Real Time Bacterial Modelling in Tasman and Golden Bays

Innovation Fund Project

National SCIENCE Challenges

SUSTAINABLE SEAS

Ko ngā moana whakauka

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1. Cawthron , 2. NIWA, 3. MetOcean Solutions
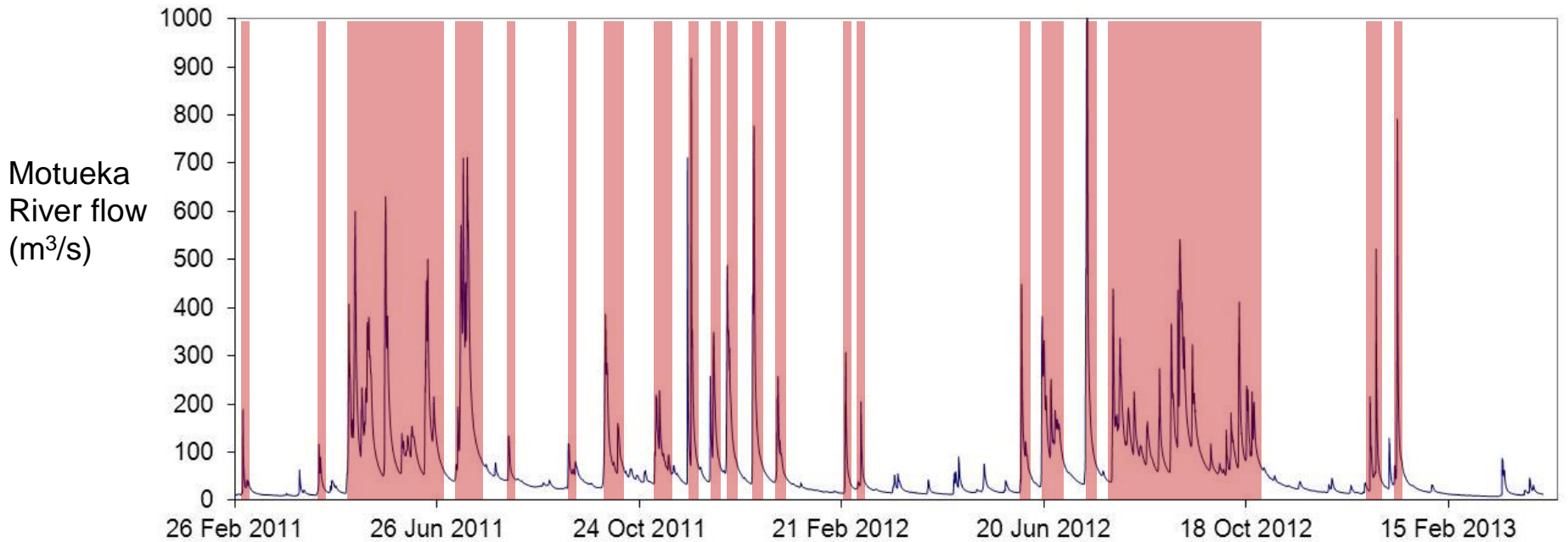
Motivation
Bacterial Run-off From Rivers Affects:

Mussel farms
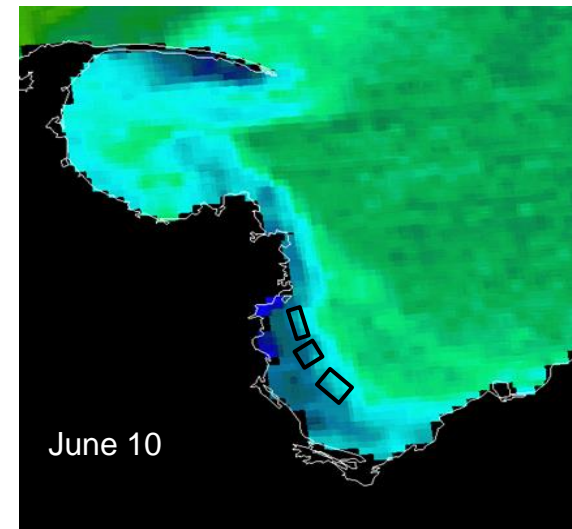
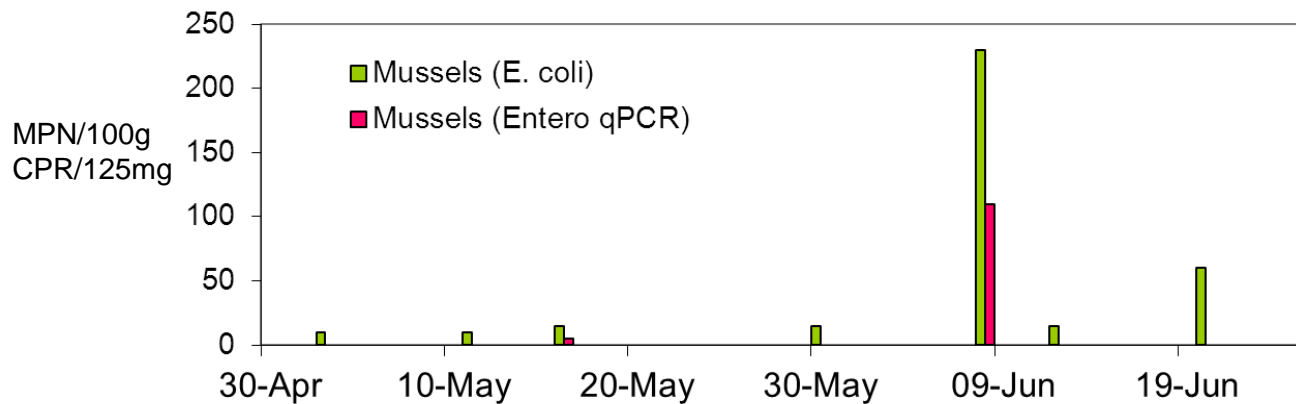Bacterial run-off from river closes harvesting operations
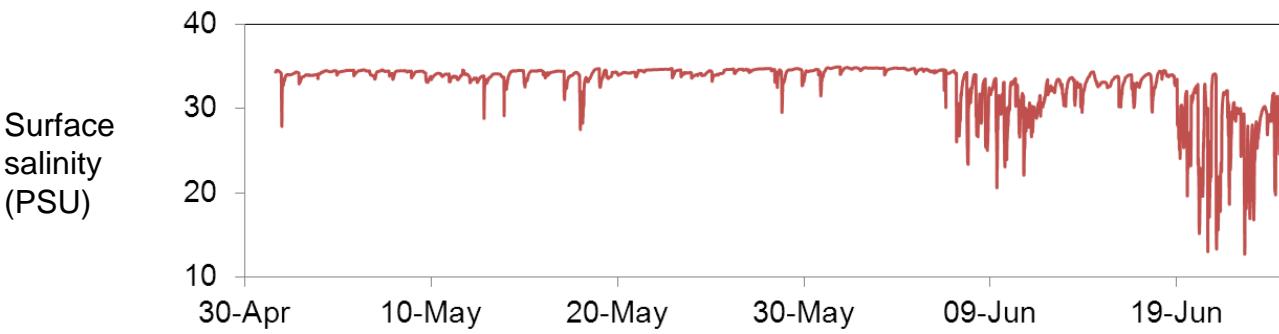
➢ The existing simple river flow and salinity rules cause long unnecessary closures

Swimming

Popular recreational swimming beaches suffer closures, with samples taking up to 3 days to process!

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Motueka
River flow
(m³/s)

= Closed for harvest based on river flows

Motueka River flow (m³/s)

Surface salinity (PSU)

MPN/100g CPR/125mg

- Mussels (E. coli)
- Mussels (Entero qPCR)

June 10

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The Solution

NASA Landsat 8
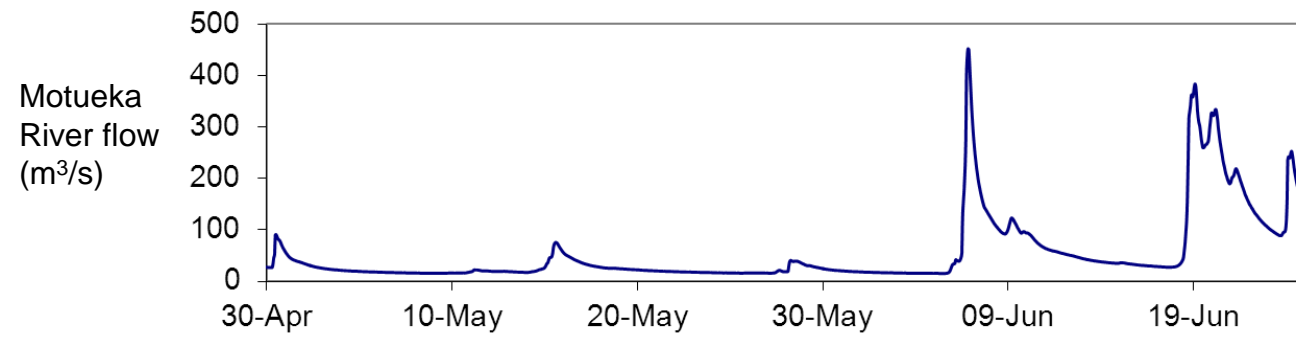
Near real-time modelling and forecasting of bacterial conditions updated daily.

Four main components to the project:

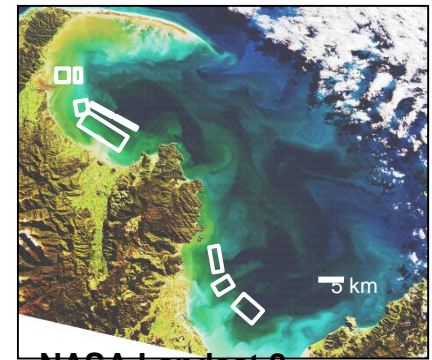1. Catchment/river modelling for bacterial source loadings
2. Coastal Modelling – transport to beaches and mussel farms
3. Data collection - river and coastal bacterial sampling
4. Management model – combining model results with collected data to create updated risk estimates for key locations around the coast.

Model and bacterial information will presented through a web platform, used to better predict the need for harvesting closures and beach notifications.

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In Diagrammatic form…

1: Compile existing datasets
- Council data on river flows, water quality
- Data from buoys, satellite imagery, surveys, etc.

2: Catchment modelling
- Weather models
- Real-time observations
→ Catchment model

3: River plume experiment for validation
- Field Experiment
- Validation

River flow forecasts

4: Hydrodynamic modelling
- Boundary conditions from regional scale ROMS model
- Weather models
→ Coastal hydrodynamic model

6: Bacteria testing for validation
- Field sampling
- Validation

5: Bacteria inputs and transports
- Bacterial loads for rivers
- Bacteria die-off into ERCore

Coastal hydrodynamics
Validation
Bacterial loads

7: Operational Tools
- Models integrated into forecast system

Outcome
Refined criteria and daily forecasts lead to reduced closures

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Progress and Plans

- Contracting just finalized

- Workshop with Industry and TDC to set and organize field sampling for model development/validation happening soon

- Coastal model development beginning and aims to have initial prototype running by April 2018 based on gauged flows (now-cast only)

- Catchment modelling will begin this year and will add a forecasting capability to the prototype by August 2018.

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