Climate Impacts on the Pacific Northwest –
A perspective on coastal planning for climate change

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Instructors: Amy Snover & Nathan Mantua, UW Climate Impacts Group
Presentation Overview

• **Planning Process**
  Scale (international, national, local), scope, level of Integration, coastal sustainability, resilience

• **Planning in Washington State**
  Can we plan for sea-level rise? What tools are available?

• **Coastal Planning in Washington State**
  Restoration for ‘sustainable’ or ‘resilient’ shorelines, definitions, authorities, regulatory vs. non-regulatory approaches

• **In-class group exercise**
  Short group discussion followed by group presentation on recommendations in reaction to the following question:

*Should the Washington States Shoreline Management Act or other State legislation be amended to better plan for sea-level rise?*

[Note] 1-group will represent a top-down perspective and the other will represent a bottom-up approach.
Planning Process

Rational (Comprehensive) Model of Planning

- Problem Identification
- Goals and Objectives
- Alternative Strategies
- Estimate Impacts
- Plan
- Implementation
- Evaluation

Integrated Ecosystem Assessment (IEA)

- Scoping
- Identify Indicator
- Risk Analysis
- Ecosystem Status
- Management Strategy

Source: Kay & Alder, 2006; Smith, 1993

Source: Levin et al.
Planning Process – International model

Figure 1.1 A coastal adaptation roadmap applies a climate lens to the ICM policy cycle often used by coastal practitioners.

- Step 1: Assess vulnerability
- Step 2: Select course of action
- Step 3: Mainstream coastal adaptation
- Step 4: Implement Adaptation
- Step 5: Evaluate for adaptive management

Chapter 2: Assess climate change impacts, trends and vulnerability
Chapter 3: Prioritize issues and define adaptation goals
Chapter 4: Mainstream coastal adaptation in policy, plans, and programs
Chapter 5: Implement adaptations
Chapter 6: Evaluate adaptations
Planning Process – *Limited Scope*

Figure 2.2 Vulnerability framework

- **CLIMATE CHANGE projections and trends**
  - **SENSITIVITY** The degree to which the coast and people are impacted
  - **EXPOSURE** Types and amount of assets at risk

- **POTENTIAL IMPACT** That may occur without planned adaptation
- **ADAPTIVE CAPACITY** Ability to cope with actual or expected changes

VULNERABILITY

Source: Adapted from Allison, 2007.

Adaptive Management for Ecosystem Decision Making

(Modified from Williams and others (2007) and Levin and others (2009))

Goals

- Adjust
- Plan and Prioritize
- Implement
- Monitor
- Evaluate

Source: Maryland Climate Action Plan, 2008
Planning Process – Degree of Integration

Source: Maryland Climate Action Plan, 2008

Source: Beatley, 2009

Source: Port of Bellingham, 2008
Olympic Sculpture Park
Seattle Waterfront

Before beach restoration

After Building Ecological Resilience?

After Building Social Resilience?
Planning In Washington State

• Growth Management Act
  RCW 36.70A adopted in 1990. “...it is in the publics interest that citizens, communities, local government and the private sector cooperate and coordinate with one another on comprehensive land-use planning”. The GMA contains 14-Goals, ranging from reducing sprawl to providing for affordable housing. Local jurisdictions are required to “balance” GMA goals and plan for 20-years of growth.

• Shoreline Master Programs
  RCW 90.58 adopted 1972. The SMA is intended “…to prevent the inherent harm in an uncoordinated and piecemeal development of the state’s shorelines.” Therefore, local jurisdictions w/Shorelines of the State are required to create Shoreline Master Programs to plan for appropriate shoreline uses that will not result in a net loss of shoreline ecological functions for the next 20-year.

• Puget Sound Partnership
  New State Agency (created in 2007), challenged to recover Puget Sound by the year 2020. Have developed a “Action Agenda” to achieve PS-recovery, which consists of prioritization and coordination of existing and future restoration/management of PS.
Coastal Planning – Washington State

- **Shoreline Development Pressure**
  Nationally 1/2 of 300-million people live within coastal areas (Pew 2003) 27 million more within next 15-years (Beach 2002)
  Puget Sound 60% growth within the next 25-years (PSAT 2007)

- **Sea-level Rise**: No regulatory requirement, SMP-Policies (Ecology 2003)

- **Shoreline Impacts**
  1/3 (800-miles) bulkheaded (PSAT 2004)

- **Shoreline Use**
  Challenge majority of shorelines are privately owned, WA Shoreline Management Act promotes ‘utilization’ & ‘preservation’ to satisfy “No Net Loss of Shoreline Ecological Function” (Ecology 2003)
Coastal Planning – Washington State

The Shoreline Management Act and Shoreline Master Program:

**Jurisdiction:** regulatory authority applies to aquatic areas and 200’ upland

**State/Local Partnership:** Department of Ecology provides technical assistance and has final approval authority for SMP-updates, but plays a limited role in permitting.

SMP contains **Policies and Regulations:** provide both long-range planning policies and use (project) specific regulations.

**SMP Updates:** updated Guidelines completed in 2003, typically 3-year update process within a jurisdiction which involves completion of the following tasks:

- Compilation of a *Inventory/Characterization* Report
- Updated *Shoreline Environment Designations*
- Updated *Policies/Regulations*
- *Cumulative Impact Assessment*
- *Restoration Plan*
Applying Coastal Sustainability or Resiliency

Defining shoreline “Restoration” policy strategies

Source: Thom et al 2005
Enhancement of selected attributes
Creation of new ecosystem
(highly disturbed urban site and landscape)

Restoration to historic conditions
Conservation
(not greatly disturbed site, but region around site is disturbed)

Protection
Conservation

Restoration to predisturbance conditions
(minimal site disturbance and landscape is intact)

Degree of Disturbance of Restoration Site

Degree of Disturbance of Landscape
(larger dots indicate higher probability of restoration success)
Policy Analysis: *top-down, bottom-up or something in between?*

**Goal:** Maintain/Improve Shoreline Ecological Functions through Efficient Management of Shoreline Resources to adapt to climate change and sea-level rise.

**Policy Objectives:**

**Equity:** environmental benefit & property rights

**Knowledge:** scientific bases, implementation (feasibly), acknowledge uncertainty

**Political Feasibility:** legislation feasible, legally defensible & community acceptance

**Policy Alternatives:**

**Alt I. No Action**
Status-quo;
- Regulations to protect
- Volunteer restoration projects

**Alt II. Education**
Identify barriers to volunteer restoration

**Alt III. Incentives**
Monetary, regulatory in exchange for restoration

**Alt IV. Legislate**
Legislative change; additional authority to req. restoration
Maintain/Improve Shoreline Ecological Functions to adapt to climate change and sea-level rise.

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Maintain/Improve Shoreline Ecological Functions to adapt to climate change and sea-level rise.

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How have these Alternatives been applied?

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<th>WATER RELATED ACTIONS</th>
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<th>Lots &gt; 100' deep</th>
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<td>1 Bulkhead removal &amp; shoreline restoration along at least 75% of the lake frontage</td>
<td>15 feet</td>
<td>20 feet</td>
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<td>2 Bulkhead removal &amp; shoreline restoration along at least 25% of the lake frontage</td>
<td>10 feet</td>
<td>15 feet</td>
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<td>3 Opening of previously piped on-site watercourse</td>
<td>10 feet</td>
<td>10 feet</td>
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<td>4 Preservation of existing natural shoreline conditions if no man-made features exist</td>
<td>10 feet</td>
<td>15 feet</td>
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<td>5 Revegetation and / or preservation of existing trees &amp; native vegetation in at least 75% of the remaining Lake Washington setback area</td>
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<td>6 Revegetation and / or preservation of existing trees &amp; native vegetation in at least 25% of the remaining Lake Washington setback area</td>
<td>5 feet</td>
<td>10 feet</td>
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| UPLAND RELATED ACTIONS | | |
|-------------------------| | |
| 7 Installation of bio-filtration / infiltration mechanisms that exceed standard stormwater requirements | 10 feet | 10 feet |
| 8 Installation of a "green" roof | 10 feet | 10 feet |
| 9 Installation of pervious material for driveway or road construction | 5 feet | 5 feet |
| 10 Limit total impervious surface in the reduced setback area to less than 5% | 5 feet | 5 feet |
| 11 Preserve or restore at least 20% of the total lot area outside of the reduced setback as native vegetation. No more than 20% of the total lot area can be lawn. | 5 feet | 5 feet |
On-going questions

- Do Green Shorelines fit within the concepts of Sustainability and coastal Resilience?

- How effective are incentives in improving ecological baseline?

- Can property owners be convinced that Green Shoreline treatments will adequately protect their property?