

RPA No.	Action Description	Implementation Plans, Annual Progress Reporting and Comprehensive RPA Evaluations
	initiation triggers defined in 50 CFR 402.16 have been exceeded.	

HYDRO ACTIONS

RPA No.	Action Description	Implementation Plans, Annual Progress Reporting and Comprehensive RPA Evaluations
<p><i>The overall hydropower objective for all ESUs is to improve the survival of juvenile and adult fish as they pass through the hydrosystem. The Action Agencies will pursue four strategies to meet this overall objective:</i></p> <ul style="list-style-type: none"> ▪ Hydropower Strategy 1—Operate the FCRPS to provide flows and water quality to improve juvenile and adult fish survival ▪ Hydropower Strategy 2—Modify Columbia and Snake River dams to maximize juvenile and adult fish survival ▪ Hydropower Strategy 3—Implement spill and juvenile transportation improvements at Columbia River and Snake River dams ▪ Hydropower Strategy 4—Operate and maintain facilities at Corps mainstem projects to maintain biological performance <p>Each strategy consists of one or more specific actions. These are summarized in the following sections.</p>		
<p>Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival</p>		
4	<p>Storage Project Operations The Action Agencies will operate the FCRPS storage projects (Libby, Hungry Horse, Albeni Falls, Grand Coulee and Dworshak projects) for flow management (see FCRPS Biological Assessment, Appendix B.2-1, for pertinent discussion and Table B.2.1-2 for a summary of seasonal flow objectives and planning dates for the mainstem Columbia and Snake rivers) to aid anadromous fish. Specific</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> ▪ Plan for the operations of storage projects will be described in the Annual Water Management Plan.

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	<p>operations for each storage project are identified in Table 1 below. These storage project operations will be included in the Water Management Plan. These projects are operated for multiple purposes including fish and wildlife, flood control, irrigation, navigation, power, and recreation. Table 1 primarily identifies operations that are designed to benefit flow management specifically for listed species. For more detail on the operation of storage projects for other purposes see Appendix B.1.</p>	<p><u>Annual Progress Report</u> Prepare an annual year end review</p> <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> ▪ Comprehensive Evaluation Report will summarize storage project operations for the fish season. There is no other physical or biological monitoring or reporting.

Table 1. Storage Project Operations to be Included in the Annual WMP

Storage Project	Operation
Dworshak	<ul style="list-style-type: none"> • Operate to standard flood control criteria; shift system flood control to Grand Coulee when possible, unless modified by Hydro Strategy 1, Action 14 (Dry Water Year Operations). • When not operating to minimum flows, operate to reaching the upper flood control rule curve on or about April 10 (the exact date to be determined during in-season management) to increase flows for spring flow management. • Provide minimum flows while not exceeding Idaho State Total Dissolved Gas (TDG) water quality standard of 110%. • Refill by about June 30. • Draft to elevation 1535 feet by the end of August and elevation 1520 feet (80 feet from full) by the end of September unless modified per the Agreement between the U.S. and the Nez Perce Tribe for water use in the Dworshak Reservoir. • Regulate outflow temperatures to attempt to maintain water temperatures at Lower Granite tailwater at or below the water quality standard of 68° F. • Maximum project discharge for salmon flow augmentation to be within state of Idaho TDG water quality standards of 110%.

Table 1. Storage Project Operations to be Included in the Annual WMP

Storage Project	Operation
Libby	<ul style="list-style-type: none"> • Follow VARQ¹ (variable outflow) flood control procedures. • Follow variable December 31 flood control draft based on early season water supply forecast. • Operate consistent with the Columbia River Treaty, and the International Joint Commission and the 1938 Order on Kootenay Lake. • When not operating to minimum flows, operate to achieve 75% chance of reaching the upper flood control rule curve on or about April 10 (the exact date to be determined during in-season management) to increase flows for spring flow management. • Operate to provide tiered white sturgeon augmentation volumes to achieve habitat attributes for sturgeon spawning/recruitment consistent with the 2006 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BiOp) in May, June and July; shaped in coordination with Regional Forum TMT. • To provide for summer flow augmentation, refill by early July (exact date to be determined in-season), determined by available water supply and shape and spring flow operations, while also avoiding involuntary spill and meeting flood control objectives. • Provide even or gradually declining flows following sturgeon flows during the summer months (minimize double peak) as determined through TMT in-season management. • Experimental draft to 10 feet from full by the end of September (except in lowest 20th percentile water years, as measured at The Dalles, when draft will increase to 20 feet from full by end of September). If project fails to refill 20 feet from full, release inflows or operate to meet minimum flows through the summer months. Rationale for the experimental draft was adopted by the Northwest Power and Conservation Council (Council) and further details of the evaluation can be found in the FCRPS Biological Assessment (Appendix B.2.1). Meet minimum flow requirements for bull trout from May 15 to September 30 as described in the USFWS 2006 Libby Biological Opinion and 4,000 cubic feet per second (cfs) in October through May 14 for resident fish. • Limit spill to avoid exceeding Montana State TDG standard of 110%, when possible, and in a manner consistent with the Action Agencies' responsibilities for ESA-listed resident fish. • Limit outflow fluctuations by operating to ramping rates set in the 2006 USFWS Biological Opinion to avoid stranding bull trout.

¹ In December 2002, the Corps prepared an Environmental Assessment (EA) and signed a Finding of No Significant Impact (FONSI) to implement VARQ on an interim basis at Libby starting in January 2003. Reclamation has been following VARQ flood control procedures at Hungry Horse Dam on an interim basis since 2002 based on an EA and a FONSI signed in March 2002. The Corps, in cooperation with Reclamation, completed preparation of the Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement in 2006 to evaluate the long-term impacts of implementation of alternative flood control operations, including VARQ, and fish flow operations at Libby and Hungry Horse dams. Both agencies are working toward completing NEPA for a decision on long-term flood control operations and fish flow operations at Libby and Hungry Horse dams.

Table 1. Storage Project Operations to be Included in the Annual WMP

Storage Project	Operation
Grand Coulee	<ul style="list-style-type: none"> • Use standard flood control criteria including adjustments for flood control shifts from Dworshak and Brownlee unless modified by Hydro Strategy 1, Action 14 (Dry Water Year Operations). • Operate to achieve 85% probability of reaching upper rule curve (URC) elevation by about April 10. • Refill by about June 30 each year (exact date to be determined during in-season management). • Take advantage of reservoir draft for flood control during high water years to perform drum gate maintenance. Drum gate maintenance may be deferred in some dry water years; however, drum gate maintenance must occur at a minimum one time in a 3-year period, two times in a 5-year period, and three times in a 7-year period. • Draft to support salmon flow objectives during July-August with variable draft limit of 1278 to 1280 feet by August 31 based on the water supply forecast. Future evaluation of this element may be accomplished as discussed in the FCRPS Biological Assessment (Appendix B.2.1). • Reduce pumping into Banks Lake and allow Banks Lake to operate up to 5 feet from full pool (elevation 1565) during August to help meet salmon flow objectives when needed. • If the Lake Roosevelt drawdown component of Washington's Columbia River Water Management Program (CRWMP) is implemented, it will not reduce flows during the salmon flow objective period (April to August). The metric for this is that Lake Roosevelt will be drafted by an additional 1.0 foot in non-drought years and by about 1.8 feet in drought² years by the end of August. A third of this water will go to in-stream flows. A more detailed description of this element is provided in this section of the FCRPS BA (Appendix B.2.1).³ • May be used to help meet tailwater elevations below Bonneville Dam to support chum spawning and incubation. • Operate to help meet Priest Rapids flow objective to support fall Chinook salmon spawning and incubation. • Operate to minimize TDG production.
Hungry Horse	<ul style="list-style-type: none"> • Follow VARQ flood control procedures.⁴ • Maintain minimum flows all year for bull trout with a sliding scale based on the forecast. Operate to meet minimum flows of 3200-3500 cfs at Columbia Falls on the mainstem Flathead River and 400-900 cfs in the South Fork Flathead River. • When not operating to minimum flows, operate to achieve 75% probability of reaching URC elevation by about April 10. • Refill by about June 30 each year (exact date to be determined during in-season management). • Experimental draft during July-September to a draft limit of 3550 feet (10 feet from full) by September 30, except in the driest 20 percentile of water conditions limit draft to 3540 feet (20 feet from full) when needed to meet lower Columbia flow augmentation objectives, If project fails to refill 20 feet from full, release inflows or operate to meet minimum flows through the summer months.

² The definition of drought year in this case is when the March 1 water supply forecast for the April through September period at The Dalles is less than 60 million acre-feet (MAF).

³ Reclamation will not implement this action unless the state of Washington has secured the concurrence of the Tribes and Reclamation has separately consulted with them on a Government-to-Government basis. In addition, the State and Reclamation would need to comply with their respective Environmental Policy Acts and Reclamation would need to submit a water permit application for approval by the State.

⁴ Reclamation has been following VARQ flood control procedures at Hungry Horse Dam on an interim basis since 2002 and will complete NEPA for long-term implementation.

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Storage Project	Operation
	<p>Rationale for the experimental draft was adopted by the Council and further details of the evaluation are provided in the BA (Appendix B.2.1).</p> <ul style="list-style-type: none"> • Provide even or gradually-declining flows during summer months (minimize double peak). • Limit spill to maximum of 15% of outflow to avoid exceeding Montana State TDG standards of 110% to the extent possible. • Limit outflow fluctuations by operating to ramping rates set in 2000 USFWS Biological Opinion to avoid stranding bull trout.
Albeni Falls	<ul style="list-style-type: none"> • Operate to standard flood control criteria. • Operate to provide Lake Pend Oreille shoreline spawning conditions for kokanee (winter pool levels of 2055 feet or 2051 feet elevation) determined through interagency coordination per USFWS Biological Opinion of 2000. • Interagency coordination of winter pool levels for kokanee in consideration of spawning and incubation needs for lower Columbia River chum salmon.

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival		
5	<p>Lower Columbia and Snake River Operations</p> <p>The Action Agencies will operate the FCRPS run-of-river mainstem lower Columbia River and Snake River projects (Bonneville, The Dalles, John Day, McNary, Ice Harbor, Lower Monumental, Little Goose and Lower Granite projects) to minimize water travel time through the lower Columbia and Snake rivers to aid in juvenile fish passage as defined below. These projects are operated for multiple purposes including fish and wildlife, irrigation, navigation, power, recreation, and limited flood control. The following description primarily identifies operations that are designed to benefit listed anadromous species.</p> <ul style="list-style-type: none"> ▪ Lower Snake River projects (Ice Harbor, Lower Monumental, Little Goose 	<p>Implementation Plans</p> <ul style="list-style-type: none"> ▪ Plan for the operations of run-of-river mainstem projects will be described in the Annual Water Management Plan. <p>Annual Progress Report</p> <ul style="list-style-type: none"> ▪ Prepare an annual year end review. <p>2013 and 2016 Comprehensive RPA Evaluation Report</p> <ul style="list-style-type: none"> ▪ Comprehensive Evaluation Report will

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	<p>and Lower Granite projects) will be operated at minimum operating pool (MOP) with a 1-foot operating range from April 3 until small numbers of juvenile migrants are present (approximately September 1) unless adjusted to meet authorized project purposes, primarily navigation. Lower Granite reservoir may be raised as needed after September 1, in order to operate the adult fish holding facilities to support brood stock collection.</p> <ul style="list-style-type: none"> ▪ Except for the John Day Project, the Lower Columbia River projects (Bonneville, The Dalles, and McNary) will be operated at normal operating range for each project. John Day Reservoir will be operated at the lowest elevation (elevation 262.5 to 264.0) (with a 1.5-foot operating range) that continues to allow irrigation withdrawals from April 10 through September 30. Slight deviations from these levels, based on navigation needs, load following, and operational sensitivity, may be required on occasion. <p>These run-of-river operations will be included in the annual WMP.</p>	<p>summarize MOP operations at the Lower Snake River projects and John Day elevations for the fish passage season. There is no other physical or biological monitoring or reporting.</p>
6	<p>In-Season Water Management</p> <p>Prioritization of the use of flow augmentation water is done through in-season management by the Regional Forum (see FCRPS BA Appendix B.2.1). Each fall, the Action Agencies will prepare an annual Water Management Plan (WMP) and seasonal updates that describe planned hydrosystem fish operations for the upcoming fall and winter, and for the spring, and summer passage seasons. The annual WMP strives to achieve the best possible mainstem passage conditions, recognizing the priorities established in the FCRPS BA and the need to balance the limited water and storage resources available in the region. Fall/winter and spring/summer updates are prepared as more data is available on the water</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> ▪ Annual Water Management Plan and seasonal updates. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Annual progress reports will describe FCRPS operations for the fish passage season. There is no other physical or biological monitoring or reporting.

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	<p>conditions for that year. A draft update of the WMP will be prepared by October 1 each year, with a final Plan completed by January 1. The fall/winter update to the WMP will be drafted by November 1 and finalized by January 1. A draft of the spring/summer update to the WMP will be prepared by March 1 and finalized by May 15.</p>	<p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize FCRPS operations for the fish passage season. There is no other physical or biological monitoring or reporting.
7	<p>Forecasting and Climate Change/Variability</p> <p>The Action Agencies will hold annual forecast performance reviews looking at in-place tools for seasonal volume forecasts and to report on the effectiveness of experimental or developing/emerging technologies and procedures. As new procedures and techniques become available and are identified to have significant potential to reduce forecast error and improve the reliability of a forecast, the Action Agencies will discuss the implementation possibilities with regional interests. The purpose is to improve upon achieving upper rule curve elevations by reducing forecasts errors and thereby providing for improved spring flows.</p> <p>The Action Agencies will work collaboratively with other agencies and research institutions to investigate the impacts of possible climate change scenarios to the Pacific Northwest and listed salmon and steelhead. Focus areas will cover 1) modeling the hydrology and operations of the Columbia River system using possible future climate change scenarios, 2) investigating possible adaptation strategies for the system, 3) monitoring the hydrologic system for trends, cycles, and changes, and 4) staying abreast of research and studies that address climate cycles, trends, and modeling.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> If new water supply forecast procedures become available, this will be reported in the 2010, 2013, or 2016 Implementation Plans. Implementation Plans will also consider any new, pertinent information on climate change and its potential impacts on limiting factors and project prioritization. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will include a summary of the annual forecast review and also summarize any new, pertinent climate change information or research. <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will

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		<p>summarize annual forecast reviews and identify any new procedures that become available. The report will also summarize any new, pertinent climate change research and the potential impacts to listed salmon and steelhead.</p>
8	<p>Operational Emergencies The Action Agencies will manage interruptions or adjustments in water management actions, which may occur due to unforeseen power system, flood control, navigation, dam safety, or other emergencies. Such emergency actions will be viewed by the Action Agencies as a last resort and will not be used in place of operations outlined in the annual WMP. Emergency operations will be managed in accordance with TMT Emergency Protocols, the Fish Passage Plan (FPP) and other appropriate Action Agencies emergency procedures. The Action Agencies will take all reasonable steps to limit the duration of any emergency impacting fish.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> TMT emergency protocols identified in the Annual Water Management Plan and other appropriate Action Agencies emergency procedure documents. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will describe any emergency situations and actions taken per the emergency protocols. There is no other physical or biological monitoring or reporting. <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize any emergency situations and actions taken. There is no other physical

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		or biological monitoring or reporting.
9	<p>Fish Emergencies The Action Agencies will manage operations for fish passage and protection at FCRPS facilities. They may be modified for brief periods of time due to unexpected equipment failures or other conditions. These events can result in short periods when projects are operating outside normal specifications due to unexpected or emergency events. Where there are significant biological effects of more than short duration resulting from emergencies impacting fish, the Action Agencies will develop (in coordination with the inseason management Regional Forum (see BA Appendix B.2.1) and implement appropriate adaptive management actions to address the situation. The Action Agencies will take all reasonable steps to limit the duration of any fish emergency.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> Fish emergencies will be included in the TMT emergency protocols and other appropriate Action Agency emergency procedure documents. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will describe any fish emergency situations and actions taken. There is no other physical or biological monitoring or reporting. <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize any emergency situations and actions taken. There is no other physical or biological monitoring or reporting.
10	<p>Columbia River Treaty Storage BPA and the Corps will pursue negotiations with Canada of annual agreements to provide 1 MAF of storage in Treaty space by April 15 consistent with:</p> <ul style="list-style-type: none"> Providing the greatest flexibility possible for releasing water to benefit U.S. 	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> BPA and the Corps will pursue negotiations annually with Canada prior to the fish passage season.

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	<p>fisheries May through July.</p> <ul style="list-style-type: none"> ▪ Giving preference to meeting April 10 upper rule curve elevation or achieving refill at Grand Coulee Dam over flow augmentation storage in Canada in lower water supply conditions. ▪ Releasing flow augmentation storage to avoid causing damaging flow or excessive TDG in the United States or Canada. <p>BPA and the Corps will coordinate with Federal agencies, States and Tribes on Treaty operating plans.</p>	<p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Annual progress reports will describe actions taken to provide 1 MAF of storage in Treaty space. There is no other physical or biological monitoring or reporting. <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> ▪ Comprehensive Evaluation Report will summarize actions taken to provide 1 MAF of storage in Treaty space. There is no other physical or biological monitoring or reporting.
11	<p>Non-Treaty Storage (NTS) BPA, in concert with BC Hydro, will refill the remaining non-Treaty storage space by June 30, 2011, as required under the 1990 non-Treaty storage agreement. Refill will be accomplished with minimal adverse impact to fisheries operations.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> ▪ BPA will manage refill obligations consistent with the 1990 non-Treaty storage agreement. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Annual progress reports will describe actions taken to refill non-Treaty storage space. There is no other physical or biological monitoring or reporting.

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		<p><u>2013 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize actions taken to refill the remaining non-Treaty storage space by June 30, 2011. There is no other physical or biological monitoring or reporting. <p><u>2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Action completed. No reporting.
12	<p>Non-Treaty Long-Term Agreement</p> <p>BPA will seek to negotiate a new long-term agreement on use of non-Treaty space in Canada so long as such an agreement provides both power and non-power benefits for BC Hydro, BPA, and Canadian and U.S. interests. As part of these negotiations, BPA will seek opportunities to provide benefits to ESA-listed fish, consistent with the Treaty. If a new long-term non-Treaty agreement is not in place, or does not address flows for fisheries purposes, BPA will approach BC Hydro about possibly negotiating an annual/seasonal agreement to provide U.S. fisheries benefits, consistent with the Treaty.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> Following refill of the non-Treaty space under the 1990 agreement, and in coordination with U.S. agencies, states, and Tribes, BPA will pursue negotiations of a long-term agreement contingent on BC Hydro's interest. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will describe actions taken to develop long-term and/or annual agreements that affect lower

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		<p>Columbia River flows during the April through August period. There is no other physical or biological monitoring or reporting.</p> <p><u>2013 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize actions taken to refill the remaining non-Treaty storage space by June 30, 2011. There is no other physical or biological monitoring or reporting. <p><u>2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Action completed. No reporting.
13	<p>Non-Treaty Coordination with Federal Agencies, States, and Tribes Prior to negotiations of new long-term or annual non-Treaty storage agreements, BPA will coordinate with Federal agencies, States, and Tribes to obtain ideas and information on possible points of negotiation, and will report on major developments during negotiations.</p>	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> Prior to negotiation of a long-term agreement, BPA will meet with U.S. agencies, states, and Tribes to solicit input. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will describe

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		<p>actions to coordinate non-Treaty storage agreements. There is no other physical or biological monitoring or reporting.</p> <p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> Comprehensive Evaluation Report will summarize actions to coordinate non-Treaty storage agreements. There is no other physical or biological monitoring or reporting.
14	<p>Dry Water Year Operations</p> <p>Flow management during dry years is often critical to maintaining and improving habitat conditions for ESA-listed species. A dry water year is defined as the lowest 20th percentile years based on the Northwest River Forecast Center's (NWRFC) averages for their statistical period of record (currently 1971 to 2000) using the May final water supply forecast for the April to August period as measured at The Dalles. The Action Agencies will complete the following activities to further the continuing efforts to address the dry flow years:</p> <ul style="list-style-type: none"> Within the defined "buckets" of available water (reservoir draft limits identified in RPA Action 4), flexibility will be exercised in a dry water year to distribute available water across the expected migration season to optimize biological benefits and anadromous fish survival. The Action Agencies will 	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> Dry water year operations will be described in the Annual Water Management Plan and seasonal updates. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> Annual progress reports will describe actions taken during dry water years. There is no other physical or biological monitoring or reporting.

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	<p>coordinate use of this flexibility in the Regional Forum TMT.</p> <ul style="list-style-type: none"> ▪ In dry water years, operating plans developed under the Treaty may result in Treaty reservoirs being operated below their normal refill levels in the late spring and summer, therefore, increasing flows during that period relative to a standard refill operation. ▪ Annual agreements between the U.S. and Canadian entities to provide flow augmentation storage in Canada for U.S. fisheries needs will include provisions that allow flexibility for the release of any stored water to provide U.S. fisheries benefits in dry water years, to the extent possible. ▪ BPA will explore opportunities in future long-term NTS storage agreements to develop mutually beneficial in-season agreements with BC Hydro to shape water releases using NTS space within the year and between years to improve flows in the lowest 20th percentile water years to the benefit of ESA-listed ESUs, considering their status. ▪ Upon issuance of the FCRPS Biological Opinion, the Action Agencies will convene a technical workgroup to scope and initiate investigations of alternative dry water year flow strategies to enhance flows in dry years for the benefit of ESA-listed ESUs. ▪ In very dry years, the Action Agencies will maximize transport for Snake River migrants in early spring, and will continue transport through May 31 (see RPA 30). ▪ BPA will implement, as appropriate, its <i>Guide to Tools and Principles for a Dry Year Strategy</i> to reduce the effect energy requirements may pose to fish 	<p><u>2013 and 2016 Comprehensive RPA Evaluation Report</u></p> <ul style="list-style-type: none"> ▪ Comprehensive Evaluation Report will summarize actions taken during dry water years. There is no other physical or biological monitoring or reporting.

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	operations and other project purposes.	
15	<p>Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers</p> <p>The Action Agencies will continue to update the <i>Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers</i> (WQP) and implement water quality measures to enhance ESA-listed juvenile and adult fish survival and mainstem spawning and rearing habitat. The WQP is a comprehensive document which contains water quality measures needed to meet both ESA and Clean Water Act responsibilities. For purposes of this RPA, the WQP will include the following measures to address TDG and water temperature to meet ESA responsibilities:</p> <ul style="list-style-type: none"> ▪ Real-time monitoring and reporting of TDG and temperatures measured at fixed monitoring sites, ▪ Continued development of fish passage strategies with less production of TDG (e.g., removable spillway weirs [RSWs]) and update the SYSTDG model to reflect modifications to spillways or spill operations, ▪ Continued development and use of SYSTDG model for estimating TDG production to assist in real-time decision making, including improved wind forecasting capabilities as appropriate, ▪ Continued development of the CE-QUAL-W2 model for estimating river temperatures from Dworshak Dam on the Clearwater and Upper Snake River near confluence with the Grand Ronde River (USGS Anatone gage) through the lower Snake River (all four Corps lower Snake River projects) to assist in 	<p><u>Implementation Plans</u></p> <ul style="list-style-type: none"> ▪ The Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers (WQP) will be updated periodically and described in the 2009, 2013 and 2016 Implementation Plans. <p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Annual progress reports will describe actions taken to implement actions for ESA commitments. There is no other physical or biological monitoring or reporting. <p><u>2013 and 2016 Comprehensive RPA Evaluation Reports</u></p> <ul style="list-style-type: none"> ▪ Comprehensive Evaluation Report will summarize actions taken to implement actions for ESA commitments. There is no other physical or biological monitoring or reporting.

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<p>Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival</p>		
	<p>real-time decision making for Dworshak Dam operations, and</p> <ul style="list-style-type: none"> ▪ Expand water temperature modeling capabilities to include the Columbia River from Grande Coulee to Bonneville dams to better assess the effect of operations or flow depletions on summer temperatures ▪ Investigate alternatives to reduce total mass loading of TDG at Bonneville Dam while maintaining juvenile survival performance, and ▪ Continued operation of lower Snake River projects at MOP. 	
<p>16</p>	<p>Tributary Projects</p> <p>The tributary projects that have not yet completed ESA Section 7 consultation are located in the Yakima, Okanogan, and Tualatin river basins. Reclamation will, as appropriate, work with NOAA Fisheries in a timely manner to complete supplemental, project-specific consultations for these tributary projects. These supplemental consultations will address effects on tributary habitat and tributary water quality, as well as direct effects on salmon survival in the tributaries. The supplemental consultations will address effects on mainstem flows only to the extent to which they reveal additional effects on the in-stream flow regime not considered in the FCRPS and Upper Snake River BA/Comprehensive Analysis.</p> <p>Reclamation submitted a BA on the Yakima Project and is currently preparing updates to this document. Reclamation completed a draft BA for the Tualatin Project in December 2007, and expects to submit a final BA to NOAA Fisheries in 2008. Reclamation has drafted a BA on the Okanogan Project and expects to transmit a final BA to NOAA Fisheries in 2008.</p>	<p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Status of the consultations will be provided in the annual progress reports.

RPA No.	Action Description	Implementation Plans, Annual Progress Reporting and Comprehensive RPA Evaluations
Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival		
17	<p>Chum Spawning Flows Provide adequate conditions for chum spawning in the mainstem Columbia River in the area of the Ives Island complex and/or access to the Hamilton and Hardy Creeks for this spawning population.</p> <ul style="list-style-type: none"> ▪ Provide a tailwater elevation below Bonneville Dam of approximately 11.5 feet beginning the first week of November (or when chum arrive) and ending by December 31, if reservoir elevations and climate forecasts indicate this operation can be maintained through incubation and emergence. ▪ Through TMT, if water supply is deemed insufficient to provide adequate mainstem spawning or continuous tributary access, provide, as appropriate, mainstem flow intermittently to allow fish access to tributary spawning sites if adequate spawning habitat is available in the tributaries. ▪ Make adjustments to the tailwater elevation through the TMT process consistent with the size of the spawning population and water supply forecasts. ▪ After the completion of spawning, use the TMT process to establish the tailwater elevation needed to provide protection for mainstem chum redds through incubation and the end of emergence ▪ If the emergence period extends beyond April 10th and the decision is made to maintain the tailwater, TMT will discuss the impacts of TDG associated with spill for fish in the gravel. Bonneville Dam typically starts its spring spill around April 10, but a delay in the start of spill may be needed. ▪ Revisit the chum protection level decision at least monthly through the TMT process to assure it is consistent with the need to provide spring flows for listed Columbia and Snake River stocks. 	<p><u>Annual Progress Report</u></p> <ul style="list-style-type: none"> ▪ Annual progress reports will describe status of the actions taken in the previous year.