

APPENDIX A

SPECIAL PROJECT OPERATIONS AND STUDIES

Bonneville Dam¹

1. Special Project Operations.

RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spring Creek Hatchery Release. The first hatchery release is expected to occur in early March, followed by special operations for juvenile fish passage as coordinated with the fish agencies through TMT. Project operations for fish passage will be defined by RCC teletype prior to the release.

1.2. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM.

1.3. First Powerhouse Main Unit Rehabilitation. Work continues on the rehabilitation of main units 7 and 8 at PH1 in 2008. Unit 8 is expected to return to service starting in mid March 2008. Unit 7 is expected to return to service in late 2008. Special operations will be requested for main unit testing once the units are ready to start the initial start up test. Tests will require but are not limited to short term runs above and below the 1% turbine efficiency range, and turbine load rejection testing. Durations of these tests are generally short (less than 6 hours). Tests requiring the units to be outside the 1% operating ranges for longer than this 6 hour period during the fish passage season will be coordinated with the regional fish representative prior to testing. Unit outages associated with line boring operations will need to be specially coordinated to minimize additional spill during the fish passage season. Efforts will be made to minimize outages that require taking units OOS during periods of high TDG levels below BON. The Corps rehabilitation fisheries representative (PM-E) along with Voith Hydro will create an advance schedule outlining line boring activities as to reduce the chances of TDG exceedances due to reduced powerhouse capacity. This schedule will be created prior to line boring activities for all remaining units.

2. Studies.

2.1. Spillway Survival Study. Acoustic telemetry will be used to estimate the survival of yearling and subyearling Chinook salmon and steelhead that pass through the spillway. The purpose of this study is to evaluate the effect of spilling 100 kcfs 24-hours per day during the spring migration and 85 kcfs daytime, TDG cap night spill during the summer. New spill patterns were developed in 2007 and will be again evaluated in 2008. Some fish for this work may be collected at the Bonneville Dam smolt monitoring facility but the bulk of the test fish

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will be from releases at John Day Dam. BRZ access to install acoustic telemetry receiving nodes will be required prior to the spill season. In-season battery changes will be necessary for hydrophones located in the BON forebay approximately every two weeks. This will require a BRZ permit for forebay access. Also, researchers may request special spill bay operations through RCC and PM-E during the FPP season to flush large woody debris from the forebay side of the spillway. These operations help safeguard the equipment mounted on the spillway pier noses that may be damaged if large debris is allowed to accumulate in these areas.

2.2 Bonneville Second Powerhouse Behavioral Guidance Structure (BGS) Installation and Biological Evaluation.

Installation and Construction- Starting in February of 2008 contractors will be installing individual sections of the new BGS. This will require the setting of large concrete bottom anchors, cabling, and the floating boom portion from a tug and barge. Several open-ended BRZ permits will be needed to accommodate this installation process. Special requirements may be needed to install new floating debris booms at the Washington Shore, CI and Bradford Island fishway Exit areas. Exit and auxiliary water flows at these areas may need to be reduced for short periods of time to facilitate installation. Special forebay operations will be requested after installation in late February to test the placement of the new BGS and to look at its travel when the forebay is raised and lowered. This forebay manipulation will be coordinated through RCC, FFDRWG, and FPOM and will take place approximately the week of 1 March, 2008 for 3 days.

Forebay BGS Salmonid Behavioral Response Study- Acoustic telemetry will be used to evaluate juvenile salmonid response to the BGS, Second Powerhouse and the B2CC. Acoustic equipment installation in the forebay (BGS) will require BRZ permits. Acoustic equipment at the PH will be mounted on 80' sections of 4" steel pipe attached to every third powerhouse pier nose below the water surface and one section just to the north of the B2CC entrance. These pipe installations are scheduled for March and early April 2008 and will require the closure of the B2CC for short periods of time as well as main unit outages for dive operations. During the study period (15 April through 15 July) several BRZ permits will be required to check or replace equipment.

2.3 Bonneville Second Powerhouse FGE Research.

Juvenile Chinook salmon will be released at three Bonneville Dam Second Powerhouse locations to compare post-passage descaling, injury, and mortality rates and gateway retention times (as measured by passage timing), during turbine operation at the high and low ends of the 1% peak efficiency range. Releases will be made into turbine intakes just upstream and near the top of trashracks, into gatewells near the top of submersible traveling screens (STS), and into the bypass system collection channel adjacent to turbine unit(s) selected for testing. Each replicate will include releases at the three specified locations during each of the two operational modes; therefore a single replicate test will require six distinct marked groups. All fish used in tests will be tagged with PIT tags and recaptured via separation-by-code (SbyC) at the Second Powerhouse Juvenile Fish Monitoring Facility (JFMF). This test will require a main unit (to be determined) to be operated as needed during

specific fish releases. It will also require the unit to be taken off-line for short periods of time to install equipment prior to testing and to dip the gatewell of fish before and after fish releases. Prior to the first releases of Spring Creek fish in 2008 the Corps will be conducting a two(2) day gatewell condition test commencing on Monday and Tuesday March 3 and 4, 2008. These gatewell tests will be conducted at unit 11A. Test fish will be released in the gatewell via a canister release system at both the upper and lower 1% turbine operating ranges each day as well as the B2 JBS channel. This special preseason gatewell testing has been requested by the regional fish managers as well as representatives from the USFWS to help managers decide on what PH2 turbine operation ranges will be used during the newly proposed SCNFH research slated for March 2008. In-season research will be undertaken after the first Spring Creek release in mid to late March 2008. Two other tests will be undertaken either prior or after the next two Spring Creek subyearling releases scheduled for April and May. Researchers will be using their own crane to dip the gatewells. Project support will be needed to mount the trashrack release pipe prior to the start of the tests in mid March. This will require a short outage of the slated unit.

2.4. Bonneville Chum Salmon Study. Starting prior to spill operations in mid-April 2007 Pacific Northwest National Laboratories (PNNL) personnel will be installing TDG monitoring stillwells (piezometers) in several gravel sights at both Ives Island and Multnomah Falls below BON Dam. Along with the piezometer installation PNNL researcher will be installing several egg baskets in early spring to replicate a spawned redd. Depending on river flows, special operations may be requested reducing BON outflows which will facilitate divers to safely install equipment and egg baskets. Any and all requests for flow reductions will be coordinated on a case by case basis with RCC.

2.5. Lamprey Passage Evaluations. From early June to the end of August, 1000-2000 adult Lamprey will be captured and tagged with half-duplex PIT tags and released below the dam to evaluate overall passage, including use of the Lamprey Passage Systems (LPS). 600 of these fish will be radio-tagged for an evaluation of reduced fishway entrance flow at Powerhouse 2. On alternating nights from around June 1 to mid August the Washington shore ladder entrance head will be reduce to 0.5' starting at 1000 and ramped back up to normal operations (1.5') at 0400. A final day by day schedule will be supplied to the project to help guide the operators before the research begins. LPS will be operational no later than the middle of May and run until at least October 1.

2.6. Adult Studies Evaluations. Hydroacoustics will be used to evaluate steelhead kelt passage at the B2CC, from 6 March 2008 to the end of the juvenile passage season.

2.7. Sea Lion Predation. Beginning when the first California sea lions return to Bonneville Dam until the last sea lion leaves, usually mid-February until June 1, exclusion gates will be installed at all downstream slots of all entrances and barriers will be installed at B2 FOGs. In addition, NMFS-approved sea lion harassment activities will occur from land during sea lion season.

2.8. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: THE DALLES

The Dalles Dam²

1. Special Project Operations

RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM.

2. Studies.

2.1. Adult Lamprey Studies. Exit area half-duplex PIT antennas and receivers will be operational to monitor adult lamprey passage no later than mid-May.

2.2. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, and equipment failures, etc. The seasonal timing (i.e., prior to, during the 1st week of spill, or during peak flow conditions) of the affects 16' gate openings will be determined via the fisheries agencies through the regional forum. Some evaluations may not proceed. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC, TMT, and BPA.

² The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

March 2008

APPENDIX A: JOHN DAY

John Day Dam³

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill are from April 10 through August 31 for spring and summer migrants as required in the UPA. Prototype top spillway weirs (TSW) will be evaluated in 2008 to provide information for design of a permanent surface flow outlet system at John Day Dam. The evaluation will compare the performance of two TSWs operating with two different training spill levels. Special spill patterns and treatments for this test are currently under development and are expected to be completed by the end of February. These spill patterns and the TSW test schedule will be coordinated through FPOM, FFDRWG, and RCC upon their completion. The TSW test will occur between 20 April and 20 July. During testing, spill and operation of the TSWs will occur 24-hours per day. Before this test, from April 10 to approximately April 20 (planning dates), spill discharges will be 60% of instantaneous project flow at project flows up to 300,000 cfs from 1800 to 0600 hours as per the 2007 FOP. Above 300,000 cfs project flow, spill discharges will be 180,000 cfs (up to the hydraulic limit of the powerhouse). Following the TSW test, from approximately July 21 through August 31, spill will be 30% of instantaneous project flow 24-hours per day. Spill will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation conditions.

2. Studies.

2.1. Adult Lamprey Studies. Exit area half-duplex PIT antennas and receivers will be operational no later than mid-May to monitor adult lamprey passage. JDA ladders will be evaluated this winter and spring for potential installation of LPS.

2.2. Evaluation of Top Spillway Weirs (TSW)

2.2.1. General. Two prototype spillway weirs that pass ~10 Kcfs each will be installed in Bays 18 and 19. Training spill patterns to support the TSW jets and provide good downstream egress for juvenile salmonids are currently being developed. It is anticipated that two spill levels will be tested to provide spill / TSW efficiency curves. These data will be used for designing surface flow outlet and tailrace improvements at John Day Dam. In addition to passage distribution / efficiency metrics, forebay retention, tailrace egress, and survival will also be estimated for yearling Chinook, steelhead, and subyearling Chinook salmon. Also, prior to the smolt migration a direct survival and injury test using balloon-tagged fish will be conducted.

³ The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

2.2.2. Installation of TSWs. Two TSWs will be delivered to the Forebay of John Day Dam immediately following the navigation lock maintenance outage – approximately 24 March. The TSWs will be installed into bays 18 and 19. Installation, by barge crane, is expected to take 1-2 days. BRZ access will be required to accomplish this.

2.2.3. TSW Evaluations. There will be two parts to the TSW evaluation: 1) a test of the direct effects of TSW passage on juvenile salmonid survival and injury, and 2) an in-season evaluation of the effects of operating the John Day project with two TSWs and two spill levels on juvenile Chinook and steelhead passage distribution, forebay residence time, tailrace egress conditions, and total survival.

The direct test will occur over a 3-day period immediately following TSW installation, and is intended to provide assurance that the TSWs do not directly injure or kill fish. Balloon-tag methods will be used for this study component. It is anticipated to take most of a work day to open and close both TSWs, therefore during the 3 day direct test, both TSWs will need to operate 24-hours per day. In addition to TSW discharge, approximately 5 Kcfs training spill at Bay 17 will be required during release of test fish.

Provided the TSWs are deemed safe to operate during the juvenile salmon passage season, acoustic telemetry and hydroacoustics will be used to assess passage behavior and survival at the dam. Passage metrics will be collected under two training spill conditions, 30% spill vs. approximately 40% spill. A randomized block design will be used to accomplish this, with each spill treatment lasting 2 or 3 days. The specific design, as well as the upper spill level to be tested is still under development in the Regional Forum. In addition to acoustic telemetry and hydroacoustic evaluations, GPS drogues will be released at the spillway, powerhouse, and juvenile bypass outfall to assess tailrace egress conditions. The period for all of these study components will run from approximately 20 April – 20 July and will depend on fish availability and river conditions. Installation of hydrophones and hydroacoustic transducers will occur in March, prior to the start of spill. Main unit rolling outages will be required for divers to install hydrophone mounts and transducers at the powerhouse. Emergency outages may be requested for replacement or repair of damaged equipment during the study. These will be coordinated through FFDRWG/FPOM and RCC. Approximately every two weeks from May through July, battery changes will be necessary for hydrophones located in the JDA forebay. This will require a BRZ permit for forebay access.

2.3. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, and equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: MCNARY

McNary Dam¹

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. During periods of high river flow, spill volumes and the elevation of McNary reservoir may need to be manipulated on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility below the dam.

1.2. Doble Tests. Two transformer banks, T1 and T3, and the respective turbine units will be taken out of service for Doble testing in 2008. Turbine units 1 and 2 will be unavailable for up to 4 days during T1 testing, and turbine units 5 and 6 will be also out of service for up to four days during T3 testing. There may be some overlap between the 2 tests. Since McNary Dam has multiple transformer banks and transmission lines, and redundant switching capability, most turbine units will be available for operation during these tests. Turbine unit 1% efficiency operations and turbine priorities will continue to follow fish passage plan requirements. Outage dates will be coordinated with the region as they become available.

1.3. TSW Installation. TSW1 is to be moved from spillbay 22 to spillbay 19 prior to the start of the 2008 spill season. This change will require one or two spill patterns depending on the number of research case studies planned. New spill pattern(s) will be devised prior to the start of the 2008 fish passage season.

1.4. Headgate Repair. This is a long term program to return the headgates to a safe operating condition by adding new roller chain, seals, anodes, and other miscellaneous components. The plan will require short unit outages throughout the year while transporting rebuilt gates from the turbine units to the repair pit and vice versa. Each swap will take from 4 to 6 hours to complete, and take place approximately every 2 months. Headgate movements are to take place concurrently with other outages as they occur, and no special operations outside the Fish Passage Plan are expected.

1.5. New Turbine Unit Oil Coolers. The existing turbine unit thrust bearing oil coolers are failing and are in need of replacement. The project has been replacing the internal oil coolers with external coolers as they fail. The plan is to replace the remaining oil coolers during planned outages rather than through forced outages after internal oil cooler failure. This work started in July, 2007 and will continue into 2008. No special operations are planned.

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1.6. Navigation. Short term adjustments in spill patterns, spill discharge rates and/or turbine operations may be required for navigational safety. This includes both commercial tows and fish barges.

1.7. McNary DC and Preferred AC Upgrades. Contract 07-C-0025 was awarded on 23 August 2007 to upgrade the existing DC and Preferred AC portion of the station service electrical system at the McNary Dam powerhouse. All contract work within the powerhouse is scheduled to be completed by 23 September 2008. As part of the work, turbine unit outages will be required for installation of seven new electrical panels. During each panel installation, a two unit outage will be required, each outage to last between 2 and 5 days. The outages will be coordinated with powerhouse operations during the month of March 2008. Fish pump outages will be required to facilitate the installation of a new feeder circuit to switchgear. There will be two fish pump outages, each anticipated to last between 1 and 5 days. During pump shutdowns, adult fishway will be configured in accordance with pump outage procedures outlined in the Fish Passage Plan.

1.8. Waterfowl Nesting. From the end of April to the beginning of July, the McNary pool may be restricted to operations to elevations between 337.0 and 340.0 feet in support of waterfowl nesting on Lake Wallula. Pool elevations are also operated between 338.5 and 339.5 feet at least once every 4 days during daylight hours for a period of 4 to 6 hours. A yearly teletype has been issued to regulate the McNary pool in this fashion since at least 1982.

1.9. McNary Dam – Underwater Sounding Inspections. Underwater sounding safety inspections of the McNary Dam stilling basin are planned in September 2008. These soundings are required to be conducted once every 5 years. This will require changes in turbine unit priorities and some restrictions in spill. Water surface is monitored on a continuous basis to determine and account for causes of changes in elevations. During the surveys, turbine units nearest the stilling basin will not be in use, and no spills will be taking place to avoid water level fluctuations. Winter time tests are impractical as this is the time of peak power demand and the highest likelihood of pool fluctuations.

1.10. Pedestal: This contract is to build a 9'x 9'x 12' concrete structure capable of supporting one rotor at the North end of the powerhouse. There is a main water cooling valve that will need to be replaced which may require an outage for Unit (12) for (2 days) between May and September 2008.

1.11. Dewatering System Improvement: The pumping system at McNary is inadequate to support two main unit dewaterings at a time. Between July and December 2008, the dewatering pumps will be replaced. Unit outages may be required for this work for a very short period.

2. Studies.

2.1. Evaluation of Juvenile Salmonid Passage and Survival. A passage and survival study to evaluate the performance of two top-spill weirs (TSW) will be conducted during the spring and summer of 2008. The spring evaluation will consist of one project operation and the summer of two project spill levels. Equipment setup and installation requiring diving and considerable boat activity in the forebay BRZ will take place from February 19 through 31. The spring evaluation will begin April 3 and continue into early June. The summer evaluation will begin later in June and continue until late July. During the evaluations, juvenile salmonids will be collected at the juvenile fish facility for tagging with acoustic tags. The facility will alternate between days of primary bypass and secondary bypass in the spring (April 1 to approximately June 20). Within this time period (approximately April 17 to July 25) during days of primary bypass, the facility will switch to secondary bypass for up to a few hours each day to collect additional fish for tagging if necessary. Tagged fish will be released upstream of the project and monitored as they enter the forebay and pass the project. Also during the evaluation, daily boat access to the forebay BRZ will be required for equipment maintenance. Equipment removal is currently slated to take place from September 8 through 13. Regional coordination will be necessary to determine appropriate spill levels and patterns for spring and summer evaluations. Treatment schedules and test spill patterns will be developed through SRWG and FFDRWG prior to the study.

2.2. Estimate of hydrosystem latent mortality associated with barge and in-river life-history strategies of Snake River spring/summer Chinook salmon. The study will require access to fish collection facilities at Lower Granite, McNary, and Bonneville Dams and access to barges and coordination with barge operations. The study will monitor pathogen prevalence and disease incidence in the barge holds and hydropower bypass facilities along the Snake and Columbia River migration corridor and characterize the impact of transport operations on disease transmission. The study will also assess the impact of loading density and water volume exchange rates on disease dynamics and estimate the incidence of latent mortality associated with the type and severity of infectious disease. This study is being conducted in conjunction with the Alternate Barge Release Strategies Study at Lower Granite which includes early season releases of barged research fish (prior to the start of normally scheduled barge operations). In addition, 6 special releases are scheduled to take place in the vicinity of the Astoria Bridge.

2.3. Developing a separator for Juvenile Lamprey. This study will require access to fish collection facilities at McNary Dam and access to the fish collection channel and orifice trap. In addition, project assistance may be needed to obtain lamprey from bypass collection operations. No special turbine or spill operations will be necessary as all work will take place within the collection channel. Project assistance may be required during installation and removal of test screen material in the JBS exit raceways. Pacific lamprey macrophthalmia and ammocoetes collected at the JBS are inadvertently transported downstream during barging and trucking operations to transport juvenile salmonids past dams. The ability to separate lamprey at these operations would allow release of both anadromous and resident lamprey juveniles back into the

river after collection. Methods to separate lamprey at JBS exit raceways may provide insights into ways to reduce other sources of juvenile lamprey mortality at dams.

2.4. Evaluation of Adult Pacific Lamprey Passage Success at McNary and Lower Snake River Dams. This study will evaluate passage success for adult Pacific lamprey *Lampetra tridentata* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using a combination of radio telemetry and half duplex passive integrated transponder (HD PIT) systems. Adult lamprey will be trapped in adult fishways at McNary dams, held and then tagged at the juvenile smolt sampling facility prior to release. This study will require McNary, Ice Harbor and potentially other Snake River dams to provide power for electronics equipment in the fishways and tailrace areas, access for the installation, repair, and testing of electronic and trapping equipment and access for the downloading of data from radio and PIT tag detection equipment. Some project crane support may be needed to install antennas in and near fishways. Maintenance and installation of equipment will occur during the winter maintenance period when adult fishways are dewatered.

APPENDIX A: ICE HARBOR

Ice Harbor Dam¹

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM.

1.2. Doble Tests. Three transformer banks, TW3, TW4, and TW0 (station service transformer) and turbine units 3 and 4 will be taken out of service for Doble testing in 2008. The outage is tentatively scheduled for 14-17 July 2008. Since Ice Harbor Dam has multiple transformer banks and transmission lines, and redundant switching capability, the remaining turbine units will be available for operation during these tests. Turbine unit 1% efficiency operations and turbine priorities will continue to follow fish passage plan requirements during these tests.

1.3. Navigation. Short term adjustments in spill patterns, spill discharge rates and/or turbine operations may be required for navigational safety. This includes both commercial tows and fish barges.

1.4. Ice Harbor RSW Tests. Tests are tentatively scheduled for February or March. The RSW developed a significant vibration during the 2007 operating season. To support ongoing research as to the source and solution to this problem CENWW may request short outages of the structure, adjacent spillbay, or Unit 6 to allow for installation of, or collection of vibration data. Should the severity of the vibration issue increase where structural integrity or safe operation of the Project are a concern the RSW will be removed from service. Either the spillway will be closed or the RSW stowed to allow for full spillway capacity. No additional outages are anticipated during the fish passage season to assist operation of the RSW.

1.5 Turbine Unit Priority Change. A major transformer has failed at the Sacajawea Substation which in turn restricts turbine operations at Ice Harbor Dam. Transformer design, build and replacement is expected to take a year or more to complete. Because of power distribution restrictions, the turbine unit priority will be 3, 1, 6, 4, 5, and 2 until the transformer is replaced.

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2. Studies.

2.1. Evaluate the Impacts of Avian Predation on Salmonid Smolts from the Columbia and Snake Rivers. This is a continuation of a pilot study to determine how various biotic and abiotic factors are associated with differences in steelhead smolt vulnerability to predation by Crescent Island terns and Foundation Island cormorants. The study request PIT tagging both hatchery and wild steelhead collected in the smolt monitoring sample at Lower Monumental and Ice Harbor dams from April through July. The recorded condition of a fish will be attached to a specific tag code and vulnerability to avian predation will be evaluated using PIT tag recovery data collected from the avian bird colonies. A sample of 500 fish per week is desired. Some collection will take place prior to the start of the regular transport season. The number of fish desired means the collection at times will exceed the numbers of fish needed to determine fish condition. Some fish will also be held greater than the maximum 2 days normally allotted.

2.2 Capture and tag adult salmon and steelhead in the trap at Ice Harbor fish ladder. This activity would take place in support of the adult passage and behavior study planned at Little Goose as well as an evaluation of adult holding in the Lower Granite fish ladder and transition pool in 2008. The trap would be used during the spring and summer spill periods for spring Chinook, steelhead and fall Chinook (April 1 to August 31 spill period). Access to the ladder may be necessary for inspecting and preparing the trap location during the dewatered winter maintenance period. The adult trap itself can be maintained and serviced without unwatering the ladder. Only the trap guides in the channel need to be examined during the maintenance period.

2.3. Evaluation of Adult Pacific Lamprey Passage Success at McNary and Lower Snake River Dams. This study will evaluate passage success for adult Pacific lamprey *Lampetra tridentata* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using a combination of radio telemetry and half duplex passive integrated transponder (HD PIT) systems. Adult lamprey will be trapped in adult fishways at McNary Dam, held and then tagged at the juvenile smolt sampling facility prior to release. This study will require McNary, Ice Harbor and potentially other Snake River dams to provide power for electronics equipment in the fishways and tailrace areas, access for the installation, repair, and testing of electronic and trapping equipment and access for the downloading of data from radio and PIT tag detection equipment. Some project crane support may be needed to install antennas in and near fishways. Maintenance and installation of equipment will occur during the winter maintenance period when adult fishways are dewatered.

APPENDIX A: LOWER MONUMENTAL

Lower Monumental Dam¹

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. During periods of high river flow, spill volumes and the elevation of Lower Monumental reservoir may need to be manipulated on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility below the dam.

1.2. 500 KV Disconnect Switch Replacement. The T1 line 500 KV disconnect switch is tentatively scheduled to be replaced in late September or early October 2008. The current switch which failed in January 2007 is a key safety and equipment protection device. This work will require a total powerhouse outage, and 100% spill (except for station service) for up to 2 weeks. This work will be coordinated with other potential outages such as Doble testing.

1.3. Navigation. Short term adjustments are needed outside of the approved spill patterns, spill discharge rates and/or turbine operations may be required for navigational safety. This includes both commercial tows and fish barges.

1.4. RSW. Following completion of the construction of the RSW in mid-March, commissioning and operational validation tests will not be undertaken, but instead postponed until after the fish passage season. Biological data collection equipment will be installed in March, prior to the fish passage season. Baseline biological data will be collected to validate the structure prior to the fish passage season. No additional outages are anticipated during the fish passage season to assist operation of the RSW. CENWW may request short outages of the structure or adjacent spillbay, or Unit 6 should adjustments need to be made to either the RSW or biological monitoring equipment during the fish passage season. When the RSW is in operation, the spillgate shall be raised to where it does not touch flow passing down the RSW.

1.5. Tailrace Crane: The trolley will be replaced in its entirety and the crane will be brought up to current codes and standards. The installation of new electrical will be isolated from the plant. When the crane is returned to service, power will be restored at the main breaker and testing can occur with the local breakers at the crane. Any power outages will occur in December 2008.

1.6. Gantry Intake Crane: The entire crane is being rehabilitated both mechanically and electrically between April 1 and October 1, 2008. A power outage will occur in April 2008 for 4 hours while the crane bus is isolated from the main power source. Overhead work for cab replacement will occur between May and August 2008 that would require 1 week of intermittent outages of Units 5 and 6 for 8 hours total.

¹ The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

2. Studies.

2.1. Evaluate the Impacts of Avian Predation on Salmonid Smolts from the Columbia and Snake Rivers. This is a continuation of a pilot study to determine how various biotic and abiotic factors are associated with differences in steelhead smolt vulnerability to predation by Crescent Island terns and Foundation Island cormorants. The study request PIT tagging both hatchery and wild steelhead collected in the smolt monitoring sample at Lower Monumental and Ice Harbor dams from April through July. The recorded condition of a fish will be attached to a specific tag code and vulnerability to avian predation will be evaluated using PIT tag recovery data collected from the avian bird colonies. A sample of 500 fish per week is desired. Some collection will take place prior to the start of the regular transport season.

2.2. Lower Monumental RSW Post Construction Evaluation . A radio telemetry survival study will be conducted with yearling Chinook through Lower Monumental Dam during the spring of 2008. Radio telemetry equipment setup will begin in February and continue until the end of March, 2008. Smolts will be radio tagged, released upstream of the project, and monitored as they pass the project beginning in mid-April. Spill using a high-gate opening alternate bay configuration will be evaluated compared to a flat pattern to maximize passage through the RSW and survival through both the RSW and spillway.

2.3 Bull Trout PIT tag Study – Incidental bull trout passing through the Lower Monumental Juvenile Fish Facility will be collected and held for PIT tag insertion, then released through the Lower Monumental primary bypass outfall. Project duration begins and ends with scheduled juvenile fish facility operations. No special turbine or spill operations will be necessary.

APPENDIX A: LITTLE GOOSE

Little Goose Dam¹

1. Special Project Operations.

1.1 Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM.

1.2 Navigation. Short term adjustments in spill patterns, spill discharge rates and/or turbine operations may be required for navigational safety. This includes both commercial tows and fish barges.

2. Studies.

2.1 Evaluate Behavior and Passage of Adult Salmon and Steelhead Under Varying Spill Conditions. Adult spring Chinook, steelhead and fall Chinook will be collected at the Ice Harbor fish ladder adult trap, radio-tagged, and released in the forebay of Ice Harbor Dam. The behavior and passage of these fish will be tracked in the tailrace and through the fish ladder at Little Goose Dam under three, or possibly four spill and power house operations. The study is planned for the spring spill season with an optional task to include the summer spill period of approximately June 1 through termination of spill in August.

Radio tag antennas will be placed in the tailrace, at all ladder entrances, at the junction pool, at the ladder exit, at the primary juvenile bypass outfall, and near the navigation lock discharge pipe. There are currently radio antennas in the ladder that will require inspection, repair and/or replacement during the winter dewatered period. Additional antenna locations may include the north shore, the earth fill portion of the dam, and the peninsula. The research biologists may also need access to the tailrace BRZ for radio-tracking antenna placement if barges are necessary to obtain the behavior information needed. In addition to tracking adults, GPS-equipped drogues will be released into selected spillways in order to record and characterize flow patterns in the tailrace under various spill patterns and power house operations. Boat access to the tailrace will be necessary for recovering the drogues as well as the mobile tracking of adults. Spill patterns and power house test treatments will be coordinated through FPOM and the regional fish managers. Once a specific project operating condition has been shown to be detrimental to adult fish passage, the condition will be dropped from the study.

¹ The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

2.2 Bull Trout PIT tag Study – Incidental bull trout passing through the Little Goose Juvenile Fish Facility will be collected and held for PIT tag insertion, then released through the Little Goose primary bypass outfall. Project duration begins and ends with scheduled juvenile fish facility operations. No special turbine or spill operations will be necessary.

APPENDIX A: LOWER GRANITE

Lower Granite Dam¹

1. Special Project Operations.

1.1. Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. During periods of high river flow, spill volumes and the elevation of Lower Granite reservoir may need to be manipulated on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility below the dam.

1.2 Turbine Unit 2 Repair. Turbine unit 2 is currently undergoing rotor pole repair and is estimated to be returned to service by late October 2008. Two weeks of operational tests are needed after the completion of repairs to verify turbine and generator controls, start-up & shut-down sequence operations, relay action, alarms, and other associated components. Operation outside of normal priority may be necessary.

1.3. Turbine Unit 3 Cavitation Repair. Unit 3 is scheduled to be taken OOS for cavitation repair early summer (Approx. Mid June-Mid July, when flows are expected to stay below 60 KCFS) and will remain OOS for approximately 4 months.

1.4 Main Unit Fire Protection. Each main unit will need to be taken OOS for a duration of approx 8 to 10 days one unit at a time to upgrade the fire protection system to a bulk CO2 storage system. Project to start sometime in either June or July depending on runoff. Unit 2 will not need further outage as the unit is already OOS. Unit 3 should also be OOS for cavitation repair and CO2 installation will occur. Unit 1 will be first outage in July and back online before followed by units 4 to 6.

1.5. Power System Stabilizer (PSS) installation on Units 4, 5, 6. Units will be scheduled OOS for approximately 1 week (one unit at a time) to perform the physical installation of PSS. After physical installations are complete, each unit will then be scheduled OOS (one unit at a time) for 1 to 2 days to tie in to existing system and commission each PSS. These outages are estimated to begin in late July to late August during mandatory spill season when river flows are low.

1.6. Main Unit Breaker: Unit 2 is currently out of service and the final testing phase for the main unit breaker replacement will take place in July 2008 when the unit is reassembled. An outage of 5 hours will be needed for Units 1-4 in July 2008 to return power to this unit for final USACE testing.

¹ The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

1.7. Arc Flash: Data collection to establish PPE levels or changes to equipment will require various unit outages for personnel safety for 1 hour on 6 different occasions to open cabinet doors for verification purposes between April and July 2008.

2. Studies.

2.1. Alternate Barge Release Strategies. In 2008, NOAA Fisheries will PIT tag yearling Chinook salmon and steelhead to evaluate if an alternate release site for barged fish improves survival. . The study will require one 2000 series barge for transporting the smolts downriver to near Astoria Bridge for release, and a separate towboat will be contracted to move this barge downriver for the release. Six separate alternate site releases on an ebb tide are planned and tagging will occur five days prior to each release. The control group will be transported in a normal barge trip with all other collected fish for release at Skamania. Arrangements have been made to use the NOAA PIT tagging buildings and personnel for the PIT marking. Acoustic marking and BKD sampling will need to take place either in the wet lab or the shed used for gas bubble monitoring. This study may require an increase in the normal facility sampling rate in order to get the required number of fish on marking days. The study will require coordination with other onsite researchers and the project biological staff and this effort has already been initiated. Alternate release site barges are to depart Lower Granite Dam on April 21, April 28, May 5, May 12, May 19, and May 26.

2.2. Comparative Performance of Acoustic-tagged and PIT-tagged Juvenile Salmonids.

This study will examine performance differences between fish tagged with only a PIT tag against fish tagged with both a microacoustic tag and PIT tag. The existing PIT tag diversion for the east raceway flume was modified in February 2007. This changed the then existing drop gate into a PIT diversion slide gate capable of rapid response. Only spring fish are to be studied during the 2008 season.

2.3. A study to compare seasonal SARs of early in-river migrating versus transported Snake River yearling anadromous salmonids. At Lower Granite, this study will ask for fish to be collected and held starting April 6 and transported by barge once a week until regularly scheduled transportation operations begin. Samples are to be collected over 2-3 days, then transported by barge on Thursdays. The desired transported sample size is 6,000 wild Chinook and 6,000 wild steelhead per week for five to six weeks beginning approximately April 1. The current tagging level for the inriver migrating group is 2000 fish per week using NOAA Fisheries Survival Study tagging standards. The study will request an increase in the inriver migrating sample size for comparison. An estimated sample size for the in-river migrating group to estimate weekly SARs with 95% confidence interval is being developed.

2.4. Estimate of hydrosystem latent mortality associated with barge and in-river life-history strategies of Snake River spring/summer Chinook salmon. The study will require access to fish collection facilities at Lower Granite, McNary, and Bonneville Dams and access to barges and coordination with barge operations. The study will monitor pathogen prevalence and disease incidence in the barge holds and hydropower bypass facilities along the Snake and Columbia River migration corridor and characterize the impact of transport operations on disease transmission. The study will also assess the impact of loading density and water volume

exchange rates on disease dynamics and estimate the incidence of latent mortality associated with the type and severity of infectious disease. This study is being conducted in conjunction with the Alternate Barge Release Strategies Study at Lower Granite which includes early season releases of barged research fish (prior to the start of normally scheduled barge operations). In addition, 6 special releases are scheduled to take place in the vicinity of the Astoria Bridge.

2.5. Evaluate causes of adults holding in the fish ladder and transition pool. Fish tagged at the Ice Harbor adult trap for the behavior and passage study at Little Goose Dam will be again tracked upon entrance in the tailrace at Lower Granite Dam. Ladder conditions at Lower Granite will be monitored and evaluated with respect to adult passage/behavior. Radio antennas currently present in the Lower Granite ladder will be inspected, repaired, or replaced as needed during the 2008 winter maintenance period.

2.6. Estimate survival of in-river and transported yearling Chinook salmon originating from Dworshak hatchery in the lower Columbia River and Estuary with emphasis on increasing understanding of causes of differential delayed mortality. The study will require access to fish collection facilities at Lower Granite and Bonneville Dams and access to barges and coordination with barge operations. The primary goal of this study is to use JSATS acoustic tags and concomitant detection arrays in conjunction with estuary net pens to increase the understanding of the extent and cause of differential delayed mortality of transported and in-river yearling Chinook salmon smolts originating from Dworshak hatchery specifically in the lower Columbia River and Estuary. This study is being conducted in conjunction with the Alternate Barge Release Strategies Study at Lower Granite which includes early season releases of barged research fish (prior to the start of normally scheduled barge operations).

2.7 Bull Trout PIT tag Study – Incidental bull trout passing through the Little Goose Juvenile Fish Facility will be collected and held for PIT tag insertion, then released to the Little Goose primary bypass outfall. Project duration begins and ends with scheduled juvenile fish facility operations. No special turbine or spill operations will be necessary.