

North Clackamas Park

North Side Master Plan

October 2009

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I. Introduction

North Clackamas Community Park, owned by the City of Milwaukie, is the largest community park maintained by the North Clackamas Parks and Recreation District (NCPRD). It is located at 5440 SE Kellogg Drive, in Milwaukie. The 47-acre park provides a unique recreational experience for all visitors. Camas Creek divides the park into north and south halves. The northern half of the park is home to the Milwaukie Center as well as a play structure, dog run area, picnic facilities and stands of large Oak and Ash trees. The southern half of the park includes multiple sports fields, an equestrian facility, a rose garden and parking areas. Mt. Scott Creek flows west along the northern and western boundaries of the park, forming a forested edge of Oregon Ash and Oregon White Oak. The park is bordered by residential and institutional properties.

Vision

The park north of Camas Creek is an opportunity to create a passive recreation setting with an emphasis on environmental enhancement and education to balance the intensively active recreation facility south of Camas Creek. During a seven month public input process in 2007, NCPRD built consensus among all interested parties around a common vision for the north side of the park.

The common vision articulated by the stakeholders of this plan was:

1. To provide recreational opportunities in a manner suitable for all users of the park and reduce the environmental impact of these uses.
2. To identify environmentally significant areas and develop suitable recommendations for those areas.
3. To develop a unifying design theme for new elements and interpretive signage to be added to the park.
4. Develop a cost-effective master plan for the future of the north side of the park that can be implemented through innovative design solutions, and is easily maintained by NCPRD and volunteers.

Public Involvement Process

Stakeholder groups, advisory committees, park neighbors, and park users played a major role in developing the North Side Plan for North Clackamas Park. The North Clackamas Park Stewardship Committee served as Project Advisory Committee (PAC) and provided input during the Plan's development. PAC members included one representative each from the following groups:

- Friends of North Clackamas Park
- Milwaukie Center
- Dog Park
- Friends of Mt. Scott/Kellogg Creek
- Sports groups

- City of Milwaukie
- Institutional Neighbors
- Equestrians

The District contracted with Alta Planning to develop the master plan for the North side. Alta staff toured the site on several occasions with stakeholders interested in sharing their knowledge of the park and expressing their desires for future park improvements. NCPRD also met with the Friends of the Milwaukie Center Community Advisory Board, Friends of the Milwaukie Center, the Milwaukie Park and Recreation Board and the NCPRD Advisory Board during the master planning process to provide project updates and solicit comments.

NCPRD organized three public meetings to obtain input and ideas for park improvements. The first meeting focused on the goals of the plan, presentation of the site analysis and allowed the public to provide feedback to the design team. The second meeting focused on the two preliminary concepts and determined the public preference for a final design. The third meeting was a presentation of the final preferred master plan and natural resource recommendations. Following each public meeting, plans were posted to an online project Web site. NCPRD held an open house on December 20, 2007 for the community to view the final plan and draft report.

Neighbors, park users, and committee members were encouraged to voice their comments and concerns throughout the design process. In addition to public meetings, many comments were received via phone conversation, email and surveys and incorporated into the plan whenever possible.

II. Existing Conditions

Existing Facilities

North Clackamas Park is an established recreation facility enjoyed by citizens throughout the community year round. Existing facilities in the northern half of the park include:

- **Off-Leash Dog Area.** The 1.45 acre facility is heavily used year-round. During the public process, there was definite support for maintaining a dog run. A few park neighbors complain about noise of barking dogs and yelling owners and the District has been working with the City of Milwaukie to address these complaints. Users of the off-leash area feel the facility is in need of updates to improve safety for owners and dogs.
- **Play Area.** Play structures were added to the north side of the park several years ago to replace a swing set previously in the park. A large structure serves older children and a smaller structure serves children two and younger. The Master plan proposes that the structures remain in their current location.
- **Picnic Shelter.** A large group picnic shelter donated to the park by the local Rotary Club is located just west of the gravel parking area. The 2,400 square-foot, 200 person facility is one of the few shelters available for reservation in the Parks District and is occupied most

weekends during warmer months for events. The existing foundation is cracking and other repairs are likely necessary in the near future. Smaller groups are unable to reserve only a portion of the shelter. Park users have requested additional smaller covered picnic areas with grills be added to the park to replace the large shelter.

- **Bridges.** One crossing of Mt. Scott Creek is located in the northwest corner of the park and provides access to the neighborhood north of the park. There are four existing crossings of Camas Creek. Two of the crossings are arched wooden bridges built by volunteers and were recently renovated. The western-most crossing, located at the confluence of Camas and Mt. Scott Creeks, is a crushed culvert primarily used by pedestrians and maintenance vehicles. The eastern-most crossing is used by vehicles to access an unpaved gravel parking area just east of the group picnic shelter. This culvert crossing is also crushed and in need of repair or replacement.
- **Parking.** The only parking located north of Camas Creek is an unpaved gravel lot with space for approximately 25 cars. The gravel lot extends into the buffer of Camas Creek. Additional parking is available in the adjacent Milwaukie Center paved lot and in lots shared with the Sara Hite Memorial Rose Garden and the softball fields.
- **Restrooms.** Existing restrooms are located east of the off-leash dog area and north of the group picnic pavilion. These facilities are outdated and in need of upgrades. Additional restrooms are located south of Camas Creek and are primarily used by walkers and by citizens using the ball fields. Both restrooms are open year round.
- **Caretaker.** A mobile home was recently removed from the park where a permanent caretaker lived for over twenty years. Another caretaker was living in a recreational vehicle parked on park property in place of the mobile home. The district is actively searching for a new caretaker to continue to provide a 24-hour presence in the park.
- **Maintenance/ Storage.** A storage facility, located near the existing restrooms, is shared by parks maintenance and the Milwaukie Center. Large equipment is stored in a fenced area east of the off-leash dog area. The Milwaukie Center also uses a storage container north of the Center near the community garden beds. Maintenance staff has expressed a need for an equipment wash area adjacent to the storage building.

As part of the planning process, NCPRD hired Pacific Habitat Services (PHS) to complete a natural resources review (Appendix A). This information was used in conjunction with public input to help develop the conceptual plan for the park.

The northern portion of North Clackamas Park lies on fine-grained alluvial sediments between Mt. Scott Creek and Camas Creek. Topography within the park is relatively flat. Mt. Scott Creek flows to the west along the northern border of the park. Camas Creek, a small tributary of Mt. Scott Creek, also flows westward, near the southern portion of the planning area.

Plant Communities

The northern portion of the park contains mown lawn, Oak and Ash woodland, the creeks, riparian areas and wetlands.

Mowed Lawn

The mowed lawns are vegetated with typical lawn grasses and weeds, with scattered trees in some areas. Predominant grasses in the lawns include Kentucky Bluegrass and Annual Bluegrass. A significant amount of weedy, non-native species such as White Clover, Hairy Cats Ear, English Daisy, Common Dandelion and Creeping Buttercup also occur within the lawns.

Riparian Woodland

The riparian woodland generally occurs as a narrow band of vegetation along Camas Creek and the south side of Mt. Scott Creek, with more extensive woodland communities to the north of Mt. Scott Creek. The riparian woodland adjacent to Mt. Scott Creek is the largest contiguous woodland community within the park, and in this area, the woodland contains both wetland and non-wetland riparian plant communities.

Riparian woodlands within the park provide important water quality and wildlife habitat functions. The riparian woodlands act as a buffer to the stream, filtering sediments and various pollutants from runoff before the water enters the stream. Trees and shrubs within these riparian woodlands also provide shade to the stream, and this shade aids in maintaining relatively low water temperatures. The buffer provided by the riparian plant communities along Mt. Scott Creek is generally wider on the north side of the stream than on the south side of the stream. The buffer provided by riparian plant communities along Camas Creek is generally narrow, though relatively recent plantings on the south side of Camas Creek have expanded the width of the buffer. The riparian woodlands, particularly those along Mt. Scott Creek, provide habitat for a number of wildlife species adapted to suburban woodland and edge habitats, and these woodlands are likely the most important terrestrial habitat within the park.

Narrow areas of riparian woodland occur along Mt. Scott Creek and Camas Creek. The riparian woodland along Mt. Scott Creek has canopy of mature second-growth hardwoods and conifers, including Red Alder, Big Leaf Maple, Douglas Fir, Oregon Ash, Black Cottonwood and Western red Cedar.

Oregon Ash is the dominant tree species along Camas Creek. Trees, shrubs and wood vines common in the under story of the riparian woodlands include Sitka Willow, Douglas Spiraea, Snowberry, Clustered Wild Rose, Indian Plum, Vine Maple, Red-Osier Dogwood, Beaked Hazelnut, Salmonberry, Himalayan Blackberry and English Ivy.

Restoration areas on the south bank of Mt. Scott Creek downstream from its confluence with Camas Creek and on the south side of Camas Creek, between the creek and the ball fields, have planted populations of native riparian species, including Red Alder, Western Red Cedar, Sitka Willow, Douglas Spiraea and Red-osier Dogwood.

Oak–Ash Woodland

A small wooded area dominated by mature Oregon White Oak and Oregon Ash is present in the north-central and eastern portions of the park, between Camas Creek and Mt. Scott Creek, and provides a contiguous, wooded corridor between the riparian woodlands associated with the two streams. The Oak-Ash woodland is frequently mowed to maintain an open, park-like setting for picnic facilities and recreation. Herbaceous vegetation within the Oak-Ash woodland consists almost

entirely of mown grass, and this woodland generally lacks an under story of trees and shrubs, though a few scattered Common Hawthorn, Oregon Grape, and English Holly are present. The mature oaks, open forest structure and sparse under story within this community are reminiscent of oak savanna habitat, which is becoming increasingly rare in the Willamette Valley.

Invasive Species

A number of non-native invasive plant species occur throughout North Clackamas Park. These plants are especially prevalent within the riparian woodlands bordering Mt. Scott Creek. Himalayan Blackberry and large stands of English Ivy occur in the vicinity of the small pond north of Mt. Scott Creek, in the northeastern corner of the park, and along the south bank of Mt. Scott Creek near the western park boundary. Mature Common Hawthorns are scattered throughout the Oak-Ash woodland between Mt. Scott Creek and Camas Creek, and many small Common Hawthorns are present between the existing maintenance buildings and the off-leash dog area.

Although they don't currently occur as dominant species, Multiflora Rose, Japanese Knotweed, English Holly and Common Laurel Cherry also occur along Mt. Scott Creek. Canada thistle occurs in un-maintained uplands in various locations, and Reed Canarygrass is common along Camas Creek. Bittersweet Nightshade occurs as a dominant species in the forested wetlands in the northwestern portion of the park.

Table 1 - Plant Species Observed in North Clackamas Park

	Botanical Name	Common Name
Trees, Shrubs and Woody Vines	<i>Abies grandis</i>	Grand Fir
	<i>Acer circinatum</i>	Vine Maple
	<i>Acer macrophyllum</i>	Bigleaf Maple
	<i>Alnus rubra</i>	Red Alder
	<i>Betula papyrifera</i>	Paper Birch
	<i>Cornus sericea</i>	Red-osier Dogwood
	<i>Corylus cornuta</i>	Beaked Hazelnut
	<i>Crataegus monogyna</i>	Common Hawthorn
	<i>Fraxinus latifolia</i>	Oregon Ash
	<i>Hedera helix</i>	English Ivy
	<i>Ilex aquifolium</i>	English Holly
	<i>Mabonia aquifolium</i>	Oregon Grape
	<i>Oemleria cerasiformis</i>	Indian Plum
	<i>Pinus contorta</i>	Shore Pine
	<i>Pinus ponderosa</i>	Ponderosa Pine
	<i>Populus trichocarpa</i>	Black Cottonwood
	<i>Prunus avium</i>	Sweet Cherry
	<i>Prunus laurocerasus</i>	Common Laurelcherry
	<i>Pseudotsuga menziesii</i>	Douglas Fir
	<i>Quercus bicolor</i>	Wwamp White Oak
	<i>Quercus garryana</i>	Oregon White Aak

	Botanical Name	Common Name
	<i>Rosa multiflora</i>	Multiflora Rose
	<i>Rosa pisocarpa</i>	Clustered Rose
	<i>Rubus discolor</i>	Himalayan Blackberry
	<i>Rubus spectabilis</i>	Salmonberry
	<i>Rubus ursinus</i>	California Dewberry
	<i>Salix sitchensis</i>	Sitka Willow
	<i>Solanum dulcamara</i>	Climbing Nightshade
	<i>Spiraea douglasii</i>	Douglas Spiraea
	<i>Symphoricarpos albus</i>	Snowberry
	<i>Thuja plicata</i>	Western Red Cedar
Herbaceous Plants	<i>Atthyrium filix-femina</i>	Lady Fern
	<i>Bellis perennis</i>	English Daisy
	<i>Bidens frondosa</i>	Devil's Beggarstick
	<i>Centaurea cyanus</i>	Garden Cornflower
	<i>Cirsium arvense</i>	Canada Thistle
	<i>Dipsacus sylvestris</i>	Teasel
	<i>Epilobium watsonii</i>	Watson's Willow Herb
	<i>Equisetum telmateia</i>	Giant Horsetail
	<i>Hypochaeris radicata</i>	Hairy Cats Ear
	<i>Impatiens noli-tangere</i>	Western Touch-me-not
	<i>Lapsana communis</i>	Nipplewort
	<i>Ludwigia palustris</i>	Marsh Seedbox
	<i>Lysichiton americanum</i>	Skunk Cabbage
	<i>Lygonum cuspidatum</i>	Japanese Knotweed
	<i>Polypodium glycyrrhiza</i>	Licorice Fern
	<i>Polystichum munitum</i>	Sword Fern
	<i>Prunella vulgaris</i>	Heal-all
	<i>Ranunculus repens</i>	Creeping Buttercup
	<i>Taraxacum officinale</i>	Common Dandelion
	<i>Tolmiea menziesii</i>	Piggy-back Plant
Grasses, Sedges and Rushes	<i>Trifolium repens</i>	White Clover
	<i>Veronica americana</i>	American Speedwell
	<i>Bromus sitchensis</i>	Alaska Brome
	<i>Carex obnupta</i>	Slough Sedge
	<i>Dactylis glomerata</i>	Orchard Grass
	<i>Eleocharis acicularis</i>	Needle Spikerush
	<i>Eleocharis palustris</i>	Common Spikerush
	<i>Eleocharis ovata</i>	Ovate Spikerush
	<i>Festuca arundinacea</i>	Tall Fescue

	Botanical Name	Common Name
	<i>Glyceria elata</i>	Tall Mannagrass
	<i>Holcus lanatus</i>	Common Velvet Grass
	<i>Juncus effusus</i>	Soft Rush
	<i>Phalaris arundinacea</i>	Reed Canarygrass
	<i>Poa annua</i>	Annual Bluegrass
	<i>Poa pratensis</i>	Kentucky Bluegrass
	<i>Poa trivialis</i>	Rough Bluegrass
	<i>Scirpus microcarpus</i>	Small-fruited Bulrush

Wetlands and Waterways

Wetland Determination and Delineation for North Clackamas Park

PHS delineated wetlands and waterways within the southern portion of the park on June 5 and June 19, 2003, with an additional site visit on February 23, 2004 to review the jurisdictional status of wetlands and ditches on site. PHS wetland delineation results were described in a wetland delineation report dated March 10, 2004 (Appendix B). The Oregon Department of State Lands (DSL) approved the wetland delineation (DSL #2004-0153) on February 17, 2005. On October 19, 2006 PHS revisited North Clackamas Park to delineate the wetlands and waterways within the northern portion of the park. DSL approved the updated wetland delineation on April 16, 2007. Please see delineation map and concurrence letter in Appendix B.

Description of On-Site Wetlands and Waterways

Wetlands and other water resources at North Clackamas Park include Mt. Scott Creek, several palustrine forested wetlands associated with Mt. Scott Creek, Camas Creek and adjacent wetlands, and a small pond located to the north of Mt. Scott Creek.

Mt. Scott Creek and Associated Wetlands

Mt. Scott Creek, a perennial stream that flows westward along the northern boundary of North Clackamas Park, is the dominant hydrologic feature in the park. Mt. Scott Creek is 10 to 20 feet wide within the park. The stream banks are generally low and rise one to two feet above the stream bed. Small areas of erosion and undercutting are apparent on the banks, but the stream banks appear to be relatively stable. Within the park, Mt. Scott Creek has a relatively uniform gravel and cobble substrate.

PHS identified two palustrine forested wetlands associated with Mt. Scott Creek in the northwestern portion of the park. These wetlands have a forest canopy dominated by Western Red Cedar, Oregon Ash, and Red Alder with Red-Osier Dogwood, Indian Plum, Salmonberry, Clustered Wild Rose and Himalayan Blackberry occurring as dominant shrubs in the under story. Dominant herbaceous species in these wetlands include Slough Sedge, Skunk Cabbage, Reed Canarygrass, Lady Fern and Piggy-Back Plant.

Flows within Mt. Scott Creek vary seasonally, like most streams in the region, with significant groundwater inputs to base flow from the slope to the north. Large and steady fluxes of groundwater feed the wetland complex near the northwestern park boundary. Water discharged from these wetlands enters Mt. Scott Creek near the western park boundary.

Camas Creek

Camas Creek is a shallow seasonal tributary to Mt. Scott Creek that crosses the central portion of the park and flows into Mt. Scott Creek in the western portion of the park. Camas Creek originates in a palustrine emergent wetland in the northeastern portion of the park. Throughout its length, Camas Creek is a low-gradient, slow-flowing stream. The stream channel is approximately four to six feet. The stream banks are low and indistinct, and the stream channel is vegetated with Reed Canarygrass in some areas. The substrate of the Camas Creek stream channel is composed primarily of fine sediments.

A narrow wetland fringe borders the entire length of Camas Creek. The wetland has a tree canopy of Oregon Ash, and Willows, Red Alder, Red-Osier Dogwood, and Swamp White Oak. Other dominant species within the Camas Creek wetlands include Reed Canarygrass, Spike Rushes, Slough Sedge, Lady Fern and Marsh Seedbox. Groundwater inputs to Camas Creek occur throughout the stream length, but major inflows appear to be near the northeastern corner of the park and from the south in the vicinity of the upper end of the northwest-trending portion of the creek.

Pond

A small pond is present north of Mt. Scott Creek in the northeastern portion of the park. The pond was excavated and has relatively steep banks that rise approximately three feet above the surface of the water. The pond receives the majority of its water from groundwater inputs and runoff from the adjacent hillside to the north, as there is no apparent surface connection to Mt. Scott Creek.

Fish and Wildlife

With its mosaic of riparian woodlands, oak woodland, lawns, streams, and wetlands, North Clackamas Park provides habitat for a variety of wildlife species adapted to suburban landscapes. Additionally, the perennial waters of Mt. Scott Creek and the small pond in the northern portion of the site provide habitat for aquatic and semi-aquatic species, including various species of fish, amphibians and benthic macroinvertebrates. Although wildlife surveys have not been conducted at North Clackamas Park specifically, PHS observed a number of wildlife species while conducting site visits at the park, and a reach of Mt. Scott Creek surveyed for fish by the Oregon Department of Fish and Wildlife (ODFW) includes the portion of Mt. Scott Creek within the park boundaries.

PHS observed 29 species of birds at North Clackamas Park during two site visits – one on the afternoon of July 13, 2007 and one on the morning of December 13, 2007. The bird species observed by PHS on each date are listed in Table 2, below.

Table 2 - Birds observed at North Clackamas Park

Common Name	Scientific Name	Date	
		7/13/07	12/13/07
American Crow	<i>Corvus brachyrhynchos</i>	X	X
American Goldfinch	<i>Carduelis tristis</i>	X	X
American Robin	<i>Turdus migratorius</i>	X	X

Common Name	Scientific Name	Date	
		7/13/07	12/13/07
American Wigeon	<i>Anas americana</i>		X
Barn Swallow	<i>Hirunda rustica</i>	X	
Bewick's Wren	<i>Thryomanes bewickii</i>		X
Black-capped Chickadee	<i>Parus atricapillus</i>	X	X
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	X	
Bushtit	<i>Psaltirparus minimus</i>	X	X
Downy Woodpecker	<i>Picoides pubescens</i>	X	X
European Starling	<i>Sturnus vulgaris</i>	X	X
Golden-crowned Kinglet	<i>Regulus satrapa</i>		X
Green Heron	<i>Butorides virescens</i>	X	
House Finch	<i>Carpodacus mexicanus</i>	X	
House Sparrow	<i>Passer domesticus</i>	X	
Lazuli Bunting	<i>Passerina amoena</i>	X	
Lesser Goldfinch	<i>Carduelis psaltria</i>	X	
Mallard	<i>Anas platyrhynchos</i>	X	X
Northern Flicker	<i>Colaptes auratus</i>	X	X
Pine Siskin	<i>Carduelis pinus</i>		X
Red-tailed Hawk	<i>Buteo jamaicensis</i>		X
Ruby-crowned Kinglet	<i>Regulus calendula</i>		X
Sharp-shinned Hawk	<i>Accipiter striatus</i>		X
Song Sparrow	<i>Melospiza melodia</i>	X	X
Spotted Towhee	<i>Pipilo maculatus</i>	X	
Stellar's Jay	<i>Cyanocitta stelleri</i>	X	X
Townsend's Warbler	<i>Dendroica townsendi</i>		X
Western Scrub-Jay	<i>Apelocoma californica</i>	X	X
White-breasted Nuthatch	<i>Sitta carolinensis</i>		X

Water Quality

The following observations were taken from Environmental Protection Agency database collected further upstream, but are representative of those in the park.

- Water quality is generally good (stream likely supports a population of resident cutthroat trout though water quality generally deteriorates as water moves downstream through increasingly urbanized areas).
- Water temperatures were found to follow the local climate with maximum recorded summer temperatures reaching 20°C (68°F).
- Dissolved oxygen concentrations are below state water quality standards (greater than 90-95% saturation), falling as low as 63% saturation.
- The pH of the water was within state standard and ranged from 6.8-7.4 standard units.
- The alkalinities of the stream are high enough (>20 mg/L) to adequately buffer pH fluctuations.
- The bacteria standard was exceeded, likely reflecting the urbanized nature of the watershed and the high fecal bacteria levels generally associated with storm water runoff from urban areas.
- Suspended sediment fluxes have not been measured, but the bed material at low flows through the portion of Mt. Scott Creek along the northern border of the park suggest that a considerable flux of silt is moving through the stream.
- Overall, the water quality of Mt. Scott Creek is typical of water quality in similar urbanized streams.

Desired Future Condition

The desired future condition (DFC) for North Clackamas Park is a community park that provides recreational opportunities as well as forested riparian wetland and non-wetland habitats that consist of native plant species and contain good structural diversity. Plant communities will consist of natural associations and will contain a diversity of native species. The overstory canopy will remain much as it exists in the wooded portions of the park. Non-native invasive species such as Reed Canarygrass, Himalayan Blackberry, and English Ivy will be removed, and native trees, shrubs, grasses and forbs will be planted to augment the existing riparian communities. The implementation of the NCPRD Integrated Pest Management Program will help to prevent invasive species from becoming established and out-competing the native vegetation.

The riparian buffers along Mt. Scott Creek and Camas Creek will be expanded up to 70 feet on the south sides of the streams, and these buffers will be planted with native trees and shrubs to shade the water surface. Supplemental shrub plantings within the existing wooded area on the south side of the east-west portion of Mt. Scott Creek downstream from Camas Creek confluence will provide additional stream shading. Reduced human impact immediately adjacent to the stream will allow a denser growth of vegetation along the stream channels. The riparian buffers will be allowed to undergo natural ecological succession to develop species diversity and vegetation structure to provide shelter, food, and reproduction opportunities for native fauna. Native grasses and wildflowers in a meadow community south of Mt. Scott Creek will provide habitat for bees, butterflies, and other insects as well as birds and small mammals.

The combination of increased stream shade and stream habitat improvements will benefit salmonids and other aquatic organisms. The proposed removal of the culvert near the mouth of Camas Creek and the restoration of the stream bed and banks will improve the connectivity of habitats between Mt. Scott Creek and the lower reaches of Camas Creek. Large woody debris in Mt. Scott Creek will diversify flows, vary sediment distribution, and provide substrate diversity, which will benefit aquatic macroinvertebrates as well as fish. Minor excavation of the outflow channel of the wetland in the northwestern portion of the park will improve the hydrologic connection between the wetland and Mt. Scott Creek and allow water to back up into the wetland during high flows, providing low-velocity refugia for fish during flood events.

III. Constraints and Opportunities

Site constraints and opportunities were identified through a series of meetings and site visits with NCPRD staff, City of Milwaukie staff, members of the stewardship community and the public. A site analysis map at the end of this section illustrates these points.

Constraints

Creek and Wetland Buffers

The north side of North Clackamas Park is bound by Mt. Scott Creek to the north and west and Camas Creek to the south. City of Milwaukie water quality resources regulations requires both of these creeks to have a fifty foot (50') buffer from the top-of-bank. No structures may be located in the buffer without approval and appropriate mitigation and plantings must be of the appropriate species and densities. Public trails and boardwalks may be allowed within the buffer limits with approval by the City of Milwaukie.

Flooding

Flooding is a concern in North Clackamas Park. Approximately 70% of the north side of North Clackamas Park is located within the 100 year floodplain. Improvements in the floodplain must meet special requirements. In addition, there are areas officially designated as out of the floodplain that are known to hold standing water during extended periods of rain. Any recommendations made for these areas will meet the requirements of the City of Milwaukie Municipal Code Chapter 18.04 – Flood Hazard Areas. Examples of some of the floodplain regulations include:

- Balanced cut and fill
- Crossing as close to perpendicular as possible
- New structures shall have the lowest floor at least one foot above base flood elevation or be flood-proofed

Existing Facilities

Many existing facilities on the north side of North Clackamas Park will remain in their current location. These include: the Milwaukie Center (including parking and all outdoor activities), the playground (including adjoining benches and sidewalks), the crossing of Mt. Scott Creek, and the two recently renovated crossings of Camas Creek.

Some existing facilities and uses will remain in the north side of North Clackamas Park, but new locations are proposed. These include: the off-leash dog area, maintenance equipment storage, caretaker housing, restrooms, parking, picnic shelters, horseshoe pits and a creek crossing near the confluence of Camas Creek and Mt. Scott Creek.

Opportunities

Property Acquisitions

North Clackamas Parks and Recreation District recently acquired two pieces of property along the northern border of North Clackamas Park.

One and a half acres were acquired south of Mt. Scott Creek between the off-leash dog area and the existing caretaker's house. Currently, this area is used for equipment storage and a fence separates it from the rest of the park. Enhancement of this riparian area is needed to improve wildlife habitat.

An additional one and a half acres was donated to the District in 2006 north of the former caretaker's facility and north of Mt. Scott Creek. A small pond was dredged out of this area many years ago. This property is currently inaccessible from the park or the neighborhood due to steep slopes on the north and the creek on the south. Enhancement of this riparian area is needed to improve wildlife habitat.



Figure 2: Map highlighting the newly acquired property on the north side of the park.

Education

Few people understand the benefits watersheds and wetlands provide and fewer still understand how their actions affect sensitive wetland environments. Opportunities to educate park users about these sensitive areas exist throughout the park.

Community Partnerships

Numerous opportunities exist to bring the park community together during the process of updating facilities in North Clackamas Park. Some opportunities to consider include:

- Improvements to the off-leash dog area serve as an opportunity to welcome dog owners to the park. Dog owners provide watchful eyes during times when other users do not visit the park and their presence deters undesirable activities.
- The Milwaukie Center has many programs for senior citizens. One partnership is the pairing of a new walking trail in the park with the existing walking program at the Milwaukie Center. Further partnership opportunities should be explored.

- Community service groups have a history of organizing volunteer projects within the park and those partnerships should continue. The Boy Scouts previously repaired two of the foot bridges that cross Camas Creek. Other groups have held park trash clean up events, monitored and counted wildlife within the park and replaced invasive plants with native plants in wetland and creek buffer areas.

IV. Master Plan

Program Elements

Maintenance Building

NCPRD maintenance staff needs an area for washing and storing equipment in the park that has utility connections. The Milwaukie Center needs additional storage for Meals on Wheels equipment, special event items and other program materials. The plan shows these facilities as a combined area north of the Milwaukie Center. This location was preferred by those who participated in the public planning process and by staff from Oregon Department of Fish and Wildlife who toured the site. An access drive is provided through the new parking lot and the building is located east of the proposed off-leash dog area.

Caretaker

The plan proposes a space for park caretaker housing just east of the off-leash dog area. This location utilizes existing utility connections and positions the caretaker in a centralized location.

Restrooms

Restrooms are located just west of the new parking lot halfway between the entrance to the off-leash dog area and the playground. This facility is to replace the current out of date structure.

Fencing

Split rail fencing will be located south of Mt. Scott Creek near the overlooks and crossing of Camas Creek and northeast of the walking path north of the proposed maintenance facility. The creek bank in these areas is eroded and fencing will help rejuvenate native plantings, protect wildlife in these areas, and reduce erosion. The remaining buffers are densely planted and will be signed as protected areas. Additional fencing will be added to protect plantings and sensitive areas as needed.

Parking

A new vehicle parking lot (estimated to be about forty spaces) and passenger drop-off is located in the approximate location of the existing gravel lot. The final design of the parking area (including the number of spaces, surfacing and storm drainage) will comply with requirements from table 19.503.9 in the City of Milwaukie Municipal Code. The existing crossing of Camas Creek is removed and a new bridge is provided.

Off Leash Dog Area

The proposed off-leash dog area is shifted east of its existing location and is approximately the same size as the existing facility (1.45 acres). Relocating the dog park farther from homes will alleviate some of the noise impacts on park neighbors.

A new fence will delineate the off leash area and plantings will provide a buffer between dogs and other park users. Double gates with separate points of entry and exit are recommended to improve safety, and the space is divided between large and small dogs (or aggressive and passive dogs). Entry plazas with benches, kiosks, water and shade structures make the off-leash area more pleasant for visitors and their dogs. Perimeter plantings provide a visual separation between the off leash area and the other park activity areas.

Playground

The existing playground will not be changed. A new play area with climbing boulders will be added to the north west of the existing playground.

Picnic Shelters

Two group shelters are proposed to replace the existing large shelter in the park. A larger shelter is proposed to be located south of the new parking lot and is proposed to be approximately two-thirds the size of the existing shelter. A smaller shelter is proposed near the playground. The total size of covered, group picnic facilities in the park is unchanged.

Educational Creek Overlooks

Two overlooks of Mt. Scott Creek with benches and educational signage provide wildlife viewing opportunities and allow visitors to access the creek without disturbing the buffers.

Trails

A half-mile (1/2) loop trail follows the southern and eastern buffers of Mt. Scott Creek, the northern buffer of Camas Creek and the eastern boundary of the park. Public input indicated a majority of park users want the trail to be paved to meet the needs of all users; however, City regulations may restrict use of impermeable surfaces in this area. Several options including crushed fines, impermeable asphalt and concrete will be considered. In addition, exercise stations geared toward a senior walking program are shown in groups of threes evenly spaced around the trail.

Horseshoes

The horseshoe courts are relocated north of the existing playground. The courts are oriented north-south so players are never facing the sun. A low fence is proposed around the courts if safety concerns arise.

Signage

The need for appropriate signage in the park was mentioned numerous times during the public involvement process. The Conceptual Signage Plan shows four types of signs and where they

should be placed in the park. The types are: Educational, Informational, Health and Fitness and Plant Identification

Educational Signs

Educational signs will be about 3 feet high with angled panels. Each of these panels will include information about topics that pertain to that area of the park. For example, the signs at the overlooks could include information and graphics about the Mt Scott Creek. History of the creek, details about the larger river system, ways to protect the health of the creek are all topics that could be covered. Other panels in the park should include graphics and information about native wildlife, plants, and natural history of the region. In addition, there is desire to have an interpretive sign near the art piece at the entrance to the park. This sign should be similar to the rest of the educational signs in the park.

Informational Signs

Informational signs will be placed at various locations along the trail. These signs will include basic information about the park such as hours of operation, park rules and a park map. In addition, there will be a sign at the entrance to the off-leash dog area. This sign will include rules pertaining specifically to the use of this area.

Health and Fitness

The proposed exercise stations are vertical with sides that display informational and educational sign panels. The manufacturer of these stations has a number of options for panels that include health and fitness information beyond just instructions for the specific exercise at that station. These include panels about preventing osteoporosis, healthy eating, and ideas for other exercise.

Plant Tags

Plant tags are an extension of the educational signs and will be no more than 1 foot high. They will be inconspicuous from a distance, but readable when a person is standing near the plant. These tags will identify key native species throughout the park and include the common plant name, the botanical name, and a short description about where the native habitat, growth habit, and any other interesting facts. Each type of plant will be identified no more than one time in the park and the tags will be located along the proposed pathway when possible. The Master Gardeners are a valuable resource and have shown interest in being responsible for the content of native plant tags.

Sign topic and content

NCPRD has been working with the Stewardship Committee to determine topics for the interpretive signs. This committee has done extensive research regarding signage options. Their recommendations are for durable signs made of metal with rounded corners. This committee also has generated lists of topics for consideration for the educational signs. These include: Watershed Map, Native Plants and Trees, Mammals

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(deer, squirrels, rabbits, etc.), Birds (owl, Blue Heron, hawk, etc.), Slithery creatures (snakes, snails, frogs, etc.), and Insects (crickets, ladybugs, dragonflies, etc.).

Restoration

This section includes short and long-term natural resource improvements that are recommended to be implemented by the Parks District.

Buffer Improvements

Mt. Scott Creek is not listed by DEQ as being "Water Quality Limited" for temperature. As such, it was not placed on the 303(d) list for this parameter. However, in 2006 Total Maximum Daily Loads (TMDLs) were issued by DEQ for all streams in the Willamette Sub-Basin. This means that Clackamas County needs to prepare an implementation plan describing how "system potential vegetation" (i.e. riparian vegetation that would historically have been found along the stream) will be planted along streams within their jurisdiction. DEQ has determined that planting "system potential vegetation" will adequately shade the creek and reduce water temperatures. Only a portion of riparian vegetation contributes to stream shading.

To determine the "system potential vegetation" width, Pacific Habitat Services (PHS) applied a model that it has used in other jurisdictions to Mt. Scott Creek. The reach of Mt. Scott Creek along the northern border of the park is dominated by blackberry thickets and has little tall vegetation providing shade to the stream surface. The stream surface will be shaded with a 70-foot wide riparian area along the south bank of the stream. The east-west portion of Mt. Scott Creek downstream from the Camas Creek confluence would also benefit from additional shading by planting tall shrubs beneath the existing trees along the south side of the stream.

The northeastern portion of Camas Creek is largely un-shaded and would greatly benefit from riparian vegetation along both sides of the stream, but especially along the entirely exposed south side. Planting was completed on the south side of Camas Creek when the new softball facilities were built. When these plants reach maturity Camas Creek will be further shaded. Suggested native trees and shrubs to be planted along the riparian areas of Mt. Scott Creek and Camas Creek are included in the table below.

IV-1 - Suggested Native Trees and Shrubs

Scientific Name	Common Name
Trees and Shrubs	
<i>Acer circinatum</i>	Vine Maple
<i>Acer macrophyllum</i>	Bigleaf Maple
<i>Alnus rubra</i>	Red Alder
<i>Corylus cornuta</i>	Beaked Hazelnut
<i>Crataegus douglasii</i>	Black Hawthorn
<i>Fraxinus latifolia</i>	Oregon Ash
<i>Lonicera involucrata</i>	Twinberry
<i>Oemleria cerasiformis</i>	Indian Plum
<i>Physocarpus capitatus</i>	Pacific Ninebark
<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Quercus garryana</i>	Oregon White Oak
<i>Rhamnus purshiana</i>	Cascara
<i>Rosa nutkana</i>	Nootka Rose

<i>Salix lasiandra</i>	Pacific Willow
<i>Sambucus racemosa</i>	Red Elderberry
<i>Spiraea douglasii</i>	Douglas Spiraea
<i>Symphoricarpos albus</i>	Snowberry
<i>Thuja plicata</i>	Western Red Cedar

Habitat Improvements

Culvert removal

A culvert currently exists in Camas Creek at its confluence with Mt. Scott Creek. This culvert allows maintenance vehicles and foot traffic to cross the creek. This culvert is proposed to be removed and the confluence area restored. The bed of the stream may benefit from a shallow grade control structure (e.g. check dam) to ensure the bed of Camas Creek does not down-cut and start to erode upstream. This activity will likely require local, state and federal permits. The banks should be planted with selected species from Table VI-1.

Woody Debris

The park portion of Mt Scott Creek has flow regimes that do not vary greatly with channel distance. A few large woody debris placements within the channel might locally diversify flows and vary the sediment distribution. The portion of the channel between the footbridge to Casa Del Rey Drive and the confluence with Camas Creek might be best suited to such installations.

Human Access

Removal of the trail along Mt. Scott Creek to the west of the Camas Creek and Mt. Scott Creek confluence is recommended. The banks in these areas have been eroded and compacted, reducing the cover of native vegetation. Access will be limited to discrete points to ensure that wildlife-human interaction is minimal and that damage to stream banks can be repaired. Continued access to the creek will degrade the stream health and reduce the effectiveness of other restoration work proposed in this plan. Viewing platforms at the edge of the stream will be an attractive and functional alternative to direct creek access. Educational groups will be allowed direct creek access with prior approval from NCPRD on a limited basis.

Wetland Preservation

Enhancements of the wetlands in the northwestern portion of the site will entail removal of invasive species: Reed Canarygrass and Himalaya Blackberry and replacement with small woody shrubs: Twinberry, Spiraea, and Red-Osier Dogwood. The discharge to Mt. Scott Creek near the west end of the park may be opened to allow high-flow refugia without fish entrapment. The present outflow from the adjacent wetlands is situated several feet above the stream thalweg and probably rarely is overtopped to allow water to flow into the adjacent wetlands. A small excavation of the present outflow channel would allow high flows of Mt. Scott Creek to enter the wetlands and provide a lower-velocity environment for fish during flood episodes. A log structure immediately downstream from the wetland orifice would locally raise water levels at the refugia entrance during large flows and increase the likelihood of water surface elevations sufficient to allow fish passage into the

wetland. The width of the channel at this point would require several anchored logs to achieve significant local elevation of storm flows.

Concrete Removal

Large pieces of concrete are currently located within the stream upstream of the confluence of Camas Creek and Mt. Scott Creek. These pieces of concrete should be removed and the large piece of wood located in this area cut in half to dissuade people from crossing the creek.

Oak-Ash Woodland

Staff should alternate picnic areas use and utilize moveable picnic tables so that only one of these sites is in use at a time. This will minimize the impact to mature trees from heavy use around the base and reduce hazards to park users caused by falling branches. Only the picnic area in use should be mowed by maintenance crews. This practice will help alleviate some of the compaction caused by heavy use and maintenance under the tree canopy.

Older trees will be replaced so this sensitive habitat does not disappear. New Oregon White Oak and Oregon Ash will be clustered with native under story shrubs such as Snowberry and Oregon Grape. Plantings should be coordinated with maintenance staff and managed so that over time the need to mow under these trees is significantly reduced or eliminated.

Native Meadow

Native forbs should be planted within areas to the south of Mt. Scott Creek. The south side of the meadow should be adjacent to the path that is proposed in this area. This will ensure that park maintenance activities do not extend into the native meadow. This native meadow will likely look unkempt compared to mowed areas of the park, but will provide more diverse habitat for insects and birds.

Management

The use of policies and measures contained in the NCPRD Integrated Pest Management Program adapted by NCPRD is proposed to control undesirable species within the park. As defined in the Oregon Statutes (ORS 262.1), Chapter 943, “integrated pest management” is “...a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives. The elements of integrated pest management include: (a) preventing pest problems; (b) monitoring for the presence of pests and pest damage; (c) establishing the density of pest population, which may be set at zero, that can be tolerated or corrected with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic or aesthetic threshold; (d) treating pest problems to reduce population below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical and pesticidal control methods and that shall consider human health, ecological impact, feasibility and cost effectiveness; and (e) evaluating the effects and efficacy of pest treatments.”

As prescribed in the Integrated Pest Management Methodology contained in PP&R's Integrated Pest Management Program, various integrated pest management measures are evaluated and considered together so that the best overall solutions are chosen and implemented. The prevention of pest problems through good policy and planning are assessed first. Cultural practices, avoidance measures, and physical means of managing pests are assessed next. Finally, mechanical practices, trapping, biological controls, and the use of natural and synthetic pesticides are assessed.

Incorporation of this integrated pest management policy into the maintenance activities at North Clackamas Park is recommended to ensure the protection of Mt. Scott Creek and Camas Creek and to help restore populations of salmonids in Mt. Scott Creek.

Mowing

Other maintenance considerations include limiting mowing to areas outside of the riparian zones. Mowing within the Oak-Ash Woodland will be limited. The trees in the woodland may be damaged by mowing equipment allowing bacteria, fungi, viruses and insects to damage mature, valuable trees. To ensure that the trees are protected and that habitat is improved, native shrubs, such as Snowberry and Oregon grape should be planted around the base of selected tree groups.

V. Next Steps

Plan Implementation

NCPRD will make improvements to the park as funding is available. This plan will make it possible for NCPRD to apply for grants and solicit partnerships to help complete improvements.

This plan is conceptual in nature. Final decisions regarding dimensions, materials and precise locations of improvements will be determined per all applicable regulatory requirements and as funding is available.

NCPRD will coordinate improvements with the City of Milwaukie and will follow necessary land use processes to ensure elements are consistent with all City policies and codes. NCPRD is also committed to making sure all other regulatory permits have been acquired prior to project commencement (e.g. Army Corps of Engineers, Division of State Lands, etc).

VI. Appendix A- Natural Resources Review

North Clackamas Park North Side Planning Process (Township 2 South, Range 2 East, Section 6, TL 100)

Prepared for
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Prepared by
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December 19, 2007



1.0 INTRODUCTION

The North Clackamas Parks and Recreation District hired Alta Planning + Design, Inc. (Alta) to manage the North Side Planning Process for North Clackamas Park (Park) in Milwaukie, Oregon. The park is located on Kellogg Creek Drive (Township 2 South, Range 2 East, Section 6, Tax Lot 100; Latitude 45° 25' 33", Longitude 122° 36' 33" W). The general location of the park is illustrated on Figure 1. All figures are in Appendix A.

The goal of the planning process is to prepare a Master Plan for the northern half of the park. Planning for the southern half of the park, which is dominated by more active uses such as baseball diamonds, is essentially complete. Pacific Habitat Services, Inc. (PHS) was hired to address natural resource issues associated with the North Side Planning Process. Although the northern half of the park contains some active uses, such as play equipment, a dog park, and a picnic shelter, it is also contains Mt. Scott Creek, Camas Creek, their riparian areas and an oak/ash woodland. As such, this portion of the park lends itself to more passive, natural resource-focused uses.

As part of the planning process, several meetings were held to understand the issues that were most important to the public. One theme commonly expressed was the desire to improve the quality of habitat within the northern portion of the park. This report describes the existing conditions within the park and reviews the natural resource issues associated with the proposed improvements.

2.0 EXISTING CONDITIONS

The northern portion of North Clackamas Park lies on fine-grained alluvial sediments between Mt. Scott Creek and Camas Creek. Topography within the park is relatively flat. Mt. Scott Creek flows to the west along the northern border of the study area. Camas Creek, a small tributary of Mt. Scott Creek, also flows westward, though near the southern portion of the planning area.

The northern portion of the park contains mown lawn, oak woodland, the creeks and their riparian areas, the Milwaukie Center, a dog park, and buildings. The following sections describe natural resources (including plant communities, wetlands, waterways, and fish and wildlife resources) within the northern portion of the park.

2.1 Plant Communities

Plant communities within North Clackamas Park include riparian woodland, oak woodland, and mowed lawns. Brief descriptions of each of the park's plant communities are provided below. A discussion of the prevalence of non-native, invasive species within the park is also provided below. Table 1, at the end of this section, is a list of plant species (native and non-native) observed within the park. This list is not intended to provide a complete inventory of plant species that occur within the park; however, it does serve to characterize the dominant species within the park's plant communities.

Mowed Lawn

Vegetation within the area north of Camas Creek consists of intensively mown lawn. The mown lawns include an off-leash dog park, picnic areas, and other areas used for general recreational activities. The lawns are vegetated with typical lawn grasses and weeds, with scattered trees in some areas. Predominant grasses in the lawns include Kentucky bluegrass (*Poa pratensis*) and annual bluegrass (*Poa annua*). Significant amount of weedy, non-native species such as white clover (*Trifolium repens*), hairy cats-ear (*Hypochaeris radicata*), English daisy (*Bellis perennis*), common dandelion (*Taraxacum officinale*), and creeping buttercup (*Ranunculus repens*) also occur within the lawns.

Riparian Woodland

Narrow areas of riparian woodland occur along Mt. Scott Creek and Camas Creek. The riparian woodland along Mt. Scott Creek has canopy of mature second-growth hardwoods and conifers, with red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), Douglas fir (*Pseudotsuga menziesii*), Oregon ash (*Fraxinus latifolia*), black cottonwood (*Populus trichocarpa*), and western red cedar (*Thuja plicata*). Oregon ash is the dominant tree species along Camas Creek. Trees, shrubs, and wood vines common in the understory of the riparian woodlands include Sitka willow (*Salix sitchensis*), Douglas spiraea (*Spiraea douglasii*), snowberry (*Symphoricarpos albus*), clustered wild rose (*Rosa pisocarpa*), Indian plum (*Oemleria cerasiformis*), vine maple (*Acer circinatum*), red-osier dogwood (*Cornus sericea*), beaked hazelnut (*Corylus cornutus*), salmonberry (*Rubus spectabilis*), Himalayan blackberry (*Rubus discolor*), and English ivy (*Hedera helix*). Restoration areas on the south bank of Mt. Scott Creek downstream from its confluence with Camas Creek and on the south side of Camas Creek, between the creek and the ball fields, have planted populations of native riparian species, including red alder, western red cedar, Sitka willow, Douglas spiraea, and red-osier dogwood.

The riparian woodland generally occurs as a narrow band of vegetation along Camas Creek and the south side of Mt. Scott Creek, with more extensive woodland communities to the north of Mt. Scott Creek. The riparian woodland adjacent to Mt. Scott Creek is the largest contiguous woodland community within the park, and in this area, the woodland contains both wetland and non-wetland riparian plant communities. Wetlands within North Clackamas Park are discussed further in Section 2.2 of this report.

Riparian woodlands within the park provide important water quality and wildlife habitat functions. The riparian woodlands act as a buffer to the stream, filtering sediments and various pollutants from runoff before the water enters the stream. Trees and shrubs within these riparian woodlands also provide shade to the stream, and this shade aids in maintaining relatively low water temperatures. The buffer provided by the riparian plant communities along Mt. Scott Creek is generally wider on the north side of the stream than on the south side of the stream. The buffer provided by riparian plant communities along Camas Creek is generally very narrow, though relatively recent plantings on the south side of Camas Creek have expanded the width of the buffer. The riparian woodlands, particularly those along Mt. Scott Creek, provide habitat for a number of wildlife species adapted to suburban woodland and edge habitats, and these woodlands are likely the most important terrestrial habitat within the park. Fish and wildlife resources within the park are discussed in more detail in Section 2.3, below.

Oak – Ash Woodland

A small wooded area dominated by mature Oregon white oak (*Quercus garryana*) and Oregon ash is present in the north-central and eastern portions of the park, between Camas Creek and Mt. Scott Creek, and provides a contiguous, wooded corridor between the riparian woodlands associated with the two streams. Under existing conditions, the oak-ash woodland is frequently mowed to maintain an open, park-like setting for picnic facilities and playground equipment. Because of the frequent mowing, herbaceous vegetation within the oak-ash woodland consists almost entirely of mown grass, and this woodland generally lacks an understory of trees and shrubs, though a few scattered common hawthorn (*Crataegus monogyna*), Oregon grape (*Mahonia aquifolium*), and English holly (*Ilex aquifolium*) are present. The mature oaks, open forest structure and sparse understory within this community are reminiscent of oak savanna habitat, which is becoming increasingly rare in the Willamette Valley. Wildlife usage within this oak – ash woodland is described in Section 2.3, below.

Invasive Species

A number of non-native invasive plant species occur throughout North Clackamas Park. These plants are especially prevalent within the riparian woodlands bordering Mt. Scott Creek. Himalayan blackberry is prevalent throughout the riparian woodland bordering Mt. Scott Creek, and large stands of English ivy occur in the vicinity of the small pond north of Mt. Scott Creek, in the northeastern corner of the park, and along the south bank of Mt. Scott Creek near the western park boundary. Mature common hawthorns are scattered throughout the oak-ash woodland between Mt. Scott Creek and Camas Creek, and many small common hawthorns are present between the existing maintenance buildings and the off-leash dog area. Although they don't currently occur as dominant species, multiflora rose (*Rosa multiflora*), Japanese knotweed (*Polygonum cuspidatum*), English holly (*Ilex aquifolium*), and common laurelcherry (*Prunus laurocerasus*) also occur along Mt. Scott Creek. Canada thistle (*Cirsium arvense*) occurs in unmaintained uplands in various locations, and reed canarygrass (*Phalaris arundinacea*) is common along Camas Creek. Bittersweet nightshade (*Solanum dulcamara*), a non-native, invasive woody vine, occurs as a dominant species in the forested wetlands in the northwestern portion of the park.

Table 1 Plant Species Observed in North Clackamas Park

	BOTANICAL NAME	COMMON NAME
TREES, SHRUBS AND WOODY VINES	<i>Abies grandis</i>	grand fir
	<i>Acer circinatum</i>	vine maple
	<i>Acer macrophyllum</i>	bigleaf maple
	<i>Alnus rubra</i>	red alder
	<i>Betula papyrifera</i>	paper birch
	<i>Cornus sericea</i>	red-osier dogwood
	<i>Corylus cornuta</i>	beaked hazelnut
	<i>Crataegus monogyna</i>	common hawthorn
	<i>Fraxinus latifolia</i>	Oregon ash
	<i>Hedera helix</i>	English ivy
	<i>Ilex aquifolium</i>	English holly

	BOTANICAL NAME	COMMON NAME
	<i>Mahonia aquifolium</i>	Oregon grape
	<i>Oemleria cerasiformis</i>	Indian-plum
	<i>Pinus contorta</i>	shore pine
	<i>Pinus ponderosa</i>	ponderosa pine
	<i>Populus trichocarpa</i>	black cottonwood
	<i>Prunus avium</i>	sweet cherry
	<i>Prunus laurocerasus</i>	common laurelcherry
	<i>Pseudotsuga menziesii</i>	Douglas fir
	<i>Quercus bicolor</i>	swamp white oak
	<i>Quercus garryana</i>	Oregon white oak
	<i>Rosa multiflora</i>	multiflora rose
	<i>Rosa pisocarpa</i>	clustered rose
	<i>Rubus discolor</i>	Himalayan blackberry
	<i>Rubus spectabilis</i>	salmonberry
	<i>Rubus ursinus</i>	California dewberry
	<i>Salix sitchensis</i>	Sitka willow
	<i>Solanum dulcamara</i>	climbing nightshade
	<i>Spiraea douglasii</i>	Douglas spiraea
	<i>Symphoricarpos albus</i>	snowberry
	<i>Thuja plicata</i>	Western red cedar
FORBS	<i>Athyrium filix-femina</i>	lady fern
	<i>Bellis perennis</i>	English daisy
	<i>Bidens frondosa</i>	devil's beggarstick
	<i>Centaurea cyanus</i>	garden cornflower
	<i>Cirsium arvense</i>	Canada thistle
	<i>Dipsacus sylvestris</i>	teasel
	<i>Epilobium watsonii</i>	Watson's willow-herb
	<i>Equisetum telmateia</i>	giant horsetail
	<i>Hypochaeris radicata</i>	hairy cats-ear
	<i>Impatiens noli-tangere</i>	western touch-me-not
	<i>Lapsana communis</i>	nipplewort
	<i>Ludwigia palustris</i>	marsh seedbox
	<i>Lysichiton americanum</i>	skunk cabbage
	<i>Lygonum cuspidatum</i>	Japanese knotweed
	<i>Polypodium glycyrrhiza</i>	Licorice fern
	<i>Polystichum munitum</i>	sword fern
	<i>Prunella vulgaris</i>	heal-all
	<i>Ranunculus repens</i>	creeping buttercup
	<i>Taraxacum officinale</i>	common dandelion

	BOTANICAL NAME	COMMON NAME
	<i>Tolmiea menziesii</i>	piggy-back plant
	<i>Trifolium repens</i>	white clover
	<i>Veronica americana</i>	American speedwell
GRAMINOIDS	<i>Bromus sitchensis</i>	Alaska brome
	<i>Carex obnupta</i>	slough sedge
	<i>Dactylis glomerata</i>	orchard grass
	<i>Eleocharis acicularis</i>	needle spikerush
	<i>Eleocharis palustris</i>	common spikerush
	<i>Eleocharis ovata</i>	ovate spikerush
	<i>Festuca arundinacea</i>	tall fescue
	<i>Glyceria elata</i>	tall mannagrass
	<i>Holcus lanatus</i>	common velvet grass
	<i>Juncus effusus</i>	soft rush
	<i>Phalaris arundinacea</i>	reed canarygrass
	<i>Poa annua</i>	annual bluegrass
	<i>Poa pratensis</i>	Kentucky bluegrass
	<i>Poa trivialis</i>	rough bluegrass
	<i>Scirpus microcarpus</i>	small-fruited bulrush

2.2 Wetlands and Waterways

Regulatory Jurisdiction and Definitions

The Oregon Department of State Lands (DSL) regulates waters of the state under the Removal-Fill Law (ORS 196.800-196.990). Similarly, the US Army Corps of Engineers (COE) regulates waters of the U.S. through Section 404 of the Clean Water Act.

“Waters of the state” is defined as “natural waterways including all tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable...”. “Natural waterways” is further defined as waterways created naturally by geological and hydrological processes, waterways that would be natural but for human-caused disturbances (e.g. channelized or culverted streams, impounded waters, partially drained wetlands or ponds created in wetlands)...”(DSL, 1995). “Waters of the U.S.” is defined at 33 CFR 328.3(a) to include the following:

- waters used in interstate and foreign commerce;

- tidal waters;
- all interstate waters and wetlands;
- all other waters (including intrastate lakes, rivers, streams, wetlands, natural ponds, etc.), the use, degradation or destruction of which could affect interstate or foreign commerce;
- impoundments of waters; tributaries of waters;
- the territorial seas; and
- wetlands adjacent to waters (other than waters that are themselves wetlands).

Wetlands are defined by both the Oregon Removal-Fill Law (ORS 196.800(17)) and Federal (33 CFR 328.3(b)) regulations as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions”.

The primary source document for determining the jurisdictional extent of wetlands is the *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory 1987), which is recognized by both the DSL and the COE. This document, also known as the “1987 Manual”, defines criteria for three parameters (i.e., hydrophytic vegetation, wetland hydrology and hydric soils) that must be met for an area to be considered a wetland. The 1987 Manual also establishes procedures for evaluating indicators to determine if the wetland criteria are met.

Description of On-Site Wetlands and Waterways

PHS delineated wetlands and waterways within the southern portion of the park on June 5 and June 19, 2003, with an additional site visit on February 23, 2004 to review the jurisdictional status of wetlands and ditches on site. The results of PHS’s wetland delineation were described in a wetland delineation report dated March 10, 2004. The Oregon Department of State Lands (DSL) approved the wetland delineation (DSL #2004-0153) on February 17, 2005. On October 19, 2006 PHS revisited North Clackamas Park to delineate the wetlands and waterways within the northern portion of the park. DSL approved the updated wetland delineation on April 16, 2007.

Wetlands and other water resources at North Clackamas Park include Mt. Scott Creek, several palustrine forested wetlands associated with Mt. Scott Creek, Camas Creek and adjacent wetlands, and a small pond located to the north of Mt. Scott Creek. Brief descriptions of the on-site wetlands and other waters are provided below.

Mt. Scott Creek and Associated Wetlands

Mt. Scott Creek, a perennial stream that flows generally westward along the northern boundary of North Clackamas Park, is the dominant hydrologic feature in the park. Within the park, Mt. Scott Creek is generally 10 to 20 feet wide. The stream banks are generally low and rise one to two feet above the stream bed. Small areas of erosion and undercutting are apparent on the banks, but the

stream banks appear to be relatively stable. Within the vicinity of the park, Mt. Scott Creek has a relatively uniform gravel and cobble substrate.

Within the park boundaries, much of Mt. Scott Creek is bordered by non-wetland riparian woodland communities, as described above. However, PHS identified two palustrine forested wetlands associated with Mt. Scott Creek in the northwestern portion of the park. These wetlands have a forest canopy dominated by western red cedar, Oregon ash, and red alder with red-osier dogwood, Indian plum, salmonberry, clustered wild rose, and Himalayan blackberry occurring as dominant shrubs in the understory. Dominant herbaceous species in these wetlands include slough sedge (*Carex obnupta*), skunk cabbage (*Lysichiton americanum*), reed canarygrass, lady fern (*Athyrium filix-femina*), and piggy-back plant (*Tolmiea menziesii*).

Flows within Mt. Scott Creek vary seasonally, like most streams in the region, with significant groundwater inputs to base flow from the slope to the north. Apparently large and steady fluxes of groundwater feed the wetland complex near the northwestern park boundary. Water discharged from these wetlands enters Mt. Scott Creek near the western park boundary.

Camas Creek

Camas Creek is a shallow seasonal tributary to Mt. Scott Creek that crosses the central portion of the park and flows into Mt. Scott Creek in the western portion of the park. Camas Creek originates in a palustrine emergent wetland in the northeastern portion of the park. Throughout its length, Camas Creek is a low-gradient, slow-flowing stream. The stream channel is approximately four to six feet. The stream banks are generally low and indistinct, and the stream channel is vegetated with reed canarygrass in some areas. The substrate of the Camas Creek stream channel is composed primarily of fine sediments.

A narrow wetland fringe borders the entire length of Camas Creek. The wetland has a tree canopy of Oregon ash, and willows (*Salix* sp.), red alder, red-osier dogwood, and swamp white oak (*Quercus bicolor*) has been recently planted within the wetland. Other dominant species within the Camas Creek wetlands include reed canarygrass, spikerushes (*Eleocharis acicularis* and *E. ovata*), slough sedge, lady fern, and marsh seedbox (*Ludwigia palustris*). Groundwater inputs to Camas Creek occur throughout the stream length, but major inflows appear to be near the northeastern corner of the park and from the south in the vicinity of the upper end of the northwest-trending portion of the creek.

Pond

A small pond is present north of Mt. Scott Creek in the northeastern portion of the park. The pond appears to have been excavated and has relatively steep banks that rise approximately three feet above the surface of the water. The pond appears to receive the majority of its water from groundwater inputs and runoff from the adjacent hillside to the north, as there is no apparent surface connection to Mt. Scott Creek.

2.3 Fish and Wildlife

With its mosaic of riparian woodlands, oak woodland, lawns, streams, and wetlands, North Clackamas Park provides habitat for a variety of wildlife species adapted to suburban landscapes. Additionally, the perennial waters of Mt. Scott Creek and the small pond in the northern portion of

the site provide habitat for aquatic and semi-aquatic species, including various species of fish, amphibians and benthic macroinvertebrates. Although wildlife surveys have not been conducted at North Clackamas Park specifically, PHS has observed a number of wildlife species while conducting site visits at the park, and a reach of Mt. Scott Creek surveyed for fish by the Oregon Department of Fish and Wildlife (ODFW) includes the portion of Mt. Scott Creek within the park boundaries. The following paragraphs describe observed and expected wildlife usage at North Clackamas Park.

PHS observed 29 species of birds at North Clackamas Park during two site visits – one on the afternoon of July 13, 2007 and one on the morning of December 13, 2007. The bird species observed by PHS on each date are listed in Table 2, below.

Table 2 - Birds observed at North Clackamas Park on July 13 and December 13, 2007

COMMON NAME	SCIENTIFIC NAME	DATE	
		7/13/07	12/13/07
American crow	<i>Corvus brachyrhynchos</i>	X	X
American goldfinch	<i>Carduelis tristis</i>	X	X
American robin	<i>Turdus migratorius</i>	X	X
American wigeon	<i>Anas americana</i>		X
Barn Swallow	<i>Hirunda rustica</i>	X	
Bewick's Wren	<i>Thryomanes bewickii</i>		X
Black-capped Chickadee	<i>Poecile atricapillus</i>	X	X
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	X	
Bushtit	<i>Psaltirparus minimus</i>	X	X
Downy woodpecker	<i>Picoides pubescens</i>	X	X
European starling	<i>Sturnus vulgaris</i>	X	X
Golden-crowned kinglet	<i>Regulus satrapa</i>		X
Green heron	<i>Butorides virescens</i>	X	
House finch	<i>Carpodacus mexicanus</i>	X	
House sparrow	<i>Passer domesticus</i>	X	
Lazuli bunting	<i>Passerina amoena</i>	X	
Lesser goldfinch	<i>Carduelis psaltria</i>	X	
Mallard	<i>Anas platyrhynchos</i>	X	X
Northern flicker	<i>Colaptes Auratus</i>	X	X
Pine siskin	<i>Carduelis pinus</i>		X
Red-tailed hawk	<i>Buteo jamaicensis</i>		X
Ruby-crowned kinglet	<i>Regulus calendula</i>		X
Sharp-shinned hawk	<i>Accipiter striatus</i>		X
Song sparrow	<i>Melospiza melodia</i>	X	X
Spotted towhee	<i>Pipilo maculatus</i>	X	
Steller's Jay	<i>Cyanocitta stelleri</i>	X	X
Townsend's warbler	<i>Dendroica townsendi</i>		X
Western Scrub-Jay	<i>Apelocoma californica</i>	X	X

COMMON NAME	SCIENTIFIC NAME	DATE	
		7/13/07	12/13/07
White-breasted nuthatch	<i>Sitta carolinensis</i>		X

The majority of birds observed by PHS were encountered in the riparian woodlands bordering Mt. Scott Creek. Green herons (*Butorides virescens*) were observed foraging in the stream and likely nest in the stream-side trees. Some species, such as back-capped chickadee (*Poecile atricapillus*), bushtiti (*Psaltiriparus minimus*), downy woodpecker (*Picoides pubescens*), song sparrow (*Melospiza melodia*), spotted towhee (*Pipilo maculatus*), and Steller's jay (*Cyanocitta stelleri*), likely nest in the riparian woodlands and remain to overwinter in the park. These permanent residents are joined in winter by species such as golden-crowned kinglet (*Regulus satrapa*), ruby-crowned kinglet (*Regulus calendula*), Townsend's warbler (*Dendroica townsendi*), which travel together in small foraging flocks. Other species such as black-headed grosbeak (*Pheucticus melanocephalus*) occur in the riparian woodlands during the breeding season, but spend the winter south of Oregon.

On December 13, 2007, PHS observed a male/female pair of white-breasted nuthatches (*Sitta carolinensis*) foraging with a foraging flock of small insectivorous birds in the oak-ash woodland in the northeastern portion of the park. The subspecies of white-breasted nuthatch found west of the Cascades, *S. c. aculeata* (sometimes referred to as "slender-billed nuthatch"), is strongly associated with oak savanna habitats with widely spaced, large-diameter oaks and little understory, a habitat mimicked by the oak-ash woodland at North Clackamas Park. Breeding Bird Survey data indicate substantial declines in white-breasted nuthatch abundance in the Willamette Valley, and these declines have been attributed to habitat loss, both through the direct cutting of mature oaks and the suppression of fires, which prevent shade-tolerant species from invading oak savannas and eliminating the open understory favored by the nuthatches. Although it is not listed as threatened or endangered at the state or federal level, the Oregon Natural Heritage Information Center considers the white-breasted nuthatch population west of the Cascades to be of conservation concern. Although PHS did not observe white-breasted nuthatches at the park during the July 13, 2007 site visit, it is likely that this species occurs at the park year-round and that the oak-ash woodlands provide nesting habitat for this declining species.

In general, the bird species observed by PHS at North Clackamas Park are species that are typical of bird species expected to occur in suburban settings in the Portland metropolitan area. Species not observed by PHS, but which may be expected to occur at the park include mourning dove (*Zenaidura macroura*), Anna's hummingbird (*Calypte anna*), rufous hummingbird (*Selasphorus rufus*), Vaux's swift (*Chaetura vauxi*), violet-green swallow (*Tachycineta thalassina*), varied thrush (*Ixoreus naevis*), yellow-rumped warbler (*Dendroica coronata*), fox sparrow (*Passerella iliaca*), golden-crowned sparrow (*Zonotrichia atricapilla*), and dark-eyed junco (*Junco hyemalis*). Many of these species are seasonal and would be expected to occur at North Clackamas Park during certain times of the year. Additionally, numerous other species may be encountered in the park during spring and fall migration when they stop to rest and feed during their journeys between breeding and wintering areas.

Although few mammals were observed during PHS's site visits, several mammal species adapted to small woodlands and edge habitats in suburban landscapes would be expected to occur within the park. Raccoons (*Procyon lotor*) and black-tailed deer (*Odocoileus hemionus columbianus*) likely occur in the riparian woodlands. Eastern fox squirrels (*Sciurus niger*) were observed by PHS in the riparian and

oak-ash woodlands. Adaptable predators, such as coyote (*Canis latrans*), may occasionally be seen hunting squirrels, deer mice (*Peromyscus maniculatus*), and other small rodents within the park. Because North Clackamas Park is a popular place for local residents to walk and exercise their dogs, most mammals are likely to occur between dusk and dawn when few people are present.

No amphibians or reptiles were observed during PHS's site visits; however, certain species are likely to occur within the park. Amphibians such as Pacific chorus frog (*Pseudacris regilla*), red-legged frog (*Rana aurora*), and roughskin newt (*Taricha granulosa*) may occur in the riparian woodlands and breed in the small pond north in the northern portion of the park. Garter snakes (*Thamnophis* sp.), the most commonly encountered snakes in western Oregon, are likely to occur in the riparian habitats.

The Oregon Department of Fish and Wildlife conducted surveys conducted fish surveys along two reaches of Mt. Scott Creek between the summer of 1997 and the spring of 1998. The results of this survey effort are summarized in Table 3, below. One of the Mt. Scott Creek survey reaches, "Reach 1", extended from the mouth of Mt. Scott Creek upstream to its confluence with Phillips Creek and included the portion of Mt. Scott Creek that flows through the park. The most commonly encountered fish species within Reach 1 were reticulate sculpin (*Cottus perplexus*), redbelt shiner (*Richardsonius balteatus*), western mosquitofish (*Gambusia affinis*), and speckled dace (*Rhinichthys osculus*). During the survey, cutthroat trout (*Oncorhynchus clarki*) were encountered in Reach 3, upstream of the park, but not within the portion of Mt. Scott Stream that flows through the park. The StreamNet database (www.streamnet.org) maps the lower portion of Mt. Scott Creek (including the portion of the stream that flows through the park) as coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*) spawning and rearing habitat; however, neither of these species were recorded during ODFW's 1997-1998 survey effort on Mt. Scott Creek.

Table 3 Result of Fish Surveys Conducted in Mt. Scott Creek by the Oregon Department of Fish and Wildlife, summer 1997 – spring 1998

Species		Number Observed by Survey Date and Reach ¹							
		Summer 1997		Autumn 1997		Winter 1997		Spring 1998	
Common Name	Scientific Name	Reach 1	Reach 3	Reach 1	Reach 3	Reach 1	Reach 3	Reach 1	Reach 3
Pacific lamprey	<i>Lampetra tridentata</i>	0	0	0	0	0	1	0	0
Speckled dace	<i>Rhinichthys osculus</i>	22	0	5	0	5	0	0	0
Redside shiner	<i>Richardsonius balteatus</i>	45	0	17	0	13	0	3	0
Largescale sucker	<i>Catostomus macrocheilus</i>	0	0	0	0	1	0	0	0
Cutthroat trout	<i>Oncorhynchus clarki</i>	0	6	0	0	0	1	0	0
Western mosquitofish	<i>Gambusia affinis</i>	29	0	18	0	0	0	0	0
Prickly sculpin	<i>Cottus asper</i>	1	0	1	0	0	0	0	0
Reticulate sculpin	<i>Cottus perplexus</i>	249	76	299	21	239	15	120	30

1. Reach 1 - Mouth to Phillips Creek confluence; Reach 3 - Dean Creek confluence to small tributary 200m downstream of Sunnyside Road; Reach 2 of Mt. Scott Creek was not surveyed by ODFW because of the short length (Friesen and Zimmerman 1999)

Certain freshwater invertebrates are more tolerant of or sensitive to poor water quality conditions than others; therefore, the composition and relative abundance of a stream's benthic macroinvertebrate community can be an important indicator of the stream's health. PHS is not aware of any organized benthic macroinvertebrate sampling efforts in Mt. Scott Creek in the vicinity of North Clackamas Park; however, during a July 2007 site visit, PHS environmental scientists casually searched for benthic macroinvertebrates by examining the stream's substrate. During this casual survey effort, PHS noted the presence of many common netspinner caddisflies (Family Hydropsychidae), prong-gilled mayflies (Family Leptophlebiidae), flat-headed mayflies (Family Heptageniidae), several blackflies (Family Simuliidae) numerous aquatic snails and dragonfly and damselfly larvae.

Common netspinner caddisflies are facultative water quality indicators, being found in both good-quality and degraded streams. Benthic macroinvertebrate communities dominated by them may indicate some level of nutrient enrichment, and the large number of common netspinner caddisflies and snails (relative to the other taxa) observed by PHS suggest there may be some nutrient enrichment in Mt. Scott Creek. Most of the prong-gilled and flat-headed mayflies are somewhat sensitive species (though some are very sensitive and some facultative), and their presence in Mt. Scott Creek suggests the water quality is relatively good. However, without on-going sampling using a standardized protocol, definitive conclusions about the stream's water quality should not be drawn.

2.4 Water quality

These observations were taken from data collected further upstream, though we believe representative of those in the park.

- Water quality is generally good (stream likely supports a population of resident cutthroat trout though water quality generally deteriorates as water moves downstream through increasingly urbanized areas).
- Water temperatures were found to follow the local climate with maximum recorded summer temperatures reaching 20°C (68°F).
- Dissolved oxygen concentrations may be an issue – they did not comply with state water quality standards (greater than 90-95% saturation), falling as low as 63% saturation.
- The pH of the water was within state standard and ranged from 6.8-7.4 standard units.
- The alkalinities of the stream are high enough (>20 mg/L) to adequately buffer pH fluctuations.
- The bacteria standard was exceeded, likely reflecting the urbanized nature of the watershed and the high fecal bacteria levels generally associated with storm water runoff from urban areas.
- Suspended sediment fluxes have not been measured, but the bed material at low flows through the portion of Mt. Scott Creek along the northern border of the park suggest that a considerable flux of silt is moving through the stream.
- Overall, the water quality of Mt. Scott Creek is typical of water quality in similar urbanized streams.

2.5 Desired Future Condition

The desired future condition (DFC) for North Clackamas Park is a neighborhood park that provides recreational opportunities as well as forested riparian wetland and non-wetland habitats that consist of native plant species and contain good structural diversity. Plant communities will consist of natural associations and will contain a diversity of native species. The overstory canopy will remain much as it exists in the wooded portions of the park. Non-native invasive species such as reed canarygrass, Himalayan blackberry, and English ivy will be removed, and native trees, shrubs, grasses and forbs will be planted to augment the existing riparian communities. The implementation of an Integrated Pest Management Program will prevent invasive species from becoming established and out-competing the native vegetation.

The riparian buffers along Mt. Scott Creek and Camas Creek will be expanded up to 70 feet on the south sides of the streams, and these buffers will be planted with native trees and shrubs to shade the water surface. Supplemental shrub plantings within the existing wooded area on south side of the east-west portion of Mt. Scott Creek downstream from Camas Creek confluence will provide additional stream shading. Reduced human impact immediately adjacent to the stream will allow a denser growth of vegetation immediately along the stream channels. The riparian buffers will be allowed to undergo natural ecological succession to develop species diversity and vegetation structure to provide shelter, food, and reproduction opportunities for native fauna. Native grasses and wildflowers in a meadow community south of Mt. Scott Creek will provide habitat for bees, butterflies, and other insects as well as birds and small mammals.

The combination of increased stream shade and stream habitat improvements will benefit salmonids and other aquatic organisms. The removal of the culvert near the mouth of Camas Creek and the restoration of the stream bed and banks will improve the connectivity of habitats between Mt. Scott Creek and the lower reaches of Camas Creek. Large woody debris in Mt. Scott Creek will diversify flows, vary sediment distribution, and provide substrate diversity, which will benefit aquatic macroinvertebrates as well as fish. Minor excavation of the outflow channel of the wetland in the northwestern portion of the park will improve the hydrologic connection between the wetland and Mt. Scott Creek and allow water to back up into the wetland during high flows, providing low-velocity refugia for fish during flood events.

3.0 KNOWN ISSUES AND PROPOSED IMPROVEMENTS

The conceptual park plan prepared by Alta includes a number of improvements that will improve natural resources within the park. This section includes the improvements that are shown on the plan, plus others that do not lend themselves to a graphic, but that will nevertheless be implemented by the Parks District in the future.

Water Temperatures and Shading: Mt. Scott Creek is not listed by DEQ as being "Water Quality Limited" for temperature. As such, it was not placed on the 303(d) list for this parameter. However, in 2006 Total Maximum Daily Loads (TMDLs) were issued by DEQ for all streams in the Willamette Sub-Basin. This means that Clackamas County needs to prepare an implementation plan describing how "system potential vegetation" (i.e. riparian vegetation that would historically have been found along the stream) will be planted along streams within their jurisdiction. DEQ has determined that planting "system potential vegetation" will adequately shade the creek and reduce water temperatures. However, only a certain width of riparian vegetation contributes to stream shading.

To determine this functional width, PHS applied a model that it has used in other jurisdictions to Mt. Scott Creek. The reach of Mt. Scott Creek along the northern border of the park is dominated by blackberry thickets and has very little taller vegetation providing shade to the stream surface. Because the direction of the stream through this reach is approximately 77° east of north and the south bank angle is approximately 7°, the stream surface could be effectively shaded (less than 1% increase in effective shade for a 5-foot increase in riparian width) at 62% with a 70-foot wide riparian area along the south bank of the stream. The east-west portion of Mt. Scott Creek downstream from the Camas Creek confluence would also benefit from additional shading by planting tall shrubs beneath the existing trees along the south side of the stream.

The northeastern portion of Camas Creek is largely unshaded and would greatly benefit from riparian vegetation along both sides of the stream, but especially along the entirely exposed south side. Additional riparian width along the south side of Camas Creek would further shade the stream without greatly affecting land use on the north side of the stream.

Suggested native trees and shrubs to be planted along the riparian areas of Mt. Scott Creek and Camas Creek are included in the table below.

Table 4 Suggested Native Trees and Shrubs

Scientific Name	Common Name
Trees and Shrubs	
<i>Acer circinatum</i>	vine maple
<i>Acer macrophyllum</i>	big leaf maple
<i>Alnus rubra</i>	red alder
<i>Corylus cornuta</i>	Beaked hazelnut
<i>Crataegus douglasii</i>	Black hawthorn
<i>Fraxinus latifolia</i>	Oregon ash
<i>Lonicera involucrata</i>	twinberry
<i>Oemleria cerasiformis</i>	Indian plum
<i>Physocarpus capitatus</i>	Pacific ninebark
<i>Pinus ponderosa</i>	Ponderosa pine
<i>Pseudotsuga menziesii</i>	Douglas fir
<i>Quercus garryana</i>	Oregon white oak
<i>Rhamnus purshiana</i>	cascara
<i>Rosa nutkana</i>	Nootka rose
<i>Salix lasiandra</i>	Pacific willow
<i>Sambucus racemosa</i>	Red elderberry
<i>Spiraea douglasii</i>	Douglas spiraea
<i>Symphoricarpos albus</i>	snowberry
<i>Thuja plicata</i>	Western red cedar

Habitat and stream improvements

Culvert removal: A culvert currently exists in Camas Creek at its confluence with Mt. Scott Creek. This culvert allows maintenance vehicles and foot traffic to cross the creek. This culvert is proposed to be removed and the confluence area restored. This activity may require state and federal permits; however, as the project is beneficial this should not be a problem. The banks should be planted with selected species from Table 4.

The bed of the stream may benefit from a shallow grade control structure (e.g. check dam) to ensure the bed of Camas Creek does not down cut and start to erode upstream.

Large wood: The park portion of Mt Scott Creek has flow regimes that do not vary greatly with channel distance. A few large woody debris placements within the channel might locally diversify flows and vary the sediment distribution. The portion of the channel between the footbridge to Casa Del Rey Drive and the confluence with Camas Creek might be best suited to such installations.

Human access: Removal of the trail along creek to the west of the Camas Creek and Mt. Scott Creek confluence should occur. The banks in these areas have been eroded and compacted, reducing the cover of native vegetation. Access will be limited to discrete points to ensure that wildlife-human interaction is minimal and that damage to stream banks can be repaired. Viewing platforms at the edge of the stream will be an attractive and functional alternative to the current condition.

Off-channel habitat in northwest corner of park: Enhancements of the wetlands in the northwestern portion of the site would entail removal of invasive species: reed canarygrass (*Phalaris arundinacea*) and brambles (*Rubus discolor*) and replacement with small woody shrubs: twinberry (*Lonicera involucrata*), spiraea (*Spiraea douglasii*), and red-osier dogwood (*Cornus sericea*). The discharge to Mt. Scott Creek near the west end of the park may be opened to allow high-flow refugia without fish entrapment. The present outflow from the adjacent wetlands is situated several feet above the stream thalweg and probably rarely is overtopped to allow water to flow into the adjacent wetlands. A small excavation of the present outflow channel would allow high flows of Mt. Scott Creek to enter the wetlands and provide a lower-velocity environment for fish during flood episodes. A log structure immediately downstream from the wetland orifice would locally raise water levels at the refugia entrance during large flows and increase the likelihood of water surface elevations sufficient to allow fish passage into the wetland. The width of the channel at this point would require several anchored logs to achieve significant local elevation of storm flows.

Removal of concrete: Large pieces of concrete are currently located within the stream upstream of the confluence of Camas Creek and Mt. Scott Creek. These pieces of concrete should be removed and the large piece of wood located in this area cut in half to dissuade people from accessing the other side of the creek.

Planting of native meadow: Native forbs should be planted within areas to the south of Mt. Scott Creek. The south side of the meadow should be adjacent to the path that is proposed in this area. This will ensure that park maintenance activities do not extend into the native meadow. This native meadow will likely look unkempt compared to mowed areas of the park, but will provide more diverse habitat for insects and birds.

Control of Invasive Species through Integrated Pest Management: The use of policies and measures contained in the Integrated Pest Management Program developed by Portland Parks and Recreation (PP&R) is recommended to control invasive species within the park. As defined in the Oregon Statutes (ORS 262.1), Chapter 943, “integrated pest management” is “...a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives. The elements of integrated pest management include: (a) preventing pest problems; (b) monitoring for the presence of pests and pest damage; (c) establishing the density of pest population, which may be set at zero, that can be tolerated or corrected with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic or aesthetic threshold; (d) treating pest problems to reduce population below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical and pesticidal control methods and that shall consider human health, ecological impact, feasibility and cost effectiveness; and (e) evaluating the effects and efficacy of pest treatments.”

As prescribed in the Integrated Pest Management Methodology contained in PP&R’s Integrated Pest Management Program, various integrated pest management measures are evaluated and considered together so that the best overall solutions are chosen and implemented. The prevention of pest problems through good policy and planning are assessed first. Cultural practices, avoidance measures, and physical means of managing pests are assessed next. Finally, mechanical practices, trapping, biological controls, and the use of natural and synthetic pesticides are assessed.

Incorporation of this integrated pest management policy into the maintenance activities at North Clackamas Park is recommended to ensure the protection of Mt. Scott Creek and Camas Creek and to help restore populations of salmonids in Mt. Scott Creek.

Other maintenance considerations include limiting mowing to areas outside of the riparian zones and within the oak woodland to the north of Camas Creek. The trees in the woodland may be damaged by mowing equipment. To ensure that the bases of the trees are protected and that habitat is improved, shrubs, such as snowberry and Oregon grape (*Mahonia nervosa*) should be planted around the base of each tree.

5.0 CONCLUSIONS

North Clackamas Park is a valuable community resource and serves many functions. The south side of the park is dominated by more active uses. The north side of the park, with the presence of the two creeks and the woodland, lends itself to more passive uses. As such, improving wildlife habitat and increasing the diversity of native vegetation has been a priority for many of the citizens who have voiced their concerns over the future of the park. The measures briefly described above will ensure that the north side of North Clackamas Park will be focused on improving the natural environment. As funding becomes available, each of the proposals will have more detail. However, many are lower cost solutions and it is hoped that improvements to the habitat within the park can be achieved relatively quickly.

VII. Appendix B - Wetland Delineation Documents

Oregon Division of State Lands wetland delineation concurrence letter



Oregon

Theodore R. Kulongoski, Governor

Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 378-3805

FAX (503) 378-4844

www.oregonstatelands.us.

April 16, 2005

State Land Board

Michelle Healy
North Clackamas Parks and Recreation District
9101 SE Sunnybrook Blvd.
Clackamas, OR 97015-6612

Theodore R. Kulongoski
Governor

Bill Bradbury
Secretary of State

Re: Wetland Delineation Report Update for the North Clackamas Park Master
Plan in Milwaukie, Clackamas County; T 2S, R 2E, Sec. 6AC, Tax Lot 100
and Sec. 6AB, Tax Lots 417, 617 and a Portion of Tax Lot 716; WD #04-0153

Randall Edwards
State Treasurer

Dear Ms. Healy:

On behalf of the North Clackamas Parks and Recreation District, Pacific Habitat Services, Inc. prepared a wetland delineation report update for the northern half of North Clackamas Park. The previous report, DSL File WD#2004-0153, was approved on February 17, 2005. Based on the information presented in the updated report, I concur with the waterway boundary as mapped in the attached Figures 6 and 7. Within the expanded study area, the ordinary high water line (OHWL) for Mt. Scott Creek was delineated. Mt. Scott Creek is an essential salmonid stream, and therefore, any amount of fill or removal below its OHWL may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only and is based on information provided to the agency. This jurisdictional determination is valid for five years from the approval date of the original concurrence letter (February 17, 2005) unless new information necessitates a revision. Circumstances under which the Department may change a determination and procedures for renewal of an expired determination are found in OAR 141-090-0045 (available on our web site or upon request). The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within 60 calendar days of the date of this letter.

Thank you for having the site evaluated. Please phone me at extension 232 if you have any questions.

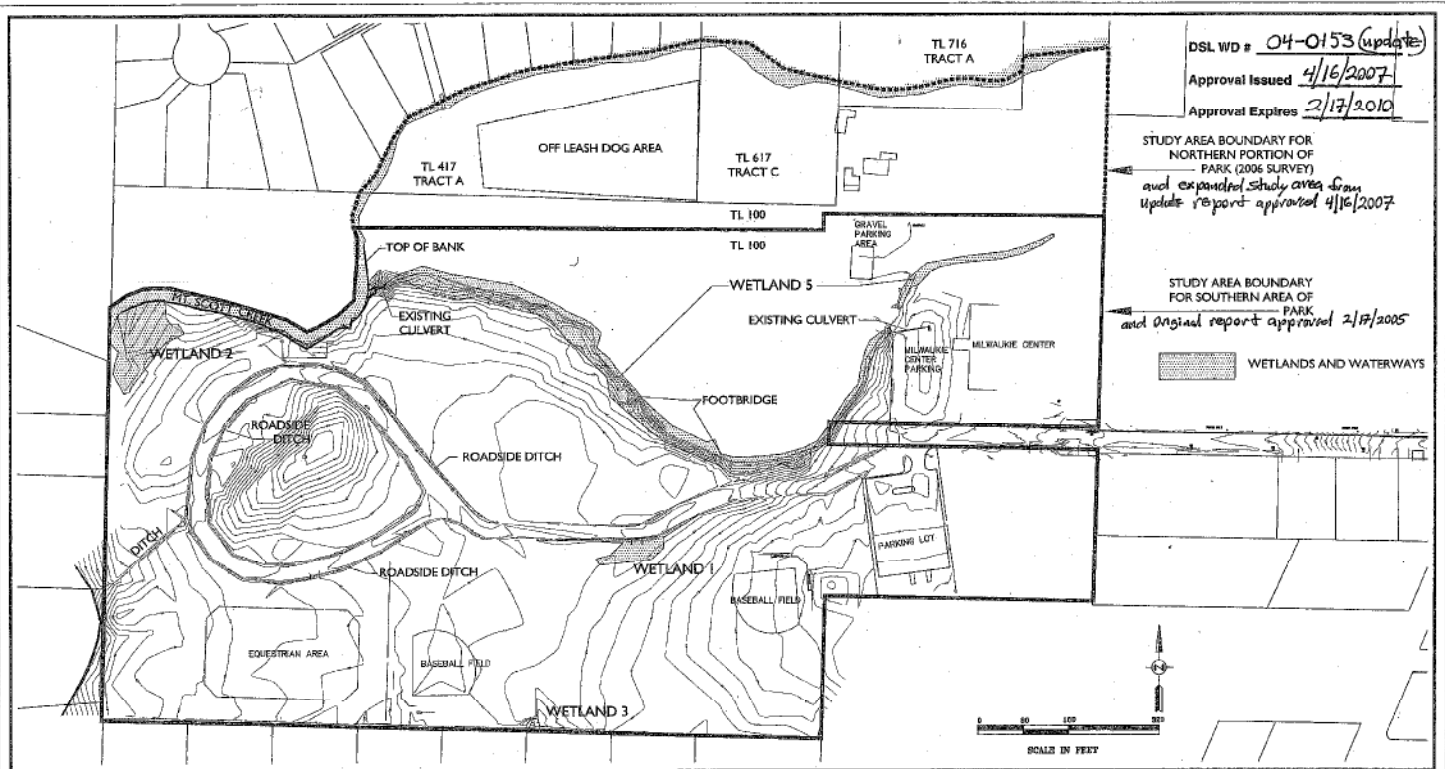
Sincerely,

Peter Ryan, PWS
Wetland Specialist

Approved by

Janet Morlan
Wetlands Program Manager

cc: Pacific Habitat Services, Inc.
Clackamas County Planning Department
Jan Stuart, Corps of Engineers
Bob Lobdell, DSL



DSL WD # 04-0153 (update)
 Approval Issued 4/16/2007
 Approval Expires 2/17/2010

STUDY AREA BOUNDARY FOR
 NORTHERN PORTION OF
 PARK (2006 SURVEY)
 and expanded study area from
 update report approved 4/16/2007

STUDY AREA BOUNDARY
 FOR SOUTHERN AREA OF
 PARK
 and original report approved 2/17/2005

WETLANDS AND WATERWAYS

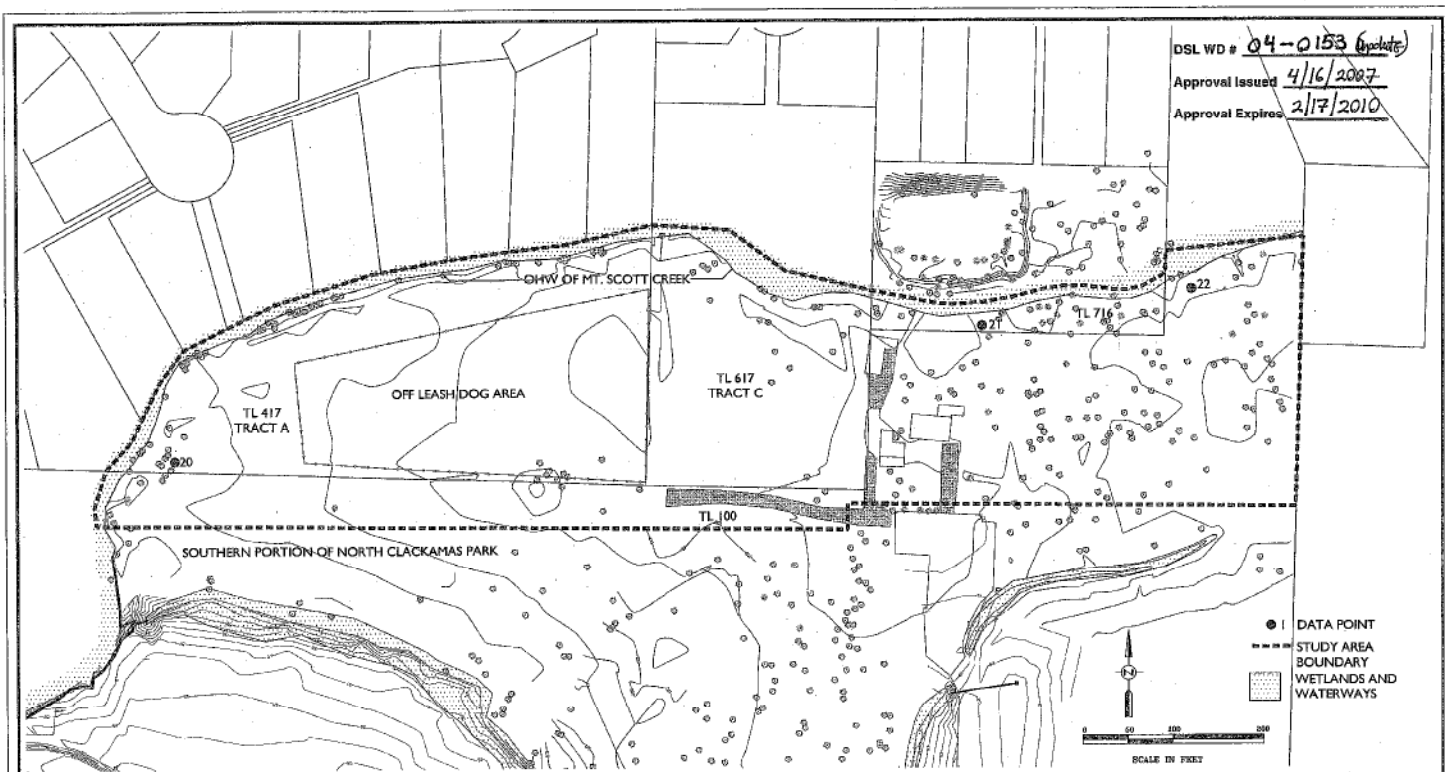
2887
 1/17/07

Overview of the study area boundaries and the wetland and waterway boundaries at North Clackamas Park in Clackamas, Oregon. Survey of southern portion provided by Clackamas County. Survey for the northern portion provided by Compass Engineering. Map accuracy is +/- 1 foot.



Pacific Habitat Services, Inc.

FIGURE
 6



2007
1/17/07

Survey of waterway boundaries for the northern portion of North Clackamas Park in Clackamas, Oregon. Map accuracy is +/- 1 foot.



Pacific Habitat Services, Inc.

FIGURE

7



Oregon

Theodore R. Kulongoski, Governor

Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 378-3805

FAX (503) 378-4844

www.oregonstatelands.us.

February 17, 2005

State Land Board

Michelle Healy
North Clackamas Parks and Recreation District
11022 SE 37th St.
Milwaukie, OR 97222

Theodore R. Kulongoski
Governor

Bill Bradbury
Secretary of State

Randall Edwards
State Treasurer

RE: Wetland Delineation Report for North Clackamas Park Master Plan
In Milwaukie, Clackamas County; T2S R2E Sec. 6AC Tax lot 100;
WD #04-0153

Dear Ms. Healy:

I have reviewed the wetland delineation report prepared by Pacific Habitat Services for the above referenced site. Based on the information presented in the report and additional information, I concur with the wetland and waterway boundaries as mapped in the revised Figure 5 of the report. The study area covers part of the parcel, and within this area Mt. Scott Creek and four wetland units (identified as Wetlands 1, 2, 3, and 5 that total 1.57 acres) were identified. The wetlands and waterways are subject to the permit requirements of the state Removal-Fill Law.

Mt. Scott Creek is an essential salmonid stream; therefore, any amount of fill or removal within the OHWL requires a state permit. In addition, Wetland 2 is adjacent and connected to the creek and thus has the same requirements. Wetlands 1, 3, and 5 would require a state permit for fill or excavation of 50 cubic yards or more in the wetland areas.


This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process. The permit coordinator for this site is Steve Morrow at extension 297.

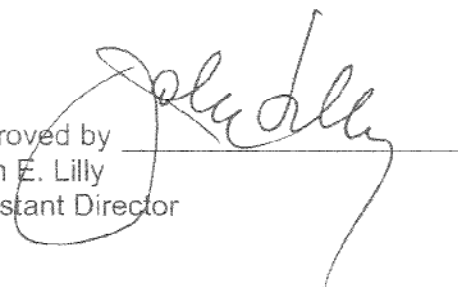
This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a determination and procedures for renewal of an expired determination are found in OAR 141-090-0045 (available on our web site or upon request). The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within 60 calendar days of the date of this letter.

Thank you for having the site evaluated. Please phone me at extension 295 if you have any questions.

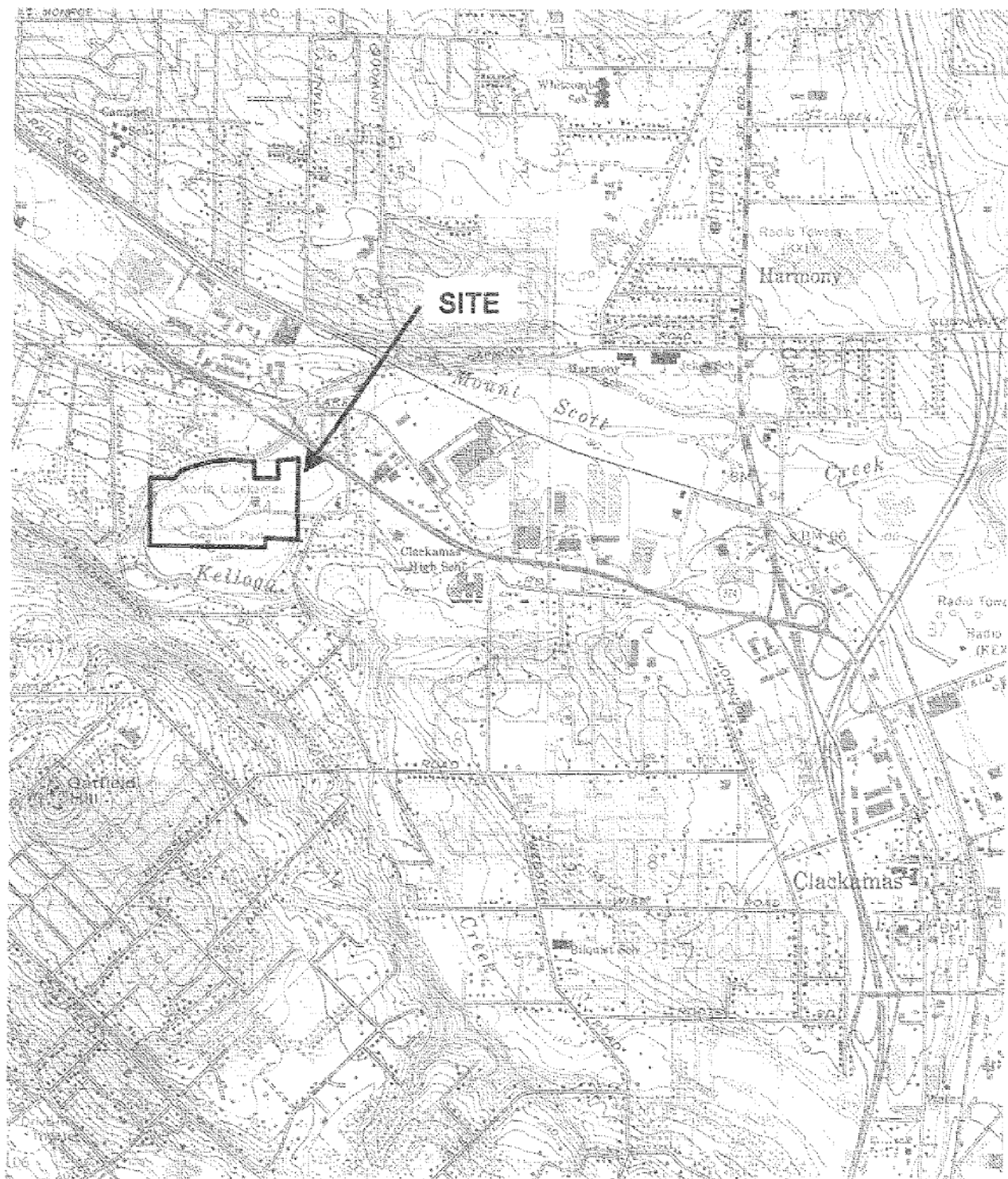
Sincerely,

 (for Kathy Verble)

Kathy Verble
Wetlands Specialist

Approved by 
John E. Lilly
Assistant Director

cc: Pacific Habitat Services
Clackamas County Planning Department
John Barco, Corps of Engineers
Steve Morrow, DSL



8/4/03

2897

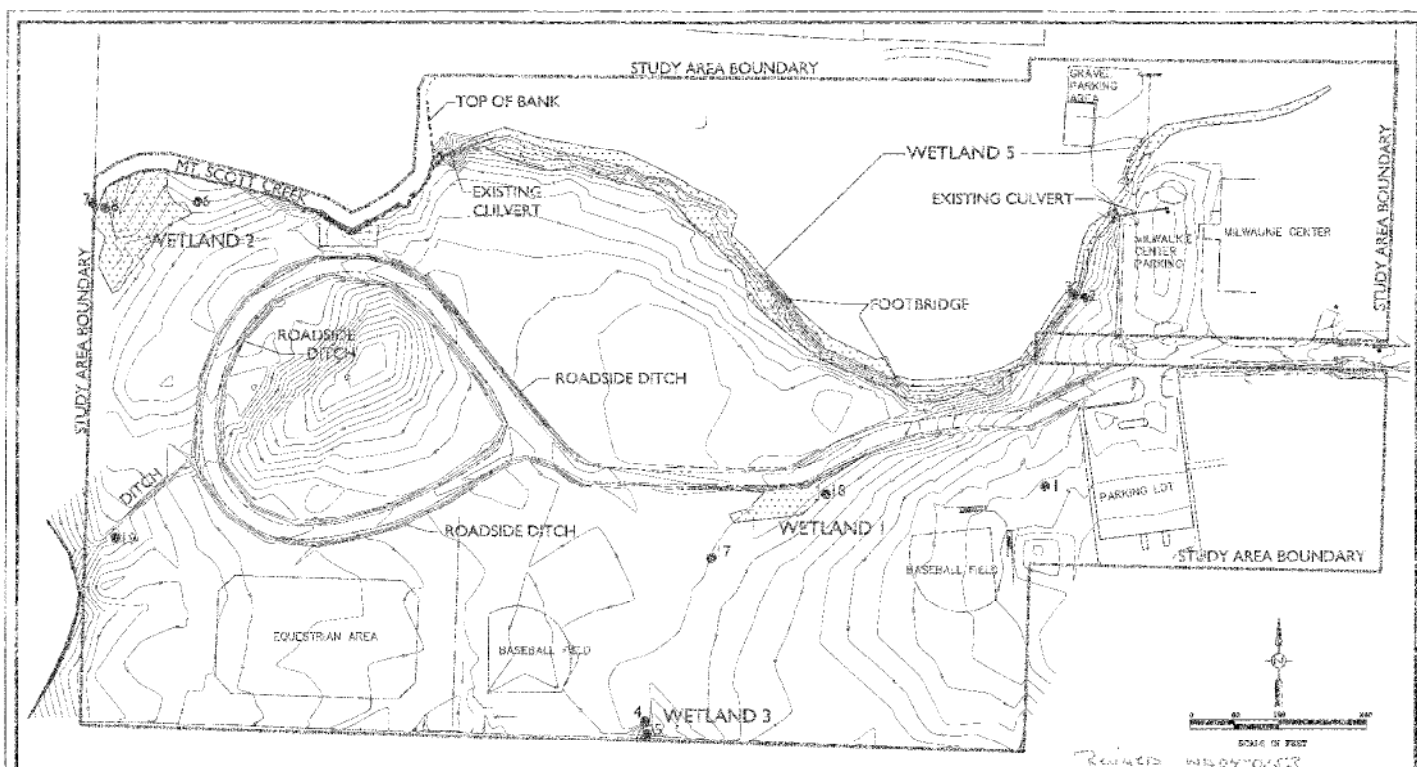
Location and general topography for the wetland delineation at North Clackamas Park in Clackamas, Oregon (USGS, Gladstone, Oregon quadrangle, 1961, photorevised 1984).

FIGURE

1



— Pacific Habitat Services, Inc. —



2007
12/16/06

Revised location of wetlands and waterways at North Clackamas Park in Clackamas, Oregon. Survey provided by Clackamas County. Map accuracy for wetland and waterway boundaries is ± 0.01 foot. Data plot location estimated by pacing from the wetland boundary in the field. Map accuracy for data plots is ± 5 feet.



Pacific Habitat Services, Inc.

REVISED
FIGURE
5



9450 SW Commerce Circle, Suite 180
Wilsonville, Oregon 97070

PACIFIC HABITAT SERVICES, INC.

(800) 871-9333 • (503) 570-0800 • Fax (503) 570-0855

February 6, 2007

Janet Morlan
Department of State Lands
775 Summer St. NE, Suite 100
Salem, OR 97301-3805

Re: Wetland Delineation Update for the North Clackamas Park in Clackamas, Oregon
DSL file # WD2004-0153
PHS Number: 2897

Dear Janet:

On behalf of the North Clackamas Parks and Recreation District, Pacific Habitat Services, Inc. has prepared this wetland delineation update for the northern half of the North Clackamas Park (DSL file # WD 2004-0153). The Parks district is seeking DSL concurrence with these updated waterway boundaries. The study area boundary includes the northern portion of 2S2E6AC Tax lot 100, all of 2S2E6AB Tax lot 617, most of 2S2E6AB Tax lot 417 (not the access easement), and the southern portion of Tax lot 716. The Tax lot maps are attached and the tax lots are labeled on Figures 6 and 7. This letter provides a summary of site conditions and the results of the October 2006 wetland delineation update site visit.

Project History

PHS conducted a wetland delineation for the entire North Clackamas Park in June 2003. This wetland delineation report was sent to DSL for review and concurrence in 2004. However, the wetland boundary maps were prepared using a GPS unit that was not very accurate in the forested areas within the park. So when the County conducted a survey for the southern half of the park in 2004, PHS prepared a revised map that had the wetland boundaries surveyed for the southern portion of the park.

The North Clackamas Park district is now working on proposed park improvements for the northern half of the site. This project will not involve earthwork in Mt. Scott Creek, however, the boundaries of Mt. Scott Creek will be used to determine the limits of the 50-foot buffer off-set requirement for the City. Therefore, on October 19, 2006, PHS returned to the site to review site conditions and to re-flag the wetland/waterway boundaries in the northern half of the site. This flagging was surveyed by Compass Engineering with a map accuracy of +/- 0.1 feet.

Site Conditions

Figure 6 provides an overview of the two study area boundaries for the North Clackamas Park project. DSL approved the wetland/waterways in the southern half of the park in a February 17, 2005, concurrence letter. Figure 7 depicts the surveyed site conditions in the northern portion of the park.

The northern portion of the park consists of a fenced dog off-leash area and mowed grassy areas. The northeastern portion of the park contains a forested overstory with a mowed grass understory. The park manager lives on site in the existing buildings depicted on Figures 6 and 7.

Wetlands and Waterways

There are no wetlands in the northern portion of the park. Mt. Scott Creek, a perennial stream, flows west along the northern site boundary. PHS flagged the limits of ordinary high water (OHW) on the south side of Mt. Scott Creek. The northern boundary of the Creek is outside of the study area boundary depicted on Figures 6 and 7. Three data plots, plots 20-22, were collected to document that there are no wetlands associated with the south side of the creek. The OHW was determined based upon several field indicators such as changes in topography, indications of scour, and changes in the vegetation communities. Some of the flags were hung at the top of bank since the bank is an abruptly scoured wall in some areas.

There are streamside riparian plantings in the vicinity of Data plot 20 that make the vegetation community seem more hydrophytic, however, this area lacked hydric soils and indicators of wetland hydrology. Data plot 21 is typical of the streamside conditions throughout most of the project corridor. Data plot 22 represents typical conditions within the maintained park.

Please feel free to contact me if you have any questions about site conditions or if you would like to conduct a site visit.

Sincerely,



Jennifer Goodridge, Biologist
Pacific Habitat Services

Attachments: Figures 6 and 7
Tax lot maps
Data Plots 1-3

c: Michelle Healy, North Clackamas Parks and Recreation District

This map was prepared for assessment purpose only.

SW 1/4 NE 1/4 SEC. 6 T.2S. R.2E. W.M.
CLACKAMAS COUNTY

D. L.C.
ELISHA KELLOGG NO. 54

2 2E 6AC

APP. 116 COR.

5109

1001

5400

13000
APP. 1/16 COR

5700

SEE MAP 2 2E 6BD

00
32.40 Ac.
LEIS

12-118

Tract A
Tax 10+716

Tract A	Tract C
Tax lot 417	Tax lot
	617

KELLOGG

CO. RD. NO. 2251

— 235 NOV 22

APP. 1/16 0
13500

study area
boundary

F.H.D.

2 2E 6AC
BOOK 15

SEE MAP 2-2E 60B



Wetland Determination Data Form

Routine Onsite Method

Pacific Habitat Services, Inc.

Project: N. Clackamas Park		Number: 2897		Sample Site: 20	
Applicant: N. Clackamas Parks & Rec.		County: Clackamas		Date: 10/19/2006	
Investigators: JG		Township: 2S Range: 2E		Section: 6	
Do Normal Circumstances exist on this site? Yes		Is the area a potential Problem Area? No			
Is this an Atypical Situation? No					
HYDROLOGY		<u>Primary Indicators</u>		<u>Secondary Indicators</u>	
		Inundated		Ox. rhizospheres	
		Sat. in Upper 12"		H2O-stained leaves	
Depth of Surf. H2O Inches		Water Marks		Local Soil Survey	
Depth to Free H2O >12 Inches		Drift Lines		FAC Neutral Test	
Depth to Saturation >12 Inches		Sediment Deposits		Other _____	
		Drainage patterns		Criteria Met: No	
SOILS		Mapped Series: Wapato silty clay loam		Hydric Soil?: Yes	
		Classification: Fluvaquent Endoaquolls		Drainage Class: poorly drained	
Depth (Inches)	Matrix Color	Soil Texture*	Redox Concentrations Color abundance/size/contrast		Other Hydric Soil Field Indicators
0-12	10YR 3/2	SL			Comments
*SD=Sand, SDL=Sandy Loam, L=Loam, SDCL=Sandy Clay Loam, S=Silt, SL=Silt Loam, SCL=Silty Clay Loam, CL=Clay Loam, C=Clay					
					Criteria Met: No
VEGETATION					
Tree Stratum (60%)		Status	% Cover	Herbaceous Stratum (10%)	
<i>Fraxinus latifolia</i> *		FACW	40	<i>Phalaris arundinacea</i> *	
<i>Alnus rubra</i> *		FAC	50		
<i>Populus balsamifera</i>		FAC	10		
Shrub Stratum (30%)		Status	% Cover		
<i>Cornus sericea</i> *		FACW	70		
<i>Physocarpus capitatus</i> *		FACW-	20		
<i>Thuja plicata</i>		FAC	10		
				Woody Vine Stratum (0%)	
				Status % Cover	
*Percent of dominant species FAC, FACW, or OBL: 100%				Criteria Met: Yes	
Comments:					
					Determination: Upland



Wetland Determination Data Form

Routine Onsite Method

Pacific Habitat Services, Inc.

Project: N. Clackamas Park		Number: 2897		Sample Site: 21	
Applicant: N. Clackamas Parks & Rec.		County: Clackamas		Date: 10/19/2006	
Investigators: JG		Township: 2S		Range: 2E	Section: 6
Do Normal Circumstances exist on this site? Yes		Is the area a potential Problem Area? No			
Is this an Atypical Situation? No					

HYDROLOGY			<u>Primary Indicators</u>	<u>Secondary Indicators</u>
			Inundated	Ox. rhizospheres
			Sat. in Upper 12"	H2O-stained leaves
Depth of Surf. H2O	Inches		Water Marks	Local Soil Survey
Depth to Free H2O	>12	Inches	Drift Lines	FAC Neutral Test
Depth to Saturation	>12	Inches	Sediment Deposits	Other _____
			Drainage patterns	Criteria Met: No

SOILS		Mapped Series: Wapato silty clay loam		Hydric Soil?: Yes	
		Classification: Fluvaquentic Endoaquolls		Drainage Class: poorly drained	

Depth (Inches)	Matrix Color	Soil Texture*	Redox Concentrations		Other Hydric Soil Field Indicators	Comments
			Color	abundance/size/contrast		
0-1	10YR 2/2	SL				
1-12	10YR 3/2	SL			>12 refusal due to roots	

*SD=Sand, SDL=Sandy Loam, L=Loam, SDCL=Sandy Clay Loam, S=Silt, SL=Silt Loam, SCL=Silty Clay Loam, CL=Clay Loam, C=Clay

Criteria Met: No	
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VEGETATION							
Tree Stratum (60%)		Status	% Cover	Herbaceous Stratum (20%)		Status	% Cover
<i>Fraxinus latifolia</i> *		FACW	20	<i>Hedera helix</i> *		UPL	75
<i>Acer macrophyllum</i> *		FACU	20	<i>Polystichum munitum</i> *		FACU	20
<i>Quercus garryana</i> *		UPL	60	<i>Carex obnupta</i>		OBL	5
Shrub Stratum (20%)		Status	% Cover				
<i>Mahonia aquilifolium</i>		NL	10				
<i>Rubus discolor</i>		FACU	15				
<i>Symphoricarpos albus</i> *		FACU	20	Woody Vine Stratum (0%)		Status	% Cover
<i>Crataegus monogyna</i> *		FACU+	25				
<i>Amelanchier alnifolia</i> *		FACU	25				
<i>Rubus ursinus</i>		FACU	5				

*Percent of dominant species FAC, FACW, or OBL: 13%		Criteria Met: No	
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Comments:		Determination: Upland	
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Wetland Determination Data Form

Routine Onsite Method

Pacific Habitat Services, Inc.

Project: N. Clackamas Park		Number: 2897		Sample Site: 22	
Applicant: N. Clackamas Parks & Rec.		County: Clackamas		Date: 10/19/2006	
Investigators: JG		Township: 2S Range: 2E		Section: 6	
Do Normal Circumstances exist on this site?		Yes		Is the area a potential Problem Area?	
Is this an Atypical Situation?		No		No	

HYDROLOGY			<u>Primary Indicators</u>	<u>Secondary Indicators</u>
			Inundated	Ox. rhizospheres
			Sat. in Upper 12"	H2O-stained leaves
Depth of Surf. H2O Inches			Water Marks	Local Soil Survey
Depth to Free H2O >12 Inches			Drift Lines	FAC Neutral Test
Depth to Saturation >12 Inches			Sediment Deposits	Other _____
			Drainage patterns	Criteria Met: No

SOILS		Mapped Series: Wapato silty clay loam		Hydric Soil?: Yes	
		Classification: Fluvaquentic Endoaquolls		Drainage Class: poorly drained	

Depth (Inches)	Matrix Color	Soil Texture*	Redox Concentrations		Other Hydric Soil Field Indicators	Comments
			Color	abundance/size/contrast		
0-3	10YR 2/2	SL				
3-5	10YR 3/3	SL				
5-12	10YR 3/2	SL			>12" refusal due to cobbles	

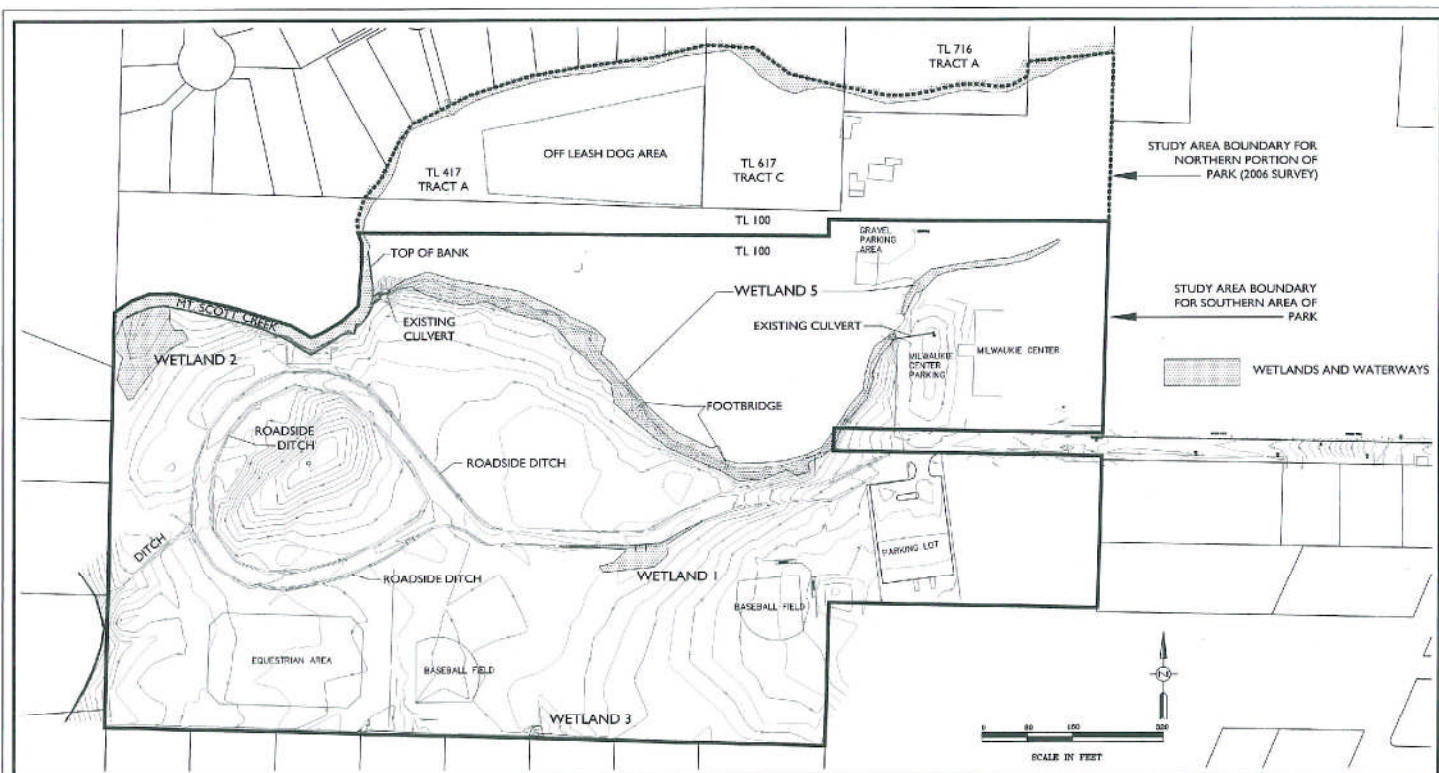
*SD=Sand, SDL=Sandy Loam, L=Loam, SDCL=Sandy Clay Loam, S=Silt, SL=Silt Loam, SCL=Silty Clay Loam, CL=Clay Loam, C=Clay

		Criteria Met: No	
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VEGETATION							
Tree Stratum (30%)		Status	% Cover	Herbaceous Stratum (40%)		Status	% Cover
<i>Quercus garryana</i> *		UPL	100	<i>Trifolium dubium</i> *		UPL	20
				<i>Lolium perenne</i> *		FACU	30
				<i>Agrostis tenuis</i> *		FAC	30
				<i>Geranium molle</i>		UPL	10
				<i>Chrysanthemum leucanthemum</i>		UPL	5
				<i>Taraxacum officinale</i>		FACU	5
Shrub Stratum (30%)		Status	% Cover				
<i>Rubus discolor</i> *		FACU	50				
<i>Prunus avium</i> *		UPL	50				
				Woody Vine Stratum (0%)		Status	% Cover

*Percent of dominant species FAC, FACW, or OBL: 17%		Criteria Met: No	
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Comments:		Determination: Upland	
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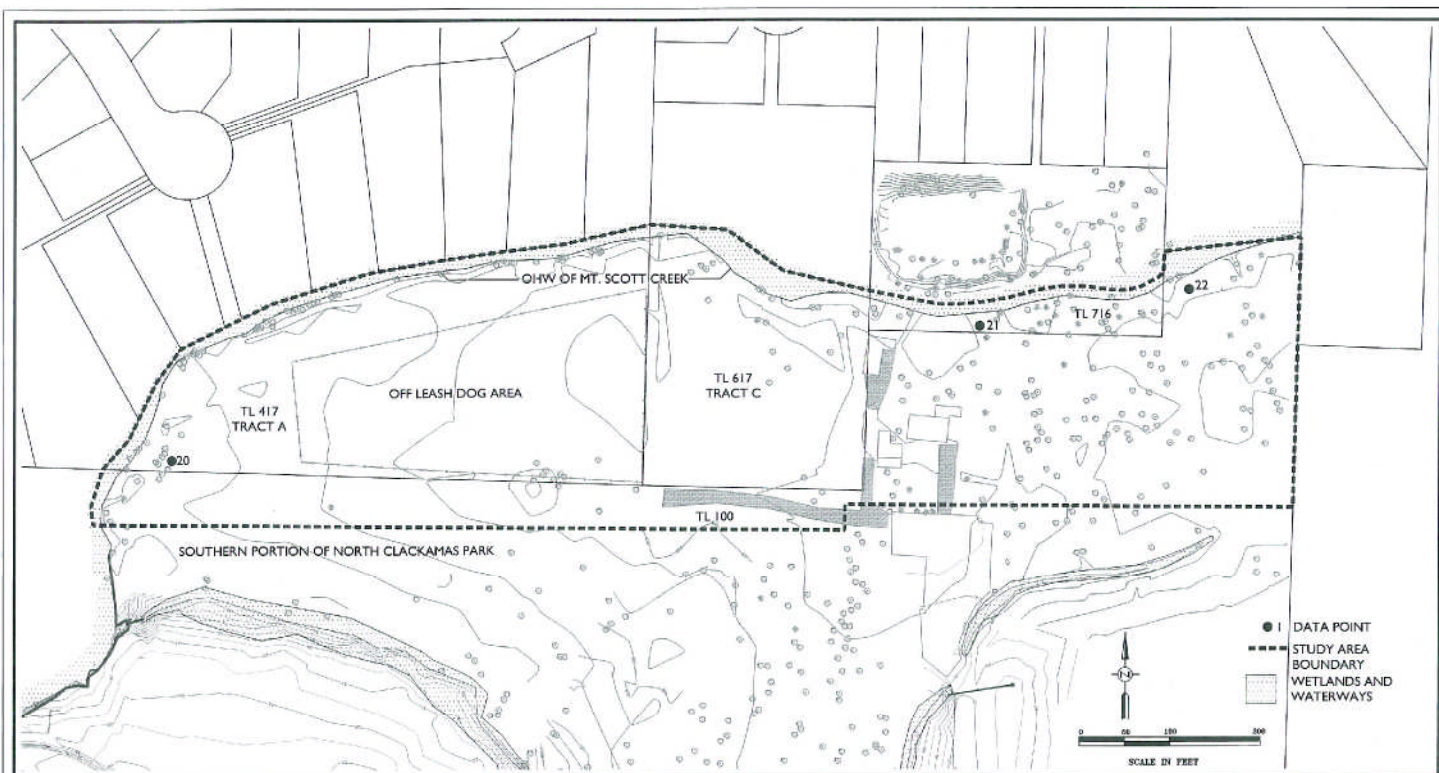
2007
1/17/07

Overview of the study area boundaries and the wetland and waterway boundaries at North Clackamas Park in Clackamas, Oregon. Survey of southern portion provided by Clackamas County. Survey for the northern portion provided by Compass Engineering. Map accuracy is ± 1 foot.



Pacific Habitat Services, Inc.

FIGURE
6



2087
1/17/07

Survey of waterway boundaries for the northern portion of North Clackamas Park in Clackamas, Oregon. Map accuracy is ± 1 foot.



Pacific Habitat Services, Inc.

FIGURE
7