

10.0 INCIDENTAL TAKE STATEMENT

10.1 INTRODUCTION

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps of Engineers, BPA, and BOR (Action Agencies). The Action Agencies have a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Action Agencies fail to assume and implement the terms and conditions of this Incidental Take Statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the effect of incidental take, the Action Agencies must report the progress of the action and its effect on each listed species to the NMFS as specified in this Incidental Take Statement. [50 CFR §402.14(i)(3)]

The NMFS has developed the following Incidental Take Statement based on the premise that the RPA described in Section 9 of the attached Biological Opinion will be implemented.

10.2 AMOUNT OR EXTENT OF TAKE ANTICIPATED

10.2.1 Incidental Take Associated with Operation of the FCRPS

The level of incidental take expected to occur as a result of the RPA will vary annually as the RPA measures are implemented. Initially, the expected take will be approximately equal to the juvenile and adult mortality rates associated with the proposed action, as estimated in Sections 6.2 and 6.3. Once the RPA measures are completely implemented, no later than 2010, the expected take will be reduced to a level that is approximately equal to the juvenile and adult mortality rates associated with the RPA, as estimated in Section 9.7. During the intervening period, the incidental take is expected to decrease on a schedule that cannot be precisely determined at this time. Therefore, the estimate of incidental take will be updated prior to March 1 of each year. This update will be based upon review of the preceding year's annual report, which will describe those elements of the RPA that were completed in the preceding year, those anticipated to be implemented during the upcoming year, and research to further characterize the effects of implementing those elements on survival of listed ESUs.

Table 10.1-1 identifies the expected incidental take resulting from the RPA during 2001 and 2010. These take estimates include mortality expected to occur as a result of passage through the mainstem FCRPS projects only. The juvenile take represents means of a range of annual estimates and, for some ESUs, a range of differential delayed mortality estimates. Averages included 1994 through 1999 for spring chinook and steelhead and 1995 through 1999 for SR fall chinook. The SR spring/summer chinook "D" (delayed mortality) estimate ranged from 0.63 to 0.73, SR fall chinook "D" was estimated at 0.24, and SR steelhead "D" ranged from 0.52 to 0.56.

Quantitative estimates of take are not possible for the spawning and incubation stages of Snake River fall chinook, Lower Columbia River chinook salmon, and Columbia River chum salmon. The incidental take of these species during the spawning and incubation life stages will be considered authorized if flow operations are implemented as described in Section 9.6.1.2. Take of juvenile sockeye salmon will be considered authorized as long as the allowable take of juvenile SR spring/summer chinook and SR steelhead is not exceeded, due to the similarity in timing and similar size of each ESU.

10.2.2 Incidental Take Associated with Offsite Mitigation

This Biological Opinion does not authorize incidental take associated with any projects related to offsite mitigation. It is anticipated that Action Agencies will seek authorization for any take associated with offsite mitigation projects through separate consultations with NMFS, once details of the proposed actions have been determined.

Table 10.1-1 Estimates of Incidental Take Resulting from the RPA in 2001 and 2010

ESU	Estimated Inriver Juvenile Mortality (%)	
	2001	2010
<i>Chinook:</i>		
SR Sp/Su ¹	43	43
SR Fall ²	88	86
UCR Spring ³	43	34
LCR Spring ⁴	13	9
LCR Fall ⁴	26	21
UWR	N/A	N/A
<i>Steelhead:</i>		
SR ⁵	54	50
UCR ⁶	42	34
MCR ⁷	42	34
LCR ⁸	15	11
UWR	N/A	N/A
<i>Sockeye:</i>		
SR ⁹	N/A	N/A
<i>Chum:</i>		
CR ¹⁰	26	21

Note: Estimates of mean incidental take resulting from RPA in 2001 and 2010. Estimates of take during intervening years will be updated annually. N/A = not applicable (for ESUs that do not pass through the hydrosystem). Estimates for ESUs with populations that pass variable numbers of dams are for maximum number of dams passed.

¹ Represents survival of transported and non-transported smolts, including NMFS (2000a) estimate of differential delayed mortality. Take of inriver migrants estimated as 60% in 2001 and 51% in 2010. For comparison, estimate of natural mortality is 15% (Table 1.2-3).

² Represents survival of transported and non-transported smolts, including PATH 24% estimated of differential delayed mortality. Take of inriver migrants estimated as 90% in 2001 and 84% in 2010. For comparison, estimate of natural mortality is 32-77% (Table 1.2-3).

³ For comparison, estimate of natural mortality is 9% (Table 1.2-3).

⁴ For comparison, estimate of natural mortality is 2% (Table 1.2-3).

⁵ Represents survival of transported and non-transported smolts including NMFS (2000a) estimates of differential delayed mortality. Take of inriver migrants estimated as 60% in 2001 and 50% in 2010. For comparison, estimate of natural mortality is 16% (Table 1.2-3).

⁶ For comparison, estimate of natural mortality is 9% (Table 1.2-3).

⁷ For comparison, estimate of natural mortality is 9% (Table 1.2-3).

⁸ For comparison, estimate of natural mortality is 1% (Table 1.2-3).

⁹ A quantitative estimate not available for this ESU. SR sockeye take is authorized as long as allowable take of SR spring/summer chinook and SR steelhead is not exceeded.

¹⁰ Based on LCR fall chinook survival estimates. No estimate of natural survival rate for comparison.

10.3 EFFECT OF THE TAKE

In the accompanying Biological Opinion, NMFS determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

10.4 REASONABLE AND PRUDENT MEASURES**10.4.1 Monitor Incidental Take**

The Action Agencies shall monitor the level of incidental take associated with the RPA and report results to NMFS in a timely manner.

10.4.2 Reduce Incidental Take by Improving Juvenile and Adult Passage Survival

The Action Agencies shall reduce the level of incidental take by implementing measures to further improve survival of juveniles and adults, in addition to those measures required by the RPA. NMFS has determined that the additional measures specified in Section 10.5 constitute only minor changes to the RPA.

10.5 TERMS AND CONDITIONS

10.5.1 Terms and Conditions Related to Monitoring Take

10.5.1.1 Evaluate Reach Survivals

The Action Agencies shall estimate dam passage and inriver survival of both juvenile and adult migrating salmonids. Using PIT-tags, radio-tags, sonic tags, or other developing technology, the Action Agencies shall measure the survival of juvenile fish migrating through the FCRPS. Using radio- and PIT-tags and additional techniques, they shall also measure the survival and reproductive success (arrival on the spawning grounds, successful spawning behavior, and successful gamete production) of adult salmonids migrating through the FCRPS. The primary focus of the current PIT-tag monitoring program is on juvenile inriver survival and return rates. However, as adult PIT-tag detection facilities are developed and installed, they will be used to measure adult passage survival on a per-project basis for fish with known origins and passage histories. Until then, a portion of the adult salmonid population shall be radio-tagged and their migration behavior and survival monitored as they migrate upstream through the FCRPS.

The Action Agencies shall continue to provide funding for required monitoring of juvenile fish passage at all dams with bypass systems. Facilities with PIT-tag detection capability at selected FCRPS projects shall be provided for this purpose. In addition, BPA is responsible for funding the smolt monitoring program coordinated and implemented by the Fish Passage Center, and the Corps is responsible for funding sampling relative to the juvenile fish transportation program and facility operations. To reduce juvenile fish handling and staffing requirements, multiple data sets are collected from sampled fish by onsite fishery agency personnel. For example, collection of fish condition information (i.e., injury, descaling, length, weight, etc.) is required for the Corps to detect juvenile fish passage facility problems that can descale, injure, or kill fish. The Corps also requires information regarding the numbers and weights of fish collected and the species composition for holding and loading purposes at the collector dams. This sampling effort also meets the requirements of approved monitoring programs (i.e., SMP, GBT sampling), and research (AFEP, BPA F&W Program), and new research required by this Biological Opinion). Given the multiple tasks accomplished under the program, the Action Agencies involved should share the cost of the program. Sampled juvenile fish handling at the projects should remain the responsibility of fishery agency personnel.

10.5.1.2 Monitor Smolt-to-Adult Returns

The Corps and BPA, in coordination with NMFS through the annual planning process, shall evaluate transport:inriver return ratios for wild SR yearling chinook salmon and steelhead. In addition, the Corps and BPA shall also evaluate effects of transportation of summer-migrating, subyearling SR chinook salmon.

Currently, the only way to conduct this research on spring-migrating fish is to mark and release wild fish at Lower Granite Dam and re-collect some for transport at Little Goose Dam and allow others to continue their migration inriver. This design should continue until such time that wild SR anadromous salmonids are sufficiently abundant to conduct studies by PIT-tagging wild fish in natal areas above the lower Snake River dams. If the decision for the long-term operation of FCRPS projects on the lower Snake River includes continued reliance on transportation, the Corps and BPA shall continue transport survival studies for spring and summer migrants passing Lower Granite Dam in future years.

Future research to evaluate the smolt-to-adult survival of subyearling fall chinook transported from Lower Granite versus the survival of marked study fish left to migrate in river will require adequate numbers of representative test fish (i.e., Lyons Ferry hatchery stock) and also may require special spill operations at one or more of the four collector dams.

10.5.1.3 Monitor Post-Transport and Post-Bypass Delayed Mortality

The Corps and BPA, in coordination with NMFS through the annual planning process, shall include an evaluation of “D” of transported relative to inriver migrating juvenile anadromous salmonids during all transport evaluations.

Considerable uncertainty exists concerning the levels of differential post-Bonneville Dam mortality of transported and non-transported fish. Evaluations of post-transport and post-bypass delayed mortality should receive a high priority. Determining how much transportation mitigates for the loss of juvenile anadromous salmonids during passage through the hydrosystem will be given the highest priority.

10.5.1.4 Monitor Juvenile Fish Passage at Dams

The Action Agencies shall continue to provide funding for required monitoring of juvenile fish passage at all dams with bypass systems.

Facilities with PIT-tag detection capability at selected FCRPS projects shall be provided for this purpose. In addition, BPA is responsible for funding the Smolt Monitoring Program coordinated and implemented by the Fish Passage Center, and the Corps is responsible for funding sampling relative to the juvenile fish transportation program and facility operations. To reduce juvenile fish handling and staffing requirements, multiple data sets are collected from sampled fish by on-site fishery agency personnel. For example, the collection of fish condition information (i.e., injury, descaling, length, weight, etc.) is required for the Corps to detect juvenile fish passage facility problems that can descale, injure, or kill fish. The Corps also requires information regarding the numbers and weights of fish collected and the species composition for holding and loading purposes at the collector dams. This sampling effort also meets the requirements of approved monitoring programs (i.e., SMP, GBT sampling) and research (AFEP, BPA F&W Program, and new research required by this Biological Opinion). Given the multiple tasks

accomplished under the program, the Action Agencies involved should implement cost sharing of the program. Sampled juvenile fish handling at the projects should remain the responsibility of fishery agency personnel.

10.5.1.5 Monitor Effects of Dissolved Gas Supersaturation

The Action Agencies shall monitor the effects of total dissolved gas supersaturation. 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 Public Utility Districts' monitoring programs.

At a minimum, the physical monitoring components of this plan shall include placement of physical dissolved gas monitors in the tailraces and forebays of all lower Snake and lower Columbia River dams and daily recording of dissolved gas data on the CROHMS database. This program shall also include a quality assurance (QA) and quality control (QC) component, including redundant and backup monitors at as many locations as necessary, weekly calibration of dissolved gas monitoring equipment, an error checking, correcting, and recording function for CROHMS data, and daily data reporting. The QA/QC components shall be reviewed annually and modified as improved information and techniques become available. The annual review shall be conducted by the Action Agencies in coordination with the Water Quality Team.

At a minimum, the biological monitoring components will include smolt monitoring at selected smolt monitoring locations, adult monitoring at Bonneville and Lower Granite dams, and daily data collection and reporting.

10.5.1.6 Install Adult PIT-tag Detectors to Facilitate Monitoring

The BPA and Corps shall install necessary adult PIT-tag detectors at appropriate FCRPS projects prior to the expected return of any adult salmon from the 2001 juvenile out-migration.

If technical problems preclude installation of these detectors within this time frame, the evaluation of spring migrant transportation from McNary should be delayed until such time that the systems are assured to be installed.

10.5.1.7 Monitor Adult Survival

The Action Agencies shall conduct a comprehensive evaluation to assess survival of adult salmonids migrating upstream and factors contributing to unaccounted losses. Broad objectives for such studies may include the following:

- Determine conversion rates between dams
- Partition inter-dam losses by factor

- Assess causal mechanisms associated with losses
- Assess reproductive success, including causal mechanisms associated with reduced reproductive success, if any
- Identify measures, as appropriate, to address factors affecting passage, survival, and reproductive success

More specific investigations may include the following:

- Fallback (operational related vs. other factors)
- Passage delay (in relation to project and reservoir operations, including turbines, spill, peaking)
- Injury (resulting from passage, marine mammals)
- “Head burns”
- Homing/straying
- Mainstem spawning
- Tributary turnoff and spawning
- Effect of DGS
- Effect of temperature (including use of cool water micro-habitat)
- Energy expenditure
- Susceptibility to disease
- Unaccounted incidental mortality associated with harvest
- Cumulative effects (synergism)

10.5.1.8 Monitor Turbine Efficiency

The BPA and the Corps shall provide an annual summary report detailing compliance with the 1% peak efficiency turbine operation guidelines for the FCRPS projects. This report should be provided to the Fish Facility Operation and Maintenance Coordination Team and NMFS by February 1 each year.

A summary report will allow review of seasonal operation of turbine units which may reveal methods to improve operations for safe fish passage.

10.5.1.9 Report Project Operations in a Timely Manner

The Corps shall make hourly turbine unit and spill bay operation data available on its website during the juvenile migration season.

These data are necessary to monitor compliance with operating criteria in the annual Fish Passage Plan (e.g., unit operating priorities and spill patterns), as well as agreed-upon special project operations for research or maintenance. These data were available for some projects during collection of information for the gas abatement program but have since been discontinued

10.5.1.10 Report on Progress Implementing the Fish Passage Plan in a Timely Manner

The Action Agencies, in coordination with the annual planning process, shall continue to provide weekly and annual reports regarding implementation of the fish passage plan to the FPOM.

The current practice of providing 7-day Corps project adult/juvenile facility reports and 7-day fish transportation summaries to NMFS via electronic mail once a week has worked well and should be continued. Additionally, hard copies of these reports have been formally submitted on a monthly basis. Since NMFS staff already have the desired information in hand up to several weeks earlier, it no longer necessary to formally provide the hard copies monthly. Rather, the Corps should provide these reports to NMFS once a year (at the February FPOM meeting) in electronic format on a compact disk for archiving. Specific details should be developed in coordination with FPOM.

10.5.2 Terms and Conditions Related to Improving Juvenile and Adult Passage Survival

10.5.2.1 Store Additional Water at Libby

The Action Agencies shall develop and implement short and long term operations at the Libby project to store additional water (over that presently available) for salmon and other listed species. These actions shall result in a greater frequency of refill to provide water for salmon while meeting the needs of bull trout and Kootenai River White sturgeon.

10.5.2.2 Develop a Dissolved Gas Model to Inform Spill and Dissolved Gas Management Decisions

The Action Agencies shall complete development of a dissolved gas model to be used as a river operations management tool. Once the model is developed, applications and results shall be coordinated through the Water Quality Team. The Action Agencies 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.

Dissolved gas supersaturation, caused by large volumes of water spilling over dams, can result in the injury or mortality of juvenile salmonids. Since the 1960s, increased hydraulic capacity at powerhouses of mainstem projects, increased water storage, and structural modification to spillways have substantially reduced this problem. However, high levels of dissolved gas have been measured under some river conditions even in recent years, e.g., during periods of involuntary spill.

10.5.2.3 Model Water Temperature to Inform Operational Decisions

By December 31, 2000, the Action Agencies shall develop and submit for NMFS' and EPA's approval a plan to model the water temperature effects of alternative Snake River operations.

The modeling plan should focus on water temperatures in the Snake River from Hells Canyon Dam on the Snake River and from Dworshak Dam on the Clearwater River to Bonneville Dam on the Columbia River, with predictive nodes located at the near-dam forebays and tailraces of each project. Both one-dimensional and multi-dimensional models (due to reservoir stratification) may be needed to fully define expected temperature conditions within the reach. The models should be developed to function both as a pre-season planning tool and to provide predicted outcomes of immediate operations in real-time.

10.5.2.4 Develop Temperature Data Collection System to Inform Operational Decisions

The Action Agencies shall develop, in consultation with EPA, NMFS and state and Tribal water quality agencies, a temperature data collection strategy necessary for developing and operating the models and documenting the effects of project operation.

Existing water temperature and meteorological data are inadequate for this purpose. Existing data and statistical tools will be used to identify locations where additional or improved data collection, in terms of precision, accuracy and frequency, would be most beneficial.

10.5.2.5 Assess Use of Safer PIT-tag Detection Methods

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 similar detection capability for the Ice Harbor juvenile bypass system.

The Corps and BPA should assess the use of full bypass flow PIT-tag detection, without the need to dewater and route fish through separators and sample flumes, with the possible benefit of reducing adverse survival effects of passage through multiple bypasses.

10.5.2.6 Improve Panel Design of Extended Submerged Intake Screens

The Corps shall complete the extended submerged intake screen systemwide letter report and implement recommended improvements.

The Corps shall complete investigation of fish performance and engineering issues pertaining to the need for improved porosity-control panel and panel connection design and install improved panels in all extended submerged intake screens. In particular, the Corps shall develop improved VBS gatewell cleaning and inspection measures for McNary and John Day dams, and implement as warranted. Also, the Corps shall develop improved debris handling measures in the forebays and screen/bypass systems to limit juvenile injury and mortality. The Corps shall implement other related measures as warranted.

10.5.2.7 Implement Studies to Reduce Bird Predation at FCRPS Projects

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.

Evaluation of this information, when combined with bird and fish behavioral information, will help managers develop a better understanding of issues such as prey selection, stock-specific vulnerability, and potential long-term predation effects on specific listed stocks, including effectiveness of management actions to reduce predation by birds.

10.5.2.8 Reduce Incidental Take Associated with Annual Fish Passage Plans

The Action Agencies, in coordination with the FPOM, shall implement or reconcile in writing, comments received from NMFS regarding ways of reducing incidental take in the current and future Corps' Fish Passage Plans prior to release of the plan each year.

Review of the final 2000 plan indicated that only about 40% of NMFS' comments (NMFS letter to William Branch dated January 21, 2000) on the Portland District projects were addressed by the text in the plan. The Corps needs to incorporate NMFS' recommendations for reducing delayed mortality or explain in writing why the recommendations were not implemented.

10.5.2.9 Reduce Mortality Associated with Special Facility Operations

All planned special facility operation activities that cause any facility to be out of compliance with the operations and criteria in the main text of the FPP (and expected to result in the take of

listed salmon stocks) must be coordinated with NMFS through the Regional Forum process at least one month prior to the anticipated action date.

Identifying special project operations in the FPP does not necessarily mean that the action has undergone the requirements of ESA Section 7 consultation. Generally, this section of the plan is not ready for review with the rest of the draft plan and insufficient consultation occurs prior to release of the plan. Essential information to be provided include a brief summary of the action, location, anticipated date and time, analysis of potential impact to listed salmon stocks, and potential alternative actions.

10.5.2.10 Develop Action Plan for Reducing Steelhead Holding in John Day Fish Ladders

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 as warranted.

This problem has been investigated in a fragmented manner for years. A more detailed collation of cumulative work to date is required, combined with an assessment of alternatives.

10.5.2.11 Evaluate Kelt Passage and Potential Improvements

The Corps shall initiate an adult steelhead downstream migrant (kelt) assessment program to determine the magnitude of passage, their contribution to population diversity and growth, and potential actions to provide safe passage.

Evaluations should be conducted to review available literature and develop pilot testing regarding reconditioning of kelts. The Corps shall assess and conduct a short-term holding evaluation at a project site where kelt are more abundant, and initiate a kelt transportation pilot study as a possible means of reducing dam passage mortality. The Corps shall evaluate kelt passage associated with the removable spillway weir (RSW) at Lower Granite (described in Section 9.2.2.4), which will be prototype-tested in 2001 in the context of juvenile fish passage. The Corps shall synthesize these work elements and report to the NMFS Regional Forum the magnitude of kelt passage, effects of passage on their survival, and potential actions to improve their survival, if deemed appropriate by 2003.