CITY OF CLE ELUM
WASTEWATER TREATMENT PLANT OUTFALL
RELOCATION AND ROCK DROP CONSTRUCTION:

SOUTH BANK YAKIMA RIVER WETLAND DELINEATION

Prepared for:

CITY OF CLE ELUM
Cle Elum, Washington

Prepared by:

ENTRIX, INC.
Olympia, Washington

Project No. 396901

November 25, 2002
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CITY OF CLE ELUM
119 W First Street
Cle Elum, WA 98922

Prepared by:

ENTRIX, INC.
148 Rogers St. NW, Suite 1
Olympia, WA 98502
Project No. 396901
(360) 352-3225

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EXECUTIVE SUMMARY

Entrix, Inc. conducted a routine wetland determination through a portion of the south bank of the Yakima River and within a vegetated gravel bar of the Yakima River, where a rock drop (a.k.a. submerged rock weir) stabilization structure is proposed. The City of Cle Elum (City) and the Yakama Nation propose to construct the rock drop across the Yakima River and associated floodplain at an abrupt bend in the river channel at approximately Rivermile (RM) 181.2. The Washington State Department of Transportation is also a project sponsor, having contributed funds toward the cost of design. Construction of the rock drop has two primary objectives: 1) to provide an inlet structure to direct a portion of the flow of the Yakima River through Hanson Ponds for fisheries habitat restoration, and 2) to stabilize the river in its present location to prevent flood damage to public and private properties and facilities (including Interstate 90) from flooding and river migration. The City has also chosen to relocate its wastewater treatment plant outfall to RM 181.2 and use the rock drop as a stable structure in which to extend the outfall and diffuser to the center of the river.

Neither construction nor operation of the outfall will affect wetland plant communities; however, constructing the rock drop will require filling a small wetland along the south bank of the river with rock, and excavating a small portion of a vegetated gravel bar in the mainstem Yakima River. This wetland delineation was performed to identify and quantify the specific impacts to these vegetation communities. Wetland boundaries were delineated using the Routine Determinations method specified in the Washington State Wetlands Identification and Delineation Manual to comply with state and federal regulations.

Wetland determinations were made for five vegetation types within the study area on September 21, 2002. Most of the study area is covered by mature, closed riparian forest, which is upland. One palustrine wetland was delineated in the study area. This wetland supports persistent emergent, mesic forested/scrub-shrub, and open scrub-shrub vegetation classes. Because there are clear surface water drainage patterns between this wetland and the Yakima River, it appears to be a jurisdictional wetland. We estimate the proposed rock drop will impact approximately 0.48 acre of the emergent and open scrub-shrub components of the wetland. Restoring access to the Hanson Ponds along with the enhancement of the ponds’ side channel habitat to the Yakima River, as described in greater detail elsewhere (ENTRIX, Inc. 2002) will create substantially more wetland habitat than that potentially lost or altered by the project action. As a result, there will be no net loss of wetland or wetland functions from the construction of the rock drop structure after all project elements are completed.
1.0 INTRODUCTION

Entrix, Inc. (Entrix) conducted a wetland delineation in the area of a proposed rock drop stabilization structure across the Yakima River at RM 181.2 on September 21, 2002. The rock drop is proposed to 1) provide a stable inlet structure to a fisheries habitat restoration project within the Hanson Ponds, and 2) protect against flooding over the north bank of the river. The City of Cle Elum also plans to use the structural support provided by the rock drop to secure a realigned Regional Sewer Plant (RSP) wastewater outfall in the riverbed. The RSP will be constructed by expanding and modernizing the City of Cle Elum’s existing sewage treatment facilities (Earth Tech 2002). The RSP, once completed, is envisioned to service the City of Cle Elum, the Town of South Cle Elum, the City of Roslyn, the Urban Growth Areas (UGA) of these communities, and unincorporated areas of Kittitas County in the vicinity.

The proposed alignment for the rock drop and RSP outfall will extend into a deep and fast moving scour pool at RM 181.2 of the upper Yakima River. The study area for the wetland delineation included a vegetated gravel bar upstream of the outfall/rock drop that would be scraped to redirect river flows to mid-channel. The proposed rock drop, outfall, mixing zone, and study area are shown in Figure 1.

Sample plots were established in representative vegetation types in the floodplain forest and emergent vegetation types found in the study area. The south bank key and southern floodplain sill of the rock drop structure would be positioned through an emergent plant community located in a narrow depression between two slightly higher terraces. The ordinary high water mark (OHWM) of the Yakima River is about 1883 feet MSL at the proposed rock drop/outfall alignment, and the 100-year flood elevation is about 1886 feet MSL at this location. Floodway boundaries, as developed by FEMA, are reflected in Figure 2.

South bank vegetation is relatively homogeneous, consisting primarily of a closed black cottonwood forest on the higher alluvial terraces. Features located in depressions on the terraces appear to be emergent wetlands. One sample plot each was established in these vegetation types.

In addition to these communities on older alluvial terrace landforms, there are younger pioneer vegetation types on the gravel bar. Scrub-shrub and early seral-forested types are the dominant types on the less well-developed soils of the bar. It is assumed that all of the area east of the riparian forest type on the bar was wetland; therefore, no sample plots were established. The area of the younger scrub-shrub communities dominated by pioneer willow species located on the bar was surveyed.
Figure 1: Study Area Showing the Proposed Rock Drop, Outfall Alignment, Mixing Zone, and Affected Gravel Bar
Figure 2: FEMA Floodway and flood plain in vicinity of wetland delineation for City of Cle Elum rock drop and outfall realignment.
2.0 METHODS

2.1 WETLAND DELINEATION

Before conducting the jurisdictional wetland determination, ENTRIX biologists reviewed background information and completed a reconnaissance of the site. Background information that was reviewed, included:

- A recent (2001) color aerial photo
- U.S. Fish and Wildlife Service National Wetland Inventory map
- Site maps and preliminary plan drawings developed by Geomax (2002)
- Draft Biological Assessment (Entrix 2002).

This information was used to guide the wetland delineation. The entire site was walked and sample plots were established in each of the vegetation types and landscape positions representative of those present except as noted in the introduction.

ENTRIX staff delineates wetlands based on best professional judgment, existing site conditions during field analysis, and information provided by the client. Wetland boundaries were delineated using the Routine Determinations method described in the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). This manual was developed as mandated by state law to be consistent with the US Army Corps of Engineers (Corps) 1987 manual (Corps 1987). It has been adopted into state regulations, and all state and local governments must use this delineation manual to implement the state Shoreline Management Act and local wetlands regulations developed to comply with the Growth Management Act. With few exceptions, the Corps and Washington State Department of Ecology (Ecology) typically require that the following three characteristics are present for an area to be identified as a wetland: (1) hydrophytic vegetation; (2) hydric soil; and (3) wetland hydrology. The methods used to determine the presence of each characteristic are described in the following subsections. Delineated and surveyed wetland boundaries are subject to verification and approval by jurisdictional agencies. A more detailed description of the methods used to determine the presence of each characteristic is described in Appendix A. In addition to using the standard Routine Determinations method to delineate the wetland boundaries, a hand auger was used to examine soils and hydrology to determine the presence of hydric soils and wetland hydrology.

Plant nomenclature generally follows Hitchcock and Cronquist (1973), except for a few recent taxonomic changes. More recent taxonomy follows Kartesz as found on the website of the National Plants Database of the Natural Resources Conservation Service (USDA, NRCS, 2000) at http://plants.usda.gov/.
Three areas of potential impact were examined in our survey: (1) closed riparian forest, (2) emergent plant communities within the riparian floodplain, and (3) gravel bar communities. Within the areas surveyed, five distinct vegetation types were identified. Wetland determinations are presented for each of the five vegetation types found in the upland, riparian and wetland habitats on the site. All wetland boundaries are subject to verification by regulatory agencies. Summaries of the dominant plants, hydrology, and soils, and a wetland determination are discussed for sample plots established within the different vegetation types identified. A brief discussion of the apparent functions for each of the wetlands is presented. Formal categorization of the identified wetlands (Ecology 2002) are only estimated because the boundaries of some of the vegetation types classified as wetlands extended beyond the area of impact from the rock drop, and were not formally surveyed.

3.1 CLOSED RIPARIAN FOREST COMMUNITY

A closed deciduous riparian forest type covers most of the study area. Mature black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) averaging an estimated 20 inches or more diameter at breast height and 50 feet tall forms a virtually continuous canopy. Understory vegetation ranges from a relatively open and depauperate herb-dominated association to associations with more species-rich and well-developed shrub and herb strata. One sample plot (SP-1) was established in this upland forest type (Figure 3). Photographic representations of upland conditions found within this area are pictured in Figure 4.

3.1.1 UPLAND VEGETATION TYPE

3.1.1.1 Vegetation

Sample plot SP-1 was established on the top of a low terrace just north of a small linear depression and the proposed outfall alignment (Figure 3). As shown in the SP-1 field data (Appendix B), dominant species included western hemlock black cottonwood, red-osier dogwood (*Cornus sericea*), a rose (*Rosa* sp.), common snowberry (*Symphoricarpos albus*), and evergreen horsetail (*Equisetum hyemale*). Because 67 percent of the dominant species have a FAC or FACW wetland indicator status, this forest type was considered hydrophytic (wetland) vegetation.
Figure 3. Wetland boundary and sample plot overlaid on 2002 Kittitas County aerial photograph (likely areas of impact bounded by solid black lines).
3.1.1.2 Hydrology

All of the riparian forest in the project area appears to be within the 100-year floodplain (Figure 2), indicating that at least portions of this forest are likely periodically flooded. Historic flooding appears to have resulted in the deposition of lenses of coarser alluvium as well as smaller silt and clay-sized particles. This coarser texture appears to have resulted in relatively well-drained properties. No saturation, oxidized rhizospheres, water-stained leaves, or other positive indicators of wetland hydrology were observed in the riparian forest sample plot within 16 inches of the ground surface. Therefore, the wetland hydrology criterion was not met.

3.1.1.3 Soils

The SP-1 sample pit was dug to a depth of more than 16 inches. The surface horizon consisted of about four inches of very dark brown (10YR 2/2) loam. Beneath this horizon the soils were dark grayish brown (10YR 4/2) loamy sand to a depth of approximately 16 inches. There were no redoximorphic features or other positive indicators of hydric soil in this apparently well-drained alluvium.

3.1.1.4 Wetland Determination and Rating Estimate

Although the deciduous forest vegetation meets the hydrophytic vegetation criterion, there were no positive indicators of either wetland hydrology or hydric soils. Because there was no wetland hydrology or hydric soil, this riparian forest community type was determined to be uplands.

3.2 Emergent Communities

There are two emergent community types within the study area, a mixed sedge/grass community, and a monoculture plant community of reed canary grass (Phalaris arundinacea). The combined areas of these two contiguous plant communities, referenced as “Area A” in Figure 3, constitutes approximately 5,865 square feet—based on AutoCad estimations of surveyed boundary flags. (Area A in Figure 3 also includes a mesic fringe of approximately 1,035 feet, as described in 3.3.1. When all three plant communities are included, the total area for Area A is 6,900 square feet.)

The second sample plot (SP-2) was established in the mixed sedge-grass vegetation type found in the narrow depression where the south bank key and southern floodplain sill of the rock drop structure would be located (Area A). The depression is located between closed riparian forest dominance types found at higher elevations on the alluvial terrace. In addition to this community, there is a reed canarygrass (Phalaris arundinacea) monoculture in a narrow band between the closed riparian forest type and OHWM of the Yakima River (Figures 4 and 5). No sample plots were established in this hydrophytic vegetation type, which was assumed to be wetland. Based on hand auger borings, the hydrology and soils in the reed canarygrass monoculture are similar to those for the sedge-dominated vegetation type described below.
3.2.1 **MIXED SEDGE-GRASS TYPE**

Sedges and grasses are the dominant plants found in depressional areas scoured in the alluvial terrace south of the active river channel. This community was identified within the boundary of Area A in Figure 3. These plants appear to be infrequently flooded by overbank flows, and have relatively well-developed soils.

3.2.1.1 **Vegetation**

SP-2 was established in an overflow channel carved in the alluvial terrace. The test pit and sample plots are approximately 40 feet southeast of SP-1 (Figure 3). Dominant species found in this emergent type were slough sedge (*Carex obnupta*), reed canarygrass, and red-osier dogwood (Figures 4 and 5). Two small red-osier dogwood plants were found in the sample plot but otherwise this species was absent in the depression. Although the canopy of the riparian forest extends over this community, there were no trees rooted in the sample plot. Figure 4 provides photographs of the communities delineated in Area A, as well as the progression to uplands moving to the south. Because 100 percent of the dominant species have a FACW or OBL wetland indicator status, this emergent type was considered hydrophytic vegetation.

3.2.1.2 **Hydrology**

There is a clear wetland drainage pattern in this overflow channel. Surface scouring is found at the entrance to this feature and at the western end of the depression. Oxidized root channels, water-stained leaves, and other positive indicators of wetland hydrology were observed. The source of hydrology appears to be infrequent overbank flooding and possibly seasonally high groundwater, as well.

3.2.1.3 **Soils**

A pit was dug at SP-2 to a depth of more than 12 inches. The surface horizon consisted of about 4 inches of very dark brown (10YR 2/2) loam. From about a depth of 4 to 8 inches was a layer of dark grayish brown (10YR 4/2) sand. Below a depth of about 8 inches was a dark grayish brown (2.5Y 4/2) sandy loam. There were many coarse, distinct yellowish brown (10YR 5/8) mottles. Soils with a matrix chroma of 2 and mottles are considered hydric.

3.2.1.4 **Wetland Determination and Rating Estimate**

All three wetland parameters were satisfied in the mixed sedge-grass community. Therefore, the sample plot and plant community are considered wetland. Surveyed wetland boundaries are shown in Figure 3. According to the U.S. Fish and Wildlife Service’s wetland classification system (Cowardin et al., 1979), this is a palustrine emergent, persistent, and seasonally saturated wetland (PEM1C). It exhibits rating characteristics consistent with a Category II wetland (Ecology 2002).
Figure 4. The south bank upland, riparian, and wetland vegetation along the proposed rock drop alignment.
Figure 5. Photographs of scrub-shrub communities on gravel bar to be scraped and contiguous portions of Area A with emergent reed canary grass and mixed sedge wetland plant community.
3.3 **SIDE CHANNEL AND GRAVEL BAR COMMUNITIES**

Two vegetation types were identified on the gravel bar that would be scraped under the proposed project action. A more mesic forested/scrub-shrub vegetation type is found on the southwest portion of the gravel bar, whereas scrub-shrub vegetation is found in northern and northeaster portions of the bar, near the active channel. The mesic community is dominated by willows, particularly Pacific willow (*Salix lucida* var. *lasiandra*), Sitka willow (*S. sitchensis*), and sandbar willow (*S. exigua*), and immature black cottonwood. The mesic forested/scrub-shrub vegetation type is bisected (and hence associated with) a side channel of the river that conveys flood flows between the higher alluvial terrace to the south (such as where SP-1 was dug), and the non-forested scrub-shrub vegetation community on the northern portions of the gravel bar. The mesic community has better developed soils than the more barren scrub-shrub portions of the gravel bar to the north. Although no formal sample plots were established in this area, vegetation, soils, and hydrology are described below.

3.3.1 **SIDE CHANNEL—MESIC DECIDUOUS FOREST/SCRUB-SHRUB TYPE PLANT COMMUNITY**

This community is bisected and associated with a side channel of the Yakima River that projects predominantly west from the palustrine emergent plant community described in 3.2, along the riparian fringe of the river. The southern boundary of this plant community is conceptually indicated as a green line in Figure 3, extending west from Area A (mostly contiguous with the side channel alignment). The northern boundary of this vegetation type on the gravel bar is not indicated in Figure 3, because this portion of the community will not be affected by the project action so a full delineation of its boundary was not necessary. The plant community overall is characterized by a mixture of well-developed and closed forested and scrub-shrub vegetation. This dense vegetation has trapped large volumes of silt and sand resulting in moderately well developed alluvial soils. Soils ranged from dry to saturated at the surface in this community. Depressional areas adjacent to the side channel tended to be wetter than soils at higher elevations on the bar.

3.3.1.1 Vegetation

Trees and shrubs are codominant and provide most of the areal cover in this mesic deciduous forest/scrub-shrub type. Cover and abundance of associated herbs is variable, ranging from sparse and virtually absent to dense and abundant. In addition to the willows and immature black cottonwood, dominant plants observed included red-osier dogwood, red alder (*Alnus rubra*), Pacific ninebark (*Physocarpus capitatus*), black twinberry (*Lonicera involucrata*), evergreen horsetail, reed canarygrass, and hedge nettle (*Stachys cooleyae*). Beneath better-developed portions of the upper stratum, there are few understory associates. In areas where tree cover is sparse or absent, reed canarygrass forms dense cover. Because more than 50% percent of the dominant plants have FAC or wetter wetland indicator statuses, this forested/scrub-shrub type met the hydrophytic vegetation criterion.
3.3.1.2 Hydrology

Water flows in the side channel at higher stages in the river providing varying levels and durations of inundation and saturation. Surface scouring, evidence of inundation, wetland drainage patterns, and saturation at or near the surface following an unusually dry summer are some of the positive indicators of wetland hydrology apparent in this lower lying area.

3.3.1.3 Soils

Although no soil pits were dug in this area, a hand auger was used to investigate soil characteristics. Characteristics were variable ranging from saturated silt loams with an aquic moisture regime and accumulation of organic matter in the surface horizon to soils with redoximorphic features that were similar to those observed in SP-1. These were among the positive indicators of hydric soils observed in the mesic deciduous forest/scrub-shrub community type.

3.3.1.4 Wetland Determination and Rating Estimate

Positive indicators of all three wetland parameters were present. The vegetation type met the wetland criteria. The boundaries of this community type also extend west and east along the Yakima River as a narrow band (between the OHWM and riparian forest) through the south bank key, and southern floodplain sill of the rock drop. The southern boundary of this plant community is conceptually indicated as the green line in Figure 3, extending west from “Area A” and through the northern boundary of the Area A polygon, to the east (contiguous with the side channel). Thus, it is contiguous with the PEM1C wetland previously described in section 3.2.

According to the U.S. Fish and Wildlife Service’s classification system, this portion of the wetland is classified as a palustrine forested/scrub-shrub broad-leaved deciduous and seasonally flooded wetland (PFO/SS1C). The wetland provides functions consistent with a category II wetland, but should not be disturbed by the rock drop installation, with the exception of that narrow portion along the northern boundary of Area A.

3.3.2 GRAVEL BAR—OPEN SCRUB-SHRUB TYPE PLANT COMMUNITY

There are two pioneer communities composed of willows on portions of the gravel bar east of the mesic deciduous forest/scrub-shrub type. These communities will be largely removed when gravel is scraped from the bar, as proposed for the project action (see Figure 1). Soils are poorly developed in this area of the bar, which is sparsely vegetated except for relatively long ellipsoidal areas covered by early seral vegetation (Figure 5). These areas are delineated as G1 and G2 in Figure 3.

3.3.2.1 Vegetation

Sandbar willow is the dominant species in this open vegetation type and reaches a maximum height of about 12 feet (Figure 5). In addition, there are scattered immature black cottonwood saplings and other willows. Average height of vegetation is about 10
feet. Based on Auto-Cad estimates of the surveyed boundary flags of contiguous vegetation, this community type covers about 13,800 square feet in two ellipsoidal areas separated by a sparsely vegetated and more or less barren area approximately 37 feet wide on the highest part of the bar (see G1 & G2 in Figure 3). The ellipses are about 214 feet and 355 feet long, respectively and range in width from about 8 to 40 feet. Because the dominant species have FAC or wetter wetland indicator statuses, the vegetation is hydrophytic.

3.3.2.2 Hydrology

The gravel bar is clearly an aggrading part of the river resulting from depositional processes. Fluvial processes have resulted in sorting gravels and sands and formation of this bar. It is assumed that much if not all of the bar is flooded for sufficient duration during spring thaw to continue to support the hydrophytic vegetation on this bar and to meet the wetland hydrology criterion.

3.3.2.3 Soils

Soils are poorly developed in the gravel bar, consisting predominantly of gravels and sands. They are classified as fluvaquents. Fluvaquents are entisols, and entisols with an aquic moisture regime are hydric soils.

3.3.2.4 Wetland Determination and Rating Estimate

Because all three parameters appear to have been met, this open scrub-shrub type is considered wetland. Because shrubs dominate it, this wetland is classified as a palustrine scrub-shrub broad-leaved deciduous, seasonally saturated wetland (PSS1C). This scrub-shrub vegetation class is part of the larger wetland mosaic that includes the PEMC and more mesic PFO/SS1C vegetation classes. As a stand-alone wetland, it would likely rate as a category 3 wetland by Ecology standards (Ecology 2002). Although the open scrub-shrub wetland community is within the channel migration zone of the Yakima River, the community appears to provide functions of less unique value than the wetland plant communities encompassed by Area A, and represents habitat that can be recreated naturally or with mitigation plantings.
4.0  POTENTIAL IMPACTS AND MITIGATION

It is assumed that the more mature vegetation types, including the closed riparian forest and mesic forested/scrub-shrub wetland types provide greater levels of function compared to mixed sedge-grass and open scrub-shrub communities. Therefore, potential impacts to these communities from the proposed rock drop construction will be minimized to the maximum extent practicable.

Potential impacts to palustrine emergent and open scrub-shrub wetland vegetation classes could occur from the proposed rock drop project where pictured in (Figure 3). The closed polygon of Area A in Figure 3, references the maximum wetlands impact area from the rock drop construction. This area, approximately 6,900 square feet (0.16 acre), is predominantly composed of the (palustrine emergent) mixed sedge-grass dominance type wetland described in Section 3.2, but also includes the small area of monoculture reed canary grass, and a small portion of the palustrine forested wetland (mesic edge) described in Section 3.1 that extends to the east and west of the project action area. Potential impacts to palustrine emergent portions of the wetland will be minimized by maintaining connectivity between the similar community to the south and by restoring surface topography after construction to ensure that the overbank flooding hydrology is maintained for the emergent wetlands to the south.

In addition to direct impacts to the palustrine emergent portions of this wetland at the rock drop location, open scrub-shrub vegetation on the bar would be directly affected by the project. Excavation of gravels from the bar will remove about 13,800 square feet (0.32 acre) of open scrub-shrub wetland vegetation in order to direct the flow of the river across the center of the rock drop. Potential impacts to the more mature mesic vegetation and palustrine forested riparian fringe to the south will be avoided by preventing excavation of the bar beyond the projected impact areas delineated as G1 and G2 in Figure 3.
Table 1. Summary of Sample Plot Data, Identified Plant Communities and Wetland Classifications.

<table>
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<tr>
<th>Sample Plot</th>
<th>Vegetation</th>
<th>Hydrology</th>
<th>Soils</th>
<th>Wetland Determination</th>
<th>Wetland Classification¹</th>
<th>Jurisdictional Wetland²</th>
<th>Approximate Wetland Area</th>
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<tr>
<td>SP-1</td>
<td>Closed riparian forest; 67% dominants FAC or FACW; Hydrophytic</td>
<td>No positive indicators of wetland hydrology.</td>
<td>No positive indicators of hydric soils. Nonhydric</td>
<td>Upland</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SP-2</td>
<td>Mixed sedge-grass type; 100% FACW or OBL Hydrophytic</td>
<td>Several positive indicators of wetland hydrology.</td>
<td>Mottles in a matrix with a chroma of 2; Hydric</td>
<td>Wetland</td>
<td>PEM1C</td>
<td>Adjacent to Yakima River</td>
<td>6,900 square feet (includes mesic fringe and reed canary grass monoculture)</td>
</tr>
<tr>
<td>-</td>
<td>Mesic forested/scrub-shrub type forest; &gt;50% dominants FAC or FACW; Hydrophytic</td>
<td>Several positive indicators of wetland hydrology.</td>
<td>Mottles in a matrix with a chroma of 2; Hydric</td>
<td>Wetland</td>
<td>PFO/SS1C</td>
<td>Adjacent to Yakima River</td>
<td>Not formally determined, area of impact estimated as 15% of Area A (~1,035 sq ft)</td>
</tr>
<tr>
<td>-</td>
<td>Reed canarygrass monoculture; 100% FACW; Hydrophytic</td>
<td>Several positive indicators of wetland hydrology.</td>
<td>Mottles in a matrix with a chroma of 2; Hydric</td>
<td>Wetland</td>
<td>PEM1C</td>
<td>Adjacent to Yakima River</td>
<td>Not formally determined, estimated as approximately 15% of Area A (~1,035 sq ft)</td>
</tr>
<tr>
<td>-</td>
<td>Open scrub-shrub type; 100% dominants FAC or FACW; Hydrophytic</td>
<td>Assumed aquic moisture regime, seasonal flooding meets wetland hydrology criterion.</td>
<td>Soils are fluvaquents, a hydric soil.</td>
<td>Wetland</td>
<td>PSS1C</td>
<td>Adjacent to Yakima River</td>
<td>13,800 square feet</td>
</tr>
</tbody>
</table>

¹: Wetland classification follows Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979).

²: Final wetland boundaries and jurisdictional determinations must be verified by the Seattle District of the U.S. Army Corps of Engineers and Washington State Department of Ecology.


ENTRIX, Inc. (2002). City of Cle Elum Wastewater Treatment Plant Outfall Relocation and Hanson Ponds Habitat Restoration and Enhancement: Biological Evaluation of Potential Impacts to Threatened and Endangered Species and Essential Fish Habitat. Prepared for: City of Cle Elum. ENTRIX, Inc., Olympia, WA.


APPENDIX A

METHODS
APPENDIX A
METHODS OF DETERMINING WETLAND CHARACTERISTICS AND CLASSIFICATION

WETLAND CHARACTERISTICS

In most cases, the US Army Corps of Engineers (1987) and Ecology (1997) requires that the following three characteristics are present for an area to be identified as a wetland: (1) hydrophytic vegetation, (2) hydric soil, and (3) wetland hydrology. There are a few exceptions to requiring presence of all three of these parameters, such as for atypical situations or problem areas. There were no atypical situations or problem areas encountered during this investigation. The following subsections summarize the routine determinations methods used to determine whether these characteristics are present on site.

HYDROPHYTIC VEGETATION

To determine whether an area has hydrophytic vegetation, the dominant plant species are identified. Dominant plants typically are those with greater than 20 percent cover. Reed (1988) has evaluated many plant species common in the Alaska region and assigned a wetland indicator status to each based on the species’ probability of occurring in wetland (Table 1). A plant community dominated (>50 percent) by species with a status of OBL, FACW, or FAC is considered hydrophytic.

Plants are identified in this report by their common and scientific names as found in Flora of Pacific Northwest (Hitchcock and Cronquist, 1973).

Table 1. Key to wetland indicator status.

<table>
<thead>
<tr>
<th>Code</th>
<th>Wetland Indicator Status</th>
<th>Probability of Occurrence in Wetland</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBL</td>
<td>Obligate wetland species</td>
<td>&gt; 99 percent</td>
</tr>
<tr>
<td>FACW</td>
<td>Facultative wet</td>
<td>67 to 99 percent</td>
</tr>
<tr>
<td>FAC</td>
<td>Facultative</td>
<td>34 to 66 percent</td>
</tr>
<tr>
<td>FACU</td>
<td>Facultative upland</td>
<td>1 to 33 percent</td>
</tr>
<tr>
<td>UPL</td>
<td>Obligate upland</td>
<td>&lt; 1 percent</td>
</tr>
</tbody>
</table>

HYDRIC SOIL

To determine whether an area has hydric soil, test pits are dug to a depth of at least 12 inches and the soil color and other characteristics described. Some of the positive indicators of hydric soils include:
• Low chroma. Soil with a low chroma (gray soil) typically develops when mineral soil is inundated; lack of oxygen reduces magnesium and iron compounds in the soil to a gray color. Soil colors are determined using a Munsell color chart (Kollmorgen Corp. 1994), which uses abbreviations to describe colors; e.g., 10YR 2/1. In the abbreviation, the last number indicates the chroma; a chroma of 1 or 0 is considered low.

• Mottles. In seasonally saturated wetlands, fluctuating water levels can trap air bubbles in the soil. The air pockets allow magnesium and iron compounds in the soil to oxidize; forming rust-colored mottles (spots or blotches). Mottles found in soil with a chroma of 2 or less indicate the soil is hydric.

• High organic content. Deep organic soils form if inundation prevents decomposition and organic debris accumulates. Organic content is considered high if the soil is composed of more than half organic material (by weight) in the upper 32 inches of the soil profile.

WETLAND HYDROLOGY

To determine whether an area has wetland hydrology, the area is examined for inundation, soil saturation, or shallow groundwater tables, or for hydrologic indicators. An area in which soils are saturated to the surface for at least one continuous week during the growing season meets the criteria for wetland hydrology; however, seasonal changes in water levels and immediacy of precipitation events must be considered when an area’s hydrology is evaluated. When wetland hydrology is not present at the time of the site visit, it can be inferred from the presence of any of the following hydrologic indicators: watermarks on vegetation, drift lines, sediment deposits, water-stained leaves, surface-scoured areas, wetland drainage patterns, or oxidized root channels.

CLASSIFICATION

Wetlands are classified according to 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. The systems described in Cowardin et al. (1979) are palustrine, marine, estuarine, riverine, and lacustrine.

The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, mosses, and lichens, and all such wetlands that occur in tidal areas where the salinity due to ocean-derived salts is below 5 parts per thousand. Wetlands included in the palustrine system are commonly referred to as marshes, swamps, bogs, fens, prairies, seeps, and intermittent ponds.

Palustrine wetlands are divided into classes by the dominant vegetation: Forested wetlands are dominated by trees greater than approximately 20 feet tall with 30 percent cover, scrub-shrub wetlands are dominated by woody shrubs, and emergent wetlands are dominated by nonwoody plants.
APPENDIX B

FIELD DATA SHEETS
# Routine Wetland Determination

## DATA FORM 1 (Revised)

(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

<table>
<thead>
<tr>
<th>Project/Site:</th>
<th>Date:</th>
<th>9/21/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/owner:</td>
<td>County:</td>
<td>Kittitas</td>
</tr>
<tr>
<td>Investigator(s): Scott Luchessa</td>
<td>State:</td>
<td>WA</td>
</tr>
</tbody>
</table>

S/T/R:

- Do normal circumstances exist on the site? ☑ Yes ☐ No
- Is the site significantly disturbed (atypical situation)? ☐ Yes ☑ No
- Is the area a potential problem area? ☑ Yes ☐ No

Explanation of atypical or problem area:

Community ID: Riparian forest
Transect ID: [a]
Plot ID: SP-1

### VEGETATION

(* = dominant plant species using the 50/20 rule)

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>% cover</th>
<th>Indicator</th>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>% cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Populus balsamifera*</td>
<td>T</td>
<td>85</td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornus sericea*</td>
<td>S</td>
<td>65</td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symphoricarpos albus*</td>
<td>S</td>
<td>20</td>
<td>FACU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosa sp.</td>
<td>S</td>
<td>15</td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equisetum hyemale</td>
<td>H</td>
<td>Trace</td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 67%

Check all indicators that apply and explain below:

- ☑ Visual observation of plant species growing in areas of prolonged inundation/saturation
- ☑ Physiological/reproductive adaptations
- ☑ Wetland plant database
- ☑ Personal knowledge of regional plant communities
- ☑ Other (explain)

Hydrophytic vegetation present? ☑ Yes ☐ No

Rationale for decision/remarks: More than 50% of the dominants have FAC and FACW wetland indicator statuses.

### HYDROLOGY

Is it the growing season? ☑ Yes ☐ No

Based on:

- ☑ Soil temp (record temp)
- ☑ Other (explain) – plant growth

Water Marks: ☑ Yes ☐ No

Drift Lines: ☑ Yes ☐ No

Oxidized Root (live roots) Channels <12 in.: ☑ Yes ☐ No

Local Soil Survey: ☑ Yes ☐ No

FAC Neutral: ☑ Yes ☐ No

Water-stained Leaves: ☑ Yes ☐ No

Check all that apply & explain below:

- ☑ Stream, lake or gage data
- ☑ Aerial photographs
- ☑ Other – site investigation, topo elevations

Other (explain):

Wetland hydrology present? ☑ Yes ☐ No

Rationale for decision/remarks: Positive indicators of wetland hydrology are lacking
SOILS

Map Unit Name (Series and Phase):

Drainage Class

Field observations confirm mapped type?  □ Yes  □ No

Taxonomy (subgroup)

Profile Description

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Horizon</th>
<th>Matrix color (Munsell moist)</th>
<th>Mottle colors (Munsell moist)</th>
<th>Mottle abundance size and contrast</th>
<th>Texture, concretions, structure, etc.</th>
<th>Drawing of soil profile (match description)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>A</td>
<td>10YR 2/2</td>
<td></td>
<td>loam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-16+</td>
<td>B</td>
<td>10YR 4/2</td>
<td></td>
<td>loamy sand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hydric Soil Indicators: (check all that apply)

- Histosol
- Histic Epipedon
- Sulfidic Odor
- Aquic Moisture Regime
- Reducing Conditions
- Gleyed or Low-Chroma (=1) matrix
- Matrix chroma ≤ 2 with mottles
- Mg or Fe Concretions
- High Organic Content in Surface Layer of Sandy Soils
- Organic Streaking in Sandy Soils
- Listed on National/Local Hydric Soils List
- Other (explain in remarks)

Hydric soils present?  □ Yes  □ No

Rationale for decision/Remarks: Positive indicators of hydric soil are lacking.

Wetland Determination

Hydrophytic vegetation present?  ☒ Yes  □ No
Hydric soils present?  □ Yes  ☒ No
Wetland hydrology present?  □ Yes  ☒ No
Is the sampling point within a wetland?  □ Yes  ☒ No

Rationale/Remarks: The forest community is upland because there are no positive indicators of either hydric soils or wetland hydrology.

NOTES: This black cottonwood-dominated forest may be in the 100-year floodplain and has developed on alluvial soils. However, the sandy soils appear to be well drained and are located on ground 2-3 feet higher than that of adjacent wetlands (see SP-2 data).
### Routine Wetland Determination

**DATA FORM 1 (Revised)**

(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

<table>
<thead>
<tr>
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<th>Date: 9/21/02</th>
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<tr>
<td>Investigator(s): Scott Luchessa</td>
<td>State: WA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S/T/R:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Do normal circumstances exist on the site?** ☑ Yes ☐ No
- **Is the site significantly disturbed (atypical situation)?** ☐ Yes ☑ No
- **Is the area a potential problem area?** ☐ Yes ☑ No

**Explanation of atypical or problem area:**

- **Community ID:** Slough sedge/reed
- **canarygrass**
- **Transect ID:**
- **Plot ID:** SP-2

### VEGETATION

(* = dominant plant species using the 50/20 rule)

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>% cover</th>
<th>Indicator</th>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>% cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornus sericea*</td>
<td>S</td>
<td>20</td>
<td>FACW</td>
<td>Carex obnupta*</td>
<td>H</td>
<td>75</td>
<td>OBL</td>
</tr>
<tr>
<td>Phalaris arundinacea*</td>
<td>H</td>
<td>20</td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 100%

Check all indicators that apply and explain below:

- ☑ Visual observation of plant species growing in areas of prolonged inundation/saturation
- ☑ Wetland plant database
- ☑ Personal knowledge of regional plant communities
- ☑ Other (explain)

**Hydrophytic vegetation present?** ☑ Yes ☐ No

Rationale for decision/Remarks: All of the dominants have FACW and OBL wetland indicator statuses.

### HYDROLOGY

- **Is it the growing season?** ☑ Yes ☐ No

  Based on:
  - ☑ Soil temp (record temp)
  - ☑ Other (explain) – plant growth

<table>
<thead>
<tr>
<th>Depth of inundation:</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth to free water in pit:</td>
<td>&gt;16 inches</td>
</tr>
<tr>
<td>Depth to saturated soil:</td>
<td>&gt;16 inches</td>
</tr>
</tbody>
</table>

Check all that apply & explain below:

- ☑ Stream, lake or gage data
- ☑ Aerial photographs
- ☑ Other – site investigation, topo elevations

**Wetland hydrology present?** ☐ Yes ☑ No

Rationale for decision/remarks: There are many positive indicators of wetland hydrology.
SOILS

Map Unit Name (Series and Phase): 

Taxonomy (subgroup)

<table>
<thead>
<tr>
<th>Profile Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (inches)</td>
</tr>
<tr>
<td>0-4</td>
</tr>
<tr>
<td>4-8</td>
</tr>
<tr>
<td>8-12+</td>
</tr>
</tbody>
</table>

Hydric Soil Indicators: (check all that apply)

- Histosol
- Histic Epipedon
- Sulfidic Odor
- Aquic Moisture Regime
- Reducing Conditions
- Gleyed or Low-Chroma (=1) matrix
- Matrix chroma ≤ 2 with mottles
- Mg or Fe Concretions
- High Organic Content in Surface Layer of Sandy Soils
- Organic Streaking in Sandy Soils
- Listed on National/Local Hydric Soils List
- Other (explain in remarks)

Hydric soils present? ☒ Yes ☐ No

Rationale for decision/Remarks: Redoximorphic features and low chroma are positive indicators of hydric soils.

Wetland Determination

Hydrophytic vegetation present? ☒ Yes ☐ No
Hydric soils present? ☒ Yes ☐ No
Wetland hydrology present? ☒ Yes ☐ No
Is the sampling point within a wetland? ☒ Yes ☐ No

Rationale/Remarks: All three criteria are met. Therefore the sample plot and community are wetland (PEM1C).

NOTES: Soils in this depressional feature would likely be classified as a fluvaquent. There is clear evidence of surface scouring and seasonal inundation in the depression, which is 2 to 3 feet lower than the surrounding riparian forest. Except for the narrow channels connecting the emergent communities in the depressions, there are no black cottonwoods rooted in the depressions.