

# State of the Science: Floodplains

Report to Science Panel on SOS Floodplains panel  
discussion held June 6, 2013 at Center for Urban  
Waters

June 13, 2013  
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# State of the Science Panels

## 2013

Ocean Health Index (April, 2013)

### **Floodplain Science, Management and Recovery (June 2013)**

Marine Survival Project (July, Science Panel meeting)

Ocean Acidification (date TBD, Oct?)

Recovery Planning and Climate Change (date TBD, Nov-Dec?)

## 2014

Stormwater Research (date TBD)

Shoreline Armoring and Infrastructure (date TBD)

# Floodplain Science, Management and Recovery

## SOS Panel Overview

**Format:** 10 panelists presented on

- Case studies (counties, tribes)
- Biophysical Sciences
- Social Sciences
- Discussion

**Materials available on EoPS**

agenda, presentations, bibliography, references

<http://www.eopugetsound.org/blogs/state-science-workshop-explores-puget-sound-floodplains>

**Attendance:** 70+ people

- John Stein, Trina, Bill, Ken, Tracy, Joel, Martha Kongsgaard, Marc Daily
- Counties (4), tribes (8), FEMA, NOAA, Corps, USGS, ECY, RCO, WDFW, UW-T, UW Seattle, PSP, consultants, TNC, PSP and PSI staff

# Floodplain Science, Management and Recovery

## CONTEXT

### PSP Floodplain Target (adopted June 2011):

By 2020, **15 percent of degraded floodplain areas** are restored or floodplain projects to achieve that outcome are underway across Puget Sound and there is **no additional loss of floodplain function** in any Puget Sound watershed relative to a 2011 baseline.

# Floodplain Science, Management and Recovery

## CONTEXT

### **Floodplain NTAs from Action Agenda:**

NTA 5.1.1: Floodplain Protection and Policy Team Actions

NTA 5.3.1: FEMA Annual Reporting for NFIP BiOp

NTA 5.3.2: CAO Updates on Frequently Flooded Areas

NTA 5.3.3: BiOp Compliance and Floodplain Target

NTA 5.3.4: Levee Vegetation

NTA 5.4.1: Prioritization of State Highways with Floodplain Impacts

NTA 5.4.2: Ag Land Ecosystem Services Markets

NTA 5.4.3: Candidate Areas for Land Swaps

# Floodplain Science, Management and Recovery

## CONTEXT

### **Floodplain-related Items from the Biennial Science Workplan:**

Estimate the value of floodplains in terms of the ecosystems services they provide

Develop key ecological indicators and implement monitoring to assess status of floodplains

Improve understanding of the effects of vegetation on dikes and other flood control structures

## Examples of what we heard: Key Themes

# Floodplain Science, Management and Recovery

## Overall Key Themes

- **Recovery Target:** What do we mean by “restore 15% of functional floodplains”?
  - For what purpose are we restoring function?*
  - Which functions are we restoring?*
  - Where?*
- Can/should we focus on **protecting or recovering a subset of floodplain functions**?
  - *What is the cost/benefit of protecting or restoring some amount of specific biophysical, social, flood risk and economic functions of floodplains?*
- **Levee setbacks:** *How much setback is really needed to recover channel function? Can we quantify benefits of variable, site-specific setbacks? How do we reconcile conflicting mandates for vegetation?*
  - Improved aquatic habitat (for salmon? for other species?)
  - flood risk reduction



## Overall Key Themes, continued

- **Climate impacts and mitigation:** Floodplains can play a major role in mitigating climate impacts but we don't yet know where or how much protection and recovery is important
- **Social science knowledge gaps are big:** Public (mis)perception of problems, lack of understanding of social history of issues, current funding structures, and lack of cost-benefit analyses all contribute to lack of effective multi-benefit floodplain management
- **Local impacts vs landscape scale costs and benefits:**
  - Understanding local context (natural and social) is key to identifying potential impacts of management decisions
  - Lack tools to scale up from local impacts to landscape scale costs and benefits

## Case Studies: Current Management Challenges

**Pierce County:** It's all about the money... *Where is it coming from?*

- Current financing structure encourages development in floodplains. *If people have to pay themselves it drastically alters decision making.*
- Compatible uses: *Need more data on compatible uses (Ag, development, hatcheries) and specific floodplain functions (flood risk, habitat benefits)*

**King County:** Conflicting federal mandates

- Best available local science (county experience) says vegetated levees are more effective (structurally and ecologically). *Need to reconcile requirements for vegetation removal (Corps) and vegetation restoration (CWA) with BAS. Need additional studies assessing impacts of woody vegetation on structural integrity of levee.*
- Regulations currently force us (counties) to choose one objective over another, when we know we can achieve both. *Need more data showing cost benefits of integrated approach to floodplain management and use of vegetation*

## Case Study Key Themes, continued

**Whatcom County:** 75% of floodplain area is zoned agriculture; Nooksack delivers more sediment than Elwha

- Current “compatible use” solutions aren’t working: flooding in prescribed overtopping areas during growing season is burden on farmers (draining field requires pumping at peak hours)
- Public perception is a challenge: gravel bars are perceived to be the cause of channel migration, not climate variability
- Establish a Fish-Farm-Floodplain program?

# Key Themes: Biophysical Sciences

**Key point:** We know a lot about the biophysical benefits of floodplain protection and recovery, but we don't know which functions to focus on or where the priority areas are.

## Knowledge Gaps

- **Local impacts:** Can't measure biological impacts/benefits on river scale due to variability. Focus on understanding local benefits.
- **Range of ecological function and degradation:** *Which functions should we focus on protecting and recovering? Where? How much?*
- **Lack of monitoring on existing restoration projects.** *Will ad hoc approach to restoration meet our needs?*
- **Levee setbacks:** Projects never capture the entire channel width: *How much is enough? Where is channel width/area most important? Size is important... but not everywhere.*
- **Building resilience:** Is it helping to think about aiming for a "new normal"? *If we can't recover entire floodplain and associated functions, can we define acceptable range of variation on a "new normal"? What are the characteristics of floodplain "resilience"?*
- **Climate impacts:** Need better models (particularly sediment dynamics) to assess potential shifts in hydrological dynamics (volume and peak flows) and ecosystem impacts.

## Key Themes: Social Sciences

- **History:** Need to better understand social and cultural history of floodplain issues in order to address barriers to floodplain protection and recovery (e.g. Skagit farmer perception that fishing, not habitat loss, is the main issue for salmon)
- **Social capital:** Need more attention on building social capital to generate support and cooperation
- **Scale:** Don't yet have good tools for moving from site scale understanding of cost-benefits to landscape scale understanding of cost-benefits (social and natural)
- **Economic services vs. economic impacts:** Services are receiving attention but economic impacts are still not well understand.
  - Local understanding of economics is critical for understanding potential impacts and building local buy in for management decisions
  - Effectiveness assessments need to include economic impact analysis
- **Environmental justice** issues are real, and poorly understood
- **Social metrics** are needed in order to incorporate social sciences in cost-benefit and impact assessments

# Discussion

*Other key themes or science gaps?*

*Where do we go from here?*

- Summarize panel discussion and identify key points – *What would be most useful for Science Panel and panel participants?*
- Incorporating findings in NTA revision, BSWP revision
- Next steps on floodplain science and science-policy discussion
- Future State of the Science panels

# SOS PANEL FORMAT FEEDBACK

- Transdisciplinary focus of the discussion was very useful
- Build in more time for discussion
- *Other thoughts about future SOS Panels ?*