# DRAFT ENVIRONMENTAL ASSESSMENT
# THE DALLES DAM
# BAY 8/9 SPILLWALL PROJECT
# KLICKITAT COUNTY, WASHINGTON

## INTRODUCTION

The Dalles Dam is located at Columbia River Mile 192.5. At The Dalles, the spillway is used as the primary downstream passage route for migrating juvenile salmon. Roughly, 80% of downstream migrating juveniles are typically passed over the spillway when spilling 40% of river flow. In 2004, a spillwall was constructed between spillbays 6 and 7 to reduce direct injuries and predation of juvenile salmon related to lateral flow within the stilling basin. Despite some success in reducing direct injuries, the survival rates of fish passing The Dalles Dam after the 2004 construction of a spillwall between bays 6 and 7 were still considered unacceptably low by regional salmon managers.

Results from post-construction survival studies indicated many fish traveling through the spillway are passed onto the spillway shelf (Hansel et al. 2005, Counihan et al. 2006, and Hansel et al. 2007). This area is known to provide resting and foraging habitats for birds and fish that prey on juvenile salmonids. Predation within this area is hypothesized to be primarily responsible for most of the indirect dam passage mortality and subsequently, the lower than acceptable survival rates. Moreover, after passing off the spillway shelf, the fish travel around and among the Bridge Islands. Like the spillway shelf, these islands provide holding and ambush habitats for predators.

## PURPOSE AND NEED

The Corps of Engineers is under a mandate to improve survival of out-migrating salmonids through the dams on the Columbia River. Fish survival data from studies at The Dalles Dam (Puls and Smith 2006) show that more direct conveyance from the spillway to the river's thalweg (deepest part of the channel) would likely improve dam passage survival rates for juvenile salmonids. Based on current fish passage distribution it is estimated that with the proposed spillwall, overall dam-passage survival would increase by as much as 4% for both yearling Chinook and steelhead (spring migrants), and 3% for subyearling Chinook (summer migrants).

## PROPOSED ACTION AND ALTERNATIVES

### Selection of Construction Alternative

To achieve the desired improvement in passage, the Corps is proposing to construct a spillwall on the spillway shelf (Figure 1). Two locations were evaluated: 1) an extension of the existing spillwall between spill bays 6 and 7 (constructed in 2004) out to the river thalweg, and 2) a new spillwall between bays 8 and 9 extending out to the river thalweg. The downstream limits of both walls were designed to have a slight curve to the north at

the western (downstream) end of the wall to ensure the conveyance of the water flow to the river's thalweg.

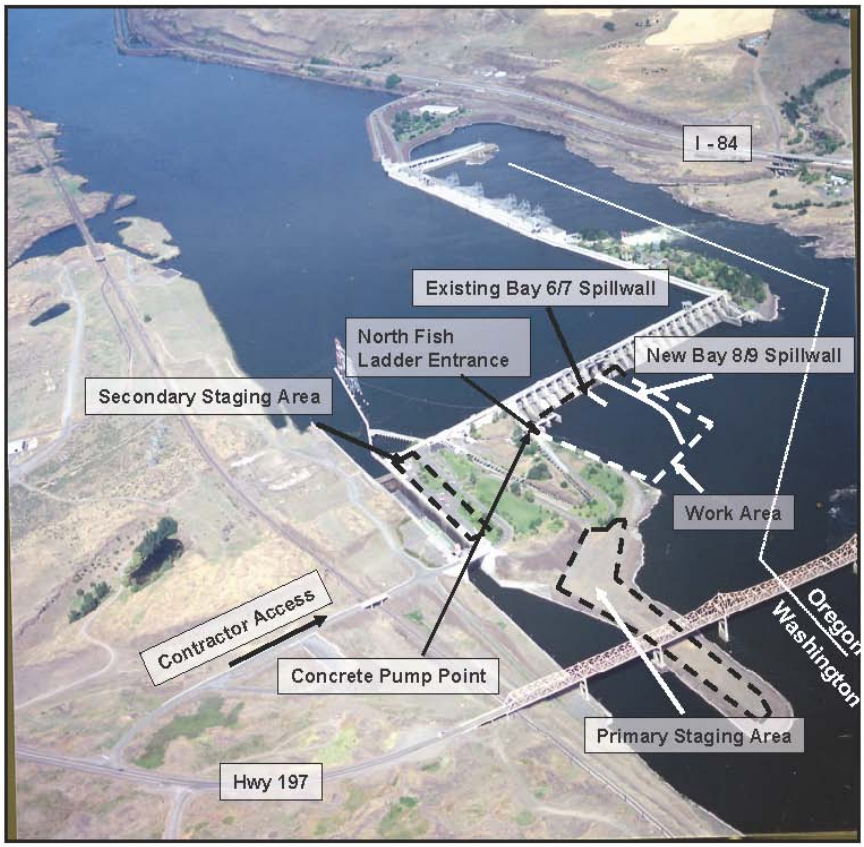


Figure 1. Aerial view of The Dalles Dam showing the location of the proposed spillwall and construction staging areas.

Extensive modeling of these two construction alternatives has shown that the bay 6/7 location would likely cause an unacceptable increase in Total Dissolved Gas (TDG) below the spillway, whereas the bay 8/9 location showed no significant change in TDG. The overall survival rate is also expected to be higher with the bay 8/9 wall – as the new wall location would be able to direct all spill, even during the higher flow of the spring spill season when in addition to bays 1-6 being open for spill, bays 7 and 8 are also open.

The selection of the proposed construction alternative is being coordinated with the regional State and Federal resource agencies through the Fish Facility Design Review Workgroup (FFDRWG). The FFDRWG includes representatives from the Corps, National Marine Fisheries Service, Bonneville Power Administration, US Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, Columbia River Inter-Tribal Fish Commission, and the Northwest Power Planning Council.

Both construction alternatives considered would be located entirely within the State of Washington.

**Preferred Construction Alternative**

The construction of the new spillwall between bays 8 and 9 would utilize precast concrete cells which will be positioned to extend from the river bottom to above the normal tailwater elevation. These concrete cells will be filled with tremie concrete (concrete for underwater placement). The wall will also be post-tensioned utilizing rock anchors that are drilled through ducts cast into the top of the precast concrete cells, into the rock below the wall. The post-tensioning will, in effect, clamp the wall to the rock to provide stability and structural strength to the wall.

The wall will be 10 feet wide, approximately 850 feet long, with the first 200 feet being 43 feet high and the remainder being between 25 and 30 feet high. Up to 230 rock anchors will be required for the construction of this wall, with each rock anchor penetrating up to 120 feet into the rock below the wall.

The following areas are unique features that will be required to complete this work, listed by location along the wall (for a cross section of the spillway showing the location of the Ogee, Endsill, and Apron, see Figure 2):

**Ogee to Endsill (Sections A, B and C) – Upstream approximately 250 feet**

Sealing of Cells – This section of wall will be built on top of the existing stilling basin slab which provides a relatively flat foundation surface to set the precast concrete cells. To achieve a full bearing foundation, a small gap will exist at the bottom of the cell to enable leveling and plumbing of the cell, and will require some form of seal (i.e. sandbags) to keep the concrete from leaking out of the bottom of the cell.

Repair of Uplifted Slab – One of the existing spillway concrete slabs along the proposed spillwall alignment has lifted 0.3 feet, as discovered in a 1967 hydrosurvey. Though this was determined at the time not to be a problem, it will have to be repaired in order to support the load from the wall. The proposed repair will involve drilling, installing dowels into the rock, grouting under the slab, and grinding the uplifted concrete edge area to provide a smooth surface for water flow and fish passage.

Slab Drain Grouting – There is an existing tile drain line covered by rock located under the northern portion of the wall alignment that connects to drain outlets through two out of every three baffle blocks. To properly found this section of wall, the drain under the wall will need to be grouted solid, while keeping the remaining stilling basin's drain system functioning. This work will involve drilling into the drain in multiple locations along its alignment and grouting to fill the void.

Baffle Block Removal – The baffle block that is under the Bay 8/9 spillwall alignment will have to be removed. This may be done using a wire saw as was done during the

placement of the first spillwall in 2004. The baffle block is 10.5 feet wide, 18 feet long and 9 feet high on the upstream face tapering to only a few inches high on the downstream face. The baffle block will be removed from the river and placed in an upland disposal site.

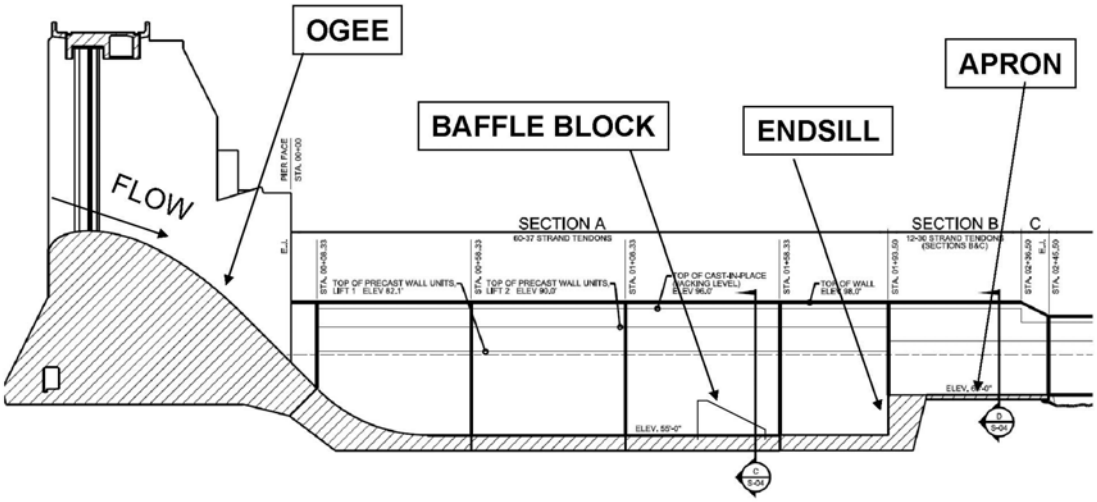


Figure 2. Cross Section of The Dalles Dam showing spillway features.

**Apron to Downstream end of Spillwall (Sections D and E) – Approximately 600 feet**

In this portion of the wall, the river bottom surface consists of exposed basalt rock that was blasted to elevation 68 feet during construction of the dam. Over the last 50 years of spilling, the weaker areas of this rock have eroded away, leaving an uneven surface that varies in elevation from 62 to 68 feet.

Rock Removal – Some areas of native rock will not be capable of supporting the loads from this wall and must be removed and replaced with concrete to create a stable foundation. Current data suggest that the weak rock is limited to an area that is no more than 100 feet long, 20 feet wide, and 5 feet deep. The removal will be done by drilling and using an excavator to break and chip the weak basalt. All removed materials will be disposed of off-site.

Leveling/Foundation Slab – The unevenness of the rock surface will make it very challenging to produce an adequate foundation for the wall. The proposed solution is to

clear the rock surface of all loose material, and remove any area of weak rock. The next step would be to place sandbags and concrete blocks to form the area to be cast with concrete. Concrete would then be used to create a foundation slightly wider than the wall, the entire length of the wall over the rock. The thickness of this slab will vary as the top of the rock surface varies, but will have a maximum top surface elevation of 68 feet. The tremie concrete placement for the foundation will not be confined in a form, but the method of placement will allow only the concrete surface to be exposed to the water. Once cured, this concrete surface will provide a relatively level foundation on which the precast cells are to be placed.

**All Sections of the Spillwall (Sections A-E)**

To produce an adequate foundation in all sections of the wall, the precast concrete cells, will be sealed along the bottom edge, with either a seal material, or with diver-installed sandbags to keep the tremie concrete inside the cell. The first tremie placement is anticipated to be only as high into the precast cell as required to provide full contact bearing and to seal the bottom of the cell. Then, after this concrete has sufficiently cured, it may be dewatered and the rest of the cell will then be filled to the top. During tremie concrete placements inside the precast cell or dewatering of the cell, the displaced water will be pumped out of the cell and into a settling tank, treated as required to meet State water quality standards, and monitored before being returned to the river.

From the top of the cell, to within 2 feet of the top of the wall, a cast-in-place form will be installed and filled with concrete. From this elevation (above the water level) the holes will be drilled down through the wall into the rock for the anchors. It is anticipated that these holes will be between 6 and 13 inches in diameter, and will require some amount of penetration grouting, which is grout that is tremie placed in the drill hole, allowed to cure, and then drilled out to seal the rock for the full depth of the hole. Then the rock anchor will be installed and grouted into the hole, and after a curing period for the bond grout, will be tensioned utilizing a jack at the top of the wall. After the rock anchors have been tensioned and locked off, the remaining 2 feet of concrete will be placed over the top of the anchors to top off the wall. The drill cuttings, including water, rock and grout, will be lifted with air from the hole into a settling tank to filter out particulates. All water will be treated as required to meet State water quality standards, and monitor prior to returning the water back into the river.

**Additional Construction Activities and Information**

Construction/Staging Areas – The contractor will be allowed to utilize the upland area on the north shore of the spillway, south of the north fish ladder for a construction staging area. Test pits were dug in this area and no archeological finds were discovered. Furthermore the peninsula under the bridge and the navigation lock parking lot will be used for primary and secondary contractor staging areas, respectively. This is shown in Figure 1. The in-water construction will require floating plants (i.e., barges) for equipment and construction materials.

Construction Schedule – The normal in-water work window (IWW) at The Dalles Dam is December 1 through February 28. It is anticipated that this construction will take two 6-month construction periods. Therefore an early start and late finish to the IWW period for two consecutive seasons, is being coordinated with the regional resource agencies through the FFDRWG process. The requested work window is 1 October to 10 April. The project will have to be carefully staged so that work completed at the end of the first construction season can withstand the force of spill waters. The wall will be built in sections beginning near the spill bays and working out from there to the downstream end.

**No Action Alternative**

The no-action alternative would leave the dam as it is and would mean no construction to improve fish passage. This alternative would not meet the mandated objective to improve juvenile fish survival at the dam. The Corps has already made numerous changes to spill patterns in an effort to find a non-structural solution that would improve survival. The spill wall constructed in 2004 was also an effort to improve survival, but was not effective enough in moving the juveniles into the thalweg and away from the shallow areas where predators are most abundant. The resource agencies and the Corps have agreed that the no-action alternative will not meet the mandate for increased survival rates.

## AFFECTED ENVIRONMENT

### General

The Dalles Dam is located on the Columbia River approximately 90 miles east of Portland, Oregon and 3 miles upstream of the city of The Dalles, OR. The development and construction of The Dalles Lock and Dam Project was authorized by the Flood Control Act of 1950. Construction began in 1952 and was completed in 1960. The authorized principal objectives of the facility are to provide improved navigation and hydropower.

The Dalles Dam extends 1.5 miles from the Oregon shore to the navigation lock on the Washington shore. The project consists of a navigation lock, spillway, powerhouse, fish-passage facilities and the non-overflow sections of the dam. Various recreational facilities are provided along Lake Celilo, the 24-mile-long impoundment behind the dam.

Lake Celilo provides slackwater navigation at a minimum depth of 15 feet in the main channel. The facility's navigation lock, on the Washington shore, is 86 feet wide and 675 feet long. It has an 88-foot normal lift, and provides a 15-foot minimum depth over the sills.

The powerhouse, with 1,807,000 kilowatts of installed generation capacity, has 22 main generators, 14 original units rated at 78,000 kilowatts and eight newer units rated at 86,000 kilowatts, and two auxiliary units of 13,500 kilowatts each. The auxiliary units also provide water to attract adult migrating fish to the fish ladders. Juvenile fish passage facilities at the dam consist of an ice-and-trash sluiceway, gatewell orifices, and the

spillway. Turbine units at The Dalles Dam are not screened. Adult fish passage facilities consist of a north shore fish ladder and an east fish ladder.

**Physical**

The upland staging work will be restricted to the confines of The Dalles Dam Project property. The upland staging areas will be the paved parking area near the navigation lock and the spit of land that was constructed when the dam was built and which extends westward from the dam, separating the lower part of the lock and navigation channel from the rest of the river. All of the areas to be used have been previously disturbed by paving or by leveling and placement of a gravel surface. Barges will be used in and around the in-water construction zone and will be moved as needed for the various stages of the construction.

The wall construction will be within the Columbia River, partially on and over the existing spillway structure. The outer end of the wall will be constructed over the native basalt river bed. The area of potential impact would extend from the dam downstream beyond the construction zone to the point at which mixing with the river water would dilute any likely suspended sediment, concrete saw cuttings, or alkalinity from the concrete being used for construction. The relatively large volumes of river water which pass the construction area and the small volumes of suspended sediment and concrete contaminants would mean that the mixing zone would be relatively small and the area of impact not likely larger that the standard 300 ft. mixing zone allowed for point-source discharges.

**Water Quality**

The Columbia River is 303(d) listed by the State of Washington for temperature both above and below The Dalles Dam (http://apps.ecy.wa.gov/wqawa/viewer.htm). There is also a Total Maximum Daily Load (TMDL) for Total Dissolved Gas (TDG) for the spillway and area immediately downstream of the dam. Approximately 0.5 miles downstream of the project, the Columbia is listed as a "water of concern" for fecal coliform.

**Biological Resources**

The area to be used for staging of the construction is either paved or gravel topped with some grass growing through the gravel. There is no native vegetation and very little upland habitat which would provide cover for mammals, waterfowl, or songbirds. The upland area which will serve as the "primary staging area" is a constructed peninsula with very short-stemmed grasses growing upon a primarily gravel substrate. The secondary staging area is a paved parking lot adjacent to the lock. The shoreline area at the bank of the river adjacent to the spillway that is within the "work area" is primarily grass that is mowed regularly. The few trees and shrubs will not be disturbed by the proposed work.

There are birds which are known to forage on juvenile salmonids in the vicinity of the spillway during spill. Considerable resources are used to discourage these birds in order to increase the number of juvenile salmonids that survive to continue their downstream

migration. The area is used by bald eagles though there is no known nest location in the immediate vicinity of the proposed work (Isaacs and Anthony 2007).

In addition to the Threatened and Endangered salmonids listed below, lamprey, shad and sturgeon are found in the area and are counted as they move past the dam April through October.

**Threatened and Endangered Species**

Within the project area of impact, the following Evolutionarily Significant Units (ESUs) and Distinct Population Segments (DPS) of Salmonids are listed as Endangered (E) or Threatened (T) under the Endangered Species Act (ESA):

Snake River Sockeye ESU (E)
Upper Columbia River Spring Chinook ESU (E)
Snake River Spring/Summer Chinook ESU (T)
Snake River Fall-run Chinook ESU (T)
Lower Columbia River Coho ESU (T)
Upper Columbia R. Steelhead DPS (E)
Snake River Basin Steelhead DPS (T)
Middle Columbia River Steelhead DPS (T)

The Columbia River is designated as Critical Habitat for all of the above-listed ESUs and DPSs. The Columbia River serves as a rearing and migration corridor and is considered to have a high conservation value.

The Columbia River has also been designated Essential Fish Habitat under the Magnuson-Stevenson Fishery Conservation and Management Act (MSA) for Chinook and Coho salmon. In the vicinity of the proposed project the river provides a migration corridor between spawning and rearing areas and the ocean.

**Cultural Resources**

A record search of reports on file at the Washington Department of Archaeology and Historic Preservation and the Corps Environmental Resources Branch revealed that no previous cultural resource investigations had been conducted within the proposed project's on-land areas of potential effect. On September 26-27, 2007, a Corps Archaeologist conducted ground inspections of all proposed on-land work, primary staging and secondary staging areas. Areas investigated included the "work area" (northside slope/bank landform), "primary staging area" (downstream-end peninsula landform) and "secondary staging area" (existing northside, asphalt parking area). Twelve 50 cm wide x 20 cm deep, shovel test units were also conducted within the proposed 50 meter (E-W) long x 29.0 meter (N-S) wide, "work area" where most ground-disturbing activities are expected to occur. All inspected areas were found to be disturbed and/or significantly altered by previous construction activities. No surface or subsurface cultural materials were found. No cultural properties were found within the specified areas of potential effect and no cultural materials will be impacted by the proposed construction activities.

Archaeological Site 45KL65 (petroglyph area), located adjacent to the existing fish ladder and approximately 50+ meters east of the proposed "secondary staging area," will be designated as a "work avoidance zone." Also, there are tribal fishing locations and structures located along the south-to-west ends of the peninsula landform, a proposed "primary staging area." A safety corridor for tribal access to fishing platforms will be coordinated with the tribes prior to staging for construction.

## ENVIRONMENTAL EFFECTS

### Physical Resources

The upland portion of the construction activity is expected to have little to no impact on the physical resources. There is some potential for impact if a spill or leak of petroleum products from any of the construction machinery used on site should occur. Best Management Practices for spill/leak prevention will be required of all contractors working on site to ensure that there are no lasting effects beyond the construction period on the upland staging area. Also, the contractor will be required to discharge all concrete wash water off site where there is no potential for the wash water to degradation any waters of the State.

The river flow pattern will be altered by the wall during and after construction. This altered flow pattern is required to achieve the project purpose, i.e. increasing the survival of juvenile salmonids at The Dalles Dam. The spillwall is designed to move the flow (and the juvenile fish which move downstream in the current of the river) quickly over the spillway and into the deep thalweg of the river. The flow pattern resulting from the completed spill wall will also help the out-migrating fish avoid the shallow areas on the south side of the river that are known to provide habitat for predatory fish and birds. The result of this modified flow patterns is that survival for juvenile fish passing The Dalles Dam should improve.

There will be one season of spill that will take place while the wall is in some stage of partial completion. There will have to be modifications to the usual spill pattern (volume of water per spillbay) that dictates how the spill will be divided between the spill bays based on the volume of water that is being passed downstream in order to preserve the structural integrity of the not-yet-completed wall. After the spillwall construction is completed, additional modification to the spill pattern will also be required to best meet the objectives of directing the most spilled water and juvenile fish toward the thalweg. These operational changes to adjust the spill pattern (both interim and post-construction) will be coordinated with the State and Federal resource agencies through the FFRDWG process.

### Water Quality

The wall construction work will be done in open water, with no coffer dam to isolate the construction activity from the river. The actions which may have some impact on water quality are:

1) *Pressure washing*. Washing of the stilling basin and native basalt rock upon which the concrete will be placed is required for adequate bonding to the surface. This will be done

with a pressure washer on each section of substrate (either concrete spillway or natural rock) as the work moves to a new area. The pressure washing will use water to remove any sediment that has settled on the surface since the last spill season. The movement of the sediment into the water column may cause a temporary increase in turbidity near the bottom of the river. The size of the plume of suspended particulates is expected to be small since the area disturbed in any given washing event is small and the layer of sediment on the surface is not thick. That is, the surface to be cleaned has some river flow across it on a daily basis year-round and is much more forcefully "washed" each year by the powerful flow across the spillway during the spill season. Also, the area to be cleaned is only slightly wider and longer than the section of wall to be constructed. In preparation for each new section to be constructed, an area slightly larger than the dimensions of the structure and forms will be pressure washed before construction begins on that section.

2) *Repair of uplifted concrete slab.* The slab repair will require drilling to place the grout under the slab and grinding of the surface to remove the protruding portion of the slab. The protruding portion of the slab to be removed is approximately 4 inches higher than the adjacent surface.

3) *Slab drain grouting.* The existing slab drain under where the wall is to be constructed will need to be grouted solid, while keeping the remaining stilling basin's drain system functioning. This work will involve drilling into the drain in multiple locations along its alignment and grouting to fill the void (12 inch diameter half tile covered by drain rock). The drilling will introduce some small quantity of ground concrete into the water. The grout placement is injected into the drain system and will have no contact with the river water.

4) *Removal of the baffle block.* The baffle block will be sawed off using a continuous loop wire saw. The baffle block is 10.5 feet wide and 18 feet long. The saw is operated from a barge floating above the baffle. Concrete saw cuttings from the wire cannot be contained and will enter the water where the sawing is being conducted. This same process was used to remove two baffle blocks in preparation for the construction of the bay 6/7 spillwall in 2004 and the impacts from that removal were minor, with no noticeable cloud of concrete saw cuttings in the water as the wire was slowly cutting through the base of the baffle block.

5) *Excavation of rock.* The area was originally blasted to 68 feet with the construction of the dam. Subsequent erosion has created areas that are as much as 6 feet deeper than the original substrate. Loose material will be removed and if necessary, weak spots will be excavated using an excavator or clamshell bucket mounted on a floating plant (i.e., barges). All removed material will be taken off-site for disposal.

6) *Placement of leveling/foundation slab.* The uneven areas will be leveled by placing tremie concrete to make a smoother foundation. This is referred to as the "leveling/foundation slab." This slab will not be contained in a sealed form. However, only the top surface of the tremie placement is in direct contact with the water. Additives

will be mixed in with the concrete that will prevent the concrete from mixing with the water in which it is placed.

7) *Cell construction.* Each section of the spillwall will be constructed by placing precast concrete hollow boxes (cells) on the prepared foundation. The cells will have leveling mechanisms on the bottom. Tremie concrete will then be used to fill the area inside the precast cell walls. During tremie concrete placement inside the precast cells, the displaced water will be pumped out of the cell and into a settling tank, treated and monitored as required before being returned to the river. Once leveled, the bottom of the cell will be sealed against the substrate so that the tremie concrete will not leak outside of the intended cell "form". This seal may consist of a combination of wood, geotech fabric, and/or sandbags, and will be removed once the concrete has cured. The first lift of tremie concrete will be placed to seal the bottom of the cell so that the second, third, and final lift concrete placements may be done in a dewatered cell.

*Volume of concrete to be placed for the wall construction:*

1. Precast – (Made off site) – 2,000 cubic yards.
2. Tremie placement - (filling in the voids in the precast cells) – 3,000 cubic yards.
3. Cast-in-place (filling in the voids in the precast units and the formed top placements) – 10,000 cubic yards.

Note: There may be some variances between Tremie placement and the Cast-in-place volumes. These amounts are estimates based on the assumption that half the height was underwater, but the contractor will most likely be able to dewater the cell and place concrete inside (below the water line) in the dry.

*Volume of concrete to be placed for the Leveling/Foundation Slab:* Estimated to be 2,000 cubic yards.

The placing of at least a portion of the concrete (in-water without using a sealed form) has the potential to impact the pH of the river in the vicinity of the project. Because of the activity level while the work is being conducted, it is not likely that fish or aquatic organisms will be moving through the immediate area where the work is and where pH levels would be expected to be the most alkaline. However, there will be some impact to the pH of the river for some unknown distance downstream until the concrete has cured. Once the curing is complete, there is very little leaching of the cement's alkalinity. The total volume of concrete indicated above will be placed intermittently over a period of 5-6 months during each of the two construction years. The timing of the impacts of the fresh concrete placements will be short in duration, intermittent over the two construction seasons, and in a relatively small area.

Small concrete particles resulting from the drilling of anchor and grout holes, sawing the baffle block, and from grinding down the uplifted concrete slab will all contribute some alkalinity to the river as well. These activities, as with the placing of fresh tremie concrete will be short in duration, intermittent over the two construction seasons, and in relatively small areas.

None of these possible sources of decreased water quality are expected to impact the temperature or TDG for which the river is 303(d) listed. Nor will it impact the level of fecal coliform which is of concern in the stretch of the river below the river bridge.

**Biological Resources**

1) *Pressure washing.* Any mobile aquatic organism should be able to easily avoid any possible plume of suspended sediment. Because the area is disturbed annually by the force of spill water, there is not expected to be a large or well established benthic invertebrate (immobile aquatic organisms) to be impacted by the washing activity.

2) *Repair of uplifted concrete slab.* This activity may affect water quality, but is located close to the stilling basin, which isolates this area from the powerhouse river velocities. The activity level within this construction zone will discourage birds, fish, and other aquatic organisms from using the area for resting or foraging.

3) *Slab drain grouting.* This activity may affect water quality, but is located close to the stilling basin, which isolates this area from the powerhouse river velocities. The activity level within this construction zone will discourage fish from using the area for resting or foraging, but is over 500 feet from the north shore adult fish ladder and is not expected to impact the small number of fish using that fish ladder or the much larger number of fish migrating along the south shore and thalweg that utilize the east fish ladder

4) *Removal of the baffle block.* This activity may affect water quality, but is located close to the stilling basin, which isolates this area from the powerhouse river velocities. The activity level within this construction zone will discourage birds, fish, and other aquatic organisms from using the area for resting or foraging.

5) *Excavation of rock.* The rock removal will be accomplished with excavation machinery such as a clamshell or excavator mounted on a floating plant. The excavation of rock may temporarily affect water quality by increasing the level of suspended solids as the work is being done. However, the activity level within this construction zone will discourage most aquatic organisms from using the immediate construction area for resting or foraging.

6) *Placement of leveling/foundation slab.* This activity may affect water quality, by exposing the river water to the alkaline concrete causing a pH change in the immediate area. As discussed in the Water Quality section above, only the top surface of the tremie placement is in direct contact with the water. Also, additives will be mixed in with the concrete that will prevent the concrete from mixing with the water in which it is placed. The activity level within this construction zone will discourage fish from resting or foraging in the immediate construction area where pH changes would be the most noticeable. Outside of the mixing zone of 300 ft downstream, there is not expected to be any detectable pH change.

7) *Cell construction.* This activity could possibly affect water quality, but is much less likely to do so because there should be little to no contact with the water for most of the

concrete placed in the pre-cast cells. All water pumped from the cells will be treated and monitored to ensure that it meets state water quality standard before being returned to the river. Also, as stated above, the activity level within this construction zone will discourage birds, fish, and other aquatic organisms from using the immediate construction area for resting or foraging.

Non-ESA fish species such as shad and sturgeon as well as birds will likely avoid the construction zone, and consequently are not expected to be harmed by the activity or the localized water quality impacts.

**Threatened and Endangered Species**

In order to finish the proposed project as soon as possible and have it functional for the second spill season, it will be necessary to extend the In-water Work Window (IWW). Normally the IWW for The Dalles Dam is from 1 December through 28 February to minimize impacts to migrating salmonids. It is anticipated that the proposed construction will take two 6-month-long construction seasons. Therefore an early start and late finish to the IWW period (allowing work to begin 1 October and continue until spill begins on 10 April for each of the two work seasons) is being coordinated through the multi-agency FFRDWG regional forum.

Fish passage data for adult salmonids at The Dalles Dam shows that the 1 October to 10 April extended work season, would have some impact on the upstream migration of adult salmonids. The 2006 Fish Passage Report (Corps 2007) shows counts of Steelhead and Chinook salmon from February 20$^{th}$ (when counting began) to April 10$^{th}$ (beginning of spill) to be on the order of 250 wild and 1,500 total. The October and November counts are even higher with numbers closer to 10,000 wild and 46,000 total steelhead. Counts for Fall Chinook and Coho were also higher in October and November with approximately 28,000 Chinook including adults and jacks, and 14,000 Coho adults and jacks. By December, the adult passage has fallen to almost 0 and remains that way until late February when the spring runs begin. Though there will be adults migrating upstream past The Dalles Dam during a portion of the extended work window, it should be noted that the east fish ladder approach is well over three thousand feet from the construction site, and is used by the vast majority of adult fish (up to 90% for some species) as they migrate upstream. Adults moving along the thalweg and the south shore are not expected to be affected by the construction. The approach to the north fish ladder is over 500 feet from the in-water construction and is used by very few migrating adult salmonids.

The spillwall construction and the completed wall are not expected to impact the number of adult salmonids that pass the dam. Both ladders will be operational during construction, except during normal scheduled maintenance outages. Also, construction will not block access to the ladders or affect attraction flow.

Because no work will be done during the spill season, juvenile downstream migration is not expected to be adversely impacted by the construction and will benefit most directly

by the completed project. The percentage of juveniles that are able to survive passage at The Dalles Dam is expected to increase.

The effects to Critical Habitat for the listed salmon ESUs and DPSs is an improved downstream migration corridor for juveniles. It is estimated that overall dam-passage survival would increase by as much as 4% for both yearling Chinook and steelhead (spring migrants), and 3% for subyearling Chinook (summer migrants) with the proposed new spillwall in place. The spillwall could have the effect of a minimal delay for the small numbers of adult fish that migrate past the dam (and the north fish ladder) on the north side of the river. However, the construction and the spillwall should not prevent the use of either fish ladder.

**Essential Fish Habitat (EFH)**

The Columbia River in the vicinity of the proposed project provides a migration corridor between spawning and rearing areas and the ocean and has been designated as EFH for Chinook and Coho salmon. The FCRPS Biological Assessment (Corps et al. 2007) provides detailed descriptions of the effects of the FCRPS proposed Reasonable and Prudent Alternative (RPA) on salmonids. The construction of a spillwall is specifically listed under *Action 15 – COP (configuration and operation plan) for The Dalles Project* which is one of 28 Actions evaluated as part of the RPA. The BA states that the "implementation of the action will be dependent on the results of ongoing research, regional collaboration and prioritization, and future appropriations." The proposed spillwall design has been developed and vetted through a collaborative process in which the State and Federal fish agencies participate. The proposed project is expected to increase the number of juvenile salmonids that survive passage downstream through The Dalles Dam and thus will improve migratory EFH.

**Cultural Resources**

In accordance with 35 CFR 800.5[b], the Corps has determined that this project's proposed undertakings will have *No Effect* on any historic properties. In compliance with Section 106 of the National Historic Preservation Act of 1966 as amended, a cultural resources investigation and findings report will be submitted to the Washington Department of Archaeology and Historic Preservation for concurrence and comments on our *No Effect* determination.

As noted above, Site 45KL65 (petroglyph area), located adjacent to the existing fish ladder approximately 50+ meters east of the proposed "secondary staging area." This site will be designated as a "work avoidance zone" and is to be avoided by all work/construction-related activities and personnel. Tribal fishing locations and structures located along the south-to-west ends of the peninsula (proposed "primary staging area") must also be avoided. A safety corridor for access to fishing platforms will be coordinated with the Tribes to minimize impacts to tribal fishing.

**Cumulative Effects**

Cumulative effects are defined as, "The impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably

foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 *Code of Federal Regulations* Section 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

The action being proposed is an effort to offset or reverse some of the impacts of the dam on the downstream passage of juvenile salmonids. Though the construction activity may temporarily contribute some degree of adverse impacts to the overall Columbia River system, the effects are expected to be in only a small area and over a relatively short time. The result of the action will be to diminish the cumulative effect of the dam on the ESA-listed salmonids.

## COORDINATION

This Environmental Assessment (EA) will be distributed for a 30-day public review. Review comments will be requested from federal, state, and local agencies and groups including but not limited to:

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
National Marine Fisheries Service
Washington State Historic Preservation Office
Washington Department of Ecology
Washington Department of Fish and Wildlife
Klickitat County
Confederated Tribes of the Warm Springs Reservation
Confederated Tribes of the Umatilla Indian Reservation
Yakama Nation
Nez Perce Tribe

## CONSULTATION REQUIREMENTS

### National Environmental Policy Act

This Environmental Assessment satisfies the requirements of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.).

### Endangered Species Act

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. A "No Effect" determination was made for the species (bull trout and the bald eagle) for which the US Fish and Wildlife Agency have jurisdiction and which might occur in the project vicinity. Subsequent to the final "No Effect" Memorandum dated May 2007, the bald eagle was delisted as an endangered species. There are no proposed species or proposed critical habitat in the vicinity. Listed Species under the jurisdiction of the National Marine Fisheries Service (NMFS) have been previously addressed in the Biological Assessment and Biological Opinion (BiOp) covering the Federal Columbia River Power System (FCRPS). This construction project is proposed in response to performance standards set

by the FCRPS BiOp for juvenile fish passage survival. As currently constructed The Dalles Dam cannot meet those performance standards.

**Clean Water Act (CWA)**

Section 401 of the Clean Water Act of 1977, as amended, requires certification from the state or interstate water control agencies that a proposed water resources project is in compliance with established effluent limitations and water quality standards of the State. Washington Department of Ecology is the agency with which the Corps will consult in order to obtain a Section 401 Water Quality Certification. Under section 404 of the CWA, the Corps is required to evaluate the effects of dredge and fill activities on "waters of the U.S." A 404 (b)(1) Evaluation was prepared by this office and was used in evaluating impacts of the concrete placement and removal of weak rock.

**Magnuson-Stevens Fishery Conservation and Management Act (MSA)**

The Magnuson-Stevens Fisher Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under the Federal Fisheries Management Plan. The MSA requires Federal agencies to consult the NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. EFH for this project is addressed in the Biological Assessment for the FCRPS dated August 2007 and is part of the subsequent and on-going coordination through the FFRDWG process.

**Clean Air Act**

The Clean Air Act of 1970, as amended, established a comprehensive program for improving and maintaining air quality throughout the United States. Its goals are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards (NAAQS). Title IV of the Act includes provisions for complying with noise pollution standards. All equipment used on site will be required to meet State and Federal emission and noise standards. As part of the contracting process, all contractors that work on the proposed construction will be required to use appropriate Best Management Practices (BMPs) on all construction activities in order to be in compliance with this act.

**National Historic Preservation Act**

Section 106 of the National Historic Preservation Act (NHPA) requires that all federally-assisted or federally-permitted projects account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. In compliance with the NHPA, the Corps conducted investigations to determine if the proposed project will affect cultural resources. In compliance with Section 106 of the National Historic Preservation Act of 1966 as amended, a cultural resources investigation and findings report will be submitted to the Washington Department of Archaeology and Historic Preservation for concurrence and comments on our *No Effect* determination.

**Native American Graves Protection and Repatriation Act**

The Native American Graves Protection and Repatriation Act (NAGPRA) provides for the protection of Native American and Native Hawaiian cultural items, established ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans. It also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land. This Act also provides for the protection, inventory, and repatriation of Native American cultural items, human remains, and associated funerary objects. Any discoveries will be handled according to Portland District policy.

**Fish and Wildlife Coordination Act**

The Fish and Wildlife Coordination Act of 1934 states that federal agencies involved in water resource development are to consult with the USFWS and state agency administering wildlife resources concerning proposed actions or plans. The proposal to make structural changes to the spillway to improvement juvenile fish passage survival rates at The Dalles Dam is incorporated into the "Biological Assessment for Effects of Federal Columbia River Power System and Mainstem Effects of Other Tributary Actions on Anadromous Salmonid Species Listed under the Endangered Species Act" (Corps et al. 2007).

**Comprehensive and Environmental Response, Compensation and Liability Act**

The location of the proposed project is not within the boundaries of a site designated by the USEPA or the State of Oregon for a response action under Comprehensive and Environmental Response, Compensation and Liability Act (CERCLA), nor is it a part of a National Priority List site under CERCLA. Should any hazardous or toxic waste material be discovered during construction, its presence will be responded to within the requirements of the law and Corps' regulations and guidance.

**Executive Order 11988, Floodplain Management**

This executive order requires federal agencies to consider how their actions may encourage future development in floodplains, and to minimize such development. The proposed action is not expected to encourage future development in floodplains, and is therefore in compliance with Executive Order 11988.

**Executive Order 11990, Protection of Wetlands**

This executive order requires federal agencies to protect wetland habitats. The proposed action has no impact on wetlands and is in compliance with Executive Order 11990.

**Executive Order 12898, Environmental Justice**

This executive order requires federal agencies to consider and minimize potential impacts on subsistence, low-income or minority communities. The goal is to ensure that no person or group of people should shoulder a disproportionate share of the negative environmental impacts resulting from the execution of this country's domestic and foreign policy programs. This activity will be coordinated with the Native American Tribes that fish in the area. No other communities are expected to be affected by the proposed project. This proposed action is in compliance with Executive Order 12898.

**Analysis of Impacts on Prime and Unique Farmlands**

No change to prime and unique farmlands would occur as a result of the proposed action.

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