

Guy Norman
Chair
Washington

Patrick Oshie
Washington

Jim Yost
Idaho

Jeffery C. Allen
Idaho



Northwest **Power** and **Conservation** Council

Doug Grob
Vice Chair
Montana

Mike Milburn
Montana

Ginny Burdick
Oregon

Louis Pitt, Jr.
Oregon

February 8, 2022

MEMORANDUM

TO: Fish and Wildlife Committee Members

FROM: Kris Homel

SUBJECT: Review of the January meeting of the Ocean and Plume Science and Management Forum

BACKGROUND:

Presenter: Kris Homel

Summary: At the February Fish and Wildlife Committee meeting staff will provide a brief summary of the most recent Ocean and Plume Science and Management Forum (Ocean Forum) meeting. Chair Norman convened the Forum on January 19th, 2022. The primary topic of this meeting was carryover effects – understanding how actions or conditions in freshwater affect survival of salmon and steelhead through the marine portion of the life cycle. The meeting had over 140 attendees representing 30+ organizations and met for about four hours.

The Forum included five presentations. The first, by Laurie Weitkamp (NOAA's Northwest Fisheries Science Center; NWFSC – Newport), focused on trends in salmon and steelhead abundance in the North Pacific. The second presentation, by Brian Burke (NWFSC – Seattle), focused on cycles of productivity in the ocean. The third presentation, by Mark Saunders (NPAFC – Vancouver, B.C.), described a new collaborative effort to develop an autonomous monitoring system in the North Pacific. The fourth presentation, by Lisa Crozier (NWFSC - Seattle), introduced the topic of carryover effects and provided numerous examples from her research and that of her colleagues. The last presentation was

by Brian Beckman (NWFSC – Seattle); he presented a conceptual model of how to link ocean conditions to hatchery release practices to minimize among-year variation in adult returns.

Subsequently, attendees discussed three topics: (1) current actions that regional and hatchery managers are taking in freshwater to improve adult returns, (2) new research needed to understand the mechanisms driving carryover effects, and (3) adaptive management- climate change, adaptation, and next steps.

Relevance: The Ocean Forum was historically a chartered Council Forum which met a few times each year to discuss ocean (and estuary) research and management implications, 2013 - 2018. Although the charter has expired, the forum will convene annually to continue discussion on these and other timely topics.

The 2020 addendum highlighted the “importance of understanding how annual variations in ocean conditions affect Columbia River salmon and steelhead.” It specifically noted the importance of the Ocean Forum as an opportunity for ideas to be shared among ocean researchers and fisheries managers.

Background: The following are a few highlights from the presentations:

- There has been an increase in frequency and magnitude of ocean heatwaves, especially since 2014. These heatwaves cause dramatic impacts to the marine food web, include harmful algal blooms, mortality events for birds and whales, and species range expansions.
- During this time of ocean heatwaves, Laurie Weitkamp presented data showing how salmon and steelhead abundance throughout the North Pacific has varied both regionally and among species - some regions show increasing trends for some species but decreasing for others.
- Brian Burke presented on the ecological indicators monitored by NOAA off the Oregon and Washington coast each year. Juvenile salmon and steelhead that entered the ocean in 2021 will be experiencing good to fair conditions across all monitored indicators. These conditions are dramatically better than what has been observed recently.
- Mark Saunders described a new effort underway to develop an autonomous monitoring system in the North Pacific that could help managers predict ocean conditions with greater lead time. The new monitoring system would build off existing high-seas sampling of both salmon and ecological indicators, ultimately producing data that can be fed into ecological models. This project – called Basin Events to Coastal Impacts (BECI) – was approved as part of the United Nations Decade of Ocean Science.
- Lisa Crozier introduced the concept of carryover effects. In brief, marine survival is influenced by both conditions in the ocean and prior conditions

experienced when juveniles migrate in freshwater. Specific carryover effects from the freshwater environment include the timing of arrival in the estuary or ocean, size at migration, or abundance/ density dependence.

- Lastly, Brian Beckman described current hatchery release strategies in relation to changing ocean conditions and proposed a testable hypothesis. Currently, permit constraints and results from prior research have led to a narrower set of release dates and release sizes of hatchery fish than what is observed in natural origin populations. This strategy can produce excellent returns during favorable environmental conditions, but during poor river migration or ocean conditions, very low returns can also happen. Brian presented a hypothesis that diversifying hatchery releases may result in less variation in returns over time.
- During the group discussion, forum attendees emphasized that against a backdrop of climate change and variable ocean conditions, it was increasingly important to maintain or promote life-history diversity and to restore diverse habitats in migratory corridors and the estuary. Moreover, managers noted the need for increased monitoring data, such as additional antennae at dams or in the estuary to detect Passive Integrated Transponder tags (PIT tags), and continued surveys in the estuary to identify habitat use by juvenile salmon and steelhead.

More Info: See the Ocean and Plume Science and Management Forum [webpage](#).