

Table 1 2000 NMFS BiOp Action Update

RPA #	Action	Implementation Summary
1	The Action Agencies, coordinating with NMFS and USFWS, shall annually develop 1- and 5-year plans to implement specific measures in hydro, habitat, hatcheries, harvest, research, monitoring, and evaluation needed to meet and evaluate the performance standards contained in this biological opinion.	Annual and 5-year implementation plans were provided for 2002, 2002-2006, and 2003/2003-2007. An implementation plan for 2004/2004-2009 will be provided in the fall of 2003. The implementation plans include detailed and summarized information for the 1- and 5-year planning periods. The plans will continue to be coordinated with state, tribal and other regional entities.
2	The Action Agencies shall coordinate development and implementation of the hydro portion of the 1- and 5-year implementation plans through the Regional Forum, chaired by NMFS.	Development of the hydrosystem portion of the implementation plan will continue to be coordinated through the NOAA Regional Forum.
3	The Action Agencies, coordinating through the Technical Management Team, shall develop and implement a 1- and 5-year water management plan and in-season action plans for the operation of the FCRPS.	In the 2003/2003-07 Implementation Plan (IP) the Action Agencies proposed that referencing the Water Management Plans in the 5-year implementation plans would serve the purpose of the 5-Year WMP. During subsequent discussions with NOAA, the Action Agencies agreed to develop the 2004-2009 5-year Water Management Plan by September 2003. The Action Agencies will develop an outline of the 5-year plan before they begin preparation of the 2004-2009 Water Management Plan.
4	The Action Agencies, coordinating through the System Configuration Team, shall annually develop and implement a 1- and 5-year capital investment plan for the configuration of the FCRPS projects.	<p>The Action Agencies 1 and 5-Year implementation plans describe the system configuration priorities, capital investments, hydro system research and reliability improvements that are recommended by SCT. These efforts are ongoing and will continue.</p> <p>The primary funding source for system configuration projects is the Columbia River Fish Mitigation appropriation to the Corps.</p>
5	The Action Agencies, coordinating through the Water Quality Team, shall annually develop a 1- and 5-year water quality plan for operation and configuration measures at FCRPS projects.	<p>The Action Agencies have developed the 1- and 5- year work plans as part of the implementation process.</p> <p>Each year the Corps develops a Water Quality Plan that describes operations that are planned to meet water quality TMDLs. This plan is issued in conjunction with the Fish Passage Plan in February. A summary of water quality measurements taken throughout the year and their compliance with for example the dissolved gas TMDLs is issued in the fall/winter each year. A review draft of the 5-year Water Quality Management Plan (described in Appendix B of the NMFS BiOp) will be released by the end of December 2003.</p>
6	The Corps and BPA, through the annual planning process, shall develop and implement 1- and 5-year operations and maintenance (O&M) plans and budgets that enhance the capability to operate and maintain fish facilities at FCRPS	The District Offices of the Corps each have developed 5-year O&M plans that describe routine and non-routine O&M projects planned at each of the dams within their District. These plans and the projects and maintenance actions they recommend are summarized in the 1 and 5-Year implementation plans. These efforts are ongoing and continue.

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	projects for listed salmonid stocks.	the 1 and 5-Year implementation plans. These efforts are ongoing and continue. BPA funds a portion of the Fish O&M Costs and thus participates in the development of O&M plans and budgets. These plans are coordinated with the Fish Passage O&M Coordination Group.
7	The Action Agencies, with assistance from NMFS and USFWS, shall annually develop 1- and 5-year plans for habitat measures that provide offsite mitigation.	The implementation plans are developed in coordination with NOAA and the USFWS and include habitat measures that provide offsite mitigation. These planning efforts are ongoing and continue. See also Section 5.2 of the 2003/2003-07 Implementation Plan.
8	The Action Agencies, with assistance from NMFS and USFWS, shall annually develop 1- and 5-year plans for hatchery and harvest measures that provide offsite mitigation.	1- and 5-Year work plans for hatchery and harvest measures are included in the 2003/2003-07 IP, the 2002 Annual IP, and the 2002-2006 5-Year IP.
9	The Action Agencies, with assistance from NMFS and USFWS, shall annually develop 1- and 5- year plans for research, monitoring, and evaluation to further develop and to determine the effectiveness of the suite of actions in this RPA.	1- and 5-Year work plans for research, monitoring, and evaluation are included in the 2003/2003-07 IP, the 2002 Annual IP, and the 2002-2006 5-Year IP.
10	The Action Agencies shall work with NMFS and others to promptly incorporate the results of recovery planning into annual Fish and Wildlife Program implementation funding, including support for incorporation of the results into the NWPPC's Fish and Wildlife Program.	See Section 4.3 of the 2003/2003-07 IP.
11	By September 30, 2001, the Action Agencies shall develop procedures for carrying out actions that could not be anticipated in the planning process, but that are necessary or prudent to achieve the performance standards.	The Action Agencies, USFWS, and NOAA have established an expedited process for considering the implementation of activities that are new or were unanticipated during development of annual implementation plans or which do not fit into established funding processes. That process begins with the identification by NOAA, USFWS, or an Action Agency of an unanticipated action that must be implemented prior to the next implementation planning process. The activity or issue will be presented by the Action Agencies, USFWS, or NOAA through the appropriate regional implementation forum for review and coordination of relevant scientific information, budget requirements, and operations or implementation requirements. For operational and system configuration actions, the Regional Forum will be the appropriate coordination forum. Other actions, to the extent practicable, will be coordinated through the Northwest Power Planning Council's (NPPC) regional process which includes the Independent Scientific Review Panel, regional fish and wildlife managers and the public. This serves as the basis for coordination among Action Agency, USFWS, and NOAA staff regarding potential effects on listed species or their critical habitat, and on other FCRPS multiple uses. These processes also allow for policy and executive level involvement as warranted for high

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		<p>profile or sensitive issues. The coordination activities and decisions are documented in forum meeting minutes, the Council's records, and memos between the Action Agencies, USFWS, and NOAA. Examples of activities that have been addressed through this expedited process include the power/chum emergency Action Plan solicitations in 2001 and various special system and project-specific operations requirements or responses to unscheduled facility outages.</p> <p>The expedited process described above supplements the framework process established by the Corps and NOAA. This is described in a June 5, 2001, letter from Brian Brown to Brigadier General Carl Strock for coordinating implementation of required actions.</p>
12	The Action Agencies shall coordinate with NMFS and USFWS in the review of the 1- and 5-year plans to facilitate timely review and approval as part of the annual decision process.	The Action Agencies continue to coordinate preparation and finalization of the implementation plans with NOAA, USFWS, and others.
13	The Action Agencies shall issue annual reports to NMFS and USFWS on progress toward achieving the performance standards set out in this biological opinion, including comprehensive cumulative reviews in years 3, 5, and 8.	The Action Agencies released the 2001 Progress Report in May 2002. The 2002 Progress Report is scheduled for release in April 2003 and will be followed by a 2003 Check-in Report in September 2003. The 2003 Check-in Report will provide a programmatic evaluation of the Action Agencies BiOp implementation progress.
14	The Action Agencies shall operate FCRPS dams and reservoirs with the intent of meeting the flow objectives (Table 9.6-1) on both a seasonal and weekly average basis for the benefit of migrating juvenile salmon.	The Action Agencies will operate the FCRPS projects to attempt to meet the flow objectives. Further details will be provided in the annual Water Management Plan.
15	The Action Agencies shall operate the FCRPS to provide flows to support chum salmon spawning in the Ives Island area below Bonneville Dam.	The Action Agencies will operate the FCRPS projects to provide flows to support chum salmon spawning in the Ives Island area below Bonneville Dam. Further details, including seasonal updates based upon water volume forecasts and chum spawning needs, will be coordinated through the TMT and provided in the annual Water Management Plan.
16	The Action Agencies shall operate the FCRPS to provide access for chum salmon spawning in Hamilton and Hardy creeks.	The Action Agencies shall operate the FCRPS projects to provide access for chum spawning in Hamilton and Hardy creeks. Further details will be provided in the annual Water Management Plan. The Water Management Plan describes the chum operation that is planned and seasonal updates based upon water volume forecasts and chum spawning needs are developed and operations are implemented in conjunction with the Technical Management Team (TMT).
17	The Action Agencies shall coordinate with NMFS, USFWS, and the states and Tribes in preseason planning and in-season management of flow and spill operations. This coordination shall occur in the Technical Management Team process (see Section 9.4.2.2).	TMT coordination will take place. The 1 and 5-Year implementation plans (general plan) through the Water Management Plan (detailed plan) describe flow and spill operations that are planned in the coming year. Seasonal updates to the spill and flow elements of the plan will continue to be coordinated with the TMT and based upon research objectives, the water volume forecast, and fish passage needs
18	The Action Agencies shall operate the FCRPS during the	The Action Agencies will attempt to operate the FCRPS projects to achieve refill to April

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	fall and winter months in a manner that achieves refill to April 10 flood control elevations, while meeting project and system minimum flow and flood control constraints before April 10. During the spring, the Action Agencies shall operate the FCRPS to meet the flow objectives and refill the storage reservoirs (Albeni Falls, Dworshak, Grand Coulee, Hungry Horse, and Libby) by approximately June 30.	10th flood control elevations, to meet the flow objectives, and to refill the storage reservoirs. Further details will be provided in the annual Water Management Plan.
19	The Action Agencies shall operate specific FCRPS projects as follows:	The Action Agencies will operate the FCRPS projects as indicated in the RPA action. Further details will be provided in the annual Water Management Plan. The Action Agencies begin each year intending to implement the hydrosystem provisions of the BiOp. In coordination with TMT, in-season fish needs and runoff forecasts are used to make operational adjustments.
20	The Corps shall operate the lower Snake River reservoirs within 1 foot of MOP from approximately April 3 until small numbers of juvenile migrants are present and shall operate the John Day pool within a 1½-foot range of the minimum level that provides irrigation pumping from April 10 to September 30.	The Corps will operate the lower Snake River reservoirs with 1 foot of MOP and will operate John Day pool within a 1.5 foot range of the minimum level that provides irrigation pumping during the dates specified. Further details will be provided in the annual Water Management Plan.
21	The Corps shall routinely identify opportunities to shift system flood control evacuation volumes from Brownlee and Dworshak reservoirs to Lake Roosevelt and identify such opportunities for the Technical Management Team. The Corps shall implement flood control shifts as necessary to best protect listed fish, as called for by NMFS in coordination with the Technical Management Team, taking into account water quality issues and the concerns of all interested parties.	The Corps will identify opportunities to shift system flood control and coordinate such opportunities with the TMT.
22	The Corps and BOR shall implement VARQ flood control operations, as defined by the Corps (1999d), at Libby by October 1, 2001, and at Hungry Horse by January 1, 2001. By February 1, 2001, the Corps shall develop a schedule to complete all disclosures, NEPA compliance, and Canadian coordination necessary to implement VARQ flood control at Libby.	The VARQ Flood Control Operation EIS was delayed by scope and content. The schedule change was clarified with NOAA as mentioned in the 2003/2003-07 IP. The Corps and USBR are currently implementing VARQ on an interim basis at Libby and Hungry Horse until the Final EIS, scheduled for completion in 2004, is completed.
23	BOR shall operate Banks Lake at an elevation 5 feet from full during August by reducing the volume of water pumped from Lake Roosevelt into Banks Lake by about	Banks Lake will be operated such that pumping is reduced by about 130 kaf in August, allowing the lake elevation to draft to 1565 feet.

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	130 kaf during this time.	
24	BPA and the Corps shall continue to request and negotiate agreements to annually provide 1 Maf of Treaty storage from January through April 15, release the water during the migration season, and seek additional storage amounts.	BPA and the Corps have negotiated an agreement with the Canadian Section of the Operating Committee that stores water in Treaty space (provisional storage) for release by March 2003. Both the U.S. and Canadian Sections may elect to convert any portion of provisional storage remaining in their respective accounts to Treaty storage that would support U.S. flow augmentation during the migration season. The agreement also gives the U.S. Entity the option of provisionally drafting Arrow in February and March. In return, Arrow flows will be reduced in April to facilitate Canadian trout spawning. Any water stored above Arrow's Treaty Storage Regulation levels at the end of April will be available to support U.S. flow augmentation. The current estimate is that treaty storage for spring flow augmentation will be less than 1 MAF.
25	BPA and the Corps shall continue to request, and negotiate with BC Hydro for storage of water in non-Treaty storage space during the spring for subsequent release in July and August for flow enhancement, as long as operations forecasts indicate that water stored in the spring can be released in July and August.	The annual letter agreement under the Non-Treaty Storage Agreement to store water in May and June for release in July and August has not been concluded yet. Typically these agreements are not made until the February-March timeframe. With potential low flows during the spring period of 2003, we will soon schedule discussions with NMFS to verify the desirability of shifting flows from the spring to the summer period before we draft an agreement for 2003
26	BPA and the Corps shall continue to evaluate, request, and negotiate with BC Hydro the shaping and release of water behind Canadian Treaty storage projects in addition to the non-Treaty storage water previously discussed during July and August.	<p>The Columbia River Treaty Operating Committee (BPA, the Corps, and BC Hydro) prepared a preliminary report on feasibility on increasing discharges from Canadian storage in July and August. The Operating Committee submitted the report in March of 2002 for the consideration of the Entities.</p> <p>The primary focus of the study was on capital improvement options that would enable significant increases in summer flows. BPA recently checked with Canada regarding their desire to implement the recommendations in the report. They indicated that there are currently no firm plans to install additional units at Mica or Revelstoke, but that additional units at both projects remain as viable options for their long-range needs. It was agreed that both entities would like to leave the door open for consideration of these measures in the future. The Operating Committee will reconsider the feasibility of these measures periodically and will submit recommendations for consideration of the Entities when economic conditions are more favorable.</p> <p>The report also concluded that there are operational approaches that might provide slight increases in summer flows. These operations require additional evaluation of their environmental effects both in Canada and in the US as well as their economic effects. The Treaty Operating Committee will continue to evaluate operating alternatives that would increase Canadian storage discharges to increase summer flows, while providing a better overall operation for Canadian non-power objectives.</p>

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27	<p>Before entering into any agreement to commit currently uncontracted water or storage space in any of its reservoirs covered by this biological opinion to any other use than salmon flow augmentation, BOR shall consult with NMFS under ESA Section 7(a)(2). Such consultations shall identify the amount of discretionary storage or water being sought, the current probability of such storage or water being available for salmon flow augmentation, and any plan to replace the storage volume currently available to salmon flow augmentation that would be lost as a result of the proposed commitment. Also, BOR shall consult with NMFS before entering into any new contract or contract amendment to increase the authorized acreage served by any irrigation district receiving BOR-supplied water. NMFS' criterion in conducting such reviews is to ensure that there be zero net impact from any such BOR commitment on the ability to meet the seasonal flow objectives established in this biological opinion. Replacement supplies should have at least an equal probability of being available for salmon flow augmentation as the storage space or water that is being committed.</p>	<p>USBR will consult with NOAA and USFWS on Lucky Peak (Boise Project) in 2004.</p>
28	<p>BOR shall pursue water conservation improvements at its projects and shall use all mechanisms available to it under state and Federal law to ensure that a reasonable portion of any water conserved will benefit listed species.</p>	<p>USBR will continue to implement water conservation projects through ongoing programs. Projects that provide benefits to listed species have a high priority.</p>
29	<p>Within 2 years from the date this opinion is signed, BOR shall provide NMFS with a detailed progress report addressing possible instances where BOR-supplied water within the Columbia River basin is being used without apparent BOR authorization to irrigate lands. In the report, BOR shall indicate how it shall proceed to identify and address instances of unauthorized use.</p>	<p>USBR will provide the requested report by March 2003, and will continue to investigate use issues on a case-by-case basis.</p>
30	<p>For those BOR projects located in the Columbia River and its tributaries downstream from Chief Joseph Dam (Table 9.6-2), BOR shall, as appropriate, work with NMFS in a timely manner to complete supplemental, project-specific consultations. These supplemental consultations shall</p>	<p>USBR seeks to clarify the role of its ESA consultations on USBR tributary projects with respect to the FCRPS RPA action. USBR will work toward resolution of this issue with NOAA Fisheries during FY 2003 and has included below a status/schedule of the on-going tributary project consultations.</p>

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	<p>address effects on tributary habitat and tributary water quality, as well as direct effects on salmon survival (e.g., impingement, entrainment in diversions, false attraction to return flows, and others). These supplemental consultations shall address effects on mainstem flows only to the extent to which they reveal additional effects on the in-stream flow regime not considered in this biological opinion (e.g., flood control).</p>	<p>Chief Joseph Consultation completed in 2001</p> <p>Okanogan Feasibility study – BPA-funded EIS in progress, schedule uncertain BA to NOAA/FWS – following feasibility study BiOp from NOAA/FWS – following feasibility study and BA</p> <p>Yakima BA to NOAA/FWS – August 2000 Draft BiOp from NOAA – August 2003 BiOp from NOAA/FWS – October 2003</p> <p>Umatilla BA to NOAA/FWS – August 2001 Draft BiOp – April 2002 Supplemental BA – February 2003 BiOp from NOAA/FWS – August 2003</p> <p>Crescent Lake is a non-USBR Project</p> <p>Crooked River, Deschutes, Wapinitia BA to NOAA/FWS – August 2003 BiOp from NOAA/FWS – January 2004</p> <p>The Dalles Completed in 1992</p> <p>Tualatin Received NOAA species listing – Jan 2001 (no FCRPS-impacted species present) BA to NOAA/FWS -- 2004</p>
31	<p>BOR shall assess the likely environmental effects of operating Banks Lake up to 10 feet down from full pool during August. The assessment and NEPA compliance work shall be completed by June 2002 to determine future operations at this project by the summer of 2002.</p>	<p>The NEPA process is in progress for this Action and the schedule defined in the BiOp has been slightly delayed due to extensive public involvement and environmental analysis for Banks Lake operations. In February 2003 the comment period was extended a month to address concerns raised in the public meetings. A Record of Decision is scheduled to be signed by the end of August. However, no draft of the reservoir below 1565 feet is expected in 2003.</p>
32	<p>The Action Agencies shall acquire water for instream use from BOR's Upper Snake River basin projects and Idaho Power Company's Hells Canyon Complex during the spring and summer flow augmentation periods to improve the likelihood of achieving spring and summer flow objectives at Lower Granite Dam.</p>	<p>USBR will provide up to 427 kaf for flow augmentation.</p>
33	<p>The Corps, in coordination with USFWS, shall design and</p>	<p>Hatchery modifications were designed in FY01 and 02 with contracts awarded in FY02.</p>

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	implement appropriate repairs and modifications to provide water supply temperatures for the Dworshak National Fish Hatchery that are conducive to fish health and growth, while allowing variable discharges of cold water from Dworshak Reservoir to mitigate adverse temperature effects on salmon downstream in the lower Snake River.	<p>Construction work is scheduled to be completed in December 2002.</p> <p>The status of the 3 parts of the Dworshak Hatchery construction project are:</p> <ol style="list-style-type: none"> 1. Boiler Replacement - This work is complete. The boilers have not been used yet because water temperatures have not been low enough but the hatchery anticipates firing them up this week or next. 2. Waterline Extension - This work is complete. 3. Reuse System 1 - This contract is still underway which is what was expected. Construction is scheduled to be completed by the end of January so the hatchery should be able to use the system 2 out of the 4 months that it's needed.
34	The Action Agencies shall evaluate potential benefits to adult Snake River steelhead and fall chinook salmon passage by drafting Dworshak Reservoir to elevation 1,500 feet in September. An evaluation of the temperature effects and adult migration behavior should accompany a draft of Dworshak Reservoir substantially below elevation 1,520 feet.	The field evaluations will continue through spring 2004 using temperature and depth-sensitive radio tags to evaluate adult salmon use of cooler waters during their migration upstream of Lower Granite. The Corps will also continue temperature monitoring in Lower Granite Reservoir and the Clearwater River and continue development of the Computational Fluid Dynamics model of the lower Snake and Clearwater rivers. Model runs to evaluate the impacts of cool water releases from Dworshak on temperatures profiles to and through Lower Granite and data analysis will continue through 2005 for the final report in 2006.
35	The Corps shall develop and conduct a detailed feasibility analysis of modifying current system flood control operations to benefit the Columbia River ecosystem, including salmon. The Corps shall consult with all interested state, Federal, Tribal, and Canadian agencies in developing its analysis. Within 6 months after receiving funding, the Corps shall provide a feasibility analysis study plan for review to NMFS and all interested agencies, including a peer-review panel (at least three independent reviewers, acceptable to NMFS, with expertise in water management, flood control, or Columbia River basin anadromous salmonids). A final study plan shall be provided to NMFS and all interested agencies 4 months after submitting the draft plan for review. The Corps shall provide a draft feasibility analysis to all interested agencies, NMFS, and the peer-review panel by September 2005.	Congressional funds were made available in 2003 for a reconnaissance level study. The Corps will continue to seek appropriations to complete the flood control study
36	By October 1, 2002, the Corps shall develop and, if feasible, implement a revised storage reservation diagram for Libby Reservoir that replaces the existing fall draft to a fixed end-of-December elevation. One option is to	By February 2003 the Corps will complete evaluation of El Nino Southern Oscillation Index (SOI) predictions or other forecast methodologies of runoff volume that is a necessary precursor to feasibility of modifying the storage reservation diagram. By October 1, 2003 the Corps will complete studies to develop and, if feasible, implement a revised

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	evaluate variable drafts based on the El Niño Southern Oscillation Index (SOI) predictions or other forecast methodologies of runoff volume. To implement this change, the Corps shall complete successful coordination with Canada under the Columbia River Treaty.	storage reservation diagram for Libby reservoir that replaces the existing fall draft to a fixed end of December elevation. To implement this change, the Corps will seek to reach necessary agreement with Canada under the Columbia River Treaty.
37	BOR shall investigate the attraction of listed salmon and steelhead into wasteways and natural streams receiving waste water from the Columbia Basin Project. If listed fish are found to be attracted into these channels, BOR shall work with NMFS to identify and implement structural or operational measures to avoid or minimize such use, as warranted.	A final report will be issued in 2003 concerning the Columbia Basin Project Wasteway and Drain Investigation.
38	By March 1, 2002, BOR shall install screens meeting NMFS' screen criteria at the canal intakes to the Burbank No. 2 and Burbank No. 3 pump plants. BOR shall connect the Burbank No. 3 intake canal to Burbank Slough to provide juvenile fish egress. BOR shall coordinate with NMFS on each of the actions identified above.	This was completed and operational in 2002. NOAA and USBR will coordinate effectiveness monitoring for 2003.
39	BOR shall evaluate the water quality characteristics of each point of surface return flows from the Columbia Basin Project to the Columbia River and estimate the effects these return flows may have on listed fish in the Columbia River and in the wasteways accessible to listed fish. By June 1, 2001, BOR shall provide NMFS with a detailed water quality monitoring plan, including a list of water quality parameters to be evaluated. If the water quality sampling reveals enough water quality degradation to adversely affect listed fish, BOR shall develop and initiate implementation of a wasteway water quality remediation plan within 12 months of the completion of the monitoring program.	USBR will continue to monitor return flows through 2006. In 2007 USBR will develop a remediation plan if it is necessary.
40	The Corps shall continue to transport all non-research juvenile salmonids collected at the Snake River collector projects. The Corps and BPA shall continue to implement voluntary spill at all three Snake River collector projects when seasonal average flows are projected to meet or exceed 85 kcfs.	The Corps will transport all non-research juvenile salmonids collected at the Snake River collector projects and shall continue to implement voluntary spill at all three Snake River collector projects when seasonal average flows are projected to meet or exceed 85 kcfs. Further details will be provided in the annual Water Management plan and annual Fish Passage Plan. Planned operations at FCRPS are described in the Water Management Plan and

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		summarized in the 1 and 5-year implementation plans. The Action Agencies begin each year intending to implement the hydrosystem provisions of the BiOp. In coordination with TMT, in-season fish needs and runoff forecasts are used to make operational adjustments.
41	The Corps and BPA shall continue (pending results of the McNary Transport Evaluation) to bypass juvenile spring migrants collected at McNary Dam and shall provide the spring spill levels described for that project.	The Corps is continuing to bypass spring migrants at McNary Dam in coordination with NOAA and on going research plans at McNary. Spill is being provided at levels provided in the BiOp. Further details will be provided in the annual Water Management Plan and Fish Passage Plan
42	The Corps and BPA shall operate the collector projects to maximize collection and transportation during the summer migration (i.e., no voluntary spill except as NMFS deems necessary for approved research).	The Corps operates the collector projects to maximize collection and transportation during the summer migration. Further details will be provided in the annual Water Management Plan and Fish Passage Plan.
43	The Corps shall not initiate collection of subyearling fall chinook for transportation at McNary Dam until inriver migratory conditions are deteriorating (i.e., no longer spring-like).	The Corps will continue to implement the transport program at McNary in compliance with the BiOp and the transport Section 10 Permit.
44	The Corps shall extend the period of barge transportation from the lower Snake River dams and McNary to further reduce reliance on trucking.	In FY02 the Corps extended barge transport from Snake River projects and McNary Dam through August 15. The Corps intends to continue barging through this date during future years. This is an extension of the barge ending date from June 24 to August 15 for Snake River projects.
45	By the end of 2001, the Corps shall develop, in coordination with NMFS and the other Federal, state, and Tribal salmon managers, a McNary Dam transportation evaluation study plan specifically focusing on the response of UCR spring chinook and steelhead to transportation. Approved research should begin by 2002, if feasible.	A research plan has been developed and research was started in 2002 to evaluate transport at McNary. Marked release groups from upstream Columbia River hatcheries comprised the majority of the test fish used in this evaluation. With the installation of the primary bypass detector at McNary, this work also evaluates the primary bypass system compared to transportation in an effort to determine the optimal operation at McNary. Additionally, delayed mortality will be estimated by evaluating an inriver release group. Passage, timing, and general migration of inriver and transported migrants will be monitored using the PIT tag trawler in the upper estuary. This work will continue through 2005 with adult return through 2008. The final report will be available in 2009.
46	The Corps and BPA, in coordination with NMFS through the annual planning process, shall evaluate transport to inriver return ratios for wild SR yearling chinook salmon and steelhead. In addition, the Corps and BPA shall also evaluate the effects of transportation on summer-migrating subyearling SR chinook salmon.	The transportation evaluation from Lower Granite will continue using wild yearling chinook, steelhead, and fall chinook. The baseline study to compare in river survival to transportation from Lower Granite will be complete in 2003. Adults will be monitored through 2006 and a final report will be available in 2007. Also in 2003, this study will evaluate experimental conditions to improve transportation. Monitoring estuary passage timing will continue in 2003 with the PIT tag trawler. Physiological monitoring of fish condition and post release behavior will continue in 2003 with final reports for each of these available in 2004.
47	During all transport evaluations, the Corps and BPA, in	Baseline estimates for delayed mortality (D) have been incorporated into the study design

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	coordination with NMFS through the annual planning process, shall include an evaluation of delayed mortality (D) of transported versus inriver migrating juvenile anadromous salmonids.	for the Lower Granite and McNary transport evaluations by maintaining an inriver release group. The D estimates will be provided in the annual status reports and in the final reports (Lower Granite in 2007 and McNary in 2009).
48	The Corps and BPA shall evaluate the effects of prior transport as smolts on the homing of adults.	<p>Adult PIT detection systems were installed at McNary and are scheduled for installation at Priest Rapids, Ice Harbor and Lower Granite this winter. Further installation needs will be considered for subsequent years.</p> <p>Adult telemetry fieldwork will be complete in April 2004. Data analysis will continue through 2005 with a final report in 2006. Starting in spring of 2003 after the installation of the adult PIT tag detector at Lower Granite and Ice Harbor, PIT tag data will be monitored and analysis will be conducted annually.</p>
49	The Corps shall evaluate strategies to enhance post-release survival of transported fish; examples of such strategies include timing releases so that fish arrival at the estuary corresponds to minimal interactions with predators and maximum availability of forage and locating releases so as to decrease passage time through areas of high predation.	Experimental transport studies begin 2003. In 2003 through 2005 impacts of steelhead holding densities will be evaluated by assessing physiological changes during and following transportation and with SARs. In 2003, planning will begin to evaluate barge releases in the estuary. This study is proposed for 2004-2006 with adult returns through 2009 and a final report on adult returns in 2010.
50	BPA and the Corps shall install necessary adult PIT-tag detectors at appropriate FCRPS projects before the expected return of adult salmon from the 2001 juvenile outmigration.	Adult Pit-tag detectors were installed at Bonneville and McNary in 2002 and are scheduled for installation at Ice Harbor and Lower Granite in 2003. The remaining projects will be scheduled for 2004 through 2006 based on need and regional funding priorities.
51	If results of Snake River studies indicate that survival of juvenile salmon and steelhead collected and transported during any segment of the juvenile migration (i.e., before May 1) is no better than the survival of juvenile salmon that migrate inriver, the Corps and BPA, in coordination with NMFS through the annual planning process, shall identify and implement appropriate measures to optimize inriver passage at the collector dams during those periods.	Analysis of the data collected to date comparing the smolt to adult returns (SARs) of Snake River spring/summer chinook which were transported versus those which migrated in-river and were not detected at any downstream transportation project suggests little benefit from transportation early in the season (April). Data for steelhead is more limited, but suggests a benefit from April transport. The conclusion drawn from the data to date is there is a benefit to providing good in-river conditions during this migration period. Transportation studies were conducted during 2002 to provide information on this issue. A more thorough analysis of the data is necessary before drawing any further conclusions."
52	The Corps shall identify and implement improvements to the transportation program.	The Corps will continue to implement facility improvements and operational changes for the transport program as they are identified and coordinated through FPOM and the Fish Passage Plan. Specific improvements to the fish facilities for research include the juvenile fish PIT tag detector/deflector sort by code systems at Lower Granite (2001), Little Goose (2002), and McNary (2002 – 2003). At Lower Monumental the juvenile fish facility is being modified to improve raceway releases and barge loading flumes in the winter 2002-2003.

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53	The Corps shall evaluate and implement structural and operational alternatives to improve juvenile transportation at the collector dams.	A new barge-loading flume will be constructed at Lower Monumental in 2003. New fish release pipes were installed at McNary in 2002. Evaluation of all juvenile facilities and resultant improvements will be completed as funds are available. The Corps will continue to implement other facility improvements and operational changes for the transport program as they are identified and coordinated through FPOM and the Fish Passage Plan.
54	The Corps and BPA shall implement an annual spill program, consistent with the spill volumes and TDG limits identified in Table 9.6-3, at all mainstem Snake and Columbia River FCRPS projects as part of the annual planning effort to achieve the juvenile salmon and steelhead performance standards.	The Corps and BPA will implement an annual spill program as specified in the RPA. Further details will be provided in the annual Water Management Plan.
55	To improve the future flexibility of the transmission system, BPA's Transmission Business Line shall initiate planning and design necessary to construct a Schultz-Hanford 500-kV line or an equivalent project, with a planned schedule for implementation by 2004 or 2005.	Line design will be completed and land and material acquisition will continue in 2003. Line energization is scheduled for October 2004. The substation at which this line will terminate is called Wautoma and the line is now referred to as the Schultz-Wautoma 500-kV line.
56	BPA's Transmission Business Line shall continue efforts to evaluate, plan, design, and construct a joint transmission project to upgrade the west-of-Hatwai cutplane and improve the transfer limitations from Montana.	The project that BPA is pursuing to solve this transfer limitation is called the Grand Coulee-Bell 500-kV transmission line. The EIS and a Record of Decision are scheduled for completion in 2003, followed by construction of the transmission line and terminal facilities in 2004.
57	BPA's Transmission Business Line shall continue to evaluate strategically located generation additions and other transmission system improvements and report progress to NMFS annually. BPA's Transmission Business Line shall also limit future reservations for transmission capacity, as needed, to enable additional spill to meet performance standards, while minimizing effects on transmission rights holders.	BPA's Transmission Business Line continues to evaluate the integration of new generating facilities, including Hungry Horse Transmission Stability Study -and the Libby Transmission Stability Study. Several new transmission line additions were proposed to integrate the output from a number of proposed combustion turbines. New 500-kV transmission lines from Lower Monumental to McNary and from McNary to John Day have been evaluated in EISs. Their scheduled completion was delayed when the generation projects were placed on hold.
58	The Corps and BPA, in coordination with the Fish Passage Operations and Maintenance Coordination Team (FPOM), shall operate all turbine units at FCRPS dams for optimum fish passage survival. Methods to achieve this objective shall include, but are not limited to, activities outlined in the following paragraphs. (See RPA)	Index Tests will have been conducted at all NWP Columbia River projects, including all families of turbines, by the end of 2003. Index testing will be completed at all NWW projects by the end of 2006. The new 1% turbine efficiency tables have been included in the annual Fish Passage Plan as soon as they were available. The remaining curves will be submitted to FPOM as soon as they are available for timely implementation. The Corps will operate all turbine units at the lower Snake and lower Columbia river FCRPS projects for optimum fish passage survival. Further details will be provided in the annual Water Management Plan and Fish Passage Plan. The Corps will also prepare an annual summary report detailing compliance with the 1% peak efficiency turbine operation guidelines included in Section 10.5.1.8 of the NOAA 2000 FCRPS BiOp.

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59	The Action Agencies, in coordination with the Regional Forum, shall determine the appropriate operating range of turbines equipped with minimum gap runners (MGRs) to increase survival of juvenile migrants passing through these new turbine designs.	Tests for best operating conditions have been accomplished at Bonneville and McNary Dams. Hydraulic modeling work is planned for 2003. Schedules for additional efforts, including field tests, will be determined through development of the Turbine Survival Program Phase II study plan in 2003 and implemented according to future funding priorities for the program
60	The Corps and BPA shall evaluate adult fallback and juvenile fish passage under daytime spill to the gas cap at Bonneville Dam in 2002 and 2003, after deflector optimization improvements allow for increased spill above current levels. Research results will be considered, in consultation with NMFS through the annual planning process, to determine implementation of additional changes in spill to further improve fish survival.	Adult fallback evaluations will continue in 2003 and may be completed depending on the data obtained from field studies. This data will be used to assess operational and configuration alternatives (See also RPA action 113).
61	The Corps shall complete the ongoing prototype powerhouse system surface collection evaluations at Bonneville First Powerhouse in 2000. The Corps shall compare the prototype with screened bypass systems and, if warranted, design and construct permanent facilities after full consideration and resolution of biological and engineering uncertainties, especially high-flow outfall investigations.	The prototype tests have been completed. Test facility removal was deferred in 2003 due to other higher funding priorities. The configuration decision process will continue with additional tests for lower cost surface bypass alternatives planned in 2003 and in 2004 after prototype removal. (See also RPA action 97)
62	The Corps shall complete Bonneville First Powerhouse prototype evaluations of extended submerged intake and gateway vertical barrier screens, including an assessment of fry passage.	FGE tests were completed in 2000. Additional testing may be necessary to include evaluation with new screen mesh size if a decision is made to move forward with implementation of a new juvenile bypass system (JBS) system.
63	The Corps shall complete the design of debris removal facilities for the Bonneville First Powerhouse forebay.	Debris removal (log boom) has been designed in conjunction with the JBS outfall relocation improvements. Implementation of JBS improvements is pending completion of the configuration decision process (see RPA action 97) and funding prioritization.
64	The Corps shall continue the investigation of minimum gap runners at the Bonneville First Powerhouse.	A second year of survival studies for the minimum gap runners will be scheduled in the Phase II Turbine Survival Program study plan. (See RPA action 59)
65	The Corps shall complete Bonneville Second Powerhouse post-construction evaluation of the new juvenile fish bypass outfall and address design and operational refinements as warranted.	Post-construction biological evaluations have been completed. Follow-on refinements will continue through 2003 and beyond as warranted when/if problems are identified.
66	The Corps shall continue design development and construction of a Bonneville Second Powerhouse permanent corner collector at the existing sluice chute, pending results of high-flow outfall investigations. The	Corner collector construction began in 2002. The facility is expected to be operational for the 2004 passage season. Evaluations are scheduled for 2004 and 2005.

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	Corps shall construct new facilities if, and as soon as, evaluations confirm the optimum design configuration and survival benefits.	
67	The Corps shall continue Bonneville Second Powerhouse investigations of measures to improve intake screen fish guidance efficiency and safe passage through the gatewell environment. This work shall include an assessment of fry passage.	Evaluations will continue in 2003 and 2004. It is anticipated that an implementation decision will be made following 2004 tests, with improvements potentially operational by 2006.
68	The Corps and BPA shall continue spill and passage survival studies at The Dalles Dam in 2001. Research results shall be considered, in consultation with NMFS through the annual planning process, to assess the need for additional changes in spill to further improve fish survival by 2002, if possible, but no later than 2005.	Spillway evaluations and alternative operations and configuration improvements to reduce spill passage mortality and reduce gas entrainment will continue in 2003, and will likely continue for several additional years. Also see RPA actions 134 and 135.
69	The Corps shall continue design development and 2001 prototype testing of upper turbine intake occlusion devices at The Dalles, with a goal of increased non-turbine passage rates through either the sluiceway or the spillway. The Corps shall install occlusion devices across the entire powerhouse, as warranted.	After testing in 2002, the future of blocked trashracks is in doubt. No tests are planned for 2003, except evaluating juvenile fish behavior in the forebay. Alternative configuration options for The Dalles will be developed in 2003 to provide direction and schedule for further evaluations leading to final configuration and operation decisions in future years.
70	The Corps shall continue biological and engineering investigations and design of a composite ice and trash sluiceway outfall relocation and adult ladder auxiliary water system at The Dalles Dam and shall construct such devices as warranted.	Continued work on outfall relocation options and initiation of design are deferred in 2003 pending clearer direction on options for configuration of the project for juvenile passage. (See RPA action 69)
71	The Corps and BPA shall continue investigation of 24-hour spill at John Day Dam in 2001. Research results will be considered, in consultation with NMFS through the annual planning process, to determine implementation of daytime spill to further improve juvenile fish survival as needed for its contribution to the performance standard.	Studies will continue in 2003 to and be completed in 2004. Spillway operations will be established in conjunction with configuration decisions for John Day project. (See RPA action 98)
72	The Corps shall continue design development of a prototype RSW and extended deflector for testing at John Day in 2002. The Corps should synthesize evaluation results, determine the fish survival benefits of one or more RSWs or a skeleton bay surface bypass, and install the units as warranted.	The NOAA Findings Letter (July 2002) acknowledges that the prototype RSW test at John Day will be delayed from 2002 until at least 2003 pending results of tests at Lower Granite, evaluation of tailrace egress issues, and assessing configuration alternatives for this project. A schedule for future development, if warranted, will be established when additional information becomes available.
73	The Corps shall continue John Day prototype development	Extended-length screen development is proceeding with replacement prototypes and

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	and investigations of extended submerged intake screens, gatewell vertical barrier screens, and, if necessary, orifices to optimize guidance and safe passage through the system, including a gatewell debris cleaning plan. This work shall include an assessment of fry passage. The Corps shall design and construct new screen systems for safe passage of juvenile salmonids, as warranted. Juvenile bypass outfall survival investigations shall also be conducted.	testing of VBSs in 2003. Implementation decisions for partial or full permanent implementation may be made after this years' tests but will be dependent on configuration decisions for this project. (See RPA action 98)
74	The Corps shall continue evaluations to assess the need for improvements of the existing intake screens, gatewell vertical barrier screen cleaning system, and bypass facilities (including debris containment and removal systems, separation, sampling, loading, and outfall facilities) at McNary to determine where improvements are necessary to reduce problems experienced during the 1996 flood, increase fish survival, and resolve holding and loading facility problems, including raceway jumping by juvenile salmon and steelhead and debris plugging of bypass lines. Additionally, the Corps shall evaluate whether the existing juvenile bypass system outfall should be relocated.	Intake screen and gatewell barrier screen work has been moved to the McNary modernization program. A technical report addressing the juvenile fish outfall and a powerhouse spillway divider wall is being prepared as part of the McNary Gas Fast-Track (deflectors) project. This technical report will examine the existing juvenile outfall location for adequacy and will present costs and benefits of installing a powerhouse/spillway divider wall. If the outfall location is determined to be inadequate, then the report will make recommendations for relocation and present an estimated cost for relocation.
75	The Corps shall investigate a surface bypass RSW at McNary Dam, based on prototype results at other locations, and shall install the unit in multiple spillway bays, as warranted.	The Corps will complete a draft decision analysis for the Lower Snake River Projects and McNary in the spring 2003. This analysis will identify project priorities for application of RSW technology. The analysis will also include other juvenile bypass features.
76	The Corps shall investigate, design, and construct, as warranted, a new juvenile bypass outfall at Lower Monumental Dam. Investigations shall be conducted in conjunction with spillway deflector and spill pattern optimization studies.	The Corps plans to use a decision analysis for McNary and Lower Snake projects similar to that used for Bonneville 1 Powerhouse that would include the RPA actions related to Lower Monumental (76, 77, 78, and 99). ESBS design and testing has not started due to other high priority work and recent discussions regarding poor performance related to the juvenile facility support. The Corps is delaying any significant improvements to the powerhouse collection system until spill survival results are available. The spill studies are scheduled to start in 2003 pending funding and regional prioritization. The studies will include consideration of spill survival, RSW benefits, transport vs in-river, etc. and call for a decision analysis to be completed by 2005. Corps and NOAA technical staff will work with the region to develop a comprehensive plan. Work in FY03 will also include hydraulic model studies to evaluate alternative outfall locations for analysis in the decision document.
77	The Corps shall investigate surface bypass (e.g., RSW) at Lower Monumental Dam, based on prototype results at	Same as 76

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	other locations, and install in multiple spillway bays, as warranted.	
78	The Corps shall initiate design development and testing of extended submerged intake screens and vertical barrier screens at Lower Monumental Dam and construct units as warranted.	Same as 76
79	The Corps shall conduct a post-construction evaluation of the new debris containment boom at Little Goose to monitor populations and behavior of aquatic predators when debris accumulates at the log boom.	The post-construction predator monitoring evaluation is complete and the final report is due in 2003.
80	The Corps shall continue the design development, fabrication/deployment, and testing of a prototype RSW at Lower Granite, in conjunction with the existing prototype powerhouse occlusion devices, including the forebay behavioral guidance structure (BGS) and upper turbine intake occlusion devices. As warranted by prototype test results, the Corps shall install one or more permanent RSWs and occlusion devices at appropriate lower Snake hydro projects, in coordination with the annual planning process.	In 2002 RSW performance exceeded expectations. A second year of testing is scheduled for spring 2003. The existing SBC and BGS will be removed to provide stand-alone test conditions. See RPA action 75 for discussion of installing RSWs at other projects.
81	The Corps shall complete design for new juvenile bypass facilities at Lower Granite Dam, including enlarged orifices and bypass gallery, open-channel flow bypass, improved separator for juvenile separation by size, and improved fish distribution flumes and barge-loading facilities and shall proceed to construction, as warranted.	NWW will resume design in 2004. It will take two construction work windows and completion of new facility will be in 2007.
82	The Action Agencies, in coordination with NMFS through the annual planning process, shall investigate the spillway passage survival of juvenile salmonids at appropriate FCRPS dams. These investigations shall assess the effect of spill patterns and per-bay spill volumes on fish survival, across a range of flow conditions. The Action Agencies shall develop a phased approach (including costs and schedules) and set priorities, in consultation with NMFS in the annual planning process, to continue spillway passage survival studies in 2001 and future years.	<p>Bonneville: Spill and project survival studies will continue in 2003 and are anticipated to be completed by 2005.</p> <p>The Dalles: Spill and project survival studies will continue in 2003. It is anticipated that tests may need to continue through the 2006 passage season, but that is highly dependent on the results obtained.</p> <p>John Day: It is anticipated that, with adequate test conditions this year, the spill survival program will be completed in 2004. Test data will be used to determine 12 vs 24 spill and configuration options for this project. (See also RPA action 98)</p> <p>McNary Dam: Spill survival studies started in 2002 and will continue in 2003-2004 with a final report in 2005.</p>

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		<p>Ice Harbor: Based on lower fish survival observed in 2000 and 2002, the spill levels are being evaluated at Ice Harbor for spring and summer conditions in 2003 with an optimization evaluation in 2004. A final report will be available in 2005.</p> <p>Lower Monumental: Baseline spill survival, effectiveness, and efficiency studies are scheduled in 2003-2005 with optimization in 2006.</p> <p>Little Goose: Following installation of the endbay deflectors, spill evaluation will begin in 2005 and continue through 2008.</p> <p>Lower Granite: Spill evaluation to optimize system survival will begin following completion of the RSW prototype evaluations.</p> <p>Project survival studies that include determination of baseline spill survival, spill efficiencies, and effectiveness are scheduled for all projects. Evaluation of adult monitoring will be incorporated into the study design where appropriate, as identified by the adult sub-group of the SRWG.</p>
83	<p>The Action Agencies, in coordination with NMFS through the annual planning process, shall evaluate the effect of spill duration and volume on spillway effectiveness (percent of total project passage via spill), spill efficiency (fish per unit flow), forebay residence time, and total project and system survival of juvenile steelhead and salmon passing FCRPS dams. Studies shall include both collector and non-collector projects. Adult passage considerations and potential adult fallback shall also be considered in study designs. Little Goose and Lower Granite dams shall be specifically considered for daytime spill studies. An overall phased study approach for spill evaluations will be determined in the 1- and 5-year implementation plans.</p>	<p>See RPA action 82</p>
84	<p>The Corps shall continue high-flow outfall investigations to determine whether it is appropriate to modify bypass outfall criteria in the context of high-discharge bypass discharges.</p>	<p>Evaluations were completed and the results were incorporated into the outfall design for the B2 corner collector. Post-construction testing of the corner collector is scheduled for 2004 and 2005 at which time outfall performance will be monitored.</p>
85	<p>The Corps shall continue to develop and evaluate improved fish-tracking technologies and computational fluid dynamics (numerical modeling). The ability to integrate these technologies and fluid dynamics shall be assessed as</p>	<p>These activities will continue in 2003 and beyond as needed. CFD models are being developed and/or verified for several projects in 2003.</p>

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	a potentially improved means of determining fish responses to forebay hydraulic conditions.	
86	The Corps shall continue to investigate a way to increase entry rates of fish approaching surface bypass/collector entrances.	This is an ongoing effort to test fish entry with various entrance geometry and flow conditions at projects where surface bypass is being tested (see specific RPA actions at various projects). Two studies are planned in 2003 to better evaluate entry conditions. These include an evaluation of several projects with an acoustic camera and a flume study proposed to better assess fish responses to hydraulic stimuli under controlled conditions.
87	The Corps and BPA shall assess less-intrusive, PIT-tag interrogation methods at FCRPS juvenile bypass systems with interrogation sites, including McNary, John Day, and Bonneville dams. The Corps and BPA shall also assess providing a similar detection capability for the Ice Harbor juvenile bypass system.	Primary bypass PIT detectors (less-intrusive) were installed at the McNary juvenile fish facility in 2003. Evaluation of primary bypass vs transport is being conducted in 2003-2009 at McNary. Design will occur in 2003 for installation at Ice Harbor (2004), possibly Lower Monumental (2004), and John Day (2005). The need for primary PIT tag detectors at Little Goose and Lower Granite will be determined by 2006.
88	The Corps and BPA, in coordination with the Fish Facility Design Review Work Group and the Fish Passage Improvement Through Turbines Technical Work Group, shall continue the program to improve turbine survival of juvenile and adult salmonids.	Program continues. (See RPA action 89)
89	The Action Agencies shall investigate hydraulic and behavioral aspects of turbine passage by juvenile steelhead and salmon through turbines to develop biologically based turbine design and operating criteria. The Corps shall submit a report to NMFS stating the findings of the first phase of the Turbine Passage Survival Program by October 2001. Annual progress reports will be provided after this date.	The Phase 1 report will be completed in 2003 with a plan of study for Phase II. Phase II will be a multi-year program to address a number of turbine passage issues identified in the BIOP.
90	The Action Agencies shall examine the effects of draft tubes and powerhouse tailraces on the survival of fish passing through turbines.	Evaluation of draft tubes was initiated in 2002 at McNary as part of the turbine survival program. Additional evaluation needs will be identified in the turbine survival program Phase II. Radio telemetry study to partition tailrace (roller) impacts from turbine mortality also started in 2002. Future work will depend on regional discussions.
91	The Action Agencies shall remove all unnecessary obstructions in the higher velocity areas of the intake-to-draft tube sections of the turbine units.	All NWP Columbia River turbine-to-draft tube sections are being inspected during scheduled turbine dewaterings. All obstructions are being identified with any unnecessary items being removed during each turbine units' 6-year overhaul. A status report is being produced and will be submitted to FPOM in 2003.
92	The Action Agencies shall consider all state-of-the-art turbine design technology to decrease fish injury and	Tests of a painted turbine will continue at The Dalles in 2003. Consideration of further fish-friendlier technologies will be discussed in the region following results. Fish Benefits

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	mortality before the implementation of any future turbine rehabilitation program (including any major repair programs, the ongoing rehabilitation program at The Dalles Dam, and any future program at Ice Harbor Dam). The Action Agencies shall coordinate within the annual planning process before making decisions that would preclude the use of fish-friendly technologies and to minimize any adverse effects of project downtime.	from the TSP are being incorporated into evaluation plans to determine final prototypes for McNary Modernization and Ice Harbor unit 2 repair. This work is being coordinated through the FFDRWG, the special TSP, and the PDT for these two programs.
93	The Action Agencies shall determine the number of adults passed through turbines, then, if warranted, investigate the survival of adult salmonid passage through turbines (including steelhead kelts).	Adult passage through turbines is being evaluated as part of the adult studies program. The initial evaluation began in 2002 and should be completed in 2004. Future work will depend on regional discussion.
94	The Corps shall continue to evaluate the need for improvements of the existing intake screens, gateway vertical barrier screens' cleaning system, and bypass facilities (including debris containment and removal systems, separation, sampling, loading, and outfall facilities) at the four lower Snake River hydropower projects.	See RPA action 75
95	The Corps shall complete investigations of improved wet separator designs in 2002. The Corps shall design and construct a new wet separator at McNary, Lower Monumental, and Little Goose dams, as warranted.	The final report was complete in 2002 and conceptual designs will be complete in 2003. However, based on regional review of the separator study findings, additional work has been recommended to evaluate impacts of fish densities on separation efficiency before considering installation at Lower Granite. The new study will be conducted in 2003 with a final report due in 2004.
96	The Corps shall complete the extended submerged intake screen systemwide letter report and implement recommended improvements.	The report was completed in 2002 and identified improvements will be completed at various projects by 2003.
97	By January 2002, the Action Agencies shall develop an analysis that compares the relative passage survival benefits of an extended-length, intake screen bypass system, a surface-collection bypass system, and hybrid alternatives at Bonneville First Powerhouse. Through the annual planning process, the Corps shall determine which of these configurations to implement.	<p>The NOAA Findings Letter (July 2002) acknowledged that the comparative analysis should be delayed. The delay is consistent with the SCT's determination that additional information is needed before a prudent final decision can be made regarding juvenile passage alternatives for the first Powerhouse. The analysis will be indefinitely delayed depending on corner collector information needs and ISRP review.</p> <p>The overall decision document for Bonneville project was completed in 2002 establishing B2 priority for operations among other recommendations. With B2 priority and recognition that additional information is needed before a B1 configuration can be determined, the decision will be deferred until at least 2005.</p>
98	By January 2003, the Action Agencies shall develop an	Configuration decisions at John Day will be indefinitely delayed pending a decision to test

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	analysis that compares the relative passage survival benefits of replacing existing standard-length intake screens with extended-length screens at the John Day Dam powerhouse to surface collection at one or more skeleton or spillway bays. Through the annual planning process, the Action Agencies shall then determine the need for, and the implementation priority of, these configuration alternatives.	RSW at this project and funding priorities.
99	By January, 2003, the Action Agencies shall develop an analysis that compares the relative passage survival benefits of replacing existing standard-length intake screens with extended-length screens at the Lower Monumental Dam powerhouse turbines to a removable RSW surface bypass system.	See RPA action 76
100	The Action Agencies shall continue to implement and study methods to reduce the loss of juvenile salmonids to predacious fishes in the lower Columbia and lower Snake rivers. This effort will include continuation and improvement of the ongoing Northern Pikeminnow Management Program and evaluation of methods to control predation by non-indigenous predacious fishes, including smallmouth bass, walleye, and channel catfish.	BPA will continue to annually monitor catch and harvest rates of Northern Pikeminnow. BPA will collect information on population dynamics and the diet of Northern Pikeminnow, small mouth bass, and walleye every 3 – 5 years.
101	The Corps, in coordination with the NMFS Regional Forum process, shall implement and maintain effective means of discouraging avian predation (e.g., water spray, avian predator lines) at all forebay, tailrace, and bypass outfall locations where avian predator activity has been observed at FCRPS dams. These controls shall remain in effect from April through August, unless otherwise coordinated through the Regional Forum process. This effort shall also include removal of the old net frames attached to the two submerged outfall bypasses at Bonneville Dam. The Corps shall work with NMFS, FPOM, USDA Wildlife Services, and USFWS on recommendations for any additional measures and implementation schedules and report progress in the annual facility operating reports to NMFS. Following consultation with NMFS, corrective measures shall be implemented as soon as possible.	Avian deterrent actions are being implemented annually with continual improvements being integrated. This program will continue to be coordinated with FPOM and be included in the annual Fish Passage Plan. The two net frames in the Bonneville powerhouses' tailraces will be removed during the ongoing winter maintenance season (December 1, 2002 – February 28, 2003).

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102	<p>The Action Agencies, in coordination with the Caspian Tern Working Group, shall continue to conduct studies (including migrational behavior) to evaluate avian predation of juvenile salmonids in the FCRPS reservoirs above Bonneville Dam. If warranted and after consultation with NMFS and USFWS, the Action Agencies shall develop and implement methods of control that may include reducing the populations of these predators.</p>	<p>Avian predation monitoring will continue in 2003-2009 under the estuary monitoring program. Monitoring at Crescent Island (McNary) has started and will continue through the project survival studies. Based on preliminary information, predation is estimated to be significant at this site. Future management discussion will begin following collection of additional data.</p> <p>The project titled "Avian Predation on Juvenile Salmonids" will (1) identify those piscivorous water bird populations (i.e., terns, cormorants, and gulls) that pose the greatest risk to smolt survival, (2) test the feasibility of different management initiatives to reduce avian predation on smolts, (3) monitor and evaluate the effectiveness of those initiatives once fully implemented, and (4) recommend changes to existing management plans to maximize benefits to juvenile salmonids, while maintaining or enhancing the status of managed bird populations.</p>
103	<p>The Action Agencies shall quantify the extent of predation by white pelicans on juvenile salmon in the McNary pool and tailrace. A study plan shall be submitted to NMFS by September 30, 2001, detailing the study objectives, methods, and schedule. Based on study findings, and in consultation with USFWS and NMFS, the Action Agencies shall develop recommendations and, if appropriate, an implementation plan.</p>	<p>The evaluation started in 2002 and will continue in 2003. A final report will be available in 2004.</p> <p>The project titled "Avian Predation on Juvenile Salmonids" will (1) identify those piscivorous water bird populations (i.e., terns, cormorants, and gulls) that pose the greatest risk to smolt survival, (2) test the feasibility of different management initiatives to reduce avian predation on smolts, (3) monitor and evaluate the effectiveness of those initiatives once fully implemented, and (4) recommend changes to existing management plans to maximize benefits to juvenile salmonids, while maintaining or enhancing the status of managed bird populations.</p>
104	<p>The Action Agencies shall recover PIT-tag information from predacious bird colonies and evaluate trends, including hatchery-to-hatchery and hatchery-to-wild depredation ratios.</p>	<p>Evaluation of avian predation will continue as part of the monitoring efforts. (See RPA action 102)</p>
105	<p>The Action Agencies shall develop a pilot study to assess the feasibility of enhancing the function of ecological communities to reduce predation losses and increase survival in reservoirs and the estuary.</p>	<p>Rest/rearing habitat that will help to reduce predation in the Lower Granite Reservoir is being constructed at river mile 116 (SR) under the Snake River Dredge Management Program. Installation is scheduled to be complete in winter 2003. Future improvements may be conducted depending on need. Monitoring of the physical and biological effects will occur in 2003 through 2004. Future woody riparian improvements (plans under development) on the Snake River will be coordinated with juvenile salmon habitat improvements.</p> <p>BPA funded the Council project 1997-026, and additional work continues to be funded as part of project 1998-014. The project assesses feeding habits of predatory fishes during the spring salmonid smolt migration period. Also assessed are the indirect effects on the changing pelagic fish community associated with different oceanographic regimes on juvenile salmonids.</p>

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106	The Action Agencies, in coordination with NMFS, shall investigate marine mammal predation in the tailrace of Bonneville Dam. A study plan shall be submitted to NMFS by June 30, 2001, detailing the study objectives, methods, and schedule.	Investigations were initiated in 2001 and will continue through 2003. The information will be provided to NOAA for further action.
107	The Action Agencies shall conduct a comprehensive evaluation to assess survival of adult salmonids migrating upstream and factors contributing to unaccounted losses.	<p>This action is being evaluated in the adult studies program and radio telemetry monitoring to assess unaccounted loss will continue through April 2004. Data analysis will be conducted through 2005 and a final report will be available in 2006. As a result of adult PIT tag detector installation in 2003 additional information will be available for PIT tag database and for further monitoring and analysis.</p> <p>Adult PIT detection systems were installed at McNary and are scheduled for installation at Priest Rapids, Ice Harbor and Lower Granite this winter. Further installation needs will be considered for subsequent years.</p>
108	The Corps and BPA shall conduct a comprehensive evaluation to investigate the causes of headburn in adult salmonids and shall implement corrective measures, as warranted.	Studies will continue through 2004 with a final report in 2005. Corrective measures will be determined based on results and regional discussions.
109	The Corps shall initiate an adult steelhead downstream migrant (kelt) assessment program to determine the magnitude of passage, the contribution to population diversity and growth, and potential actions to provide safe passage.	This study was initiated in 2000 for both the Snake and lower Columbia rivers. Evaluation of kelt abundance and survival through various routes of passage (including transportation) shall continue in 2003 and 2004. Monitoring of return spawning shall continue through 2007 and the final report is due in 2008.
110	The Corps shall use information from previous and ongoing investigations regarding the problem of adult steelhead holding and jumping in the fish ladders at John Day Dam, develop a proposed course of action, and implement it, as warranted.	Ladder weir modifications were initiated in 2002 to be completed for 2003 adult migration season. An evaluation is scheduled to be completed in 2003.
111	The Corps shall investigate and enumerate fallback of upstream migrant salmonids through turbine intakes at all lower Snake and lower Columbia River dams. The Corps shall implement corrective measures to reduce turbine mortality, as warranted.	Radio telemetry monitoring of fallback is ongoing and will continue through April 2004. Data analysis will be conducted through 2005 and a final report will be available in 2006. Actions for remediation will be assessed at that time.
112	The Corps shall investigate ways to provide egress to adult fish that have fallen back into juvenile collection galleries and primary dewatering facilities at Ice Harbor and McNary dams. The Corps shall either install structural, or implement operational, remedies to minimize delay and	The field evaluation is complete and a final report is due in 2003. Although a final decision to modify the collection channel depends on the results in the final report, preliminary results do not appear to support collection channel modifications. Results and recommendations will be coordinated through the FFDRWG.

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	injury of fish that fall back, as warranted.	
113	The Corps shall investigate measures to reduce adult steelhead and salmon fallback and mortality through the Bonneville Dam spillway. A final report shall be submitted to NMFS stating the findings of these investigations and recommending corrective measures. Potential remedies shall be included in the annual planning process.	Fallback studies will continue in 2003 (see RPA action 60). A determination will be made on remedies based upon the results of the field studies and in conjunction with configuration and operational decisions for the project (see RPA action 97).
114	The Corps shall examine existing fish-ladder water temperature and adult radio-telemetry data to determine whether observed temperature differences in fishways adversely affect fish passage time and holding behavior. If non-uniform temperatures are found to cause delay, means for supplying cooler water to identified areas of warmer temperatures should be developed and implemented in coordination with the annual planning process.	NWP monitored ladder water temperatures for four years at Bonneville, The Dalles and John Day dams. The John Day ladder systems were the only ones where non-uniform temperatures large enough to be detected by fish were noted. No passage delays (radio tracking data) were apparent that could be associated with those temperature differences. NWW is currently working on a similar report.
115	The Corps and BPA shall conduct a comprehensive depth and temperature investigation to characterize direct mortality sources at an FCRPS project considered to have high unaccountable adult losses (either from counts and/or previous adult evaluations).	Evaluation of temperature impacts on adult delays, homing, straying, and survival will continue using radio telemetry through April 2004. Data analysis will be conducted through 2005 and a final report will be available in 2006.
116	The Corps shall investigate adult fish delay and fallback at ladder junction pools and implement remedies to reduce this problem, as warranted.	Field evaluation of fish passage improvements will be complete in December 2002 and the final report will be available in 2003. Design for changes will occur in 2004 for implementation in 2005 at Lower Granite. A schedule for implementation at additional projects (2003-2004) will be developed and prioritized through FFDRWG.
117	The Corps shall evaluate adult count station facilities and rehabilitate where necessary at all projects to either minimize delay of adults or minimize counting difficulties that reduce count accuracy.	NWP evaluated all count stations and reports will be submitted to FPOM in 2003. Funding for corrective actions will be prioritized by FPOM in the O&M budget process for future implementation. Telemetry evaluation of impacts of count windows will continue through spring 2004.
118	The Corps shall develop and implement a program to better assess and enumerate indirect prespawning mortality of adult upstream-migrating fish. Such mortality may be due to, or exacerbated by, passage through the FCRPS hydro projects. If measures are identified which will reduce the unaccountable adult loss rate and/or the prespawning mortality rate, the Corps shall implement these measures as warranted. The program should also enhance efforts to enumerate unaccountable losses associated with tributary	Adult telemetry evaluation to help identify factors that contribute to successful spawning or unaccounted loss will be continues through spring 2004. Data analysis is scheduled through 2005 and the final report will be available in 2006.

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	turnoff, harvest, or other factors in FCRPS mainstem reservoirs and upstream of FCRPS projects.	
119	The Corps shall ensure that alterations to fish ladders and adult passage facilities to accommodate Pacific lamprey passage do not adversely affect salmonid passage timing and success.	Adult lamprey prototype studies will continue and potentially be completed in 2003. A design report could be initiated in late-2003. Implementation of ladder modifications could be initiated by 2005 at one or more projects subject to regional funding priorities.
120	The Corps shall develop improved operations for adult fishway main entrances at FCRPS dams so that the best possible attraction conditions are provided for adult migrants, both at the four Columbia River hydro projects and the four lower Snake hydro projects (where reservoir elevations are held near MOP). The Corps shall report the findings of fishway entrance flow-balancing investigations in a report to NMFS by the end of 2001 and shall continue to work through FPOM to evaluate and implement, as warranted, structural changes to satisfy fish passage plan fishway entrance criteria.	Hydraulic evaluation reports for various projects were prepared and submitted to FPOM prior to 2000. An in-depth analysis of some of the reports showed the consultant did not evaluate the systems as they were being operated. More thorough and accurate hydraulic evaluations are being conducted by NWW and NWP and will be completed and submitted in 2003 and 2004 to FPOM. By the end of calendar year 2003, the Corps will report to NOAA the findings of fishway entrance flow-balancing investigations. This delay is needed to allow the Corps to complete the work informing the report. Corrective actions will be implemented as warranted and when funding becomes available (if additional funding is necessary).
121	The Corps shall develop and maintain an auxiliary water-supply, emergency-parts inventory for all adult fishways where determined necessary, in coordination with NMFS.	NWP and NWW determined which spare parts need to be available on project. Funding was made available to the respective projects for procurement of the identified spare parts. A report will be submitted to FPOM by the end of 2003. Funding for additional spare parts or high cost items will be prioritized by FPOM in the O&M budget process for future implementation.
122	The Corps shall continue design development and, subsequently, construct an emergency auxiliary water supply system at The Dalles Dam's east ladder.	Work has been deferred in 2003. See RPA action 70.
123	The Corps shall continue to investigate alternatives to dewater adult auxiliary water system floor diffusers for inspection at The Dalles adult fishway powerhouse collection channel. The Corps shall implement design and construction of needed changes, as warranted.	Construction was initiated in 2002 and the system will be operational in late 2003 or early 2004.
124	The Corps shall investigate methods to provide additional emergency auxiliary water to The Dalles Dam north fishway when the normal auxiliary water supply is interrupted.	This activity was deferred in 2003 due to funding priorities. The Corps will initiate in 2004 if funding is available.
125	The Corps shall develop and implement an automated monitoring and alarm system at appropriate FCRPS projects, as determined in the NMFS Regional Forum, to monitor changes in head differential remotely between the	NWP and NWW projects have ensured all diffusion water gratings are secured in place. Methods have been demonstrated to FPOM. NWW has conducted an engineering study to determine the feasibility of successfully and economically constructing an automated monitoring and alarm system on an AWS system the size of those on NWW and NWP

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	primary auxiliary water supply conduits/channels and the adult collection channels and to minimize diffuser damage due to excessive differentials. The Corps shall ensure that diffuser gratings for all auxiliary water supply systems are securely fastened. The Corps shall work through FPOM to develop a monitoring program for inspecting diffuser gratings and grating fasteners.	projects. A report will be provided to FPOM in 2003.
126	The Corps shall initiate an investigation and prepare a report on the Bonneville First Powerhouse Bradford Island and Cascade Island adult fishway auxiliary water system by the end of 2001. In the report, the Corps shall identify measures that will improve or replace aging components, thereby enhancing current and long-term performance and reliability.	The Bonneville Project has replaced and repaired major aging components of the subject fishways in the last three years, averaging \$284,000.00 per year. In 2003, an engineering study will be completed to evaluate all components of these fishways, including their expected life. The report will include recommendations for corrective actions. These will be prioritized by FPOM in the O&M budget process for future implementation.
127	The Corps shall continue its investigation of the Bonneville Second Powerhouse adult fishway auxiliary water system and shall identify measures to satisfactorily address emergency backup auxiliary water needs.	Modifications are underway and will be completed in 2003.
128	The Corps shall initiate an engineering study to evaluate existing limitations relating to its inability to satisfy fish passage plan operating criteria at the John Day Dam north shore ladder.	Potential corrective measures will be identified and a recommendation made in 2003. Implementation of improvements at that time.
129	The Corps shall complete adult fishway auxiliary water supply evaluations at each lower Snake River hydro project and implement corrective measures as warranted.	Construction related to auxiliary water supply systems at Lower Granite and Ice Harbor will be completed in 2003. Decisions on necessary improvements to Lower Monumental and Little Goose will be made in 2003.
130	The Corps shall complete its DGAS by April 2001. The results of this study will be used to guide future studies and decisions about implementation of some long-term structural measures to reduce TDG.	The DGAS study was completed in 2002 and the TDG production equations have been used to develop the SYSTDG spreadsheet model. SYSTDG model results have been used to evaluate operational alternatives related to annual spill cap management.
131	The Action Agencies shall monitor the effects of TDG. This annual program shall include physical and biological monitoring and shall be developed and implemented in consultation with the Water Quality Team and the Mid-Columbia PUDs' monitoring programs.	The Corps has prepared a report of the annual physical monitoring program for TDG since 2000, and has coordinated the annual reporting of biological monitoring by the Fish Passage Center. The reports are sent annually to the Oregon DEQ and Washington DOE. Rather than requiring "redundant and backup monitors at as many locations as the Water Quality Team determines necessary" the program will include a quality assurance/quality control program coordinated with the Water Quality Team. This would be effective, efficient, and less costly. The team would provide input to determine the locations of fixed monitoring stations, spot-checking monitoring equipment needs, and interpretation of

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		environmental influences on monitoring accuracy. The QA/QC program would cover laboratory calibration, field instrumentation post-calibration, field performance checks, and general criteria as described by the Water Quality Team.
132	The Action Agencies shall develop a plan to conduct a systematic review and evaluation of the TDG fixed monitoring stations in the forebays of all the mainstem Columbia and Snake river dams (including the Camas/Washougal monitor). The evaluation plan shall be developed by February 2001 and included as part of the first annual water quality improvement plan. The Action Agencies shall conduct the evaluation and make changes in the location of fixed monitoring sites, as warranted, and in coordination with the Water Quality Team. It should be possible to make some modifications by the start of the 2001 spill season.	The Action Agencies have worked with a Water Quality Team subcommittee in 2001 and 2002 on a systematic review of the forebay fixed monitoring sites. The 2001 efforts focused on the lower Columbia River. In 2002, lower Columbia River and lower Snake River sites were evaluated. Changes at some sites have been implemented and studies are ongoing for 2003 at other sites.
133	As part of DGAS, the Corps shall complete development of a TDG model to be used as a river operations management tool by spring 2001. Once a model is developed, the applications and results shall be coordinated through the Water Quality Team. The Corps shall coordinate the systemwide management applications of gas abatement model studies with the annual planning process, the Transboundary Gas Group, the Mid-Columbia Public Utilities, and other interested parties.	The Corps advanced the development of the SYSTDG spreadsheet model and two MASS numerical models for use as river operations models. The SYSTDG model was used for guidance in 2000 and the MASS 1 model was used for water temperature guidance during the 2001 drought year spill season. The SYSTDG model was shared with the region in 2001 by providing regional training sessions.
134	The Corps shall continue the spillway deflector optimization program at each FCRPS project and implement it, as warranted. The Corps and BPA shall conduct physical and biological evaluations to ensure optimum gas abatement and fish passage conditions. Implementation decisions will be based on the effect of spill duration and volume on TDG, spillway effectiveness, spill efficiency, forebay residence time, and total project and system survival of juvenile salmon and steelhead passing FCRPS dams.	Additional deflectors were installed at Bonneville in 2002. A report will be available in 2003 on whether existing deflectors should be modified. For The Dalles, deflectors are being considered among other configuration and operational alternatives to reduce spillway mortality and TDG. Evaluations and prototype testing are expected to continue onto 2006 or beyond. (see RPA actions 68 and 135) Deflector construction will be completed at Lower Monumental in 2003. Depending on regional support, construction at Little Goose could occur as early as 2005. No work has started or is scheduled for Lower Granite. Post-construction biological evaluation of deflectors and tailrace environment will continue at Ice Harbor, McNary and Lower Monumental Dams in 2003 through 2005. Evaluation of the Little Goose end bay deflectors is scheduled to start in 2005 and continue through 2008.
135	The Corps shall include evaluations of divider walls at each FCRPS project in the spillway deflector optimization program. Design development and construction of divider	A prototype spill wall will be designed for The Dalles. Construction will be initiated in 2003, with completion and initial testing anticipated for the 2004 passage season.

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	program. Design development and construction of divider walls would begin only after coordination within the annual planning process, and only if warranted.	Decisions on installation of a divider wall at Lower Monumental are under evaluation in 2003. Installation is dependent on findings of the hydraulic model work at WES and evaluation of tailrace conditions. Consideration of a divider wall at McNary has been shelved due to lack of regional and NOAA support.
136	The Corps shall continue to develop and construct spillway deflectors at Chief Joseph Dam by 2004 to minimize TDG levels associated with system spill.	The Corps received an additional \$500,000 of congressional funds to initiate design in FY03 of the "flow deflectors" selected during the General Reevaluation Report process as well as complete the design of some pre-construction projects necessary for dam preparation prior to the construction of the flow deflectors. In the interim, the Corps, NMFS, and USBR will continue efforts of the task force investigating alternative means to reduce total dissolved gas saturation in the Columbia River below Chief Joseph and Grand Coulee Dams by shifting additional power generation to Grand Coulee Dam. The Task Force prepared a draft report and expects to make recommendations soon. Because most potential benefits would be expected in higher flow years and the current runoff volume forecast for 2003 is well below average, we do not expect that there will be an opportunity to apply these operational recommendations this year. However, the Corps and USBR will continue to coordinate with NOAA to identify specific operations that might occur in higher flow years. The Corps will continue to seek appropriations to develop and construct the spillway deflectors.
137	The Corps shall investigate TDG abatement options at Libby Dam, including the installation of spillway deflectors and/or additional turbine units. The Corps shall construct gas abatement improvements at Libby on the Kootenai River, as warranted, to reduce TDG levels below the project.	The Corps is discussing the results of the 2002 spill test with the State of Montana for potential future spill options, including a potential TDG variance. The Corps will investigate in FY 03 the feasibility of installing flow deflectors in the spillway. The Corps has already investigated installation of additional turbines (in FY 02) and found that the installation of generating units at Libby is technically feasible using a generating unit major rehab construction protocol. Most of the major parts for two units are present and in relatively good condition. However, it is not currently possible to transmit the power generated from even one more unit at Libby. Current transmission lines operate at capacity. BPA Transmission Business Line, BPATBL, or another regional transmission line owner or subscriber must provide additional transmission capacity prior to addition of any generating capacity at Libby. If the projects were funded, environmental coordination, planning, and other requirements would take several years to complete before construction of a new transmission line could be undertaken. Under an optimistic schedule, the soonest that new turbines could be in place would be 2007 or 2008.
138	The Corps shall continue to investigate RSWs, in conjunction with extended spillway deflectors, as a means of optimizing safe spillway passage of adult steelhead kelts and juvenile migrants.	RSW evaluations will continue in 2003 at Lower Granite. Future work is under development through the FFDRWG. The juvenile salmon survival evaluation will begin in 2003 and a final report will be available in 2004. Evaluation of kelt passage survival is under discussion through the SRWG sub-group on surface bypass. Difficulties associated with this type of evaluation may delay this action.
139	The Corps shall investigate TDG abatement options at	Hydraulic analysis, field analysis, and physical modeling is scheduled to begin in late

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	Dworshak Dam and implement options, as warranted, in coordination with the annual planning process.	2003. A technical report summarizing results and options for construction will be completed in 2005. Actual construction requirements will be identified at that time.
140	The Corps shall design the spillway Number 1 (end bay) deflector at John Day Dam, and implement as warranted, in coordination with the annual planning process.	Spill bay 1 deflector construction is deferred for construction efficiency reasons pending decisions on spillbay 20 construction plans relative to RSW testing at this project and for determination of regional funding priorities
141	The Action Agencies shall evaluate juvenile fish condition due to disease in relation to high temperature impacts during critical migration periods. This evaluation should include monitoring summer migrants at lower Columbia and lower Snake river dams to clarify the possible link between temperature and fish disease and mortality. This information will be used to assess the long-term impacts of water temperature on juvenile fish survival.	Temperature monitoring and physiological monitoring will continue at McNary in 2003 with the final report available in 2004. The SRWG sub-group on juvenile fish temperature impacts will develop an action plan and schedule by 2004.
142	The Corps shall work through the regional forum process to identify and implement measures to address juvenile fish mortality associated with high summer temperatures at McNary Dam. As a starting point, the Corps shall assemble and analyze the temperature data that have been recorded in the McNary forebay, collection channel, and juvenile facilities. The Corps shall examine relationships among juvenile mortality, temperatures, river flow rates, and unit operations in detail. The Corps shall investigate the feasibility of developing a hydrothermal computational fluid dynamics model of the McNary forebay to evaluate the potential to determine optimal powerhouse operations or structural modifications for minimizing thermal stress of juvenile salmon collected in the summer and to conduct a modeling program, if warranted.	Temperature monitoring has been conducted at McNary. A temperature model of the McNary forebay is scheduled to be complete by 2004. Physiological monitoring will continue in 2003 at McNary and a final report is due in 2004.
143	By June 30, 2001, the Action Agencies shall develop and coordinate with NMFS and EPA on a plan to model the water temperature effects of alternative Snake River operations. The modeling plan shall include a temperature data collection strategy developed in consultation with EPA, NMFS, and state and Tribal water quality agencies. The data collection strategy shall be sufficient to develop and operate the model and to document the effects of project operations.	The Action Agencies have been working with an ongoing Water Quality Team subcommittee since 2001 to develop a plan to model water temperature effects of alternative Snake River operations. The 2001 and 2002 subcommittee work efforts have determined the goals of water temperature modeling, have investigated and evaluated multi-agency existing data, determined what questions can be answered without modeling, recommended and started additional data collection, recommended numerical models to be considered, and are currently in the process of identifying a recommended numerical model to be used.
144	The Corps, in coordination with the Regional Forum, shall	The Corps has worked annually with NOAA and the Region through FPOM to develop the

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	<p>maintain juvenile and adult fish facilities within identified criteria and operate FCRPS projects within operational guidelines contained in the Corps' Fish Passage Plan. The Corps shall coordinate with NMFS on the development of these criteria and operational guidelines before the start of each fish passage season (generally February 1).</p>	<p>Fish Passage Plan. Typically this coordination has been completed by March 1 each year with the FPP in place for the fish passage season.</p>
145	<p>The Corps shall develop and implement preventative maintenance programs for fish passage facilities that ensure long-term reliability, thereby minimizing repair costs.</p>	<p>NWP and NWW Projects are developing, budgeting for, and implementing preventative maintenance programs for their fishways. These plans will be coordinated with FPOM in 2003. The Bonneville Project is installing new windings on AWS fish water turbine F1 during this winter maintenance season. The John Day Project purchased all the necessary parts to re-habilitate the three powerhouse fish water turbine pumps, one pump per year for the next three years, during the winter maintenance seasons. The actions at Bonneville and John Day dams will greatly improve the reliability of the AWS systems.</p> <p>Rehabilitation of pumps for the Lower Monumental AWS began in FY 02 and will continue through FY 04. Rehabilitation of pumps systems for the Ice Harbor south shore AWS begin in FY 03 and will continue through FY07. Additional work included in the program will be coordinated through FPOM.</p>
146	<p>The Corps shall address debris-handling needs and continue to assess more efficient and effective debris-handling techniques to ensure that the performance of both new and old fish passage facilities will not be compromised.</p>	<p>General: As a normal course of O&M of the projects, debris is constantly monitored throughout the facilities and appropriate removal action initiated as required. This has been and will continue to be addressed in the Fish Passage Plan. Specific problem areas that come up are presented and discussed at FPOM, where courses of action are developed and then followed-up on by the Corps. The Corps believes fish passage effects are adequately addressed and are the critical concern in establishing protocols and correcting problem areas. A system-wide assessment was not called for in the subject RPA, nor is one necessary at this time. At the end of this summary is a chronology of evaluations and actions completed for the Snake River and McNary projects that the Corps believes have fully addressed the issue at those projects and in conjunction with ongoing efforts as will be described below meet the intent of this RPA.</p> <p>The Corps also questions the value for a reconnaissance-level analysis for debris booms at the dams and believes they are beyond that at the projects. Again, see the specific actions and the chronology below. Immediately following is a listing of the status and plans for specific debris-related issues for FY 03 and beyond at the projects. In these the Corps references the other RPA actions items associated with these activities. Several of these actions are only a part of other larger measures and as such may not have been highlighted in the RPA implementation summaries. Much of this information should be available in the FY03 work plans provided to the SCT, and used as the basis for implementation plan</p>

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		<p>summaries.</p> <p>Bonneville: Also, reference RPA Action 63. At 1st PH, analysis of debris handling has been addressed in association with the JBS improvement/outfall relocation project. A debris boom is recommended and has been designed for installation when and if that project is implemented. No action is planned until that decision is made.</p> <p>At B2 (no specific RPA reference) an ongoing prototype study of a gateway debris removal system is underway, but has not been funded recently, nor in 2003, due to funding priorities. Also, action is being deferred pending completion of the corner collector and evaluation of the effect of its operation on B2 debris issues.</p> <p>Under the B2 FGE improvement study (RPA 67), evaluation of problems with failure of VBS screens due to increased slot flows, tighter mesh criteria, and debris will continue. New VBS screen frame designs will be tested in 2003 and a new screen cleaner prototype is under design and is planned for testing in 2004.</p> <p>Also at B2, under the follow-on work for bypass improvements (RPA 65) a new air burst cleaning system is under development due to problems with the mechanical cleaning system for the DSM dewatering screens. We are also planning for an automated trash rake for the fish units in 2004.</p> <p>The Dalles: No specific actions are anticipated at this time</p> <p>John Day: Reference RPA Action 73. Debris issues will continue to be addressed in association with the extended screen evaluations. No specific debris-related work is planned for 2003, but would be continued as the screen program moves forward. The schedule will depend on future funding priorities and decisions on future configuration of this project.</p> <p>McNary: Reference RPA Action 74. Ongoing efforts continue as required. Annual contracts for debris removal continue and the new debris removal craft is scheduled to be purchased in 2004, subject to funding priorities. Corrections to the debris plugging problems in the 10-inch fish transport lines were completed in 2002 and no further action is anticipated. Testing of the cylindrical dewatering prototype was concluded in 2002, final reports will be completed in 2003 and the test facility is scheduled to be removed in 2004.</p> <p>We are continuing a major modeling effort at WES to try to identify and resolve gateway debris issues, particularly at McNary. That effort continues, under the McNary Modernization Project to look at options to resolve periodic VBS and gateway debris</p>

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		<p>issues at McNary.</p> <p>Snake River projects (system evaluation): Reference RPA 94. The Lower Snake and Columbia Rivers Extended-Length Submerged Bar Screen System-Wide Letter Report was completed in 2002 to assess JBS system performance at each of the Lower Snake projects to include debris control and cleaning systems.</p> <p>Ice Harbor: No specific actions for debris planned as a result of the system evaluation.</p> <p>Lower Monumental: No specific actions for debris planned as a result of the system evaluation. New debris issues may need to be evaluated in conjunction with ongoing ESBS development initiated in 2002 for this project (RPA 78).</p> <p>Little Goose: Reference RPA 79. Completed post-construction predator studies of the new containment boom to verify or modify debris removal criteria in 2002. No further action required.</p> <p>Lower Granite: No specific actions for debris are planned based on above evaluations and until re-initiation of the Lower Granite juvenile bypass facility improvement measure (RPA action 81).</p> <p>Lower Snake and McNary debris issues chronology</p> <p>November 1996 - The Lower Snake and Columbia Rivers Debris Control Study Phase I Report was completed. That report identified various short-term actions that could be implemented to mitigate the effects of debris at the projects. The report also looked at potential long-term solutions.</p> <p>1997 – Lower Snake and Columbia River Debris Control Phase II was completed. Short-term actions identified in the Phase I report were implemented.</p> <p>July 1998 – The Lower Snake and Columbia Rivers Debris Control Study Phase III Report was completed. This report recommended long-term actions and measures to be installed as permanent systems. This report recommended installation of a debris boom at Little Goose, which was subsequently installed in 2000 and recommended not to install a debris boom at McNary. The report also made other recommendations specific to the Collection Systems at McNary and Lower Granite.</p> <p>March 2000 – The McNary Dam Debris Boom Analysis & Alternatives report was completed. This report reinforced the conclusions of the Phase III report that a debris boom was not a feasible alternative and that the recommended course of action was to procure a Debris Removal Craft. Purchase of that craft is scheduled for FY04, subject to</p>

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		<p>regional coordination and SCT prioritization.</p> <p>August 2002 – The Lower Snake and Columbia Rivers Extended Length Submerged Bar Screen System-Wide Letter Report was completed. Section 4 of that report dealt extensively with Forebay Debris, Collection System Debris and Holding & Loading Debris as applicable at all projects.</p> <p>Current Status: Forebay Debris Booms exist at Lower Granite and Little Goose Projects. Similar booms are not needed at Lower Monumental or Ice Harbor due to minimal debris accumulation and 24 hr spill.</p>
147	<p>As a contingency plan, the Corps (in cooperation with other Federal agencies) shall develop a project management plan to reevaluate more intensive dams. The project management plan will identify the scope, schedule, costs, tasks, products, and responsibilities for the reevaluation study. The study should assess all significant changed conditions to the Lower Snake River Feasibility Report and Environmental Impact Statement (Corps 1999c). The project management plan should be consistent with direction from Congress, Corps authorities, and other legal requirements. The completed project management plan should be coordinated with the appropriate regional interests. The project management plan should include, but not be limited to, plans to mitigate disproportionate impacts to communities, industries, and Tribes, detailed water and air quality effects, implementation plans, and a complete public involvement program. The decision to start the reevaluation study should result from the NMFS check-in process in Section 9.5. The Corps will request funding or reprogramming to complete the project management plan within 1 year after NMFS' issuance of a check-in report indicating the need to seek additional authority. The study should result in a general reevaluation report and supplemental environmental impact statement, which would be used to seek authorization and/or appropriations to implement, recommended action(s), if needed. The general reevaluation report/ supplemental environmental impact statement will require approximately 2 years to complete.</p>	<p>Further action on this item will follow the 2005 check-in.</p>

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148	<p>The Corps shall conduct detailed engineering and design work for improvements recommended in the general reevaluation report and supplemental environmental impact statement described in the preceding action. The Corps shall seek funding to allow initiation of the engineering and design work to occur immediately upon completion of the final general reevaluation report. The engineering and design work shall include only those activities on (or near) the implementation schedule critical path for the recommended actions, up to the award of the first construction contract. For a dam breach recommendation, the critical path activities shall include turbine physical modeling (for use as low level outlets), rock source explorations for embankment erosion protection (riprap), and hydraulic (physical) modeling for the embankment removal and channelization. Tentative milestones for the general reevaluation report/EIS and engineering and design work are as follows, based on the check-in process identified in Section 9.5. (see RPA for list)</p>	<p>Further action on this item will follow the 2005 check-in.</p>
149	<p>BOR shall initiate programs in three priority subbasins (identified in the Conceptual Recovery Plan) per year over 5 years, in coordination with NMFS, FWS, the states and others, to address all flow, passage, and screening problems in each subbasin over 10 years. The Corps shall implement demonstration projects to improve habitat in subbasins where water-diversion-related problems could cause take of listed species. Under the NWPPC program, BPA addresses passage, screening, and flow problems, where they are not the responsibility of others. BPA expects to expand on these measures in coordination with the NWPPC process to complement BOR actions described in the action above.</p>	<p>USBR is continuing to seek construction authority to implement this Action. In October 2002, the Administration provided a draft bill for that purpose to the Congress and USBR is working with interested members from the Northwest State's delegations to introduce the legislation. In addition, USBR is working with NOAA Fisheries to resolve the identity and number of priority subbasins to be addressed under Action 149 and is moving forward to have this issue resolved by April 2003.</p> <p>The 2003-07 IP identifies over 100 projects, programs, and studies to fulfill this RPA action. In FY03, BPA will fund projects in at least 2 subbasins or aggregates of subbasins, the Corps will undertake projects in 4 subbasins, and USBR will pursue projects or programs in 9 subbasins. BPA and USBR will continue to seek clarification of the respective federal agency roles and responsibilities under this Action. BPA will continue to select projects under this action through NPPC processes.</p> <p>Identification of projects for implementation in future years will depend on the project selection processes used by the three Action Agencies. The Action Agencies project selection will be prioritized based on NPPC subbasin planning recommendations. Increments of change attributable to the implementation of these programs in each subbasin will not be possible until a baseline of problem conditions is available, presumably with completion of the Council's subbasin assessments and plans. The actions</p>

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		<p>are summarized, by subbasin, as follows with a cross reference to the appropriate BiOp ID number if more information is needed:</p> <p>Entiat: Two USBR projects: (1) Initiation of a diversion barrier/screen and flow program in the subbasin during FY 2003 (ID # 424), and (2) initiation of IFIM studies in partnership with the Entiat Water Planning Unit (ID # 389) which will be integrated into an EDT analysis. (Note: to avoid double counting, disregard ID # 587 because it is a repeat of # 389).</p> <p>Grays: One Corps section 206 project to restore a large portion of 7.6 miles of stream and 15 acres of wetlands through culvert replacement, installation of fishways and ladders, and wetland enhancement (ID # 559).</p> <p>Upper John Day: Five USBR projects affect this subbasin: (1) continuation of the program in the subbasin to implement action 149 including completion of programmatic NEPA assessments (ID #431), (2) installation of a siphon, screen and passage structure at the Panama Ditch/Beech Creek crossing (ID #420), (3) installing a siphon, screen, and passage structure at Strawberry Creek (ID # 421), (4) installing temporary gauging stations for flow data collection (ID # 422), and (5) initiating IFIM studies to ascertain fish flow needs (ID # 423).</p> <p>Middle Fork John Day: Three USBR projects affect this subbasin: (1) continuation of the program in the subbasin to implement action 149 including completion of programmatic NEPA assessments (ID #429), (2) installing temporary gaging stations for flow data collection (ID # 413), and (3) initiating IFIM studies to ascertain fish flow needs (ID # 414).</p> <p>North Fork John Day: Two USBR projects affect this subbasin: USBR will initiate a program in this subbasin during FY 2003 and will complete a programmatic NEPA assessment for all three of the upper John Day subbasins (ID # 430) and will initiate IFIM studies in the subbasin to ascertain fish flow needs (ID # 418) if the subbasin is confirmed as a priority.</p> <p>Methow: Fifteen USBR projects are planned or underway in the Methow subbasin. USBR projects are (1) water acquisition opportunities in Beaver Creek (ID # 383), (2) replace pushup dams at the Batie and Red Shirt diversions in Beaver Creek with facilities to provide fish passage (ID # 384), (3) provide fish screens, water measurement, and passage barrier improvements at Chewuch Diversion on the Chewuch River (ID # 387), (4) develop a pump exchange system at the Fort-Thurlow diversion dam to eliminate fish passage problems and open 10 miles of Beaver Creek (ID # 390), (5) improve fish passage at the Fulton Diversion on the Chewuch River (ID # 391), (6) provide fish passage</p>

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		<p>facilities and screens at Gold Creek Diversion Dam (ID # 392), (7) replace the Marracci Diversion on upper Beaver Creek with a structure that incorporates fish passage (ID # 408), (8) assist the USGS with hydrologic model upgrades to evaluation ground-water effects (ID # 409), (9) assist with a screen replacement owned by Methow Valley Irrigation District (ID # 410 and also see BPA ID # 108 for other work at this facility), (10) assist with screen replacements at the Methow Valley Irrigation District Twisp River diversion (ID #411 and also see BPA ID # 108), (11) a pump exchange project at the Methow Valley Irrigation District Twisp River Diversion (ID # 412 and also see BPA ID # 108 for this location), (12) replacement of the Methow Valley Irrigation District Methow River diversion to provide fish passage (ID #416), (13) design and construction of a diversion and headgate to replace a pushup dam related to the Methow Valley Irrigation District Twisp River Diversion (ID # 417), (14) participate in a USGS and Okanogan county/Methow Basin Water Planning Unit study to model hydrologic effects of water management options (ID #419), and (15) continuation of the USBR Methow subbasin program to liaison with local groups and landowners and support outreach programs.</p> <p>Salmon River: Twenty-six programs and projects are included in the Salmon River drainage including 3 by BPA, 1 by the Corps, and 22 by USBR. Several of these projects are joint ventures by the action agencies and project sponsors, and a cross reference is noted below where appropriate. BPA has two projects that apply to the entire Salmon River drainage and the remainder can be allocated into subbasins.</p> <p>Entire Salmon River: BPA projects are: (1) a program for consolidation and elimination of irrigation diversions and screen intakes and canals (ID #82), (2) a model watershed habitat improvement project through development of alternative management plans and reestablishment of riparian protection (ID #83) and (3) a multi-year project in the Upper Salmon River to reduce the number of irrigation diversions, enhance in-stream flows through water conservation measures, reduce juvenile delay and entrapment, and construct NMFS approved fish screens (ID #85). USBR is providing technical assistance to sponsors under this project.</p> <p>Lemhi: USBR has 21 projects or programs in the Lemhi. USBR projects in the Lemhi are: (1) L-13 diversion, headgate, and screen replacement projects (ID # 393, 394, and 395), (2) L-18 headgate replacement for control of water delivery (ID #396), (3) L-20 headgate replacement for control of water delivery (ID # 397), (4) L-3 diversion and headgate replacement to provide fish passage and control water delivery (ID # 398 and 404, see also BPA ID # 105), (5) L-35A diversion, headgate, and screen replacement projects (ID #399, 400, and 401), (6) L-3A diversion replacement to provide fish passage (ID #402, see also BPA ID #105), (7) L-3A0 diversion replacement (ID # 403), (8) L-6/S-14 water exchange project to address instream flows in the lower Lemhi (ID # 405 and</p>

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		<p>also see BPA #107), (9) L-9 diversion and headgate replacements to provide fish passage and to control water delivery (ID# 406 and 407), (10) Williams Creek diversion replacements, headgate replacements and screen replacement which address two gravel push-up dams, two headgates, and three screens (ID # 434, 435, and 436), (11) subbasin IFIM studies to ascertain fish flow needs (ID # 588), and (12) continued management of USBR's Lemhi subbasin program including program outreach and completion of programmatic NEPA compliance.</p> <p>Upper Salmon Subbasin: BPA has 2 projects in the Upper Salmon, the Corps has 1 project, and USBR has 1 project. BPA projects are: (1) addressing effectiveness assessments, migration barriers, fine sediments, geomorphic structure, and riparian vegetation in Custer County (ID # 81), (2) an upper Salmon diversion consolidation, fish screen and irrigation water conservation program (ID # 82),. The Corps has initiated a project to restore habitat quality in the lower 12 miles of the upper Salmon River through a channel restoration feasibility study (ID # 555). The USBR is initiating its program in the upper Salmon by installing a subbasin liaison, implementing a public outreach program, and completing programmatic NEPA compliance (ID #432).</p> <p>Walla Walla subbasin: the Corps is supporting one study in the Walla Walla. The Corps has a 3-year feasibility study to identify alternatives for increased instream flow, headwater dams for instream flows, water exchanges with the Columbia River, increased irrigation efficiency, and purchase of water rights (ID # 561).</p> <p>Wenatchee subbasin: USBR has 4 projects identified in the Wenatchee: (1) established a subbasin liaison program for outreach and project coordination (ID # 433), (2) initiation of IFIM studies in partnership with the Cleland County Watershed Planning Group (ID #385), (3) address replacement of small diversion facilities on Chumstick Creek that affect fish passage (ID #388), and (4) replace several small diversions on Mission Creek that affect fish passage (ID # 415).</p> <p>Yakima River: The Yakima is not a high priority subbasin, but BPA is implementing 2 projects that meet the intent of this action. Other projects not listed in this summary also contribute to the basic intent of action 149, but are not located in a high priority subbasin. The 2 projects are part of the Yakama Nation Yakima/Klickitat Fisheries Project and exemplify projects that contribute to the basic intent of action 149. They are: (1) a project to protect and restore off-channel rearing habitats associated with the Yakima and Naches mainstems, (ID #13) and (2) a project to reestablish access into Yakima tributaries through fencing, revegetation, easement and/or property purchases, consolidation of diversions and modernization of irrigation systems (ID # 16).</p>
150	In subbasins with listed salmon and steelhead, BPA shall	BPA and NOAA developed criteria and priorities that BPA is using for funding decisions.

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	<p>fund protection of currently productive non-Federal habitat, especially if at risk of being degraded, in accordance with criteria and priorities BPA and NMFS will develop by June 1, 2001.</p>	<p>In FY03, BPA will implement the 3 projects listed in the Critical Elements list under this Action. Those projects include (1) a habitat project to preserve and restore Columbia River estuary islands (proposal # 30011), (2) development of a Watershed Management Plan to achieve and maintain naturally self-sustaining native habitat on Pine Creek Ranch (1998-022-00), and (3) enhance and protect productive habitat on the Oxbow Ranch by removing historic mine tailings and constructing headgates to improve instream flows (2000-015-00). The 5 projects listed under this Action in the 2003-07 IP but not included in the Critical Elements list (1996-042-00, 1997-051-00, 1998-034-00, 2001-040-00, 2002-018-00) were not considered essential for implementation prior to the 2003 or 2005 Check-in evaluations.</p>
151	<p>BPA shall, in coordination with NMFS, experiment with innovative ways to increase tributary flows by, for example, establishing a water brokerage. BPA will begin these experiments as soon as possible and submit a report evaluating their efficacy at the end of 5 years.</p>	<p>The Water Entity project (2002-013-01) included in the Critical Elements list has been added to the 2003-07 IP.</p> <p>BPA Projects –</p> <ul style="list-style-type: none"> • Explore innovative types of water transactions - A regional water entity has been established to facilitate tributary water transactions basinwide. After a Request for Qualifications process, BPA selected the National Fish and Wildlife Foundation (NFWF) to serve as the regional entity and qualified ten local entities (QLEs) to begin the Columbia Basin Water Transactions Program (CBWTP). NFWF will administer this program to implement Action 151. This regional entity will work through qualified local entities to identify and develop opportunities for providing cost-effective in-stream flows. NFWF will submit a report evaluating its efforts annually and at the end of five years. One major focus of the regional entity's efforts is to support local entity efforts to test the effectiveness of various transactional strategies for increasing tributary flows to improve habitat throughout the Columbia Basin. • Additional information about the regional entity and the Columbia Basin Water Transactions Program (CBWTP) is available at http://www.nfwf.org/watertransactionsprogram/index.htm. The website currently provides background information on the program, the upcoming implementation timeline, a description of the ten current QLEs, criteria and information for submitting proposals, maps of the basin, and contact information. NFWF has already begun receiving proposals from QLEs for implementation in 2002-2003. The regional entity has organized a September 19-20 meeting at Portland State University on water transaction strategies and a roundtable working session with representatives of the ten QLEs to further implement the program. The QLEs will be implementing innovative transactional approaches in 2003 and in subsequent years. BPA expects to continue supporting this program to cost-effectively implement innovative strategies to increase tributary flows. BPA intends to utilize the regional entity structure and the CBWTP in

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		<p>order to test transactional strategies in each of the Columbia Basin states and apply the effective strategies in the field to make progress toward meeting performance standards.</p> <ul style="list-style-type: none"> • Build a regional structure for flow improvements – The regional water entity described above will also pursue: <ol style="list-style-type: none"> 1. Coordination of water transactions and associated habitat projects. 2. Development of a competitive process to supply water to increase flows. 3. Development of water solicitations and selection of the most promising transaction proposals. 4. Development of a regional clearinghouse and public information site for water transactions. • Develop criteria and priorities — BPA has worked with NOAA, Council staff and other interested parties to develop criteria and priorities for the regional water entity to use in the selection of water transactions and transfers. The Action Agencies will also work with NOAA, USFWS and others to develop a methodology for evaluating the biological effectiveness of documented increases in quantity of in-stream water. <ol style="list-style-type: none"> 1. Acquire/improve flows at diversions – BPA will field at least nine projects that increase tributary flows through water acquisitions and improvements at diversions in the following five subbasins. • Identify additional in-stream flow improvements – The regional water entity is structured to identify and facilitate additional promising water transactions for the purposes of increasing in-stream flows. <p>2004-07 Work Plan</p> <p>In addition to the continuing activities described above, the Action Agencies plan to:</p> <ul style="list-style-type: none"> • Develop stream flow protocol methodologies/studies and water acquisition processes or incorporate the protocols provided by NOAA. BPA is coordinating with USBR to use the results of six current IFIM studies to enhance water acquisition strategies. NOAA has also assumed responsibility to provide BPA with an IFIM methodology capable of ascertaining instream flows that meet ESA requirements. • Enable the regional entity, the National Fish and Wildlife Foundation, to qualify additional local entities, pursue cost-sharing agreements, and further implement the Columbia Basin Water Transactions Program over the next five years. • Coordinate with the Oregon Water Resources Department (OWRD), Washington

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		<p>Department of Ecology (WDOE), Idaho Department of Water Resources (IDWR), and the Montana Fish Wildlife and Parks (FWP) to improve water transaction efficacy and ensure transactional strategies are consistent with state water law.</p> <ul style="list-style-type: none"> Complete a report evaluating the efficacy of the regional water entity and the CBWTP, including a decision on whether to continue the program.
152	The Action Agencies shall coordinate their efforts and support offsite habitat enhancement measures undertaken by other Federal agencies, states, Tribes, and local governments by the following: (See RPA)	BPA's Critical Elements list does not include any projects for implementation in FY03 under this Action. The projects listed under this Action in the 2003-07 IP may contribute to this action but are not considered essential for implementation in FY03 to meet the 3- or 5-year Check-in evaluations.
153	BPA shall, working with agricultural incentive programs such as the Conservation Reserve Enhancement Program, negotiate and fund long-term protection for 100 miles of riparian buffers per year in accordance with criteria BPA and NMFS will develop by June 1, 2001.	<p>Under this action, BPA will implement the 20 projects identified in the Critical Elements list. The other projects listed in the 2003-07 IP that are not included on the Critical Elements list may contribute to this action, but are not considered essential for implementation in FY03 to meet the 3- or 5-year Check-in evaluations.</p> <p>It is expected that a two-tier approach will initially be necessary to leverage agricultural incentive programs to fund long-term protection for riparian buffers. Tier 1 will be a continued effort to develop and implement a program for establishing long-term protection for lands enrolled in these programs. Tier 2 consists of continued support of CREP implementation and other similar federal programs as needed to develop, refine, implement and support the long-term protection program. To this end, BPA, working with NOAA, FSA, NRCS, the States, and others, will collaboratively develop and implement a multi-agency program to strengthen the CREP in areas within the range of listed fish species. The objective of this multi-agency program is to ultimately achieve long-term or permanent protection of 100 miles of riparian habitat per year. NOAA and BPA will annually evaluate the implementation of the multi-agency program and conclude whether and how the program could be adjusted for more effective implementation. The goal of this action is 300 miles enrolled in long term or permanent CREP easements.</p> <p>See also the Tributary Habitat Substrategy 1.5 (Watershed Health) included in Section 5.2.1 of the 2003/2003-07 Implementation Plan.</p>
154	BPA shall work with the NWPPC to ensure development and updating of subbasin assessments and plans; match state and local funding for coordinated development of watershed assessments and plans; and help fund technical support for subbasin and watershed plan implementation from 2001 to 2006. Planning for priority subbasins should be completed by the 2003 check-in. The action agencies will work with other Federal agencies to ensure that subbasin and watershed assessments and plans are	<p>BPA is implementing this action through state, provincial, and tribal Subbasin Planning contracts (2002-051-00). The other BPA projects listed under this Action in the 2003-07 IP may contribute to this action but were not considered essential for implementation in FY03 to meet the 3- or 5-year Check-in evaluations.</p> <p>Until subbasin plans are completed, the Action Agencies are using subbasin assessments, BiOp criteria, and ISRP reviews to inform Provincial Review project selections. In 2002 BPA entered into contracts with the Council to develop subbasin plans for the entire Columbia River Basin and anticipates plan completion for all 62 subbasins by the end of</p>

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	subbasin and watershed assessments and plans are coordinated across non-Federal and Federal land ownerships and programs.	2004. NOAA and the Action Agencies are collaborating to finalize identification of priority subbasins, which will allow BPA to especially focus attention on ensuring completion of those plans. Although delayed, developing the subbasin plans in close coordination with NOAA and the USFWS will ensure the integration and prioritization of ESA-focused project activities in the Council's Fish and Wildlife Program. The Action Agencies expect subbasin plans to adhere to the current completion schedule.
155	BPA, working with BOR, the Corps, EPA, and USGS, shall develop a program to 1) identify mainstem habitat sampling reaches, survey conditions, describe cause-and-effect relationships, and identify research needs; 2) develop improvement plans for all mainstem reaches; and 3) initiate improvements in three mainstem reaches. Results shall be reported annually.	In FY03, BPA will implement this action with the 3 existing projects and one proposal included in the Critical Elements list. The three existing projects include evaluation of fall Chinook and chum salmon spawning, restoration of the Sandy River delta, and the evaluation of factors limiting Columbia River Gorge chum salmon populations. BPA will also proceed with proposal 35007 to evaluate the restoration potential of Snake River fall Chinook salmon spawning habitat. See also the Mainstem Habitat Substrategy 2.1 (Watershed Health) included in Section 5.2.2 of the 2003/2003-07 Implementation Plan.
156	The Action Agencies and NMFS shall study the feasibility (including both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area.	The Corps is funding a feasibility report on actions to restore and/or protect chum spawning areas. The team developing the report is working closely with Regional salmon managers actively involved in chum salmon management. The report should be completed and available to NOAA and the Region in 2003. BPA also plans to implement the 3 projects identified in the Critical Elements list (1999-003-01, 2000-012-00, and 2001-053-00).
157	BPA shall fund actions to improve and restore tributary and mainstem habitat for CR chum salmon in the reach between The Dalles Dam and the mouth of the Columbia River.	The above feasibility report includes options apart from Corps projects. Funding alternatives for those options will be outlined in the report. BPA plans to implement 3 projects identified in the Critical Elements list (1999-003-01, 1999-025-00, and 2001-053-00) that apply to this Action. Project number 2001-012-00 was identified under this Action in the 2003-07 IP, though it not considered essential for implementation in FY03 to meet the 3- or 5-year Check-in evaluations. BPA still plans to implement this project, but has identified it under Action 156.
158	During 2001, the Corps and BPA shall seek funding and develop an action plan to rapidly inventory estuarine habitat, model physical and biological features of the historical lower river and estuary, identify limiting biological and physical factors in the estuary, identify impacts of the FCRPS system on habitat and listed salmon in the estuary relative to other factors, and develop criteria for estuarine habitat restoration.	The Corps and BPA committed on February 3, 2003 to complete the action plan, in coordination with NOAA-Fisheries. On-going Federal activity in the estuary including research by NOAA, LCREP, and others that is supported by BPA and the Corps, mapping, and habitat restoration activities will continue while the action plan is developed and will be integrated into the plan. The Action Agencies will adhere to the following timelines: 3/19/03 - Outline and submission to NMFS for review 3/24/03 - Review from NMFS of outline 4/30/03 - 30% draft plan submitted to NMFS for review 5/15/03 - Review due by Action Agencies and NMFS 6/15/03 - 60% draft plan submitted to NMFS for review

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		<p>6/30/03 - Review due by Action Agencies and NMFS 7/30/03 - 95% draft plan submitted to NMFS for review 8/30/03 - Review due by Action Agencies, NMFS, LCREP Science workgroup, and other organizations as appropriate (i.e., ISRP) 9/30/03 - Completed Action Plan sent to NMFS</p> <p>Under this Action, BPA plans to implement the 2 proposals (30001, 30002) and 2 projects (1998-014-00 and 2002-012-00) identified in the Critical Elements list.</p>
159	<p>BPA and the Corps, working with LCREP and NMFS, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.</p>	<p>BPA is working with the Corps, LCREP and the Columbia River Estuary Study Taskforce (CREST) to develop this plan. This project, initiated in FY 2002, will provide the foundational plan for habitat restoration activities in the estuary. The study will eventually be coordinated with the more comprehensive GI study. It was noted that the scope of the plan being prepared under this contract is greater than RPA 159 calls for, offsetting the fact that it will be completed later than NOAA Fisheries desired. The Action Agencies will adhere to the following timelines:</p> <p>4/30/03 - 90% draft plan submitted to NMFS for review 7/01/03 - Draft final plan submitted to NMFS for review 8/15/03 - Completed Plan sent to NMFS</p> <p>In addition, the Corps, BPA, and LCREP are developing a long-range plan for protection and restoration of the estuary that is broader in scope than the needs of NOAA BiOp implementation. This General Investigation (GI) study for ecosystem restoration in the Columbia River estuary (covering from the river mouth to river mile 145) is expected to continue from 2003 to 2007, but results will inform actions for the estuary along the way. The Action Agencies plan to address the habitat needs of salmon and steelhead in the estuary in coordination with the GI feasibility study to avoid duplication of effort</p>
160	<p>The Corps and BPA, working with LCREP, shall develop and implement an estuary restoration program with a goal of protecting and enhancing 10,000 acres of tidal wetlands and other key habitats over 10 years, beginning in 2001, to rebuild productivity for listed populations in the lower 46 river miles of the Columbia River. The Corps shall seek funds for the Federal share of the program, and BPA shall provide funding for the non-Federal share. The Action Agencies shall provide planning and engineering expertise to implement the non-Federal share of on-the-ground habitat improvement efforts identified in LCREP, Action 2.</p>	<p>The Corps and BPA are working on a cost share agreement that will allow the Corps to use existing and new authorities to protect and enhance 5,000 acres of estuary habitat during the next 5 years (2003-2007). Congress provided a new authority (Section 536) and appropriated funds to the Corps in 2003 for habitat work in the estuary. This authority requires cost sharing which may be provided by the States, local governments, LCREP or BPA through the Council's Provincial Review and subbasin planning processes. Under this authority, the Corps plans to implement ecosystem restoration projects to protect, monitor and restore fish and wildlife habitat in close coordination with LCREP. This program is expected to generate a mosaic of restoration projects that will address RPA action 160 and augment the comprehensive master plan generated by the GI study. The Action Agencies will adhere to the following timelines:</p> <p>4/30/03 - List of potential estuary restoration projects for FY 03-05 to be submitted to</p>

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		<p>NMFS and LCREP Science Workgroup for review 5/30/03 - List finalized and restoration projects initiated for FY 03 field season</p> <p>The Corps will also continue to seek and pursue opportunities for habitat restoration or enhancement projects in the estuary under available authorities such as the Section 1135 and 206 restoration authorities. These authorities may be used to accomplish work in 2003 if funding is not appropriated under Section 536.</p> <p>BPA identified 4 proposals/projects under this action in their Critical Elements list and plans to implement them in cooperation with the Corps, LCREP, and other. The 4 projects are Blind Slough Restoration (proposal 30004), Effectiveness Monitoring of the Chinook River Estuary Restoration (proposal 30006), Implement habitat Restoration Program for the Columbia Estuary and Lower Columbia River (proposal 30016), and Preserve and Restore Columbia River Estuary Islands to Enhance Juvenile Salmonids and Columbian White-tailed Deer Habitat. (proposal 30011).</p>
161	<p>Between 2001 and 2010, the Corps and BPA shall fund a monitoring and research program acceptable to NMFS and closely coordinated with the LCREP monitoring and research efforts (Management Plan Action 28) to address the estuary objectives of this biological opinion.</p>	<p>Research will continue in the estuary, guided by the RM&E Estuary/Ocean Work Group, with input from NOAA and LCREP, and by regional review processes including the Corps Anadromous Fish Evaluation Program (AFEP) and the Council's Provincial Review and subbasin planning processes. The RM&E Estuary/Ocean Work Group has concluded an analysis of on-going and proposed RM&E efforts to determine what is being done and identify any gaps that need to be addressed. The Work Group is currently developing an RM&E plan for the estuary and ocean (plume) requirements in the BiOp in 2003.</p> <p>The Action Agencies support implementation of the timetable and tasks identified in the draft RM&E Framework (12/20/02) for the estuary/ocean to implement the actions related to development of the RM&E Plan. Integration of estuary research in the overall RM&E plan is covered in more detail under the RM&E section of this document. In accordance with the Action Agencies January 28, 2003 resolution, they commit to further develop and implement the research and monitoring program by September 2003. The Action Agencies will adhere to the following:</p> <p>4/30/03 - 30% draft plan submitted to NMFS for review 6/15/03 - 60% draft plan submitted to NMFS for review 8/15/03 - 95% draft final plan submitted to NMFS for review 9/30/03 - Completed Action Plan sent to NMFS</p> <p>BPA plans to implement 3 proposals/projects under this action and has included them in the Critical Elements list. Those projects are Optimization of FCRPS Impacts on Juvenile Salmonids (proposal 30002), Lower Columbia River and Columbia River Estuary Ecosystem Monitoring and Data Management (proposal 30015), and Estuary/Ocean RME Support (project 2002-077-00).</p>

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162	<p>During 2000, BPA, working with NMFS, shall continue to develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience. The model will highlight the relationship among hydropower, water management, estuarine conditions, and fish response. The work will enable the agencies to identify information gaps that have to be addressed to develop recommendations for FCRPS management and operations.</p>	<p>Work began in 1998 and continues under project 1998-014-00, which is included in the Critical Elements list. The conceptual model is being further calibrated and validated and will be completed by September 2003. The conceptual model will be used to help identify information gaps and develop recommendations for FCRPS management and operations. The effort includes exploratory development of physically based metrics for plume habitat opportunity; observation of physical parameters at an OGI monitoring site, and limited forecasts of plume dynamics to support cruise planning and sampling strategies. Calibration and validation effort will continue through 2003, and will culminate in an extensive field-based demonstration in 2004. Through separate funding, developed habitat opportunity maps for juvenile salmon in the estuary, for contrasting modern and pre-development conditions (Bottom et al. 2001). The process entailed developing an extensive simulation database of estuarine circulation, and interrogating that database using criteria describing physical conditions presumed favorable to juvenile salmon.</p> <p>There are currently three possible models available or under development (Dr. Thom's model developed for the Columbia River Channel Improvement Project, NOAA Fisheries' Salmon at Rivers End report, and Dr. Simenstad's work on food web interactions and nutrient cycling in the estuary). BPA and the Corps are working collaboratively with the authors of these models to combine their findings into one complete conceptual model capable of evaluating hydrosystem impacts on the estuary. This evaluation with recommendations will be submitted to NOAA Fisheries for final review by September 2003 for inclusion in the RM&E plan and portion of the RPA 159 plan that discusses conceptual models. The Action Agencies will adhere to the following timelines:</p> <p style="padding-left: 40px;">4/30/03 - 30% draft plan submitted to NMFS for review 5/15/03 - 60% draft plan submitted to NMFS for review 8/31/03 - Draft final plan submitted to NMFS for review 9/30/03 - Final revised version submitted to NMFS</p>
163	<p>The Action Agencies and NMFS, in conjunction with the Habitat Coordination Team, will develop a compliance monitoring program for inclusion in the first 1- and 5-year plans.</p>	<p>The Action Agencies are using an Access database for project level BiOp implementation planning and progress reporting. This provides the initial effort towards development of a compliance monitoring program. The Action Agencies will continue to work with other parties to develop a compliance monitoring program.</p>
164	<p>The Action Agencies shall work with NMFS, USFWS, and Tribal and state fishery management agencies in a multiyear program to develop, test, and deploy selective fishing methods and gear that enable fisheries to target nonlisted fish while holding incidental impacts on listed fish within NMFS-defined limits. The design of this program and initial implementation (i.e., at least the testing</p>	<p>BPA will continue to estimate and compare the long term survival of adult spring Chinook captured and released from tooth tangle nets through project 2001-007-00 (included on the Critical Elements list). Program objectives will be reviewed and refined based on results from 2002.</p> <p>Through the Select Area Fishery Evaluation Project (BiOp Project Id 292), BPA plans to scope the suitability of expanding sites for rearing and release of salmon, continue to collect and analyze homing and straying information, and evaluate the suitability of the sea</p>

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	of new gear types and methods) shall begin in FY 2001. Studies and/or pilot projects shall be under way and/or methods deployed by the 3-year check-in.	collect and analyze homing and straying information, and evaluate the suitability of the use of Willamette and Cowlitz stock of spring Chinook for optimal use in select fishing areas. This project contributes to this Action, but is not considered essential for implementation in FY03 to meet the 3- or 5-year Check-in evaluations.
165	The Action Agencies shall work with NMFS, USFWS, Tribal and state fishery managers, and the relevant Pacific Salmon Commission and Pacific Fishery Management Council (PFMC) technical committees to develop and implement methods and analytical procedures (including revising and/or replacing current fishery management and stock assessment models based on these methods and procedures) to estimate fishery and stock-specific management parameters (e.g., harvest rates). The Action Agencies shall place particular emphasis on current methods and procedures affected by the transition to mass marking of Columbia River basin hatchery produced fish and/or deployment of selective fishery regimes in the Columbia River basin, addressing these concerns within a time frame necessary to make the new selective fishing regimes feasible. Specifically, the Action Agencies shall facilitate the development of models, methods, and analytical procedures by the 3-year check-in.	See the Harvest Substrategy 2.2 (Alternative Modeling Systems that Work in the context of Selective Fisheries) 5-Year Outcomes and 2003 Work Plan included in Section 5.4.2 of the 2003/2003-07 IP.
166	The Action Agencies shall work with NMFS, USFWS, the Pacific States Marine Fisheries Commission, and Tribal and state fishery management agencies to implement and/or enable changes in catch sampling programs and data recovery systems, including any required changes in current databases (e.g., reformatting) and associated data retrieval systems, pursuant to the time frame necessary to implement and monitor mass marking programs and/or selective fishery regimes in the Columbia River basin. Specifically, the Action Agencies shall facilitate the revision of programs and systems, as needed, by the 3-year check-in.	See the Harvest Substrategy 2.1 (Improved Escapement Assessments and Other Critical Population-specific Data to Support Conservation Based Harvest Methods) included in Section 5.4.2 of the 2003/2003-07 IP.
167	The Action Agencies shall work with NMFS, USFWS, and Tribal and state fishery management agencies to develop improved methods for estimating incidental mortalities in fisheries, with particular emphasis on selective fisheries in	BPA is continuing its projects with WDFW and ODFW to Evaluate Live Capture Selective Harvest Methods (Project 2001-007-00, included on the Critical Elements list). In 2003 BPA will estimate and compare the long-term survival of adult spring Chinook captured and released from tooth-tangle nets. The program objectives will be reviewed and refined

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	the Columbia River basin, doing so within the time frame necessary to make new marking and selective fishery regimes feasible. The Action Agencies shall initiate studies and/or develop methods by the 3-year check-in.	based on results from 2002. Project 2001-058-00 to Study the Feasibility of Ghost Fishing Net Removal was completed on December 31, 2002.
168	The Action Agencies shall work with NMFS, USFWS, and Tribal and state fishery management agencies to develop methods for crediting harvest reforms, and the survival benefits they produce, toward FCRPS offsite mitigation responsibilities. A crediting approach shall be agreed upon by the 3-year check-in.	The Action Agencies and NOAA are working on a white paper to address crediting approaches for harvest-related reforms.
169	The Action Agencies shall fund the development of NMFS-approved HGMPs for implementation, including plans for monitoring and revising them as necessary as new information becomes available. HGMPs have to be completed first for the facilities and programs affecting the most at-risk species (Upper Columbia and Snake River ESUs), followed by those affecting mid-Columbia, and then the Lower Columbia ESUs. HGMPs for all the Columbia basin hatchery programs and facilities should be completed (and approved by NMFS) by the 3-year check-in.	<p>NOAA and the Action Agencies have developed a 3-phased process for producing NOAA-approvable HGMPs. Phase I will be integrated with and contracted under APRE. Using this approach has expedited contracting, reduced inefficiencies and accommodated regionally coordinated efforts. Phases II and III will be accomplished by states and tribes through new direct contracts or modification of existing subcontracts (e.g., under LSRCP with USFWS).</p> <p>The Corps has funded HGMP development for Spring Creek and Bonneville fish hatcheries. These have been completed and should be through the NOAA approval process prior to September 2003.</p> <p>Through the NPPC, BPA is funding project 2003-005-00 to Develop HGMPs</p> <p>See also the Hatchery Substrategy 2.1 (Develop HGMPs) included in Section 5.3.2 of the 2003/2003-07 Implementation Plan.</p>
170	Using new authorizations and appropriations and/or BPA funds as necessary and appropriate, the Corps, working with USFWS, shall oversee the design and construction of capital modifications identified as necessary in the HGMP planning process for Lower Snake River Compensation Plan anadromous fish hatchery programs. These improvements shall begin immediately after the relevant HGMPs are completed and approved by NMFS, and shall be completed as expeditiously as is feasible. BPA shall provide for the operations and maintenance costs of these reforms and shall reimburse the Federal Treasury for an appropriate share of the capital costs. The Corps shall have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in.	<p>As the HGMPs are completed and approved, the Corps, USFWS, and NOAA will coordinate implementation schedules and funding mechanisms to expedite recommended construction modifications and operations and maintenance reforms. No new processes are required to secure BPA funding. Prompt review (Council's 3-step Hatchery Review process) and implementation (through mid-year reallocations) can be used. Non-BPA avenues of funding (authorizations and appropriations) will require more agency lead time.</p> <p>It is likely that some reforms will not be subject to the 3-step process, which is designed primarily for new hatchery production or significant changes to existing hatchery programs.</p> <p>See also the Hatchery Substrategy 2.1 (Develop HGMPs) included in Section 5.3.2 of the 2003/2003-07 Implementation Plan.</p>

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171	BOR shall implement the reforms identified in the HGMP planning process for the Grand Coulee mitigation anadromous fish hatchery programs, beginning immediately following completion of the relevant (NMFS approved) HGMPs and completing the work as expeditiously as feasible. BPA shall fund the operations and maintenance costs of the reforms and shall reimburse the Federal Treasury for an appropriate share of the capital costs. BOR shall have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in	HGMPs for Leavenworth, Entiat and Winthrop National Fish Hatcheries will be completed and submitted to NOAA in FY2003 for review and approval. Approval of HGMPs should occur either in late FY2003 or early FY2004. Planning for and implementation of reforms will begin as soon as practical after receiving NOAA approval.
172	The Corps shall implement the reforms identified in the HGMP planning process for the Corp's Columbia River basin mitigation anadromous fish hatchery programs, beginning immediately after the relevant HGMPs are completed and are approved by NMFS. The work shall be completed as expeditiously as feasible. BPA shall fund the operations and maintenance costs of the reforms and shall reimburse the Federal Treasury for an appropriate share of the capital costs. The Corps shall have begun to implement reforms for the programs affecting the most at-risk species by the 3-year check-in.	<p>The Corps will work with each hatchery operating agency to ensure prompt implementation of recommended HGMP reforms. Reforms requiring additional funding will be submitted in the first available budget request. Dependent upon the relative priority of the reform action compared to other ongoing fish activities, funds may be supplied sooner if available. The Corps will implement the HGMP reforms as the HGMPs are completed.</p> <p>See also the Hatchery Substrategy 2.1 (Develop HGMPs) included in Section 5.3.2 of the 2003/2003-07 Implementation Plan.</p>
173	BPA shall implement the reforms identified in the HGMP planning process for Federal and Federally funded hatcheries, beginning immediately after the relevant HGMPs are completed and approved by NMFS. The work shall be completed as expeditiously as possible. BPA shall have begun to implement reforms for the programs affecting the most at-risk species by the 3-year check-in.	<p>BPA will implement the HGMP reforms as the HGMPs are completed. BPA and NOAA will work with hatchery operators to coordinate implementation schedules and funding mechanisms to expedite recommended construction modifications and operations and maintenance reforms. No new processes are required to secure BPA funding. Prompt review (Council 3-step Hatchery Review process) and implementation (through mid-year reallocations) can be used.</p> <p>It is likely that some reforms will not be subject to 3-step process, which is designed primarily for new hatchery production or significant changes to existing hatchery programs.</p> <p>See also the Hatchery Substrategy 2.1 (Develop HGMPs) included in Section 5.3.2 of the 2003/2003-07 Implementation Plan.</p>
174	Working through regional prioritization processes to the extent feasible and in coordination with NMFS, BPA shall collaborate with the regional, state, Tribal, and Federal fish managers and the Pacific States Marine Fisheries Commission to enable the development and	The development of the comprehensive marking strategy is delayed to allow regional interests to work through policy and technical issues. Consequently, the Action Agencies will develop the strategy for all salmon and steelhead artificial production programs in the Columbia River basin by the end of calendar year 2002. The subsequent steps will follow. BPA will continue the Coded-wire Tag Program. At least 1 group of smolts from each

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	implementation of a comprehensive marking plan. Included in this action are the following four steps:	hatchery will be coded-wire tagged and information will be used to estimate survival of tagged groups, develop preliminary catch, escapement and distribution data for all Columbia River hatcheries and evaluate alternative marking techniques. See also the Hatchery Strategy 3 (Contribute to the Development and Implementation of a Comprehensive Marking Plan) included in Section 5.3.3 of the 2003/2003-07 Implementation Plan.
	1. Develop a comprehensive marking strategy for all salmon and steelhead artificial production programs in the Columbia River basin by the end of 2001.	See above.
	2. Provide funding by March 1, 2001, to begin marking all spring chinook salmon that are currently released unmarked from Federal or Federally funded hatcheries.	No plans for FY03 – program will be initiated upon completion of Step 1.
	3. Provide funding, beginning in FY 2002, to implement the Action Agencies’ share of the comprehensive marking plan for production not addressed in (2) above.	
	4. Obtain funding contributions as appropriate for additional sampling efforts and specific experiments to determine relative distribution and timing of hatchery and natural spawners.	
175	BPA shall, in coordination with NMFS, USFWS, and the relevant state and Tribal comanagers, fund the four-step planning process described above as quickly as possible and, if so determined by that process, implement safety-net projects as quickly as possible at least for the following salmon and steelhead populations: 1) A-run steelhead populations in the Lemhi River, main Salmon River tributaries, East Fork Salmon River, and Lower Salmon River; 2) B-run steelhead populations in the Upper Lochsa River and South Fork Salmon River; and 3) spring/summer chinook populations in the Lemhi, East Fork, and Yankee Fork Salmon rivers, and Valley Creek.	The NOAA Findings Letter (July 2002) acknowledged that the planning process was delayed by up to one year to allow co-managers to better define and coordinate the components of the program. The planning process was expanded to include analysis of 38 populations instead of the original 10 populations specified in Action 175. Planning was delayed for approximately six months while the consolidated Safety-Net Artificial Propagation Program (SNAPP) proposal was undergoing review and approval through the Provincial Review process. As a result of this review, the SNAPP planning process was more closely aligned and coordinated with the efforts of the Interior Columbia Technical Recovery Team, making the SNAPP schedule somewhat dependent on the TRT’s completion of it’s work products. Because of all of these changes to the SNAPP program, the end of 2003 is now a realistic target date for completion of the initial products from SNAPP, the NOAA-approved HGMPs for contingency safety-net projects. See also the Hatchery Strategy 1 (Implement a Safety-net Program as an Interim Measure to Avoid Extinction) included in Section 5.3.1 of the 2003/2003-07 Implementation Plan.
176	BPA shall, in coordination with NMFS, USFWS, and the relevant state and Tribal comanagers, fund the development of HGMPs for the Grande Ronde and Tucannon spring/summer chinook safety-net programs.	Completion of these safety-net action items will be delayed until 2003, accommodating plans for facility development in late 2003 or the beginning of 2004. Because the Tucannon spring Chinook salmon has a fixed, 5-brood year lifespan, no additional major capital modifications are anticipated.

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		<p>modifications are anticipated.</p> <p>See also the Hatchery Strategy 1 (Implement a Safety-net Program as an Interim Measure to Avoid Extinction) included in Section 5.3.1 of the 2003/2003-07 Implementation Plan.</p>
177	<p>In 2002, BPA shall begin to implement and sustain NMFS-approved, safety-net projects.</p>	<p>Existing safety-net projects (Snake River spring/summer chinook and Snake River sockeye captive brood programs) are being sustained when required. (The Tucannon program has a planned phase-out date). Any new safety-net projects that may result from SNAPP will be implemented and sustained in compliance with respective HGMPs.</p> <p>See also the Hatchery Strategy 1 (Implement a Safety-net Program as an Interim Measure to Avoid Extinction) included in Section 5.3.1 of the 2003/2003-07 Implementation Plan.</p>
178	<p>BPA shall commit to a process whereby funds can be made quickly available for funding the planning and implementation of additional safety-net projects for high-risk salmon and steelhead populations NMFS identified during the term of this biological opinion.</p>	<p>BPA and NOAA will work within existing processes (e.g., Council's 3-step Hatchery Review Process, mid-year reallocations, targeted solicitations) to fund planning and implementation of additional safety-net projects as expeditiously as possible. See also the Hatchery Strategy 1 (Implement a Safety-net Program as an Interim Measure to Avoid Extinction) included in Section 5.3.1 of the 2003/2003-07 Implementation Plan.</p>
179	<p>The Action Agencies and NMFS shall work with affected parties to establish regional priorities within the congressional appropriations processes to set and provide the appropriate level of FCRPS funding to develop recovery goals for listed salmon ESUs in the Columbia River basin. Tasks shall include defining populations based on biological criteria and evaluating population viability in accordance with NMFS' viable salmonid population approach. These tasks shall be completed by 2003.</p>	<p>The Action Agencies will cost-share with NOAA to produce TRT recovery planning products for Columbia Basin ESUs. BPA will fund project 2002-075-00 to directly support this Action. The tasks include defining populations based on biological criteria and evaluating population viability in accordance with NMFS's viable salmonid population approach.</p> <p>See also RM&E Substrategy 1.1 (System Monitoring) 2003 and 2004-07 Work Plans included in Section 5.6.1 of the 2003/2003-07 Implementation Plan.</p>
180	<p>The Action Agencies and NMFS shall work within regional prioritization and congressional appropriation processes to establish and provide the level of FCRPS funding to develop and implement a basinwide hierarchical monitoring program. This program shall be developed collaboratively with appropriate regional agencies and shall determine population and environmental status (including assessment of performance measures and standards) and allow ground-truthing of regional databases. A draft program including protocols for specific data to be collected, frequency of samples, and sampling sites shall be developed by September 2001. Implementation should begin no later than the spring of 2002 and will be fully</p>	<p>NOAA and the Action Agencies have developed a detailed plan for this Action item, including pilot scale projects. Ongoing RM&E consistent with the plan continues and is being augmented by the Action Agencies and NOAA. We are working toward implementation of all aspects of the plan. In 2003, this will include a ramp up of RM&E projects, including funding pilot status monitoring studies in at least one subbasin each for the Lower Columbia (John Day); the Upper Columbia (Wenatchee); and the Snake (Grand Ronde or a Snake River site located in Idaho).</p> <p>The Action Agencies will (1) develop a monitoring coordination process that is mutually acceptable to the relevant entities in 2003, (2) work with NMFS and other entities to develop a more detailed status monitoring schedule and plan for extending the monitoring program beyond the 3 pilot subbasins by spring 2004, and (3) coordinate the development of the status monitoring program with that of the AER program through the implementation</p>

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	implemented no later than 2003.	<p>of a data management program.</p> <p>USBR assigned a half-time monitoring coordinator for the Salmon River Basin in Idaho beginning FY2003. This person will also oversee the Methow diversion dam removal studies (see RPA 183).</p> <p>See also RM&E Substrategy 1.1 (System Monitoring) and 1.2 (System Monitoring and Tributary Monitoring) included in Section 5.6.1 of the 2003/2003-07 Implementation Plan.</p>
181	<p>The Action Agencies and NMFS shall work within regional prioritization and congressional appropriations processes to establish and provide the appropriate level of FCRPS funding for a program to acquire and digitize aerial or satellite imagery of the entire Columbia River basin once every 3 to 5 years.</p>	<p>The Action Agencies will conduct a comprehensive review of existing and proposed aerial and satellite imagery, including the analytical use of the imagery, for the anadromous portion of the Columbia River Basin. The Action Agencies will contract the review for completion by September 2003. NOAA and the Action Agencies will evaluate analytical tools for landscape analyses and initiate landscape level studies. Future acquisitions will be guided by the 2003 research.</p> <p>USBR purchased LANDSAT aerial imagery in FY2002 for a significant portion of the Columbia River Basin. In 2003 USBR will contract with the University of Washington under the Cooperative Ecosystems Studies Unit to perform a landscape change analysis for the period 1984-1999.</p> <p>USBR is developing a land use/land cover classification in the Upper Salmon River to compare the value of medium and high resolution satellite imagery. This pilot project will compare/contrast the classification accuracy and utility as a function of the spatial resolution of the imagery.</p> <p>NOAA and USBR will outline and USBR will fund a review of GIS work in the pilot study basins.</p> <p>USBR will fund a GIS watershed mapping program for the John Day Basin.</p> <p>USBR will fund in FY2003 a water use database for the John Day Basin pilot study.</p> <p>BPA plans to fund proposal 35016, A Pilot Study to Test Links Between Land Use/Land Cover Tier 1 Monitoring Data and Tier 2 and 3 Monitoring Data.</p> <p>See also RM&E Substrategy 1.1 (System Monitoring) included in Section 5.6.1 of the 2003/2003-07 Implementation Plan.</p>
182	<p>The Action Agencies and NMFS shall work within regional priorities and congressional appropriations processes to establish and provide the appropriate level of FCRPS funding for studies to determine the reproductive success of hatchery fish relative to wild fish. At a minimum, two to</p>	<p>The Action Agencies and NOAA reviewed Technical Recovery Team products and consulted with the TRTs to identify populations potentially affected by hatchery fish by December 2002. The Action Agencies and NOAA, working with the RM&E Work Group, established priorities for studies determining the relative effectiveness of hatchery fish spawners, taking into account information needs across ESUs. The Action Agencies issued</p>

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	four studies shall be conducted in each ESU. The Action Agencies shall work with the Technical Recovery Teams to identify the most appropriate populations or stocks for these studies no later than 2002. Studies will begin no later than 2003.	targeted solicitations for these needed projects on March 14, 2003. A study will not be required for sockeye.
183	Initiate at least three tier 3 studies (each necessarily comprising several sites) within each ESU (a single action may affect more than one ESU). In addition, at least two studies focusing on each major management action must take place within the Columbia River basin. The Action Agencies shall work with NMFS and the Technical Recovery Teams to identify key studies in the 1-year plan. Those studies will be implemented no later than 2003.	Implementation of effectiveness monitoring projects under this Action will be coordinated with the implementation of the status monitoring program under Action 180 and the data management program under Action 198. USBR will implement research on push-up dam replacement in 2003 and will continue research on flow augmentation. BPA worked with NOAA Fisheries to develop proposals identified by the RM&E Work Group as critical to implementing this Action. However, the Council's ISRP provided technical and policy level comments in opposition to proceeding with bottom-up effectiveness studies and therefore, implementation of this action will now be limited to top-down action effectiveness studies in the John Day, Wenatchee, and Upper Salmon. BPA is working with the Council and NOAA Fisheries on options to address the ISRP issues with bottom-up effectiveness studies and to proceed with funding this work, but at this time it appears unlikely that these issues will be resolved in a manner that allows the bottom-up effectiveness studies to proceed in 2003. In FY 2003 USBR will: <ul style="list-style-type: none"> • implement research on push-up dam replacement in the John Day Basin; • research instream flow salmon survival study methods in FY2003, and, • research salmon survival relative to the barrier removal in the Methow River.
184	The Action Agencies and NMFS shall work within regional prioritization and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for a hatchery research, monitoring, and evaluation program consisting of studies to determine whether hatchery reforms reduce the risk of extinction for Columbia River basin salmonids and whether conservation hatcheries contribute to recovery.	The RM&E Plan was written and includes an evaluation of RM&E needs relating to hatchery reforms. A number of pertinent projects appeared as a result of the Mainstem/Systemwide Provincial Review and the work group identified their relative priority for implementing this RPA Action. The work group has also identified the need for additional projects that were not proposed in any of the provincial solicitations. The Action Agencies issued targeted solicitations for these needed projects on March 14, 2003.
185	The Action Agencies shall continue to fund and expand, as appropriate, fish marking and recapturing programs aimed at defining juvenile migrant survival for both transported and nontransported migrants and adult returns for both groups. These studies shall also compare the SARs of transported and nontransported fish to calculate the differential delayed mortality (D), if any, of transported	This work is being conduct from the Lower Granite and McNary Dams. At Lower Granite field marking for the transport evaluation of wild yearling chinook, steelhead and fall chinook will be complete in 2003. This baseline study compares inriver survival to transportation from Lower Granite, including an estimate of "D". Adult returns will be monitored through 2006 and a final report will be available in 2007. In 2003 this study will include evaluating experimental conditions to improve transportation. Research began in 2002 to evaluate transport at McNary. Marked release groups from upstream Columbia

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	fish.	River hatcheries comprise the majority of the test fish used in this evaluation. With the installation of the primary bypass detector at McNary, this work also evaluates the primary bypass system compared to transportation in an effort to determine the optimal operation at McNary. Additionally, estimates of delayed mortality will be determined using an in river release group. Passage, timing, and general migration of in river and transported migrants will be monitored using the PIT tag trawler in the upper estuary. This work will continue through 2005 with adult returns through 2008. The final report will be available in 2009. A Hydro RME Plan will include an analysis of the precision of estimates in ongoing studies and an analysis of the adequacy of stock coverage and applicability of metrics based on hatchery fish to wild fish.
186	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for comparative evaluations of the behavior and survival of transported and downstream migrants to determine whether causes of D can be identified for the reach between Bonneville Dam and the mouth of the Columbia River.	Ongoing studies will be continued in 2003 to compare survival of radio tagged run-of-river and transported fish to partition delayed mortality downstream of Bonneville (also to evaluate transportation) and to compare survival of acoustically tagged transported and run-of-river smolts through the saltwater interface and Columbia River Plume. Final reports will be available in 2004. Evaluation of losses will be conducted in the Bonneville and Columbia river estuary after experimental transportation from Lower Granite has been started (estimated started 2004). A Hydro RME Plan will include an analysis of the precision of estimates in ongoing studies and an analysis of the adequacy of stock coverage and applicability of metrics based on hatchery fish to wild fish.
187	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies and analyses to evaluate relationships between ocean entry timing and SARs for transported and downstream migrants.	<p>The Corps study EST-02-03 <i>Evaluation of the Relationship Among Time of Ocean Entry, Physical, and Biological Characteristics of the Estuary and Plume Environment and Adult Return Rates</i> is directly addressing this RPA Action.</p> <p>PIT tag trawler monitoring and development of an ocean entry sited trawler will continue in 2003 through 2006 for the transport studies. Additionally, the evaluation of ocean entry timing using a surrogate stock continues in 2003 through 2004 with a final report scheduled to be available in 2006.</p> <p>The Action Agencies and NOAA Fisheries continue to provide precise, up-to-date measurements of survival of juvenile salmon as they pass through dams and reservoirs in the Snake and Columbia Rivers and relate to adult returns. PIT tagging continues of yearling chinook salmon and steelhead at Lower Granite and McNary Dams, and hatchery subyearling fall chinook salmon for release above Lower Granite Dam to estimate their survival through the lower Columbia River. NOAA will explore the relationships among survival, travel time, environmental variables, and dam operations using the expanding database. Included are timing of ocean entry and conditions in the estuary, plume, and near shore ocean conditions into the Gulf of Alaska.</p> <p>In addition, adult and juvenile PIT tag recovery data are analyzed to compare survival</p>

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		<p>estimates for transported fish of known origin, downriver stocks, wild and hatchery transported fish and fish handled and not handled at dams.</p> <p>A Hydro RME Plan will include an analysis of the precision of estimates in ongoing studies and an analysis of the adequacy of stock coverage and applicability of metrics based on hatchery fish to wild fish.</p>
188	<p>The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies of PIT-tagged wild stocks from the lower river streams. The studies shall be used to contrast stock productivity and hydrosystem effects.</p>	<p>PIT-tags are used in monitoring status and trends in abundance of spawning adult, rearing juvenile, and outmigrant steelhead/O. mykiss and some habitat attributes in the John Day subbasin and potentially other Oregon subbasins in the Columbia Plateau Province.</p> <p>Improved monitoring and evaluation capabilities by developing better measurement tools and study designs to estimate juvenile and adult salmonid survival and survival relationships. Provided statistical guidance to investigators in the Columbia Basin.</p> <p>Adult and juvenile PIT tag recovery data are analyzed to compare survival estimates for transported fish of known origin, downriver stocks, wild and hatchery transported fish and fish handled and not handled at dams.</p> <p>A Hydro RME Plan will include an analysis of the precision of estimates in ongoing studies and an analysis of the adequacy of stock coverage and applicability of metrics based on hatchery fish to wild fish.</p>
189	<p>The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to investigate the causes of discrepancies in adult return rates for juvenile salmonids that have different passage histories through the hydrosystem.</p>	<p>The rearing study to evaluate differences in survival of fish with different routes of passage will continue through fall 2004 and a final report will be available in spring 2006. Physiology evaluations will continue in 2003 and a final report will be available in 2004.</p> <p>Adult and juvenile PIT tag recovery data are analyzed to compare survival estimates for transported fish of known origin, downriver stocks, wild and hatchery transported fish and fish handled and not handled at dams.</p> <p>Installed adult PIT detection systems in all ladders at Bonneville and McNary; and installed an innovative, less-expensive, alternative, adult PIT detection system in McNary Oregon-shore ladder.</p> <p>The focus is on determining the absolute and comparative adult return rates of smolts transported from Lower Granite and McNary to smolts that complete their outmigration within the river. Lower Granite transport evaluation, spring chinook and steelhead completed.</p>
190	<p>The Action Agencies shall continue to fund studies that monitor survival, growth, and other early life history attributes of Snake River wild juvenile fall chinook.</p>	<p>Provided precise measurements of survival of juvenile salmon as they pass through dams and reservoirs in the Snake and Columbia Rivers. This work is closely related to RPA 187.</p> <p>Exploring holdover behavior of fall chinook salmon in Lower Granite Reservoir and</p>

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		refining existing methods of scale pattern analysis for determining age and DNA analysis for determining genetic lineage of holdover fish. Using radio telemetry to determine where fish hold over in Lower Granite Reservoir and document passage timing past Lower Granite Dam.
191	The Action Agencies shall continue to implement adult salmonid counting programs at FCRPS dams, but shall improve the reporting of these counts.	The Corps will continue to implement its annual adult fish counting program at mainstem Columbia and Snake river projects and will continue routine operation of fish passage facilities, including monitoring adult fallback. Beginning in 2003 the adult counting schedule was changed at the request of NMFS to expand the counting periods at The Dalles, John Day, McNary, and Ice Harbor to gather additional data for scheduling facility maintenance activities and night counting was reduced at Bonneville, Ice Harbor and Lower Granite. These changes were coordinated with NMFS staff and the FPOM.
192	As set out in Action 50 (Section 9.6.1.3.4), BPA and the Corps shall install necessary adult PIT-tag detectors at appropriate FCRPS projects before the expected return of adult salmon from the 2001 juvenile outmigration. These adult PIT-tag detectors shall be used as needed for calculating transport benefits, conversion rates, and SARs for listed salmon and steelhead.	<p>Provided basic infrastructure for all PIT tag related projects in Columbia River Basin. Operates and maintains long-term data repository for PIT tag information, permanent PIT tag interrogation sites, and supports other PIT tag research.</p> <p>Adult PIT tag interrogation systems have been installed in all four of the adult fish ladders at the Bonneville project for use beginning in 2002. Also, the two fish ladders and one of the counting stations at McNary project have been equipped. Significant problems with shields leaking and fall chinook using the overflow weirs has caused the implementation team to re-evaluate future deployments. Installation is complete at the Bonneville ladders.</p>
193	The Action Agencies shall investigate state-of-the-art, novel fish detection and tagging techniques for use, if warranted, in long-term research, monitoring, and evaluation efforts.	<p>Developed, installed, and evaluated a prototype adult PIT detection system in Bonneville WA-shore ladder. 2) Continued development of the flat-plate PIT detection system in the Bonneville 1st powerhouse sluiceway. 3) Continued development of small-stream PIT detection systems. 4) Designed adult PIT detection systems for all ladders at Bonneville and McNary under project number 2001-003-00.</p> <p>Assessing the feasibility/validity of remote monitoring approaches to quantify adult steelhead escapement in select tributaries of the Imnaha River subbasin.</p> <p>Completed feasibility project to evaluate new acoustic tracking technology to verify its capabilities and designed an acoustic monitoring network to track movement of salmon smolts into the ocean and along the continental shelf to areas of ocean residency.</p>
194	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to develop a physical model of the lower Columbia River and plume. This model will characterize potential changes to estuarine habitat associated with modified hydrosystem flows and the effects	The RM&E Estuary/Ocean Work Group will incorporate into their work plan an evaluation of the available physical models and to consider their applicability to evaluating hydrosystem impacts on the estuary. From this evaluation the group will recommend the appropriate model(s) to characterize changes to the estuarine environment due to FCRPS operations. The models being considered include the CORIE model, which continues to be funded and developed for this application, and other physical models, which were developed by the Corps for other specific purposes but may be useful in identifying

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	of altered flows where they meet the California Current to form the Columbia River plume.	<p>potential changes in the estuary. See RPA 162, these two RPAs are addressed by the OGI work under project 1998-014 (BiOp Project ID 247 & 248)..</p> <p>Work continues to physically characterize and model the Columbia River plume in the nearshore ocean environment, providing estimates of growth of juvenile chinook and coho salmon inside and outside the Columbia River plume, and document the impact of changing ocean productivity on survival and growth rates of juvenile salmonids in the Pacific Northwest and on their prey field.</p>
195	The Action Agencies shall investigate and partition the causes of mortality below Bonneville Dam after juvenile salmonid passage through the FCRPS.	<p>Work began in 1998 under project 1998-014-00. A major component is the Canadian Shelf monitoring project that samples salmonids from Canadian waters up into Alaskan waters. Additional work has been completed under project 2000-08 to develop an innovative sonic tag tracking system to monitor fish movement from the estuary through the near shore waters of the continental shelf. NOAA is developing a smaller sonic tag and the Corps has conducted sonic tagging in the estuary. Over time these projects will address the causes and partition mortality below Bonneville Dam. The Action Agencies agree to fund additional studies through the mainstem/systemwide Provincial Review process and through targeted solicitations that specifically meet needs and requirements identified by the Action Agency/NMFW Hydro RM&E Technical Work Groups work plan.</p>
196	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to develop an understanding of juvenile and adult salmon use of the Columbia River estuary. These studies support the actions to develop criteria for estuarine restoration (Action 158), restoration planning (Action 159), and implementation (Action 160) in Section 9.6.2.2.	<p>Studies of juvenile salmonid use of the estuary, including a study to estimate survival through the estuary, another to evaluate current and historical use and linkages, and one evaluating the relationship between time of ocean entry, physical and biological characteristics of the estuary and adult returns are continuing under the AFEP program.</p> <p>Studies of adult use of the Columbia River estuary were given a low priority at the Scientific Review Working Group (SRWG) and no proposals were received. The Action Agencies recognize the requirement for adult studies and are working with NOAA, in accord with the Action Agencies January 28, 2003 resolution document, to develop a study plan that identifies the needed studies and establish the priority, scope, and time line for adult use studies.</p> <p>The Action Agencies are working with NOAA to establish the scope, including identifying components and responsibilities for those components for Columbia River estuary research. The appropriate funding levels will be established through this process and the Action Agencies will use their available funding sources, such as CRFM, O&M, GI for the Corps, to meet their requirements. The Action Agencies plan to meet by April 30, 2003 to complete the study plan for adults and determine next steps for inclusion in the FY 2004 research program.</p>
197	The Action Agencies and NMFS shall work within the	Studies of adult use of the Columbia River plume were given a low priority at the Scientific

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	annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to develop an understanding of juvenile and adult salmon use of the Columbia River plume.	<p>Review Working Group (SRWG) and no proposals were received. The Action Agencies recognize the requirement for adult studies and are working with NOAA, in accord with the Action Agencies January 28, 2003 resolution document, to develop a study plan that identifies the needed studies and establish the priority, scope, and time line for adult use studies.</p> <p>The Action Agencies are working with NOAA to establish the scope, including identifying components and responsibilities for those components for Columbia River plume research. The appropriate funding levels will be established through this process and the Action Agencies will use their available funding sources, such as CRFM, O&M, GI for the Corps, to meet their requirements. See comment under RPA 196. The Action Agencies plan to meet by April 30, 2003 to complete the study plan for adults and determine next steps for inclusion in the FY 2004 research program.</p>
198	The Action Agencies, in coordination with NMFS, USFWS, and other Federal agencies, NWPPC, states, and Tribes, shall develop a common data management system for fish populations, water quality, and habitat data.	The development of a regional data management system will serve the Action Agency information needs for BiOp implementation and assessment, including monitoring and evaluation data required for development and assessments of BiOp implementation, performance standards and check-in evaluation criteria. The Action Agencies plan to (1) develop a comprehensive database management system for FCRPS data in 2004, and (2) develop an explicit schedule and funding plan to ensure implementation in 2004. The Action Agencies worked with NOAA Fisheries to develop a proposal to establish pilot data management systems in 3 subbasins during 2003 as part of this work. However, the pilot work proposed to start in 2003 will not be implemented this year, unless technical and policy level comments made by the Council's ISRP to not fund these studies are resolved. BPA is working with the Council and NOAA Fisheries on options to fund this work, but at this time it appears unlikely that these issues will be resolved in a manner that allows work to proceed in 2003.
199	The Action Agencies shall implement the specific research/monitoring actions outlined in Appendix H.	The Action Agencies are working within AFEP and the Regional process (including NOAA) to ensure that the elements of App. H are integrated with the broader R, M&E framework. Action Agency contractors will submit all required reports to NMFS, including any that are overdue.