



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

April 5, 2013

Dr. Christopher C. Caudill
Department of Fish and Wildlife Sciences
University of Idaho
Corner of 6th & Line St.
Moscow, Idaho 83844-1141

RE: Determination of Take for Research Purposes (24-13-UI93)

Dear Dr. Caudill:

National Marine Fisheries Service (NMFS) Hydropower Division's Federal Columbia River Power System (FCRPS) Branch has determined that take associated with the study, "Passage behavior and fate of adult salmon and steelhead in the Columbia and Snake rivers" is permitted in 2013 under the 2010 FCRPS Supplemental Biological Opinion (2010 Opinion). If this research continues beyond 2013, the take allowed under the determination process must be updated annually. The estimated numbers of listed salmonids needed to complete this study in 2013 are given in Table 1 below.

Project Justification, Description, and Methods

Justification

Specific RPAs identified in the 2008 NMFS Biological Opinion include RPA's 28, 52, and 54, which deal with monitoring to assure safe passage and maintaining passage metrics. The study topics and proposals were reviewed regionally by Study Review Working Group (SRWG) members during summer and fall 2012.

Description

Lower Columbia Studies:

Major and minor fishway modifications intended to improve passage for salmonids or Pacific lamprey have recently been installed or are planned for installation in coming years. As with any significant changes to the passage facilities, the modifications must be evaluated for effectiveness and to ensure that salmon passage is not adversely affected. Increases in passage time are of concern because salmon migrate upstream using fixed energetic reserves and relatively long passage is associated with unsuccessful passage. At Bonneville Dam, slowed passage into the fishways may also increase the probability of predation by sea lions in the tailrace for spring and early summer Chinook salmon.

In 2010, a prototype lamprey flume system (LFS) to aid adult lamprey passage was designed for the Washington-shore fishway North Downstream Entrance (NDE) at Bonneville Dam. Design elements for this structure were drawn from experience with the Bonneville Dam Lamprey Passage Structure (LPS) collectors and from behavioral observations in the experimental



lamprey fishway. The flume system includes two alternative entrances with lower entrance velocities meant to improve lamprey passage and a duct system leading to a LPS collector that will terminate on the tailrace deck. The Washington-shore NDE structure will be installed during winter 2012-2013 and a primary objective of work in 2013 will be assessment of adult salmonids at the NDE entrance.

The installation of a variable-width entrance weir and bollards at the Cascades Island (CI) entrance at Bonneville Dam in 2008-2009 was designed to improve passage performance for both salmon and lamprey. The variable-width weir has no moving parts and should reduce operation and maintenance costs and is thought to improve attraction flows for salmonids. This design also eliminates lower bulkheads that may have interfered with adult lamprey attempting to enter this fishway. Monitoring of adult Chinook salmon at the site indicated some evidence of slowed passage in the first year post-construction. Monitoring in 2010 indicated passage that was more typical of pre-modification passage at Cascades Island, though the mechanisms creating the differences between pre- and post-years remain unknown and may have been related to short-term effects of construction and “seasoning” of the structure, interannual variation in overall environmental conditions, and/or hydraulic effects of the new weir design. Monitoring in 2013 will provide a third year of post-modification data on passage behavior at the location.

Other recent modifications include construction of a new spill wall at The Dalles Dam Wall intended to improve downstream survival of juvenile salmonids and modification of the upper ladder at the John Day North Fish Ladder. A single year of post-modification monitoring of adult Chinook salmon at both locations indicated no adverse effects on adult spring Chinook salmon passage and there was some evidence of improved passage at JDA. More recent examination of dam counts suggests that smaller-bodied adults such as sockeye and jack Chinook salmon are finding and passing TDA North Fishway at lower rates than prior to the completion of the spillway. Whether the lower passage rates are associated with delayed or failed passage by individual fish is currently unknown and will be explicitly tested here using radio telemetry.

Modifications similar to the Cascades Island entrance modification are to be completed during winter 2012-13 at the John Day Dam North fishway entrance. We propose to monitor individual behavior of radio-tagged adult Chinook salmon at this location to determine whether the intended improvements at John Day North Fish Ladder entrance enhance or impede passage. Monitoring will also provide an additional year of post-modification monitoring at the upper section of the JDA North Fish ladder.

Conversion rates for three-listed Evolutionarily Significant Unit (ESUs) (Snake River and Upper Columbia River spring-summer Chinook salmon, Snake River steelhead) between Bonneville and McNary dams are below performance standards established by the FCRPS Biological Opinion. A concurrent objective of this study is to improve the spatial resolution of conversion rates between Bonneville, The Dalles, John Day, and McNary dams.

Substantial numbers of adult summer steelhead overwinter in reservoirs or migrate through portions of the FCRPS in early spring after overwintering in non-natal tributaries prior to spawning. Keefer et al. (2008) found that 12.4% of 5,939 radio-tagged adults overwintered at least partially in the Hydrosystem during 1996-1998 and 2000-2004 study years. Downstream

movement over dams (fallback) and kelt migration are both of concern because downstream passage routes specifically designed to attract and safely pass adult salmonids are lacking at FCRPS dams. Telemetry and bioacoustics evaluations indicate adult steelhead preferentially use and are benefited by surface routes when available. The relative costs and benefits of providing surface flow routes (e.g., spill, ice-and-trash sluice operation, operation of juvenile bypass structures) in wintertime depends on the abundance and distribution of steelhead, frequency of movements and the survival benefit to providing such routes. However, the frequency and route during downstream movements over dams during winter remains uncharacterized for most locations. Therefore, we propose to radio tag a supplemental sample of late-run steelhead (defined as passing Bonneville Dam (BON) during September and October). The supplemental sample will increase the sample size of steelhead observed overwintering.

Snake River Studies:

In recent years adult salmonid passage rates in the lower Snake River FCRPS have not met conversion standards identified in the FCRPS 2008 and 2010 Biological Opinion and evaluation of potential causes of loss and delay are needed. The FY 2013 Anadromous Fish Evaluation Program (AFEP) Research Summary ADS-W-13-1 identified several areas of concern including: 1) conversion rates through the lower Snake River related to poor passage metrics at lower Snake River dams; 2) effects of operations including surface flow operations at Little Goose Dam on adult delay in the tailrace; 3) effects of fallback and reascension on adult fish counts; 4) influence of temperature on migration behavior and success; and 5) effect of overshoot behavior on fallback, fallback route, survival, and straying, particularly by John Day and Tucannon stocks.

Methodology

Lower Columbia Studies:

Adult spring-summer Chinook salmon, sockeye salmon and steelhead will be collected at the Adult Fish Facility, located adjacent to the Washington-shore ladder. Tagging will be in approximate proportion to the run, and the tagging schedule will be adjusted depending on arrival timing of each run (with the addition of increased effort directed at the supplemental late steelhead sample). Typically, fish will be selected at random in the order they enter the trap each morning and adults will be selected randomly and Genetic Stock Identification (GSI) analyses will be used to back-assign origin to genetic reporting group for a subsample of adults with unknown final fates.

Protocols for collection and outfitting salmon and steelhead with transmitters at Bonneville Dam, mobile tracking (if needed), downloading of data from receivers, recovery of information for recaptured fish, coding of the data, and data analysis will be similar to those developed in prior years. All tagged fish will be released 8 km downstream from Bonneville Dam and monitored as they migrate upstream using a series of fixed-site receivers at each project, taking special care to monitor fishway entrances. The Study will coordinate with all research groups using radiotelemetry for other studies to insure efficient use of the equipment and resources available. Radiotelemetry receivers will be maintained and returned to the manufacturer for repairs and updates, prior to the 2013 field season, as required. All required receivers and antennas will be installed prior to the start of tagging of spring Chinook salmon in April 2013.

All adults will have a full duplex Passive Integrated Transponder (PIT)-tag inserted to the abdominal cavity as a secondary tag that will allow estimation of tag loss rates, detection efficiencies and conversion rates using both radio- and PIT-detections using permanent PIT detectors at Bonneville, McNary, Ice Harbor, and Lower Granite dams and using temporary PIT detectors installed at The Dalles Dam to be installed during winter 2012-2013. Detection efficiency will be estimated as $N_{\text{downstream}} / N_{\text{upstream}} * 100$ where N_{upstream} is the number of all individuals detected at the upstream site. Radio tag loss rates will be determined by enumerating the individuals with upstream PIT records that lack corresponding radio tag detections, indicating tag loss or failure.

Steps to limit project take include ensuring that the Bonneville Dam adult fish facility ceases to divert salmon through the trap once the daily allotment of salmon to radio-tag is filled. We will also ensure that no Chinook salmon >100 cm in fork length is anesthetized, as per Corps regulations for AFF trap operations. Trapping will not occur when fish ladder water temperatures exceed 70°F. University of Idaho personnel will ensure that tagging procedures are performed as quickly and as safely as possible for both the scientific technicians and the fish. Tagging and handling protocols will be approved by the University of Idaho Animal Care and Use Committee.

Snake River Studies:

The project will use radiotelemetry to monitor adult salmonids tagged at a new adult trap at the top of the IH South Fishway. Adults will be selectively diverted and anesthetized using a similar design to the historical trap. The project will radio tag previously PIT-tagged adult Tucannon River-origin steelhead at the LGR adult trap operated by NMFS personnel using sort-by-code. Radio receivers will be deployed at historic and new locations at dams and other key locations to monitor fishway approach and entrance behaviors, dam passage, and final distribution. Key metrics will be calculated from telemetry histories including passage times, passage efficiencies, fallback rates, and (where appropriate) straying rate. Data collected in 2013 will be compared to passage performance metrics collected during previous passage evaluations (1996-2010), with comparisons focusing on years with the most similar structural and operational conditions to the 2013 study year. Directed analyses will include evaluation of the relationships between passage and spill operations at LGO and lamprey weir orifices under construction at LGO and LGR.

Terms, Conditions, and Requirements

Fish listed under the Endangered Species Act (ESA) must be handled with extreme care and kept in water to the maximum extent possible during sampling and processing. Adequate circulation and replenishment of water in holding units is required. When using gear that captures a mix of species, ESA-listed fish must be processed first, to the extent possible, to minimize the duration of handling stress. Endangered Species Act listed fish must be transferred using a sanctuary net (which holds water during transfer) whenever practical to prevent the added stress of being out of water. Should NMFS determine that a researcher's procedure is no longer acceptable; the researcher must immediately cease such activity until an acceptable alternative procedure can be developed with NMFS. To implement the Hydro research, monitoring & evaluation (RM&E) reasonable and prudent alternatives (RPAs), the Applicant shall ensure that all of the following conditions are met:

1. Researchers must not intentionally kill or cause to be killed any listed species unless a specific monitoring or evaluation proposal, approved by NMFS, specifically allows intentional lethal take.
2. Each ESA-listed fish handled out of water must be anesthetized to prevent injury or mortality.
3. Anesthetized fish must be allowed to recover (e.g., in a recovery tank) before being released. Fish that are simply counted but not handled must remain in water, but do not have to be anesthetized. Whenever possible, unintentional or indirect mortalities of ESA-listed fish that occur during scientific research and monitoring activities shall be used in place of intentional lethal take, if applicable.
4. Each researcher must ensure that the ESA-listed species are taken only by the means, in the areas, and for the purposes set forth in the research proposal, as limited by the terms and conditions.
5. Each researcher, in effecting the take authorized by the incidental take statement (ITS) (Chapter 14, 2008 Opinion – incorporated into the 2010 Opinion) and through NMFS' Take Determination Letters, is considered to have accepted the terms and conditions of the ITS and any additional terms or conditions required by NMFS' Take Determination Letters, and must be prepared to comply with the provisions of these two documents, and the applicable NMFS' regulations and the ESA.
6. Each researcher is responsible for the actions of any individual operating under the authority of the researcher's designated take authorization within the Incidental Take Statement (ITS) of the 2010 Opinion and NMFS' Take Determination Letters.
7. Each researcher, staff member, or designated agent acting on the researcher's behalf must possess a copy of the ITS in the 2010 Opinion and the NMFS authorizing Take Determination letter when conducting the activities for which a take of ESA-listed species or other exception to ESA prohibitions is authorized herein.
8. Researchers may not transfer or assign a take authorization included within this determination to any other person(s), as person is defined in Section 3(12) of the ESA. The take authorization ceases to be in force or effective if transferred or assigned to any other person without prior authorization from NMFS.
9. Each researcher must obtain any other Federal, State, and local permits or authorizations necessary to conduct the activities provided for in this ITS.
10. Each researcher must coordinate with other applicable co-managers and researchers to ensure that no unnecessary duplication or adverse cumulative effects occur as a result of the researcher's activities.

11. National Marine Fisheries Service reserves the right to inspect research activities as they occur. This may include observation or review of research activities, facilities, records, etc., pertaining to ESA-listed species covered by this determination.
12. Under the terms of NMFS' regulations, a violation of any of the terms and conditions of this ITS will subject the offending researcher and/or any individual who is operating under the authority of this ITS to penalties as provided for in the ESA for authorized take.
13. Each researcher is responsible for biological samples collected from ESA-listed species as long as they are useful for research purposes. The terms and conditions concerning any samples collected remain in effect as long as the researcher maintains authority over and responsibility for the material taken. A researcher may not transfer biological samples to anyone not listed in the research proposal without obtaining prior written approval from NMFS. Any such transfer will be subject to such conditions, as NMFS deems appropriate.
14. NMFS may amend a take authorization identified in this determination, or adjust specific take levels after reasonable notice to the applicable researcher.
15. NMFS may revoke a take authorization identified in this ITS if the activities for which it provides are not carried out. If the activities are not carried out in accordance with the conditions of this ITS and the purposes and requirements of the ESA, or if NMFS otherwise determines that the continuation of activities would operate to the disadvantage of ESA-listed species.

Annual Reporting and Authorization Requirements

The conduct of scientific research and monitoring activities each year is contingent on submission and approval of a report on each proceeding year's research and monitoring activities. Researchers are providing annual reports summarizing the take of ESA-listed salmon and steelhead associated with their activity. These annual reports are to be provided to NMFS' designated Take Determination Coordinator by December 1 of each year unless this date is otherwise modified by NMFS' authorizing Take Determination letter. The report must include the following:

1. A detailed description of scientific research and monitoring activities, including the total number of fish taken at each location, an estimate of the number of ESA-listed fish taken at each location, the manner of take, and the dates and locations of the take.
2. Measures taken to minimize disturbances to ESA-listed fish and the effectiveness of these measures, the condition of ESA-listed fish taken and used for research and monitoring, a description of the effects of research and monitoring activities on the subject species, the disposition of ESA-listed fish in the event of mortality, and a brief narrative of the circumstances surrounding fish injuries or mortalities to ESA-listed fish.
3. Any problems that arose during research and monitoring activities, and a statement as to whether the activities had any unforeseen effects.

4. Descriptions of how all take estimates were derived.
5. Steps that have been and will be taken to coordinate research and monitoring activities with those of other researchers.

Operational Reporting & Notification Requirements

1. Researchers must obtain NMFS' approval prior to implementing research protocols (e.g., changes in sampling locations or fish handling protocols) that differ from those considered in the Take Determination Letters, unless immediate deviation from these same protocols are necessary to reduce impacts to fish in hand. In this case, researchers must contact NMFS' designated Take Determination Coordinator or other designated staff as soon as possible to report on the situation (including reporting any resultant unexpected take), the actions taken by the research to minimize impacts to research fish, and coordination of additional actions that are necessary before the research can continue.
2. Each researcher must alert NMFS whenever the authorized level of take is exceeded, or if circumstances indicate that such an event is imminent. Notification should be made as soon as possible, but no later than 2 days after the authorized level of take is exceeded. The researcher must then submit a detailed written report to NMFS. Pending a review of the circumstances, NMFS may suspend the research and monitoring activities or implement reasonable measures and/or alternatives to allow research and monitoring activities to continue.
3. Each researcher must alert NMFS when a take of any ESA-listed species not included in the research proposal is killed, injured, or collected during the course of research and monitoring activities. Notification should be made as soon as possible, but no later than 2 days after the unauthorized take. The researcher must then submit a detailed written report to NMFS. Pending a review of the circumstances, NMFS may suspend research and monitoring activities or implement reasonable measures and/or alternatives to allow research and monitoring activities to continue.
4. In the case of ongoing studies, a report of actual take will be submitted to NMFS no less than 30 days before the request for take for the next year is submitted. For studies which only last 1 year, or upon termination of a multi-year study, a report of actual take will be submitted no less than 30 days after the activities described in the take determination letter cease. Take reports will include the numbers, life stage, species, and evolutionarily significant unit (ESU) of fish taken; the type of take (harass, handle, kill); and levels of incidental mortality. The reports will also include the location of the take (geographical names and Hydrologic Unit Code (HUC), and summarize take into blocks no larger than one month (i.e., take for April, May, etc.). Any of the incidents described in items 2 and 3 above (exceeded take limits, or incidental mortality not covered by the take determination) will also be described in this report. The report will also include an evaluation if methodology can be improved to reduce take (especially incidental mortality).

Take Estimates

The following tables list the total authorized take of listed salmon species.

Table 1. Total number of all potentially listed salmon species taken by the study. These numbers do not include numbers of fish carcass (no limit) which may be handled or sampled in the course of this project. Take levels: 1-harass or disturb, 2-capture and handle, 3-collect sample or tag, 4-lethal sampling.

Species	Clip status	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Chinook	unk	adult		Tag	3	600	1	Bonneville Dam	Mar-Jul.
Chinook	unk	adult		capture, measure, release	3	30	1	Bonneville Dam	Mar-Jul.
Chinook	unk	adult		Tag	3	300	1	Bonneville Dam	Mar-Jul.
Chinook	unk	adult		capture, measure, release	2	15	1	Bonneville Dam	Mar-Jul.
Sockeye	unk	adult		Tag	3	400	1	Bonneville Dam	May-Jul.
Sockeye	unk	adult		capture, measure, release	2	20	1	Bonneville Dam	May-Jul.
Steelhead	unk	adult		Tag	3	800	2	Bonneville Dam	Jun.-Oct.
Steelhead	unk	adult		capture, measure, release	2	40	1	Bonneville Dam	Jun.-Oct.
Chinook	unk	adult		Tag	3	300	1	Ice Harbor Dam	Apr-Jul.
Chinook	unk	adult		capture, measure, release	2	30	1	Ice Harbor Dam	Apr-Jul.

Species	Clip status	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Steelhead	unk	adult		Tag	3	100	1	Lower Granite Dam	Sep.-Nov.

Species Summary	Take	Incidental Mortality
Chinook	1275	6
Sockeye	420	2
Steelhead	940	4

Table 2. Estimated 2013 take activities for potentially ESA-listed salmonids authorized to be taken during the study. These numbers do not include numbers of fish carcass (no limit) which may be handled or sampled in the course of this project. Take levels: 1-harass or disturb, 2-capture and handle, 3-collect sample or tag, 4-lethal sampling.

ESU	Hatchery or Wild	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Lower Columbia Chinook	unknown	adult		Tag	3	26	1	Bonneville Dam	Mar-Jul.
Upper Columbia Spring Chinook	unknown	adult		Tag	3	76	1	Bonneville Dam	Mar-Jul.
Snake River Spring Chinook	unknown	adult		Tag	3	226	1	Bonneville Dam	Mar-Jul.
Lower Columbia Chinook	unknown	adult		Tag	3	2	1	Bonneville Dam	Mar-Jul.

ESU	Hatchery or Wild	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Upper Columbia Spring Chinook	unknown	adult		Tag	3	38	1	Bonneville Dam	Mar-Jul.
Snake River Spring Chinook	unknown	adult		Tag	3	113	1	Bonneville Dam	Mar-Jul.
Lower Columbia Steelhead	unknown	adult		Tag	3	3	1	Bonneville Dam	Jun. - Oct
Middle Columbia Steelhead	unknown	adult		Tag	3	50	1	Bonneville Dam	Jun. - Oct
Upper Columbia Steelhead	unknown	adult		Tag	3	52	1	Bonneville Dam	Jun. - Oct
Snake River Steelhead	unknown	adult		Tag	3	383	1	Bonneville Dam	Jun. - Oct
Snake River sockeye	unknown	adult		Tag	3	15	1	Bonneville Dam	May - Jul.
Snake River Spring Chinook	unknown	adult		Tag	3	330	1	Ice Harbor Dam	Apr-Jul.
Snake River Steelhead	unknown	adult		Tag	3	100	1	Lower Granite Dam	Sep.-Nov.

ESU Summary	Take	Incidental Mortality
Lower Columbia Chinook	28	1
Upper Columbia River Chinook	114	1
Snake River Spring Chinook	669	3
Lower Columbia Steelhead	3	1
Middle Columbia Steelhead	50	1
Upper Columbia Steelhead	52	1
Snake River Steelhead	483	2
Snake River sockeye	15	1

Pacific eulachon are listed as threatened under the ESA and eulachon critical habitat in the lower Columbia River and tributaries has been designated for protection. Nothing in this letter authorizes any take of eulachon which may occur as a result of your activities. If you encounter any eulachon in your activities, you should report any sighting, handling or other encounters with eulachon, and take all appropriate measures to avoid contact or minimize the potential for harm to the species. Any eulachon captured during your activities should be released as quickly as possible; and NMFS should be notified as soon as practicable. If your activities are also likely to adversely affect eulachon critical habitat, you should consult with NMFS.

Determinations by the FCRPS Branch for this research during the 2013 fish passage season and beyond will be made on an annual basis. The annual determination will depend upon information submitted in the research study's annual report, other new information, the annual anticipated status of fisheries stocks, and any subsequent review through regional review processes.

Given the number of researchers using the Corps' facility during the 2013 migration season, we strongly encourage collaboration among the researchers to maximize the amount of information gained using the least number of adult salmon and steelhead possible.

Please notify Gary Fredricks, (503)231-6855, Gary.Fredricks@noaa.gov as soon as possible of any deviation from the terms and conditions in this determination. Please include the study's official title and the number (from the subject line) of the current Take Determination Letter in all communications regarding this study. Please provide the FCRPS Branch's Take Determination Coordinator, Blane Bellerud (503-231-2238, Blane.Bellerud@noaa.gov), with the annual report for this research study.

Sincerely,



Ritchie J. Graves, Chief
Federal Columbia River Power System Branch
Hydropower Division

cc: Michael A. Jepson
Department of Fish and Wildlife Sciences
University of Idaho
Corner of 6th & Line St.
Moscow, Id 83844-3141
mjepson@uidaho.edu