

NPAFC holds the Second International Year of the Salmon Workshop in Portland, Oregon, USA: Wrap-up Summary

By Ed Farley

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The North Pacific Anadromous Fish Commission (NPAFC) convened the Second NPAFC-IYS Workshop on Salmon Ocean Ecology in a Changing Climate, in a partnership with Salmon Ocean Ecology Meeting (SOME) for three days following its 27th Annual Meeting in Portland, Oregon, USA to discuss results on research conducted for the International Year of the Salmon (IYS). Forty-four oral presentations, including ten keynote oral presentations, and twenty-four posters were presented. Over 150 participants from Canada, Japan, Korea, Russia, and the USA, gathered in Portland on May 18–20. Oral and poster presentations given at the workshop are currently available at <https://npafc.org/workshop-presentations-2019/>. Extended abstracts are being compiled in Technical Report 15, which will be available online in the winter. The IYS is a five-year outreach and research initiative of the North Pacific Anadromous Fish Commission (NPAFC) and the North Atlantic Salmon Conservation Organization (NASCO). Countries across the Northern Hemisphere are banding together in a new partnership of government, academia, NGOs, Indigenous Peoples and industry to drive an intense burst of outreach and research that will establish the conditions necessary for the resilience of salmon and people in an uncertain future. Workshop topics included 1) current status of salmon and their environments; 2) salmon in changing ocean conditions; and 3) new technologies and information systems for salmon research and management. There was also a discussion of results from the successful winter high seas survey in the Gulf of Alaska that occurred during February to March 2019.

Total biomass of Pacific salmon in the North Pacific Ocean (NPO) has remained at an historic high level from 1990 to present, however there are differences in regional production that suggest southern stocks of salmon are not doing as well as northern stocks. For instance, the abundance of chum salmon returning to Japan and sockeye salmon returning to the Fraser River in Canada have declined during the past decade. However, returns of pink, chum, and sockeye salmon stocks in more northern latitudes remain strong. While production dynamics among pink, chum, and sockeye salmon stocks vary within the NPO, Chinook salmon and Steelhead returns are down basin wide suggesting other factors are affecting their survival.



Ed Farley is the Program Manager for the Ecosystem Monitoring and Assessment (EMA) Program at the Alaska Fisheries Science

Center, Auke Bay Laboratories in Juneau, AK. The EMA program conducts regular fish and oceanographic research in Alaska's large marine ecosystems (Gulf of Alaska, Bering Sea, and Chukchi Sea). Data from these surveys are utilized in 'end to end' ecosystems models as an Integrated Ecosystem Assessment to understand the relative role of climate on groundfish recruitment and salmon marine survival. In that regard, Ed's current research is focused on addressing hypotheses that link climate change and variability to ecosystem function and to link ecosystem function to fish growth, fitness, and survival at critical life history stages. Ed's interest in fisheries began during the 1980s, when he commercially fished for sockeye salmon in Bristol Bay. Since that time, Ed completed a BS in Mathematics at the University of Washington and a MS and PhD in Fisheries from the University of Alaska Fairbanks.

The sustained high biomass of adult and immature Pacific salmon in the NPO over the past 25 years includes mostly chum salmon (60%), pink salmon (22%), and sockeye salmon (18%). Nearly 40% of the biomass of these three species is comprised of hatchery fish; Alaska generates 68% of hatchery pink salmon while Japan generates 75% of the hatchery chum salmon. The recent high production of pink salmon (wild and hatchery) in the NPO may be exerting top-down control on the food web of the NPO ecosystem that may be impacting the growth and survival of other salmon species. The mechanistic understanding of how pink salmon interact with the ecosystems of the NPO and their top-down effect on prey resources is still being debated.

Earth's climate is changing more rapidly than scientists predicted and the ecosystems of the NPO are responding in various ways. Climate models predict continued warming of the surface waters in the NPO and that new extreme states are much more possible in the first half of the 21st century. As an example, during 2014 and 2015 a large portion of the coastal and offshore regions of the eastern Pacific experienced exceptionally high ocean temperatures. The anomalous warming event, known as the “Blob”, because of the extreme magnitude of the region of warm water is believed to be responsible for shifts in zooplankton community structure in coastal ecosystems and northward movement of sub-tropical fish species to the Gulf of Alaska. Consequently, salmon returns to the Gulf of Alaska one to three years after the “Blob” event were much lower than predicted. We have time series data sets on salmon marine ecology from ocean surveys, tagging, spawner and recruitment data, and others that are available for modeling efforts to help link marine ecosystem structure to salmon distribution, fitness,

and survival. Coupling this information with freshwater data will improve our understanding of climate impact on the full life-cycle of salmon.

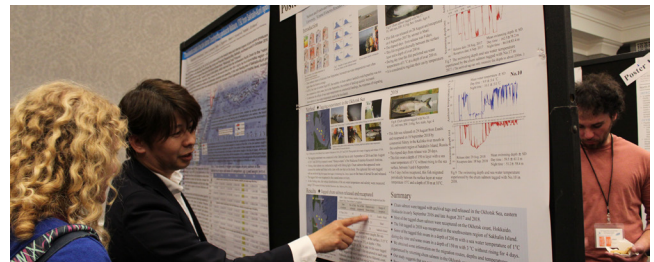
The IYS scientists are also employing new technologies such as eDNA to help address population and ecosystem-level hypotheses as well as analytical methodologies and new equipment (i.e., acoustics) to help address distribution and migration questions over broad geographical space and through time. Some of these methods are being used during ocean surveys by IYS scientists to test their utility in real time applications.

I would like to acknowledge the hard work of the Workshop Organizing Committee, particularly the co-chairpersons Richard Brodeur, Mark Saunders, Shigehiko Urawa, and Brian Wells as well as NPAFC Secretariat staff, including Jeongseok Park, Jennifer Chang, Mariia Artiushkina, Stephanie Taylor, Nathan Bendriem and Caroline Graham who did a great job in ensuring the workshop ran smoothly.

I look forward to seeing all of you at the third NPAFC-IYS Workshop in Hakodate, Japan, in 2020.



2nd NPAFC-IYS Workshop Organizing Committee members (from left to right) Jeongseok Park, Shigehiko Urawa, Ed Farley, Richard Brodeur, Svetlana Naydenko, Jim Irvine, Brian Wells, Mark Saunders. Missing from photo—Ju Young Kim and Michael Schmidt. Photo credit: NPAFC Secretariat



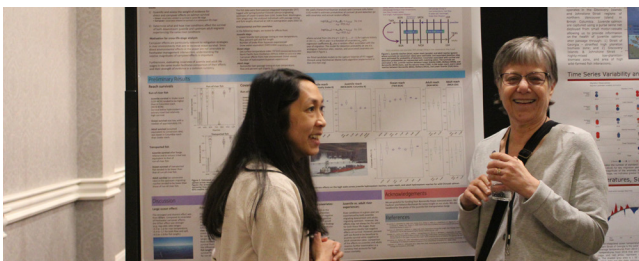
Hayato Saneyoshi presenting his poster at the poster session of the workshop. Photo credit: NPAFC Secretariat



Participants reading displayed posters at the poster session of the workshop. Photo credit: NPAFC Secretariat



Ed Farley, Chairperson of the workshop, giving his introductory remarks at the beginning of the workshop. Photo credit: NPAFC Secretariat



Participants reading displayed posters at the poster session of the workshop. Photo credit: NPAFC Secretariat



Presenters and participants at the second NPAFC-IYS Workshop. Photo credit: NPAFC Secretariat