



NZ Geospatial R&D and Resilience

Infrastructure Research Day – Integrating Research into Practice
17 October 2018, LINZ

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Resilience and Positioning Team, Location Information

Today we will hear about:

- NZ Geospatial R&D Documents
- Resilience Program

NZ Geospatial R&D Documents



New Zealand Geospatial Research and Development Priorities and Opportunities 2016 - 2020

Working in partnership to grow
benefits for end users



Section A - Overview

New Zealand Government

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Section B - Appendix

New Zealand Government

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Section C - Supplementary Information

New Zealand Government

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See <http://www.linz.govt.nz/about-linz/our-location-strategy/new-zealand-geospatial-research-and-development-priorities-and-opportunities>
Or Google "geospatial research and development priorities"

Thank you Greg...

Effectiveness = quality + acceptance

Benefit = (science) quality + user / end-user uptake (impact)

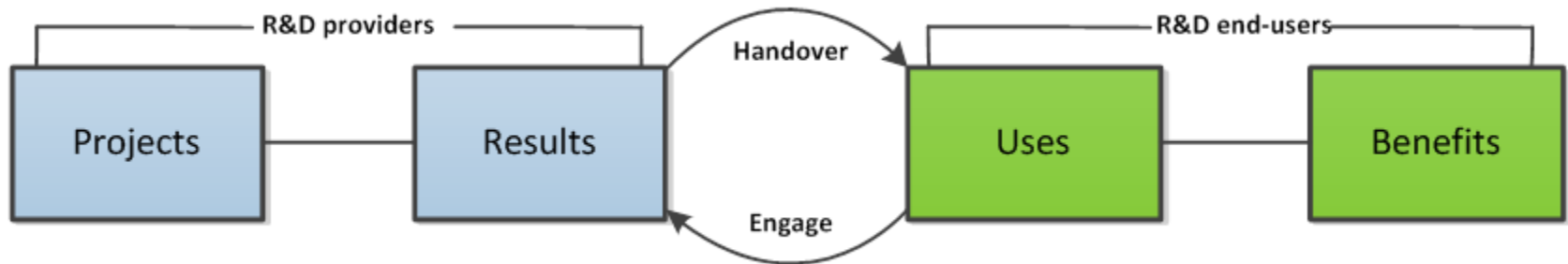
How we developed these documents

- Invited a cross section of public and private sector researchers, end-users and other stakeholders.
- Segmented into 13 sector workshops:
 - Auckland for Today and Tomorrow; Buildings and Urban Planning; [Canterbury Earthquake Recovery](#); Culture, Heritage and Tourism; Energy and Minerals; Environment ; Health and Society; [National Infrastructure](#); [National Resilience against Natural Hazards](#); Strategic Interests Beyond Our Borders; Primary Industries (Agriculture and Forestry as well as Fisheries and Aquaculture); and Emergency and Related Services
- Finally, had 1 common-theme workshop.
- In total, over 200 people attended.

Common themes



National Resilience to Natural Hazards



City council builds/uses virtual models, digital elevation maps and other geospatial information to run simulations of flooding (at individual property level) throughout a city to identify flood risks and inform land owners and owners of man-made and natural assets (and also to clarify the current and evolving demarcation of land/water boundaries for TLAs and RCs).

City councils and others have detailed flood-risk information which they can subsequently use to pre-emptively minimise their risks and impacts from flooding (this Result can be replicated for all forms of natural hazard) (includes more accurate weather/land boundaries (shorelines, rivers, estuaries, lakes) and how they are varying and are predicted to vary over time).

City councils and others pre-emptively minimise their risks and impacts from flooding using detailed flood-risk geospatial information/ other information (can be duplicated for other natural hazards) (includes the councils preparing long-term climate-change adaption plans for coastal and river flood plains).

Safe, resilient cities where people have a high quality of life.

PRUB – trying to identify the best research questions that align with practitioner needs. See OpenStrategies, <http://openstrategies.com/>

LINZ's challenge and outcome area



Resilience and climate change

Support 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).

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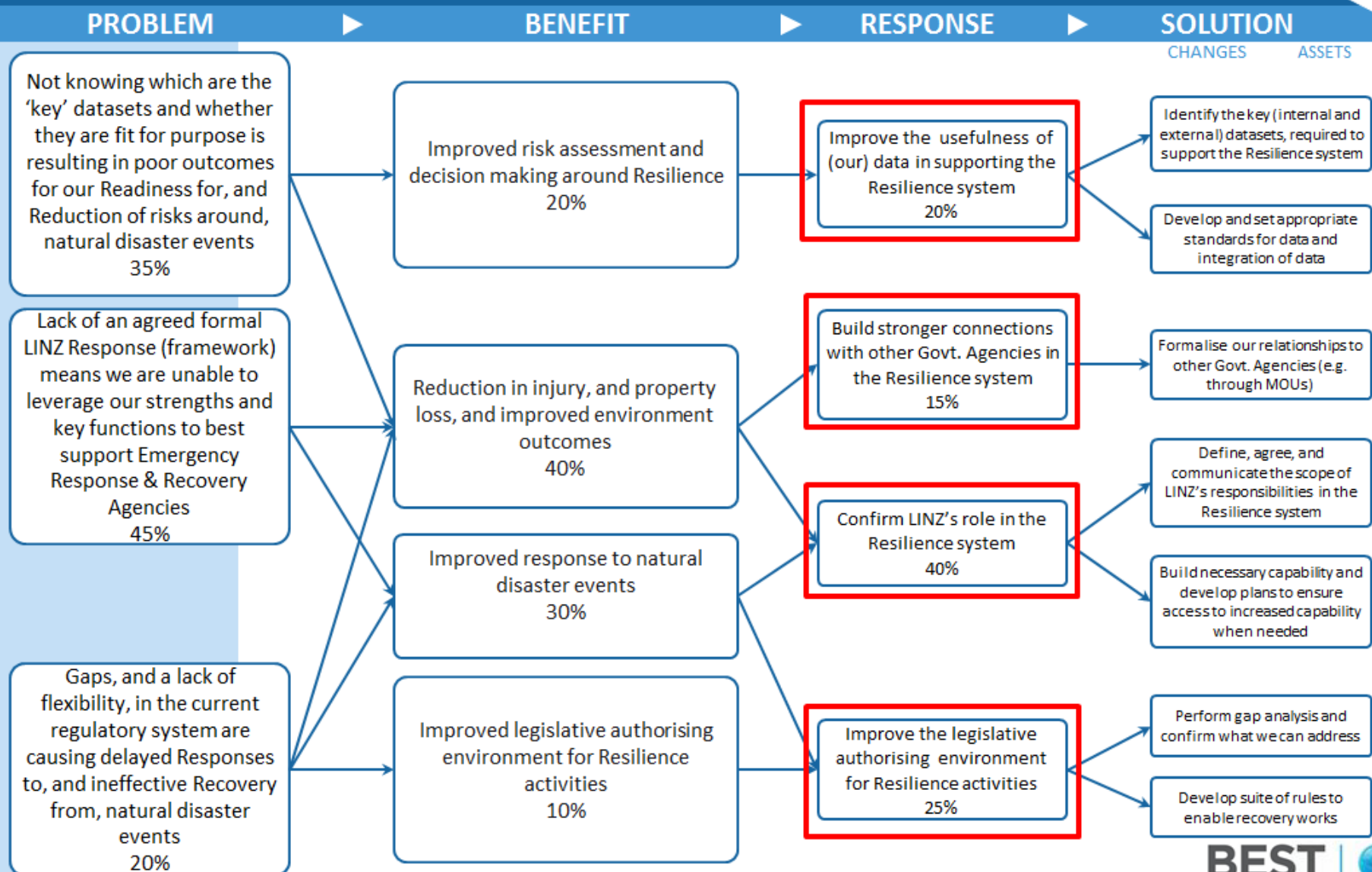


High-value geographic and property information

Geographic and property information are used effectively to deliver value for New Zealand.

Improving NZ's Resilience to Disaster events

Improving NZ's ability to reduce and be ready for, and respond to and recover from, the effects on land and sea caused by natural or man-made events including the impact of climate change.



Data improvement - identify datasets based on User Needs

Use Case	Representative Organisation
Reduction	RiskScape plus Tonkin + Taylor
Readiness	Lifelines
Response	Emergency Services
Recovery	Local Government
Climate Change	NZ & UK Climate Change Risk Assessment



High-value geographic
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Resilience and
climate change

Key Datasets for Resilience & Climate Change



Address
Buildings
Property
Population



Road Network
Rail Network



Aerial Photography
Topographic Map
Elevation
Coastline



River Network
Water Catchments

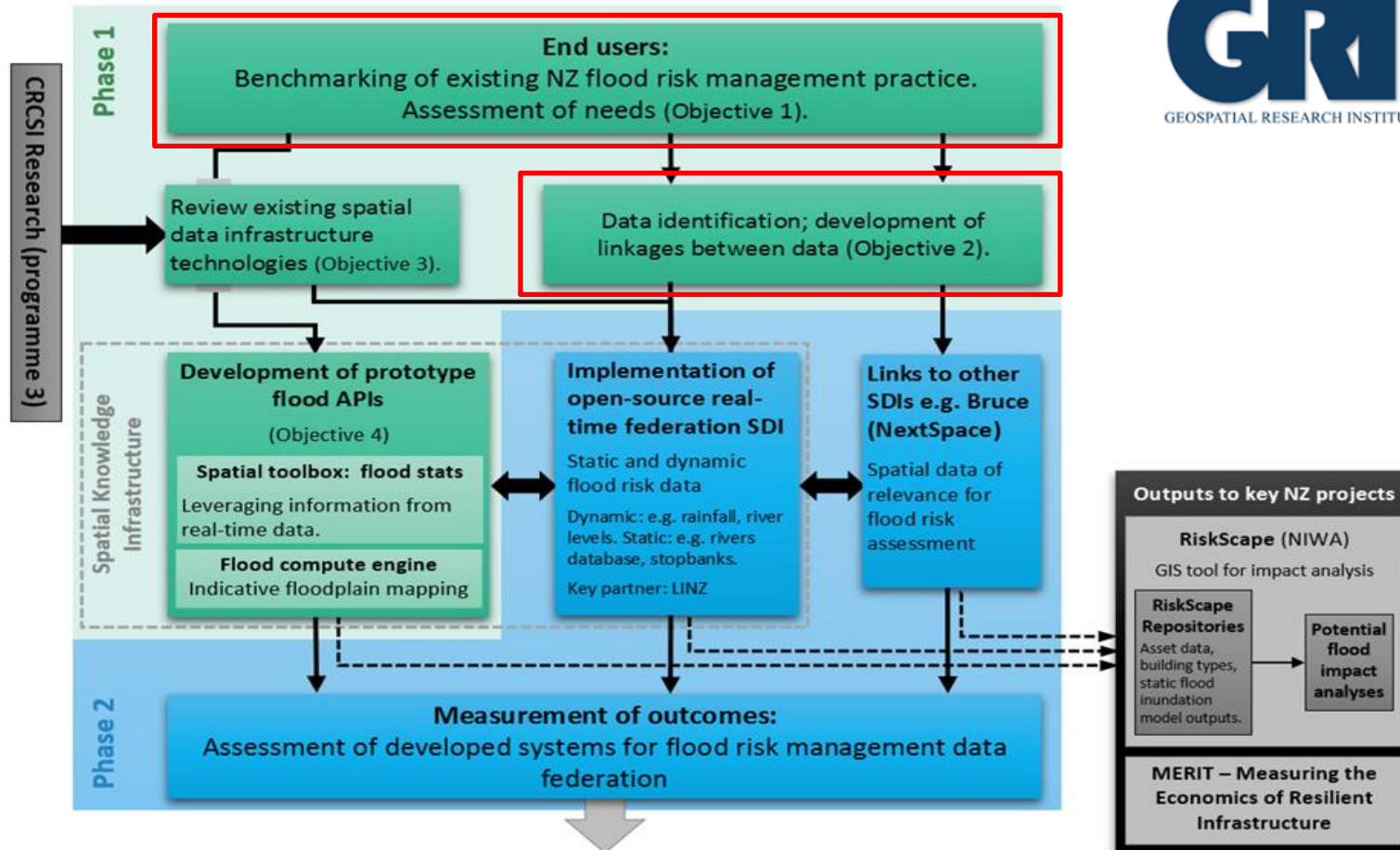


High-value geographic
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Resilience and
climate change

Flood Data Federation R&D



Further follow-on projects – e.g. changing flood risk; implementation in Australia

Overarching data issues identified by workshop participants

Key to issues:

Accessibility	Coverage	Governance	Policy
Standardisation	Uncertainty and data quality	Other	

- Accessibility
- Coverage
- Governance
- Policy
- Standardisation
- Uncertainty & data quality

Identified Problems	What Currently Works Well	Desired Improvements
Hard to download large datasets	Easy to access download services.	Access to data real-time
Data saved in individual files so takes ages to download		Stock-take of existing available datasets and barriers to making them available
Difficult to find and access some datasets e.g. need to know who to ask in the councils to obtain data		Better monitoring - improved coverage (temporal and spatial) and greater use of remotely sensed data
Insufficient frequency of measurement in datasets: temporal (update cycle and time series frequency), spatial resolution / gaps in coverage.	Resolution of some data	Reduce 2-3 hour time lag in processing real-time satellite imagery
Reliance on averaged / interpolated data due to lack of measured data.		Feedback improved DEM's to a central collection
Lack of authoritative source of data; multiple providers/sources of the same or similar data; unidentified or unknown data provider		Data sharing e.g. make it easier to share and access model outputs
De-centralised responsibility for data; this creates inconsistency at regional and national levels, with gaps and duplication between agencies and their data.		Gathering site data and feeding it back so that others can use it
CRIs conflicting drivers of providing freely and openly available data and their need to operate on a commercially competitive way and protect their IP	Open and freely available data.	Centralised datasets; centralised database/ collection of LIDAR data
Property data is hard / costly to access - IP is commercially licenced		One organisation to collect all data? or high level coordination for same consistent data.
Possible ethical concerns about making property values freely available.		Coordinate federated agencies and host data from one place of access.
Lack of common semantics to support users understanding and interpretation of the data.	Guidelines for LIDAR, standards for data (e.g. LAWA)	Super-computer to hold and process data and models
Insufficient standardisation in data exchange formats;	Interoperability of some datasets	Establish common responsibilities and approaches for dataset collection and management
Regional variability of data coverage and quality.	National map projection	Standardisation of datasets (content, formats, semantics).
Variation in vertical datums used and ability to recognise this and interpolate / convert between them.	Technology	Standardisation of data collection and coverage.
Poor / non-existent metadata describing datasets.		Need to set common ARI - plus these assessments often vary with hazard type e.g. volcano, earthquake, flood
Uncertainty over relevance or fitness-for-purpose of available data		Handling of uncertainty
Poor warrantability of data; lack of audits to confirm data quality.		Need to communicate/ understand error with different data
Absence of effective understanding and communication of errors and uncertainty in data and model outputs		
Keeping datasets up-to-date e.g. pipe data		

Resilience Programme: next steps

- Data improvement plans
- Improving data discovery
- Getting clear about LINZ's service offering in a major event
- Cross-system coordination



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Resilience and
climate change



Thank you!