ROCKY REEF IMPACT QUANTIFICATION AND MONITORING FOR THE KAIKŌURA EARTHQUAKE

Gauging impacts on biogenic habitats and key invertebrates in the nearshore subtidal zone.

Objective: to gauge the status of shallow subtidal reefs, the biogenic habitat that remains, the presence of subtidal habitat suitable for pāua settlement and recruitment, and the abundances of key species.

CAWTHRON
The power of science®

MARINE ECOLOGY RESEARCH GROUP
UNIVERSITY OF CANTERBURY, N.Z.

Fisheries New Zealand
Tini a Tangaroa

SITES: ACROSS A DEGREE OF UPLIFT, FROM CAPE CAMPBELL TO OARO.

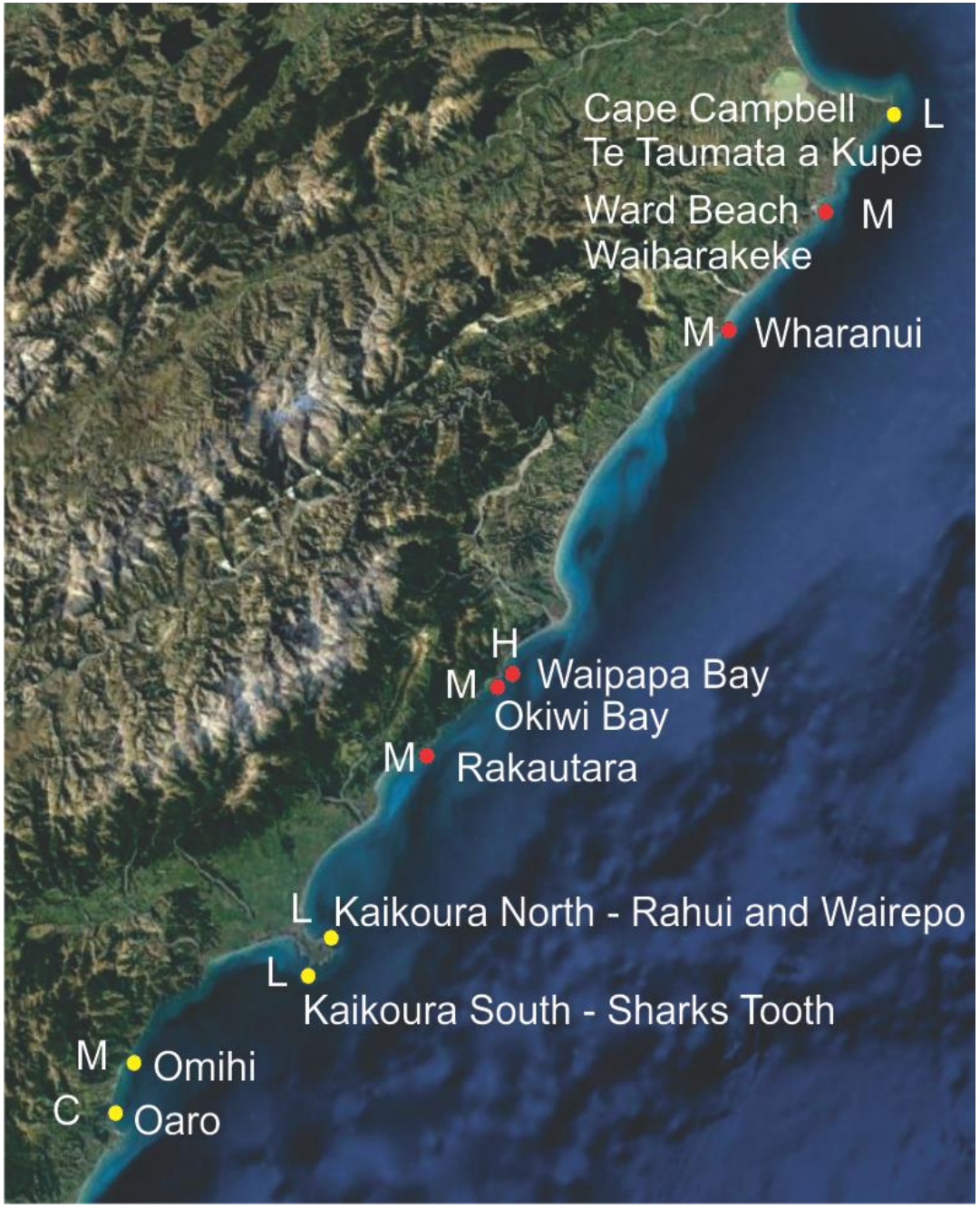
- 5 key locations (surveyed twice)
- 5 additional locations (surveyed once)

Sites allocated Uplift levels according to values determined by GNS Science

C = control L = low
M = medium H = high

First surveys: Aug-Nov 2017

Second surveys: Mar-Jun 2018

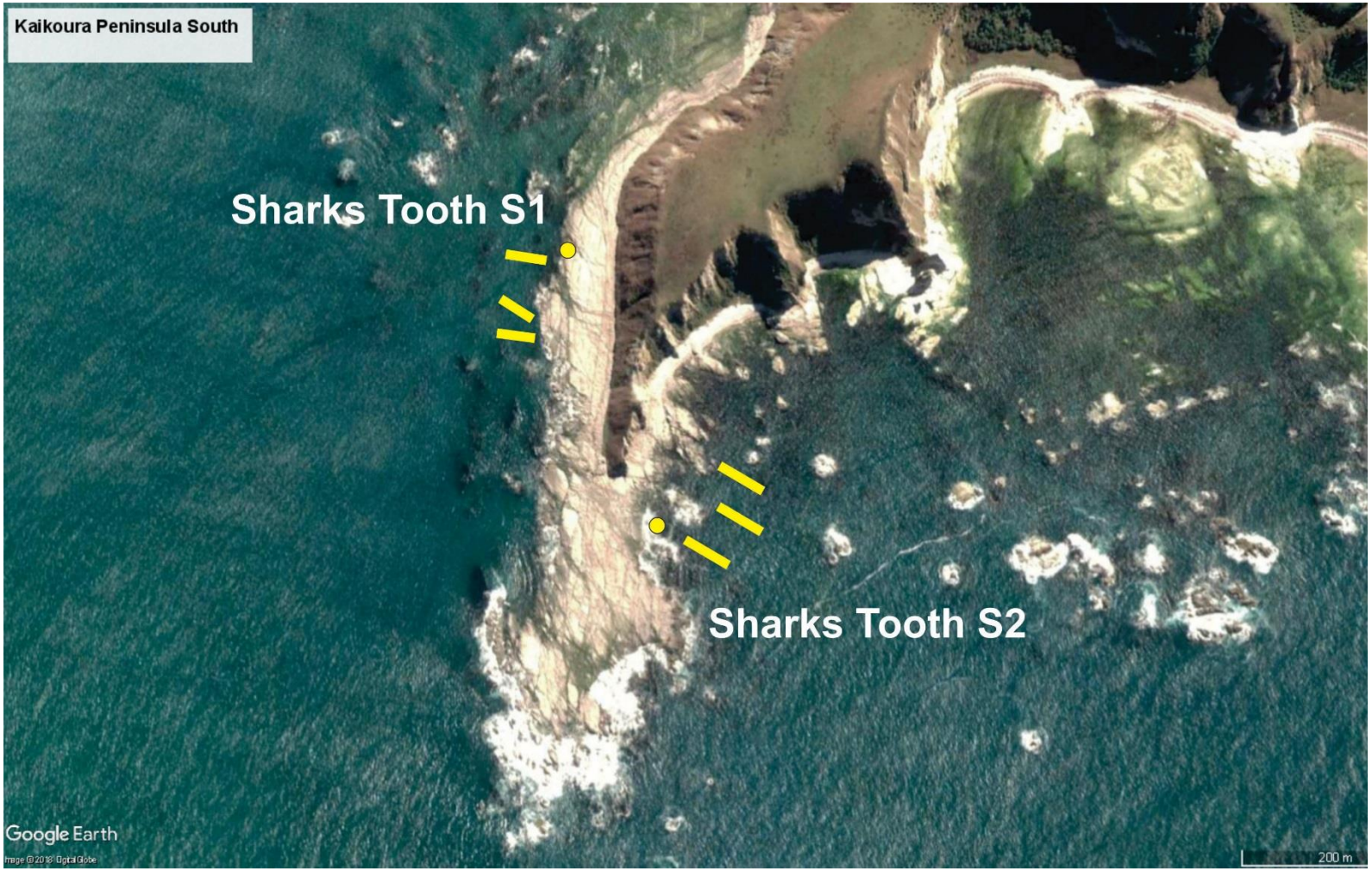


CAWTHRON
The power of science®

SURVEY DESIGN

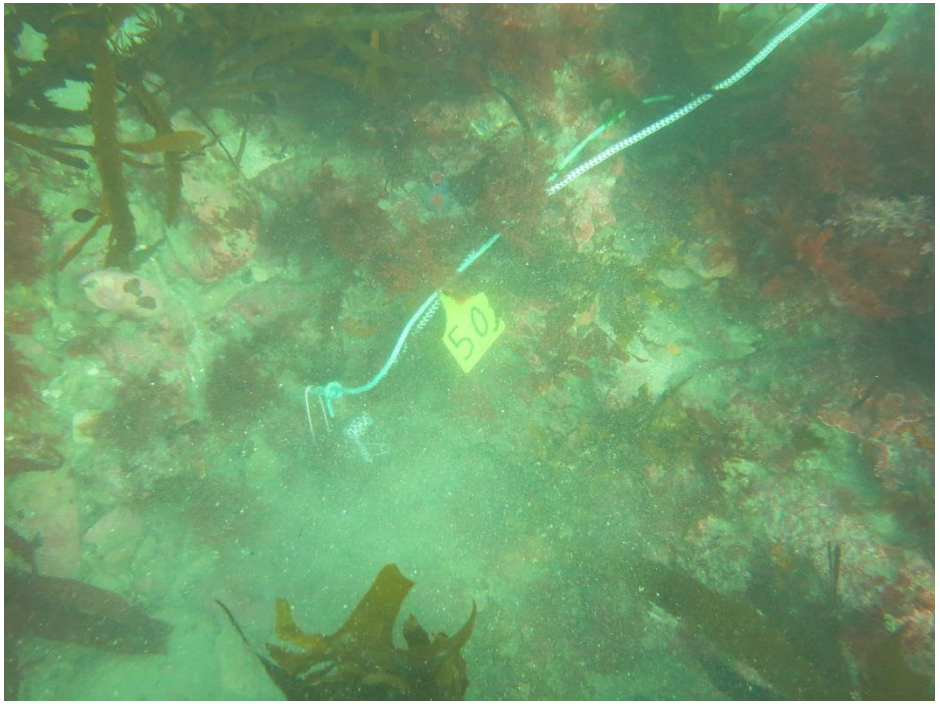
Within each location:
2 sites
At each site, 3 transects

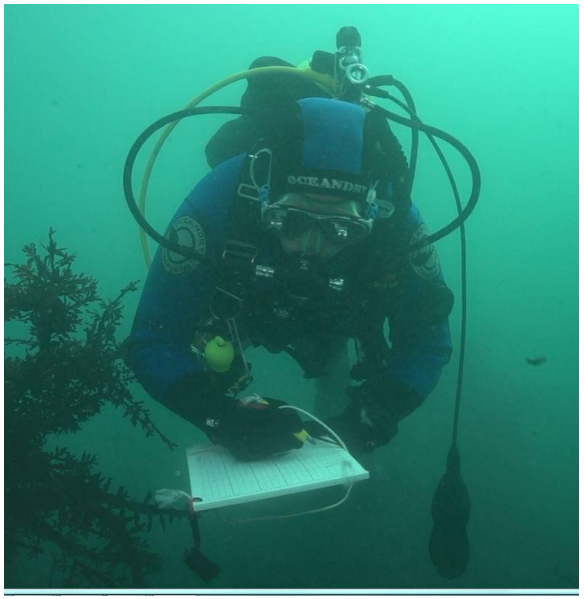
50 m transects perpendicular to the shore, from the low tidal zone to depths of <10 m

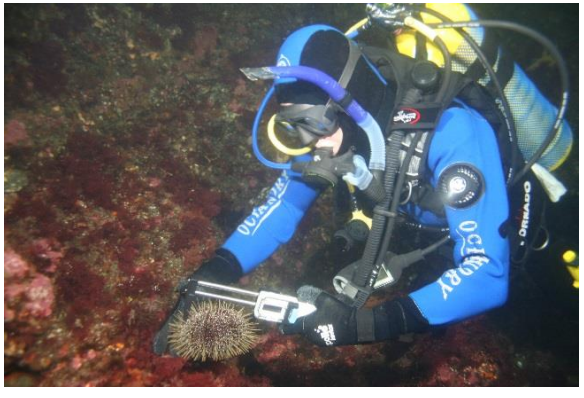


SURVEY DESIGN

- Fish counts;
- Video;
- Substrate type, seaweed and sessile invertebrate percentage covers, and numbers of mobile invertebrates;
- Pāua measurements using underwater calipers.







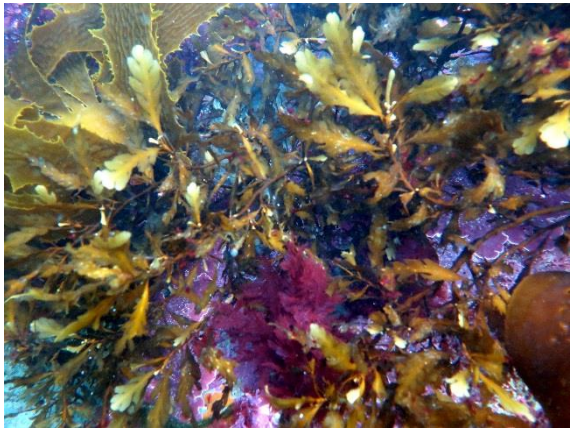
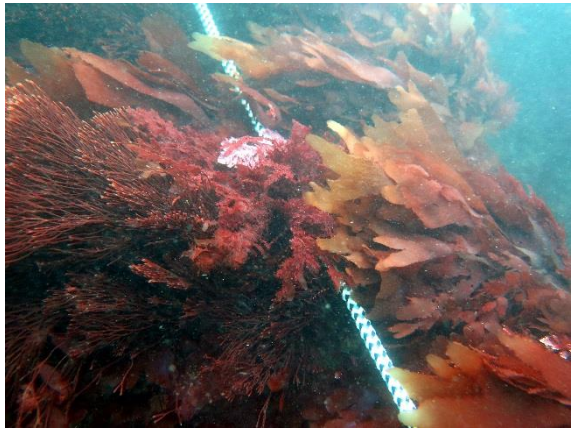
CAWTHRON
The power of science®

GENERAL OBSERVATIONS

- The degree of uplift was reflected in the amount of habitat disturbance
  - Most disturbance at Waipapa Bay (high uplift)
  - Minor-medium disturbance at medium levels of uplift
  - No obvious effects at no-low uplift sites (Oaro, Kaikoura Peninsula, Cape Campbell)

- Obvious impacts:
  - Bare rock
  - Seaweed abundances
  - Sand/gravel areas



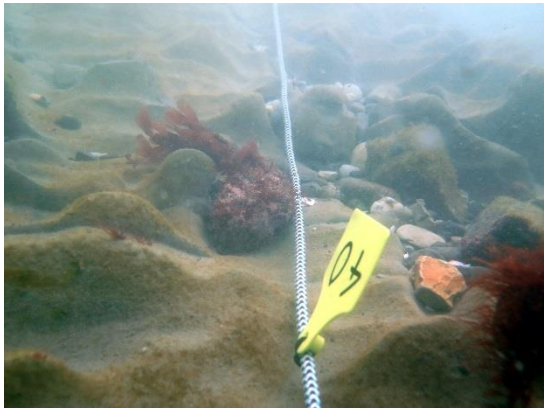
5m

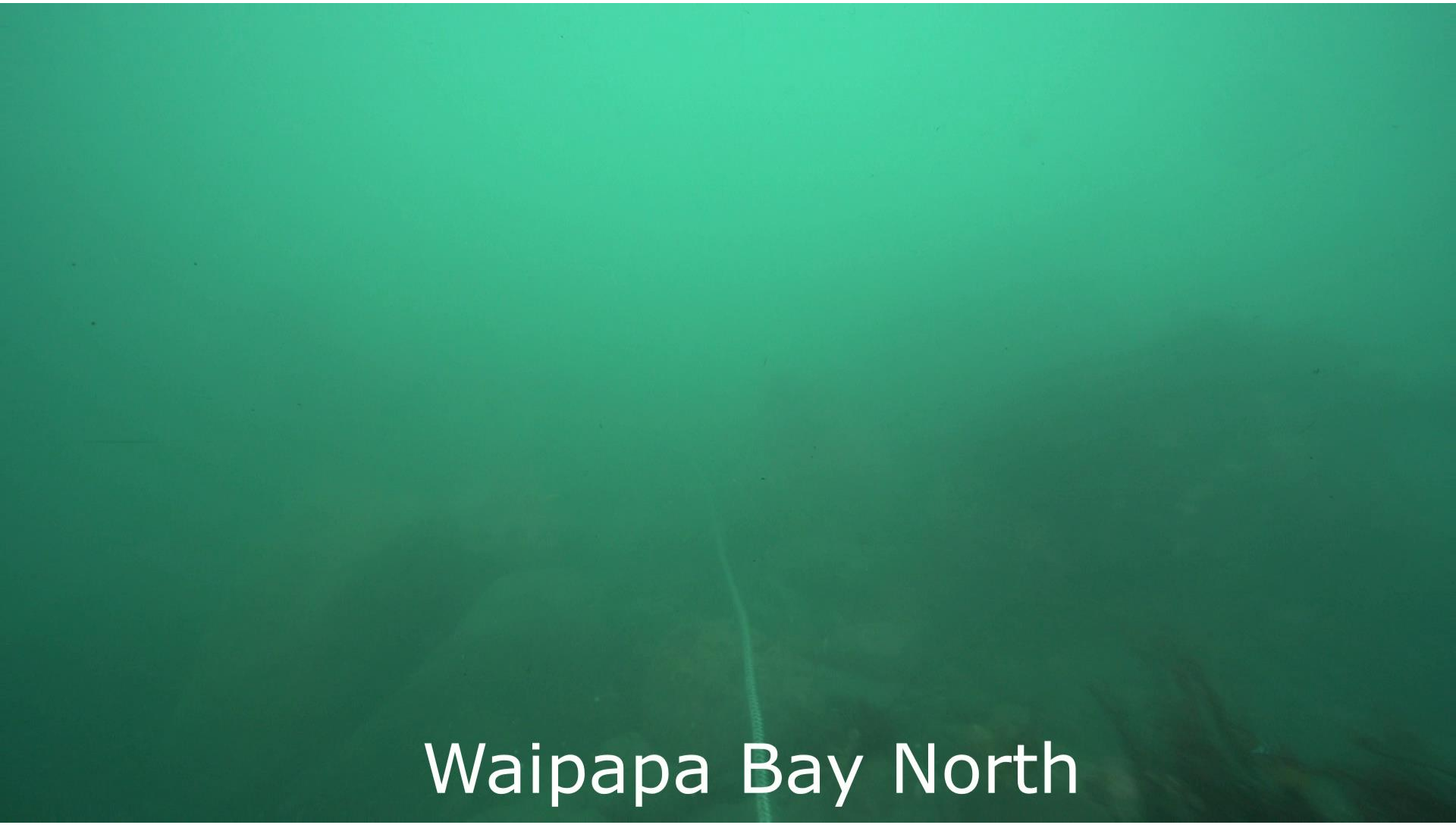






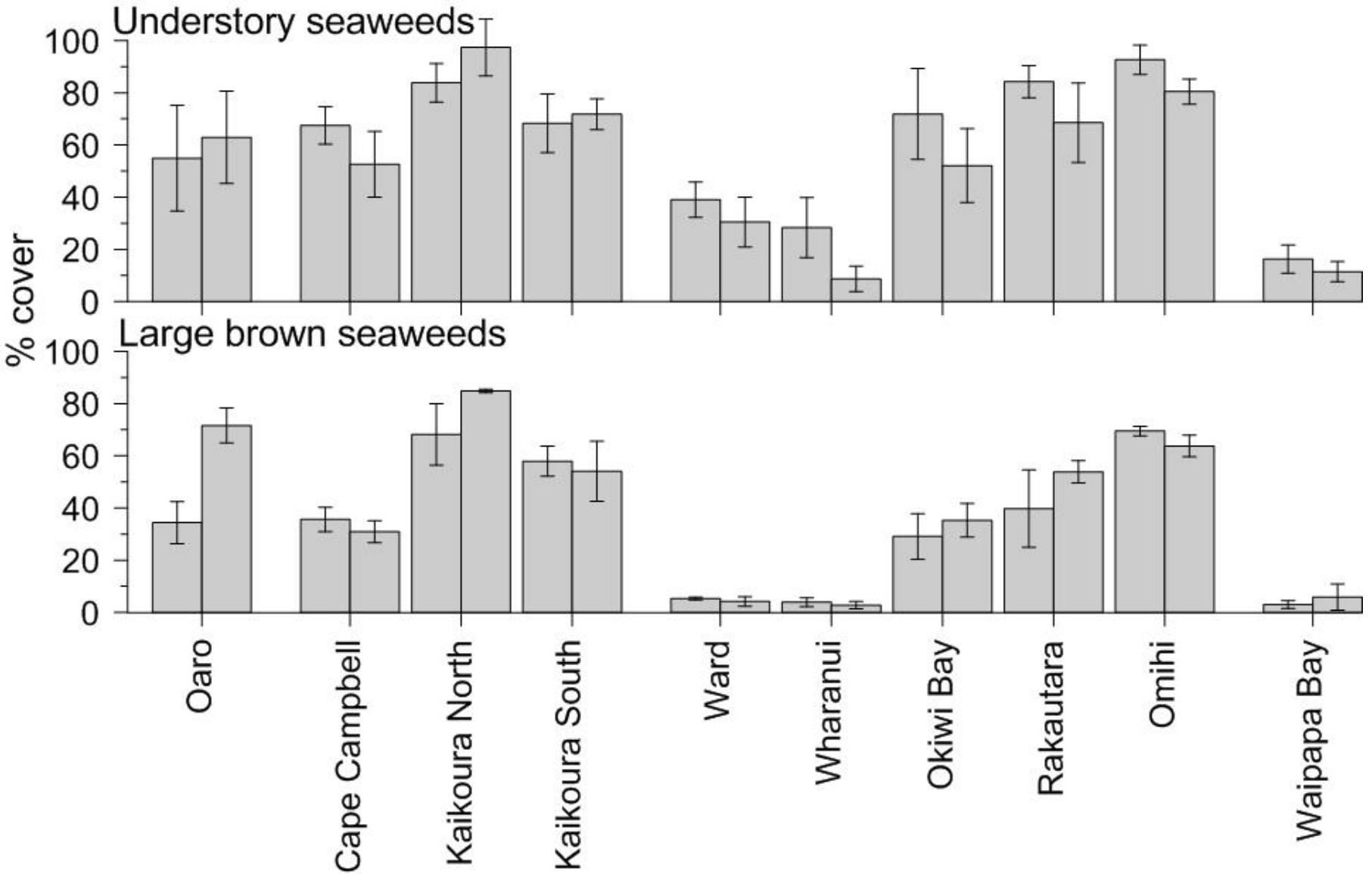

325


40



CAWTHRON
The power of science®

SEAWEED ABUNDANCES



SUMMARY

Location	Uplift	Effects
Oaro	C	No obvious
Cape Campbell	L	No obvious
Kaikoura North	L	No obvious
Kaikoura South	L	No obvious
Omihi	M	Minor
Rakautara	M	Minor
Ward	M	Minor-medium
Wharanui	M	Minor-medium
Okiwi Bay	M	Minor-medium
Waipapa Bay	H	Major

SUMMARY

- Rocky substrate was present in the nearshore environment (50 m offshore). Waipapa Bay – some sandy areas

- Degree of uplift had a significant effect
  - clear disturbance to sites with high uplift (Waipapa Bay)
  - more minor effects at some sites with medium uplift (Ward, Wharanui and Okiwi Bay).

- Most obvious effects:
  - abundances of understorey algae (coralline turfs and crusts, and red and brown encrusting algae), and large brown foliose algae
  - presence of newly-emerged rock at some sites.

CAWTHRON
The power of science®

SUMMARY

- Subtle changes may occur in the immediate subtidal zone – shifts in composition of seaweeds as some may not adapt to the dynamic environment of the wash zone and/or increased light, temperature and desiccation exposure

- The massive loss of *Durvillaea* species (bull kelp) from the intertidal zone may also cause indirect effects on the subtidal. Stronger grazing pressure by butterfish on other taxa may occur.

CAWTHRON
The power of science®

ACKNOWLEDGEMENTS

- **Divers:** Cawthron (Ross Sneddon, Dave Taylor, Dana Clark, Dan Crossett, Javier Atalah and Matt Cameron), Marlborough Commercial Diving Services (James Brodie, Luke Ogilvy and Mark Hodren) and Diving Services New Zealand (Sam Hodgson).
- **Site knowledge, access and boat launching:** North Canterbury Transport Infrastructure Recovery (NCTIR), Cape Campbell Farm - The Peters family, Dean and Lester Gregg, Burkhart fisheries - Jeremy Phipps, Geoff Lawrence, Reader Fishing Ltd. - Tonya Pachett, Ash, Jak and Johnny Reader, Sim Bell, Johnny Clark, Ted Howard, Nigel Scott, Pāua Industry Council - Tom McCowan.
- **Dive tank fills:** BP Kaikōura - Richard Priddle, and the Blenheim Dive Centre
- **Accommodation:** Bluff Station – Sue, Chid and Hamish Murray, Donna Worthington, Graham family, Awatea - Alison Taylor