SFU



Adaptation to Climate Change Team



Green Infrastructure Planning and Ecosystem Health

Jack Satzewich July 17, 2018 TWN Climate Summit Tsleil Waututh, Musqueam, Squamish Traditional Territory

What is ACT?



- ACT brings leading experts from around the world together with industry, community, and government decision-makers to explore the risks posed by topof-mind climate change issues and identify opportunities for sustainable adaptation.
- Located at SFU Harbour Centre

Presentation outline

- "How can communities of all shapes and sizes use green infrastructure to benefit regional ecosystem health in a changing climate?"
- Part 1
 - Indicators of a healthy ecosystem
 - Biodiversity and climate change
- Part 2
 - Green infrastructure as a climate change adaptation approach
 - Components of well designed green infrastructure
- Part 3
 - Integrating biodiversity in green infrastructure planning
 - Co-benefits of an integrated approach
 - 2 Examples
 - A rehabilitated ecosystem
 - An engineered ecosystem

What are the indicators of a healthy ecosystem?



- 1. Physio-chemical indicators
- 2. Biological indicators
- 3. Habitat indicators
- 4. Flow indicators

Ecosystem health and climate change

- Sixth mass extinction
- Disruption to ecosystem flows and species migration
- Climate change induced species migration
- Urban and industrial expansion into sensitive ecosystems



Global to local response to biodiversity crisis

- (2001) Millennium Ecosystem Assessment
- (2011-2020) Strategic Plan for **Biodiversity**- Aichi Targets
- (2016) A Biodiversity Outcomes Framéwork for Canada
 - National Biodiversity Strategy and Action Plan
 - Target 5: By 2020, the ability of Canadian ecological systems to adapt to climate change is better understood, and priority adaptation measures are underway ۲
- (2014) Surrey Biodiversity Conservation Strategy



Canada







What is green infrastructure?

Green infrastructure: the natural vegetation, soils, water and bioengineered solutions that collectively provide society with a broad array of products and services for healthy living. Natural areas such as forests, wetlands and floodplains, and engineered systems like bioswales and rain gardens which conserve natural resources and mitigate negative environmental effects, benefiting both people and wildlife.

Human-made Natural Grasslands Street trees **Riparian** areas Rain gardens Forests Green roofs INTERCONNECTED Fields Porous pavement NATURAL SYSTEM **Vetlands** ECOLOGICAL PROCESSES Bioswales Clean water, clean air, wildlife habitat and higher quality of life

GREEN INFRASTRUCTURE

Why choose green infrastructure?

 Ecosystem services are those which all species rely on and are provided naturally through healthy ecosystems, they include water filtration, providing pollinator species habitat, regulating air quality and storm water management.



What is NOT good green infrastructure?



Co-benefits of green infrastructure

How Wetlands Support Achievement of the SDGs



- Carbon sequestration
- Costs can be reduced compared to grey infrastructure (maintenance/replacement)
- Social impacts
 - Communities become nicer and healthier places (more green space)
 - Connects people to nature, demonstrates what natural systems we rely on
 - Public participation in the construction and maintenance

Examples of green infrastructure planning



CONNECTIVITY. Green infrastructure should be connected wherever possible. Multi-partner coordination is required to overcome obstacles associated with jurisdictional boundaries.

PROXIMITY. Green infrastructure projects located close to one another provide more benefits than those that are farther apart.



SIZE. Although existing land use will dictate the type of green infrastructure that can be implemented, generally speaking, larger projects will provide more benefits than smaller ones.

- Metro Vancouver Connecting the Dots
- Metro Vancouver Integrated Stormwater Management Plan
 - Vancouver Rain City Strategy
 - Musqueam Integrated Stormwater Management Plan
- Official Community Plans
- Comprehensive Community Plans
 - (2010) Tla'amin Official Land Use Plan
 - Anticipating the Future
 - "Protecting important ecological features and maximize ecological function."

Example 1: Still Creek Watershed

 Creek systems are an important part of stormwater management and are responsible for the drainage of urban areas. In most cases storm drains in cities connect to trunk sewers which flow directly into local creeks without treatment.



Example 2: Kanaka Creek Watershed Stewardship Center

- The Kanaka Creek Watershed Stewardship Centre is an example of how to effectively consider ecosystem services into the design and building processes to reduce the impact development has on a watershed
- The center and surrounding campus uses a Roof-To-Creek concept to ensure the ecosystem services the creek provides are not inhibited by the buildings' location.





Concluding thoughts

- Climate change adaptation requires a multi-disciplinary approach
- Community planning plays critical role in adaptation
- Considering ecosystem health while planning green infrastructure is one way to increase the adaptive capacity of your community.
- Co-benefits!







For more information about ACT, our policy reports, and adaptation resources, please go to **act-adapt.org**, or contact us at <u>adapt@sfu.ca</u> @ACTadaptation or jsatzewi@sfu.ca.

Thank you! Questions?



- Stormwater management on south coast has been identified as a priority and important opportunity to consider how climate change is impacting a <u>resource</u> in an urban environment.
 - Permeable pavements
 - Rain gardens
 - Green roofs
 - Bioswales
 - Creek daylighting