ATTACHMENT C – WETLAND DELINEATION REPORT

JURISDICTIONAL WATERS REPORT

Beebe Springs Natural Area
Chelan County, Washington
Phase 3

Prepared for

Washington Department of Fish and Wildlife

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1.0 INTRODUCTION

Phase 3 of the Beebe Springs Natural Area Development Project will consist of the creation of a series of new side channels to Lake Entiat (Columbia River), the enhancement and creation of wetlands, planting of upland and riparian vegetation, and construction of trails with viewpoints. Phases 1 and 2 involved the creation of a new, second channel for Beebe Springs Creek, the creation of one side channel, trail and viewpoint construction, one vault-style restroom, and riparian and shrub-steppe restoration.

A previous delineation was conducted on the site in 2005 by Watershed Company for Phase 1 work around Beebe Creek. URS conducted a wetland delineation of the Phase 2 area on March 6, 2007 (URS Corporation 2007).

For Phase 3, URS conducted a field visit on February 19, 2010 to determine the presence and extent of wetlands and other jurisdictional waters on the remainder of the project site. URS Corporation confirmed the presence of two wetlands in the Phase 3 area. These wetlands are an extension of the Lake Entiat shoreline wetlands delineated during Phases 1 and 2. This report documents the delineated wetlands and characterizes the vegetation communities, soils, and hydrologic regimes occurring on the property that were used to distinguish wetlands from uplands.

2.0 METHODS

2.1 WETLAND DELINEATION

Documents reviewed to aid in the identification and determination of wetlands in the Phase 3 vicinity include the:

- National Wetlands Inventory Map (USFWS 2010); online at: *http://wetlandsfws.er.usgs.gov/wtlnds/launch.html*
- Soil Survey of Chelan County Area Washington (NRCS 2010); online at: *http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx*
- Aerial Photographs; online at: *http://terraserver.microsoft.com* and Google Earth
- Wetland Delineation and Impacts Report; Beebe Springs Natural Area – Phase 2 (URS 2007).

Wetland determinations were made on site by wetland biologists using the 1987 US Army Corps of Engineers (Corps) *Wetlands Delineation Manual* (Corps 1987) and the Washington State Department of Ecology (Ecology) *Wetland Identification and Delineation Manual* (Ecology 1997), in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). The 1997 Ecology methodology was developed to be consistent with the 1987 Corps manual. The recently-adopted 2008 *Regional Supplement* (Corps 2008) provides technical guidance and procedures specific to the arid west region. This wetland delineation is subject to agency verification and approval.

Delineated and surveyed wetland boundaries are subject to agency verification and approval.

For regulatory purposes, wetlands are defined as follows (Corps 1987):

> Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

According to the manuals, the following three characteristics usually must be present for an area to be identified as a wetland: (1) wetland hydrology, (2) hydric soil, and (3) hydrophytic vegetation. Wetland hydrology includes seasonal, periodic, or permanent inundation or soil saturation that creates anaerobic conditions in the soil for a portion of the growing season sufficient for wetland soil and vegetation to be maintained. Hydric soils are saturated, flooded, or ponded long enough during the growing season to become deoxygenated in the upper soil horizon. Hydrophytic vegetation consists of those plant species growing in water, in soil, or on a substrate that at least periodically lacks oxygen.

The growing season is technically defined as the period when soil temperatures 19.7 inches below the ground surface (bgs) are greater than 5°C (41°F), according to the 1987 Corps *Wetlands Delineation Manual*. However, Corps regulatory guidance letters and the Ecology manual state that the final determination of growing season should be based on careful observations of evidence that active growth is occurring. This evidence can include new or recent growth such as flowers, new shoots, new leaves, or swollen buds on plants.

A total of four sample plots were used to investigate the Phase 3 project area. The sample plots are located in places that adequately represent the variation in vegetation, soils, and hydrologic regime across the site. The presence or absence of hydrophytic vegetation, hydric soil, and wetland hydrology indicators were documented for each sample plot as a means of justifying the delineated wetland boundaries. Wetland determination data forms can be found in Appendix A.

2.1.1 Wetland Hydrology

To determine whether a vegetation community has wetland hydrology, an area is examined for inundation, soil saturation, shallow groundwater tables, or other hydrologic indicators. An area in which soils are saturated to the surface for at least 5 to 12 percent of the growing season meets the criterion for wetland hydrology. Seasonal changes in water levels and the effect of recent precipitation events must be considered when evaluating an area's hydrology. Wetland hydrology can also be inferred from the presence of any of the following indicators: watermarks on vegetation, drift lines, sediment deposits, water-stained leaves, surface-scoured areas, wetland drainage patterns, algae growth, and oxidized root channels.

2.1.2 Hydric Soil

Soil observations were made in wetlands and adjacent upland areas by digging soil investigation pits in each sample plot. Soil color and other characteristics used to indicate hydric soils were

documented using the Munsell Soil Color Chart (GretagMacbeth 2000). The Natural Resources Conservation Service (NRCS) soil survey provided soil taxonomy, map unit name (soil series), and drainage class data. Soil in which any of the following indicators is present meets the criteria for hydric soil:

- **Gleyed soil (gray colors).** Gleyed soils develop when mineral soil is saturated or inundated for periods of time sufficient to result in anaerobic (no oxygen) conditions. Anaerobic conditions cause elements common in soil, such as iron and manganese, to exist in reduced forms that are usually bluish, greenish, or grayish in color. Soil colors are determined using a Munsell soil color chart (GretagMacbeth 2000), which has separate pages for gley-colored soils.
- **Low chroma matrix.** A low chroma matrix develops when mineral soil is saturated or inundated for substantial periods of time during the growing season (but not long enough to produce gleyed soil) to result in anaerobic or hypoxic (low oxygen) conditions. A soil matrix is the portion of a given soil layer (usually more than 50 percent by volume) that has the predominant color. The Munsell system uses three dimensions to describe soil color: hue, value, and chroma. The Munsell soil color chart uses abbreviations to describe the colors, for example, 10YR 3/2. In the abbreviation, the first number and letters indicate the hue (10YR), the next number indicates the value (3), and the last number indicates chroma (2). A chroma of 1 or 2 is considered low. Soils with a matrix chroma of 2 are usually considered hydric when mottles are present. Mottles are rust-colored spots or blotches in the soil formed by the oxidation of iron compounds via fluctuating water levels. Mottles found in soil with a matrix chroma of 2 (or less) often indicate that a soil is hydric.
- **High organic content.** Soil retains high levels of organic matter when saturation prevents decomposition over long periods, thus allowing organic debris to accumulate. Organic content is considered high if the soil is composed of more than 20 to 30 percent (threshold differs depending upon other soil characteristics) organic material by weight in a layer at least 8 inches thick located in the upper 32 inches of the soil profile.
- **Soils appearing on the hydric soils list.** A list of hydric soils has been compiled by the U.S. Department of Agriculture's National Technical Committee for Hydric Soils (NRCS 2001). Listed soils have reducing conditions for a significant portion of the growing season in a major portion of the root zone and are frequently saturated within 12 inches of the soil surface.
- **Other hydric indicators.** Other positive indicators of hydric soil include sulfide or "rotten egg" odor, aquic or peraquic moisture regimes (reducing soil moisture regimes due to groundwater at or near the soil surface), and the presence of iron or manganese concretions.

The 2008 *Regional Supplement* uses similar and additional indicators, adopted from *Field Indicators of Hydric Soils in the United States*, version 6.0 (USDA NRCS 2006).

2.1.3 Hydrophytic Vegetation

The dominant plant species in each vegetation community were identified within each sample plot. Vegetation communities are defined here as a contiguous assortment of plants in a given area sharing similar environmental conditions. Dominant plants are those plant species that collectively account for more than 50 percent of the total coverage of vegetation in a stratum (trees, shrubs, herbs, vines), or individually comprises at least 20 percent of the total. The sample plots are circular and have a 30-foot radius for trees and shrubs and a 5-foot radius for herbaceous plants. Plots were situated so that they best represent the vegetation present within each community.

The hydrophytic indicator status for each dominant species, as designated by the US Fish and Wildlife Service (USFWS) for Region 9 (USFWS 1993), was used to determine whether the vegetation in each community is hydrophytic. To meet the hydrophytic vegetation criteria, more than 50 percent of the dominant species must have an indicator status of obligate (OBL), facultative wetland (FACW), and/or facultative (FAC). Indicator status categories are defined in Table 2-1. The facultative status categories are often modified using minus (-) or plus (+) symbols. For example, FAC+ species are considered to have a somewhat greater estimated probability of occurring in wetlands than FAC species, whereas FAC- species are considered to have a somewhat lesser estimated probability of occurring in wetlands than FAC species. The 2008 *Regional Supplement* no longer uses the (-) and (+) modifiers.

Table 1. Plant Species Wetland Indicator Categories

Indicator Category	Occurrence	Probability in Wetlands (estimated)
Obligate (OBL)	Occurs almost always in wetlands under natural conditions	>99%
Facultative Wetland (FACW)	Usually occurs in wetlands, but occasionally found in non-wetlands	67-99%
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands	34–66%
Facultative Upland (FACU)	Usually occurs in non-wetlands, but occasionally found in wetlands	1–33%
Upland (UPL)	Occurs almost always under natural conditions in non-wetlands in this region but may occur in wetlands in another region	<1%

Source: Corps 1987

2.2 WETLAND CLASSIFICATION

2.2.1 Cowardin Classification

Wetlands are classified according to the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Under the Cowardin classification scheme, wetlands and deepwater habitats are grouped into systems based on shared hydrologic factors. These systems are marine, estuarine, riverine, lacustrine, and palustrine. Palustrine systems are present in the Phase 3 project area.

Palustrine Systems include all wetlands having less than 0.5% salinity and containing persistent vegetation. Vegetation may include trees, shrubs, erect (emergent) or floating (aquatic bed) herbaceous plants, mosses, and/or lichens. Wetlands included in the palustrine system are those commonly referred to as marshes, swamps, bogs, fens, prairies, seeps, and intermittent ponds. A palustrine system can exist directly adjacent to or within the lacustrine, riverine, or estuarine systems.

Palustrine wetlands are divided into classes by the dominant vegetation. Palustrine forested (PFO) wetlands or forested wetland communities are dominated by trees or arborescent shrubs greater than 20 feet tall having greater than 30 percent cover. Palustrine scrub-shrub (PSS) wetlands or scrub-shrub wetland communities are dominated by woody shrubs less than 20 feet tall with at least 30 percent cover. Palustrine emergent (PEM) wetlands or emergent wetland communities are dominated by nonwoody, rooted vascular plants having at least 30 percent cover.

The U. S. Fish and Wildlife Service National Wetlands Inventory (NWI) provides information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. The NWI collects data from aerial photography to produce maps that correspond to the USGS 7.5 or 15 minute topographic quadrangles. NWI quadrangles use the Cowardin classification system to characterize wetland features on each map.

2.2.2 HGM Classification

Wetlands were also classified according to the Hydrogeomorphic (HGM) classification. The HGM classification groups wetlands into categories based on the geomorphic and hydrologic characteristics that control many wetland functions. The modified version of this classification system that is found in the *Washington State Wetland Rating System for Eastern Washington* (Ecology 2004) was used for HGM classification. The HGM class found in the project area is lake-fringe.

Lake-fringe wetlands occur in or adjacent to bodies of water greater than 20 acres in size with at least 30% of the open water areas more than 10 feet deep. The HGM definition of lake-fringe, which accounts for geomorphology, differs from the Cowardin definition of lacustrine that uses persistence of vegetation. The hydrologic characteristics of the two systems also provide subtle differences in definition.

2.3 WETLAND RATINGS AND BUFFERS

Wetlands were rated using Ecology's *Revised Wetlands Rating System for Eastern Washington* (Ecology 2004). Chelan County Code also uses Ecology's rating system (Chelan County 2010). The Eastern Washington Wetland Rating Data Forms are provided in Appendix B.

2.3.1 Department of Ecology Wetland Rating System

Category I are those wetlands of exceptional value in terms of protecting water quality, storing flood and storm water, and/or providing habitat for wildlife as indicated by a rating system score of 70 points or more on the Ecology rating forms. These wetlands are communities of infrequent

occurrence that often provide documented habitat for sensitive, threatened, or endangered species, and/or have other attributes that are very difficult or impossible to replace if altered.

Category II wetlands are those wetlands that are difficult, though not impossible, to replace, generally have little to no disturbance, and provide high levels of some functions. The primary criteria for category II wetlands are that they score 51–69 out of 100 points on the rating questions related to functions. Category II wetlands also include estuarine wetlands less than 1 acre, or greater than 1 acre that are disturbed, and interdunal wetlands greater than 1 acre. Although category II wetlands occur more commonly than category I wetlands, they are deemed to warrant a relatively high level of protection.

Category III wetlands generally provide a moderate level of functions, have been disturbed in some way, and are often less diverse or more isolated from other natural resources. The primary criteria for category III wetlands are that they score 30–50 out of 100 points as defined in Ecology's *Wetlands Rating System for Eastern Washington*. Interdunal wetlands between 0.1 and 1 acre in size are also category III regardless of their score. Category III wetlands are regulated wetlands that do not contain features or levels outlined in Categories I, II, or IV. They occur more frequently, are less difficult to replace, and need a moderate level of protection compared to higher rated wetlands.

Category IV wetlands have the lowest levels of functions (less than 30 points on the rating questions relating to functions). They do not meet the criteria for Category I, II or III wetlands. These are wetlands that should be replaceable and, in some cases, can be improved from a functions standpoint. These wetlands may provide important functions and values and should be protected to some degree.

2.3.2 Chelan County Wetland Buffers

Chelan County enforces wetland buffers (Chelan County 2005) to provide additional protections to a wetland's physical and biological function. Buffers are calculated based on the wetland's categorical rating and the intensity of adjacent land uses (Table 2).

Table 2. Chelan County Wetland Buffer Widths for High and Low Intensity Land Uses.

Wetland Category	High Intensity (feet)	Low Intensity (feet)
Category 1	300	200
Category 2	200	100
Category 3	150	75
Category 4	50	50

Source: Chelan County Code Section 11.80.060

2.4 WETLAND FUNCTIONS ASSESSMENT

Wetland functions were analyzed using methodology developed by Ecology and published in the *Revised Wetlands Rating System for Eastern Washington* (Ecology 2004). These functions are assessed in three broad categories: water quality improvement, hydrologic function, and habitat

quality. Both the potential and opportunity to provide each function is analyzed. The potential to perform a function is based on the physical, biological, and chemical characteristics within the wetland itself. The opportunity is to what degree the wetland's position in the landscape will allow it to perform a specific function.

2.5 WETLAND MAPPING

The boundary between wetland and upland areas was marked in the field with orange "Wetland Delineation" tape flagging. Sample plots were marked with pink flagging. Flag locations were collected using a mapping-grade Trimble GeoXT global positioning system and post-processed to obtain sub-meter accuracy of the regulatory wetland edge.

2.6 ORDINARY HIGH WATER MARK

The Ordinary High Water Mark (OHWM) on Lake Entiat (Columbia River) was established by locating where the fluctuations of water in the reservoir have created a clear, natural line on the bank indicated by changes in the character of the soil/substrate and destruction of terrestrial vegetation. During a February 7, 2007 site visit, a single point along this line was flagged by Tim Erkel (U.S. Corps of Engineers, Eastern Washington Regional Office). A URS biologist made a visit to the Beebe Springs Natural Area Development project area on February 9, 2007, to record OHWM elevations along the shoreline of Lake Entiat (Columbia River). After locating the flag, a Trimble GeoExplorer Geo XT GPS unit was used to record the marked location and similar locations along the length of the shoreline of Lake Entiat in the project area.

The data were post-processed with Trimble TerraSync software to obtain sub-meter points for each location. The OHWM locations were then added to CADD coverage of the project area and elevations were derived from surveyed topographic lines (2 foot interval lines). Based on the surveyed locations, the line for OHWM falls between an elevation of 708 and 709 feet (1927 Datum) and this elevation line was defined as the OHWM for the project area. This methodology was accepted for permitting Phase 2 of the Beebe Springs Natural Areas project.

3.0 RESULTS

URS conducted a pre-field review of the NWI map, the local NRCS soil survey, and topographic maps. The NWI map indicates that a series of palustrine scrub-shrub and emergent wetlands occur along the right shoreline of the Columbia River in the project area and the greater vicinity (Figure 2). A review of the Chelan County hydric soils list determined that the four soil types mapped in the project area are not hydric soils (NRCS 2001). A field investigation and wetland delineation was performed on February 19, 2010. The presence of two wetlands was confirmed during the field visit.

3.1 SITE SOILS

According to the USDA Natural Resources Conservation Service (NRCS) *Soil Survey of Chelan County Area, Washington*, four soil types are mapped within the project area (Figure 3). They include Chelan gravelly sandy loam, 0 to 3 and 3 to 8 percent slopes (C1A and ClB), Pogue gravelly fine sandy loam, 3 to 8 percent slopes (PrB), and Supplee very fine sandy loam, 3 to 8 percent slopes (SuB). Although all four soil types are present, Chelan soils represent the majority of the site.

The Chelan series is comprised of well-drained, moderately coarse textured soils that formed in pumice, volcanic ash, and loess over non-sorted gravelly, cobbly, or bouldery deposits of ablation glacial till. The surface soil layer is gray gravelly sandy loam about 18-inches thick, underlain by dark grayish brown gravelly sandy loam 17-inches thick, underlain by pale brown very gravelly sandy loam that extends to a depth of 60 inches. Runoff is very slow for soils ClA and ClB, and the hazard of water erosion is none to slight.

The Pogue series is comprised of somewhat excessively drained, moderately coarse textured soils that formed in glacial outwash derived mainly from quartz-bearing rocks. The surface soil layer is grayish brown fine sandy loam, gravelly or very stony in places, 6-inches thick, underlain by brown fine sandy loam 11-inches thick, underlain by brown gravelly fine sandy loam 13-inches thick. Outwash sand and gravel underlie these soils at a depth of 30 inches. Runoff is slow for soil PrB, and the hazards of soil blowing and water erosion are slight. If this soil is irrigated, runoff is medium and the hazard of water erosion is moderate.

The Supplee series is comprised of well-drained, medium-textured soils that formed in pumice, volcanic ash, and deposits of loess over gravelly and cobbly glacial outwash. The surface soil layer is grayish brown very fine sandy loam 6 inches thick, underlain by brown gravelly fine sandy loam and very gravelly sandy loam 25 inches thick, underlain by glacial outwash material of sand, gravel, and cobblestones at a depth of 31 inches, which extends to a depth of 60 inches and more. Runoff is slow for soil SuB, and the hazard of water erosion is slight. If this soil is irrigated, runoff is medium and the hazard of erosion is moderate.

3.2 SITE HYDROLOGY

The Beebe Springs project area contains two major sources of water – Beebe Springs Creek and the Columbia River/Lake Entiat. Beebe Springs Creek flows through the site rapidly along a moderate gradient and does not provide much hydrologic input to the project area. Lake Entiat is a reservoir pool created by the Rocky Reach Dam. The project area is located in the upper third of the reservoir where the pool levels are more heavily influenced by the highly fluctuating flows being released from the nearby upstream Wells Dam. Therefore, the hydrology along this section of the river/reservoir has characteristics of both.

The wetlands in the Phase 3 project area are within the river's active floodplain. Their hydrology is associated with both the daily elevation fluctuations of the reservoir, and seasonal overbank flooding during upstream spring runoff. These flood occurrences correspond to seasonal snowmelt. According to WDFW staff, this flooding occurs in middle and late spring, with multiple events possible that correspond with snowmelt timing in the North Cascades and the

Canadian Rockies. During these events, flood waters are detained in shallow depressions on the low terrace upslope and behind the ordinary high water line. Water captured in these depressions provides temporary inundation in the wetlands.

3.3 WETLANDS

The BSNA has had two previous delineations, in 2005 and 2007. During these previous surveys, two wetlands were identified, Wetland A and Wetland B. Wetland A was delineated along the Columbia River shoreline near the mouth of Beebe Creek. Wetland B was delineated further west of Wetland A and was partially excavated as part of Phase 2.

Two wetlands were identified in the Phase 3 project area (Figure 4). Wetlands C and D lie along the Columbia River (Lake Entiat) shoreline and were partially delineated during Phases 1 and 2 of the project (as part of Wetland A). The remainder of these wetlands on the Beebe Springs Natural Area site was delineated during Phase 3 surveys. They were delineated as 2 different wetlands, because they are now separated from each other by the newly excavated side channel and by Beebe Creek.

3.3.1 Wetland C

The segment of Wetland C within the Phase 3 area is a 1.36-acre wetland (Figures 5 and 6). It is classified under Cowardin as palustrine scrub-shrub and as a lake-fringe wetland using the HGM system. The boundary of Wetland C was defined on the waterward side by the edge of persistent vegetation and on the upslope side by a short, steep embankment.

Since this wetland is immediately adjacent to Lake Entiat, its hydrology is directly controlled by both the river/reservoir's daily and seasonal water elevations. This would be described as regularly saturated or flooded by Cowardin (Cowardin 1979). Hydrology may range from dry to flooded depending on the time of day, time of year, and hydroelectric generation demand by both Wells Dam and Rocky Reach Dam.

Soils within Wetland C typically have a 7 inch olive brown (2.5Y 4/3) very fine sand surface with brown (10YR 4/3) redox concentrations. From 7 to 13 inches, the soil is a dark grayish brown (2.5Y 4/2.5) fine sand with dark yellowish brown (10YR 4/4) redox concentrations. From 13 to 20 inches, the soil is an olive gray (5Y 5/2) very fine sand/silt with dark yellowish brown (10YR 4/4) redox concentrations. From 20 to 30 inches, the soil is an olive gray (5Y 4/2) medium sand with brown (7.5YR 4/4) redox concentrations. This bottom layer was very moist at the time of the site visit.

The vegetation in Wetland C consists of both a scrub-shrub overstory and an herbaceous emergent layer. Dominant woody plant species include white alder (*Alnus rhombifolia*/FACW), coyote willow (*Salix exigua*/OBL), red-osier dogwood (*Cornus sericea*/FACW), and some Himalayan blackberry (*Rubus armeniacus*/FACU). Herbaceous species include reed canarygrass (*Phalaris arundinacea*/FACW), smooth scouring-rush (*Equisetum laevigatum*/FACW), purple loosestrife (*Lythrum salicaria*), and field mint (*Mentha arvensis*/FACW-). Ute ladies'-tresses (*Spiranthes diluvialis*) was observed in this wetland in September 2009. This plant species is listed as Threatened under the Endangered Species Act (ESA).

According to the state and county rating methods, Wetland C would be rated as a Category III based on functions. However, since an ESA-listed plant is known to occur in the wetland, the rating is elevated to a Category I wetland. The wetland rating form is available in Appendix B.

Chelan County requires buffers be placed around wetlands to protect and enhance the biotic, physical, and chemical functions that wetlands perform. Chelan County requires that a 200-foot buffer be located around Category I wetlands situated in low intensity developed areas.

3.3.2 Wetland D

The segment of Wetland D within the Phase 3 area is a 1.62-acre wetland (Figure 7). It is classified under Cowardin as palustrine scrub-shrub and as a lake-fringe wetland using the HGM system. The Wetland D boundary was defined on the waterward side by the edge of persistent vegetation. The upland side of the wetland is situated on a gradual slope from Lake Entiat.

Since this wetland is immediately adjacent to Lake Entiat, its hydrology is directly controlled by both the river/reservoir's daily and seasonal water elevation. This would be described as regularly saturated or flooded by Cowardin (Cowardin 1979). Hydrology may range from dry to flooded depending on the time of day, time of year, and hydroelectric generation demand by both Wells Dam and Rocky Reach Dam.

Soils within Wetland D typically have a 7 inch brown (10YR 4/3) very cobbly sandy loam surface with yellowish brown (10YR 5/6) redox concentrations. The subsurface to 12 inches is a very dark grayish brown (10YR 3/2) silt loam with brown (10YR 4/3) redox concentrations.

The vegetation in Wetland D consists of both a scrub-shrub overstory and an herbaceous emergent layer. Dominant woody plant species include white alder, coyote willow, red-osier dogwood, and Himalayan blackberry. Herbaceous species include reed canarygrass and common cattail (*Typha latifolia*/OBL)

According to the state and county rating methods, Wetland D would be rated as a Category III wetland having a moderate potential and opportunity to provide habitat and water quality functions. Its position on a reservoir significantly reduced its opportunity to provide hydrologic functions. The wetland rating form is available in Appendix B.

Chelan County requires buffers be placed around wetlands to protect and enhance the biotic, physical, and chemical functions that wetlands perform. Chelan County requires that a 75-foot buffer be located around Category III wetlands situated in low intensity developed areas.

4.0 PROJECT IMPACTS

The proposed project would grade and recontour upland, wetland, and shoreline areas to enhance the existing site conditions and create off-channel fish habitat along the Columbia River.

Approximately 0.42 acre of wetland will be permanently impacted from construction of the project. The permanent impact will result from a combination of filling of wetland to protect the

rearing side channel and to place the approach to a dock and a boardwalk and viewing platform and converting of wetland to unvegetated open water. In addition, approximately 0.51 acre of temporary wetland impact will result from construction of the project. Much of the temporary impact is located in Wetlands C and D in areas where the side channel will connect to Lake Entiat. The temporary impact will be restored by planting a combination of native trees, shrubs, and herbaceous vegetation. Permanent and temporary impacts are shown in Table 3.

Over half of Wetland B was impacted by the construction of a side channel in Phase 2 of the Beebe Springs Natural Area. These impacts were described in the JARPA prepared for that work. The BSNA master plan shows that the area around the rest of Wetland B will be further impacted by the construction of the side channel.

The wetland was delineated as a Class III wetland with hydrology driven by occasional high flows in the Columbia River. It appears that, with the construction of the side channel, ground water levels dropped due to the permeable soils in the area. In addition, Wetland B was also modified through on-going vegetation management designed to remove non-native vegetation from the site with the long range plan to enhance the area and to plant extensive areas of native vegetation. It was impossible to remove the invasive vegetation without disturbing the few native species that existed within the remaining areas of Wetland B. Ultimately the area has been cleared.

As anticipated in Phase 3, additional work will be completed in the vicinity of Wetland B. All remaining portions of Wetland B will be impacted by this next phase, with most of the wetland being enhanced and developed as a seasonally saturated marsh. These impact areas are accounted for in the calculation of wetland impacts for Phase 3. See the Phase 3 JARPA to which this report is attached.

Table 3. Temporary and Permanent Wetland Impacts.

Wetland	Permanent Impact (sq. ft.)	Temporary Impact (sq. ft.)
Wetland B	770	7,452
Wetland C	3,420	4,535
Wetland D	14,250	10,076
Totals	18,440 (0.42 acre)	22,063 (0.51 acre)

Chelan County enforces buffer regulations for jurisdictional waters. Most of Phase 3 construction also occurs in the buffers of Wetlands C and D and the Columbia River/Lake Entiat. Currently the buffers of these features are degraded by previous land uses. The construction of Phase 3 actually enhances the buffers and therefore will require no mitigation.
No indirect impacts from the project are anticipated to the portions of Wetland C and D that will not be directly impacted by construction. The hydrology of these wetlands will remain unchanged since it is driven by dam management. The vegetation will also not be affected by the project. In addition, the functions of the wetlands are anticipated to remain the same after construction.

Approximately 0.67 acre will be excavated below the OHWM of Lake Entiat as part of the construction of the side channels. This area does not include impact to wetland that lies below the OHWM, as it is already included in the wetland impacts. The work below the OHWM (and outside of wetland) is considered self-mitigating as the jurisdictional water and its habitat value will remain relatively unchanged after construction. In addition, construction of a dock for observation will require installation of up to four pilings. The pilings will occupy less than one square foot each of substrate surface, and of course will displace a small volume (probably less than a cubic yard) of water. The dock would extend 30 feet into the river/lake, and would be a about 6 feet wide. The decking would be grating so as to minimize shading of substrate, most of which is not vegetated.

The proposed culvert removal on Beebe Springs Creek would include some in-water work to remove the culverts and the fill covering them. The temporary effects will lead to restoration of a naturally vegetated stream channel.

5.0 MITIGATION

5.1 RATIOS

Implementation of Phase 3 of the Beebe Springs Natural Area will include creation of additional side channels to the Columbia River/Lake Entiat, which will impact Wetlands C and D. One side channel was already installed in Phase 2, affecting Wetland A (which is connected to Wetland C). Similar to Phase 2, the Phase 3 side channels will actually result in a net gain of wetland area. Phase 2 of the project was considered self-mitigating, as twice as much wetland area was created as was lost.

Wetland D is a Category III wetland. It seems reasonable that the 2:1 wetland creation ratio accepted during Phase 2 of the project would be appropriate for impacts to this wetland.

However, since Phase 2 was permitted, Ute ladies'-tresses (a Threatened species under the Endangered Species Act) was discovered along the banks of Lake Entiat in Wetland C. The presence of this species in Wetland C automatically results in its designation as a Category I "Natural Heritage" wetland. According to agency guidance, it is not considered possible to create, rehabilitate, or re-establish a Category I Natural Heritage wetland. However, the Chelan PUD (who has monitored this species in Lake Entiat since 2000) has concluded that Ute ladies'-tresses became established in the area after creation of the reservoir.

Since the "natural heritage" status of the wetland is solely based on the presence of the orchid (it would be a Category III based on functions), creating more habitat for the species will be a positive change. As part of Phase II ESA consultation, it was determined that no known orchid locations will be disturbed during construction. The creation of side channels would create more potential habitat for this species. In addition, these side channels would be physically connected to Wetland C and act as a continuation of the wetland. Therefore we believe that a 2:1 wetland creation ratio would be appropriate for impacts to Wetland C.

Table 4. Proposed Wetland Mitigation Ratios and Areas

Impact Type	Ratio	Impact Area (sq. ft.)	Mitigation Needed (sq. ft.)	Mitigation Area Available (sq. ft.)
Permanent Impact	2:1	18,440	36,800	52,708
Temporary Impact	1:1	22,063	22,063	22,063

As discussed earlier, the impacts below the OHWM of Lake Entiat are considered self-mitigating, as the jurisdictional water will remain relatively unchanged after construction.

6.0 REFERENCES

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