

Hawke's Bay CDEM Risk Register

High level Risk Overview

Likelihood ↑	<u>Drought</u> <u>Coastal Inundation</u> <u>Coastal Erosion</u> <u>Frost</u> <u>Landslide-small</u> <u>Hazardous substances event</u>	<u>Average Flood (50 yr)</u> <u>Earthquake (MMI 6)</u> <u>Strong Wind</u>			
	<u>Trace Volcanic Ash (<1mm)</u>	<u>Rural Fire</u> <u>Large Landslide</u> <u>Lifeline failure- electric</u> <u>Lifeline failure – waste water & sewage</u>	<u>Earthquake (MMI 7)</u> <u>Human Pandemic</u> <u>Animal epidemic-plant and animal pests</u>		
	<u>Snow</u> <u>Hail</u> <u>Major transport accident – road/rail</u>	<u>Urban fire- multiple</u> <u>Pollution over unconfined aquifer</u>	<u>Large Flood</u> <u>Moderate Tsunami (100 Yr.)</u> <u>Light Volcanic</u> <u>Lifeline failure – water</u> <u>Major transport accident- Marine</u>		
	<u>Civil unrest/terrorism</u>	<u>Extreme temperature</u> <u>Lifeline failure – Gas</u> <u>Major transport accident - Air</u>	<u>Heavy Volcanic Ash</u>	<u>Large Tsunami (500 Yr)</u> <u>Earthquake (MMI 8)</u>	
	<u>Dam failure</u>		<u>Very Large Landslide</u> <u>Lifeline failure - telecommunications</u>	<u>Earthquake (MMI 9)</u> <u>Very Large Tsunami</u>	
	Consequence →				

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Ref ID <small>N=National response R=Regional response</small>	Risk	Return period (year)	Scenario description and consequences	Likelihood	Consequence	Risk Score	Links to science https://hbmaps.hbrc.govt.nz/hazards/	Links to relevant hazard response plans or SOPs	Risk last exercised
				Risk Rating					Next exercise due
Natural risks									
1N	Earthquake (MMI 9)	740	<p>A magnitude 7.1 earthquake on the Poukawa Fault near Bridge Pa causing extreme shaking (MMI 9). Substantial ground shaking throughout Hawke's Bay</p> <ul style="list-style-type: none"> 10-15 deaths, 250-350 injuries, some serious. \$400m heavy damage to buildings. Damage to bridges and roads. Large cracks in ground. Landslides on steep slopes. Liquefaction effects intensify. Substantial damage to lifelines including power, water & waste water and transportation routes. Telecommunications also badly affected. 	Rare	Extreme	15.8	Click here for earthquake science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	<p>Exercise Ruamoko 2019 (Tier 2)</p> <p>Alpine Fault Exercise 2020 (Tier 4)</p>
2N	Very large tsunami	N/A*	<p>A magnitude 8.9 earthquake on the Hikurangi subduction zone producing a 2500-year return period tsunami, which has an offshore wave eight of approximately 10 m. Arrives within 40 minutes without any time for an official evacuation warning.</p> <ul style="list-style-type: none"> 1000s of fatalities and 10,000s injuries International and domestic assistance required to supplement the response 1000s of homes damaged requiring repair Significant damage to infrastructure including power, telecommunications, and three waters, with long restoration times Severe environmental damage Complex and long-term recovery process <p>*In total there have been 6-10 Hikurangi subduction zone earthquakes over the last 7000 years. The last one was about 500 years ago, which mostly impacted the southern part of the subduction zone (Wellington and Wairarapa)</p>	Rare	Extreme	15.3	Click here for tsunami science	Hikurangi Response Planning Toolbox July 2020 HB CDEM Group Initial Response Plan Version 1.3 Hawke's Bay CDEM Group Tsunami Response Plan Hawkes Bay fuel plan v3	<p>Exercise Tangaroa 2010 (Tier 4)</p> <p>2024 - Tier 4 proposed</p>
3N	Large tsunami	500	<p>A distance source event, caused by a M8.5 earthquake on the coast of Peru resulting in a 1000-year return period tsunami, which has an offshore wave height of approximately 5m. Arrives on high tide</p>	Unlikely	Extreme	14.3	Click here for tsunami science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	<p>Exercise Tangaroa 2010 (Tier 4)</p>

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			<p>with 10 hours advance warning with time for evacuation.</p> <ul style="list-style-type: none"> <input type="checkbox"/> 2 deaths, 140 injuries. <input type="checkbox"/> \$800m damage to buildings, homes and coastal infrastructure. Many coastal private dwellings uninhabitable. <input type="checkbox"/> Severe environmental damage along the coastline. 	Very High					2024 - Tier 4 proposed
4N	Heavy volcanic ash	1,000	<p>Mount Ruapehu erupts with wind directing ash over Hawke's Bay. All the cities and towns are affected, with region covered with between 50-100 mm of ash over the course of 3 weeks. Wet weather exacerbates problems.</p> <ul style="list-style-type: none"> <input type="checkbox"/> 700 affected with bad health from ash which is irritant to lungs and eyes. <input type="checkbox"/> Burial of pasture and low plants and foliage stripped off some trees. Most pasture will be killed by over 50mm of ash. <input type="checkbox"/> Livestock may suffer from lack of feed, wear on teeth, and contamination of water supplies. <input type="checkbox"/> Major ash removal in urban areas. <input type="checkbox"/> Weaker roof structures may collapse at 100mm ash thickness if the ash is wet. <input type="checkbox"/> Airports closed. <input type="checkbox"/> Road transport badly affected. <input type="checkbox"/> Electricity cuts due to ash shorting at substations. Water supplied limited due to failure of power to pumps. 	Unlikely	Major	14.3	Click here for volcanic science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	<p>Exercise Ashbay 2006 (Tier 2)</p> <p>2021</p>
4aN	Extreme Event^ - Very heavy volcanic ash	N/A*	<p>A very large eruption in the Taupo Volcanic Centre producing over 1 cubic km of material. Vent open for months to years. Ash thickness 100-2000 mm with between 50-100mm being deposited in the Hawke's Bay</p> <ul style="list-style-type: none"> <input type="checkbox"/> Distal airfall issues <input type="checkbox"/> Sedimentation/remobilisations <input type="checkbox"/> Transport/airways not operable <input type="checkbox"/> Supply chain impacts <p>*Over the last 30,000 years, there have been three extremely large eruptions in the TVC, all producing over 1 cubic km of material. This scenario represents an extreme event, defined as a statistical outlier which cannot be predicted.</p> <p>^This scenario has been included as an example of an extreme event for the Hawke's Bay. Because of the rare likelihood of this event occurring, a risk rating will not be calculated.</p>				Click here for volcanic science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	<p>Exercise Ashbay 2006 (Tier 2)</p> <p>2021</p>
5N	Earthquake (MMI 8)	130	<p>A magnitude 6.4 earthquake on the Mohaka Fault line near Willowflat causing extreme shaking throughout Hawke's Bay.</p>	Unlikely	Extreme	13.5	Click here for earthquake science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	<p>Exercise Ruaumoko 2019 (Tier 3)</p>

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			<ul style="list-style-type: none"> <input type="checkbox"/> 3-5 deaths & 90-150 injuries. <input type="checkbox"/> \$130m building damage with some damage to earthquake resistant buildings. Cracks in ground. Heavy furniture overturned. <input type="checkbox"/> Damage to lifelines including power, water & waste water and transportation routes. Telecommunications also affected. 	Very high					2024
6R	Large flood	101	A cyclone brings high rainfall to Hawke's Bay with considerable damage to Hastings, Napier and Central HB. Rainfall at Rissington is 510mm in 10 hours, and there is substantial flooding on the Heretaunga Plains caused by a breach in the stopbank on the Ngaruroro River.	Possible	Major	13.3	Click here for flood science	HB CDEM Group Initial Response Plan Version 1.3 Hawkes Bay fuel plan v3	Exercise BayVac 2009 (Tier 2)
			<ul style="list-style-type: none"> <input type="checkbox"/> 2 deaths, 35 serious injuries. <input type="checkbox"/> Clean up, production loss, and damage to homes and businesses in millions. <input type="checkbox"/> Health impacts if sewage & water supplies affected. 	Very High					2021
7N	Moderate tsunami	100	A regional source event from a magnitude 7.9 earthquake at the Kermadec Islands produces an offshore wave height of approximately 1-2. Arrives on high tide with 2 hours advance warning.	Possible	Major	13.1	Click here for tsunami science	HB CDEM Group Initial Response Plan Version 1.3	Exercise Tangaroa 2010 (Tier 4)
			<ul style="list-style-type: none"> <input type="checkbox"/> 28 injuries <input type="checkbox"/> \$7m damage to coastal infrastructure and boats including at the Port of Napier. 	Very High					2024 - Tier 4 proposed
8R	Earthquake (MMI 7)	26	A magnitude 6.9 earthquake centred south of Wairoa causing severe earthquake shaking.	Likely	Major	11.0	Click here for earthquake science	HB CDEM Group Initial Response Plan Version 1.3	Exercise Ruauumoko 2019 (Tier 3)
			<ul style="list-style-type: none"> <input type="checkbox"/> 1 death & 15 injuries <input type="checkbox"/> \$7m building damage. Tiles, water tanks, walls damaged. Some chimneys broken. Furniture movement. <input type="checkbox"/> Lifelines including power, water & waste water and transportation routes all report some damage. Telecommunications affected. 	Very High					2024
9N	Light volcanic	100	Mount Taranaki erupts with wind directing ash over Hawke's Bay. Some of the cities and towns are affected, with region covered with between 1-5mm of ash over the course of 4 weeks. Weather stays reasonably dry.	Possible	Major	10.4	Click here for volcanic science	HB CDEM Group Initial Response Plan Version 1.3	Exercise Ashbay 2006 (Tier 2)
			<ul style="list-style-type: none"> <input type="checkbox"/> 100 affected with bad health from ash which is an irritant to lungs and eyes. <input type="checkbox"/> Airports closed <input type="checkbox"/> Livestock may suffer from lack of feed; wear on teeth, and possible contamination of water supplies. <input type="checkbox"/> Minor damage to houses if ash enters buildings, 	Very High					2021

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			<ul style="list-style-type: none"> soiling & blocking air con filters, etc. Road transport may need to be cleared. Electricity may be cut due to ash shorting at substations. High water use from ash clean up. Water supplies may be limited. 						
10R	Average flood	50	<p>A chain of thunderstorms formed up the eastern coast of NZ which results in downpours in HB. In Napier & Hastings 50mm of rain falls in 1 hour – close to the average for an entire month.</p> <ul style="list-style-type: none"> Millions of dollars damage from water and surface water flooding and damage to some roofs and shop stock. Clean-up, production loss, and damage to homes and businesses. 	Almost certain	Moderate	10.1	Click here for flood science/reports	HB CDEM Group Initial Response Plan Version 1.3	Exercise BayVac 2009 (Tier 2) 2021
			Very High						
11R	Rural Fire	N/A*	<p>Major fire in extreme drought conditions on rural-urban interface and threatening urban areas.</p> <ul style="list-style-type: none"> Fire-fighters and residents killed and injured Widespread evacuations required and extensive destruction of property and vegetation. National and international assistance required. Airspace restrictions Loss of income to rural sector with significant losses to forestry <p>*Return period not available. Each year rural fire authorities control approx. 500 fires which burn about 400 hectares of land.</p>	Likely	Moderate	9.6	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
			Very High						
12R	Earthquake (MMI 6)	6	<p>An earthquake measuring 6.1 on the Richter scale with its epicentre near Lake Poukawa. Shaking throughout HB causing strong shaking</p> <ul style="list-style-type: none"> \$1.5m slight damage to poorly constructed buildings. Objects fall from shelves Slight damage to lifelines including power and water supplies. Telecommunications overloads and cellphones affected. 	Almost Certain	Moderate	8.4	Click here for earthquake science	HB CDEM Group Initial Response Plan Version 1.3	Exercise Ruauoko 2019 (Tier 3) 2024
			Very High						
13R	Drought	3*	<p>A prolonged and severe drought similar to that experienced in 1982.</p> <ul style="list-style-type: none"> Small streams dry up, trees die, and stock numbers are greatly reduced. Increased likelihood of extensive rural fires Loss of water impacts on production and economic activity in the region and there is a general economic decline. <p>*Based on the current historical record, drought</p>	Almost Certain	Minor	7.8	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	N/A
			High						

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			affects the region on average once every 3 years.						
14R	Coastal inundation	N/A*	<p>A severe coastal storm swell event inundates land adjacent to the coast, as seawater is driven over beach crests.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Evacuations required. Some injuries <input type="checkbox"/> Building damage including sea water and loss of roofs from wind. <input type="checkbox"/> Storm water networks overwhelmed. Blocked and damaged culverts. Interruption of power. Road disruptions and temporary isolation of parts of the region due to access problems. <p>*Return period not available. Risk predicted to increase</p>	Almost Certain	Minor	8.6	Click here for coastal science	HB CDEM Group Initial Response Plan Version 1.3 Cape Coast Initial Response Plan	N/A
15R	Very large landslide	100+	<p>After several weeks of wet weather in the region a large landslide occurs in the Esk Valley blocking SH5.</p> <ul style="list-style-type: none"> <input type="checkbox"/> A number of casualties from an associated vehicle accident. A number of properties badly damaged. People are unable to return to their homes. <input type="checkbox"/> Transportation redirects required. Severe infrastructure damage with SH 5 closed for over 8 weeks given the size of the landslide and rebuild required which results in high business & economic losses. 	Rare	Major	7.8	Click here for landslide science	HB CDEM Group Initial Response Plan Version 1.3	N/A
16R	Coastal erosion	N/A*	<p>Storm leads to the removal of beach front and private coastal land adjacent to the beach.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Destruction of several private houses on the coast. <input type="checkbox"/> Loss of land, distress. <input type="checkbox"/> Loss of utilities in the area <input type="checkbox"/> Damage to wetlands, riverbank and river mouth ecosystems. <p>*Return period not available. Risk predicted to increase</p>	Almost Certain	Minor	7.3	Click here for coastal science	HB CDEM Group Initial Response Plan Version 1.3	N/A
17R	Large landslide	10	<p>Numerous small rainfall induced landslides in all parts of the region. A small number block essential roads such as SH 2 & 5 for a period of 3-4 days.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Some people are unable to return to their homes. <input type="checkbox"/> SH Infrastructure damage. Transportation delays <input type="checkbox"/> Property damage <input type="checkbox"/> Economic losses 	Likely	Moderate	7.3	Click here for landslide science	HB CDEM Group Initial Response Plan Version 1.3	N/A

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18R	Strong wind	142	<p>Ex-tropical cyclone affects entire region bringing winds of 200 km/hr</p> <ul style="list-style-type: none"> Power supplies disrupted with power poles damaged by winds. Roofing materials torn off roofs, trees blown down, transport accidents and injuries. Some people unable to return to homes 	Almost certain	Moderate	7.1	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	N/A
19R	Extreme temperature	N/A*	<p>Following a period of drought, a high establishes over Hawke's Bay bringing extreme temperatures of 32°C for 2 days</p> <ul style="list-style-type: none"> A death(s) of urban-dwelling elderly without access to an air-conditioned environment. Highways and roads are damaged by excessive heat Livestock, such as poultry, are severely impacted. Increased demand for water. <p>*Return period not available. Risk predicted to increase.</p>	Unlikely	Moderate	6.3	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
20N	Trace volcanic ash fall <1mm	20	<p>Mount Ruapehu erupts with wind directing some ash over HB. Wairoa mainly affected, with region covered with less than 1 mm of ash over 1 week.</p> <ul style="list-style-type: none"> Irritant to lungs and eyes. Airports will close due to potential damage to aircraft. Possible minor damage to vehicles, houses and equipment caused by abrasive ash Dust affects road visibility and possible contamination of roof-fed water supplies 	Likely	Minor	6.1	Click here for volcanic science	HB CDEM Group Initial Response Plan Version 1.3	<p>Exercise Ashbay 2006 (Tier 2)</p> <p>2021/22</p>
21R	Snow	N/A*	<p>A prolonged period of cold moist air produces heavy snowfall that closes all road into and out of HB</p> <ul style="list-style-type: none"> The cold weather freezes the snow, producing icy roads, which remain closed for a few days. Transportation delays. Stock losses occur in CHB due to the cold and snow. Some damage and disruption to power and telecommunication lines. <p>*Return period not available.</p>	Possible	Minor	6.1	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
22R	Hail	N/A*	<p>Severe and widespread hail storm over the Heretaunga Plains in mid-summer.</p>	Possible	Minor	5.8	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency

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			<ul style="list-style-type: none"> Damage affects most of the export crop apples, estimated to be \$50million Loss of family income for affected properties. Distress. Minor damage to homes, broken windows, and damaged air con units. <p>*Return period not available.</p>	Medium					National Exercise Programme
23R	Frost	N/A*	<p>A severe frost covers the Heretaunga Plains at the end of summer.</p> <ul style="list-style-type: none"> Major crop losses, including tomatoes for Heinz Wattie's estimate to be in the millions Major economic losses to families <p>*Return period not available.</p>	Almost Certain	Minor	4.6	Click here for science about meteorological hazards	HB CDEM Group Initial Response Plan Version 1.3	N/A
24R	Landslide-Small	1-2	<p>A number of small rainfall induced landslides across SH 5 from Napier to Wairoa for a period of 1-2 days</p> <ul style="list-style-type: none"> Some people are unable to return to their homes SH Infrastructure damage Transportation delays. 	Almost Certain	Minor	4.3	Click here for landslide science	HB CDEM Group Initial Response Plan Version 1.3	N/A
Technological risks									
25R	Urban fire-Multiple	N/A*	<p>After a long hot summer, on a hot windy day a large number of fires occur in a short period over a wide suburban areas</p> <ul style="list-style-type: none"> All fire service resources are fully committed. There are many casualties and one fatality. Several of the fires spread destroying several homes. Welfare provision is necessary. <p>*Return period not available.</p>	Possible	Moderate	10.6	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
26R	Lifeline failure Electric	N/A*	<p>A storm causes the 200kv link with Wairakei to fail, causing a total blackout to the region which lasts up to 6 hours in some areas.</p> <ul style="list-style-type: none"> The power cut affects hundreds of homes and is estimated to cost the region's industry hundreds of thousands of dollars. Distress and communities affected <p>*Return period not available.</p>	Likely	Moderate	10.4	Click here for lifeline reports	HB CDEM Group Initial Response Plan Version 1.3 Critical Lifeline Sites-Hawke's Bay	Click here to view the interagency National Exercise Programme
27R	Lifeline failure Water	N/A*	<p>A water pipe attached to a bridge ruptures after a bridge collapse close to the epicentre of a small earthquake.</p>	Possible	Major	10.4	Click here for lifeline reports	HB CDEM Group Initial Response Plan Version 1.3 Critical Lifeline Sites-Hawke's Bay	Click here to view the interagency National

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			<ul style="list-style-type: none"> Water supply to a small HB community fails and access is limited. Distress and communities affected Alternative supplies required. <p>*Return period not available.</p>	Very High					Exercise Programme
28R	Hazardous substances event	10	<p>A large explosion at an industrial site in Hastings, causes a huge fire and sends black</p> <ul style="list-style-type: none"> Injuries including burns and effects from toxic fumes 150 homes require evacuation Significant residential and central business district disterution from smoke/toxic cloud. Runoff of toxic materials into inland water, air pollution, on-site contamination of soil and groundwater Economic losses 	Almost Certain	Minor	9.3	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
29R	Pollution over unconfined aquifer	N/A*	<p>A major truck accident on SH 50 causes a significant chemical spill which leaks into the surrounding land at Roys Hill</p> <ul style="list-style-type: none"> The major pollutant spill threatens the groundwater systems which provides 85% of the water needs of the local population. <p>*Return period not available.</p>	Possible	Moderate	9.3	Click here for a science report	HB CDEM Group Initial Response Plan Version 1.3	N/A
30R	Lifeline failure – Telecommunications	N/A*	<p>A telecommunications line attached to a ridge to a coastal community breaks after a bridge collapse close to the epicentre of a small earthquake (?)</p> <ul style="list-style-type: none"> Coastal community loses telecommunications and access to 111 calls, putting lives at risk Telecommunications in the region experience overloading due to earthquake <p>*Return period not available.</p>	Rare	Major	8.6	Click here for lifeline reports	HB CDEM Group Initial Response Plan Version 1.3 Critical Lifeline Sites-Hawke's Bay	Click here to view the interagency National Exercise Programme
31N	Civil unrest/terrorism	N/A*	<p>Terrorism targets include political & economic interests, critical infrastructure, mass gatherings of people & events that capture media attention</p> <ul style="list-style-type: none"> Violent acts, protest and civil unrest can all impact severely on normal life and operations. <p>*Return period not available.</p>	Unlikely	Minor	7.8	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
32R	Major transport accident – Marine	N/A*	<p>A ship goes aground on Pania Reef, leaking tonnes of heavy fuel oil into the Bay.</p> <ul style="list-style-type: none"> Port of Napier operations affected. Marine industry affected and economic losses. 	Possible	Major	7.3	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme

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			<ul style="list-style-type: none"> <input type="checkbox"/> Black oil on HB beaches requires months of clean up. <input type="checkbox"/> Distress and effects from fumes from those living close to the beaches <input type="checkbox"/> Significant economic impact, businesses affected. <p>*Return period not available.</p>	Very High					Programme
33R	Lifeline failure – Gas	N/A*	<p>A bridge collapse breaks the gas supply to Napier</p> <ul style="list-style-type: none"> <input type="checkbox"/> Significant economic impact <input type="checkbox"/> Businesses affected <p>*Return period not available.</p>	Unlikely	Moderate	6.8	Click here for lifeline reports	HB CDEM Group Initial Response Plan Version 1.3 Critical Lifeline Sites-Hawke's Bay	Click here to view the interagency National Exercise Programme
34R	Lifeline failure – Waste Water & Sewage	N/A*	<p>After 3 weeks of wet weather, the failure of a pump station causes the back up of sewage in a Napier community.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Public health issues <input type="checkbox"/> Risk of contamination from sewerage systems <p>*Return period not available.</p>	Likely	Moderate	6.6	Click here for lifeline reports	HB CDEM Group Initial Response Plan Version 1.3 Critical Lifeline Sites-Hawke's Bay	Click here to view the interagency National Exercise Programme
35R	Major transport accident - Air	N/A*	<p>A fully laden airplane crashes near to a residential area</p> <ul style="list-style-type: none"> <input type="checkbox"/> Deaths & injuries <input type="checkbox"/> Transportation systems disrupted <input type="checkbox"/> Damage to infrastructure in the area <input type="checkbox"/> Large cost of response and investigation <input type="checkbox"/> Business disruption <p>*Return period not available.</p>	Unlikely	Moderate	6.6	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
36R	Dam failure	N/A*	<p>A dam on Te Mata peak breaks following heavy rain</p> <ul style="list-style-type: none"> <input type="checkbox"/> The broken dam sends a wall of water down through the residential area of Havelock North. <input type="checkbox"/> Many houses are destroyed and there are many severe injuries <p>*Return period not available.</p>	Rare	Minor	6.2	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
37R	Major transport accident- Road/rail	N/A*	<p>A train derails between Napier and Hastings</p> <ul style="list-style-type: none"> <input type="checkbox"/> Injuries <input type="checkbox"/> Transportation systems disrupted 	Possible	Minor	6.1	N/A	HB CDEM Group Initial Response Plan Version 1.3 Supporting Plan-Closure of State Highways	Click here to view the interagency National Exercise Programme

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			<input type="checkbox"/> Damage to infrastructure in the area <input type="checkbox"/> Large cost of response and investigation <input type="checkbox"/> Business disruption *Return period not available.	Medium					Programme	
Biological risks										
38N	Human Pandemic	N/A*	A new strain of influenza spreads around the world and arrives in HB <input type="checkbox"/> Up to 300 deaths, 59,000 clinically unwell over a 2-3-month period. <input type="checkbox"/> Interruption to business, services, schools through staff being unwell or affected. <input type="checkbox"/> Problems with food supplies to those infected. <input type="checkbox"/> Problems with storage and disposal of bodies *Return period not available.	Likely	Major		13.7	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme
39R	Animal Epidemic, plant and animal pests	N/A*	A number of cases of anthrax are detected on the banks of the Tukituki River. It affects animals and humans, and can be fatal, so is considered a serious public health risk. <input type="checkbox"/> Large number of illness in Central HB and 1 death. <input type="checkbox"/> Public health officials overwhelmed with demand for information <input type="checkbox"/> Trade is severely affected <input type="checkbox"/> Significant economic losses <input type="checkbox"/> Food safety issues <input type="checkbox"/> Other public health priorities compromised *Return period not available.	Likely	Major		11.8	N/A	HB CDEM Group Initial Response Plan Version 1.3	Click here to view the interagency National Exercise Programme

Links to Science

Hazard	Research Title/Link
Earthquake	The Shock of '31: The Hawke's Bay Earthquake (1980)
	Pre-A.D. 1931 tectonic subsidence of Ahuriri lagoon, Napier, Hawke's Bay, New Zealand.(1986)
	Normal faulting through subducted oceanic crust: the 19 July 1985 earthquake of Hawkes Bay, New Zealand (1989)
	Estimation of Earthquake Strong Ground Motions: Napier and Hastings Hospital Sites (1991)
	A comparison of seismic sources used for High Resolution Onshore Seismic Surveys in New Zealand (1991)
	A seismic reflection survey near Takapau, Southern Hawke's Bay (1993)
	Seismic Reflection Investigations near Tollemache Road and St George Road, Hastings (1993)
	Earthquakes, active fault displacement and associated Vertical Deformation near Lake Taupo, Taupo Volcanic Zone (1994)
	Earthquake hazards in Hawke's Bay: initial assessment (1994)
	Earthquake Hazard Analysis- Hawke's Bay (1996)
	Damage Ratios for Houses and microzoning effects in Napier in the magnitude7.8 Hawke's Bay New Zealand earthquake of 1931 (1995)
Earthquake Hazards analysis – Stage 1. Recurrence of large earthquakes determined from geological and seismological studies in Hawke's Bay area (1996)	

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Tsunami	<ul style="list-style-type: none"> • New Zealand Tsunamis 1840-1982 (1986) • Hawke's Bay tsunami inundation by attenuation rule • Tsunami hazard study for the Hawke's Bay Region (1994) • The 26 March and 17 May 1947 Gisborne Earthquakes and Tsunami: Implication for Tsunami Hazard for East Coast (2000) • Tsunami Impacts in Hawke's Bay (2000) • A Tsunami (ca. 6300) and other Holocene environmental changes, Northern Hawke's Bay (2002) • Subduction earthquake Geology in Northern Hawke's Bay, New Zealand (2003) • Towards a record of Holocene Tsunami and Storms for northern Hawke's Bay (2005) • Community Understanding and Preparedness for Tsunami Risk in the Eastern North Island, New Zealand (2007) • Tsunami Hazard Assessment for Hawke's Bay Region (2008) • Tsunami Hazard posed by earthquakes on the Hikurangi subduction zone interface (2008) • Chile Tsunami Event Impacts in Hawke's Bay February 2010 • Scoping Study for evaluating the Tsunami Vulnerability of New Zealand Buildings for use as evacuation structures (2011) • Tsunami Evacuation: Lessons from the Great East Japan earthquake and tsunami of March 11th 2011 (2012) • Hikurangi Response Plan- Developing a scenario for an Mw8.9 Hikurangi earthquake, including tsunami modelling and a preliminary description of impacts (2018) • Exercise injects for a Hikurangi Subduction Zone earthquake aftershock sequence (2019) • Paleoseismology of an active reverse fault in a forearc setting: the Poukawa Fault zone, Hikurangi forearc, New Zealand (1998) • Fault kinetic adjustments during the last 2 Myr in the transition area between continental collision and Hikurangi Margin subduction (1998) • 1931 Waikari River Tsunami: New Zealand's largest historical tsunami (2016)
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Flooding	<ul style="list-style-type: none"> • Report on Storm of 26-28 July 1985 (1985) • SH38 Waiau River Flooding (1987) • The Climate and Weather of Hawkes Bay- Third Edition (1987) • Cyclone Bola 7-10 March 1988 (1989) • Floods and Drought: the New Zealand experience (1997) • Towards a record of Holocene Tsunami and Storms for northern Hawke's Bay (2005) • Te Ngaru Catchment Flood Hazard Study (2005) • Wairoa River: Flood hazard study (2006) • Wairoa Catchments Flood Report: Labour Weekend, 20-21 October 2005 (2006) • Wharerangi Flood Risk Assessment (2007) • Waipatiki Catchment Flood Hazard Analysis (2008) • Wairoa River Bank Stability Assessment (2009) • Wairoa River Bank Erosion Risk (2009) • Kopuawhara Opoutama Flood Hazard Analysis (2010)
Drought	<ul style="list-style-type: none"> • Floods and Drought: the New Zealand experience (1997) • Meteorological hazards to Hawke's Bay Engineering Lifelines (1999)
Coastal Inundation and Erosion	<ul style="list-style-type: none"> • Aokautere: An assessment of storm damage at Otoi in Northern Hawke's Bay • Sea Inundation: Heavy Swells Wave Run-up (2000) • Review of the 1996 Coastal Hazard Zone between Ahuriri Entrance and Esk River Mouth (2002) • Hawke's Bay Regional Coastal Hazard Assessment (2004) (Vol. 1 of 3) • Hawke's Bay Regional Coastal Hazard Assessment (2004) (Vol. 2 of 3) • Hawke's Bay Regional Coastal Hazard Assessment (2004) (Vol. 3 of 3) • Coastal Hazard Assessment for Hardinge Rd, Napier (2005) • Cliff hazard zone delineation (2005) • Summary report on site specific coastal hazard determination for Southern Beaches (2005) • Summary report: The Coast of Hawkes Bay: Processes and Erosion Problems (2007) • Summary Report: The Coast of Hawke's Bay: Processes and Erosion Problems (2007) • Hawke's bay Regional Coastal Environment Plan: Coastal hazards – additional information (2008) • Hawke's Bay Climate Change and Gravel-Beach Responses Conference Proceedings, 2015 • Hawke Bay coastal Strategy – Coastal Hazard Assessment (Draft) (2015) • Clifton to Tangoio Coastal Hazards Strategy 2120, Coastal Hazard Assessment (Draft) (2015) • Clifton to Tangoio Coastal Hazards Strategy 2120, Coastal Risk Assessment (Draft) (2016)
Landslides	<ul style="list-style-type: none"> • Hydrological behaviour of pastoral hill country modified by extensive landsliding, Northern Hawke's Bay, New Zealand (1988) • Slope Instability and Mud Volcano Hazard Assessment, Gisborne District Council (1997)
Meteorological hazards	<ul style="list-style-type: none"> • Meteorological Hazards to Hawke's Bay Engineering Lifelines (1999) • Extreme winds in the Hawke's Bay (2000)
Lifelines	<ul style="list-style-type: none"> • Report of the Hawke's Bay Engineering Lifelines Project: Facing the risks (2001) • Hawkes Bay Gas Supply Disruption Crisis Management in Action (2004)
Other	<ul style="list-style-type: none"> • Hawke's Bay joint hazard strategy for local authority land-use planning (2012) • A review of natural physical hazards research in Hawke's Bay (2003)

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	<ul style="list-style-type: none"> • Report on Two Shallow Seismic Surveys in the Roys Hill Recharge Area (1992)
	<ul style="list-style-type: none"> • Large Earthquakes in New Zealand. Anticipation. Precaution. Reconstruction. (1981)
	<ul style="list-style-type: none"> • Report on the Relief Organisation in Hastings arising out of the Earthquake in Hawke's Bay on February 3, 1931 (1999)