RECOVER
Reef Ecology and Coastal Values Earthquake Recovery Project

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

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Kia Ora!

Welcome to the *Recover* newsletter Issue 3 from the Marine Ecology Research Group (MERG) at 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). In this third instalment we are looking into recent paua, whitebait, and seaweed recovery work along the Kaikōura coast.

Young pāua growing well

Our work monitoring the juvenile pāua around Kaikōura has shown encouraging signs of recovery of this hard-hit population. Wild pāua tagged a year ago have had excellent growth rates and survival. They're quickly advancing through the size classes and will soon migrate to deeper waters and join the adult spawning groups, a key step in recovery. The abundance of pāua at our sites is increasing significantly through time, and we are seeing much higher numbers than we did in the early days after the earthquake. Hatchery-raised reseed pāua planted in 2018 by the Pāua Industry Council have also shown excellent survival and growth. While things are looking good overall, some sites have been significantly impacted by large gravel movement, erosion and sedimentation, which can compromise pāua habitat and cause mortality.

Figure 1: Recaptured seed pāua with their characteristic blue hatchery shell material. Shawn Gerrity

Figure 2: Seed pāua found within groups of large wild pāua seemingly naturalised and behaving like their wild relatives. Shawn Gerrity

Whitebait spawning sites located in Kaikōura's coastal rivers

Early in 2019 we started work to fill a knowledge gap about whitebait in streams and rivers along the Kaikōura coast. For īnanga, which makes up the bulk of the whitebait catch, the spawning grounds are usually found close to the coast near the river mouths. Knowing where they are is useful for recovery planning in the same areas post-earthquake as well as for restoration projects in local waterways. Our survey programme started with fish trapping to find out which species were living in which rivers, after which we selected waterways that were suspected to have good īnanga populations. They included seven catchments close to Kaikōura (Oaro, Kahutara, Lyell / Waikōau, Middle, Swan, Harnetts and Blue Duck) as well as other sites in Marlborough. After four months of surveying we discovered at least one spawning event in all of these streams and rivers and were able to map the spawning locations including some large sites!

Spawning events often coincided with a rise in water levels due to rain events leaving the eggs high above the normal waterline where they can be easily disturbed. The spawning grounds themselves were not always in the same locations but we now have a better understanding of where they might be to make sure they are protected. We also followed the fate of some sites through to hatching... stay tuned for more on this in the next issue of *Recover*.

Figure 3: Trapping was used to characterise fish populations in the coastal streams to identify which ones were likely to be supporting īnanga spawning (top). Thomas Falconer surveyed in Lyell Creek where we found several spawning sites in down-town Kaikōura! (bottom). The fish have very likely benefitted from the restoration efforts underway in the Waikōau catchment that have improved the riparian habitat. Shane Orchard

Kelp and seaweed recovery

In the summer of 2019 NIWA and the University of Canterbury completed aerial drone surveys of many sites along the Kaikōura coast to examine the survival of vulnerable kelp species such as bull kelp (*Durvillaea* spp). This included testing the relative accuracy of readily available "RGB" cameras, and enhanced spectral cameras (multispectral cameras). This research revealed that both RGB and multi-spectral cameras can be used effectively for mapping broad scale distribution of marine vegetation (i.e., kelp), but multispectral cameras can be used to examine species biodiversity at higher taxonomic resolution. NIWA and UC researchers will now be examining kelp and seaweed distribution across a broader range of locations, and tracking the recovery through time.

Figure 4: View of the M200 UAV platform during a multi-spectral survey of Oaro Reef. Brendon Smith

Resources

Schiel, D. R. et al. (2019). The Kaikōura earthquake in southern New Zealand: Loss of connectivity of marine communities and the necessity of a cross-ecosystem perspective. *Aquatic Conservation Marine and Freshwater Ecosystems 29* (9): 1520-1534. doi:10.1002/aqc.3122

Tait, L. et al. (2019). Unmanned Aerial Vehicles (UAVs) for Monitoring Macroalgal Biodiversity: Comparison of RGB and Multispectral Imaging Sensors for Biodiversity Assessments. *Remote Sensing 11*(19), 2332. doi:10.3390/rs11192332

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