

RiskScape & New Zealand Flood Exposure

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RiskScape 2.0 – Development Progress

- A RiskScape 'engine' rebuild started in May 2018.
- Flexible framework for deterministic and stochastic risk modelling.
- Plugin architecture for developing and connecting software features to the engine.
- Operable via Command line or Graphical User Interface.
- RiskScape 2.0 public release targeted for May 2020.

```
C:\WINDOWS\system32\cmd.exe
Error: No subcommand argument given
Usage: riskscape [-eh] [--no-core-plugins] [--sorting-aggregation]
               [--log-level=<logLevel>] [--stats-out=<statisticsDumpFile>]
               [-b=<basePath>] [-l=<pluginPaths>]... [COMMAND]
Run the riskscape engine via the command line
  --log-level=<logLevel>
                        Sets the log level for default loggers
  --no-core-plugins    Disable loading core plugins
  --sorting-aggregation
                        Use the sorting aggregation algorithm instead of the
                        default bucketing algorithm
  --stats-out=<statisticsDumpFile>
                        Periodically update a file with statistics
  -b, -H, --home=<basePath>
                        Specify path to your riskscape directory containing types,
                        functions etc. Defaults to HOME/riskscape. Can be set
                        via a RISKSCAPE_HOME environment variable.
  -e, --show-stacktrace Show detailed error information
  -h, --help            Show this help message and exit.
  -l, --load-plugin=<pluginPaths>
                        Load a plugin from this path

Commands:
function  Query riskscape functions
type      Query riskscape types
bookmark  List and inspect bookmark data
model     Inspect and run Riskscape models
plugins   Interrogate plugins
datastore Interrogate a datastore, such as a WFS server


C:\Users\paulikr\RiskScape>
```

Recent National Flood Exposure Research

National Science Challenges

THE DEEP SOUTH

Te Kōmata o Te Tonga



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Coastal Flooding Exposure Under Future Sea-level Rise for New Zealand

Prepared for The Deep South Challenge

National Science Challenges

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New Zealand Fluvial and Pluvial Flood Exposure

Prepared for The Deep South Challenge

<https://www.deepsouthchallenge.co.nz/projects/national-flood-risks-climate-change>

Coastal Flood Hazard Mapping

New Zealand 1% AEP extreme sea-level flood hazard maps (ESL 1) for present-day MSL:

- Increments of + 0.1m SLR up to +3m.
- LIDAR DEM (31 Maps)
- Satellite DEM (1 Map)



Fluvial/Pluvial Flood Hazard Mapping

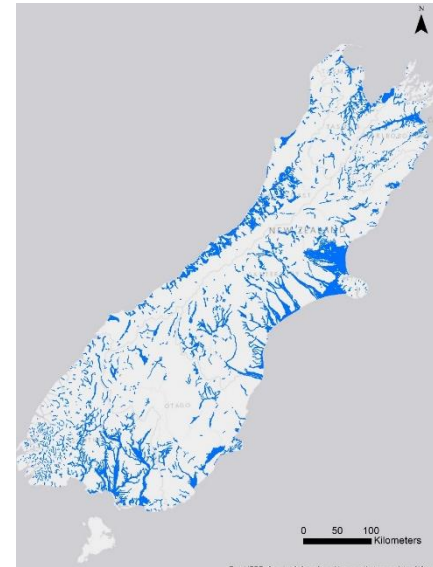
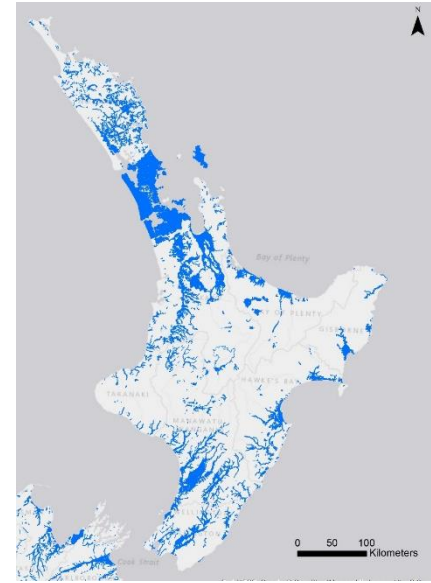
New Zealand flood hazard area map (FLHA)

The FLHA combines:

- Modelled or historic flood hazard maps.
- Flood prone soil maps.

FLHA maps used were publicly available.

The FLHA maps represent a range of flood magnitudes and frequencies.



National and Regional Coastal Flood Exposure - Transport

ESL1 Exposure Summary

National

Road and railway exposure increases by 133 km and 10 km for every + 0.1m SLR on average.

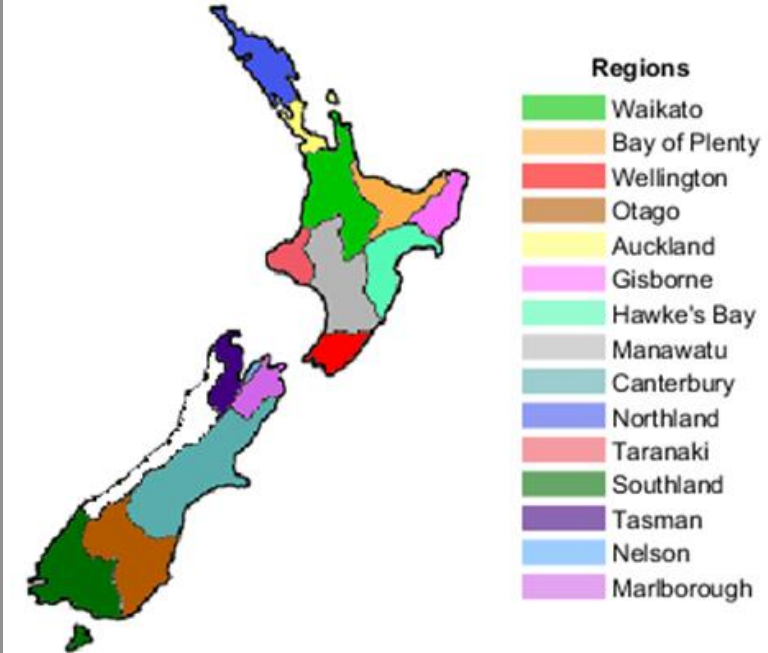
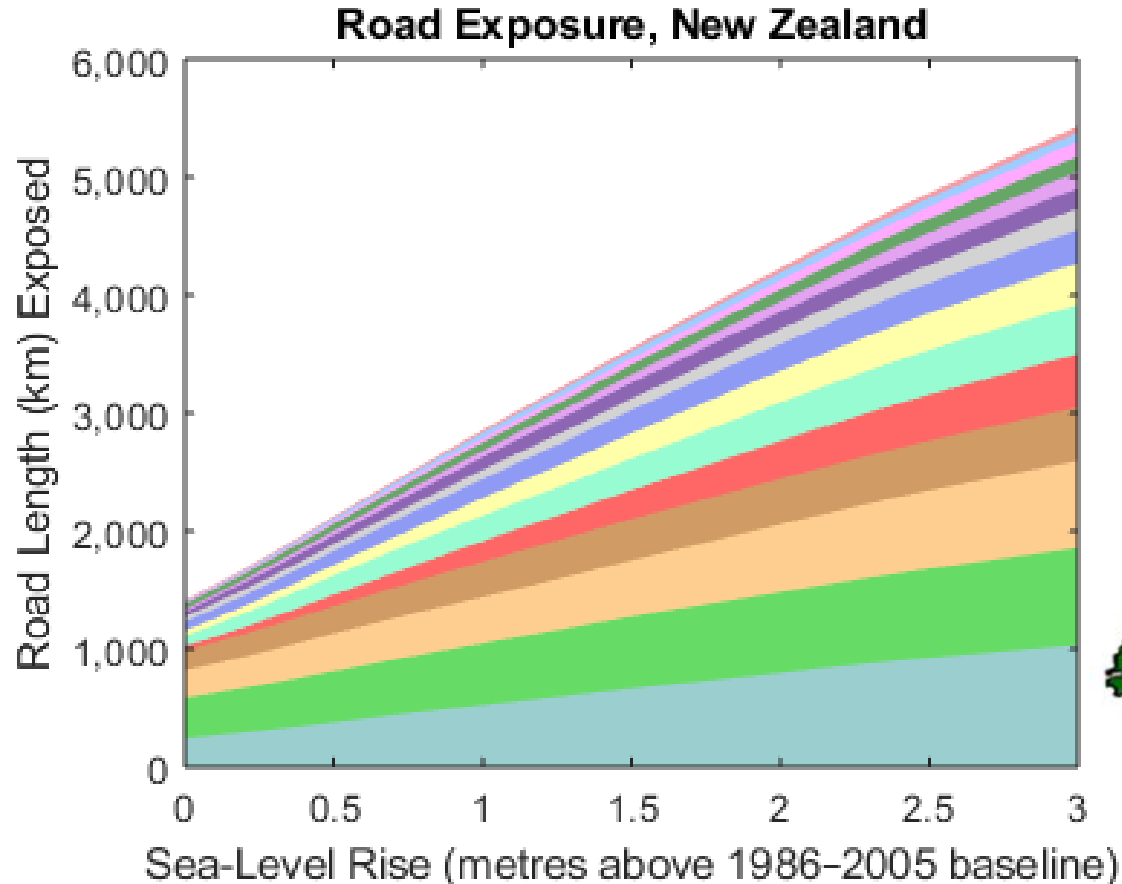
13 airports are exposed at 0 m SLR.

Regions

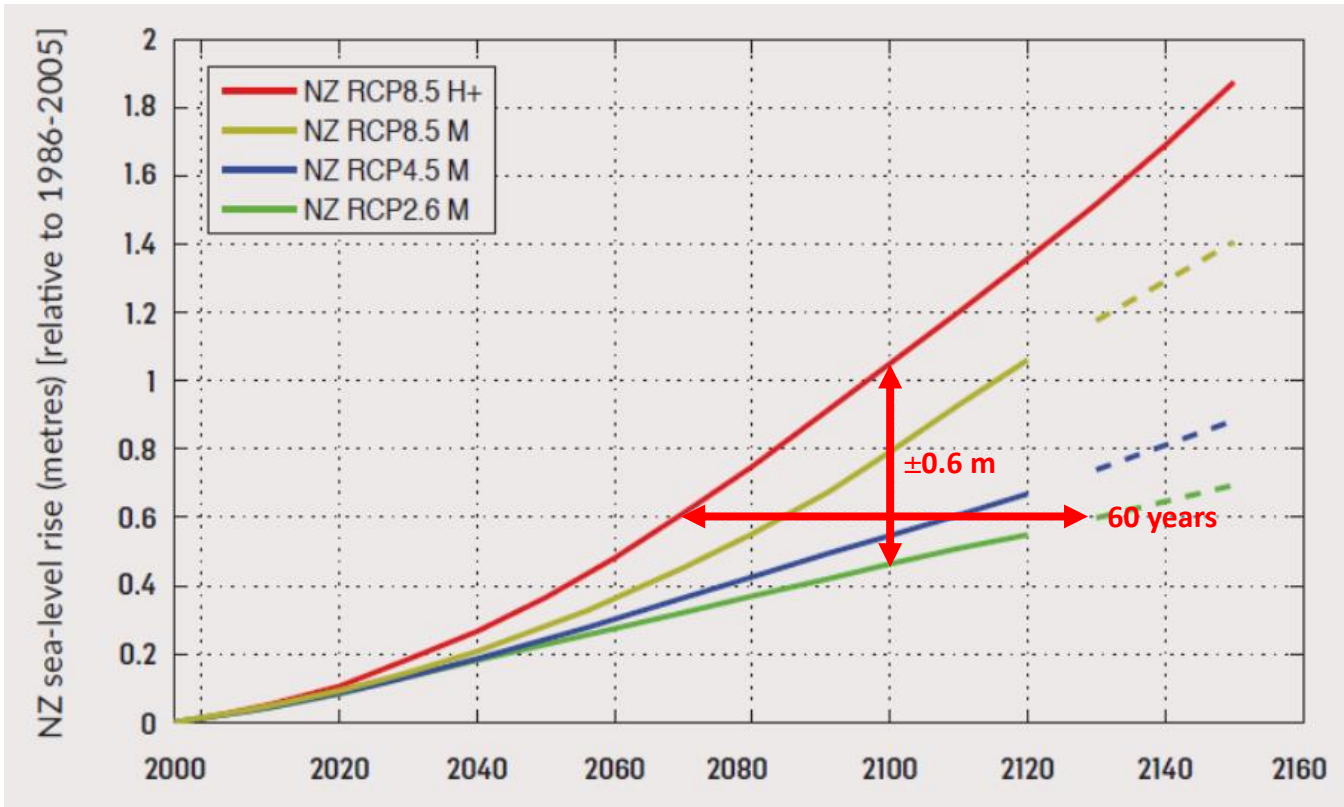
Road exposure in both Waikato and Canterbury exceeds 500 km at 1 m SLR.

Territories

Around 300 km of roads are exposed in Hauraki District and Christchurch City at 1 m SLR.



Exposure and Sea-Level Rise Projections (MfE, 2017)



SLR (m)	Year RCP8.5H+ (83%ile)	Year RCP8.5H (50%ile)	Year RCP4.5 (50%ile)	Year RCP2.6 (50%ile)	Auckland Road Exposure (km)
0	-	-	-	-	48
0.3	2045	2050	2060	2070	70
0.4	2055	2065	2075	2090	80
0.5	2060	2075	2090	2110	89
0.6	2070	2085	2110	2130	100
0.7	2075	2090	2125	2155	111
0.8	2085	2100	2140	2175	123
0.9	2090	2110	2155	2200	136
1	2100	2115	2170	>2200	149
1.2	2110	2130	2200	>2200	162
1.5	2130	2160	>2200	>2200	213

<https://www.mfe.govt.nz/publications/climate-change/coastal-hazards-and-climate-change-guidance-local-government>

Next Steps

2020 MBIE Endeavour Fund

- Bid to implement a national flood risk assessment which includes development of a national flood model(s).
- Opportunity to provide consistent fluvial/pluvial flood map coverage across New Zealand.

2019 -2024 Deep South Challenge – Infrastructure Domain.

- RfP's for research that enables adaptation to climate change.
- Opportunity to develop maps for a broader range of coastal flooding scenarios (e.g. 20%, 10 %, 5 %, 2 %, 1 %, 0.2% AEPs).
- Quantify the impacts of coastal flooding on critical infrastructure networks.