Introduction to the Crosswalk of 2000 NOAA FCRPS BiOp RPA Actions and the 8/30/04 Draft UPA

The 2000 BiOp RPA, as Revised Through the Implementation Planning Process. The 2000 BiOp included a Reasonable and Prudent Alternative (RPA) to avoid jeopardy to ESA listed salmon and steelhead and the destruction or adverse modification of their critical habitat. The RPA used a performance-based approach, including hydropower survival and population performance standards to be achieved over a 10-year period. To progress toward meeting these performance standards, the RPA presented a list of 199 initial actions. As new information through research and on the ground experience was gained, the BiOp contemplated that the list of 199 actions would change through an implementation planning process enabling steady progress toward attainment of performance standards (2000 FCRPS BiOp, Section 9.1.4). For the past 3 years, consistent with the 2000 RPA, the Action Agencies have made adjustments to and fine-tuned the initial 199 RPA actions in annual implementation plans and progress reports submitted to NOAA Fisheries.

RPA Actions Included in Draft UPA. The draft UPA continues to focus on actions that will contribute toward meeting performance standards. It continues the implementation of many of the initial 199 RPA actions in the 2000 BiOp, except for actions that the action agencies have already completed. The draft UPA also adds new, specific actions, designed to address the 2004 jeopardy analysis and 2003 remand directions from the court.

Draft UPA Response to Remand. The court remanded the 2000 BiOp because it relied in part on non-federal actions that were not reasonably certain to occur, and actions by other federal agencies (federal agencies other than the action agencies for the federal hydroelectric projects) that had not completed ESA consultation. Consistent with the court's order, the draft UPA provides more specific commitments of the Action Agencies for hydro, habitat, and hatchery actions. The draft UPA includes specific objectives, locations, and preliminary schedules that update and provide more detail than the initial set of actions in the 2000 RPA. The draft UPA relies upon actions within the authority of the Action Agencies and does not rely upon actions by other federal or non-federal entities.

New ESU Detail. The 2000 RPA took a more programmatic approach that did not specifically identify actions that needed to avoid jeopardy for each ESU. NOAA's updated jeopardy analysis now addresses ESU-specific survival needs. In consideration of these analyses, the draft UPA presents a customized approach to the life-stage needs of each ESU designed to lead to a no-jeopardy finding.

Types of Actions. NOAA Fisheries compares system juvenile survival under a "reference operation" and under hydrosystem operations proposed in the draft UPA. To the extent that survival under proposed hydrosystem operations is less than survival under the "reference operation", the draft UPA proposes to reduce and even remove this difference through implementation of additional beneficial actions.

Continued Assessment. As in the 2000 RPA, the draft UPA includes processes to assess and report progress and implementation planning, incorporating performance standards and adaptive

management. In addition to annual implementation plans and progress reports, cumulative reviews are provided every 3 years.

Continued Level of Effort. The draft UPA provides a more ESU-focused, more specific effort compared to the 2000 BiOp. For clarity, hydrosystem, habitat, hatchery, and predation control actions are organized by specific implementation strategies and substrategies. The Action Agencies have undertaken and will undertake additional actions to benefit non-ESA-listed as well as ESA-listed fish consistent with the Northwest Power and Conservation Council's Fish and Wildlife Program, and recovery plans developed by NOAA Fisheries and the U.S. Fish and Wildlife Service. These actions continue a high, unreduced, overall level of effort to benefit fish and wildlife.

Summary of the UPA

Following is a summary of the important actions included in the draft UPA. Revised actions under each of these headings have been developed, and new, more specific commitments add certainty to the draft UPA's actions.

Hydrosystem modifications to improve fish passage. The Action Agencies have already completed a number of reconfiguration projects at federal dams to improve fish passage and survival based on actions identified in the 2000 RPA. The Action Agencies will continue to maintain and implement specific capital improvements, providing funding priority to dams with the lowest passage survival rates. Where feasible, the Action Agencies will pursue removable spillway weirs (RSWs) or similar surface bypass devices. These configuration modifications will result in improved survival at federal dams compared with existing conditions for all ESUs.

Continue hydrosystem operations to benefit migrating fish. The Action Agencies will continue to operate federal storage reservoirs to supplement streamflows and provide spill at mainstem dams to benefit juvenile fish migration. The draft UPA proposes flow augmentation and spill consistent with current implementation of the 2000 BiOp as modified through the implementation planning process. This proposed hydrosystem operation continues to include operations to meet all authorized purposes.

Continue fish transportation to improve juvenile survival. The Action Agencies will also continue to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. In response to recent data, transportation will be limited in early April to allow for more in-river conveyance. We will maximize our use of transportation in the summer, and in the spring when and if river flows are 85 kcfs or below. The transportation program will be adaptively managed in coordination with the Regional Technical Management Team with an eye toward improving the survival of affected ESUs.

Expanded predator control to manage impacts to juvenile fish. The Action Agencies propose to expand efforts to reduce predation of juvenile salmon by birds and other fish. Caspian tern management actions could be implemented as early as 2005 (pending completion of environmental review and approval), with resulting juvenile survival improvements as early as 2006. Increased incentives under the Northern Pikeminnow Management Program will also deliver immediate juvenile survival improvements for listed ESUs. The Action Agencies will

continue to develop our understanding of the effect of predation on migrating juvenile salmonids. This will enable us to enhance existing predator management programs as well as develop and implement additional predator management actions to increase in-river survival of juvenile salmonids.

Improve tributary spawning and rearing habitat. As we did under the 2000 RPA, we will continue to improve tributary fish habitat by removing passage barriers and performing other channel improvements to improve the access to, and condition of, spawning and rearing areas; screening diversions to prevent fish entrainment; securing instream flows to provide tributary migration and spawning and rearing flows, and to help maintain water quality such as water temperature; and protecting and restoring the ecological functions of riparian areas to support bank and stream channel integrity, water temperatures, and nutrient sources. Based on the NOAA's current information in its jeopardy analysis, the Action Agencies propose to emphasize habitat improvements for those ESUs that NOAA Fisheries has determined have the greatest survival needs. We provide specific commitments and evaluation criteria in the form of three and six year targets for the applicable individual ESUs. This should help explain the direction of mitigation measures and benefits we are undertaking, and improve the measurement of our performance.

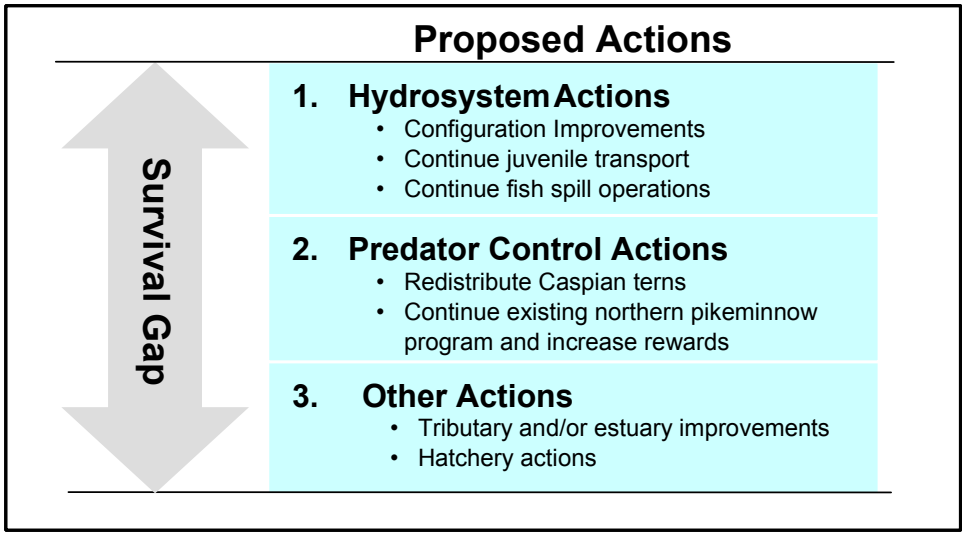
Improve estuary habitat. The Corps and BPA will continue to implement projects to protect and enhance habitat along and adjacent to the mainstem below Bonneville Dam and tidal wetlands. As in the case of tributary habitat, we are adding a greater focus to these efforts, and propose to implement actions that NOAA agrees will provide survival improvements for listed ESUs, based upon the most recent available information and priorities.

Implement hatchery actions. As long as NOAA considers the action is effectively reducing the risk of extinction, BPA will continue to fund the Snake River Sockeye safety-net program. BPA will also continue to fund the Safety Net Artificial Propagation Program (SNAPP) process identified in the 2000 RPA to develop safety-net contingency plans. If identified as necessary, effective, and feasible through the SNAPP process, we will intervene with artificial production for additional severely depressed and declining populations. We are not proposing additional hatchery reform actions at this time, but may consider them in the future when NOAA Fisheries identifies actions as likely to have substantial survival benefits for listed ESUs and/or major populations groups. These actions could be additional or could displace others in the draft UPA, consistent with cost effectiveness, biological benefits, and the adaptive management process.

Pursue harvest opportunities. The Action Agencies will continue to pursue harvest opportunities as discretionary conservation actions. We are willing to pursue opportunities to reduce harvest impacts on listed species and assess and inventory additional terminal locations above Bonneville Dam that provide potential for reducing ESA impacts from mainstem fisheries.

Continue to support regional RM&E. The Action Agencies will continue to invest in studies to help improve our understanding of how various actions affect fish survival to fine-tune future actions and better measure their results. Many of the studies are on the cutting-edge of scientific inquiry and will require multiple years of investigation to provide definitive results, but in the long run, will provide valuable information and increase our ability to meet our ESA obligations.

The figure below appears on page 14 of the draft UPA and graphically displays the components of the Action Agencies' prioritized approach for addressing the ESU-specific survival needs identified in NOAA's revised jeopardy analysis.



Actions taken under the 2000 FCRPS Biological Opinion. The Action Agencies have been implementing the 2000 RPA for the past four years. Many of the actions taken since 2000 continue to provide biological benefits to ESA-listed species. The draft UPA proposes to continue these actions, including maintenance of otherwise completed actions, so that their biological benefits continue and provide part of the survival benefits anticipated from the draft UPA.

Each year the Action Agencies have submitted to NOAA and made publicly available annual progress reports and have produced a comprehensive 2003 Check-In Report on implementation progress and accomplishments. The draft UPA, too, will give regular updates of progress that will be submitted to NOAA and made publicly available.

Acronyms and Abbreviations

B2	Bonneville Second Powerhouse
BGS	behavioral guidance structure
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
CFD	computational fluid dynamics
Corps	U.S. Army Corps of Engineers
Council	Northwest Power and Conservation Council
CR	Columbia River
D	differential delayed mortality
DEQ	Department of Environmental quality
DGAS	dissolved gas abatement study
ESA	Endangered Species Act
ESBS	extended-length submersible bar screen
ESU	evolutionarily significant unit
FCRPS	Federal Columbia River Power System
FFDRWG	Fish Facility Design Review Workgroup
FGE	fish guidance efficiency
FMS	fixed monitoring station
FPOM	Fish Passage Operations and Maintenance Coordination
HGMP	hatchery and genetic management plan
kaf	1000 acre feet
kcfs	1000 cubic feet per second
LCREP	Lower Columbia River Estuary Program
Maf	million acre feet
MASS	Modular Aquatic Simulation System
MGR	minimum gap runners
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration Fisheries
O&M	operation and maintenance
PIT	passive integrated transponder
PNAMP	Pacific Northwest Aquatic Monitoring Program
RM&E	research, monitoring, and evaluation
RPA	Reasonable and Prudent Alternative
RSW	removable spillway weir
SCT	System Configuration Team
SNAPP	Safety Net Artificial Propagation Program
SRWG	Study Review Workgroup
SYSTDG	system total dissolved gas
TDG	total dissolved gas
TMT	Technical Management Team
TSP	turbine survival program
UPA	Updated Proposed Action
USFWS	U.S. Fish and Wildlife Service
WQT	Water Quality Team

Crosswalk of 2000 NOAA FCRPS BiOp RPA Actions and the 8/30/04 Draft UPA

Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	The Action Agencies have prepared annual 1- and 5-year implementation plans under the 2000 BiOp. The Action Agencies propose to consolidate their implementation planning and progress reporting to NOAA Fisheries and the USFWS. The Action Agencies propose to prepare a single annual report addressing RPAs: 1-10, 12, 13 and 57. Consolidated annual reporting will improve the efficiency of BiOp implementation. See draft UPA Section II.A.1, pgs. 6-7.
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.	The Action Agencies have prepared annual 1- and 5-year implementation plans, including hydrosystem actions, under the 2000 BiOp. The Action Agencies propose to consolidate their implementation planning and progress reporting to NOAA Fisheries and the USFWS. The Action Agencies propose to prepare a single implementation plans for actions included in the UPA and other related conservation actions. Consolidated annual reporting will improve the efficiency of BiOp implementation. See draft UPA Section II.A.1, pgs. 6-7.
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.	The Action Agencies will develop 5-year Water Management Plans. See draft UPA, Section II.A.1, pgs. 6-7 and Section III.D.1, pg. 16.
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.	The Action Agencies will develop implementation plans that describe the system configuration priorities, capital investments, hydro system research and reliability. These plans will be coordinated with SCT. Further information on these plans will be provided in the Final UPA. See draft UPA Section II.A.1, pgs. 6-7.
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.	Each year the Corps develops a Water Quality Report summarizing water quality actions taken throughout the year. The Mainstem Water Quality Management Plan will be periodically updated. See draft UPA Section II.A.1, pgs. 6-7 and Section III.D.1, pg. 15.
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 projects for listed salmonid stocks.	The Corps develops 5-year O&M plans that describe routine and non-routine O&M projects planned at each of the dams. These plans are coordinated with the Fish Passage O&M Coordination Group. Further information on O&M plans will be provided in the Final UPA. See also draft UPA Section II.A.1, pgs. 6-7 and Section III.D.1, pg. 17.
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 Action Agencies will continue to prepare implementation plans for actions included in the UPA and other related conservation actions. See draft UPA Section II.A.1, pgs. 6-7.
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.	The Action Agencies will continue to prepare implementation plans for actions included in the UPA and other related conservation actions. See draft UPA Section II.A.1, pgs. 6-7.

Crosswalk of 2000 NOAA FCRPS BiOp RPA Actions and the 8/30/04 Draft UPA

Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	See draft UPA Section II.A.1, pgs. 6-7. Further information will be provided in the Final UPA.
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 draft UPA Section I.D, E, and F, pg. 5.
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 and NOAA agreed upon 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. This process was approved by NOAA in the 2003 Findings Report.
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 will continue to coordinate review of implementation plans with NOAA and the USFWS. See draft UPA Section II.A.1, pg 5.
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 propose to prepare annual progress reports to track overall population performance and document our ability to achieve the ESU-specific performance targets described in the UPA and subsequent implementation plans. The Action Agencies also propose to prepare comprehensive programmatic evaluations of progress in 2007 and 2010. See draft UPA Section II.A.2, pg. 7.
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 flow objectives as discussed in the 2004 Water Management Plan. Further details will be provided in annual Water Management Plans and coordinated through the TMT. See also draft UPA Section III. D.1, pg. 16.
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. Details will be included in the annual Water Management Plan and coordinated through the TMT. Further information will be provided in the Final UPA. See draft UPA Section III.E.1, pg. 40.
16	The Action Agencies shall operate the FCRPS to provide access for chum salmon spawning in Hamilton and Hardy creeks.	The Action Agencies will operate the FCRPS projects in an attempt to provide access for chum spawning in Hamilton and Hardy creeks. Details will be included in the annual Water Management Plan and coordinated through the TMT. Further information will be provided in the Final UPA. See draft UPA Section III.E.1, pg. 40.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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).	The Water Management Plan describes flow and spill operations planned for the upcoming year. Seasonal updates to the spill and flow elements of the plan will continue to be coordinated with the TMT and will be based upon research objectives, the water volume forecast, and fish passage needs. See draft UPA Section II.A.2, pg. 6 and Section III.D.1, pg. 16.
18	The Action Agencies shall operate the FCRPS during the 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.	The Action Agencies will attempt to operate the FCRPS projects to achieve refill to April 10th flood control elevations, to meet flow objectives, and to refill the storage reservoirs. Further details will be provided in the annual Water Management Plan and coordinated through the TMT. See draft UPA Section III.E.1, pgs. 39-40.
19	The Action Agencies shall operate specific FCRPS projects as follows: *(see BiOp for description of operations for Hungry Horse, Libby, Albeni Falls, Grand Coulee, and Dworshak dams)*.	The Action Agencies will operate the FCRPS storage projects as described in the draft UPA, Section III.E.1, pgs. 39-40, Table 2. Further details will be provided in the annual Water Management Plan and coordinated through the TMT.
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 plans to operate the lower Snake River reservoirs at MOP and the 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 and will be coordinated through TMT. See draft UPA, Section III.E.1, pgs. 39-40, Table 2.
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. See draft UPA Section III. E.1, pg. 40.
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 Corps and RECLAMATION will implement VARQ on an interim basis at Libby and Hungry Horse until the Final EIS is completed. See draft UPA, Section III.E.1, pg. 39, Table 2.
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 130 kaf during this time.	Reclamation operates Banks Lake at an elevation 5 feet from full during August. See draft UPA, Section III.E.1. Pg 40, Table 2.

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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 coordinate with Canada for storage that would support U.S. flow augmentation during the migration season. Further information will be provided in Final UPA.
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.	BPA coordinates with Canada for storage that would support U.S. flow augmentation during the migration season. Further information will be provided in Final UPA.
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.	The Columbia River Treaty Operating Committee (BPA, the Corps, and BC Hydro) will continue to coordinate Canadian storage discharges to increase summer flows. Further information will be provided in Final UPA.
27	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.	This is an on-going agency practice so it is not necessary to include in the draft UPA. Contract renewals and amendments are Federal actions that will undergo ESA consultation before such actions are taken.
28	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 conserved will benefit listed species.	This is an on-going agency program and is not specifically included in the draft UPA. Highest priority is given to projects that benefit ESA-listed species.
29	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.	Completed. The report was completed and submitted to NOAA on March 17, 2003.

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30	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 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).	ESA section 7 consultations have been completed or are currently underway on all Reclamation projects that affect listed Columbia River Salmonids. See Appendix C pgs. C-3 through C-6 of draft UPA.
31	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.	NEPA has been completed, and a Record of Decision signed June 29, 2004 and is available at www.usbr.gov/pn. The No Action Alternative was identified as the environmentally preferred alternative.
32	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.	Included in separate BiOp, but noted in the draft UPA, Appendix C, pg. C-6. Annual details of Upper Snake operation will be provided in Water Management Plans.
33	The Corps, in coordination with USFWS, shall design and 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.	Completed. These modifications were completed in 2003.
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 fall 2004 using temperature and depth-sensitive radio tags to evaluate adult salmon use of cooler waters during their migration upstream of Lower Granite. 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. See draft UPA, Section IV, pg. 74. This information will be provided in Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	A reconnaissance level study is being conducted in 2004 and will be coordinated with NOAA and the Region. Further information will be provided in the Final UPA.
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 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.	A new variable end of December flood control diagram was developed in 2003 and will continue to be utilized. See draft UPA, Section III.E.1, pg. 39, Table 2.
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 multi-year study is in place to investigate the attraction of listed ESUs into wasteways of the Columbia Basin Project. Further information will be provided in the Final UPA, Appendix C.
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.	Completed. Fish screens were installed on Burbank No. 2 and No. 3 pumps during the 2001-2002 construction season. The effectiveness evaluation was completed in December 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. 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.	A multi year water quality-monitoring program is in place to collect water samples throughout the irrigation season and will continue through 2007, at which time a final report will be prepared. Further information will be provided in the Final UPA Appendix C, pg. C-6.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 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 coordinated through TMT. See draft UPA, Section III.E.1, pg. 40, Table 2.
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. Spill is being provided at levels defined in the 2004 Water Management Plan. Further details will be provided in annual Water Management Plans and Fish Passage Plans and coordinated through the TMT. See draft UPA, Section III.E.1, pgs 36 and 40.
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 will operate 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 and coordinated through the TMT. See draft UPA, Section III.E.1, pgs. 36, 40, and 41.
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 accordance with the annual Water Management Plan and Fish Passage Plan and coordinated through the TMT. See draft UPA Section III.E.1, pg. 40.
44	The Corps shall extend the period of barge transportation from the lower Snake River dams and McNary to further reduce reliance on trucking.	The Corps will extend barge transport from Snake River projects and McNary Dam through August 15. See draft UPA, Section III. E.1, pgs. 36 and 42.
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. This work will continue through 2005 with adult return through 2008. The final report will be available in 2009. Further information will be provided in the Final UPA. See draft UPA, Section III.E.1, pg. 36.
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. Adults will be monitored through 2006 and a final report will be available in 2007. See draft UPA, Section IV, pg. 80. Further information will be provided in Final UPA.
47	During all transport evaluations, the Corps and BPA, in coordination with NMFS through the annual planning process, shall include an evaluation of delayed mortality (D) of transported versus inriver migrating juvenile anadromous salmonids.	Baseline estimates for delayed mortality (D) have been incorporated into the study design for the Lower Granite and McNary transport evaluations by maintaining an inriver release group. The D estimates will be provided for Lower Granite in 2007 and McNary in 2009. See draft UPA, Section IV, pg. 80. Further information will be provided in Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
48	The Corps and BPA shall evaluate the effects of prior transport as smolts on the homing of adults.	Evaluation of the homing of adult fish that were transported as juveniles is currently being conducted through the adult telemetry work with a final report in 2006. Future evaluations will be conducted with the aid of PIT-tagged fish and adult pit tag detectors. See draft UPA Section IV, pg. 74. Further information will be provided in Final UPA.
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.	The Corps is investigating conducting research in 2005-2007 on holding densities of spring Chinook. In 2005, planning will begin to evaluate barge releases in the lower river/estuary. This study is proposed for 2006-2008 with adult returns through 2011 and a final report on adult returns in 2012. See draft UPA Section IV, pg. 74. Further information will be provided in Final UPA.
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, McNary, Ice Harbor and Lower Granite. Modifications required at Bonneville are planned for 2005 and 2006 and balance of projects will be completed based on priorities discussed at the SCT. See draft UPA, Section III.D.1, pg. 17, Section III.E.1, pgs. 30 and 32, and Section IV, pg. 74.
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.	Based on results of Snake River studies of juvenile salmon and steelhead collected and transported, the Corps proposes to modify initiation of transport. See draft UPA, Section III.E.1, pgs. 36 and 37 and Section IV, pgs. 74 and 80.
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, SCT and the Fish Passage Plan. See draft UPA Section III.E.1, pg. 37.
53	The Corps shall evaluate and implement structural and operational alternatives to improve juvenile transportation at the collector dams.	New barge loading line dewatering units are planned for winter of 2004-2005. The Corps will continue to implement other facility improvements and operational changes for the transport program as they are identified and coordinated through FPOM, SCT and the Fish Passage Plan. See draft UPA Section III.E.1, pg. 37-38.
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 Action Agencies will provide spill as identified in Table 4 of the 2004 Water Management Plan to improve juvenile fish passage while avoiding high TDG supersaturation levels or adult fallback problems. Spill may be modified by implementation planning and adaptive management decisions. Future Water Management Plans will contain the annual work plans for these operations and spill programs will be coordinated through the TMT. Further information will be provided in Final UPA. See draft UPA, Section III.E.1, pg. 40.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	The line is under construction and will be complete and energized in November 2005.
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 Bell-Coulee transmission line is under construction and will be complete and energized in November 2004. See draft UPA, Section III. D. 1., pg. 17 and Section III. E. 1., pg. 41.
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.	See draft UPA Section III.E.1, Hydrosystem Substrategy 2.4, pg. 41 for evaluation of future transmission constraints and improvements.
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 have been conducted at all the Corps' Portland District Columbia River projects and will be completed at all Corps' Walla Walla District projects by the end of 2006. Turbine efficiency tables for optimum fish survival will be included in the annual Fish Passage Plan after coordination with FPOM. Further details will be provided in the annual Water Management Plan and Fish Passage Plan. See draft UPA, Section III.E.1, pg. 38. This information will be included in the Final UPA.
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. Schedules for additional efforts, including field tests, will be determined through development of the Turbine Survival Program Phase II study plan in 2004 and implemented according to future funding priorities for the program. This information will be included in the Final UPA.
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 continued in 2004 at Bonneville and The Dalles Dam. Final reports are due in 2005. This data will be used to assess operational and configuration alternatives. See draft UPA, Section IV, pgs. 71 and 74.
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 deep slot surface bypass tests have been completed. Evaluation of sluiceway passage efficiency and survival was initiated in 2004. Improvements in the sluiceway are being investigated as a lower cost surface bypass alternative to bypass system improvements and deep-slot surface bypass. See draft UPA, Section III.E.1, pgs. 29-30.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
62	The Corps shall complete Bonneville First Powerhouse prototype evaluations of extended submerged intake and gatewell 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, as coordinated through SCT.
63	The Corps shall complete the design of debris removal facilities for the Bonneville First Powerhouse forebay.	Completed.
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 was completed in 2004. Preliminary results will be available in November 2004. This information will aid in operation and configuration decisions for Bonneville Project. See draft UPA, Section III.E.1, pg. 29.
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 2004 and beyond as warranted when/if problems are identified. See draft UPA, Section IV, pg. 71.
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 Corps shall construct new facilities if, and as soon as, evaluations confirm the optimum design configuration and survival benefits.	Corner collector construction began in 2002. The facility was operational in February for the 2004 passage season. Evaluations are scheduled for 2004 and 2005. See draft UPA, Section IV, pg. 71.
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 continued in 2004. It is anticipated that an implementation decision will be made following 2004 tests, with improvements potentially operational by 2006. See draft UPA, Section III.E.1, pg. 30.
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.	Based on results from prior years a spillwall was constructed and put in operation in 2004. Spill and survival evaluations continued in 2004 and will continue through 2005. Pending results, additional spillway modifications (operational and/or structural) may be required. See draft UPA, Section IV, pg. 71.
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.	Intake occlusion devices were evaluated and found to be ineffective. Additional forebay biological behavior studies were conducted in 2003 and 2004. Subject to the results of these studies and further development considerations, installation of a forebay guidance device is tentatively planned for the 2007 passage season. This potential improvement will be considered in the overall configuration document being developed for The Dalles project, a draft of which is planned for December 2004. See draft UPA, Section III.E.1, pg 31.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 and AWS options were deferred in 2004 pending clearer direction on options for configuration of the project for juvenile passage. This potential improvement will be considered in the overall configuration document being developed for The Dalles project, a draft of which is planned for December 2004. See draft UPA, Section III.E.1, pg. 31.
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 were completed in 2003, with a final report in 2004. Spillway operations were modified to 12-hour spill in the spring and 24-hour spill in the summer. See draft UPA, Section III.E.1, pg. 38 and Section IV, pg. 71.
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 prototype high-flow RSW at John Day has been deferred indefinitely due to concerns with downstream conditions that could be detrimental to fish egress, survival and injury. Options for surface bypass are being considered in conjunction with other alternative improvements, spill and turbine operations to address passage efficiency, egress, predation and cost issues. See draft UPA, Section III.E.1, pg. 32.
73	The Corps shall continue John Day prototype development 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.	Biological and structural testing of screen prototypes will be completed in early 2005. Implementation can be initiated thereafter, in-full or partially to evaluate debris issues, depending on configuration decisions for this project. See draft UPA, Section III.E.1, pg. 32.
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.	Improvements were made to the primary dewatering structure after the debris damage in 1996. Additional intake screen and gatewell barrier screen work will be part of the McNary modernization program. A new outfall location will be investigated if ongoing project survival studies indicate there is an outfall survival problem. See draft UPA Section III.E.1, pgs. 33, 38 and 40.
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 2005. This analysis will identify project priorities for application of RSW technology. The analysis will also include other juvenile bypass features. See draft UPA Section III.E.1, pgs. 33, 38 and 39.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 Lower Monumental similar to that used for Bonneville 1 Powerhouse that would address configuration changes including ESBS and powerhouse collection system. The studies will include consideration of spill survival, RSW benefits, transport vs. in-river, etc. and call for a decision analysis to be completed in 2005. Corps and NOAA technical staff will work with the region to develop a comprehensive plan. See draft UPA, Section III.E.1, pgs. 34, 35 and 38. Final UPA will clarify the decision analysis.
77	The Corps shall investigate surface bypass (e.g., RSW) at Lower Monumental Dam, based on prototype results at other locations, and install in multiple spillway bays, as warranted.	See statement for action 76.
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.	See statement for action 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.	Completed. The post-construction predator monitoring evaluation is complete and the final report was provided 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.	Testing of RSW at Lower Granite began in 2002 and continues. Based on the results of the tests to date, installation of RSWs at other projects is being investigated. See draft UPA Section III.E.1, pgs 27-35.
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.	The Corps will resume design in 2005, pending availability of funding. It will take two construction work windows and completion of new facility will be in 2008. See draft UPA, Section III.E.1, pg. 37.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	**Bonneville**: Spill and project survival studies were conducted in 2004 and are anticipated to be completed by 2005. **The Dalles**: Spill and project survival studies are ongoing. It is anticipated that tests will continue through the 2005. **John Day:** Tests were completed in 2003 with a final report in 2004. Test data was used to determine 12 vs. 24 hour spill and as input to the configuration options for this project. **McNary Dam**: Spill survival studies started in 2002 and will continue through 2005 with a final report in 2006. **Ice Harbor**: Based on lower fish survival observed in 2000 and 2002-03, the spill levels are being evaluated at Ice Harbor for spring and summer conditions in 2004. A final report will be available in 2005. Future spill studies are to evaluate RSW operations**. Lower Monumental:** Baseline spill survival, effectiveness, and efficiency studies are scheduled in 2003-2005 with final reporting in 2006. **Little Goose**: Spill evaluation will begin in 2005 and continue through 2008. **Lower Granite**: Spill evaluation to optimize system survival will begin following completion of the RSW. This information will be included in the Final UPA.
83	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.	See action 82.
84	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.	High-flow outfall investigations were completed. The results were incorporated into the outfall design for the B2 corner collector. Future investigation will be focused on RSW rather than high-discharge bypass facilities. Further information will be provided in the Final UPA.
85	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 a potentially improved means of determining fish responses to forebay hydraulic conditions.	These activities will continue. CFD models are being developed and/or verified for several projects in 2005. CFD models have been developed for Lower Granite and Ice Harbor, and are under development for McNary and Lower Monumental. Evaluations to correlate fish behavior and hydraulics are underway for Lower Granite and Ice Harbor. Future work will be associated with RSW and BGS development. See draft UPA, Section III.E.1, pgs. 29, 30, 32-36 and 38. Further information will be provided in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
86	The Corps shall continue to investigate a way to increase entry rates of fish approaching surface bypass/collector entrances.	These activities will continue. The Corps evaluated entrance efficiency at B2 corner collector, The Dalles sluiceway and Lower Granite RSW in 2004. Studies to evaluate BGS performance to increase entry rates of the RSW at Lower Granite are planned for 2005. The results of these studies will be assessed and incorporated as new surface collection installations are developed. Also see action 85. Further information will be provided in the Final UPA.
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 begin in 2004 for installation at Ice Harbor (2005), Lower Monumental (2006), and John Day (2005) pending prioritization through SCT. The need for primary PIT tag detectors at Little Goose will be determined by 2006. This information will be provided in the Final UPA.
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.	The report on the 1st phase of the Turbine Survival Program has been completed. Scoping and initiation of the 2nd phase of the program began in 2004. Phase II will be a multi-year program to address a number of turbine passage issues. A plan to conduct biological index testing of families of units is planned to be initiated, beginning at John Day Dam, by 2006 with other projects to follow. Evaluation of draft tubes was initiated in 2002 at McNary as part of the turbine survival program. See draft UPA, Section III.E.1, pgs. 32, 33, 38 and Section IV, RM&E Strategy 2, pg. 74. Further information will be included in the Final UPA.
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.	See action 88.
90	The Action Agencies shall examine the effects of draft tubes and powerhouse tailraces on the survival of fish passing through turbines.	See action 88.
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 Corps Portland and Walla Walla District Columbia and Snake 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. Further information will be included in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
92	The Action Agencies shall consider all state-of-the-art turbine design technology to decrease fish injury and 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.	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 from the TSP (see action 88) are being incorporated into evaluation plans to determine final prototypes for McNary Modernization. This work is being coordinated through the FFDRWG, the special TSP, and the Product Delivery Team for these two programs. Further information will be included in the Final UPA.
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).	Completed. Adult passage through turbines has been evaluated. No additional actions are being planned as discussed in the Regional Forum.
94	The Corps shall continue to evaluate the need for improvements of the existing intake screens, gatewell 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.	The Corps intends to continue evaluating the need for facility improvements pending prioritization through SCT. See UPA, Section III.E.1, pgs. 29, 30, and 33-37.
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. 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 was conducted in 2004 with a final report due in 2005. See draft UPA, Section III.E.1, pg. 29. Further information will be included in the Final UPA.
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 2005.
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.	The overall decision document for Bonneville project was completed in 2002 establishing B2 priority for operations among other recommendations, including corner collector construction. See draft UPA, Section III.E.1, pgs. 29-30.
98	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 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.	A preliminary report on the configuration and operational alternatives at John Day is anticipated in early 2005 with a final report in 2006. This will identify configuration/operational modifications to be implemented at this dam. See draft UPA, Section III.E.1, pg. 32.
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 draft UPA, Section III.E.1, pg. 35.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 has been funding the Northern Pikeminnow Management Program to implement this action. See draft UPA Section III.D.2, pgs. 19-20 and Section III.E.1, pgs. 45-46.
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. This program will continue to be coordinated with FPOM and included in the annual Fish Passage Plan. Removal of the two net frames at the Bonneville powerhouses has been completed. Research on alternative predation deterrent methods will be investigated in 2005. See draft UPA, Section III.E.1, pg. 41. Further information will be included in the Final UPA.
102	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.	The Corps has identified several actions being taken for avian predation including redistribution of Caspian tern and management measures to disperse double-crested cormorants. See draft UPA, Section III.E.1, pgs. 42-45.
103	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.	Completed. The evaluation started in 2002 and continued through 2004. A final report was published in 2004. No further work is anticipated on this item.
104	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.	See action 102.
105	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.	BPA is funding the research of avian predation on juvenile salmon and a study to evaluate the role of the Columbia River plume in survival of juvenile salmon through the Council's Fish and Wildlife Program. See draft UPA, Section III.E.1, pgs. 42-44 for avian predator control actions and pgs. 46 – 47 for a description of the estuary action plan.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Completed. Investigations were completed in 2004. No further work is anticipated.
107	The Action Agencies shall conduct a comprehensive evaluation to assess survival of adult salmonids migrating upstream and factors contributing to unaccounted losses.	This action has been evaluated in the adult studies program. Radio telemetry monitoring to assess unaccounted loss continued through April 2004. Data analysis will be conducted through 2005 and a final report will be available in 2006. See draft UPA, Section III.E.1, pgs. 30, 32, and Section IV, RM&E Substrategy 1.3 and 1.4, pgs. 71-73.
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 continued through 2004 and a final report has been completed. Corrective measures will be determined based on results and regional discussions within FFDRWG. See draft UPA, Section IV, RM&E Strategy 3, pgs. 79- 80, Further information will be provided in the Final UPA.
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 kelt study was initiated in 2000 for both the Snake and lower Columbia rivers. Evaluation of kelt abundance, survival and return rates through various routes of passage in the Lower Columbia will be complete in 2005. See draft UPA, Section IV, RM&E Substrategy 1.3, pg. 71.
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.	South ladder improvements have been implemented and evaluated in 2004, with a final report in 2005. A course of action is being investigated for the north ladder. See draft UPA, Section III.E.1, pg. 33
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 has been completed. 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. Further information will be provided in the Final UPA.
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 injury of fish that fall back, as warranted.	Completed. The field evaluation is complete and a final report was provided in 2003. This research showed that delay of adult in the juvenile fish collection channels was not sufficient enough to warrant facility modifications. Results and recommendations were coordinated through the FFDRWG.
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 continued through 2004. As a result, Bonneville 2 priority and limits on daytime spill have minimized adult fallback at this project. Report to be completed 2005. See draft UPA, Section IV, RM&E Substrategy 1.3, pg. 71.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Ladder water temperatures were monitored at Bonneville, The Dalles and John Day dams and the John Day ladder systems were the only ones where non-uniform temperatures were large enough to be detected. No passage delays (radio tracking data) were apparent that could be associated with those temperature differences. A similar report for other mainstem dams was distributed through FFDRWG in 2004 for regional review. See draft UPA, Section IV, RM&E Substrategy 1.3, pgs. 71, 72 and 74.
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. Data analysis will be conducted through 2005 and a final report will be available in 2006. See draft UPA, pgs. 79- 80. Further information will be provided in the Final UPA.
116	The Corps shall investigate adult fish delay and fallback at ladder junction pools and implement remedies to reduce this problem, as warranted.	Field evaluations of fish passage improvements were completed in December 2002 with final report in 2003. Design for changes occurred in 2004 for implementation in 2005 at Lower Granite, however, regional priorities at SCT placed this project below the funding level. A schedule for implementation at additional projects will be developed and prioritized through FFDRWG. Further information will be provided in the Final UPA.
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.	Rehabilitation needs will be reviewed at each project and plans will be developed for necessary work. Columbia River project reports completed and submitted to NOAA Fisheries and other FPOM members. See draft UPA, Section III.E.1, pg. 41.
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 turnoff, harvest, or other factors in FCRPS mainstem reservoirs and upstream of FCRPS projects.	Adult telemetry evaluation to help identify factors that contribute to successful spawning or unaccounted loss continued in 2004. Data analysis is scheduled through 2005 and the final report will be available in 2006. PIT tag evaluations are planned for future years. Further information will be provided in the Final UPA.
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.	Studies of adult pacific lamprey are ongoing and will continue to incorporate consideration of salmonid passage issues. Further information will be provided in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 will be completed in 2005. Corrective actions will be coordinated through FPOM and implemented as warranted. Further information will be provided in the Final UPA.
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.	The Corps determines which spare parts need to be available for each project. Funding for additional spare parts or high cost items will be prioritized by FPOM in the O&M budget process for future implementation. See draft UPA, Section III.E.1, pg. 41. Further information will be provided in the Final UPA.
122	The Corps shall continue design development and, subsequently, construct an emergency auxiliary water supply system at The Dalles Dam's east ladder.	This action has been deferred pending resolution of the sluiceway outfall relocation.
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.	Completed. Construction has been completed, system operational in 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 2004 due to funding priorities coordinated through SCT. The Corps will initiate in 2005 if funding is available. The work will continue as funding priorities allow. Further information will be provided in the Final UPA.
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 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.	The Corps has ensured all diffusion water gratings are secured in place and methods have been demonstrated to FPOM. An engineering study was performed to determine the feasibility of successfully and economically constructing an automated monitoring and alarm system. This study determined that an automated monitoring and alarm system was not feasible. A report was provided to FPOM in 2003. Maintenance and monitoring of diffuser gratings continues as specified in the Corps Fish Passage Plan.
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.	Bonneville Project has replaced and repaired major aging components of the subject fishways and submitted a final report. Engineering reports to be completed in early FY 05 including identification of any additional major components needing rehabilitation. Implementation will be coordinated through SCT. Further information will be provided in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Completed. Modifications have been implemented.
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.	Progress on this item has been deferred due to funding priorities coordinated through SCT. When funding becomes available, a design report is planned which will evaluate alternatives and recommend corrective measures, as warranted. Further information will be provided in the Final UPA.
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 were completed in 2003. Investigations on alternatives for Little Goose and Lower Monumental are continuing. Further information will be provided in the Final UPA.
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.	Completed. 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. The program currently consists of forebay and tailwater monitoring stations, along with a few locations in free-flowing reaches. The use of back-up monitors and quality assurance/quality control (QA/QC) program have been implemented. See draft UPA, Section III.E.1, pg. 41. Further information will be provided in the Final UPA.
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 on a systematic review of the forebay fixed monitoring sites. Changes at some sites have been implemented. Review and evaluation of forebay fixed monitoring stations at McNary Dam and the Snake River projects was initiated during the 2003 spill season and continued during the 2004 spill season. Alternative monitor locations were evaluated and compared to the existing FMS station. Findings and recommendations for more representative alternate forebay FMS locations will be presented to the WQT in October 2004. Recommendations will be implemented as warranted. Further information will be provided in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Completed. 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 and is currently being utilized.
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. John Day, McNary, Ice Harbor and Lower Monumental. Results of spillway evaluations will be coordinated with the region. For The Dalles, deflectors are being considered among other configuration and operational alternatives. Depending on coordination through SCT, construction at Little Goose could occur as early as 2006. No work has started or is scheduled for Lower Granite at this time. See draft UPA, Section III.E.1, pgs. 34-36 and 38.
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 walls would begin only after coordination within the annual planning process, and only if warranted.	At The Dalles a spill wall was completed in 2004. At John Day a spillway divider wall alternative is being evaluated in the configuration decision document. See draft UPA, Section III.E.1, pgs. 34-36 and 38.
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.	Construction schedule to be completed in 2007/2008. See draft UPA, Section III.E.1, pg. 36.
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 and BPA are evaluating gas abatement options at Libby Dam. A comprehensive set of alternatives (including flow deflectors) for passing additional flow at Libby, and their respective TDG and temperature implications, are currently being evaluated. Installation of one or two additional units was examined and determined not to be a reasonable or economically prudent near term option. The Corps and BPA are currently consulting with the USFWS under ESA on Libby Dam operations, including these options. Further information will be provided in the Final UPA.
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 2005 at Lower Granite and Ice Harbor. At John Day RSW alternatives are being evaluated for potential implementation. See draft UPA, Section III.E.1, pgs. 32-36.
139	The Corps shall investigate TDG abatement options at Dworshak Dam and implement options, as warranted, in coordination with the annual planning process.	Primary flow augmentation from Dworshak is now during the summer for temperature reduction and flows with releases of 14.5 kcfs within the state dissolved gas standard of 110%. See draft UPA, Section III.E.1, pg. 40.
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.	Bay 1 is not used for spill for fish due to egress considerations. Spill bay 1 deflector construction is deferred relative to RSW testing at this project.

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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. See draft UPA, Section IV, RM&E Substrategy 2.1, pg. 74.
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.	A temperature study that included the Columbia River upstream of McNary Dam, trash racks, gatewells, and draft tubes was completed in 2004. A computational fluid dynamics (CFD) model of the hydrodynamics and thermal characteristics of the project is currently under development and will be completed in 2005. Similarly, a report that examines the spatial and temporal characteristics of the 2004 temperature dataset, along with a comparison to historical information, will also be completed in 2005. Further information will be provided in the Final UPA.
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 determined the goals of water temperature modeling, investigated and evaluated multi-agency existing data, determined what questions can be answered without modeling, recommended and started additional data collection, and recommended numerical models to be considered. The technical team recommended to the regional WQT that the CE-QUAL-W2 model be adopted for development in the river reaches of interest and identified a data collection strategy. The workgroup proposed to build the model in phases. The initial phase 1 includes the North Fork Clearwater at the mouth, Mainstem Clearwater at Orofino, Upstream Snake River at Anatone to the Downstream Snake River at Lower Granite Dam. Additional phases would include Dworshak Dam and up to Brownlee Dam. Phase 1 is scheduled to be complete in 2004. Phases 2 and 3 are scheduled to be completed in 2005 and 2006 respectively. This information will be provided in the Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
144	The Corps, in coordination with the Regional Forum, shall 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).	The Corps has worked annually with NOAA and the Region through FPOM to develop the Fish Passage Plan. Typically this coordination has been completed by March 1 each year with the FPP in place for the fish passage season. See draft UPA, Section III.E.1, pg. 41.
145	The Corps shall develop and implement preventative maintenance programs for fish passage facilities that ensure long-term reliability, thereby minimizing repair costs.	Corps projects are developing, budgeting for, and implementing preventative maintenance programs for their fishways. These plans and additional work included in the program will be coordinated through FPOM. See draft UPA, Section III.E.1, pg. 41.
146	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.	This action is considered a normal O&M activity. 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 arise are presented and discussed at FPOM, where courses of action are developed and followed-up on by the Corps. See draft UPA, Section III.E.1, pg. 41.
147	As a contingency plan, the Corps (in cooperation with other Federal agencies) shall develop a project management plan to reevaluate more intensive hydropower-related actions (including breaching) for the four lower Snake River 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.	Based upon the review of the current status of the stocks, the updated jeopardy analysis, and the lack of certainty in obtaining congressional appropriation and authorization, the Corps has determined inclusion of contingency planning for dam breaching is not appropriate and is not included in the draft UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
148	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).	Based upon the review of the current status of the stocks, the updated jeopardy analysis, and the lack of certainty in obtaining congressional appropriation and authorization, the Corps has determined inclusion of contingency planning for dam breaching is not appropriate and is not included in the draft UPA.
149	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.	Implementing ongoing flow, passage, and entrainment programs in 3 subbasins for the Upper Columbia River Spring Chinook (see draft UPA, Section III.E.4), and Upper Columbia River Steelhead (see draft UPA, Section III.E.8). Implementing ongoing flow, passage, and entrainment programs as conservation measures in 6 subbasins for Mid-Columbia River Steelhead (see draft UPA, Section III.E.9), Snake River Spring/Summer Chinook (see draft UPA, Section III.E.2), and Snake River Steelhead (see draft UPA, Section III.E.7) ESUs. Actions and conservation measures included in the draft UPA are based upon NOAA's revised analysis emphasizing limiting factors (Draft BiOp Appendix E) and NOAA Fisheries effects analysis (Draft BiOp, Chapter 6).
150	In subbasins with listed salmon and steelhead, BPA shall 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.	Implementing riparian protection and enhancement with ESU-focused actions based on NOAA revised analysis emphasizing limiting factors and ESUs with the greatest survival needs. See draft UPA Section III.D.3, pgs. 20 - 23 (strategies); Sections III.E.4 & 8, pgs. 54-57 and pgs. 60 - 62 (proposed actions); and Sections III.E.2, 7, & 9, pgs. 51-52, 58 - 59, and 63 - 64 (conservation actions).
151	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.	Implementing streamflow and instream water transactions, including continuation of water brokerage program, with ESU-focused actions based on NOAA revised analysis emphasizing limiting factors and ESUs with the greatest survival needs. See draft UPA Section III.D.3, pgs. 20 - 23 (strategies); Sections III.E.4 & 8, pgs. 54-57 and pgs. 60 - 62 (proposed actions); and Sections III.E.2, 7, & 9, pgs. 51-52, 58 - 59, and 63 - 64 (conservation actions).

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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).	Coordination of habitat implementation will take place as described in draft UPA Section 1.F, pg. 5.
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.	Implementing riparian protection and enhancement with ESU-focused actions based on NOAA revised analysis emphasizing limiting factors and ESUs with the greatest survival needs. See draft UPA Section III.D.3, pgs. 20 - 23 (strategies); Sections III.E.4 & 8, pgs. 54-57 and pgs. 60 - 62 (proposed actions); and Sections III.E.2, 7, & 9, pgs. 51-52, 58 - 59, and 63 - 64 (conservation actions).
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 coordinated across non-Federal and Federal land ownerships and programs.	Draft subbasin plans are complete. In 2002, BPA contracted with the Council for development of Columbia Basin subbasin plans. The draft subbasin plans were submitted to the Council in May 2004, followed by regional and Independent Scientific Review Panel review from June through August 2004. The Council is adopting subbasin plans that meet the required standards during the October to December 2004 timeframe. See the draft UPA Section I.E, pg. 5 for a description of the Action Agencies intended use of subbasin plans for BiOp implementation.
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.	BPA is funding a project to evaluate the restoration potential of Snake River fall Chinook salmon spawning habitat through the Council's Fish and Wildlife Program. This project will quantify the physical characteristics that define suitable fall chinook spawning habitat at each of two Snake River study sites: 1) the Ice Harbor tailrace downstream to the Columbia River confluence, and 2) the Lower Granite tailrace. Further information on these actions may be provided in the Final UPA.
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 will be completed and available to NOAA and the region in 2005. BPA is implementing projects under the Council's Fish and Wildlife Program to evaluate spawning of fall chinook and chum salmon just below the 4 lowermost Columbia River mainstem dams, to evaluate factors limiting Columbia River chum salmon populations, and to enhance spawning areas historically used by chum salmon in Duncan Creek. See draft UPA, Section III.E.1, pgs. 46-49.
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.	BPA is implementing projects to improve and restore tributary and mainstem habitat for CR chum under the Council's Fish and Wildlife Program.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Completed. The final draft plan was submitted to NOAA on September 2003. No further action is anticipated.
159	BPA and the Corps, working with LCREP and NMFS, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.	Completed. BPA and Corps worked with LCREP and the Columbia River Estuary Study Taskforce (CREST) to develop the foundational plan for habitat restoration activities in the estuary. The final report was published in November 2003 after review by ISRP and NOAA.
160	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.	In response to NOAA's updated scientific analysis on role of the estuary in salmon viability (*Role of the Estuary in the Recovery of Columbia River Basin Salmon and Steelhead: An Evaluation of the Effects of Selected Factors on Population Viability.* June, 2004), the Action Agencies are focusing on the identified potential limiting factors for those ESUs that NOAA has identified as primarily benefiting from estuary habitat. In order to increase certainty of beneficial effects, actions proposed in the draft UPA have under-gone NOAA review. See draft UPA Section III E 1, pgs. 47-48. Further development of the proposal is in process with NOAA and will be included in the Final UPA.
161	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.	Research will continue in the estuary, guided by the RM&E Estuary/Ocean Work Group, with input from NOAA and by regional review processes including the Corps Anadromous Fish Evaluation Program (AFEP) and the Council's subbasin planning processes as well as other interested parties in the lower river. See draft UPA, Section III.E.1, pgs. 48-49 and 72.
162	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.	Completed. The conceptual model was completed in September 2004 and is undergoing review. It will be provided to NOAA by December 2004. No further action is anticipated.
163	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.	The Action Agencies' annual BiOp progress reports have provided project level compliance reporting. The Action Agencies propose to annually report progress toward achieving the ESU-specific performance targets described in the draft UPA and subsequent implementation plans. See draft UPA Section II.A.2, pg. 7.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
164	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 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.	The Action Agencies have completed the development and testing of tooth-tangle nets for use in the lower Columbia non-treaty commercial spring fishery. Treaty fishers continue to implement the NOAA Fisheries Net Exchange Program as an ongoing management tool to reduce steelhead interceptions while increasing Chinook harvest under current impacts. Non-treaty commercial fishers and managers continue the Select Area Fishery Evaluation program. This fishery provides opportunity for a terminal fishery on non-listed fish that reduced fishing pressure and associated incidental take of listed species in more conventional mixed stock fisheries. See draft UPA, Section III.D.5, pg. 26 for harvest strategies that may be used to implement harvest measures under the Council's Fish and Wildlife Program.
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.	The Action Agencies completed a three-year research study to determine the incidental mortality using the tooth-tangle net gear in 2004. See draft UPA Section III.D.5, pg. 26 for harvest strategies that may be used to implement harvest measures under the Council's Fish and Wildlife Program.
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.	BPA provides funding for the Coded Wire Tag program that includes resources dedicated to implement port and creel sampling programs. BPA also provided funding in 2004 for the Nez Perce Harvest Monitoring Program. See draft UPA Section III.D.5, pg. 26 for harvest strategies that may be used to implement harvest measures under the Council's Fish and Wildlife Program.
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 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.	BPA funded a study to determine the feasibility of locating, marking and removing lost gillnets within Bonneville and The Dalles reservoir. See draft UPA Section III.D.5, pg. 26 for harvest strategies that may be used to implement harvest measures under the Council's Fish and Wildlife Program.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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, through general and specific harvest discussions, have scoped the methods and metrics for crediting harvest reforms. Specifically, discussions of value-added and conservation easement proposals have centered on how to enumerate and credit the adult survival benefits associated with these agreements. See draft UPA, Section III.D.5, pg. 26 for harvest strategies that may be used to implement harvest measures under the Council's Fish and Wildlife Program.
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.	The Action Agencies have funded the development of HGMPs for NOAA Fisheries review and approval. As a conservation action in the draft UPA, the Action Agencies propose to consider funding and implementing hatchery reform actions that NOAA Fisheries identifies as likely to have substantial survival benefits for listed salmon and steelhead ESUs and/or populations. See draft UPA Section III.E.1, pgs. 49-50.
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.	The Action Agencies have funded the development of HGMPs for NOAA Fisheries review and approval. As a conservation action in the draft UPA, the Action Agencies propose to consider funding and implementing hatchery reform actions that NOAA Fisheries identifies as likely to have substantial survival benefits for listed salmon and steelhead ESUs and/or populations. See draft UPA Section III.E.1, pgs. 49-50.
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	The Action Agencies have funded the development of HGMPs for NOAA Fisheries review and approval. As a conservation action in the draft UPA, the Action Agencies propose to consider funding and implementing hatchery reform actions that NOAA Fisheries identifies as likely to have substantial survival benefits for listed salmon and steelhead ESUs and/or populations. See draft UPA Section III.E.1, pgs. 49-50.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	The Action Agencies have funded the development of HGMPs for NOAA Fisheries review and approval. As a conservation action in the draft UPA, the Action Agencies propose to consider funding and implementing hatchery reform actions that NOAA Fisheries identifies as likely to have substantial survival benefits for listed salmon and steelhead ESUs and/or populations. See draft UPA Section III.E.1, pgs. 49-50.
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.	The Action Agencies have funded the development of HGMPs for NOAA Fisheries review and approval. As a conservation action in the draft UPA, the Action Agencies propose to consider funding and implementing hatchery reform actions that NOAA Fisheries identifies as likely to have substantial survival benefits for listed salmon and steelhead ESUs and/or populations. See draft UPA Section III.E.1, pgs. 49-50.
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 implementation of a comprehensive marking plan. Included in this action are the following four steps: 1. Develop a comprehensive marking strategy for all salmon and steelhead artificial production programs in the Columbia River basin by the end of 2001. 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. 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.	BPA has funded the development of a Comprehensive Marking Strategy, which is due to be completed in 2005. See draft UPA, Section IV, RM&E Substrategy 1.1, pg. 70 of the for the Action Agencies' proposal to fund marking of hatchery fish at Action Agency funded facilities.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	BPA is funding safety-net programs for Snake River sockeye, spring/summer Chinook, fall Chinook and steelhead, and mid- and lower-Columbia steelhead. See draft UPA Section III.E.13, pg. 67 for the continued implementation of Snake River sockeye safety-net program. BPA is funding safety-net programs for other ESUs as conservation actions under the Council's Fish and Wildlife Program.
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.	BPA funded development of HGMPs for the Grande Ronde and Tucannon spring/summer chinook safety-net programs and continues to fund the safety-net programs under the Council's Fish and Wildlife Program. See draft UPA Section III.D.4, pg. 25 for a description of the safety-net program implementation strategy.
177	In 2002, BPA shall begin to implement and sustain NMFS-approved, safety-net projects.	BPA has sustained funding of safety-net projects for several populations of Snake River spring/summer chinook and Snake River sockeye and other ESUs. See draft UPA Section III.E.13, pg. 67 for continued implementation of the Snake River sockeye safety-net program. BPA is funding safety-net programs for other ESUs as conservation actions under the Council's Fish and Wildlife Program.
178	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.	BPA and NOAA have agreed to 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. No specific actions included in draft UPA. See Section III.D.4, pgs. 25-26 for a description of the hatchery implementation strategies.
179	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.	Completed. This action was funded and products have been drafted.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
180	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 implemented no later than 2003.	The Action Agencies will continue to work collaboratively with NOAA, other Federal Caucus agencies, and the states and tribes to participate in a regionally developed network of status monitoring programs. The Action Agencies will continue to co-fund and participate in the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) to develop and implement collaborative region-wide monitoring strategies. BPA and the Corps are continuing to fund pilot status monitoring programs in several Columbia River tributary basins and in the estuary. Status monitoring within the hydro corridor will continue to be coordinated and implemented through the Corps' Anadromous Fish Enhancement Program. See draft UPA, Section IV, RME Strategy 1, p. 69.
181	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.	Reclamation has acquired LANDSAT data covering the previous twenty years. The Action Agencies will continue to implement pilot projects that support a regionally coordinated program for aerial and satellite imagery data and a landscape change analysis using satellite imagery. Digitizing and mapping are in progress. See draft UPA, Section IV, RME Substrategy 1.1, p. 70.
182	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 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.	Studies of the reproductive success of hatchery fish relative to wild fish are included as conservation actions in the draft UPA, Section IV, RM&E Strategy 3, pg. 80. In 2004, BPA began funding five new studies selected through a targeted solicitation process and the Mainstem/Systemwide Provincial Review. BPA has been funding these new studies, as well as other ongoing studies, to determine the relative effectiveness of hatchery fish spawners, taking into account information needs across ESUs.
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.	The Action Agencies will continue to work with NOAA to implement a tributary habitat effectiveness project in the Upper Columbia through the program outlined in the draft UPA, Section IV, RM&E Substrategy 2.2, p. 75. In addition, the Action Agencies will continue to implement a tributary habitat effectiveness project in the John Day subbasin and potentially one other study area to be determined as conservation measures (see draft UPA, Section IV, RM&E Substrategy 2.2, pg. 77). These tributary action effectiveness studies will be coordinated with other agencies through the Upper Columbia Basin Monitoring Strategy and PNAMP. The Action Agencies will also develop an action effectiveness study in the lower Columbia below Bonneville.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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.	Hatchery related action effectiveness research studies are continued in the draft UPA, Section IV, RM&E Substrategy 2.3, pg. 78 - 79. BPA continues to fund the ongoing studies as conservation actions under the Council's Fish and Wildlife Program.
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 fish.	The Action Agencies will continue to monitor migrant survival and adult returns of transported and non-transported fish. This research will provide annual estimates of D for transported fish and improve the quality of those estimates. See draft UPA, RM&E Strategy 3, pg. 79.
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.	The Action Agencies will continue to fund research on annual estimates of D for transported fish and identify causes of D, as well as the geographic zones where delayed effects are expressed. Final reports will be provided when individual reports are completed. See draft UPA Section IV, RM&E Strategy 3, pg. 79.
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.	The Action Agencies will continue to monitor migrant survival and adult returns of transported and non-transported fish. This research will provide annual estimates of D for transported fish and improve the quality of those estimates. See draft UPA, RM&E Strategy 3, pg. 79.
188	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.	PIT-tags are used in monitoring status and trends in abundance of spawning adult, rearing juvenile, and outmigrant steelhead and some habitat attributes in the John Day subbasin and potentially other Oregon subbasins in the Columbia Plateau Province. Further information will be included in the Final UPA.
189	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.	The Action Agencies will continue to fund research on the possible existence of delayed mortality including the uncertainty of different dam passage histories on survival and fish health. See draft UPA Section IV, RM&E Strategy 3, pg. 80.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
190	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.	The Action Agencies will continue to implement juvenile migration status monitoring within the hydrosystem corridor including monitoring the emergence, growth, migration timing, and survival of Snake River fall Chinook. See draft UPA Section IV, RM&E Substrategy 1.3, pg. 71.
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 has developed and is implementing improvements; both in time and accuracy, to the fish count reporting. See draft UPA, Section IV, RM&E Substrategy 1.3, pg. 71.
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.	Adult PIT tag interrogation systems have been installed in fish ladders at Bonneville, McNary, Ice Harbor, Lower Granite, and Priest Rapids and were installed in time for the McNary transport study. Prioritizations for installation at additional projects are continuing through the Regional Forum. See draft UPA, Section III.E.1. pgs. 30-32.
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.	The Action Agencies will continue developing adult and juvenile research technologies (such as acoustic tracking, high flow PIT detection, and tags for subyearling fish) as necessary to address critical uncertainties. See draft UPA, Section IV, RM&E Substrategy 1.1, pg. 70.
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 of altered flows where they meet the California Current to form the Columbia River plume.	Work continues to physically characterize and model the Columbia River plume in the nearshore ocean environment See draft UPA, Section III E 1, pg. 48 and Section IV, pg. 72. There are currently three numeric models under development focused on circulation and water properties predictions and sediment dynamics. Further information will be provided in Final UPA.
195	The Action Agencies shall investigate and partition the causes of mortality below Bonneville Dam after juvenile salmonid passage through the FCRPS.	Studies from 2001 to 2004 developed techniques to evaluate fish survival in the estuary. Survival evaluation will commence in 2005 and beyond. The intent is to begin partitioning mortality in the Lower Columbia for various stocks of fish. See draft UPA, Section IV, pg. 80.
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.	Action Agencies have initiated a number of research studies to evaluate juvenile survival and cumulative effects of restoration actions on juvenile survival. Continuation of juvenile studies is proposed in the draft UPA, Section III E 1, pg. 48 and Section IV, pg. 72. Further information will be provided in Final UPA.
197	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 plume.	The Action Agencies have initiated three studies in the Columbia River Plume evaluating survival, growth and residence time of juvenile salmonids. See draft UPA Section III.E.1, pgs. 48 and 72. Further information will be provided in Final UPA.

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Action #	Action in 2000 Biological Opinion	Treatment Within the Draft Updated Proposed Action
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 Action Agencies will continue to work with PNAMP and the Northwest Environmental Data-network group to develop a coordinated, regional data-network. Reclamation funded and has nearly completed the development of a pilot database project in the John Day basin and coordinated this activity with other regional database efforts. See the draft UPA, Section IV, RM&E Strategy 5, p. 80-81 for more information.
199	The Action Agencies shall implement the specific research/monitoring actions outlined in Appendix H.	See draft UPA, Section IV, pgs. 69 – 92 for the Action Agencies' proposal for comprehensive monitoring of the proposed action.