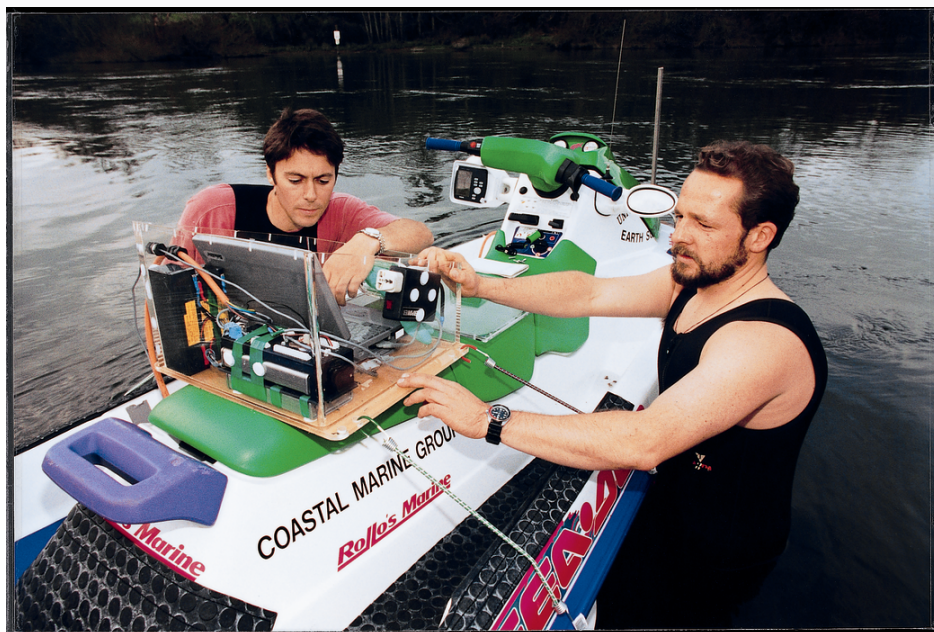




## New Zealand: Auckland Estuaries Oceanographic Research

*Campbell Scientific data loggers used in research in the surf-zone and on the ocean floor*



*John Radford (left) and Dirk Immenga make final adjustments on the Seadoo-based system before taking a test ride.*

When Campbell data loggers went down under, New Zealanders had some good ideas for them. For several years, the Earth Sciences Department at the University of Waikato in Hamilton has used the loggers for weather monitoring. The most recent use, however, is in the marine environment on the bottom of the ocean—down under.

With innovative technicians John Radford and Dirk Immenga, and with direction from Professor Kerry Black, the department has been developing oceanographic equipment to do specialized research on beaches and in estuaries. This equipment fills several niches in the oceanographic market. The Campbell Scientific data loggers are used for central processing and instrument control.

Of three newly developed instruments, the first is a portable depth-sounding system mounted on a three-person jet ski. The system consists of a high-resolution Mesotech depth sounder, a Trimble Differential Global Positioning System, a laptop computer, and a Campbell data logger that controls the operation of the system.

"The system is designed to operate in shallow water of estuaries or in the surf zone among breaking waves. These are places where vessels normally can't go," Radford said. Senior marine technician Immenga added, "We are doing research in the surf zone, which is one of the most difficult environments, so we needed a vessel and equipment that would survive."

### Case Study Summary

#### Application

Monitoring the effects of cooling water discharges in an Auckland Estuary

#### Location

Auckland Estuary, New Zealand

#### Products Used

CR10X

#### Contributors

Prof. Kerry Black, National Institute of Water and Atmospheric Research, Hamilton; John Radford, University of Waikato, Hamilton

#### Participating Organizations

Earth Sciences Dept. at the University of Waikato, Hamilton

#### Related Website

[NIWA](http://NIWA)

This jet ski system has provided quality depth soundings for modeling the effects of cooling water discharges on an Auckland estuary. Professor Black continues, “The system is also being used to survey surfing reefs around the Pacific Basin as part of a project with the National Institute of Water and Atmospheric Research to design and build multipurpose offshore breakwaters. We have used a similar system in six countries in the last 12 months (including Australia, Hawaii, Brazil, Tahiti, and New Zealand).”



*The University of Waikato's Seadoo-based system measures and records water depth versus geographic position, making the system ideal for surf-zone bathymetry. (Photo courtesy of the Waikato Times, NZ)*

The second application, named ALISON, uses a Campbell data logger in a custom-built frame, which is mounted on the ocean floor. The frame supports an array of instruments that measure currents, waves, and sediment movements for up to six weeks at a time. ALISON includes a video camera, Purv, which records the changing sea bed as storms evolve, and a high-resolution depth sounder to record sea-bed level changes to the nearest centimeter. An acoustic Doppler current profiler measures currents in the two meters above the ocean floor using reflected sound waves. An infrared turbidity monitor records the changing sediment concentrations in the water column. The overall coordination of ALISON is controlled by the Campbell data logger.

To sample the seawater, the Earth Sciences Department has built an automated water sampler, Weta, which they believe is the first of its kind. The water sampler is linked to a wave-sensing pressure sensor to trigger the water samples when conditions are suitably rough. The sampler is fully submersible and able to be left for several weeks.

ALISON is presently being used to study the currents and dredging needs for proposed port expansion at Gisborne on New Zealand's east coast. The port managers are using the equipment to provide baseline data for planning their future dredging and to locate suitable sites for dumping dredged spoil. The data will also be used in a suite of computer models of the currents, waves, and sediment movement.

The third application is the Seawiper, the latest device built at the Earth Sciences Department. This pneumatic device extrudes a plunger fitted with a cleaning brush. Controlled by the Campbell data logger, the screen wiper cleans marine fouling off the infrared turbidity sensor prior to every sample taken.

“We have a number of world's-first applications for the Campbell loggers and we are especially pleased with their reliability. The cost of marine deployments is high and it is not always possible to get a second chance if something goes wrong. We chose the Campbell logger because we never have any problems with them,” Radford said.

*Editor's note: Campbell Scientific products have been capably represented and supported in New Zealand since 1986 by Scott Technical Instruments, Ltd., Hamilton.*



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