Appendix A – Special Project Operations & Studies
Bonneville Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer juvenile salmonid outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOP and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through FPOM. Planning dates for spill at projects on the Lower Columbia River are from April 10 through August 31 for spring and summer migrants.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Lower Columbia River projects is scheduled for March 02–16. During this 2-week period, the navigation lock at Bonneville Dam will be closed for annual inspection, maintenance and repair.

2. Studies.

2.1. Powerhouse Two (PH2) Fish Guidance Efficiency (FGE) Program Research. From March through July, 2013, the COE-funded study "*Validation of the Computational Fluid Dynamics Analysis and Evaluation of Fish Condition and Gatewell Residence Time for Juvenile Salmonids in a Modified Gatewell at the Bonneville Dam Second Powerhouse*" is scheduled to occur. Powerhouse 2 (PH2) unit 14 will be out of service March 04–23, 2013, for installation of a Turbulence Reduction Device (TRD) in gatewell 14A. Proof-of-concept testing will determine if the TRD reduces gatewell turbulence during operation at the upper end of the 1% peak efficiency operating range, and if so, whether the turbulence reduction results in measureable fish condition improvements for juvenile Chinook salmon passing through the modified PH2 gatewells.

The first phase of testing consists of physical velocity measurements in gatewells 14A, 15A, and 14C from approximately March 25–April 05. Gatewell 14A will be equipped with a TRD. Velocity measurements will occur in 14C and 15A without TRDs. Instrumentation will be present in the gatewells for approximately 10 hours each day. Units will be operated at specified flow ranges in the 1% peak efficiency range during velocity testing and a schedule will be provided to Bonneville Dam Operations.

PH 2 unit priority during velocity testing (approx. March 25–April 5) will be as follows:

- 14A Test: 12, 18, 14, 13, 15, 17, 16 (unit 11 out-of-service)
- 14C Test: 12, 18, 14, 15, 13, 17, 16 (unit 11 out-of-service)

- 15A Test: 12, 18, 15, 14, 16, 13, 17 (unit 11 out-of-service)

The second phase consists of biological testing in gatewell 14A. Spring Creek and run-of-the-river juvenile Chinook salmon will be released through a pipe at the unit 14 intake trash rack and the bypass system collection channel to compare post-passage descaling, mortality rates, and gatewell retention times. This will occur during turbine operation at the high end of the 1% peak efficiency range with and without TRDs installed, and also at the low end of the 1% range without TRDs installed. Units will be operated at specified flow ranges during fish releases and a schedule will be provided to Bonneville Dam Operations. The first releases will occur early April and continue periodically through mid-July. Project support will be needed for the reinstallation of the trash rack release pipe in March. Short unit outages will be required for VBS cleaning and weekly VBS seal inspection. PIT-tagged test fish will be recovered in the PH2 Juvenile Monitoring Facility via sort-by-code (SbyC).

PH2 unit priority during biological testing with fish (approx. April 8–July 18) will be as follows:

- 14A Test: 18, 12, 14, 13, 15, 17, 16 (unit 11 out-of-service)

PH2 unit priority as defined in the 2013 Fish Passage Plan will occur during non-test periods (i.e., the period between velocity testing and biological testing, Spring Creek NFH releases, and weekends or weeks when not conducting biological testing).

2.2. Adult Salmon Studies. From late March to early October, up to 600 adult and 400 jack spring-summer Chinook salmon, 400 sockeye salmon, and up to 800 steelhead will be captured and radio-tagged and/or PIT-tagged at the Bonneville Dam Adult Fish Facility (AFF) and released below the dam to evaluate passage and migration behavior. At Bonneville Dam, the primary focus of this study will be on passage behavior at the modified Washington Shore Fish Ladder – North Downstream Entrance. Access to antenna and receivers for downloading and maintenance at all fishways will be needed from March through October. Any new radio-telemetry antenna or receiver installations or maintenance will be completed during the 2012-2013 IWW period.

2.3. Lamprey Passage Evaluations. From early June to the end of August, up to 900 adult Pacific lamprey will be captured and tagged at the Adult Fish Facility, tagged with half-duplex PIT-tags and released below the dam to evaluate efficacy of fishway modifications and overall migration through the FCRPS. Access to antennas and receivers for downloading and maintenance will be needed from March through October. LPS and half-duplex PIT antennas will be operational no later than the middle of May and run until at least October 1. Any new antenna or receiver installations will be completed during the 2012-2013 IWW period.

Installation of a prototype Lamprey Flume System (LFS) at the Washington Shore Fish Ladder – North Downstream Entrance is expected to be completed in March 2013. Testing of the LFS will include an evaluation of various flow settings for the gravity-flow water supply system, with the intent of determining an optimal set point for attracting and successfully passing adult lamprey via this route. The LFS system will terminate in a holding tank installed on the tailrace deck. Lamprey collected from this location may be used for passage studies, released in the forebay of the dam, or transferred to tribal lamprey biologists for upriver studies and restoration efforts. Allocation details will be coordinated with the Tribes and FPOM.

To evaluate the use of JSATS acoustic telemetry tags in adult Pacific lamprey studies and to determine the fate of adult lamprey in the FCRPS, up to 400 adult Pacific lamprey will be captured and tagged with a JSATS and half-duplex PIT-tag. Some will be released in the Bonneville Dam forebay, and some in the tailrace for this study. Movements will be monitored via fixed autonomous receivers equipped with hydrophones and through boat-based mobile tracking. This work may require a permit for access to the BRZ of Bonneville Dam.

In addition, a DIDSON and low-light optical video cameras will be used to evaluate fine-scale passage behavior of Pacific lamprey at the North Downstream Entrance, junction pool, and transition pool of the Washington Shore Fish Ladder. As with other lamprey study objectives, operation of the DIDSON and conventional video cameras will occur throughout the adult lamprey passage season (early June – October).

2.4. Sea Lion Predation. From early January through May 31, 2013, the Fisheries Field Unit (FFU) will monitor sea lion predation and evaluate sea lion deterrent efforts from the powerhouse decks and the spillway public parking lot. Beginning when the first sea lions appear at Bonneville Dam until the last sea lion leaves (usually mid-November through June 1, or as coordinated through FPOM), exclusion gates will be installed at all downstream slots of all entrances, and barriers will be installed at PH2 floating orifice gates (FOGs). In addition, NOAA Fisheries-approved sea lion harassment activities will occur from land and water during sea lion season.

2.5. Summary. All dates shown are approximate and could be advanced or delayed depending on variables 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 significant special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the appropriate regional forum with the action agencies making the final decision.

Appendix A – Special Project Operations & Studies
The Dalles Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer juvenile salmonid outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOP and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through FPOM. Planning dates for spill at projects on the Lower Columbia River are from April 10 through August 31 for spring and summer migrants.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Lower Columbia River projects is scheduled for March 02–16. During this 2-week period, the navigation lock at The Dalles Dam will be closed for annual inspection, maintenance and repair.

2. Studies.

2.1. Adult Lamprey Studies. Half-duplex PIT-tag systems will be operational to monitor adult lamprey passage no later than mid-May, 2013. Access to antennas and receivers for downloading and maintenance will be needed from March until August. Any new antenna installations will be completed during the 2012-2013 IWW period.

JSATS-tagged adult lamprey will be released in the Bonneville Dam forebay and tailrace and mobile tracked by boat through the reservoir reaches, tributary mouths, and tailraces of upstream dams. This work may require a permit for access to the tailrace BRZ of The Dalles Dam.

2.2. Adult Salmon Studies. Passage of salmon and steelhead collected, tagged with radio-telemetry transmitters and/or PIT-tags, and released below Bonneville Dam will be monitored at The Dalles Dam from late March through October, 2013. The primary focus of the passage study will be on impacts of the 8/9 extended spillwall and associated spill pattern on passage behavior of adult salmonids. Inter-dam conversion of PIT-tagged fish will also be used to assess losses from Bonneville Dam to McNary Dam.

Prototype full-duplex PIT-tag antennas are to be installed at both the East and North fish ladder count stations during the 2012-2013 IWW period. Any new radio-telemetry antenna or receiver installations or maintenance will be completed during the 2013-2014 IWW period. Access to

antennas and receivers for downloading and maintenance will be needed from March through the 2013-2014 IWW period.

2.3. Summary. All dates shown are approximate and could be advanced or delayed depending on variables 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 significant special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the appropriate regional forum with the action agencies making the final decision.

Appendix A – Special Project Operations & Studies
John Day Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer juvenile salmonid outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOP and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through FPOM. Planning dates for spill at projects on the Lower Columbia River are from April 10 through August 31 for spring and summer migrants.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Lower Columbia River projects is scheduled for March 02–16. During this 2-week period, the navigation lock at John Day Dam will be closed for annual inspection, maintenance and repair.

2. Studies.

2.1. Adult Lamprey Studies. Half-duplex PIT-tag systems will be operational to monitor adult lamprey passage no later than mid-May, 2013. Access to antennas and receivers for downloading and maintenance will be needed from March until October, 2013. Of particular interest in 2013 is passage behavior in response to modifications at the North Fish Ladder entrance and lower ladder. Any new antenna installations will be completed during the 2012-2013 IWW period.

Installation of a prototype Lamprey Passage Structure (LPS) at the North Fish Ladder is expected to be completed in March, 2013. This LPS will terminate in a holding tank installed on the tailrace deck. Lamprey collected from this location may be used for passage studies, released directly into the forebay of the dam, or transferred to tribal lamprey biologists for upriver studies and restoration efforts. Allocation details will be coordinated with the Tribes and FPOM.

In addition, a DIDSON camera will be used to evaluate fine-scale passage behavior of Pacific lamprey at the entrance and transition pool of the North Fish Ladder. As with other lamprey study objectives, operation of the DIDSON and conventional video cameras will occur throughout the adult lamprey passage season (early June–October).

Installation of a prototype lamprey trap and counting structure behind picket leads at the South Fish Ladder count station should be completed in February 2013. This structure can be operated

in either a "bypass" mode or in a "trap" mode. When actively trapping, the system will terminate in a submerged trap behind the picket leads. Tribal lamprey biologists will operate the trap in lieu of conventional trapping at this location. Collected lamprey will be transported by the Tribes for upriver studies and restoration efforts. Additional details on trap operations will be coordinated with the Tribes and FPOM.

JSATS-tagged adult lamprey will be released in the Bonneville Dam forebay and tailrace and mobile tracked by boat through the reservoir reaches, tributary mouths, and tailraces of upstream dams. This work may require a permit for access to the tailrace BRZ of John Day Dam.

2.2. Adult Salmon Studies. Passage of salmon and steelhead collected, tagged with radio-telemetry transmitters and/or PIT-tags, and released below Bonneville Dam will be monitored at John Day Dam from late March through October, 2013. The primary focus of the passage study will be on the efficacy of improvements to the North Fish Ladder entrance and transition pool area.

Any new radio-telemetry antenna or receiver installations or maintenance will be completed during the 2012-2013 IWW period. Access to antennas and receivers for downloading and maintenance will be needed from March through the 2013-2014 IWW period.

2.3. Summary. All dates shown are approximate and could be advanced or delayed depending on variables 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 significant special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the appropriate regional forum with the action agencies making the final decision.

Appendix A – Special Project Operations & Studies
McNary Dam

The purpose of this Appendix is to notify regional interests of special operations and studies that are planned to occur at the project during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOPs and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill at projects on the Lower Columbia River are from April 10 through August 31 for spring and summer migrants. During periods of high river flow, spill rates and forebay elevation at McNary Dam may need to be adjusted on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility downstream of the dam.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Lower Columbia River projects is scheduled for March 02–16. During this 2-week period, the navigation lock at McNary Dam will be closed for annual inspection, maintenance and repair.

1.3. Doble Tests. From July 08–July 19, 2013, Doble testing of transformer banks, T4, and T5, will require their respective turbine units to be out of service (OOS) and unavailable for up to 4 days during testing. There may be some overlap between the two 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 FPP requirements.

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 4-6 hours to complete, and occur approximately every 2 months. Headgate movements are to take place concurrently with other outages as they occur, and the project does not expect any special operations outside FPP criteria.

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

1.6. Unit 4 and 11 Rewind. Units 4 and 11 will be taken out of service from June, 2013 through February 01, 2014, for winding and replacement of various other electrical and mechanical components, from the old excitation system down to the wicket gate servomotors.

2. Studies

2.1. Adult Salmon Studies. Both a lower Columbia River and a Snake River adult salmon passage study are planned for the 2013 adult passage season. Any new radio-telemetry antenna or receiver installations or maintenance will be completed in March-April 2013.

2.2. Evaluation of Adult Pacific Lamprey Passage Success at McNary Dam. This study will evaluate passage success for adult Pacific lamprey at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using half-duplex (HD) PIT-tag systems. This study will require McNary, Ice Harbor and Lower Snake River dams to provide power for electronics, and access for the downloading of data from the PIT-tag detection equipment. Maintenance of equipment will occur during the winter maintenance period when adult fishways are dewatered.

2.3. Fish Guidance Efficiency (FGE) and Fish Condition Study relative to partially raised operating gate (PROG) and stored operating gate (SOG) position will occur at McNary Dam during the 2013 fish passage season. The study will occur over a period of approximately two weeks during April–May and June–July. Prior to the fish passage season, hydroacoustic transducers will be installed behind the trashracks and on the ESBS brackets in the A, B, and C intakes in turbine units 6, 7, 12, and 13. The use of turbines 6 and 7 may cause unit priority to deviate from that stated in the FPP and will be coordinated appropriately. Turbine units will be operated within the 1% range. It is expected that the install of hydroacoustic transducers behind the trashrack will require approximately 7 days and occur during the timeframe of April 01–12, 2013. Hydroacoustic transducers to be installed on the ESBSs will be coordinated prior to the install of the ESBSs to reduce the possibility of any unnecessary outages. Final study dates, required outages for hydroacoustic transducer install and intake gate position changes will be coordinated appropriately through SRWG and FPOM. Equipment removal will occur subsequent to the fish passage season in September, 2013.

2.4. Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at McNary Dam. The purpose of this study is to use underwater video, acoustic imaging, and/or other non-invasive technologies to count and observe adult salmonids and Pacific lamprey in the fish ladders at McNary Dam. The primary goal of this work is to estimate the numbers of adult lamprey passing behind the picketed lead gates at count stations and to develop escapement estimates of the total number of lamprey passing McNary Dam. This study will require McNary to provide power for electronics equipment in the fishways, access for the installation, repair, and testing of electronic equipment and access for the downloading of data from video camera equipment.

2.5. Oregon Shore Ladder Intake Screen Monitoring. The purpose of this monitoring study is to ensure that the current Oregon shore adult ladder fish screens are not impinging ESA-listed juvenile fish, Pacific lamprey or bull trout. The screens were designed and installed in the early 1950s, thus do not meet the current screening criteria defined by NOAA Fisheries. The area in

front of this intake screen will be monitored using video cameras to discern the extent to which fish populations are impacted by operation of these travelling screens. In addition, the fingerling bypass ports on either side of the ladder downstream of the ladder exit will also be monitored using video cameras. Monitoring will be conducted throughout the juvenile fish passage season, approximately April 10 through August 31. The video cameras will be attached in front of the screens to existing frames used since the 2011 monitoring season. These cameras will be aimed at different angles in order to record as much of the screens as possible. The cameras for the bypass ports will be lowered into place on new mounting frames installed at the exits of the ports during the ladder outage in February 2013.

Appendix A – Special Project Operations & Studies
Ice Harbor Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOPs and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill at projects on the Lower Snake River are from April 3 through August 31 for spring and summer migrants.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Snake River projects is scheduled for March 02–23. During this 3-week period, the Projects have scheduled routine inspections and maintenance, as well as some non-routine work, such as replacement of an unwatering pump, upstream lock gate seal and wire rope replacement, and mooring bit repair.

1.3. Doble Testing. In 2013, Doble testing will take the following out of service: two transformers, TW1, TW2, and TJO and turbine units 1 and 2**.** The outage is tentatively scheduled for August–September, 2013. Since Ice Harbor Dam has multiple transformer banks, transmission lines, and redundant switching capability, the remaining turbine units will be available for operation during these tests. Turbine units will operate within the 1% of peak efficiency operating range, in accordance with the turbine priority order defined in the Fish Passage Plan. During the test, units 3 and 4 will be required to generate power out of Line #2 of Ice Harbor which could be against section 4.1 of the Fish Passage Plan depending on river flows. The switching necessary to support power generation and BPA system reliability may not be able to occur in August and September 2013. This outage will be coordinated with the Line #1 Disconnect Switch Maintenance in item 1.9.

1.4. Steady State Model Validation Testing. Western Electricity Coordinating Council (WECC) requires steady state model validation testing on a periodic basis to ensure the generating equipment will meet real and reactive power ratings. All units will be tested on a 1-2 year cycle. Tests will involve running the unit out of fish priority sequence and outside the 1% range. Testing can occur at any time from September 01–March 31, and will not occur during fish passage season (April 01–August 31). Tests will preferably be conducted just after unit annual maintenance, but may happen at other times. Tests will last for a standard of 30 minutes at maximum load with additional time to run the unit along the maximum real/reactive power curve to the minimum settings. Total test time is anticipated to be 90 minutes or less. Test

durations will be minimized to the extent possible and will only be run for the purpose of completing the required model validation testing.

1.5. DC System and Low Voltage Switchgear replacement. This project will start in May 2012 through August 2013 and will require turbine unit outages for the replacement of the associated panels. There are times during this evolution when switching electrical unit control busses must occur in which the unit will be brought down to accommodate switching. This switching will affect unit priority to assist with lineup of power on the units to minimize downtime on evolutions for this project. At times all turbine units or priority units will be out of service during panel replacements and temporary power installations and these outages will be limited in duration. After the panel, breaker and switchgear replacements, the turbine units will be ran and tested out of unit priority to support commissioning of the modifications. These evolutions may utilize water that would normally be used for spill.

1.5.1 SQO Tie Breaker Replacement. From March–May, 2013, the tie breaker for the 480-volt SQO switchgear will be replaced as part of this project. In order to replace this breaker, the STSs and count station will require temporary power to support the replacement of this breaker. The cut-over for temporary power and replacement of this breaker will take less than 10 hours. The replacement of this breaker will take less than a shift.

1.5.2 SQ1 Tie Breaker Replacement. From March–May, 2013, the tie breaker for the 480-volt SQ1 switchgear will be replaced as part of this project. In order to replace this breaker, units 1–3 will be taken out of service. The replacement of this breaker will take one day and will impact unit operation priority order.

1.6. Main Unit #5 and #6 Reactive Limit Testing. In FY13, after repairs of units 5 and 6 are complete, reactive limit testing will be performed. The test is required every two years for generator owners to quantitatively measure machine performance limits to ensure it is capable of providing protective functions during grid disturbances and to ensure it is not a contributor to these disturbances. The test requires operating outside of the 1% operating range for approximately 15 minutes to ensure the reactive limits of the generator can be met and held for a period of time. Testing of the units may utilize water that would normally be used for spill.

1.7. Transformer Oil Replacement. In FY13 and FY14, Ice Harbor project will be replacing transformer oil on TW-4, TW-5, TJ-0, and TW-0 based on the condition of the oil and the PCB levels within these transformers. Currently the outages are not scheduled for these items but they will occur in 2013 and will impact testing of units that may utilize water that would normally be used for spill.

1.8. Main Unit Digital Governor Upgrades. From June 2013 to December 2015, the Main Unit Digital Governors at Ice Harbor will be replaced starting on unit 4 and proceeding up to unit 6. Each unit will take about 5 weeks for the governors to be replaced. This will also involve response testing prior to the unit coming back online that will require the unit be operated outside of the 1% range and out of unit priority order in the Fish Passage Plan.

1.9. Line #1 Disconnect Maintenance. In August 2013, required maintenance and routine PMs will be performed on the 115KV Line #1 disconnect and ground switch at Ice Harbor. This maintenance will be coordinated with the Doble testing in item 1.2. During this time Main Units 3 and 4 will be required to generate power out of Line #2 of Ice Harbor which could be against section 4.1 of the Fish Passage Plan depending on river flows. Switching may not be able to occur to support power generation and BPA system reliability from August 19–September 09, 2013.

1.10. Drainage/Unwatering Pump Replacements. Beginning in December 2013, the project will install new switchgear that will be supplied by the station service 480 volt switchgear SQO. To perform this cutover and installation each bus on SQO will be taken out at different times. This will impact the south shore count station and controls while temporary power is installed to support this cutover.

1.11. 2014 Dam Safety Periodic Inspection. After October 2013, the periodic safety inspection will occur. These inspections will involve running the spillway diesel generator with all spillway gates running on the diesel generator. The spillways gates will be operated with water while on the diesel generator.

2. Studies

2.1. Adult Salmon Studies. Both a lower Columbia River and a Snake River adult salmon passage study are planned for the 2013 adult passage season. Any new radio-telemetry antenna or receiver installations or maintenance will be completed in March-April 2013. A new water-to-water transfer adult trap in the old trap location of the south fish ladder will be completed during the 2012-2013 IWW and operational beginning in March 2013. Adult spring Chinook salmon will be collected from the adult trap by a contractor for radio-tagging from April–June, 2013.

2.2. Evaluation of Adult Pacific Lamprey Passage Success at Ice Harbor Dam. This study will evaluate passage success for adult Pacific lamprey *Entosphenus tridentatus* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using half-duplex (HD) PIT-tag systems. This study will require McNary, Ice Harbor and Lower Snake River dams to provide power for electronics and access for the downloading of data from the PIT-tag detection equipment. Maintenance of equipment will occur during the winter maintenance period when adult fishways are dewatered.

2.3. Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at Ice Harbor Dam. The purpose of this study is to use underwater video, acoustic imaging, and/or other non-invasive technologies to count and observe adult salmonids and Pacific lampreys, *Entosphenus tridentatus*, in the fish ladders at Ice Harbor Dam. The goal of this work is to estimate the number of adult lamprey passing behind the picketed lead gates at count stations and to develop escapement estimates of the total number of lamprey passing Ice Harbor Dam. This study will require Ice Harbor to provide power for electronics equipment in the fishways, access for the installation, repair, and testing of electronic equipment and access for the downloading of data from video camera equipment. Maintenance and installation of camera equipment and will occur during the winter maintenance period when adult fishways are dewatered.

2.4. Evaluation of Fish Counting Accuracy Issues at FCRPS Dams, Ice Harbor and Lower Monumental Dams. This study is to determine if counting slot lighting modifications, video camera location and upgrades, and video monitor placement can improve fish counting accuracy at Ice Harbor and Lower Monumental dams. During daytime, the IHR north counting slot is exposed to direct sunlight, particularly in June and July, when the sun is highest and when the majority of count discrepancies are seen, and this creates difficult viewing conditions for fish counters. By conducting random visual sampling counts of the video recorded count stations (and sample video recordings periods) and comparing to the visual counter at the other count station, we can determine if there are count accuracy and/or identification issues. Fish counts at IHR are often lower than those at upstream dams, possibly suggesting some issue with fish counting accuracy at IHR. This is particularly frequent in June and July, when the sun is highest and glare may be at its worst at these count windows. At IHR and at LMN, all fish counting is done by video in the IHR north and the LMN south fish ladder counting slots.

Appendix A – Special Project Operations & Studies
Lower Monumental Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOPs and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill at projects on the Lower Snake River are from April 3 through August 31 for spring and summer migrants. During periods of high river flow, spill rates and forebay elevation at Lower Monumental Dam may need to be adjusted on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility downstream of the dam.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Snake River projects is scheduled for March 02–23. During this 3-week period, the Projects have scheduled routine inspections and maintenance, as well as some non-routine work, such as replacement of an unwatering pump, upstream lock gate seal and wire rope replacement, and mooring bit repair.

1.3. Steady State Model Validation Testing. Western Electricity Coordinating Council (WECC) requires steady state model validation testing on a periodic basis to ensure the generating equipment will meet real and reactive power ratings. All units will be tested on a 1-2 year cycle. Tests will involve running the unit out of fish priority sequence and outside the 1% range. Testing can occur at any time from September 01–March 31, and will not occur during fish passage season (April 01–August 31). Tests will preferably be conducted just after unit annual maintenance, but may happen at other times. Tests will last for a standard of 30 minutes at maximum load with additional time to run the unit along the maximum real/reactive power curve to the minimum settings. Total test time is anticipated to be 90 minutes or less. Test durations will be minimized to the extent possible and will only be run for the purpose of completing the required model validation testing.

1.4. T2 Doble Tests. Transformer bank T1 and turbine units 1, 2, 3, and 4 will be taken out of service for doble testing in 2013. The outage is tentatively scheduled for August 19 to Aug 23, 2013. This work will require a total powerhouse outage, and 100% spill (except for station service) for up to 4 hours. By then, all clearance tags should be hung, and the line could be re-energized allowing generation availability of Units 5 and 6. Turbine unit 1% efficiency operations and turbine priorities will continue to follow fish passage plan requirements during

these tests. Another total plant outage will be required on the last day of testing to remove clearance tags and restore T1 bank.

1.5. Lower Snake Exciter Replacement: Lower Snake exciter replacement took place at Lower Monumental in FY12. During the commissioning process at Little Goose, some commissioning process errors were noticed that derated the Units at Lower Monumental and Lower Granite. The team is evaluating whether or not to re-commission the Units at Lower Monumental and Lower Granite. Units 4-6 at Lower Monumental may need to undergo re-commissioning to bring the capability of the Units back to original levels. This work will also require performance testing and model validation testing. Thus running units out of priority order and outside the 1% operating range. See model validation testing paragraph number 1.3. This contract work is subject to normal contracting and construction delays. The schedule for this evolution is not yet determined, but will be scheduled so that impacts to fish are minimized.

1.6. Lower Monumental Head Gate Rehab: Under the BPA Large Cap Program, parts and materials have been acquired to rehabilitate the headgates at Lower Monumental Dam. To facilitate the process, units will be scheduled out of service to remove or replace headgates. The headgates will be serviced in the repair pit and then placed back into service. Deviation from unit priority will be necessary to swap headgates from the unit to the pit. The duration of the outages is expected to be one day. The work is expected to start in December of 2012 and continue in to 2014.

1.7. Lower Monumental Main Unit 2 Liner: Under the BPA Large Cap Program, Unit 2 is scheduled to receive a liner replacement. The work is scheduled to start in October of 2013 and go to March of 2014. During this time, Unit 2 will be out of service. Testing following the repairs will be addressed in the 2014 FPP.

1.8. Lower Monumental AWS Fish Pump 2 Rehab: Lower Monumental Staff will undertake the rehab of fish pump 2 in FY13. The present rehab schedule is to have fish pump 2 returned to service by April 01, 2013. The AWS system should remain in compliance with a 2-pump operation. However, the monthly PMs will require us to operate on single-pump operation for the required two day outage necessary to work on pump 1 and pump 3. This work is subject to normal construction-type delays.

1.9. RSW Transition Plate Replacement: The Lower Monumental RSW is scheduled to have the transition plates and bolts replaced in FY13. This effort will be done with divers. Units 5 and 6 will be out of service while dive operations are taking place. The in-water work period is scheduled to start on September 1, 2013. This contracting work is subject to normal construction and contracting delays.

2. Studies

2.1. Evaluation of Fish Counting Accuracy Issues at FCRPS Dams, at Ice Harbor and Lower Monumental Dams. This study is to determine if counting slot lighting modifications, video camera location and upgrades, and video monitor placement can improve fish counting accuracy at Ice Harbor and Lower Monumental dams. During daytime, the IHR north counting slot is exposed to direct sunlight, particularly in June and July, when the sun is highest and when

the majority of count discrepancies are seen, and this creates difficult viewing conditions for fish counters. By conducting random visual sampling counts of the video recorded count stations (and sample video recordings periods) and comparing to the visual counter at the other count station, we can determine if there are count accuracy and/or identification issues. Fish counts at IHR are often lower than those at upstream dams, possibly suggesting some issue with fish counting accuracy at IHR. This is particularly frequent in June and July, when the sun is highest and glare may be at its worst at these count windows. At IHR and at LMN, all fish counting is done by video in the IHR north and the LMN south fish ladder counting slots.

2.2. BiOp Kelt Passage and Survival Monitoring. In 2013, a contractor will conduct the second year of a two year study to assess dam route passage efficiency and survival for downriver migrating steelhead kelt utilizing the existing acoustic telemetry receiver system installed by PNNL for the BiOp Juvenile Summer-run Salmon Performance Standard. Access for contractor downloading acoustic data from the arrays of receivers is the only requirement for this study.

2.3. Adult Salmon Studies. Both a lower Columbia River and a Snake River adult salmon passage study are planned for the 2013 adult passage season. Any new radio-telemetry antenna or receiver installations or maintenance will be completed in March-April 2013.

2.4. BiOp Performance Standard Compliance Test at Lower Monumental Dam. In 2013, Battelle will conduct the second year of a two year study to assess compliance with the BiOp Juvenile Salmon Performance Standard. This test will utilize acoustic telemetry to estimate dam passage survival for subyearling Chinook salmon. Hydrophones will be deployed on the upstream face of the dam to monitor all major routes of passage available to juvenile salmon. In addition, hydrophones will be deployed in the forebays of the spillway and powerhouse and autonomous receivers will be deployed in both the Forebay and tailrace each approximately two kilometers from the dam. At Lower Monumental Dam forebay coverage will include two additional clusters stationed upstream of the RSW to monitor RSW passage. These clusters will be positioned far enough upstream as not to interfere with RSW operation.

2.5. Evaluation of Adult Pacific Lamprey Passage Success at Lower Monumental Dam. This study will evaluate passage success for adult Pacific lamprey *Entosphenus tridentatus* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using half-duplex (HD) PIT-tag systems. This study will require McNary, Ice Harbor and Lower Snake River dams to provide power for electronics, and access for the downloading of data from the PIT-tag detection equipment. Maintenance of equipment will occur during the winter maintenance period when adult fishways are dewatered.

Appendix A – Special Project Operations & Studies
Little Goose Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOPs and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill at projects on the Lower Snake River are from April 3 through August 31 for spring and summer migrants.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Snake River projects is scheduled for March 02–23. During this 3-week period, the Projects have scheduled routine inspections and maintenance, as well as some non-routine work, such as replacement of an unwatering pump, upstream lock gate seal and wire rope replacement, and mooring bit repair.

1.3. Periodic Inspection. The Little Goose project is scheduled to be inspected during May 2013. This is part of the 5-year formal Periodic Inspection process.

1.4. Steady State Model Validation Testing. Western Electricity Coordinating Council (WECC) requires steady state model validation testing on a periodic basis to ensure the generating equipment will meet real and reactive power ratings. All units will be tested on a 1-2 year cycle. Tests will involve running the unit out of fish priority sequence and outside the 1% range. Testing can occur at any time from September 01–March 31, and will not occur during fish passage season (April 01–August 31). Tests will preferably be conducted just after unit annual maintenance, but may happen at other times. Tests will last for a standard of 30 minutes at maximum load with additional time to run the unit along the maximum real/reactive power curve to the minimum settings. Total test time is anticipated to be 90 minutes or less. Test durations will be minimized to the extent possible and will only be run for the purpose of completing the required model validation testing.

1.5. Lower Snake Exciter Replacement. Little Goose units 1 or 2 exciter replacement is scheduled for January–February 2013, but may extend into April for testing. This work will also require performance testing and model validation testing. Thus running units out of priority and outside 1%. See model validation testing paragraph number 1.5 and 1.6. This contract work is subject to normal contracting and construction delays or issues.

1.6. Doble Testing. In 2013, two transformers, T-1 and turbine units 1 to 4 will be taken out of service for Doble testing**.** The outage is tentatively scheduled for August 5–15, 2013. Since Little Goose Dam has multiple transformer banks, 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.

1.7. Intake Gantry Crane. Little Goose intake gantry crane will be replaced in 2013. The completion of installation is scheduled for July, 2013. Upon completion, a functional test will be required to be completed before acceptance. The functional test consists of installing a main unit headgate with the cylinder attached, installing, deploying and uninstalling an ESBS, and installing a spillway stop log and testing installation of the TSW. This will require one Unit and one spill bay to be out of service for a day for each functional test. The choice of spillbay and Unit will be approved by NWW OD-T personnel to minimize fish passage impacts.

2. Studies.

2.1. BiOp Performance Standard Compliance Test at Little Goose Dam. In 2013, Battelle will conduct the second year of a two year study to assess compliance with the BiOp Juvenile Salmon Performance Standard. This test will utilize acoustic telemetry to estimate dam passage survival for subyearling Chinook salmon. Hydrophones will be deployed on the upstream face of the dam to monitor all major routes of passage available to juvenile salmon. In addition, hydrophones will be deployed in the forebays of the spillway and powerhouse and autonomous receivers will be deployed in both the Forebay and tailrace each approximately two kilometers from the dam. At Little Goose Dam forebay coverage will include two additional clusters stationed upstream of the RSW to monitor RSW passage. These clusters will be positioned far enough upstream as not to interfere with RSW operation.

2.2. BiOp Kelt Passage and Survival Monitoring. In 2013, researchers will conduct the second year of a 2-year study to assess dam route passage efficiency and survival for downriver migrating steelhead kelt utilizing the existing acoustic telemetry receiver system installed by Battelle for the BiOp Juvenile Summer-run Salmon Performance Standard. Access for contractor downloading acoustic data from the arrays of receivers is the only requirement for this study.

2.3. Adult Salmon Studies. Both a lower Columbia River and a Snake River adult salmon passage study are planned for the 2013 adult passage season. Any new radio-telemetry antenna or receiver installations or maintenance will be completed during March-April 2013. The adult ladder count window slot will be modified during the IWW for a minimum slot opening of 18’ in preparation of temporary PIT-tag antennae in January 2014.

2.4. Evaluation of Adult Pacific Lamprey Passage Success at Little Goose Dam. This study will evaluate passage success for adult Pacific lamprey *Entosphenus tridentatus* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using half-duplex (HD) PIT-tag systems. This study will require McNary, Ice Harbor and Lower Snake River dams to provide power for electronics, and access for the downloading of data from the PIT-tag detection equipment. Maintenance of equipment will occur during the winter maintenance period when the adult fishway are dewatered.

2.5. Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at Little Goose Dam. The purpose of this study is to use underwater video, acoustic imaging, and/or other non-invasive technologies to count and observe adult salmonids and Pacific lampreys, *Entosphenus tridentatus*, in the fish ladders at Little Goose Dam. The goal is to evaluate the behavior of adult salmonids and lamprey at newly installed lamprey orifices in the control section of the adult fish ladder using underwater video equipment. This study will require Little Goose to provide power for electronics equipment in the fishway, access for the installation, repair, and testing of electronic equipment and access for the downloading of data from video camera equipment. Installation of camera equipment will occur during the winter maintenance period when the adult fishway is dewatered.

Appendix A – Special Project Operations & Studies
Lower Granite Dam

The purpose of this Appendix is to notify regional interests of special project operations and studies that are planned to occur during the current year that will or may affect fish passage. Further coordination may occur as needed.

1. Special Project Operations.

RCC will coordinate needed changes with the project and authorize operational changes with issuance of a teletype describing the regulations.

1.1. Spill. Spill for fish passage will be provided during the spring and summer outmigration seasons in accordance with spill specifications in the Fish Operations Plan (FOP), pursuant to the U.S. District of Oregon Court Order for Fish Operations, and as coordinated through the TMT. The FOPs and Court Order are included in the Fish Passage Plan as Appendix E. Alternative spill patterns to control total dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. Planning dates for spill at projects on the Lower Snake River are from April 3 through August 31 for spring and summer migrants. During periods of high river flow, spill rates and forebay elevation at Lower Granite Dam may need to be adjusted on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility downstream of the dam.

1.2. Navigation. In 2013, the annual maintenance navigation lock closure for Snake River projects is scheduled for March 02–23. During this 3-week period, the Projects have scheduled routine inspections and maintenance, as well as some non-routine work, such as replacement of an unwatering pump, upstream lock gate seal and wire rope replacement, and mooring bit repair.

1.3. Doble Test. Lower Granite transformer bank T1 will be Doble tested this year. A full line outage will be taken daily. Unit 5 will be run at speed-no-load daily to supply station service power. At night, T2 (Units 5 and 6) will be returned to service. T1 (Units 1-4) will remain out of service for the duration of the Doble test. The Doble test is scheduled for 5 days starting at 0400 12 August 2013. T1 is scheduled to return to service August 16, 2013 at 1600.

1.4. Unit Cavitation Repairs. Lower Granite has a contract in place to continue cavitation repairs on Units 5 and 6. Each unit will be out one at a time for blade and liner cavitation repairs. Unit 5 will continue through March, 2013. After which LWG project maintenance will replace the blade seal packing. Unit 5 is scheduled to return to service April 12, 2013. Unit 6 will be OOS July 01–December 07, 2013, for cavitation repair.

1.5. 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, but it may cause an occasional outage on a priority unit.

1.6. Fish Screen Repair. This is a long-term program to return the fish screens to a safe operating condition by tearing down, repainting and rebuilding the screens. The plan will require short unit outages throughout the year while transporting rebuilt screens 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. Fish screen movements are to normally take place concurrently with other outages as they occur, and no special operations outside the Fish Passage Plan are expected, but it may cause an occasional outage on a priority unit.

1.7. Unit 4 Turbine Guide Bearing. From July 26–August 16, 2013, the unit 4 turbine guide bearing will be replaced following the normal unit 4 annual maintenance. Unit 4 annual maintenance is scheduled for July 01–26, 2013.

1.8. NSE3 bulkhead is in need of being replaced. The new bulkhead is anticipated to be completed and installed during the winter maintenance period. If delivery of the bulkhead is delayed, we will need to coordinate with OD-T to request a shutdown of the AWS system to swap out these bulkheads. The old NSE3 bulkhead will be placed in NPE3 bulkhead slot as there is a temporary steel one there that does not seal correctly. This year, we will be getting an NPE3 bulkhead fabricated to replace the old NSE3 bulkhead placed in the NPE3 slot. There may be damage to the NPE3 bulkhead slot where the temporary steel bulkhead has resided for over a year.

1.9. AWS pumps. Due to the large amount of work being done on the adult collection channel fishway grating, the project will not be able to complete a gearbox oil change on all the AWS pumps. Last year, there were elevated temperatures on all AWS pump gearboxes. The gearbox oil changes can be completed one at a time during the year, but will require coordination of an approximate 2-hour AWS pump outage to swap bulkheads from the standby pump to an operational pump (hence swapping standby pumps). This outage needs to be coordinated with OD-T on two separate occasions throughout the year to enable the changing of AWS gearbox oil.

2. Studies

2.1. Evaluation of Prototype Overflow Weir and 14-inch Orifice for the Lower Granite Juvenile Bypass System Upgrade. A prototype overflow weir and enlarged 14" orifice are being installed into intake gatewell 5A during the winter of 2012/13 for biological testing during the 2013 fish passage season from April 15–June 30, 2013. This testing period is intended to coincide with peak fish outmigration periods, water passage, and cavitation repairs of unit 5 through mid-April 2013. Preliminary plans for a new Juvenile Fish Facility at Lower Granite include the use of larger orifices and/or overflow weirs for fish to pass from the gatewells to the collection channel. Results of this study will be used to inform management decisions on final structural modifications and operational changes at Lower Granite Dam to optimize survival and passage for salmonids.

Final study plans during the test period are still being developed and will be coordinated with RCC and Lower Granite project staff for implementation. In order to conduct the necessary biological testing, deviations from the standard turbine priorities (see the Fish Passage Plan Table LWG-5 below) will be necessary to operate unit 5 during the testing periods.

Unit 2 will remain the first priority during the test period to provide fish ladder attraction flow. There will be no changes to spill or spill patterns for this study. From April 15–June 30, 2013, unit 5 will be operated at the upper end of the 1% operating range, or at an alternative fixed discharge if possible, during each test block to provide consistent testing conditions. Based on historical river flows, it is likely that sufficient inflows will permit operation of unit 5 for this test through June 30. Final unit operations will be dictated by final study plans (i.e., days per week) and will be coordinated with RCC and Lower Granite Dam project staff.

Fish Passage Plan Table LWG- 1. Turbine unit operating priority for Lower Granite Dam.
Highlighted text is added for the 2013 test only.

Season	Duration	Unit Priority
March 1 – December 15 24 hours/day Except during 2013 Test Periods below	Start Units	2, 3, then 4-6 any order, then 1 [a]
	Stop Units [b]	4-6 any order, then 3, 2, 1 [a]
April 15 – June 30 24 hours/day During 2013 Test Periods [c]	Start Units	2, 5, 3, then 4 or 6 any order, then 1
	Stop Units [b]	4 or 6 any order, then 3, 5, 2, 1
December 16 – February 28 24 hours/day	Start/Stop Units	Any Order

a. Unit 1 has fixed Kaplan blades and can only run at 130 megawatts. The Unit Priority order in Table LWG-5 minimizes starts and stops of Unit 1 and allows for the longest runtime once Unit 1 is started.

b. Stop Units in reverse Start Unit order, except run Unit 1 as long as BPA load request and required spill rates can be met.

c. In 2013, modifications to turbine unit priorities are only needed during testing of the prototype overflow weir and enlarged 14" orifice installed in Unit 5. Unit priority operations during the test period are currently anticipated to be 24 hours per day, 6 days per week. Implementation of final study plans will be coordinated with RCC and Lower Granite Dam project staff.

2.2. Kelt Reconditioning / Transportation / In-river Survival. Provide assistance to Nez Perce Tribe for collection and tagging of post-spawn steelhead (kelt) off the Lower Granite separator for reconditioning study, temporary rearing and feed, and JSATS route survival determination in order to determine the feasibility and success of these alternatives for increased steelhead population growth. Depending on flow year conditions, separator technicians will collect a similar number of A-run and B-run kelt for transfer to CRITFC/NPT researchers for reconditioning facilities at Dworshak Dam (about 400 kelt), JSATS and PIT-tagging (300 kelt) with direct release into the tailwaters, or PIT-tagging with direct release into the tailwaters (about 1200-1400 kelt).

2.3. BiOp Kelt Passage and Survival Monitoring. In 2013, a contractor will conduct the second year of a two year study to assess dam route passage efficiency and survival for downriver migrating steelhead kelt utilizing the existing acoustic telemetry receiver system installed by Battelle for the BiOp Juvenile Summer-run Salmon Performance Standard at Little Goose and Lower Monumental dams. Two-thirds of sample kelt will be dominated by A-run

steelhead collected off the LGR JFF separator as collaboration with the CRITFC study. The remaining one-third of the sample will be double-tagged PIT- and JSAT from 4-5 subbasin stream weirs in the Clearwater and South Fork Salmon rivers. Passage route distribution and survivals at Lower Granite require installation of acoustic receiver arrays in the Lower Granite forebay and tailrace beginning in March prior to scheduled voluntary spill. Using the existing trolley pipes and an inriver receiver rosette, minimal array systems will cover the RSW and remaining spillbays, all Turbine units, as well as the forebay entrance and tailwater exit lines placed outside the BRZs. No unit outages are planned as necessary for receiver installation. The Contractor will likely request placement of a single computer trailer with cable routing and electrical hook-up for the trolley pipes for receiver deployment. Access for contractor downloading acoustic data from the arrays of receivers between mid-March and 30 August is required for this study.

2.4. Adult Salmon Studies. Both a lower Columbia River and a Snake River adult salmon passage study are planned for the 2013 adult passage season. Any new radio-telemetry antenna or receiver installations or maintenance will be completed in March-April 2013. Adult steelhead will be collected from the adult trap at Lower Granite by a contractor for radio-tagging during July–September.

2.5. Evaluation of Adult Pacific Lamprey Passage Success at Lower Granite Dam. This study will evaluate passage success for adult Pacific lamprey *Entosphenus tridentatus* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using half duplex passive integrated transponder (HD PIT) systems. This study will require McNary, Ice Harbor and Lower Snake River dams to provide power for electronics, and access for the downloading of data from the PIT-tag detection equipment. Maintenance of equipment will occur during the winter maintenance period when the adult fishway are dewatered.

2.6. Lower Granite Winter / Spring 2013 Tailrace Field Data Collection. A physical general tailrace model (1:55 scale) and 2-D Computational Fluid Dynamics (CFD) model are currently being developed for the Lower Granite tailrace area. Extensive tailrace data will need to be collected during the winter, spring, and early summer of 2013 to verify and calibrate these new models and for providing direct hydraulic field information. Field data will primarily consist of Acoustic Doppler Current Profile (ADCP) transects, time-lapse video of the tailrace, and local wind measurements. In order to collect relevant data, project operations will need to remain constant for 10-12 hours during each test condition. Every effort will be made to collect desired flow/operating conditions as they occur during normal system operations during the winter, spring and summer (1 February to August 2013) in order to avoid requests for operational changes to the FCRPS. However, it is anticipated that operational changes to the FCRPS may need to be requested in order to collect the necessary data in a timely manner for development of potential Lower Granite JBS outfall locations during the summer of 2013. There are two operational conditions that may require special operating conditions during fish passage plan (FPP) spill: total in-river flow of approximately 50 kcfs with no spill and total in-river flow of approximately 75 kcfs with no spill. If these target flow ranges are not attained prior to April 3rd (commencement of FPP spill), it would be requested to temporarily (10 to 12 hours) suspend FPP spill in order to obtain field measurements under these conditions. If special operations are required, a coordination request will be submitted to FPOM and coordinated with RCC and BPA

for regional approval and coordination.

2.7. Lower Granite Outfall Geotechnical Explorations. In order to collect necessary data for construction of a new Lower Granite Juvenile Bypass System (JBS), it will be necessary to conduct geotechnical explorations at Lower Granite both on-shore (upland) and in the water. Upland (on-shore) geotechnical explorations will occur on the south shore of the tailrace near the JFF and adult ladder starting in March utilizing light-weight (e.g., man-portable) drill rig and a standard truck mounted drill rig. In-water explorations within the tailrace area is expected to take place in the September-October 2013 or January-February 2014 timeframe. It is anticipated in-water geotechnical explorations will be conducted 1,500-3,500 feet downriver of the Lower Granite Dam powerhouse outside of the Boat Restricted Zone (BRZ) based on final decisions for placement of the new bypass outfall. In-water geotechnical exploration work will include deployment of a floating barge in the tailrace for support of a drill rig and ancillary equipment. The drill rig will advance a boring through the alluvial material into the underlying basalt. Standard Penetration Tests (SPTs) will be performed in the alluvial material and coring in the basalt. Geotechnical exploration efforts are not expected to require any special project operations. Any deviations from this project schedule or area of work will be submitted to FPOM for regional coordination and approval.

2.8. Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at Lower Granite Dam. The purpose of this study is to use underwater video, acoustic imaging, and/or other non-invasive technologies to count and observe adult salmonids and Pacific lampreys, *Entosphenus tridentatus*, in the fish ladders at Lower Granite Dam. The goal is to evaluate the behavior of adult salmonids and lamprey at newly installed lamprey orifices in the control section of the adult fish ladder using underwater video equipment. This study will require Lower Granite to provide power for electronics equipment in the fishway, access for the installation, repair, and testing of electronic equipment and access for the downloading of data from video camera equipment. Installation of camera equipment will occur during the winter maintenance period when the adult fishway is dewatered.