Mahinga Kai - He Pou Herenga Tāngata, Haere Ake Nei, Haere Ake Nei:

Ngāi Tahu Mahinga Kai Food Safety Framework

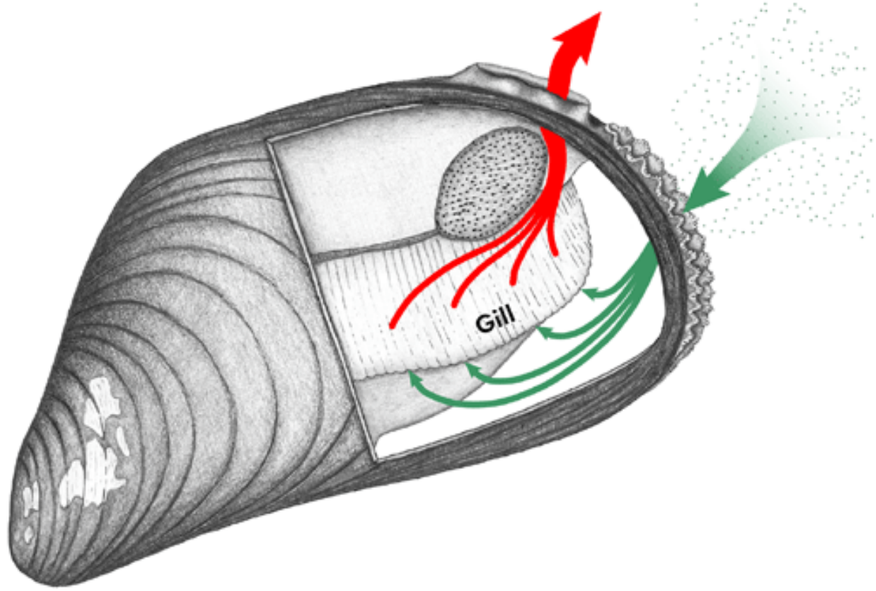
Georgia Bell

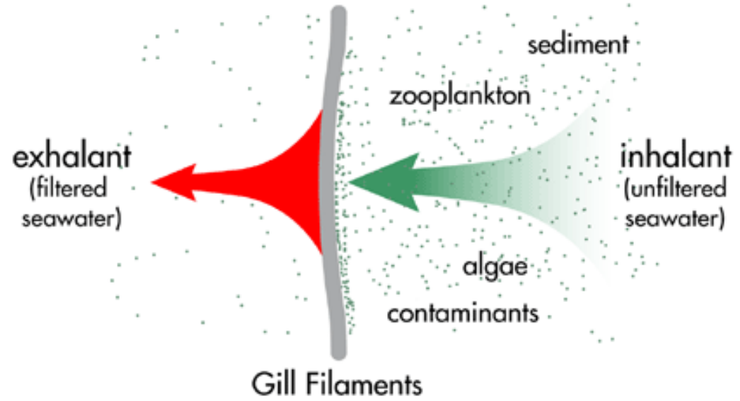
Mahinga Kai

- Natural resources
- Harvesting and knowledge of resource gathering
  - Hundreds of years old
  - Anchors us to our whakapapa
- Cultural, spiritual and physical sustenance
- Traditional food, practices involved, and gathering places
  - Wild foods
  - Cultivated

Challenges for Mahinga Kai

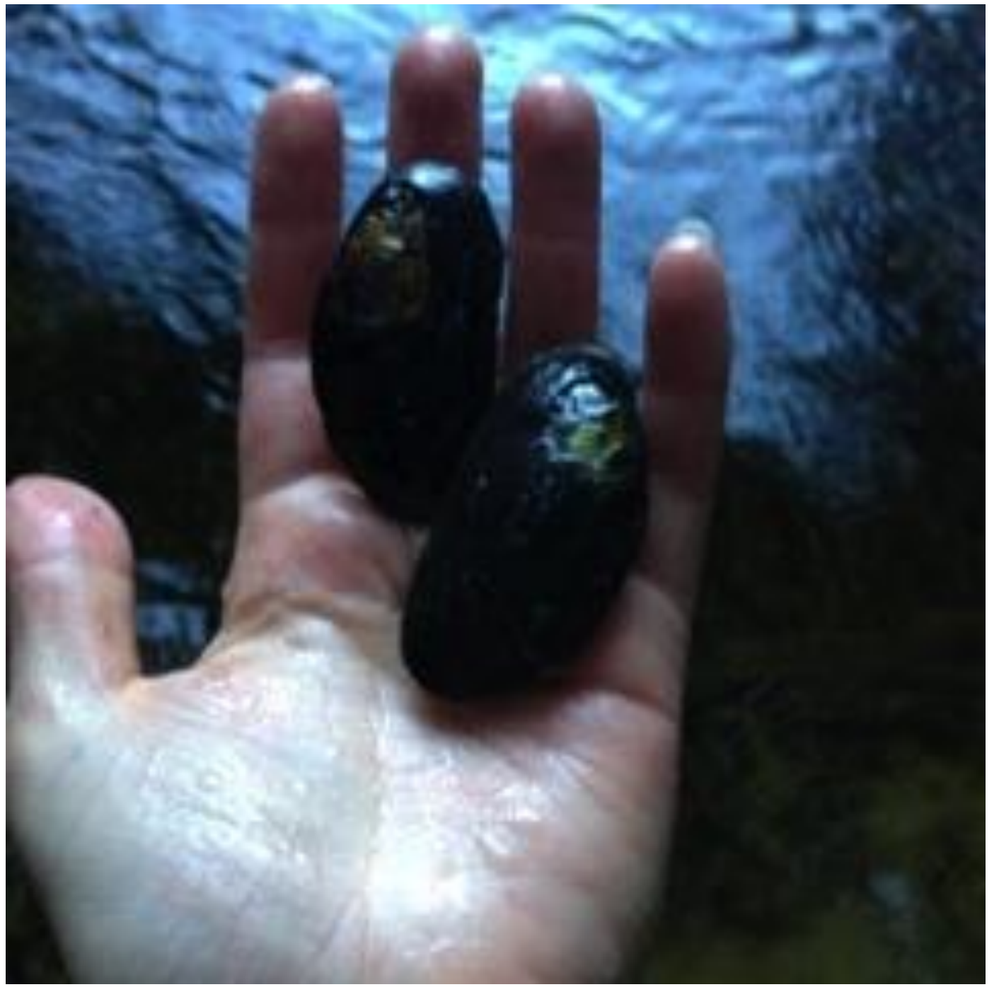
- Land development
- Loss of habitat
  - Species decline
- Anthropogenic pollution
- Impacted by upstream activities
  - Lowlying areas
- Bioaccumulate in kai
  - Filter feeders
- Risks unknown
  - Knowledge gap





Challenges for Māori

- He pātaka kai - food cupboard
  - Manaakitanga
  - Large harvests for events
- Māori at higher risk of consuming contaminants
  - Eat more
  - Harvest more
  - Eat raw
- Harvesters unsure about health risks
- Mātauranga māori



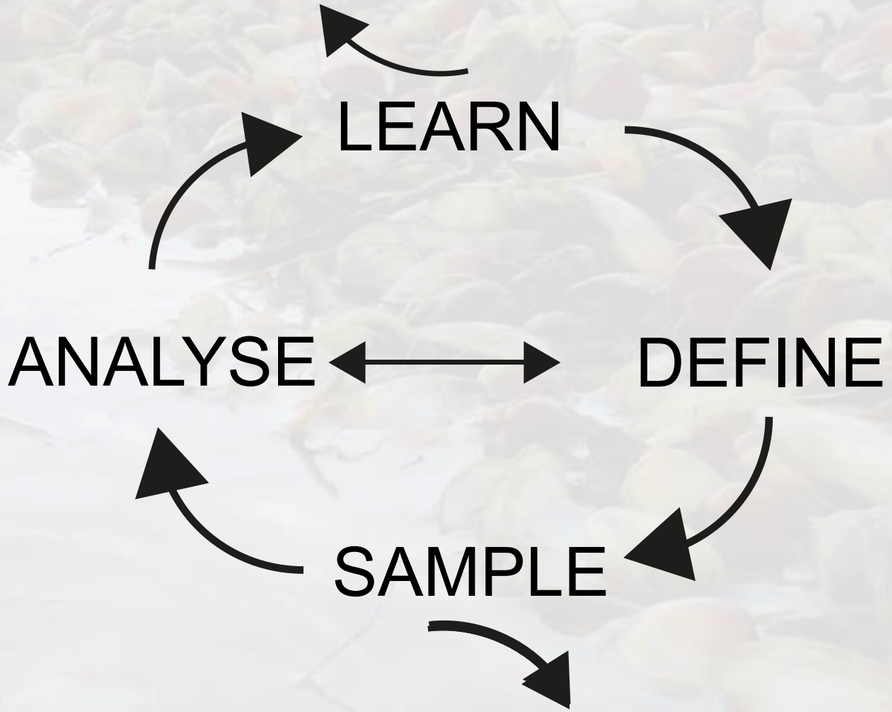
Customary Fisheries

- Fishing rights for tangata whenua
  - Co-management
  - Sustainability
- Current gap in food safety
  - Commercial operations
  - Recreational

Ngāi Tahu Mahinga Kai Food Safety Framework

  - Deliver monitoring tools and expertise to the community
  - Marine

Models
Further assesment tools
- Microbial Source Tracking
Optimise framework



Data analyses
Determine risk
- National standards
Reporting
- Presentations

Sites of concern
Mātauranga Māori
- Pūrākau
- 'Kanohi ki te kanohi'
- Hui/wānanga
Previous monitoring
- review

Survey design
- Species
- Time
- Contaminants of concern
- Climate data

Case Study

- Whakaraupō Mātaitai
  - Ngāti Wheke
  - Lyttelton Harbour
- Water and sediment
- Actively harvested, mussels, cockles, pāua (including the hua)

https://teara.govt.nz/en/photograph/5107/paua-gut

Whakaraupō Mātaitai Sampling Sites

Contamination Suite

Bacteria

- Total bacterial counts, *E. coli*, feacal coliforms, Enterococci
- *Salmonella*, *Campylobacter*, *Listeria monocytogenes, Vibrio spp.*

Virus

- Norovirus

Metal

- Arsenic, cadmium, chromium, copper, lead, nickel and zinc

Guidelines for Shellfish Harvesting Areas (MAF, 2006)

Water	Shellfish
Faecal coliforms:	***E. coli*:**
10% allowable limit for exceedances over 43 MPN/100 mL	10% allowable limit for exceedances over 700 MPN/100 g
Median measuring below 14 MPN/100 mL	Median below 230 MPN/100 g

Guidelines for Shellfish Harvesting Areas (MAF, 2006)

Water

Faecal coliforms:

10% allowable limit for exceedances over 43 MPN/100 mL
20% exceeded

Median measuring below 14 MPN/100 mL
Median concentration 3 MPN/100 mL

One guideline exceeded

Shellfish

***E. coli*:**

10% allowable limit for exceedances over 700 MPN/100 g
1.9% exceeded
Pāua - highest concentrations

Median below 230 MPN/100 g
Median 20 MPN/100g

Overall – acceptable

Shellfish
Microbial Quality

- Ready to eat
- Aerobic bacterial count (MoH, 1995)

Requiring **no further** cooking / raw
Exceedances:

- No samples over 10^5/g

Requiring cooking:

- No samples over 5 x 10^6/g

https://teara.govt.nz/en/photograph/5107/paua-gut

Shellfish
Microbial Quality

- Ready to eat
- Aerobic bacterial count (MoH, 1995)

Requiring **no further** cooking / raw
Exceedances:

- No samples over 10^5/g
  = five pāua samples exceeded maximum
  - potentially at risk eating Pāua raw with hua

Requiring cooking:

- No samples over 5 x 10^6/g
  = within limits

https://teara.govt.nz/en/photograph/5107/paua-gut

Microbial Quality - Pathogens

	Site	Species	*Listeria sp*	*L. monocytogens*	*Salmonella*	*V. parahaemolyticus*	*V. cholerae*	*V. vulnificus**	*V. alginolyticus**
Kaimoana	Cass	Cockles	-	-	-	-	-	-	-
	Sandy	Cockles	-	-	-	-	-	-	+
	Rīpapa	Mussels	-	-	-	-	-	-	++++
	Quail	Mussels	+	-	-	-	-	-	++
	Rīpapa	Pāua	-	-	-	-	-	-	-
	Quail	Pāua	-	-	-	-	-	++	+

Overall risk

- Microbial risks:
  - Water
  - Pāua raw with hua
  - *Vibrio* and *Listeria* species

- No metal risk in shellfish
- No norovirus
- Whānau should cook their kai

Overall risk

- **Microbial risks:**
  - Water
  - Pāua raw with hua
  - *Vibrio* and *Listeria* species

- No metal risk in shellfish
- No norovirus
- Whānau should cook their kai

Rangatiratanga

- Driven by our tangata whenua
- Information used by tangata tiaki
  - Inform harvesters
- Ultimate goal: whānau confidence to engage in their traditional resources
  - Restore food security
  - Inform mitigation strategies for contamination

Photo credit: Claire Hodge

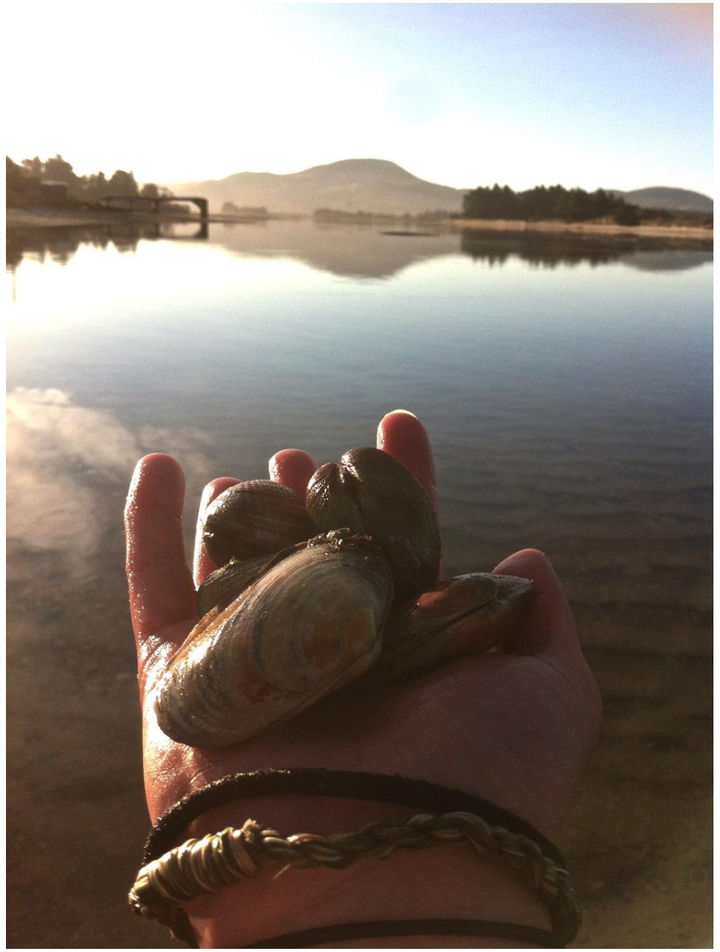
Future Optimisations

- Validate the framework
- Consider other contaminants and species
- Food consumption surveys
    - Specific to local areas

One Health Aotearoa

- Tools and resources directly into our communities
- Model for other areas in Aotearoa
- Kai for our future generations

“Toitū te Marae o Tane, toitū te marae o Tangaroa, toitū te iwi”



Ngā mihi nui

- Ngāti Wheke, Kāti Huirapa, Otago East Coast Taiāpure
- ESR colleagues: Elaine Moriarty, Jymal Morgan, Sarah Coxon, Rob Lake
- Te Tiaki Mahinga Kai colleagues: Dan Pritchard, Emma Kearney, Derek Richards
- Te Rūnanga o Ngāi Tahu: Nigel Scott
- Vision mātauranga capability fund

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Science for Communities

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Te Rūnanga o NGĀI TAHU

Te Tiaki Mahinga Kai
tātai kōrero ka ngaro, tātai kōrero ka rangona

Sample type	Guideline	Microbial/metal types
Shellfish	Microbiological Reference Criteria for Food (MoH 1995)	Aerobic plate counts *Staphlococcus aureus* *Salmonella* and *Listeria monocytogenes* *V. parahaemolyticus* *V. cholerae*
	The NZFSA Animal Products (Specification for Bivalve Molluscan Shellfish) Notice 2006 (MAF, 2006)*	*E. coli*
	Australia New Zealand Food Safety Standards Code (FSANZ 2008)*	Arsenic Cadmium Lead Mercury
	FSANZ Compendium of microbiological criteria for food (FSANZ 2016)*	*Listeria* spp.
Water	The NZFSA Animal Products (Specification for Bivalve Molluscan Shellfish) Notice 2006 (MAF, 2006)	Faecal coliforms