

Report No:	RCN12-01-10
File No:	C271
Date:	15 January 2012
Decision Required	

REPORT SUMMARY

Report to: Full Council
Meeting Date: 26 January 2012
Report Author: Dennis Bush-King, Acting Chief Executive
Subject: December 2011 Rain Event

EXECUTIVE SUMMARY

This report provides Council with a summary of the December rain event that severely affected the eastern Golden Bay and Nelson Richmond areas resulting in the declaration of a civil defence emergency. The report also identifies key issues arising for the recovery phase and assesses possible cost implications.

RECOMMENDATION

That the report be received

DRAFT RESOLUTION

THAT the Tasman District Council receives the December 2011 Rain Event Report number RCN12-01-10; and

THAT the Tasman District Council agrees to authorise the Chief Executive to commit up to an additional \$50,000 of unbudgeted monies towards planning for the recovery effort provided that the Chief Executive shall first explore savings from other areas.

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Subject: **December 2011 Rain Event**

1. Purpose

- 1.1 The purpose of this report is to provide Councillors with preliminary information on the rain event which started on 14 December 2011 that had major impacts on the eastern Golden Bay and on the Nelson Richmond foothills and resulted in the declaration of a civil defence emergency.

2. The Rain Event

- 2.1 On Tuesday 13 December 2011 the MetService released a heavy rain forecast for the Tasman Nelson area. By the following morning on 14 December 190mm had fallen in Eastern Golden Bay with more predicted. An Emergency Operation Centre was activated in the Tasman District Council chambers in response to the escalating situation and at 1920 hrs on 14 December a civil defence emergency was declared for the Nelson Tasman region, the first such declaration since 1990.
- 2.2 A full explanation of the rainfall received, its duration and intensity is attached as Appendix 1. Clearly we were dealing with an extreme event unparalleled within the district since records began. It also ranks highly nationally and as such needs to be kept in perspective when organising the recovery. It would not be cost effective to design for such an extreme event. How we manage any future risks is the challenge.

3. Key Impacts and Issues

3.1 Golden Bay

Some residents of eastern Golden Bay, and particularly Pohara, Ligar Bay and Wainui, were affected by landslips and debris flows inundating homes and properties. Roads were closed by slips including State Highway 60 at Birds Hill (single lane now operating) while others experienced surface flooding with temporary access constraints. Severe damage to the Totaranui Rd has closed off access to the campground and Awaroa. The Wainui Hill was initially closed but later reopened to supervised access (still in place).

Water supply in Pohara was affected and temporary arrangements for the Pohara Campground were put in place with assistance from Fonterra. A boil water notice was issued for the Pohara water supply and will remain in force until the filtration plant is upgraded. Water supply to Port Tarohe was also affected by the silting up of the dam in Pohara. Temporary arrangements were made for water to be supplied to tanks by the Takaka Fire Brigade. There were issues with reticulated wastewater services but these were largely restored (5 properties without sewerage connection at present 120116). The release of sewage did result in restrictions on swimming (lifted 48 hours later) and shellfish gathering (still in place until at least 28 January).

Significant damage was done to stormwater services both public and private. Some watercourses changed course, the Wainui River having the most dramatic effect but creeks and streams in Pohara and Ligar Bay were completely overwhelmed and significant damage occurred to residential properties and services in these areas.

Telephone outages were experienced including to the cell phone network but again were restored in short time.

A series of street meetings were organised around affected areas to keep residents informed and provide a channel of responding to issues.

3.2 **Richmond**

Some residents along the foothills were impacted by landslips and some by overland flow of stormwater. Property and houses needed cleaning up and repair work undertaken.

A temporary boil water notice was issued for Richmond because of water quality readings showing presence of pathogens at low levels which would not have been an issue under the old drinking water standards. This did create problems for sellers of fresh food in Richmond.

Council's Dellside Reserve and Easby Park suffered damage to walkways and inundation and landslip. Bill Wilkes reserve and Washbourne Gardens did what they were meant to do as detention ponds but were also overwhelmed by the volume of water which created issues for Oxford Street businesses and those who parked vehicles here (and in Wensley Rd).

Rabbit Island experienced significant ponding of water because of rising groundwater levels and tidal influence. Poned water was contaminated which required fencing and access constraints. Closing the island at the peak of summer was not a welcome prospect.

Aniseed Valley Rd was closed to traffic and at time of writing access has to be gained via Meade Rd, a forestry road.

For a time there were concerns about the integrity of the former Richmond water supply dam on Reservoir Creek but works relieved the pressure and thereby any downstream risk.

3.3 Building Damage

Widespread damage was caused by flood waters and in the most severe cases also the debris it contained. The worst effects were felt where natural dams of logs, rocks etc formed and then failed under extreme pressure. The contents then cascaded into similar dams below and caused a "domino effect". The end result being huge volumes of water and debris hitting land and property below.

Some property and houses needed to be evacuated during the event. Work and Income assisted with the associated welfare issues. A major community effort will be required in the clean-up exercise. Council has assisted in providing for the dumping of waste generated from the rain event.

Inspections by geotechnical advisers, building control staff and a welfare representative lead to the 'stickering' of houses with access conditions. These have been followed up with the issue of Section 124 notices under the Building Act to 29 houses in Tasman District, 18 in the Golden Bay area and 11 in the Richmond area. Seven of these notices have been uplifted as at the date of preparing this report (4 in Golden Bay and 3 in Richmond). A verbal update will be given at the meeting.

Council will have to address whether and under what conditions some sites will be able to be built upon. This may involve the issue of what are called Section 72 notices on the certificate of title noting the property may be subject to natural hazards.

3.4 Upslope Land use

The rain event again cast a spotlight on forestry activity, similar to the Tapawera event in 2010. However the majority of forest debris that ended up downslope came from standing forest, including mature native vegetation. That is not to say there was not production forest slash in what ended up in Ligar Bay as there was a skid site which failed with the deluge of water, however, even here there was more native timber than radiata pine.

What was experienced in Golden Bay and to a lesser extent in Richmond were debris flows which were made up of water, soil, and vegetation. Because of the steepness of the land, and the Separation Point granite lithology, the flows in Ligar Bay and Pohara in particular have had dramatic consequences as they moved downslope.

The disturbance of Separation Point Granite land has been the subject of intensive study over a long period. Land Disturbance Zone 2 in the TRMP is a

particular response to the challenges this soil type presents. The rules however focus on tracking and roads; the actual harvesting of tree does not require a consent and we rely on forest owners observing best practice through environmental management systems that should be in place.

There is already a project to be done to review the land disturbance rules but while it is priority 1, given current priorities, it is not programmed to commence until late 2012/early 2013.

3.5 Legacy Subdivision Decisions

In two cases questions have been asked about past decisions approving land subdivision. Did Council take into account to a sufficient degree information or advice received on the design and layout of the subdivisions and their servicing?

The benefit of hindsight is always an advantage over the originating decision. However provided due process is followed and the Council has discharged its legal obligations appropriately, taking into account all information received, it serves little purpose to revisit the decisions. What is more important is working with what we have in order to minimise future risks from other rain events.

4. Ongoing Recovery Work

- 4.1 After the closure of the EOC a recovery centre was set up at Nelson City Council to co-ordinate recovery measures. Earthquake Commission assessors and insurance company representatives will be working closely with property owners to identify remedial actions. This will flow into work by building control staff around the section 124 notices and any consent requirements.
- 4.2 Council staff, consultants and contractors are still undertaking work in ongoing assessment of damage and the costs of repair and reinstatement works on roads, culverts, walkways, reserves etc. This will come together in a Recovery Action Plan that will identify the range of jobs to be done.

5. Initial Cost Estimates

- 5.1 The recovery action plan will also seek to identify indicative costs of repair to Council infrastructure and reserves. There will obviously be other costs to land owners and insurers. An update will be provided at the meeting.
- 5.2 Council staff are working with Government agencies and our insurers on what possible funding sources and assistance that may be available. For example, we will be making a claim for funding from the New Zealand Transport Agency for repairs and reinstatement of the roading and bridge network. The work

should be funded to at least a 49 percent subsidy. We will also be making a claim against the Local Authority Protection Programme (LAPP) and national civil defence funding for utilities and drainage/river works. The LAPP fund has an excess of around \$450,000.

- 5.3 Even with these claims, it appears that there could be yet another significant impact on Council's General Disaster Fund and Insurance account, on rates and on other resources. This raises the question of whether it will be possible to reinstate all infrastructure to its original state in particular Totaranui Road.
- 5.4 We have already incurred some unbudgeted expense in commissioning consultants to advise on work to be done which has not exceeded the \$50,000 contingency expenditure delegated to the Chief Executive (Section 7.3 of the delegation Register refers). However there will be resourcing costs to implement projects under the recovery plan and little capacity exists within existing staff resources. Approval is sought to spend up to a further \$50,000 for additional consultant or fixed term contract work to assist the recovery.
- 5.5 Because of the proximity of the event to the release of the 2012-2022 Long Term Plan and the fact that the cost implications cannot reasonably be assessed, we propose that the LTP include a statement to the effect that we will consider the cost implication during the submission process.

6. Acknowledgements

- 6.1 The Declaration of Emergency lasted for the full two weeks permissible under the Civil Defence and Emergency Management Act. The Emergency Operation Centres at Richmond and Takaka were staffed for a good proportion of this time by council staff from Tasman and Nelson (too many to name), other emergency services and welfare agencies. We had assistance from other Councils, the Ministry of Civil Defence and Emergency Management (MCDEM), and the Department of Building and Housing sent three officers for a brief time. A dedicated team of geotechnical specialists, locally and from across the country were also deployed during the emergency.
- 6.2 On review I know we can be proud of our staff and the way that they and Council contractors and consultants responded. As with any emergency or crisis there will be things done and decisions made that some might question with more time and information, but overall the whole response went well. MCDEM has congratulated the Nelson Tasman Group for its management of the event.
- 6.3 It is also worth noting that land owners have also responded well despite some very difficult and trying personal situations including the total demolition of some houses. The civil defence framework has as one of its objectives building resilient communities ready to respond in the event of natural disasters. It comes down to communities working together, keeping in touch

and supporting each other, maintaining basic necessities of life, and responding to the natural calamity with dedication, selflessness, practicality, and patience. This was certainly exemplified by the people affected and involved in the event.

7. Timeline/Next Steps

- 7.1 The Recovery Action Plan needs completing and project identified will come back to the respective Council committee for approval as required. Staff will be compiling any claim requests and will continue to work with property owners regarding the section 124 notices.
- 7.2 A debrief on how the event was managed will be arranged in due course.

8. Draft Resolution

THAT the Tasman District Council receives the December 2011 Rain Event Report number RCN12-01-10; and

THAT the Tasman District Council agrees to authorise the Chief Executive to commit up to an additional \$50,000 of unbudgeted monies towards planning for the recovery effort provided that the Chief Executive shall first explore savings from other areas.

Appendices:

Appendix 1 Hydrology Summary for 13 – 15 December 2011 flood event

Appendix 1

Hydrology Summary for 13 – 15 December 2011 flood event

Martin Doyle and Monique Harvey

From 13 – 15 December 2011, following record breaking rainfall, a serious land slip and debris flow event was experienced in parts of the Tasman and Nelson Districts. This report documents and explains the unique hydrological aspects that lead to the damage. It is intended that this report can be used as a reference for future events, and for parts to be included in other summaries that may be written.

Metservice Forecast

On the evening of Tuesday 13th December, Metservice advised: *"rain should become persistent and heavy overnight Tuesday. In the 36 hours from 9pm Tuesday to 9am Thursday, expect 300 to 400mm of rain in the ranges west of about Motueka and 150 to 250mm in the remainder of Nelson."* By next morning 190mm of rain had already fallen at Takaka, but the forecast remained the same, predicting a further 300 to 400mm of rain in the western ranges.

This was seen by the Hydrology team as a very serious forecast, and the duty Hydrologist Matt Mclarin spent the day prior preparing for the event by checking equipment and alerting Civil Defence and other key people as to the seriousness of the storm.

Rainfall

The storm was very unusual in that rainfall was highest near the coast. Normally the largest totals are seen at higher altitudes, usually around twice as much as observed at low altitude. In this case in the Takaka area, the totals at altitude were only 40% of those seen in Takaka itself.

The bulk of the rain fell over a 48 hour period. No extreme short term intensities were recorded, but the sheer volume of rain was exceptional. The most startling of these was that observed in Council's Kotinga gauge by the Takaka Township where 1/3 of Takaka's normal annual rainfall fell over two days. The 24 hour maximum was 453mm, and the 48 hour maximum was 674mm. These totals were verified by a manually read checkgauge after the event and compared closely to the 48 hour totals seen at the information centre and at a private weather station at Paynes Ford, these values being 609mm and 656mm respectively. The 48 hour total is significantly more than anything recorded in that locality over the past 50 years, and this is best seen in figure 1.

The other part of our district that suffered from the deluge was the coastal strip from Brightwater to North of Hira, including the hills behind Nelson. At Richmond a total of 280mm was measured over 48 hours, this being more than 1/4 of Richmond's normal annual rainfall. This is much less than at Takaka, but it was still a hugely significant rainfall given Richmond is less susceptible to heavy falls than is Takaka. Some other totals measured by TDC are shown in Table 1.

Table 1 - Some rainfall totals measured by TDC during the 13-15 December 2011 storm

Location	24 hour maximum	48 hour maximum
Aorere at Devils Boots	202 mm	287 mm
Takaka at Kotinga	454 mm	674 mm
Anatoki at Happy Sams	370 mm	531 mm
Waimea Plains at Appleby	182 mm	241 mm
Brook at Third House	329 mm	493 mm
Richmond at TDC Office	205 mm	281 mm
Roding at Caretakers	323 mm	445 mm
Wakapuaka at Hira	238 mm	369 mm

In other areas rainfall was measured by manually read gauges owned by residents. The three day totals were adjusted slightly to bring them into line with the 48 hour maximums shown above.

One group of readings worth noting are those seen around Takaka and these values are shown in table 2. The gradient of rainfall away from the coast is quite evident.

Table 2 - Rainfall around Takaka for the 13-15 December 2011 storm

Location	Distance from the coast (km)	48 hr maximum
Pohara coast	0.1 km	405 mm
Rangihaeata Heads	0.5 km	352 mm
Pohara hill	0.9 km	470 mm
Puramahoi	2 km	508 mm
Motupipi	3 km	529 mm
Kotinga	5 km	674 mm
Paynes Ford	6 km	660 mm
Anatoki valley	10 km	531 mm
Waingarō Valley	13 km	410 mm
Little Devil	20 km	247 mm

How significant was the rainfall?

Evidence of other exceptional coastal rainfall totals over a similar period was sought from other regions. It is apparent that throughout New Zealand, 300mm of rain falling in a coastal area over a 48 hour period is a lot of rain. Northland is known for large rainfall amounts, many of which result from ex-tropical cyclones passing close by. A search of records showed one fall of 436mm over 48 hours, for records going back to at least 1905.

In April of this year a massive 626mm over 48 hours fell south of Napier, and this was probably the highest total previously seen in a coastal location. That event resulted in similar damage to that seen near Takaka and Nelson. The largest 48hr total recorded in New Zealand was 1049mm in 1995. This occurred high in the Southern Alps in the Cropp Catchment, inland from Hokitika.

Analysing the records collected to date, the Takaka 48 hour total seen last year is likely to only occur around once every 500 year on average. In Nelson the 48 hour rainfall experienced is only likely to occur every 250 years or so.

Figure 1 shows the rainfall as an isohyetal map. The side boxes show the significance of this storm – the 10 largest 48 hour rainfall totals seen for gauges in each area for a period going back at least 50 years. In each case it can be seen that the December 2011 rainfall total is much larger than anything seen before, and in the Takaka case, it is more than twice as much as anything previously recorded over the past 50 years.

Why was the rain so coastal?

In this storm, the heaviest rainfall was only some 2-5 km from the Coast. Usually this would occur 15–20 km inland. MetService noted that the airflow during the December storm was particularly warm and moist in the lower levels. This moisture was available for conversion to rain immediately as the airstream started to rise and cool over the foothills.

Another difference the hydrology team noted was the lower wind speed seen in this storm. A strong wind will drive the moisture further inland, this being the typical pattern as seen during the 2010 Aorere flood and the 1983 Takaka flood. A combination of these two factors meant that for our district the inland catchments this time did not receive much rain.

Flood levels

The larger rivers monitored by hydrology staff were not affected greatly during the storm because the rainfall was so coastal. Instead the lower country which is unaccustomed to such heavy rain became saturated to an extent not seen before, and bore the brunt of the damage. This was mostly caused by slips and debris flows,

and the flood waters that did cause problems were more a result of streams spilling water on account of being choked with silt, rock and logs. On some occasions very high flows will have occurred as a surge as debris dams released.

This is not to say that there weren't significant flows in the small coastal streams, just that they were not exceptionally high flows to the same level of significance as the 2 day rainfall totals.

From observation after the event, it can be seen that the Richmond/Stoke/Nelson areas were very lucky to not receive greater damage. Streams were becoming choked to an extent where they were about to, or had just started spilling into urban areas.

Of the larger rivers, the main Takaka River did not even reach an annual flood level, while in the east the two most significant were the Wai-iti (13 year flood) and the Wakapuaka (10 year flood).

Why were stream flows not greater given the 2 day rainfall was so immense?

The most intense rainfall will only occur for a short duration, maybe up to an hour or so. This allows small streams to generate their highest flows as this gives time for all of the catchment to contribute to flow at the outlet. A large river in comparison will suffer a large flood when steady rain occurs over a longer period, and over all of the catchment. The longer period provides time for flow from the far away upland areas to reach the outlet while the lower parts are still flooding.

In December the rainfall stayed in a coastal band and intensities did not reach very high levels, instead staying relatively steady over a long period. Often a storm in this region will finish with a burst of heavy rain that causes a sharp rise in river level, but this did not occur on this occasion.

At Takaka the maximum hourly rainfall was 35mm, and this could be expected to occur every 3 years or so. In Stoke (a good guide for Richmond and Nelson as well) the maximum hourly rainfall was 16mm, and this intensity will occur several times a year. As a comparison, during 2007 one burst of rain in Stoke reached 65 mm for the hour. As a general guide, 50mm for one hour is considered an exceptional heavy rain.

How did this storm differ from other notable events?

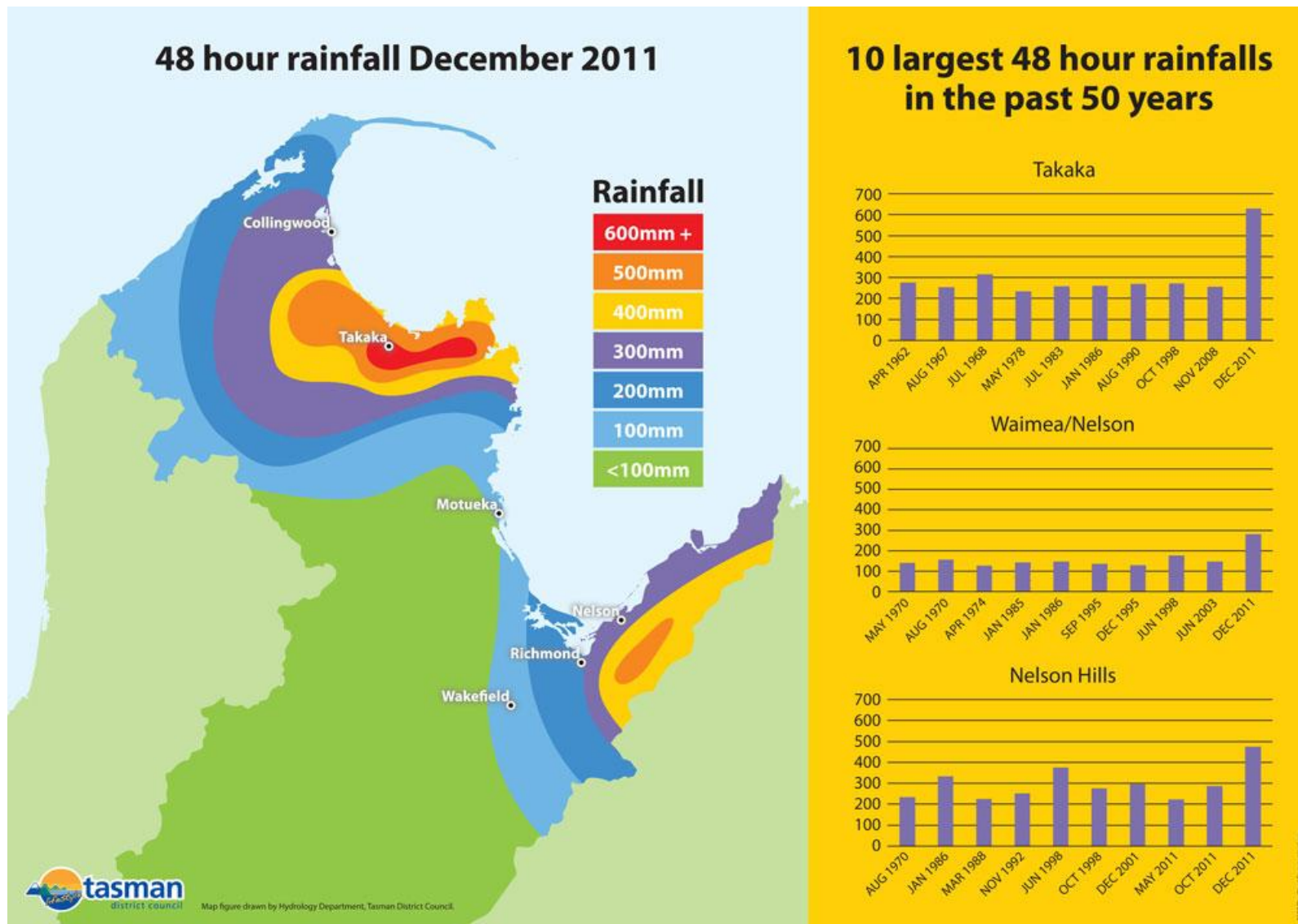
It is useful to compare this storm with three past events. On each of these occasions moisture laden warm air was dragged down from the tropics and reached our shores in a North or North East airstream. Large totals of rain fell and the catchments were soaked before the worst of the flooding started.

The 2010 Aorere flood followed a period when strong winds pushed rainfall far back into the catchment, allowing the entire watershed to contribute to a large flood. In particular, there was a period of 5 hours where rainfall rates sat at around 40 mm/hr, and it was at the end of this time when the damage occurred.

A storm in August 1990 had some parallels to this last event except the wind direction was more easterly. It affected the Motueka catchment and had a duration similar to the 2011 storm. It is useful to note that the Riwaka/Brooklyn area was badly affected by slips. Despite the Riwaka River not producing a huge flood, there were flooding issues as a result of water ways being choked with debris - such as we have just experienced.

The 1983 flood was a memorable event, particularly in Takaka. In comparison to 2011, a feature of that storm was a strong wind that pushed rainfall far back into the catchment, and the long duration of the storm allowed much of the catchment to contribute. The large rivers had major floods as a result.

Figure 1 - Map of 48 hour rainfall for flood 13-15 December 2011



Groundwater levels

One effect of the storm was to raise ground water levels on the Waimea plains to levels not measured before. Areas that don't usually pond at all had water sitting in them for a number of days after the rain stopped. There was overland flow across parts of the plains, something that rarely happens.

Large parts of the Rabbit Island including much of the picnic area remain flooded 4 weeks after the storm. Parts of Nelson Golf Course have also suffered in the same way, an indication of the perched water table in these coastal areas.

Flood warning

The equipment and processes operated by Council worked well. The recent upgrade of equipment and power supplies meant no voltage issues were experienced despite the prolonged nature of the storm. One council team operates the rainfall and flow recorders across both council districts and the value of this is apparent during a large flood, with all information coming to one central area, and staff having built experience over many years in both districts.

Hydrology staff recognised and correctly advised that large rivers were not likely to flood and efforts were able to be concentrated on the coastal areas receiving damage.

A full complement of relatively experienced staff was available, and this is extremely valuable during a prolonged storm. It was possible to cycle these staff throughout the event in 12 hour shifts. Any longer than this and the quality of decision making drops.

Once again the lack of a rain radar that operates effectively in our district leaves staff to infer information about the spread of rainfall, leaving a gap in the knowledge of those making predictions. The Wellington radar appears to be partially effective around Nelson, but not Golden Bay.