Welcome to the Recover newsletter Issue 4 from the Marine Ecology Research Group (MERG) of the University of Canterbury. Recover is designed to keep you updated on our MBIE-funded earthquake recovery project called RECOVER (Reef Ecology, Coastal Values & Earthquake Recovery). This 4th instalment covers recent work on seaweed recovery in the subtidal zone, ecological engineering in Waikoau / Lyell Creek, and a sneak preview of drone survey results!

Subtidal research

Robyn Dunmore and PhD student Dan Crossett from the Cawthron Institute have been tracking recovery in the nearshore subtidal zone. This has involved large-scale surveys and experiments in the field and lab. They found that initially, there was clear disturbance to areas with medium to high uplift, especially around Waipapa Bay but also including areas like Ward, Wharanui and Okiwi Bay. Bare rock had been uplifted through sand and gravel, and shifts in sand and gravel into seaweed habitats had also occurred. More recently, they observed some declines in large brown algae across many sites (even those with low uplift), with changes from brown seaweed-dominated habitats to areas characterised by red seaweed.

These effects could result from a combination of a changing wave climate (from uplift and specific weather events) and stress from marine heatwaves.

After the earthquake, slips along rivers increased runoff of turbid water into the sea, and erosion from unstable rock along the coast also contributes to increased turbidity. Lab experiments were done to test the effects of temperature, light and turbidity on the early life stages of several species of large brown algae. These showed that some species can handle a range of temperatures, while others are restricted to growing only at cooler temperatures. Low light and turbidity also slowed growth in some species.

Clearance experiments are helping us understand how seaweed recruitment is affected by substrate type, encrusting coralline algae and the presence of large brown seaweeds. Sites at Waipapa have had little or no recruitment of coralline algae and large brown seaweeds, but other sites with nearby reproductive adult plants are quick to recover. The information from the clearance and lab experiments is important to understand how these seaweeds will recruit into and grow in areas disturbed by the earthquake.
Whitebait hatching experiment with Environment Canterbury

Our discovery of whitebait spawning sites in Kaikōura streams (see Recover Issue 3) ended with a twist in Waikoau / Lyell Creek when we realised that the eggs were unlikely to hatch. Thanks to Pete Adams at Environment Canterbury we came up with an engineering experiment in the form of a temporary closure — the reverse of mechanical stream openings that are routinely used to alleviate flood waters backing up after natural river mouth closures.

In this case we temporarily blocked the mouth with gravel to raise the water level around 40 cm for just a few hours. That was enough to hatch out our īnanga/whitebait eggs that had been found four weeks previously, high on the river bank. This very simple experiment would not be feasible in most rivers but did demonstrate a successful rescue plan to give some stranded fish eggs a much needed helping hand!


Remote sensing the recovery

Our spatial team has been busy optimising methods for using drones to quantify and monitor coastal environment change. Look out for more in the next issue!

Figure 3: Shane and Pete at the mouth of Waikoau / Lyell Creek after pushing up a small gravel bund to raise the water level for a few hours.  

Figure 4: Two views of a digital model produced from high resolution drone imagery at one of our rocky reef study sites near Ward Beach.  

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Resources


Thanks to our research funders:

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