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

April 4, 2017

MEMORANDUM

TO: **Fish and Wildlife Committee members**

FROM: **Leslie Bach**

SUBJECT: **Cold-water habitat overview**

BACKGROUND:

Presenter: Leslie Bach

Summary: The importance of cold-water to salmon and steelhead is well-known and documented. Seasonal temperatures in both the mainstem and tributaries are often above optimal conditions for fish. In addition, climate change models predict general increases in stream temperature as well as shifts in the timing of streamflow. These changes could exacerbate the already challenging seasonal conditions for fish. Maintaining and enhancing cold-water habitats is critical to the conservation and long-term viability of salmonids in the Columbia River Basin.

Numerous efforts are underway to understand the distribution, processes and functions of cold-water habitats, and to identify measures to protect and restore them. The processes that form and maintain cold-water habitats, as well as the manner in which fish use these habitats, varies with location, landscape context and scale. A summary of the ongoing work on cold-water habitats; tools and methods to identify and map these habitats; and relationships to fish use will be summarized in this presentation. Gaps in existing knowledge and data will also be highlighted.

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Relevance: Actions related to cold-water habitat are identified in numerous locations in the 2014 Fish and Wildlife Program. Protecting and restoring habitat is a key sub-strategy in the Ecosystem Function section of the Program (page 41). An important aspect of this is ensuring that the habitats that are restored and protected are providing the appropriate thermal regimes for fish and other aquatic life. Specific to mainstem habitat measures, the Program states that "The Council will consider additional mainstem habitat actions including "identifying, protecting restoring and managing thermal refugia for salmonid use during high water-temperature periods" (page 43). Under the Climate-Change sub-strategy, the general measures call for the action agencies to "evaluate the effectiveness and feasibility of possible actions to mitigate effects of climate change…other actions to create or protect cool water refugia in mainstem reaches or reservoirs" (page 58).

The ISAB and ISRP's 2016 Critical Uncertainties Report extensively highlights the importance of thermal refuges. Some examples include the value of 1) understanding the locations of thermal refuges in the mainstem as temperatures increase with climate change, 2) securing thermal refuges and sufficient high quality water under predicted landscape-scale changes in hydrology, and 3) considering areas likely to provide thermal refuges for aquatic species when selecting areas for habitat restoration.

Background: Components of this topic have been addressed at previous Council meetings over the past several years. Information on cold-water refuges in the mainstem Columbia were presented at EPA's Columbia River Cold Water Refugia workshop in June, 2016. In addition, Stan Gregory provided an overview of cold-water habitats at the Future of our Salmon Conference in 2016. This overview will build on these past presentations to summarize the state of the science.

More Info:

- Nov 2015 presentation from Dan Isaak and Mike Young on Identifying, Protecting & Enhancing Climate Refugia for Salmonids
- January 2016 Council briefing on the Distribution and use of Cold Water Refuges in the Willamette
- August 2016 presentation from John Palmer and Matthew Keefer