Testimony of San Juan County Council Member Kevin Ranker before the U.S. Senate Subcommittee on Oceans, Atmosphere, Fisheries and the Coast Guard (of the U.S. Senate Committee on Commerce, Science and Transportation)

Field hearing on effects of climate change on marine and coastal ecosystems in Washington

Seattle Aquarium
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Introduction

Thank you, Chairman Inouye and Senators, for the opportunity to testify today. Welcome to Washington State. I am so glad to see that Chairman Inouye continues his legacy of supporting Washington State as he did in the Magnusson/Jackson era now during the Murray/Cantwell era. Senator, we have something in common we both live on islands and therefore our constituents could be the most affected by sea level rise and climate change.

For the record, I'm Kevin Ranker. I'm a San Juan County Council Member *(and Chair of the Puget Sound Salmon Recovery Council, the Washington Coastal Counties Caucus, Pacific Region Program Officer of the Ocean Foundation and a member of the Ecosystem Coordination Board of the Puget Sound Partnership, which is taking an ecosystem-based approach to restoring and protecting our jewel, Puget Sound, by the year 2020)*.

The 2007 report from the Intergovernmental Panel on Climate Change (IPCC) says it best:

"Warming of the climate system is *unequivocal*, as is now evident from observations in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level."

Based on 20 years of research and thousands of published, peer-reviewed reports, the IPCC concluded that it is more than 90 percent likely that the accelerated warming of the past 50 to 60 years is due to human contributions.

Scientists also tell us that Washington State is particularly vulnerable to the impacts of climate change.

As a Pacific Rim state, sea level rise associated with temperature rise is a concern – especially for all of the communities along our 2,300 miles of shoreline.

- A study released in January concludes that sea levels in Puget Sound are likely to rise a half a foot by mid-century. The study (*Sea Level Rise in the Coastal Waters of Washington State*, 2008), conducted by the University of Washington's Climate Impacts Group and the state Department of Ecology, factored in global warming as well as local weather patterns and geology.
- Under its worst-case scenario, regarded as unlikely, but still a possibility, sea levels in Puget Sound could rise more than 4 feet by 2100.

Also making Washington especially vulnerable to climate change are our snow-fed water supplies. Snowmelt feeds rivers and streams, providing essential support to all kinds of ecosystems, salmon and other wildlife as well as critical aquifer recharge for drinking water for millions of Washington citizens.

The impact of these changes will also be widespread and devastating to numerous sectors of our economy. While obvious economic impacts due to climate change have been raised, such as the loss of coastal development, rebuilding of infrastructure or impacts to commercial fisheries, impacts associated with the relationship between a healthy environment and a healthy economy are less frequently discussed. Tourism for example, depends a great deal on a healthy Puget Sound and surrounding natural environment. In 2006 Washington State tourism revenue was $13.9 billion and created 146,500 jobs. In San Juan County during the same year tourism revenue topped $121.1 million and

created 1,780 jobs. The economic impact of losing key ecosystem services will be severe and widespread throughout our statewide economy.

Impacts of climate change on Puget Sound

Another study (*Uncertain Future: Climate Change and Its Effects on Puget Sound*, 2005) by the University of Washington's Climate Impacts Group concludes that "profound changes have occurred in the Puget Sound over the past century and the next several decades will see even more change."

"Changes caused by a warming climate are likely to reverberate across the Puget Sound ecosystem in complex and unpredictable ways, disrupting crucial interactions between Puget Sound plants and animals – and their environment."

Projected changes include:

- **Continued increases in air and water temperature.** Air and water temperatures have risen more here than in other parts of the world.
    - **Increased air temperatures** have reduced spring snowpack, produced earlier spring snowmelt, increased winter flow and decreased summer flow – which can lead to altered habitat for fish and other species.
        - And even the lowest estimated warming could change the Northwest's climate significantly more than the warming of the 20th century.
    - **Warmer water temperature** has the potential to put many species at risk, including plankton, the foundation of Puget Sound's food web.
- **Continued alteration of river and stream flows.** With decreased snowpack and earlier snowmelt, Western Washington's low summer stream flows are likely to be further reduced, while winter stream flows rise, altering the timing of freshwater inputs to marine waters.
- **Increased flooding in Puget Sound watersheds.** Recent flooding has cost human lives, hundreds of cattle and other farm animals, and millions of dollars in property

damage, to say nothing of the years of recovery for the local communities that were impacted. Projections show that this trend will continue.

- **Accelerated rates of sea level rise** are likely to **increase both the pace and extent of erosion and nearshore habitat loss** already affecting Puget Sound shorelines. The slightest changes in average sea level can dramatically impact the existing fragile nearshore ecosystems of the Puget Sound. Further, as the Puget Sound rises, the impact on coastal development increases. This trend leads to increased coastal armoring which devastates nearshore habitats. The nearshore ecosystems of the Puget Sound provide critical habitat for numerous species currently listed under the Endangered Species Act.
- **Salt marshes at risk.** Projected changes in water temperature, water salinity and soil salinity could change the mix of plant species in salt marshes and the viability of invertebrates that play a key role in the health of salt marsh systems.
- **Increased likelihood of algal blooms and low oxygen concentrations in bottom waters.** Increased algal productivity would lead to a further depletion of oxygen at depth.
    - Puget Sound is one of the largest shellfish-producing regions in the United States; and Puget Sound shellfish are vulnerable to contamination by the toxics produced by harmful algal blooms.

Effects of climate change on salmon

Salmon are fundamental to Pacific Northwest ecology, culture and economy.

Unfortunately, in most river basins, wild populations are severely depleted. Several stocks have been listed or are being considered for listing under the Endangered Species Act.

Salmon depend on both freshwater and marine habitats. They need:

- Clean, cold water; well-connected rivers; and reliable stream flows for spawning, rearing and migration;

- healthy estuaries where juveniles can adjust to ocean conditions, and adults can rest before spawning upstream; and
- productive ocean conditions, with abundant food sources and optimal temperature regimes.

And climate change is taking its toll on salmon, too.

- **More rain and less snow** have led to a major change in hydrograph: higher high flows, lower low flows. This both **increases the vulnerability of their eggs** to flood wipe out and **decreases the rearing capacity** of rivers to support juvenile salmon.
- Because less snowpack feeds the rivers, **water temperatures are warmer in the summer,** which **lowers the survival of rearing juvenile salmon.**
- **Warmer summer temperatures increase the mortality of holding adult salmon** (particularly spring and summer Chinook and summer steelhead – as they enter rivers many months before spawning).
- **Warmer summer temperatures increase the prevalence of certain parasites, which increases in-river mortality of return adults.** (This has been a problem with Fraser River sockeye in recent years and has been noted in Puget Sound rivers, like the Stillaguamish.)
- Modeling suggests that **global climate change will modify circulation patterns resulting in microclimate changes.** For example, more rainfall is likely to occur in lower valleys making less precipitation available for upper watersheds. This will **exacerbate the effects on lower summer flows and higher temperatures, further reducing the capacity of rivers for species such as steelhead and spring Chinook, which depend on upper watershed rearing.**
- **Sea level rise will completely modify lower main stem, estuarine and nearshore rearing habitats,** which have been identified as key habitats for some species/stocks (e.g. Skagit and Snohomish Chinook salmon). This means that **habitat restoration and protection actions will likely be less effective** than modeled.
- **Climate change is associated with broad changes in ocean circulation patterns.** The tendency is likely more toward the El Niño-like years, meaning **less upwelling, less productivity and poorer salmon survival in the ocean.**

- As noted earlier, **higher average ocean temperatures** will **alter the marine food web** and **reduce survivability of salmon.**

What Washington is doing to adapt to climate change

Thanks in large part to the leadership of Gov. Chris Gregoire and the state Legislature, Washington is taking bold steps to address climate change.

In Washington, nearly 50 percent of our greenhouse gas emissions come from cars, trucks, planes and ships. With this in mind:

- **Emission reduction.** In 2007, emission-reduction goals were established. In 2008, the goals were replaced by statewide emission limits:
    - To return to 1990 emission levels by 2020.
    - To reduce emissions to 50 percent below 1990 levels by 2050.

- **Emissions disclosure.** To assist consumers in making informed decisions about greenhouse gas emissions when buying a vehicle, starting in 2010, disclosure labels will be placed on new passenger vehicles.

- **Clean cars.** Beginning with model year 2009, new cars sold in Washington must meet the clean car standards adopted by California and 16 other states, which will help significantly reduce air quality pollutants.

Energy efficiency avoids the need to increase power generation, which can avoid increases in greenhouse gas emissions. Along those lines:

- **Energy efficiency standards.** Washington has adopted strong energy efficiency standards for new appliance products.

- **Green building standards.** Washington became the first state in the nation to require that state buildings be built to LEED silver certification.

Ecosystem-based management in Washington

Puget Sound Partnership: Another testament to the governor's leadership and concern for the environment came last year, when she and the Legislature created the Puget Sound Partnership to restore and protect Puget Sound.

Puget Sound's beauty belies its problems:

- Puget Sound orcas are the most contaminated marine mammals in the world.
- Shellfish beds are closed because their harvests are unsafe to eat.
- Beaches are closed because they are unsafe for swimming.
- The list of Puget Sound species that are threatened or endangered is long and, without action, likely to grow.

And a projected population growth of some 1.5 million people by 2020, which will put more stress on the Sound, only increases the urgency to act now.

The Puget Sound Partnership, which I have the pleasure to be involved with, is different from previous cleanup efforts in many respects.

- Its work is based on science.
- It will hold entities charged with the tasks accountable for results.
- And, it is charged with looking at the entire ecosystem – from the snowcaps to the whitecaps.

In developing its Action Agenda for a restored Sound by 2020, the Partnership is considering 6 ecosystem goals:

- human health;
- human quality of life;
- species, biodiversity and food web;
- habitat and land use;
- water quality; and
- water quantity.

This ecosystem-based approach will be essential to turning around the fate of the Sound – a task only made more difficult by climate change.

San Juan Initiative: In San Juan County, we have a local effort that will recommend changes to how local government and state and federal agencies protect the remaining high quality habitat of the Islands and by extension, all of Puget Sound. The San Juan Initiative's assessment of protection effectiveness will mostly demonstrate that parcel–by- parcel protection has not worked to protect what we care about. The Assessment points out that the way forward is through ecosystem or reach level management that engages the community in finding ways to manage collective resources together, insuring that the values of the community are expressed in protection efforts.

The San Juan Initiative will be completed this year and will point out where our combined local, state and federal efforts are working to protect the environment, address climate change impacts and where they need to be strengthened to fill the gaps. The process will engage citizens and governments so that the recommendations are ground-truthed and commitments are secured for actions necessary for immediate implementation.

The San Juan Initiative's model for improving protection is the best way to begin preparing for climate change at the local level. The effects of climate change will require new ideas and local solutions that change our management approach to focus less on the parcel and more on the scale of ecosystems.

Federal support needed for better understanding, response to climate change's effects on Washington's marine, coastal ecosystems

In the interest of time, I will limit my remarks about necessary federal support to salmon, as they are an excellent indicator of ecosystem health and our Northwest culture.

Perhaps Jim Martin, former Chief of Oregon Fisheries and Salmon Adviser to Oregon Gov. John Kitzhaber, says it best in the "Light in the River" report on the effects of climate change on Columbia and Snake River salmon:

"Whether salmon can recover in the Columbia and Snake Basin depends primarily on federal policy. Will it keep backing into the future with eyes on the past? Or will it turn forward, scout the changes coming fast and act strategically?"

The report recommends a restoration strategy with 4 primary features:

- **Immediate actions** to reduce the impacts or buffer salmon against them, with a priority focus on:
    - reconnecting salmon to headwater habitats;
    - protecting headwater flows and temperatures; and
    - reducing mainstem Columbia and Snake River mortalities to adult and especially juvenile salmon.

- **Population-specific analyses and actions** as precise as possible to the status, life histories and warming effects on each species.

- **Assured feedback** so that research and evaluation of effects on species of both chose actions and warming impacts loop back quickly and certainly to modify and add actions, on an annual or biennial basis.

- **Assured commitment to the precautionary principle under the Endangered Species Act** – which, requires human actions, not salmon, to bear more of the risks from global warming uncertainties and unknowns.

Conclusion

It is critical that the federal government be a leader in the efforts to address the effects of climate change on the marine and coastal ecosystems of Washington State and elsewhere

in the nation. Congress must provide increased support to NOAA, academic institutions and non-governmental organizations who are conducting important research and modeling that will be critical to coastal states and local communities as we develop strategies to address these issues. Congress must also provide more support for the state, regional and local programs already underway in Washington and elsewhere in our nation. These "bottom-up" ecosystem-based efforts are developing local solutions and management strategies while engaging citizens at a level they understand. They will be incredibly valuable models for replication as the effects of climate change become more apparent over the coming years.

Lastly, I want to emphasize that financial support is not enough. What we sorely need is a renewal of the kind of leadership, commitment and innovation at the federal level that – in the past – defined the United States as the leading force in protecting the environment and the planet. I hope that as we move forward we can all work together to regain that position.

Thank you very much for the opportunity to testify today.