

2014 ANNUAL REPORT
WHITE STURGEON MANAGEMENT PLAN
WELLS HYDROELECTRIC PROJECT
FERC PROJECT NO. 2149

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Prepared by:
Public Utility District No. 1 of Douglas County
East Wenatchee, Washington

EXECUTIVE SUMMARY

The annual White Sturgeon Management Plan (WSMP) Report includes a summary of the progress made towards meeting measures required by the Federal Energy Regulatory Commission (FERC) operating license for Wells Dam and the requirements found within Appendix A (Clean Water Act section 401 Water Quality Certification). The 2012 FERC Order requires Douglas PUD to submit an annual WSMP report to the FERC on or before May 31st during each year of the license.

The goal of the WSMP is to increase the white sturgeon (*Acipenser transmontanus*) population in the Wells Reservoir to a level that can be supported by the available habitat and characterized by a diverse age structure consisting of multiple cohorts (juvenile and adult). In addition, the WSMP is intended to support spawning, rearing and migration as identified by the aquatic life designated use under WAC 173-201A in the Washington state water quality standards. Based upon the information available as of December 2006, the Aquatic Settlement Work Group (Aquatic SWG) determined that an assessment of Project effects on white sturgeon was not practical given sturgeon life history characteristics and the limited number of fish estimated to exist in the Project. Therefore, the Aquatic SWG concluded that resource measures related to white sturgeon should focus on population protection and enhancement by means of supplementation as an initial step in order to increase the number of fish within the Wells Reservoir. In addition to the initial supplementation activities, implementation of a monitoring and evaluation program shall be conducted to accurately assess natural recruitment, juvenile habitat use, emigration rates, carrying capacity, and the potential for natural reproduction so as to inform the scope of a future, longer-term supplementation strategy. All objectives were developed in order to meet the WSMP goal. The Protection, Mitigation and Enhancement measures presented within the WSMP are designed to meet the following objectives:

Objective 1: Supplement the white sturgeon population in order to address Project effects, including impediments to migration and associated bottlenecks in spawning and recruitment. Public Utility District No. 1 of Douglas County (Douglas PUD), in consultation with the Aquatic SWG has developed a larval collection and direct gamete take program to implement in years 1-4 of the Wells Operating License. During May through July of 2014, both larval and fertilized eggs were collected and transported to Wells Hatchery where juveniles were reared for up to one year. These fish will be released in the Wells Project in 2015 towards meeting this objective, and will be the second annual release as part of Douglas PUD's Phase I WSMP.

Objective 2: Determine the effectiveness of the supplementation activities through a monitoring and evaluation program. Monitoring of naturally produced and hatchery produced juvenile and adult sturgeon will be initiated in 2015. On January 8, 2014, the Aquatic SWG approved the Phase One White Sturgeon Management Plan Monitoring and Evaluation Study Plan (as appended to the 2013 Aquatic Settlement Agreement Annual Report). (Note: Ecology and USFWS approved the study plan via email on December 20, 2013.)

Objective 3: Determine the potential for natural reproduction in the Wells Reservoir in order to appropriately inform the scope of future supplementation activities. Natural reproduction evaluations may be coupled with the active tagging studies being implemented under Objective 2

Index Monitoring Program. This objective is covered in the 2014 approved White Sturgeon Monitoring and Evaluation Study Plan.

Objective 4: Adaptively manage the supplementation program as warranted by the monitoring results. Phase II goals will be addressed following the completion of Phase I in 2022.

Objective 5: Evaluate whether there is biological merit to providing safe and efficient adult upstream passage. Phase II goals, including longer term indexing and evaluating the feasibility and biological merit of adult passage measures will be addressed one year after the completion of Phase I (2023).

Objective 6: Identify white sturgeon educational opportunities that coincide with WSMP activities. In 2014, as a part of the WSMP, Douglas PUD began white sturgeon public outreach. In spring 2014, Douglas PUD hosted two tours for high school students at Wells Hatchery as part of a pre-college credit program. During one of the tours, held in April 2014, students participated in releasing 30 direct gamete-origin fish into the Wells Reservoir. On May 14, 2014, the Aquatic SWG approved the Douglas PUD White Sturgeon Outreach Plan (See Anchor QEA., 2015; May 14, 2014 meeting minutes), which identifies selected WSMP activities as opportunities for education to public entities such as schools, cities, fishing and recreation groups, and other interested local groups. Outreach efforts may include hatchery tours, release of hatchery juveniles, tagging of juveniles prior to release, upgrades to the Overlook Area at Wells Dam, and other possible white sturgeon displays. Instructional videos including community outreach activities as they relate to white sturgeon actions were created in 2014 and are available at Douglas PUD's public webpage at www.douglaspud.org.

This WSMP is intended to be compatible with other white sturgeon management plans in the Columbia River mainstem. Furthermore, this management plan is intended to be not inconsistent with other management strategies and recovery goals of federal, state and tribal natural resource management agencies. The WSMP is not intended to be a harvest management plan and does not create or supersede jurisdiction over fisheries management decisions made by the responsible fishery agencies and tribes. However, the WSMP activities are expected to ultimately support appropriate and reasonable harvest opportunities consistent with the goals of the responsible fishery agencies and tribes and designated use for harvest under WAC 173-201A identified in the Washington state water quality standards. Should the responsible fishery agencies and tribes determine that there is an ongoing harvestable surplus of sturgeon in the Wells Reservoir, then this indicates significant progress toward achievement of the goals and objectives of this plan.

1.0 INTRODUCTION

The White Sturgeon Management Plan (WSMP) is one of six Aquatic Resource Management Plans contained within the Aquatic Settlement Agreement (Agreement). Collectively, these six Aquatic Resource Management Plans are critical to direct implementation of Protection, Mitigation, and Enhancement measures (PMEs) during the term of the new license (Issued November 9, 2012).

To ensure active stakeholder participation and support, the Public Utility District No. 1 of Douglas County (Douglas PUD) developed all of the resource management plans in close coordination with agency and tribal natural resource managers (Aquatic Settlement Work Group or Aquatic SWG). During the development of the WSMP, the Aquatic SWG focused on developing management priorities for resources potentially impacted by Project operations. Entities invited to participate in the Aquatic SWG include the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), Washington Department of Ecology (Ecology), Washington State Department of Fish and Wildlife (WDFW), the Confederated Tribes of the Colville Reservation (Colville), the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation), and Douglas PUD.

The WSMP directs the implementation of measures to protect against and mitigate for potential Project impacts on white sturgeon (*Acipenser transmontanus*).

The Aquatic SWG agrees on the need to develop a plan for the long-term management of white sturgeon in the Wells Hydroelectric Project (Project). This management plan report summarizes the relevant resource issues and background (Section 2), identifies the goal and objectives of the plan (Section 3), and describes the relevant PMEs (Section 4) for white sturgeon during the term of the new license. In addition, the progress toward meeting each of these sections is provided.

In addition to the requirements found within the WSMP, the new Federal Energy Regulatory Commission (FERC) license added several additional sturgeon related requirements associated with the continued operation of the Wells Project. Implementation of all of the WSMP related measures will be reported to the various agencies and tribes within this report.

2.0 BACKGROUND

2.1 White Sturgeon Biology

White sturgeon are the largest of all North American freshwater fish. They are found in marine waters and freshwaters of rivers along the Pacific coast from Monterey, California to Cook Inlet in northwestern Alaska (Wydoski and Whitney 2003). Significant populations of the Pacific coast appear to be restricted to three locations: the Sacramento, Fraser, and Columbia rivers (Lane 1991). White sturgeon are distributed throughout the U.S. portion of the Columbia River and in many of its larger tributaries. Historically, white sturgeon migrated throughout the mainstem Columbia River from the estuary to the headwaters, although passage was probably limited at times by large rapids and falls (Brannon and Setter 1992).

White sturgeon are long-lived fish, with fin ray analysis documenting fish over 100 years in age (Beamesderfer et al. 1995). This anadromous species has been reported to reach a length of 20 feet and a weight of 1,800 pounds (Wydoski and Whitney 2003). In the Columbia River, white sturgeon spawn in the spring between April and July. Only a small percentage of adult white sturgeon in the Columbia River spawn in a given year. Intervals between spawning have been estimated to be between 3 and 11 years. White sturgeon deposit eggs through broadcast spawning at water temperatures between 10 and 18°C. Mature white sturgeon commonly produce between 100,000 and 300,000 eggs, but larger fish may produce up to 3 million eggs (Wydoski and Whitney 2003). Spawning and egg incubation in the Columbia River occur in the swiftest water available (2.6-9.2 feet per second) at depths between 13.1 and 65.6 feet over cobble, boulder, and bedrock substrates (Wydoski and Whitney 2003). In mainstem Columbia River reservoirs, spawning occurred within 5 miles downstream of the mainstem dams. Eggs hatch in approximately 7 days at 15°C.

Columbia River white sturgeon are reported to have declined in numbers because of numerous factors, including obstruction of migration by mainstem hydroelectric dams, altered stream flows, altered hydrologic regimes, altered temperature regimes, reduced spawning habitat, and over harvest (van der Leeuw et al. 2006; Wydoski and Whitney 2003). Variations in population characteristics also have been attributed to differences in exploitation rates and recruitment success, access to marine food resources, and suitability of hydrologic conditions and available habitats (Devore et al. 1995). During the 1800s, prior to construction of mainstem hydroelectric dams on the Columbia River, white sturgeon were in great demand for their caviar and smoked flesh. In 1892, during the peak of commercial harvest activities, approximately 2.5 million kilograms of white sturgeon were harvested (Wydoski and Whitney 2003). Regulations of the white sturgeon fishery began with a 4-foot minimum size limit established in 1899. Several regulations were established from 1899 to 2000 to manage the fishery in the lower Columbia River, although, effective recovery efforts did not begin until spawners were protected in the 1950s (Wydoski and Whitney 2003).

Beginning in the 1930s, with the construction of Rock Island, Grand Coulee, and Bonneville dams, migration was disrupted because white sturgeon generally do not pass upstream through fishways that were built for salmon, although they do pass downstream through dams (Lepla et al. 2001). Construction of hydroelectric projects in the mid-Columbia River Basin, such as Priest Rapids, Wanapum, Rock Island, Rocky Reach, and Wells has also affected the upstream movement of white sturgeon. Current populations in the Columbia River basin can be divided into three groups: fish below the Bonneville Dam, with access to the ocean; fish isolated functionally, but not genetically, between dams; and fish in several large tributaries. However, the population dynamics and factors regulating production of white sturgeon within isolated populations in the mid-Columbia River reservoirs such as the Rocky Reach and Wells reservoirs are not well understood.

2.2 White Sturgeon Management and Recovery Efforts

Management programs to protect and restore white sturgeon in the Kootenai River and the upper Columbia River are on-going and have provided a relevant framework for the development of a white sturgeon management plan in the Wells Reservoir. The Kootenai and upper Columbia

sturgeon recovery efforts have also provided a good technical framework for implementing a sturgeon management plan. The strategies and activities outlined in these aforementioned management programs have provided important information, which has been used to develop an effective WSMP.

2.2.1 Kootenai River White Sturgeon Recovery

In the early 1990s following concerns that white sturgeon populations were decreasing due to near total recruitment failure, a detailed monitoring program was instituted by the Idaho Department of Fish and Game (IDFG) to provide more information on white sturgeon species status in the Kootenai River system. In 1994, the USFWS listed the Kootenai stock of white sturgeon as an endangered species, which introduced a higher level of management and control by various authorities in the drainage and region. A Recovery Team was established to provide technical direction regarding hatchery supplementation efforts. A final Kootenai White Sturgeon Recovery Plan was signed by the USFWS in 1999.

Kootenai white sturgeon recovery efforts consist of a multi-faceted approach aimed at improving survival at various life history stages. Coordinated flow releases during spring are a major habitat restoration focus designed to increase natural recruitment, although currently it is difficult to assess the relationship between flows and recruitment success (USFWS 1999). Directed stocking programs, which address genetic concerns, stocking rates, and fish size at release, have also been implemented to boost juvenile sturgeon in the Kootenai system. The Kootenai Tribe of Idaho in collaboration with the Kootenay Trout Hatchery (KTH) in Canada are primarily responsible for producing high-quality juvenile white sturgeon for the directed stocking program. Information collected from annual monitoring activities, which assess survival, growth rates, and natural spawning success, allow for an adaptive management approach with regards to the stocking program.

2.2.2 Upper Columbia River White Sturgeon Recovery

In 2002, a bi-national Recovery Team, termed the Upper Columbia White Sturgeon Recovery Initiative (UCWSRI) finalized the Upper Columbia White Sturgeon Recovery Plan in response to concerns that the transboundary white sturgeon population residing between Hugh L. Keenleyside Dam and Grand Coulee Dam consists of an aging and declining population with extremely limited recruitment. The Recovery Team, consisting of technical representatives from Federal, Provincial, and State resource management agencies and from Canadian and U.S. tribes, directs the recovery program.

Due to near total recruitment failure over the past two decades, a decision was made early in the recovery planning process to move immediately to development of a hatchery program to produce juvenile sturgeon for stocking (UCWSRI 2002). The breeding plan (Kincaid 1993) developed for the Kootenai sturgeon program was used as a model for the upper Columbia sturgeon. Rearing of all fish for the stocking program occurs at the KTH. Similar to the Kootenai recovery strategy, a juvenile index monitoring program to assess growth, survival, health, distribution, and relative abundance of released juveniles shall provide information essential to monitoring the upper Columbia sturgeon population and the success of the hatchery stocking program.

2.2.3 Rocky Reach White Sturgeon Management Plan

The relicensing process for the Rocky Reach Hydroelectric Project brought fisheries agencies, tribes, and interested parties together in a Natural Resources Working Group (Rocky Reach Fish Forum or RRFF) that provided an opportunity for comprehensive review of current and future management priorities for fish resources potentially impacted by ongoing Project operations (Chelan PUD 2005). In 2004 and 2005, RRFF members collaborated on the development of goals and objectives to manage the white sturgeon population within the Rocky Reach Project boundary under the new license. Based upon the information collected from white sturgeon field studies implemented by Chelan PUD in 2001 and 2002, a white sturgeon management plan was developed to promote population growth of sturgeon to a level commensurate with the available habitat. The Rocky Reach management plan measures include the implementation of a white sturgeon supplementation program, a monitoring program to determine population characteristics, and tracking surveys to determine movements and to assess potential spawning locations.

Following the issuance of Rocky Reach Dam's operating license from the FERC Chelan PUD implemented the first year of broodstock collection in 2010. Few viable adults were obtained despite many adults being captured. Offspring from 1x2 cross and captive brood fish were released into the Rocky Reach Reservoir, for an approximate 2011 release of 6,500 fish. In 2011, viable broodstock capture increased, however offspring produced showed signs of White Sturgeon Iridovirus which prevented the release of very many fish in 2012. Approximately 130 fish were released into the Rocky Reach Project in 2012. In 2012, broodstock collection resulted in two spawning groups that contained multiple males and it is expected that 6,500 fish will be released in 2013.

2.2.4 Priest Rapids Project White Sturgeon Management Plan

As part of the Priest Rapids Project relicensing, white sturgeon populations were investigated in the Priest Rapids and Wanapum reservoirs from 1999 to 2003. Results of the study have assisted in identifying a framework for the future development and implementation of a Priest Rapids Project White Sturgeon Management Plan. Biological objectives associated with this management plan consist of increasing white sturgeon populations to a level commensurate with available habitat through a supplementation program and the implementation of a monitoring program to determine population characteristics such as natural recruitment, spawning, rearing, growth, survival, and rates of emigration.

Following the issuance of the Priest Rapids Dam license Order and the issuance of a Clean Water Act Section 401 Water Quality Certification (401 Certification) via the Washing Department of Ecology, Grant PUD has begun implementing white sturgeon stocking objectives. Similar to Chelan PUD, Grant PUD has participated in three years of juvenile sturgeon releases above Priest Rapids and Wanapum Dams. Release numbers and broodstock collection for this effort is coordinated through the Priest Rapids Fish Forum (PRFF), but have targeted approximately 6,500 fish per year.

2.3 Project White Sturgeon Study

Since little information existed on the status of white sturgeon populations in the mid-Columbia, Chelan, Grant, and Douglas PUDs each initiated studies of white sturgeon to support their current or upcoming relicensing processes. The information gathered from these studies was intended to provide basic white sturgeon life history information, distribution, and current population sizes in the mid-Columbia River Basin. Additionally, study results provided the foundation for the development of appropriate management goals and objectives.

From 2001-2003, Douglas PUD implemented a study to examine the white sturgeon population within the Project. Prior to the implementation of this study, little information on white sturgeon was available for the Wells Reservoir. WDFW catch record card returns for 1993 and 1994 indicate that legal size white sturgeon were present in the Wells Reservoir (Brad James, WDFW, pers. comm.). Additionally, information from previous studies in reservoirs upstream and downstream supported the existence of a population. The primary objectives of the study were to provide basic information on the population abundance, age structure, size, and growth of Project white sturgeon; analyze movements of white sturgeon within the Reservoir; and compare the data collected during this study with data collected during assessments at other projects (Jerald 2007).

During the summers of 2001 and 2002, setlines were deployed in the Wells Reservoir. Sturgeon captured on setlines were measured, marked with passive integrated transponder (PIT) tags and with scute markings. Additionally, a select number of captured fish were fitted with radio-transmitters to track movements and had pectoral fin rays removed for age analysis using standard methodologies (Beamesderfer et al. 1989).

Setline sampling took place over a two-year timeframe with a total of 129 setlines deployed and retrieved from throughout the reservoir. In total, 13 white sturgeon were captured during the 2-year study with the majority of the fish being captured in the Columbia River within five miles of the mouth of the Okanogan River. Twelve of the captured fish were PIT tagged. Subsequently, five recapture events were recorded for a total of 18 capture events during the mark-recapture period (one fish was recaptured twice). Population abundance was estimated to be 31.35 ± 17.51 . The 95% confidence interval for sturgeon abundance was calculated to be CI (13 < N < 218). The results of the mark-recapture portion of the study indicated that the sturgeon population in the Wells Reservoir is small with a point estimate of 31 fish over 50 cm in length (Skalski and Townsend 2005).

The length of the 13 fish captured during the study ranged from 60-202 cm. Two of the fish were classified as juveniles (<90 cm fork length) while 11 were classified as sub-adults or adults. It is important to note that the capture methodology was not designed to provide accurate sampling of fish under 50 cm. Captured sturgeon ranged in age from 6 to 30 years old (based on 11 fish) demonstrating that all of these fish recruited to the Wells Reservoir after Wells Dam was completed in 1967 with strong year class recruitment between the years 1972 and 1978 and again between 1988 and 1996. The presence of fish within these age classes suggests that successful recruitment within or to the Wells Reservoir is occurring either through (1) spawning within the Wells Reservoir and/or (2) immigration into the Wells Reservoir from populations upstream.

Two white sturgeon were captured in 2001 and subsequently recaptured in 2002 to provide limited growth rate information. One juvenile fish was measured at 65 cm (fork length) on July 11, 2001. The fish was again captured on September 26, 2002 and measured 87 cm. This represented a growth rate of 22 cm in 14 months, or 18.9 cm/year. One adult fish was captured on August 9, 2001 measuring 197 cm (fork length). The fish was subsequently captured on September 6, 2002 and measured 199 cm representing a 2 cm growth rate over approximately 13 months, or 1.85 cm/year (Jerald 2007). In October 2006, this fish was found dead along the shoreline of the Columbia River adjacent to the mouth of the Okanogan River. At that time, biologists measured the fish at 228.5 cm representing a 29.5 cm increase in length over a four year period or an average of 7.4 cm of growth per year.

A total of six white sturgeon were fitted with radio-tags and monitored throughout the study period using mobile and fixed telemetry. Telemetry data along with setline capture data verify that white sturgeon congregate in the Columbia River near the Okanogan River confluence during the summer, fall, and winter months with none of the six fish being detected downstream from Brewster river mile (RM 530) or upstream of Park Island (RM 538). Very little movement of tagged sturgeon was observed during winter months. In the spring of 2002, one of the five mature fish radio-tagged made an upstream migration into the Okanogan River and two different radio-tagged mature sized sturgeon made movements into the Okanogan River during 2003.

In general, the results of the white sturgeon study in the Wells Reservoir were similar to the results of a study conducted in the neighboring Rocky Reach Reservoir in 2001-2002 (Chelan PUD 2005). Results indicate that the Wells Reservoir adult sturgeon population is estimated from 13-217 fish. These results are similar to the Rocky Reach assessment which estimated numbers of sturgeon from 50-115 fish. Both studies captured similar numbers of sturgeon using similar amounts of effort and similar capture techniques (Rocky Reach=18 sturgeon, Wells=13 sturgeon). Radio-telemetry data from both studies suggest that very little activity occurs during the overwintering period. Wells Reservoir sturgeon ranged in age from 6 to 30 years old while Rocky Reach sturgeon ranged in age from 7 to 50 years old. Both studies suggest that some recruitment into each population is occurring given the presence of juvenile fish in their respective reservoirs (Chelan PUD 2005; Jerald 2007).

3.0 GOAL AND OBJECTIVES

The goal of the WSMP is to increase the white sturgeon population in the Wells Reservoir to a level that can be supported by the available habitat and characterized by a diverse age structure consisting of multiple cohorts (juvenile and adult). In addition, the WSMP is intended to support spawning, rearing and migration as identified by the aquatic life designated use under WAC 173-201A in the Washington state water quality standards. Based upon the available information, the Aquatic SWG agreed that a rigorous and reliable assessment of ongoing Project effects on white sturgeon was not practical given sturgeon life history characteristics and the limited number of fish estimated to exist in the Wells Reservoir. Therefore, the Aquatic SWG concluded that efforts should focus, initially, on supplementation efforts to increase the population within the Wells Reservoir in order to address Project effects. Once the population numbers have been increased to a level that can be studied, as determined by the Aquatic SWG, Douglas PUD shall implement a monitoring and evaluation program to accurately assess natural recruitment,

juvenile habitat use, emigration rates, carrying capacity, and the potential for natural reproduction so as to inform the scope of a future, long-term supplementation strategy. The PME's of the WSMP are designed to meet the following objectives:

Objective 1: Supplement the white sturgeon population in order to address Project effects, including impediments to migration and associated bottlenecks in spawning and recruitment;

Objective 2: Determine the effectiveness of the supplementation activities through a monitoring and evaluation program;

Objective 3: Determine the potential for natural reproduction in the Wells Reservoir in order to appropriately inform the scope of future supplementation activities;

Objective 4: Adaptively manage the supplementation program as warranted by the monitoring results and in consultation with the Aquatic SWG;

Objective 5: Evaluate whether there is biological merit to providing safe and efficient adult upstream passage;

Objective 6: Identify white sturgeon educational opportunities that coincide with WSMP activities.

This WSMP is intended to be compatible with other white sturgeon management plans in the Columbia River mainstem. Furthermore, this management plan is intended to be not inconsistent with other management strategies and recovery goals of federal, state and tribal natural resource management agencies. The WSMP is not intended to be a harvest management plan and does not create or supersede jurisdiction over fisheries management decisions made by the responsible fishery agencies and tribes. However, the WSMP activities are expected to ultimately support appropriate and reasonable harvest opportunities consistent with the goals of the responsible fishery agencies and tribes and designated use for harvest under WAC 173-201A identified in the Washington state water quality standards. Should the responsible fishery agencies and tribes determine that there is an ongoing harvestable surplus of sturgeon in the Wells Reservoir, then this indicates significant progress toward achievement of the goals and objectives of this plan.

The schedule for implementation of specific measures within the WSMP is based on the best information available at the time the Plan was developed. As new information becomes available, implementation of each activity may be adjusted through consultation with the Aquatic SWG.

4.0 PROTECTION, MITIGATION AND ENHANCEMENT MEASURES

In order to fulfill the goal and objectives described in Section 3.0 of the WBMP, Douglas PUD, in consultation with the Aquatic SWG, has initiated the implementation of the following measures. The program shall be implemented in two phases. Phase I of the PME's shall be implemented during the first ten years of the new license and consist of supplementation,

monitoring and evaluation activities. Results of Phase I PME's will be used to inform the scope of continued PME's during Phase II, which shall be implemented for the remainder of the new license.

Douglas PUD, in consultation with the Aquatic SWG, shall initiate implementation of the following PME's during the 50-year license term:

Phase I (Years 1-10)

- Development of a Broodstock Collection and Breeding Plan (Year 1 and updated as determined by the Aquatic SWG, See Section 4.1.1);
- Broodstock Collection (Years 1-4 and other years TBD by the Aquatic SWG, see Section 4.1.1);
- Juvenile Stocking (Years 2-5 and other years TBD by the Aquatic SWG, see Section 4.1.2);
- Index Monitoring Program (Years 3-5 and 2 more years prior to Year 10 TBD by the Aquatic SWG, see Section 4.2.1);
- Marked Fish Tracking (Years 3-5 and 2 more years prior to Year 10 TBD by the Aquatic SWG, see Section 4.2.2);
- Natural Reproduction Assessments (5 annual assessments over the license term, see Section 4.2.3)*;

* Natural reproduction assessments can be implemented over the term of the license (Phase I and Phase II) as determined by the Aquatic SWG.

Phase II (Years 11-50)

- Long-term juvenile stocking (stocking rate and frequency TBD by Aquatic SWG in Years 11-50, see Section 4.4.1);
- Supplementation Program Review (Years 11-50 TBD by the Aquatic SWG, see Section 4.4.2);
- Long-term Index Monitoring Program (Year 12 and once every 3-5 years thereafter TBD by the Aquatic SWG, see Section 4.4.3);
- Adult Passage Evaluation (Year 11 and once every 10 years thereafter, see Section 4.4)

As determined by the Aquatic SWG, appropriate educational opportunities coinciding with implementation of WSMP activities (Section 4.5) will be made available during the entire license term.

The following sections describe, in detail, the components, timing of implementation, and decision-making process of the PME's to be conducted during Phase I and II of the white sturgeon management program.

4.1 Phase I Supplementation Program (Objective 1)

4.1.1 Broodstock Collection and Breeding Plan

Due to the low numbers of sturgeon indicated by the 2001-2003 white sturgeon study and the need to increase genetic variation, there is a low probability that broodstock from only the Wells Reservoir can be utilized as the basis for supplementation activities. Consequently, other sources of fish must be considered in addition to capturing fish from Wells Reservoir to increase the white sturgeon population. Within one year of issuance of the new license Douglas PUD shall prepare and implement a Broodstock Collection and Breeding Plan, in consultation with the Aquatic SWG, which considers such factors as genetics and questions of imprinting, and are consistent with the goal and objectives of the WSMP and includes the level of detail provided in other existing white sturgeon breeding plans.

Following is a prioritized list¹ of juvenile fish source options that shall be incorporated into a Broodstock Collection and Breeding Plan:

- Broodstock collected from the Wells Reservoir;
- Broodstock collected from nearby reservoirs (Priest Rapids, Wanapum, Rocky Reach, Rock Island);
- Broodstock collected from McNary Reservoir;
- Juvenile production from the Lake Roosevelt white sturgeon recovery effort;
- Broodstock collected from below Bonneville Dam in the lower Columbia River;
- Juveniles purchased from a commercial facility.

A white sturgeon supplementation program may include, but may not be limited to, the following implementation options (Not listed in a priority order):

- Build new or retrofit existing Douglas PUD funded hatchery facilities to accommodate white sturgeon broodstock, egg incubation, and juvenile rearing;
- Development of a mid-Columbia hatchery facility funded by the three PUDs (Douglas, Chelan, and Grant) to accommodate various phases of white sturgeon supplementation; broodstock, egg incubation, and juvenile rearing;
- Direct release into the Wells Reservoir of juveniles produced via appropriate Breeding Plan criteria and reared at a commercial facility;
- Direct release into the Wells Reservoir juveniles or adults trapped and hauled from the lower Columbia River.

The initial source of broodstock shall be determined within the first year of issuance of the new license. Collection of broodstock shall occur consistent with the broodstock collection plan in years 1-4 of the new license. Any additional years during the Phase I program (first ten years of

¹ Although the original WSMP included a prioritized list, since the development of the WSMP the Aquatic SWG has approved the White Sturgeon Brood Stock Collection and Breeding Plan (field with the FERC on February 14 2012) and a sturgeon collection location Statement of Agreement developed and approved in the Aquatic SWG on March 20th 2012. Collectively, these two documents approve all capture locations found in the WSMP and remove the prioritization found in the WSMP.

the new license) in which broodstock collection shall occur in order to facilitate additional juvenile stocking into the Wells Reservoir (Section 4.1.2) will be determined by the Aquatic SWG. The intent of broodstock collection is to use their progeny, if feasible, for future white sturgeon stocking activities in the Wells Reservoir. The broodstock collection plan shall be updated annually, or as otherwise recommended by Douglas PUD in consultation with the Aquatic SWG, to incorporate new and appropriate information.

4.1.1.1 Progress Towards Objective 1 in 2014 – Broodstock Collection and Breeding Plan

Since the approval of the 2011 Broodstock and Breeding Plan a number of statements of agreements (SOAs) have been reviewed and approved within the Aquatic SWG. In 2012 the Parties approved two white sturgeon collection techniques consistent with the Broodstock and Breeding Plan. Over the course of 2013-2016 Douglas PUD will fund both the collection of wild origin sturgeon larvae and the collection of wild adults for the purposes of hatchery breeding. Fish collected under the Broodstock and Breeding Plan and the various SOAs will be stocked during the years 2014-2017.

4.1.2 Juvenile White Sturgeon Stocking

Within two years following issuance of the new license, Douglas PUD shall release up to 5,000 yearling white sturgeon into the Wells Reservoir annually for four consecutive years (20,000 fish total). Additional years and numbers of juvenile sturgeon to be stocked during Phase I will be determined by the Aquatic SWG and will not exceed 15,000 juvenile sturgeon (total of 35,000 juvenile sturgeon during Phase I). In consultation with the Aquatic SWG, yearling fish for release shall be acquired through one or more of the sources listed in priority order in Section 4.1.1 above, or through other measures identified by the Aquatic SWG. If juvenile sturgeon stocking deadlines cannot be achieved, the Aquatic SWG will determine alternative implementation measures that will be undertaken by Douglas PUD (see Table 4.7-1, footnote 2).

Douglas PUD shall ensure that all hatchery-reared juvenile white sturgeon released into the Wells Reservoir are marked with PIT tags and year-specific scute marks for monitoring purposes described in Section 4.2 of this plan. In order to allow for tracking of juvenile white sturgeon emigration described under Section 4.2.2, Douglas PUD shall ensure that up to one percent (or a maximum of 50) of the juvenile white sturgeon released into the Wells Reservoir are large enough to allow implantation of an active tag prior to release. In addition, following the third year of supplementation (unless the Aquatic SWG determines more analysis is required), the Aquatic SWG may elect to release juveniles at an earlier or later life stage for the fourth year in order to compare success of fish released at varying life stages. For example, the Aquatic SWG may elect to have a proportion of the hatchery-reared juveniles released at differing size intervals (with the minimum size being that which permits PIT tagging), in order to monitor potential differences in survival and growth during future indexing periods.

4.1.2.1 Progress Towards Objective 1 in 2014 – Juvenile White Sturgeon Stocking

In March 2014, Douglas PUD led a tour of the newly upgraded Wells Sturgeon Hatchery Facility, which was upgraded in 2013 as part of the Wells Hatchery Modernization. Sturgeon

facility improvements included 12 new circular tanks with improved lids, pipes, temperature control, and biosecurity.

Brood Year 2013

In March 2013, the Aquatic SWG approved a White Sturgeon Collection Plan SOA for implementation in the first year (2013) of Douglas PUD's white sturgeon collection efforts, which included the following efforts: 1) larval collection in the Mid-Columbia River from the Vernita Bridge upstream to the Rock Island Dam tailrace, and in Lake Roosevelt, with collection from Mid-Columbia locations as the highest priority; and 2) broodstock collection in the pools of the Columbia River between Bonneville Dam upstream to Rock Island Dam. The Aquatic SWG also agreed that the proportion of fish from each program (larvae and brood-collected offspring) released into the Wells Project would be agreed on prior to planting in spring 2014 following the completion of the larvae and brood-collection season and following the results from initial incubation and rearing efforts.

In March 2014, following several months of discussions regarding genetics, fish health, and the merits of stocking larval-origin versus direct gamete-origin fish, the Aquatic SWG approved the following plan for stocking Wells white sturgeon for implementation in 2014: 1) all stocked fish will be asymptomatic of disease (i.e., no clinical signs of disease); 2) all larvae-source fish available at the Wells Fish Hatchery (approximately 2,200) will be stocked at a target size of at least 146 to 272 grams (280 to 352 millimeters [mm]); and 3) the balance of the 5,000-fish target will be stocked using direct gamete-source fish from 12 families (half sibling) and be stocked at a target mean size of 111 to 146 grams (256 to 280 mm).

In April 2014, approximately 2,900 direct gamete-origin fish were released into Wells Reservoir. Larval-origin fish were held an additional 2 months for additional growth; in June 2014, more than 2,100 larval-origin fish were released into the Wells Reservoir.

Brood Years 2014 to 2016

In 2014, based on 2013 collection efforts, the Aquatic SWG agreed to focus larval-collection efforts in Lake Roosevelt, and to not collect below Rock Island Dam again because few larvae were collected suggesting low production in the area. The Aquatic SWG also agreed that 2014 brood-collection efforts would continue in the same manner as in 2013, including brood collection in the Dalles and Bonneville pools, and coordination with Grant PUD and Chelan PUD for brood collection at their respective facilities.

In May 2014, Douglas PUD distributed a draft Wells White Sturgeon Collection and Stocking SOA for brood years 2014 to 2016. During the next several months, the Aquatic SWG discussed at length fish source, collection capabilities, cultural boundaries, fish health, genetics, and stocking goals. Several revisions and iterations of the draft SOA were provided by Douglas PUD, the CCT, the YN, and WDFW. The following common objectives were expressed by Aquatic SWG members: 1) moving genes from the lower river upstream; 2) achieving a genetically based split through parental representation; and 3) meeting the stocking target of 5,000 fish. In December 2014, WDFW contacted geneticists Drs. Paul Anders (Cramer Fish Sciences/University of Idaho) and Andrea Drauch-Schreier (University of California, Davis) for

technical advice. WDFW indicated that they expected to provide input on the draft SOA by February 2015.

4.2 Phase I Monitoring and Evaluation Program (Objective 2)

Douglas PUD shall conduct a monitoring and evaluation program within the Wells Reservoir for the purpose of assessing the effectiveness of the supplementation activities described in Section 4.1 and outlined in Table 4.7-1. Monitoring shall include both an Index Monitoring Program (Section 4.2.1) and a Marked Fish Tracking Program (Section 4.2.2). Both of these studies will be used to collect life history and population dynamics information including rates of fish movements into and out of the Wells Reservoir and habitat use. Douglas PUD shall also obtain updated information, when available, on other white sturgeon recovery programs (e.g., Upper Columbia River, Kootenai River, mid-Columbia PUDs), in order to improve the monitoring and evaluation program and refine its implementation. The results of this information will also inform supplementation, monitoring and evaluation activities during implementation of Phase II of the WSMP.

4.2.1 Index Monitoring Program

Within three years following issuance of the New License, Douglas PUD shall initiate a three-year index monitoring program (Years 3-5) for juvenile and adult sturgeon in the Wells Reservoir to determine age-class structure, survival rates, abundance, density, condition factor, growth rates, and to identify distribution and habitat selection of juvenile sturgeon. The indexing methods shall include using gillnets, set lines or other appropriate recapture methods for juveniles and adults.

As a component of the Phase I indexing program, Douglas PUD shall capture and implant active tags in a portion of the juvenile and sexually mature adult sturgeon population found in the Wells Reservoir. This tagging effort shall be used to augment broodstock collection (Section 4.1.1), population level information and juvenile habitat use (Section 4.2.2) and natural reproduction potential (Section 4.2.3).

After the initial three-year indexing period (Years 3-5), Douglas PUD shall conduct an additional two years of index monitoring in Phase I as determined by the Aquatic SWG. After year 9, an additional year of index monitoring would take place in year 12 and then every three to five years over the term of the new license (Phase II) to assess age-class structure, survival rates, abundance, condition factor, growth rates; identify distribution and habitat selection of juvenile sturgeon; and to inform the supplementation program strategy (see Table 4.7-1).

Frequency (every 3, 4 or 5 years) of implementation of a long-term index monitoring activities (after year 12) will be determined by the Aquatic SWG. Phase II index monitoring activities will not consist of implantation of active tags in captured individuals.

4.2.1.1 Progress Towards Objective 2 in 2014 – Index Monitoring Program

On January 8, 2014, the Aquatic SWG approved the Phase One White Sturgeon Management Plan Monitoring and Evaluation Study Plan (See Anchor QEA., 2015). (Note: Ecology and

USFWS approved the study plan via email on December 20, 2013.) Consistent with the WSMP, Monitoring and Evaluation with specific emphasis on index monitoring is scheduled to begin in the summer of 2015.

4.2.2 Marked Fish Tracking Program

Beginning in year three of the new license and continuing for three years (Years 3-5), Douglas PUD shall conduct tracking surveys of the juvenile white sturgeon that were released with active tags as part of supplementation activities. This will require one percent of each of the annual classes of juvenile sturgeon (up to a maximum of 50 fish each year) released in years 2, 3, 4, and 5 to be reared large enough to implant an active tag for tracking purposes (See Table 4.7-1). The purpose of tracking active-tagged fish is to determine juvenile white sturgeon emigration rates out of the Wells Reservoir and habitat use within the Wells Reservoir.

Douglas PUD shall repeat the tracking survey for two additional years during Phase I (see Table 4.7-1). The additional two years of surveys shall track: 1) active tags implanted in a percentage of juvenile fish from previous years of supplementation activities (dependent upon tag life) and 2) any juvenile and adult fish implanted with active tags during the last indexing period preceding the survey. Subsequent Phase I surveys are likely to coincide with the additional Phase I index monitoring and juvenile stocking activities.

4.2.2.1 Progress Towards Objective 2 in 2014 – Monitoring and Evaluation Program

On January 8, 2014, the Aquatic SWG approved the Phase One White Sturgeon Management Plan Monitoring and Evaluation Study Plan (See Anchor QEA., 2015). (Note: Ecology and USFWS approved the study plan via email on December 20, 2013.) Consistent with the WSMP, Monitoring and Evaluation with specific emphasis on applying active tags and monitoring white sturgeon movement within the Wells Project is scheduled to begin in the summer of 2015..

4.2.3 Determining Natural Reproduction Potential (Objective 3)

In years where environmental conditions are appropriate, Douglas PUD shall track sexually mature adult sturgeon that were captured and implanted with active tags under Section 4.2.1 for the purpose of identifying potential spawning locations and determining natural reproduction potential. Appropriate environmental conditions may be determined by examining the following factors: water quality and quantity (i.e., flow, temperature, and turbidity), the presence of reproductively viable adults during index monitoring activities, and the status of maturity for supplemented fish. In years in which sexually mature adult sturgeon are tagged under Section 4.2.1, Douglas PUD may also utilize egg collection mats in combination with tracking in areas of the Wells Reservoir for the purpose of identifying potential spawning locations and activity. Five surveys of natural reproduction using adult tracking and/or egg mat placement shall occur over the term of the new license. Several of these surveys are intended to be implemented during the latter part of the license in order to examine the natural reproductive potential of supplemented fish recruiting to sexually maturity. These activities will support the aquatic life designated use for spawning under WAC 173-201A in the Washington state water quality standards.

4.2.3.1 Progress Towards Objective 3 in 2014 – Determining Natural Reproduction Potential

On January 8, 2014, the Aquatic SWG approved the Phase One White Sturgeon Management Plan Monitoring and Evaluation Study Plan (See Anchor QEA., 2015). (Note: Ecology and USFWS approved the study plan via email on December 20, 2013.) Consistent with the WSMP, Monitoring and Evaluation with specific emphasis on determining white sturgeon natural reproduction potential within the Wells Project is scheduled to occur during the first 10 years of monitoring and evaluation and in years when environmental conditions are appropriate (as determined by the Aquatic SWG).

4.3 Phase II Supplementation and Monitoring Program (Objectives 2 and 4)

The information collected through activities described in Section 4.1-4.3 will provide insight into the population dynamics, habitat availability, and limiting factors that affect the natural population structure of white sturgeon within the Wells Reservoir. This information will inform supplementation, monitoring and evaluation activities during implementation of Phase II supplementation and monitoring activities in the WSMP for the duration of the new license term after year 10.

4.3.1 Long-Term Juvenile White Sturgeon Stocking

The number and frequency of yearlings released in Phase II of the white sturgeon supplementation program will range from 0 to 5,000 fish. Stocking rates shall be based on the results of the Phase I Monitoring and Evaluation Program (Section 4.2) and determination of carrying capacity (Section 4.3) and shall be consistent with the goal and objectives of the WSMP. The Phase II stocking rates can also be adjusted as determined by the Aquatic SWG (also see Table 4.7-1, footnotes 2 and 3).

4.3.1.1 Progress Towards Objectives 2 and 4 - Phase II Supplementation and Monitoring Program

Phase II goals will be addressed following the completion of Phase I in 2022.

4.3.2 Supplementation Program Review

Douglas PUD shall compile information on other white sturgeon supplementation programs in the Columbia River Basin in order to assess whether the white sturgeon supplementation program being implemented at the Project is: (i) consistent and comparable with the technology and methods being implemented by other supplementation programs in the region; (ii) reasonable in cost and effective to implement at the Project; and (iii) consistent with the supplementation program goals and objectives. The supplementation program review will be conducted annually in coordination with the development of the annual report (Section 4.6).

4.3.2.1 *Progress Towards Objectives 2 and 4 - Phase II Supplementation and Monitoring Program*

Phase II goals will be addressed following the completion of Phase I in 2022.

4.3.3 Long-term Index Monitoring Program

Beginning in Year Twelve of the new license and every 3 to 5 years thereafter for the duration of the new license, Douglas PUD shall continue to conduct a Phase II Index Monitoring Study for juvenile and adult sturgeon in the Wells Reservoir. This program will be used to monitor age-class structure, survival rates, abundance, condition factor, growth rates, identify distribution and habitat selection of juvenile sturgeon, and may continue to support broodstock collection activities. The indexing methods will include using gillnets or other appropriate recapture methods for juveniles and set lines for adults and will not consist of actively tracking fish. Frequency (every 3, 4, or 5 years) of implementation of long-term index monitoring activities (after year 12) will be determined by the Aquatic SWG.

4.3.3.1 *Progress Towards Objectives 2 and 4 - Phase II Supplementation and Monitoring Program*

Phase II goals will be addressed following the completion of Phase I in 2022.

4.4 Evaluation and Implementation of Adult Passage Measures (Objective 5)

In Year Eleven of the new license and every 10 years thereafter for the duration of the new license unless otherwise determined by the Aquatic SWG, the Aquatic SWG shall evaluate the biological merit to providing upstream passage for adult white sturgeon. The assessment of biological merit shall be determined by: (i) evaluating information gathered from monitoring and evaluation activities and determining whether there is significant biological benefit and need for upstream passage; (ii) the availability of reasonable and appropriate means to provide upstream passage; and (iii) consensus from all other operators of the mid-Columbia projects to implement adult upstream passage measures¹. If all three criteria above are met, Douglas PUD, in consultation with the Aquatic SWG shall develop adult passage measures that are consistent with measures being implemented by other mid-Columbia project operators.

4.4.1 *Progress Towards Objective 5 - Phase II Evaluation and Implementation of Adult Passage Measures*

Phase two goals, including longer term indexing and evaluating the feasibility and biological merit of adult passage measures will be addressed one year after the completion of Phase I (2023).

¹ The intent is to provide connectivity to the Hanford Reach white sturgeon population.

4.5 Educational Opportunities Coinciding with WSMP Activities (Objective 6)

Douglas PUD, in consultation with the Aquatic SWG, shall identify appropriate WSMP activities as opportunities for education to local public entities such as schools, cities, fishing and recreation groups, and other interested local groups. WSMP activities that may be appropriate for public participation are hatchery tours, release of hatchery juveniles, and tagging of juveniles prior to release.

4.5.1 Progress Towards Objective 6 – Educational Opportunities Coinciding with WSMP Activities

In 2014, as a part of the WSMP, Douglas PUD began white sturgeon public outreach. In spring 2014, Douglas PUD hosted two tours for high school students at Wells Hatchery as part of a pre-college credit program. During one of the tours, held in April 2014, students participated in releasing 30 direct gamete-origin fish into the Wells Reservoir. On May 14, 2014, the Aquatic SWG approved the Douglas PUD White Sturgeon Outreach Plan (Appendix A; May 14, 2014 meeting minutes), which identifies selected WSMP activities as opportunities for education to public entities such as schools, cities, fishing and recreation groups, and other interested local groups. Instructional videos including community outreach activities as they relate to white sturgeon actions were created in 2014 and are available at Douglas PUD's public webpage at www.douglaspud.org. In addition, during the development of the new visitor center at Wells Dam, white sturgeon educational material will be provided consistent with requirements of the WSMP.

4.6 Reporting

Douglas PUD will provide a draft annual report to the Aquatic SWG summarizing the previous year's activities undertaken in accordance with the WSMP. The report will document all white sturgeon activities conducted within the Project. Furthermore, any decisions, statements of agreement, evaluations, or changes made pursuant to this WSMP will be included in the annual report. If significant activity was not conducted in a given year, Douglas PUD will prepare a memorandum providing an explanation of the circumstances in lieu of the annual report.

4.6.1 Progress Towards Meeting Annual Reporting Requirements

Consistent with the reporting requirements in Article 406 of the FERC License for the Wells Project, the 401 Certification, and the Aquatic Settlement Agreement WSMP, the WSMP Annual Report will be updated annually in consultation with the Aquatic SWG. Each year the WSMP Annual Report (this report) will be provided to the Aquatic SWG for review and then filed with the FERC on or prior to May 31st. The report will include a summary of the annual progress made towards the implantation of the WSMP and focus on the previous year's developments.

4.7 Implementation Schedule

Table 4.7-1 outlines the estimated long-term schedule of the activities described in Sections 4.1-4.4 of the WSMP.

Table 4.7-1 Project White Sturgeon Implementation Schedule

New License Year	Broodstock Plan and Collection ¹	Release Fish into Wells Reservoir ²	Index Monitoring ³	Tracking Marked Fish ⁴	Natural Production Assessment ⁵	Adult Passage Evaluation
PHASE I						
1	X				TBD	
2	X	X				
3	X	X	X	X	TBD	
4	X	X	X	X		
5	TBD	X	X	X		
6	TBD	TBD			TBD	
7	TBD	TBD	TBD	TBD		
8	TBD	TBD				
9	TBD	TBD	TBD	TBD		
10	TBD	TBD			TBD	
PHASE II ⁶						
11	Level and frequency TBD	Level and frequency TBD				X ⁷
12			X			
13-50			TBD		TBD	Every ten years after Year 11

¹Douglas PUD broodstock plan shall be completed within one year following this issuance of the new license. Broodstock collection activities will occur at a minimum in years 1-4 during the new license term. Additional years, during Phase I, will be determined by the Aquatic SWG. In Year 11 (Phase II), level and frequency of activity will be determined by the Aquatic SWG and will be based upon the level of long-term supplementation identified from monitoring results.

²No more than a total of 35,000 fish will be stocked in Phase I (Years 1-10). The Phase II supplementation program will be determined by the Aquatic SWG and consistent with the goal of the WSMP.

³ Results of the index monitoring activities will be used to determine the scope of future supplementation activities. Index monitoring activities from year 12 through the remainder of the new license term will occur at a frequency of 3-5 years as determined by the Aquatic SWG.

⁴ Active-tagged juvenile and adult sturgeon will be tracked to assess emigration, habitat use, and potential spawning locations. This activity will occur in years 3, 4, and 5. Two additional years will be determined by the Aquatic SWG but will likely be consistent with years in which index monitoring activities are implemented.

⁵ Tracking of reproductively viable adult sturgeon in combination with deployment of egg collection mats to identify natural production in the Wells Reservoir during 5 separate years over the term of the new license based on flow conditions or other data as determined by the Aquatic SWG.

⁶ Phase II activities will consist only of broodstock plan and collection, stocking activities, index monitoring, and potentially natural reproduction assessments for the remainder of the new license.

⁷ Adult Passage Evaluations will occur in Year 11 and every 10 years thereafter for the term of the new license.

5.0 REFERENCES

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