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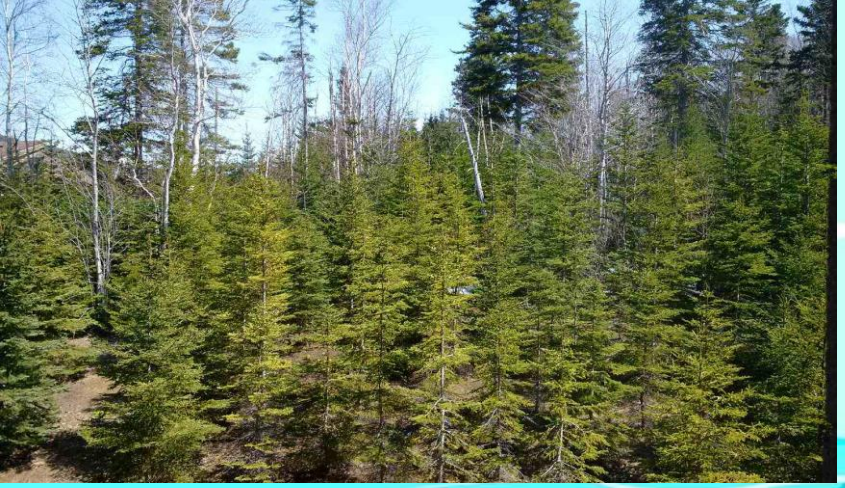
Assessing Climate Change in Ecological and Social Systems:

a regional integrated assessment of climate change adaptation in Newfoundland forests

Doug Piercey and Joe Bowden

Canada

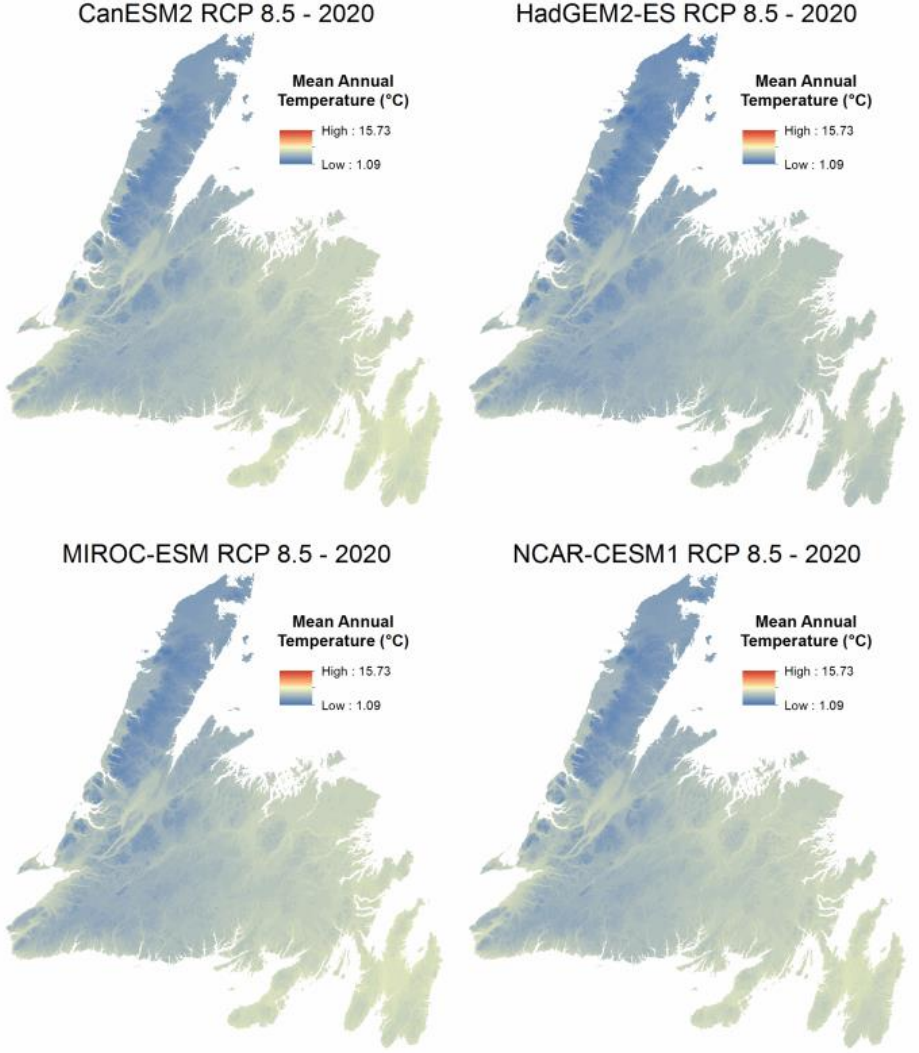


What we know about CC impacts

True Impacts/Implications of CC

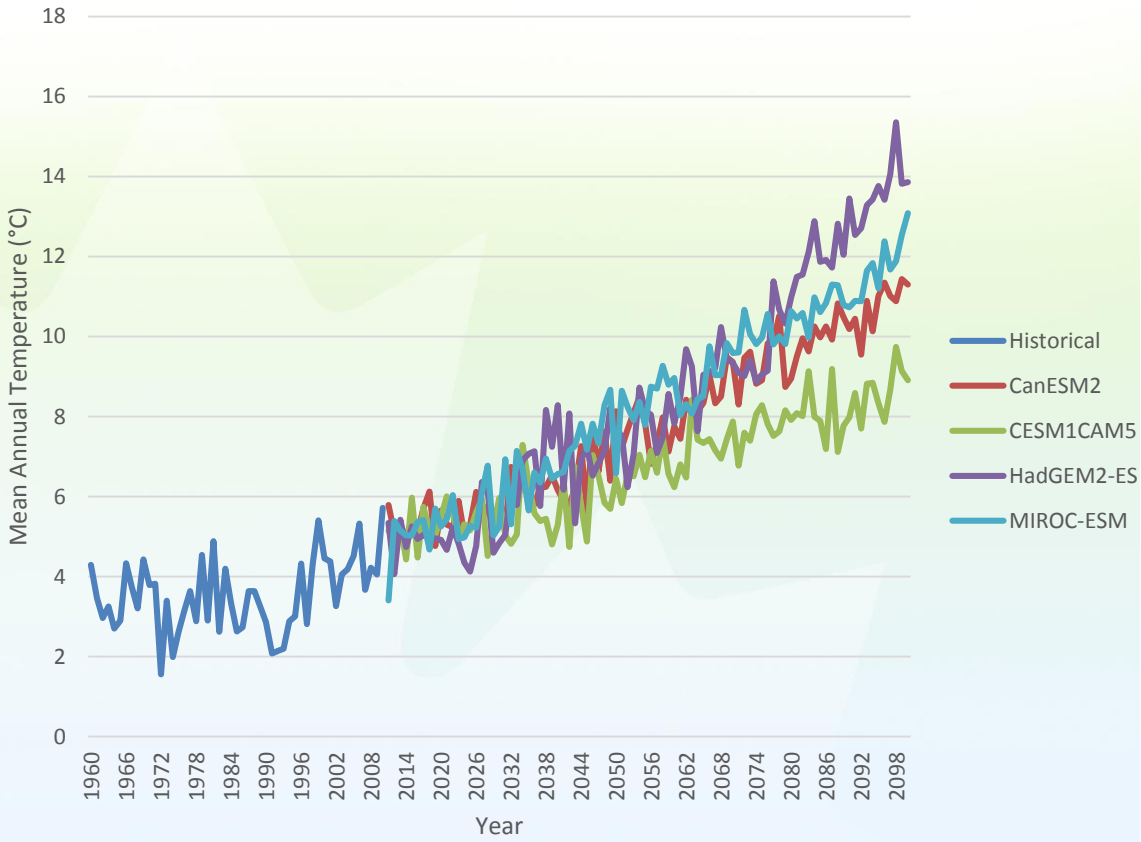
Development of Adaptation and Mitigation Strategies that Work

Mean annual temp
Corner Brook
5.17°C ± 1.52 (SE)
(1961-1990)

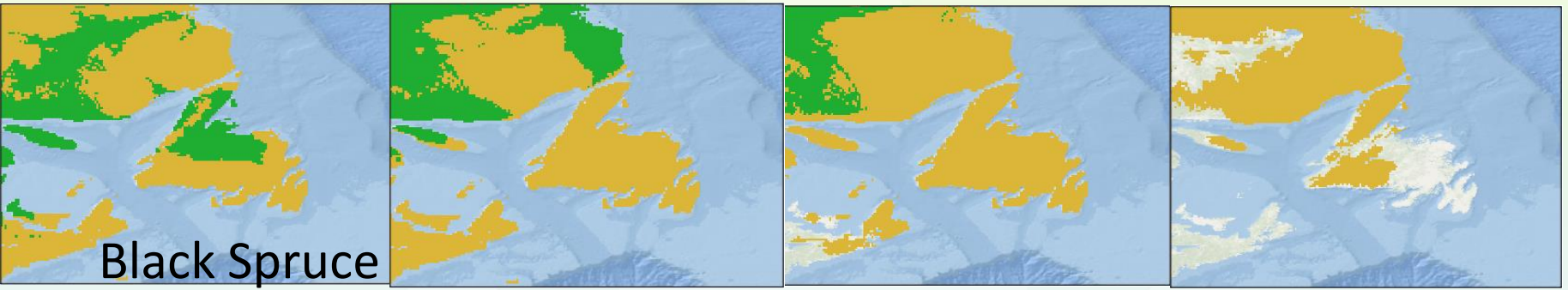


NL Precipitation Projections

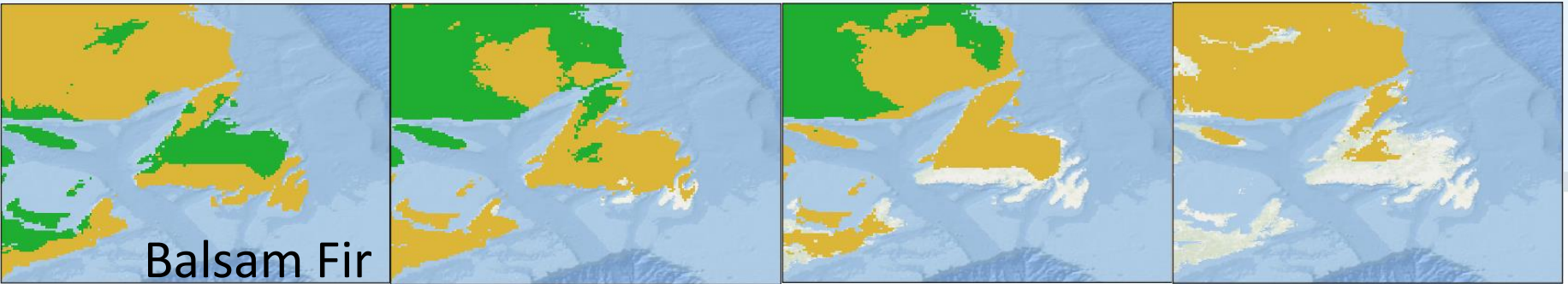
Return Period	10 Years			
	Hist	2020s	2050s	2080s
Newfoundland and Labrador	Precip. (mm)	Precip. (mm)	Precip. (mm)	Precip. (mm)
Gander CGCM2	59.4	65.8	65.5	62.1
Gander HadCM3	59.4	61.7	70.7	81.3
St Johns CGCM2	75.9	113.2	118.5	107.2
St. Johns HadCM3	75.9	103.5	139.1	110.8



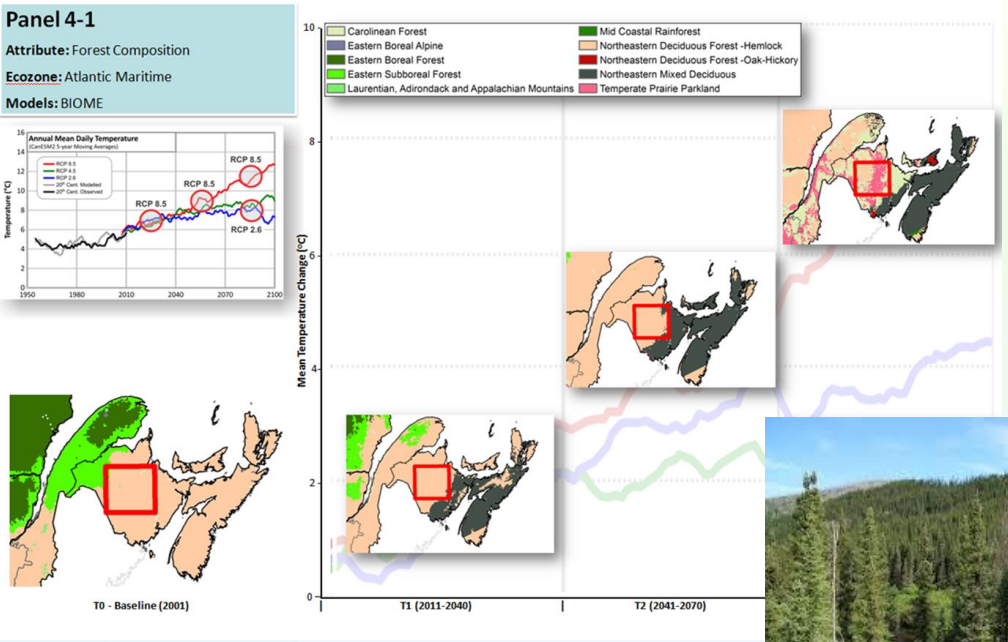
Northward Shift of Climate ‘Envelopes’



1971-2000 2011-2040 2041-2070 2071-2100

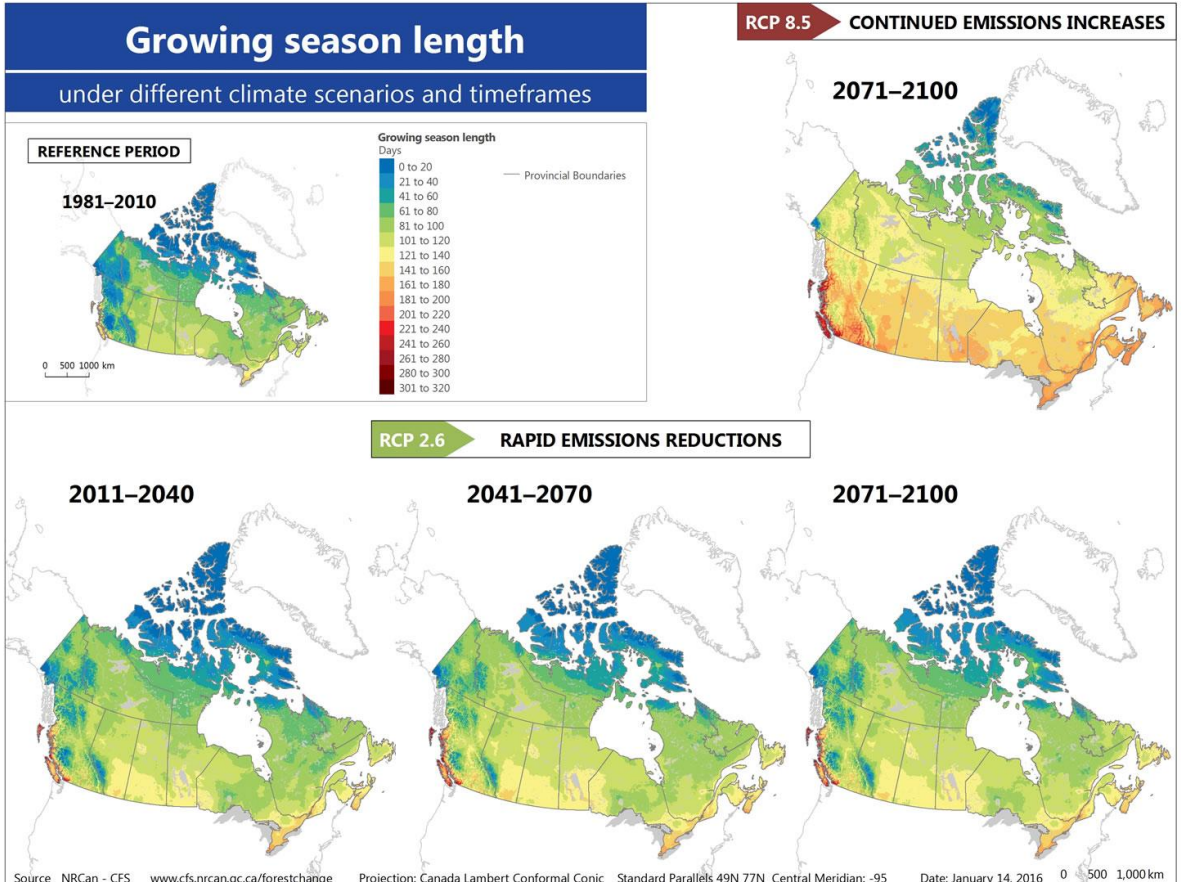


Forest Composition is Changing



Forest Disturbance

Growing Season Getting Longer



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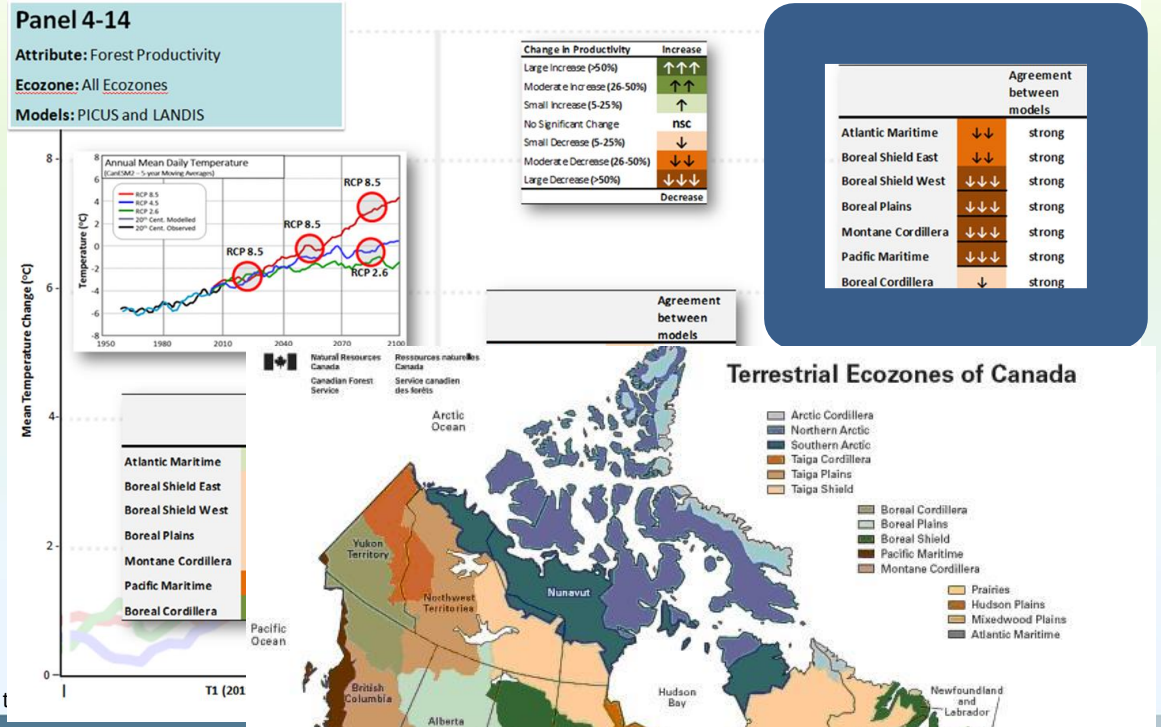
Forest Productivity is Changing



The Boreal is the Largest Forest on Earth

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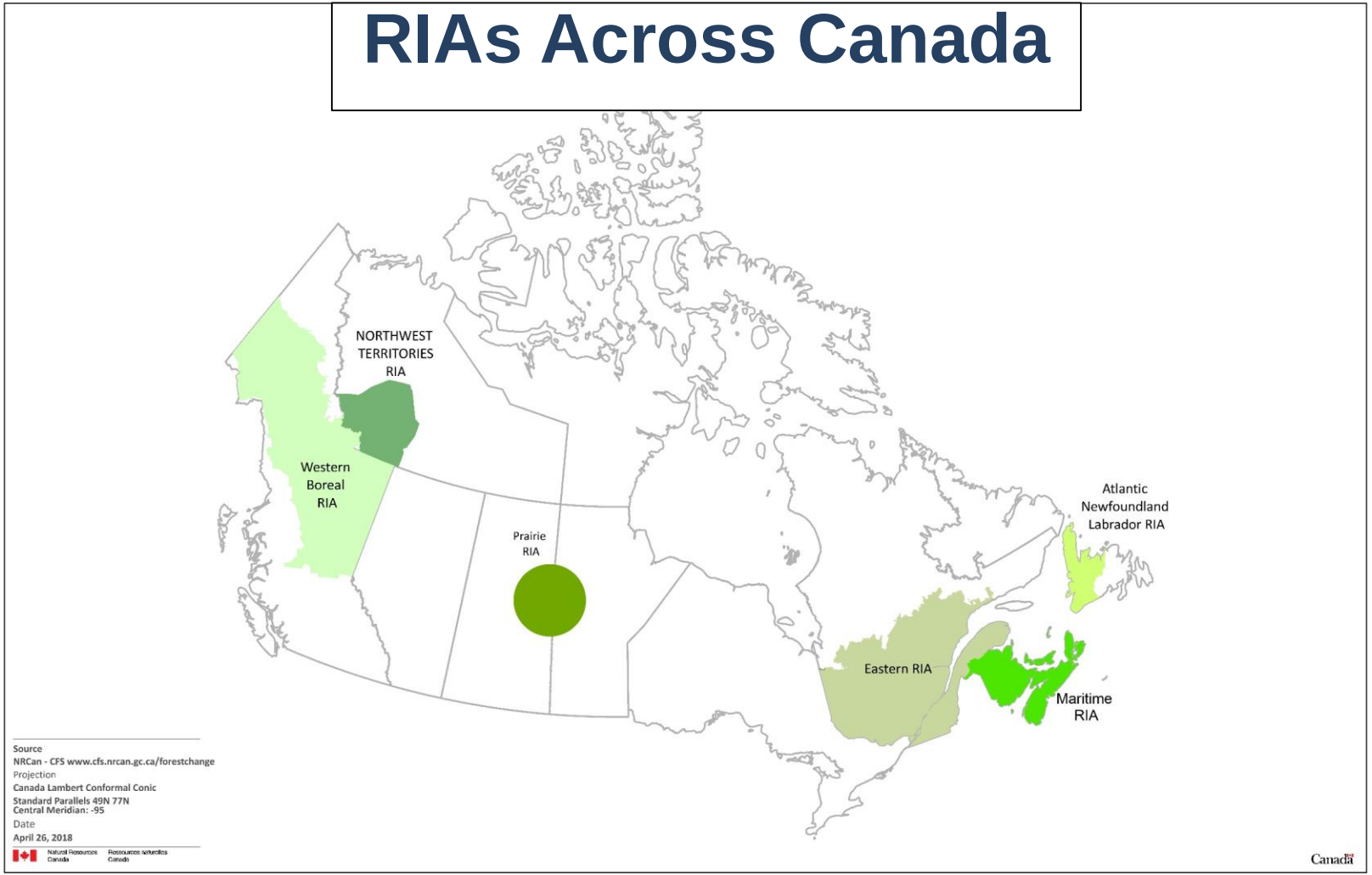
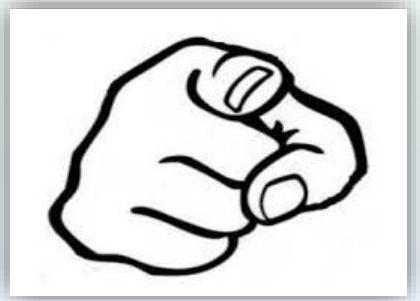
RIAs Across Canada



ACCESS

Assessing **C**limate **C**hange in **E**cological and **S**ocial **S**ystems

Goal: Assess the potential impacts of climate change on multiple values within the study area through collaborative efforts with stakeholder groups and subject-area experts



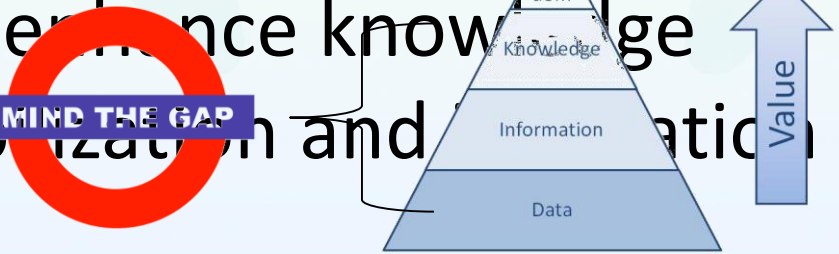
Should this include you?

ACCESS

Assessing **C**limate **C**hange in **E**cological and **S**ocial **S**ystems

Why?

-facilitate the application of scientific information to inform policy, improve decision making and e[illegible]nce know[illegible]lge mob[illegible]izat[illegible]n and [illegible]atio[illegible]



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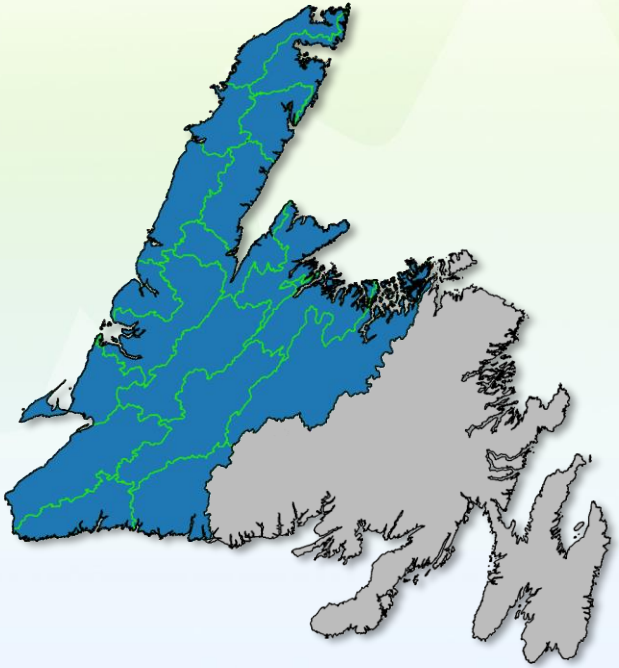
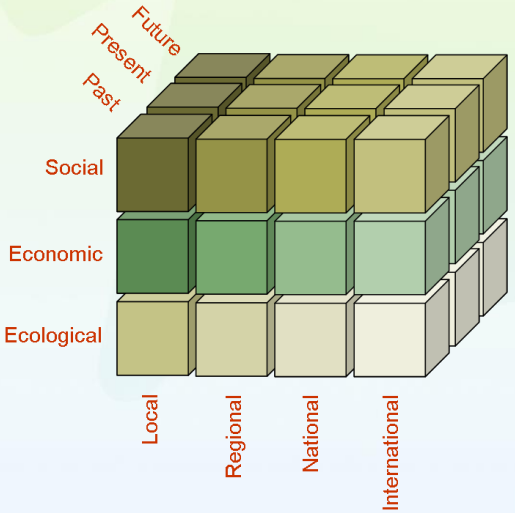


ACCESS Study Area

- Western-Central Insular NL
- ~60,000km^2
- Defined by NHN
- Main NL Forest Planning Zones
- Gros Morne NP
- Mixed EcoDistricts within Boreal Shield
- Fir/Spruce dominant
- First Nations
- Disturbance

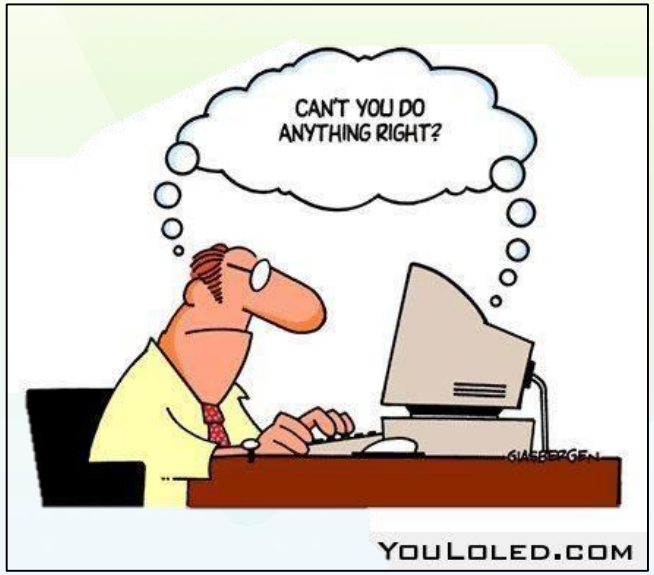
How do we get there?

- Recognition that social-ecological systems are complex, multi-dimensional phenomenon



How do we get there?

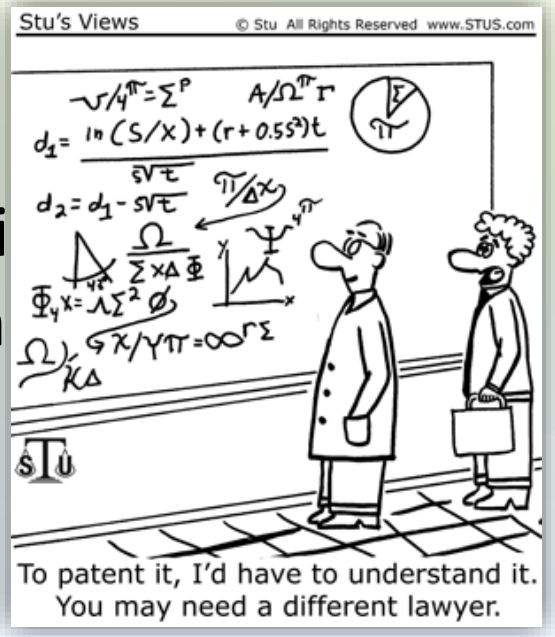
- Technology change
  - black box vs human computer interaction
- Combining computer processing with people's capacity for insight



"There is need for a technology of design that can work in tandem with the human decision-making process" (Goodchild, Guo et al. 2012)

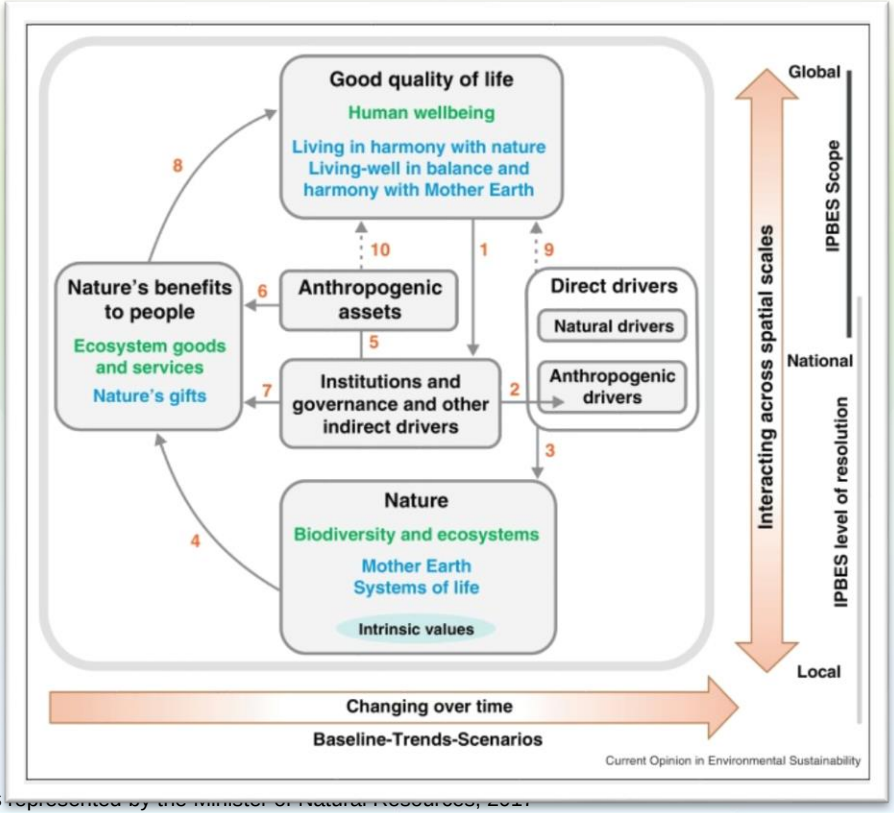
How do we get there?

- Methods/technologies must be usable in real world situations!



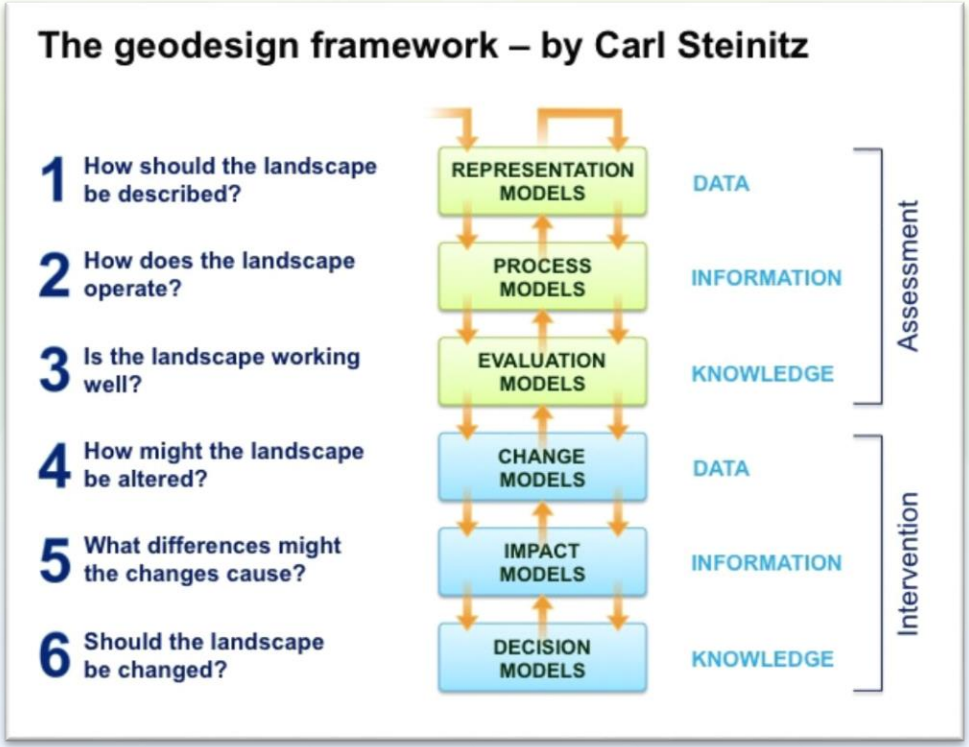
The platform to get there!

Descriptive Framework



www.ipbes.net

Operational Framework



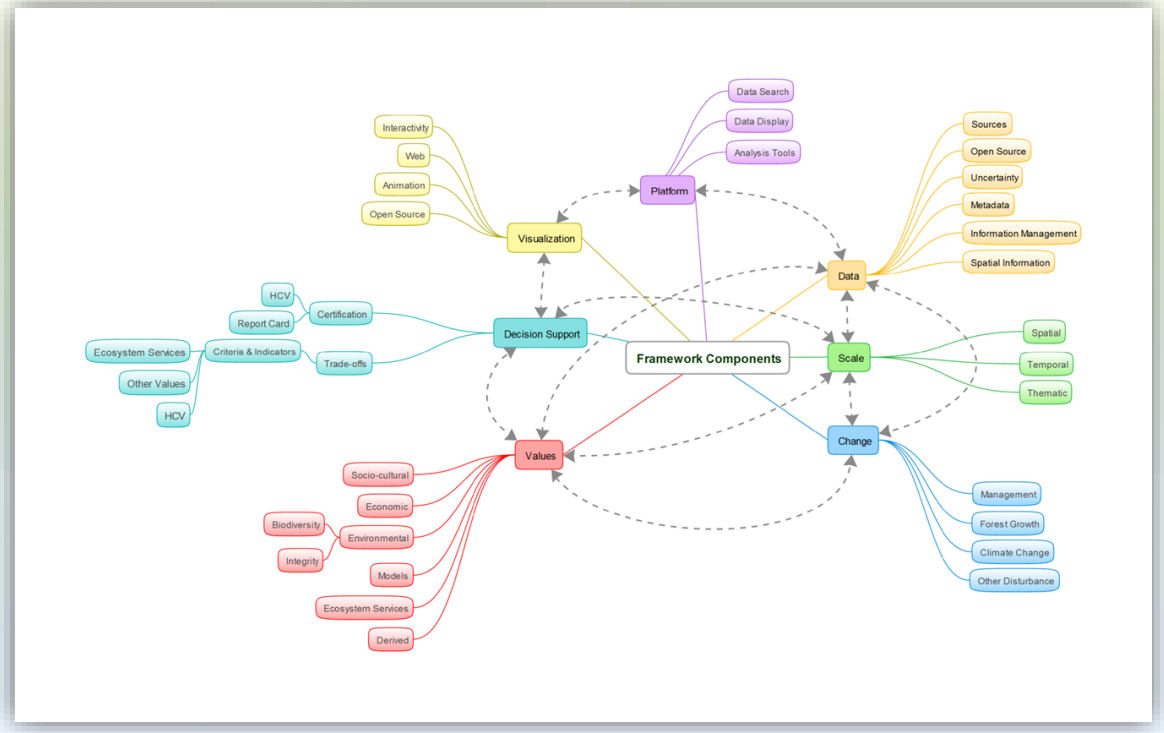
Steinitz 2012

Software Platform

Holistic **I**nteractive
Visualization **E**nvironment

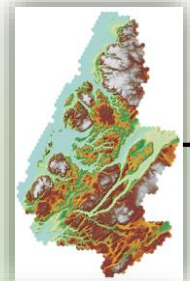
- Data models
- Geoprocessing tools
- Geovisual analytics
- Interactive feedback displays
- Scenario management tools
- Collaboration tools

Mind Mapping

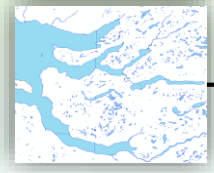


Changing Values – Visual Quality

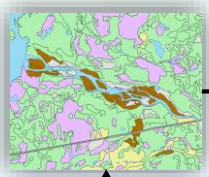
- Topography



- Hydrology



- Tree species
- Disturbance



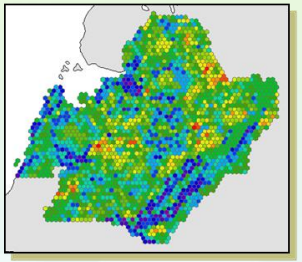
Visual Quality Model

Future Visual Quality Dataset

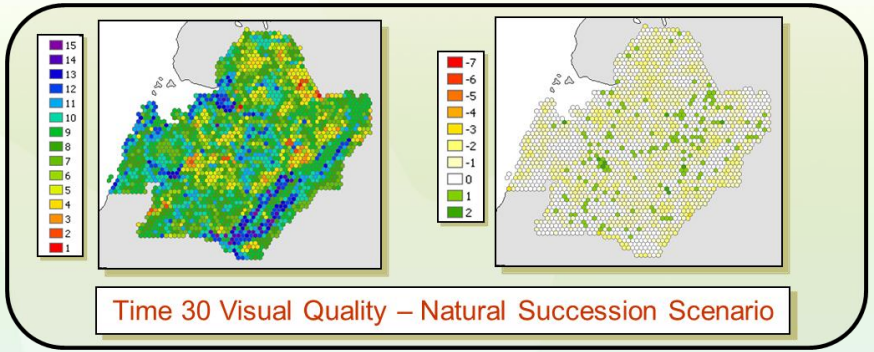
Future Forest Inventory

- Simulate growth of the forest and see what impact it has on the value
- Accomplished using LANDIS-II which simulates change as a function of growth and succession
  - Can incorporate forest management, land use change, fire, wind, insects
  - Climate change

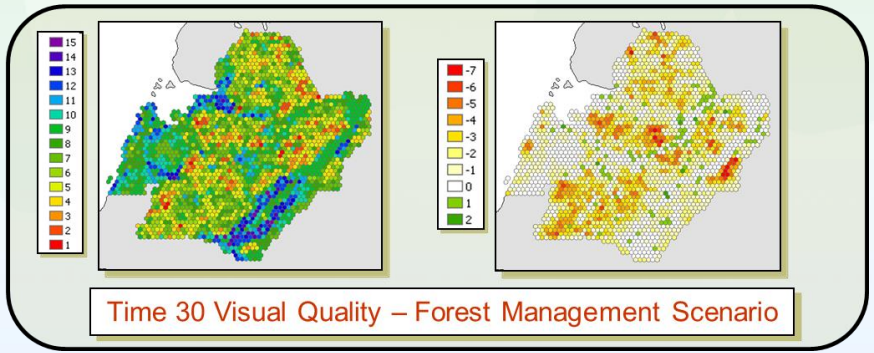
Scenario Comparison



Time 0 Visual Quality

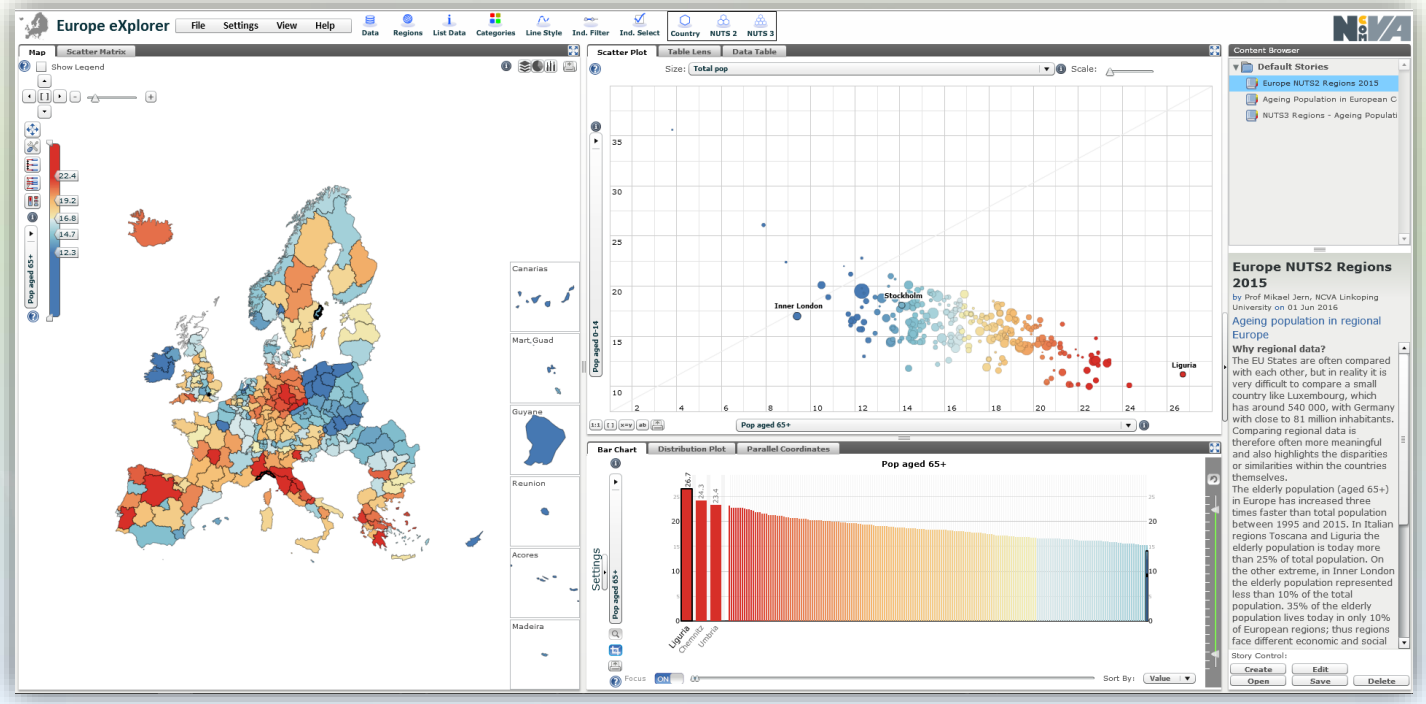


Time 30 Visual Quality – Natural Succession Scenario



Time 30 Visual Quality – Forest Management Scenario

Interactive Visualizations



https://mitweb.itn.liu.se/geovis/eXplorer/euro/

Summary

- Impacts are complex, not mutually exclusive
- Must fully understand impacts in order to develop meaningful adaptation actions
- Adaptation actions must be co-developed
- Impacts, adaptation modelled using multiple future climate scenarios – within HIVE
- Monitoring is key to understanding CC impacts and evaluate effectiveness of adaptation actions

Acknowledgements

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