

Revive Our Gulf

Restoration of historic mussel beds

Shane Kelly



Mussel Reef Restoration Trust

- Core group of people who love the Gulf and aren't scared of a challenge
 - Supported by a range of others
- Range of backgrounds and experiences
- Key focus is the restoration of historic mussel beds
- Build on the success of island restoration

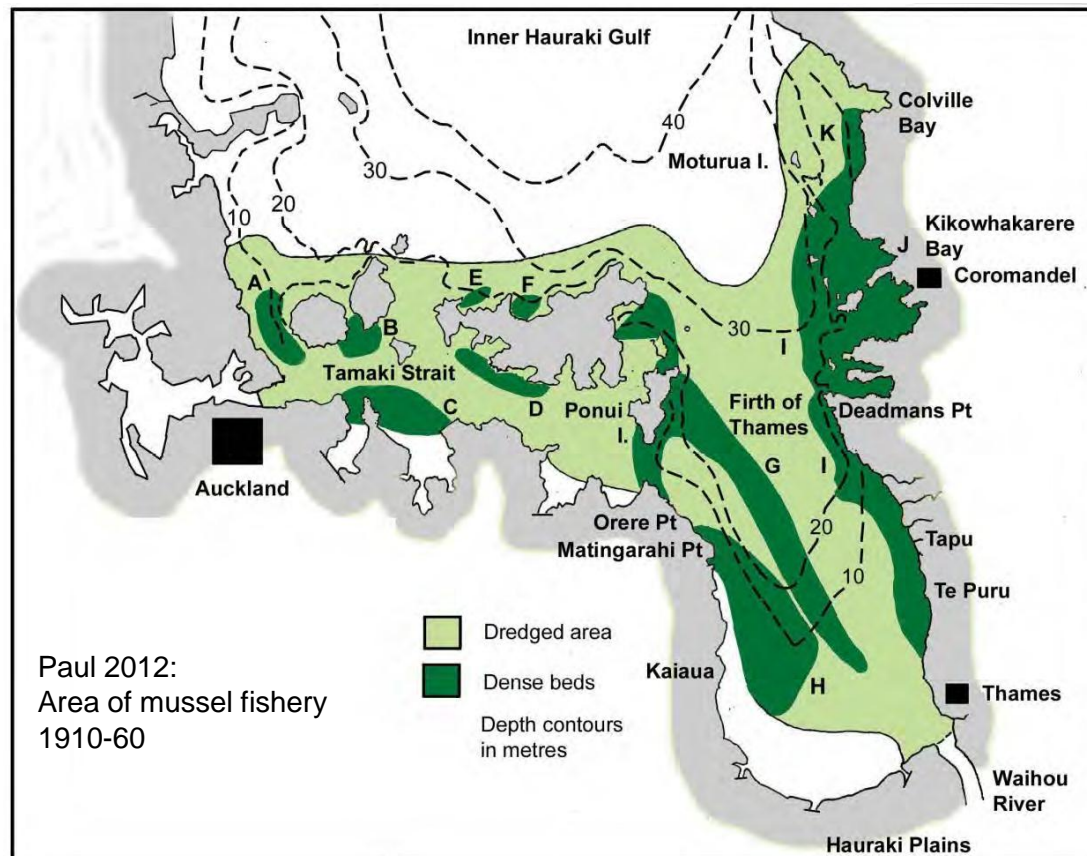


Mussel Reef Restoration Trust

- Understands that this is a long term project
- Restoration underpinned by partnerships, science, enthusiasm, and a determination to make things happen.
 - Mutually beneficial outcomes
 - Maximise chances of success through science and experience
 - Learning by doing
 - Enabling and supporting local initiatives



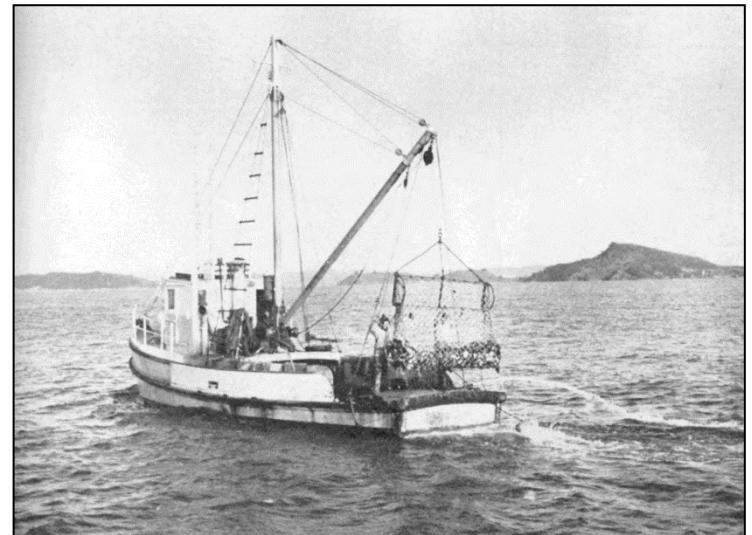
Historic extent of mussel beds



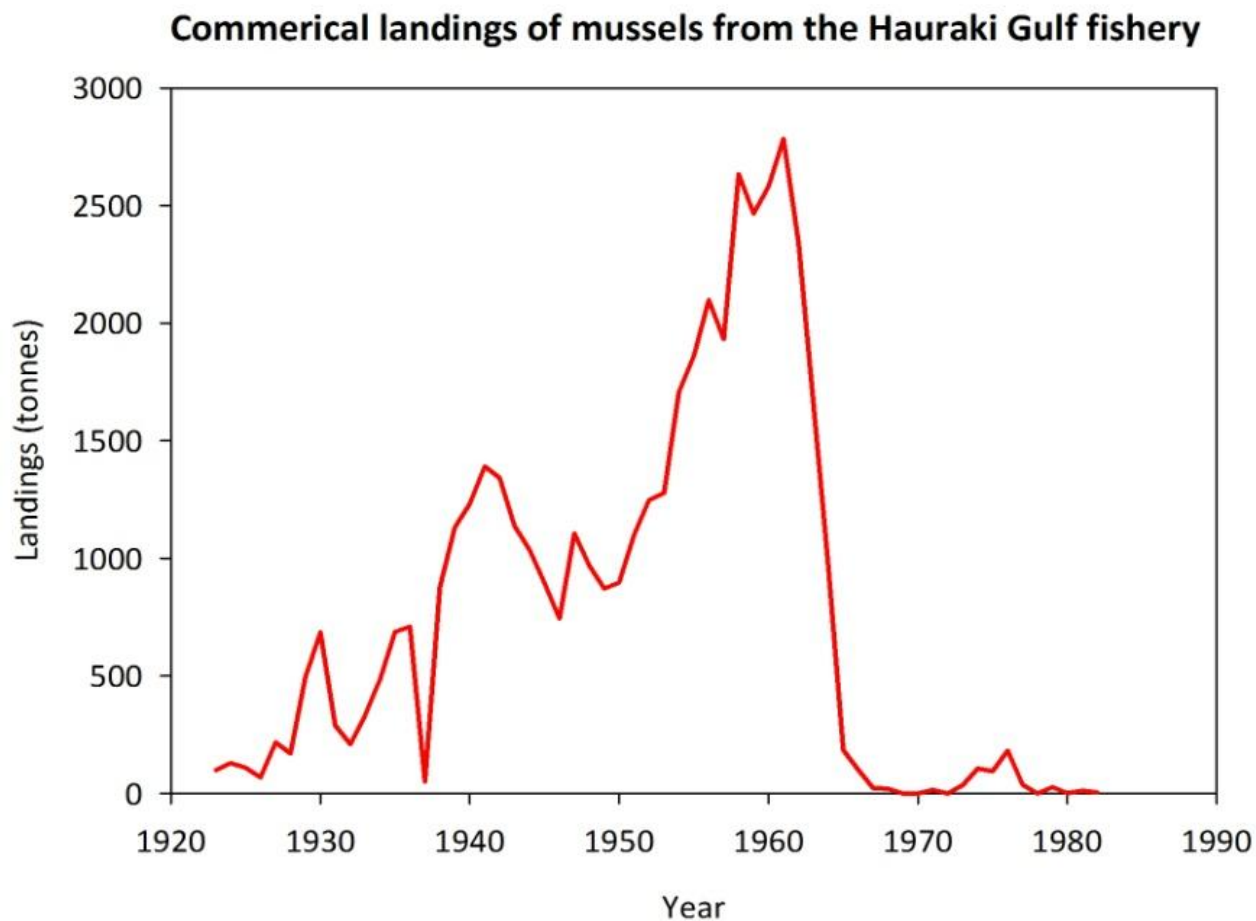


History of the mussel fishery

- Initially important for Māori
- From 1909 markets develop for hand picked mussels
- Dredging from small boats soon after
- 2-3 full time dredge boats by the 1920's



Mussel catches



Today

- No recovery in the 50 years since fishing ceased
- Small remnant beds at:
 - Waimangu Point and Te Mata (Firth of Thames)
 - Whangapoua Estuary (Great Barrier Island)
 - Weiti River (tiny)
 - Kaiaua? (reported but not located)
 - Sandspit



Why should we care?

- Biogenic habitat & food source
 - Complex three dimensional hard structure
 - High biomass and productivity of associated invertebrates
 - Habitat for juvenile fish
 - Food source for adult fish and invertebrates



Why should we care?

- Mussels are ecosystem engineers:
 - Remove plankton & seston
 - Deposit as pseudo-faeces (reduced re-suspension)
 - Control nutrient cycling (reduce algal blooms and anoxic events)
 - Improve water clarity



What are the relic beds like?

- Ian McLeod MSc research
- High abundance of associated invertebrates
- Biomass & productivity 5-7 times higher
- Pre-1950 beds:
 - 100's to 1000's t extra secondary productivity per year
 - Could potentially filter the Firth in days to months vs years

Why haven't they recovered?

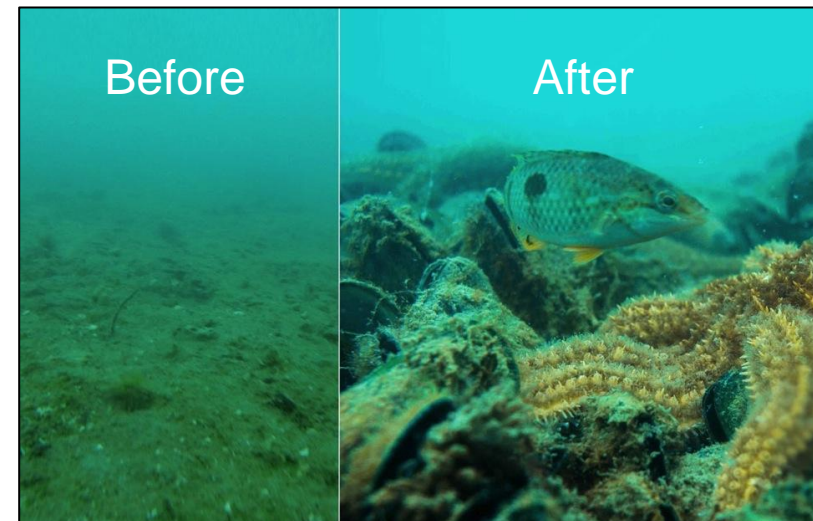
- Environmental change?
 - Caged adults can survive in their former range
- Larval supply?
- Settlement processes?
- Spat/juvenile survival?
- Predation
- **Loss of adult beds**

Trust's achievements to date

- A new organisation
 - Building team, project planning and raising profile
- Support partnerships
 - University of Auckland, aquaculture industry, tangatā whenua.
- Funding and in-kind support
 - Seed funding (OBC, HGF, personal donations)
 - Research and monitoring (UoA, Coast and Catchment, Saltwater Science, volunteers)
 - Mussels (NIML)

Trust's achievements to date

- Year one: proof of concept
 - 7 one tonne beds
 - Good survival, but two beds suffered storm damage
 - Latest survey 580 live mussels per m² vs 18 dead mussels
 - Settlement of spat on monitoring ropes
 - Little recruitment



Trust's achievements to date

- Year two:
 - Trust, with the support of NIML has spread 60 tonnes of mussels (~3.5 million mussels) over 4 ha area
 - Baseline monitoring planned
 - Mana whenua and community initiatives
 - Ngati Whatua o Orakei established initial beds in Okahu Bay
 - Community interest and small deployment on Meola Reef (Waitemata Harbour)



Mussel farms vs mussel beds

- Both provide filtration.
- Longlines frequently disturbed – doesn't allow a stable, natural community to develop.
- Benthic habitat beneath farms are modified by the deposition of material from above.
- Beds can be restored in locations where farms are unlikely to be approved.
- Complimentary.

Next steps

- Funding, logistics and security of mussel supply – scaling up.
- Foster industry, research, and Maori partnerships.
- Identification of new areas suitable for mussel deployments.
- Protection of established beds.
- Support local initiatives.
- Development of a nursery farm (unlikely to be required in current industry support continues).

Conclusions

- Beginning of a long and exciting journey
- Many challenges
- Requires ongoing commitment and support by many
 - Impossible to achieve without the support of the aquaculture industry