EMPOWERING COMMUNITIES: Visualization tools for building climate change awareness and assessing resilience

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Empowering Communities on Resilience: Outline

1. A simple framework for engaging communities on climate change resilience
2. **Level One**: Using simple “do-it-yourself” (DIY) visual learning tools for community self-assessment
3. **Level Two**: Using better participatory planning/visioning processes with visualization tools
4. Resources for scaling-up and applying such methods
1. Principles for building awareness and capacity for climate change resilience
(adapted from Sheppard 2012)

• Make it local (place-based & personal)
• Make it visual (clear & compelling)
• Make it holistic (connecting the dots on causes, threats, & resilience)
Various visual learning tools

• Photos

• 2D maps/community mapping

• Info-graphics

• 3D landscape visualizations, video, animations

Data: Natural Resources Canada; Visualization: J. Danahy, U. of Toronto
Community climate change components

Causes
- Carbon consciousness

Impacts
- Understanding the threats

Mitigation solutions
- Dealing with the causes (GHGs)

Adaptation solutions
- Building resilience
CIMA Framework: Seeing the world through a holistic climate change lens

CLIMATE CHANGE

Other Causes

Environmental Push

HIGH CARBON SIGNS

LOW VULNERABILITY SIGNS

HIGH VULNERABILITY SIGNS

LOW CARBON SIGNS

SOLUTIONS
Recognizable visual indicators of a high carbon, vulnerable community
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2. Citizen ‘photo-album’ recording the subtle impacts of climate change on local landscapes...

Impact Window 3  Historical evidence and gradual shifts in temperate regions

Fading memories of once-common conditions, and creeping changes.

(a) Backyard ice-rinks: a tradition for children

(b) ‘Early spring’ in my mother’s garden in

Source: S. Sheppard, 2012
Recognizing local adaptation solutions

**Adaptation Window 4** Measures for managing water hazards in one area

The MetroVancouver region of Canada: wet and wild.

(a) **Sea-walls** have been built to protect homes along Boundary Bay, BC, but higher walls to guard against faster sea-level rise have been opposed by some residents because they will block cherished beach views.

(b) Major **stream channel reconstruction** has become necessary on steep Northshore creeks to reduce bank erosion, channel scouring and debris flows (rock-laden torrents).

*Photo credits: S. Sheppard*
NEIGHBOURHOOD TOOLKIT: Mapping climate change on your block

Purpose: engaging neighbours with community mapping of local climate change & resilience indicators

– **Carbon** *(high or low?; mitigation potential?) *
– **Vulnerability** to climate change *(high or low?; adaptation potential?)*
Hot Spots

Credit: Mayara Benedetti
Vulnerability—easily flooded areas

Nanjing Forestry University students Group 6, November 2013

MOST POSSIBLE FLOODED AREAS

SECONDARY FLOODED AREAS
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3 Better planning processes for resilience?
We need science-based, compelling, visual narratives offering time-travel in familiar places - ‘defensible drama’
Build Up Scenario with dike breach

Ladner - Dike View

Build Up Scenario (hypothetical year 2100)

1.2 metres sea level rise
D. Flanders, CALP
Local Climate Change Visioning Process

1. Participation

2. Scenario Building

3. Data / Modeling Integration

4. 3D and 4D Visualizations
Local Climate Change Scenarios: developing meaningful future stories

- Land Use/Development Trends
- Local Climate Change Causes
- Local Climate Change Impacts
- Mitigation Policy/Measures
- Adaptation Measures
- Holistic Scenarios/Visualisations
Visualizing future pathways (alternative land use plans and lifestyles)

GHG Scenarios (CO2-equiv, millions of tonnes) (28-01-07)

- A2 / Fortress World
- B2 / Policy Reform
- B1-450 / Great Transitions

GB-QUEST Modelling/ Tellus regional scenarios for Metro Vancouver (Carmichael)

High-carbon vulnerable world

Low-carbon resilient world

Visualisation: D. Flanders, CALP
North Vancouver snowpack / water supply data

Average April 1st Snowline

Data: Environment Canada; Visualization: D. Flanders, CALP
An Illustrated Guide to COMMUNITY ENERGY

Exploring the sustainable energy potential of your neighbourhood

www.guidecommunityenergy.com

Community Energy Explorer: online platform to build awareness of community energy solutions

http://www.energyexplorer.ca

78% of thermal energy is used to heat space
22% of thermal energy is used to heat water

Electricity is used to power appliances, lights and devices such as electronics
Renewable energy capacity mapping
Local food market
Live / work development
Stormwater drainage swale
Smaller, efficient cars
60% reduction in home energy consumption
Passive solar conservatory
Community gardening
Increased public transit
Multifamily suites
Electric commuter vehicles
Smaller, efficient cars
Increased public transit
NORTH VANCOUVER J. Laurenz, CALP
Impacts of Local Climate Change Visioning Process?

Delta 2007 public workshops with survey:

- Increased understanding of local impacts and solutions
- Increased willingness (65-69%) to support local mitigation/adaptation measures

Longterm impacts on decision-making (interviews 4 years later):

- Local government staff more willing to consider radical solutions to climate change
- Northshore climate hazards study / detailed Delta adaptation scenario assessment
- Widespread use of visual images in the community
Mountain Pine Beetle and fire in the watershed could increase debris flows and accelerate run-off.

Climate Change projected increase of winter precipitation, leading to likely flooding.
First phase of work on the Mark Creek Flume Flood Management and Stream Rehabilitation Project (photo: T. Pollock, 2013).
Empowering Communities: Outline

1. More effective community engagement:
   - **Making climate change local** with hands-on visual learning tools

1. Better planning processes:
   - **Exploring alternative future visions**: embedding time travel through landscape visualization within participatory processes

1. Resources for scaling-up & replicating such processes
4 Resources: Delta RAC website: [http://www.delta-adaptation-bc.ca](http://www.delta-adaptation-bc.ca)

Visualization Training Modules: [http://www.delta-adaptation-bc.ca/category/training-modules/](http://www.delta-adaptation-bc.ca/category/training-modules/)

[www.calp.forestry.ubc.ca/publications](http://www.calp.forestry.ubc.ca/publications)

Earthscan/Routledge book
[www.visualizingclimatechange.ca](http://www.visualizingclimatechange.ca)
Empowering communities with visual tools in moving towards resilience:

- Vivid, personally meaningful visual imagery that grabs attention & makes resilience tangible
  - Grassroots DIY tools & simple visual indicators to build citizen understanding & accelerate action
  - Systematic use of data-informed visualization to enhance resilience planning & participatory decision-making

- Need for training in new methods to support resilience assessment & action

2050: Complete resilient floating neighbourhood
Credit: D. Flanders, CALP

www.calp.forestry.ubc.ca