

10.0 INCIDENTAL TAKE STATEMENT

10.1 INTRODUCTION

Section 9 of the ESA and Federal regulations 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 in this section are nondiscretionary and must be undertaken by the Corps, BPA, and USBR. The Action Agencies have a continuing duty to regulate the activities 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. 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 NOAA Fisheries, as specified in this incidental take statement [50 CFR Section 402.14(i)(3)].

10.2 AMOUNT OR EXTENT OF ANTICIPATED TAKE

10.2.1 Amount of Take

In Section 6.0, NOAA Fisheries estimated the mortality attributable to proposed hydro operation of FCRPS and 19 USBR projects. These quantitative estimates of incidental take are summarized for eight ESUs in Tables 10.1 (juvenile mortality) and 10.2 (adult mortality). Estimated take is based on the difference in mortality between a reference FCRPS operation and the proposed FCRPS operation, including the transportation program and differential post-Bonneville mortality, over a variety of annual runoff conditions (see Sections 1.0, 5.0, and 6.0). This survival difference cannot be monitored directly, because only the proposed operation will be implemented. Therefore, it is impossible to determine if mortality observed at a particular location or time is the result of the discretionary operations that are part of the proposed action, or if they are the result of the existence and non-discretionary operations of FCRPS projects that are included in the hydro portion of the environmental baseline as represented by the reference operation. To monitor the amount of authorized incidental take, NOAA Fisheries will monitor the total mortality associated with FCRPS passage and juvenile transportation (i.e., mortality associated with both the discretionary proposed operations and the non-discretionary operations and existence of the dams), which is described in Tables 10.3 and 10.4. If the total FCRPS passage mortality exceeds the mortality rates in Tables 10.3 and 10.4, NOAA Fisheries will suspect that the authorized incidental take in Tables 10.1 and 10.2 has also been exceeded to an indeterminate amount and determine whether reinitiation of consultation is necessary.

The amount of incidental take also can be estimated for some components of the monitoring and evaluation program required by the terms and conditions of this Incidental Take Statement (Table 10.5). For example, the Smolt Monitoring Program annually handles 4% to 6% of the listed fish arriving at Lower Granite, Little Goose, and Lower Monumental dams and 0.01% to 0.30% of the listed fish arriving at other FCRPS mainstem projects. Mortality of the handled fish averages less than 1%. Take associated with required monitoring programs may vary somewhat from the amount described in Table 10.5 because of annual variations in the focus of each program. As described below, NOAA Fisheries requires annual coordination to determine if the specific annual operations are consistent with the terms and conditions of this Incidental Take Statement. Although some proportion of the take associated with monitoring and evaluation is associated with non-discretionary operation and the existence of the dams, it is difficult to attempt to separate these monitoring effects and the proposed action’s monitoring effects.

Table 10.1 Quantitative estimates of incidental take of juvenile salmonids migrating past FCRPS projects resulting from the proposed FCRPS actions. The amount of take is estimated as the difference between the reference operation and the proposed operation of the FCRPS (Section 6.0). Expected take is reduced by additional hydro and non-hydro actions that qualitatively increase survival.

ESU	Estimated Juvenile Mortality (%)			
	Range (2004)	Mean	Range (2010)	Mean
<i>Chinook</i>				
SR spring/summer ¹	<1-2%	1%	<1%	<1%
SR fall ²	1-4%	3%	1-4%	3%
UCR spring ³	2-7%	5%	<1-3%	<1%
LCR spring ⁴	<1-3%	1%	<1-2%	<1%
LCR fall ⁴	<1-2%	1%	<1-3%	2%
UWR	N/A	N/A	N/A	N/A
<i>Steelhead</i>				
SR ⁵	<1-1%	<1%	<1-1%	<1%
UCR ⁶	<1-7%	4%	<1-6%	2%
MCR ⁷	<1-2%	<1%	<1%	<1%
LCR ⁸	<1-1%	<1%	<1-1%	<1%
UWR	N/A	N/A	N/A	N/A
<i>Sockeye</i>				
SR ⁹	N/A	N/A	N/A	N/A
<i>Chum</i>				
CR ¹⁰	N/A	N/A	N/A	N/A

Table 10.2. Estimates of incidental take of adult salmonids resulting from the proposed FCRPS hydro operations. The amount of take is estimated as the difference between the reference operation and the proposed hydro operation of the FCRPS (Section 6.0). N/A = not applicable (i.e., for ESUs that do not pass FCRPS projects). Estimates for ESUs with subbasin populations that pass different numbers of dams are for the maximum number of dams passed.

ESU	Estimated Adult Mortality (%)
<i>Chinook</i>	
SR spring/ summer	0
SR fall	0
UCR spring	0
LCR spring	0
LCR fall	0
UWR	0
<i>Steelhead</i>	
SR	0
UCR	0
MCR	0
LCR	0
UWR	0
<i>Sockeye</i>	
SR	0
<i>Chum</i>	
CR	0

Table 10.3 Quantitative estimates of total FCRPS passage mortality of juvenile salmonids migrating past FCRPS projects resulting from a combination of the proposed hydro operations, which include discretionary and non-discretionary operations and the existence of the dams. If the total FCRPS mortality described in this table is exceeded, NOAA Fisheries will suspect that the authorized take in Table 10.1 is also exceeded.

ESU	Estimated Juvenile Mortality (%)			
	Range (2004)	Mean	Range (2010)	Mean
<i>Chinook</i>				
SR spring/summer ¹	47-53%	49%	45-52%	48%
SR fall ² (in-river only)	77-91%	86%	75-90%	84%
UCR spring ³	25-52%	36%	21-49%	32%
LCR spring ⁴	7-16%	11%	6-16%	11%
LCR fall ⁴	3-23%	14%	3-23%	14%
UWR	N/A	N/A	N/A	N/A
<i>Steelhead</i>				
SR ⁵	45-57%	50%	45-57%	50%
UCR ⁶	42-78%	54%	39-77%	52%
MCR ⁷ (JDA Dam-BON)	12-58%	33%	10-57%	31%
LCR ⁸	3-36%	16%	2-36%	16%
UWR	N/A	N/A	N/A	N/A
<i>SR Sockeye</i>				
SR ⁹	N/A	N/A	N/A	N/A
<i>Chum</i>				
CR ¹⁰	N/A	N/A	N/A	N/A

Table 10.4. Estimates of total FCRPS mortality of adult salmonids resulting from a combination of the proposed hydro operations, which include discretionary and non-discretionary operations and the existence of the dams. If the total FCRPS mortality described in this table is exceeded, NOAA Fisheries will suspect that the authorized take in Table 10.2 is also exceeded. N/A = not applicable (i.e., for ESUs that do not pass FCRPS projects). Estimates for ESUs with subbasin populations that pass different numbers of dams are for the maximum number of dams passed.

ESU	Estimated Adult Mortality (%)
<i>Chinook</i>	
SR spring/ summer	14%
SR fall	20%
UCR spring	10%
LCR spring	2%
LCR fall	3%
UWR	N/A
<i>Steelhead</i>	
SR	11%
UCR	7%
MCR	
(4 dams)	5%
(3 dams)	4%
(2 dams)	3%
(1 dam)	1%
LCR	1%
UWR	N/A
<i>SR Sockeye</i>	14%
<i>CR Chum</i>	N/A

Table 10.5. Incidental take associated with components of the monitoring and evaluation program for the hydrosystem.

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10.2.2 Hydro Juvenile Survival Performance Standard

NOAA Fisheries understands that the proposed hydro action employs an adaptive management framework for adjusting the proposed action to respond to new information. For the purposes of this Incidental Take Statement and its estimate of the amount of take, NOAA Fisheries will employ a hydro operations performance standard for juvenile survival.

The hydro operations performance standard for juvenile survival is to equal or exceed, in any given year, the level of juvenile survival that would otherwise occur if the specific hydro operations described in the Action Agencies' Updated Proposed Action were carried out as described. This performance standard can be satisfied by alternative hydro operations or a combination of alternative hydro operations and qualifying non-hydro actions. For the purpose of meeting this performance standard, the Action Agencies can receive credit for non-hydro actions that are (1) in addition to the non-hydro actions described in this Opinion, or (2) non-hydro actions described in this Opinion that result in benefits in excess of those expected or relied upon in this Opinion, but only to the extent that such benefits exceed the benefits expected or relied upon.

In the case of an Action Agency proposal to implement a different operation than is described in the proposed action, compliance with the hydro operations performance standard will be determined on a prospective basis using the current year's water supply forecast, the SIMPAS model and flow-survival relationships as determined by NOAA Fisheries, and as updated using the best available scientific information. In the event that this modeling predicts that the alternative hydro operations specified for the year, plus such non-hydro actions that qualify for crediting, will equal or exceed the level of juvenile survival that would otherwise occur if the hydro operation in the updated proposed action were carried out, the hydro operations performance standard for juvenile survival shall be deemed satisfied by the alternative hydro operation and qualifying non-hydro actions.

10.2.3 Incidental Take Associated with Non-hydro Activities

Proposed non-hydro activities are expected to have net beneficial effects. However, some short-term adverse effects are expected, and these are likely to result in incidental take of listed species. Because the proposed non-hydro actions have not been described at a level of detail that enables NOAA Fisheries to evaluate the amount or extent of incidental take or to include reasonable and prudent measures and terms and conditions to minimize that take, this Opinion does not authorize incidental take associated with any non-hydro activities except for monitoring and evaluation. It is anticipated that activities funded by BPA will be evaluated through the August 1, 2003 Programmatic Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Bonneville Power Administration Habitat Improvement Program (HIP) in the Columbia River basin. NOAA Fisheries anticipates that the Corps and USBR will seek similar authorization for any take associated with their non-hydro activities through separate consultations with NOAA Fisheries, once details of the proposed activities have been determined.

10.3 EFFECT OF THE TAKE

Earlier in this biological opinion, NOAA Fisheries determined that the projected levels of juvenile and adult survival through the FCRPS and the projected effects of the proposed additional hydro and non-hydro mitigation actions are not likely to result in jeopardy to any of the 13 species.

10.4 REASONABLE AND PRUDENT MEASURES

NOAA Fisheries is requiring the following reasonable and prudent measures and terms and conditions in this Incidental Take Statement. NOAA Fisheries believes these are necessary and appropriate to minimize the impacts of incidental take associated with the proposed FCRPS operation, as well as monitoring and evaluation activities sufficient to determine whether 1) the proposed action is being implemented as expected, 2) the effects of the action considered in the Opinion are occurring as expected, 3) actions to minimize take are being implemented, and 4) authorized take is not being exceeded.

10.4.1 Monitor Incidental Take

The Action Agencies will monitor the level of take associated with their proposed action and will report the results to NOAA Fisheries in a timely manner.

10.4.2 Reduce Incidental Take by Improving Juvenile and Adult Passage Survival

The Action Agencies will reduce the level of take by implementing the additional measures specified in Section 10.5.2.1 to further improve survival of juveniles and adults, in addition to measures described in the proposed action. NOAA Fisheries has determined that these 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 Terms and Conditions Related to Monitoring Take Due to Mainstem Hydro Operations

10.5.1.1.1 Evaluate Reach Survival. Annually, the Action Agencies will estimate juvenile and adult reach survival using empirical information and modeling. In annual reports, compare averages (up to and including the most recent operations year) with the estimates of juvenile mortality for each ESU in Table 10.3. Results will be reported in annual progress reports and compared with in-river survival estimates for both the 2004 and 2014 proposed hydro operations using study methods that will be reviewed through the Regional Implementation Forum process.

The Action Agencies will pursue the development of new tagging methodologies as necessary for obtaining reach survival estimates. These methods should enable **interrogation** of tagged fish through turbines and spillways.

The Action Agencies, in coordination with NOAA Fisheries through the annual planning process, will continue to support and fund the monitoring of wild juvenile Snake River fall chinook survival, growth, and life history attributes. Knowledge of wild fish life history attributes is critical as a baseline comparison for studies involving juvenile hatchery fall chinook used as surrogates for wild fish and their passage timing through the FCRPS.

10.5.1.1.2 Monitor Smolt-to-adult Returns. 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 will complete ongoing transport survival studies for spring migrants passing Lower Granite Dam and McNary Dam in future years to determine the transport operation that would provide the most benefit to transported fish.

10.5.1.1.3 Monitor Post-transport and Post-bypass Delayed Mortality. The Corps and BPA, in coordination with NOAA Fisheries through the annual planning process, will include an evaluation of D of transported fish relative to in-river migrating juvenile anadromous salmonids during all transport evaluations. Updated annual estimates of D for each transported species will be included in the annual progress reports. Compare annual or rolling averages of D with estimates in Appendix D (Ruff *et al.* 2004).

10.5.1.1.4 Monitor Effects of Dissolved Gas Supersaturation. The Action Agencies will monitor the levels of total dissolved gas (TDG) and associated biological impacts in the lower Snake and lower Columbia rivers. This annual program will include water quality monitoring and be developed and implemented in coordination with the Water Quality Team (WQT) and the mid-Columbia PUDs. The TDG pressure and percent saturation, water temperature, and barometric pressure will be sampled on an hourly basis and shared with resource agencies on a real-time basis. This information will be summarized and reviewed in the annual reports.

The water quality sampling methodology should include monitoring TDG levels throughout the Columbia River basin in river reaches. A comprehensive monitoring plan includes monitoring TDG levels in locations as agreed upon in the WQT for each project in critical reaches. This program will also include a QA/QC component conforming to the Data Quality Criteria developed by the Corps and approved by the Water Quality Team. This data quality control system will involve frequent calibration and maintenance of water quality equipment, daily screening of real time data, and archival storage in a regional data base (CWMS). The QA/QC components will be reviewed annually and modified as improved information and techniques become available. The Action Agencies will conduct the annual review in coordination with the Water Quality Team. 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 only when TDG exceeds 125% for extended periods of time.

10.5.1.1.5. Monitor Adult Survival. The Action Agencies will estimate adult survival annually from Bonneville to Priest Rapids and Lower Granite dams for Upper Columbia and Snake River ESUs, respectively. This information will be included in the annual progress reports, including estimates in Table 10.2.

Broad objectives for such studies may include evaluating survival rates between dams and through the system and factors contributing to unaccounted loss through the FCRPS.

10.5.1.1.6 Report Progress in Implementing Fish Passage Plan in a Timely Manner. The current practice of providing 7-day Corps project adult/juvenile facility reports and 7-day fish transportation summaries to NOAA Fisheries via electronic mail once a week has worked well and should continue. The Corps should provide these reports to NOAA Fisheries once a year (preferably at the February FPOM meeting) in electronic format on a compact disk for archiving. Specific details should be developed in coordination with FPOM.

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

10.5.1.2 Monitoring Incidental Take Due to Beneficial Effects of Non-hydro Actions

10.5.1.2.1. Monitoring and Reporting to Confirm Impacts of the Fish Predation Reduction Program. In annual reports, the Action Agencies will report progress in implementing the expanded pikeminnow predation reduction program to demonstrate consistency with the proposed schedule.

The Action Agencies will monitor changes in pikeminnow production rates to ensure consistency with NOAA Fisheries' assumptions for improvements. This information will be included in the annual progress reports.

10.5.2 Terms and Conditions Related to Improving Juvenile and Adult Passage

10.5.2.1 Additional Measures to Minimize Incidental Take

The Action Agencies will continue to refine the SYSTDG model and its use as a river operations management tool. SYSTDG applications and results will be coordinated through the Water Quality Team and the Technical Management Team. The Action Agencies will coordinate the system-wide management applications of SYSTDG and other gas abatement model studies with the annual planning process, the Transboundary Gas Group, the Mid-Columbia PUDs, TMT, and other interested parties.

The Action Agencies will continue to develop a water quality model that addresses Columbia and Snake river mainstem river temperature monitoring and meteorological data. The model will initially be applied to river management decisions for the lower Snake River. The Action Agencies will continue to develop an expanded data gathering network and strategy compatible with the model requirements.

- The Action Agencies will expand the water quality model to include Dworshak Reservoir and the Snake and Grande Ronde rivers and the lower three projects on the Snake River (2006).
- The annual meteorological data collection will continue as support to the model and provide input to the TDG monitoring (annual).
- The Action Agencies shall investigate gaps in coverage of the bathymetry and flow field/water velocity data to meet modeling requirements (2010).

The Action Agencies will assess and implement, where feasible, less-intrusive, PIT-tag interrogation methods (including full detection) at FCRPS juvenile bypass systems with interrogation sites, including John Day and Ice Harbor dams.

The Action Agencies should assess and implement, where feasible, 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.

The Action Agencies will address the following issues to improve adult fish passage, survival, and reproductive success:

- Fallback (operational-related versus other factors).
- Passage delay (in relation to project and reservoir operations, including turbines, spill, and peaking).
- Injury (resulting from passage, marine mammals, and headburns).
- 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.
- Effect of temperature (including use of cool water microhabitat).
- Susceptibility due to disease.
- Cumulative effects (synergism).

- Actions to address unaccounted loss:
 - Partition inter-dam losses by factor.
 - Assess causal mechanisms associated with losses.
 - Homing/straying.
 - Unaccounted incidental mortality associated with harvest.

Before any RM&E study authorized through the Corps regional planning process is initiated, NOAA Fisheries must determine on an annual basis whether the study's anticipated take is within acceptable limits and if the research is necessary to implement the Opinion. The determinations are intended to be used only for hydro-related activities that are primarily reviewed in the AFEP process. The determinations are not intended to be used for RM&E mitigation-related research involving tributary and estuary habitat, hatchery and harvest activities, or other actions, such as dredging.