Draft Preliminary Alternatives Framework

The following preliminary "focus" alternatives reflect the co-lead agencies' current phase in the development of the CRSO EIS alternatives. The intent is that each of these focus alternatives will be modeled and analyzed to assist the agencies in understanding the tradeoffs among various resources, and help to develop a range of reasonable alternatives for analysis in the Draft EIS, which may include elements of some or all of these focus preliminary alternatives.

Draft Preliminary Alternative: Adult Fish Survival Focus

Summary: The Adult Fish Survival Focus Preliminary Alternative will analyze the performance of actions intended to maximize adult salmonid survival through the Columbia River System (System) above other authorized project purposes.

Context: Since the listing of Columbia River Basin salmonids under the Endangered Species Act (ESA) in the 1990s, the co-lead agencies have undertaken a number of measures to reduce impacts of the System on salmon. These improvements have ranged from structural modifications to operational changes to benefit fish. The result has been increased survival of ESA-listed salmon as they move through the System.

This preliminary alternative will frame methods to improve adult fish migration within the CRSO projects, including but not limited to configuration, flow management, spill, and water quality to benefit ESA-listed anadromous salmonids. Adult fish passage is prioritized. Measures under consideration include improvements to fish ladders, providing cooler water with flow augmentation, and improved operations and spill patterns for adult passage.

Draft Alternative: Lower Snake River Dam Breach Focus

Summary: For this preliminary alternative, breaching the four Lower Snake River dams is comparable to the breaching alternative in the 2002 Lower Snake River Juvenile Salmon Migration Feasibility Study. The alternative proposes breaching of the earthen embankments at all four lower Snake River dams while leaving the concrete portions of the dam in place. The powerhouses would be nonoperational but remain intact. The reservoirs would be drawn down over time in a controlled manner to avoid impacts to the stability of river banks, cultural resources, adjacent roads, and railroads. Hydropower generation and inland navigation would cease.

Modifications required to existing mitigation areas such as hatcheries and Habitat Management Units are unknown at this time, and will be determined as part of the Fish and Wildlife Coordination Act process to be conducted with the U.S. Fish and Wildlife Service. The analysis will also evaluate potential modifications or changes to the Bonneville Power Administration's implementation of the Northwest

Power and Conservation Council's Fish and Wildlife program, and the integrated Bonneville transmission system. Additional studies and analyses will be necessary for congressional authorization for implementation of this alternative.

Context: Breaching of the four lower Snake River dams was studied by the Corps in the 2002 Lower Snake River Juvenile Salmon Migration Feasibility Study as a means to improve population levels of the four ESA-listed salmon evolutionarily significant units (ESUs) in the Snake River. At that time, the alternative was not selected due to significant impacts to other congressionally authorized project purposes and existing uncertainty of the benefits of breaching. In the 2009 Adaptive Management Implementation Plan developed jointly by the co-lead agencies and NOAA, dam breaching would be evaluated as a "contingency of last resort," an action to be evaluated if ESA-listed salmon populations dropped below agreed upon thresholds. To date, salmon populations have not declined below the identified thresholds, but there continues to be high interest in breaching the four lower Snake River dams. In addition, the U.S. District Court for the District of Oregon in the *NWF v. NMFS* case noted that breaching of the four lower Snake River dams would be reasonable for consideration in this EIS.

Breaching the lower Snake River dams would be recommended as a means to return this portion of the river to its natural condition, including the volume and timing of flows water depth and temperature, sediment movement and geomorphology, and the reestablishment of riparian and wetland habitats at the river margins. These conditions could contribute to more natural migration, spawning, and rearing conditions for some ESA-listed fish.

Draft Preliminary Alternative: Juvenile Anadromous Fish Survival Focus

Summary: The Juvenile Fish Survival Focus Preliminary Alternative will analyze the impacts of actions intended to maximize juvenile salmonid survival through the System above other congressionally authorized project purposes.

Context: Since the listing of Columbia River Basin salmonids under the Endangered Species Act (ESA) in the 1990s, the co-lead agencies have undertaken a number of measures to reduce impacts of the System projects on salmon. These improvements have ranged from structural modifications to operational changes to benefit fish. The result has been increased survival of ESA-listed salmon as they move through the System.

The measures in this preliminary alternative are intended to further increase juvenile salmon and steelhead fish passage survival and abundance, decrease travel times for juvenile outmigration, and provide safer passage routes for juvenile salmon and steelhead, through changes in configuration such as additional surface passage facilities, flow management, spill levels and patterns, modifications of reservoirs operations, and water quality improvements to benefit ESA-listed anadromous salmonids

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Draft Preliminary Alternative: ESA-Listed Resident Fish Survival Focus

Summary: The Resident Fish Survival Focus Preliminary Alternative is intended to maximize conditions for ESA-listed resident fish in the basin, namely Kootenai River white sturgeon and bull trout.

Context: The Kootenai River white sturgeon (KRWS) was listed as endangered under Endangered Species Act (ESA) in 1994. The wild population of KRWS is in decline due to an aging population and low juvenile survival. Research indicates that most mortality occurs between egg and larval stages, due to a lack of suitable habitat, making actions for juvenile survival particularly critical. Bull trout was listed as threatened under the ESA in 1998. Water temperatures, water quality, water quantity, and habitat degradation are factors contributing to their decline. This preliminary alternative is intended to provide river and reservoir conditions that will contribute to the survival and productivity of ESA-listed Kootenai River white sturgeon and bull trout.

Draft Preliminary Alternative: High Spill Operations Focus

Summary: This High Spill Preliminary Alternative will analyze proposed spill operations to evaluate fish passage spill above the current gas cap limits under state regulations.

Context: During the formal scoping process, the co-lead agencies received multiple public comments requesting analysis of the impacts of changing operation to include increasing the proportion of flow voluntarily released through the spillways for juvenile fish passage to levels up to 125 percent total dissolved gas (TDG) and above current State water quality standards for juvenile fish passage. The purpose of the High Spill Operations Focus Preliminary Alternative is to analyze potential benefits to spring-run juvenile anadromous fish and impacts to other resources in the System from increasing fish passage spill above the current State water quality standards (also referred to as the gas cap). There are no structural measures to this preliminary alternative; operational measures include evaluating spill patterns with spill for juvenile fish passage up to 125 percent TDG at all lower Snake River dams and all lower Columbia River dams.

Draft Preliminary Alternative: Hydropower Generation Focus

Summary: The Hydropower Generation Focus Preliminary Alternative is intended to show the tradeoffs between hydropower production and other operations. It operates the System close to conditions prior to the Northwest Power Act. The information is valuable in comparing the EIS alternatives to better understand the impacts of various operations on various resources and will be used in the analysis to help illuminate trade-offs.

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Context: Total hydropower production and flexibility have been reduced in the last 2–3 decades due to the implementation of juvenile anadromous fish passage spill and due to limitations on timing of water releases that have resulted in increased spill. Restrictions on ramping rates, turbine operating ranges, reservoir operating ranges, and similar measures have reduced the flexibility needed for hydropower generation to respond to hourly, daily, and seasonal power demand. The Hydropower Generation Focus Preliminary Alternative will analyze the impacts of optimizing hydropower generation by examining operations without many of the restrictions that have been placed on the System projects in the past 2–3 decades. Flood Risk Management (FRM) operations would be retained. The purpose of this study is to show the trade-offs between power production and impacts to other resources in the System.

Draft Preliminary Alternative: Water Management Focus

Summary: The Water Management Focus Preliminary Alternative will analyze the impacts of allowing greater flexibility for water managers to react to unanticipated changes in river flow and forecast runoff volume. Increased operating flexibility is intended to increase water managers' ability to balance the multiple congressionally authorized purposes of the System's storage projects by reducing the likelihood of involuntary spill and associated increases in TDG, improving the likelihood of achieving refill of storage projects which provides for downstream flow augmentation and recreation benefits, faster turnover of Libby reservoir to support downstream nutrient delivery, and better management of outflow temperature during Kootenai River white sturgeon spawning.

Context: As storage reservoirs are drafted for flood risk management (FRM), situations can occur where rapid and large water releases can be required in the March-April timeframe to achieve FRM draft goals (e.g. high runoff during late winter/early spring or years with rapidly increasing water supply forecasts). Drafting large volumes in a short timeframe can require increased spill (involuntary) to achieve the draft target or a deviation from FRM draft requirements, which could result in high levels of total dissolved gas (TDG) or slight increases in flood risk in a given year. In addition, heavy rain results in near-term high runoff that cannot be forecasted in the same way as longer-term snowmelt-induced runoff. Water management operating procedures that more explicitly account for the rain component of runoff would afford greater flexibility and adaptability in reservoir operations. The purpose of the Water Management Focus Preliminary Alternative is to evaluate the impacts to resources in the System from implementing modified Storage Reservation Diagrams (SRDs) at Libby, Hungry Horse, Grand Coulee, and Dworshak dams and potentially modify VARQ FRM operations at Libby and Hungry Horse dams that would reduce the likelihood of involuntary spill during refill.

Draft Preliminary Alternative: Water Supply Focus

Summary: During the formal scoping process, the Action Agencies received multiple public comments requesting analysis related to water supply, with an emphasis on irrigation issues. The Water Supply

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Focus Preliminary Alternative would analyze the impacts of providing water necessary to irrigate the fully authorized acreage from the Columbia Basin Project and Chief Joseph Dam Project as well as the volume of water requested by the Confederated Salish and Kootenai Tribes from the Hungry Horse project.

Context: Columbia Basin Project was originally authorized for 1,095,000 acres, but has only developed 758,700 acres. At an assumed duty of 4.7 feet of water per acre, the additional volume of water required would be 1,379,338 acre-feet.

Bureau of Reclamation's Hungry Horse Project was originally authorized for irrigation, but has never been used for that purpose. The amount of water authorized for irrigation was not specified in the initial authorization, but there has been a negotiated water rights settlement with the Confederated Salish and Kootenai Tribes (CSKT) for the Flathead Indian Irrigation Project. This settlement, if approved by Congress, would allocate 90,000 acre-feet of water for irrigation or municipal purposes.

At the Chief Joseph Dam Project 2,821 acres of land were authorized for irrigation but have not been developed. If developed, it would result in a small increase in water diversions from the Columbia River (about 14,000 acre-feet) when compared to Columbia River Flows.