Cascading impacts and implications for Aotearoa New Zealand
The Cascades team

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Cascades: the knowledge gap

How do climate change impacts cascade...

- **Across scales**
  - Space, time and social organisation

- **Across domains**
  - Ecological, social and economic
  - Within/outside domains of interest

- **In what way(s) are they compounded**
  - External policies/decisions/events at higher scales
Purpose

**Aim:** better understand the scale and scope of cascading impacts and implications to inform the next 100-years’ adaptation
- How they interact
- What and who is affected
- Inter- and co-dependencies
- How far they extend across multiple sectors

**Focus:** priority impacts for urban, infrastructure and financial services sector
Framing of Cascades

- Cascades are described and understood as\(^1\)
  - Societal, economic and political
  - Complex causality
  - Non-linear change (+ frequency, acceleration and magnitude)
  - Potential for Recombination
  - Cascading dynamics

- How to identify stressors (triggers) ahead of impacts
  - Linking to ‘DSC Adaptive tools and Enablers’

- What is? What could be? What are the choices and their sensitivity to climate impacts? and What to do about it?

\(^1\)based on Galaz et al. 2010
Different impacts across domains

- **Slowly emerging impacts**
  - Sea level rise
- **Widening climate variability**
  - Drought, increased flood and coastal storm frequency
- **Extremes**
  - Coastal storm surge, intense rainfall, wind
- **Surprises**
  - Accelerated sea level rise
- **Combined impacts**

- **Planning**
  - Regional/district/asset
- **Coastal and flood risk**
- **Stormwater, waste water and water supply**
- **Transport and utilities**
- **Finance and insurance**
- **Governance**
# Co-production of knowledge

## Stakeholders

1. Local government agencies
   - Regional
   - Territorial
   - Three waters agencies
2. Central government agencies
   - Policy agencies and funders
   - Transport

## Methods

1. Literature review
2. Facilitated w/shops
   - Framework
   - Draw cascades
   - Discuss implications
3. Test cascades with stakeholders for vulnerability (interviews, w/shops)
Preliminary results
Urban Cascades Workshop: Elucidating Cascades

What factors are important for a functioning liveable city (the system)? *(Brainstorm and discuss)*

How will climate change affect these factors? *(Brainstorm and discuss)*

Using one impact as an example how could climate change impacts and implications flow/cascade through the system? *(Discuss and illustrate)*

What are the critical nodes/points? *(Brainstorm and discuss)*
A functioning city is ....

- Stable predictable responsive governance decision-making systems
- Financial systems: Borrowing/lending/insurance
- Economic opportunities (work/buying selling/services)
- Reliable health systems
- Functioning supply chains
- Power supply
- Transport systems
- Water supply
- Wastewater
- Stormwater
- Accessible social services
- Leisure activities and opportunities
- A safe place to live
- A functioning city is ....
- Social activities: eat, drink, play, visit
- Equity and social justice
- Emergency services
A functioning city is ....

- Emergency services
- Power supply
- Reliable health systems
- Leisure activities and opportunities
- Economic opportunity (work/buying selling/services)
- Functioning supply chains
- Financial systems (borrowing/lending/insurance)
- Functional: Water supply
  - Wastewater
  - Stormwater
- Equity and social justice
- Transport Systems
- A safe place to live
- Accessible social services
- Social activities: eat, drink, play, visit

Overlay climate change impacts – what consequences?
Increased High Intensity Rainfall = Water Logging & Flooding

Stormwater and drainage affected – some areas are more frequently inundated or suffer regular nuisance flooding

Service levels reduced
Pressure to upgrade

Choices over how, where, when and to whom

Threat of retreat

Reduced investment – mortgage or insurance possible?

Demographic shift – risk greater for the poor

Social equity

Accommodate?

Safety

Transport & access?

Health issues for residents – damp homes/stress

Mitigate or protect?

Disruptions to business

Pressure on health systems? Other services?

Who pays and for what? Who chooses?

Impacts on other elements of a functioning city

Influences other critical decisions

Health issues for residents – damp homes/stress

Pressure on health systems? Other services?

Social equity
Next steps

• Refine workshop process

• Pilot with two further groups of stakeholders in Christchurch & Hamilton

• Produce a framework/method/tools to explore cascades

• Consider the gaps – supplement with interviews as necessary
COMMENTS OR QUESTIONS?

Thank you