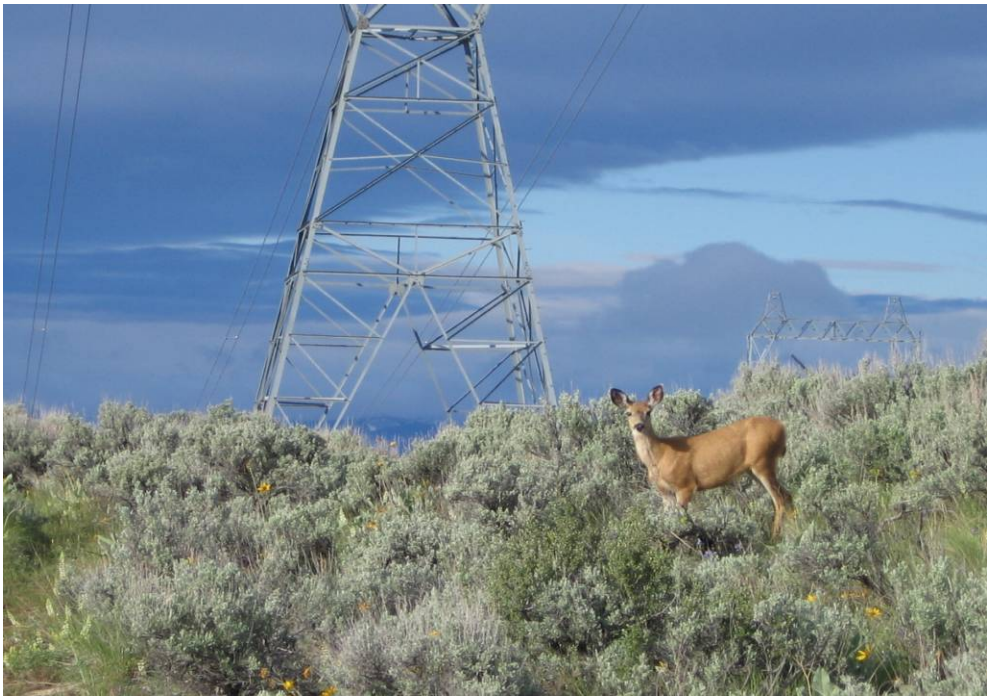
UPDATED STUDY REPORT DOCUMENT

INTRODUCTION
EVALUATION OF GOALS AND OBJECTIVES
SUMMARIES OF STUDY RESULTS
UPDATED STUDY REPORT MEETING
NOTICE OF INTENT TO FILE DRAFT LICENSE APPLICATION

WELLS HYDROELECTRIC PROJECT
FERC PROJECT NO. 2149-131
SECURITY LEVEL: PUBLIC



Prepared by:
Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802
www.douglaspud.org/relicensing

April 15, 2009

For copies of this Updated Study Report, contact:

Public Utility District No. 1 of Douglas County
Attention: Relicensing
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4497
Phone: (509) 884-7191
E-Mail: relicensing@dcpud.org

Table of Contents

List of Tables

List of Appendices

BLANK PAGE

1.0 INTRODUCTION

Public Utility District No. 1 of Douglas County (Douglas PUD) is the owner, operator and licensee of the 774.3 megawatt Wells Hydroelectric Project (Wells Project), located on the Columbia River in central Washington. Douglas PUD's current Federal Energy Regulatory Commission (FERC) license expires on May 31, 2012. Douglas PUD is seeking a new 50-year FERC license to continue to operate the Wells Project.

In August 2005, Douglas PUD initiated a series of meetings with stakeholders regarding the upcoming relicensing of the Wells Project. This voluntary effort was initiated to provide stakeholders with information about the Wells Project, to identify resource issues and to develop preliminary study plans prior to filing the Notice of Intent (NOI) and Pre-Application Document (PAD).

Douglas PUD initiated this voluntary process by hosting an introductory workshop regarding the Integrated Licensing Process (ILP) on October 18, 2005. The intent of the workshop was to introduce stakeholders to the ILP, provide stakeholders with information about the Wells Project and provide an overview of the relicensing schedule. At the conclusion of the workshop, stakeholders were encouraged to participate in the following four resource work groups or RWGs: Aquatic/Water Quality, Terrestrial, Cultural, and Recreation. A series of RWG meetings and site tours began in November 2005 and meetings have continued throughout the ILP.

The primary goals of the RWGs were to identify issues and potential study needs. This process provided stakeholders and Douglas PUD an opportunity to have open dialogue about issues in advance of the rigorous timeline that began once the NOI and PAD were filed. Through 35 meetings, each RWG cooperatively developed a list of Issue Statements, Issue Determination Statements and Agreed-Upon Study Plans. An Issue Statement is an agreed-upon definition of a resource issue raised by a stakeholder. An Issue Determination Statement reflects each RWG's efforts to apply the FERC's seven study criteria to mutually determine the applicability of each individual Issue Statement. An Agreed-Upon Study Plans is a detailed study plan that has been developed, reviewed and agreed to by all of the members of the applicable RWG.

Douglas PUD submitted the NOI and PAD to the FERC on December 1, 2006. The PAD included the 12 Agreed-Upon Study Plans. The filing of these documents initiated the relicensing process for the Wells Project under the FERC's regulations governing the ILP.

On May 16, 2007, Douglas PUD submitted a Proposed Study Plan (PSP) Document. The PSP Document consists of the Applicant's Proposed Study Plans, Responses to Stakeholder Study Requests and a schedule for conducting the Study Plan Meeting. The ILP required Study Plan Meeting was conducted on June 14, 2007. The purpose of the Study Plan Meeting was to provide stakeholders with an opportunity to review and comment on Douglas PUD's PSP Document, to review and answer questions related to stakeholder study requests and to attempt to resolve any outstanding issues with respect to the PSP Document.

On September 14, 2007, Douglas PUD submitted a Revised Study Plan (RSP) Document. The RSP Document consists of a summary of each of Douglas PUD's revised study plans and a response to stakeholder PSP Document comments.

On October 11, 2007, the FERC issued its Study Plan Determination based on its review of the RSP Document and comments from stakeholders. The FERC's Study Plan Determination required Douglas PUD to complete 10 of the 12 studies included in its RSP Document. Douglas PUD has opted to complete all 12 studies to better prepare for the 401 Water Quality Certification process conducted by the Washington State Department of Ecology (Ecology) and to fulfill its commitment to the RWGs who collaboratively developed the 12 Agreed-Upon Study Plans with Douglas PUD. On October 15, 2008, Douglas PUD filed with the FERC the Initial Study Report (ISR) Document that contained final reports for eight of the studies and interim progress reports for four of the studies. The ISR Document included results from all ten of the studies required by the FERC in the October 11, 2007 Study Plan Determination. The ISR Document also included results from two studies voluntarily conducted by Douglas PUD for the reasons stated above. On November 24, 2008, Douglas PUD filed a letter correcting a water temperature figure within the original ISR Document. On December 2, 2008, Douglas PUD filed the final Traditional Cultural Property Study for the Wells Project, which was prepared by the Confederated Tribes of the Colville Reservation under a contract with Douglas PUD.

The deadline for stakeholder comment on the ISR Document was December 15, 2008 pursuant to the approved Process Plan and Schedule for the Wells Project. Comments were filed by the City of Pateros on November 7, 2008 and by the City of Brewster on December 5, 2008.

On January 14, 2009, Douglas PUD filed a letter containing its responses to the cities' comments on the ISR Document and proposing revisions to the schedule for the Wells ILP. On February 4, 2009, the FERC issued a determination on the requests for modification to the Wells Study Plan and on Douglas PUD's proposed revisions to the schedule. The FERC concluded that there was no need to modify the Wells Study Plan. The FERC also approved Douglas PUD's proposed modifications to the Wells ILP schedule. This proposed modification consisted of advancing the schedule for the Updated Study Report Meeting.

This Updated Study Report (USR) Document contains the final reports for the four studies that were subject to interim progress reports at the time the ISR Document was filed with the FERC. The USR Document has been prepared in accordance with 18 CFR § 5.15(f) (2008). The USR contains an Introduction (Section 1), a section describing the Evaluation of Goals and Objectives (Section 2), Summaries of Study Results (Section 3), and information related to the USR Meeting, scheduled for April 30, 2009 (Section 4). Pursuant to 18 C.F.R § 5.16 (c) (2008), Section 5 of the USR Document contains Douglas PUD's Notice of Intent to file a draft license application for the Wells Project instead of a Preliminary Licensing Proposal. The USR Document also contains Appendices A-C. Appendix A contains the final reports for the 2008 Adult Lamprey Passage Study, Total Dissolved Gas (TDG) Investigation, and the Dissolved Oxygen (DO), pH and Turbidity Study. Appendix B contains the final report on the Transmission Line Wildlife and Botanical Study. The Summary of Consultation related to the implementation of these studies can be found in Appendix C.

In accordance with the ILP regulations and as described in the FERC-approved Process Plan and Schedule for the Wells Project, the USR Document is being filed with the FERC and simultaneously distributed to federal and state resource agencies, local governments, affected Indian tribes, members of the public and other interested parties.

2.0 EVALUATION OF GOALS AND OBJECTIVES

The ISR Document was filed with the FERC on October 15, 2008. The ISR Document contained final reports for eight of the studies and interim progress reports for four of the studies. The USR Document contains the final reports for the four studies completed since the ISR Document was filed.

The following tables describe the final results of the four studies that are the subject of the USR Document. Each of the subsection headings in Section 2 (Evaluations of Goals and Objectives) corresponds with the subsection headings in Section 3 (Summaries of Study Results). As an example, the table in Section 2.1 and the summary in Section 3.1 pertain to the Total Dissolved Gas Investigation.

2.1 Total Dissolved Gas Investigation

Table 2.1-1 Total Dissolved Gas Investigation		
Goal: The goal of this study was to develop a numerical model capable of predicting the hydrodynamics and Total Dissolved Gas (TDG) concentrations in the tailrace of the Wells Project. The purpose of the model was to assist in the understanding of the underlying phenomena leading to TDG supersaturation allowing the evaluation of the effectiveness of spill type and plant operations in reducing TDG production at Wells Dam.		
Status: Completed. The report describing the Total Dissolved Gas Investigation is final.	**Goal Achieved (Y/N)**	**Variance (Y/N)**
Objectives:		
• Develop a numerical model capable of predicting the hydrodynamics and TDG concentrations in the tailrace of the Wells Project up to a flow of 246,000 cfs.	Y	N
Methodology: The methodology specified in the approved study plan was followed and remains appropriate. No changes to the study methodology were needed to meet the study goals and objectives.		
Study Variance: There were no variances from the FERC-approved study plan for the Total Dissolved Gas Investigation.		

2.2 DO, pH and Turbidity Study (Not Required by the FERC)

Table 2.2-1 DO, pH and Turbidity Study (Not Required by the FERC)		
Goal: The goal of this study was to obtain required DO, pH, and turbidity information for the Wells Dam forebay and lower Okanogan River, both above and within the Wells Project boundary. The information gathered from this monitoring effort will assist Ecology in determining whether the Project, as proposed to be operated under the new license, will meet the numeric criteria for DO, pH and turbidity.		
Status: Completed. The report describing the voluntary DO, pH and Turbidity Study is final.	**Objective Achieved (Y/N)**	**Variance (Y/N)**
Objectives:		
• Monitor DO, pH, and turbidity in the Wells Dam forebay and lower Okanogan River.	Y	Y
Methodology: The methodology specified in the study plan was followed with minor modifications (see Study Variance below).		
Study Variance: This study was not required by the FERC as part of the October 11, 2007 Study Plan Determination. This study was voluntarily conducted by Douglas PUD at the request of Ecology in support of the application for 401 water quality certification for the Wells Project. Variances associated with the voluntarily conducted study for DO, pH, and Turbidity include the following: • The upper sampling station location was changed from the Project boundary (RM 15.5) to the Malott Bridge (RM 17.0). No suitable structure could be found at RM 15.5 and as a result, the instrument housing was installed on the Malott Bridge located at RM 17.0. This change in location should have no effect on the results of this study. • The Study Plan specified that DO monitoring would take place hourly between mid-July and mid-September when there is a greater possibility of lower DO levels occurring. In order to access the river prior to the peak of the spring hydrograph, the monitoring equipment was deployed earlier than required in the study plan. Equipment was deployed on May 5 and 6 at the Okanogan River locations and May 30 at the Wells forebay. The equipment also continued collecting data until October 15, more than a month later than required by the study plan. • The study plan required that data be collected on an hourly basis. Battery failures and instrument inaccessibility during high flow and debris load periods caused gaps in the hourly database. • All turbidity results for the Wells Dam forebay location were judged to be unreliable and rejected as unusable. The self-cleaning mechanism on the water quality probe was not functioning properly and became fouled frequently during the study.		

2.3 Adult Lamprey Passage Study

Table 2.3-1 Adult Lamprey Passage Study		
Goal: The goal of the voluntary second season of study was to evaluate the effect of the Wells Project on adult lamprey behavior and passage performance in the collection gallery and fishways entrances of Wells Dam.		
Status: Completed. The report describing the second year of study in 2008 is final. The 2007 report was completed and filed in the ISR Document in October 2008.	**Objective Achieved (Y/N)**	**Variance (Y/N)**
Objectives:		
• Conduct a literature review of existing adult Pacific lamprey passage studies at Columbia and Snake river dams. This task was completed during the 2007 study.	Y	N
• Identify methods for capturing adult Pacific lamprey at Wells Dam. This task was completed during the 2007 study.	Y	N
• Document the timing and abundance of radio-tagged lamprey passage through Wells Dam. This task was completed during the 2007 study.	Y	N
• Determine whether adult lamprey are bypassing the adult counting windows at Wells Dam. This task was completed during the 2007 study.	Y	N
• Where sample size is adequate, estimate passage metrics including fishway passage times and efficiencies, residence time between detection zones, and downstream passage events (drop back). This task was completed in the 2007 and 2008 studies.	Y	N
• If necessary, identify potential areas of improvement to existing upstream fish passage facilities for the protection and enhancement of adult lamprey at the Wells Project. This task was accomplished in the 2007 and 2008 studies.	Y	N
Methodology: Radio-tag adult Pacific lamprey collected at Rocky Reach and Wells dams for use in evaluating passage at Wells Dam.		
Study Variance: There were no variances in the FERC-approved study plan for the 2008 Adult Lamprey Passage Study.		

2.4 Transmission Line Wildlife and Botanical Study

Table 2.4-1 Transmission Line Wildlife and Botanical Study		
Goal: The overall goal of the wildlife and botanical surveys along the Wells Project transmission lines is to provide information needed to guide land management decisions, avoid damage to valuable habitat during future transmission corridor management activities and minimize the spread of invasive weeds.		
Status: Completed. The report describing the Transmission Line Wildlife and Botanical Study is final.	**Objective Achieved (Y/N)**	**Variance (Y/N)**
Objectives:		
Botanical Resources		
• Identify and document the location of Rare, Threatened and Endangered (RTE) plant species that occur within the transmission line corridor.	Y	N
• Identify and classify the specific vegetation cover types in the study area.	Y	N
• Generate detailed information on the species composition and classification of these plant communities and their structures.	Y	N
• Create a detailed Geographic Information System (GIS) cover type map of the study area showing the locations of these plant communities, their distribution, areas of coverage (acres), and note locations of habitats of special concern or unique areas observed.	Y	N
• Identify any invasive plant species in the transmission corridor. For this transmission line corridor study, invasive species are Washington State Class A and B-designate noxious weeds.	Y	N
Wildlife Resources		
Avian		
• Identify and document the location of any federal and state RTE avian species that use the study area.	Y	N
• Describe the habitat features used by RTE avian species observed within the corridor.	Y	N
• Document the presence of other avian species and provide relative abundance for birds using the study area.	Y	N
• Document raptor and corvid nesting and sharp-tailed and sage grouse use within the study area.	Y	N
• Document any evidence within the transmission line ROW of avian collisions.	Y	N

Table 2.4-1 Transmission Line Wildlife and Botanical Study (Continued)		
Mammal		
• Identify and document the location of federal and state RTE mammal species that use the study area.	Y	N
• Describe the habitat features used by RTE mammals observed within the corridor.	Y	N
• Document the presence of other mammal species in the study area.	Y	N
Reptile		
• Identify and document the location of federal and state RTE reptile species that use the study area.	Y	N
• Describe the habitat features used by RTE reptiles observed within the corridor.	Y	N
• Document the presence of other reptile species in the study area.	Y	N
Methodology: The methodology specified in the approved study plan was followed and remains appropriate. No changes to the study methodology were needed to meet the study goals and objectives.		
Study Variance: There were no variances in the FERC-approved study plan for the Transmission Line Wildlife and Botanical Study.		

3.0 SUMMARIES OF STUDY RESULTS

3.1 Total Dissolved Gas Investigation

The current Wells Hydroelectric Project (Wells Project) license will expire on May 31, 2012. As part of the Wells Project relicensing process, the Public Utility District No. 1 of Douglas County (Douglas PUD) is required to obtain a water quality certificate pursuant to Section 401 of the Clean Water Act. As part of the 401 certification process, the Washington State Department of Ecology (Ecology) must determine whether the Wells Project meets state water quality standards, including standards for total dissolved gas (TDG).

Douglas PUD examined TDG production dynamics at the Wells Project to comply with State water quality standards (WQS). As part of the relicensing of the Wells Project, Douglas PUD initiated a series of assessments aimed at gaining a better understanding of the effect of spill operations on the production, transport and mixing of TDG in the Wells Dam tailrace.

The primary methodology employed in this study was the development of an unsteady state three-dimensional (3D), two-phase flow computational fluid dynamics (CFD) tool to predict the hydrodynamics of gas saturation and TDG distribution within the Wells tailrace. Two models were used in the study: a volume of fluid (VOF) model and a rigid-lid two-phase flow model.

The VOF model predicts the flow regime and the free-surface characteristics, recognizing that a spillway jet may plunge to depth in the tailrace or remain closer to the surface depending upon the geometry of the outlet and the tailwater elevation. The VOF model boundary extended approximately 1,700 feet downstream of the dam.

The rigid-lid model included 16,500 feet of the Wells tailrace, from Wells Dam downstream to the TDG compliance monitoring station. This two-phase flow model characterizes the hydrodynamics and three-dimensional distribution of gas volume fraction, bubble size and TDG in the Wells tailrace. This model assumes that the free surface can be modeled using a rigid-lid non-flat boundary condition. The free-surface shape for the first 1,000 feet downstream of the dam was extracted from VOF computations and slopes derived from HEC-RAS simulations for the remaining downstream regions. The velocity profiles derived from the VOF model were input into the rigid-lid model. Predictions of the gas volume fraction, bubble diameter at the spillbays, and typical environmental conditions observed at high flow events ($\geq$ 200 kcfs) are the external parameters of the model.

The model was calibrated and validated using field data collected in 2006 during a TDG production dynamics study (EES et al. 2007). Agreement was attained between the depth-averaged velocity data collected in the field and those generated by the model. A gas volume fraction of 3% and bubble diameter of 0.5 mm in the spillbays produced TDG values that bracketed the 2006 field observations.

Once calibrated, the predictive ability of the model was validated by running three different operational conditions tested in 2006. The model captured the lateral TDG distribution and the reduction of TDG longitudinally as observed in the field. The numerical results demonstrate that

the model provides a reliable predictor of tailrace TDG and therefore can be used as a tool to identify Project operations that minimize TDG concentrations downstream of Wells Dam.

After validation and calibration, the model was used to analyze the sensitivity of TDG concentration to the operation of the Project. Nine runs were completed for four river flows in which spill was either spread across the spillbays or concentrated in one or more spillbays. Numerical results indicate that concentrated spill operations resulted in the lowest TDG concentration downstream of the dam. According to the model, concentrated spill operations reduce the TDG production and increase the degasification at the free surface.

Based on the results from the theoretical sensitivity runs, the model was used to predict TDG in the tailrace using the preferred operating condition for a 7Q10 flow of 246 kcfs. The preferred operating condition utilized a spillway configuration where water was concentrated rather than spread evenly across the entire length of the spillway. Using environmental conditions expected to occur during the passage of a 7Q10 flow and using the preferred operating condition, the TDG values predicted by the model at the location of the compliance station was within the Washington State water quality standards (<120%). The results of this study indicate that specific changes in Project operations can be utilized to meet the numeric water quality standards for TDG under 7Q10 flows.

The numerical results of the model also confirm the findings of the 2005 and 2006 TDG studies indicating that TDG values at the compliance monitoring station downstream of Wells Dam are representative of the TDG production in the Wells tailrace.

3.2 DO, pH and Turbidity Study (Not Required by the FERC)

As part of the Wells Project relicensing process, Douglas PUD is required to obtain a water quality certificate pursuant to Section 401 of the Clean Water Act. As part of the 401 certification process, Ecology must determine whether the Wells Project meets state water quality standards, including the numeric standards, for DO, pH, and turbidity.

The Aquatic RWG, which is comprised of interested parties (including Ecology) and Douglas PUD, was formed for the purpose of identifying issues that may require study during the Wells Project relicensing. The Aquatic RWG proposed a study to collect additional DO, pH, and turbidity data from within the Wells Project. The goal of this study is to collect required DO, pH, and turbidity data from the Wells Dam forebay and lower Okanogan River, both above and within the Wells Project boundary. The information gathered from this monitoring effort will assist Ecology in determining whether the Project, as proposed to be operated under the new license, will meet the numeric criteria for DO, pH and turbidity.

A Quality Assurance Project Plan (QAPP), revised to incorporate review comments from Ecology, identified the organization, schedule, data quality objectives, sampling design, field and laboratory procedures, quality control, and data management and reporting parameters required to implement the DO, pH, and turbidity study proposed by the Aquatic RWG (Parametrix, 2008a).

Three Hydrolab Minisonde5 instruments equipped with DO, pH, and turbidity sensors were installed throughout the lower Okanogan River and began recording data at 30-minute intervals on May 5, 2008. Protective instrument housings were attached to pilings at the Malott Bridge (River Mile [RM] 17.0, above the Project boundary), Monse Bridge (RM 5.0) and Highway 97 Bridge (RM 1.3). Similar instrumentation, operating in the Wells Dam forebay at RM 515.6, began recording DO and pH measurements at 1-hour intervals on May 30, 2008, and a Global Water WQ750 sensor began monitoring turbidity at 5-minute intervals on June 3, 2008. These forebay instruments complete the network of four continuous water quality monitoring locations that were operated until late October 2008.

Twelve Okanogan River instrument servicing events were conducted over the monitoring period. Each servicing event involved downloading data, calibrating and performing maintenance on the instruments, performing quality control checks (including Winkler titrations for dissolved oxygen determination) and replacing batteries. High river flows and woody debris accumulations at times precluded access to some of the instruments in the Okanogan River during two of the twelve servicing events. Battery failures and an electrical short in a data logger also caused some data gaps.

In general, DO measurements in the Okanogan River remained above the 8.0 mg/L water quality criterion throughout the monitoring season, with infrequent recordings (28 of 165 days at Highway 97) below 8.0 mg/L occurring in July and August as snowmelt runoff receded and both air and water temperatures increased. The lowest minimum daily DO on the Okanogan River during this period was observed most frequently at Malott upstream of the Wells Project boundary. Project effects on DO concentrations in the Okanogan River were not evident as incoming DO concentrations closely resemble those within the inundated portions of the Okanogan River. Changes in background minimum DO levels at Malott have a strong and significant linear relationship ($P < .0001$) with minimum values recorded at both Monse and the Highway 97 Bridge (R^2 of 0.92 and 0.72, respectively). These results indicate that there is no statistically significant difference between minimum DO measurements collected above the Project (Malott) and within the Project (lower Okanogan River). Further, there is no statistical difference among DO measurements by location. Median DO levels during the peak months of concern (July, August, and September) are equal to or greater than background values observed at Malott.

DO concentrations at the Wells Dam forebay monitoring station decreased from June through mid-August, although concentrations remained well above the minimum numeric water quality criterion until early October when a brief and minor excursion, thought to be instrument related, below 8.0 mg/L was recorded over an 4 day period (7.8 mg/L minimum value overall average).

The majority of observed pH exceedances were within + 0.3 units of the criteria (6.5 to 8.5) and occurred at Malott (18 of 123 days, or 14.6%), above the Wells Project boundary. There were nine excursions of pH above the 6.5 to 8.5 range of water quality criteria and no excursion below the standard. On all but one of the nine exceedance event (May 6th), the pH was higher at Malott, upriver from the Project's influence, compared to Monse or Highway 97. On May 6th, the pH at Monse exceeded readings at Malott, but only by 0.06 units, well within the water quality allowance for human caused conditions.

It is not clear what effect, if any, the Wells Project may have had on turbidity. No turbidity data from the Wells forebay are available from this study, due to instrumentation failure. Limited data availability from locations upstream of the Wells Project boundary prevented comparisons to incoming waters on the Okanogan River during high turbidity events. However, given that elevated turbidity values coincided with increasing spring temperatures, river flow and precipitation, these observations are believed to be a product of annual snowmelt and runoff. Turbidity levels exceeding 5 NTU (over background when the background is 50 NTU or less) at Malott were inconsistent with readings collected at both Monse (5 of 122 comparable days, or 4%) and Highway 97 (8 of 165 comparable days, or 5%), suggesting that such events are not widespread or persistent within the Wells Project.

3.3 Adult Lamprey Passage Study

In 2008, Douglas PUD conducted lamprey passage research at Wells Dam using radio-tagged fish collected at Wells and Rocky Reach dams as a voluntary effort to supplement results from the 2007 study. Thirty-eight radio-tagged adult Pacific lamprey were released in the tailrace (n = 18) and fishways (n = 20) of Wells Dam. The goal of the 2008 study was to evaluate adult lamprey behavior and passage performance in the collection gallery and fishways entrances of Wells Dam.

In 2008, up to half of the radio-tagged lamprey displayed uncharacteristic behaviors indicative of death, tag shed, or abandonment of migration. Decreasing water temperatures may have also contributed to the abandonment of migration as lamprey approach Wells Dam near the known overwintering period. Of the remaining fish that appeared active, 15 approached the fishway from the tailrace and five entered (entrance efficiency of 33%). Lamprey activity within the collection gallery indicated that movement was not restricted by flows in this portion of the fishway. At least 11 of 19 (58%) lamprey that volitionally entered or were released in the collection gallery ascended the lower fishway to the trapping area. Fishway modifications to increase trapping efficiency for this study effectively blocked migration for 12 of 14 fish (86%) that encountered the trap (including one fish that ascended the lower fishway twice). The presence of the lamprey trapping structures substantially reduced lower fishway passage efficiency, and substantially reduced recruitment of tagged fish into the upper fishway.

Upper fishway passage times for the four radio-tagged lamprey that ascended the upper fishway were relatively fast (< 4 hours), except for one fish that hesitated during daylight hours. Three of these lamprey (75%) also bypassed the adult counting station undetected, supporting findings in 2007 that a majority (73%, n = 11) of lamprey that ascend Wells Dam are uncounted. No fallbacks of fish that successfully ascended the fishway were observed for the second consecutive year. Overall, results indicate that any potential areas of impediment are restricted to the entrance and the temporary lamprey trapping structure, as upper fishway passage efficiency was 100% for the second consecutive year.

The uncharacteristic behaviors observed with several fish were likely related to handling and tagging effects that are amplified in lamprey collected at Wells Dam because they are considerably thinner than those used in downriver studies. Increasing tag to body mass ratios has

been shown to substantially reduce swimming performance in Pacific lamprey. Trapping efforts implemented to achieve the tagging goals of the study also had a significant effect by effectively blocking or impeding a majority (86%) of lamprey during their ascent through the fishways, thus reducing escapement of fish to the upper fishway where passage success has been 100%. These results suggest that future lamprey passage and behavior studies at Wells Dam should use alternative monitoring technology that would reduce or eliminate trapping, tagging, and handling effects.

Passage efficiency from this study is comparable or superior to results from other radio-telemetry studies conducted in the Columbia River during 2008. For example, entrance efficiencies of radio-tagged lamprey at Bonneville Dam ranged from 6% to 32%, compared to 33% at Wells Dam. Fallback at Bonneville was 19% compared to no documented fall back events at Wells Dam. Median project passage times at Bonneville exceeded 180 hours compared to Wells where lower fishway passage time was 6.1 hours, upper fishway passage time was 5.9 hours, and time spent in or at the trap was 20 hours (32 hours total).

The results from the 2007 and 2008 passage studies at Wells Dam indicate that adult lamprey experience difficulty negotiating water velocities produced by head differentials at the fishway entrances ($\leq$ 3.4 m/s) established as attraction flows for migrating adult salmon. A reduction in head differential to reduce entrance velocities may be warranted to enhance adult lamprey passage at the Project, specifically during nighttime hours to capitalize on the nocturnal behavior of lamprey and avoid interference with salmon.

3.4 Transmission Line Wildlife and Botanical Study

In 2008, Douglas PUD conducted surveys for botanical and wildlife resources within the Wells Project transmission line corridor. The overall goal of these surveys was to provide information needed to guide land management decisions, avoid damage to valuable habitat during future transmission corridor management activities, and minimize the spread of invasive weeds. The study provides baseline data on plants and animals found within or adjacent to the corridor and information on the presence and habitat associations of rare, threatened, and endangered (RTE) plant and animal species in the corridor.

Surveys in the transmission line corridor targeted RTE plants, invasive plant species, birds, mammals, and reptiles. Field surveys were also conducted to identify and classify the specific vegetation cover types in the transmission line corridor. Additional data were collected to document (1) nesting by raptors and corvids, (2) use by sharp-tailed grouse (*Tympanuchus phasianellus*) and greater sage-grouse (*Centrocercus urophasianus*), and (3) evidence of avian collisions with the transmission line and associated structures in the study area.

One occurrence of an RTE plant species [Thompson's clover (*Trifolium thompsonii*), a State-listed threatened species] was observed and mapped within the transmission line corridor during botanical field surveys. Invasive plant surveys mapped and documented 9 potential occurrences of two Class B Designate weed species, Dalmatian toadflax (*Linaria dalmatica ssp. dalmatica*) and spotted knapweed (*Centaurea stoebe*). Dalmatian toadflax is a Class B Designate in Douglas County south of Township 25N and west of Range 25E only. Dalmatian toadflax

occurrences north of Township 25N were noted, but not mapped because the species is not a Class B Designate in that area. Occurrences of other Class B (non-designate) and Class C weed species were also noted, but not mapped.

Cover types were grouped into 13 mapping categories based on previously mapped geographic information system (GIS) data and field observations. The most common cover type was Active Agriculture, covering more than half the transmission line corridor. Shrub-Steppe was the most common native vegetation cover type, mapped on 30 percent of the corridor.
Biologists documented the presence of 103 bird species in the study area. Based on an analysis of relative abundance (number of birds observed per 5-minute visit within 115 feet of the 50 point count stations), the most common species in the study area was the American robin (*Turdus migratorius*). Other commonly detected species (in descending order of relative abundance) were Brewer's sparrow (*Spizella breweri*), spotted towhee (*Pipilo maculatus*), dark-eyed junco (*Junco hyemalis*), and mountain chickadee (*Poecile gambeli*). The greatest number of species was detected where the dominant cover type was Shrub-Steppe (this is the most common native vegetation cover type in the study area and therefore received the greatest survey effort), closely followed by Cleared Conifer and Riparian.

Two avian RTE bird species were documented in the study area. These were sage thrasher (*Oreoscoptes montanus*) and golden eagle (*Aquila chrysaetos*), both State candidate species. One additional RTE species was observed where the transmission line crosses the Columba River below Wells Dam, this being the American white pelican (*Pelecanus erythrorhynchus*), a State endangered species.

Eleven nests of raptors or corvids were detected within or adjacent to the study area, including four on Douglas PUD transmission towers. Three bird carcasses were found during focused surveys, and three other carcasses were found incidentally to other survey efforts. No direct evidence of collision was noted from these six carcasses.

Reptile species observed included pygmy short-horned lizard (*Phrynosoma douglasii*), western skink (*Eumeces skiltonianus*), racer (*Coluber constrictor*), western terrestrial garter snake (*Thamnophis elegans*), and western rattlesnake (*Crotalus viridis*). Mammals that were documented through sign or direct observation included mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), bobcat (*Felis rufus*), cougar (*Puma concolor*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), America badger (*Taxidea taxus*), porcupine (*Erethizon dorsatum*), northern pocket gopher (*Thomomys talpoides*), bushy-tailed woodrat (*Neotoma cinerea*), yellow-bellied marmot (*Marmota flaviventris*), and Douglas' squirrel (*Tamiasciurus douglasii*). Additional observations indicated the presence of chipmunks (*Tamias spp., yellow-pine and/or least*) and voles (species unknown).

4.0 UPDATED STUDY REPORT MEETING

In accordance with 18 CFR § 5.15(f) (2008), Douglas PUD will conduct a meeting to discuss the final study results contained within the USR Document. This meeting date will be within the required 15-day ILP timeframe following the filing of the USR Document and is scheduled as follows:

Thursday, April 30, 2009
9:00 am – 12:00 pm
Douglas PUD Auditorium
1151 Valley Mall Parkway
East Wenatchee, Washington

BLANK PAGE

5.0 NOTICE OF INTENT TO FILE DRAFT LICENSE APPLICATION

Section 5.16 (a) of the FERC regulations, 18 CFR § 5.16 (a) (2008), requires a potential applicant to file a preliminary licensing proposal no later than 150 days prior to the deadline for filing a new license application. Under section 5.16 (b) of the FERC regulations, 18 CFR § 5.16 (b) (2008), a preliminary licensing proposal must describe, as applicable, (1) the existing and proposed project facilities, including project lands and waters, and (2) the existing and proposed project operation and maintenance plan, including measures for protection, mitigation and enhancement with respect to each resource affected by the project proposal. In addition, a preliminary licensing proposal must include the potential applicant's draft environmental analysis by resource area of the continuing and incremental impacts, if any, of the project proposal, including the results of the studies conducted under the approved study plan.

Section 5.16 (c) of the FERC regulations, 18 CFR § 5.16 (c) (2008), provides that a potential applicant may elect to file a draft license application, which includes the contents of a license application required by section 5.18 of the FERC regulations, 18 CFR § 5.18 (2008), instead of the preliminary licensing proposal. A potential applicant that elects to file a draft license application must include a notice of its intent to do so in the updated study report required by section 5.15 (f) of the FERC regulations, 18 CFR § 5.15 (f) (2008).

Pursuant to section 5.16 (c) of the FERC regulations, Douglas PUD hereby provides notice of its intent to file a draft license application, which includes the contents of a license application required by section 5.18 of the FERC regulations, instead of a preliminary licensing proposal. Douglas PUD's draft license application will include Exhibits A, B, C, D, F and G for a major project – existing dam, an Exhibit E in the form of a draft environmental assessment, and an Exhibit H consistent with applicable regulations. Douglas PUD intends to file its draft license application on or before December 31, 2009.

BLANK PAGE