Portland Vancouver ULTRA-Ex* Overview

Alan Yeakley + many others

School of the Environment
Portland State University

*Urban Long-Term Research Area - Exploratory
Portland-Vancouver ULTRA-Ex
Geographical Setting

Source: Metro
Oregon vs Washington

Exurban Growth in the Portland Metro Region
1990-2000  2000-2010

Each red dot = 10 new people

Source: Sightlines
Contained urban growth in Oregon

UGB = urban growth boundary
More specifically:

Do differences in levels of governance affect the resilience of urban ecosystems?

Do alternative land use planning strategies affect urban ecosystem integrity & services?

Does monitoring ecosystem services provide a feedback loop in urban socio-ecological systems?
PV ULTRA-Ex Information Management is in coordination with the HJ Andrews LTER
OUR APPROACH – Two Dimensions & Two Scales

**Social Dimension**
- Land use and planning effects
- Civic ecology/governance
- Environmental education

**Ecological Dimension**
- Riparian greenspaces
- Water quality
- Stormwater management

**Project scale**
- Riparian greenspace management
- Stormwater and green infrastructure
- Water quality analyses
- Economic analyses

**Ultra wide scale**
- Land use and planning effects
- Perceptions of residents
- Decision makers and environmental information
- Role of K-12 and citizen education
**PV ULTRA-Ex**

**Presentations this morning**

March 17, 2014

**Proposed morning schedule from US presenters**

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<th>TIME</th>
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<tr>
<td>9.00</td>
<td>Intro to ULTRA-Ex</td>
<td>Alan Yeakley</td>
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<td>9.10</td>
<td>Riparian greenspace analyses</td>
<td>Alan Yeakley</td>
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<td>9.30</td>
<td>Water quality studies</td>
<td>Heejun Chang</td>
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<td>9.55</td>
<td>Biogeochemistry in urban settings</td>
<td>Jen Morse</td>
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<td>10.15</td>
<td>Water quality modeling</td>
<td>Denisse Fisher de Leon</td>
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<td><strong>Break</strong></td>
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<td>10.45</td>
<td>Hedonic analyses</td>
<td>Noelwah Netusil</td>
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<td>11.10</td>
<td>Community perceptions</td>
<td>Anita Morzillo</td>
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<td>11.35</td>
<td>Institutions and climate change</td>
<td>Connie Ozawa</td>
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<td>12.00</td>
<td>ULTRA-Ex major findings so far</td>
<td>Alan Yeakley</td>
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<td>12.05</td>
<td><strong>Discussion</strong></td>
<td>All</td>
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<td>12.15</td>
<td>BES and the City of Portland</td>
<td>Maggie Skendarian</td>
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<td>12.30</td>
<td><strong>Lunch</strong></td>
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Tryon Creek, Lake Oswego, OR

East Portland bioswales
Changes in Vegetated Urban Riparian Areas in Portland-Vancouver over an 18 year Period of Growth

Alan Yeakley\textsuperscript{1}, Connie Ozawa\textsuperscript{2}, Denisse Fisher de Leon\textsuperscript{1}

\textsuperscript{1}School of the Environment
\textsuperscript{2}Toulan School of Urban Studies and Planning
Portland State University
Determine the *extent and rate of riparian buffer loss* in urbanizing areas under various regulatory frameworks in Oregon and Washington cities for the period 1990-2008
Methods – part 1

Data

- 1990 gray scale photographs at 1’ resolution
- 2002 color photographs at 1’ resolution
- 2007 & 2008 color photographs at 1’ resolution
- Metro and County databases for stream locations and ownership patterns

Digitizing

- 0-200 m from permanent streams and wetland features
- Viewing scale: 1:1500
- Patch definitions*
  - minimum inter-patch distance of 5 m
  - area of a patch using 5 m x 5 m area

Methods – part 2

Banding

- 7.5 m (25 ft – Washington County buffer regulation)
- 15 m (50 ft – Metro Title 3 minimum)
- 22.5 m
- 30 m (100 ft – corresponds to 50x100 ft lot dimension max)
- 45 m
- 61 m
- 100 m
- 200 m (total)

Cover classes of vegetation within bands

- Adjacent woody
- Adjacent unmanaged
- Non-adjacent woody
- Non-adjacent unmanaged
Earlier findings: 1990-2002 in Oregon
Hillsboro tree loss
100 m buffer (1990-2002)

Brown = losses for 1990-1997

Red = losses for 1997-2002
Brown – tree loss 1990-1997
Red – tree loss 1997-2002
An example of riparian area loss in Hillsboro ...
% loss per year: 1990-2002

100 m - Adj Tree

Mirrors population growth

Oregon City-100m

Hillsboro-100m

Portland-100m

private
total
% loss per year: 1990-2002

30 m - Adj Tree

Biggest change is in Hillsboro
1990-2002 % Adjacent Riparian Vegetation Lost

Oregon City

Hillsboro

Portland
1990-2002 % Adjacent Riparian Vegetation Lost

100 m = development pressure
One indicator of regulatory effectiveness is the rate of loss near the stream (7.5 or 15 m)

1990-2002 % Adjacent Riparian Vegetation Lost
Another indicator of regulatory effectiveness is the diff. between 100 m and 7.5 (or 15) m

1990-2002 % Adjacent Riparian Vegetation Lost
Results from 1990-2008 so far
Washington cities

Oregon cities

Study Cities in WA & OR
Adjacent Woody Vegetation Change (Washington urban areas)

1990-2002

2002-2007

Hectares/Year

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<th>7.5m</th>
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<th>30m</th>
<th>100m</th>
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Vancouver
Camas
Salmon Ck
Adjacent Woody Vegetation Change (Oregon urban areas)

1990-2002

2002-2008

Hectares/Year

Portland
Hillsboro
Oregon City

7.5m 15m 30m 100m

9.90 3.23
Riparian loss rate, evident in the 1990s, slowed down in the 2000’s for 5 of the 6 urban areas studied.

The rate of riparian vegetation gains increased in the 2000’s.

Some cities began to see net gains in riparian areas due to both governance activities at both the local and state level.

Natural areas conservation policies in Oregon and Washington, while quite different, both show promising progress for maintaining and restoring urban riparian areas.
Portland Vancouver ULTRA-Ex questions – Does governance matter?

Do differences in levels of governance affect the resilience of urban ecosystems?
A tentative yes, but more analysis is needed

Do alternative land use planning strategies affect urban ecosystem integrity & services?
Yes, but there are multiple pathways available to affect positive change

Does monitoring ecosystem services provide a feedback loop in urban socio-ecological systems?
Results in both states with urban floodplain restoration suggest yes … but more study needed

For riparian ecosystems in urbanizing areas:

- Governance & Behavior
- Ecological Integrity & Change
- Perception & Monitoring

For riparian ecosystems in urbanizing areas: