

3.6 PLANTS AND ANIMALS

This section of the DEIS describes the existing plants and animals conditions (including wetlands) on the site (including the approximately 188-acre Expansion Area and approximately 125-acre Re-Mine Area), and in the site vicinity (including the area associated with the Sequalitchew Creek Restoration). Potential impacts associated with the EIS Alternatives are evaluated and mitigation measures identified. This section is based on the *Plants and Animals Report* (June 2023), *Landmark Tree Inventory Report* (August 2021), and *Floodplain Habitat Assessment and Mitigation Report* (November 2022) all prepared by Anchor QEA and peer review by Raedeke Associates (see **Appendices H, I, and J**).

3.6.1 Affected Environment

Plants and Habitat

Dominant plant communities and habitats within the site, the off-site Sequalitchew Creek Restoration Area, and the areas subject to changes in groundwater levels (i.e., the aquatic resources of Sequalitchew Creek and the four wetland systems within the Sequalitchew Creek Restoration Area: East Edmond Marsh, West Edmond Marsh, and the Sequalitchew Creek Riparian Wetlands) with proposed mining operations include coniferous forests, shrublands, grassland, and aquatic resources (streams and wetlands), as described below. Rare plants and plant communities are also described.

Conifer Forests

Conifer forests cover most of the Expansion Area portion of the site, including approximately 135 acres of the approximately 188 acres that would be cleared for mining (see **Figure 2-2** of Chapter 2 of this Draft EIS). Second-growth conifer forests are interspersed with young regenerating stands as a result of previous timber harvest practices. Douglas-fir (*Pseudotsuga menziesii*) dominates the canopy and regeneration in most areas. Western red cedar (*Thuja plicata*) and Oregon white oak (*Quercus garryana*) also occur in smaller numbers within the conifer forest.

Common understory shrub species include beaked hazelnut (*Corylus cornuta*), snowberry (*Symphoricarpos albus*), trailing blackberry (*Rubus ursinus*), Scot's broom, and salal (*Gaultheria shallon*). Other species include twin flower (*Linnea borealis*), low Oregon grape (*Mahonia nervosa*), sword fern (*Polystichum munitum*), bald-hip rose (*Rosa gymnocarpa*), red huckleberry (*Vaccinium parvifolium*), ocean spray (*Holodiscus discolor*), black-cap raspberry (*Rubus leucodermis*), kinnikinnick (*Arctostaphylos uva-ursi*), bracken fern (*Pteridium aquilinum*), St. John's wort (*Hypericum perforatum*), western and hairy honeysuckles (*Lonicera ciliosa* and *L. hispidula*, respectively), wild strawberry (*Fragaria vesca*), yarrow (*Achillea millefolium*), yerba Buena (*Satureja douglasii*), wood rush (*Luzula parviflora*), velvet grass (*Holcus lanatus*), and colonial bentgrass (*Agrostis capillaris*).

The Re-Mine Area portion of the site is an active mining area dominated with grassland, with patches of shrubland and young stands of red alder (*Alnus rubra*). An approximately 5-acre patch of conifer forest is located at the south end of the Re-Mine Area with similar species composition as the Expansion Area (see **Figure 2-2** of **Chapter 2** of this Draft EIS). Forest vegetation within the off-site Sequalitchew Creek Restoration Area includes riparian habitat associated with Sequalitchew Creek and wetland buffer habitat of wetlands within the Restoration Area. These forested areas are a mixture of coniferous and deciduous trees with a diverse shrub and herbaceous understory. Sequalitchew Creek, wetlands within the Restoration Area, and nearby wetlands are described under *Aquatic Resources* later in this section.

Landmark Trees

A landmark tree survey was performed for the site consistent with DMC Critical Area Chapter 25.10.120.005 criteria. The DMC defines a “landmark tree” as “an existing healthy, well formed tree which poses no safety hazard due to potential collapse, and that meets minimum diameter measurements. Five species and a total of 116 landmark trees were identified during the survey. Landmark tree species include Douglas-fir, Oregon white oak, Pacific madrone, (*Arbutus menziesii*), Pacific yew (*Taxus brevifolia*), and western red cedar. The species and number of landmark trees within the Expansion Area and Re-Mine Area are shown in **Table 3.6-1**. See **Appendix I** for additional detail on landmark trees on the site.

**Table 3.6-1
LANDMARK TREES ON THE SITE**

Common Name	Scientific Name	Expansion Area Total Trees ¹	Re-Mine Area Total Trees
Douglas-fir	<i>Pseudotsuga menziesii</i>	81	1
Oregon white oak	<i>Quercus garryana</i>	17	2
Pacific madrone	<i>Arbutus menziesii</i>	2	0
Pacific yew	<i>Taxus brevifolia</i>	2	0
Western red cedar	<i>Thuja plicata</i>	10	1
Total		112	4

¹ Includes adjacent buffer.

Source: Anchor QEA, 2021.

Shrublands

Shrublands within the Expansion Area portion of the site are dominated by the non-native invasive species Scot’s broom. This non-native invasive plant community covers approximately 42 acres of the Expansion Area. Plant coverage beneath this layer is restricted to mosses and small patches of colonial bentgrass. Native shrub species are mostly absent and are present in only a few areas adjacent to patches of native tree species. The native herbaceous species include Idaho fescue (*Festuca idahoensis*), chocolate

lily (*Fritillaria lanceolata*), early blue violet (*Viola adunca*), and Pacific sanicle (*Sanicula crassicaulis*).

As mentioned previously, the Re-Mine Area portion of the site is an active mining area dominated with grassland areas that were hydroseeded during reclamation. The presence of the non-native invasive species Scot's broom and the native species red alder are controlled as part of the reclamation process of the mining.

Shrublands associated with the off-site Sequalitchew Creek Restoration Area (and associated with the nearby wetlands) include wetland buffer habitat that is a mixture of native and nonnative shrub species. Sequalitchew Creek, wetlands within the Restoration Area, and nearby wetlands are described under *Aquatic Resources* below.

Aquatic Resources

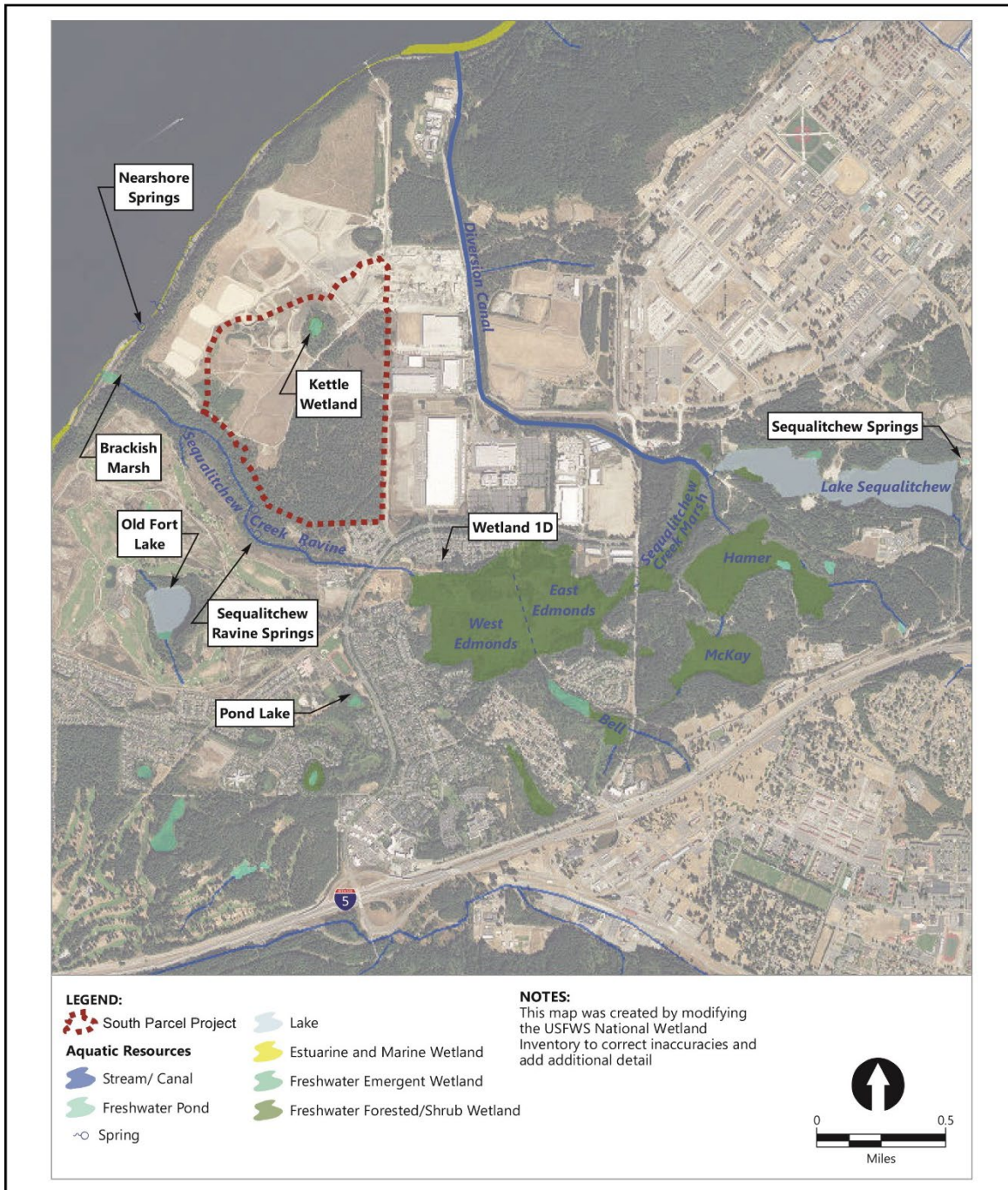
Aquatic resources on the site and in the site vicinity include Sequalitchew Creek, Puget Sound shoreline nearshore springs, and eight wetland communities. No aquatic resources are located within the Re-Mine Area portion of the site. One aquatic resource, the Kettle Wetland, is located within the Expansion Area portion of the site. Sequalitchew Creek and the East Edmond Marsh, West Edmond Marsh, Sequalitchew Creek Riparian Wetlands, and the Brackish Marsh wetland systems are located offsite but within the Sequalitchew Creek Restoration Area and within the area where changes in groundwater levels could occur. Three nearby wetlands are Sequalitchew Creek Ravine Seep Wetlands, Pond Lake, and Wetland 1D (see **Figure 3.6-1**).

Expansion Area Portion of Site Wetlands

Kettle Wetland

The Kettle Wetland is an approximately 1.78-acre, Category III wetland, with a 75-foot required buffer (Per MDC 25.105.050(1)(b)(C)). This wetland is located within the Expansion Area portion of the site (see **Figure 3.6-1**). This wetland contains persistent emergent, non-persistent emergent, aquatic bed, and scrub-shrub wetland communities. The dominant hydrologic source for the wetland is the aquifer system. Water levels within the wetland are determined by the seasonal fluctuation in the elevation of the Vashon Aquifer.

Pioneer Aggregates South Parcel Project Draft EIS



Source: Anchor QEA, 2022.



Figure 3.6-1
Existing Aquatic Resources

The emergent communities within this wetland 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 during site visits include pondweed (*Potamogeton* sp.), lesser duckweed (*Lemna minor*), arrowleaf bur-reed (*Sparganium angustifolium*), and floating-leaved pondweed (*Potamogeton natans*). Along the wetland boundary, the scrub-shrub 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, and Henderson sedge (*Carex hendersonii*).

Buffer vegetation bordering the Kettle Wetland includes tree, shrub, grass, and herbaceous species. Dominant tree species include big-leaf maple (*Acer macrophylla*), red alder, black cottonwood (*Populus trichocarpa*), western red cedar, bitter cherry (*Prunus emarginata*), Douglas hawthorne (*Crataegus Douglasii*), blue elderberry, and Pacific madrone. Dominant shrub species include trailing blackberry, salal, snowberry, Scot's broom, Oregon grape, bald-hip rose, ocean spray, sword fern, Saskatoon serviceberry (*Amelanchier alnifolia*), red huckleberry, and bracken fern. Herbaceous species include velvet grass, western wild-rye (*Elymus glaucus*), and colonial bentgrass (*Agrostis capillaris*). Vine species include manroot (*Marah oreganus*).

Off-Site Wetlands (Sequalitchew Creek Restoration Area)

The below describes off-site wetlands resources in the site vicinity; off-site wetland resources are located within the Sequalitchew Creek Restoration Area. The following describes wetlands in the Restoration Area offsite.

West Edmond Marsh

West Edmond Marsh is an approximately 80-acre, Category II wetland, with a 100- foot required buffer (per DMC 25.105.050(1)(b)(B)). West Edmond Marsh is the portion of Edmond Marsh located west of Robinson Trail, a former railroad grade that bisects Edmond Marsh and east of Center Drive (see **Figure 3.6-1**). It has a hydrologic regime dominated by surface water inputs entering East Edmond Marsh to the east and smaller inputs from stormwater infiltration ponds along the north and south. Sequalitchew Creek follows a relatively straight path near the northern boundary of the marsh that results from historical efforts to drain and channelize the marsh.

Water levels in West Edmond Marsh are controlled by multiple beaver dams, the most substantial of which is a large beaver dam at the western boundary just upstream of the normally dry reach of Sequalitchew Creek under Center Drive.

Seasonal high water levels in West Edmond Marsh range from approximately 210 feet elevation in the westernmost portion to 211.8 feet elevation just downstream of Robinson Trail. The westernmost portion has seasonal variation in water levels of 4 to 5 feet and typically dries up in summer. The portion near Robinson Trail retains water year-round and typically experiences a seasonal range in water levels of 1 to 1.5 feet.

Over time, the hydrology of West Edmond Marsh has been affected by various efforts to maintain an open water channel through dense scrub-shrub wetland. The construction and periodic maintenance of this channel through the marsh maintained water levels that were lower than currently exist. Subsequent impoundment of water by beaver dams across this channel and elsewhere in the marsh has resulted in water levels of the marsh steadily increasing in recent decades, as is evidenced by the drowning of some mature upland trees. Vegetative communities include scrub-shrub, emergent, and aquatic bed wetland types. The eastern portion of the marsh is shallow to deeply inundated, due to impoundment by beaver dams. Dominant vegetation includes black cottonwood, willows (*Salix* sp.), spiraea (*Spirea douglasii*), water parsley (*Oenanthe sarmentosa*), yellow pond lily (*Nuphar luteum* var. *polysepala*), pond weed (*Lemna minor*), cattails (*Typha latifolia*), and reed canarygrass (*Phalaris arundinacea*). The area includes upland islands that are forested with mature Douglas-fir, black cottonwood, and other native species. The dense, layered vegetation within the marsh, upland islands, and patches of open water provide high-quality wildlife habitat and offer a substantial habitat base for native wetland plant and animal species.

East Edmond Marsh

East Edmond Marsh is an approximately 55-acre, Category II wetland, with a 100- foot required buffer. This wetland is located between the Robinson Trail on the west and DuPont-Steilacoom Road on the east (see **Figure 3.6-1**). East Edmond Marsh continues to the east of DuPont- Steilacoom on Joint Base Lewis-McChord.¹

Historically, the primary source of water to East Edmond Marsh was the surface water of Sequelitchew Creek flowing out of Sequelitchew Lake. The Creek followed a meandering channel through the marsh that has been excavated and cleared by human activity. However, beaver activity has resulted in water levels in East Edmond Marsh that are higher than in Sequelitchew Lake, and now the hydrology of East Edmond Marsh is dominated by groundwater inflows from multiple sources including regional groundwater, shallow subsurface flow from nearby Bell, Hamer, and McKay marshes, and stormwater from nearby infiltration ponds.

The water level in East Edmond Marsh is controlled by a large beaver dam located just upstream of the primary culvert under Robinson Trail and is relatively uniform throughout the marsh segment. Seasonal high water levels are typically about 212.5 to 213 ft NGVD 29.

¹ This segment of the Marsh is not evaluated for this EIS but will be evaluated as part of separate environmental review prepared by others required for the Sequelitchew Creek Restoration Plan.

East Edmond Marsh retains water year-round, with a typical water level fluctuation of 1 to 1.5 feet seasonally.

Vegetative communities include forested, scrub-shrub, emergent, and aquatic bed wetland types. Dominant vegetation includes black cottonwood, red alder, Oregon ash (*Fraxinus latifolia*), willows, red-osier dogwood, spiraea, sedges (*Carex* spp.), bulrushes (*Scirpus* spp.), water smartweed (*Polygonum amphibium*), water parsley, cattails, and reed canarygrass. Floodwater storage, sediment sequestering, nutrient filtration, and biological support are strong functions of East Edmond Marsh. The area includes upland islands that are forested with mature Douglas-fir, black cottonwood, and other native species. The dense, layered vegetation within the marsh, upland islands, and patches of open water provide high-quality wildlife habitat and offer a habitat base for native wetland plant and animal species.

Sequalitchew Creek Ravine Riparian Wetlands

Sequalitchew Creek Ravine Riparian Wetlands are an approximately 0.5- acre, Category II wetland complex, with a 100- foot required buffer. These wetlands border Sequalitchew Creek west of Center Drive (see **Figure 3.6-1**) and includes many areas of braided flow and side-channels, flood terraces, and well-established forested riparian wetland vegetation communities. The canopy species include red alder, big-leaf maple, and western red cedar. Common shrub species include vine maple (*Acer circinatum*), salmonberry (*Rubus spectabilis*), red elderberry (*Sambucus acemose*), black gooseberry (*Ribes lacustre*), and cascara (*Rhamnus purshiana*). Common herbaceous species include mannagrass (*Glyceria elata*), giant horsetail (*Equisetum telmatiea*), American brooklime (*Veronica americana*), slough sedge (*Carex obnupta*), stinging nettle, Cooley's hedge-nettle (*Stachys coolyeii*), and water parsley.

Brackish Marsh

The Brackish Marsh is an approximately 0.5-acre, Category II wetland, with a 100- foot required buffer. Near its mouth, Sequalitchew Creek passes through a concrete box culvert (5 feet wide by 5 feet high and 240 feet long) under the BNSF Railway Company rail line before discharging into Puget Sound. Upstream of this culvert is the brackish marsh (see **Figure 3.6-1**). The Brackish Marsh occupies a series of terraces dissected by dendritic channels. Common plant species in the marsh include Lyngby's sedge (*Carex lyngbeyi*), seacoast bulrush (*Scirpus maritimus*), seashore saltgrass (*Distichlis spicata*), marsh cinquefoil (*Potentilla anserina*), and gumweed (*Grindelia integrifolia*). Significant patches of colonial bentgrass occur along the margins of the Brackish Marsh.

Nearby Wetlands

Sequalitchew Creek Ravine Seep Wetlands

The Sequalitchew Creek Ravine Seep Wetlands are an approximately 0.13-acre, Category IV wetland complex, with a 50-foot required buffer (DMC 25.105.050.(1)(b)_D). The wetland complex, consisting of two long, very narrow, and non-contiguous wetlands, is located just above the trail along Sequalitchew Creek at about river mile 0.75 to 0.85. The ravine containing Sequalitchew Creek contains seeps and springs that surface from mid-slope to the toe of slope. These seeps and springs provide base flow to Sequalitchew Creek and contribute to species diversity within the area by supporting plant species that require more moisture than is available in surrounding upland areas. The wetland hydrology emanates from seep heads just above the trail and is dominated by groundwater. Dominant vegetation species include willow herb (*Epilobium ciliatum*) and lady fern (*Athyrium filix-femina*). These forested Seep Wetlands are classified as Category IV wetlands.

Wetland 1D

Wetland 1D is an approximately 2.1-acre, Category II wetland, with a 100-foot required buffer. This wetland is located immediately north of West Edmond Marsh and south of Center Drive (see **Figure 3.6-1**). Wetland 1D is shallow and permanently inundated. Water levels in Wetland 1D range seasonally from 208.6 to 211 feet and track closely with nearby groundwater levels. The wetland is dominated by scrub-shrub vegetation including Pacific willow, spiraea, western crabapple (*Malus fusca*), and red-osier dogwood.

Pond Lake

Pond Lake is an approximately 1.8-acre Category II wetland, with a 100-foot required buffer. This wetland is located approximately 0.5 mile south of the Expansion Area portion of the site (see **Figure 3.6-1**). The water level in Pond Lake typically exhibits a seasonal range of about 4 feet and tracks closely with nearby groundwater levels. It is a shallow pond dominated by herbaceous species, with a forested upland edge dominated by red alder and big-leaf maple. The dominant species in the wetland is reed canarygrass. Small pockets of native species including sedges and water-plantain (*Alisma plantago-aquatica*) occur in the wetland.

Nearshore Springs

Nearshore springs located along the shore immediately west of the Existing Mine and north of the mouth of Sequalitchew Creek of Puget Sound, flow directly into Puget Sound (see **Figure 3.6-1**). These springs express from the rip rap protected shore and there is no surface flow associated with these features within the site.

Rare Plants and Plant Communities

Washington Department of Fish and Wildlife Plants and Priority Habitats

No rare plants are identified by Washington Department of Fish and Wildlife (WDFW) in locations where mining could occur in the site or within the areas subject to changes in groundwater levels. No populations of white-topped aster (*Sericocarpus rigidus*), a state sensitive species, have been documented within the limits of the site, although populations do occur in Pierce County and in oak forests elsewhere in the area.

A patch of forested habitat at the south end of the Re-Mine Area where mining is proposed is mapped by WDFW as priority habitat biodiversity areas and corridor, but the physical characteristics within the small portion where mining is planned do not meet WDFW's stated criteria. Specifically, this area is flat, developable land and is not part of the steep, undevelopable ravine side slope. The forested riparian habitat of Sequelitchew Creek and the forested hillside of Puget Sound near where mining is proposed are also mapped as priority habitat biodiversity areas and corridor. The habitat of East and West Edmond Marsh are mapped by WDFW as waterfowl concentration areas. The Priority Habitats and Species (PHS) database does not include any white oak woodlands in or around the site, or within the City of DuPont. Where white oak exist within the site, they are interspersed in a primarily coniferous forest within the Expansion Area and account for less than 5% of the canopy. WDFW defines priority Oregon white oak woodlands as stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%; or where total canopy coverage of the stand is less than 25%, but oak accounts for at least 50% of the canopy coverage present. The latter is often referred to as an oak savanna. In non-urbanized areas west of the Cascades, priority oak habitat consists of stands one acre in size. Therefore, the interspersed oaks on the site does not meet WDFW criteria for priority habitat.

Important habitats in the larger vicinity of the site include the Nisqually Delta, located approximately two miles from the site. This delta is a large, high-quality wetland complex with regionally rare intact estuarine functions and native plant populations, abundant wildlife habitat, and high utilization by wildlife.

U.S. Fish and Wildlife Service Threatened and Endangered Plants

The U.S. Fish and Wildlife Service (USFWS) identifies Endangered Species Act (ESA)-listed plant species and critical habitats under USFWS jurisdiction that occur or may occur within a specific location where a project is proposed on the agency's website. The status of federally listed plant species and critical habitats protected under the ESA that occur or may occur where mining is proposed on the site or within the area subject to changes in groundwater levels is presented in Table 5 of **Appendix H**. The site and site vicinity does not contain any potential habitat for the ESA plant species golden paintbrush (*Castilleja levisecta*) and marsh sandwort (*Arenaria paludicola*).

Animals

Animal species are described below based on the animal types: birds, mammals, and amphibians. Several federally- and state-listed species occur within the site vicinity. Their status and use of the site vicinity are described.

Birds

The site and off-site Sequelitchew Creek Restoration Area provides a range of habitat features that can provide breeding, foraging, resting, and overwintering habitat to support a wide range of bird species. Forested habitats provide foraging and nesting habitat for a wide variety of songbird species such as song sparrow (*Melospiza melodia*), bushtit (*Psaltirparus minimus*), Bewick's wren (*Thryomanes bewickii*), Steller's jay (*Cyanocitta stelleri*), spotted towhee (*Pipilo erythrophthalmus*), Swainson's thrush (*Catharus ustulatus*), winter wren (*Troglodytes hiemalis*), varied thrush (*Ixoreus naevius*), black-capped chickadee (*Parus atricapillus*), dark-eyed junco (*Junco hyemalis*), chestnut-backed chickadee (*Parus rufescens*), golden-crowned kinglet (*Regulus satrapa*), and red-breasted nuthatch (*Sitta canadensis*).

Upland shrublands and herbaceous habitats are used by species like barn swallow (*Hirundo rustica*), tree swallow (*Tachycineta bicolor*) and white-crowned sparrow (*Zonotrichia leucophrys*). Predatory birds like red-tailed hawk (*Buteo jamaicensis*) commonly hunt in these habitat types. Other raptors such as northern harrier (*Circus cyaneus*) and bald eagle (*Haliaeetus leucocephalus*) occur in forested areas near waterbodies. Snags and downed trees in forested habitat and along the forest edges also provide perch sites for these species. Snags in forested habitats also provide potential nest sites for cavity-nesting birds such as great horned owl (*Bubo virginianus*), and species of woodpeckers including downy woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), and pileated woodpecker (*Dryocopus pileatus*).

Aquatic habitats and wetland habitats provide a variety of habitat for terrestrial birds, waterbirds, and waterfowl. Open water sections of wetlands can be expected to provide habitat for belted kingfisher (*Megaceryle alcyon*) and wintering and migratory waterfowl, including gadwall (*Anas strepera*), American widgeon (*Mareca americana*), mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), and American coot (*Fulica americana*). Wetland areas with grass and herbaceous vegetation provide habitat for red-winged blackbird (*Agelaius phoeniceus*), song sparrow, and marsh wren (*Cistothorus palustris*), among other species including waterfowl. Forested and scrub-shrub wetlands are commonly used by similar species as well as wood duck (*Aix sponsa*). Waterbird species such as great blue heron (*Ardea herodias*) also use many of these habitats.

Mammals

Small mammal species associated with forested habitats include shrew mole (*Neurotrichus gibbsii*), Townsend's vole (*Microtus townsendii*), masked shrew (*Sorex cinereus*), and striped skunk (*Mephitis mephitis*). Larger mammals such as black-tailed deer (*Odocoileus hemionus columbianus*) and coyote (*Canis latrans*) also occur throughout the site.

Wetlands and riparian areas provide habitat for North American beaver (*Castor canadensis*), water shrew (*Sorex palustris*), and raccoon (*Procyon lotor*). Beavers are well documented in the wetland habitats of East and West Edmond Marsh. The non-native species Virginia opossum (*Didelphis virginiana*) also occurs in these habitat types. These and similar species depend on water for foraging, breeding, and sometimes, overwintering habitats.

Amphibians

Wetlands and streams provide habitat for amphibian species such as northern red-legged frog (*Rana aurora*), northwestern salamander (*Ambystoma gracile*), Pacific treefrog (*Pseudacris regilla*), roughskin newt (*Taricha granulosa*), and western red-backed salamander (*Plethodon vehiculum*).

Washington Department of Fish and Wildlife Priority Species

Three priority species are mapped by WDFW as occurring or their habitat present within the site: big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), and Yuma myotis bat (*Myotis yumanensis*). These bat species occur in forested habitats, typically occupying mature trees. They are not state or federally listed.

Western gray squirrel (*Sciurus griseus*), a state threatened species, is documented within the site vicinity but is not currently identified by WDFW as occurring within the site and surrounding area. This species favors Garry oak (*Quercus garryana*) woodlands as prime habitat. This habitat occurs within areas adjacent to the site, in patches throughout the City of DuPont, and also within the Fort Lewis Military Reservation. This species also forages within coniferous forests that occur near Garry oak woodlands.

The Western gray squirrel was listed as threatened in Washington State in 1993 (WAC 323.12.011). There are three known populations in Washington: the southern Puget Trough, north-central Washington, and south-central Washington. Typical Western gray squirrel habitat in the Puget Trough includes a Douglas-fir-Oregon white oak woodland with an understory dominated by snowberry (*Symphoricarpos albus*), California hazelnut (*Corylus cornuta* var. *californica*), Indian plum (*Oemleria cerasiformis*), and sword fern (*Polystichum munitum*). The typical characteristics of oak woodlands that are important to Western gray squirrels consist of a mix of Douglas-fir (53% on average) with oaks comprising 34% on average. These characteristics were not observed within the site (see **Appendix H** for detail).

One of the primary limiting factors in Western gray squirrel success in the Puget Trough is the lack of genetic diversity through habitat fragmentation. The South Parcel is separated from the primary Western gray squirrel population at Joint Base Lewis-McChord (JBLM) by Interstate 5, as well as several other heavily used roadways. While a small amount of canopy connectivity to JBLM property exists across the Puget Sound Bluff and up Sequelitchew Creek ravine, the lack of connectivity to confirmed squirrel-populated sites contributes to the overall lack of habitat potential on the site for gray squirrels. Accordingly, the site (including Expansion Area) does not provide primary (nesting, breeding) habitat for Western gray squirrel. While the site does possess marginal characteristics of secondary squirrel habitat (e.g., conifer-dominated, moderate canopy and shrub coverage), the factors identified above make the possibility of use of the site by Western gray squirrel remote.

U.S. Fish and Wildlife Service Threatened and Endangered Species

No USFW-listed ESA fish or wildlife species or critical habitats have been identified to be present within the site or vicinity (see **Appendix H** for detail).

3.6.2 Impacts of the Alternatives

This section identifies and analyzes impacts to plants and animals and their habitat on and in the vicinity of the site with proposed clearing, mining (including dewatering), and reclamation under the Proposed Action. Conditions under the No Action Alternative are also identified.

As described in **Chapter 2** of this DEIS, the 2011 Settlement Agreement states that permits for the Pioneer Aggregates South Parcel Project (Proposed Action) shall not be effective until permits for the Sequelitchew Creek Restoration Plan (Restoration Plan) are in place, as a separate but related action. The Restoration Plan seeks to restore and enhance streamflow and ecological functions from Sequelitchew Lake through Edmond Marsh into Sequelitchew Creek ravine by sequentially restoring diverted flows back to the creek, improving the sustainability of flows through the system, and restoring aquatic habitat. Consistent with the 2011 Settlement Agreement, this DEIS assumes that mining and reclamation activities under the Proposed Action would not proceed until the permits are in place to implement the Restoration Plan. It is assumed that projects associated with the Restoration Plan would be mitigation for certain environmental impacts identified in this DEIS, and that permits for the Restoration Plan would be a condition of any City of DuPont approval of the Proposed Action. However, because the Restoration Plan is considered a separate project that would be subject to separate environmental review and could be funded and implemented independent of the Proposed Action, the general discussion in the Environmental Impacts sub-section of Plants & Animals only addresses the impacts of the proposed mining/reclamation and does not include implementation of the Restoration Plan. This is intended to help the reader understand the impacts of the proposed

mining/reclamation, and the need for the Restoration Plan with the proposed project. Proposed mining/reclamation in combination with the Restoration Plan is specifically discussed under Cumulative Impacts.

ALTERNATIVE 1 – PROPOSED ACTION

Direct Plants and Habitat Impacts

Conifer Forests

The majority of coniferous forests within the site would be logged prior to initiating mining. The total area of coniferous forest proposed for clearing within the Re-Mine Area portion of the site is approximately 15 acres, and the conifer forest proposed for clearing in the Expansion Area portion of the site is approximately 135 acres. Revegetation would occur throughout the site consistent with the reclamation plan developed for both the existing and proposed mining areas. Reclamation would include the establishment of mixed species, including Oregon white oak, and conifer-dominant forests along the slopes of the mine.

Landmark Trees

Ninety landmark trees would be removed under the Proposed Action including Douglas-fir (74), Oregon white oak (13), Pacific madrone (1), Pacific yew (1), and western red cedar (1). All of these landmark trees are within the Mineral Resource Overlay designated under the City's Comprehensive Plan. Replacement of landmark trees would be provided, consistent with City of DuPont replacement ratio guidance.

Shrublands and Grasslands

The majority of the shrublands and grasslands within the site would be cleared in conjunction with proposed logging activities. The total area of shrublands and grasslands within the Re-Mine Area portion of the site is approximately 60 acres, with most of that area comprised of grassland habitat associated with hydroseeding during reclamation activities. The total area of shrublands and grasslands within the Expansion Area portion of the site is approximately 42 acres. The dominant shrublands species is the non-native invasive species Scot's broom. Scot's broom has been controlled in the Re-Mine Area during reclamation activities and would also be controlled throughout the site during mining and reclamation. This control of invasive species would benefit the existing adjacent native habitats and the riparian corridor of North Sequalitchew Creek by reducing invasive species pressure. Grassland and shrublands would be created on the site with proposed reclamation, similar to reclamation associated with portions of the Existing Mine.

Aquatic Resources

The 1.8-acre Kettle Wetland is the only aquatic resource located within the site and the only aquatic resource that would be directly impacted by the Proposed Action.

Kettle Wetland - The Kettle Wetland and its buffer would be cleared under the Proposed Action, and the entire wetland would be eliminated. The Kettle Wetland relies on groundwater to sustain wetland vegetation so even if the Kettle Wetland were to be left in place within the site, the change in groundwater levels would eventually alter the hydrology of the Kettle Wetland, converting the wetland vegetation to upland plant species. Proposed mitigation for these wetland impacts includes creation of a new wetland, as discussed in Sub-Section 3.6.3.

Rare Plants and Plant Communities

The Proposed Action would not directly impact rare plants or rare plant communities.

Indirect Plant and Habitat Impacts (Offsite)

Conifer Forests

No indirect impacts to coniferous forest habitats (i.e. loss of forest area) outside the site associated with the Proposed Action are anticipated.

Shrublands and Grasslands

No indirect impacts to shrublands and grasslands habitats (i.e. loss of shrublands or grasslands) outside the site associated with the Proposed Action are anticipated.

Aquatic Resources

The aquatic resources of Sequalitchew Creek and the four wetland systems within the Sequalitchew Creek Restoration Area: East Edmond Marsh, West Edmond Marsh, and the Sequalitchew Creek Riparian Wetlands are within the area where wetland hydrology could be affected by changes in groundwater levels under the Proposed Action. The wetland hydrology of aquatic resources identified as nearby wetlands, except for the Seep Wetlands (Sequalitchew Creek Ravine, Pond Lake, and Wetland 1D) could also be affected by changes in groundwater levels, but any effects are anticipated to be minor. The indirect effects of the Proposed Action on the Seep Wetlands are anticipated to have a greater potential for impact. Groundwater seeps that support the hydrology of these wetlands would be reduced, resulting in a reduction or loss of wetland hydrology. The Brackish Marsh is not anticipated to be affected by changes in groundwater levels due the dominance of tidal hydrology on that resource. The potential hydrologic impacts on these wetlands are described in greater detail below.

West Edmond Marsh and Wetland 1D - West Edmond Marsh and Wetland 1D are the two resources that are most likely to be affected by the proposed groundwater drawdown without implementation of the Sequalitchew Creek Restoration Plan (see Section 3.3, **Groundwater**, and Section 3.4, **Surface Water**). Earlier drying of saturated and inundated areas could have detrimental effects on the existing plant community. Wetland plant communities (and soils) are shaped by saturated and inundated conditions during the growing season (averages from March 1 to October 31). Exotic plant invasion (particularly reed canarygrass) favors this type of alteration when winter saturation and inundation are not sufficient to maintain existing plant communities or preclude noxious weed invasion.

It is likely that a slow conversion of wetland habitats would occur; the changes could result in some conversion of aquatic wetland habitat to emergent wetland habitat and emergent wetland habitat to shrub-scrub wetland habitat (see **Appendix H** for detail).

East Edmond Marsh - Under the Proposed Action the drawdown effects on East Edmond Marsh would result in an average decrease in water level of 1.2 inches (see Section 3.3, **Groundwater**, and Section 3.4 **Surface Water**). The decrease would be greatest in June at about 1.5 inches and lowest in February at less than 0.1 inch. East Edmond Marsh would continue to follow the same seasonal pattern of fluctuation with the highest water levels in January through March and seasonal lows in August and September. It is not anticipated that this change would have any measurable effect on the wetland given that this decrease would occur within a seasonal fluctuation in water level of more than 20 inches. Ultimately, continued beaver activity would be anticipated to have a greater impact on water levels in the marsh.

Pond Lake - Pond Lake is an isolated water body, hydrologically connected to groundwater with little surface water inflow and no outflows. With the Proposed Action, the surface water level in Pond Lake is conservatively projected to decrease by about two feet, based on the amount of groundwater drawdown estimated in its vicinity. The surface water level in Pond Lake currently varies seasonally by up to eight feet but more typically around four feet. Pond Lake goes dry in summer. With the Proposed Action, the seasonal variation would be two feet, and the lake would go dry a month earlier and rewet slightly later. Herbaceous vegetation in Pond Lake varies from year to year depending on when the water levels recede. With the Proposed Action, the conditions observed during driest years would become common, with more emergent vegetation and less aquatic vegetation establishing. A sustained reduction in peak water levels could allow establishment of scrub-shrub wetland species along the wetland boundary and greater cover of reed canary grass within the higher parts of the wetland. The relatively steep slopes around the wetland would prevent the wetland size from substantially changing.

Sequalitchew Creek and Riparian Forest Wetlands - Without restoration, Sequalitchew Creek west of Center Drive would experience reduced base flows as a result of reduction in seep and spring discharge caused by the drawdown of the Vashon Aquifer. A reduction of aquatic life would be expected to occur in the upper ravine without implementation of the Sequalitchew Creek Restoration Plan activities (see Section 3.5, **Fisheries**, for additional detail).

Without implementation of the Restoration Plan, the change in groundwater levels would eliminate the hydrologic support provided to the Sequalitchew Creek riparian forest wetlands and some loss of the existing wetland vegetation would occur.

Sequalitchew Creek Ravine Seep Wetlands - Dewatering of the aquifer under the Proposed Action is likely to indirectly impact the Seep Wetlands along the Sequalitchew Creek trail by disrupting the hydrology of these wetlands. These indirect impacts would result in the loss of wetland vegetation and function of the wetlands. The resulting loss in wetland area could be up to 0.13 acre of wetland habitat being converted to upland habitat due to insufficient saturation during the growing season. Indirect impacts from changes in the aquifer would also affect the springs in the Sequalitchew Creek bed.

Brackish Marsh - The reduction in flows in Sequalitchew Creek resulting from dewatering of the Vashon Aquifer without implementation of the Sequalitchew Creek Restoration Plan are estimated at 1.3 cfs. While this is a substantial fraction of the freshwater in the marsh, it is anticipated to have little impact to the Brackish Marsh. The reduction in freshwater input would result in only a negligible increase in salinity in the marsh during high tides. No effect on the existing wetland is anticipated as a result of salinity alterations (see **Appendix H** for detail).

Nearshore Springs - The springs that flow directly into Puget Sound express from the shore near the toe of slope at the beach and there is no surface flow associated with these features within the site. No measurable change in groundwater flow from these springs is expected, and no impacts to these springs are expected as a result of the Proposed Action.

Direct Impacts to Animals

Birds

The Proposed Action would reduce and degrade existing foraging and breeding habitat for some bird species that use habitats within the site. The clearing of vegetation would increase the fragmentation and isolation of remaining habitats. The components of the Proposed Action with the greatest potential to impact bird habitats are the clearing of vegetation which would eliminate the existing foraging and breeding habitats for birds.

Reclamation of the mine slopes would continue to progress. After mining activities are completed, the Proposed Action would increase the acreage of reclaimed and reforested areas on the mine slopes, and their associated potential habitat for birds, by approximately 177 acres.

The removal of the Kettle Wetland could disrupt bird habitat and reduce breeding, wintering, and migration habitat for bird species until habitat in the mitigation wetland is fully functional. Although different from wetland buffer habitat, restored forests on reclaimed slopes are currently maturing and would continue to provide new habitat to offset this impact.

Mammals

The Proposed Action would alter habitat for mammal species within the site for reasons similar to those described for above for birds. The majority of individual mammals would disperse into adjoining habitats; however, some of the individual mammals could perish. The proximity of the site area to similar intact habitats would provide dispersal routes as proposed clearing begins. Clearing would occur segmentally which may provide small mammals opportunity to relocate and disperse into newly reclaimed areas.

Amphibians and Reptiles

Within the Kettle Wetland, any existing amphibians would perish during the clearing of the surface vegetation and soils. New habitat with similar hydrology would be created in the mitigation wetland to compensate for these impacts; see Sub-section 3.6.3 for detail.

Washington Department of Fish and Wildlife Priority Species

Removal of mature trees in the coniferous forest could reduce habitat for big brown bat, little brown bat, and Yuma myotis bat priority species. Clearing of forested areas within the site would reduce habitat that is thought to have once been within the historical range of gray squirrels but is unlikely to be occupied by the current population.

U.S. Fish and Wildlife Service Threatened and Endangered Species

No ESA-listed animals species habitat would be altered directly as a result of the Proposed Action. Refer to Section 3.4, **Fisheries**, of this EIS for analysis of the potential effects on fish species.

Indirect Impacts to Animals

Birds

The alteration of wetland systems within the off-site area with the changes in groundwater level without Sequelitchew Creek Restoration, particularly East and West Edmond Marsh,

could disrupt bird habitat and reduce breeding, wintering, and migration habitat for bird species. These areas are documented to regularly attract concentrations of waterfowl. However, the potential impacts to wetland area associated with changes in groundwater level is anticipated to be minor relative to the size of the wetland systems, particularly in combination with the Sequalitchew Creek Restoration Plan activities (see *Cumulative Impacts* below for detail).

Mammals

The alteration of Edmond Marsh and other wetland systems that could be modified by the changes in groundwater without mitigation could disrupt the existing wetland mammal habitat by removing existing water and food sources and sheltering vegetation, thereby reducing the available breeding and foraging habitat for aquatic habitat dependent mammal species (e.g., beaver). However, the potential reduction in wetland areas due to changes in groundwater level are expected to be minor relative to the size of the wetland systems, particularly in combination with the Sequalitchew Creek Restoration Plan activities (see *Cumulative Impacts* below for detail). Use of the Seep Wetlands by mammals is unlikely, and a reduction in the size or the loss of the Seep Wetlands would have minimal impacts due to the proximity of the much larger Sequalitchew Creek and its associated riparian areas, which provide mammalian habitat.

Amphibians and Reptiles

Loss of wetland area, alterations to seasonal inundation patterns, and subsequent changes in plant communities would reduce the area of habitat that support amphibians. These changes could indirectly disrupt amphibian habitat and reduce breeding, wintering, and foraging habitat for amphibian species.

The early drying of normally inundated areas could adversely affect amphibian breeding by lowering surface water levels during the breeding and rearing seasons. This could result in the loss of available habitat, leading to exposure of egg masses and rearing juveniles from reduced water levels. Tadpoles, juveniles, and adults may disperse to areas that remain inundated during early drying periods. However, the existing amphibian population likely uses all available habitats. Thus, unoccupied amphibian habitats are likely to be unavailable to individuals dispersing from drying portions of the wetlands. However, the potential reduction in wetland area associated with the changes in groundwater level is expected to be minor relative to the size of the wetland systems, particularly in combination with the proposed Sequalitchew Creek Restoration Plan activities (see *Cumulative Impacts* below for detail).

CUMULATIVE IMPACTS WITH PROPOSED ACTION AND SEQUALITCHEW CREEK RESTORATION PLAN

Introduction

As indicated in **Chapter 2** (Description of Proposed Action and Alternatives) of this EIS, the 2011 Settlement Agreement indicates that any approval for mining under the Pioneer Aggregates South Parcel Project shall include a provision that prohibits mining until permits are in place to implement the Sequalitchew Creek Restoration Plan developed by CalPortland and the Environmental Caucus, as a separate but related action. The Sequalitchew Creek Restoration Plan seeks to restore and enhance streamflow and ecological functions from Sequalitchew Lake through Edmond Marsh into Sequalitchew Creek ravine. The Restoration Plan seeks to address almost two centuries of human manipulation. The principal goals of the Restoration Plan are to restore flows in Sequalitchew Creek, portions of which are now dry. This goal will be achieved by implementing a series of actions in a coordinated and adaptively managed project. The Restoration Plan is intended to sequentially restore diverted flows back to the creek, improve the sustainability of flows through the system, and restore aquatic habitat by removing flow-related fish passage barriers and increasing the habitat available to aquatic species.

The Sequalitchew Creek Restoration Plan has the potential to restore an annual average of 12.9 cfs to a 1,200-foot reach of Sequalitchew Creek that currently experiences little to no consistent flow. Seasonally, the flows in this reach following restoration are predicted to be between 2.5- cfs in August up to just over 26 cfs in March. Flows of this magnitude would re-establish a functioning stream in the now frequently dry channel, providing new aquatic and riparian habitat and a connection between the Sequalitchew Creek ravine and the marshes. This would provide a corridor for both aquatic and terrestrial species and would provide new opportunities for species expansion and recovery.

Cumulative Conditions

The combined impacts of mining under the Proposed Action together with implementation of the Sequalitchew Creek Restoration (the 'cumulative condition') on stream and wetland habitat is discussed below.

Sequalitchew Creek

The combined impacts under the cumulative condition on stream habitat would include re-establishing flow from Sequalitchew Lake to flow through the marshes and into Sequalitchew Creek ravine. The cumulative condition would also result in re-establishing the ecosystem process, specifically, the movement of water, sediment, nutrients, biota, and dissolved gases through the watershed from the headwater springs on Sequalitchew Lake to

Puget Sound. The increase in hydrology and stream energy are anticipated to increase aquatic ecosystem productivity and create and maintain habitat diversity. See Section 3.3, **Fisheries**, for discussion on cumulative conditions associated with stream flow and creek water quality.

Wetlands

The Sequelitchew Marsh wetland complex has increased in size by more than 30 acres since the late 1990s when efforts to maintain a channel through the system were abandoned, and beaver dams began to raise water levels, preventing flow from reaching the ravine and redirecting nearly all flow to the Diversion Canal (see **Figure 3.6-1**). A fundamental goal of the Sequelitchew Creek Restoration Plan is to direct flows from the Diversion Canal back down Sequelitchew Creek. This requires restoring the historical gradient from the outlet of Sequelitchew Lake to the top of the ravine, which would require a lowering of water levels in some parts of the wetland complex resulting in a reduction of wetland acreage. Some wetland and lake fringe habitats would be gained with the Sequelitchew Creek Restoration Plan. Raising water levels in Hamer Marsh would compensate for some wetland loss. Removing fill from Edmond Marsh would also compensate for some wetland loss and more connectivity and function in the wetland.

Marsh Water Levels

As outlined in the Sequelitchew Creek Restoration Plan, reconnecting flow from Sequelitchew Lake to the Sequelitchew Creek ravine will require lowering water levels in some areas of the marshes in order to establish a consistent downhill gradient (refer to **Appendix H** for additional detail).

A water balance model analysis was conducted to evaluate the combined effects of the Sequelitchew Creek Restoration and mining under the Proposed Action, includes an assumption that there would be little variation in wetland water levels in the cumulative condition, as there would almost always be more than enough flow from Sequelitchew Lake to keep the wetlands full to their target elevations. However, there would likely be some summers when water levels in Eastern East Edmond Marsh would dip below the target elevations for a month or more. East and West Edmond Marshes would also experience occasional dips below the target elevation, but of lesser magnitude and much less frequently. These impacts could be reduced or eliminated by managing water level behind the beaver dams to store water and release it slowly during periods of low flow. The hydraulic gradient through the marshes would always be maintained, however, as the water level in Eastern East Edmond Marsh never dips below the water level in East Edmond Marsh allowing water stored in the marsh to flow downstream to the ravine.

The model results indicate that most months of the year (September through June), the wetland system would experience contribute a small amount of additional water to the flow from Sequelitchew Lake, ranging from a 8% gain in April up to a 26% gain in October.

However, in the driest months (July and August) some flow (up to 3%) would be lost in the wetlands from evaporation and losses to groundwater. (see **Appendix H** for additional detail).

Wetland Water Quality

The cumulative condition would benefit the water quality in Eastern East Edmond Marsh and Edmond Marsh by providing a large amount of high-quality water. The residence time in the wetlands would be less than at present, decreasing from weeks or months to days. Water quality in the wetlands would be dominated by the input from Sequalitchew Lake. As a result, dissolved oxygen would be higher, and the pH would be slightly more neutral. Temperature and turbidity have been about the same in the lake and marshes, so little change is anticipated in these parameters. It is also anticipated that the elevated iron concentrations observed in the center of Edmond Marsh would be resolved through flushing and dilution with Sequalitchew Lake water (see **Appendix H** for detail).

Conifer Forest

The restoration of the watershed under the cumulative condition would allow the re-establishment of conifer forests around the perimeter of Edmond Marsh. These forests have been recently lost due to raising water levels, particularly on the northern boundary of East Edmond Marsh. Other impacts would be similar to those described for the Proposed Action.

Landmark Trees, Shrublands, and Grasslands

Landmark tree, shrubland and grassland conditions would not be affected by the cumulative condition, and conditions would be similar to described for the Proposed Action.

Aquatic Resources

West Edmond Marsh - The marsh would be more frequently and continuously inundated in the deeper areas of the wetland, and seasonal fluctuations in water levels would decrease in the cumulative condition. This would occur as a lower and more stable outlet hydrology is established in place of the existing beaver dam. The beaver dam currently prevents flow out of West Edmond Marsh, but it is occasionally breached. Reducing or eliminating these rapid changes in hydrology under the cumulative condition would help to stabilize the vegetation communities which are currently susceptible to hydrologic fluctuations.

East Edmond Marsh - Water levels in East Edmond Marsh are currently higher than in Eastern East Edmond Marsh and West Edmond Marsh. This reverses the gradient of Sequalitchew Creek preventing surface flow to the ravine from West Edmond Marsh. The cumulative condition (specifically the Sequalitchew Creek Restoration Plan) would lower water levels in East Edmond Marsh to restore a gradient from Lake Sequalitchew to the ravine. This would impact habitats, particularly along fringes of the wetland where forested

areas would be able to re-establish. Forested wetland and wetland buffer has been lost over the past decades as water levels have risen. Rising water levels have also been responsible for the loss of scrub-shrub vegetation and detritus from those communities has prevented establishment of an emergent vegetation community.

Sequalitchew Creek Ravine Wetlands - Changes in groundwater flow under the Proposed Action in combination with the Sequalitchew Creek Restoration Plan would be anticipated to still result in a disruption of Ravine (seep) Wetland habitat (as described for the Proposed Action). In addition, the Sequalitchew Creek Ravine Wetlands would be impacted as flows in the creek are restored in the cumulative condition. This would cause a change in the bankfull width of Sequalitchew Creek as well as the sediment load being actively transported downstream. Over the subsequent several decades, the riparian and floodplain wetland communities would be affected by deposition of new floodplain terraces, channel migration, increased wet season flows and other natural stream processes.

Brackish Marsh - Due to the increased base and peak flows in Sequalitchew Creek in the cumulative condition (particularly with the Sequalitchew Creek Restoration Plan), the Brackish Marsh at the mouth of Sequalitchew Creek is likely to be affected by increased sediment inputs and decreased salinity due to increased volumes of fresh water discharging into the wetland.

Increased sediment inputs into the Brackish Marsh due to increased flows in Sequalitchew Creek could modify the existing wetland topography, and as a result, the existing vegetation. Sedimentation would be minimized by controlling the discharge into Sequalitchew Creek during implementation of the Restoration Plan to prevent a rapid mobilization of sediments in the stream reaches upstream of the Brackish Marsh. Stream flows would be slowly increased to allow the channel and stream bank vegetation to adapt to the increased flow rates. With appropriate upstream mitigation, changes in sediment loading to the Brackish Marsh are expected to be minimal and would be further minimized by tidal flushing.

Salinity in the Brackish Marsh would continue to be driven by tidal inflows and decreases in salinity associated with freshwater flows would only be expected during high flow events in winter months. Increased flow in Sequalitchew Creek with cumulative conditions is not expected to affect existing Brackish Marsh vegetation or functions.

Other Wetlands - The cumulative condition is not anticipated to impact the Nearshore Springs or Nearby Wetlands.

Birds

The cumulative condition (specifically the Restoration Plan) would reverse the changes in bird habitat in East and West Edmond Marsh that have occurred over the last three decades. This would include a reorganization of some specific habitats to include scrub-

shrub wetlands and forested wetlands. It would increase the area of forested wetland buffer as water levels in some areas of East Edmond Marsh drop and increase the amount of and persistence of emergent wetland habitat in the west end of West Edmond Marsh.

Mammals

Beaver in the Edmond Marsh complex would be actively managed under the cumulative condition (specifically the Sequelitchew Creek Restoration Plan). The intent is to maintain the beaver population while managing water levels to restore flow. Other mammal species are expected to see increases in available habitat, particularly where water levels drop providing additional denning opportunities in the wetland banks and increasing the size of upland islands within the wetland complex.

Amphibians and Reptiles

Amphibian reproduction can be adversely affected by sudden, non-seasonal changes in water levels. This occurs in West Edmond Marsh when the large beaver dam above the dry reach is breached. Amphibian eggs attached to the stalks of emergent vegetation would suddenly be above water, causing complete mortality. Areas of reduced wetland area under the cumulative condition in the Edmond Marsh complex could reduce the area of habitat for some amphibian species, while others would benefit from the re-establishment of the forested riparian buffer.

ALTERNATIVE 2 – NO ACTION

The No Action Alternative includes two scenarios: Scenario A - Continuation of Existing Conditions; and Scenario B - Site Development under Existing Zoning.

Scenario A

Under Scenario A the Proposed Action would not occur and clearing and mining activities, and resulting impacts to plants and habitat, would not occur. The site would not undergo remediation from Tacoma Smelter Plume impacts leaving high concentrations of lead and arsenic in the soils which could impact animals.

The Sequelitchew Creek Restoration Plan would not receive funding from the Pioneer Aggregates South Parcel Project applicant without the Proposed Action, although it is possible that funding for the Plan could be provided from another source. Under the No Action Alternative, the improvements and benefits to habitat and impacts to groundwater with implementation of the Sequelitchew Creek Restoration Area may not occur. Also, If the Sequelitchew Creek Restoration Plan is not implemented, wildlife species within the Sequelitchew Creek Restoration would not benefit from improved aquatic resource habitat conditions.

Scenario B

Development could occur on the site consistent with underlying zoning. Future development is assumed to be consistent with the DMC Critical Areas chapter (DMC 25.105), which could allow for development within 50 feet of the top of the Sequalitchew Creek ravine. In contrast, DuPont City ordinance 95-521 prohibits mining within 100 feet of the top of Sequalitchew Creek ravine so any future development following the proposed action would be at least 100 feet from the top of the ravine, whereas future development under Scenario B could occur 50 feet from the top of the ravine. Existing coniferous forest within the Expansion Area portion of the site could be cleared with future development, with landmark trees retained in accord with DMC requirements. There would be no changes in the use of the areas of the South Parcel zoned for Open Space; these areas currently include the naturally vegetated slope of the Sequalitchew Creek ravine and the Sequalitchew Creek pedestrian trail.

Development on the site consistent with underlying zoning would also result in clearing of forested and shrub habitat, reducing habitat for wildlife species that use these habitats. Direct impacts associated with future development under existing zoning to animals would be similar to those described for the Proposed Action.

There would be no change in use of the areas within the existing mine. However, once the Re-Mine Area is reclaimed, it would likely be redeveloped according to its underlying zoning, similar to the South Parcel. The Kettle Wetland is within the existing mine and is assumed to remain intact, the buffers would remain vegetated, and mining operations would continue in other portions of the existing mine. The Kettle Wetland, its buffer, and other mine-related buffers could be reduced to the minimum width in the DMC. The Sequalitchew Creek Restoration Plan would not receive funding from the Pioneer Aggregates South Parcel Project applicant without the Proposed Action, although it is possible that funding for the Plan could be provided from another source. Under the No Action Alternative, the improvements and benefits to habitat and impacts to groundwater with implementation of the Sequalitchew Creek Restoration Area may not occur.

3.6.3 Mitigation Measures

The following mitigation measures have been included in the Proposed Action to reduce impacts to plant and animal communities, including impacts to on-site resources and indirect impacts to off-site resources due to changes in groundwater hydrology.

Proposed On-Site Mitigation

- Revegetation of cleared and mined area on the site would occur as part of segmental reclamation under the Reclamation Plan reviewed and approved by the Washington State Department of Natural Resources.
- Mitigation for impacts for the removal of the Kettle Wetland are identified in the Project *Wetland Mitigation Plan*. The design of the mitigation wetland complex is intended to create aquatic, wetland, riparian, and upland forest habitat by using groundwater intercepted within the mine. Specific Kettle Wetland mitigation goals include the following:
 - Create a constructed palustrine depressional wetland complex consisting of forested, scrub-shrub, emergent, and aquatic bed wetland areas at least 3.4 acres in size.
 - Provide adequate wetland acreage, functions, and values to mitigate all Project-related wetland impacts to the Kettle Wetland.
 - Construct a vegetated buffer at least 100 feet around the boundary of the wetland.
 - Create a larger complex of seep wetlands and springs within the mine.
- Springs and seeps will generally emanate on the eastern and southeastern slopes of the proposed mine in the South Parcel. Generally, seeps and springs will form within the lower one-third of the mine slope, approximately 20 to 30 vertical feet above the Olympia Beds. These areas will be colonized or planted with pioneer wetland species, such as horsetail (*Equisetum* sp.), buttercup (*Ranunculus* sp.), and miner's lettuce (*Montia fontana*). Additional species would be introduced later, once the soils have developed sufficiently to support seral grasses such as foxtails, rushes, sedges etc. The buffers around these new seeps will be subject to the City of DuPont's Critical Areas Ordinance (DMC 25.105.050) and protected. The minimum buffer size is 50 feet. These buffers would be planted in accordance with the mine reclamation plan and monitored in accordance with the Wetland Mitigation Plan. Control of Scot's broom, reed canarygrass, Himalayan blackberry (*Rubus armeniacus*), and other noxious weeds within areas affected by the proposed Project would also be included as part of the Project mitigation activities.
- The Applicant (CalPortland) has provided a tree replacement proposal as part of its application and will coordinate with the City of DuPont regarding the appropriate strategy for replacement of removed landmark trees through proposed mine reclamation plans.

Proposed Mitigation for Off-Site Resources

- Implementation and monitoring of the Sequalitchew Creek Restoration Plan would provide mitigation to minimize potential impacts to aquatic resources and vegetation resulting from changes to groundwater levels. As described in Chapter 2 of this DEIS, the Sequalitchew Creek Restoration Plan will be permitted and implemented contemporaneously with mining of the South Parcel. Conditions associated with this mitigation measure are the same as described above in the subsection Cumulative impacts with Proposed Action and Sequalitchew Creek Restoration Plan.

Other Possible Contingency Mitigation Measure

- As an element of the approval conditions for the Proposed Action, the City of DuPont could require a Monitoring and Response Plan. The Monitoring and Response Plan could include, among other things, definition of monitoring methodology, establishment of performance thresholds, and identification of contingency response measures to be considered for implementation if monitoring indicates exceedance of a performance threshold. The Monitoring and Response Plan could incorporate elements of the adaptive management processes proposed to be established for the Proposed Action and the Sequalitchew Creek Restoration Plan.

The Sequalitchew Creek Restoration Plan is a separate but related action that is intended to be implemented in parallel with the Proposed Action. The mine and the stream restoration project each have their own adaptive management process tailored to achieving the goals and objectives of each specific project. The interaction between the two adaptive management processes could include: 1) project schedules that encourage restoration in advance of the potential impacts from mining; 2) development of performance thresholds for mining that support restoration and 3) coordinated monitoring and open sharing of information. The City, as the permitting authority for both projects would have a key role in assuring consistency between the two adaptive management plans.

3.6.4 Significant Unavoidable Adverse Impacts

Development of the Proposed Action would result in the loss of existing conifer forest/shrublands, the existing kettle wetland, and associated animal habitat on the site. The proposed site reclamation plan and wetland mitigation plan would mitigate loss of on-site resources. These impacts would be unavoidable but not considered significant with mitigation described above in Sub-section 3.6.3.

The Proposed Action would indirectly impact the off-site Seep Wetlands associated with the Sequalitchew Creek Ravine by disrupting the hydrology of these wetlands. This impact

would be unavoidable and mitigated by creation a larger complex of seep wetlands on the eastern slope of the reclaimed mine, resulting in a net impact that is considered insignificant.

Cumulatively, implementation of the Sequalitchew Creek Restoration Plan would further mitigate for the loss of wetland acreage associated with reduction in groundwater levels. The intent of the proposed mitigation measures described in Sub-section 3.6.3 with the Sequalitchew Creek Restoration Plan, is to reduce these unavoidable adverse impacts to a non-significant status. If implementation of the proposed mitigation measures fails to mitigate these unavoidable adverse impacts, the City will consider implementing other possible contingency mitigation measures listed in Sub-section 3.6.3 as part of the adaptive management process.