The Northland Floods
28-29 March 2007

Hydrologic Hazards Hindvestigation

NIWA Client Report: CHC2007-049
April 2007

NIWA Project: RIWB055

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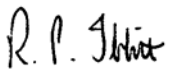


R.P. Ibbitt

Summary

Floods and landslides over eastern Northland occurred following exceptionally high rainfalls on 29-28 March 2007. Rainfall probabilities were estimated to range from 1/50 year to 1/150 year.

Weather forecasting models did not foresee the intensity of rainfall that occurred. Many residents were caught unawares and serious losses occurred. These losses were mainly due to the landslides and overwhelming of low-level flood protection schemes designed for 1/5 year to 1/20 year events. Such low level protection schemes create a false sense of security.

Whangarei City was saved from serious flooding by its water supply reservoir which was, by chance, partially full at the onset of the storm. The state of this reservoir saved Whangarei from multi-million dollar inundation losses and likely loss of life. The reservoir is not lowered in anticipation of floods because of previous false alarms and water shortages. This situation is not satisfactory and measures should be implemented to prevent a future disaster.

There is a pervasive distrust of the reliability of heavy rain forecasts in Northland.

Higher population densities mean that more people are now living in hazardous locations. Research effort should be focussed on better warning systems, provision and publicising of realistic inundation and landslide hazard maps and incorporation of these into regional development plans.

1. Situation

At 8.40 am on Wednesday 28 March, 2007, a Northland Severe Weather Warning was issued for Northland by the NZ Met. Service: “areas near the eastern hills could receive 100 to 150mm of rain over the 36 to 42 hours from Wednesday morning”. A further Severe Weather Warning was issued at 7.47 pm on Wednesday evening: “In the 28 hours from 8pm Wednesday to midnight Thursday expect 80 to 100 mm rain”. On the Thursday morning the warning was for a total of 30-50 mm north of the Bay of Islands through to 9pm but 60-90 mm further south up until midnight Thursday. A media release by the Northland Regional Council was made at 9.56 am on Thursday 29 March to warn of widespread flooding and the likelihood of further heavy rainfall.

In actuality, more than 400 mm of rain fell in the hill catchments of eastern Northland, representing an extreme 1/150 year rain event for a 24 hr period. Usual high intensity rainstorms in Northland last 1-2 hours. This was a widespread, long duration event lasting 8-10 hours. The storm formed a distinct rain band that moved down the eastern side of Northland from Coopers Beach to Whangarei (Fig. 1). A hydrologic summary of events from Northland Regional Council (NRC) is attached as Appendix 1. The rain caused widespread flooding and landslides.

By mid April around 700 insurance claims had been lodged, 20 households were still displaced, many livestock had been drowned. Significant economic damage was caused by the landslips and flood inundation. There were no fatalities. A situation report is attached as Appendix 2.

Because the economic damages exceeded $20M a FRST contingency investigation of causes and implications was instigated. The following findings and observations were made as a result of a site visit on 19 – 20 April, 2007 and subsequent enquiries. Areas of serious damage are reported from North to South.

2. The Far North – Mangonui to Kawakawa

“Everyone expected the rain to stop but it just kept going”.

Local Body Contacts:

Far North District Council (FNDC): Bill Hutchison, Civil Defence Coordinator, Andrew Prangley, Field Compliance & Monitoring,
NRC: Bob Cathcart, NIWA: Graeme Mackay.

Figure 1: Location Map.

Figure 2: New Zealand is on the move.

Figure 3: Inundation debris

Serious damage in the far north was caused primarily by unstable hill slopes (Figs 2 and 4) and inundation (Fig. 3). Many of the recent hill slope failures were re-initiated old slips. Houses are being built “on the edge” of steep slopes because of the views (Fig. 4).

Figure 4: Slope failure at Opua on 29 March, 2007 (FNDC Photo).

A full investigation into hillside failures is being undertaken by Mike Page of Landcare.

Inundation damage also occurred in many locations where dwellings are situated on floodplains. People are living on the Northland floodplains for the following reasons:

- Settlements originally developed alongside rivers which provided transport access.
- Roads tended to be built along the river valleys and people built near the road.
- Building costs are lower on flatter sites.
- General population drift has shifted more people northwards.
- Maori have been moving back to their ancestral lands. Maori originally used the floodplains for gardens and lived on the hills. Now the only land they can claim connection to (e.g. for security against a loan) is what was their part of the communal garden[1].

[1] Pers. com. Bob Cathcart, NRC.

Several households in the Matangirau area (Matangirau School Road) have been displaced because of flooding from the Touwai Stream (Fig. 5). There is a flood avoidance and mitigation plan for this area but it does not appear to have been adopted by the local community.

Figure 5: Flood prone house on the Touwai Stream floodplain, Matangirau.

Kaeo township has a flood protection scheme designed to give ~1/20 year protection. After the heavy rain warning on the Wednesday night the Kaeo fire chief was warned by FNDC. On Thursday the capacity of the Kaeo flood scheme was overwhelmed by floodwaters and fourteen houses were inundated. It should be noted that with the 1/20 chance-per-year protection the Kaeo residents should be prepared to be flooded every 20 years (on average).

The Maungaparerua River (a tributary of the Kerikeri River) experienced the second highest flood in 40 years of record. A forecasting system is in place to help protect the historic Kemp House which is situated on the bank of the Kerikeri River where it joins the Kerikeri Inlet. The forecasting system relies on analysis of upstream hydrologic data and a rainfall-based flood level prediction model.

The model predictions at 6 am are shown by the dark red line (D-D) on Figure 6a. The computational + manual decision-making process resulted in Kemp House being prepared for inundation at 9.30 am on 29/3/07. The actual flood evacuation threshold was crossed just before 1pm as shown by the green line on Figure 6b. The maximum level of the flood is indicated in Figure 7. Fortunately the water level did not rise above the Kemp House floor level.

Prediction of accurate levels is difficult because the Kerikeri Basin bridge (Fig. 8, top) acts as a flood constriction (Fig. 8, bottom) except at high tide levels. Debris collect on the bridge (Fig. 9) and restrict its capacity to an unpredictable degree. Removal or raising of this bridge would help safeguard Kemp House and make flood levels more predictable. Flood detention basins could help reduce the flood peak levels.

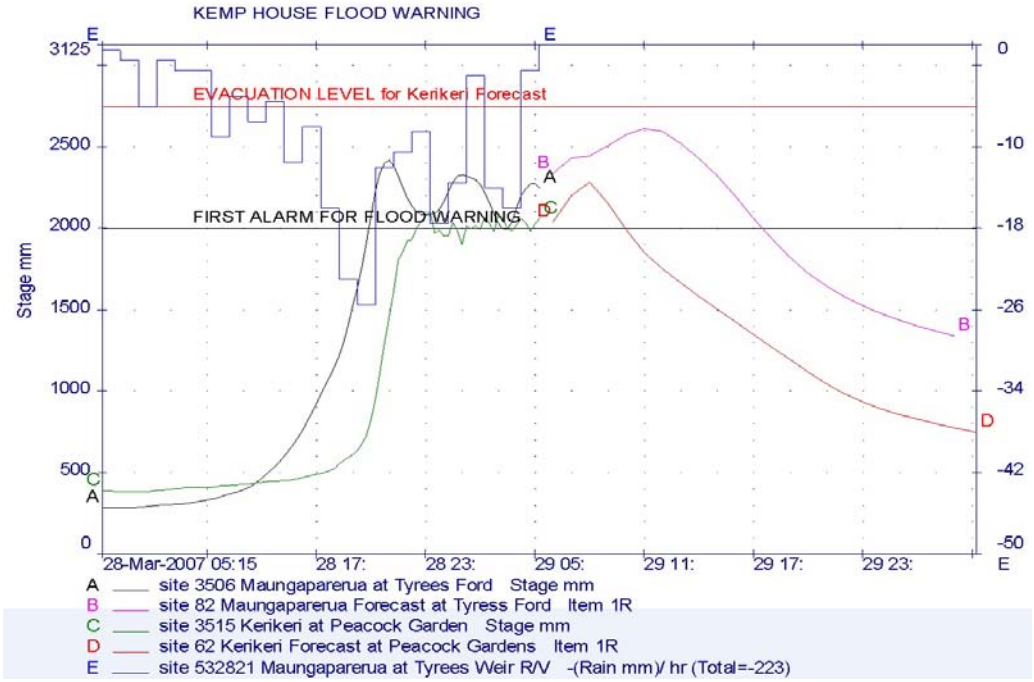


Figure 6a: **Flood** Forecast for Kemp House (red line D-D) made at 6 am on 29/3/07

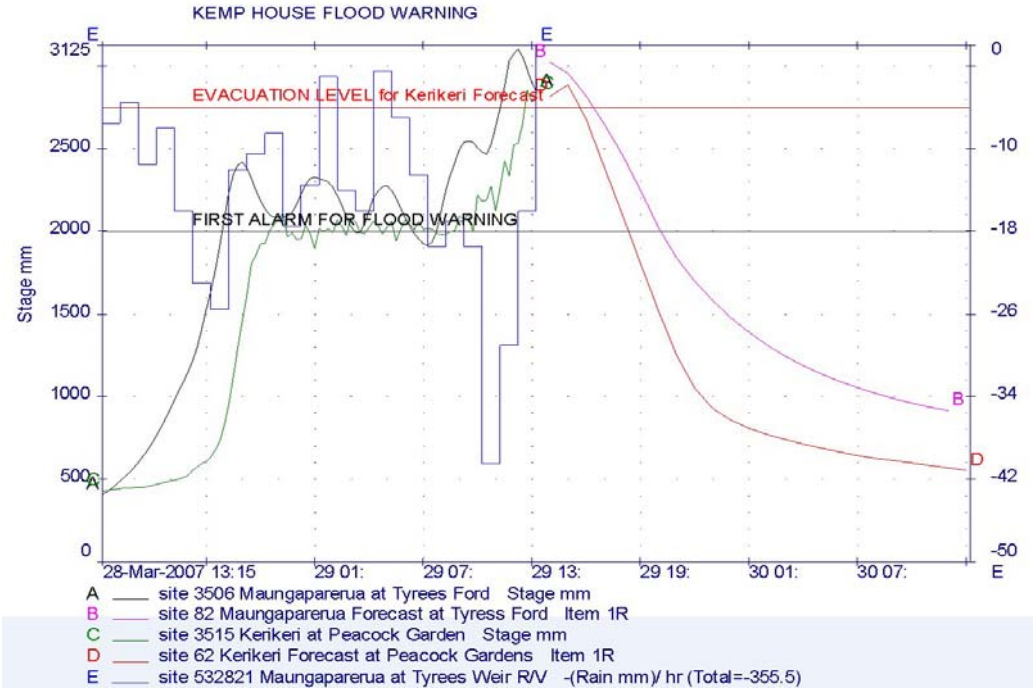


Figure 6b: Situation showing Kemp House level (green line) at 1pm on 29/3/07.

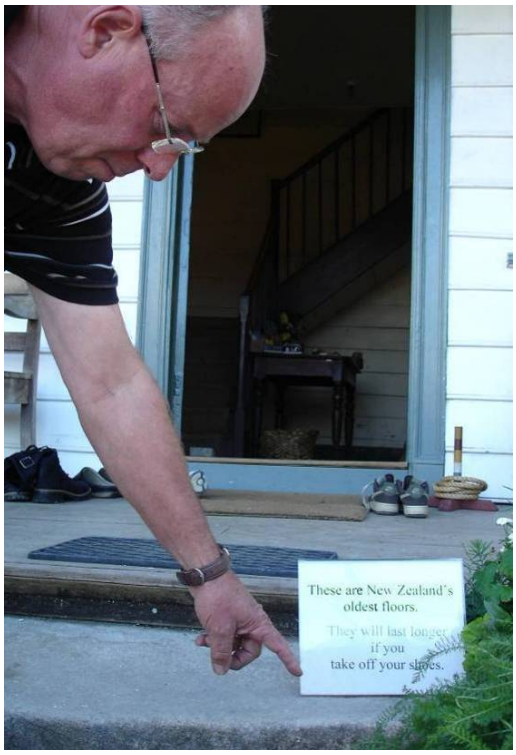


Figure 7: Flood level at Kemp House**.**

Figure 8: Kerikeri Basin bridge.

Figure 9: Flood debris on the Kerikeri Basin bridge, Kemp House in background. Photo: FNDC.

South of Kerikeri the Waitangi River reached the highest water level measured in 28 years of record. It inundated the Lily Pond Farm Park at Puketona and the Haruru Falls Resort. The residents were unaware of the impending flooding. They had heard a "heavy rain warning" but "you get these all the time". The owners of Lily Pond Farm Park decided to evacuate when the water level reached the top of the fence outside their house. Carrying valuables they waded through flowing flood water waist deep. If the flood had occurred during the night they would have probably drowned as they evacuated. The eventual water level reached sink bench level in the house (Fig. 10).

The high flood levels were contributed to by willow growth in the Waitangi River (Fig. 12) which restricted flow and aggravated bank erosion (Fig. 11).

Figure 10: A resident of Lily Pond indicates Farm Park indicates flood level on the house.

Figure 11: Waitangi River flood scour.

The area below Haruru Falls has had severe flooding in the past (1930s and 1950s) and minor flooding in 1981. In the March 2007 floods the Haruru Falls Resort (Fig. 13) suffered severe damages on two fronts. It was inundated by the river on its lower side (Fig. 14) and partially demolished by landslips on its uphill side (Figs. 15, 16). Some protection to this facility could be offered by retaining walls, flood walls and a flood warning system.

Waitangi River levels are monitored by NIWA at site 3722 upstream of Haruru Falls. Water level alarms at this site were set to alert NIWA staff to carry out flood gaugings when the water level exceeded 4 m. The actual water levels went to 7 m during the flood. Although the alarms were set and activated for a moderate flood level, other hydrologic problems occurring at the time meant that the major flood was not identified until after the event. NRC operated a water level site further up the Waitangi River (site 3707) which could be reinstated to give more warning lead time for flood forecasting purposes.

Figure 12: Willow growth in the Waitangi River.

Figure 13: Haruru Falls Resort sign during and following the flood.

Figure 14: Haruru Falls Resort on 29 March, 2007.

Figure 15: Landslide damage to the back of Haruru Falls Resort. (Photo FNDC)

Figure 16: Mud on the carpets at Haruru Falls Resort.

The Opua-Paihia region suffered many landslides. A land use capability plan for this area was published in 1987[2]. Although this identified hazardous landslip zones and other natural hazards, it has not been incorporated into the Far North District Plan.

Figure 4 shows a disastrous situation on land that was subdivided in the 1970s. At that time, the Bay of Islands County Council, acting on the advice of the Northland Catchment Commission, turned down the application for a subdivision on the grounds that the land was unsuitable for such an intensity of development because of instability. The Council's decision was overturned by the Town and Country Planning Tribunal (the forerunner of the Environment Court) but the County Council refused to grant building consents for three sections with slopes greater than 47 degrees. The sub-divider sued the Council and was paid compensation for those three sections.

Further south, at Taumarere, the Bike Museum was partially buried by landslides on 29 March (Fig. 17), and a house is in danger of being engulfed during the next deluge. At this site the Taumarere Bike Museum curator, Richard Crowden, measured 100 mm rain in one hour (at about 2pm on 29 March). Such high rainfall intensities were not foreseen by Met.

[2] Cathcart. B. (1987) Urban Capability Surveys of selected Bay of Islands Areas, Northland Catchment Commission, September 1987, ISBN 0-908744-04-8

Service or NIWA atmospheric forecasting models which anticipated that the intense rainfall would occur offshore.

Figure 17: Landslides engulfed the Taumarere Bike Museum

Many comments were made by affected residents along the following lines: “Whenever you get a warning nothing will happen. When there is no warning and heavy rain then there will be trouble”.

3. Hikurangi Swamp Area

Whangarei District Council (WDC) contact: James Blackburn, Drainage Engineer.

The Hikurangi “swamp” area of some 5600 ha was originally alluvial plain and marshland which was drained in the 1920s. In the late 1960s and early 1970s the Wairua river was re-straightened and bunded to protect farm land from 1/5 year floods. When floods exceed the 1/5 year level, 7 polders (or “pockets”) of farmland were designed to fill slowly and evenly, spreading the floodwaters into the pockets. As soon as the river falls, large pumps (with 34 m^3/s capacity) start to evacuate the ponded water at a rate of 21 mm every 24 hours. In this way a 1/20 year flood event could be passed without destroying the pastures. In the recent

March event the river rose 3½ m in 2½ hours. This surprisingly rapid "flood wave" overfilled upstream "pockets" and 5000 ha of farmland was inundated (Fig. 18).

Figure 18: Wairua River spilling into the Hikurangi Swamp flood pockets Photo: WDC (J Blackburn)

Downstream pockets have the highest pumping capacity but, because of the steepness of the flood wave and the flat grade of the river, these received the least water. Some accounts claim that farmers have raised the river overflow sill levels by several centimetres to offer their land greater protection. Floodwaters from the Wairua River were augmented by runoff from local hills. As a result, an estimated 80,000,000 m^3 of water was detained in the scheme ponding area. The pumps could not cope with this volume of ponded water and on Sunday 1 April, stop banks were deliberately cut to drain three of the pockets. A digger made 8 metre wide cuts (Fig. 19) with the base of the cut at river level to reduced scour. The pockets took 8-16 days to drain and large areas of pasture were destroyed by the long-term submersion (Fig. 20).

Figure 19: Hikurangi pockets draining to the Wairua River after the bund was cut.

Figure 20: Hikurangi pastures destroyed by long term inundation.

The Hikurangi scheme detains floodwater. The March 2007 flooding of the pockets reduced downstream flood peaks and protected riparian land as far as Dargaville. There are two dwellings situated with the Hikurangi ponding area.

Although the Hikurangi pockets could (statistically) flood every 5 years, there had not been serious flooding for almost 20 years (since cyclones Bola and Delilah in 1988) and local farmers did not expect a flood to rise so fast and inundate their land to such an extent. The rise occurred so quickly and over such an enlarged area that many farmers 'flood reserve' pastures were also inundated.

Future damages could be reduced for such events by giving more flood warning, by distributing the floodwaters more evenly between the pockets, by constructing gated culverts to quickly drain flood waters back to the river after a flood, and by not permitting dwellings or other non-robust infrastructure to be constructed at vulnerable locations within the ponding areas.

4. Whangarei City Area

Local Body Contacts: NRC: Bob Cathcart, Graeme MacDonald (Hazard Management), Dale Hansen (Hydrologist), NIWA: Graeme Mackay, WDC: James Blackburn (Drainage Engineer).

Fortunately the heaviest rainfall intensities stopped short of Whangarei during the March 07 floods and a 1/50-1/80 year event was recorded in the city (Fig. 21). Three rivers flow through Whangarei; the Hatea, the Raumanga Stream and the Waiarohia Stream. A major flood destroyed the Hatea River station in 1995 and it has not yet been reinstated. Consequently, there is no data available from that river for the March floods. The Raumanga has been monitored since 1979 and a 1/50 year flood peak was recorded at 3.30 pm on 29 March. The Waiarohia has catchments west of the city and the Whau Valley water supply reservoir is situated on this river, 3 km upstream of the city. Although originally designed to include flood storage, the Whau Valley Dam spill level was raised some 20 years ago to provide more water supply storage and the flood detention facility was lost. Fortunately, at the end of March 2007 the Whau Valley Dam was not full. It had around 550,000 m^3 of available storage and acted as a flood detention dam. The detention effect of the dam reduced the outflows to only a 1/10 year flood event in the Waiarohia River. The Whau Valley Dam has no inflow gauges and no rain gauges in the its catchments. The dam inflow during the March floods can be roughly estimated at a 1/100 year event as the peak reservoir level came within 200 mm of flowing over the crest of the emergency spillway which starts to operate in a 1/150 year event.

Whangarei Civil Defence watch the level of city streams in order to decide whether evacuation is necessary. For floods larger than a 1/10 year probability the Waiarohia River flows into the city. At around 2 pm on 29 March Civil Defence made the recommendation that Whangarei City workers should go home because of the rising river levels. The town became gridlocked with traffic. At this time the Whau Valley Dam was filling with floodwater. By 3 pm the river level had stopped rising. Had storage not been available in the Whau Valley Dam, the Waiarohia Stream would have continued to rise to perhaps a 1/75 year flood level and serious inundation would have occurred. Some gridlocked cars within Whangarei city would have been swept away. It is likely that loss of life could have

occurred. Indications are that a 1/75 year flood event would cause around $75M of damage to Whangarei City (URS Whangarei CBD flood study, - in preparation).

Figure 21: Whangarei City got off lightly this time.

Following the modifications that removed the automatic flood retention effect of the Whau Valley Dam, a trial was made to manually lower the water level in anticipation of high flood inflows. It was expected that the available storage would refill and, at the same time, protect the city during the flood. Unfortunately, the forecast flood did not occur and the low reservoir levels caused water shortages in the following months. The local consensus is that: "Forecasting in Northland does not work".

It should be recognised that, had the Whau Valley Dam been full at the end of March 2007, there would have been a major disaster in Whangarei. Significant Central Government funding would have been made available to repair the damage and to install protection measures to prevent future disasters. It would be prudent to now spend a small part of such a potential future relief fund to install the protection measures and prevent the future disasters. The flood protection measures could either be structural flood defence works, provision of sufficient flood detention storage based on more reliable forecasting systems, or a combination of these.

5. Conclusions

The March 2007 Northland floods and landslides were caused by exceptionally high rainfalls that covered a wide area over a two-day period. Rainfall return intervals were estimated to range from 1/50 year to 1/150 year.

The rainfall intensities were more than double the forecast amounts and warnings did not prepare people for what eventuated.

Some Northland river protection schemes offer very low levels of protection (1/5 year and 1/20 year). Human memory is short and these low level protection schemes create a false sense of security.

Many landslides took place in locations where previous hillside failures had occurred.

All floods took place in locations where previous floods had occurred.

All damaged dwellings that were inspected had suffered damage because of their precarious locations. The chance of further such damages could be reduced by structural measures (such as flood banks or retaining walls) to contain the hazards, or by planning and zoning to remove infrastructure and people from the hazardous locations.

Whangarei City was saved from serious flooding by its water supply reservoir which was, by chance, partially full at the onset of the storm. The reservoir is not lowered in anticipation of floods because of previous false alarms and water shortages. This situation is not satisfactory and measures should be implemented to prevent a future disaster. The flood protection measures could either be structural flood defence works, provision of sufficient flood detention storage based on more reliable forecasting systems, or a combination of these.

There is presently a widespread distrust of the reliability of heavy rain forecasts in Northland.

Increasing population densities mean that increasing numbers of people are living in hazardous locations.

Research effort should be focussed on better warning systems, provision of realistic inundation and landslide hazard maps and incorporation of these into regional development plans.

Appendix 1.

Flood Report for Event 29 March, 2007

Complied by:

Dale Hansen
Water Resources/Hydrology Team Leader

Alan Bee
Hydrology Monitoring Officer

2 April 2007

The Northland Regional Council acknowledges NIWA for the information supplied from their water level and rainfall stations during this event.

Flood Report for Event 29 March, 2007

On Tuesday 27 March at 11.10 am the MetService issued a Severe Weather Watch for Northland. This indicated the development of a low pressure system in the northern Tasman blocked by a high further to the east. Together these would bring a strengthening, humid northeast flow onto the North Island with rain spreading south. This watch was upgraded to a full warning at 8.40am on Wednesday 28 March with an expectation that 100 – 150mm of rain may fall and that heavy falls in the order of 50mm over 2 – 5 hours may occur through Thursday and into Friday.

As a result, a north to north-easterly flow spread onto Northland bringing with it widespread rain. Areas first affected were the Far North and particularly Kaeo and the Bay of Islands. Rivers were starting to rise on Wednesday evening. By midnight Wednesday NIWA's Maungaparerua rain gauge, in the western hills of Kerikeri, had received 175mm and NRC's gauges at Kaeo, Ohaeawai and Ngunguru had all recorded falls exceeding 100mm. Many other NRC gauges exceeded 50mm.

NRC released a media report on Thursday morning indicating the potential for widespread flooding, particularly in the Kerikeri area. The Kaeo River was severely swollen and other rivers in the Bay of Islands and further south were rising rapidly. Also, the Mangakahia, Opouteke and Hikurangi Rivers showed rapid rising water levels and together with a predicted four metre flood peak from the Wairua River, extensive flooding was expected on the lower flats of the Mangakahia, Wairua and Northern Wairoa Rivers (Tangiteroria). Flood warnings were issued for these areas.

By Thursday morning the MetService expected another 30 – 50mm in the Bay of Islands and up to 90mm further south. The event was larger than anticipated with rains falling over a longer duration as the moist north easterly continued funnelling into the eastern coast and with only a slow movement southwards.

Rain had cleared in the Far North early on Thursday but eastern areas from Kaeo south continued to receive significant falls. By midnight on Thursday Ngunguru and Puhipuhi gauges had received over 330mm each on top of Wednesdays falls with two day totals exceeding 430mm. Along with these two gauges four other gauges exceeded 300mm (Maungaparerua, Oakura Bay, Kaeo and Tara near Mangawhai). Heavy rains finally cleared the Bay of Islands by late afternoon on Thursday and from our southern parts in the early hours of Friday.

As a consequence rivers rose to very high levels in parts of the region. Rivers around the Kaeo/Bay of Islands area were some of the first to rise late on Wednesday 28 March and continued to rise through most of Thursday. Many rivers flowed out of their channels including the Kaeo, Waipapa, Waitangi, Waiharakeke, Whakapara, Hatea, Ruakaka and Waipu all resulting in road closures and large areas of farmland inundated with floodwater. There was also significant surface flooding and subsidence affecting many residential areas.

Based on 24 hour rainfall totals, this storm was equivalent to a 1:150 year rain event.

The attached tables summarise rainfall totals, the initial assessment of return periods, one hour rainfall plots and river water levels.

Rain Event 28, 29 and 30 March 2007	Midnight to Midnight	Midnight to Midnight	Totals to 0630hrs		
Location	**Weds 28 March**	**Thurs 29 March**	**Fri 30 March**	**Total mm**	**max mm/hr**
East Whangarei (Glenbervie Hills)	**104**	**332**	**2.5**	**438.5**	**36**
Puhipuhi Hills	**99**	**335.5**	**1.5**	**436**	**46**
Western Hills Kerikeri (Maungaparerua)	**175**	**229**	**0.5**	**404.5**	**46**
Oakura Bay	**85.5**	**285**	**0.5**	**371**	**33.5**
Tara (Mangawhai)	**43.5**	**280.5**	**16.5**	**340.5**	**40**
Kaeo	**131**	**190.5**	**0.5**	**322**	**36.5**
Marsden Point (Port)	**42**	**251**	**2**	**295**	**37.5**
Whangarei City	**45.5**	**222**	**3**	**270.5**	**42.5**
Ohaeawai	**110.5**	**153**	**0**	**263.5**	**19**
North Brynderwyn Hills	**34**	**195.5**	**4.5**	**234**	**30**
East Mangamuka (Mangakawakawa)	**99**	**65.5**	**0**	**164.5**	**21.5**
Tutamoe	**78.5**	**76.5**	**0.5**	**155.5**	**17.5**
Maungaturoto	**20.5**	**130.5**	**1**	**152**	**23.5**
Opouteke (Eastern Tutamoe)	**63**	**79**	**0**	**142**	**16**
Twin Bridges	**51**	**68.5**	**0.5**	**120**	**15**
Paparoa	**17.5**	**97.5**	**0**	**115**	**20.5**
West Mangamuka (Te Rore)	**54**	**37.5**	**0**	**91.5**	**12**
Opononi	**36.5**	**43.5**	**0.5**	**80.5**	**10.5**
Kaitaia	**53.5**	**25.5**	**0.5**	**79.5**	**13.5**
North Hokianga (Rotokakahi)	**43.5**	**27**	**1**	**71.5**	**11**
Dargaville	**15**	**46.5**	**0.5**	**62**	**10.5**
Pouto Point	**7.5**	**32**	**0.5**	**40**	**8**

Rainfall Return Periods
(Based on NIWA's software program HIRDS - High Intensity Design Rainfall System)

Kaeo

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	135.5	1 : 75
12	179.5	1 : 65
24	291.5	1 : **150**
48	306.0	1 : 80

Maungaparerua – Western Hills Kerikeri

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	144.5	1 : **140**
12	201.0	1 : **150+**
24	359.5	1 : **150+**
48	386.5	1 : **150+**

Ohaeawai

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	89.0	1 : 10
12	135.5	1 : 18
24	238.5	1 : 60
48	251.0	1 : 30

Oakura Bay

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	120.5	1 : 50
12	228.5	1 : **150+**
24	310.5	1 : **150+**
48	360.0	1 : **150+**

Puhipuhi

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	192.0	1 : **150**
12	281.5	1 : **150+**
24	383.5	1 : **150+**
48	428.5	1 : **150+**

Ngunguru – Glenbervie hills

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	143.0	1 : 60
12	242.0	1 : **150+**
24	382.0	1 : **150+**
48	438.0	1 : **150+**

Whangarei City

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	153.5	1 : **140**
12	197.0	1 : **110**
24	246.0	1 : 80
48	268.0	1 : 55

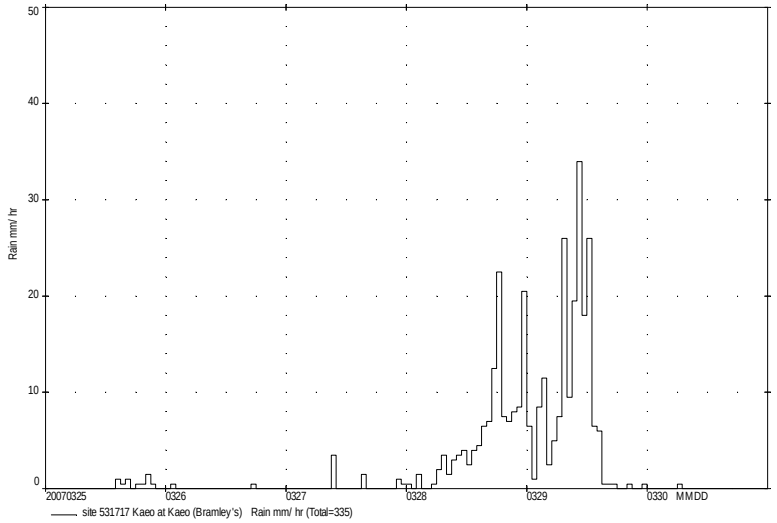
Marsden Point

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	143.0	1 : **110**
12	198.0	1 : **110**
24	268.5	1 : **120**
48	293.0	1 : **100**

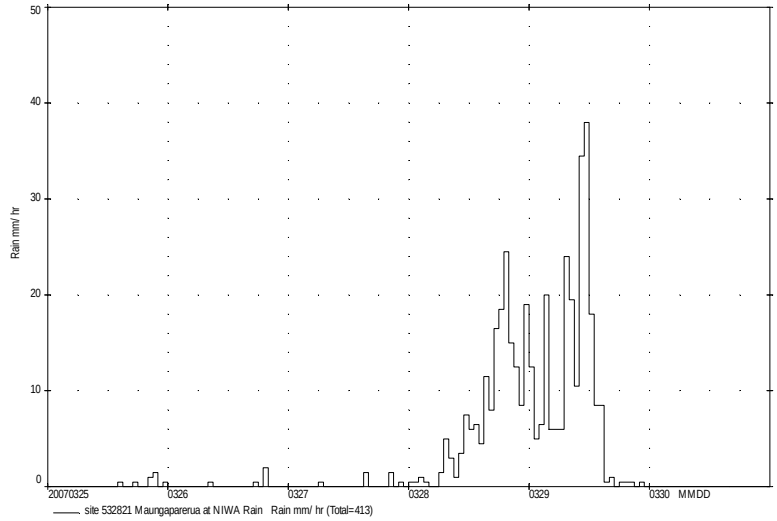
Tara (Mangawhai)

Period(hours)	Rainfall(mm)	Estimated Return Period(yrs)
6	144.5	1 : **130**
12	215.5	1 : **150+**
24	293.5	1 : **150+**
48	340.5	1 : **150+**

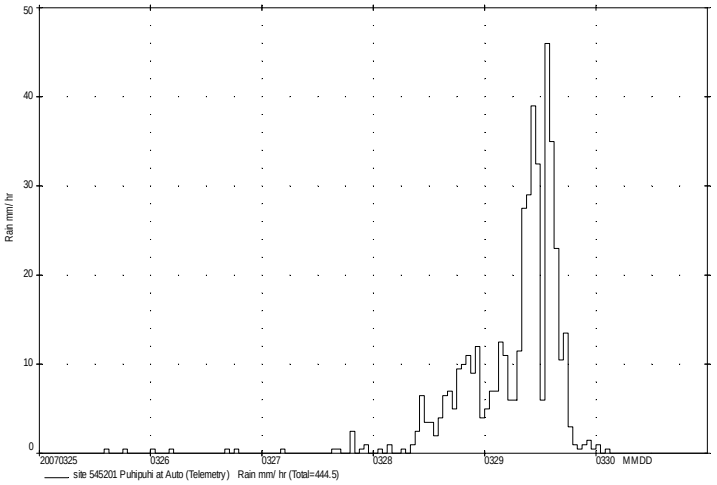
One Hourly Rainfall Plots (mm/hr) from 25 March to 30 March 2007



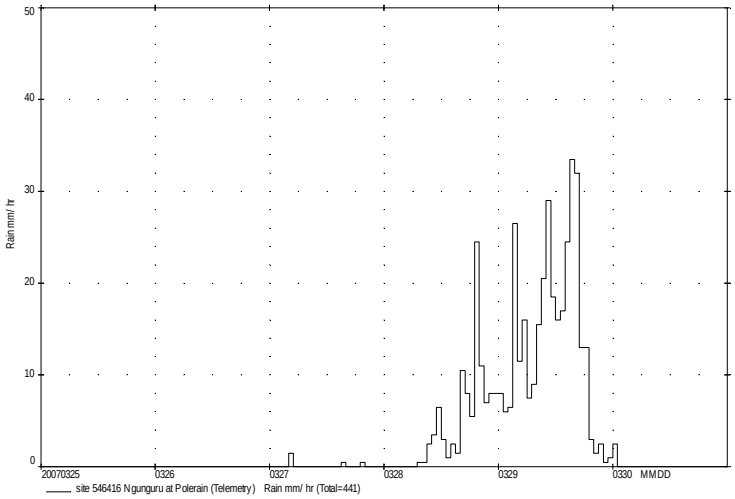
KAEO



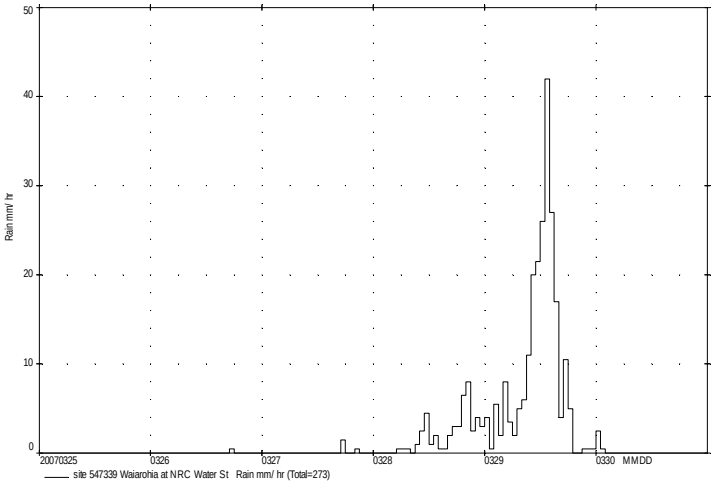
KERIKERI – WESTERN HILLS



PUHIPUHI



NGUNGURU – GLENBERVIE FOREST HILLS



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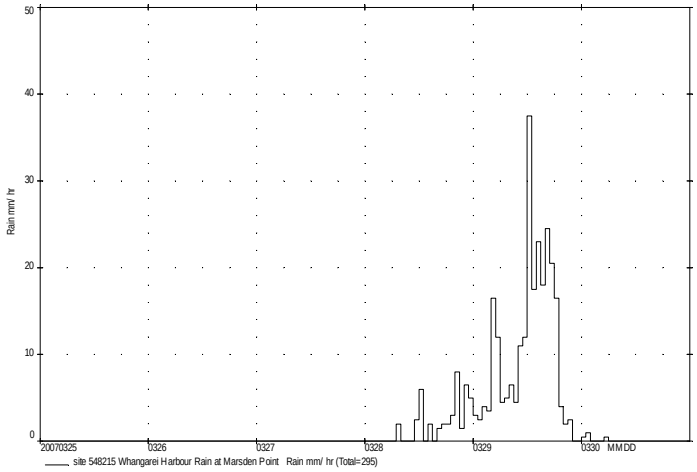

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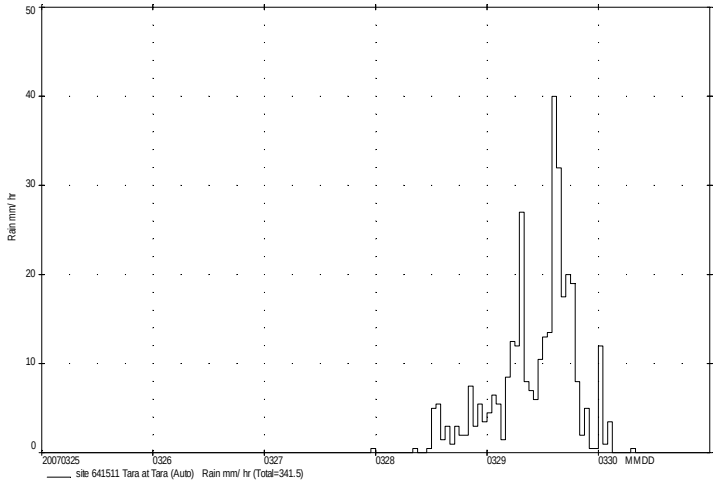
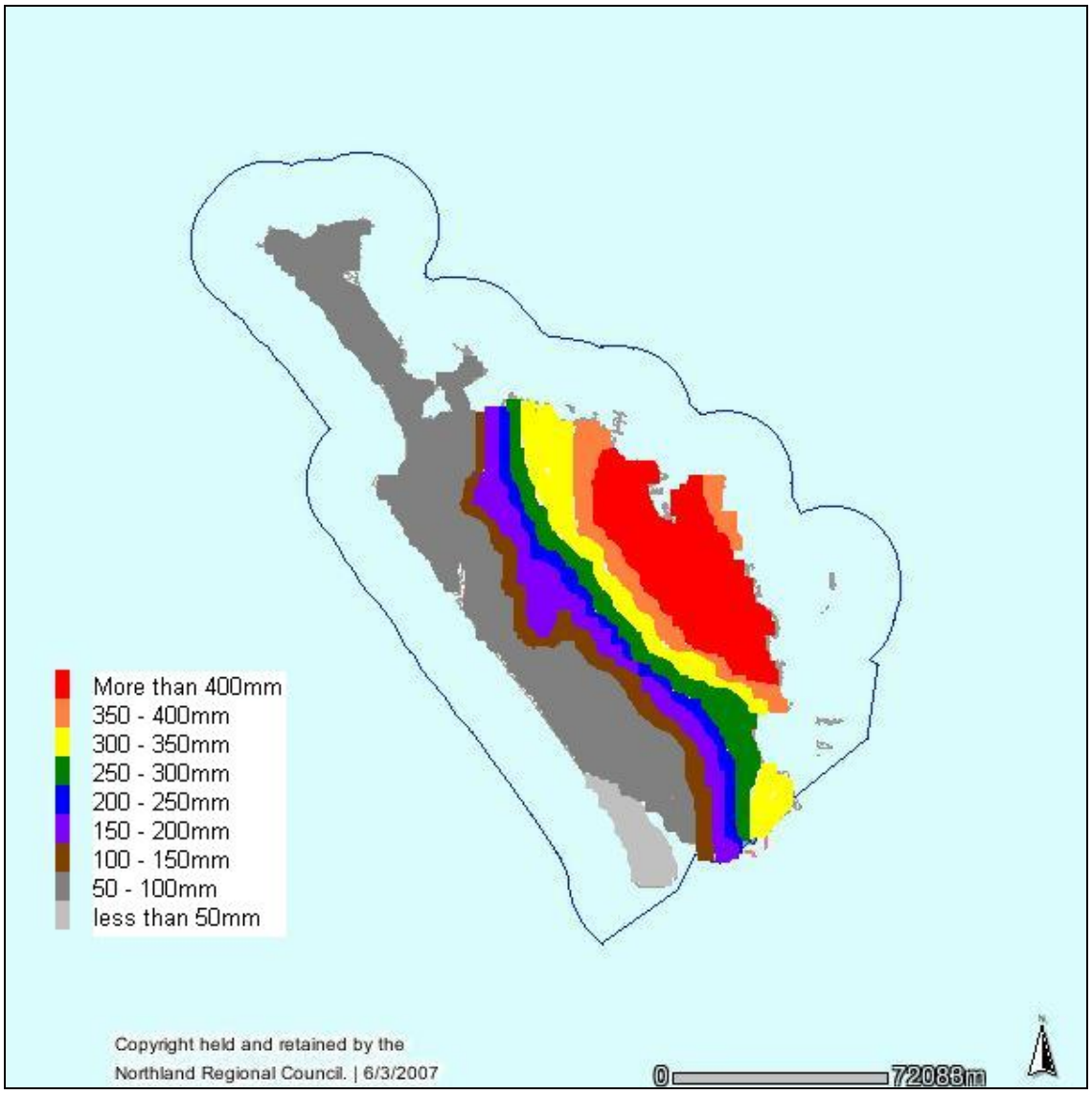


TARA (MANGAWHAI)

River Height in Relation to Historic Records

Water Level Station	Years of Record	Recorded Peak Height	Rank
Waitangi at Haruru Falls (NIWA)	28	6.939m	**1st**
Waipapa at Puketi Forest (NIWA)	29	5.524m	**1st**
Rangitane at Waipapa	30	5.137m	**1st**
Maungaparerua at Puketotara Rd (NIWA)	40	3.102m	2nd Kerikeri flood 1981 = 1st
Waiharakeke at Moerewa	40	4.563m	8th
Waiotu at SH1	20	8.690m	**1st**
Whakapara at SH1	48	9.444m	**1st**
Mangahahuru at Kauri	39	4.185m	**1st**
Wairua at Pipiwai Rd	47	7.548m	15th
Wairua at Wairua Bridge	46	4.788m	4th
Hikurangi at Moengawahine	32	9.054m	8th
Mangakahia at Gorge (NIWA)	47	4.219m	29th
Mangakahia at Titoki	24	11.293m	13th
Ngunguru at Kaikatia rd	38	2.914m	7th
Ruakaka at Flyger Rd (SH1)	23	4.699m	**1st**
Ahuroa at Braigh Flats (SH1)	24	5.826m	2nd


More than 400mm
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250 - 300mm
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150 - 200mm
100 - 150mm
50 - 100mm
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Appendix 2

Situation Report 3

By:

Trevor Norton
Recovery Manager
Far North District Council
11 April 2007

Far North Weather Event – March 2007
Recovery Situation Report Number 3
(5.00 p.m. 11th April 2007)

Situation Analysis

Recovery work is continuing, focused on priority areas:

- Social / Welfare needs
- Buildings infrastructure
- Roading infrastructure
- Utilities infrastructure.
- Economic impact – business, farming, aquaculture
- Natural environment.

Priorities are:

- Contacting and assisting people who are displaced or otherwise have immediate welfare needs to ensure that necessary assistance is being provided.
- Continuing property inspections and surveys – FNDC Building and Health Inspectors, Insurance Assessors, Earthquake Commission and Housing New Zealand are variously involved.
- Repairs to roads and key infrastructure.
- Economic impact assessment including close contact with the commercial sector and rural/farming communities.
- Data gathering and consolidation to support recovery action planning and the preparation of the recovery business case.

There is a particular focus on Kaeo where concerns have been raised via the media about whether affected households are receiving all the assistance they need. Both WINZ and FNDC staff have been involved over the last week but priority is being given to ensuring that everything that needs to be done is being done. Housing New Zealand building inspectors will be assessing repairs needs for uninsured properties from tomorrow.

There continues to be a steady flow of requests for assistance resulting from the flooding and these are largely being dealt with as business as usual. Enhanced Taskforce Green is up and running and will focus on assisting the clean-up on farms and in rural areas.

Social / Welfare Needs

	4th April	5th April	11th April
Calls for assistance to the WINZ 0800 number (Government Emergency Response Line)	55	55	72
Requests for assistance via WINZ regional offices (for food and clothing)	43	58	53
Follow-up calls and visits to check welfare needs	50	150	200+

Recovery work is now focusing on households and businesses known to have been affected and requiring ongoing support and assistance.

The main effects have been flood damage to homes, contents and personal possessions, together with power cuts and access problems.

Assistance given through Work and Income includes:

- 25 requests for food parcels
- 12 requests for clothing and bedding
- 6 requests for petrol
- 5 requests to fix water pumps
- 3 requests to clean septic tanks
- 2 requests for emergency accommodation.

Calls to the helpline are now focusing on clean-up issues.

An 0800 number is operational for families needing psychosocial assistance due to the flooding and GPs in Northland are being notified of the referral process for assistance. A letterbox drop is also planned to make people aware of the support and contact available.

FNDC is providing free dumping of damaged household items at refuse centres.

FNDC is writing to householders whose properties have 'dangerous notices' (see below) to inform them of the rates postponement policy.

Buildings Infrastructure

Insurance / Earthquake Commission (EQC) Claims

	4th April	5th April	11th April
Insurance Council figure for total claims via EQC and Insurers (Northland Region)	Estimated 700	700	700
EQC claims for FNDC area	-	180	180

Building Inspections

	4th April	5th April	11th April
Number of properties visited by FNDC building inspectors and listed with serious problems	70	142	167
Properties with "Dangerous" Notices	15	18	17
Properties with "At risk" notices	-	46	47
Properties with "Unsanitary" notices			8

The initial focus for FNDC inspections has been on slip-related problems, but work is ongoing in relation to flooding.

Most people with whom we have had contact, so far, have insurance cover.

Housing NZ are undertaking inspections of uninsured properties to assess damage and repairs costs.

Displaced Households

	4th April	5th April	11th April
Number of households displaced i.e. staying with friends, relatives, in temporary accommodation etc	-	11	20
Approximate number of people in affected households			35

Some households are only displaced temporarily pending completion of clean-up work.

Roading Infrastructure

	4th April	5th April	11th April
Estimated costs for FNDC roads	$7-10m	$7-10m	$7-10m
Estimated costs for Transit roads	-	$5m (and rising)	$3m - $7m
Roads with initial key damage (FNDC)	-	54	54

Most of the costs are expected to be in the repairs to under-slips, which will take some time to complete, in the interim, the areas of under-slips will be sign-posted and made safe accordingly. Next step is geotechnical investigations to establish solutions at each site.

FNDC Roads:

- There were in excess of 200 overslips and 25 underslips
- All roads are now passable but work continues on the clean-up
- Under-slips will receive the main ongoing focus and geotech assessments are currently underway. Remedial work could take 12 months
- Detailed cost estimates should start to come available at the end of this week
- Long-term repairs will take several months
- No noticeable increase in accidents as a result of the problems

State Highways

- All open, but passage is very narrow in some places
- Significant damage with a large number of overslips and underslips
- Bridges checked and OK
- Expected to be months before we are back to normal.

Utilities Infrastructure

Water and Sewerage

All services have been restored, but temporary repairs are in place in a number of cases and the network is vulnerable and at risk in number of places e.g. linked to road-slips, etc.

	4th April	5th April	11th April
Estimated costs of repairs to, reinstatement of, FNDC utilities	-	-	$1m

Ongoing issues include:

- Paihia water treatment plant repairs – 2-3 weeks
- Paihia water reticulation repairs – 3-4 weeks
- Paihia sewerage reticulation reinstatement (several locations)
- Kawakawa water treatment plant river intake repairs – 2 weeks
- Kawakawa raw water borehole supplies – damage assessment, repairs and replacements – 4-6 weeks
- Kawakawa water reticulation replacement – 6-8 weeks
- Russell water treatment plant – 4-6 weeks
- Kerikeri water reticulation possible replacement required
- Potential future pipeline fractures due to ground movement following slips and with already weakened assets.

Stormwater

FNDC is considering stormwater implications of the recent weather event by reference to badly hit parts of the district. This will form part of ongoing work to produce stormwater management plans for urban areas across the district and will now incorporate information previously unavailable on flood effects in key areas.

Far North District Council Community services

	4th April	5th April	11th April
Damage to Council community assets and facilities (e.g. car parks, public toilets, reserves, parks, footbridges, walkways, beaches, gardens)	-	-	$380k

Power services

	4th April	5th April	11th April
Top Energy: Number of outages of various durations (between 28th and 31st March)	-	7488	7488
Telecom: Number of faults (normal week would be 250)	-	900	900
Top Energy costs (storm faults, feeder cable, helicopter costs, Puketona Lines Depot flood impact and clean up),			$280k of which $122k is expected to be recoverable.

Service is now restored. Some ongoing issues re replacement of water damaged transformers.

Telecom

All key infrastructure is back in service. All faults should be resolved by middle of this week. A lot of the network is at risk and exposed and access is still difficult in a number of places.

Ontrack

Track closed between Whangarei and Otiria due to wash-outs until 10 April. Resourcing and access problematic. Track is normally used for transporting logs from Otiria.

Economic Impact Status

	4th April	5th April	11th April
Number of data returns to FNDC to date	-	46	87
Estimated cost of damage **from the 87 returns only**	-	$1m - $1.1m	$1.37m
Estimated loss of revenue **from the 87 returns only**	-	$300k – 350k	$600k

Business feedback

Business returns are still flowing in. Based on the returns received so far the overall impact projected for, say, 200 affected businesses is roughly $3.2m damage and $1.4m loss of revenue.

Worst hit businesses include:

- Lily Pond Farm Park – loss of facilities and animals
- Haruru Falls Motor Inn – severe flooding and loss of accommodation units
- Sterlings Second Hand Shop Kaeo – severe flooding
- Doubtless Bay and Cottle Hill Wineries – significant loss of this year's grape crop
- Sunbeam motor cycle museum – slip damage to building and generalised flooding
- Opua Commercial Estate – severe flooding and damaged infrastructure
- Whangaroa Farm – lost timber stocks and posts.

Anecdotal reports indicate that the “Open for business as usual” media campaign worked well, with businesses reporting that they have had a good Easter.

Meetings with business associations, farmers groups and individual businesses are ongoing this week.

We are identifying a small number of businesses who appear under-insured and are following up the implications with them.

Farmers

See separate MAF update (11.00 a.m. 11th April). MAF estimates the overall Northland on-farm cost of recovery from the flood, including lost production but excluding buildings at $2.5m. The majority of this cost will relate to the Hikurangi Swamp area and MAF is reporting that the Far North seems to have escaped serious damage, although our business data returns are showing some individual farmers with estimated losses in the tens of thousands.

The main issues for farmers are silting, damage to fences and slips. Most farmers appear to be deferring full recovery until drier weather in the summer.

Enhanced Task Force Green is now being activated and there are a number of requests for assistance that will be processed over the coming days e.g. clearing and repairing fences.

There is limited data at this stage on the impact on aquaculture and we are currently seeking more information.

Natural Environment

Water quality was passed fit for swimming in Bay of Islands, Cable Bay and Taipa before Easter. The 28 day closure period remains in force for shellfish.

Contact has been made with Department of Conservation for support in assessing wider impacts on the natural environment.

Northland Regional Council is in the process of assessing impacts on river systems and related problems such as logjams.

Next Steps

- We will continue to ensure that we have identified all affected people and that they are receiving necessary assistance
- Data gathering will continue over the coming weeks
- Infrastructure repairs will be ongoing for some months
- The format and content of a recovery action plan and business case will be discussed with MCDEM and other key agencies
- We will explore with LTNZ the approach required regarding special policy for roading.