Lahar Factsheet #3
November 2006

Mt Ruapehu Crater Lake Lahar threat response

-LAHAR RISK ASSESSMENT, MITIGATION, RECOMMENDATIONS & ALARM SYSTEM

Assessment of environmental effects

Was an environmental and risk assessment for mitigating the lahar hazard carried out?

Yes. In 1997 the Department of Conservation began preparing an Assessment of Environmental Effects (AEE) for then Minister of Conservation Dr Nick Smith. DOC staff, engineering and scientific consultants researched 23 options for mitigating the effects of a lahar. They included a range of engineering options at the crater rim, alarm systems, dams and diversion walls further downstream.

Did other affected organisations carry out their own risk assessments?

Yes. Organisations with infrastructure likely to be affected by a lahar flowing down the Whangaehu River were asked to carry out their own risk assessments. The NZ Army, Transpower and Tranz Rail concluded that the risks to their infrastructure did not require engineering work. They favoured the installation of an alarm system. Transit NZ and Ruapehu District Council favoured both options. ECNZ/Genesis supported the alarm systems and concluded they needed to carry out enginerring work to protect their infrastructure, rather than at the crater.

What recommendations did the AEE make?

The draft AEE (1998) was released for public consultation. Forty-five submissions were received before the final document was submitted to the former Minister in mid-1999. Most submissions did not favour an engineering solution at the crater. The report recommended that a reliable 'real-time' lahar warning system should be installed high on the eastern side of Mt Ruapehu, and that consideration be given to pursuing the option of preventing a spillover into the Tongariro River.

What decisions were made?

The incoming Minister of Conservation, Sandra Lee, accepted the AEE's recommendations and in May 2000 approved the installation of an alarm system. The Minister also requested an independent scientific review of the AEE. This review concluded that the quality of the AEE had set a

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new international standard for assessments of this type.

The alarm system was installed over the summer of 2001/200 and commissioned in July 2003.

In December 2000, on the recommendation of the independent scientific review, the Minister requested the construction of a bund (embankment) on the lower slopes of the mountain to reduce the likelihood of the lahar leaving the Whangaehu River and flowing into the Tongariro River. Construction of the bund required a resource consent under the Resource Management Act from Environment Waikato. The bund was completed in February 2002.

In 2003 Cabinet asked Transit and Transfund to consider other options to safeguard highway infrastructure at significant risk from lahars. This led to the SH49 bridge at Tangiwai being strengthened and raised to provide long term protection from lahars however caused. The task was completed in early 2005.

What work has happened since?

Precautionary programmes of work are completed or ongoing:

- Long-term and ongoing monitoring of Crater Lake levels that will give several weeks to months advance notice of when we need to be on increased alert. This would entail warning signs, track and road barriers, and briefing visitors entering the area.
- Management of the alarm/response system
- Major exercises to test the alarm response system take place each year to enable Police, DOC, local authorities and other agencies to pratcice their integrated plan to repsond to the alarm in order to minimise risk to human life.
- Monitoring the bund (stopbank) after floods to enusure it remains able to prevent the lahar from spilling into the Tongariro River.

Alarm System

How does the East Ruapehu Lahar Alarm Warning System (ERLAWS) work?

Sophisticated ground sensors have been installed at three sites on Mt Ruapehu: close to the Crater Lake outlet, near the New Zealand Alpine Club hut above the Whangaehu River and near the Tukino Skifield. The sensors detect vibration caused by the movement of a lahar. In addition, a trip-wire has been placed in the tephra dam and water level sensors in Crater Lake itself to detect the dam breaking and the dropping water level. The triggering of the lake outlet sensors alerts authorities via a radio, phone and computer networks. A lahar passing down the Whangaehu River past the Alpine Club site creates a second opportunity for an alert or reinforces the first alert. The timing between the two reports gives a further indication that a lahar is underway and how fast it is moving. This information is confirmed if the Tukino sensors also respond. Au-

thorities involved in the emergency response, such as DOC, Police and Ruapehu District Council are immediately notified by pager alarms, and pre-determined actions are initiated. These include notifying other stakeholders such as Transit New Zealand, Transpower, Genesis, Ontrack and Toll Rail and other local and regional authorities.

How much warning will the system give?

Up to two hours advance warning at the Tangiwai Bridge, and up to one hour's warning at the Desert Road.

What is the likelihood of the alarm system failing?

Failure is considered very unlikely. The alarm system is the best available in the world, and has been adapted to meet conditions on Mt Ruapehu. It has three types of lahar sensors at three sites, supported by dual radio telemetry paths. The base station has a automatic backup computer system ready at all times and a 24/7 website for information support and system operation.. A similar system in operation on Mt St Helens in Washington has worked without failing for the past 15 years. In May 2003 the sensors picked up a small rain flood in the Whangaehu Valley.

Are other alarm systems in place?

Ontrack has an alarm system that will stop trains before a lahar reaches the rail bridge at Tangiwai. Genesis also has an alarm system for its water diversion and hydropower operations, and several of the sensors on the estarn side of Ruapehu are incorporated in ERLAWS. This makes the DOC/Genesis alarm systems well integrated and support each other.

The Department of Conservation's mission is: To conserve New Zealand'snatural and historic heritage for all to enjoy now and in the future. Ko ta TePapa Atawhai he whakaute he tiaki i nga taonga koiora me nga taonga tuku ihohei painga mo te katoa inaianei, mo ake tonu ake.