A man in a bright yellow raincoat is standing in a flooded field, talking on a mobile phone. The water is murky brown. In the foreground, a sheep's head is visible, partially submerged. In the background, another sheep is also in the water. The scene is set in a rural area with trees and a wire fence.

“Our science will prevent property damage and save lives”

Dr Murray Poulter
Chief Scientist – Natural Hazards

Hazards studies underpin planning in Otago

The 2004 Boxing Day tsunami in South East Asia was the catalyst for the Otago Regional Council to contract NIWA to look at the risks of coastal flooding from tsunamis and extreme weather. The two-year study identified the sea floor off the west coast of South America, and the Puysegur fault (southwest of Fiordland), as the tsunami sources of greatest threat to the Otago coast.

The research estimated the speed at which a tsunami would hit following a magnitude 8.5 earthquake, and the depth and extent of inundation for each of 17 Otago coastal communities.

NIWA scientists also used the same underlying data to examine the risk to the same coastal communities from storm surges. Now, for the first time in New Zealand, the regional council can directly compare the effects of tsunamis and storm surge on a number of settlements.

The research follows work previously carried out by NIWA for the Otago Regional Council in 2005 and 2006 which analysed flooding and erosion hazards in the lower delta region of the Clutha River, and flooding risks to Balclutha township from sea-level rises and flood-bank breaches.

The most recent study used a numerical modelling tool called RiCOM (River and Coastal Model, developed by Roy Walters) combined with aerial topographical Lidar (Light Detection and Ranging) data, supplied by Otago Regional Council, to quantify the inundation caused by each tsunami or storm surge. The study also accounted for future sea-level rise of up to 50 cm.

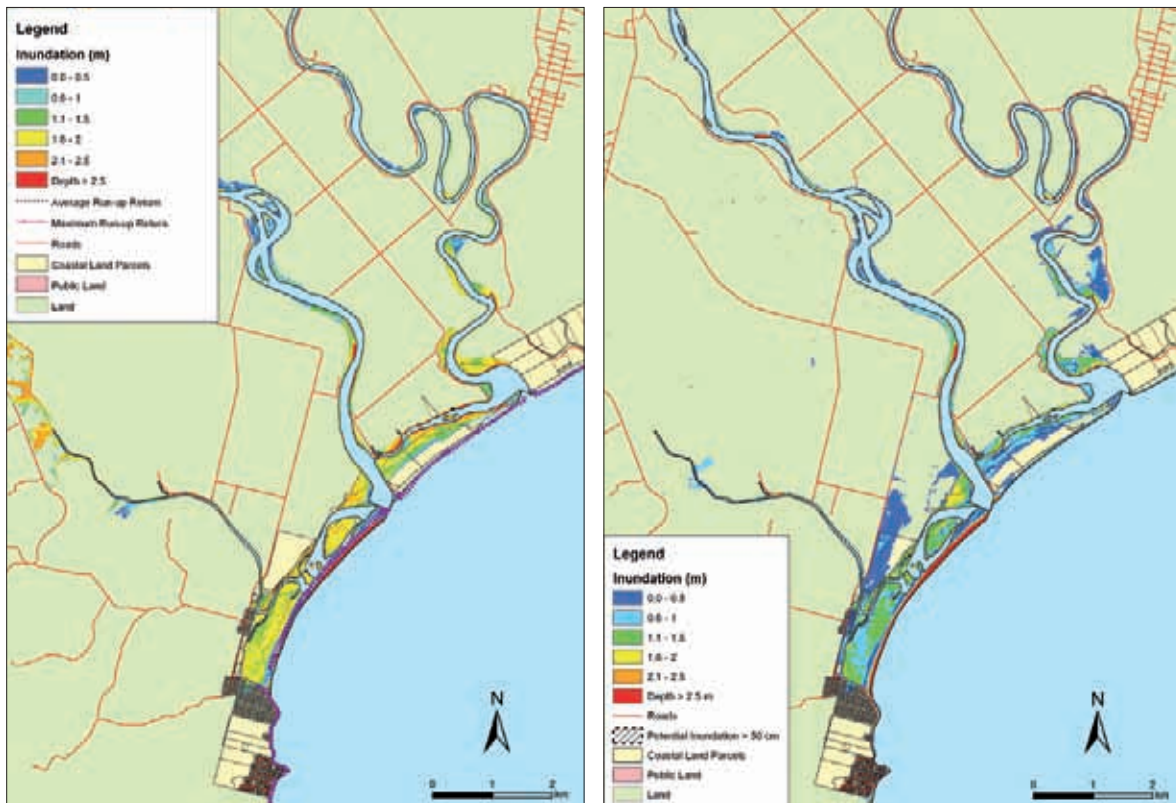
"The good news," says NIWA's Dr James Goff, "is that the Otago coast is not hugely exposed to a tsunami, with one-in-100, -500, or -600 year events causing maximum coastal inundation to about 3 or more metres in only a few places."

Storm surges, caused by high winds and low atmospheric pressure, pose a slightly more significant threat to some Otago coastal settlements. Modelling shows, for example, the maximum depth of inundation at both Clutha and Karitane to be about 2.5 m after a one-in-500 year Puysegur tsunami or a storm surge, but the inundation is more extensive and lasts longer when caused by a storm.

"We have focused specifically where there are settlements and provided the council and civil defence with an incredibly powerful tool to help them allocate resources effectively," says Dr Goff.

FUNDER:

- Otago Regional Council



For the first time, the Otago Regional Council can look at tsunami and storm surge hazards on the same maps. It can use the NIWA maps to decide which sites are more exposed than others and how to develop specific evacuation plans. This follows previous NIWA work on the region's flooding hazard.