



State of the Salmon 2009 Conference:



Alex Speaks photo

Dr. C.S. "Buzz" Holling speaks on the need for resilience in the management of the linked ecological and social systems related to wild salmon conservation.

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"The first rule of intelligent tinkering is to save all the pieces." –Aldo Leopold

"We are overwhelmed by insurmountable opportunities." –Pogo

These were two of the tone-setting quotes used by conference speakers at the State of the Salmon 2009 Conference in Vancouver. This conference provided an open forum where people from multiple jurisdictions, countries, and continents could present their perspectives on Pacific salmon (*Oncorhynchus*) conservation. The purpose of the conference was to share information to help launch innovative, ecologically sound solutions to save wild salmon populations. The speakers and audience presented a wide variety of viewpoints, including opposing perspectives. But the primary and consistent message was one of urgent resolution and immediate action to conserve wild salmon populations before they are extirpated. Considering that salmon habitat encompasses remote mountain forests at the headwaters of watersheds and downstream to the farthest ranges of open Pacific Ocean, this is a massive challenge. The one question that remained constant was: "Is this a surmountable task?" Judging by the large attendance and passion displayed at the conference, people are trying hard to find solutions to conserve Pacific salmon. Below are highlights from a sample of speakers, along with a general overview.

The conference started with keynote presentations featuring internationally known speakers. All speakers identified that salmon are integral to the social

identity of people on the west coast of North America. They also outlined some of the issues that are leading to declining wild salmon populations, and offered a few potential solutions. In general, threats to wild salmon stem from humans: habitat loss, overfishing, genetic integrity, and climate change. **David Suzuki** said that salmon management is a human management issue because politics and economics, not the salmon's needs, are driving conservation. Former federal Fisheries Minister **David Anderson** offered context on the political process, noting that the policy process favours status quo approaches. It is politically easier, he said, to make modifications to existing programs than to review and propose new programs. University of Washington professor, **Nate Mantua**, discussed potential climate change impacts on salmon. Climate change is a major source of uncertainty and concern for the sustainability of wild salmon. Increased carbon dioxide in the atmosphere impacts salmon in two primary ways: by increasing water temperature and increasing the acidity of the ocean, which can influence the productivity of salmon food sources.

Amidst the rather sobering assessments of the threats and challenges for sustaining healthy wild salmon populations, the conference highlighted some reasons for optimism. Salmon have a long history of adapting to changes in climate and geological events. While climate change may have negative effects on populations in the southern portion of their range, populations in northern areas could increase due to warmer temperatures and increased productivity. In Russia, protected areas have been set-up in the Kol and Kekhta River watersheds, and are showing promise as a strategy to protect wild salmon populations and ensure sustainable fisheries. While the future for salmon is unknown, humans must manage adaptively to ensure resilient salmon populations and habitats that support multiple life-history stages. Trying to restore the past will not be successful because researchers don't know what to manage for given that salmon populations and their habitats have not maintained a steady-state condition, but have adapted to change over the millennia. In the southern portion of the salmon range, there will be tough choices about which populations to focus resources on at the cost of potentially losing less viable populations.

A panel of speakers was assembled to provide regional assessments of the status of salmon populations. In Japan and Korea, populations are small and largely maintained by hatchery programs. In Russia, some populations seem to



Bringing the future into focus

be declining (pink) while others are increasing (chum), and greater habitat protection and hatchery programs are being proposed as the primary methods to increase the productivity of the fishery. Alaskan salmon runs are generally strong due to local sustained yield management and little political intervention; however, numerous sources of uncertainty are on the horizon. On BC's west coast, the 2008 commercial catch was the lowest on record, and it is not clear if the low numbers are the result of salmon mortality in the ocean or in freshwater habitats. In general, salmon populations in northern BC are healthier than in southern BC. On the US west coast, populations have dropped to less than 10% of historic levels, with many extirpated populations. Low salmon populations in the US are a result of past land and water management practices that decreased the resilience of salmon populations, and of political compromises related to competing needs for water. In total, 29% of approximately 1400 Pacific salmon populations have gone extinct in recent times, and surviving populations have lost 27% of their genetic diversity.

Another panel of speakers discussed conservation principles and their integration around the Pacific Rim, citing some specific guidelines to help restore salmon populations. A three-step process described an approach to salmon conservation: 1) protect, 2) reconnect, and 3) restore.

- Protect the headwaters area for spawning and fry-rearing habitat.
- Maintain or rebuild the stream/river connections through areas of development, from the headwaters to the ocean.
- Restore salmon populations using a watershed-scale approach through all salmon life cycles. Don't allow artificial means of augmentation (e.g., hatcheries and barging fish around dams) to overshadow habitat preservation.

Another presenter addressed biocomplexity, which is the complexity of habitat, and how salmon landscapes are heterogeneous and dynamic filters of the climate. Thus, salmon are not directly affected by climate change, but are affected indirectly by consequences of climate change on their habitat.


Presentations on more specific, practical conservation measures included an evaluation of genotypic and phenotypic effects of artificial selection by fisheries on salmon stocks on salmon migration dates (early run versus late run); choices of spawning habitat (small stream versus larger river); selection

of stream section (upper versus lower reach); body size at spawning time; and differential reproductive success. Maintaining diversity within and between salmon stocks is critical to their population viability. The most popular type of commercial fishing gear has very significant long-term effects on salmon populations. A central theme was the need to maintain salmon stocks to allow for adaptability. One researcher suggested that marine predation was a significant factor impacting salmon survival and proposed killing large numbers of seals to resolve the problem.

At the close of one afternoon Plenary session, a guest speaker came to the podium. A First Nations Elder named Pearl spoke on the traditional use and importance of salmon to the aboriginal people, and strongly urged participants to immediately enact and implement laws to preserve the wild salmon. She received a standing ovation for her heartfelt perspective.

In summary, the concerns about and issues surrounding wild salmon conservation included the following:

- The problem's vast geographic and sociopolitical scope
- Political inertia and the need for decentralized, collaborative stakeholder processes
- Protection of the role of wild salmon in First Nations culture, use, and economies
- Habitat degradation and loss through expanding human populations and related development
- Climate change as a major source of uncertainty around habitat suitability and ocean conditions (e.g., increasingly wider swings of extreme natural events such as flooding and wildfire, and warmer ocean temperatures affecting ocean survival)
- Impacts of commercial and recreational fisheries
- Biological threats such as exotic invasive species, disease, sea lice, and predation by marine mammals
- Legacies of land and water management policies (e.g., blocked migration paths due to dams)
- The genetic integrity of wild stocks, and in light of genetic pollution, what defines a "wild" salmon

In the end, the good news was that researchers, fisheries managers, First Nations, environmental non-government organizations, and the public are all discussing the next steps needed to truly bring the future into focus for wild Pacific salmon. 

More Information

Conference website: www.stateofthesalmon.org

Lackey, R.T. et al. 2006. Salmon 2100: The future of wild Pacific salmon. American Fisheries Society, Bethesda, MA www.afsbooks.org/x55050xm.html

Montgomery, D.R. 2003. King of fish: The thousand-year run of salmon, Westview Press, Boulder

Special Issue of Ecology and Society, 2009, "Pathways to Resilient Salmon Ecosystems" www.ecologyandsociety.org/viewissue.php?sf=34

Pacific Salmon Foundation www.psf.ca/

Department of Fisheries and Oceans www.dfo-mpo.gc.ca/index-eng.htm

Fraser Basin Council-Fraser Salmon and Watershed Program www.fraserbasin.bc.ca/programs/basin_wide.html#fish

Helping Pacific Salmon Survive the Impact of Climate Change on Freshwater Habitats: Pursuing Proactive and Reactive Adaptation Strategies www.fish.bc.ca/files/PFRCC-ClimateChange-Adaptation.pdf

Helping Pacific Salmon Survive the Impact of Climate Change on Freshwater Habitats: Case Studies: Perspectives from the Okanagan, Quesnel, Nicola, Cowichan, Nass, and Englishman River Watersheds www.fish.bc.ca/files/PFRCC-ClimateChange-Adaptation-CaseStudies_Complete.pdf