

# **Using Existing Information to Develop Adaptation Strategies**

**Kathy O'Halloran, Olympic National Forest**

**Figure 1. Process of Sense-Making and Action**

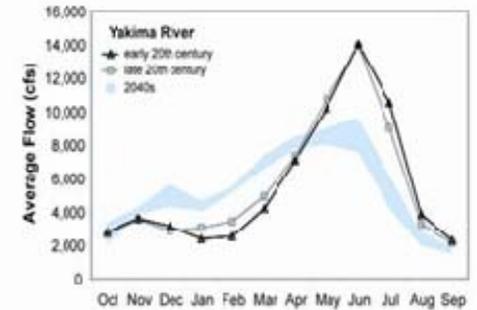
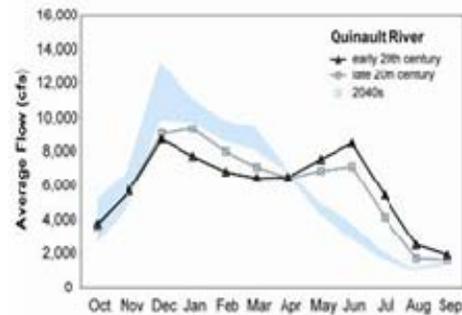
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	<b>Stage</b>	<b>Thought Process</b>
1	<b>Awareness</b>	Interesting issue. Could affect us some day.
2	<b>Fear &amp; Denial</b>	Goodness, this could wipe out everything we've been working on, make the \$\$ we've spent irrelevant, threaten our mission! Don't go near it
3	<b>Conceptualization</b>	OK, I can see this is something we can't ignore any more
4	<b>Disorientation</b>	But what should we do? How do we incorporate this into our work?
5	<b>Integration</b>	Maybe we could start thinking about __ and we could start thinking about __. We could try some pilots around them
6	<b>Action</b>	We're in the midst of project __ and project __. We're doing it and learning a lot. X was really not as threatening as we thought, Y was worse than we expected, Z is really an important extension of what we're doing anyway.
7	<b>Maturity</b>	This makes sense. Here's how it relates to our work: ____. Others are saying __, but we're starting to think about __, __, and __ as modifications because we think they'll get us closer to where we want to be.

# Olympic Case Study

- **UW Climate Impacts group**
- **FS PNW Research Station**
- **Olympic National Forest**
  
- **Science day – raising awareness**
- **Structured discussion-focus on adaptation**
  
- **Awareness continues**
  - **Share ideas with other groups**

# Expected Changes



- **Less Snow**
- **Altered Streamflow**
- **Increased Water Loss**



# Implication: Roads and Water

- **Flooding**
  - Increased risk of winter flooding in mid- and low-elevation basins
- **Flood events / sustained wind events**
  - Interactions with old road network of logging roads.
- **Program Considerations** – Transition watersheds influence priorities
- **Project design** - Culvert sizing, out sloping of roads, decommissioning



# Implications: Anadromous and freshwater fish

- **Salmon (and steelhead) and Bull trout:**
  - Increased stress due to lower summer and fall streamflow, warmer water temperature, and increased potential for winter flooding.
  - Resident populations at risk due to warming stream temperature and road network influences on water quality.
- **Project Selection and Design** - Fish structure design considerations for higher flows, where to implement projects



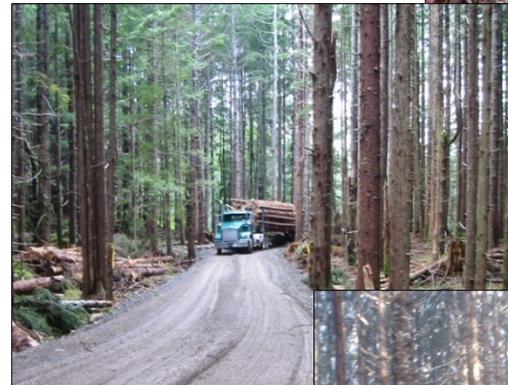
# Implication: Recreation , Lands and Roads Programs

- **Washouts** - Power and phone cables exposed
- **Flooding** - Recreation sites inundated
- **Management actions** - Decommission roads and campgrounds. Move campgrounds out of flood plains.



# Implications: vegetation management

- **Commercial thinning program:** Currently planning and implementing for biodiversity at landscape and stand level
- **NEPA:** Analysis now includes climate discussion



# Adaptation Strategies

- **Some strategies are currently being used and are generally accepted**
- **Some require new thinking or thinking in new ways**
- **Reactions to the strategies were proportional to the degree of change required**

# Increase Landscape Diversity

**Landscape level  
multiple sites;  
connectivity;  
assisted  
migration**



# Manage for biodiversity

**Identify  
vulnerable  
species;  
seed zones;  
invasive species -  
EDRR**



# Manage for Realistic Outcomes

**Identify key thresholds for species and functions**

**Prioritize projects with a high probability of success**



# Managing for the Future

- **Historical information is only a part of the picture**
  - New tools are needed
  - HRV - FRV
- **Scenario planning**
  - Uncertainty is uncomfortable
  - Modeling & multiple futures need to be considered



# Integrate Climate Change into Laws, Regulations and Policies

- **Endangered Species Act** – species shifts, triage
- **National Environmental Policy Act** – slow process yet rapid change - EDRR and Invasives
- **Clean Water Act** – cold water requirements with rising temperatures
- **Challenge: New concepts are needed. Utilize flexibilities while engaging policy makers and the publics.**



# Collaboration

**Working across disciplines -  
integration**

**Research-Management  
Partnership – rapid transfer**

**Working across agencies**

**Engaging more effectively  
with the public**



# Change is Coming

## Looking back: '08 Energy Bill

- Potential funding for wildlife adaptation
- The predicted changes are big and we need to be thinking of solutions on a commensurate scale

<b>NATURAL RESOURCE AGENCY/ PROGRAM</b>	<b>AVG/YR FUNDING (millions)</b>
(DOI) Land/Water/WL	\$1,148
DOI LWCF	\$281
U.S. Forest Service	\$338
USFS LWCF	\$281
EPA	\$405
U.S. Army	\$507
NOAA	\$574
DOI Coop Grants	\$338
DOI LWCF Coop Grants	\$141
DOI Tribal Coop Grants	\$68
USFS LWCF Coop Grants	\$141
State FWL Agencies	\$2,990
<b>TOTAL</b>	<b>\$7,211</b>

# Challenge/Opportunity

- **Climate change is the greatest challenge that we have ever faced.**
- **This is the greatest opportunity that we will ever have to make a positive difference.**
- **Just Pick One**



# Olympic Case Study on Climate Change

## SAP 4.4

US Climate Change Science Program Synthesis and Assessment Product 4.4 (SAP 4.4), Chapter 3:

<http://www.climate-science.gov/Library/sap/sap4-4/final-report/>

Joyce, L.;Blate, G.M.;Littell, J.S.;McNulty, S.G.;Millar, C.I.;Moser, S.C.;Neilson, R.P.;O'Halloran, K.;Peterson, D.L. 2008. National forests. In:Adaptation options for climate-sensitive ecosystems and resources. Synthesis and Assessment Product 4.4 U.S. Climate Change Science Program: Washington, DC.

# **Information Sources**

**Intergovernmental Panel on Climate Change**

<http://www.ipcc.ch>

**US Forest Service Climate Change Resource Center**

<http://www.fs.fed.us/ccrc>

**University of Washington Climate Impacts Group**

<http://cses.washington.edu/cig>



**The End**