



**King County**

**Conference Notes**

**“The Future Ain’t What it Used to Be:  
Planning for Climate Disruption”**

**Summary of Fish and Shellfish Breakout Session**

**October 27, 2005**

**Qwest Field Conference Center**

**Seattle, Washington**

**Sponsored by King County**

**Report prepared by Katie Crahan**

Information on the conference is available at:  
<http://metrokc.gov/climateconference2005>

## **Fish and Shellfish Session Steering Committee**

Kathy Fletcher, People for Puget Sound, **Co-chair**

Derek Poon, EPA, Salmon Recovery, **Co-chair**

Gino Lucchetti, King County: Water/Lands

Bob Fuerstenberg, King County: Water/Lands

**“The Future Ain’t What it Used to Be: Planning for Climate Disruption”**  
**October 27, 2005**  
**Seattle, Washington**

**Summary of Fish and Shellfish Breakout Session**

On Thursday, October 27, 2005, King County hosted a one day meeting to engage a broad cross-section of Washington State governments, businesses, tribes, farmers, non-profits, and the community-at-large in a dialogue about climate change impacts and potential adaptations in Washington State. The following is a summary of the Fish and Shellfish Sector breakout group presentations and discussion. More information on the meeting, including electronic copies of the breakout group presentations, is available at <http://metrokc.gov/climateconference2005>

The Fish and Shellfish Sector breakout session included a morning session consisting of introductions by Kathy Fletcher from People for Puget Sounds, and presentations by Nate Mantua from the University of Washington, Mary Ruckelshaus from NOAA Fisheries, and Dan Cheney and Bill Dewey, from the Pacific Shellfish Institute and Taylor Shellfish Company, respectively. The afternoon session was moderated by Kathy Fletcher, Executive Director, People for Puget Sound, and Sarah Brandt, EnviroIssues, and began with questions to the panel, consisting of: Nate Mantua, University of Washington; Dan Cheney, Pacific Shellfish Institute; Bill Dewey, Taylor Shellfish Company; Robert Fuerstenberg, King County; Derek Poon, EPA, Salmon Recovery. It then continued in discussion format with the participation of the entire audience.

The Fish and Shellfish sector breakout session identified the following three items as priorities in their afternoon report to the plenary:

- Fish and shellfish must be thought of in the context of the ecosystem as a whole. A resilient ecosystem is more resistant to damage and impact due to climate change.
- Climate change has not yet been factored into many conservation plans nor into regulations. Current fish and shellfish regulations need to be reviewed in light of future impacts posed by climate change.
- Areas and populations that are healthiest and most resilient to potential climate change impacts need to be prioritized and conservation efforts should be focused there.

***Participants***

The Fish and Shellfish Sector breakout group attracted forty-six participants. Representatives from nine sectors participated, and breakdown information can be seen in Figure One, on the following page.

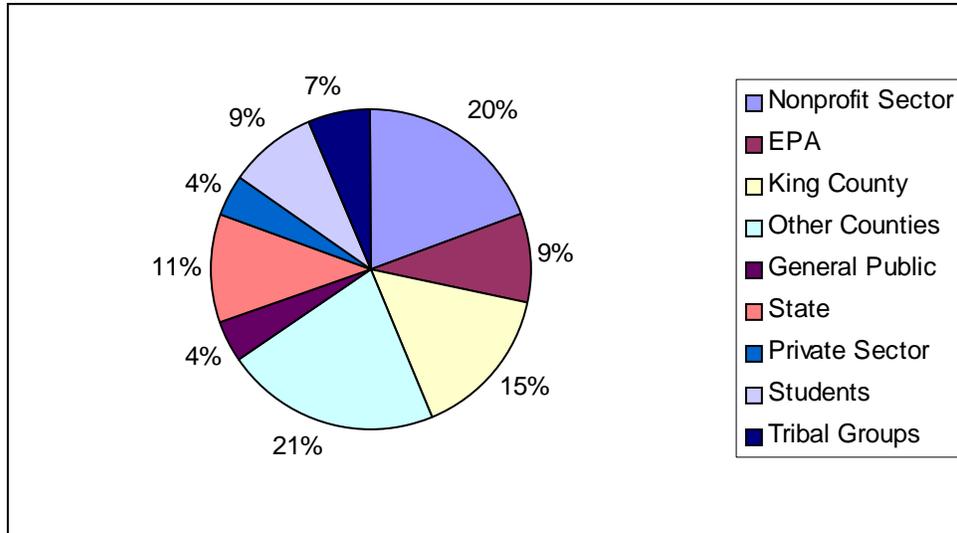


Figure One: A summary of the participants in the Fish and Shellfish Sector Breakout Section of the 2005 King County Climate Change Conference.

## Summary of Morning Session

### Presentations

*Nate Mantua: "Planet Impacts on Fish Habitat and Marine Food Webs."*

A pdf of the presentation is available on the meeting website.

There were no questions following this presentation.

*Mary Ruckelshaus: "Puget Sound Salmon Recovery."*

The annotated presentation file is available on the meeting website.

The questions to the speaker and the responses are summarized below.

*Question:* Does NOAA have plans to look at regions with desired diversity that are possibly less susceptible to climate change?

*M. Ruckelshaus:* Yes—the TRT (Technical Recovery Team) ESU viability criteria indicate that in order for the Chinook in Puget Sound to be more resilient to future environmental changes, all of the remaining spring (early run) Chinook will need to achieve low-risk in their recovery objectives. There is a paper describing the relationship between snow-pack dominated systems and the locations of spring-run Chinook populations.

*Question:* Have restoration actions been included in your model?

*M. Ruckelshaus:* We included many of the restoration actions the Snohomish plan specified, but couldn't model all, such as the engineered logjams, due to the simplicity of the model. The model probably underestimates restoration impacts. It also does not include the possibly mitigating effects of salmon evolving to adjust to climate-related habitat changes.

*Dan Cheney and Bill Dewey: "Puget Sound Shellfish."*

A pdf of the presentation is available on the meeting website.

There were no questions following this presentation.

## ***Summary of Afternoon Session***

Moderators: Kathy Fletcher, Executive Director, People for Puget Sound, and Sarah Brandt, EnviroIssues

### ***Questions to the Panelists***

Panelists: Nate Mantua, University of Washington; Dan Cheney, Pacific Shellfish Institute; Bill Dewey, Taylor Shellfish Company; Robert Fuerstenberg, King County; Derek Poon, EPA, Salmon Recovery

*Question:* We know that high carbon dioxide levels in the atmosphere track with the pH of the ocean water. Does this pH change impact crustacean and shellfish growth?

*R. Fuerstenberg:* Recent papers in Science this fall address the impact of pH changes on the ability of zooplankton to deposit calcium. It shows that this ability is reduced.

*D. Poon:* We believe freshwater clams and shellfish may be affected as well.

*Question:* Will climate change affect PDO?

*Audience Member:* We can track PDO variability in ice cores, but we are not sure how it may be impacted in the future.

### ***General Discussion***

The general discussion focused on several major issues that may impact the future of the fish and shellfish industry. The discussion was broken down into four sections, each with an overriding question.

#### **What impacts are likely to occur?**

Ecosystem impacts include potential changes in:

- Ocean and Puget Sound circulation
- Food webs
- Habitat type
- Invasive species population
- Timing and quantity of freshwater runoff in snow-melt river basins

For example, climate change will likely impact the effectiveness of planned salmon habitat restoration due to lifecycle impacts including decreases in spawning flows, increases in peak incubation flows, a reduction in summer streamflows and a rise in summer water temperatures.

Also, shellfish production may be impacted in terms of their health and the location of shellfish beds. This has the potential to harm human health due to transport of water-borne toxins. Climate change will also impact harvesting practices such as farming season duration, facilities and access to shellfish beds. It may also cause changes in types and duration of toxic algae blooms.

Additional concerns include:

- The Puget Sound is a unique habitat, and does not have a lot of flushing, which is exacerbated by zoning and estuary problems. We need to think about new ways to prevent degradation.
- The increased sea level may inundate the septic systems, degrading water quality.
- Global warming may impact the ability for ground water to recharge due to decreased snow packs.
- Climate change may cause changes in geomorphology.

### **What questions still remain?**

- What is the cumulative impact on fish and shellfish ecosystems of problems we are currently experiencing and future impacts that will be caused by global warming?
- Is there an impact from changes in the intensity of storm water runoff on lowland ecosystems?
- Will groundwater recharge be impacted due to decreased snow packs?
- How do we design multimillion-dollar projects with these questions in mind? Does this affect existing plans and prioritization?
- Will salinity changes due to changes in flow patterns impact the food web and cause habitat disruption? Some dams have been changing the salinity of stream flows already – what has this shown us?
- Have mitigation studies taken harvesting into account? Should we move to more selective harvesting methods such as fish traps?
- Should we learn to rely on rain-driven watershed species for harvest?
- Will we have to choose between apples and salmon?
- How do we measure and monitor impacts from global warming?

### **What are our priorities?**

- We have limited resources and a lot of money is spent on seriously degraded watersheds. We need to focus our restoration money. For example, rain-driven watersheds are likely to be less impacted by climate change than snowmelt-driven watersheds. We should focus on some unique genetic lines in some snowmelt-driven-watersheds but really concentrate our restoration efforts on rain-driven watersheds where species may be more resilient.
- We need to develop a comprehensive strategy and prioritize our actions.
- We can't do restoration basin by basin. We need a broader focus.
- Conversely, many restoration activities take place because the local population decides it is an important action. We should let the local population decide if it is a priority in their region.

### **What actions are important and need to be planned?**

Many recovery efforts focused on land acquisition:

- We should acquire as much property as possible, because it is difficult to do restoration projects when there is human population nearby.

- Salmon will be able to adapt if we give them the space to recover.
- We could buy an entire flood plain to solve water rerouting and storage problems.

Efforts to restore entire ecosystems would have a large, positive impact on salmon populations:

- Restoring natural ecosystems will give the salmon the ability to recover.
- Shellfish can be used to maintain the quality of estuaries.
- We must prioritize the smallest and fastest changing niches.
- Coastal protections, such as near-shore bulk-heads, should be put in place.
- Water quality is a limiting factor. Efforts to improve water quality in regards to climate change impacts should be planned, such as those necessary for storm water and septic treatments.
- Restoration money should focus on entire ecosystems, not individual properties.

The public must be reengaged in the restoration and conservation conversation. This is accomplished through:

- linking the benefits of restoration to the local population. The problem is real and the solution requires behavioral changes on the personal and commercial level.
- encouraging low-impact developments.
- cutting policies that harm the environment and creating market-based incentives to encourage conservation.
- tying salmon habitat restoration to other benefits of a healthy watershed such as flood protection.
- enhancing the dialogue with private shoreline property owners.

We should address the disease rather than the symptoms.

- Mandatory caps should be put in place to control carbon dioxide emissions.
- Every sector, including the fishing sector should manage their own carbon dioxide emissions.

Salmon fishermen should be protected.

- There was disagreement as to whether renegotiating the Pacific Salmon Treaty would return more salmon to Washington streams.
- Use science and modeling to see where harvestable runs will most likely persist and focus conservation efforts there.

Governmental actions are needed

- Revisit habitat laws and regulations to see if climate change will alter the impact of the law.
- An increase in sewage treatment and water treatment must be planned.
- Don't offer FEMA insurance to flood-prone properties.
- Converting watersheds to parks, such as California did, allows a new source of money to be directed at restoration efforts.
- Consider experimental projects.

### ***Summary of Report to Plenary***

Kathy Fletcher was charged with reporting the top three priorities identified by the breakout group to the plenary session. These are summarized below.

Top three priorities:

- Fish and shellfish must be thought of in the context of the ecosystem as a whole. A resilient ecosystem is more resistant to damage and impact due to climate change.
- Climate change has not yet been factored into many conservation plans nor into regulations. Current fish and shellfish regulations need to be reviewed in light of future impacts posed by climate change.
- Areas and populations that are healthiest and most resilient to potential climate change impacts need to be prioritized and conservation efforts should be focused there.