Watching the water in and after floods

High river flows where the Shotover meets the Kawarau River, on 3 December.

Otago has been hit by significant flood events twice since late last year. In December, heavy rainfall over the headwaters of the Southern Lakes pushed Lakes Wakatipu and Wānaka right up to the edges of Queenstown and the Wānaka township.

Then, in February, widespread rainfall saw rivers, particularly in the south, reaching flood-level flows: the Clutha River at Balclutha peaked at around 3,175 cumecs (cubic metres per second), the highest level recorded since 1999. While, in most respects, Otago didn't fare as badly during this event as our Southland neighbours, many rural properties were badly affected by flooding, leading to long hours and anxious waits for South and West Otago farmers.

ORC's flood management and drainage scheme functioned well in the high flow conditions. Our engineering team was on-site monitoring the scheme, focusing their efforts in particular on a weakened flood bank near Balclutha's Hospital Road, and at Waitepeka, west of the Owaka highway.

Staff mitigated flood issues at those sites with spillway modification, and the operation of ORC's pumping stations and outflow gates to manage water.

When flood events occur, ORC's Engineering Team is on the ground, often for long stretches through the night, to keep an eye on flood protection and drainage infrastructure and to monitor pump stations. During the February event, their flood response also included supporting the Clutha District Council.

Staff monitored sea levels and high tides at the mouths of the Clutha River (Matau and Koau branches), but thankfully these were not an issue in February. Overall, the schemes performed to expected levels of service, but some assets were damaged and have been assessed and prioritised for repairs.

Modelling catchment flows

A key part of ORC's role in responding to flood effects is to monitor river flows and model the impacts of additional rainfall, so that communities know what to prepare for.

Flood events like the one in February are an opportunity for us to collect data on how Otago rivers respond to high flows. We might have a pretty good idea of what the Clutha looks like at 3,000 cumecs when we model it in the office, but it's not often that we can observe it in reality.

Staff inspect a flow monitoring site at Cluden Stream after the December event.

Environmental monitoring staff prepare a kayak for lift-off near the Clutha River.

Helicopter-gauging in the Young River, north of Wānaka, in February.

Environmental Monitoring staff were out during the floods, gathering data with an innovative helicopter-gauging technique pioneered right here at ORC. This method involves the helicopter towing a kayak from one side of the river to the other. The kayak contains electronic instruments measuring water depth and velocity.

By measuring the depth and velocity of water flowing in Otago rivers, we can verify and adjust our hydrological models for the way rainwater moves through the region.

The work doesn't stop when the rain is finished, either. Staff make their way out to dozens of monitoring sites in the wake of a high-flow event to check on monitoring instruments, recalibrate them for any changes in the hydrology of the site, and in some cases relocate them to a more suitable location.

During the February floods, we set up a webpage with advice for anyone in the rural community affected by flooding.

While that event has passed now, the links and advice at this page will still be useful to keep on hand:
www.orc.govt.nz/floodresponsefeb2020

Flooding of Ardmore Street in Wānaka, December 2019.