

**From:** Susan Shaw  
**Sent:** Monday, 29 July 2019 10:48 PM  
**To:** Juriss, Chris; Donaldson, Matt  
**Subject:** Key Datasets for Resilience and Climate Change - Suburbs  
**Attachments:** Data Improvement Plan 2019\_20 - Including Survey Responses.docx; Lead Agency Hui - Key Datasets for Resilience & Climate Change Workshop - Updated priority improvements.pptx

Hello Matt and Chris

Thanks again for following up on the key datasets for resilience and climate change work. It was good to talk with you both last week, and we really appreciate your support for this work. Do let me know once you have heard from Gavin on a suitable date for further discussion, as I would be happy to help with this.

The lead agency hui in June prompted lots of follow up discussion, but we were able to secure sign off of the data improvement plan with all lead agencies by 18 June. Congratulations to everyone involved at Fire and Emergency New Zealand.

We are keen to share the priority data improvements with the users who have been involved, particularly NZGIS4EM and MCDEM, and have published a webpage to help communicate this.

**Please can you review this webpage by Monday 5<sup>th</sup> August.**

<https://www.linz.govt.nz/data/linz-data/resilience-and-climate-change/key-datasets-for-resilience-and-climate-change>

I was unable to grant you, as an external agency, access to review the pages before they were published. However, our Communications Team assures us they can provide a quick turn around if there are any edits you would like to suggest. Our aim is to start publicising this page from Wednesday 7<sup>th</sup> August onwards.

*Note this webpage links to the public version of the data improvement plan, which only includes the priority improvements as listed in the executive summary. The public version of the data improvement plan does not include the detailed survey responses or the current and future improvements.*

In addition, please find attached your copy of the final data improvement plan (including survey responses) which will only be shared with the lead agencies and those who completed the survey. Also attached is the hui presentation which has been updated to show the approved priority improvements.

So what happens next? Look out for another email from me with a draft progress report template, plus a meeting appointment for our first progress report conference call which will be scheduled for early October.

We look forward to working with you to help build a more resilient New Zealand.

Thanks, Susan

*PS Please note I'm currently working remotely in Central European Time, which is the reason you are receiving this email outside normal office hours.*



**Susan Shaw**  
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# Key Datasets for Resilience & Climate Change

Data Improvement Plan 2019/20



18 June 2019

Objective ID: A3569222

## Acceptance

Role	Name	Approval	Date
Deputy Chief Executive Location Information	Jan Pierce	<a href="https://linzone/id:A3677260">https://linzone/id:A3677260</a>	18 June 2019

## Reference Documents

Location	Description
<a href="https://www.linz.govt.nz/about-linz/publications/strategy/outcomes-framework">https://www.linz.govt.nz/about-linz/publications/strategy/outcomes-framework</a>	LINZ Outcomes Framework
<a href="https://arcg.is/mib49">https://arcg.is/mib49</a>	Key Datasets for Resilience and Climate Change Survey
<a href="https://linzone/id:A3614757">https://linzone/id:A3614757</a>	Metadata Content Guidance

## Revision History

Date	Version	Author	Description
19/03/2019	0.1	Susan Shaw	First draft prepared for lead agencies
10/05/2019	0.2	Susan Shaw	Second draft prepared to incorporate feedback from lead agencies
31/05/2019	0.3	Susan Shaw	Third draft prepared to incorporate feedback from lead agency senior managers
18/06/2019	1.0	Susan Shaw	Document finalised and approved by lead agencies.

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## Executive Summary

Key datasets to support those working in resilience and climate change have been identified and their fitness for purpose assessed. Consultation with the user community, and collaboration with the key dataset lead agencies, identified the following data improvements which can be progressed over the next 12 months:



1. **LINZ** to provide a more comprehensive national coverage of addresses by June 2021.



2. **LINZ** to work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets by June 2023.



3. **NZTA** understands the importance of providing easy access to road closure data, but currently is unable to commit to an improvement plan.



4. **Stats NZ** understands the importance of providing small geography population count information for use in responding to emergency events and will explore options with LINZ on how best this could be achieved.



5. **LINZ** to improve access to parcel attribution by June 2020 and investigate the feasibility of creating a property boundary layer by June 2021.



6. **LINZ** to complete national coverage of building outlines by June 2020.



7. **Fire and Emergency New Zealand** understands the importance of the suburbs dataset and is working with LINZ to establish options regarding the dataset by December 2019.



8. **LINZ** to create a national topographic basemap by June 2022.



9. **LINZ** to establish a process for coordinating the capture and delivery of imagery and LiDAR during an event by June 2020.



10. **LINZ** to create and maintain a national coastline dataset based on the best available data by June 2020.



11. **NIWA** to improve the availability of river network and water catchment data by releasing under Creative Commons license and publishing scale dependant webservices by June 2020.



12. **LINZ** to publish key datasets maintained by LINZ as Esri REST services by June 2020.



13. **KiwiRail** to improve access to rail network data by June 2020.

## Introduction

In 2017, LINZ published its strategic direction for the next ten years in the Outcomes Framework document. The aim of the Outcomes Framework is to ensure LINZ contributes its effort and resources to the things that matter most for New Zealand.

The Outcomes Framework identified three challenges: Water, Urban Development, and Resilience and Climate Change. The challenges provide a clear focus for LINZ to consider the big picture and identify key datasets which deliver high value.

The Resilience and Climate Change challenge supports efforts to prepare for, mitigate and adapt to the impacts on land and sea of climate change and one-off events (natural and man-made).

Applying this resilience and climate change lens has enabled LINZ to identify 12 key datasets and work with our customers to help prioritise important data improvements.

## Purpose

The purpose of this document is to set out how the key datasets for resilience and climate change were identified and assessed, and to establish the priority data improvements which would deliver the most benefit.

It is intended that both the resilience and climate change community and the key dataset lead agencies review this document, as a record of the key datasets and the required data improvements.

Once approved by the lead agencies, this Data Improvement Plan will be used to report on progress towards achieving these improvements during 2019/20.

## Key Datasets for Resilience and Climate Change

### What are the key datasets?

The key datasets are focused on people, property, transport, rivers and land.



Address  
Buildings  
Property  
Population



Road Network  
Rail Network



Aerial Photography  
Topographic Map  
Elevation  
Coastline



River Network  
Water Catchments

## Who is our customer?

NZGIS4EM (New Zealand GIS for Emergency Management) represents geospatial practitioners in central government, local authorities, and Civil Defence Emergency Management groups, who are working together to make GIS integral to emergency management within New Zealand. [www.nzgis4em.com](http://www.nzgis4em.com)

LINZ has engaged with NZGIS4EM as an organisation best placed to represent the resilience and climate change data user community. In addition to the active members of NZGIS4EM, LINZ has worked with academia, Crown Research Institutes, private consultancies, local and central government and Civil Defence Emergency Management representatives to understand their data requirements and improvement priorities.

## Why are key datasets important?

It is clear that many of our customers, particularly the local authorities, have already done a great deal of work to improve these key datasets in their local area. As an example, many local authorities have captured their own, more detailed river network, catchment boundaries and coastline. These local authorities will continue to rely on their own data during a local emergency event.

When a major emergency event happens, such as the 2016 Kaikoura earthquake, where multiple local authorities are impacted, and a multi-agency response is required, it is currently difficult to access this data from multiple local sources. In these circumstances, national datasets, which are consistently available across the country as a single source, will be critical to ensure an effective and efficient response. For these national datasets to be fit for purpose, it is acknowledged that collaboration with local authorities will be vital to ensure the national datasets are accurate and reliable.

## How were the key datasets chosen?

The first step to identify the key datasets was to define 'resilience and climate change'. The '4Rs' of Emergency Management - Reduction, Readiness, Response and Recovery - were agreed as a useful definition of resilience, plus climate change. Organisations to represent each of these areas were identified. A literature review was then carried out for each of these organisations to determine their data requirements ([Appendix A](#)).

The literature review identified 106 datasets which are important for resilience and climate change. To prioritise this list, criteria were applied to assess whether the dataset could be considered 'key' ([Appendix B](#)). This identified the 12 key datasets for resilience and climate change. The key datasets and the methodology used to select them were reviewed and verified by LINZ staff and the NZGIS4EM community in August 2018.

## Who is responsible for the key datasets?

The lead agency for each key dataset was identified as

Population	Stats NZ
Building	LINZ Topographic Group
Address	LINZ Addressing Team plus Fire and Emergency New Zealand for Suburbs
Property	LINZ Integrated Property System Team
Roads	New Zealand Transport Agency
Rail	KiwiRail
Rivers	NIWA
Catchments	NIWA

Imagery	LINZ Topographic Group
Elevation	LINZ Topographic Group
Topo50	LINZ Topographic Group
Coastline	LINZ Hydrographic Data and Products Team

Workshops with the lead agencies were hosted by LINZ during September and October 2018. The workshops introduced the key datasets for resilience and climate change project to the lead agencies and presented feedback from NZGIS4EM on the current limitations of these datasets.

## How were the key datasets assessed?

The lead agency workshops helped define the criteria ([Appendix C](#)) used to assess whether a key dataset could be considered fit for purpose for resilience and climate change, based on:

- Complete national coverage
- Relevant data attributes
- Adequate level of accuracy
- Acceptable update programme
- Suitable topography
- Relevant metadata
- Free to access
- Creative Commons CC-BY licence
- Suitable formats for download
- Available as a webservice
- The national source of truth
- Ready to respond to an event
- Discoverable on data.govt.nz

The criteria were assessed by the lead agencies, and the resilience and climate change community were asked to confirm this assessment, based on data availability as at 30 August 2018. In addition, LINZ carried out a review of the metadata for each of the key datasets, based on the Metadata Content Guidance ([see Reference Documents](#)). The result of the initial assessment by the lead agencies is shown on the next page.

The feedback from NZGIS4EM and the fitness for purpose assessment were combined into a list of required data improvements. The lead agencies were then asked to identify which of the data improvements were already in progress.

The remaining improvements, which were not planned or budgeted, were shared with the resilience and climate change community as a survey (<https://arcg.is/mib49>). For each dataset, the survey asked respondents to assess the criteria above as either acceptable, not acceptable or don't know. The survey then presented the data improvements which are already being progressed by the lead agency. The unplanned improvements were presented, and respondents were asked to report on the importance of the improvement, and to share user stories to demonstrate the value of the data improvement.

The survey ran during January to April 2019 and was split into two parts. The first survey ran from January to February and targeted a representative from both central and local government who were recognised as being experienced users of one of the key datasets. These users had the option of providing feedback on more than one dataset.

The second survey ran from March to April and replicated the same questions, but this version was made available to the wider resilience and climate change community. In addition, all the lead agencies were given the opportunity to share the survey with their own customer networks to gather additional feedback.

A total of 98 survey responses were received. While both surveys returned a similar number of responses, the first survey provided more detailed user stories to demonstrate the importance of the data improvement.

## Summary of key datasets

In August 2018, the key datasets were assessed to measure their fitness for purpose for resilience and climate change.

Lead Agency	LINZ	LINZ	FENZ	LINZ	Stats NZ	NZTA	KiwiRail	NIWA / LINZ	NIWA	LINZ	LINZ	LINZ	LINZ
As at 30 August 2018, does the lead agency provide the key dataset ...	Building	Address	Suburb	Property	Population	Road	Rail	River	Water Catchment	Elevation	Aerial	Coastline	Topo
with relevant data attribution	No	Partly	Partly	Partly	Partly	Partly	Partly	No	Partly	Partly	Yes	Partly	n/a
adequate level of accuracy	Partly	Partly	Yes	Partly	Partly	Yes	Yes	Partly	Partly	Yes	Partly	Partly	Yes
acceptable update programme	Partly	Yes	Yes	Yes	Partly	Yes	Partly	Yes	Yes	No	Partly	Partly	Partly
suitable vector topology	Yes	Yes	Partly	Yes	Yes	No	Partly	Yes	Yes	Yes	n/a	Yes	n/a
free to access	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creative Commons CC-BY License	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Partly	Yes	Yes
download in suitable formats	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
available as a webservice	Partly	Partly	No	Partly	Partly	No	Partly	Yes	Yes	Partly	Yes	Partly	Partly
with appropriate metadata	Yes	Yes	Partly	Yes	Partly	Partly	Partly	Partly	Partly	Yes	Partly	Partly	Yes
discoverable on data.govt.nz	Partly	Partly	No	Partly	Partly	No	Partly	Partly	Partly	Partly	Partly	Partly	Partly
ready to respond to an event	No	No	No	No	No	Partly	No	No	No	No	No	No	No
national single source of truth	Partly	Partly	No	Yes	Partly	No	Partly	Partly	Partly	Yes	Partly	No	Yes

## What data improvements can deliver the most benefit?

The results of the survey were analysed by LINZ and a data improvement plan prepared for each dataset, in consultation with the lead agencies ([Appendix D](#)).

Some improvements are clearly important but cannot be progressed in the next 12 months. An example of this is associating a property with a building and an address. This is because a more comprehensive national coverage of addresses and buildings needs to be prepared first.

The most important priority for each dataset, which the lead agency can commit to progressing in the next 12 months, was determined by the number of respondents who identified the improvement as important, with further weighting given where respondents had provided a user story to demonstrate why the improvement was important.

The priority improvement for each dataset was then ranked based on the number of survey responses, the number of respondents who identified the improvement as extremely important, and the number of user stories provided to demonstrate the value of the improvement. This resulted in the priority improvements for resilience and climate change being identified as:



1. **LINZ** to provide a more comprehensive national coverage of addresses.



2. **LINZ** to work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets.



3. **NZTA** understands the importance of providing easy access to road closure data, but currently is unable to commit to an improvement plan.



4. **Stats NZ** understands the importance of providing small geography population count information for use in responding to emergency events and will explore options with LINZ on how best this could be achieved.



5. **LINZ** to improve access to parcel attribution and investigate the feasibility of creating a property boundary layer.



6. **LINZ** to complete national coverage of building outlines.



7. **Fire and Emergency New Zealand** understands the importance of the suburbs dataset and is working with LINZ to establish options regarding the dataset.



8. **LINZ** to create a national topographic basemap.



9. **LINZ** to establish a process for coordinating the capture and delivery of imagery and LiDAR during an event.



10. **LINZ** to create and maintain a national coastline dataset based on the best available data.



11. **NIWA** to improve the availability of river network and water catchment data by releasing under Creative Commons license and publishing scale dependant webservices.



12. **LINZ** to publish key datasets maintained by LINZ as Esri REST services.



13. **KiwiRail** to improve access to rail network data.

## How will data improvements be measured?

It is acknowledged that things change, and it is understood that the commitment of the lead agency to these priority improvements is based on current known resourcing and organisational priorities.

Over the next 12 months, a quarterly progress report will be prepared in collaboration with the lead agencies and reported to the NZGIS4EM Committee and the Ministry for Civil Defence and Emergency Management.

A report on the data improvements will be published in June 2020, which will also provide an opportunity to review the priority improvements and deadlines.

## What can LINZ contribute?

LINZ understands the vital importance of having datasets which are fit for purpose to inform those working in resilience and climate change. This is why LINZ is investing in improving the key datasets where it is the lead agency.

The importance of key datasets maintained by other lead agencies and their contribution to resilience and climate change is also clear. The lead agency workshop in June 2019 identified a number of ways in which LINZ can collaborate with lead agencies to ensure the successful outcome for resilience and climate change data improvements.

LINZ will keep in regular contact with all lead agencies over the next 12 months, in order to administer quarterly progress reports and publish an annual progress report.

LINZ will also identify opportunities to promote the key datasets as the national single source of truth, which can be relied upon and easily accessed during an emergency response, both with data users, lead agency senior managers and with Ministers.

In addition, LINZ is able to support lead agencies with drafting business cases and communications relating to the key datasets for resilience and climate change project. LINZ is committed to facilitating any queries and supporting any government agency in regard to datasets which play a role in resilience and climate change.

The LINZ Resilience Team have prepared metadata guidance and can work with the lead agencies to ensure the key datasets have associated metadata with sufficient detail to support their use. The LINZ Resilience Team will also continue to work with the Department of Internal Affairs to improve the data.govt.nz interface to ensure it is user friendly and to encourage agencies to publish relevant datasets, which will be curated into specific data groups.

LINZ looks forward to working with the lead agencies and the data users to make a real difference to resilience and climate change.

## Appendix A – Definition Resilience and Climate Change

Organisations were identified to represent each area of 4Rs of emergency management, plus climate change. A literature review was then carried out to identify the data requirements of each of these organisations.

Definition	Representative Organisation	Literature Review
Reduction	Riskscape and Tonkin + Taylor	Riskscape 2017, Layers list in Riskscape Wiki <a href="https://wiki.riskscape.org.nz/index.php/Layers_List">https://wiki.riskscape.org.nz/index.php/Layers_List</a> Tonkin + Taylor 2018, Method to calculate Annual Average Damage from flooding. Supplied by Jon Rix <a href="https://linzone/id:A3227738">https://linzone/id:A3227738</a>
Readiness	Lifelines	Lifelines 2017, New Zealand Lifelines Infrastructure Vulnerability Assessment: Stage 1 <a href="https://www.civildefence.govt.nz/assets/Uploads/lifelines/National-Vulnerability-Assessment-Stage-1-September-2017.pdf">https://www.civildefence.govt.nz/assets/Uploads/lifelines/National-Vulnerability-Assessment-Stage-1-September-2017.pdf</a>
Response	Emergency Services	Emergency Services 2016, Emergency Services GIS Contract. Supplied by GEOINT, New Zealand Defence Force <a href="https://linzone/id:A3225253">https://linzone/id:A3225253</a>
Recovery	Local Government	Wellington City Council 2017, Wellington City Council Resilience Strategy <a href="https://wellington.govt.nz/~/_media/about-wellington/resilient-wellington/files/strategy/resilience-strategyj001767-100-web.pdf?la=en">https://wellington.govt.nz/~/_media/about-wellington/resilient-wellington/files/strategy/resilience-strategyj001767-100-web.pdf?la=en</a> Statistics NZ Open Data Office 2018, Datasets required for recovery <a href="https://linzone/id:A3227759">https://linzone/id:A3227759</a>
Climate Change	UK Committee on Climate Change	Committee on Climate Change 2017, UK Climate Change Risk Assessment 2017 Evidence Report <a href="https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/">https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/</a>

## Appendix B – Key Dataset Criteria

Criteria used to identify key datasets for resilience and climate change.

Criteria	Definition
<b>Data Re-Use for Resilience and Climate Change</b>	
Geospatial Layer	A geospatial dataset or a combination of spatial and non-spatial datasets. This excludes requirements which are not geospatial datasets e.g. websites or applications.
Base Layer	A geospatial dataset which provides context to other datasets. Examples are geographic datasets required for a basemap, e.g. placenames or required to generate other datasets e.g. LiDAR is required to build contours.
Multiple Use	A geospatial layer which supports activities across multiple agencies and organisations represented by reduction, readiness, response, recovery and climate change.
<b>Data Significance for Resilience and Climate Change</b>	
National Coverage	A geospatial layer required to build a national picture for the 4Rs and climate change. Examples are the road network identifies national transportation links, but the location of individual fire hydrants is excluded as this is overwhelming information at a national scale.
Legislation	A legislative requirement for the geospatial dataset has been determined, based on the Civil Defence and Emergency Management Act 2002, and related legislation recognised by the Ministry for Civil Defence and Emergency Management (MCDEM). <a href="https://www.civildefence.govt.nz/cdem-sector/cdem-framework/civil-defence-emergency-management-act-2002/#legislation">https://www.civildefence.govt.nz/cdem-sector/cdem-framework/civil-defence-emergency-management-act-2002/#legislation</a>
Physical Infrastructure	A geospatial layer which represent assets which are significant to societal wellbeing and should be prioritised in an emergency response. Examples include water, energy, transport, telecommunications, public health and security services.
Navigation	A geospatial layer which represents transportation. Examples include land, sea and air navigation.
Public Funding	A geospatial layer which is publicly funded. Examples include geospatial data where Central Government or Local Government is the data custodian.
<b>Data for Resilience and Climate Change Scenarios</b>	
Response	A geospatial layer required when responding to an emergency.
Risk Reduction	A geospatial layer required for hazard identification and risk reduction analysis to enable New Zealand to meet its targets under the Sendai Framework for Disaster Risk Reduction 2015-2030

## Appendix C – Fitness for Purpose Criteria

Criteria	Definition
Resilience	The 4Rs of Emergency Management - risk reduction, readiness planning, emergency response and disaster recovery.
Complete national coverage	The North Island, South Island, Stewart/Rakiura Island, Chatham Islands and the smaller coastal islands of New Zealand.
Relevant data attributes	Information associated with a spatial feature, which is necessary to inform decision making related to resilience and climate change.
Adequate level of accuracy	The scale of data capture is known and recorded, which is appropriate to inform decision making related to resilience
Acceptable update programme	A known and planned update frequency, which is appropriate for resilience given the expected frequency of change.
Suitable topology	The data is available as point, line or polygon. Lines are contiguous and can form a network, polygons are discrete and do not overlap.
Relevant metadata	All metadata fields are recorded to meet the ISO standard mandatory fields, plus some options fields identified by LINZ as being important for resilience decision making.
Free to access	Cost is not a barrier to accessing the data.
Creative Commons license – CC BY	Licensing is not a barrier to accessing, and reusing the data, including for commercial purposes.
Suitable formats for download	Data is available to download in a minimum of two formats. If the data is in proprietary format, it must be available in an alternative format.
Available as a webservice	Vector data should be presented as both OGC WFS and Esri REST service Raster data should be presented as OGC WMTS or Esri Imagery Tile Service
National source of truth	The authoritative, reference dataset at a national scale. Local versions may be more up-to-date, but the best available data for the whole of New Zealand.
Ready to respond to an event	Data has been prepared specifically to enable an efficient and effective response to an emergency event
Discoverable on data.govt.nz	Data is easily identified and described after a keyword search on data.govt.nz

## Appendix D – Survey Results

Two surveys were used to assess the importance of the data improvements for each key dataset. The first survey targeted a representative from both central and local government who was recognised as being an experienced user of one the key datasets. These users had the option of providing feedback on more than one dataset.

The second survey replicated the same survey format and questions and was made available to the wider resilience and climate change community. In addition, all the lead agencies were given the opportunity to share the survey with their own customer networks to gather additional feedback.

A total of 98 responses were received. While both surveys returned a similar number of responses, the first survey provided more detailed user stories to demonstrate the importance of the data improvement.

<b>Dataset</b>	<b>First survey</b>	<b>Second survey</b>	<b>Total</b>
Address	4	11	15
Buildings	5	8	13
Roads	5	8	13
Property	4	6	10
Population	2	7	9
Elevation	6	2	8
Aerial	3	2	5
River	4	1	5
Suburbs	3	2	5
Topo	3	2	5
Catchments	3	1	4
Coastline	3	0	3
Rail	2	1	3
	47	51	98

An improvement plan had been prepared for each dataset which summaries the survey results and feedback from the lead agencies. The text in *blue italics* represents user comments provided in the survey response. In addition to the priority improvements which the lead agency is committing to, future improvements are also listed to ensure these ideas are not lost, even though there is no commitment to deliver them at present.

# People & Property

## Population

Key Dataset:	Meshblocks
Lead Agency:	Stats NZ
Data Source:	Stats NZ Geographic Data Service <a href="https://datafinder.stats.govt.nz/layer/8347-meshblock-2013/">https://datafinder.stats.govt.nz/layer/8347-meshblock-2013/</a>
Key Dataset Score:	August 2018 - 61% <span style="float: right;">June 2019 - 61%</span>

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### Survey Summary

The delay in publishing the 2018 Census is concerning for emergency management practitioners, due to the limitations of using population data which is six years out of date, particularly in high growth areas. Stats NZ are focused on publishing the 2018 census data, and no population counts will be made available before the full census is released. Population forecast data, up to 2018, is available online from Stats NZ.

Attempting to assess welfare needs in the rural areas of Kaikoura after the November 2016 earthquake is a clear example of the limitations of the current meshblocks, which are too aggregated to be reliable for evacuation planning.

Providing population counts as areas smaller than meshblocks and attributing these areas with additional population data, is the priority improvement where Stats NZ can add real value to inform emergency management decision making.

Making this dataset available as an Esri REST service would significantly increase the reuse of this data. Providing clear instructions, linked from data.govt.nz, on how to best use population data and future estimates would also help.

At the time of writing, Stats NZ is able to commit to improving population count data and extending the data provision to include an Esri REST service. Stats NZ is currently scoping the work required to supply this data with additional attribution.

### Priority Improvements

1. Stats NZ understands the importance of providing small geography population count information for use in responding to emergency events and will explore options with LINZ on how best this could be achieved.
2. Publish estimates of population growth between census updates by June 2020.
3. Update metadata to include contact information, last updated, coordinate system and collection method by June 2020.

### Future Improvements

4. Define new boundaries for providing population count data, which are smaller than meshblock.
5. Publish these new boundaries as an Esri REST service, and ensure the data is discoverable on data.govt.nz.
6. Attribute the boundaries with important population data including age, ethnic group, religion, gender, deprivation, employment status and income.

7. Provide access to additional attributes to help identify population vulnerability in emergency events.

### Fit for Purpose

Meshblocks have been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – Meshblocks are available as complete national coverage, including the Chatham Islands  
56% of respondents report meshblocks as providing a complete national coverage  
*Coverage of NZ's offshore dependencies (Tokelau, Cook Islands etc.) or even the Chatham Islands is deficient*
- Suitable vector topology - Meshblocks are supplied as discrete polygons and aligned with cadastral boundaries  
44% of respondents report meshblocks as being supplied as suitable topography
- Free to access – Meshblocks are available free to access  
88% of respondents report meshblocks as free to access
- Creative Commons CC-BY licensing – Meshblocks are available under CC BY 4.0  
75% of respondents report meshblocks as having acceptable licensing
- Available for download in suitable formats – Meshblocks are available to download in shapefile, mapinfo TAB, CSV, geopackage and Geodatabase formats  
75% of respondents recorded meshblocks as having acceptable download formats

### Current Status

Stats NZ are not currently working on any of the data improvements identified by NZGIS4EM and the wider resilience community.

### Data Improvements

Data improvements, identified by NZGIS4EM and the wider resilience community, which are not currently planned by Stats NZ include:

- Attribute meshblocks with age, ethnic group, religion, gender, deprivation, employment status and income  
100% of respondents recorded attributing meshblocks as important; either extremely important (50%), very important (25%) or moderately important (25%).

*Needs to be easy downloadable dataset (pre-joined to meshblock)*

*As Emergency management practitioners detailed data leads to better risk assessment for communities providing better outcomes across the 4R's*

*Would be great to combine the pop #'s and age distribution with the base table for EM purposes*

- Provide more granular, detailed data than meshblock aggregation, to better inform decision making, such as evacuations

100% of respondents recorded attributing meshblocks as important; either extremely important (75%), very important (12.5%) or moderately important (12.5%).

*As a Defence Geospatial Agency, I want to be able to graphically show where the people are relative to the problem, so that decision makers can appreciate where resources need to be deployed.*

*The current population dataset based on meshblocks is not granular enough to address rural areas in a disaster relief operation. During the response to the Kaikoura earthquake, planners required population information to identify potentially affected households in rural areas. However, the population number based on meshblocks did not allow planners to identify specific areas within those meshblocks where affected populations may have been located. This lack of granularity was a serious limitation in planning support operations.*

*As a GIS Analyst in EOC exercises, I am regularly asked to provide accurate population statistics for a tsunami evacuation area, so we know the number of people that have been advised to evacuate. These lines don't generally align with meshblock boundaries so more granularity would be helpful*

*As a user, we commissioned ID to develop bespoke, bottom up population projects that broadly align with Stats NZ but are more granular and detailed, developed in collaboration with local planners. This provides the level of detail required to achieve our goal of providing a consistent evidence base and forecasts for regional planning. Stats NZ is developed from a top down, national perspective.*

*There are many occurrences of useful data not being supplied at meshblock level due to privacy considerations that are still critical for us as emergency managers*

*It seems the data is collected in the census but not releasable due to privacy concerns. Now that Stats lead the open data initiative, this should change?*

- Publish the updated population count by meshblock, prior to the publication of the full 2018 census

87% of respondents reported that an update of population, prior to the delayed duplication of the full 2018 census is important; either extremely important (25%), very important (37%) or moderately important (25%).

- Publish population estimates for years between now and the next census

87% of respondents reported that providing population estimates between each census is important; either very important (37%) or moderately important (50%).

- Publish meshblock boundaries, with attributes, as an Esri REST service

100% of respondents reported that accessing population data as an Esri REST service is important; either extremely important (14%), very important (57%) or moderately important (29%).

- adequate level of accuracy

22% of respondents reported that population data was provided to an adequate level of accuracy. 45% disagreed, and 33% did not know.

*Don't have confidence in the level of accuracy of the 2018 dataset when it is released*

*I have low confidence in the quality of the data in relation to elderly vulnerable people that are not tech-savvy based on the poor quality experience of my mother-in-law who had to work very hard on the phone to actually be able to take part in the census when her forms never arrived as she has no access to computers.*

- acceptable update programme

22% of respondents reported the update programme for population data was acceptable. 56% disagreed, and 22% did not know.

*We are not confident using the 2013 data to respond to a 2019 emergency, particularly in high growth suburbs.*

*The 2018 meshblock data set is overdue and confidence in its quality is dropping*

*More frequently is necessary. Last year we had to use Census 2013 data, Tauranga's population had exploded since then.*

*Update every 5 years (census) is potentially missing major shifts in population, particularly given the recent housing crisis. Populations appear to be changing demographics quicker than they used to*

- appropriate metadata

33% of respondents reported the metadata for population data was acceptable. 22% disagreed, and 45% did not know.

LINZ review of metadata for meshblocks recommends populating the following fields: 'responsible party' (a contact organisation name and role is mandatory, AS/NZ ISO 19115.1.2015), 'source contact information' (a phone number is mandatory, AS/NZ ISO 19115.1.2015), 'reference system identifier' (a code is required), and 'lineage'.

- discoverable on data.govt.nz

75% of respondents reported the population data was discoverable on data.govt.nz. 12.5% disagreed, and 12.5% did not know.

- ready to respond to an event

37.5% of respondents considered population data to be ready to respond to an event. 37.5% disagreed, and 25% did not know.

*The Census data was not releasable for Kaikoura EQ. We had to use a UK global population dataset.*

- recognised as the national single source of truth

75% of respondents recognised Stats NZ population data as the national single source of truth. 25% disagreed.

*I guess it is the only source of truth but question its accuracy*

*There are two data sources for Wellington Region - ID and Stats NZ, both generally align but needs correct interpretation of differences*

### Additional Data Improvements

- *As an analyst I would really like to see the 2018 census be re-done in 2021 to improve the techniques used to gain the highest quality information possible and to re-align the census years to 5 yearly intervals.*
- *More information about peoples individual circumstances (wheelchair bound, deaf, blind, elderly etc.) would greatly assist with the response.*

### Additional Comments

- *As a GIS professional in an EM-environment, I want easy access to spatial population statistics, so that our staff can make informed decisions about impacted areas for response and recovery purposes. During the April 2017 Edgumbe Flood event, the 2013 meshblock population data was used by EOC staff @WDC to gauge the approximate number of residents evacuated to rapidly assess welfare need, etc. This was great! But, during the Recovery, we required much more detailed statistics about the impacted population, particularly the number of renters in the affected area. Homeowners could be accounted for within our own valuation database, and we were able to get tenancy data from the tenancy services, but we continued to receive intelligence about renters that didn't have submitted agreements with tenancy services.*

## Buildings

Key Dataset: NZ Building Outlines

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/layer/101290-nz-building-outlines/>

Key Dataset Score: August 2018 - 57% June 2019 - 68%

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### Survey Summary

The LINZ Topo Team has made great progress over the last nine months in publishing the NZ Building Outlines as an official dataset rather than a pilot, and attributing buildings with a Building ID. This will clearly be of real value to the respondents.

Building and Address datasets both received the highest number of survey results, which represents how critical these datasets are to resilience and climate change.

Associating an address with a building was identified as the highest priority improvement, however, LINZ will not initiate this work until a more comprehensive national coverage of addresses has been provided.

Assigning a building use attribute is the next highest priority. Being able to differentiate between residential, commercial and other structures is vital during a response. Building use was also identified as a key attribute in the 2016 Building Outline Pilot Survey. In addition, LINZ will research the user requirements and data maintenance involved in capturing building height once national LiDAR data has been captured.

The supply format is also important, with 75% respondents recorded an Esri REST service as being extremely or very important.

The ongoing update programme of buildings will be associated with future aerial imagery updates. LINZ also recognises the importance of updating Buildings directly from Territorial Authorities.

### Priority Improvements

1. Complete national coverage of Building Outlines by June 2020.
2. Assign a specific use to a building, such as hospitals by June 2020.
3. Investigate how to maintain a height attribute and estimate of number of floors by December 2019.
4. Provide NZ Building Outline data as an Esri REST service by June 2020.
5. Share and promote the intended update programme by June 2020.
6. Promote NZ Buildings Outlines as the national source of truth by June 2020.

### Future Improvements

7. Link Buildings to Property Data Management Framework.
8. Associate a building with an address.
9. Link Buildings to District Valuation Roll data.

## Fit for Purpose

NZ Building Outlines have been assessed by NZGIS4EM and the wider user community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Free to access – NZ Building Outlines are available free of charge  
100% of respondents report NZ Building Outlines as being free of charge.
- Creative Commons License (CC BY) – NZ Building Outlines are available under CC BY 4.0.  
100% of respondents report NZ Building Outlines as supplied under Creative Commons.
- Download in multiple formats – NZ Building Outlines is available for download as shapefile, mapinfo TAB, CSV, Geodatabase, KML, DWG and PDF  
78% of respondents report NZ Building Outlines as available in multiple formats.
- Suitable vector topology – NZ Building Outlines are maintained as discrete polygons  
64% of respondents report NZ Building Outlines as suitable topology.
- Discoverable on data.govt.nz – NZ Building Outlines is associated with both the Land and the Resilience Support Data Groups.  
78% of respondents report NZ Building Outlines as discoverable on data.govt.nz.

## Current Status

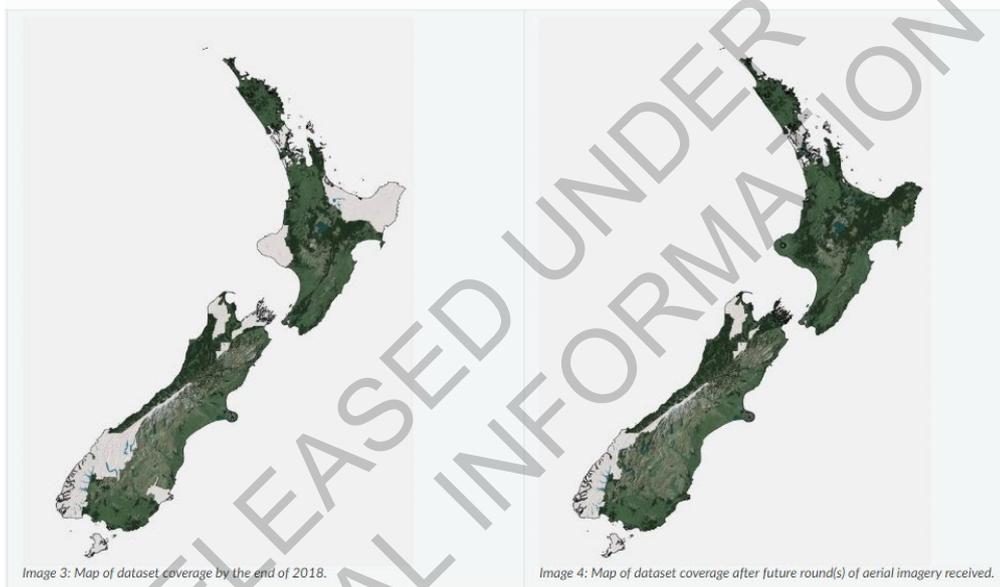
LINZ has been working on the following data improvements identified by NZGIS4EM.

- complete national coverage – ongoing  
2.8 million building outlines have now been captured in the national dataset, which equates to approximately 80% of the population. Complete national coverage of building outlines is planned to be completed by June 2020, based on anticipated aerial imagery updates.

*Would love to have ... greater coverage of NZ*

Regional or Unitary Council	Building Outline Capture Status - May 2019
Environment Canterbury	Completed
Greater Wellington Regional Council	Completed
Hawke's Bay Regional Council	Completed
Horizons Regional Council	Completed
Northland Regional Council	Completed
Waikato Regional Council	Completed
Environment Southland	Completed urban areas – where imagery is available
Tasman District Council	Completed urban areas – where imagery is available

West Coast Regional Council	Completed urban areas – where imagery is available
Bay of Plenty Regional Council	Planned for July 2019
Gisborne District Council	Planned for July 2019
Nelson City Council	Planned for July 2019
Marlborough District Council	Planned for July 2019
Taranaki Regional Council	Planned for July 2019
Otago Regional Council	Completed some urban areas. Dunedin and Otago Lakes planned for June 2020.
Auckland Council	Completed urban areas. Remaining areas planned for December 2020.



- maintaining a persistent, unique ID for each building – completed

The dataset transitioned from pilot status, into an authoritative dataset in May 2019. NZ Building Outlines now includes a Building\_ID as a unique and persistent ID, which can be relied upon to associate buildings with other datasets.

- add Territorial Authority attribute, to enable easy filtering of data for both download and webservice – completed

NZ Building Outlines now includes a Territorial Authority attribute associated with every building outline to enable the data to be filtered.

- adequate level of accuracy – completed

NZ Building Outlines is now an authoritative dataset and is no longer in pilot status. Buildings with an area of 10m<sup>2</sup> or larger are captured from 10cm to 50cm aerial photography.

- acceptable update programme – ongoing

Only 9% of respondents reported the update programme as being acceptable, with 27% stating it is not acceptable and 64% don't know.

*Is there an update programme, has this been communicated to the wider public?*

*Other TA's do have programmes to update their own building outline sets, so really need this coordinated. Plus there needs possibly an archiving mechanism too... i.e. buildings to come and go.*

*Need for a quick and easy way (updating process) for new buildings to be added to the dataset. This is the most important aspect of this project and I hope that it will be addressed.*

*Council's may have better data?*

- appropriate metadata

64% of respondents saw metadata as an issue either not knowing about metadata or reporting the metadata as unacceptable.

*limited metadata, only imagery source. Not sure where this data is sourced from. Is this using rural or urban or both sets.*

LINZ review confirms metadata for NZ Building Outlines meets requirements.

## Data Improvements

Data improvements identified by NZGIS4EM, which are not currently planned by LINZ:

- assign an address to each building

89% of respondents rated associating a building with an address as extremely or very important.

*As an emergency management practitioner critical building attributes are important because they inform us and the public and ensure we have a consistent authoritative address dataset.*

*As an EQC assessor I want to indicate the building assessed and make sure subsequent assessments are on the same building. As a loss modeller I want to identify the buildings affected by natural hazards and link this back to an address or insurance claim.*

- assign a height estimate to each building, and indication of number of floors

56% of respondents rated attributing a building with a height as extremely or very important. The remaining 44% considered height to be moderately important.

*As emergency management practitioners critical building attributes are important because they inform us and the public of identified safe evacuation locations (multi-floor buildings) in low lying areas especially our coastal & flood prone areas - reference MCDEM guidance for vertical evacuation.*

*Emergency perspective: For low lying coastal communities it would be helpful if building attributes included. 1. No of floors in building (potential safe evacuation area in a tsunami)*

*Would love to have number of levels*

- assign a ground slope estimate to assist with Rapid Damage Assessment
- 44% of respondents rated attributing a building with a height as moderately important. Most respondents rated this as slightly or not at all important. No user story was provided to demonstrate the importance of this improvement.
- set attribute standards, for example to record earthquake prone buildings, to enable a consistent national dataset to be built

56% of respondents rated settings standards for building attribution such as earthquake prone buildings as extremely or very important, and a further 33% saw this as moderately important.

*As Emergency management practitioner critical building attributes are important because they inform us and the public about whether they can / cannot withstand a severe earthquake especially during daytime in workplaces, e.g., earthquake prone buildings, and identify 'hot spots' in readiness, and in response where initial resources may need to be deployed and risk reduction measures can be targeted.*

*Emergency perspective: For low lying coastal communities it would be helpful if building attributes included. Building structure. (suitability to either withstand an earthquake and or a Tsunami)*

- publish as an Esri REST service
- 75% of respondents rated providing buildings as an Esri REST service as extremely or very important. No user story was provided to demonstrate the reason for this improvement.

*Needs to be available as a high performing Esri map service.*

*Really need an Esri REST end service, most efficient for us.*

- assign District Valuation Roll attribution to buildings to assist with Rapid Damage Assessment, including building footprint area, structure type and, use and construction age

44% of respondents rated assign District Valuation Roll attribution to buildings as extremely or very important. 44% of respondents rated this as moderately important. Assigning use to a building was stated in several user stories.

*Missing is ...Height, roof type, building material (i.e. link to building consent)*

*Would be really good to be able to differentiate dwellings (residential houses) from other buildings*

*Floor level would be great. And building type. Attributes from the NZ building database that RiskScape uses would be cool.*

*As Emergency management practitioners critical building attributes are important because they inform us and the public to identify what is the type of building use, example hospital for risk assessment - identify the building age and number of dwellings within an address, e.g. apartments/flats for risk assessment & response.*

*As a responder to an event in the rural area affecting farming community (say flooding), we want to identify structures on a farm, including purpose, to assess impact of the event and support that needs to be provided.*

*As a GIS analyst I have been given data to record from team on the ground, I want to record and identify the actual building that needs to be demolished and*

*be able to give accurate statistics on properties that have damaged/demolished buildings i.e. all buildings damaged/demolished vs 1 of (garage vs main dwelling / one of several school buildings etc), so that I can give the Controller a better view of the situation to make better informed decisions.*

*Additional improvement to be able to differentiate between building use/type (residential buildings, commercial/industrial buildings, sheds, garages etc.)*

*Additional improvement to assign Building age and type, for risk assessments, and to assist manage a response to event.*

#### Additional Data Improvements

- *Tie this into the PDMF, but I would start with the improvements identified first.*
- *Assign number of dwellings per building for risk assessments, and to assist manage a response to event.*

#### Additional Comments

- *Are these building outlines being related back to the core property framework? aka PDMF? Really need the data linked / related to other property datasets first, but start with the improvements identified first*
- *Attributes would elevate the data to another level of usefulness*
- *Attributes would help make this data event ready*
- *This dataset will be crucial for assessing natural hazard consequences and risk assessment.*
- *It is a very useful layer for uses other than emergency management*

## Address

Key Dataset: NZ Street Address

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/layer/53353-nz-street-address/>

Key Dataset Score: August 2018 - 69%

June 2019 - 69%

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### Survey Summary

The key issue for addressing in terms of resilience, is the lack of a national source of truth. Different emergency management agencies use different, and therefore inconsistent, sources for an address. NZ Street Address could become the national source of truth for resilience if LINZ were able to deliver on the improvement priorities.

NZ Street Address was originally recorded as having an acceptable update programme, given it was updated weekly. The score has been reduced to reflect survey feedback and user stories consistently raising the issue of including all in use addresses, with a focus on improving addressing in rural areas. As an example, in the Marlborough Sounds a coordinate is used instead of an address to identify a property during an event.

It is recommended that LINZ work with Councils to align update formats and timing, given this was such an important contribution to the national dataset.

Another clear message is that respondents are looking to LINZ to standardise the location of an address point on a building, and to associate an address with a building. Another data requirement which is critical during an emergency event.

Building a national geolocator service by combining Address, Points of Interest, Towns & Suburbs was a requirement of the majority of respondents, which also ties in with the low score of NZ Street Address being ready to respond to an event.

Publishing NZ Street Address as an Esri REST service was identified as important for most respondents, with feedback noting that organisations are currently having to republish LINZ data, which is inefficient and costly.

### Priority Improvements

1. Provide a more comprehensive national coverage of addresses by June 2021.
2. Work with Councils to improve the accuracy of address data, including in rural areas by June 2020.
3. Standardise the address point location against a building, where possible, by June 2020.
4. Publish NZ Street Address as an Esri REST service by June 2020.

### Future Improvements

5. Associate an address with a building.
6. Add Territorial Council attribute to NZ Street Address.
7. Build a national geolocator service by combining NZ Street Address, Points of Interest, Towns & Suburbs.

## Fit for Purpose

NZ Street Address has been assessed by NZGIS4EM and the wider user community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Free to access – NZ Street Address are available free of charge.  
85% of respondents report NZ Street Address as being available free of charge.
- Creative Commons License (CC BY) – NZ Street Address are available under CC BY 4.0.  
85% of respondents report NZ Street Address supplied under Creative Commons.
- Download in multiple formats – NZ Street Address is available for download as shapefile, mapinfo TAB, CSV, Geodatabase, KML, DWG and PDF formats.  
77% of respondents report NZ Street Address as supplied in suitable download formats.
- Suitable vector topology – NZ Street Address is maintained as point features.  
54% of respondents report NZ Street Address as being suitable topology.
- Appropriate metadata – LINZ review confirms metadata for NZ Street Address meets requirements.  
61% of respondents report NZ Street Address as providing appropriate metadata.
- Discoverable on data.govt.nz - NZ Street Address is associated with both the Land and the Resilience Support Data Groups.  
69% of respondents report NZ Street Address as discoverable on data.govt.nz.

## Current Status

LINZ has been working on the following data improvements identified by NZGIS4EM.

- Assigning a persistent, unique ID to each address – completed.  
The existing attribute address\_id is maintained as a persistent, unique ID in NZ Street Address.
- Adding unallocated addresses to ensure a more comprehensive national coverage  
Only 31% of respondents scored the NZ Street Address as maintained at an adequate level of accuracy. The comments consistently raised issues about poor addressing in rural areas, in addition to the including all in use or unallocated addresses.

*Dataset incomplete, particularly for flats, granny flats, farm cottages etc.*

*I would like to stop my organisation from needing to use postcode as a proxy for address when a client does not have an address ID. As a GIS analyst at MSD, I have thousands of unallocated addresses either because these are not found in my organisation's Central Address Database (in some cases too new as we only update quarterly), or sometimes a user types an incorrect address or a client-defined address and these do not get an address\_ID (and easting and northing) attached. I WANT to be able to quickly geocode these addresses at low or no cost SO THAT I can more accurately report by an administrative area AND so that*

*when I am using a user-defined selection tool, I get all clients in an area not just those with an address ID.*

*LINZ address data points are allocated addresses only I believe. Also require physical addresses and need to know whether address is in use or not.*

*As a natural hazard advisor to districts, I want to be able to locate the address that we are commenting on so that we can give the correct information for the land development assessment to reduce risk.*

#### Rural Addressing Comments

*As a Local Government user and Emergency response user I want address points that are accurate and up to date, particularly in the remote areas so that we are sure to get the right property/address/owner .*

*For risk reduction assessments for our region, and the ability to locate the correct property we would like to see the improvement of rural property information by including all road numbers/RAPID numbers in the property information.*

*Missing addresses, particularly in remote areas*

*Occasionally the numbers are not correct – particularly for rural properties*

*A number of rural postal addresses are missing their road/RAPID numbers and there is an obvious disconnect with the rateable information and LINZ property information.*

*Postal addresses could be improved for the rural addresses so it's easier to find properties for land development assessments (for risk reduction purposes) e.g. often rural properties don't have the postal numbers for roads. Many rural address numbers are missing.*

#### Data Improvements

Data improvements identified by NZGIS4EM, which are not currently planned by LINZ:

- Standardise the location of the address point

*91% of respondents reported standardising the location of address point as either extremely or very important, with 54% reporting this improvement as extremely important.*

*Accuracy in rural areas - often it appears parcel centroid is used, at least in our address dataset (CoreLogic). This has led to some unintended consequences (client addresses falling outside a 'zone', like Accommodation Supplement, and not being eligible for payment*

*Not based on physical locations (I.e. gate point)*

*I think there should be guidelines for location of the address point relating to the access way and building itself - sometime we need flexibility between the two*

*Not sure what you mean by standardised address locations. Address locations should reflect actual physical location (not standardised as say middle of the boundary and 5m in from the parcel). Actual gate or access location is especially important with the (often) large rural properties)*

- Associate an address with the relevant buildings

100% of respondents recorded associating a building with an address as important, with 50% of respondents reported this as extremely important

*As a building inspector, I want to accurately identify and assess building's (and levels) by address/location so that I can direct emergency services to the correct building at an address and so that all buildings are assessed and no assessments are missed.*

*As a responder to an event affecting a farm we need (we want) to have unambiguous address locations, so that we can direct staff and resources to the right location.*

*Limited experience with this data set but would be ideal if address points could be correlated with the actual building footprint data set and also with building (land) use, such as commercial, industrial, farm, residential, school, hospital, etc.*

*As an Intelligence Manager for a short period during the Nelson Tasman fires we found it quite tricky to follow the addressing system on the Tasman GIS system in terms of including/excluding properties for evacuation. The road naming and numbering conventions in Redwood Valley were particularly tricky to follow when trying to create cordon lists (too many similar road names and a numbering system that confused many). Making sure that a street/road number was properly associated with all land parcels related to it was important.*

*Street address can sometimes be located off main dwellings, ideally for EQC the address would be located on the building*

*Location of address points needs to be more specific to the building it relates to - in most cases the address point is close the property boundary*

- OGC and Esri webservice

70% of respondents reported publishing NZ Street Address as an Esri REST service as either extremely or very important, with 10% considering this improvement to be not at all important. Note earlier in the questionnaire, 69% of respondents had recorded the current service provision as acceptable.

*Current service is slow to access*

*Needs to be available as high performing Esri REST Service*

*Yes, it is available, but to provide this within the business we extract a copy and make our own webservice to serve in ArcGIS*

- Add Territorial Council attribute to enable the easy filtering of data for both download and webservice

64% of respondents recorded a Territorial Council attribute as either extremely or very important

- Build a national geolocator service by combining Address, Points of Interest, Towns & Suburbs

82% of respondents reported a national geolocator as either extremely or very important.

*As Emergency management practitioners it is important to build a national geolocator service so that we can avoid the differences & difficulties between adhoc services*

- ready to respond to an event

46% of respondents reported NZ Street Address as being ready to respond to an event

*I'm not an expert in this other than we have been asked to ensure that we are using the same addressing dataset as other emergency services which appears as if it is going to cost us tens of thousands a year. Surely the addressing data set used by emergency services should be under a creative commons licensing and supplied by LINZ. I'm not sure why they are using a private provider, and what the difference between that dataset is and the one you provide. Sorry to sound so vague on this.*

*EQC has traditionally gone with Corelogic, which comes at a significant cost. The problem with this is EQC then does not use the same address system as local govt, insurers, banks and other entities. EQC cannot share the CoreLogic data, so ideally having a nationally provided address data set that has a geolocation api, property attributes and level of confidence would allow better integration from EQC to govt and other organisations.*

- recognised as the national single source of truth

61% of respondents reported that the NZ Street Address was not considered the national single source of truth

*It obviously isn't the national source of truth for emergency management if FENZ and Police are using a different data set*

*What is the national source of truth? Is it CoreLogic? Is it LINZ? Is it someone else? In an ideal world we would have one authoritative dataset*

*EQC has many issues with addressing during the Canterbury Earthquakes in 2010-2011, this continued during the Kaikoura event in 2016 and has a real cost to efficiency and integration between those working in the recovery space of emergency management. EQC would benefit greatly from having the same national address system as Fire, Police, CDEM, Private Insurer, Recovery agencies (like CERA, National Recovery Office), NGOs and local government. Associating the address with buildings and combining local government information with LINZ data would be a big step for to gain the trust of organisations like EQC to use a single national address source. Another issue for EQC is areas like Marlborough Sounds, which do not have street addresses in some remote areas. Customers often use coordinates instead of an address to help EQC find properties and locate places requiring assessment.*

- acceptable update programme – NZ Street Address is available as weekly updates from LINZ Data Service

Only 38% of respondents recorded the update programme as acceptable.

*LINZ update is great, but update from Councils to LINZ is too random*

*Dependent on councils providing updates in a timely fashion. New subdivisions often not added for a while*

*Not for us - currently WDC send address changes via PDF. If we provided you with a spatial dataset some of the accuracy issues I raised above would not exist.*

*I am not sure if it is data limitations as much as the way multiple disparate address datasets (and coordinate systems) are being used across central government. Lack of consistency makes sharing data more challenging*

*I think it should be made a higher priority for Councils to manage and maintain their address database in order to update LINZ more reliably*

#### Additional Data Improvements

- *Attribute to indicate if dwelling exists at the address or if it is unoccupied land.*
- *Attribute to indicate deliverable address vs non deliverable address (eg, post box).*
- *Attribute as Urban or Rural addresses to enable rural addresses to be labeled at a smaller scale*
- *Attribute natural hazards with an address e.g. tsunami evacuation zone*

#### Additional Comments

No additional comments

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## Suburbs

Key Dataset: NZ Localities / Suburbs

Lead Agency: Fire and Emergency New Zealand (Fire and Emergency)

Data Source: Email Fire and Emergency to request a copy of the data  
[dsi-support@fireandemergency.nz](mailto:dsi-support@fireandemergency.nz)

Key Dataset Score: August 2018 - 42% June 2019 - 38%

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### Survey Summary

NZ Localities / Suburbs (Suburbs) has been identified as one of the datasets least fit for purpose for resilience and climate change. This is mainly due to the licensing restrictions required to access Suburbs, and the fact the data is not readily available as a webservice.

The original assessment for Suburbs recorded the quarterly update programme as being acceptable, however the survey response records the update programme as having limitations. Associated with this, is frustration about the perceived inability to influence the Suburbs update process with suggested feedback and uptake of official naming conventions.

Suburbs could be improved by replacing the current licensing process, and instead publish Suburbs as an Esri REST and OGC WFS service under a Creative Commons license. This would help ensure the data is widely available in multiple formats, including additional download formats.

Improving the attribution of Suburbs would also be beneficial in terms of simplifying the attribution, associating a suburb with the relevant Territorial Authority and, ideally, assigning population counts to each suburb.

### Priority Improvements

1. Fire and Emergency New Zealand understands the importance of the suburbs dataset and is working with LINZ to establish options regarding the dataset.

### Future Improvements

2. Supply Suburbs under Creative Commons CC-BY 4 licensing.
3. Publish Suburbs as both an Esri REST and OGC WFS service.
4. Publish Suburbs on data.govt.nz to ensure the data is discoverable.
5. Update metadata to include geographic extent and purpose.
6. Facilitate external agencies to provide feedback on preferred boundaries and naming of suburbs.
7. Review the attribution of Suburbs to simplify the existing information and add Territorial Authority as an attribute.
8. Ensure Suburbs are associated with official naming conventions.
9. Add population count attribute to each suburb.

## Fit for Purpose

NZ Localities / Suburbs (Suburbs) has been assessed by NZGIS4EM and the wider user community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – national coverage exists for suburbs.  
100% of respondents report Suburbs as providing complete national coverage.
- Adequate level of accuracy – boundaries between suburbs are aligned with cadastral boundaries in urban areas.  
67% of respondents report Suburbs as being an adequate level of accuracy.
- Free to access – Suburbs data is available free of charge.  
25% of respondents report Suburbs as available free of charge.

*The time, cost and effort involved per person/agency to obtain access from FENZ is an issue.*

- Appropriate metadata – metadata for suburbs is supplied as part of the shapefile.  
33% of respondents report Suburbs as having appropriate metadata.  
  
LINZ review of metadata for suburbs recommends populating the following fields: 'geographic extent', and 'purpose'.

## Current Status

Fire and Emergency is already aware of the following data improvements identified by NZGIS4EM and the wider user community.

- Supplying the data under Creative Commons licensing – ongoing  
  
Not supplying Suburbs under Creative Commons licensing is identified as a data limitation by 80% of the respondents.  
  
*The number of hoops to jump through to access the data was ridiculous*
- Supplying the data in multiple formats for download– ongoing  
  
The format for supplying Suburbs data is identified as a data limitation by 50% of the respondents. It is acceptable for 25% and 25% don't know.  
  
*Not sure what formats are available, we receive a shapefile, accessed via dropbox*  
*Limited number of formats and proprietary*  
*No means to download and update in a crisis*
- Supplying the data as both an Esri REST service and OGC Web Feature Service – ongoing  
  
Not publishing Suburbs data as a service is identified as a data limitation by 67% of the respondents. 33% don't know.

*Limitations could be avoided by the availability of the data as a service*

- Simplifying the attribution – ongoing

The current attribution of Suburbs data is identified as acceptable by 50% of the respondents. 25% report the attribution as a data limitation and 25% don't know.

*There are a lot of attributes, with limited metadata as to how best use them. I appear to need to use at least three fields to correctly define boundaries.*

*It is FENZ's view of the world*

- Adding Territorial Council attribute to enable the easy filtering of data for both download and webservice – ongoing
- Publishing Suburbs on data.govt.nz – ongoing

*If the data gets opened up, then this should be a given*

## Data Improvements

Data improvements assessed by NZGIS4EM were:

- Remove lakes, and maintain as a separate lakes dataset

Is not considered important, particularly when compared to the issues Fire and Emergency is already aware of. 20% rate it as slightly important and 80% as not at all important.

*As an EQC user, lakes are not an issue as I would only want to use locality to report on information at a level that is understandable*

- Acceptable update programme – suburbs are updated quarterly

Quarterly updates were originally identified by Fire and Emergency as being acceptable. 33% of respondents report the update programme as a data limitation and 67% don't know.

*Update programme is unclear*

*Requesting changes to improve/correct Suburbs boundaries is a nightmare. A process needs to be implemented to allow users to assist with improving the integrity of this data.*

*As a Council employee, I want to have the ability to provide constructive input regarding Suburbs, so that the dataset can be on benefit to a wide variety of users*

- National source of truth

50% of respondents identify Suburbs as the national source of truth. 25% report a data limitation and 25% don't know.

*As it is the ONLY available suburb like dataset and has been accepted in use for decades, and used for the 111 system*

- Ready to respond to an event

100% of respondents reported not knowing if Suburbs is ready to respond to an event.

*No - as there is a license agreement and no means to download and update in a crisis*

- Population attribute

Two respondents requested suburbs to be attributed with the population count.

*Assigning populations for suburbs would be good to have, but the license agreement restricts this.*

*Populations for suburbs would be good to have, but the licence agreement restricts this*

## Additional Data Improvements

Additional data improvements identified by the survey respondents include:

- Standardisation

Two respondents identified the need to improve suburbs by standardising the data to improve addressing and provided multiple examples to demonstrate the importance of this improvement. Standardisation could be achieved by aligning the suburbs with official and in use place names and putting in place a process to enable external agencies to suggest boundary and naming improvements.

Fire and Emergency notes New Zealand Localities Dataset is maintained principally for its own operational purposes. Fire and Emergency uses NZ Localities to mitigate the risk that emergency responses are despatched to inaccurate locations (and the consequent delay in that response arriving at the location that it is required).

Fire and Emergency also notes, to the extent possible, the locality names and boundaries recorded in NZ Localities are supplied by relevant Territorial Authorities. Where that is not possible, Fire and Emergency determines the boundaries and names of localities in accordance with principles that best mitigate the risk of emergency services being inaccurately deployed. These include the following:

- a. Where the [New Zealand Geographic Board](#) (the national authority for naming geographic features and places in New Zealand) has determined official place names, those official place names should be reflected in NZ Localities.
- b. Locality boundaries should reflect the most direct road access to a property for emergency services.
- c. Locality boundaries should not cross or bisect property boundaries.
- d. Locality boundaries should not cross or bisect roads, except when a road, such as a state highway, clearly traverses a number of localities (in those cases, locality boundaries should bisect roads at appropriate intersections or bridges).
- e. Properties on both sides of a road should fall within the same locality boundary.

Alternate locality names (or name spellings), should map to the single locality name that has been determined.

*Suburbs are an extremely important component of addressing and need to be standardised (singing from the same songsheet for NZ'ders, for the NZ data ecosystem) - so that mail can be delivered, so that a census can be run, so that social surveys can be delivered, so that services are provided to the right communities, so that data can be provided accurately at the neighbourhood level (reflecting whats happening on the ground) – standardisation is key, less duplication and a clear maintenance approach -alignment with the gazetted place names and historical place names (includes official/in use relationship maintained)*

*I have asked about creating additional Suburbs but have not received any feedback. As an example, I wanted to know if "Waimea West" could be created as a new definition, rather than "Brightwater" becoming "Redwood Valley". "Ruby Bay Bypass" has created a bit of a headache, with Suburbs crossing back and forth across the State Highway. I documented that Mapua/Ruby Bay/Tasman should stay on the seaward side of The Coastal Highway, and Upper Moutere/Mahana should stay of the inland side of The Coastal Highway, but this has fallen on deaf ears!!*

*It was concerning that this dataset became the authoritative, without any notification to Local Authorities. We stumbled across the change when I was asked why Quail Valley Road had three (3) location descriptions. On contacting LINZ, I was told that they had adopted Suburbs and updated all road centreline and address point data accordingly - thanks for the heads-up, not.*

*Suburbs aren't standard. Maybe we should at least formalise whose version of suburbs we use. Then a data user could say, this is the street address, its NZ Post suburb is AAAA, its Fire Service suburb is AAAA too but its Google suburb is BBBB*

## Property

Key Dataset: NZ Parcels

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/layer/51571-nz-parcels/>

Key Dataset Score: August 2018 - 77% June 2019 - 77%

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### Survey Summary

The number of survey responses identify property as an important dataset for resilience. The highest value LINZ could deliver is to provide parcels associated with relevant attribution without having to process multiple table joins. Similar attribution for State Land was also identified as a key improvement. LINZ notes access to owner name requires the sign up to the LINZ Licence for Personal Data due to privacy restrictions.

The next most important improvement is to create and maintain property boundaries, which combines the relevant parcels into a single property. Feedback was provided on how much time this would save, and it was recognised as the first step in associating property, address and buildings. Being able to accurately identify properties is significant particularly during an emergency response to ensure all properties are evacuated.

Providing property information as an Esri REST service was also key improvement, as the current web feature service has been identified by respondents as too slow.

Future improvements include recording multiple landowners, linking property to the District Valuation Roll, linking a property to an address and buildings, and expanding attribution to including Territorial Authority and properties with natural hazards.

In addition to the improvements, the respondents also recorded dissatisfaction with the current data in terms of accuracy and topology. Only 50% of respondents recorded the accuracy and topology of NZ Parcels to be adequate, citing issues with intersecting and missing parcels, and the accuracy around rivers particularly in rural areas.

### Improvements

1. Improve access to parcel attribution by June 2020.
2. Supply parcels as an Esri REST service by June 2020.
3. Investigate the feasibility of creating a property boundary layer by June 2021.

### Future Improvements

4. Provide property attribution for State Land.
5. Enable multiple landowners to be associated with a property.
6. Associate a property with the District Valuation Roll audit file information.
7. Associate property with the relevant building and address.
8. Identify properties where Section 72 of Building Act has been applied to identify potential natural hazard on a property
9. Add Territorial Council attribute to enable filtering of data.

## Fit for Purpose

NZ Parcels has been assessed by NZGIS4EM and the wider user community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – national coverage of NZ Parcels is available, including the Chatham Islands.  
80% of respondents report NZ Parcels as providing a complete national coverage.
- Acceptable update programme – NZ Parcels are updated weekly on LINZ Data Service.  
50% of respondents report NZ Parcels having an acceptable update programme.
- Free to access – NZ Parcels are available free of charge.  
89% of respondents report NZ Parcels as being available free of charge.
- Creative Commons License (CC BY) – NZ Parcels are available under CC BY 4.0.  
88% of respondents report NZ Parcels supplied as Creative Commons licensing.
- Download in multiple formats – NZ Parcels are available for download as shapefile, MapInfo TAB, CSV, Geodatabase, KML, DWG and PDF formats.  
78% of respondents report NZ Parcels available in suitable download formats.
- Appropriate metadata – LINZ review confirms metadata for NZ Parcels meets requirements.  
70% of respondents report NZ Parcels having appropriate metadata.
- Discoverable on data.govt.nz – NZ Parcels are associated with both the Land and the Resilience Support Data Groups.  
56% of respondents report NZ Parcels as being discoverable on data.govt.nz.
- Recognised as the national single source of truth – maintaining the New Zealand cadastre including property location, boundary dimensions and area, plus land ownership and property rights has been the primary, legislation function of LINZ and its predecessors for over 100 years.  
67% of respondents report NZ Parcels as being the national single source of truth.

## Current Status

LINZ are not currently working on any of the data improvements identified by NZGIS4EM.

## Data Improvements

Data improvements identified by NZGIS4EM, which are not currently planned by LINZ:

- Create property boundaries by combining the relevant parcels  
88% of respondents reported creating property boundaries as important; 25% extremely important, 50% as very important, and 13% as moderately important.

*As a responder for a biosecurity event, we want to identify farms (based on property data) so that we can identify responsible land owners and affected farmers.*

*One of the issues that we have as a Regional Council is that we rely on the local TA's to supply a Valuation NZ ID - Parcel ID match so that we can then join our Ratepayers to the Parcel layer. If this match could be maintained nationally it would save us a lot of work and time. We have had this data from Core Logic in the past but the accuracy was not as good as from our local TA's.*

*As a Regional Council GIS staff member, having the Valuation number included in the property data set would save me a lot of time as this currently has to be compiled from various formats from our TLA's who have kindly agreed to share it with us.*

*Important is the integration with other data. The property data framework is important to provide the links.*

*Limited links from parcel to property to address and so on.*

*As a Council we need more of a 'whole property' type dataset*

- Extend attribution in NZ Parcels to include Land Owner, Purpose, Legality, Statute (for non-titled properties), Statutory Name, Maori Name and Hydro Name.

*100% of respondents reported extending the attribution of NZ Parcels as important; 67% extremely important and 33% as very important.*

*As a GIS Analyst, I want improved off the shelf data available, so that it easier/faster to access current data and have the ability to filter levels of ownership eg: Maori/Iwi land holdings, Conservation and other government land without having to join multiple tables.*

*Need to have one general set that has the main title, owner, parcel ID these are key fields for property information*

*As Emergency management practitioners see value in having the additional data associated with items like landowner, or Section 72 notices available during events*

*An easy property layer where it includes the more relevant fields. We have to make ours from a few different sources*

*Splitting appellation Lot No and DP No.s*

*Possibly too many unnecessary attributes*

- Enable multiple landowners to be associated with a property

*88% of respondents reported enabling multiple landowners to be associated with a property as important; 25% extremely important, 38% as very important, and 25% as moderately important.*

*As a general user as well as Emergency management user, I want to see complete information about each property so that owners / occupiers can be identified easily, particularly where there are multiple occupiers of a property. The side benefit as a Local Council user would mean property and valuation of the same would be linked which would save hours and hours of work.*

*Lack of ownership*

- Associate a property with the District Valuation Roll audit files to pre-populate property Rapid Assessments

88% of respondents consider associating a property with the District Valuation Roll audit files as important; 33% extremely important, 33% as very important, and 22% as moderately important. No user story or commentary was provided to demonstrate the importance of this improvement.

- Associate buildings with the relevant property

100% of respondents reported creating property boundaries as important; 30% extremely important, 30% as very important, and 40% as moderately important.

*Not that familiar with this data set but property correlations with address points and land use (residential/commercial/industrial/school/hospital/farm/etc) and building footprints is important*

- Identify properties with Section 72 of Building Act issued, where building work will create or make worse a natural hazard on a property

88% of respondents reported identifying properties which have been issued with Section 72 of the Building Act as important; 11% extremely important, 33% as very important, and 44% as moderately important.

*As Emergency management practitioners see value in having the additional data associated with items like landowner, or Section 72 notices available during events*

- Publish data as an Esri REST service

88% of respondents identified an Esri REST service as important; 25% extremely important, 50% as very important, and 13% as moderately important.

*Slow to access*

*Whilst not tested. Performance may be an issue*

*Needs to be available as a high performing Esri map service.*

- Add Territorial Council attribute to enable filtering of data for both download and webservice.

- 88% of respondents identified having a Territorial Authority attribute as important; 22% extremely important, 22% as very important, and 44% as moderately important. No user story or commentary was provided to demonstrate the importance of this improvement.

- Ensure all parcels, particularly on State Land, are fully attributed.

88% of respondents reported full attributes on all parcels, particularly on State Land as important; 44% extremely important, 33% as very important, and 11% as moderately important. No user story or commentary was provided to demonstrate the importance of this improvement.

- Adequate level of accuracy – NZ Parcels have a nominal accuracy of 0.1-1m in urban areas and 1-100m in rural areas. This was originally assessed as adequate. However only 50% of respondents reported the accuracy of NZ Parcels of be adequate.

*We have issues around rivers that have changed overtime, particularly in rural areas*

- Suitable vector topology – NZ Parcels is maintained as polygon features was originally assessed as adequate

However, only 50% of respondents reported the topology of NZ Parcels of be adequate.

*We have issues with intersecting polygons and missing parcels*

#### Additional Data Improvements

No additional data improvements were suggested by the respondents.

#### Additional Comments

No additional data comments were provided by the respondents.

RELEASED UNDER  
THE OFFICIAL INFORMATION ACT

# Transport

## Roads

Key Dataset:	National Road Centreline
Lead Agency:	New Zealand Transport Agency (NZTA)
Data Source:	NZ Transport Agency Open Data Portal
	<a href="https://opendata-nzta.opendata.arcgis.com/datasets/national-road-centreline">https://opendata-nzta.opendata.arcgis.com/datasets/national-road-centreline</a>

Key Dataset Score: August 2018 - 42% June 2019 - 38%

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### Survey Summary

The National Road Centreline dataset (Roads) has been identified as one of the datasets least fit for purpose for resilience and climate change. This is mainly due to the lack of national consistency, plus licensing restrictions imposed on access to road attributes. Roads is the lowest scoring dataset in terms of providing a national source of truth, and the biggest issues relate to attribution and accuracy limitations from any one source.

This means the roads dataset provides one of the biggest opportunities to make a real improvement to contribute to resilience and climate change. The survey identifies creating a combined road closure network webservice, to show the status of both State Highways and local roads, as providing the highest value improvement. This would build on NZTA's existing work, as Roads is the only key dataset identified as being prepared for an emergency event, with the existing webservice of closed state highways.

A national routable road network, with relevant attribution, supplied under Creative Commons licensing is required. Attribution requirements include identifying roads suitable for heavy goods vehicles, road state, level of service, traffic volume, road classification, road hierarchy, speed, restrictions and address.

NZTA has started making attribution improvements, with the National Speed Limit Register which is currently being developed.

### Priority Improvements

1. NZTA understands the importance of providing easy access to road closure data, but currently is unable to commit to an improvement plan.

### Future Improvements

2. Work with Road Controlling Authorities to create a combined view of road network closures, to show the status of both State Highways and local roads.
3. Adopt the NZGIS4EM emergency management symbology standard.
4. Update metadata to include contact information, geographic extent, coordinate system, spatial representation and collection method and include metadata as part of the data supply.
5. Supply the National Speed Limit Register as a webservice under Creative Commons licensing.
6. Publish NZTA roads data on data.govt.nz.

7. Supply a national routable road network, with relevant attribution, as a webservice under Creative Commons licensing.

### Fit for Purpose

The National Road Centreline (Roads) has been assessed by NZGIS4EM and the wider user community against agreed criteria, and is considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – the National Road Centreline is available as complete national coverage including the Chatham Islands

42% of respondents report Roads as providing a complete national coverage

The centreline geometry has complete national coverage, although there are some gaps in the attributes as 7 Road Controlling Authorities have not yet granted permission to include their information in the national dataset.

- Adequate level of accuracy – the National Road Centreline is captured at an accuracy which NZTA considers is fit for purpose. The data is sourced from multiple sources over time, and therefore difficult to accurately determine the accuracy.

33% of respondents report the accuracy of Roads data as being acceptable

*Some rural roads are very inaccurate*

*RAMM geometry is road sections which are approximations of true road boundary, but attribution is good. LINZ RCL has limited (if any) attribution*

- Acceptable update programme – the public version of the National Road Centreline is updated monthly

33% of respondents report the update programme for Roads as being acceptable

- Free to access – the National Road Centreline data is available free of charge

42% of respondents report Roads as being free to access

*LINZ is free. RAMM is not free - and requires Council permission to access.*

The dataset score for Roads has been reduced to account for this feedback.

### Current Status

NZTA has been working on the following data improvements identified by NZGIS4EM.

- Provide Road Controlling Authority attribute, to enable filtering once the data has been downloaded – completed

A Road Controlling Authority is attributed to each Road.

- Supply road data in additional download formats, including KML – completed

The National Road Centreline can be downloaded from the NZTA Open data portal in the following formats: Spreadsheet, KML, Shapefile, File Geodatabase, GeoService and GeoJSON

70% of respondents recorded formats for download as acceptable.

*Roading datasets can be accessed by usual GIS software*

- Making road attribution available for the whole country, and from all Road Controlling Authorities – ongoing

NZTA are continuing to work with Road Controlling Authorities (RCAs) to provide complete national attribution by December 2019. There are seven remaining RCAs who have not yet granted approval to access their information from the national dataset: Ashburton, Christchurch, Dunedin, Hutt City, Taupo, Waimakariri and Waitaki.

17% of respondents recorded the attribution of Roads as acceptable.

*Incomplete for all RCA's and fields*

*Missing attribute data*

*Centrelines cant be used, data incomplete.*

*Centreline information available but traffic/routable speed/speed limit not widely accessible.*

- Supply metadata as part of the road data download – ongoing

NZTA are aware that the download of the National Road Centreline does not currently contain metadata and are working to supply this by June 2020.

33% of respondents reported metadata as acceptable for Roads

- Publish road data on data.govt.nz – ongoing

NZTA are aware of this limitation and agree it would make the roads data easier to find. Roads data will be published on data.govt.nz by June 2020.

## **Data Improvements**

Data improvements identified by NZGIS4EM, which are not currently planned by NZTA:

- Attribute which roads are suitable for heavy vehicles

100% of respondents recorded as a heavy vehicle attribute as important; 20% extremely important, 70% very important and 10% moderately important.

- Provide access to a national routable road network

90% of respondents recorded a national routable road network as important; 46% extremely important, 36% very important, 9% as moderately and 9% slightly important

*This depends on the use case but navigation is not supported by either dataset - this is important for recovery efforts.*

*Routable network that is a national standard network that all organisations can consistently use.*

- Make data available under Creative Commons license

82% of respondents reported Creative Commons licensing for Roads as important; 46% extremely important, 27% very important and 9% as moderately important.

- Publish roads data as an Esri REST service

70% of respondents reported publishing Roads as an Esri REST service as important; 30% extremely important, 10% very important and 30% as moderately important.

- Publish roads data as an OGC Web Feature Service

90% of respondents reported publishing Roads as an OGS WFS service as important; 10% extremely important, 50% very important and 30% as moderately important.

- Review symbology in State Highway closure webservice, to be consistent with NZGIS4EM standards. For example, display most significant issue in red not black

70% of respondents reported reviewing symbology for State Highway closure webservice as important; 60% very important and 10% as moderately important.

- Create a combined road network closure webservice, to show the status of both State Highways and local roads

91% of respondents reported a combined road network closure webservice as important; 55% extremely important, 27% very important and 9% as moderately important.

*As a GIS user, I want to provide accurate maps that emergency responders can rely on, with correct names, attributes and alignment over aerial photos, so that they have confidence in the data to make the best decision when time is of the essence and lives are at stake.*

*As Emergency management practitioners to be able to quickly map road closures in an EOC/ECC and available to the public in an emergency is essential.*

*There are significant discrepancies between RAMM and NZTA. Can we please have one National Dataset? This causes major issues at times with people getting different info from different sources*

*Simply don't know which is the national source of truth - this is a problem. It is assumed that LINZ dataset is authoritative.*

*There needs to be a discussion about the importance of an authoritative national road dataset that has the topology to support navigation. Say you have a fire, flood or earthquake - how do you know what roads are open, closed, closed in one direction only etc?*

*As a Council worker I want road network closure webservice to inform our ratepayers and inform decision making in an event without having to open different viewers.*

NZTA are aware of this as being a high priority in various scenarios, and have started researching how this may be achieved, including stakeholder engagement.

#### Additional Data Improvements

- Additional road attribution was suggested, including:

*Road state, Level of service, traffic volume, road classification, road hierarchy*

*For cartography purposes, it would be nice to display the roads dataset based on some sort of hierarchy or ADT. That would enable a different symbology to be applied for roads of higher significance compared to local roads.*

*Traffic data/speed attributes*

*No mention of impedance, i.e. widths, overhead, restrictions, seal type*

*aligned to the centre of the roads names that are not ALL IN CAPITALS a field that can be used for width in software. one way etc*

*Routable speed/speed limit/traffic data attributes*

*It would be good to differentiate Paper roads*

*Addressing is an issue for both roading datasets - there's poor linkage between geometry in these datasets and the addresses adjacent to the network. Consistency (or lack) of metadata standard across the RAMM dataset is problematic as we can't take a systems approach and assume the data can be readily federated across council regions. We understand that NZTA are working on metadata standards for roading.*

*I want to ensure that the roads network includes walking access and shortcuts, showing stairs or other potential limitations so that these routes can be cleared rapidly in emergencies, not only routes for motorised traffic which may take longer.*

*I also want to see data about pedestrian access shared with GoogleMaps as this is not currently complete. For example, the motorway footpaths from Thorndon Quay to Parliament are not on googlemaps whereas they would be really useful for civil servants and politicians of roads became impassable.*

*As a data scientist, I want to create disaster scenarios pre-emptively so that when a real emergency occurs, the correct plans and procedures and systems are already in place*

*I'm not certain whether this is within scope but the actual mode use data used for traffic priority is sadly lacking. There is an international standard for measuring walking on Walk21.com which is comprehensive for age and purpose of user but is not consistently used by central and local government in NZ.*

**Additional Comments**

*Roading information is a probably one of the most important datasets that we can display to the public and use internally to work through emergency management situations. They provide the physical network that allows people to evacuate, provide services and how people get home safely. That TLA's have not made this information readily available as a BUA process staggers me.*

*As a network operations (transport) manager I want a standardised national approach to identifying road sections to which I can apply attributes and data. This is so that any information I collect can be shared with others in a common schema or ID. An example would be a geotechnical engineer who records a landslide which impacts a lane on a state-highway - a common schema/ID would capture the state-highway section, the lane, direction of travel etc. This would need to be consistent across territorial boundaries (RAMM achieves this to some degree but it is proprietary and is not supportive of lane based navigation/routing. Whereas LINZ RCL data has no road network logic such as lanes, or direction of travel).*

*There are so many centerlines available*

*I really had to go looking, trying, and now I still do not have what I need while actively responding to a national security event.*

*There are so many varying centerlines, even with NZTA themselves. However, I would argue that the centerline itself is only half of the truth. The other half is the correct representation of the network in a graph, i.e. nodes and links. This is of more value sometimes than the geospatial accuracy of the line itself*

*Dimensions, Levels of Service, Culverts and Bridges weight restrictions.*

*Road speed data (posted speed limit) is important (which is currently being worked on by NZTA). Bridges are a unique use-case - the way that these are captured in RAMM and LINZ RCL should be considered (as an example - if there was an earthquake that required all bridge structures to be assessed there would be a need to identify resilient (non-bridge) routes for first-responders, recovery agents and general public. Consideration may also want to be given to the paper-road dataset (which is understood to be held by DOC).*

*Lines do not overlay on imagery well. NZTA data cant be used, nor is the data complete, eg, lower hutt. LINZ data is not spatially accurate, used for cartography, not overlay mapping. There is no public road data that can readily be used with names, road type, and that is aligned to the middle of the road.*

*Carriageway level segmentation is completely arbitrary. A 20km carriageway has the same weight as a 100m carriageway, which is not correct. Also, I don't believe the attributes are suitable for any sort of emergency response, e.g. would you be able to (with confidence) say identify critical routes to open first, given a required classification of vehicles that will traverse it?*

*When I went to look at this layer on the NZTA open data portal it gave me the following error: "This layer has an invalid extent and cannot be loaded".*

## Rail

Key Dataset: KiwiRail Infrastructure

Lead Agency: KiwiRail

Data Source: KiwiRail Open Data Portal

<http://data-kiwirail.opendata.arcgis.com/datasets>

Key Dataset Score: August 2018 - 62% June 2019 - 73%

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### Survey Summary

The work KiwiRail has completed over the last nine months means Rail data has made the most significant improvement, terms of being a key dataset for resilience and climate change which is fit for purpose. Congratulations KiwiRail!

Going forward, preparing rail data for an emergency event was identified as the most valuable improvement to focus on. Providing access to closed tracks, stations, bridges plus level crossings was identified as important by all respondents and clear user stories were provided.

The survey results identified that providing rail data as an OGC WFS service and supplying passenger numbers were both important for most respondents, but no user stories were provided. Therefore, these will be recorded as future improvements, with KiwiRail not making a commitment to implementing the changes at this stage.

Preparing rail data for an emergency event is likely to provide greater value than adding the territorial authority attribute given the rail network has relatively few features. Metadata is already provided and is being improved, based on the LINZ metadata review. Promotion of KiwiRail data as the national single source of truth will be ongoing over the next 12 months and supported by LINZ.

### Priority Improvements

1. Assign Territorial Authority attribute to bridges, tunnels, level crossings and km pegs by December 2019.
2. Update metadata to include contact information, collection method and maintenance programme by December 2019.
3. Promote KiwiRail Infrastructure data as the national source of truth for rail data by June 2020.
4. Provide KiwiRail Infrastructure data as an OGC WFS webservice by June 2020.

### Future Improvements

5. Prepare data for an emergency event to show closed tracks, stations and bridges during an event.
6. Provide access to passenger numbers, when required during an event.

## Fit for Purpose

KiwiRail infrastructure datasets have been assessed by NZGIS4EM and the wider user community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Adequate level of accuracy - Spatial accuracy of Kiwirail Infrastructure data is +/- 0.5m, except for KM pegs are within 3 metres.  
50% of respondents report Kiwirail data as being an adequate level of accuracy.
- Free to access - Kiwirail Infrastructure data is available free of charge.  
100% of respondents report Kiwirail data as being free to access.
- Creative Commons License (CC BY) - Kiwirail Infrastructure data is available under CC BY 4.0.  
No respondents reported Kiwirail data as being supplied as Creative Commons.
- Download in multiple formats - Kiwirail Infrastructure data is available for download as shapefile, KML and CSV.  
100% of respondents report Kiwirail data is supplied in suitable download formats.

## Current Status

KiwiRail has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Complete national coverage – completed  
National coverage existed for stations, bridges, tunnels, public level crossings and locations. Since August 2018, the New Zealand Railway Network dataset has been extended to include national coverage of private tracks, private sidings and mothballed tracks.
- Suitable vector topology – completed  
NZ railway network is now available as a complete network, including private tracks, private sidings and mothballed tracks. This is considered more useful for resilience and climate change purposes, rather than the original asset based data provided by Kiwirail. Note asset based data is available from Kiwirail on request.
- Discoverable on data.govt.nz – completed  
Kiwirail has published its infrastructure datasets on data.govt.nz. The data has been associated with both the transport and the resilience support data groups.
- Relevant attribution – ongoing. Kiwirail is working to add a territorial authority attribute to enable filtering for data download and webservices - for bridges, tunnels, level crossings and km pegs.  
*Add tla, region. Users may not recognise rail 'branch names'*
- Appropriate metadata – ongoing. Kiwirail to complete appropriate metadata once confirmed by LINZ resilience team.  
LINZ review of metadata for NZ Railway Network recommends populating the following fields: 'responsible party' (a contact organisation name and role is mandatory, AS/NZ ISO 19115.1.2015), 'source contact information' (a phone number is mandatory, AS/NZ ISO 19115.1.2015), and 'lineage'.

- Acceptable update programme – ongoing. Kiwirail to include data maintenance programme in metadata.
- Recognised as the national single source of truth – ongoing. LINZ and Kiwirail to work together to promote the Kiwirail data as the national single source of truth. Focus particularly on councils with the rail network in their region by June 2020.

*Single national owner of data (kiwirail) adds integrity and confidence in the quality of data*

## Data Improvements

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by KiwiRail:

- OGC and Esri webservice

KiwiRail provide an Esri webservice, but do not provide an OGC WFS service.

67% of respondents thought providing an OGC WFS service was very important and 33% did not know. No user story was provided to demonstrate the importance of this improvement.

- Prepare data for an emergency event to show closed tracks, stations and bridges during an event

The survey feedback indicated that 100% of respondents thought providing access to closed tracks, stations and bridges was either very important or moderately important.

*As a road network operations manager, I want to know if trains are running (is the track live) following an event (flood, quake etc) so that I know what is expected around level crossings.*

*Track closures do not necessarily inform the road users whether trains can be expected at level-crossing points. The status of the network (live or not live) may also be useful. For example, downstream of a closure point - can trains still be expected (such as work trains running up and down the track to service the track repair)*

- Provide access to passenger numbers

33% of respondents thought providing passenger numbers was very important, 33% slightly important and 33% did not know. No user story was provided to demonstrate the importance of this improvement

## Additional Data Improvements

No additional data improvements were suggested by the respondents.

## Additional Comments

- *Not clear if double-tracking is part of dataset*

KiwiRail confirms double tracking is included in the NZ Railway Network.

- *Inclusion of tunnels, posted speed, radius of curvature, culvert location etc is very useful. This data isn't as readily accessible for roads*

KiwiRail confirms that KiwiRail Tunnels are available and published on data.govt.nz. Some attribution is available in the rail asset data, which is available on request.

# Rivers

## Rivers

Key Dataset: River Lines

Lead Agency: NIWA

Data Source: NIWA Open Geospatial Portal

<https://data-niwa.opendata.arcgis.com/datasets/river-lines>

Key Dataset Score: August 2018 - 58% June 2019 - 54%

### Survey Summary

The survey confirmed significant work on rivers and flood management is already managed by Regional Councils and Unitary Authorities. At a national scale, the survey recognised the importance of the coordinated capture of LiDAR by LINZ to enable the creation of an improved national river network in future.

To generate the most value from both these areas of work, NIWA and LINZ will collaborate to assess the feasibility of creating a national river network which combines the requirements of NIWA River Environment Classification and LINZ Topo mapping products, which is validated by data supplied by Councils.

The key dataset score has been reduced for River Lines, due to the clear message from the survey results that the current upgrade programme is not acceptable.

The importance of river names was identified, and this will be helped in part by the release of a new river names dataset on the LINZ Data Service in the next 12 months.

NIWA can commit to some of requested improvements including supplying River Lines under Creative Commons licensing and improving the existing webservice by making the data scale dependent, to display only main rivers at a small scale.

### Priority Improvements

1. NIWA to supply River Lines under Creative Commons license by September 2019.
2. NIWA to make the River Lines webservice data scale dependant by June 2020.
3. NIWA to update metadata to include contact, date updated, geographic extent, coordinate system, spatial representation, and collection method by June 2020.
4. LINZ to promote the new river names dataset by June 2020.
5. LINZ to work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets by June 2023.
6. NIWA and LINZ to assess the feasibility of creating a national river network, and to validate this work in collaboration with Councils by June 2020.

### Future Improvements

7. Extend River Lines attribution to include names and Territorial Authority, and to allow for upstream and downstream tracing.
8. Extend River Lines to include the Chatham Islands.

9. Consider creating river, lake and river plain extents, in addition to river centreline.
10. Improve the linkage between the national river network and flood frequency data.

### Fit for Purpose

River Lines have been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Acceptable update programme – River Lines were last updated in July 2017  
33% of respondents reported an acceptable update programme for River Lines.  
*The update programme is fairly adhoc. this may be ok though, reflecting improved techniques etc.*  
The original dataset score has been reduced to account for the update programme not considered to be acceptable.
- Suitable vector topology – Rivers Lines are provided as a topologically correct network which reflects flow direction  
50% of respondents reported Rivers Lines as being provided in a suitable topology  
*Useful network, but only centreline of routing lines of water features, not extent of river, lake or river plains. This makes it difficult to predict water flow.*
- Free to access - River linework is free of charge. Some attribution is available on request for a fee.  
66% of respondents reported River Lines as being free to access; 33% don't know.
- Download in multiple formats – River Lines are available to download as shapefile, KML and CSV  
66% of respondents reported River Lines download formats as acceptable; 33% don't know.
- OGC and Esri webservice – River Lines are available as both OGC WFS and Esri REST services and GeoJSON.  
66% of respondents reported River Lines webservices as acceptable; 33% don't know.

### Current Status

NIWA has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Supplying River Lines under Creative Commons licensing from data.govt.nz - ongoing

The River Lines will be supplied under Creative Commons CC BY 4.0 licensing by September 2019. It is agreed that currently on data.govt.nz the licensing is displayed as "other licensing (check with source agency)", which may limit data uptake.

50% of respondents reported River Lines Creative Commons licensing as acceptable; 50% don't know.

## Data Improvements

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by NIWA include:

- Improve the accuracy of the river network geometry

66% of respondents recorded improving the accuracy of the river network as very important and 34% as moderately important.

*Patchy coverage of LIDAR means resolution differences, mostly at lower orders (1 and 2)*

*Main channels are not always modeled correctly, and data still needs to be verified for a particular area before use*

- Collate rivers captured by Councils into the national dataset

83% of respondents recorded collating local river networks into a national dataset as very important and 17% as moderately important.

*NIWA use REC to route flow, but models are not necessarily tied to reality and so this data needs to be used with caution, particularly for water routing. Local Councils already have their own flow modelling in place, forecasting flood heights and this is the authoritative source of info about flood peak and potential impact. This information needs to feed up into national picture against the REC. Where Councils have captured LiDAR, local channels will have been captured from DEM and should be fed into the REC. What is key information that is being looked for, more likely need to derive information from this data eg for logistics, forecasting, to build a national picture. Cant hold everything and run everything nationally, as need to use local knowledge to interpret the data, and then pass on decisions to EOC to plan evacuations.*

*As a policy user, I want to test different policy options at a fine spatial scale consistently across New Zealand, so that I can inform decision-makers on the suite of options available to them.*

*As a person working in the EOC, rivers at local level are an extent rather than a river centreline. Update REC from DEM and validate. If was used locally - nodes are not accurate and rivers move around, so is based on a point in time, due to wandering channels. Being able to feed updates from local data mean REC can be closer to local picture.*

- Assign river name to each river

50% of respondents recorded assigning a river name to each river as important; 33% extremely and 17% very important. 17% reported a river name attribute as being moderately important and 33% slightly important.

17% of respondents reported attribution of River Lines as acceptable.

*No river names in the data*

*Names of water courses (rivers) should be mandatory to help identify them.*

*As a person working in the EOC, I want to know river names, so that I can identify a river for simple location of an event or a community.*

*As a map/data author, I want the ability to know which river is which (without checking text on a topo) so that I can save time searching for relevant features related to such rivers.*

- Add Territorial Council attribute to enable the easy filtering of data for both download and webservice

Adding a Territorial Council attribute is recorded as very important for 33% of respondents, and moderately important for 67%.

*As a person working in the EOC, include a further locality field against river name because stream names are not unique within NZ eg Territorial Authority or catchment name to help refine the location.*

- Add rivers for Chatham Islands, to complete national extent

83% of respondents reported rivers for the Chatham Islands as moderately important; 17% as slightly important.

- Provide ability to aggregate individual rivers into larger catchments units (upstream search)

83% of respondents reported aggregating rivers into larger catchment units as very important; 17% as slightly important.

- Provide a webservice which is scale dependant, to show only main rivers at a small scale

50% of respondents reported rivers a scale dependent webservice as very important; 33% moderately important and 17% as not at all important.

- Appropriate metadata

50% of respondents reported the metadata for River Lines to be acceptable.

LINZ review of metadata for river lines recommends populating the following fields: 'identifier' (a unique identifier is mandatory, AS/NZ ISO 19115.1.2015), 'responsible party' (a contact organisation name and role is mandatory, AS/NZ ISO 19115.1.2015), 'source contact information' (a phone number is mandatory, AS/NZ ISO 19115.1.2015), 'last update', 'geographic extent', 'reference system identifier' (a code is required), 'spatial representation', and 'lineage'.

- Discoverable on data.govt.nz

67% of respondents did not know if River Lines were discoverable on data.govt.nz

- Ready to respond to an event

67% of respondents recorded River Lines as being ready to respond to an event

*As a background layer it is useful, and at a national level it is useful - but no names, lakes or ponds - and again the local data will take precedence, alongside additional data eg stopbanks.*

- Recognised as the national single source of truth

50% of respondents identified River Lines as the national single source of truth

*Consistent "national source of truth", but local data takes priority because it is more detailed and reliable.*

*Councils already have their own flow modelling in place, forecasting flood heights and this is the authoritative source of info about flood peak and potential impact.*

## Additional Data Improvements

*I am no expert in emergency management but linking in flood frequency data for major reaches would be useful, alongside other hydrometric indices. MfE already publish a number of these indices (notably FRE3 - which is the frequency of when a river 'floods' from an environmental management point of view - which is the frequency by which a river exceeds three times the median flow annually. FRE3 however is unlikely to be useful for emergency management. Perhaps it could be refined for risk of 'flashiness' of a particular river, or risks of exceeding stop banks or other engineered structures during different return periods (ie 1 in 50 year, 1 in 100 year) for floods.*

*REC is used for routing water flow, but need a programme of work to represent the physical representation of the hydrological environment, including rivers, ponds, drainage networks, rather than the modelled REC. Need to combine Topo50 with the REC. DGGS may be useful as a consistent framework to apply this?*

*Each river / Floodplain requires a 'needs' analysis in terms of types of data, how they are presented and how to access them.*

*There is real value in creating a seamless elevation data set that runs from "Top to Bottom" captured to high resolution to answer a lot of hazard work across the board (identification, risk mitigation and policy response and monitoring).*



### Additional Comments

*The REC is one of the essential products for freshwater quality. Continued work to characterise groundwater/surface water interaction is ongoing I understand, which is needed.*

NIWA recognise the importance of using the future LiDAR and bathymetry data capture to be improve the data they maintain on the hydrological environment. Unfortunately, NIWA is unable to make a commitment to these improvements at this point. This is due to its current funding model, which requires NIWA, as a Crown Research Institute, to remain financially viable and to cover capital costs. NIWA and LINZ are committed to working together to learn more about each organisation's requirements for rivers and to identify opportunities to work together in future.

## Water Catchments

Key Dataset: Watersheds

Lead Agency: NIWA

Data Source: NIWA Open Geospatial Portal

<https://data-niwa.opendata.arcgis.com/datasets/watersheds>

Key Dataset Score: August 2018 - 62% June 2019 - 58%

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### Survey Summary

The Water Catchment survey responses are closely aligned with River Lines. The survey confirmed significant work on water catchments is already managed by Regional Councils and Unitary Authorities. At a national scale, the survey recognised the importance of the coordinated capture of LiDAR by LINZ to enable the creation of improved national water catchment boundaries in future.

To generate the most value from both these areas of work, NIWA and LINZ will collaborate to assess the feasibility of improving the national watershed boundaries based on the updated LiDAR, and which is validated by data supplied by Councils. Any new updated watershed boundaries should be attributed to enable aggregation into larger water catchment boundaries and a name assigned to each water catchment.

NIWA can commit to some requested improvements including supplying Watersheds under Creative Commons licensing and improving the existing webservice by making the data scale dependent, to display only main catchments at a small scale.

### Priority Improvements

1. NIWA to supply Watersheds under Creative Commons license by September 2019.
2. NIWA to publish a non-deprecated version of Watersheds on data.govt.nz by September 2019.
3. NIWA to make the Watersheds webservice scale dependant by June 2020.
4. NIWA to update metadata to include title, contact, geographic extent, coordinate system, spatial representation, purpose and collection method by June 2020.
5. LINZ to work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets by June 2023.
6. NIWA and LINZ to assess the feasibility of improving and attributing the national watershed boundaries, and to validate this work in collaboration with Councils by June 2020.

### Future Improvements

7. Enable watershed boundaries to be combined into water catchment boundaries and assign a name to each water catchment.
8. Extend Watersheds to include the Chatham Islands.

## Fit for Purpose

Watersheds have been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Acceptable update programme – Watersheds were last updated in July 2017  
25% of respondents reported an acceptable update programme for Watersheds; 50% don't know.

*Linked directly to the wider REC updates programme*

The original dataset score has been reduced to account for the update programme not considered to be acceptable.

- Suitable vector topology – Watersheds are supplied as discrete polygons.  
75% of respondents reported Watersheds as being provided in a suitable topology
- Free to access - Watersheds are free of charge. Some attribution is available on request for a fee.  
75% of respondents reported River Lines as being free to access.
- Download in multiple formats – Watersheds are available to download as shapefile and KML  
50% of respondents reported Watersheds download formats as acceptable; 50% don't know.
- OGC and Esri webservice – Watersheds are available as both OGC WFS and Esri REST services and GeoJSON  
50% of respondents reported Watershed webservices as acceptable; 50% don't know.

## Current Status

NIWA has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Supplying Watersheds under Creative Commons licensing from data.govt.nz – ongoing  
25% of respondents reported Watershed Creative Commons licensing as acceptable; 75% don't know.

The LINZ review identified the current version of watersheds published on data.govt.nz is listed as deprecated.

Watersheds will be supplied under Creative Commons CC BY 4.0 licensing by September 2019. It is agreed that currently on data.govt.nz the licensing is displayed as "other licensing (check with source agency)", which may limit data uptake.

## Data Improvements

Data improvements identified by NZGIS4EM, which are not currently planned by NIWA:

- Improve the accuracy of the watershed boundaries
 

75% of respondents recorded improving the accuracy of Watersheds as very important and 25% as slightly important.

*The precision of DEMs is continuing to be improved over time. The recently funded national LIDAR programme will help improve the precision of catchment boundaries if adopted in future REC updates, which seems likely.*
- Collate catchment boundaries captured by Councils into the national dataset
 

75% of respondents recorded collating Watershed boundaries captured by Councils into the national dataset as very important and 25% as moderately important.
- Include water catchments for Chatham Islands
 

75% of respondents recorded collating Watershed boundaries for the Chatham Islands as moderately important and 25% as slightly important.
- Assign a name to each water catchment
 

50% of respondents reported assigning a name to Watersheds as very important; 25% moderately and 25% slightly important.

*As a person in the EOC, I want know the name of the water catchment, so that I can see where it is in the district and the extent of the catchment to help inform decisions. Rivers cross local authority boundaries, which the catchments help to identify. Rivers to drive catchment naming. If you get naming right for rivers first this will potentially help name catchments.*

*No catchment name. This has been done by local Councils. Also need to appropriate apply NZ Gazetteer and appropriate use of macrons. This also applies to rivers.*
- Add Territorial Council attribute to enable the easy filtering of data for both download and webservice.
 

25% of respondents reported assigning a Territorial Authority to Watersheds as very important, 50% moderately important and 25% not at all important.
- Enable watershed boundaries to be combined into water catchment boundaries
 

25% of respondents reported combining Watershed boundaries into water catchment boundaries as extremely important, 25% very important and 50% as moderately important.
- Provide a webservice which is scale dependent, to show only main water catchments at a small scale
 

50% of respondents reported an improved webservice for Watershed as very important, 25% moderately important and 25% not at all important.
- Appropriate metadata
 

75% of respondents reported the metadata for Watersheds to be acceptable.

LINZ review of metadata for water sheds recommends populating the following fields: 'identifier' (a unique identifier is mandatory, AS/NZ ISO 19115.1.2015),

'dataset title' (mandatory, AS/NZ ISO 19115.1.2015), 'responsible party' (a contact organisation name and role is mandatory, AS/NZ ISO 19115.1.2015), 'source contact information' (a phone number is mandatory, AS/NZ ISO 19115.1.2015), 'geographic extent', 'reference system identifier' (a code is required), 'spatial representation', 'purpose' and 'lineage'.

- Discoverable on data.govt.nz

75% of respondents did not know if Watersheds were discoverable on data.govt.nz

- Ready to respond to an event

50% of respondents recorded Watersheds as being ready to respond to an event

*I am not sure whether the way catchments are categorised here, based off of the REC, is suitable for emergency management purposes.*

- Recognised as the national single source of truth

75% of respondents identified Watersheds as the national single source of truth

*Same answer as for rivers - yes national, but local information is more detailed and useful*

#### Additional Data Improvements

*Based on the REC, these catchment boundaries are useful and acceptable for environmental policy work. If or when national level LIDAR data is incorporated into REC, the accuracy of catchment boundaries will be improved. How much this matters for emergency management is difficult to say.*

*Representation of catchment boundaries which have been modelled, so has limitations. Stepped boundary rather than topological line and possible gaps in catchments eg top of ranges, but less significant. May wish to associate with a physical catchment boundary.*

#### Additional Comments

No additional comments were provided for Watersheds.

# Topography

## Aerial Imagery

Key Dataset: NZ Aerial Imagery + NZ Imagery Surveys

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/set/4702-nz-aerial-imagery/>  
<https://data.linz.govt.nz/layer/95677-nz-imagery-surveys/>

Key Dataset Score: August 2018 - 63% June 2019 - 58%

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### Survey Summary

It was positive to see the work of LINZ to develop a national imagery dataset being acknowledged and appreciated in the survey results. The greatest benefit LINZ can contribute to resilience and climate change for aerial imagery, is to coordinate the capture and delivery of imagery during an emergency response. This requires LINZ to develop and exercise its own internal processes to ensure an efficient activation. In addition, LINZ will need to work with external agencies to ensure the best fit with existing initiatives, and to promote this capability.

NZ Aerial Imagery is clearly a well-used product, but a suggested improvement is to combine aerial imagery with satellite imagery to provide a consistent basemap.

A recent LINZ initiative to encourage all local authorities to consistently supply imagery under Creative Commons CC BY 4.0 licensing is clearly reflected in the survey response.

The overall score for aerial imagery has decreased because the link between NZ Aerial Imagery and NZ Imagery Surveys is not understood. This could be improved by updating the data descriptions and changing the name of NZ Imagery Surveys.

Aerial Imagery is captured by Local Authorities, and LINZ coordinates the release of a national dataset. It is therefore the Local Authorities who determine the accuracy and update programme, however LINZ should publish the imagery capture programme.

### Priority Improvements

1. Develop processes at LINZ to coordinate the efficient capture and delivery of aerial photography during an emergency event by June 2020.
2. Combine NZ Aerial Imagery with satellite imagery as a basemap by June 2021.
3. Improve NZ Aerial Imagery and NZ Imagery Survey links by January 2020.
4. Promote latest and future aerial imagery capture programme by January 2020.
5. Update metadata with coordinate system and collection method by January 2020.
6. Review tile service documentation on the LINZ Data Service by January 2020.

### Future Improvements

7. Continue to provide access to historical aerial photography.
8. Complete full national coverage of aerial imagery.

## Fit for Purpose

NZ Aerial Imagery and NZ Imagery Survey (NZ Aerials) have been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Relevant attribution – attribution is associated with NZ Imagery Surveys, including date flown and resolution

40% of respondents reported NZ Aerials having acceptable attribution.

*Dates captured would be handy per tile*

*LDS has date loaded/updated in LDS but not the capture date*

Users appear unaware that NZ Aerial Surveys attributes NZ Aerial Imagery.

- Free to access – NZ Aerials are available free of charge

60% of respondents reported costs for NZ Aerials as being acceptable.

- Creative Commons license (CC BY) – NZ Aerials data are supplied as CC BY 4.0.

80% of respondents reported the Creative Commons licensing for NZ Aerials as being acceptable.

- Download in multiple formats – NZ Aerials are available to download as GeoTIFF, JPEG, ERDAS Imagine, KEA, KML, DWF and PDF formats

100% of respondents reported the NZ Aerials download formats as being acceptable.

- OGC and Esri webservice - NZ Aerial Imagery is available as an OGC Web Map Tile Service (WMTS) which works in the major GIS systems in New Zealand.

60% of respondents reported the NZ Aerials WMTS as being acceptable.

*As a GIS emergency management user I want to have quick and easy access to the latest imagery throughout NZ so that I'm not redownloading data or having to search for it. Just all accessible easily.*

*Hosting this on AGOL would be great.*

*The WMTS service is challenging to use and understand for users, so we use the service provided by ESRI/Eagle instead.*

- Appropriate metadata

80% of respondents reported NZ Aerials as having an acceptable metadata.

LINZ review of metadata for NZ Aerial Imagery recommends populating the following fields: 'reference system identifier' (a code is required), and 'lineage'.

## Current Status

LINZ has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Maintaining the LINZ NZ Aerial Imagery basemap and the NZ Imagery Surveys index with the latest aerial photography available to LINZ, including high resolution urban photography - ongoing

The NZ Aerial Imagery basemap provides a seamless nationwide imagery layer with the newest and highest resolution data which covers 95% of New Zealand.

Since August 2018, LINZ has released ten new imagery layers of imagery covering six different regions.

60% of respondents reported NZ Aerials as being ready to respond to an event.

*Constraints include internet access and how recent the imagery is. e.g. Plantation fire and harvested areas not shown on dated photo.*

## Data Improvements

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by LINZ include:

- Coordinate the capture of aerial photography during an event, and provide as a service

100% of respondents reported LINZ coordinating the capture of aerial photography during an event as important; 80% extremely important and 20% very important.

*As Emergency management practitioners collecting aerial imagery can be difficult in managing an emergency so anything that can be done to improve early assessment will mitigate risks.*

*Kaikoura earthquake response was facilitated with shared imagery. Getting aerial photography is expensive; makes sense to coordinate so area flown once, with good overlap and data shared widely cf. any number of inefficient ways of doing. Expected storms hitting Chatham's, we assist with mountain rescue; imagery likely helpful, presently has gaps and current resolution is poor.*

- Maintain access to older aerial photography, after national dataset has been updated, on LINZ Data Service

80% of respondents reported LINZ maintaining access to older aerial photography as important; 20% extremely important, 40% very important and 20% moderately important.

*As a student and emergency management officer, i want to collate as much relevant data, so that i can run scenarios and look thru datasets during peace time.*

- Provide complete national coverage of aerial photography, including Chatham Islands and Southern Alps

100% of respondents recorded providing a complete national coverage as important; 60% extremely important and 40% very important.

20% of respondents reported complete national coverage of NZ Aerials as currently acceptable.

*Incomplete coverage*

*There are areas of NZ that do not have complete coverage e.g. West Coast/Southern Alps and between Nelson and West Coast Regions.*

- Adequate level of accuracy

60% of respondents recorded NZ Aerials as having an acceptable level of accuracy.

*Varies for different areas. Some higher resolution imagery not available*

- Acceptable update programme

40% of respondents recorded NZ Aerials as having an acceptable update programme.

*Varies for different areas*

*Unsure of update programme for Aerial imagery*

Aerial Imagery is captured by Local Authorities, and LINZ coordinates the release of a national dataset. It is therefore the Local Authorities who determine the accuracy and update programme. LINZ does maintain imagery acquisition standards to ensure datasets are procured to common specifications.

- Discoverable on data.govt.nz

40% of respondents reported NZ Aerials as being discoverable on data.govt.nz.

*Search engine returned zero results for 'Nelson aerial imagery', the search engine may require some work.*

*Would be good to confirm who is missing from data.govt.nz and encourage them to put it on there. Most people wouldn't choose this as a first point of information. Having this information on ArcGIS Online is also a good thing, if it's always up to date.*

- Recognised as the national single source of truth

60% of respondents reported NZ Aerials as being the national single source of truth.

*Yes, but unsure if there are more recent imagery out there.*

#### Additional Data Improvements

*Merging of data from space applications to satellite imagery to StreetView and topography. I know it's a stretch.*

*10m satellite imagery - could LINZ stand up this imagery and even possibly better quality satellite imagery - then in an event we can have better up to date imagery (we have some rural areas which aren't flown everytime - e.g could be 5 years old) that might not be as high spec as aerial imagery but great for emergency purposes. Again hosting this on AGOL would be great.*

LINZ notes the generally restrictive nature of satellite imagery licenses prevents its release under Creative Commons licensing.

#### Additional Comments

*We appreciate the work that LINZ has undertaken and driven to achieve a 'nearly' national coverage of imagery and made this discoverable and available.*

## Elevation

Key Dataset: LiDAR

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/group/national-elevation/data/category/elevation/>

Key Dataset Score: August 2018 - 65% June 2019 - 62%

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### Survey Summary

The steps taken by LINZ to secure \$19 million to part fund national LiDAR data capture via the Provincial Growth Fund, and to create a nationally consistent height dataset, is recognised as a very positive opportunity.

It is important this national dataset is supplied with an index layer to ensure the data is easy to find. Derived products are also essential, particularly an improved Digital Elevation Model and Digital Surface Model. Attribution limitations were raised, which may be addressed by the increase in the number of minimum requirement classifications now included in the national LiDAR specification.

There is also clear support for the role LINZ to coordinate the capture of LiDAR data during an emergency event to understand ground changes.

The overall dataset score has been reduced, as respondents do not identify the LINZ collated LiDAR data as the national source of truth, although it is recognised this is likely to change once the Provincial Growth Fund has extended LiDAR coverage.

Although some respondents raised concerns about the lack of an ongoing maintenance programme for LiDAR, most of the additional feedback focused on the information which could be derived from the initial LiDAR updates, including assigning building roof heights and identifying flood infrastructure such as stop banks.

### Priority Improvements

1. Work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets by June 2023.
2. Create a national index of LiDAR data by December 2019.
3. Create a national Digital Elevation Model with the latest LiDAR data by June 2023.
4. Create the national Digital Surface Model with the latest LiDAR data by June 2023.
5. Develop processes at LINZ to coordinate the efficient capture and delivery of LiDAR during an emergency event by June 2020.

### Future Improvements

6. LINZ to work with Councils to collate future LiDAR data updates into the national dataset.
7. Publish a relief basemap to represent elevation
8. Look at what other information can be derived from LiDAR e.g. building heights and flood infrastructure.

## Fit for Purpose

LiDAR has been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and is considered fit for purpose for resilience and climate change, in terms of:

- Adequate level of accuracy - LiDAR is captured to a national standard of vertical accuracy (95%)  $\leq 20$  cm, horizontal accuracy (95%)  $\leq 100$  cm and Pulse density  $\geq 2$  pls/m<sup>2</sup>.

57% of respondents report the accuracy of LiDAR to be acceptable; with 43% reported data limitations.

*LiDAR specification provides for a high degree of accuracy*

*varies for different areas*

*not national consistent, especially not consistent uncertainty estimate*

- Suitable vector topology – LiDAR is captured as point features.

57% of respondents record the topology of LiDAR to be acceptable; with 43% don't know.

- Free to access - LiDAR data is available free to access.

88% of respondents report LiDAR to be available free to access.

- Creative Commons license (CC BY) - LiDAR is available as CC BY 4.0

88% of respondents report LiDAR to be available as CC BY

*All Tasman DC LiDAR has been supplied to LINZ for inclusion in LDS and opentopography.org*

*Lidar is collected by a number of organisations that do not share the information for commercial advantage*

- Download in multiple formats - LiDAR point cloud data is available for download in LAS, LAZ and ASCII format

88% of respondents report LiDAR to be available for download in suitable formats

*1m DEM & DSM, and point clouds, are available in standard formats.*

*The data is downloaded by our GIS specialist, but I have not heard any issues regarding format*

- Appropriate metadata – LINZ review confirms metadata for LiDAR meets requirements.

*Good metadata accompanies the LiDAR delivery.*

71% of respondents report the metadata associated with LiDAR as acceptable, with 14% recording limitations.

- Recognised as the national single source of truth

38% of respondents recognise LiDAR as the national single source of truth.

*This is the most up-to-date and accurate data for areas captured.*

*Only if all the latest data is shared with LINZ*

*Data still dispersed, but I guess new programme will help*

*It needs to be complete, updated regularly with version control so that earlier versions are accessible*

## **Current Status**

LINZ has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Creating a national index of LiDAR surveys to identify extent, capture dates and processing types - ongoing

LINZ confirms an index of LiDAR surveys will be published by December 2019.

*Tile map directory with dates is very important.*

## **Data Improvements**

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by LINZ include:

- Extend availability of LiDAR to create national coverage

100% of respondents report national coverage of LiDAR as important; 78% extremely important and 22% very important.

*As a GIS user, I want to be able to work with terrain data across TA boundaries, so that we have consistent and accurate data to use in the event of a flood or earthquake.*

*We want a system that provides best elevation data for any area of NZ, this will be critical as base information for event response.*

*As a Hydrodynamic Hazard Scientist (tsunamis, storm surge, floods) I want complete national coverage and point cloud data available at a high resolution including intensities so that I can develop model grids and calculate roughness estimates from the point cloud data to use in my models.*

*As a heavy user of elevation data, I want to see Tasman DC completed, so that we can make better internal decisions for planning and other work. The importance may come down to how LINZ propose to manage the data. If it is going to be left to individuals to download relevant data from a number of datasets, then it may not be a problem. If LINZ are going to build a "national" elevation dataset, then they should include a maintenance process to update as replacement areas are flown.*

*No national coverage in high res DEM; also no national consistency = very important!*

*For my work I would require complete coverage*

*LiDAR acquisition has been undertaken in adhoc way, usually constrained by limited budget.*

*Coverage is available only through patchy coverage across different lidar versions*

- Enable LiDAR to be captured and data and derived products to be supplied during an event

100% of respondents report coordinating the capture of LiDAR during an event as important; 45% extremely important, 22% very important and 33% moderately important.

*As recent events have shown it is also critical to be able to quickly capture new information after an event and include it into a national system!*

*Rapid additional LiDAR after major seismic events would also be extremely useful for understanding the ground changes.*

*Actual maps/images of flood extent are very important for predicting future flood hazard areas. Such data needs to be captured and made available.*

*Radar is superior to LiDAR for mapping flood extent if there is cloud present.*

- Update national Digital Elevation Model with latest LiDAR

100% of respondents report updating the national DEM as important; 67% extremely important and 33% very important.

*As a GIS user in an emergency I would like access to an accurate DEM or Contour layer for decision making.*

- Update national Digital Surface Model with latest LiDAR

100% of respondents report updating the national DSM as important; 56% extremely important and 44% very important.

- Publish relief basemap to represent elevation

100% of respondents recorded a relief basemap as important; 22% extremely important, 56% very important, 11% moderately important and 11% slightly important.

*Hillshade important for rapid visual assessment of topography*

- Relevant attribution

57% of respondents report the attribution for LiDAR to be acceptable, with 29% noting data limitations.

*LiDAR captured using the agreed national standard has sufficient attribution.*

*Need to include metadata about how was elevation data derived, what was raw data used, as different methods used; also need to include uncertainty estimate roughness data*

- Acceptable update programme

14% of respondents report the update programme for LiDAR to be acceptable, with 57% noting data limitations.

*Ideally once all areas are captured there would be a rolling update policy - say every 5-10 year with additional updates after major seismic events.*

*Tasman DC has undertaken a refly of primary areas of interest, but still has 60% yet to capture.*

- OGC and Esri webservice

75% of respondents report the provision of LiDAR as a service to be acceptable, with 25% don't know.

*DEM & DSM are*

- Discoverable on data.govt.nz

88% of respondents report that LiDAR is discoverable on data.govt.nz, with 12% don't know.

*Perhaps it will be easier to have first and foremost the extent of lidar coverage, instead of an alphabetical listing*

*All Tasman DC LiDAR is discoverable via this site.*

- Ready to respond to an event

50% of respondents report that LiDAR is ready to respond to an event, with 25% reporting limitations and 25% don't know.

*For an event you would want derived products that are ready to run*

*Internally, these are cached, or can be loaded from a mosaic dataset.*

*As soon as we have full coverage.*

*Provided that data is current and available for the area of interest.*

*Currently there are various datasets available, it will be desirable to have ONE consolidated way of accessing best data; we should also think about automatic ways to generate DEM from ALL underlying data?*

#### Additional Data Improvements

*Given that the PGF-LiDAR opportunity will most likely not be able to cover LIDAR for the whole country, have LINZ thought about prioritisation areas from a national perspective? For example flood prone areas, coastal areas might be higher priority. I understand LINZ is negotiating with Regional Councils around prioritisation. Have LINZ engaged with National Agencies (MCDEM, FireService, GNS, NIWA, ...) on priority areas from a national perspective?*

*We also need point cloud data for modelling of flood hazard.*

*It would be nice if the roof outlines, provided by LINZ could be attributed with heights. The national LiDAR dataset can be used to determine the heights where possible.*

*Improvements can be made not for emergency use but for downstream users to :  
characterise and identify rivers/canal/ditches potentially conveying waterways;  
identifying ephemeral channels potentially conveying water downstream;  
characterising vegetation characteristics*

*Database of flood infrastructure (stopbanks, bridges, culverts etc) Database of historic inundation Database of land roughness derived from LiDAR Consistent hydraulically conditioned DEM and river network*

*High resolution bathymetry for near-shore NZ, rivers and lakes would also be extremely useful*

## Additional Comments

- *The PGF-LiDAR opportunity is great, key will be to ensure consistency in data, uncertainty and metadata!*
- *I am aware of the initiative to update LiDAR for New Zealand - Great!*
- *Tasman DC has completed a PGF application for the uncaptured areas and will be submitting it for the first tranche. LINZ have been involved in this process, due to the complex nature of our application.*

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## Coastline

Key Dataset: NZ Coastlines and Islands Polygons (Topo 1:50k)

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/layer/51153-nz-coastlines-and-islands-polygons-topo-150k/>

Key Dataset Score: August 2018 - 65% June 2019 - 69%

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### Survey Summary

The biggest value LINZ can contribute to improve the Coastline data for resilience and climate change in the short term is to create and maintain a national coastline dataset based on the best available data. There are disparate coastline datasets currently being maintained, and LINZ has agreed to focus on pulling together the highest resolution data and creating a new independent dataset 'NZ Coastlines'.

This will be an interim measure while more detailed LiDAR and bathymetry data is captured and used to provide much more detailed information in the intertidal zone between land and sea. It is this longer-term project which will enable areas with a high rate of coastal change to be identified and prioritised for more frequent updates.

In addition, LINZ will improve the capture of NZ Coastlines by working with stakeholders to identify how best to capture river mouths as part of the coastline definition, and to attribute the coastline with the scale at which the data has been captured. Publishing the data as an Esri REST service would also be useful.

### Priority Improvements

1. Create and maintain a national coastline dataset based on the best available data by June 2020.
2. LINZ to continue to capture LiDAR and bathymetry across New Zealand by June 2023.
3. Attribute NZ Coastline with the scale the data has been captured by June 2020.
4. Publish NZ Coastlines as an Esri REST service by June 2020.

### Future Improvements

5. Work with stakeholders to identify how best to capture areas of change, such as river mouths, in the definition of NZ Coastlines.
6. Use the new LiDAR and bathymetry data to improve the accuracy of NZ Coastlines.
7. Identify areas with a high rate of coastal change and prioritise more frequent updates in these areas.

## Fit for Purpose

NZ Coastlines and Islands Polygons (Topo 1:50k) (NZ Coastlines) has been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – NZ Coastlines is available for the whole of New Zealand, including Chatham Islands  
33% of respondents report NZ Coastlines national coverage to be acceptable.
- Suitable vector topology – NZ Coastlines is available as polygon features  
33% of respondents reported NZ Coastline as suitable vector topology  
*Higher resolution needed*
- Free to access – NZ Coastlines is available free of charge  
100% of respondents reported NZ Coastline was available free of charge.
- Creative Commons License (CC BY) – NZ Coastlines is available under CC BY 4.0  
50% of respondents reported the licensing of NZ Coastlines to be acceptable;  
50% didn't know.
- Download in multiple formats– NZ Coastlines is available for download as shapefile, mapinfo TAB, CSV, Geodatabase, KML, DWG and PDF  
100% of respondents reported the download formats for NZ Coastline to be acceptable.
- Appropriate metadata – LINZ review confirms metadata for NZ Coastlines and Islands Polygons (Topo 1:50k) meets requirements.  
33% of respondents reported NZ Coastline having appropriate metadata.

## Current Status

LINZ has been working on the following data improvements identified by NZGIS4EM and the wider resilience community:

- Discoverable on data.govt.nz – completed  
NZ Coastlines is available from data.govt.nz. The data is associated with both the Land and the Resilience Support Data Group

## Data Improvements

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by LINZ include:

- Identify the scale the data has been captured  
100% of respondents reported attributing the coastline with the scale at which it was collected as important; 50% extremely and 50% very important.

- Include river mouths in coastline
 

100% of respondents reported including river mouths as important; 33% extremely important and 67% very important.
- Identify areas with high rate of coastal change and prioritise more frequent updates
 

67% of respondents thought providing more frequent updates for areas with high rate of coastal change was extremely important, and 33% moderately important.

*Accuracy is the issue, especially as the coast is such a changeable and dynamic boundary*

*As a researcher, I want high resolution, comprehensive datasets so that I can effectively model coastal processes and hazards events.*

*As a Unitary Authority, Council is required to manage its coastal resources and land use that may impact or be impacted by coastal processes and hazards. Accurate and up to date data on the location of the land-coast boundary is essential.*
- Adequate level of accuracy
 

33% of respondents reported the accuracy of NZ Coastlines to be adequate, with 67% reporting data limitations.

*Higher resolution needed*
- Adequate representation of Mean High Water line
 

No respondents reported NZ Coastlines as adequately representing the Mean High Water line, 33% reported data limitations and 67% did not know.
- Coastline most important for emergency management work
 

67% of respondents recorded Mean High Water Springs as most important; 33% recorded Mean Sea Level as most important for emergency management work.
- Acceptable update program
 

No respondents reported knowing whether the update program for NZ Coastlines was acceptable.
- OGC and Esri webservices
 

LINZ provides an OGC WFS service, but does not provide an Esri REST service

50% of respondents reported an Esri REST service as moderately important, and 50% as not at all important.

*Not sure if it is compatible with WFS but that could be useful in future*
- Ready to respond to an event
 

67% of respondents reported NZ Coastlines as being ready to respond to an event; 33% didn't know.
- Recognised as the national single source of truth
 

None of the respondents identified NZ Coastlines at the national source of truth

### Additional Data Improvements

- *National Lidar acquisition as a means to achieve national consistency in hazard identification, mitigation and policy alignment. Give consideration to national bathymetric sets which would inform coastal change, erosion and inundation and runup modeling.*
- *MDC has identified both bathymetry and elevation data captured at high resolution important for future policy setting and environmental mitigation. Continued support for this work would help us with this necessary policy improvement.*
- *High resolution elevation available immediately above the high water mark to some distance from mean low water. and water depth adjacent to the shore line and some distance from shore line. Both are important for modelling expected run up and potential inundation areas. Effort currently underway at MDC to acquire district coverage of both bathymetry and Lidar to address these points for the Marlborough Region.*
- *Compatibility with national natural hazards datasets, the development of a national data schema for better alignment between base national datasets and hazard models etc.*

### Additional Comments

No additional comments were reported.

## Topography

Key Dataset: Topo50 and Topo250 Maps

Lead Agency: LINZ

Data Source: LINZ Data Service

<https://data.linz.govt.nz/layer/50767-nz-topo50-maps/>  
<https://data.linz.govt.nz/layer/50798-nz-topo250-maps/>

Key Dataset Score: August 2018 - 77% June 2019 - 77%

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### Survey Summary

The key dataset survey has highlighted the importance of both Topo50 and Topo250 maps as a vital component of emergency management, particularly for the New Zealand Defence Force.

It was good to see an appreciation of the work carried out by the LINZ Topo Team in the survey feedback. The importance of maintaining the topo maps as a valuable resource by presenting a lot of information in a way which is easy to understand, was recognised as extremely important.

The most significant improvement LINZ can provide for Topo users is to create a combined topographic basemap as a webservice. Whilst creating this basemap, the idea of a grey scale version should also be considered.

LINZ to promote the latest update programme for the Topo map series to ensure the data maintenance is better understood. For example, each topo map sheet is now reviewed, on average, every three years, and publication of updates to Topo50 rasters and the relevant feature layers is now synchronised. The understanding of the maintenance programme could be supported by converting the Topo sheets update list to a spatial layer, similar to the aerial imagery index.

### Priority Improvements

1. Create a national topographic basemap as a webservice by June 2022.
2. Create the Topo sheet history updates as a spatial layer by June 2020.
3. Promote the latest Topo map series update programme by June 2020.

### Future Improvements

4. Update the Topo50 sheets more often.
5. Consider creating alternative versions of the topographic basemap webservice, such as greyscale.

## Fit for Purpose

Topo50 and Topo250 have been assessed by NZGIS4EM and the wider resilience community against agreed criteria, and are considered fit for purpose for resilience and climate change, in terms of:

- Complete national coverage – national coverage of Topo50 is available, including the Chatham Islands.  
80% of respondents report Topo50 and Topo250 to be at an adequate level of accuracy
- Adequate level of accuracy – Topo50 and Topo250 are supplied at an adequate level of accuracy in relation to the known scale  
40% of respondents report Topo50 and Topo250 to be at an adequate level of accuracy
- Free to access - Topo50 and Topo250 are available free of charge  
80% of respondents report Topo50 and Topo250 to be at available free of charge
- Creative commons license (CC BY) – Topo50 and Topo250 are available under CC BY 4.0  
80% of respondents report Topo50 and Topo250 to be available under Creative Commons licensing
- Download in multiple formats – Topo50 and Topo250 are available as GeoTIFF, JPEG, ERDAS Imagine, KEA, KML, DWF and PDF formats  
*Some re-formatting is required.*  
60% of respondents report Topo50 and Topo250 to be available in suitable download formats
- Appropriate metadata – LINZ review confirms metadata for Topo50 and Topo250 Maps meets requirements.  
80% of respondents report Topo50 and Topo250 to be at an adequate level of accuracy
- Discoverable on data.govt.nz – Topo50 and Topo250 are associated with both the Land and the Resilience Support Data Groups  
20% of respondents report Topo50 and Topo250 as discoverable on data.govt.nz, with 60% stating there are data limitations
- Recognised as the national single source of truth – Topo50 and Topo250 are the authoritative national record of New Zealand’s physical features  
60% of respondents report Topo50 and Topo250 as the national source of truth

## Current Status

LINZ are not currently working on any of the data improvements identified by NZGIS4EM and the wider resilience community.

## Data Improvements

Data improvements identified by NZGIS4EM and the wider resilience community, which are not currently planned by LINZ include:

- Publish and maintain a combined basemap of Topo50 Maps, Topo250 Maps and imagery as an OGC Web Map Tiled Service

100% of respondents identified an a combined Topo basemap as important; 60% extremely important, 20% as very important, and 20% as moderately important.

*NZDF is unable to utilise the NZTopo50 layer as a webservice due to our network security*

*WMTS and WMS OK but would be great if all authoritative data used in the maps was also served up as WFS and ArcGIS Online Feature Service.*

- Update the Topo sheets more often. (Sheets are reviewed, on average, every 3 years)

100% of respondents reported more frequent updates of Topo50 and Topo250 as important; 20% extremely important, 60% as very important, and 20% as moderately important.

- Create the Topo sheet history update information as a spatial layer, similar to the aerial imagery tile service

80% of respondents reported converting the Topo sheet layer into a spatial layer as important; 20% as very important, and 60% as moderately important.

## Additional Data Improvements

*Identification of public land and private roads/tracks would be helpful but acknowledge this may clutter the map*

*22m has been surpassed by positioning accuracies of better than 10m so they need to match.*

*Local urban road names would be helpful but I know hard to show at 1:50k so best left as separate urban scale product?*

*Live maps being updated on the fly from the source of truth would be ideal but appreciate this may not be feasible just yet.*

*It is still a cartographic representation rather than GIS dataset.*

*A publicly available grey scale version would be helpful in case users wish to overlay other data over the maps.*

*Maintaining updates from the NZTopo 50 generalised to the NZtopo250 with would be extremely useful. Keeping those scale products in sync would be useful for smaller scale production (such as our defence aero chart series).*

*The fully compiled and authoritative NZTopo50 raster maps remain the base standard for NZDF planning, operations and exercises within New Zealand. As a defence agency, we work on secure networks that are not directly connected with the internet. This makes it more complicated to receive regular updates to the raster files as any data published on the LDS cannot be quickly replicated within NZDF systems. As a major user of NZTopo50, the NZDF wants to ensure access to authoritative 50k scale topo mapping of NZ that is consistent with other NZ*

*Government partner agencies, especially when working together during response operations to domestic emergency events.*

#### Additional Comments

*I think the Topo50 Maps are a great stand-alone product. LINZ does a great job with keeping them up to date given capacity and limiting the content to within a realistic scope so that map can be actively managed and not too cluttered*

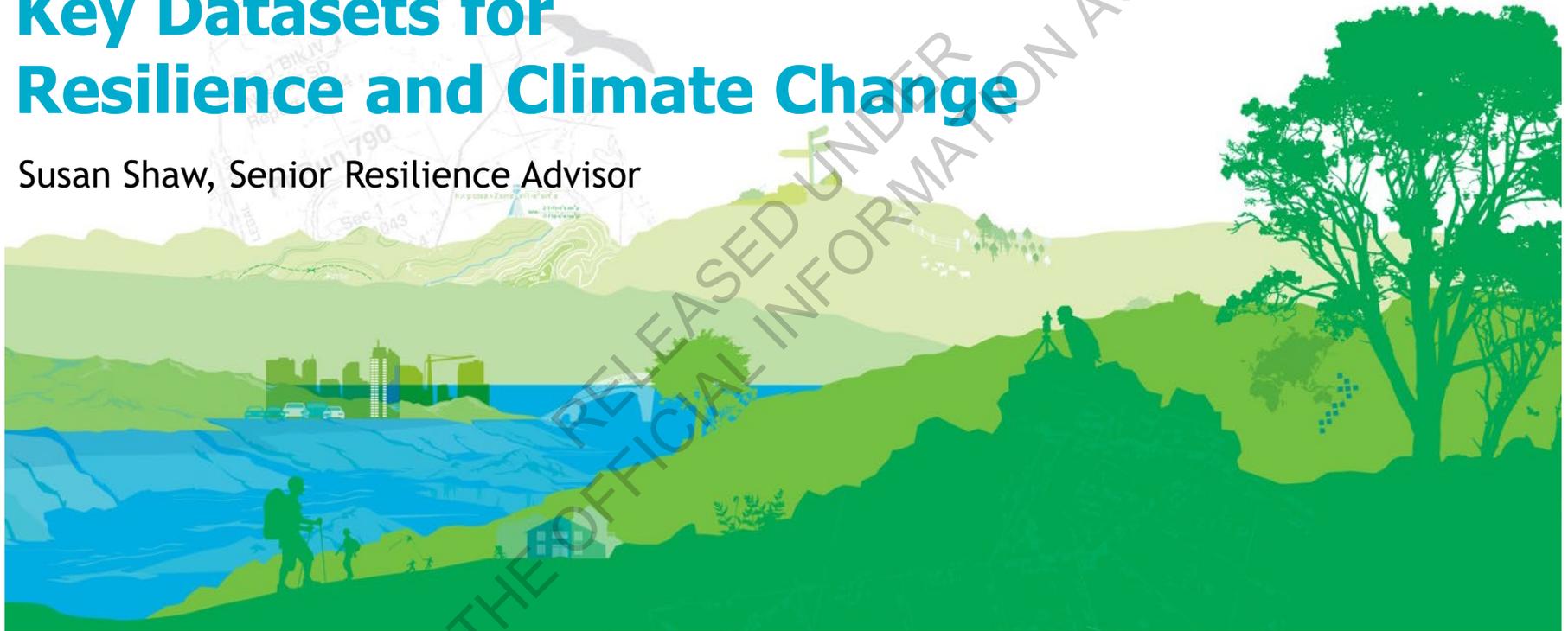
*NZDF still requires raster formats of the NZ Topo50 to enable rapid printing and dissemination during a domestic response operations. Updates to specific layers within unpublished NZTopo50 causes inconsistencies if those layers are published separately. Hard copy NZTopo50 are still widely use by NZDF personnel during domestic response situations.*

*Defence personnel require up to date information in unfamiliar areas so the map data needs to reflect what exists on the ground. This is also important in planning. Web services are required to feed into the major command and control systems to ensure everyone is seeing the same view of the situation.*

*As a spatial analyst working with CDEM I want confidence that the data portrayed in topomaps is as up to date and authoritative as is reasonably possible so that CDEM can make the best decisions possible with the best information available at that time.*

# Key Datasets for Resilience and Climate Change

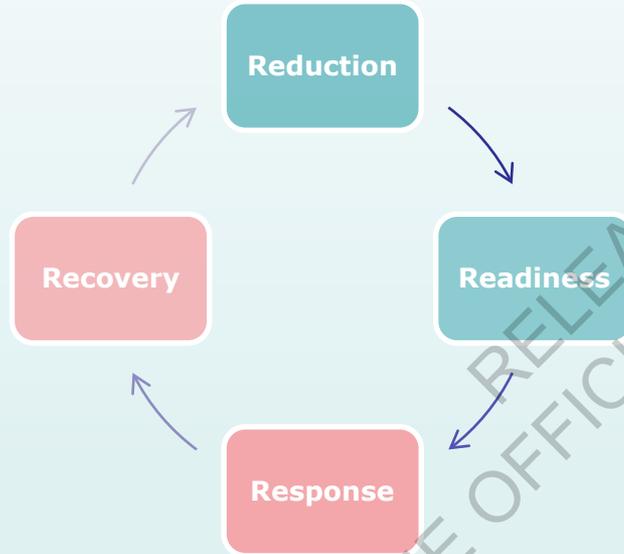
Susan Shaw, Senior Resilience Advisor



## Resilience & Climate Change Key Challenge

*Identifies where LINZ can work with others to deliver the most value to New Zealand over the next 10 years.*

# Step 1 - Define Resilience & Climate Change



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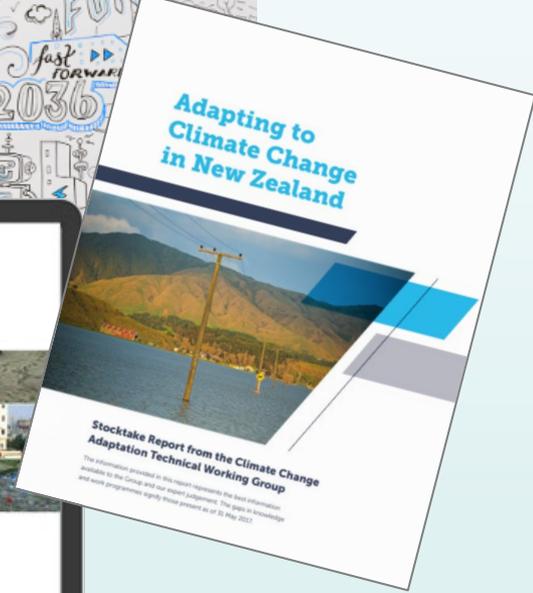
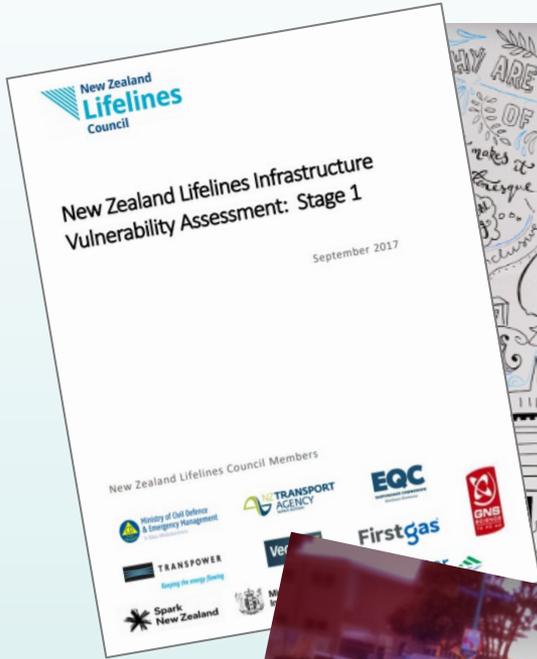
## Step 2- Identify Relevant Datasets



Issue	Representative Organisation
Reduction	Riskscape
Readiness	Lifelines
Response	Emergency Services
Recovery	Local Government
Climate Change	Central Government

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# Step 2- Identify Relevant Datasets



# Step 3 - Identify Key Datasets



## Data Re-Use



- Geospatial layer
- Base Layer
- Multiple Use

## Data Significance



- National
- Legislation
- Infrastructure
- Transport
- Public Funding

## Data Scenarios



- Response
- Risk Reduction

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# Key Datasets for Resilience & Climate Change



Address  
Buildings  
Property  
Population



Road Network  
Rail Network



Elevation  
Aerial Photography  
Topographic Map  
Coastline



River Network  
Water Catchments

# Step 4 - Define Our Customer



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# Step 5 - Identify Lead Agencies



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# Step 6 - Assess Key Datasets



Transport



Rivers, Coasts & Topography



People & Property

Lead Agency	LINZ	LINZ	FENZ	LINZ	Stats NZ	NZTA	KiwiRail	NIWA	NIWA	LINZ	LINZ	LINZ	LINZ
As at 30 August 2018, does the lead agency provide the key dataset ...	Building	Address	Suburb	Property	Population	Road	Rail	River	Water Catchment	Elevation	Aerial	Coastline	Topo
as complete national coverage	Partly	Partly	Yes	Yes	Yes	Yes	Partly	Partly	Partly	No	Partly	Yes	Yes
with relevant data attribution	No	Partly	Partly	Partly	Partly	Partly	Partly	No	Partly	Partly	Yes	Partly	n/a
adequate level of accuracy	Partly	Partly	Yes	Partly	Partly	Yes	Yes	Partly	Partly	Yes	Partly	Partly	Yes
acceptable update programme	Partly	Yes	Yes	Yes	Partly	Yes	Partly	Yes	Yes	No	Partly	Partly	Partly
suitable vector topology	Yes	Yes	Partly	Yes	Yes	No	Partly	Yes	Yes	Yes	n/a	Yes	n/a
free to access	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creative Commons CC-BY License	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Partly	Yes	Yes
download in suitable formats	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
available as a webservice	Partly	Partly	No	Partly	Partly	No	Partly	Yes	Yes	Partly	Yes	Partly	Partly
with appropriate metadata	Yes	Yes	Partly	Yes	Partly	Partly	Partly	Partly	Partly	Yes	Partly	Yes	Yes
discoverable on data.govt.nz	Partly	Partly	No	Partly	Partly	No	Partly	Partly	Partly	Partly	Partly	Partly	Partly
ready to respond to an event	No	No	No	No	No	Partly	No	No	No	No	No	No	No
national single source of truth	Partly	Partly	No	Yes	Partly	No	Partly	Partly	Partly	Yes	Partly	No	Yes

Lead Agency	LINZ	LINZ	FENZ	LINZ	Stats NZ	NZTA	KiwiRail	NIWA	NIWA	LINZ	LINZ	LINZ	LINZ
As at 30 August 2018, does the lead agency provide the key dataset ...	Building	Address	Suburb	Property	Population	Road	Rail	River	Water Catchment	Elevation	Aerial	Coastline	Topo
as complete national coverage	Partly	Partly	Yes	Yes	Yes	Yes	Partly	Partly	Partly	No	Partly	Yes	Yes
with relevant data attribution	No	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Partly	n/a
adequate level of accuracy	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Partly	Partly	Yes
acceptable update programme	Partly	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	No	Partly	Partly	Partly
suitable vector topology	Yes	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	n/a	Yes	n/a
free to access	Yes	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Yes
Creative Commons CC-BY License	Yes	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Yes
download in suitable formats	Yes	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Yes
available as a webservice	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly
with appropriate metadata	Yes	Yes	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Yes	Yes
discoverable on data.govt.nz	Partly	Partly	No	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly	Partly
ready to respond to an event	No	No	No	No	No	Partly	No	No	No	No	No	No	No
national single source of truth	Partly	Partly	No	Yes	Partly	No	Partly	Partly	Partly	Yes	Partly	No	Yes



Lead Agency	LINZ	LINZ	FENZ	LINZ	Stats NZ	NZTA	KiwiRail	NIWA	NIWA	LINZ	LINZ	LINZ	LINZ
As at 30 August 2018, does the lead agency provide the key dataset ...	Building	Address	Suburb	Property	Population	Road	Rail	River	Water Catchment	Elevation	Aerial	Coastline	Topo
as complete national coverage	Partly	Partly	Yes	Yes	Yes	Yes	Yes	Partly	Partly	No	Partly	Yes	Yes
with relevant data attribution	No	Partly	Partly	Partly	Partly	Partly	Partly	No	Partly	Partly	Yes	Partly	n/a
adequate level of accuracy	Partly	Partly	Yes	Partly	Partly	Yes	Yes	Partly	Partly	Yes	Partly	Partly	Yes
acceptable update programme	Partly	Yes	Yes	Yes	Partly	Yes	Partly	Yes	Yes	No	Partly	Partly	Partly
suitable vector topology	Yes	Yes	Partly	Yes	Yes	No	Yes	Yes	Yes	Yes	n/a	Yes	n/a
free to access	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creative Commons CC-BY License	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Partly	Yes	Yes
download in suitable formats	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
available as a webservice	Partly	Partly	No	Partly	Partly	No	Partly	Yes	Yes	Partly	Yes	Partly	Partly
with appropriate metadata	Yes	Yes	Partly	Yes	Partly	Partly	Yes	Partly	Partly	Yes	Partly	Yes	Yes
discoverable on data.govt.nz	Partly	Partly	No	Partly	Partly	No	Yes	Partly	Partly	Partly	Partly	Partly	Partly
ready to respond to an event	No	No	No	No	No	Partly	No	No	No	No	No	No	No
national single source of truth	Partly	Partly	No	Yes	Partly	No	Partly	Partly	Partly	Yes	Partly	No	Yes

# Step 6 - Identify Priority Improvements



## Key Datasets for Resilience

LINZ identified 12 key datasets which are important for emergency management, covering population, property, transport, rivers, coasts and topography.

Our aim is to improve these datasets for risk reduction, readiness, response and recovery.

We need your help to understand and prioritise the suggested data improvements.

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## Help prioritise the suggested improvements for emergency management

The following data improvements for **Aerial Imagery** were identified by the NZGIS4EM community, but are not included in the current LINZ work programme.

Please rate how important these improvements are to your emergency management work, and tell us why they are important.

	How important is this improvement?
a. Coordinate the capture of aerial photography during an event, and provide as a service	<input type="text"/>
b. Maintain access to older aerial photography, after national dataset has been updated, on LINZ Data Service	<input type="text"/>
c. Provide complete national coverage of aerial photography, including Chatham Islands and Southern Alps	<input type="text"/>
<b>Why are the improvements important?</b>	<input type="text"/>
If you can share a strong user story, it will be used to improve.	<input type="text"/>
To help write a user story, try completing this sentence: <b>As a</b> <type of user>, <b>I want</b> <add goal>, <b>so that</b> <add reason why>.	<input type="text"/>

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## Key Datasets for Resilience

### Why is a user story important?

A powerful user story demonstrates the impact of your work, and helps prioritise the data improvement.

*A damaged property was searched multiple times after the Christchurch earthquake, simply because there were multiple address points to represent each separate entrance.*

This user story demonstrates the importance of maintaining a national building dataset.

We are not able to guarantee that every proposed data improvement will happen. However, a strong user story is key to understanding the limitations of the current datasets, and to make a successful business case to fund the data improvement.



# Priority Improvements



1. **LINZ** to provide a more comprehensive national coverage of addresses by June 2021.



2. **LINZ** to work with all regions to coordinate the acquisition and release of LiDAR data into open national datasets by June 2023.



3. **NZTA** understands the importance of providing easy access to road closure data, but currently is unable to commit to an improvement plan.



4. **Stats NZ** understands the importance of providing small geography population count information for use in responding to emergency events and will explore options with LINZ on how best this could be achieved.



5. **LINZ** to improve access to parcel attribution by June 2020 and investigate the feasibility of creating a property boundary layer by June 2021.



6. **LINZ** to complete national coverage of building outlines by June 2020.



7. **Fire and Emergency New Zealand** understands the importance of the suburbs dataset and is working with LINZ to establish options regarding the dataset by December 2019.



8. **LINZ** to create a national topographic basemap by June 2022.



9. **LINZ** to establish a process for coordinating the capture and delivery of imagery and LiDAR during an event by June 2020.



10. **LINZ** to create and maintain a national coastline dataset based on the best available data by June 2020.



11. **NIWA** to improve the availability of river network and water catchment data by releasing under Creative Commons license and publishing scale dependant webservicees by June 2020.



12. **LINZ** to publish key datasets maintained by LINZ as Esri REST services by June 2020.



13. **KiwiRail** to improve access to rail network data by June 2020.

# Support from LINZ



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## Resilience Support Data

Resilience support datasets are commonly used, openly available and authoritative geospatial datasets, required to support operations and decision-making for risk reduction,...

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### KiwiRail Electrified Network

KiwiRail Holdings Limited

Shapefile which identifies the extents of the electrified railway network. Polylines may not match the exact track centreline. Supplied as ESRI shapefile (polyline) in NZTM.

HTML Esri REST GeoJSON CSV KML ZIP

### Meshblock 2013

Stats NZ

This dataset is the definitive set of meshblock boundaries for 2013 as defined by Statistics New Zealand. Statistics New Zealand maintains an annual meshblock pattern for the...

SHP MapInfo File CSV GPKG FileGDB KML DWG PDF

### NZ Imagery Surveys

Land Information New Zealand

The NZ Imagery Surveys dataset contains a comprehensive index of all orthophoto index tiles found on the LINZ Data Service. Each record in the dataset provides both a geometry...

SHP MapInfo File CSV GPKG FileGDB KML DWG PDF

## Metadata Content Guidance

For key resilience and climate change datasets

Objective ID: A3614757

### Location Information

7 May 2019



# How can LINZ support your resilience work?



Land Information  
New Zealand  
*Teitū te Whenua*

# How can we work together to make a real difference?

