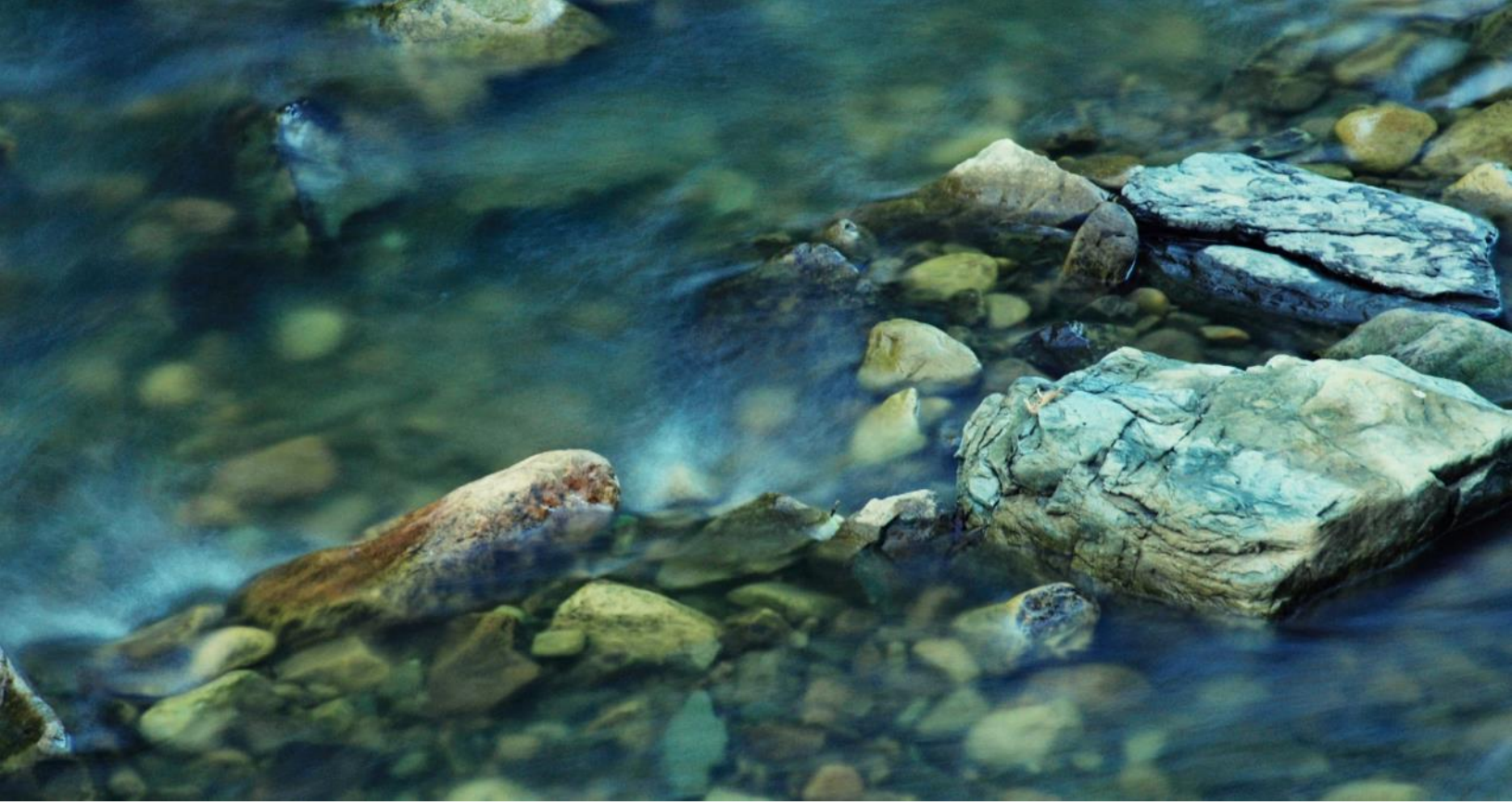

February 2021
Pioneer Aggregates Mine Expansion (South Parcel) Project

ANCHOR QEA

Critical Areas Report

Prepared for CalPortland

February 2021
Pioneer Aggregates Mine Expansion (South Parcel) Project

Critical Areas Report

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ABBREVIATIONS

Aspect	Aspect Consulting, LLC
DMC	City of DuPont Municipal Code
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology
GHA	Geologically Hazardous Area
H:V	horizontal to vertical
I-5	Interstate 5
JBLM	Joint Base Lewis-McChord
LOS	level of service
MSL	mean sea level
NRCS	Natural Resource Conservation Service
PHS	Priority Habitat and Species
Project	Pioneer Aggregates Mine Expansion (South Parcel) Project
RCW	Revised Code of Washington
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1 Introduction

Glacier Northwest, Inc., dba CalPortland, is seeking regulatory approvals for the Pioneer Aggregates South Parcel Project (Project). The Project would expand the footprint of the existing mine on to 188 acres (Figure 1) comprised of the 168-acre South Parcel that is located south east of the existing mine, 9.2 acres of buffer between the existing mine and the South Parcel and 10.8 acres surrounding the kettle wetland. Groundwater would need to be lowered under the under the 188-acre Expansion Area to facilitate extraction. Groundwater levels would be lowered in a 125 acre portion of the existing mine south east of the Olympia Beds (Qob) Truncation allowing additional mining to occur in that area. For the purpose of this document, this approximate 125 acre area is being called the Re-mine area.

The Project Area is located just southeast of the existing mine in the City of DuPont, southwestern Pierce County, Sections 22, 23, 26, and 27, Township 19 North, Range 1 East of the Willamette Meridian (see Figure 1). The Project Area is bordered to the northwest by the existing mine; to the east by Joint Base Lewis-McChord (JBLM), an Intel facility, Westblock Pacific, and other industrial/distribution facilities; and to the south by Sequalitchew Creek. The Project Area is on several parcels owned by Weyerhaeuser and leased to CalPortland. The site is located in the Chambers-Clover sub-basin of Water Resources Inventory Area 12. The Project Area is entirely within the boundaries of the City of DuPont's designated Mineral Resources Overlay area.

1.1 Content and Organization

This Critical Areas Report supports the proposed Project permitting and land use approvals by providing information regarding the presence of critical areas within the Project Area, evaluating potential impacts to existing critical areas and associated regulated buffers, as defined in the City of DuPont Municipal Code (DMC) Chapter 25.105, Critical Areas, and providing a mitigation summary to address these impacts. The following critical areas were identified as occurring within the Expansion Area:

- Wetlands: DMC 25.105.050(1)
- Fish and Wildlife Conservation Areas: DMC 25.105.050(2)
- Geologically Hazardous Areas: DMC 25.105.050(3)

Anchor QEA ecologists conducted a review of the Critical Areas chapter of the DMC, gathered and reviewed existing information, and performed field surveys of the Project Area in 2007 and 2017 to identify and assess existing critical areas. As part of the analysis to identify natural resources and critical areas in the Expansion Area, the ecologists reviewed the following sources of information to support field observations and subsequent analysis necessary to prepare this report:

- City of DuPont Municipal Code, including DMC 25.105

- U.S. Fish and Wildlife Service (USFWS) Wetlands Mapper for National Wetlands Inventory Map Information (USFWS 2007)
- Soil Survey of Pierce County, Washington (USDA 1979)
- Natural Resource Conservation Service Soil Series Mapping (USDA 2007)
- Hydric Soil List for Pierce County, Washington (USDA 2001)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) maps (WDFW 2020)
- *Final Supplemental Environmental Impact Statement, CalPortland Northwest DuPont Mining Area Expansion and North Sequalitchew Creek Project* (City of DuPont 2007)
- *Final Environmental Impact Statement for CalPortland North Parcel Mining Expansion* (City of Dupont [2013])

The following sections of this report describe the methods used in the field investigation and findings:

- Section 1 – Introduction
- Section 2 – Project Description
- Section 3 – Project Setting
- Section 4 – Critical Areas Assessment
- Section 5 – References

In addition to this study, several documents associated with the proposed Project have been prepared that address and describe critical areas within the Expansion Area. Information from these documents is summarized and/or included by reference in this report.

2 Project Description

The proposed Project includes clearing, topsoil removal and stockpiling and mining within the 188-acre Expansion Area. Additional extraction would also occur in the 125-acre Re-mine Area within the existing mine area. The Project would extend mining at the current rate for approximately 14 additional years and increase the available sand and gravel resources by 30 to 40 million tons. The Project Area is located within a Mineral Resource Overlay applied by the City of DuPont's Comprehensive Plan (Figure 2). The purpose of a Mineral Resource Overlay designation is to implement the Growth Management Act, the Surface Mining Act, and the DuPont Comprehensive Plan by designating an overlay area where mineral extraction is allowed (DMC 25.60.010). The mitigation approach for critical area impacts would be finalized during the State Environmental Policy Act review and permit process

Sand and gravel mine operations in the Expansion Area would involve six primary activities: logging, clearing and topsoil removal, groundwater management, extraction, processing and transport, and reclamation. These activities would overlap, with multiple activities occurring at any one time.

2.1 Logging

Timber was logged from the Expansion Area several years ago, but logging would still be needed prior to clearing and mining. A substantial portion of sand and gravel mine operations in the Project Area would occur within previously reclaimed areas of the existing mine (the Re-Mine Area) in addition to the previously unmined areas (the Expansion Area), where second-growth forest[1] and Scot's broom shrub dominates the landscape. The Expansion Area would be logged at a single time prior to segmental clearing, mining, and reclamation.

2.2 Clearing and Topsoil Removal

Prior to mining, dozers and excavators would be used to remove stumps and vegetation. This material would then be processed with a portable tub grinder and used to amend topsoil for use in reclamation. Over the life of the Project, clearing and topsoil removal would occur in the mine area in segments as mining advances into the South Parcel. Mass clearing of the site would not occur.

The Expansion Area is located downwind of the former Asarco copper smelter and refinery in Ruston, Washington. Airborne pollution emitted from the former smelter has resulted in a 1,000-square-mile, area-wide plume of arsenic- and lead-contaminated soil known as the Tacoma Smelter Plume. Surficial soils at the Expansion Area may contain arsenic and lead at concentrations above cleanup levels. These soils would be cleaned up under an approved plan developed in consultation with the Washington State Department of Ecology (Ecology) through the Voluntary Cleanup Program.

[1] "Second growth" here refers to a forest that has regenerated after harvest and has not yet reached maturity.

2.3 Groundwater Management

There is an existing aquifer in the sands and gravels to be mined in the Project Area. Wells would be installed and pumped in advance of mining, to intercept groundwater and dry out the gravels for mining. Mining using a trough method would be employed to minimize the duration that active dewatering by pumping wells is required. Once mining of each section of trough is completed, the adjacent wells can be turned off, allowing groundwater to passively seep from the stable engineered slope along the southeastern perimeter of the mine area and flow by gravity to an infiltration facility on the floor of the existing mine. After mining the trough along the perimeter, gravel would be extracted from the interior area.

2.4 Mining

Mining of the Project Area would proceed slowly from the north to the south over a period of 5 to 8 years, extracting gravel to create a broad trough along the southeastern perimeter of the mine (Figure 3). The method of mining would be identical to that currently used in the permitted mine area. A dozer would push excavated material from the top of the mine face to two front-end loaders working on the mine floor. The front-end loaders would scoop up the sand and gravel and dump it into portable hoppers used to feed conveyors leading to the processing plant.

The mine face of each sequence area would be a maximum of approximately 80 feet. During reclamation, the graded side slopes and mine areas would be revegetated and stabilized, in accordance with the mine reclamation plan.

A conveyor would begin near the location where mining will begin and then be extended to the other areas as mining progresses. The conveyor comprises a 48-inch-wide rubberized belt that is supported by a series of rollers, called idlers, mounted on steel framed segments that support the conveyor about 5 feet off the ground.

A 20-foot-high noise berm would be constructed along the southern boundary of the South Parcel. The berm would be located behind retained vegetation, and would prevent noise generated on the Project area from reaching adjacent properties. Processing and Transport

Material mined from the Project Area would be conveyed to the existing processing facility and would be processed in the same general manner presently used. The material extracted from the Project Area is anticipated to have a higher moisture content and fines content than the aggregate currently being extracted. As a result, there may be minor adjustments to some of the equipment used in the processing area, but the overall process and equipment used would remain the same.

To remove silt and clay, water is used to wash the raw material conveyed from the mine. Sand and gravel smaller than 1.5 inches pass through a screening and classifying process that separates and conveys the material to a series of stockpiles sorted by size and stacked on the south side of the

processing plant. Stones larger than 1.5 inches are crushed, sorted by size, and conveyed to a series of crushed-rock stockpiles, sorted by size, north of the processing plant. Screening equipment, rock crushers, and other processing equipment are located between the stockpiles of sorted rock products. Custom-blended rock products are also made to customer specifications.

More than 95% of the water used to process the mined material is recycled through a treatment system, where silt and clay are removed so that the water can be reused to process more raw material.

The mode and extent of transporting aggregate products from the site would not change, relative to existing operations. Approximately 80% of the product would be loaded onto barges at the existing dock at Tatsolo Point and transported to the Puget Sound regional market by barges. Approximately 20% of the product would be transported to the local market by truck. Some material would continue to be incorporated into concrete at the existing on-site concrete batch plant serving the local market.

2.5 Reclamation

As mining progresses, completed mine segments would be reclaimed. The reclamation plan would be reviewed, approved, and periodically inspected for compliance by the Washington Department of Natural Resources (DNR) for consistency with the Surface Mining Act (Revised Code of Washington [RCW] 78.44). In general, reclamation would consist of regrading, replacement of topsoil, and re-vegetation. CalPortland is currently preparing an application to revise the existing reclamation plan incorporated into the surface mining permit. DNR's approval would occur after the City's permits are issued. The proposed reclamation plan would be similar to the plan approved by DNR for the existing mine.

3 Project Setting

3.1 Topography

The Project Area consists of a gently rolling to level area at approximately 200 feet above mean sea level and slopes down to the floor of the existing mine (western boundary of the expansion) and Sequalitchew Creek (southern boundary of the expansion). Small glacial kettles (topographic closed depressions associated with melting of glacial ice remnants during the most recent glacial retreat) are present near the site, including a kettle wetland within the Expansion Area, discussed in Section 3.1, Wetlands Assessment.

The slope grades west of the Project Area vary between 10% and 70%. The ravine that includes Sequalitchew Creek is located south and southwest of the Project Area; this ravine forms most of the southern boundary of the existing mine and the western portion of the Expansion Area. The ravine deepens as it approaches Puget Sound, to a maximum depth of 175 feet below the plateau elevation. Slopes along the northern side of the Sequalitchew Creek ravine range from approximately 30% to 75%. A narrow-gauge railroad, associated with the former E.I. DuPont de Nemours Company Munitions facility, was constructed on a bench cut in the northern slope of the ravine; it has since been converted to a public trail. The BNSF Railway right-of-way extends along the shoreline berm between the property and Puget Sound.

3.2 Soils

The surficial geology in the Project Area consist of various geologic units deposited before, during, and after the Vashon glaciation of the Puget Sound Lowland. The youngest deposits include the Steilacoom Gravel, sometimes locally referred to as the DuPont Delta. These gravels occur primarily to the west of the proposed Project, in the area of the current mining operation, where they are hundreds of feet thick and unsaturated to near sea level. In the Project Area , these outwash deposits occur as a veneer over a sequence of Vashon Drift, which primarily comprises sand and gravel, but which has been regionally characterized as a sequence of recessional outwash, till, and advance outwash. The Vashon Drift includes the shallow-most aquifer in the Project study area.

The Vashon Drift is underlain by pre-Vashon, non-glacial deposits, referred to as Olympia Beds. These deposits are dense, glacially overridden, and predominantly fine-grained, silty sands and sandy silts. These non-glacial sediments (as evidenced by organics and wood fragments) were deposited in lowland river, floodplain, lake, and bog environments similar to those found in the larger river valleys in the modern Puget Lowland. These deposits mark the bottom of the Vashon aquifer and the bottom of the sand and gravel being considered for mining.

The soils in the project area are typically a well-drained, sandy, gravelly loam. The NRCS has mapped three soil series in the Project Area (Figure 3). These are: Alderwood which is derived from glacial till,

Spanaway which is derived from glacial outwash deposits and Pits. Pits signifies mining of some sort and is associated sand and gravel extraction that occurred before the Pioneer Aggregates Mine was established.

3.3 Vegetation

The site currently comprises primarily second-growth coniferous forest (Douglas fir [*Pseudotsuga menziesii]*, dominant), with areas of shrublands (Scot's broom [*Cytisus scoparius*], dominant). Vegetation in the Kettle Wetland contains Palustrine emergent and Palustrine scrub-shrub systems, described in more detail in Section 4.1, Wetlands Assessment.

3.4 Zoning

The Project Area is within the City Comprehensive Plan's designated Mineral Resources Overlay. The City of Dupont Comprehensive Plan Land Use Goals and Policies (LU-3.5) state that "the Mineral Resource Overlay designation shall be enforced and recognized for a length of time corresponding to the completion of excavation and reclamation within the designated area" (City of DuPont 2015). Mining within the Mineral Resource Overlay is a permitted use (DMC 25.60.020(1)).

Following the completion of mining and excavation, The Project Area would be developed in a manner consistent with underlying City zoning designations in accordance with DuPont Comprehensive Plan (2015), Land Use Policy LU-10.4. The southern portion (approximately 164 acres) is designated for Manufacturing and Research use; and the northern portion (approximately 36 acres), located within the future Sequalitchew Village, is designated R-4 Residential (approximately 14 acres) and Residential Reserve (approximately 22 acres). The northern portion of the city is zoned primarily for Industrial and Manufacturing/Research Park, with some Residential and Residential Reserve in and adjacent to Sequalitchew Village, and Military in the northeast corner of the city.

3.5 Currently Permitted Mining Activity

CalPortland's original sand and gravel mine was permitted in 1997 (355 acres), and the North Parcel Expansion (142 acres) was permitted in 2014.

4 Critical Areas Assessment

This section describes critical areas as defined under the City's critical areas regulations (Chapter 25.105 DMC), including Wetlands, Fish and Wildlife Conservation Areas, and Geologically Hazardous Areas.

4.1 Wetlands Assessment

Wetlands are protected under DMC 25.105.050.1. One kettle wetland, located within the Project Area, is expected to be directly impacted by the proposed sand and gravel mine operations. The Kettle Wetland Delineation Report (Appendix A includes a summary of data collected at each sampling plot during the wetland delineation, wetland delineation field data forms, and the 2014 Ecology Wetland Rating Forms. This section also provides an assessment of wetland functions and impacts.

4.1.1 Wetland Delineation

The wetland delineation was initially conducted on July 31 and August 9, 2007, by Anchor Environmental, L.L.C. staff, and the Kettle Wetland delineation was confrimed on December 6, 2017, due to the length of time that transpired since the original delineation occurred. During this later delineation, the Kettle Wetland was rated under Ecology's Washington State Wetland Rating System – Western Washington: 2014 Update (Hruby 2014) and the 2018 DMC Sensitive Areas Regulations (City of DuPont 2018). On April 17, 2019, the U.S. Army Corps of Engineers issued a determination that the Kettle Wetland is not a water of the United States (USACE 2018), and therefore is not subject to federal regulations.

The Kettle Wetland is a 1.78-acre wetland located southwest of the existing processing plant and within the Expansion Area. This wetland is classified as a Class II wetland by City of DuPont regulations and a Category III wetland using the Ecology rating system. Water levels within the wetland are determined by the seasonal fluctuation in the elevation of the Vashon aquifer, which is the dominant source of hydrology for the wetland. The Kettle Wetland is more than 1/2 mile from a Water of the United states and sits in a closed depression, with no surface water connection to the larger watershed, substantially limiting the wetland's opportunity to provide hydrologic or water quality function.

The Kettle Wetland has unique soils due to its formation process during glacial retreat, in which the stagnant melting ice sheet left large blocks of stranded glacial ice, called "dead ice." Glacial meltwater would often flow around these stagnant ice blocks, depositing its river-borne sediment. When the ice blocks later melted, kettles were formed where sediment had been deposited adjacent to the ice blocks. The ice-contact sediment is typically an unstratified silt, sand, and gravel, with much lower permeability than the adjacent outwash. An ablation till can also be formed in kettles when stagnant ice evaporates, leaving the glacial fines once contained in the ice as a low permeability

deposit. In the Kettle Wetland, peat is present above silty clay ranging from 14 to greater than 20 inches in thickness (Anchor Environmental 2007). Finer-grained ablation till "dead ice" deposits were encountered beneath peat in nearby marshes and are present in the peat (Walsh et al. 2003), which appear to be similar to the lower permeability silty clay layer.

The Kettle Wetland contains persistent and non-persistent emergent and scrub-shrub vegetation communities. The depth of water in the Kettle Wetland fluctuates seasonally, from 0 to 2 feet during the summer to 4 to 6 feet during the winter (CH2M Hill 2001). In the central portion of the wetland, emergent plants are present where the water is deepest. Common emergent species include common mare's tail (*Hippuris vulgaris*), creeping spike rush (*Eleocharis palustris*), giant bur-reed (*Sparganium eurycarpum*), water parsnip (*Sium suave*), reed canarygrass (*Phalaris arundinacea*), water ladysthumb (*Polygonum amphibium*), mild waterpepper (*Polygonum hydropiperoides*), skunk cabbage (*Lysichiton americanus*), inflated sedge (*Carex vesicaria*), and northern bugleweed (*Lycopus uniflorus*). Less frequent aquatic species identified include pondweed (*Potamogeton* sp.) and lesser duckweed (*Lemna minor*).

Ground elevations rise near the wetland boundary, which contains scrub-shrub species, including several species of willow (*Salix lucida, S. scouleriana, S. sitchensis*), red-osier dogwood (*Cornus sericea*), and Douglas spirea (*Spiraea douglasii*). Other vegetation along the wetland boundary consists of stinging nettle (*Urtica dioica*), blue elderberry (*Sambucus caerulea*), beaked hazelnut (*Corylus cornuta*), and Henderson sedge (*Carex hendersonii*).

The buffer of the Kettle Wetland is second-growth coniferous forest, with a canopy dominated by Douglas fir that evenly slopes up from the wetland boundary. Other dominant tree species in the wetland buffer include big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), and Pacific madrone (*Arbutus menziesii*). Dominant shrub species around the Kettle Wetland include trailing blackberry (*Rubus ursinus*), salal (*Gaultheria shallon*), snowberry (*Symphoricarpos albus*), Scot's broom, Oregon grape (*Mahonia nervosa*), bald-hip rose (*Rosa gymnocarpa*), oceanspray (*Holodiscus discolor*), sword fern (*Polystichum munitum*), saskatoon (*Amelanchier alnifolia*), red huckleberry (*Vaccinium parvifolium*), and bracken fern (*Pteridium aquilinum*). Herbaceous species include velvet-grass (*Holcus lanatus*), western wild-rye (*Elymus glaucus*), and colonial bent-grass (*Agrostis capillaris*). Vine species include manroot (*Marah oreganus*). The vegetated area around the Kettle Wetland ranges from 215 to more than 300 feet wide.

4.1.2 Wetland Classification and Rating

Under Ecology's 2014 wetland rating system, the Kettle Wetland meets the criteria of Category III wetland, compared to a Category II wetland under Ecology's 2004 wetland rating system (Hruby 2014; Ecology 2004). This rating difference between the 2004 and the 2014 wetland rating systems is

due to the 2014 rating method placing more emphasis on potential pollutants discharging into a wetland, the characteristics of aquatic resources downstream of a wetland, and the presence of aquatic resources with flooding problems downstream of the wetland. The Kettle Wetland received lower scores for these attributes, which contributed to the Category III wetland rating.

Under the City's updated critical areas regulations adopted in 2018 the Ecology's 2014 rating system is used.,. Under the regulations adopted in 2018, the Kettle Wetland meets the criteria of a Class III wetland.

4.1.3 Wetland Functional Assessment

Water quality and hydrologic function potential for the Kettle Wetland are rated high for removal of sediments, nutrients, and toxics, and reduction in peak flows and downstream erosion. Potential for the wetland to provide these functions is moderate because of the small drainage area and minimal upgradient disturbance. Water quality and hydrologic improvement functions are rated low because the wetland does not have surface water connections to downstream aquatic resources.

The wetland has moderate potential habitat functions, based on the plant communities and species variation, the variety of hydroperiods provided, and the habitat features present. The wetland has a low landscape potential due to the land use activities in the vicinity. The wetland has a high habitat value because the wetland is identified by WDFW as providing habitat for WDFW priority species (native bats). The 2014 Ecology wetland rating forms are included in Appendix A.

4.1.4 Wetland Impact Assessment

Under the proposed Project, mining within the Mineral Resource Overlay would result in permanent impacts to the isolated Kettle Wetland and its buffer as a result of earthwork mining activities: the entire wetland would be excavated. The area of wetland disturbance is 1.78 acres, and the total buffer area of disturbance is 3.4 acres. Alteration of a Class II wetland, such as the Kettle Wetland, is allowed if requirements for wetland mitigation can be met (DMC 25.105.050(1)(c)(vi)).

4.1.5 Wetland Mitigation

Alternatives to mitigate wetland impacts would be evaluated as part of a Supplemental Environmental Impact Statement for the Project. All impacts would be mitigated in accordance with the standards set forth in DMC 25.105.050(1)(d).

4.2 Fish and Wildlife Conservation Areas

Fish and Wildlife Conservation Areas (FWCAs) were identified in the Project Area based on the following definitions in DMC 25.105.030.140:

> *(a) Areas with which state or federally designated endangered, threatened, and sensitive species have a primary association. Federally designated endangered and threatened species are those fish and wildlife species identified by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that are in danger of extinction or threatened to become endangered. State designated endangered, threatened, and sensitive species are those fish and wildlife species native to the state of Washington identified by the Department of Fish and Wildlife;*
>
> *(b) Lands and waters containing documented habitats for plant and animal species listed in the Washington Department of Fish and Wildlife's Priority Habitats and Species Program List. Habitats and species of local significance may be added by action of the city council where the value and significance of such species locally can be established and sound scientific evidence can be presented to establish that the species' existence is determined to be locally significant;*
>
> *(c) Public and private tidelands or bedlands are regulated under the City of DuPont 2013 Shoreline Master Program (SMP), as amended;*
>
> *(d) Streams and waters of the state (see WAC 190-080(5)(a)(vi)) that provide habitat to endangered or threatened species, or certain species that have been identified as being sensitive to habitat manipulation, as defined in WAC 222-16-030, Forest Practices Rules and Regulations; lakes, ponds and streams planted with game fish, including those planted under the auspices of a federal, state, local or tribal program; and waters which support priority fish species as identified by the Department of Fish and Wildlife.*

The evaluation used the following data to determine fish and wildlife distribution in the Expansion Area:

- StreamNet fish distribution data
- WDFW's Salmon Recovery maps and the PHS database
- USFWS's Listed and Proposed Endangered and Threatened Species and Critical Habitat, Candidate Species, and Species of Concern in Pierce County
- USFWS's Information for Planning and Consultation

4.2.1 Conservation Areas Assessment

The project has been designed to avoid impacts to fish and wildlife areas and in the case of the Kettle wetland mitigate for any unavoidable impacts. The following assessment is organized using the definition of FWCAs in DMC 25.105.030.140.

(a) No evidence of any federally designated endangered, threatened, and sensitive species has been identified in or near the Expansion Area. The habitat is not well suited to any of the federally designated endangered, threatened, and sensitive species that are potentially present in the area.

(b) PHS mapping of the site identifies the Expansion Area as containing habitat suitable for big brown bats (Eptesicus fuscus), and little brown bats (Myotis lucifugus), and Yuma myotis bats (Myotis yumanensis), which may breed in the area.

(c) The expansion area is wholly outside of Shoreline Management Act Jurisdiction

(d) The Kettle wetland is the only water of the state within the Expansion Area. Impacts to habitat, hydrology and water quality will be fully mitigated. A wetland mitigation plan has been prepared for the project. (see section 4.1)

Approximately 160 acres of the 188-acre Expansion Area have second-growth conifer forestlands, with Douglas fir dominating. A 13-acre prairie-like habitat was described in the 1992 Draft Environmental Impact Statement, but Scot's broom has since colonized this area. In 2019 and 2020, a landmark tree survey was conducted by qualified biologists from Anchor QEA. No threatened or endangered plant species were encountered during the 5 days of field survey. Fish and Wildlife Habitat

The WDFW PHS also identifies The Project Area as containing habitat suitable for big brown bats (*Eptesicus fuscus*), little brown bats (*Myotis lucifugus*), and Yuma myotis bats (*Myotis yumanensis*), which may breed in the area. The Project Area also contains a variety of vegetation communities associated with wetland and upland habitats that support a variety of bird, amphibian, reptile, insect, and small and large mammal species to breed, forage, and rest.

4.2.2 Conservation Areas Impact

The primary project impact on habitat conservation areas is the direct loss of potential bat habitat on the slopes surrounding the Kettle Wetland. Clearing and grading associated with the Project would include these areas and result in a loss of this habitat.

4.2.3 Mitigation Measures

Impacts to wildlife and wildlife habitat would be mitigated by on-site restoration activities. All wetland functions and values will be mitigated for with the construction of an on-site mitigation wetland. For bat conservation, forestland management outside of the active mine area will include the retention of dead and dying trees and trees with basal hollows, which can provide adequate roosting habitat for bats. Reclamation of the slopes of the mine will create over 100 times more area with the habitat characteristics (steep forested slopes) used by the three bat species likely to use the site. This reclamation work is already underway and will continue until most of the mine slopes are reforested (a small portion will be developed as roads, etc.). In the near term, bats in the area have access to large amounts of nearby habitat along the forested bluffs above Puget Sound and Sequalitchew Creek.

4.3 Geologically Hazardous Areas Assessment

This section assesses the potential effects of the Project on geologically hazardous areas completed by Aspect Consulting, LLC (Aspect). Definitions of the geologically hazardous areas are provided below, followed by an assessment of the existing site conditions, conditions anticipated as a result of the Project, and recommendations for hazard mitigation.

4.3.1 DuPont Municipal Code Geologically Hazardous Areas Definitions

The Project Area and surrounding areas contain Geologically Hazardous Areas (GHAs) as regulated under DMC 25.105.050(3)(a). Geologically Hazardous Areas are defined in DMC 25.105.030 as including the following:

- Landslide Hazard Areas
- Steep Slopes
- Erosion Hazard Areas
- Seismic Hazard Areas

The DMC defines Landslide Hazard Areas, Steep Slopes, Erosion Hazard Areas, and Seismic Hazard Areas with several criteria:

> ***Landslide Hazard Areas –*** *Landslide hazard areas shall include areas potentially susceptible to landslides based on a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible to mass movement due to any combination of bedrock, soil, slope (gradient), slope aspect, slope form (concave, convex, planar), geological structure, surface and subsurface hydrology, or other factors. Landslide hazard areas shall also include areas along which landslide material may be routed or which may be subject to deposition of landslide delivered material. Landslide hazard areas include but are not limited to the following areas:*
>
> *(A) Areas designated as quaternary slumps, earth-flows, mudflows, or landslides on maps published by the U.S. Geological Survey, Washington State Department of Natural Resources, or other reputable sources;*

(B) Areas with all three of the following characteristics:

(I) Slopes steeper than 15 percent;

(II) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

(III) Springs or ground water seepage.

(C) Areas that have shown movement and/or are underlain or covered by mass wastage debris;

(D) Potentially unstable slopes resulting from river or stream erosion or undercutting by wave erosion;

(E) Areas that show past sloughing or calving of sediment or rocks resulting in a steep slope that is poorly vegetated;

(F) Slopes that are parallel or sub-parallel to planes of weakness (which may include but not be limited to bedding planes, soft clay layers, joint systems, and fault planes) in subsurface materials;

(G) Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of competent bedrock or a properly engineered slope designed and approved by a geotechnical engineer licensed in the state of Washington and experienced with the site;

(H) Areas within which land use activities could affect the slope stability, including but not limited to areas with subsurface hydrologic flow, ground water recharge areas and surface water flow; and

(I) Areas of historical landslide movement including coastal shoreline areas mapped by the Department of Ecology Coastal Zone Atlas or the Department of Natural Resources slope stability mapping as unstable ("U" or class 3), unstable old slides ("UOS" or class 4), or unstable recent slides ("URS" or class 5).

Steep Slope – *As used in this chapter means a geologically hazardous area exhibiting all three of the following characteristics:*

(A) Slopes steeper than 15 percent;

(B) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

(C) Springs or ground water seepage.

Erosion Hazard Areas – *Erosion hazard areas shall include:*

(A) Channel migration zones, also known as riverine erosion areas, are defined as the areas along a river or stream within which the channel(s) can be reasonably predicted to migrate over time. This is a result of natural and normally occurring geomorphic, hydrological, and related processes when considered with the characteristics of the river or stream and its surroundings, and in consideration of river and stream management plans. Channel

migration hazard areas shall include: potential channel migration, channel avulsion, bank erosion, and stability of slopes along the river or stream;

(B) Coastal erosion areas that are subject to shoreline retreat from wind, wave, and tidal erosion.

Seismic Hazard Areas – *Includes areas subject to severe risk of damage because of seismic induced ground shaking, slope failure, settlement, soil liquefaction or surface faulting. Ground shaking is a primary risk, followed by slope failure. Soils on slopes greater than 40 percent that are expected to be seasonally or perpetually saturated pose a specific risk of settlement, movement, or liquefaction. When saturated, these soils tend to be cohesionless and are unsuitable for foundations.*

This assessment will evaluate the Project with respect to the criteria defined above.

4.3.2 Evaluation of Existing Conditions

This section assesses existing conditions in and around the Project Area. Mapping of GHAs was completed using publicly available Light Detection and Ranging (LiDAR) data and from a reconnaissance.

Existing conditions were reviewed within the South Parcel and in two adjacent areas with slopes greater than 15%: the existing mine west of the South Parcel, and Sequalitchew Creek ravine. These additional areas were reviewed to gain information regarding the stability of native soils and slopes. Descriptions are provided in the preceding Topography (3.1) and Soils (3.2) sections. These adjacent areas will not be modified or impacted by the Project, but were evaluated because their soils, geology, and other conditions are identical to those in the Project Area, and as such are a good predictor of the performance of the proposed conditions in the Project Area.

4.3.2.1 Expansion Area

Existing conditions within the Expansion Area do not meet the definition of GHAs. Topography within the Expansion Area is generally characterized by level ground or gentle slopes, typically inclined at gradients less than 15%. Aspect observed areas interpreted as old rail grade cut and fill slopes steeper than 40% that locally exceed more the 10 feet of vertical relief in the southeast portion of the South Parcel (Figure 4). However, these areas do not meet the City's definition of steep slopes because they do not intersect a geologic contact with relatively impermeable sediment or bedrock and do not have spring or groundwater seepage (DMC 25.105.030.345 and they should not be considered Landslide Hazard Areas as they are stable constructed slopes that have historically performed well.

4.3.2.2 Existing Mine

The areas north and west of the Expansion Area make up the active mine pit and processing area. On the west slope of the active pit, mining activity is substantially complete, and the slope has been

graded to its final configuration. The west slope is about 175 feet high and is smoothly graded at about 30% up to 50%, as shown in Figure 4. The subsurface soil[2] under the topsoil of the west slope is sand and gravel with a trace of fines. The slope has been planted with grasses and conifer trees.

The west slope of the Existing Mine is an engineered slope and thus is exempted from being a GHA (DMC 25.105.050 (3)(a)(i)(G)).

During the reconnaissance of the west slope on November 1, 2019, Aspect observed no indication of past or imminent slope failure, landsliding, or erosion. There are no concave or convex topographic features that would suggest slumping or calving, and there are no areas of exposed soil. The vegetation shows no evidence of disturbance from slope instability or erosion.

Aspect also observed a localized area of an older oversteepened mined slope west of the mining site on west-facing slopes upslope of the railroad corridor and Puget Sound. This area is outside of the mining limits and pre-dates CalPortland's activities by more than 100 years (Figure 4). The localized area includes slopes that are largely vegetated with conifer and deciduous trees with some back-tilted trees and locally exposed soils on slopes typically steeper than 65%.

4.3.2.3 Sequalitchew Creek Ravine

The Sequalitchew Creek ravine lies along the southern boundary of the active mine and the Expansion Area and runs westward for about 1.5 miles down to the creek confluence with Puget Sound. A small portion of the Sequalitchew Creek ravine is located within the South Parcel property boundary, but outside the proposed Expansion Area. The majority of the Sequalitchew Creek ravine is outside of the South Parcel. The slopes on the northern side of the ravine range from approximately 30% to 75%.

4.3.2.4 Summary of Existing Conditions

Existing conditions within the Expansion Area do not meet criteria for any of the four types of Geologically Hazardous Areas identified in the City's critical area regulations (landslide hazard areas, steep slopes, erosion hazard areas, and seismic hazard areas). There are no indications of landsliding, slope movement, erosion or with regard to seismic hazards, areas of settlement, movement, or liquefaction.

[2] No subsurface explorations were completed for this report. Descriptions of the subsurface in this section are based on logs of subsurface explorations from previous reports.

4.3.3 Geologically Hazardous Areas Mitigation Measures

GHAs are not present within the Expansion Project Area, but are present nearby in the Sequalitchew Creek ravine. The hazard mitigation recommendations listed below are intended to protect GHAs located outside of, but nearby, the Project Area.

- Maintain the 100-foot setback from the top of slopes greater than 40% within the Sequalitchew Creek ravine, consistent with the conditions for the existing mine and the 1994 and 2012 settlement agreements.
- Erosion control measures and setbacks from GHAs, and other critical areas should comply with the City of DuPont's Comprehensive Plan and applicable development regulations.

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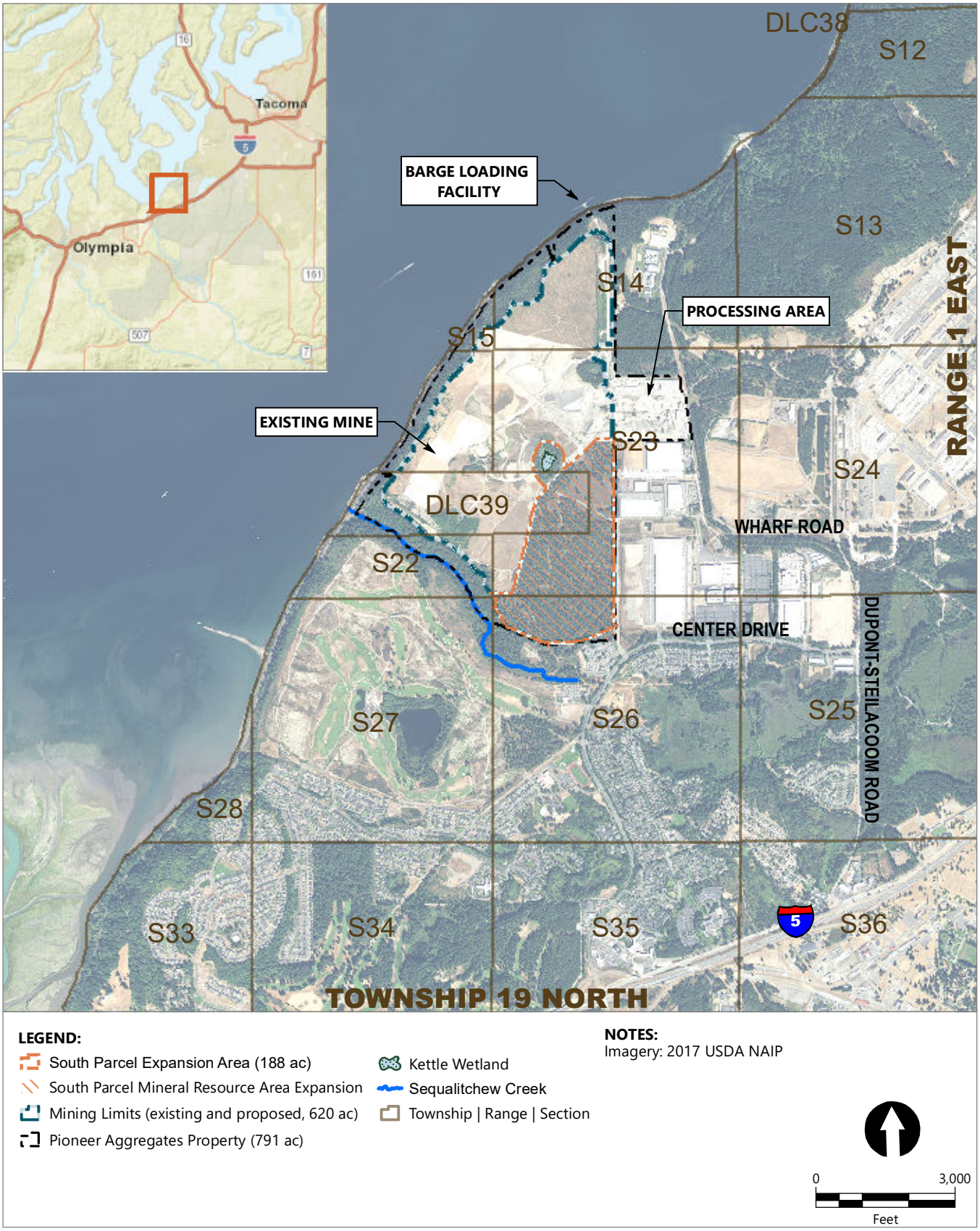
Figures

Appendix A
North Sequalitchew Creek Project Impact Area Wetland Delineation Report



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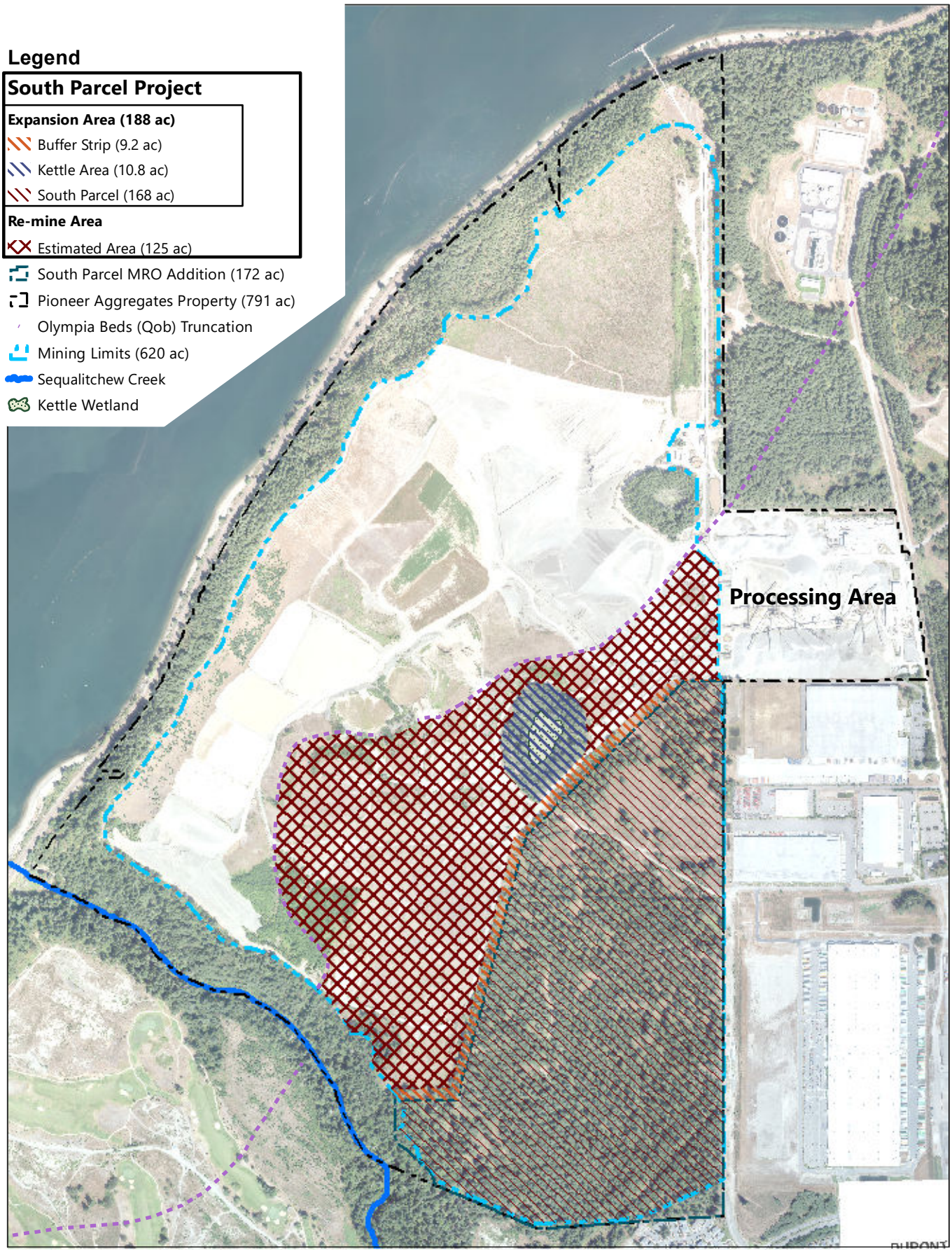
ANCHOR QEA

Figure 1
Vicinity Map
Project Description
Pioneer Aggregates South Parcel Project



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ANCHOR QEA

Figure 2
Site Map
Project Description
Pioneer Aggregates South Parcel Project

Appendix B
Addendum to 2007 North Sequalitchew Creek Project Impact Area Wetland Delineation Report

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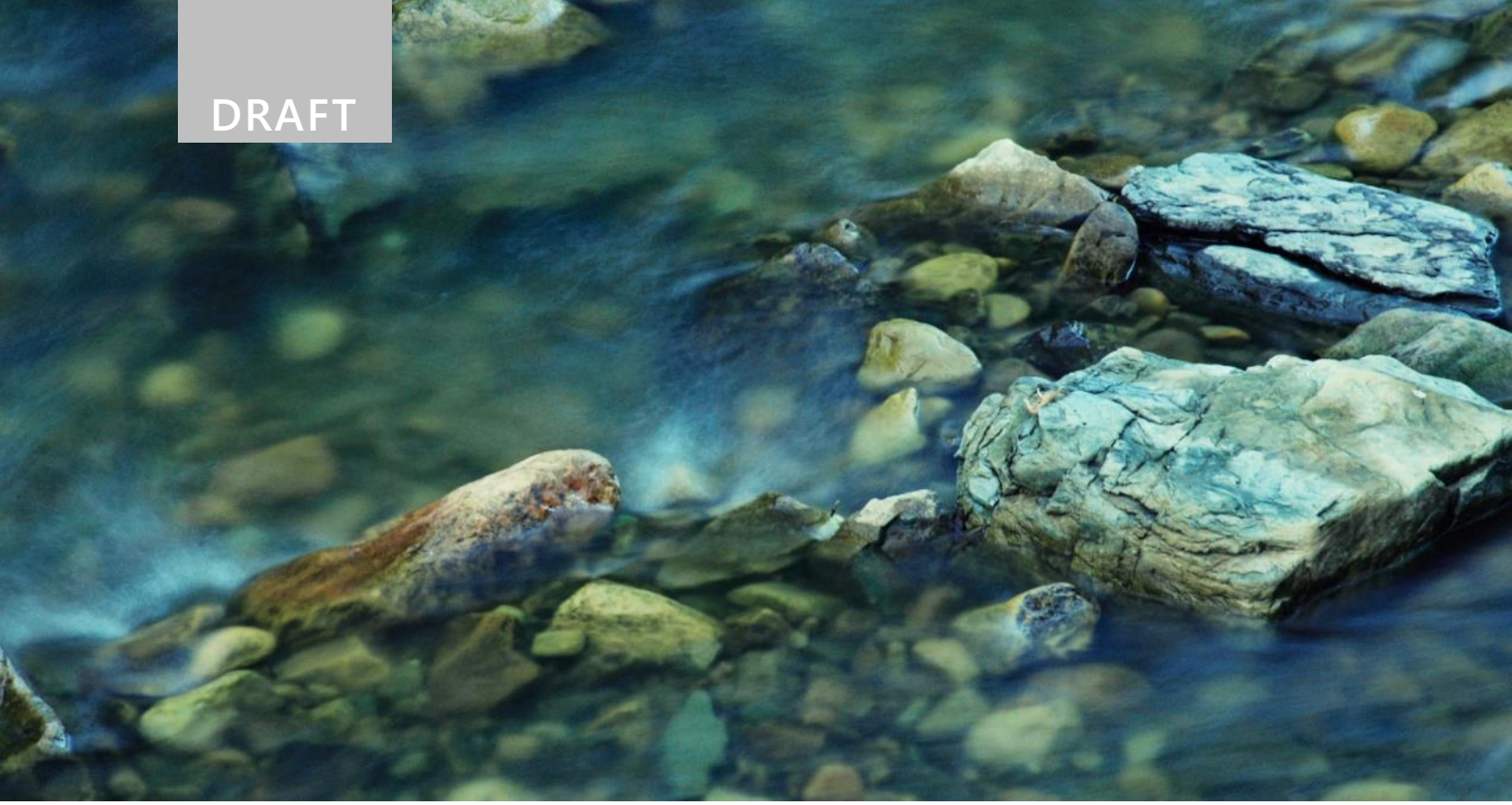

December 2020
Pioneer Aggregates Mine Expansion (South Parcel)

ANCHOR QEA

Kettle Wetland Delineation Report

Prepared for CalPortland

DRAFT

December 2020
Pioneer Aggregates Mine Expansion (South Parcel)

Kettle Wetland Delineation Report

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ABBREVIATIONS

DMC	City of DuPont Municipal Code
Ecology	Washington State Department of Ecology
FAC	facultative
FACW	facultative wetland
HGM	Hydrogeomorphic
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	obligate wetland
PEM	palustrine emergent
PHS	Priority Habitats and Species
PSS	palustrine scrub-shrub
Report	*Kettle Wetland Delineation Report*
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1 Introduction

This *Kettle Wetland Delineation Report* (Report) provides the wetland delineation results for the Kettle Wetland located in DuPont, Washington (Township 19 North, Range 1 East, Section 23). This Report has been prepared to compile the information from previous Kettle Wetland delineation reports into one cohesive document. Information in this Report is based on the Kettle Wetland delineation results presented in the *North Sequalitchew Creek Project Impact Area Wetland Delineation Report* (Anchor Environmental 2007) and the *Addendum to the 2007 North Sequalitchew Creek Project Impact Area Wetland Delineation Report* (Anchor QEA 2018).

The initial Kettle Wetland delineation was performed by Anchor Environmental wetland scientists on July 31 and August 9, 2007 (Anchor Environmental 2007). On December 6, 2017, Anchor QEA wetland scientists performed a wetland boundary verification site visit (Anchor QEA 2018). On October 22 and December 5, 2019, Anchor QEA wetland scientists performed site visits verifying that the Kettle Wetland boundary and wetland features were consistent with the 2007 and 2017 reports (Anchor QEA 2019). A vicinity map showing the Kettle Wetland in relationship to the existing DuPont Aggregates mine and South Parcel Expansion is presented as Figure 1. An aerial photograph of the Kettle Wetland showing the mapped soils, wetland data plot locations, and wetland boundary flag locations is shown as Figure 2.

Section 2 of this Report describes the wetland delineation and verification methods, and Section 3 describes the findings of the wetland delineation and verification. Wetland field data forms are included in Appendix A. The Washington State Department of Ecology (Ecology) wetland rating forms are included in Appendix B.

1.1 Review of Existing Information

As part of the Kettle Wetland delineation analysis, Anchor Environmental and Anchor QEA wetland scientists reviewed the following sources of information to support the 2007 and 2017 field observations and preparation of this Report:

- Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2007, 2017, 2020)
- U.S. Fish and Wildlife Service (USFWS) Wetlands Mapper for National Wetlands Inventory (NWI) map information (USFWS 2017, 2020)
- DuPont City Code (City of DuPont 2007, 2017, 2020)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) maps (WDFW 2017, 2020)
- Aerial photographs, Google Earth, December 2020

2 Methods

This section describes the methodology used to perform the 2007 wetland delineation and the 2017 and 2019 wetland verification site visits and field investigation procedures. These methods are consistent with current federal and state agency requirements, as well as local (City of DuPont) jurisdiction requirements, for performing wetland delineations and identifying protective wetland buffer widths.

2.1 Data Collection

As specified by the City of DuPont Municipal Code (DMC; City of DuPont 2007, 2017, 2020), in 2007, 2017, and 2019 the Kettle Wetland boundary was identified, delineated, and verified according to the methods defined in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and Ecology's *Washington State Wetland Identification and Delineation Manual* (Ecology 1997). Soil colors were classified by their numerical description, as identified on a Munsell Soil Color Chart (Munsell 1994). In 2017 and 2019 the wetland boundary was also identified and verified according to the methods defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (USACE 2010).

The U.S. Army Corps of Engineers (USACE; Environmental Laboratory 1987) defines wetlands as "those areas that are inundated or saturated by surface or groundwater 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." The method for delineating wetlands is based on the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. Hydrophytic vegetation is "the macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present." Hydric soils are "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Wetland hydrology "encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season" (Ecology 1997). Data collection methods for each of these parameters are described in the following subsections.

In 2007, a total of six data plots were sampled and recorded (Anchor Environmental 2007). Vegetation, soils, and hydrology information was collected at each of the plots and recorded on field datasheets (Appendix A). The Kettle Wetland boundary was determined based on plot data and visual observations of the wetland. The Kettle Wetland boundary and data plot locations were flagged and surveyed.

In 2017, vegetation, soil, and hydrology information was collected at sample plots in locations similar to the previous 2007 delineation plots (Anchor QEA 2018). In addition, the boundary of the Kettle Wetland was walked with a handheld Trimble GPS that contained the mapped 2007 wetland delineation boundary for comparison with the 2017 site conditions. The wetland boundary observed during the 2017 investigation was nearly identical to the 2007 delineation boundary; therefore, no additional flagging or survey of the wetland boundary was performed in 2017.

In 2019, the boundary of the Kettle Wetland was walked for comparison with the 2007 and 2017 site conditions (Anchor QEA 2019). Again, no discernable change in the wetland boundary was observed; therefore, no additional flagging or survey of the wetland boundary was performed in 2019.

2.1.1 Vegetation

Plant species occurring in each plot were recorded on field data forms, with one data form per plot (Appendix A). Percent cover for each plant species was estimated in the plot, and dominant plant species were identified. At each plot, trees within a 30-foot radius, shrubs within a 15-foot radius, and emergents within a 3-foot radius from the center of the plot were identified and recorded. A plant indicator status, designated by USFWS (Reed 1988, 1993), was assigned to each species, and a determination was made as to whether the vegetation in the plot was hydrophytic. To meet the hydrophytic parameter, more than 50% of the dominant species, with 20% or greater cover, must have an indicator of obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC). Table 1 provides the wetland indicator status categories.

Table 1
Wetland Plant Indicator Definitions

Indicator Status	Description
Obligate Wetland (OBL)	Plant species occur almost always in wetlands (estimated probability greater than 99%) under natural conditions.
Facultative Wetland (FACW)	Plant species usually occur in wetlands (estimated probability 67% to 99%) but are occasionally found in non-wetlands.
Facultative (FAC)	Plant species are equally likely to occur in wetlands or non-wetlands (estimated probability 34% to 66%).
Facultative Upland (FACU)	Plant species usually occur in non-wetlands (estimated probability 67% to 99%) but are occasionally found in wetlands.
Obligate Upland (UPL)	Plant species occur almost always in non-wetlands (estimated probability greater than 99%) under natural conditions.

2.1.2 Soils

Soils were sampled in each plot and evaluated for hydric soil indicators. Soil pits were dug to a depth of 18 inches, unless prevented by impenetrable substrate. Hydric soil indicators include low soil

matrix chroma, gleying, and redoximorphic (or "redox") features. Redox features are spots of contrasting color that occur within the soil matrix (the predominant soil color). Gleyed soils are predominantly bluish, greenish, or grayish in color. Soils having a chroma of 2 or less are positive indicators of hydric soils (Environmental Laboratory 1987; USACE 2010).

2.1.3 Hydrology

Wetland hydrology was evaluated at each plot to determine whether it "encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season" (Ecology 1997). Field observations of saturation, inundation, and other indicators of wetland hydrology, such as water-stained leaves and drainage patterns in wetlands, were recorded.

2.2 Wetland Classifications

Wetland community types are discussed according to the USFWS classification developed by Cowardin et al. (1979) for use in the NWI. This system, published in 1979 by a team of USFWS scientists led by L.M. Cowardin, bases the classification of wetlands on their physical characteristics, such as the general type of vegetation in the wetland (e.g., trees, shrubs, grass) and how much, and where, water is present in the wetland. The Cowardin system provides a classification for every known wetland type that occurs throughout the United States and, under this system, a wetland can be classified as having one or more wetland classification types. The Kettle Wetland contained the following Cowardin community types:

- **Palustrine scrub-shrub (PSS):** These wetlands have at least 30% cover of woody vegetation that is less than 20 feet high.
- **Palustrine emergent (PEM):** These wetlands have erect, rooted, herbaceous vegetation present for most of the growing season in most years.

2.3 State Hydrogeomorphic Classification System

Scientists have come to understand that wetlands can perform functions in different ways. The way a wetland functions depends to a large degree on hydrologic and geomorphic conditions. To recognize these differences among wetlands, a way to group or classify them has been developed. This classification system, called the Hydrogeomorphic (HGM) Classification, groups wetlands into categories based on the geomorphic and hydrologic characteristics that control many functions.

The *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) incorporates the HGM Classification system as part of the questionnaire for characterizing a wetland's functions. The rating system uses only the highest grouping in the classification, i.e., wetland class. Wetland classes are based on geomorphic settings, such as Riverine, Slope, Lake-fringe, or Depressional. A classification key is provided within the rating form to help identify

which of the following HGM Classifications apply to the wetland: Riverine; Depressional; Slope; Lake-fringe; Tidal Fringe; or Flats.

2.4 Other Data Sources

Existing information was referenced to identify potential wetlands or site characteristics indicative of wetlands. The sources of reference information that supported field observations are identified in Section 1.1, Review of Existing Information.

2.5 Wetland Ratings

In 2007, wetland ratings were determined using the most current version of Ecology guidance in *Washington State Wetland Rating System for Western Washington: Revised* (Ecology 2004) and *Wetland Rating Form – Western Washington, Version 2* (Ecology 2006) and according to the City of DuPont wetland rating criteria, as defined in the DMC (City of DuPont 2007).

For the 2017 verification, wetland ratings were determined using the most current version of Ecology guidance in the *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) and according to the DMC (City of DuPont 2017). The DMC has been updated since the 2017 wetland verification was performed. The Kettle Wetland rating under the current DMC (City of DuPont 2020) has been identified in this Report.

The rating system developed by Ecology is used to differentiate wetlands based on their sensitivity to disturbance, their significance in the watershed, their rarity, ability to be replaced, and the beneficial functions they provide to society. The Ecology rating system requires the user to collect specific information about the wetland in a step-by-step process. Three major functions are analyzed (water quality improvement, hydrologic functions, and habitat). Ratings are based on a point system, where points are given if a wetland meets specific criteria related to the wetland's potential and the opportunity to provide certain benefits.

Per Ecology's rating system, wetlands are categorized according to the following criteria and to points given:

- **Category I wetlands (23 or more points)** represent a unique or rare wetland type, are more sensitive to disturbance, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.
- **Category II wetlands (20 to 22 points)** are difficult, though not impossible, to replace, and provide high levels of some functions.
- **Category III wetlands (16 to 19 points)** have moderate levels of functions. They have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

- **Category IV wetlands (less than 16 points)** have the lowest levels of functions and are often heavily disturbed.

The current DMC classifies wetlands into four categories (Categories I, II, III, and IV) based on the updated 2014 Ecology Wetland Rating System for Western Washington (City of DuPont 2020).

2.6 Wetland Functional Assessment

During the 2017 wetland verification, the functional values of wetlands were rated according to *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014). Using Ecology's system, wetlands were rated based on a point system where points were awarded to three functional value categories (water quality improvement, hydrologic functions, and habitat). Detailed scoring, based on Ecology wetland rating forms, is provided in Appendix B.

3 Wetland Delineation Results

This section describes the wetland delineation results of the 2007 wetland delineation (Anchor Environmental 2007) and 2017 (Anchor QEA 2018) and 2019 (Anchor QEA 2019) wetland verification site visits. Overall, no discernable changes in the Kettle Wetland vegetation, soils, or hydrologic characteristics or the wetland boundary or were observed across the various investigations.

3.1 Kettle Wetland

The Kettle Wetland is a 1.78-acre enclosed, depressional HGM class wetland dominated by a PEM vegetation class with a PSS vegetation class along the wetland boundary. Forty-eight flags were used to identify the Kettle Wetland boundary in 2007. The Kettle Wetland boundary was confirmed to be unchanged during the 2017 and 2019 investigations. The Kettle Wetland is identified on the USFWS Wetlands Mapper for NWI Map Information (USFWS 2007, 2017, 2020) and WDFW PHS maps (WDFW 2017, 2020). The boundary of the Kettle Wetland is shown in Figure 1 in relationship to other wetlands in the vicinity and in detail on Figure 2. The following subsections provide a description of the Kettle Wetland vegetation, soils, and hydrology.

3.1.1 Vegetation

Similar vegetation species were observed in the Kettle Wetland during the 2007, 2017, and 2019 investigations. The PEM communities consist of common mare's tail (*Hippuris vulgaris*), creeping spike rush (*Eleocharis palustris*), giant bur-reed (*Sparganium eurycarpum*), water parsnip (*Sium suave*), reed canarygrass (*Phalaris arundinacea*), water ladysthumb (*Polygonum amphibium*), mild waterpepper (*Polygonum hydropiperoides*), skunk cabbage (*Lysichiton americanus*), inflated sedge (*Carex vesicaria*), and northern bugleweed (*Lycopus uniflorus*). Aquatic species observed include pondweed (*Potamogeton* sp.) and lesser duckweed (*Lemna minor*).

Along the wetland boundary, the PSS community consists of Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), sitka willow (*Salix sitchensis*), red-osier dogwood (*Cornus sericea*), and hardhack (*Spiraea douglasii*). Other vegetation along the wetland boundary consists of stinging nettle (*Urtica dioica*), blue elderberry (*Sambucus caerulea*), beaked hazelnut (*Corylus cornuta*), and Henderson sedge (*Carex hendersonii*).

Kettle Wetland upland buffer vegetation includes tree, shrub, grass, and herbaceous species. Dominant tree species include big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), bitter cherry (*Prunus emarginata*), Douglas hawthorne (*Crataegus douglasii*), blue elderberry, and Pacific madrone (*Arbutus menziesii*). Dominant shrub species include trailing blackberry (*Rubus ursinus*), salal (*Gaultheria shallon*), snowberry (*Symphoricarpos albus*), Scot's broom (*Cytisus scoparius*), Oregon grape (*Mahonia*

nervosa), bald-hip rose (*Rosa gymnocarpa*), oceanspray (*Holodiscus discolor*), sword fern (*Polystichum munitum*), saskatoon (*Amelanchier alnifolia*), red huckleberry (*Vaccinium parvifolium*), and bracken fern (*Pteridium aquilinum*). Herbaceous species include velvet grass (*Holcus lanatus*), western wild-rye (*Elymus glaucus*), colonial bent-grass (*Agrostis capillaries*). Vine species include manroot (*Marah oreganus*). Data plot vegetation is presented in the field data forms in Appendix A.

3.1.2 Soils

Kettle wetlands were formed during glacial retreat, when the stagnant melting ice sheet left large blocks of stranded glacial ice called "dead ice." Glacial meltwater would often flow around these stagnant ice blocks, depositing sediment. When the ice blocks later melted, kettles were formed where sediment had been deposited adjacent to the ice blocks. The ice-contact sediment is typically an unstratified silt, sand, and gravel, much lower in permeability than the adjacent outwash. An ablation till can also be formed in kettles when stagnant ice evaporates, leaving the glacial fines once contained in the ice as a low-permeability deposit. Kettles generally are present in the area as closed topographic depressions, some of which are lakes, bogs, and marshes. Over time, peat, silt, and clay collect in these quiet waters, producing the peat and wetland deposits encountered near the ground surface in these low areas.

The NRCS has mapped one soil series in the location of the Kettle Wetland (USDA 2007, 2017, 2020), Spanaway gravelly sandy loam (0% to 6% slopes). These soils are glacial outwash. These soils are very steep and moderately well drained to somewhat excessively drained. Spanaway soils are not classified as hydric soils by the NRCS. Mapped soils are shown in Figure 2.

Kettle Wetland soil characteristics were the same during the 2007 and 2017 investigations. Soils consist of 16 to 20 inches of black peat above a layer of lower permeability silty clay. The peat contained low chroma (less than 1) with slightly decomposed wood fragments indicative of extended periods of inundation. Some areas beneath the peat also contained thin organic lenses within the silty clay layer. The silty clay layer appears to correspond to the "dead ice" phenomenon associated with the formation of kettle wetlands. Upland soils adjacent to the wetland boundary are composed of high chroma (greater than or equal to 2), dry, brown Spanaway gravelly sandy loam. The wetland boundary corresponded with a clear change in soils from gravelly sandy loam to peat. Data plot soils are presented in the field data forms in Appendix A.

3.1.3 Hydrology

The Kettle Wetland is located within the Chambers/Clover Basin Water Resource Inventory Area 12 (Ecology 2020) and the Sequalitchew Creek drainage basin, and it is hydrologically connected with the Vashon aquifer (CH2M Hill 2003a). There are no streams that drain into or out of the Kettle Wetland. The Kettle Wetland is more than 1/2 mile from a Water of the United States and has no surface water connection to any other waterbody. As an enclosed depression, precipitation falling

within the existing vegetated wetland buffer drains toward the Kettle Wetland. The PEM area is inundated for all or most of the year. Water levels in the Kettle Wetland fluctuate seasonally, from 1 to 2 feet during the summer, to 4 to 6 feet during the winter. The width of the open water component also varies seasonally from 50 feet during the summer to several hundred feet during the winter. Water levels in the wetland were monitored intermittently at a staff gauge installed in the wetland in 1999 (CH2M Hill 2003b). Water levels over the monitoring period ranged from a high of 6.22 feet in December 1999, to the soil surface (0.63 foot) in October 1999.

Similar Kettle Wetland hydrology characteristics were observed during the 2007, 2017, and 2019 investigations. Inundation of up to 3 feet was present throughout the central portion of the Kettle Wetland. Within the wetland near the edges, soil saturation ranged from near the surface to greater than 20 inches. However, several secondary indicators of wetland hydrology were observed in areas with peat soils where saturation was well below the surface, including sediment deposits, water marks, and the FAC neutral test. No saturation, standing water, or indications of wetland hydrology were observed in adjacent upland areas. Data plot hydrology is presented in the field data forms in Appendix A.

Data was collected at six data plots, K-1 through K-6 (Appendix A). Plots K-1, K-4, and K-5 contained indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. Plots K-2, K-3, and K-6 contained no hydric soil or wetland hydrology, although K-3 contained hydrophytic vegetation.

3.2 Regulatory Framework

Guidance from USFWS, Ecology, and the City of DuPont was used to determine the wetland classifications. Information and excerpts from the specific guidance language are provided in the following subsections.

3.2.1 USFWS Classification

The Kettle Wetland has been classified using the system developed by Cowardin et al. (1979) for use in the NWI. Table 2 lists the USFWS classifications for the Kettle Wetland and the connection to surface water.

Table 2
U.S. Fish and Wildlife Service Wetland Classifications

Wetland	USFWS Classification	Surface Water Connection
Kettle	PSS and PEM	None

3.2.2 Ecology Rating, Classification, and Functions and Values Scores

Per the current DMC (City of DuPont 2020), wetland ratings are determined using Ecology's *Washington State Wetlands Rating System – Western Washington: 2014 Update* (Hruby 2014). Under the 2014 Ecology wetland rating system, the Kettle Wetland is rated as Category III wetland. Table 3 lists the 2014 Ecology and local (City of DuPont) wetland rating and classification.

Table 3
Summary of Wetland Classes and Ratings Using Ecology 2014 Wetland Rating Systems

Wetland	Area (acres)	Hydrogeomorphic Classification	2014[1] State Rating (Ecology)	Local Rating (City of DuPont)[2]
Kettle	1.78	Depressional	III	III

Notes:

1. Hruby, T., 2014. *Washington State Wetlands Rating System for Western Washington: 2014 Update*. Publication No. 14-06-029. Olympia, WA: Washington State Department of Ecology.
2. City of DuPont, 2020. City of DuPont Municipal Code. Accessed December 8, 2020. Available at http://www.codepublishing.com/WA/DuPont/.

For the 2014 Ecology wetland rating system (Hruby 2014), a low, moderate, or high rating is based on three functions: 1) Water Quality Improvement; 2) Hydrologic; and 3) Habitat. Within each of these three functions are three sub-function categories: 1) Site Potential; 2) Landscape Potential; and 3) Value. Each of these sub-function categories is rated as low, moderate, or high. Wetland functional values and scores for the Kettle Wetland under the 2014 Ecology rating system are shown in Table 4. The 2014 Ecology wetland rating forms are provided in Appendix B.

Table 4
Summary of Functions and Values: 2014 Wetland Rating Scores

Wetland and Function	Water Quality Improvement	Hydrologic	Habitat	Total Functions Score[1]
Kettle Wetland				
Site Potential	High	High	High	
Landscape Potential	Moderate	Moderate	Low	
Value	Low	Low	High	
Score Based on Rating[1]	6	6	7	19

Notes:

1. Potential total score per function is 9, for a potential total score of 27.

3.3 Wetland Functional Assessment

The following subsections provide a description of the functions of the Kettle Wetland based on the 2014 Ecology wetland rating system.

3.3.1 Water Quality Improvement Functions

The Kettle Wetland has a high function score for the potential to improve water quality for removal of sediments, nutrients, and toxics, because it is a closed depression with no surface water outlet. The Kettle Wetland also has dense vegetation to trap sediments and pollutants, and the soil characteristics include organic material.

The Kettle Wetland has a moderate function score for the landscape potential to support water quality functions because of the potential of the surrounding land uses to generate pollutants and discharge stormwater to the wetland.

The Kettle Wetland has a low function score to provide water quality improvement valuable to society because it is not located in the vicinity of aquatic resources that are on the Ecology 303(d) list, and there is no surface flow from the wetland to other waterbodies.

3.3.2 Hydrologic Functions

The Kettle Wetland provides a high function score for potential to reduce flooding and erosion based on the absence of surface water outflows from the wetland, the depth of storage provided by the wetland during wet periods, and the contribution of the wetland to storage in the watershed.

The Kettle Wetland provides a moderate functions score for potential to support hydrologic functions based on the potential for surrounding land uses to generate pollutants and discharge stormwater to the wetland.

The Kettle Wetland has a low function score to provide hydrologic functions valuable to society because it is located in a landscape where it does not potentially flow downgradient into areas where flooding has damaged human or natural resources.

3.3.3 Habitat Functions

The Kettle Wetland has a high function score for the potential to provide habitat due to the vegetative structure (number of Cowardin [1979] vegetation classes), the number of water regimes or hydroperiods, the plant richness, the habitat diversity, and special habitat features present.

The Kettle Wetland has a low score for the landscape potential to support habitat functions because of the characteristics of disturbed and undisturbed habitats surrounding the wetland and the land use intensity of the surrounding area.

The Kettle Wetland has a high function score to provide habitat functions valuable to society because the wetland is identified by WDFW as providing habitat for WDFW priority species, native bats (WDFW 2020). The 2014 Ecology wetland rating forms are included in Attachment A.

3.4 City of DuPont Wetland Buffer Guidance

Required wetland buffers have been identified according to the current DMC Chapter 25.105.050 (City of DuPont 2020). The DMC identifies minimum protective buffer widths based on the wetland category, per the 2014 Ecology rating system. The Kettle Wetland is a Category III wetland.

Wetland boundaries are shown in Figure 2. Table 5 summarizes DMC ratings and buffer widths based on the 2014 Ecology rating system.

Table 5
Wetland Rating and Standard Buffer Widths

Wetland	2014 State Rating (Ecology)	Local Rating (City of DuPont)	Buffer Width (feet)[1]
Kettle	III	III	75

Note:
1. City of DuPont, 2020. City of DuPont Municipal Code. Accessed December 8, 2020. Available at http://www.codepublishing.com/WA/DuPont/.

3.5 Wetland Delineation and Typing Limitations

Wetland identification is an inexact science, and differences of professional opinion occasionally occur between trained individuals. Final determinations for wetland boundaries and typing concurrence or adjustments to these are the responsibility of the regulating resource agency. Wetlands are, by definition, transitional areas; their boundaries can be altered by changes in hydrology or land use. In addition, the definition of jurisdictional wetlands may change. If a physical change occurs in the basin, or if 3 years pass before the proposed project is undertaken, another wetland survey should be conducted. The results and conclusions expressed herein represent Anchor QEA's professional judgment based on the information available.

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Figures

NOTES:
Imagery: 2017 USDA NAIP

LEGEND:

- Kettle Wetland
- Other Wetlands (NWI)
- Sequalitchew Creek
- Mining Limits (existing and proposed, 620 ac))
- DuPont Aggregates Property (791 ac)
- South Parcel Expansion Area (188 ac)*
- Existing and Proposed

0 1,000
Feet

Publish Date: 2020/12/21, 2:55 PM | User: jsmall
Filepath: Q:\Jobs\CalPortland_0217\DupontAggregate_SouthParcel\Map\2020_12_UpdatedFigs\KettleDelineationVicinityMap_v2.mxd

ANCHOR QEA

Figure 1
Vicinity Map
Kettle Wetland Delineation Report
CalPortland DuPont Aggregates South Parcel Expansion Project

DRAFT

LEGEND:

- Data Plot
- Wetland Boundary Flag
- NRCS Soils Series
- South Parcel Expansion Area

NOTES:
Imagery: 7/21/2019 CalPortland

0 200
Feet

Publish Date: 2020/12/21, 4:19 PM | User: jsmall
Filepath: Q:\Jobs\CalPortland_0217\DupontAggregate_SouthParcel\Map\2020_12_UpdatedFigs\KettleDelineationMap.mxd

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Figure 2
Kettle Wetland

Kettle Wetland Delineation Report
CalPortland DuPont Aggregates South Parcel Expansion Project

Appendix A
Field Data Forms

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K1
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasiandra	T 60%	FACW+	Urtica dioica	H 15%	FAC+
Pseudotsuga menziesii	T 20%	FACU	Sium suave	H 5%	OBL
Sambucus racemosa	T 5%	FACU			
Spiraea douglasii	S 15%	FACW			
Salix lasiandra	S 10%	FAC+			
Symphoricarpus albus	S 15%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/2 = 50%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: >20 inches			

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☐ Aerial photographs	
☐ Other	

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	O1	10YR 2,1	None	None	Peat (black, decomposed wood/twigs and peat)	
14-20	O2	10YR 2,1	None	None	Gravelly peat	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☒ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☒ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

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:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K2
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Polystichum munitum	H 20%	FACU	Pseudotsuga menziesii	T 20%	FACU
Rubus ursinus	H 40%	FACU	Holodiscus discolor	T 10%	NI
Mahonia nervosa	S 20%	FACU	Sambucus racemosa	T 15%	FACU
Symphoricarpos albus	S 20%	FACU	Corylus cornuta	T 10%	FACU
Marah oreganus	V 20%	NI	Carex hendersonii	H 15%	FAC
Salix lasiandra	T 40%	FAC+	Urtica dioica	H 5%	FAC+

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/7 = 14%

Check all indicators that apply and explain below:

- ☐ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☐ No	Sediment Deposits: ☐ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☐ No	Local Soil Survey: ☐ Yes ☐ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: None inches			

Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	A	10YR 2,2	None	None	Gravelly sandy loam (brown). Gravel prevented further shovel penetration.	

Hydric Soil Indicators: (check all that apply)

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

Hydric soils present? ☐ **Yes** ☒ **No**

Rationale for decision/Remarks:

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:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K3
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Sambucus racemosa	S 40%	FACU			
Cornus nutallii	S 50%	NI			
Urtica dioica	H 15%	FAC+			
Galium aparine	H 5%	FACU			
Rubus ursinus	H 5%	FACU			
Tolmiea menziesii	H 5%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 0/2 = 0%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☒ No	Sediment Deposits: ☐ Yes ☒ No
Based on: Observation	Drift Lines: ☐ Yes ☒ No	Drainage Patterns: ☐ Yes ☒ No
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☒ No	Water-stained Leaves: ☐ Yes ☒ No
Depth to saturated soil: None inches		

Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-6	A	7.5YR 2.5,1	None	None	Loamy gravel; Gravel prevented further penetration.	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks: Soil chroma is low because color is black, but no other indications of hydric soil are present. No indications of wetland hydrology are present.

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:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K4
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasandra	S 40%	FAC+			
Cornus nutallii	S 50%	NI			
Moss	H 10%	None			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/2 = 50%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No
Based on: Observation	Drift Lines: ☒ Yes ☐ No	Drainage Patterns: ☐ Yes ☒ No
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No
Depth to free water in pit: 20 inches	FAC Neutral: ☐ Yes ☒ No	Water-stained Leaves: ☒ Yes ☐ No
Depth to saturated soil: 1 inches		

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☒ Aerial photographs	
☐ Other	

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-8	A1	7.5YR 2.5,1	None	None	Siilty peat (decomposed organic debris)	
8-15	A2	7.5YR 2.5,1	7.5YR 3,2	40% 2 inches	Silty peat with gleyed colors	
15-17	B1	7.5YR 3,2	2.5Y 5,6	10% 1/2 inch	clayey silt with organic lenses	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☒ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

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:

NOTES: Matrix chroma <=2 with mottles

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K5
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasiandra	T 30%	FAC+			
Salix scouleriana	T 30%	FAC			
Cornus nutallii	S 30%	NI			
Spirea douglasii	S 40%	FACW			
Oenanthe sarmentosa	H 20%	OBL			
Solanum dulcamara	H 5%	FAC+			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 4/5 = 80%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No	
Based on: Observation	Drift Lines: ☒ Yes ☐ No	Drainage Patterns: ☐ Yes ☒ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No	
Depth to free water in pit: 20 inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☒ Yes ☐ No	
Depth to saturated soil: 1 inches			

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☒ Aerial photographs	
☐ Other	

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	A1	7.5YR 2.5,1	None	None	Siilty peat (decomposed organic debris)	
14-16	A2	7.5YR 2.5,1	10YR 6,2	20% 1 inch	clayey silt (chalky) and silty peat	
16-20	B	10YR 6,2	None	None	clayey silt (chalky)	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☒ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

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:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K6
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Polystichium munitum	S 20%	FACU	Galium aparine	H 10%	FACU
Corylus cornuta	T 80%	FACU	Tolmiea menziesii	H 10%	FACU
Salix scouleriana	T 20%	FAC			
Urtica dioica	S 10%	FAC+			
Symphoricarpus albus	S 10%	FACU			
Rubus ursinus	H 10%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/3 = 33%

Check all indicators that apply and explain below:

- ☐ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☐ No	Sediment Deposits: ☐ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☐ No	Local Soil Survey: ☐ Yes ☐ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: None inches			
Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):		

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

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-8	A	10YR 2,2	None	None	Sandy gravel. Gravel prevented further shovel penetration.	

Hydric Soil Indicators: (check all that apply)

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

Hydric soils present? ☐ **Yes** ☒ **No**

Rationale for decision/Remarks:

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:

NOTES:

Appendix B
Ecology Wetland Rating Forms

Wetland name or number Kettle

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Kettle Wetland Date of site visit: November 2017

Rated by C. Douglas Trained by Ecology? ☒ Yes ☐ No Date of training 2007

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☒ Y ☐ N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
	Circle the appropriate ratings									
Site Potential	**H**	M	L	**H**	M	L	**H**	M	L	
Landscape Potential	H	**M**	L	H	**M**	L	H	M	**L**	
Value	H	M	**L**	H	M	**L**	**H**	M	L	**TOTAL**
Score Based on Ratings	6			6			7			**19**

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	X

Wetland name or number Kettle_____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number Kettle

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

◉ NO – go to 2 ○ **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

○ **NO – Saltwater Tidal Fringe (Estuarine)** ○ **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

◉ NO – go to 3 ○ **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

◉ NO – go to 4 ○ **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

☐ The water leaves the wetland **without being impounded**.

◉ NO – go to 5 ○ **YES –** The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number Kettle_____

◉ NO – go to 6 ○ **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

○ NO – go to 7 ◉ **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

◉ NO – go to 8 ○ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number Kettle

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	4
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**16**

Rating of Site Potential If score is: ☒ **12-16 = H** ☐ **6-11 = M** ☐ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☒ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2-4 = H** ☐ **1 = M** ☒ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	7
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	5
Total for D 4 Add the points in the boxes above	**16**

Rating of Site Potential If score is: ☒ **12-16 = H** ☐ **6-11 = M** ☐ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**2**

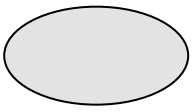
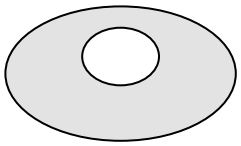
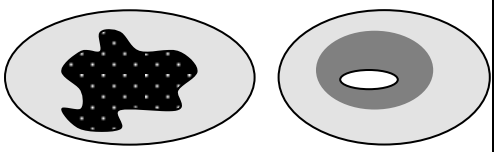
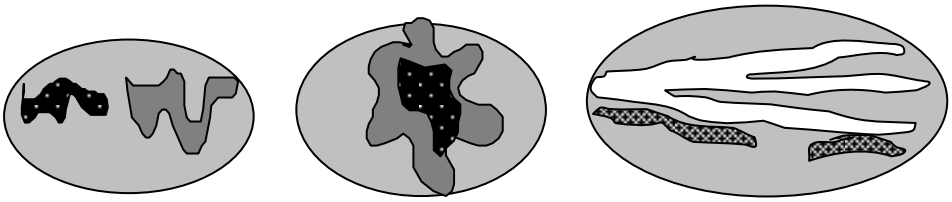
Rating of Landscape Potential If score is: ☐ **3 = H** ☒ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0 There are no problems with flooding downstream of the wetland. points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2-4 = H** ☐ **1 = M** ☒ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle _____

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the site have the potential to provide habitat?	
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* __X__Aquatic bed — 4 structures or more: points = 4 __X__Emergent — 3 structures: points = 2 __X__Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 __X__Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*). __X__Permanently flooded or inundated — 4 or more types present: points = 3 __X__Seasonally flooded or inundated — 3 types present: points = 2 ____Occasionally flooded or inundated — 2 types present: points = 1 __X__Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	2
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	2
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3points 	3

Wetland name or number Kettle

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* __X__ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). __X__ Standing snags (dbh > 4 in) within the wetland ____ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* __X__ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __X__ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	**11**

Rating of Site Potential If score is: ☐ **15-18 = H** ☒ **7-14 = M** ☐ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 5 **+** [(% moderate and low intensity land uses)/2] 2.5 **=** 7.5 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 20 **+** [(% moderate and low intensity land uses)/2] 5 **=** 25 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If score is: ☐ **4-6 = H** ☐ **1-3 = M** ☒ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) __X__ It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	**2**

Rating of Value If score is: ☒ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number Kettle

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt ◯Yes –Go to **SC 1.1** ◯No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ◯Yes = **Category I** ◯No - Go to **SC 1.2**	◯**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ◯Yes = **Category I** ◯No = **Category II**	◯**Cat. I** ◯**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ◯Yes – Go to **SC 2.2** ◯No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ◯Yes = **Category I** ◯No = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ◯Yes – **Contact WNHP/WDNR and go to SC 2.4** ◯No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ◯Yes = **Category I** ◯No = **Not a WHCV**	◯**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ◯Yes – Go to **SC 3.3** ◯No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ◯Yes – Go to **SC 3.3** ◯No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ◯Yes = **Is a Category I bog** ◯No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ◯Yes = **Is a Category I bog** ◯No = **Is not a bog**	◯**Cat. I**

Wetland name or number Kettle

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). ◯Yes = **Category I** ◯No = **Not a forested wetland for this section**	◯**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ◯Yes – Go to **SC 5.1** ◯No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) ◯Yes = **Category I** ◯No = **Category II**	◯**Cat. I** ◯**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 ◯Yes – Go to **SC 6.1** ◯No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ◯Yes = **Category I** ◯No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? ◯Yes = **Category II** ◯No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? ◯Yes = **Category III** ◯No = **Category IV**	◯**Cat I** ◯**Cat. II** ◯**Cat. III** ◯**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	NA