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November 9, 2015

MEMORANDUM

TO: Council members

FROM: Jim Ruff – Manager, Mainstem Passage and River Operations

SUBJECT: Briefing on identifying, protecting and enhancing climate refugia for salmonids in the Pacific Northwest

BACKGROUND:

Presenter: Dr. Dan Isaak, a research fish biologist at the U.S. Forest Service Rocky Mountain Research Station in Boise, ID, will be the presenter. Dr. Mike Young, who is a research fisheries biologist at the U.S. Forest Service Rocky Mountain Research Station in Missoula, MT, collaborated with Dr. Isaak on this work.

Summary: Climate change in the Pacific Northwest has been gradually warming rivers and reducing snowpacks and runoff for several decades. Those trends are likely to continue for the next several decades and maybe longer depending on the evolution of human energy economies and future greenhouse gas emissions. Climate cycles associated with the Pacific Decadal Oscillation and El Niño-Southern Oscillation periodically dampen or exacerbate environmental trends, but populations of salmon and trout that require cold water to survive will be subject to increasing amounts of thermal stress for the foreseeable future. Many populations of resident salmonid species like bull trout or cutthroat trout that live in steep, cold headwater streams can persist simply by shifting their distributions towards higher elevation refuge habitats. But adaptation is more challenging for populations of anadromous fish that migrate through large rivers during warm periods. Warming trends of those rivers are difficult or

impossible to stop, so shifts in migration timing by natural and hatchery selection are needed. Near spawning grounds, habitat restoration strategies that maximize riparian vegetation shade or instream flows may be beneficial. Facilitating access of anadromous fish to cooler river habitats that are blocked by dams or natural barriers could also be a viable option in a few instances. High-resolution stream temperature and flow scenarios are available to predict where the most resilient habitats are likely to persist, which could provide a strategic basis for long-term conservation investing, but uncertainties about the amount of future climate change will loom for decades. Biocomplexity and environmental heterogeneity in the Pacific Northwest ensure that many salmonid species will continue to persist in the region's rivers and streams, but some populations of some species are likely to experience long-term declines. Continuing and enhancing the culture of adaptive management and collaborative spirit that permeates the fisheries community will be needed to navigate the challenges ahead.

Relevance: One of the Council's emerging high priorities addresses "preserving program effectiveness by ... taking into account the effects of climate change." (See p. 116 of the Council's 2014 Fish and Wildlife Program.) This priority action was recommended by numerous state, tribal and regional entities during the 2013-14 program amendment process and subsequently adopted by the Council into the program.

Workplan: This presentation addresses Council work plan item 2.B, which promotes regional fish and wildlife recovery by prioritizing and implementing 2014 Fish and Wildlife Program actions.

Background: The climate change sub-strategy in the Council's 2014 Fish and Wildlife Program calls on the federal action agencies, in coordination and collaboration with others, to "assess whether climate change effects are altering or are likely to alter critical river flows, water temperatures or other habitat attributes in a way that could significantly affect fish and wildlife important to the program." The program also identifies a need to "continue to encourage, monitor, and promote public awareness of pertinent climate change research and information and assess how it should influence program mitigation efforts." Dr. Isaak's presentation addresses aspects of both of these measures.

More Info: None.