LGNZ - Local Government Sea Level Rise Exposure Project

(interim findings)

James Hughes

Agenda

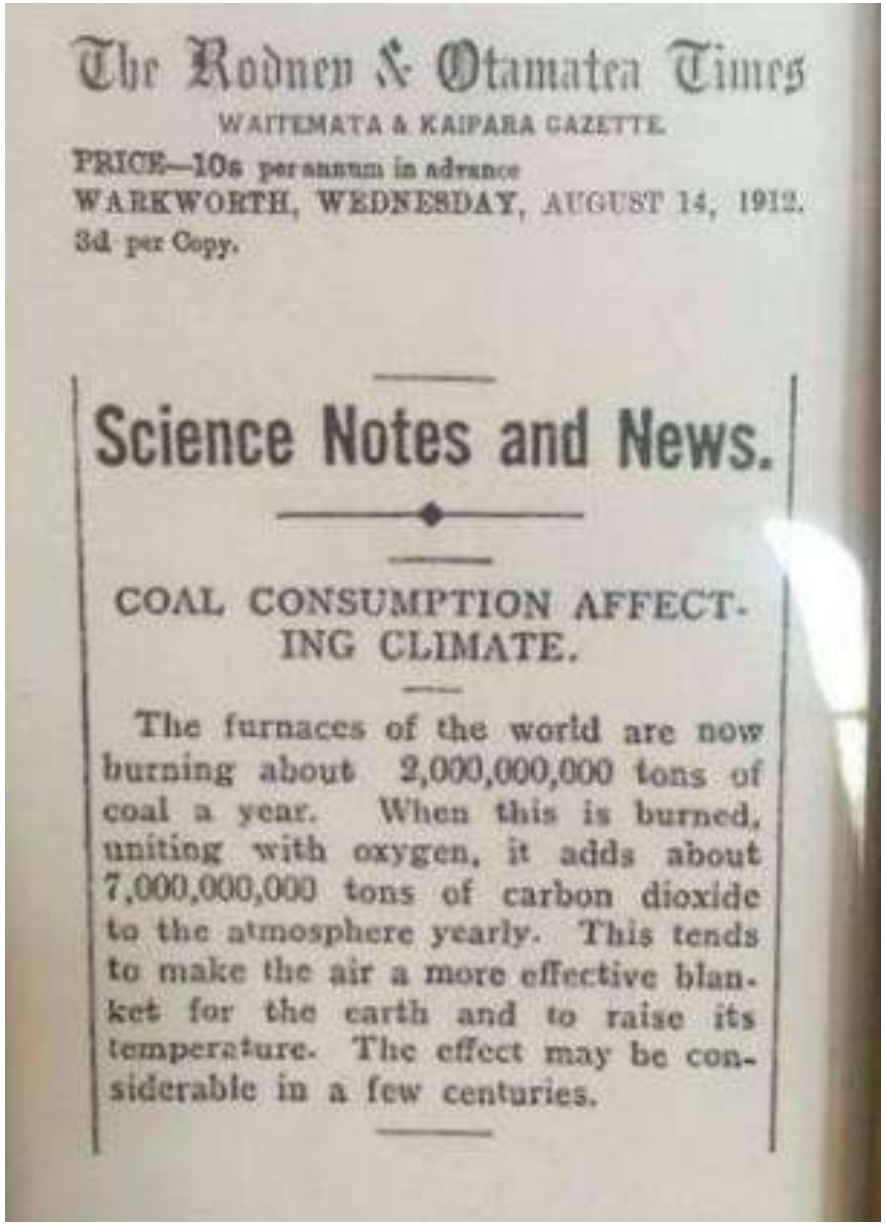
- Background
- The project
- Interim findings
- What this means and next steps

Background

Climate change is complex

1. Emergent and unpredictable
2. Huge amounts of Data
3. Responses and behaviours vary – and this creates feedback

Data



The Rodney & Otamatea Times

WAITEMATA & KAIPARA GAZETTE.

PRICE—10s per annum in advance

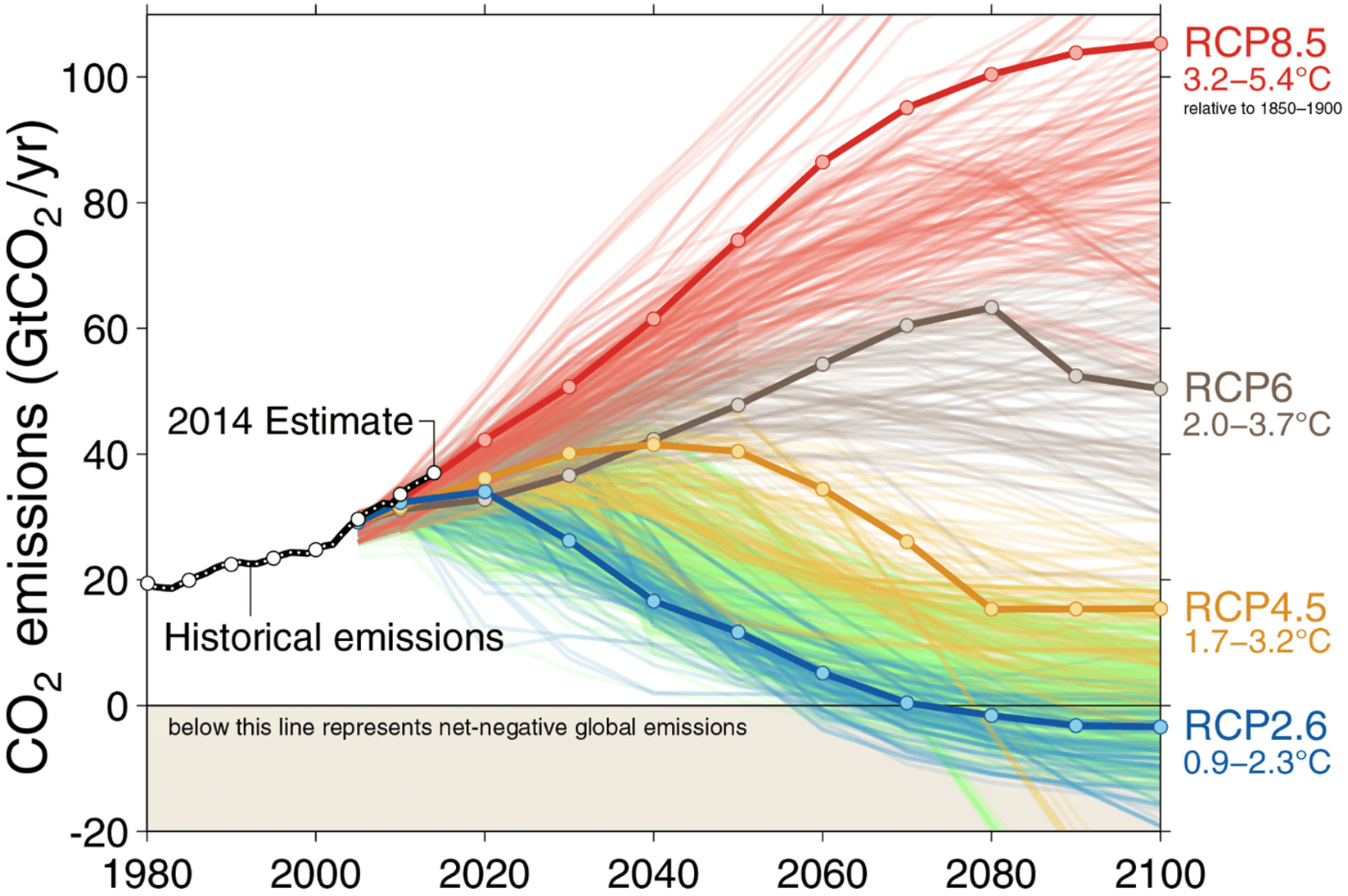
WARKWORTH, WEDNESDAY, AUGUST 14, 1912.

3d per Copy.

Science Notes and News.

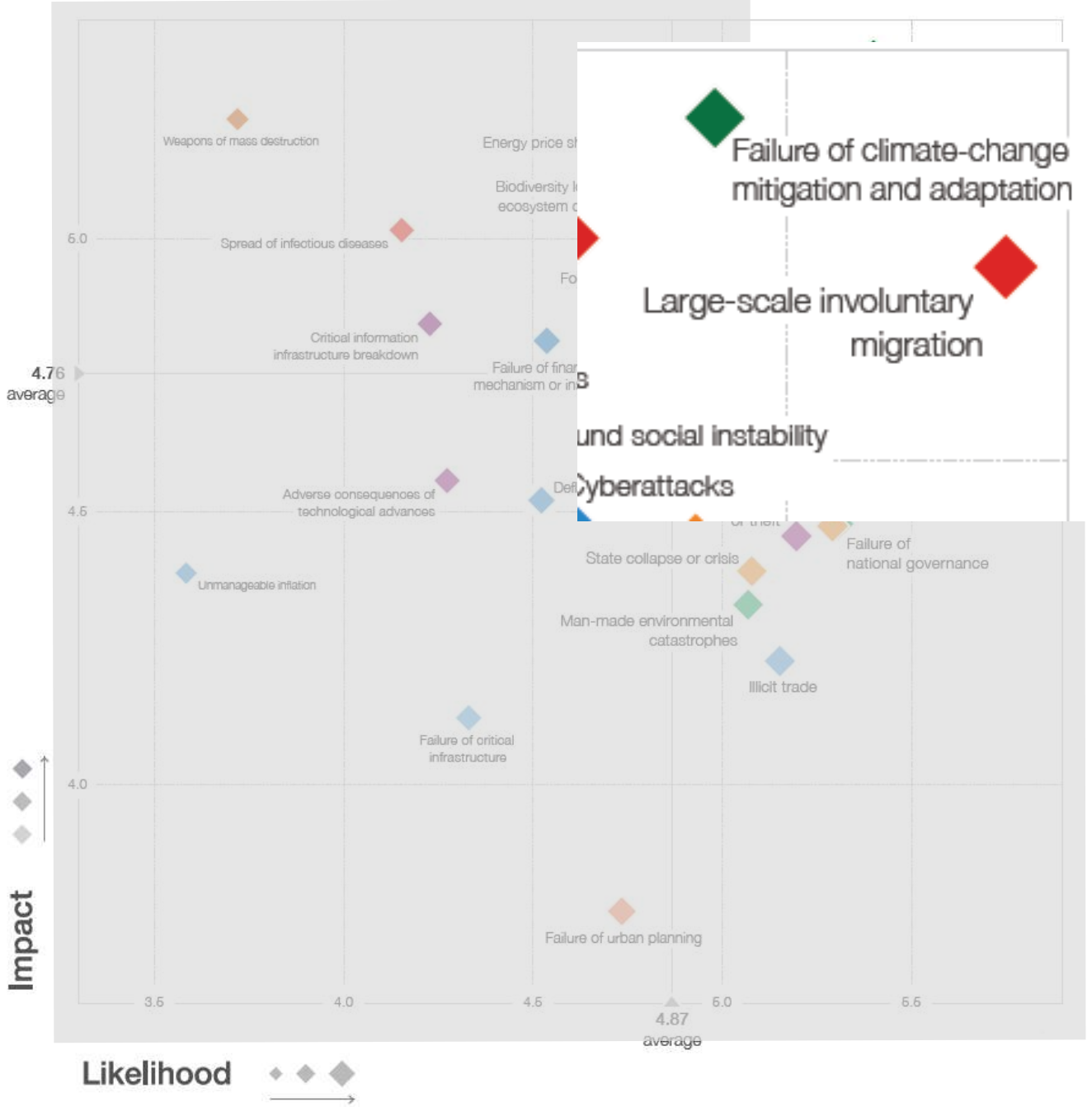
COAL CONSUMPTION AFFECTING CLIMATE.

The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.



Source: Fuss et al, 2014

So what does this mean?



World Economic Forum: ***Global Risks Report 2016***

Is unprecedented the new normal?

- The past is not a good indicator of the future
- Direct / indirect / residual risks

- ICNZ: $234M in insured losses (2017);
- ICNZ: $72M in May event, $174M to date (2018)
- What about uninsured?

The Washington Post
Democracy Dies in Darkness

Wonkblog | Analysis

Houston is experiencing its third '500-year' flood in 3 years. How is that possible?

By Christopher Ingraham
August 29, 2017 at 7:30 AM

This drone video taken Aug. 27 shows the historic flooding in Houston caused by Hurricane Harvey. (ahmed.gul/Instagram)

Hurricane Harvey has brought "500-year"


TIM WHITTAKER
PHOTOGRAPHY


364 river control, flood protection, and land drainage schemes
protect some 1.5 million hectares of land
collective replacement value of $2.3 billion

Edgecumbe flood 2017

… the Panel has concluded that the historic framework which has governed the development of the Rangitāiki River Control Scheme is at or near the end of its useful life. Frameworks now being more widely adopted look towards allowing greater room for rivers to move. ***This change is underlined by the near-certainty that climate change is leading to more severe and more frequent extreme weather events of the sort that occurred in April this year.***

Rangitaiki River Scheme Review, 2017

How well do we understand exposure and risk?

Source: Bell et al (2015), including the infographic; Parliamentary Commissioner for the Environment (2015)

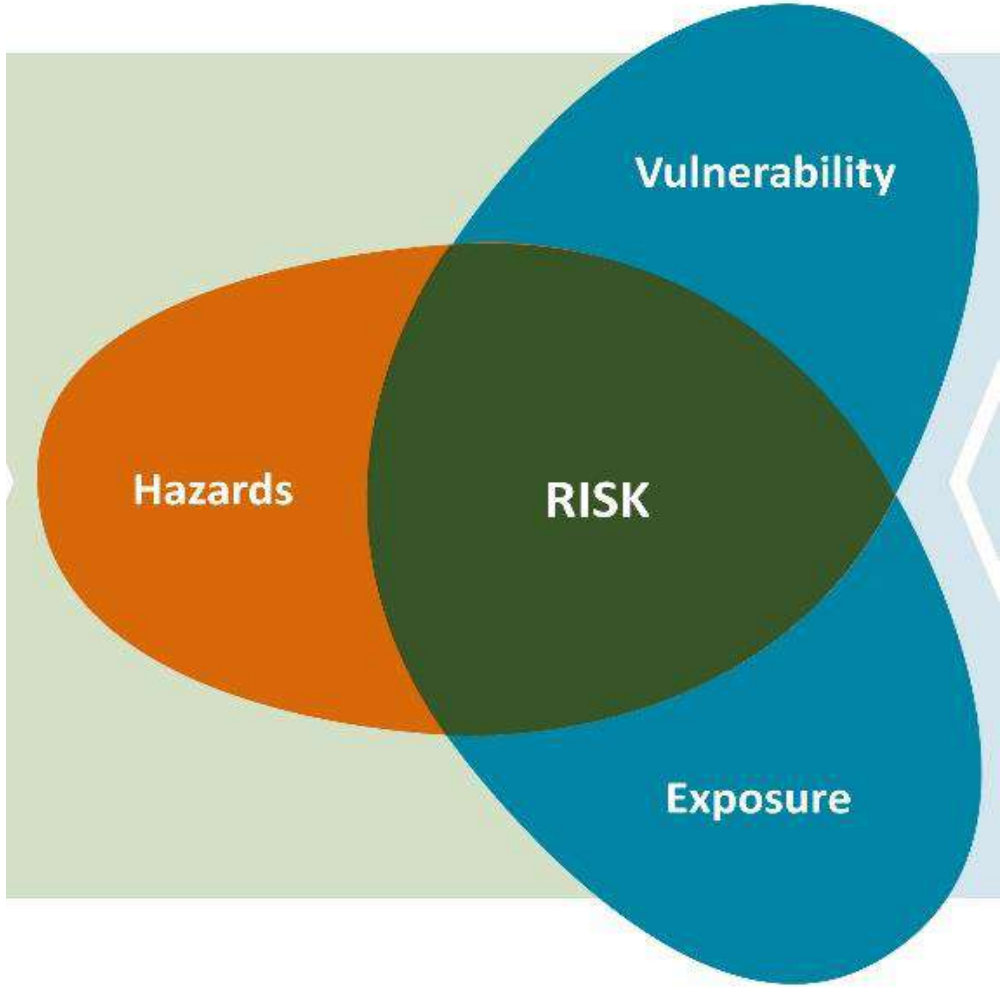
- Areas of hardship within NZ will be more greatly affected during and after a shock event.
- In a major event, how will society respond? How can we learn from this?

Increased focus on climate risk and adaptation in NZ

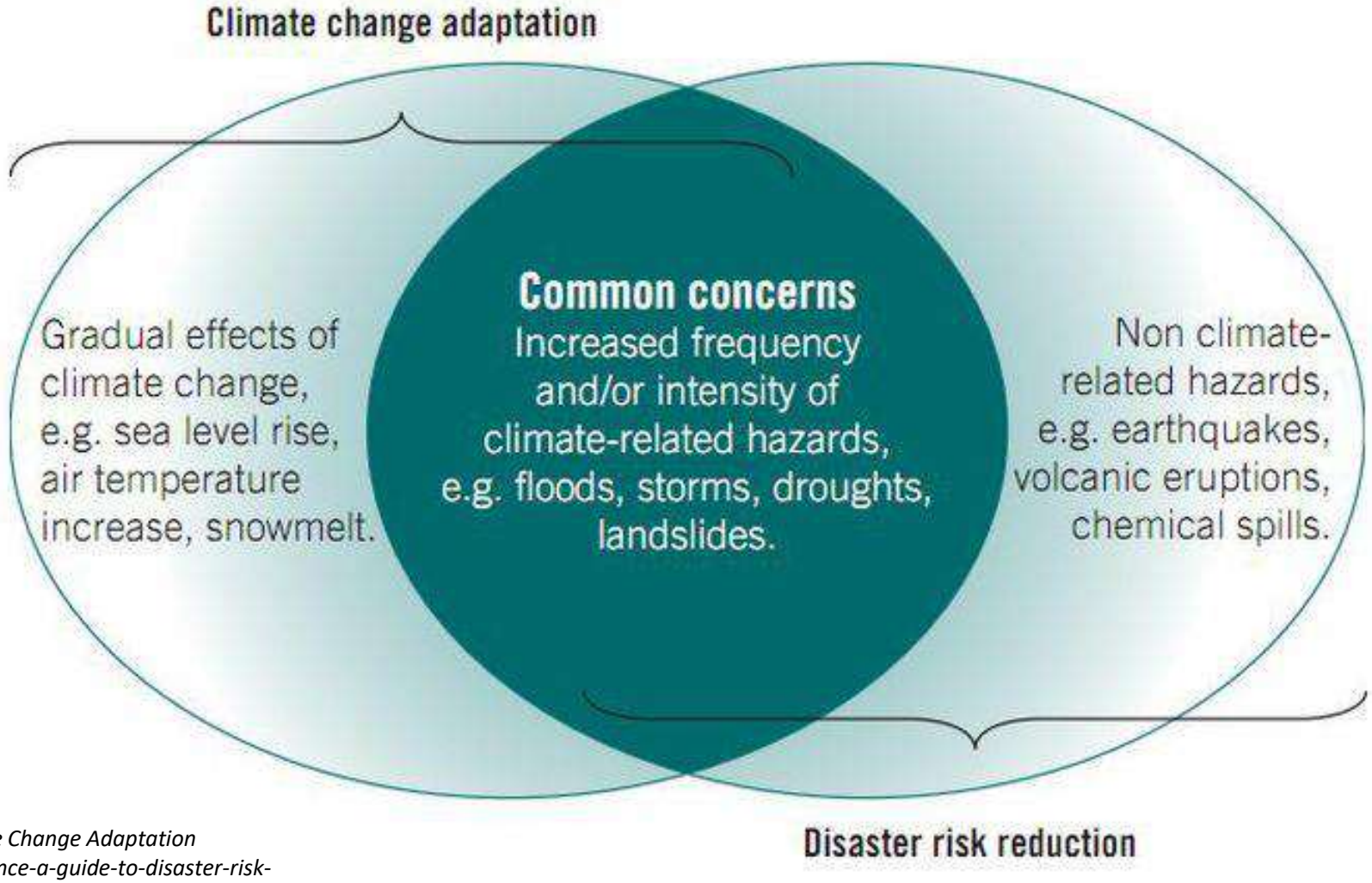
A focus on improving:

- Understanding of exposure and risk
- Approaches
- Consistency

Climate risk / natural hazard risk

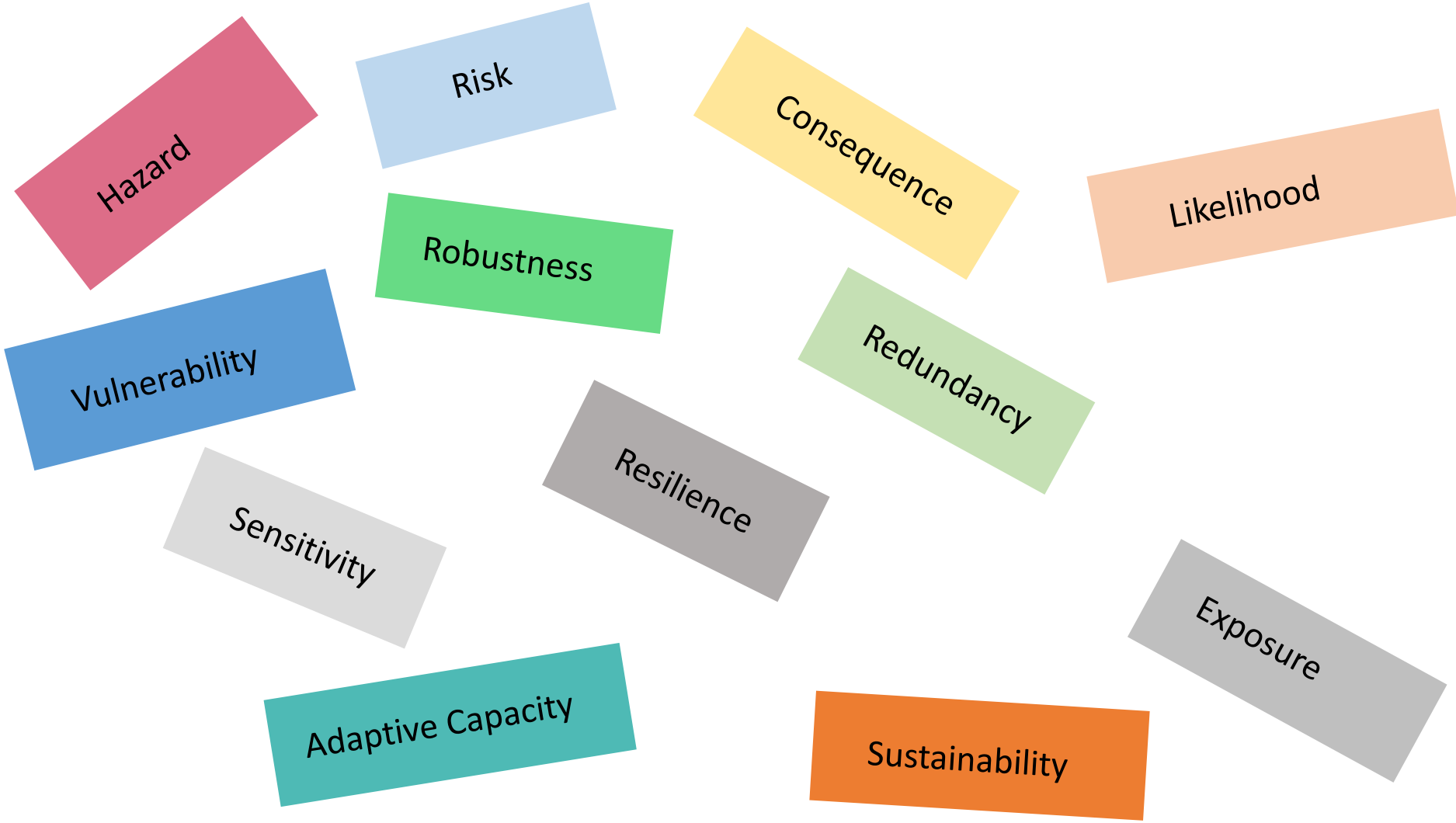


Common concerns: CCA and DRR



Toward Resilience: A Guide to Disaster Risk Reduction and Climate Change Adaptation (http://www.ecbproject.org/resources/library/341-toward-resilience-a-guide-to-disaster-risk-reduction-and-climate-change-adaptation)

Many different approaches & language

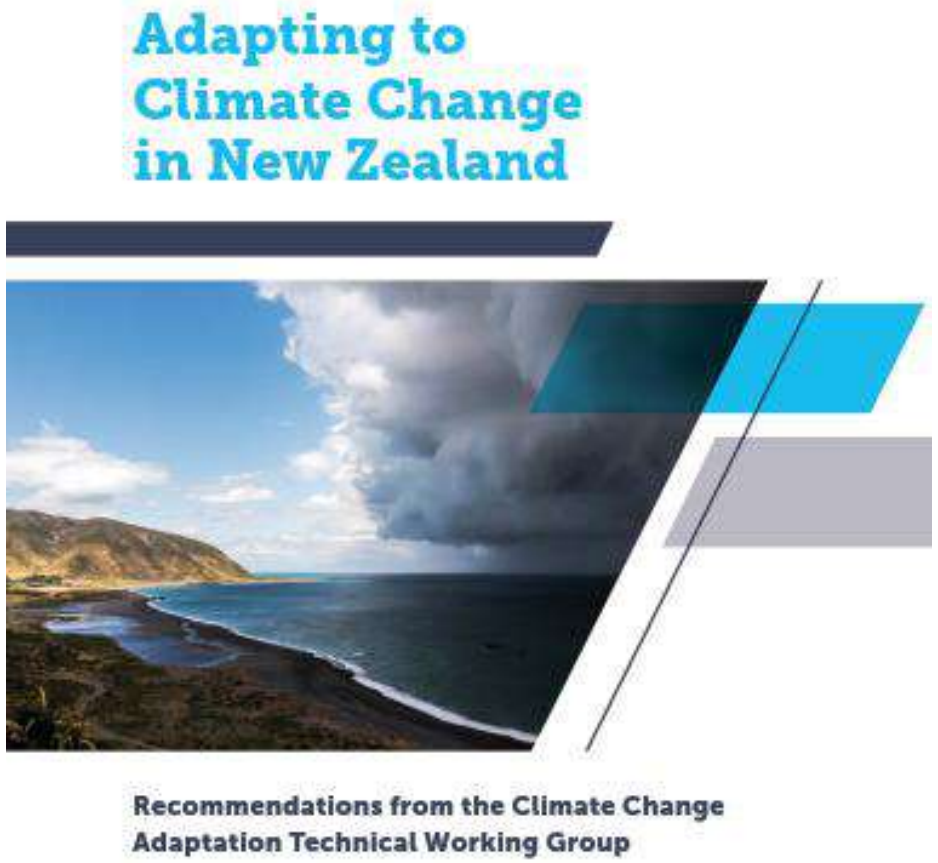


Many things happening

- Climate Commission
- MfE – Working Group, stocktake and options report (2017/18)
- LGNZ Sea Level Rise Exposure Survey
- CDEM National Resilience Strategy
- Local Government Risk Agency
- 60:40 Review
- MfE Coastal Guidance
- National Science Challenges – Deep South, Resilience to Natures Challenges, Our land & water etc
- NSC: Impacts of CC on wastewater and stormwater
- Sea Rise Project (NIWA)
- Lifelines Vulnerability Studies
- Infrastructure Strategies
- NCCRA, Etc

CCATWG Recommendations

- Action 1: Develop and regularly update a national adaptation action plan
- Action 4: Develop a national methodology and regularly undertake a national climate risk assessment
- Action 7: Review existing legislation and policy to integrate and align climate change adaptation considerations: (eg. LGA, RMA S106, NZCPS, Building Code, NPS')
- Action 12-14: Build capability and capacity in climate change adaptation across sectors – including for risk management



Summary of issues

- Government policy and activity is fragmented
- Sectoral responses are uneven
- Approaches and language are confused
- We understand climate drivers,
- Our understanding of exposure, impacts and risk is limited

Summary of issues (Aus)

This means that adaptation decisions are either not recognised as being needed, purposefully delayed, focused on managing short-term considerations, or continue to be influenced by the vested interests of property owners or developers resulting in the 'hardening' of coastlines at the expense of beaches, dunes and estuaries (CSIRO, 2016)

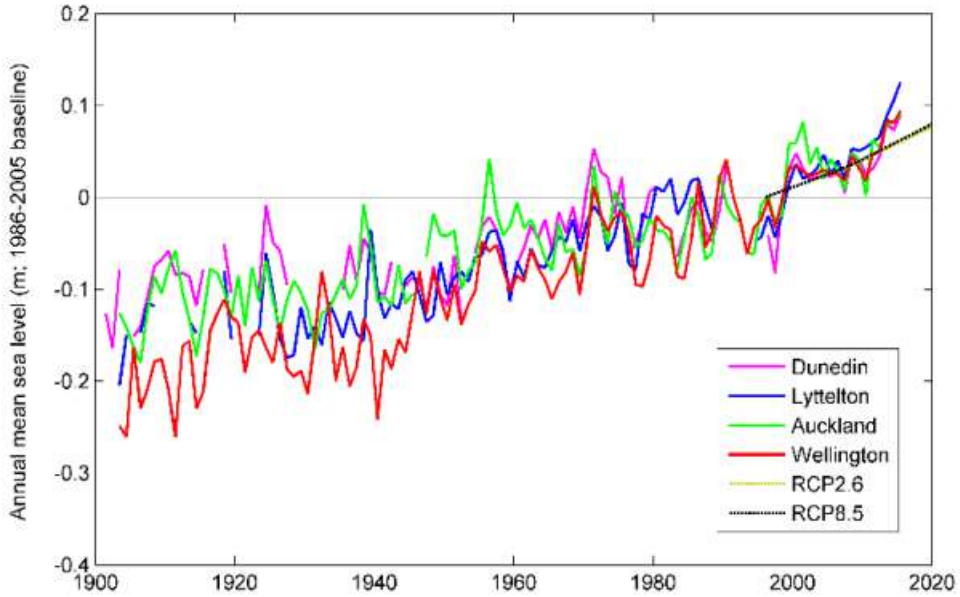
The LGNZ SLR Exposure Project

SLR exposure project

- To quantify local government infrastructure which is ***exposed*** to SLR scenarios.
  - 0.5 m
  - 1.0 m
  - 1.5 m
  - 3.0 m
- Councils with available LiDAR data covered all four scenarios.
- The national 25 m DEM was used to develop 3.0 m SLR scenario only for councils without LiDAR.
- Partially LiDAR covered councils were sent both.
- ***NOTE:*** Exposure does not necessarily imply impact or damage

SLR in NZ (NIWA)

- Average SLR of 1.7 mm/yr for NZ over past century
- Recent rate (4.4 mm/yr since 1993) larger than global average
- Uplift and subsidence a factor (e.g. Wellington subsidence)



Template Development – Three waters

1. Three Waters

Asset Type	Unit	Council TOTAL**	Replacement Value	Depreciated Value	Total - 3.0m SLR	Replacement Value	Depreciated Value	Details*	Comments / assumptions
Wastewater									
Treatment Plants	No.							*	
Pump Stations	No.								
Manholes	No.								
Pipes	km							Please use 'intersect'	
Stormwater									
Manholes	No.								
Pipes	km							Please use 'intersect'	
Water Supply (Potable)									
Treatment Plants	No.							*	
Water supply wells / bores	No.								
Pump Stations	No.								
Pipes	km							Please use 'intersect'	
Reservoirs	No.							*	
Irrigation / Flood control									
Pumps / pump stations	No.								

*Please provide a list of all assets/facilities that are impacted

** Total quantum and value for all assets owned by Council. This will enable estimations of percentages

Methodology

Council Trial

- Three councils trailed the survey to determine usability and fit for purpose
  - Tasman District Council
  - Waimakariri District Council
  - Hawkes Bay District Council

Data checks

- As data was received by councils the data was checked to ensure the values were in the correct format
- The data was also compared against all other councils as a sense check
- The single unit values was calculated from the total council values and impacted assets to ensure consistent valuations
- Data was then uploaded into Tableau for analysis

Other findings

- Data integrity
- Asset management data, vs financial data
- Valuations

Impacts & implications

National SCIENCE Challenges

THE DEEP SOUTH

Te Kōmata o Te Tonga

Wastewater System Impacts

- Increased I&I and overflows in WW systems
- Soakage field performance affected when soils are waterlogged
- Assimilation capacity of receiving environments reduced
- Corrosion due to low flows resulting in increased concentration of ww
- Increased strength of influent risking breach of toxicity levels
- Pipes float causing cracking.
- Increased odours at TPs and outfalls
- Performance varies with temperature e.g. oxidation ponds
- Drought and increased instances of very low flows and blockages – impacting on conveyance and treatment

Stormwater System Impacts

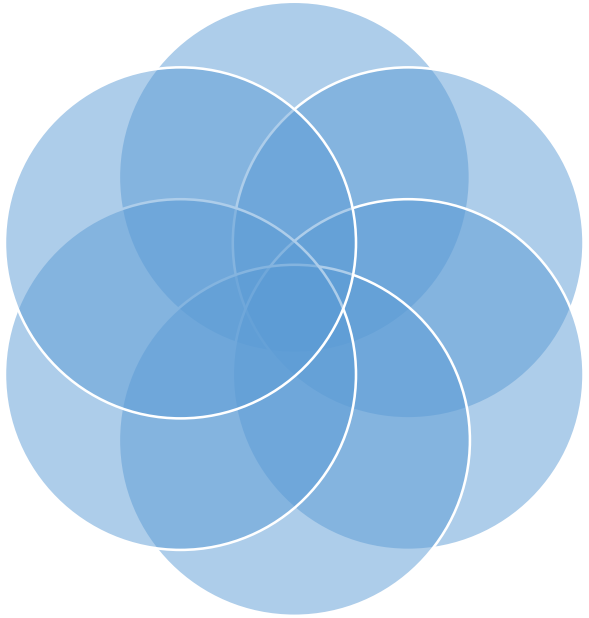
- Increased flash flooding - Roads, Assets, buildings/lifeline
- Slumping and landslides along open storm water systems
- Increased or acute contamination loading- gross pollution, fine pollution, sedimentation
- Reduction in available capacity through less time to drain between events – lower level of service
- Breaches / structural failures of flood protection
- Rising groundwater and saline ingress
- Increased tailwater levels reducing capacity and increased turbidity

Where to from here?

At Risk Working Group – Issues discussed

Transparency of data

Recommendations should set out minimum standards to be achieved as a sector



Alignment and consistency of data

Integration of sea level rise into all council planning/policy

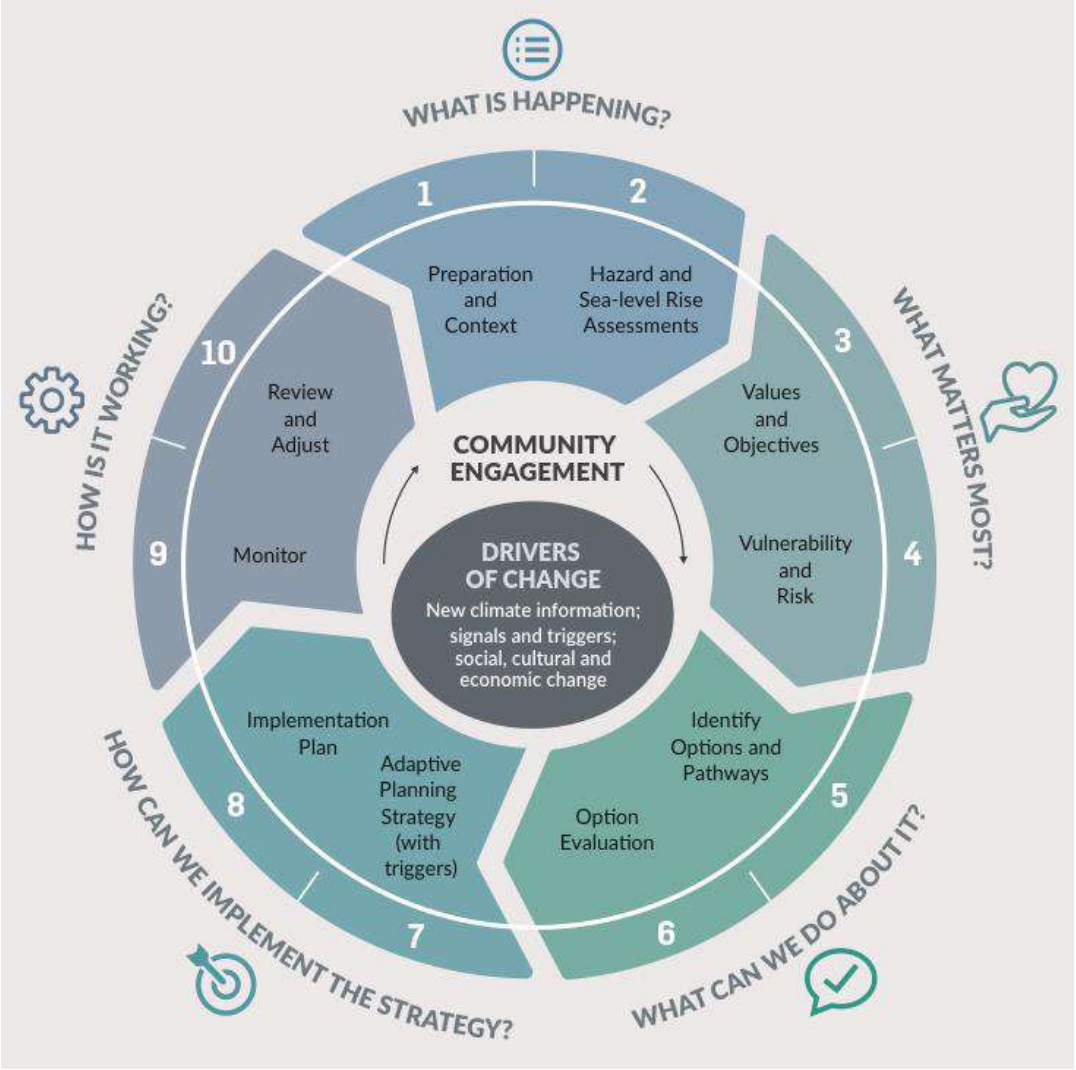
Climate risk assessments – multi-hazard assessments

Legislative change

At Risk Working Group – Issues discussed

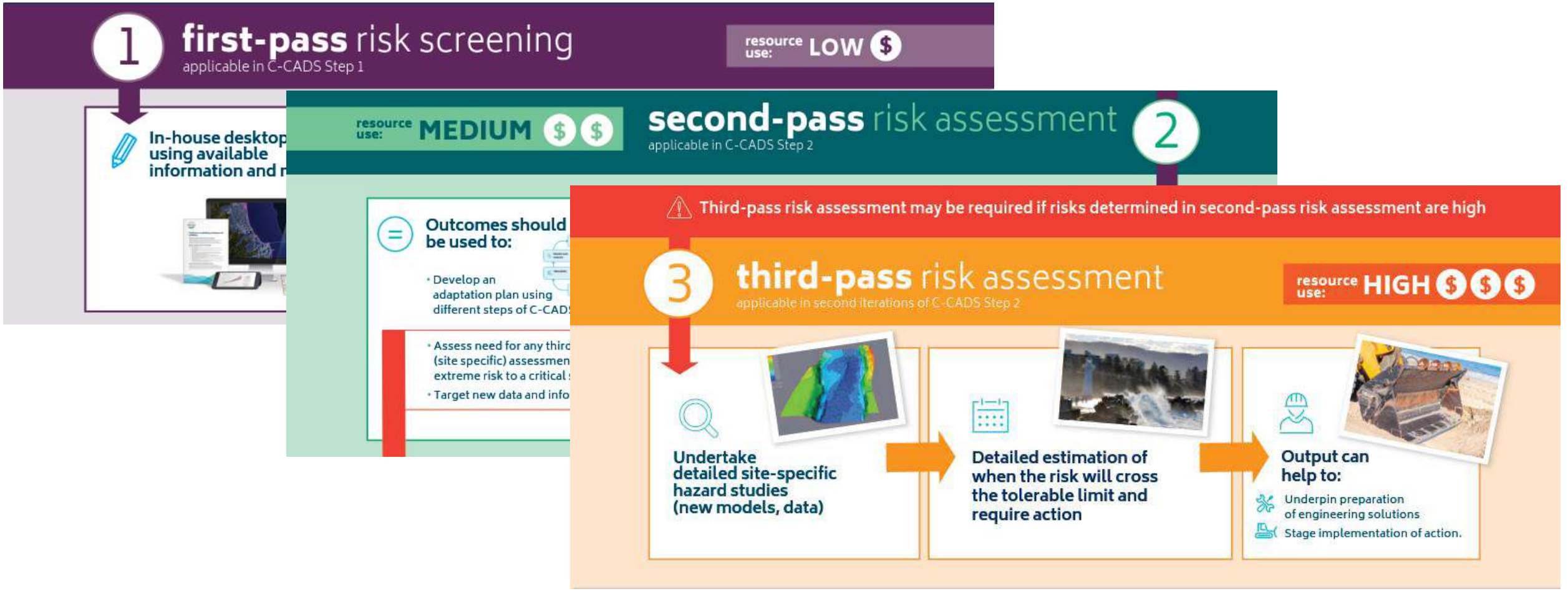
- Legislation and questions around ability to withdraw service over time and ‘send signals’. Existing use rights.
- Insurance implications and changes to 60/40
- Infrastructure strategies - and inclusion of SLR and extreme events
- Funding allocation for ‘resilience improvements’.
- Reconciling CC related hazards with other hazards – multi hazard approaches
- Current predominance of short termism and focus on BAU. Need to move to a longer term view and plan for resilience.
- Can current LOS be maintained? Implications of providing lower LOS?

Addressing risk: Robust process



MfE Coastal Guidance, 2017

Risk assessment process

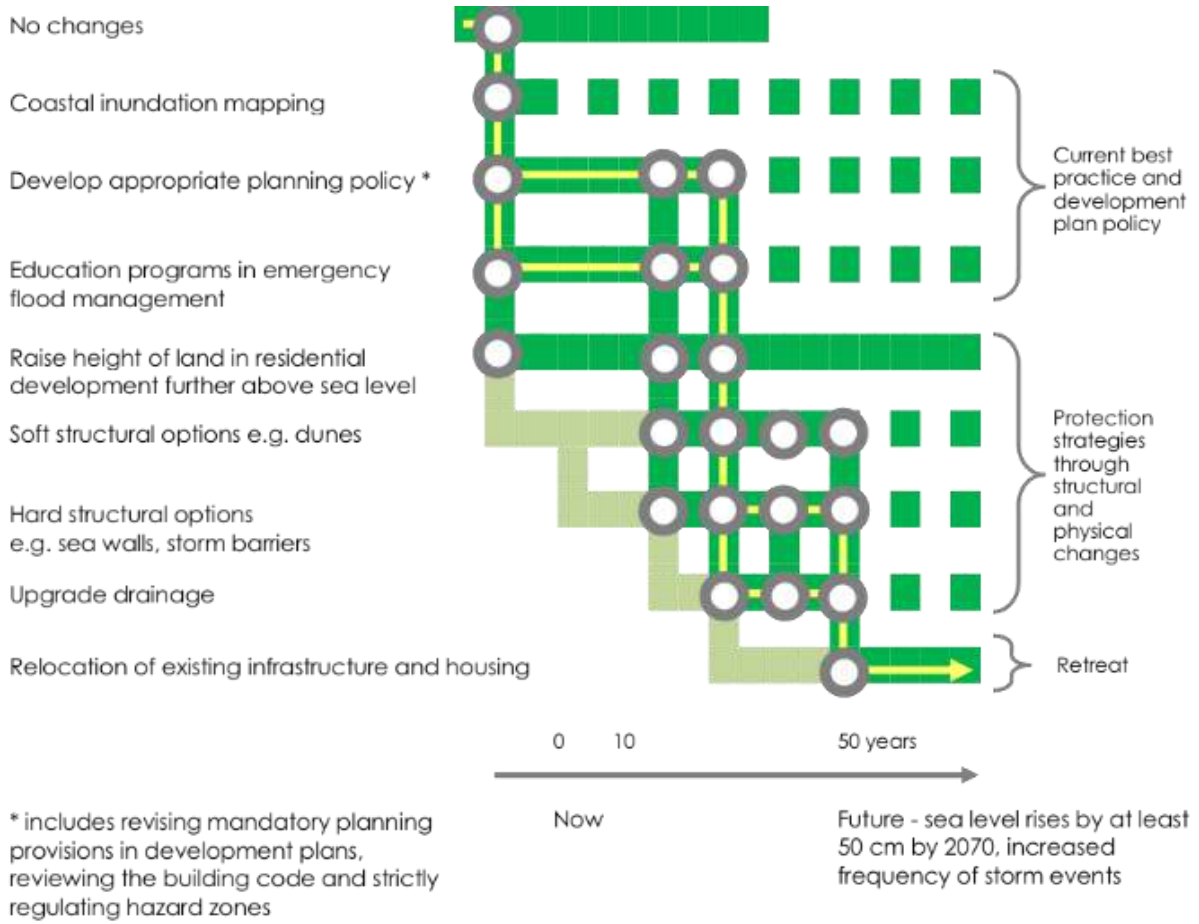


Source: NCCARF, CoastAdapt

Areas of risk

Risk Area	Sub areas
Natural Environment	Impacts on biodiversity, natural ecosystems, freshwater quantity and quality, oceans and coasts, raw resources for energy (water, wind), other ecosystem services.
Built environment	Impacts on infrastructure and buildings
Economic	Impacts on primary industries (Agriculture, Forestry, fisheries, mining), mining, biosecurity, tourism, finance and insurance, other businesses, overall costs of natural disasters.
Social and cultural	Impacts on public health, cultural heritage (waahi tapu, marae, taonga), vulnerable groups.

Pathways, signals, triggers



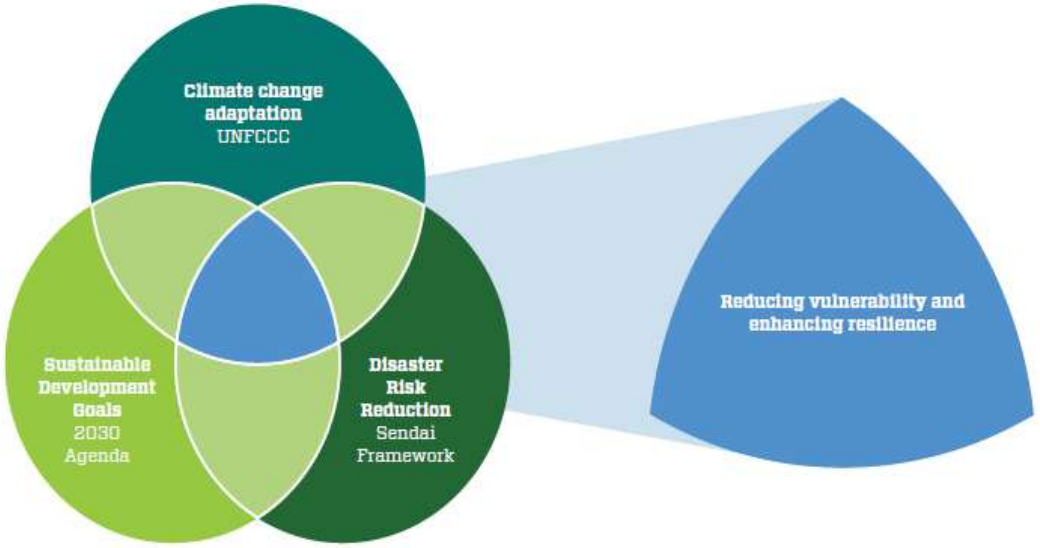
Ref: Eyre Council

ICLEI and other frameworks

ICLEI Local Governments for Sustainability

Global Covenant of Mayors

- 6 NZ cities
- Common framework and support in mitigation and adaptation
- Transparency, sharing, political support
- New framework launched next week



Closing comments

- Problems are complex & dynamic – we need **new ways of working together** to manage the significant climate risks we face
- A **joined up approach** to DRR and CCA
- **Consistent and aligned policy** and institutional arrangements
- **Risk assessment** across all sectors: Communities, infrastructure, natural environments, business and industry, health sectors, international dimensions etc
- **Options and pathways** which consider defend-adapt-retreat, policy interventions, hard and soft solutions etc
- Engagement and working together to build a **common vision and long term view**

“Human civilization is built on the premise that the level of the sea is stable, as indeed it has been for several thousand years”.

NY Times, 2016