



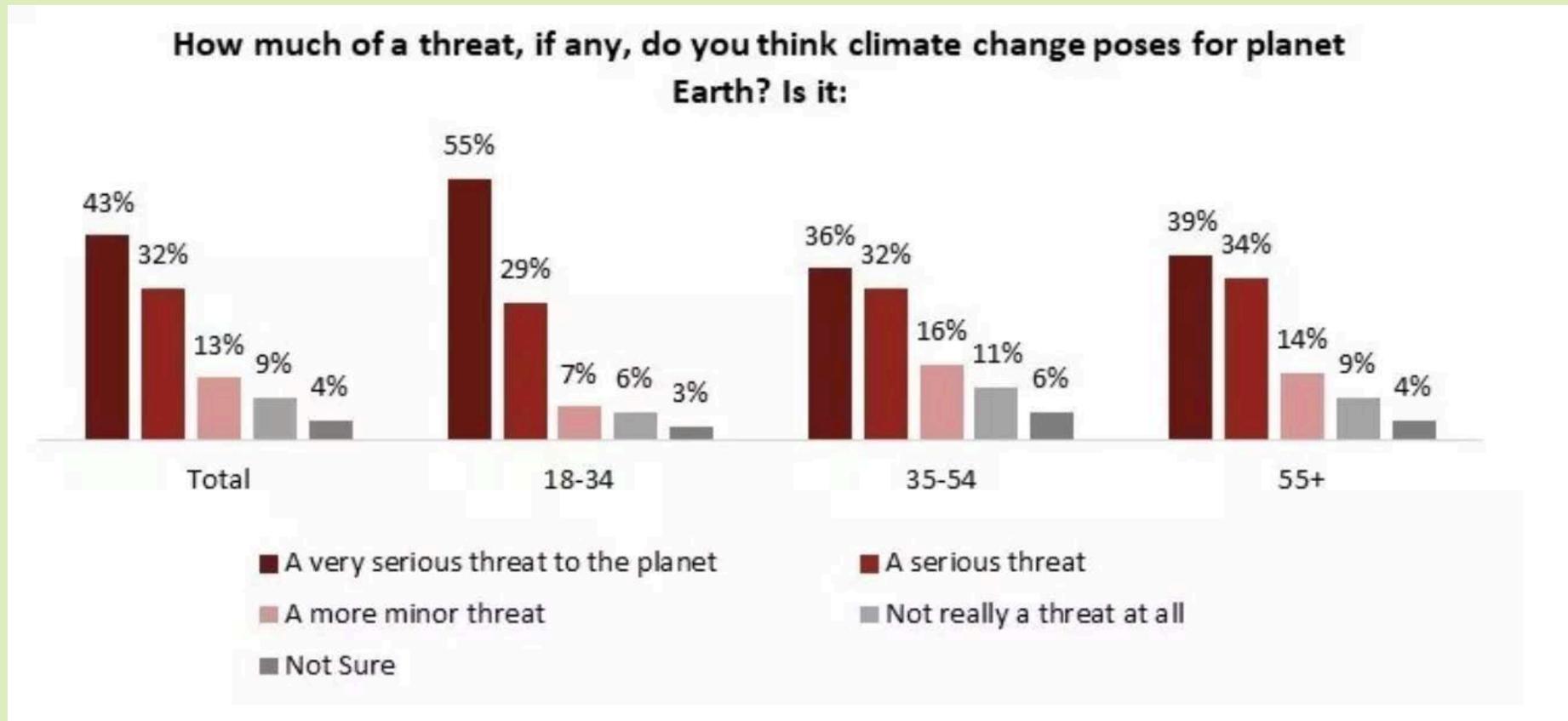
# Economic and policy considerations for climate change resilience in Canada

Climate change is real – now what?

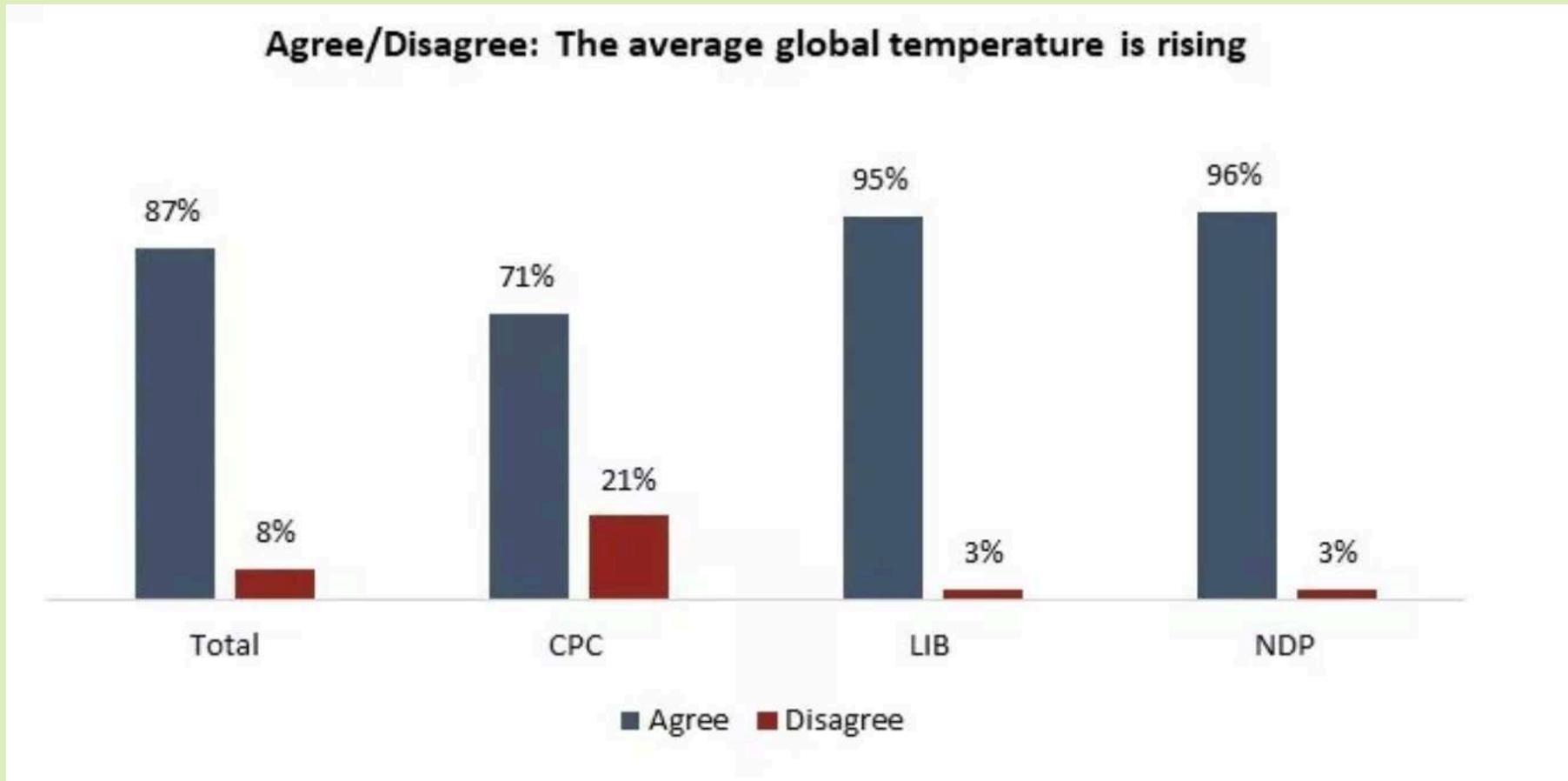
Maya Papineau

Carleton University

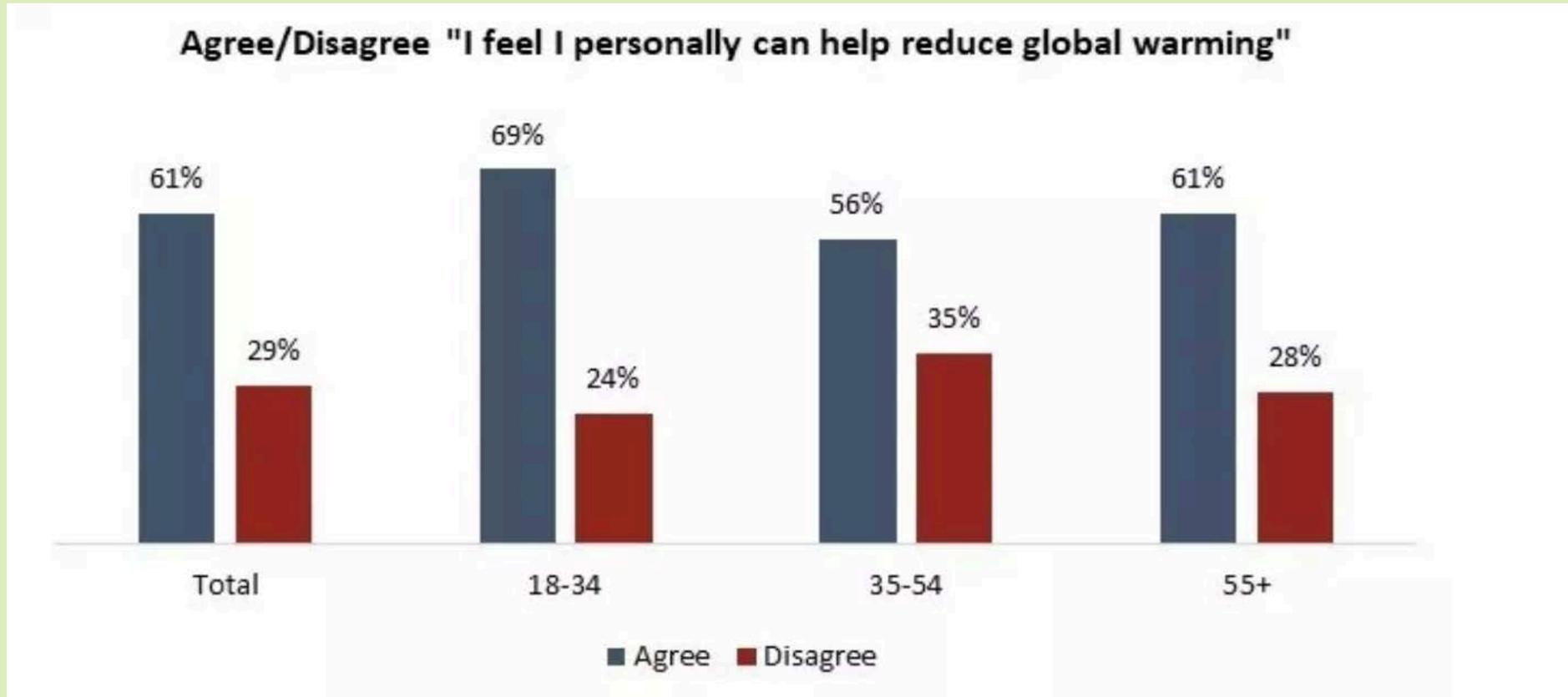
# Public Opinion Polls Indicate Strong Support for Action



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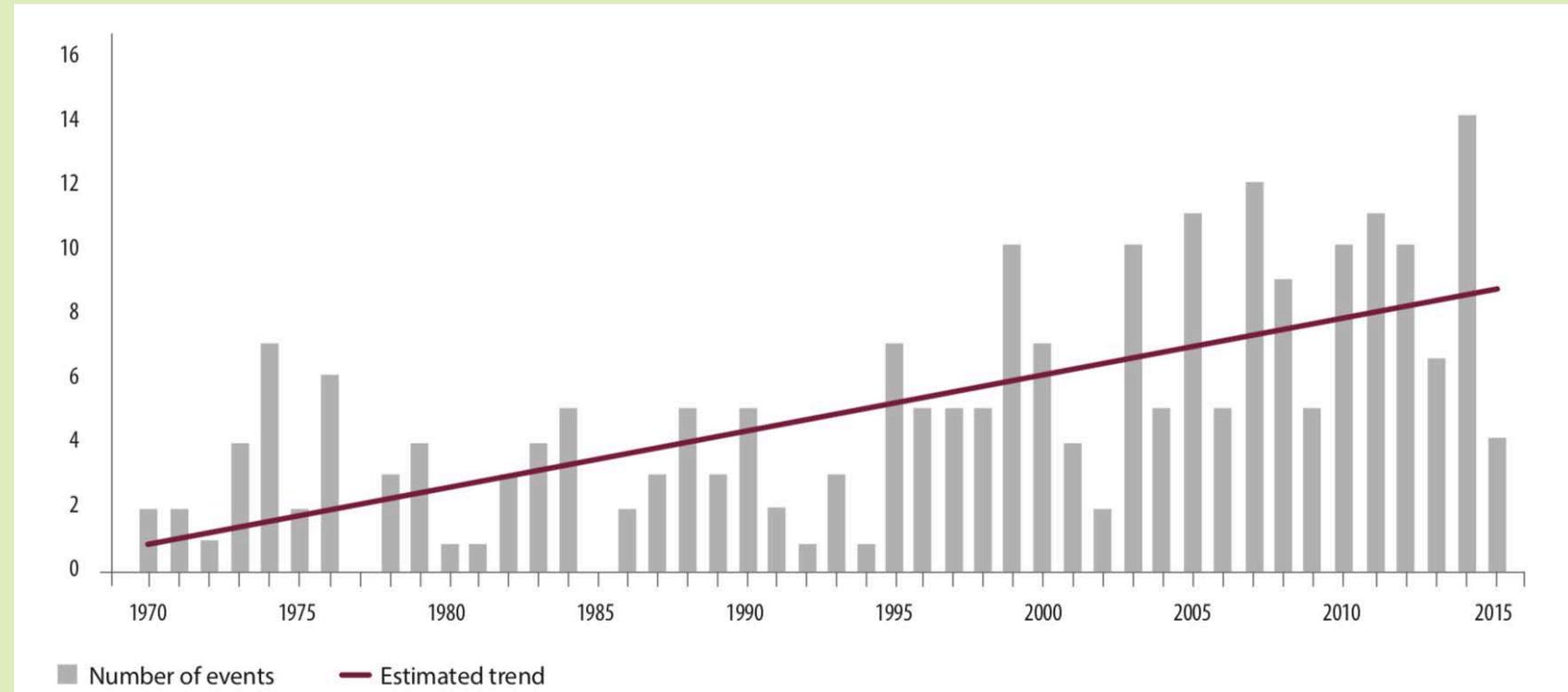
# Public Opinion Polls Indicate Strong Support for Action



# Escalating costs of natural disasters stress insurance markets

## Number of Natural Disasters in Requiring Compensation in Canada (1970–2015)

- Higher frequency of heavy precipitation events, floods, droughts and storms
- Canada will warm *faster* than the global average and experience more frequent severe weather
- These events are already presenting a significant economic concern

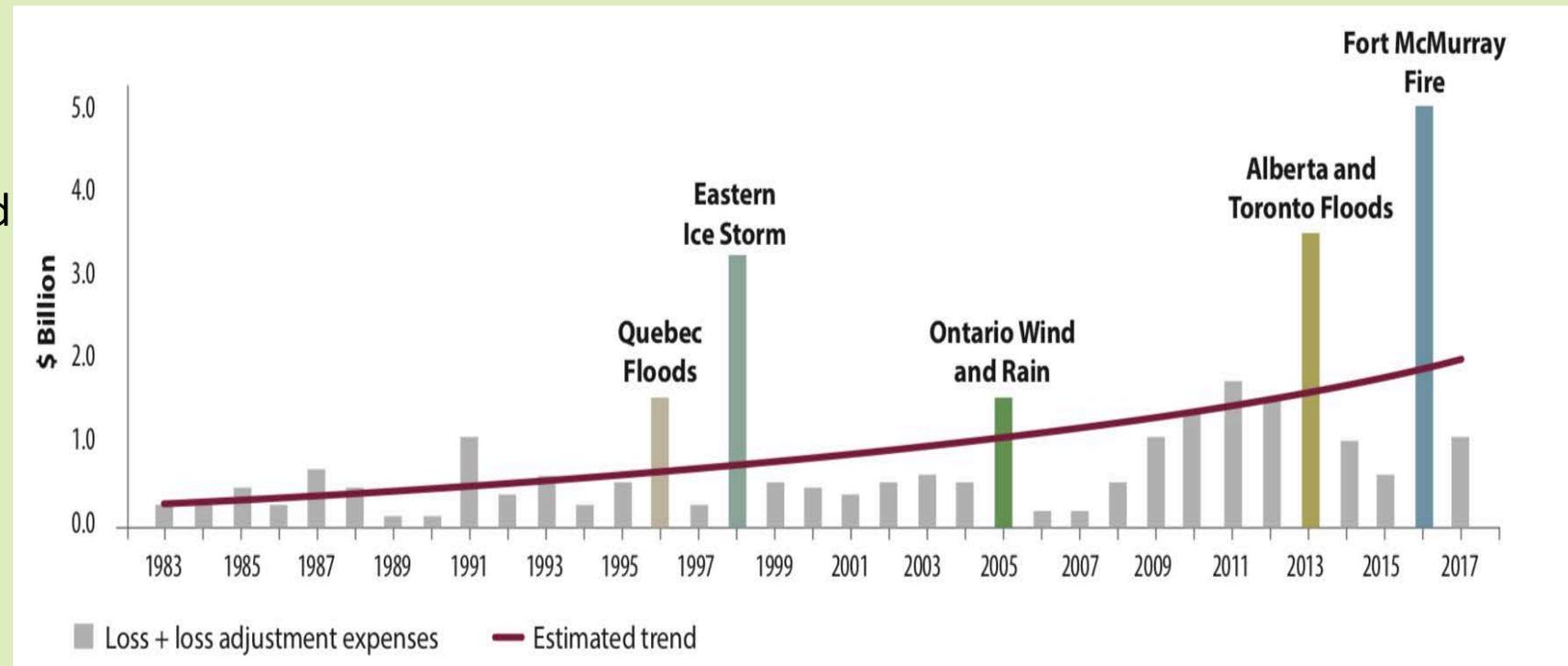


Source: Public Safety Canada

# Escalating costs of natural disasters stress insurance markets

## Catastrophic Insured Losses in Canada (1980–2017)

- Insurance payouts have doubled every 5-10 years since the 1980s
- Losses averaged **\$405 million** per year between 1983 and 2008, and **\$1.8 billion** per year between 2009 and 2017
- Mortgage default rates likely to increase as households increasingly face flooding and other disasters



Source: IBC Facts Book

# Investments in Natural Infrastructure Are Key To Community Climate Change Resilience

- Green roofs
- Sustainable urban drainage systems
- Stormwater and flood mitigation benefits from wetlands and forests
- The value of natural assets in providing resilience are magnified under climate change



Chicago City Hall Green Roof. Credit: CC BY-SA 3.0 by TonyTheTiger

# Data Gaps On the Benefits of Natural Infrastructure

Based on '[Making Nature Count](#)' and [SPI Symposium](#) reports

- Substantial knowledge gaps hinder the implementation of natural infrastructure
- Need large investments in R&D and pilot projects to gather data, monitor and evaluate outcomes (invest in projects)
- Technical and institutional capacity gaps exist among local governments (invest in people)
- Missing data to make a strong business case in support of natural infrastructure
- These are all opportunities!

# Importance of Adaptive Governance

## Key Contributions from Economics Nobel laureate Elinor Ostrom

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TRAGEDY OF THE COMMONS?

REVIEW

# The Struggle to Govern the Commons

Thomas Dietz,<sup>1</sup> Elinor Ostrom,<sup>2</sup> Paul C. Stern<sup>3\*</sup>

Human institutions—ways of organizing activities—affect the resilience of the environment. Locally evolved institutional arrangements governed by stable communities and buffered from outside forces have sustained resources successfully for centuries, although they often fail when rapid change occurs. Ideal conditions for governance are increasingly rare. Critical problems, such as transboundary pollution, tropical deforestation, and climate change, are at larger scales and involve nonlocal influences. Promising strategies for addressing these problems include dialogue among interested parties, officials, and scientists; complex, redundant, and layered institutions; a mix of institutional types; and designs that facilitate experimentation, learning, and change.

international agreements on ozone depletion, was signed in 1987. Before then, ODS concentrations were increasing faster than those of CO<sub>2</sub>; the increases slowed by the early 1990s and the concentration appears to have stabilized in recent years. The international treaty regime to reduce the anthropogenic impact on stratospheric ozone is widely considered an example of a successful effort to protect the global commons. In contrast, international efforts to reduce greenhouse gas

# Adaptive Governance

General principles for successful climate change governance:

## Broad-based dialogue

- Include experts
- Include resource users
- Use informed analysis
- Focus on deliberation
- Focus on consensus
- Focus on trust-building

## Nesting

- Institutional arrangements must be complex and multi-leveled
- Avoid exclusive reliance on one-level top down central governance

## Institutional variety

- Include mixtures of institutional types
  - Markets
  - Decentralized self-governance
  - Hierarchies
- Adaptivity to new information is key
  - May need to change incentives, increase or change information provision

# Support Climate Action Through Participatory Democracy

- Policymakers need to have the active, participatory support of their constituents
- Voice your support for a robust price on carbon
- Show up at town halls
- Shareholder activism
- Comment on the Federal Sustainable Development Strategy

