Key Datasets for Resilience & Climate Change

Data Improvement Plan 2019/20

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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

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

Appendix B – Key Dataset Criteria

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

Criteria	Definition
Data Re-Use for Resilience and Climate Change	
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.
Data Significance for Resilience and Climate Change	
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). https://www.civildefence.govt.nz/cdem-sector/cdem-framework/civil-defence-emergency-management-act-2002/#legislation
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.
Data for Resilience and Climate Change Scenarios	
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.

Dataset	**First survey**	**Second survey**	**Total**
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.