



# Instrument Systems

collecting data, delivering solutions

## Minute by minute:

### Monitoring wind along Tekapo canal

A private road runs alongside the Tekapo canal. The road, operated by Meridian Energy, is exposed to gusty cross-winds which can make driving hazardous. A new wind monitoring system, designed and built by NIWA Instrument Systems, is helping the company with its road safety management and dam safety assurance programmes. In addition, information will be shared with the local landowners for use with their irrigation programmes.

Every minute, a logger system in the weather station calculates the average wind speed over the past 10 minutes. The rolling average is transmitted by radio link straight into Meridian's computer system. In addition to the minute-by-minute updates, Instrument Systems installed a 'fixed point alarm' system, so Meridian receives an alert when the average wind speed reaches a specified trigger point.

The weather station also logs full details of wind speed and direction, temperature, barometric pressure, and rainfall. Those data are transmitted via the GPRS cellular network to the local NIWA office in Tekapo, where the full dataset is integrated with other hydrometric data which we send to Meridian.

*Bob Newland of NIWA Instrument Systems and Elliot Tuck from the NIWA Tekapo field team help prepare the wind mast for installation. Near real-time wind monitoring helps Meridian with operation of the private road next to the Tekapo canal.*



## For complex currents, call in the drogues

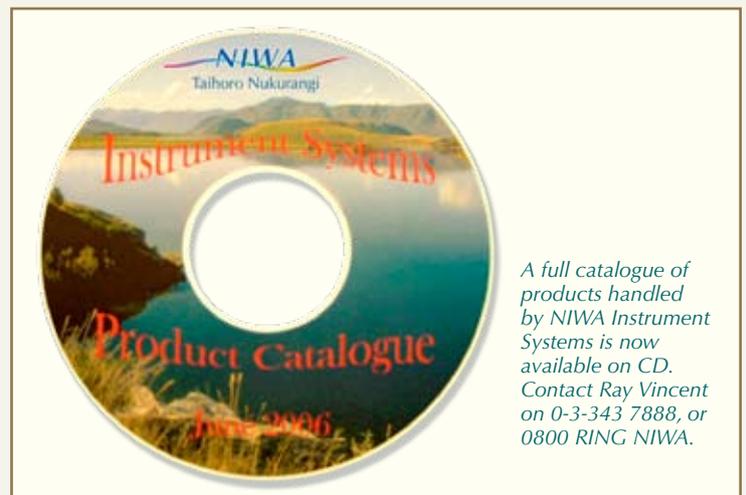
NIWA Instrument Systems have been modifying commercial buoys into useful, cost-effective tools for researchers.

The GPS drifters (or drogues) record surface and near surface currents. The drifters are often used in conjunction with Acoustic Doppler Current Profilers (ADCPs) and moored current meters. Often several drifters are released from the same spot so complex currents can be recorded over a relatively wide area. NIWA scientists use them extensively for near-shore mussel farm consent work and Fisheries Resource Impact Assessments, where measurements and modelling help us estimate water use and plankton consumption by marine farms. We also use them for surveys in turbulent waters where ADCPs are not suitable, and for monitoring currents in the open ocean.

The drifters have a GPS, datalogger, and transmitter installed inside the buoy. The data are logged onboard, but also transmitted every few minutes back to a receiver, which enables the drifters to be rounded up at the end of the project. Typical deployments are from a few hours to a couple of days.



*GPS drifter beside a mussel farm in the Marlborough Sounds. An underwater sail ensures the buoy moves with the currents not the wind. (Photo: Warren Thompson)*



*A full catalogue of products handled by NIWA Instrument Systems is now available on CD. Contact Ray Vincent on 0-3-343 7888, or 0800 RING NIWA.*

## How to play the Pied Piper

Jeremy Bulleid of Instrument Systems describes using a NIWA Electric Fishing Machine: 'It's quite amazing. Fish suddenly emerge from their hiding places and are drawn towards the electrode. More than one unsuspecting IS technician has been surprised by a large eel while standing alone in the middle of a stream carrying out field trials of a product enhancement.'

The EFM300 has been designed and refined by Instrument Systems over almost a decade for safe and reliable live fish capture. NIWA scientists use it to study freshwater fish populations. The EFM creates a pulsing electric field in the water between and around two electrodes. These pulses hijack a fish's muscles, causing it to swim involuntarily towards the hand-held catching electrode or 'wand'. This momentarily stuns the fish, enabling an operator to net them, record their details, and return them to the water unharmed.

The EFM300 includes four separate safety circuits and was one of the first instruments in the world to be certified as complying with the international safety standard, now AS/NZS80335. The machine independently controls output voltage, frequency, and pulse width. These provide flexibility over a wide range of water conditions and minimise the possibility of damage to fish. NIWA runs regular two-day courses on the safe and effective operation of electric fishing equipment.

*One key to the comfort of the EFM300 is the backpack design, which draws on the expertise of a leading outdoors equipment company.*



## New Product Spotlight

### Supersaturated water can kill fish

'Supersaturation' occurs when the total pressure of all gases dissolved in water is higher than the ambient atmospheric pressure at the surface. Excessive supersaturation is lethal to fish. Sources of supersaturation include dam spillways, heated water discharge from power plants, faulty water pumps in aquaculture recirculation systems, naturally high levels of nitrogen in well water, and algal blooms.

The 'Total Dissolved Gas (TDG) Sensor' from US company In-Situ Inc. takes accurate measurements of the total pressure of all dissolved gases, not just dissolved oxygen. Uses include: aquifer testing, hydroelectric power discharge, river ecosystems, aquaculture, and commercial aquariums.



### A troll for all seasons

The Troll® 9500 is a portable water quality monitoring unit, also from In-Situ Inc. It comes with up to 9 field-replaceable



sensors in a hand-held wand, and a rugged pocket-sized display unit. Uses include: surface water-ground water interaction, stream restoration, wastewater effluent and stormwater runoff monitoring, dredging operations, low-flow sampling, and aquaculture.

These sensors contain their own calibration information and so may be replaced in the field without the need to make any adjustments.

**NIWA Instrument Systems hires out these and many other instruments. Our hire pool contains more than four dozen types of equipment, ranging from flow gauges to pH meters, turbidity instruments to weather stations, data loggers to electric fishing machines.**

For more information on NIWA Instrument Systems, contact:

Ray Vincent  
Product servicing & sales

instruments@niwa.co.nz  
0-3-343 7888

or call free on

0800 RING NIWA  
(0800 746 464)