



# The effects of elevated suspended sediments on offshore benthos

# Collaboration



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# Background

- A large proportion of the seafloor around New Zealand is soft sediment, which can be easily disturbed by storms and/or by human activities;
- Impacts on biological communities have been studied in near-shore coastal environments, but little information exists on tolerances of fauna from deeper shelf waters.

## ***Motivators:***

- continuing interest in offshore mining, uncertainty of the actual effects of sediment plumes on benthos (e.g. EPA decisions for TransTasman Resources and Chatham Rock Phosphate);
- increased awareness of fisheries impacts (MSC certification of bottom trawl fisheries, e.g. hoki and orange roughy).



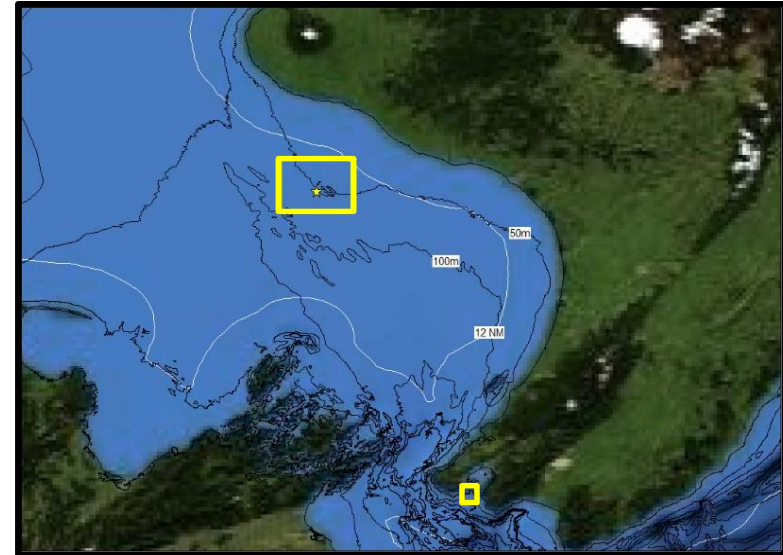
# This project

- Investigate the effects of elevated suspended sediment concentrations on deep-shelf benthic communities;
- Help establish threshold levels of sediments where impacts might become “ecologically significant”; provide information to mitigate or manage impacts;
- Sustainable Seas programme “fit”
  - Aligned to the Challenge objective to enhance utilisation of resources within biological constraints
  - Improved knowledge of impacts, support for ecological risk assessments and ecosystem based models
  - Extends SS programme research to deeper shelf waters;
- Focus on south Taranaki Bight
  - Consistent with West Coast Stage 1 study area of the Challenge
  - Relevance to current interest in offshore impacts (e.g. ironsands mining)
- 2 year project, started October 2016; C01X1515 (IF4.3.2)

# What are we doing?

- Measure acute and sub-lethal effects of elevated suspended sediment concentrations on important biogenic habitat formers in the iron sands of the South Taranaki Bight (Patea Shoal, 60-80 m deep);
- Focus on common sponges and bivalves;
- ***Laboratory experiments***

The same sponge taxa are found in <20 m on Wellington south coast; are the shallow water communities more resilient?





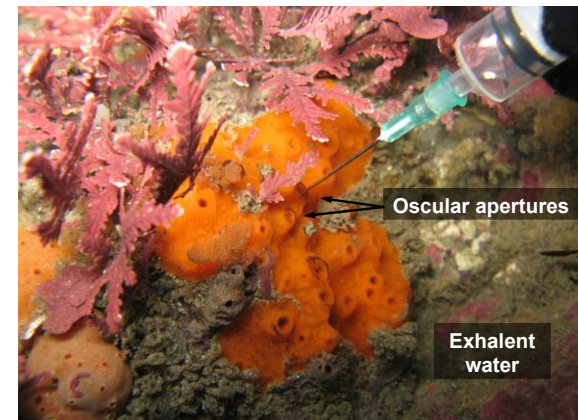
# What are we doing?

- Two species
  - Bivalve (dog cockle, *Tucetona laticostata*)
  - Sponge (*Crella incrustans*)
- Treatments
  - Suspended sediment (SSC) load
  - Control particle size, temperature, pH; based on environmental data
  - Up to 4 weeks exposure
- Experiments in NIWA's Marine Environmental Manipulation Facility



# Assessing biological responses

- Many species can cope with elevated SSCs for periods of time
  - Specific strategies to cope (e.g. stop pumping, reverse water currents to expel large particles, mucous production)
- Thresholds above which normal functions are disrupted are unknown
- Assess physiological response via multiple measures
  - survival
  - metabolism (respiration, pumping rates)
  - feeding activity (clearance rates)
  - structural damage
  - behaviour (burial, feeding, mucous production)

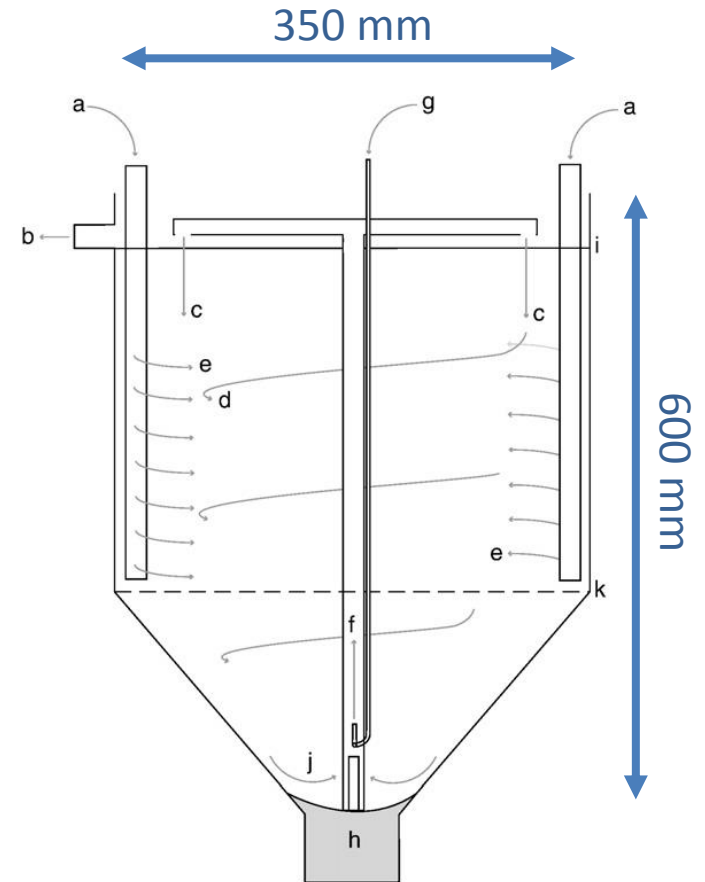


# Current status

System developed to suspend and control sediment loading



Volume ~35 litres

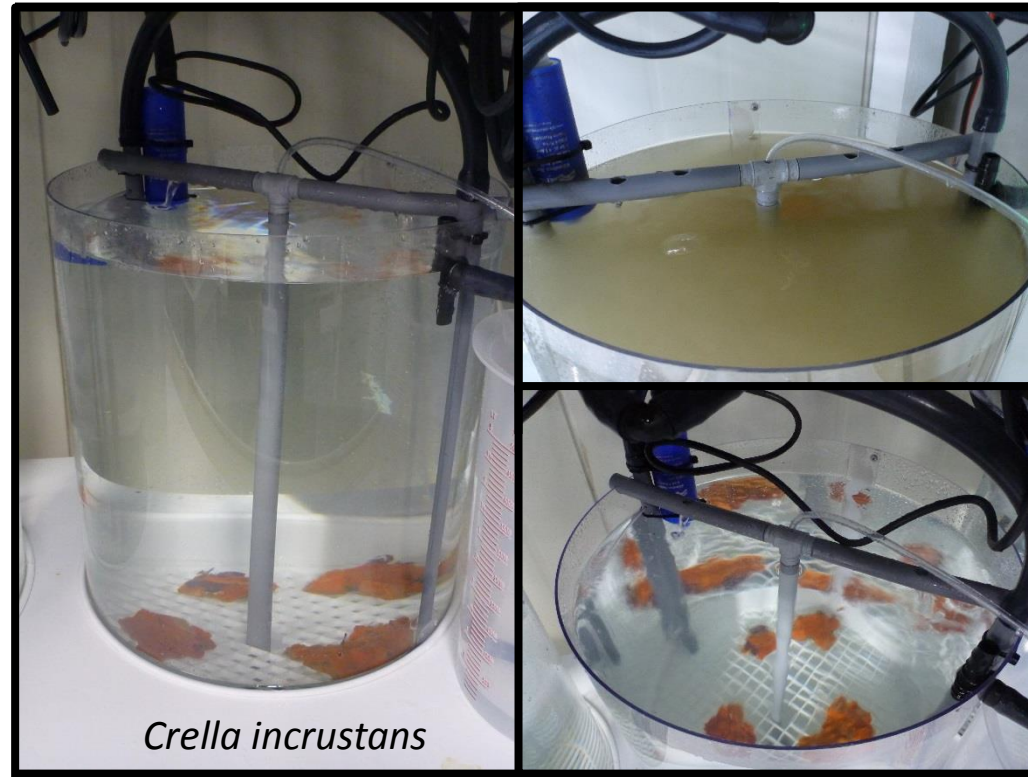


Based on *Vortex Resuspension Tank (VoRT)*,  
Davies et al. (2009), *JEMBE* 370: 35–40



# Current status

Shallow water sponges and sediments collected, trials underway



# Current status

- Consultation with iwi (Linda Faulkner, Tangaroa)
  - Project summary document provided
  - Discussions at several hui
  - Tai Hauauru Fisheries Forum (later this month)
- Images and story to SS comms (Robin Wilkinson)
  - Laboratory set-up
  - Sample collection (coastal)
  - Focus on RV *Kaharoa* collection voyage (mid-May)
- Establishing linkages with other Challenge programmes
  - Data will feed into other Challenge projects on Tipping Points, Stressor footprints and dynamics, and Ecosystem services
  - This conference....

# Next steps

- Deep-water species and sediments to be collected May 18-21 (RV *Kaharoa*)
- Stabilisation period in laboratory (June)
- Species 1 experiments start late June
- Species 2 collection voyage & experiments, late 2017

