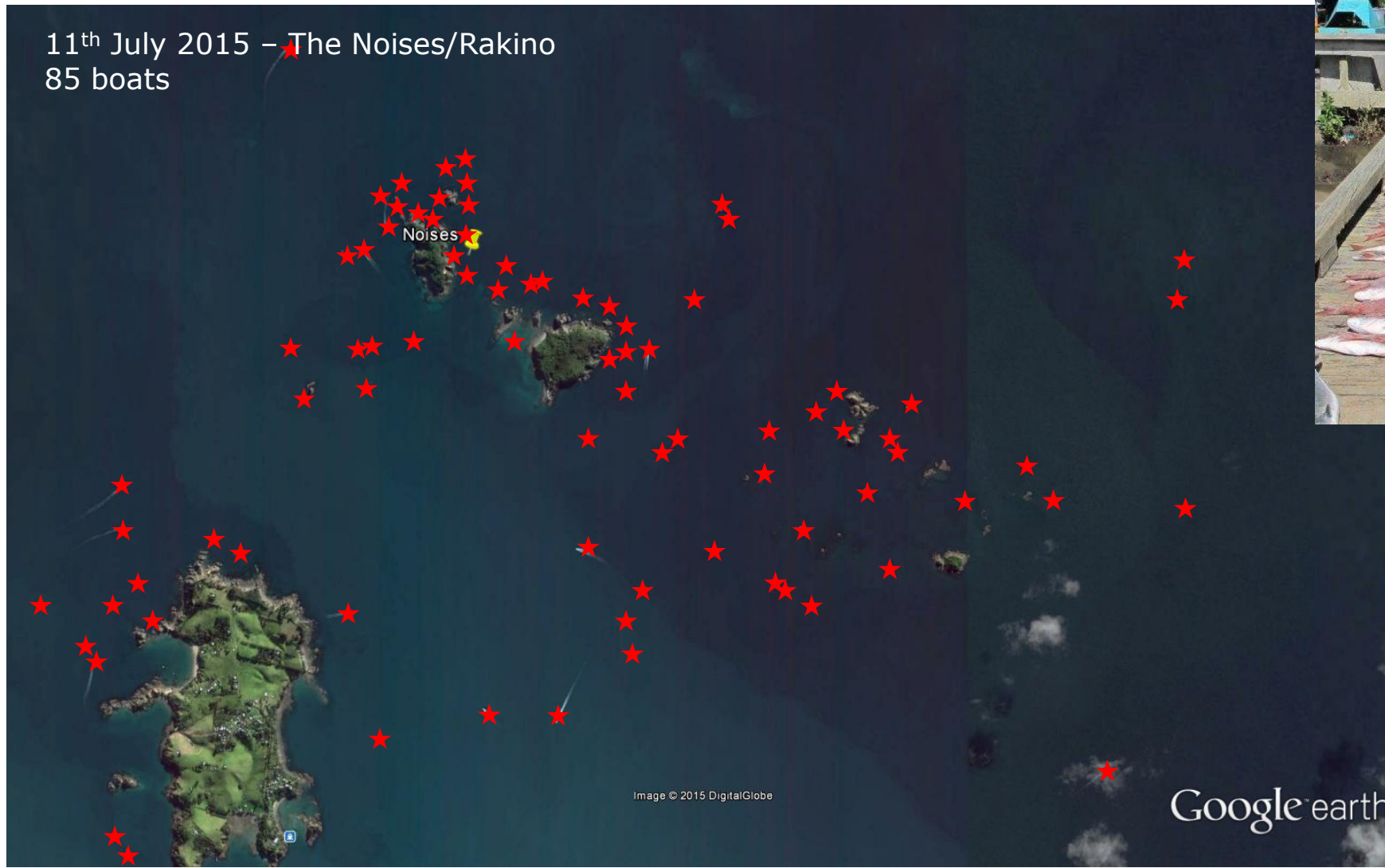
Hauraki Gulf Marine Park: Fishing 2011-2013



(HG SoE Report 2014)

- Many species, many methods, many people – all increasing.
- 6 MR's (0.3% of HGMP); fishing also prohibited in cable protection zones (4.9% of the Gulf)

11th July 2015 – The Noises/Rakino
85 boats



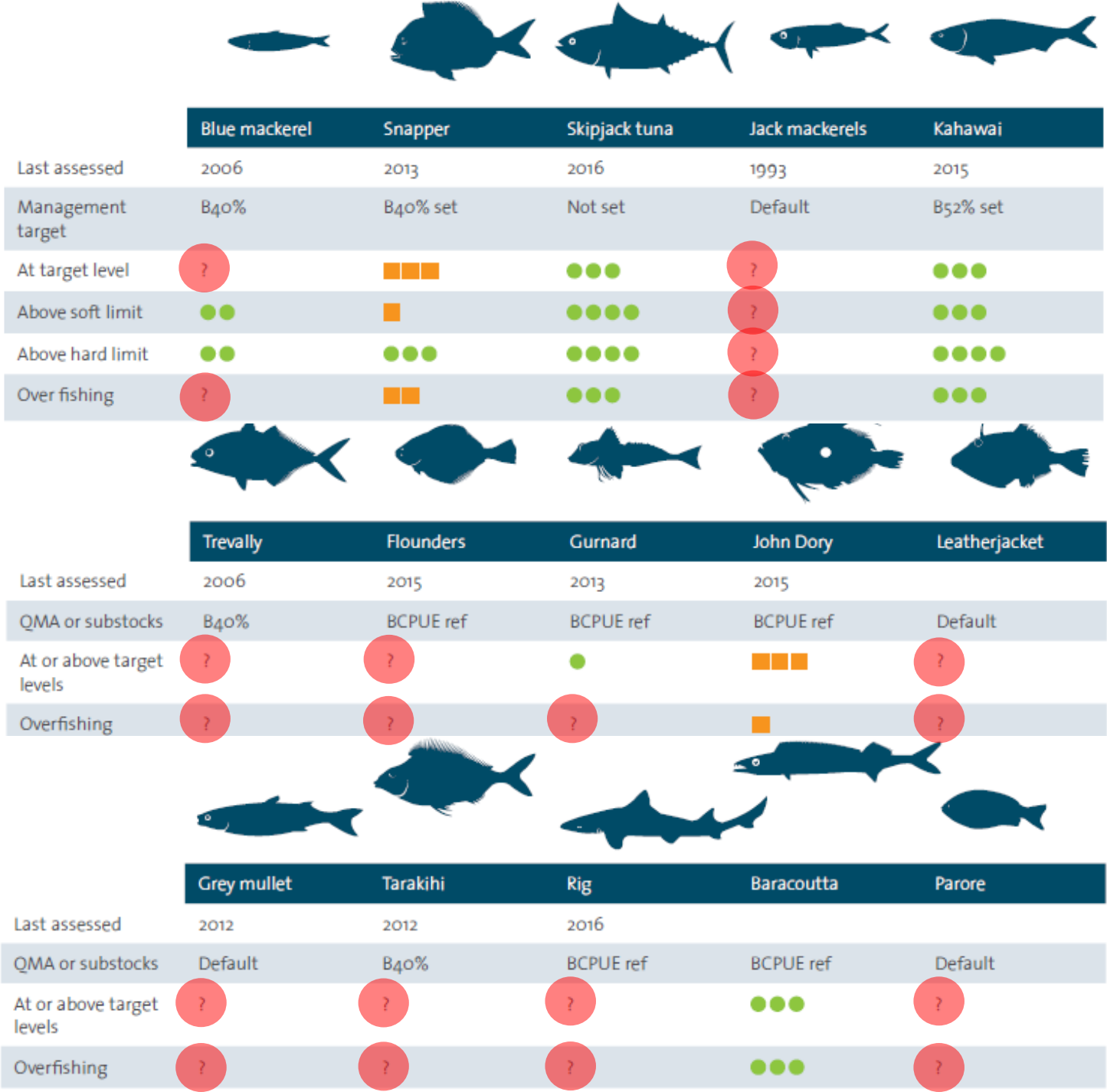
30+ years of QMS – How's that working out for the Hauraki Gulf?

- Status of 15 main finfish species:
 - 3 are not likely overfished
 - 2 likely overfished (incl. snapper)
 - 10 unknown

Time for some new ideas on how to get a stock above a target level?

- Relatively small protected areas can protect a disproportionate amount of stock and contribute to replenishment of wider fishery
- Ecosystem impacts are also reversed through long-term protection
- MPA's should be incorporated into fisheries management not implemented in isolation (Gaines et al 2010)

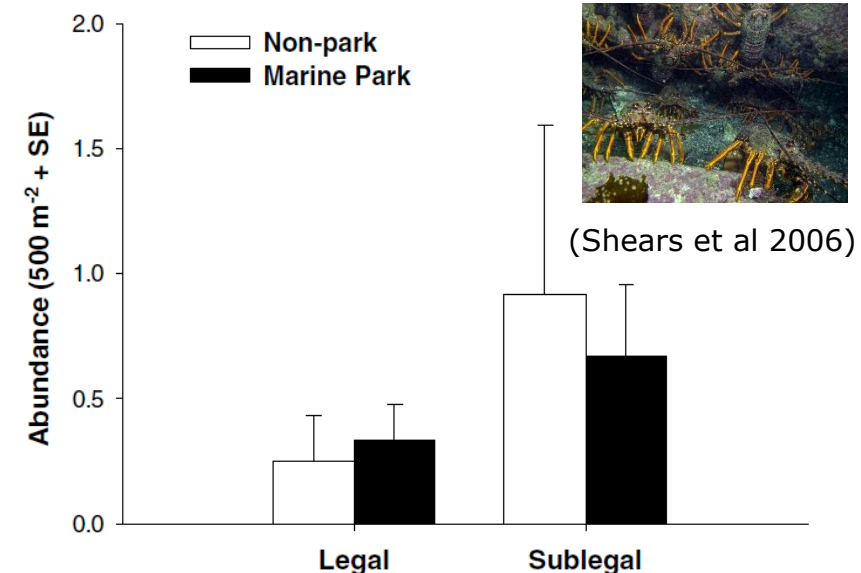
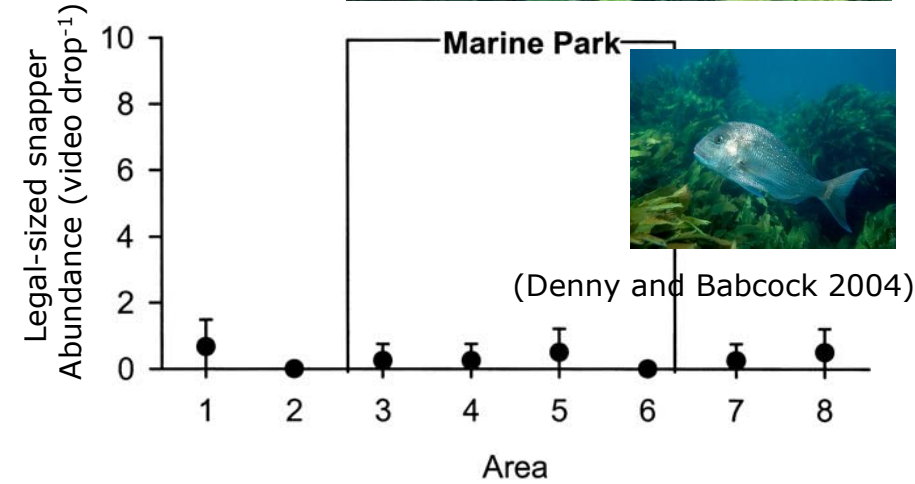
Source: Hauraki Gulf State of Environment Report 2017



What about “Fishing parks”?

Can we have our cake fish and eat it too?

- MPAs that exclude commercial fishing are an attractive option to many
- NZ examples: Mimiwhangata Marine Park, Poor Knights Islands (1981-1998)
- Research demonstrates small marine parks have no value for exploited species or for biodiversity (access to resources)
- Larger-scale exclusion of commercial fisheries may have wider value for some species and biodiversity, and also allow for better management of recreational fishing



Designing MPAs (in 1 minute...)

- What is/are the goal(s) of an MPA?
 1. To divide up access to resources?
 2. Protection of exploited species for potential fisheries gains?
 3. Protection of biodiversity from the impacts of fishing?
- This determines the type of MPA needed and how it is designed, e.g. no-take MPAs provide greatest value for biodiversity if designed appropriately
- Simple guidelines based on best available science provides an effective approach to ensuring MPAs are likely to achieve their goals and are possible to manage

