Storms in the Winterless North

Simon Weston
Manager – Infrastructure & Services
Whangarei District Council

Situation
8-20 July 2014

3 events

Record levels of rainfall

525mm rain fell between 8–12 July
(July avg. 234mm)

Severe gales up to 100-140kmh in Whangarei

Up to 168kmh at Cape Reinga

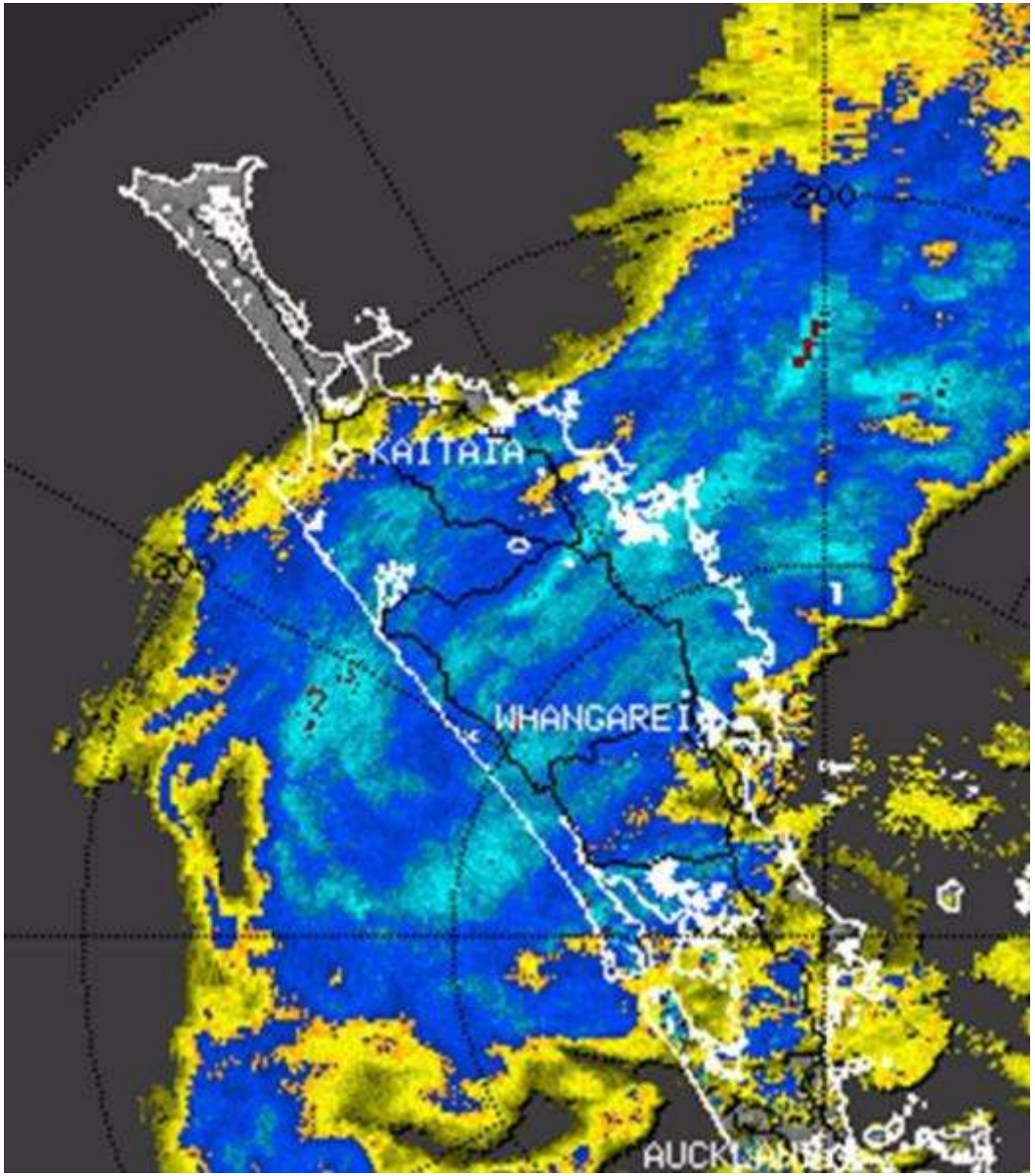
MPI

15 July – Declared a **medium-scale adverse event** by Minister for Primary Industries Nathan Guy

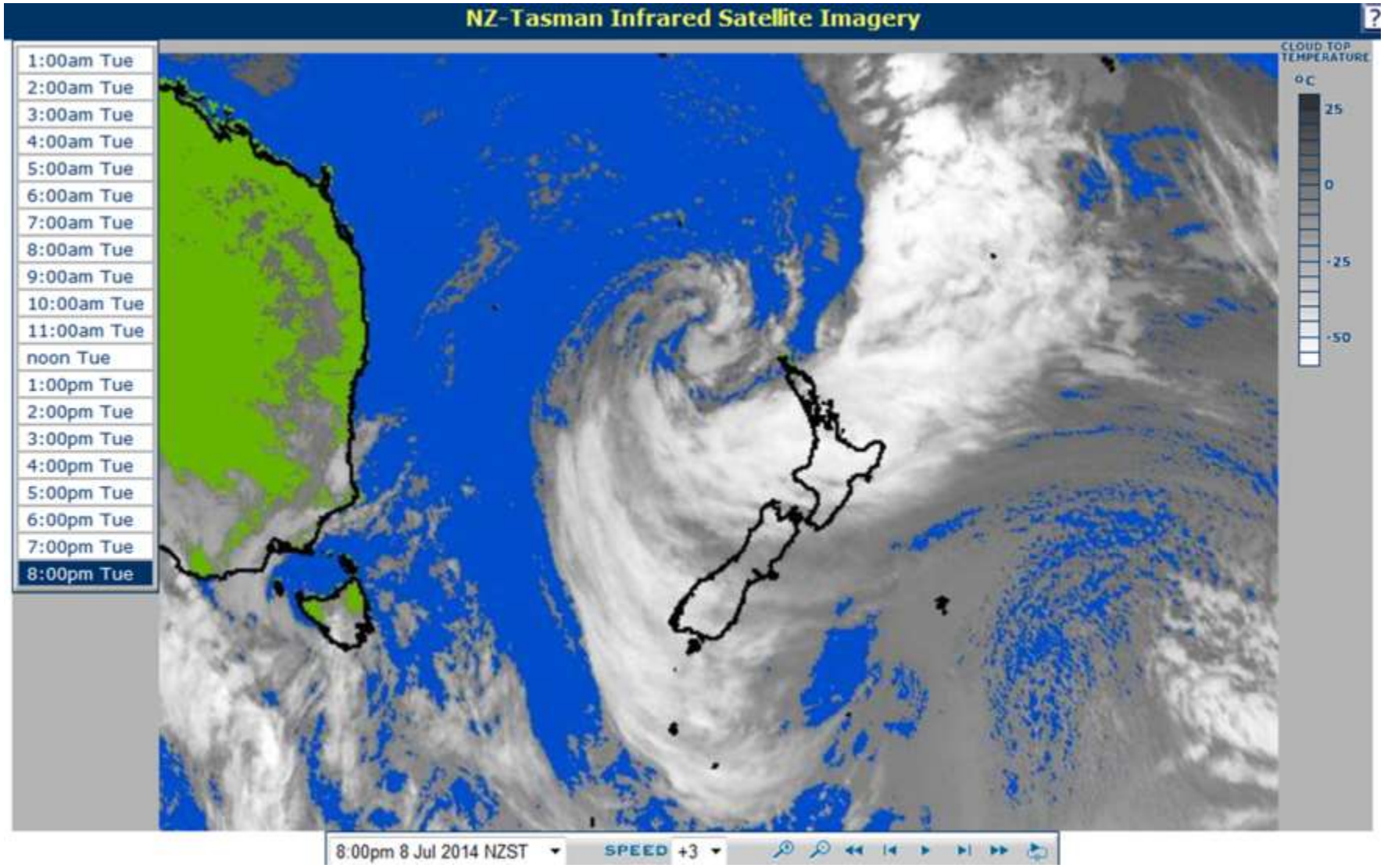
Response measures:

- **Pastoral care**: the Northland Rural Support Trust will be funded to provide pastoral care and support to affected farmers and growers.
- **Enhanced Taskforce Green**: Enhanced Taskforce Green is a temporary employment programme administered by the Ministry of Social Development to help regions recover from adverse events.
- **Tax provisions**: Farmers will be offered assistance through Inland Revenue's income equalisation discretion.

Rain radar



8 July 2014


NZ-Tasman Infrared Satellite Imagery
1:00am Tue
2:00am Tue
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8:00am Tue
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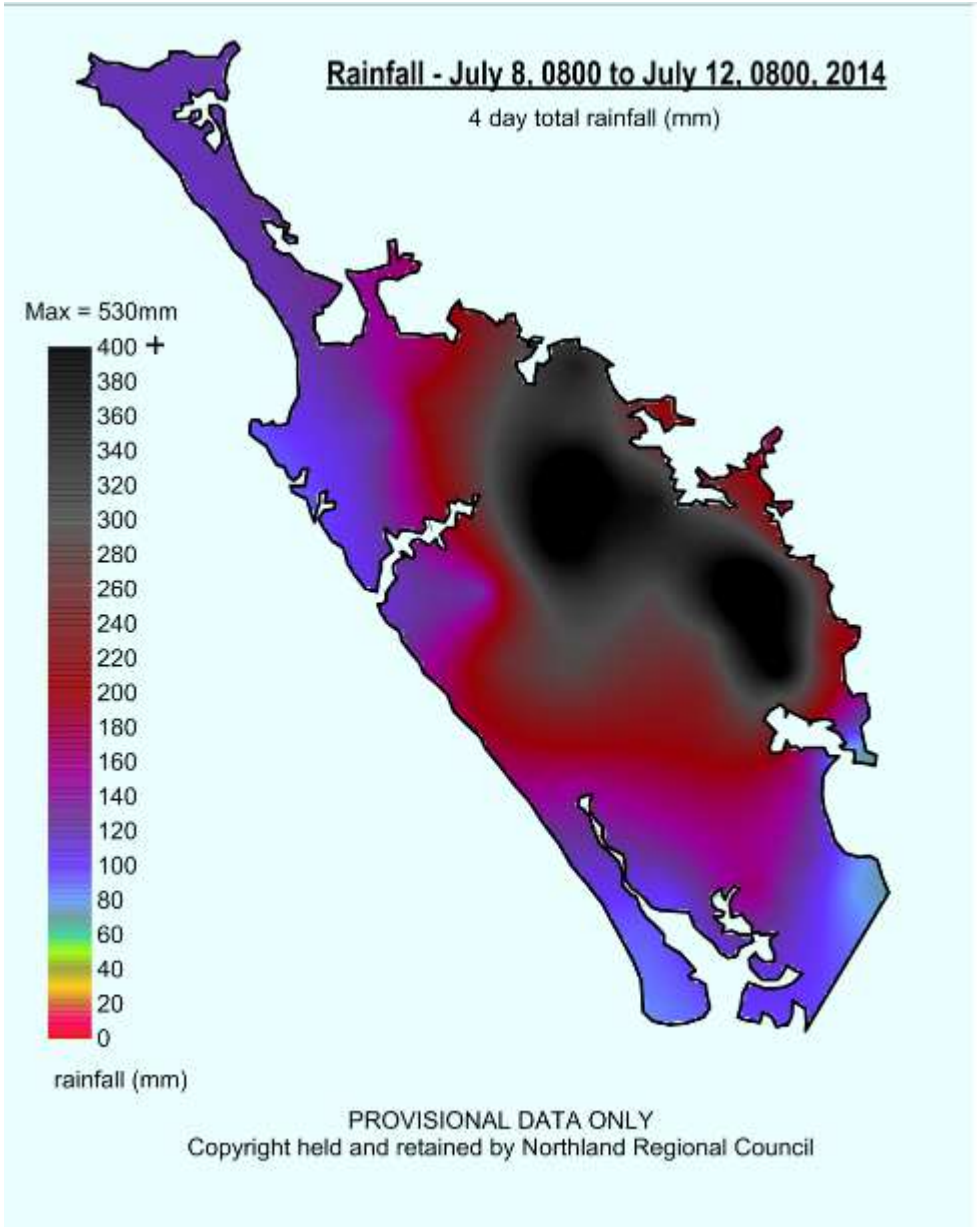
4:00pm Tue
5:00pm Tue
6:00pm Tue
7:00pm Tue
8:00pm Tue
CLOUD TOP TEMPERATURE
°C
25
0
-25
-50
8:00pm 8 Jul 2014 NZST
SPEED +3



8-12 July 2014 Rainfall

Black = 400mm+

Rainfall
(4 day total Northland)

2011 Cyclone Wilma
39,100,000 m3
Or 869,000 milk tankers & trailers

2007 March ‘The Deluge’
54,800,000 m3
Or 1,218,000 milk tankers & trailers

2014 ‘The Storm’
72,800,000 m3
Or 1,618,000 milk tankers & trailers

Tutukaka Harbour

Tutukaka Harbour

CDEM response

Not ‘an event’ but the accumulative affect
of several storms on top of one another

Initial response by emergency services and on duty council staff

Monitoring and keeping duty staff informed

Surface flooding, roads affected, major power outages = CD response

Social media useful for dissemination and gathering of information
AA Roadwatch, Facebook, Traditional Media

Worked with community response groups, Rural Support Trust, and other agencies for immediate and post-event support

Welfare Officers helicoptered into isolated communities

Post-event welfare door knocking

Northland Lifelines Group

Impact

- SH1, SH10, SH11, SH12 closed and SH14 to single lane
- 100+ total roads closed
- 430+ slips
- No fuel deliveries to 2 sites
- Power lost to 30,000 customers (27 customers had no power for 9 days)
- Phone lost to 2,000 customers and numerous cell towers out
- 120 homes and business flooded
- Refinery, airport and port unaffected

Total estimated cost to region
$100 million

Housing

120 homes flooded

Whau Valley Road slip
– residents unable to get in or out

Sink hole in Kamo, Whangarei

Power

- 30,000 customers without power
- 27 customers without power for 9 days


10/07/2014


608
235
382

Power summary

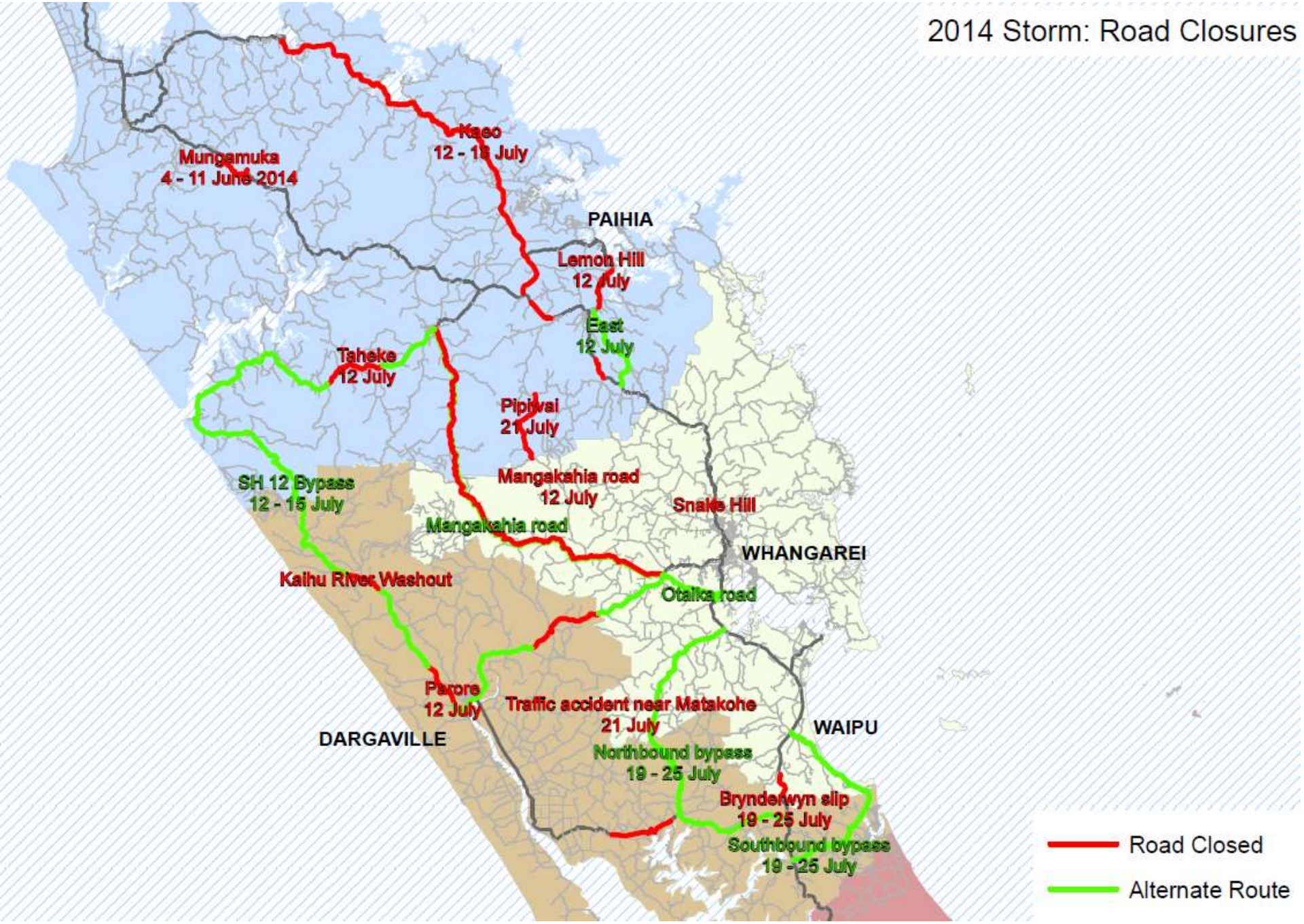
Overall comments	What went well	What could have gone better
Transpower • no issues Top Energy • 19,000 calls, • 5,000 got through Northpower • not as badly affected; • 200 SAIDI	• Early Metservice and CDEM warnings • Warning enabled mobilisation – gear, resources, etc • Media coverage took pressure off utilities – public accepted it as a big event • Top Energy network investments paid off – only one 33kV outage • Good safety and fatigue management procedures • CDEM framework kicked in, good information exchange • Good welfare support for community – advise from Top Energy helped to identify areas with likely long term outages.	• Didn't use EMIS • Earlier briefings would have been useful • Contacts at EOC as staff rosters changed – need standard emails/phone numbers for lifelines • Better reference information from telcos to identify their sites (naming and location description)

Telco summary

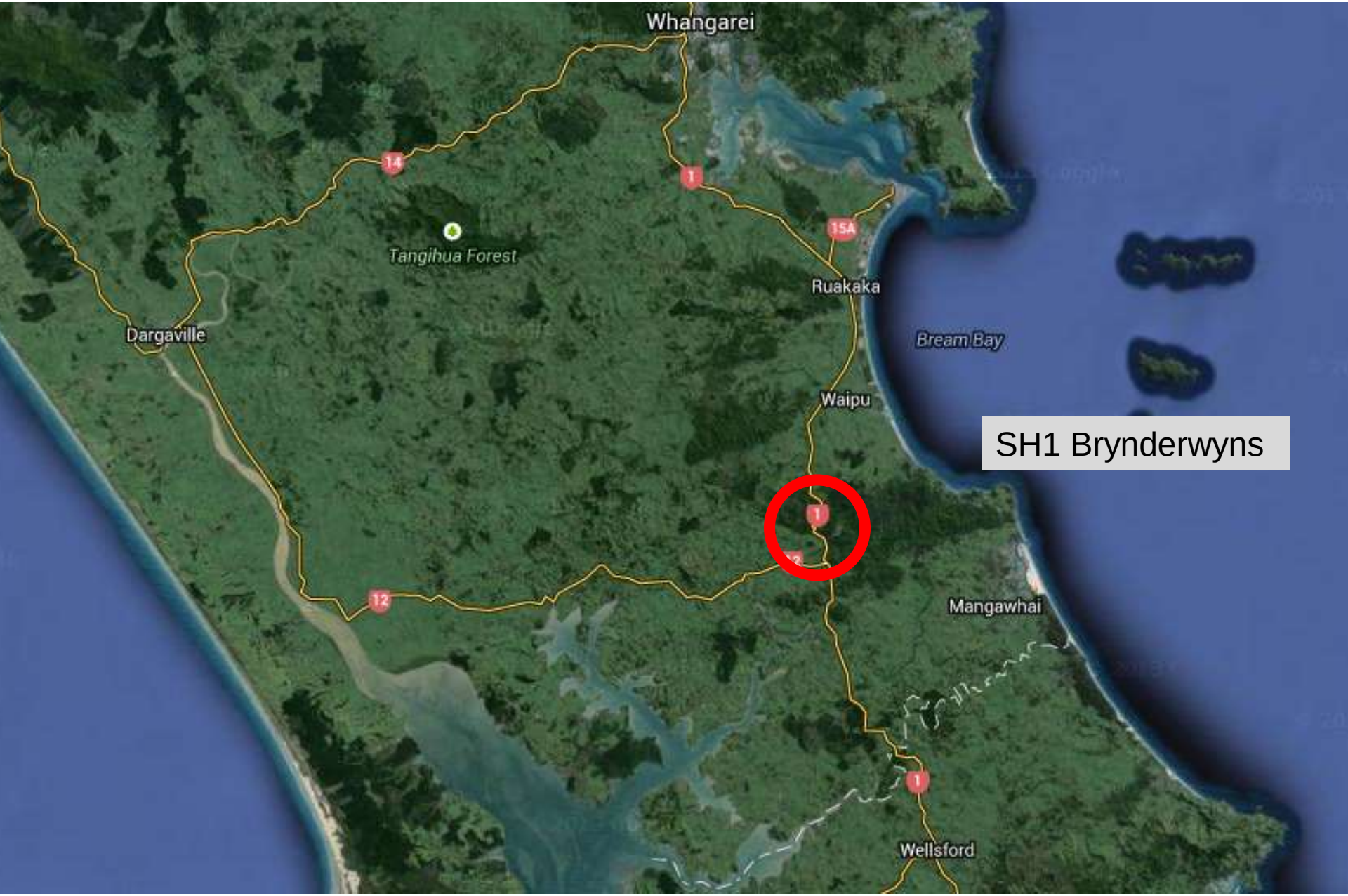
Overall comments	What went well	What could have gone better
Generator deployment problems – difficult access to hilltop sites (had some stolen) Vodafone – a number of outages in Far North. Long term mains power outages Hokianga and north of Bay of Islands. Longest outage 8-9 days. One case of damage to tower – couldn't access till wind died down. All other outages electricity related. Chorus – had to go via Dargaville to sites causing delay to repairs. Spark – 15 cell sites down. Farm access to sites difficult in some cases.	• Communication systems good regarding the weather • CDEM status reports good • Prioritisation of power restoration to utilities was well done.	• More permanent generators, but difficult to justify for end of line sites • Helicopters? • Wind generators? • Security of generators • Targeted road upgrades of secondary roads • Access was an issue.

Roading

- 5 SHs closed
- 100+ roads closed
- 430+ slips


2014 Storm: Road Closures
Mungamuka
4 - 11 June 2014
Kaeo
12 - 13 July
PAIHIA
Lemon Hill
12 July
East
12 July
Taheke
12 July
Pipiwai
21 July
Mangakahia road
12 July
Mangakahia road
SH 12 Bypass
12 - 15 July
Snake Hill
WHANGAREI
Kaihu River Washout
Otaika road
Parore
12 July
Traffic accident near Matakohe
21 July
DARGAVILLE
WAIPU
Northbound bypass
19 - 25 July
Brynderwyn slip
19 - 25 July
Southbound bypass
19 - 25 July
Road Closed
Alternate Route

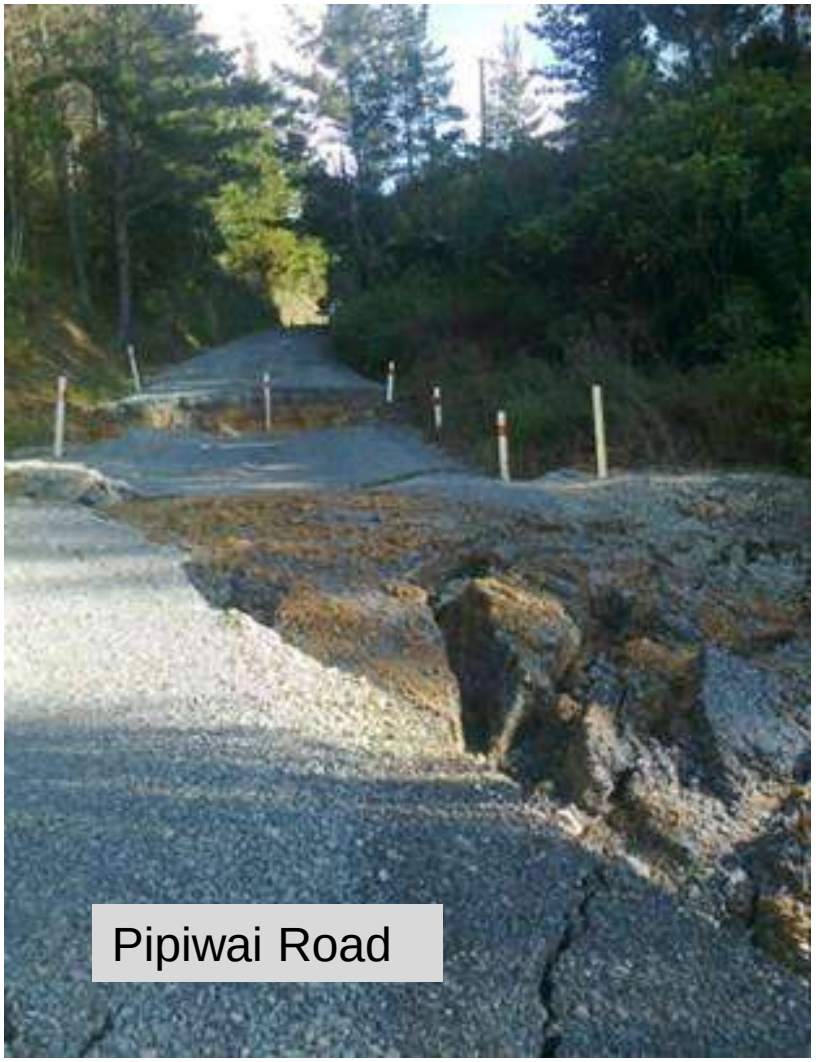
The drivers of this van and rental car had to be rescued from State Highway 11 near Kawakawa by a policeman riding a tractor's digger bucket.


Whangarei
Tangihua Forest
Dargaville
Ruakaka
Bream Bay
Waipu
Mangawhai
Wellsford
SH1 Brynderwyns


SH1 - Brynderwyns


CAT
HARRIS

Otuhi Road slip



Pipiwai Road

SH1 Kaihu, Kaipara


Takitu Road,
Opoutere


Orakau Road,
Far North


Mangakahia
Road, Far North
14/07/2014 15:42


Mangakahia
Road, Far North
14/07/2014 14:20

Roading summary

Overall comment	What went well	What could have gone better
• 430+ slips • All 7 roads to Far North were impacted • State Highways impacted at Maromaku, Kaihu, Brynderwyns, and others • 18 major slips • 12 flood impact closures	• Good teamwork, good communication • Roads were opened fairly quickly • Roading sub-group established by LUCs and worked well • Within 24 hours contractors had extra staff and were offering each other help	• Briefing and sitrep times needed to be standardised and planned in advance • Wasn’t clear the status of the emergency; who was leading, who was involved • Resourcing limited.

Hikurangi Swamp

Waste & Drainage

Wairua Falls at normal flows

Wairua Falls during flood

Waitangi River
on a normal day


KERIKERI FLOOD 20-03-81
WAITANGI RIVER - 2 KMS UPSTREAM OF HARURU FALLS
STANDING WAVE HEIGHT - APPROX 3 METRES
PHOTO TAKEN BY K.D.RUSSELL. DSIR

Key Issues

- Reticulation networks not sized for these events
- Stormwater grates blocking
- Cesspits full
- Private systems failed
- Unknown asset ownership
- Level of Service provided – some communities require a higher LoS

Water

Close call for Paihia water supply

- Debris from Waitangi River blocked water plant intakes and filters
- Staff couldn't get in until river subsided – about a week later
- Potable supplies critically short – restrictions in place early
- Contingency plan with tankers – but weren't required.

Kawakawa and Moerewa pumps and motors underwater

- Expected to fail but thankfully didn't
- Restrictions in place early.

Water

Whangarei – no bad news

- Teams worked around the clock to keep pumps going
- The dams are full!

Water summary

Overall comment	What went well	What could have gone better
• WDC - no water shortages • Isolated manhole surcharging • Pump station power outages • Paihia water supply impacted and restrictions (similarly at Moerewa and other small supplies) • Excessive stormwater flooding	• WDC infrastructure coped well, changed dosing plans and worked in accordance with plan • Procedures with contractors went well • Communications with other asset groups good.	• Communications with power companies – more information on restoration timing would have helped • Mobile coverage patchy • Hikurangi Swamp water release caused downstream issues and political issues.

What worked well

- Infrastructure coped well – investment in maintenance helps
- Healthy active Lifelines Group
- Social media and public information
- Communication between response groups
- Sharing of resources NZTA/Councils
- Working together, e.g. welfare officers hitching a ride with Northpower chopper
- Commitment and willingness to get infrastructure back up
- Community resilience, response plans, business continuity plans, welfare planning and delivery
- Restoration coordination and Taskforce Green
- No serious harm to staff or contractors

An innovative approach

- In two locations, the river cut into the roadway potentially closing the road
- Retaining wall repairs over long lengths of the road = +/- $1m
- Negotiated with Northland Regional Council to enter river with heavy machinery
- Realigned the river channel and restored the river bank with protection from future high river level events.
- Retrospective consent from NRC – very happy with results
- Overall cost for both sites < $100,000
- Roads reopened quickly

OLD SCHOOL

Location of slips where rivers were shifted.
Twin Bridges is location of major slip isolating a community.


Waimatenui Rd


Waimatenui Rd


Mangakahia Rd

Issues and pressures

- Public and political involvement
- Route resilience to emergency events
- Long duration, school holidays, stretched resources, fatigue
- Some incorrect messaging
- Generator deployment and security
- Difficulty in accessing some sites to restore services
- Patchy mobile coverage out in the field
- Need clear status of emergency and single source of truth
- Need earlier briefings to determine scale of emergency
- Need standardised EOC contacts as staff rosters changed

Issues and pressures

Deviation routes

- Trying to get these into a database

Enhanced farm roads

- Not designed for long term, HV use;
- Not currently on road upgrade programmes and unlikely to get funding

EMIS

- Decided on the Tuesday night not to use it
- Next time will set up an event site.

Council regulatory pressures

- Local government regulatory requirements can impact on event preparedness
- Letter from MCDEM regarding impacts on telecommunications sector
- Planning and consent rules may limit how much fuel can be stored on site
- Urbanisation has resulted in noise and acoustic issues, restricting telcos' operation of stand-by systems
- Looking for alignment across all organisations to collectively support lifeline utilities.

Financial impact

Estimated damage	$ (est.)
Businesses and farmers	48m
Roading (including Transit roads)	48m
Councils' utilities, parks and assets	1m
Environmental cost	?

Life returns to normal

The New Zealand Herald

Search keywords...

National | World | Business | Sport | Technology | Entertainment | Life & Style

Millions of spiders on the move across the Hikurangi Swamp on Jordan Valley road. Photo / John Stone

The Northern Advocate

Local News | Opinion | Sport | Business | R

Sting in tail for cyclone season

By Imran Ali

10:00 AM Tuesday Oct 28, 2014

But wait, there's more…

Warmer conditions could bring wild weather to North

Photo / Peter de Graaf

A warmer than normal start to summer could have a sting in the tail, with Northland likely to bear the brunt of any ex-tropical cyclones that hit the country this cyclone season, forecasters are warning.

With a slightly higher than normal risk of an ex-tropical cyclone hitting the country by April, Northland is "highly likely" to feel its effects due to its geography.

The prediction was made by Niwa in its southwest Pacific tropical cyclone outlook for Auckland city.

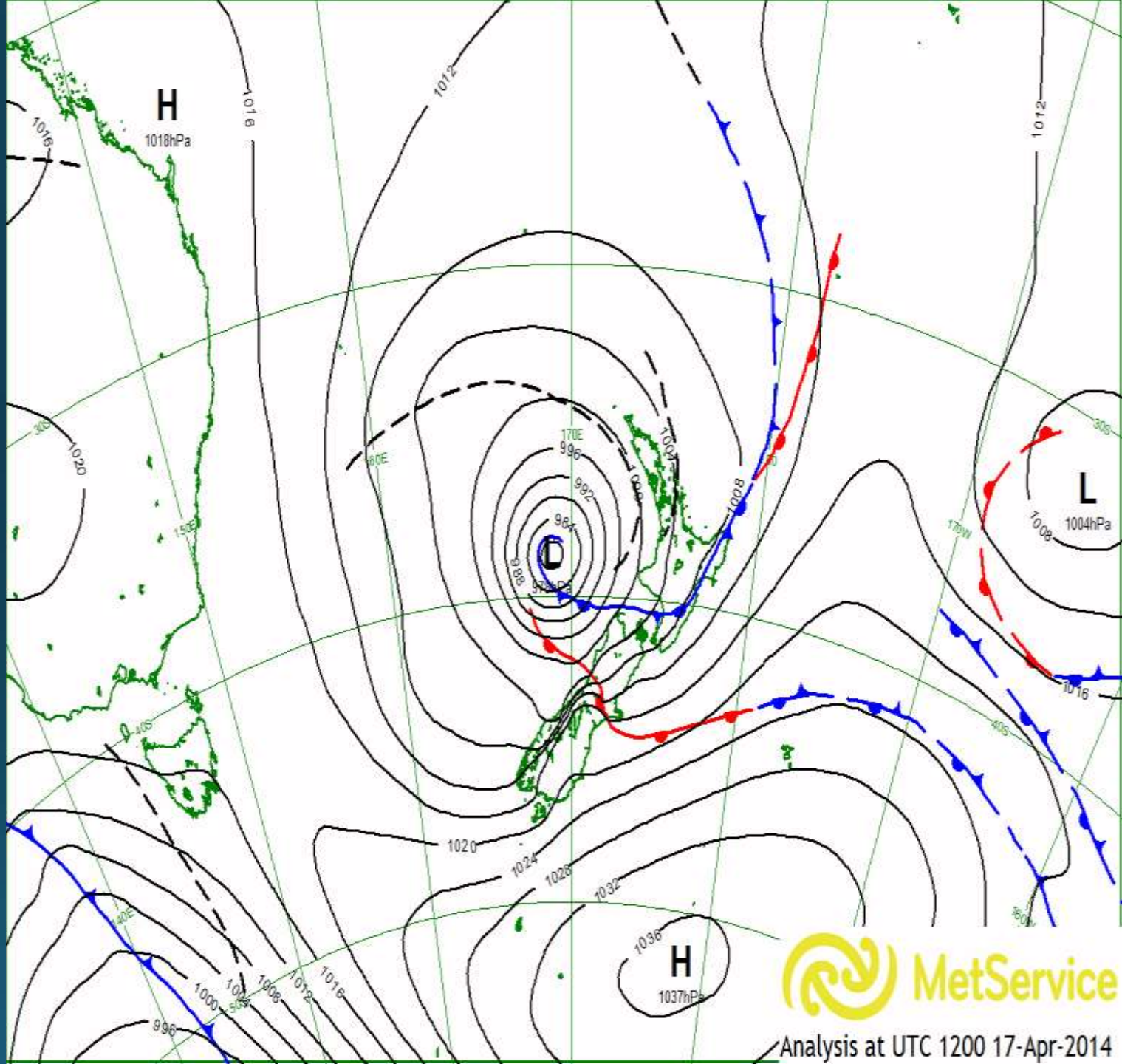
Meteorological forecasting centres in the southwest Pacific have predicted that between eight and 12 tropical cyclones are expected in Pacific countries, including New Zealand, from November to April.

WHANGAREI: LOVE IT HERE!

Tropical Cyclone Ita

April 17, 2014

This chart is drawn from observed information (weather stations, satellite, radar etc), and shows what the situation actually looked like at the time.



24 hours of gale force winds brought:

- Over 500 fire brigade callouts in the Grey District.

- Estimated peak wind gusts of between 160-170kph.

- An estimated 20,000ha of felled forest and a further 200,000ha of significant damage causing the worst windfall damage in generations.

The timing of this event, Easter Weekend, resulted in response organisations reporting a 30% reduction in availability of staff.

Buller Electricity

- Fault notifications began early morning ,Power was progressively lost on 17th
- All power was lost by mid afternoon in Buller District along with Vodafone network
- Last electrical repair was 11 days later post storm on 28th April.
- Cost of restoration $612,000
- Tree damage was main significant cause of outages
- Buller electricity estimates the lost load on the network equated to 157 Megawatt hours .a cost to consumers from the outage of $3.14 million,

uller District


Westport


SHEREE CARGILL
Photography & Studio

"On one day some 400 truckloads of green waste were transported from our streets." Buller


Karamea Bluffs


Greymouth Aerodrome

Grey Electricity

- Winds estimated to be gusting 160-170kph as Ita's influence affected Grey district
- Power was lost in Blaketown and Cobden overnight 17th April but was progressively restored over following days
- Cobden bridge closed as storm force gusts rolled down Grey River
- Dairy farmers lost their power feed inland , trees on lines , reconnecting very dangerous for power crews owing to the high winds
- Westpower estimated Ita was the worse windstorm in last 30 years

e greater Greymouth area lost roofs off 60

mercial buildings were deemed uninhabitable.

Westfleet porta-com blown into the Grey River

Westland District

- A tale of two weather patterns: gentle breezes in Hokitika and howling storm force easterly winds in South Westland
- 10 reinforced power poles snapped at Whataroa morning of 17th
- Vehicles being blown off road
- Trees falling closed SH 6 between Ross and Franz Josef
- Power was lost but farmers helped each other with generators so cows could be milked

er line damage in South Westland


outh Westland

Hari Hari Squash Courts

State Highways

- The first section of State Highway closed was SH 6 HariHari to Whataroa at 0945 on Thursday 17th
- Progressively almost the rest of SH 6 ,67,73 and 7 became impassable in places from fallen trees , slips , power lines and wind strength(vehicles being blown over or off road) more so in South Westland
- Significant damage to road furniture (signs blown down and blown away!)
- Opus estimate rough order costs of the clean-up and remedial works at $1,200,000(including fees, consents and some contingency

ain Road, Franz Josef

npervan blown over at Whataroa

Rural Community

- 250 of Westland Milk Products 394 West Coast suppliers -63% suffered major disruption to their farming operation
- 125 suppliers lost power
- Others lost equipment , buildings, fences , pasture cover, and trees fell and killed stock
- Significant drop in production , loss in milk solids , farmers drying off stock meant less payout now left with repairing the damage

Ex Tropical Cyclone Ita resulted in $45.6 Million dollars of damage (NZ Insurance Council provisional figure.)

Canterbury Weather Event Update

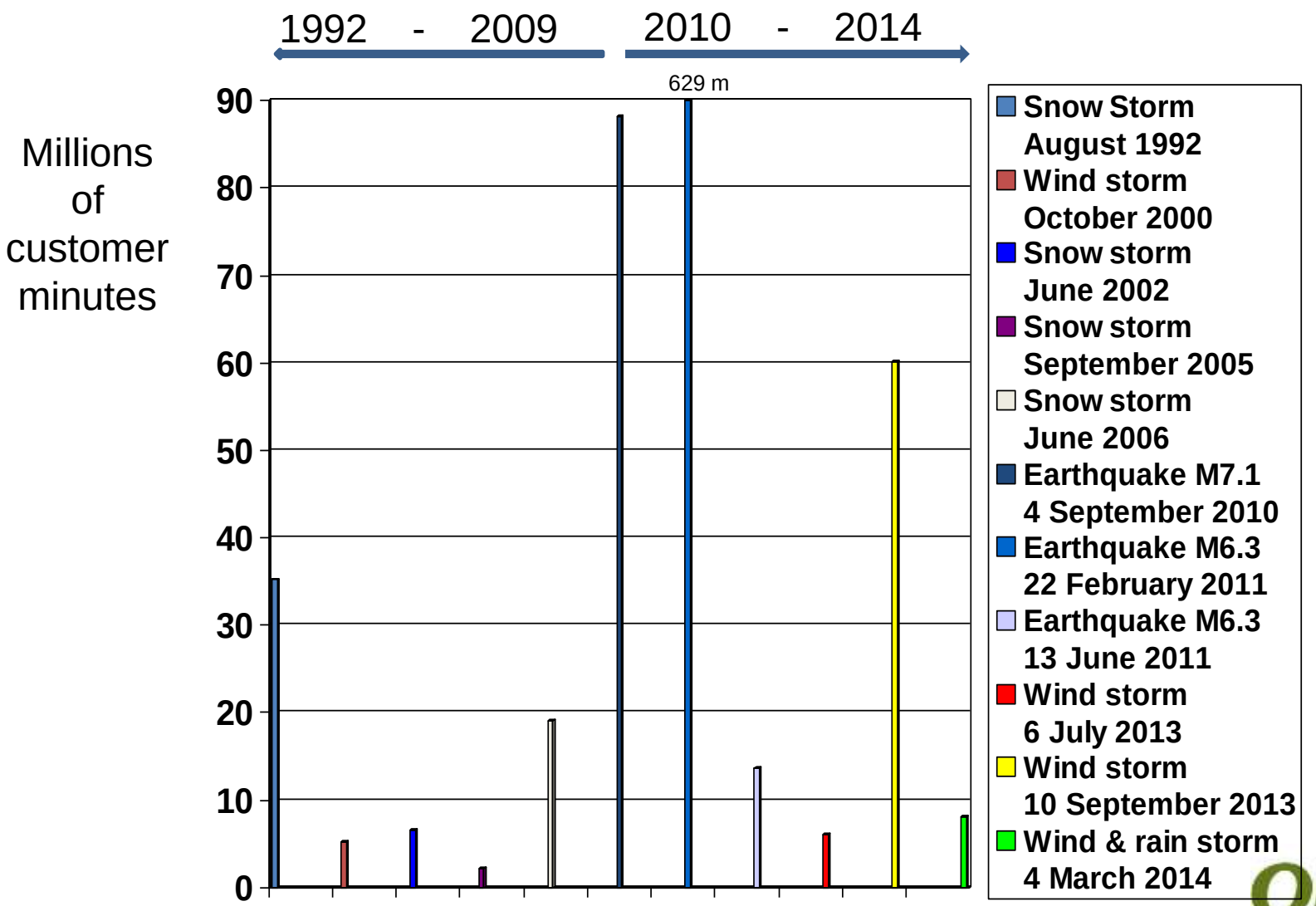
2013 and 2014

John O'Donnell

Chief Operating Officer, Orion NZ Limited

November 2014

22yrs of significant events



Orion your network

Last year's major event

- A widespread wind storm moved up the country on the evening of 10th September 2013
- These were the most damaging winds to hit the Canterbury rural area since 1975 having the third largest impact upon our network performance on record
- The worst of the damage occurred after 10 pm to the Orion network resulting in about 28,000 customers losing power at its peak
- Ongoing high winds hampered response efforts in two key ways:
  - by limiting initial response due to crew safety concerns
  - by limiting access to survey the extent of tree damage to our network

Orion your network

Simple message to tree owners

This year's event

3 to 5 March

- High winds and rain on Banks Peninsula & Christchurch city
- A deep stalled low to the east of Canterbury
- Wind gust's recorded on the Peninsula in excess of 180km per hour
- Followed by consistent heavy rain –
    - Barry's Bay recorded over 180mm in a 24 hour period
- Flooding in Christchurch City mainly in the EQ affected Eastern suburbs
- Initially 7000 customers off
- 5 kiosk substations switched off due to excessive flooding
- Access to the Peninsula limited restoration
- Impact 40 -50 SAIDI minutes

Orion your network

Lyttelton

Simeon Quay substation slip & wind damage

Banks Peninsula

Okains Bay washout

Basement substation flooding

Simple message to building owners

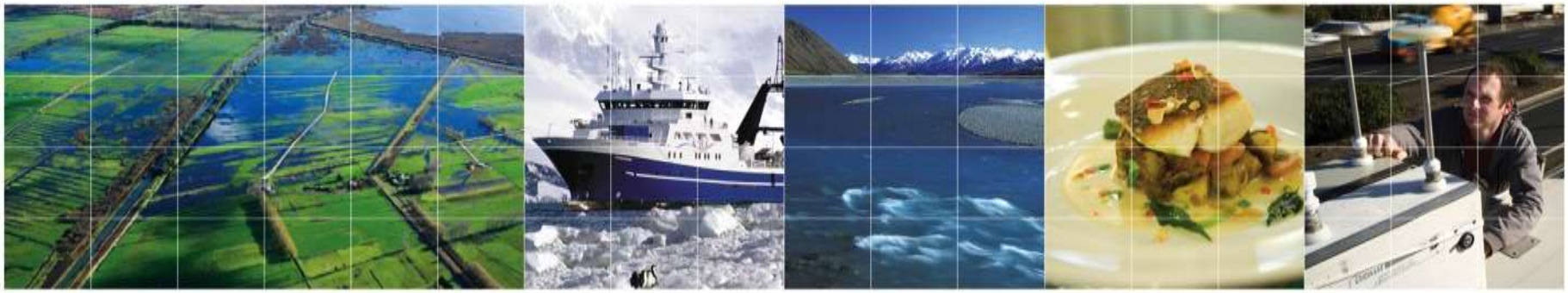
Note!

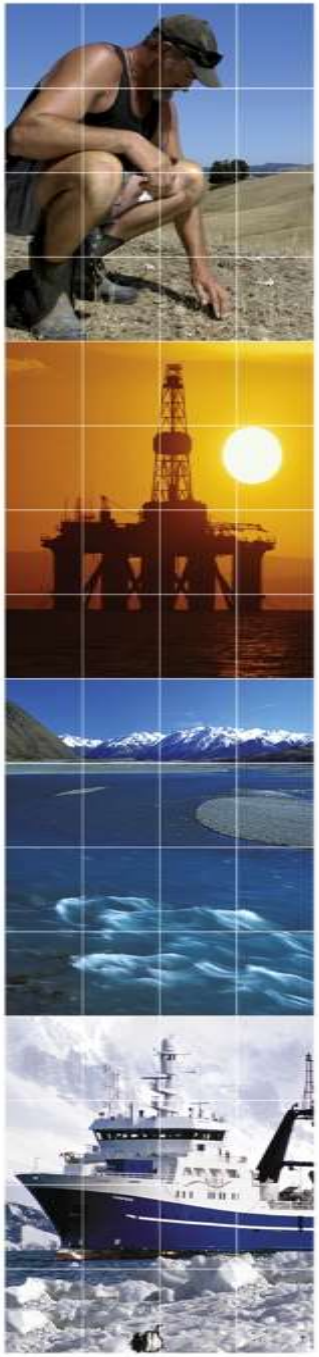
NIWA
Taihoro Nukurangi

Weather-related hazards & climate-change: Linkages

Rob Bell

NIWA

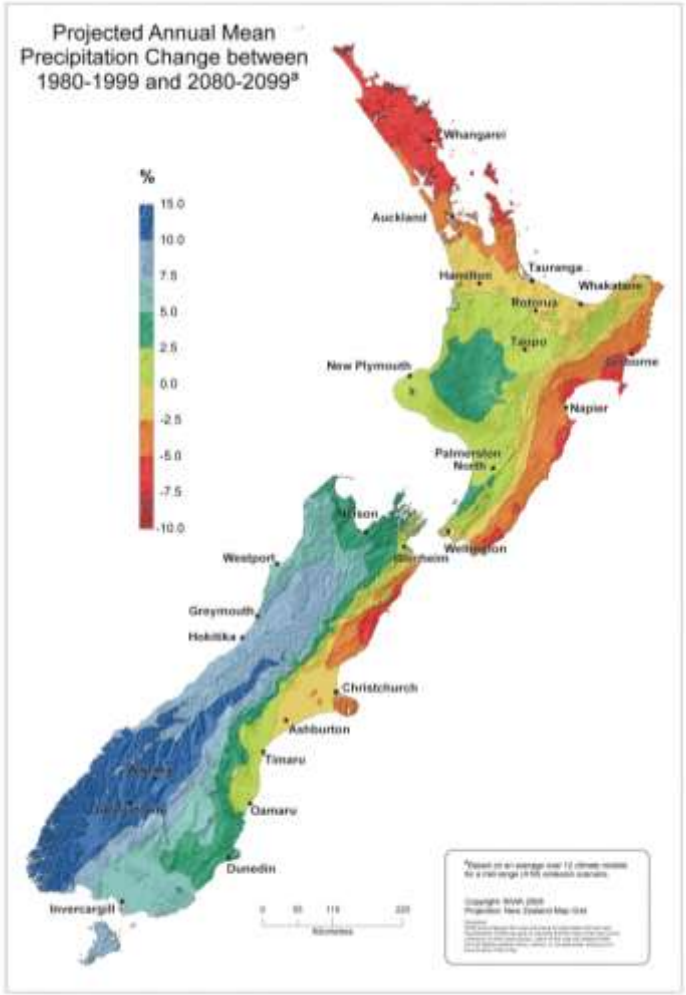


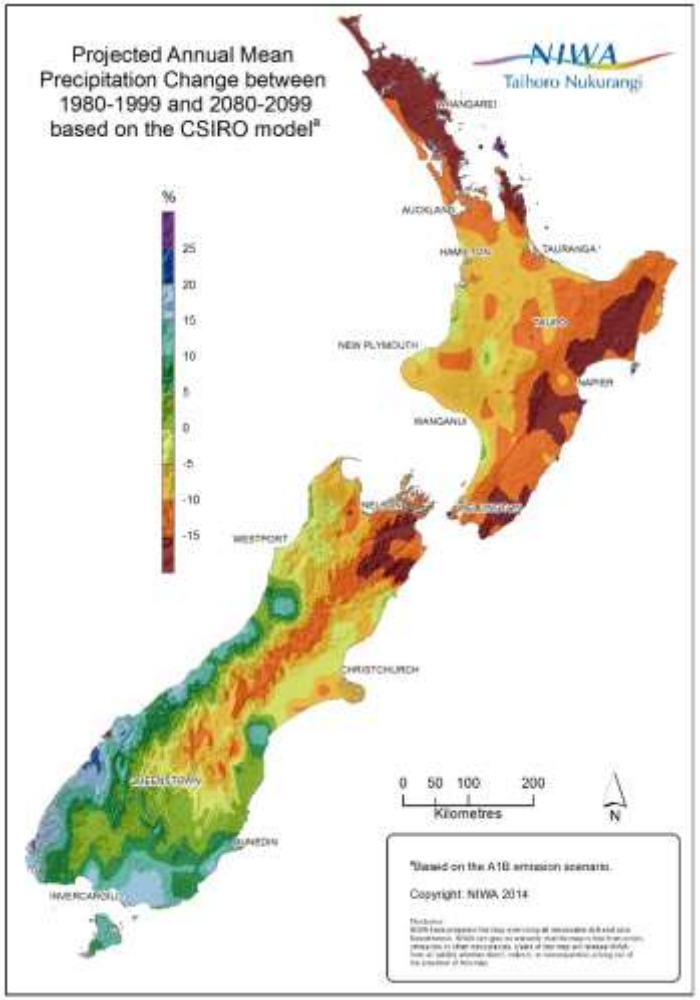


2011 Nelson/Tasman storms: climate change influence

- 300 homes flooded & landslips
- NIWA report (Sam Dean, 2012):
  - 1/500 ARI for record rainfall of 674 mm in 48 hrs (Takaka)
  - 1 to 5% higher moisture content due to increased greenhouse gases
  - Probability of event occurring may have increased

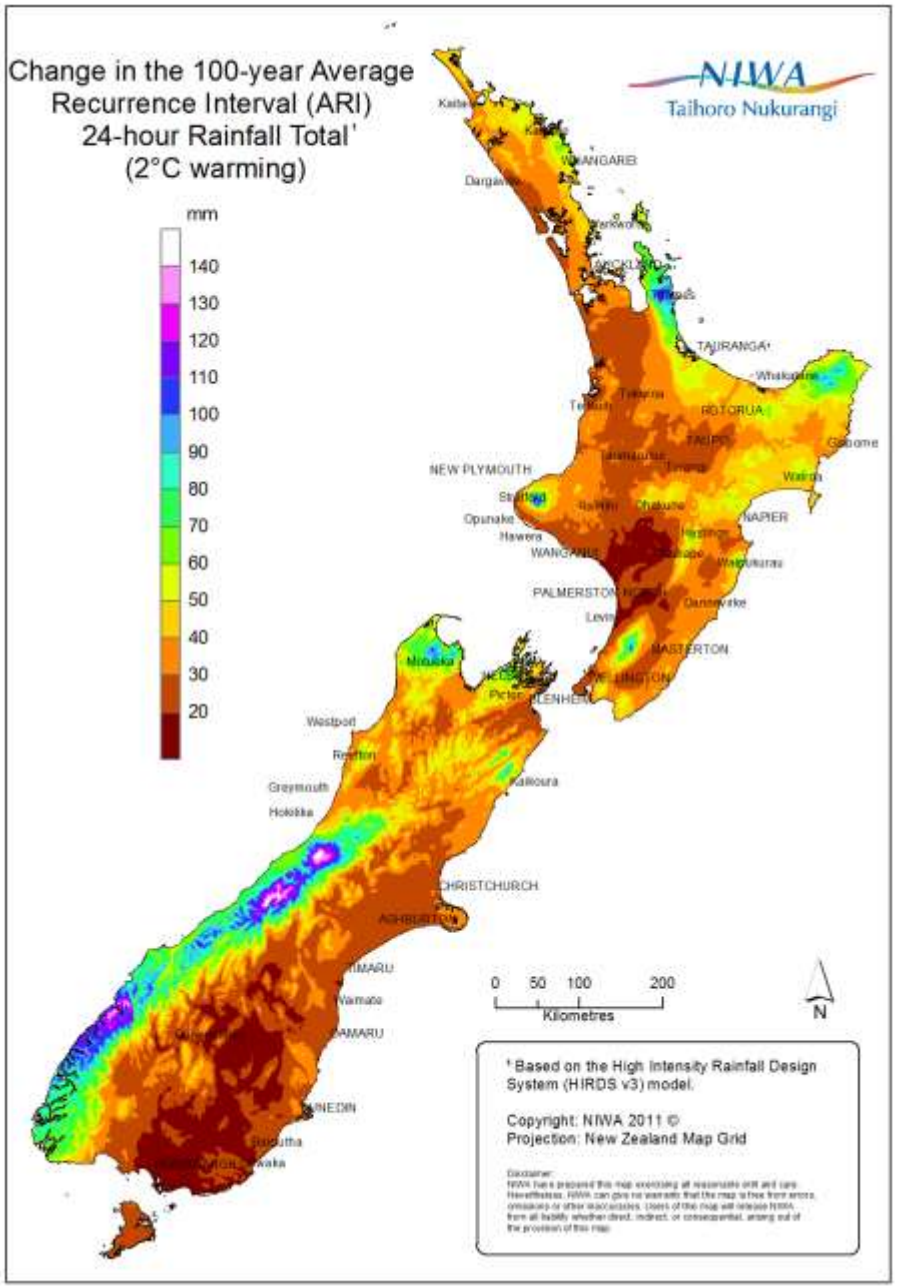
Latest RCM projections & data



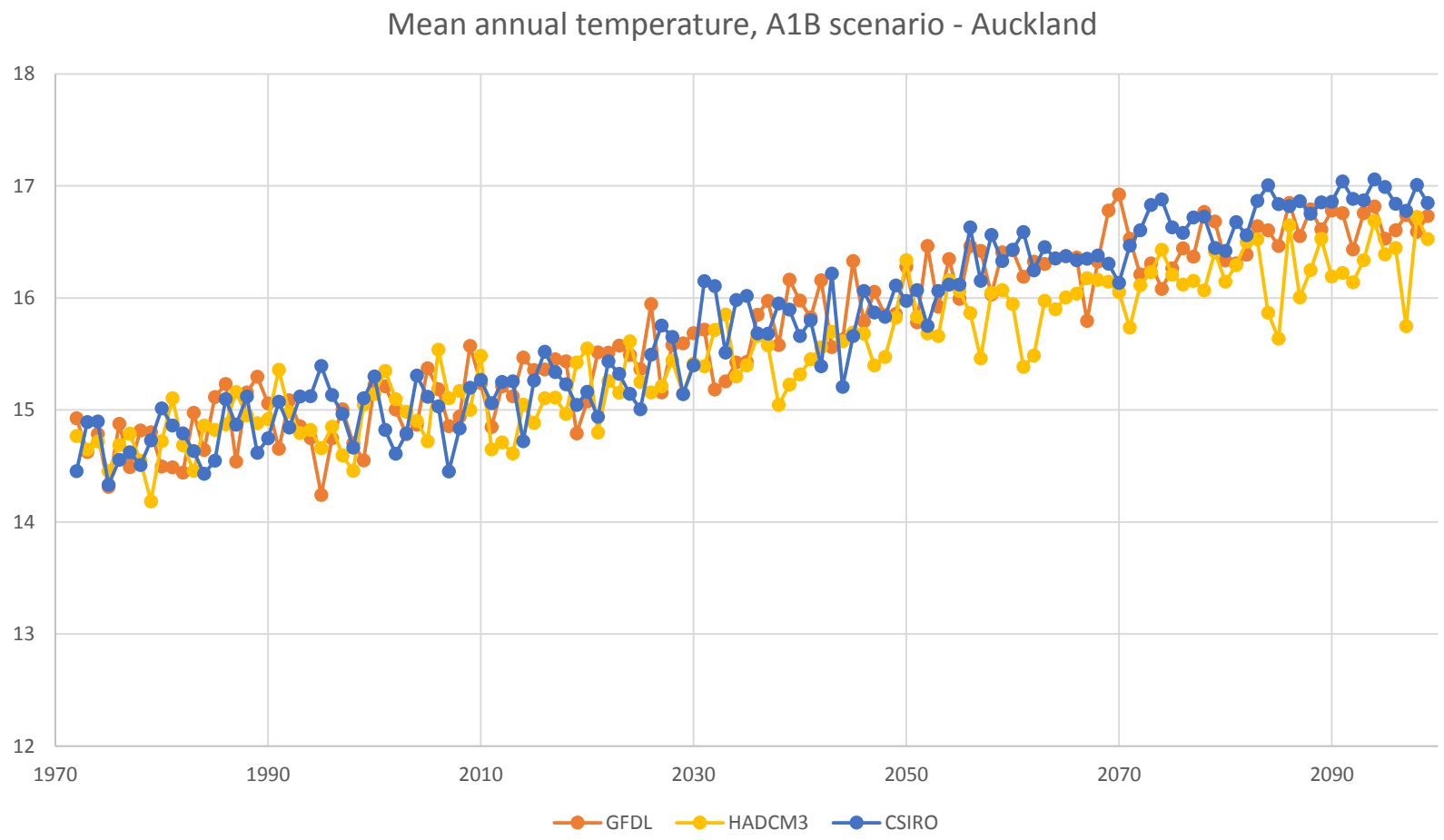


Key risk - flooding

- Already significant risk and cost
- ‘Adaptation deficit’: events with much less than 100-year return periods cause significant damages.
- Widespread increase in flood exposure, but uncertain amount of change
- More severe end of changes would pose significant challenges



Latest RCM projections & data



Tool re-development & CC effects

- High Intensity Rainfall Design System (HIRDS v4)
  - Just received Envirolink Funding + 20% NIWA core
- River flood frequency/magnitudes in NZ
  - Last updated in late 1980s
  - Re-analysis now well underway (all data in)
- Freq of storms may not change substantially but more intense storms – likewise at other end (droughts)
- Freq of coastal inundation will dramatically rise:
  - With 0.5 m sea-level rise, a present 1% AEP storm-tide event will become a monthly affair