



NIWA helps prevent falling pylons

NIWA scientists from the National Hazards Centre have created a way for Transpower to identify the power pylons most at risk from flooding and slipping.

We developed a risk assessment tool which combines information about land cover (grass or trees), hill slope, proximity to rivers, and the size of the rivers. So, for example, a pylon on a steep grassy slope is more at risk from slipping than one on a flat, tree-covered hilltop. Similarly, a pylon that stands on the flood plain of a major river is more at risk than one well away from any watercourses.

Our risk assessment tool uses GIS (geographical information system) layers so the different aspects can be mapped, and the risk to each pylon in the country assessed. Pylons were categorised as to how extreme each of these parameters were, and then ranked in order of risk. The system was evaluated by comparing its results for pylons already known to be at risk.

Transpower is now using the risk-assessment tool to prioritise its pylon inspections.

How high the sea?

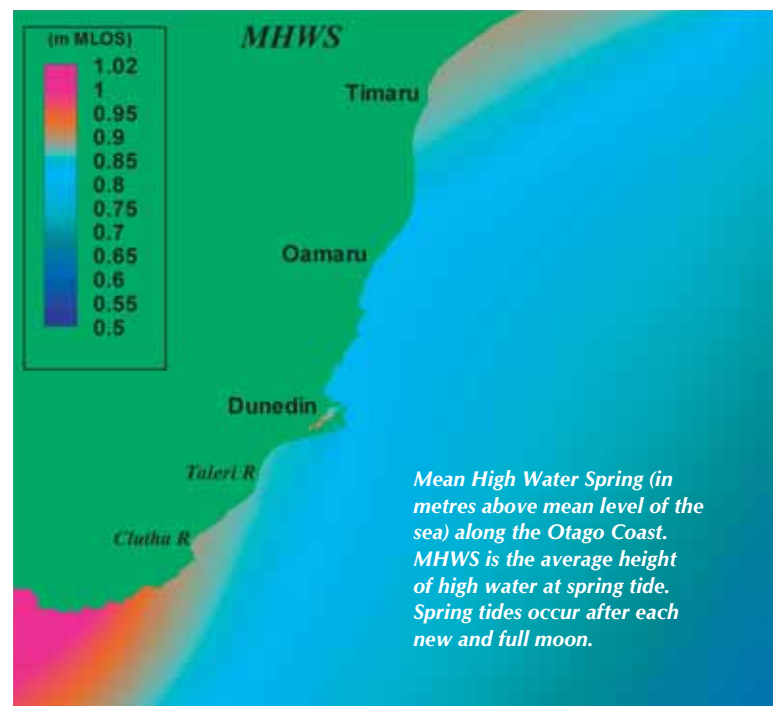
Recently, the Otago Regional Council commissioned NIWA to determine extreme sea levels with various return periods from 2 to 100 years for eight specified locations along the Otago coast. The council intends to use this information to support its natural hazards investigation and river management programmes in Otago.

As with most of New Zealand's coast, reliable sea level records for Otago are sparse and short. The only open-coast gauge, on Green Island, has been operational only since 2003. So we had to construct our own long sea-level record.

We used three key components of extreme seas: tides, inverse-barometric pressure (the lower the pressure the higher the sea gets), and wind set-up (strong winds piling water up against the coast). In most coastal locations, tide records are not long enough to use the standard prediction techniques to determine Mean High Water Spring, so we used NIWA's tidal model of the New Zealand EEZ. Records of barometric pressure and wind speed from the weather station at Taiaroa Head, going back over 40 years, were used as surrogates for storm surge.

This method gives us extreme sea levels of about 1.4 metres above the mean level of the sea for a 2-year return period, up to 1-in-100 year extreme sea levels of 1.7–1.8 metres on the

open coast. Several factors other than tides and storm surge can increase sea level further, including sea-level rise and wave run-up on beaches.



How will climate change affect the Chatham Islands?

A NIWA report aims to help Chatham Islanders, especially the Chatham Islands Council, assess the risks and plan for the future.

Over the past 100 years, the annual mean temperature on the Chathams has increased by about 1.0 °C and annual rainfall has risen about 10%. By the end of the century, we calculate that the temperature could increase by between 0.5 and 3.9 °C above what was normal in 1971–2000. This is based on global figures from the Intergovernmental Panel on Climate Change (IPCC).

So, the Chatham Islands are likely to experience:

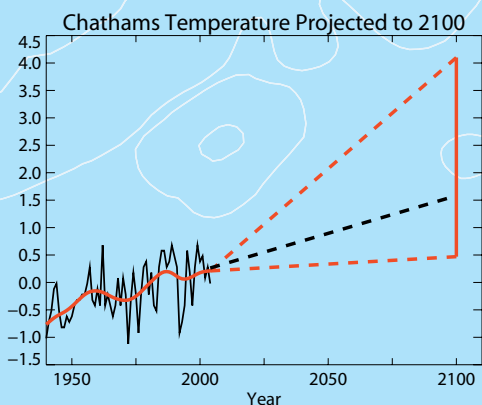
- stronger westerly winds
- increased annual rainfall
- more instances of extremely high rainfall
- higher storm tides as the mean sea level rises



Just how much change will occur and what will its effects be? Councils across the country are grappling with the difficulties of planning for an uncertain future. Since no-one can know for sure, we're suggesting a pragmatic approach, looking at a plausible range of what might happen. That would generally involve a best case, a worst case, and something in the middle.

Consider, for example, extreme rainfall under the current climate on the Chathams. If the temperature rise is about middle of the IPCC range, we expect this extreme rainfall to occur about twice as often by the end of the century. But if the temperature rise is at the upper end of the range, extreme rainfall is likely to be 3–4 times as frequent.

The report was commissioned by the Ministry for the Environment, and builds on previous guidance notes for local government. Read the full report at: www.climatechange.govt.nz/resources/reports/index.html



This line graph shows the Chatham Islands annual temperature for 1934–2004, and projections into the future. All temperatures are shown as a deviation in degrees Celsius from the 1971–2000 normal. This shows that the Chathams has warmed by almost 1 °C since 1934. The dotted lines show the lower and upper edges of the IPCC range of warming. If the current trend continues, the temperature on the Chathams could be just over 1.5 °C higher by 2100 than 1971–2000.

Course a hit

We had to turn people away from last month's short course on managing extreme weather and flooding, and are considering hosting a special one later this year to meet demand.

The course deals with extreme weather systems, weather warnings, hydrology, and flooding. 'It's not as dry as it sounds,' says presenter Warren Gray (who is known for sweetening his talks with gifts of chocolate for participants).



Graeme Smart (NIWA) talks flooding issues with participants on the field trip. The Waimakariri River is in the background.

This was the second such course based at NIWA, Christchurch. Warren says the extensive field trip is always a highlight. Participants viewed inundation prevention works on the Waimakariri River, where the regional council has built stopbanks to withstand a 1-in-450 year flood. They looked at infrastructure hardening by Orion to protect its power lines and substations from earthquake, wind, snow, and other hazards.

Effective communication with the general public is essential in hazards management. The course's practical exercises included preparing a media release for a hypothetical 1-in-100 year flood affecting much of Kaitaia.

The Natural Hazards Centre's next short course, led by the Institute of Geological & Nuclear Sciences, will be on planning for a volcano crisis. It will be held in Auckland on 10–11 November.

More information about courses run by the Natural Hazards Centre can be found at:

www.naturalhazards.net.nz/courses

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