

MINTO ISLAND CONSERVATION AREA MANAGEMENT AND CONSERVATION PLAN



PREPARED FOR

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SECTION 1: INTRODUCTION

1.1 Context and Background

This Management and Conservation Plan (Plan) covers the northern 307 acres of the approximately 1,200-acre Minto-Brown Island Park in Salem, Oregon (Figure 1, See Appendix A for all Figures). Minto-Brown Island Park is owned by the City of Salem (City). The park provides a valuable location for passive recreation, with over 20 miles of trails, wooded areas, open fields, and access to wetlands, sloughs, and the Willamette River.

In 2013, the City purchased the 307-acre property from the Boise Cascade Corporation. Since the 1950s, that portion of the island had been used for industrial purposes (Figure 2). The 307-acre area was acquired as a “Conservation Area” through the Willamette Wildlife Mitigation Program, which is administered by the Oregon Department of Fish and Wildlife (ODFW). Funding for the acquisition was provided by the Bonneville Power Administration (BPA) with the stipulation that a management plan would be completed within 18 months of acquisition. Funding was dedicated for the purpose of compensating for the ecological effects to fish and wildlife from the construction and operation of Willamette River dams. Both BPA and ODFW hold a Conservation Easement on the property. According to the Conservation Easement, the 307-acre area, which in this report is referred to as the Conservation Area, is to be managed for fish and wildlife habitat, with limited trail access allowed for passive recreation.

In 2015/2016 a pedestrian bridge will be constructed across the Willamette Slough, connecting Riverfront Park with the Conservation Area and the rest of Minto-Brown Island Park. From the southern end of the pedestrian bridge, a paved trail will be constructed along an existing north-south trending berm. The bridge will provide easy access to an area that has been in private ownership for decades. Unless pedestrian access is managed, certain species of wildlife, which have become habituated to few disturbances, may no longer use portions of the Conservation Area.

This Plan provides a blueprint for managing the island’s natural resources and balancing the desire for passive recreation with the needs of wildlife. This Plan describes the history of this portion of the island and its current condition, and identifies existing conservation values, key ecological attributes, desired future conditions, short- and long-term management goals, and restoration and recreation priorities.

1.2 Goal and Objectives of the Conservation and Management Plan

The goal of this Plan is to describe a course of action that will protect and enhance the Conservation Area as an environmental and recreational resource for the City of Salem. The Conservation Area will be preserved as wildlife habitat, but with the understanding that the public will be passing through the site on a daily basis. Many of the vegetation communities within the Conservation Area will be maintained and enhanced. Non-native, invasive, and forest “plantation” vegetation will, over time, be restored to appropriate natural habitat. Recreational uses will be compatible with the environmental objectives of the Plan and the Conservation Easement.

The Plan establishes a series of priority objectives, including:

- Restore and maintain forest habitat, shrubland, aquatic/mudflat/emergent habitat, native fish habitat, and meadow habitat.
- Ensure recreational uses within the Conservation Area are compatible with the conservation and enhancement of wildlife habitat.
- Provide educational opportunities for trail users.

SECTION 2: PLANNING PROCESS SUMMARY

2.1 Planning Area and Process

This Plan addresses the Conservation Area, a 307-acre area at the northern tip of Minto-Brown Island Park. Figure 1 shows the limits of the Conservation Area. In 2014, the City hired Pacific Habitat Services, Inc., and Greenworks, Inc., to prepare this Plan. As part of the planning process, the City engaged numerous stakeholders to form a Technical Advisory Committee (TAC). The purpose of the TAC was to solicit input on the Plan. A list of TAC members and meeting notes are included in Appendix B.

This Plan follows the Conservation Action Planning template developed by The Nature Conservancy (TNC). The TNC process has been used in conservation planning throughout the country and has proven to be an effective way to analyze and prioritize conservation actions. The process includes analyzing existing habitats within a study area, establishing Conservation Targets, evaluating Key Ecological Attributes for each Conservation Target, and developing actions to attain the Conservation Targets. Definitions and details of these terms are included below.

Conservation Targets

Conservation targets are the habitat types that encompass the native biodiversity of the Conservation Area. They reflect the habitat types that are viable or at least feasibly restorable within the conservation planning area.

Key Ecological Attributes

Key Ecological Attributes (KEAs) are aspects of a Conservation Target's biology or ecology that, if missing or altered, would lead to the loss of that target over time (The Nature Conservancy 2007). KEAs are the biological or ecological components that most clearly characterize the Conservation Target. They are the most critical components of a Conservation Target that sustains its viability or ecological integrity. KEAs are rated from poor to very good, which aids in establishing restoration goals and provides a guide in the development of restoration actions.

SECTION 3: SITE HISTORY AND EXISTING CONDITIONS

3.1 Site History

The Conservation Area was likely used by the Kalapuya Native Americans and was a place of importance for collecting plants, for hunting game, and as a location for seasonal encampments. Several encampments are known to have been located along the Willamette River, between Mill and Pringle Creeks, on the shore opposite the Conservation Area (Hemesath, L. and T. Nunez. 2002. *Pringle, Glen-Gibson, Claggett and Mill Creeks Watershed Assessment*). The backwater of the slough at the mouth of Croisan and Pringle Creeks also helped to make this area culturally significant.

Minto-Brown Island formerly consisted of two islands, Minto Island and Brown Island. Between 1851 and 1865, the General Land Office (GLO) mapped surface features within the Willamette Valley. Within the Conservation Area, the dominant vegetation was identified as riparian hardwood, which was likely primarily Oregon ash. Willows were also noted at the northern end of the island near the location of the proposed pedestrian bridge.

Following severe flooding in 1861, the Willamette River changed course to flow around the north side of both historic islands rather than between them, resulting in the current configuration of Minto-Brown Island. Although colloquially referred to as an “island,” the project area is actually connected to the east bank of the Willamette River. Remnant sloughs and ponds are present throughout the landscape, and flooding is frequent as the entire island is within the 100-year floodplain and floodway.

The site history of Minto-Brown Island includes agricultural, industrial, and recreational uses. In the mid-1800s, the first historical accounts and land records for the area indicate that much of the land was used for various agricultural purposes, including by the land owners Isaac Brown and John Minto.

In the early 1970s, the City of Salem acquired 833 acres of land that would become Minto-Brown Island Park. The Minto-Brown Island Park Master Plan (1985) and Revised Master Plan (1995) were created by the City to guide development of the park. During public hearings for the Revised Master Plan, participants strongly opposed a proposal to create an arboretum or any other tourist-type attractions on the island, recognizing it as a valuable, quiet, open space that needed to be protected from development. The Revised Master Plan further emphasized the need to approach any development with sensitivity, avoiding the development of facility-based recreation opportunities that would severely alter the landscape. The 1995 Revised Master Plan identified the need to inventory existing wildlife

for future planning or improvement decisions prior to the City acting upon any improvements identified in the Revised Master Plan. The 1995 Master Plan is currently being updated.

The Nature Conservancy transferred ownership of a 23-acre parcel on the northern tip of Minto Island to the Salem Audubon Society in early 1980. The Audubon property is an undeveloped riparian reserve area with limited access and no official trails. This property is not included in plans for the Conservation Area.

Approximately 100 of the 307 acres within the Conservation Area have been used for industrial purposes since the 1950s. Oregon Pulp and Paper began storing spent sulfur liquor on the property from their paper mill located on the east bank of the Willamette River in 1953. Mill waste was initially stored in undeveloped surface ponds and later in an unlined, 50-million-gallon (MG) pond constructed in 1959.



Boise Cascade Corporation (Boise) acquired the property in 1962, constructed the 100-MG pond (unlined) in 1964, and began landfill activities in 1968. Boise used the property to store pulp mill liquors, treat clarifier effluent, and dispose of clarifier solids from its sulfite paper mill in downtown Salem until 1982 when the mill closed. The remaining approximately 200 acres of the property were mostly undisturbed Willamette River floodplain, though an area along the Willamette Slough was planted to Douglas fir and hybrid poplar plantations.



The industrial site was officially closed in 1985. As part of site closure, waste sludges were removed and consolidated into two on-site landfill areas where they were covered (capped) with clean soil (Figure 3). In 1999, the Oregon Department of Environmental Quality (DEQ) recommended the site be placed on its Confirmed Release List due to the presence of hazardous wastes. Boise then joined DEQ's Voluntary Cleanup Program. In 2000, the Voluntary Cleanup Program completed its evaluation of the Boise Facility within

the Conservation Area. Sampling conducted for the Expanded Preliminary Assessment indicated that the site was not posing a threat to either human health or the environment, assuming the site would remain in industrial use and groundwater would not be used. DEQ initiated project closeout on April 6, 2000, and confirmed that no further action under the Oregon Environmental Cleanup Law was required at the site at that time.

In 2007, Boise sampled the property in areas both inside and outside of their former operations to evaluate risk from a proposed change in use from industrial to recreational. DEQ concluded that a recreational path through the former industrial area would not pose a risk to human health. To ensure human health and safety, the City must perform remedial actions to use the former industrial area. A 2013 DEQ memorandum, included as part of the Conservation Easement, lists the following potential remedial actions:

- Provide fencing and/or signs near any paths constructed through the former industrial areas to protect recreational users from soil and sediment contamination;
- Assure that fencing and signs are annually inspected and maintained;
- Inspect and maintain existing caps that cover the former landfill and wastewater treatment pond sediments;
- Report inspections and maintenance activities to DEQ every 5 years;
- Limit use of the site to a “passive use” park, and prohibit any use of groundwater.

In 2011, the interior berm between two former ponds (50- and 100-MG ponds) was breached to drain the 50-MG pond. Three feet of berm material were spread over the 50-MG pond floor to stabilize sediments. In October 2011, DEQ issued a wastewater pond closure letter.



In 2013, the Boise property was purchased by the City of Salem. The 307-acre property, combined with the adjacent Audubon Society property and Minto-Brown Island Park, provides over 1,200 contiguous acres of Willamette River floodplain habitat. In August 2014 the zoning designation and Comprehensive Plan were changed to reflect the new usage of the property. The zoning was changed from IG (General Industrial) to PA (Public Amusement), and the Comprehensive Plan Map was changed from Industrial to Parks, Open Space, and Outdoor Recreation.

3.2 Existing Conditions and Ecological Setting

The Conservation Area includes approximately 207 acres of riparian forest, forest plantations, wetlands, and floodplain and approximately 100 acres of former Boise industrial lands with some environmental constraints, such as soil caps. Portions of the site that have been impacted by past industrial land uses are dominated by non-native, often invasive or undesirable plants, while other portions of the site remain relatively intact. The Conservation Area contains several remnant channels, alcoves, and other floodplain depressions that provide both year-round water and seasonal inundation and also provide non-structural flood water storage, nutrient and energy cycling, and habitat for native and exotic species. The riparian forests provide habitat for a variety of aquatic and terrestrial species of conservation concern, such as red legged frogs and little willow flycatchers.

The Conservation Area is entirely located within the 100-year floodplain and floodway as mapped by the Federal Emergency Management Agency. Areas of the Conservation Area that are below 120 feet North American Vertical Datum (NAVD) frequently flood. Areas that are between elevations of 120 and 122 feet experience seasonal flooding (City of Salem, 2013).

Fish and Wildlife

Approximately 150 bird species have been identified within Minto-Brown Island Park, with at least 90 species nesting in the park (Salem chapter of the Audubon Society, 2014). A list of the nesting birds is included in Appendix C. Other wildlife that have been documented within the Conservation Area include cougars, skunks, coyotes, raccoons, frogs, snakes, and turtles.

Native anadromous fish species present in the Willamette River in the vicinity of the Conservation Area include spring-run Chinook salmon, winter steelhead, cutthroat trout, and Pacific lamprey. The StreamNet database (2014) indicates the river in this area provides rearing and migration habitat for spring Chinook salmon and winter steelhead trout (both listed as Threatened under Federal Endangered Species Act), and spawning and rearing habitat for fall Chinook salmon. According to ODFW, the natural pond located in the northwest corner of the site (North Pond) provides off-channel salmonid rearing habitat.

The list of sensitive species that are known to be within Marion County was obtained from the U.S. Fish & Wildlife Service, and a list of all of those species with known sightings within two miles of the Conservation Area was obtained from the Oregon Biodiversity Information Center (ORBIC). Based on these references, the Conservation Area does not appear to provide terrestrial habitat for endangered, threatened, proposed for listing, or candidate species under the Federal Endangered Species Act (ESA). According to ODFW, however, western pond and western painted turtles use the Conservation Area for basking, nesting,

and aestivation. Western pond and western painted turtles are listed as State Sensitive Critical, and the western pond turtle is also a Species of Concern by USFWS.

Wetlands

A wetland determination was conducted within the Conservation Area as part of the planning process. It found that over 54% (approximately 167.32 acres) of the Conservation Area is potentially jurisdictional wetland (Figures 4A and 4B). The wetland determination was based on aerial photography and some limited fieldwork to determine wetland classification and approximate boundaries. Wetlands were classified according to Cowardin and included Palustrine and Riverine types. Palustrine wetlands are non-tidal wetlands; in the Conservation Area they are dominated by emergent vegetation (PEM), forest vegetation (PFO), and open water (POW). Areas mapped as PFO also include pockets of upland forest. Riverine wetlands are contained within a river channel; in the Conservation Area there is one Riverine wetland that is periodically flooded by the Willamette.

Table 1. Wetland Types and Acreages Within the Conservation Area

Wetland Type (Cowardin)	Approximate Area (acres)
Palustrine Emergent (PEM)	111.56
Palustrine Forested (PFO)	50.63
Palustrine Open Water (POW)	2.27
Riverine (R2)	2.79
Total	167.32

Previous wetland inventories conducted within the Conservation Area included the Local Wetland Inventory (LWI) conducted for the City in 1999 and the U.S. Fish and Wildlife Service (<http://www.fws.gov/wetlands>) National Wetlands Inventory, which mapped wetlands in 1994. The wetland determination found that both inventories are inaccurate.

The previous inventories reflect past industrial land uses, with large areas of palustrine open water or unconsolidated bottom (POW or PUB) mapped in the former lagoon locations. In recent years, several actions within the former industrial area have changed the character of the wetlands within the Conservation Area:

- In 2011, the berm between two former ponds (50- and 100-MG ponds) was breached to drain the 50-MG pond. Three feet of berm material were spread over the 50-MG pond floor to stabilize sediments. The 50-MG pond is still wetland, but now forms a contiguous, approximately 66-acre, seasonally flooded wetland with the 100-MG pond.

- As part of site closure, waste sludges were removed and consolidated into two on-site landfill areas where they were covered (capped) with clean soil. Depressional wetland pockets have formed in both of these areas.

3.3 Major Habitat Types

The Conservation Area can be characterized by seven habitat types: riparian forest, forest plantation, blackberry thicket, upland meadow, reed canarygrass, seasonal water/mudflat/emergent, and open water (Figure 5). Photographs of the major habitat types are included in Appendix D. A description of each of the habitat types is provided below.

Riparian Forest (A)

Riparian forest areas are located on the fringes of the Conservation Area. These areas include a mosaic of wetland and upland bottomland deciduous forest. The forest has been shaped by past land use activities, seasonal flooding, scour, and soil deposition. The multi-layered canopy is rich with insects, seeds, and fruit and provides essential nesting and wintering habitat for many species of wildlife. The trees help protect the riverbank from erosion, influence in-channel aquatic habitat, and maintain favorable water temperature for fish by shading, filtering runoff, and providing nutrients.

Riparian habitat conditions are generally intact. Vegetation is dominated by a variety of native trees and shrubs. Invasive Armenian blackberry dominates forest fringes and openings, and pockets of English ivy are present.

Plants: Common native trees and shrubs found in this habitat include black cottonwood in drier areas and Oregon ash, willow, red-osier dogwood, and Douglas' spiraea in wetter areas. Other less common species include big leaf maple, red alder, red elderberry, rose, snowberry, twinberry, black hawthorn, and Pacific ninebark.

Wildlife: Migratory and nesting songbirds, woodpeckers, bald eagle, and willow flycatcher use this habitat. Some other notable species observed include yellow-rumped warbler, swallows (tree, violet-green, northern rough-winged), warblers (black-throated gray, orange-crowned, Townsend's, Wilson's, yellow warblers), belted kingfisher, brown creeper, black-capped chickadee, great blue heron, green heron, black-tailed deer, and coyote. Seasonally ponded riparian wetlands provide potential breeding areas for Pacific tree frog, northern red-legged frog, and long-toed salamanders. Turtles may also use these areas for aestivation or nesting.

Current extent: Riparian forests within the Conservation Area have been fragmented by past land uses and reduced to the outer fringes of the Conservation Area, where they are up

to approximately 500 feet in width. There are approximately 80 acres of riparian forest habitat within the Conservation Area.

Forest Plantation (B)

There are three remnant plantations on site: Douglas fir, hybrid poplar, and hazelnut. Based on historical aerial photographs, hazelnut was planted before 1954, and the fir and poplar, in the late 1980s, possibly as a wood pulp source. The Douglas fir grove is densely planted, with a few western red cedar present in the stand; no light penetrates the forest floor, resulting in scarce understory vegetation except on the outer forest edges where sword fern, common horsetail, red elderberry, and Armenian blackberry occur. The hybrid poplar plantation understory is dominated by reed canarygrass, with smaller amounts of blackberry, thistle, and poison oak. The hazelnut orchard is overgrown with black cottonwood, and the understory is dominated by English ivy.

The Douglas fir plantation with its dense canopy and open understory attracts unauthorized ‘camping’ and associated trash and waste disposal.

Plants: Since these are plantations, native vegetation is limited and includes poison oak, sword fern, common horsetail, and red elderberry. Douglas fir, hybrid poplar, and hazelnut would not naturally occur on the island.

Wildlife: Cooper’s hawk, Pacific wren, and deer have been observed in this habitat. Cooper’s hawk and Great Horned owl have been known to use this area for nesting.

Current extent: Forest plantations include Douglas fir (22.2 acres), hybrid poplar (16.9 acres), and hazelnut (6.3 acres), with Douglas fir and poplar approximately 25–30 years old.

Blackberry Thicket (C)

Dense blackberry thickets line the berms and extend into adjacent habitats in disturbed areas. They are impenetrable for humans, but provide food (i.e., fruit, insects), nesting, and protective cover for wildlife. Vegetation is dominated by Armenian blackberry and native wild cucumber.

Plants: Native wild cucumber and invasive Armenian blackberry occur in this disturbed habitat.

Wildlife: Resident song sparrow and spotted towhee; wintering golden-crowned sparrow flocks and fox sparrow; and summering common yellowthroat, lazuli bunting, and willow flycatcher. Wrentit, white-throated sparrow, and Bewick’s wren also inhabit blackberry thickets. Turtles may use these areas near water for nesting or aestivation.

Current extent: Blackberry habitat is common due to past land use disturbances. There are approximately 46.4 acres of blackberry within the Conservation Area.

Upland Meadow (D)

Upland meadow is located on the sandy, northern riverbank terrace and in three isolated disturbed areas. Vegetation on the shoreline consists of a mixture of native and non-native grasses and forbs with scattered Oregon ash and black cottonwood trees. Larger logs drift onto the terrace during high water, and standing trees show flood debris at approximately 5 feet above the ground. Native herbaceous vegetation is scarce but present. The two isolated disturbed uplands consist of non-native grasses with pockets of common tansy, purple deadnettle, and reed canarygrass.

Plants: On the riverbank terrace there are scattered patches of native plants including goldenrod, meadow rue, camas, and miniature lupine.

Wildlife: Red-tailed hawk, lazuli bunting, savannah sparrow, white-crowned sparrow, and black-tailed deer are some of the species observed in this habitat.

Current extent: The 6.75 acres of upland meadow habitat adjacent to the river retains some native vegetation. The other meadows (3.0 acres) consist of non-native and invasive species.

Reed Canarygrass (E)—Wetland and Upland

Emergent wetland habitat is dominated by a monoculture of 5- to 9-foot-tall reed canarygrass. When new shoots are forming in the early spring, it provides forage for waterfowl, and later in the spring and summer, it provides protective cover for wildlife. This habitat category also includes uplands dominated by reed canarygrass.

Plants: Few native plants were observed in this habitat. Native vegetation cannot compete with the dense cover.

Wildlife: Dusky Canada goose, other migratory and winter waterfowl, and turtles may use this habitat seasonally.

Current extent: Approximately 82 acres of the Conservation Area are dominated by reed canarygrass.

Seasonal Water / Mud Flat / Emergent Wetland (F)

Seasonally flooded wetlands and sloughs hold water during the winter and early spring, but typically dry up in the summer. Vegetation is dominated by reed canarygrass, but other obligate, native wetland vegetation grows in the wettest areas after water recedes.

Plants: As water levels recede, native popcorn flower, beggar’s tick, cudweed, smartweed, bay forget-me-not, water foxtail, and witchgrass develop.

Wildlife: Species include migratory and winter waterfowl (e.g., dusky Canada goose, greater white-fronted goose, green-winged and cinnamon teal, mallard, northern shoveler, ring-necked duck, gadwall, wigeon, bufflehead, eared grebe, pied-billed grebe, common and hooded mergansers), migratory shorebirds (semi-palmated plover, lesser and greater yellowlegs), marsh wren, Virginia rail, sora, swallows, killdeer, great blue heron, western pond and painted turtles, and amphibians (breeding habitat).

Current extent: There are approximately 47 acres of seasonal water/mud flat/emergent habitat in the Conservation Area. Winter waterfowl are attracted to the seasonal ponds for loafing, roosting, and respite from the Willamette River current and to the emergent vegetation for foraging. The mudflats provide resting and foraging habitat for migratory shorebirds. Turtles may also use this area seasonally.

Open Water (G)

In the northwest corner of the Conservation Area, there is an alcove and the connected North Pond, both of which provide important salmonid rearing habitat as well as habitat for turtles. The alcove is surrounded by a multi-layered, deciduous forest canopy of black cottonwood, willow, Oregon ash, and reed canarygrass; the connected pond to the south is surrounded by pockets of willow and reed canarygrass. In high flows, this area may be connected to adjacent areas E and F.

Wildlife: Open water provides rearing habitat for spring-run Chinook salmon, winter steelhead, and cutthroat trout. It also provides habitat for turtles, river otter, beaver, belted kingfisher, green heron, and waterfowl. Waterfowl are attracted to the protected pond for loafing, roosting, and respite from the Willamette River current. Native turtles have been observed basking in this area.

Current extent and attributes: The North Pond is approximately 2.27 acres in size.

3.4 Existing Trails and Use by the Public

There is currently no public access to the Conservation Area. Two gated access points allow Park Maintenance personnel access to the Conservation Area from the south. Vehicle access exists on top of the berms, and there are minor unimproved trails to the slough and the river. The site will continue to be closed to the public until after the construction of the pedestrian bridge and trail, anticipated to be completed in 2016.

SECTION 4: CONSERVATION PLANNING

This section follows the Conservation Action Planning template (The Nature Conservancy 2007) and includes analyzing the site, establishing Conservation Targets, and evaluating Key Ecological Attributes (KEA) for each Conservation Target.

4.1 Conservation Targets

Conservation Targets were identified using the major habitat types described in Section 3.3 above. Although past industrial activities altered native habitats and reduced species diversity in the Conservation Area, remnant native habitats on site and regionally will serve as reference sites for restoration. All native habitat types in the Conservation Area are considered Targets, though some areas will be more difficult to restore than others. The Conservation Targets within the Conservation Area are depicted on Figure 6 and are described below.

Key ecological attributes are the biological and ecological components that characterize a viable native habitat. KEAs were rated from poor to good for each Conservation Target. This rating helped establish restoration goals and guide the development of restoration actions. KEA tables for all of the Conservation Targets are included in Appendix E. Appendix F includes a list of tree and shrub species that can be planted within each of the Conservation Targets for restoration.

Forest Habitat—A (132 acres)

Forest habitat includes both native riparian (A1, 87 acres) and plantation forests (Douglas Fir, A2, 22.2 acres; Hybrid Poplar, A3, 16.9 acres) within the Conservation Area (Figure 6). Plantation forests will be restored to native forest conditions. Also, some areas dominated by blackberry (A4, 4.9 acres) and other non-native species (A5, 1.4 acres) will be restored to native forest to improve forest connectivity and reduce fragmentation. Healthy forest habitat is multi-layered with few gaps and with native species diversity in all layers. Biodiversity is higher in forests where some light reaches the forest floor and where standing and fallen dead wood is ample and of mixed age and size.

Key ecological attributes:

- ***Native tree and shrub richness:*** Most of the native forest (A1) has a healthy native canopy and understory except for the forest fringes. Historic use of the site by Boise Cascade altered native habitats, promoted invasive species, and reduced the cover of native trees and shrubs per acre. The dense growth and closed canopy of the Douglas fir plantation (A2) precludes any understory from growing. The hybrid

poplar plantation (A3) is dominated by non-native poplar, and openings in the canopy are dominated by non-native reed canarygrass and blackberry.

- ***Vegetative structure:*** There is very limited shrub understory in the Douglas fir plantation due to dense canopy coverage and in the hybrid poplar plantation due to dense reed canarygrass. The A4 and A5 areas lack tree canopy.
- ***Key habitat feature presence—snags:*** The Douglas fir plantation lacks snags and is lacking in downed dead trees. Snags and downed trees do exist within the native forest and hybrid poplar plantation.

Restoration Strategy: The desired future condition is to improve the majority of the key ecological attributes for native bottomland forest habitat; maintaining and restoring habitat suitable for riparian-forest-dependent wildlife species, such as little willow flycatcher and a variety of neotropical birds, as well as coniferous-forest-dependent species seeking winter cover and food. Restoration actions include thinning the Douglas fir plantation, removing hybrid poplars, controlling non-native invasive species (e.g., blackberry, English ivy, clematis), and increasing the cover of native shrubs. Since Douglas fir forest is not a naturally occurring forest community in river bottomlands, only a portion of it (approximately 30%) will be retained to sustain existing species and continue to provide nesting opportunities. Hybrid poplars will be removed entirely because they are not native and might hybridize with native black cottonwood; they will be replaced with a native riparian forest. To reduce fragmentation and widen the riparian community on the west end of the Conservation Area, blackberry thickets and non-native grasses in A4 and A5 will be controlled and planted with native trees and shrubs. Controlling the dominance of reed canarygrass in the forest understory is likely not possible, especially in areas most prone to annual flooding. Native tree plantings should target areas that have less than 30% canopy cover (e.g., blackberry communities). Native shrub plantings should target riparian areas where blackberry is removed and areas with less than 20% shrub cover.

Short-term goals 2015–2020:

- Selectively log up to 70% of the Douglas fir plantation (A2) at one time to provide openings, snags, downed wood, habitat trees, and public safety. Logging should consider habitat features, educational opportunities, and future trail location. Figure 7 depicts the restored Douglas fir forest.
- Remove hybrid poplars (A3) at one time and replant with native riparian trees and shrubs.
- Note: Both the hybrid poplar and Douglas fir plantations should be cut prior to the main paved trail construction to reduce impacts to the public and infrastructure. Investigate selling surplus timber.

- In the Douglas fir and hybrid poplar plantations, retain some girdled trees standing for snags (~5 snags/acre) and large logs and brush piles for wildlife habitat, and use mulch generated by the removal for soft path trails and other areas within the park. The snags will favor cavity nesters, and downed wood provides cover for small wildlife species and contributes to the long-term health of the forest.
- After logging, remove/control Armenian blackberry, English ivy, and other invasive species in A2 and A3 so that native understory shrubs can be planted. Refer to Section 4.2 for control methods.
- Establish tentative alignment of future soft trail in coordination with ODFW, and locate habitat features nearby for educational purposes.

Long-term goals:

- Control blackberry and other invasive species in A4 and A5; once controlled, plant native trees and shrubs.
- Increase percent cover and species richness of native shrubs and understory plants (vegetation structure) in A2 and A3.
- Continue to remove/control blackberry, English ivy, and other invasive species in A2 and A3 and replant with native plants.
- In the Native Forest (A1) conservation target area: Eliminate gaps in native woody vegetation by removing/controlling blackberry and other invasive species and planting native trees, shrubs, and herbaceous vegetation.

Shrubland—B (44 acres)

The shrubland conservation target areas are currently dominated by reed canarygrass (B1) and dense blackberry thickets (B2); native shrubs are present in the understory of native forest habitat and in small pockets of shrubland that are too small to map. The shrubland target areas will be restored to native shrubland conditions to provide important breeding habitat for little willow flycatcher, lazuli bunting, song sparrow, and yellow-breasted chat, among many other songbirds that use this habitat for breeding. Turtles may use this area for nesting or aestivation. Healthy shrubland habitat includes up to 80% shrub cover with scattered herbaceous openings.

Key ecological attributes:

- ***Native shrub richness:*** Historic use of the site by Boise Cascade altered native habitats, promoted invasive species, and reduced the cover of native shrubs per acre. Areas once dominated by shrubland are now dominated by non-native reed canarygrass and blackberry.

- ***Vegetative structure:*** There is very limited shrub cover due primarily to dense reed canarygrass and blackberry. Healthy wetland/upland scrub-shrub habitat provides nesting and foraging habitat for sensitive species, such as willow flycatcher and yellow-breasted chat.
- ***Transition to riparian forests:*** The shrubland communities are currently dominated by reed canarygrass and blackberry. Once restored, these areas will form a transition between the seasonal water/mudflat/emergent habitat and the riparian forests.

Restoration strategy: The desired future condition is restored shrubland in some areas now dominated by reed canarygrass (B1, 19.16 acres) and blackberry (B2, 24.9 acres). Historically, willows formed a dominant plant community within the Conservation Area. Although complete control of reed canarygrass is unlikely, increased cover of willows and other wetland shrubs in areas now dominated by reed canarygrass is possible. Blackberry can more easily be controlled and replaced with native upland shrub species.

Short-term goals 2015–2020:

- Establish willow, redosier dogwood, and other appropriate plantings in the “buried solids” area of B1 (see Figures 3 and 6) to provide a natural screen of winter waterfowl habitat (C4) and in reed canarygrass habitat along the potential soft trail in the southeastern corner of the Conservation Area.
- Control blackberry along the main paved trail (see section 4.2) and replace with dense native shrubs (Appendix F).
- Along main trail, mowing of edges for public safety should be done prior to and after bird and turtle nesting seasons, if possible (see section 4.2), as per City of Portland 2010 and ODFW 2015 guidance.
- If mowing cannot be done in the recommended time periods, consult with qualified professional for bird and turtle nest surveys and avoid mowing near flagged nests.
- Consider the use of targeted grazing by goats for weed control in dense blackberry and reed canarygrass areas after initially mowing.

Long-term goals:

- Plant willows, redosier dogwood, spirea and other appropriate shrubs (See Appendix F) within some areas dominated by reed canarygrass (C3, C2 fringe) to increase native shrub habitat.
- Control blackberry in drier areas (B2: east of the North Pond and east of the Douglas Fir forest) and increase percent cover and species richness of native shrubs by planting appropriate species such as mock orange, oceanspray, red-flowering

currant, native roses, and snowberry (Appendix F); continue to control blackberry to ensure dominance by native shrub community.

- Continue to plant native shrubs in other mapped B1 and B2 areas as time and budget allow.
- If mowing is necessary due to non-native grasses, consider replanting with native bunch grasses.

Seasonal Pond/Mudflat/Emergent Habitat—C (101 acres)

Seasonal Pond/Mudflat/Emergent habitat provides important feeding and resting habitat for migratory and winter waterfowl, migratory shorebirds, and turtles. Winter waterfowl habitat requires open water for resting and emergent vegetation for foraging. Migratory shorebirds require mudflats for foraging. Native turtles require upland habitat for nesting in proximity to aquatic areas for foraging and basking. C1 and C4 provide seasonal water and mudflat habitat (45 acres); C2 (25.4 acres) is reed canarygrass with difficult access, and C3 (31.1 acres) is emergent habitat dominated by reed canarygrass that can be accessed easily for maintenance.

Key ecological attributes:

- Seasonal exposure of mudflats: Water levels within C1, the former 50-MG lagoon, and C4 typically recede and become mudflats from June through October, which benefits shorebirds.
- Open water in winter: Water levels in C1, C2, and C4 are deeper in the winter and spring, which benefits waterfowl (e.g., dusky Canada geese) and turtles.
- Large wood: Although the area floods, large wood generally does not float over the berms. Basking sites for waterfowl and turtles are lacking.
- Native vegetation cover: The percent cover of native species is very low.

Restoration Strategy: Much of the area within the Conservation Target is dominated by reed canarygrass. The restoration strategy is not to try and control this invasive species, especially in areas that should remain as emergent wetland. Instead, areas can be mowed to encourage waterfowl, such as dusky Canada geese, that forage in these areas. Turtle habitat is present in C1, D, and North Pond. Native turtles should be encouraged to inhabit the site by anchoring large wood to provide basking sites. The wood will make turtles more visible and also provide resting areas for waterfowl. Mudflats should be preserved in C1 and C4 to continue to provide habitat for migratory shorebirds.

A long-term restoration action could involve the removal or breaching of portions of the berms that surround C1 and C3. Prior to this happening, a study will need to be conducted in consultation with DEQ to ensure the effects of this action are clearly understood. Issues that could arise include the potential scour of C1 and C3, the potential avulsion of the river through the island if the berms are removed, impacts to native turtle habitat, and any potential detrimental effects to the berm or to the bridge across the Willamette Slough.

Short-term goals 2015–2020:

- Conduct turtle surveys in coordination with ODFW to determine species of turtles using the site, distribution, and nesting habitat. Anchor large wood or basking structures within C1 (away from the trail to avoid disturbance), D, and the North Pond to encourage turtle basking and improve visibility to determine species presence. If possible, determine whether turtles are nesting within the berms.
- Since native turtles are present within the Conservation Area, maintenance and restoration activities will follow ODFW 2015 guidance.
- Mow the entire area of C1 and C3 each August after the waterfowl nesting season to reduce the cover of reed canarygrass, to prevent trees and shrubs from spreading and to maintain forage habitat.
- Remove birch trees from C3 since they are not native and are spreading.
- Plant native aquatic species such as wapato, bur-reed, sedges, rushes, yellow pond lily and duckweed to increase habitat complexity and richness.

Long-term goals:

- Maintain annual mowing regime to reduce reed canarygrass and prevent birch and other non-native woody vegetation from growing.
- Conduct study to investigate the removal or breaching of the berms surrounding C1 and C3, as described in the restoration strategy above.
- Enhance basking and nesting opportunities for native turtles.

- Remove or decommission the old outfall structure at the southwest corner of C3 for public safety.

Native Fish and Turtle Habitat—D (3.8 acres)

The Willamette River provides spawning and rearing habitat for spring Chinook and winter Steelhead ESUs. Healthy salmonid rearing habitat includes off channel habitat, which is present in an alcove and the North Pond. Additional salmonid refugia are present in the Conservation Area in a remnant channel (D) when it is connected to the Willamette Slough during high water events. Native turtles have also been observed in this area as well as the Willamette Slough.

Key ecological attributes:

- Temperature of backwater channel: The temperature of the channel (D) is currently too high to support salmonids year round.
- Refugia from strong current: The channel (D) provides refugia during high water events when the northern portion of the Conservation Area is inundated. In lower flows, the channel appears isolated and does not provide backwater habitat for salmonids.
- In-channel habitat diversity: The current condition of the channel (D) lacks habitat diversity and basking sites.

Restoration Strategy: A potential Conservation Target is improving habitat for native fish through the enhancement of D, a channel at the northern end of the island that is only connected to the Willamette Slough during high water events. Three issues were raised concerning the excavation of an opening to the slough. The first was whether this could pose a hazard to the abutments of the Minto Slough pedestrian bridge. The second is whether the channel will then provide habitat for non-native fish. The second concern is due to the fact that non-native fish are known to inhabit Willamette Slough based on its warmer temperatures. The third concern is whether this action would negatively impact existing turtle habitat.

For the channel to be restored, a study will need to first be conducted that investigates the hydrologic and the hydraulic effects of increasing the connectivity and complexity of the channel. Specifically, the study needs to investigate the creation of a broad, shallow, backwater alcove that backfills from the Willamette Slough but drains completely each year.

The channel bed should slope towards the slough so that it drains as water recedes during the summer low-flow period. Add in-channel structure to provide shelter and more complex habitat when the channel is inundated. The study will also need to confirm the hydraulic

effects of the channel and ensure it will not undermine abutments of the adjacent pedestrian bridge. Improvements to the channel should not provide habitat for warm water fish that are known to use the Willamette Slough. The desired future condition is to have all key ecological attributes ranked as good to very good thereby maintaining and restoring suitable native salmonid rearing habitat and supporting the recovery of ESA listed salmon/steelhead populations in the Willamette River, while not impacting turtle habitat.

Short-term goal 2015-2020:

- Add basking structures for turtles.

Long-term goal:

- Conduct feasibility study as described in the restoration strategy above.
- Investigate funding opportunities for conducting study and, if feasible, excavating the channel to achieve the desired future condition.
- Enhance riparian vegetation surrounding the North Pond and add large woody debris to improve habitat for native fish, turtles, and other wildlife species.

Meadow Habitat - E (7.12 acres)

This habitat exists along the northern bank of the Conservation Area. It is frequently flooded, which makes it important floodplain habitat for salmonids. The natural disturbance of this area has reduced the cover of trees and shrubs and deposition likely smothers native forbs and graminoids.

Key ecological attribute:

- Native forb and graminoid abundance: The area is subject to annual flooding and much of the area is not well vegetated.
- Native woody species cover: As stated above, the area is regularly flooded and woody species do not thrive in this area.

Restoration Strategy: The annual flooding of the area precludes restoration actions and the meadow habitat is generally self-maintained. A long term restoration action could be the control of non-native species, such as blackberry, as needed.

Short-term goal 2015-2020:

- None.

Long-term goal:

- Maintain by controlling invasive species, such as blackberry, as needed.

4.2 General Restoration and Maintenance Recommendations

Control of non-native invasive species should use a variety of methods from goats or hand pulling to herbicides. Methods should include the use of mechanical and chemical controls and adapted to specific site conditions:

- Mechanical methods could include mowing, hand-pulling/digging, or targeted grazing by goats. Goats can be used to control blackberry and reed canarygrass areas after initially mowing the area.
- Blackberry removal should be done incrementally and in stages to minimize loss of cover and nesting habitat, and followed by planting of native species.
- Herbicide applications should target specific invasive species. Since the Conservation Area is within the floodplain, only approved aquatic labeled herbicides that when properly applied have low aquatic toxicity to listed salmonids should be used (e.g., aquatic glyphosate, aquatic imazapyr, aquatic triclopyr-TEA).
- Scheduling of treatments (e.g., mowing, spraying) should minimize impacts to nesting wildlife by following the prescriptions in the City of Portland 2010 and ODFW 2015 guidance documents.
- The best time for major disturbance to vegetation (e.g., logging, removal of blackberry thickets) is between August 1 and January 31. Avoid maintenance measures in nesting areas during the primary nesting season from mid-April through July; from early to mid-August survey brushy areas for late nesters (i.e., willow flycatcher) and from February 1 through mid-April survey for early nesters (i.e., raptors, herons, geese, hummingbirds) prior to maintenance activities. Remove blackberries incrementally and in conjunction with replanting of natives.

Any excavation or fill in the Conservation Area will require approval by BPA and ODFW and appropriate state and federal permits associated with the floodplain, Clean Water Act, Endangered Species Act, and National Historic Preservation Act.

SECTION 5: RECREATION ACCESS AND EDUCATION

Public access will dramatically increase once the pedestrian bridge is constructed across the Willamette Slough. Scheduled to be constructed in 2015–16, the bridge will allow easy access from the downtown area to Minto-Brown Island Park. A 12-foot-wide paved path through the Conservation Area will connect the bridge to the main park trail system.

Wildlife has become habituated to decades of limited human presence within the Conservation Area. Not only will there be an increase in human presence, but people will bring dogs through the Conservation Area, though they are required to be kept on a leash at all times and their access will be limited to the main, paved trail.

Two goals of the Conservation and Management Plan are:

- Ensure sensitive wildlife species are protected from increased human and dog use within the Conservation Area, while still allowing for passive recreation.
- Provide educational opportunities that ensure visitors to the Conservation Area understand its history and dedicated purpose as a conservation area for wildlife.

Recommendations:

- **Controlled Public Access:** Other than the primary paved trail, all other potential future trails will be soft trails. Prior to mowing berms around C1 and C3, building new trails, or allowing access to the berms, wildlife surveys should be undertaken. Public access will not be allowed except on the main paved trail until turtle and waterfowl surveys are completed and potential impacts to wildlife are assessed. ODFW and Audubon will be enlisted to assist with the surveys. Once the surveys have been completed and prior to any soft trail development, the City will meet again with BPA and ODFW to discuss whether the proposed trails meet with the conservation area values and other options for additional public access and maintenance.
- **Controlled Public Access:** C1, C3, and C4 provide habitat for a variety of wintering waterfowl, which scare easily with the presence of humans or dogs. Should public access be deemed compatible with the Conservation Easement, these areas will be managed for waterfowl, turtles, and conservation values, which may require seasonal closures and off-limits areas. Seasonal trail closures would coincide with fall and winter waterfowl use of the ponds and will roughly extend from late fall to early spring. Best management practices will be used for protection of turtle nesting habitat. If during the City's annual monitoring it is determined that management

practices are not appropriately limiting human- or dog-related adverse impacts on wildlife, then the City would consider implementing tighter restrictions or increased barriers in consultation with BPA and ODFW. Gates and signage will be installed to educate the public about the reasons for the seasonal trail closure. Figure 8 shows the locations of potential future soft trails, gates, and seasonal closures.

- ***New Trail Construction:*** A new unpaved trail may be constructed from near the southeast corner of the former 50-MG pond (C1) to the main park in the south. The approximate location of the trail is depicted on Figures 8 and 9 and a detail of the trail surrounded by restored native shrubland is depicted on Figure 10. The trail can meander through the location of the current Douglas fir and hybrid poplar plantations and be constructed once the poplar and Douglas fir plantations are logged. The proposed alignment will be provided to BPA and ODFW for approval, and the alignment should be surveyed for turtles. City staff should also show this route to ODFW and ask for ideas to avoid potential impacts. The trail will be designed to allow pedestrians to experience the Conservation Area with minimal disturbance to wildlife.
- ***Selective Blackberry Maintenance:*** Armenian blackberry is a non-native species that will be controlled and replaced with native trees and shrubs in many areas of the Conservation Area. Armenian blackberry, however, is a plant that has thorns and creates an excellent barrier to people and dogs. As such, blackberry control will be done strategically as replanting and maintenance allows. An early priority will be along the main paved trail where blackberry will be replaced with dense native plantings along the entire length of the main trail through the Conservation Area. The vegetation should be a combination of trees and shrubs that will minimize disturbance to the waterfowl, shorebirds, and turtles using this habitat from trail users, while still allowing for open views and public safety. A split rail fence could also be installed, which will encourage people to stay on the trail as the native vegetation becomes established.
- ***Construction of Wildlife Viewing Areas (Blinds):*** Blinds provide an excellent educational opportunity to observe birds and other wildlife species without disturbing them. Many birds (e.g., waterfowl) will leave an area if they perceive human presence. As such, two blinds can be constructed at strategic locations to provide trail users with a view of areas now providing habitat to large flocks of wintering waterfowl. Potential locations include the northeast corner of C1 and the eastern end of a short trail leading to the East Pond. The locations of the blinds are illustrated on Figure 9. The blinds' construction will be compatible with the fact they are in the floodway.

- ***Signage and Interpretive Graphics:*** Education is an important element of a recreational experience. The Conservation Area provides several opportunities to inform the public about Native American history, past industrial uses, wildlife, and the conservation goals of the area. Examples of signage and interpretive graphics are illustrated in Figure 11. Trail users can be educated about:
 - *Conservation Goals and Site Context:* Trail users should be informed about the presence of wildlife species sensitive to disturbance as soon as they enter the Conservation Area. The conservation requirements and management goals can be included on interpretative signs and graphics to ensure trail users understand the City's commitment to managing and enhancing natural resources. The signs and interpretive graphics are especially important at the south end of the bridge, but can also be placed as trail users enter the Conservation Area at its southern end and at any other trail junctions.
 - *Dogs:* Dogs can be one of the most difficult management issues for public places. Research shows that dogs are perceived as predators by wildlife even if they stay on trails. Signage at all main access points and especially the south end of the bridge will be important to educate trail users that the Conservation Area provides habitat for wildlife sensitive to disturbance and that dogs must be kept on a leash at all times and be kept in control (i.e., avoid situations that encourage barking). Existing ordinances will need to be enforced in the Conservation Area to minimize disturbance to wildlife.
 - *Site History:* The surrounding area has a rich history of Native American use, which should be depicted on signs at the west end of the bridge. Information to be placed on the signs will be closely coordinated and approved by the Tribes. The Conservation Area also has an industrial history. Trail users can be educated about the past industrial use near the location of the wildlife viewing area at the northeast corner of C1 and about agricultural use (Douglas fir plantation) along the new trail (see description below). The signs will inform them of how the area is being enhanced to improve wildlife habitat and native plant cover and why it is important to stay on the trail.

SECTION 6: RESTORATION AND RECREATIONAL PRIORITIES AND APPROXIMATE RESTORATION COSTS

6.1 Restoration and Recreation Priorities

The Conservation Plan has described short- and long-term goals (both ecologically and recreationally) that should be implemented. For the Conservation Plan to be a success a number of important points need to be considered:

- Providing public access without harming natural resource conservation.
- Monitoring restoration efforts to track effectiveness and make changes to the priorities and goals as needed.
- Coordinating with local stakeholders, including the Salem Audubon Society, to assist in project implementation.
- Funding to realize the strategic restoration and access actions identified in this plan.

Below is a list of priorities based on the Conservation Targets and Recreational Needs within the Conservation Area:

Short-Term Priorities (2015 to 2020)

Higher Priority

- Conduct turtle and waterfowl surveys to understand the species present within the Conservation Area and to direct and inform potential future soft trails and public access.
- Replace blackberries with dense native plantings to provide a buffer along the edge of main paved trail.
- Except for along the main paved trail, do not mow berms adjacent to C1 and C3 until wildlife surveys are completed and after consultation with BPA and ODFW.
- Remove up to 70% of Douglas fir plantation (A2) to improve safety along the main trail and to provide openings for understory plantings.
- Remove hybrid poplar plantation and replant with native trees and shrubs. Leave strategic trees for snags and cavity nesting birds where they won't impact future trail.

- Schedule tree and blackberry removal (e.g., Douglas fir, hybrid poplar, blackberry) to avoid impacting nesting birds (see section 4.2).
- Increase downed wood and girdle some remaining trees for snags within the remaining Douglas fir forest habitat to favor cavity nesters and to improve the long-term health of the forest.
- Remove birch trees from the south end of C1 and mow the bottom of C1 and C3 in August following the end of the nesting season.
- Plant shrubs (e.g., willows, redosier dogwood) in the buried solids area to provide a screen.
- Anchor permanent large wood in C1, D, and North Pond for native turtle basking sites.
- Construct interpretive signs and benches along main trail prior to opening of trail to public.
- Establish tentative alignment of future soft trail and locate habitat features nearby for educational purposes.

Lower Priority

- Control blackberries and increase native shrubs east of North Pond.
- Construct two wildlife viewing blinds in strategic locations along main paved trail and spur trail to C4. Proposed designs should be sent to BPA and ODFW prior to finalization.

Long-Term Priorities (Beyond 2020 or when funding is available)

- Control non-native species (especially blackberry) incrementally in A1, A2, and A3.
- Control non-native species (as needed) within E.
- Conduct feasibility study to determine potential for excavating channel (D), so that it does not increase/improve habitat for non-native fish, impact native turtle habitat, or undermine the abutments of the adjacent pedestrian bridge.
- Construct new unpaved trail segment (in area of current Douglas fir and poplar plantations) in consultation with BPA and ODFW.
- Maintain mowing regime in C1 and C3 if determined to be beneficial for wildlife.
- Investigate breaching or removal of berms surrounding C1 and C3 in consultation with DEQ.

6.2 Restoration Costs

Due to the constraints placed on portions of the Conservation Area from past contamination, DEQ has stated that City personnel or professional contractors will be used to restore and manage plant communities within the Conservation Area, and not volunteers or other members of the public, unless approved by DEQ. The costs included in Table 2 are the approximate costs per acre for restoration actions:

Table 2. Potential Restoration Costs

Description	Unit Cost / Acre
Broadcast Spray	\$100
Rough Mow	\$100
Clear and grub	\$2,000
Broadcast Seeding	\$1,500
Drill Seeding	\$1,500
Spot spray	\$225
Planting Trees and Shrubs	\$10,000 to \$15,000

SECTION 7: SUMMARY

The 307-acre Conservation Area provides a unique opportunity for restoring and enhancing native Willamette River floodplain habitat while allowing for compatible public access and education. While the Conservation Area is part of Minto Brown Island Park, it has a conservation easement that distinguishes it from the rest of the park. As such, all restoration and recreation plans need to be compatible with the overall conservation values of the site for wildlife. This plan provides a blueprint for activities and priorities within the Conservation Area. The effectiveness of activities described in this plan (e.g., invasive species control, planting, people management) should be monitored to inform future management decisions and modified and updated accordingly to the results.

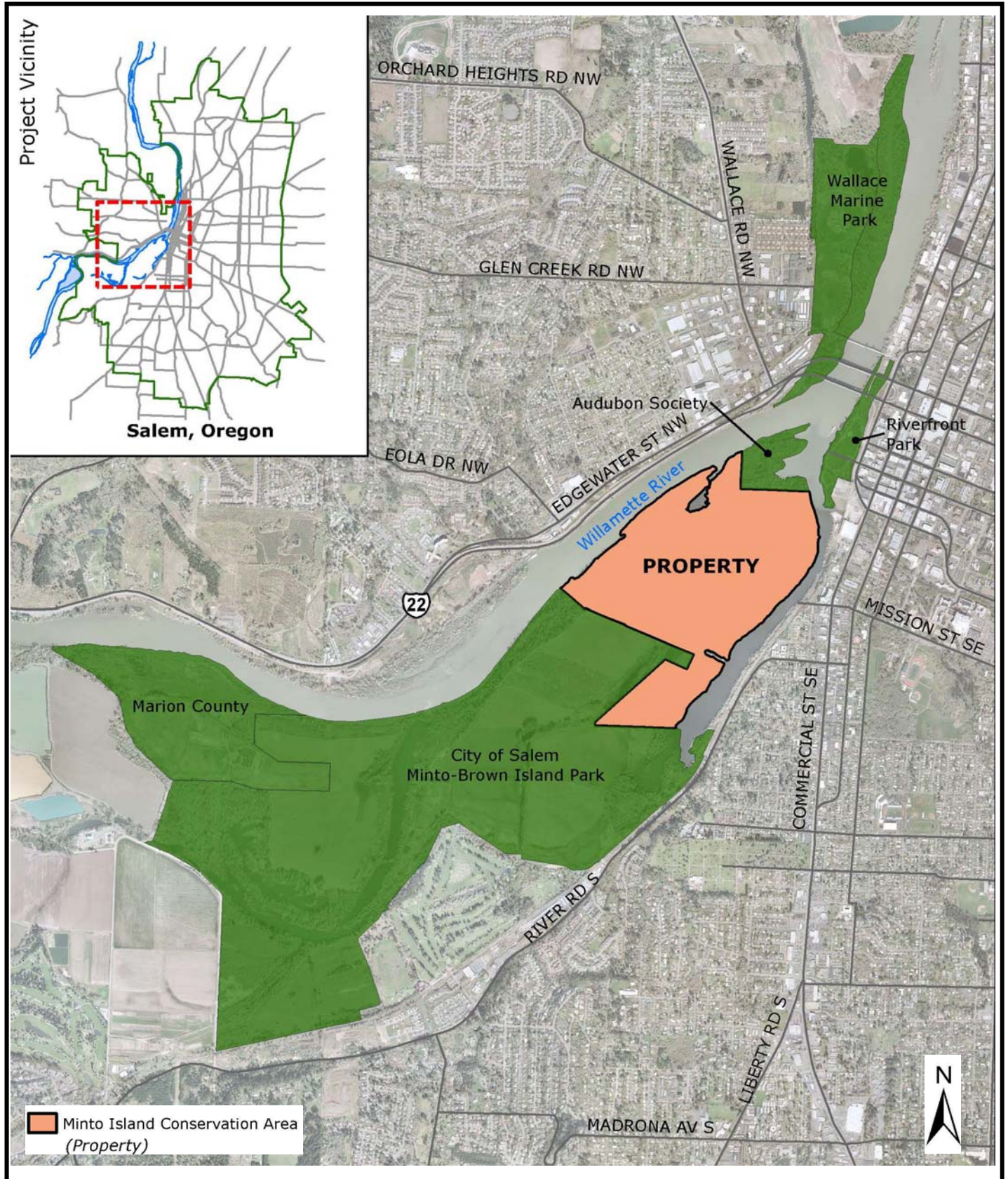
SECTION 8: REFERENCES

City of Portland, 2010. *Terrestrial Ecology Enhancement Strategy Guidance: Avoiding Impacts on Nesting Birds During Construction and Restoration Projects*. Bureau of Environmental Services, Version 2, October 2010.

ODFW, 2015. *Guidance for Conserving Oregon's Native Turtles Including Best Management Practices*. Oregon Department of Fish and Wildlife. 99 pp

Appendix A

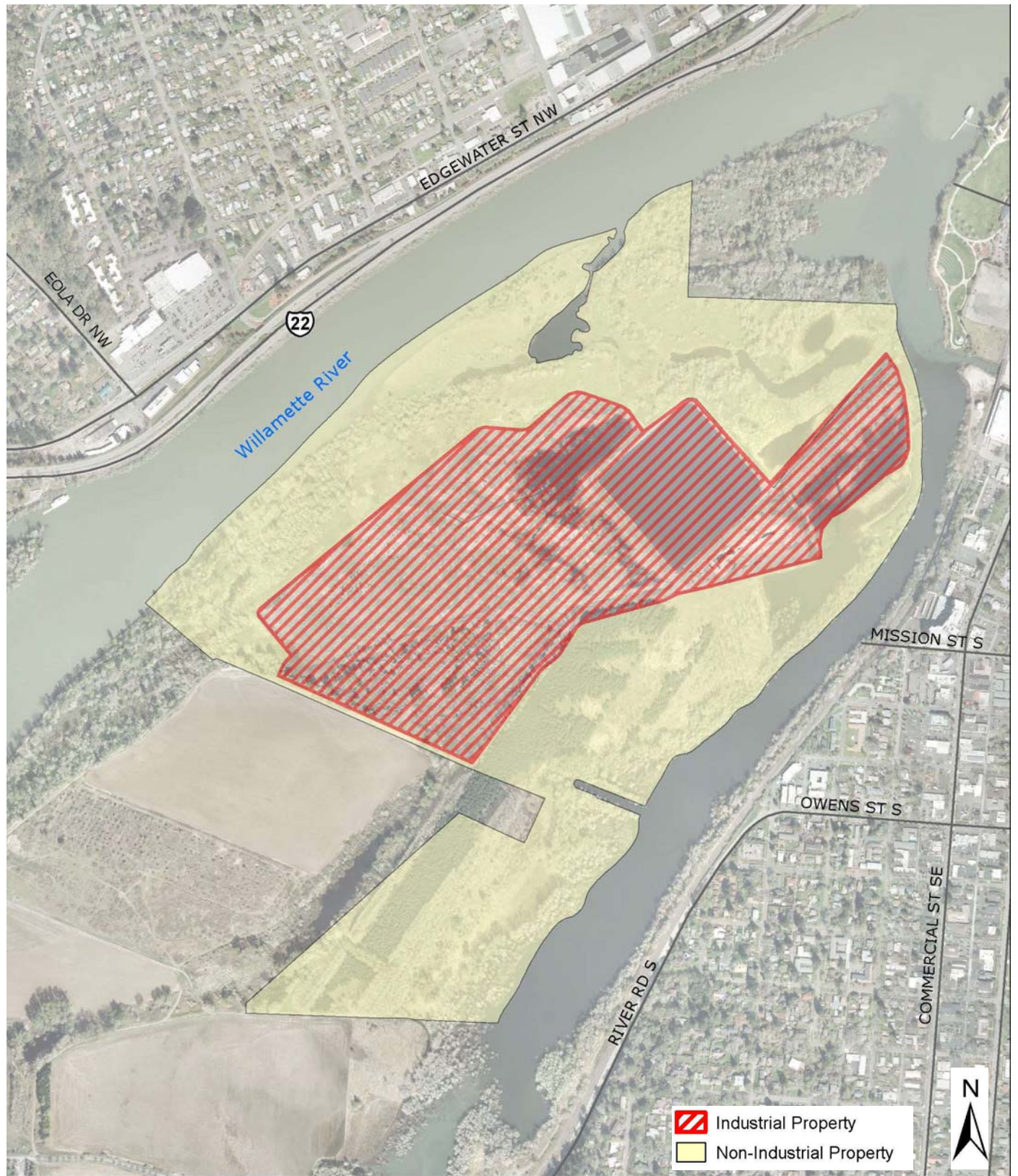
Figures



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Location Map
Minto Island Conservation Area - Salem, Oregon
Provided by City of Salem

FIGURE
1



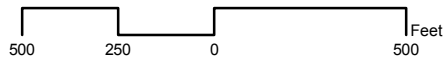
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9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Former Industrial and Non-Industrial Property
Minto Island Conservation Area - Salem, Oregon
Provided by City of Salem

FIGURE
2



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MINTO ISLAND CONSERVATION AREA - FORMER INDUSTRIAL AREAS

Minto Island Conservation Area - Conservation and Management Plan
Salem, Oregon

FIGURE
3

10-01-2014

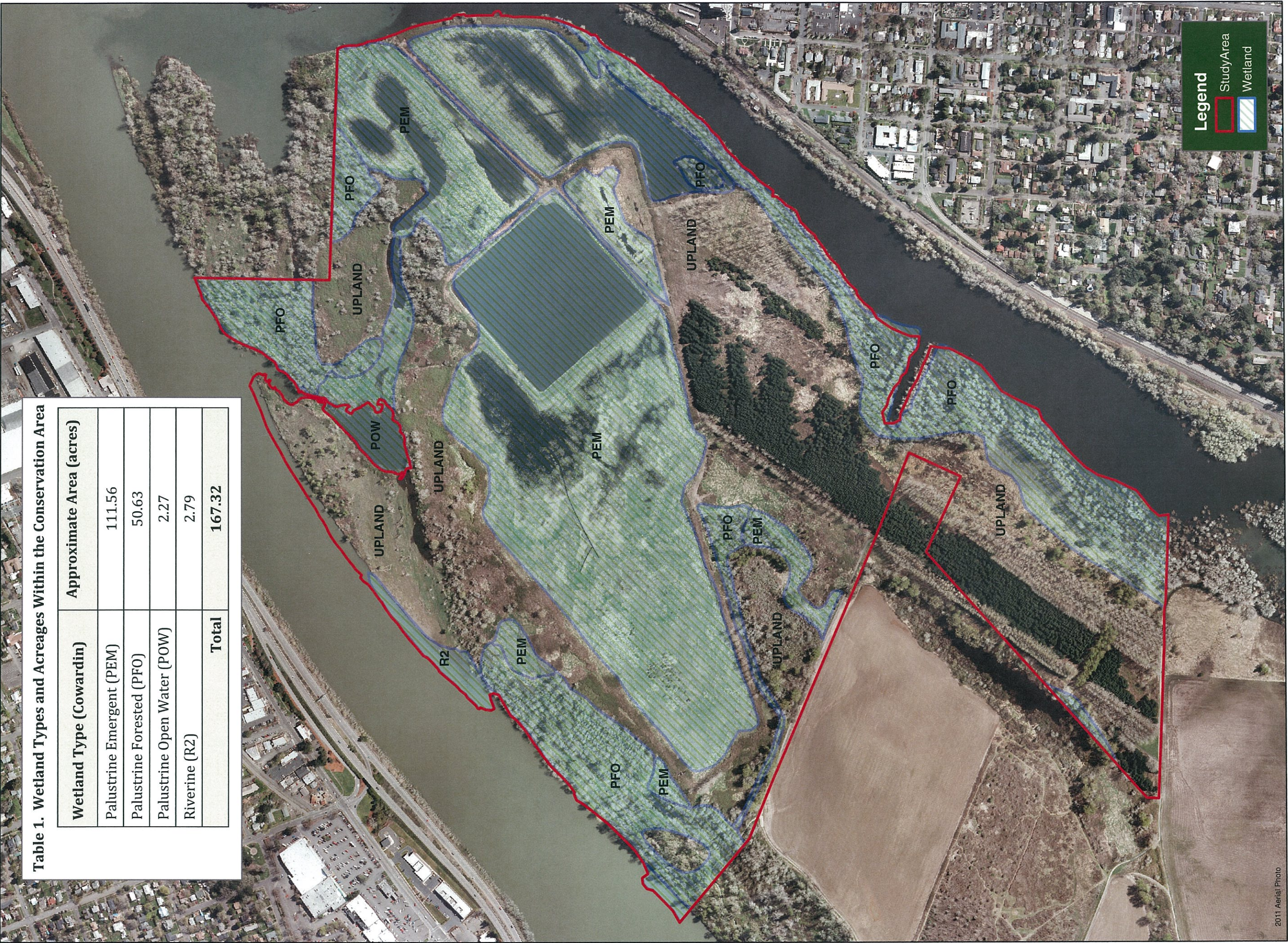


Table 1. Wetland Types and Acreages Within the Conservation Area

Wetland Type (Cowardin)	Approximate Area (acres)
Palustrine Emergent (PEM)	111.56
Palustrine Forested (PFO)	50.63
Palustrine Open Water (POW)	2.27
Riverine (R2)	2.79
Total	167.32





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WETLANDS (Aerial Photo Base 2014)

Minto Island Conservation Area - Conservation and Management Plan
Salem, Oregon

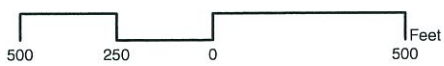
FIGURE

4B

02-20-2015



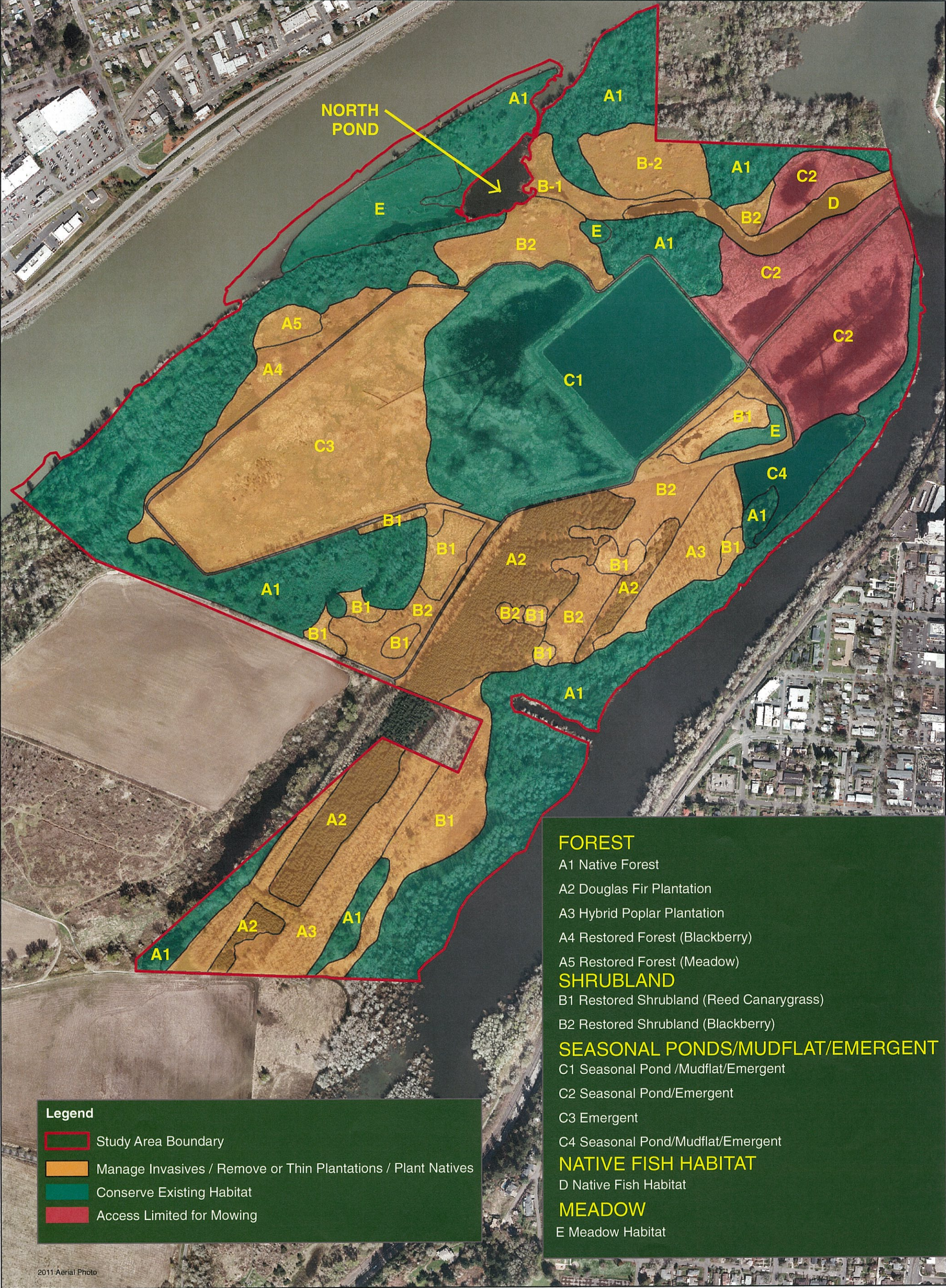
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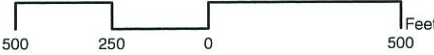
HABITAT TYPES

Minto Island Conservation Area - Conservation and Management Plan
Salem, Oregon

FIGURE
5



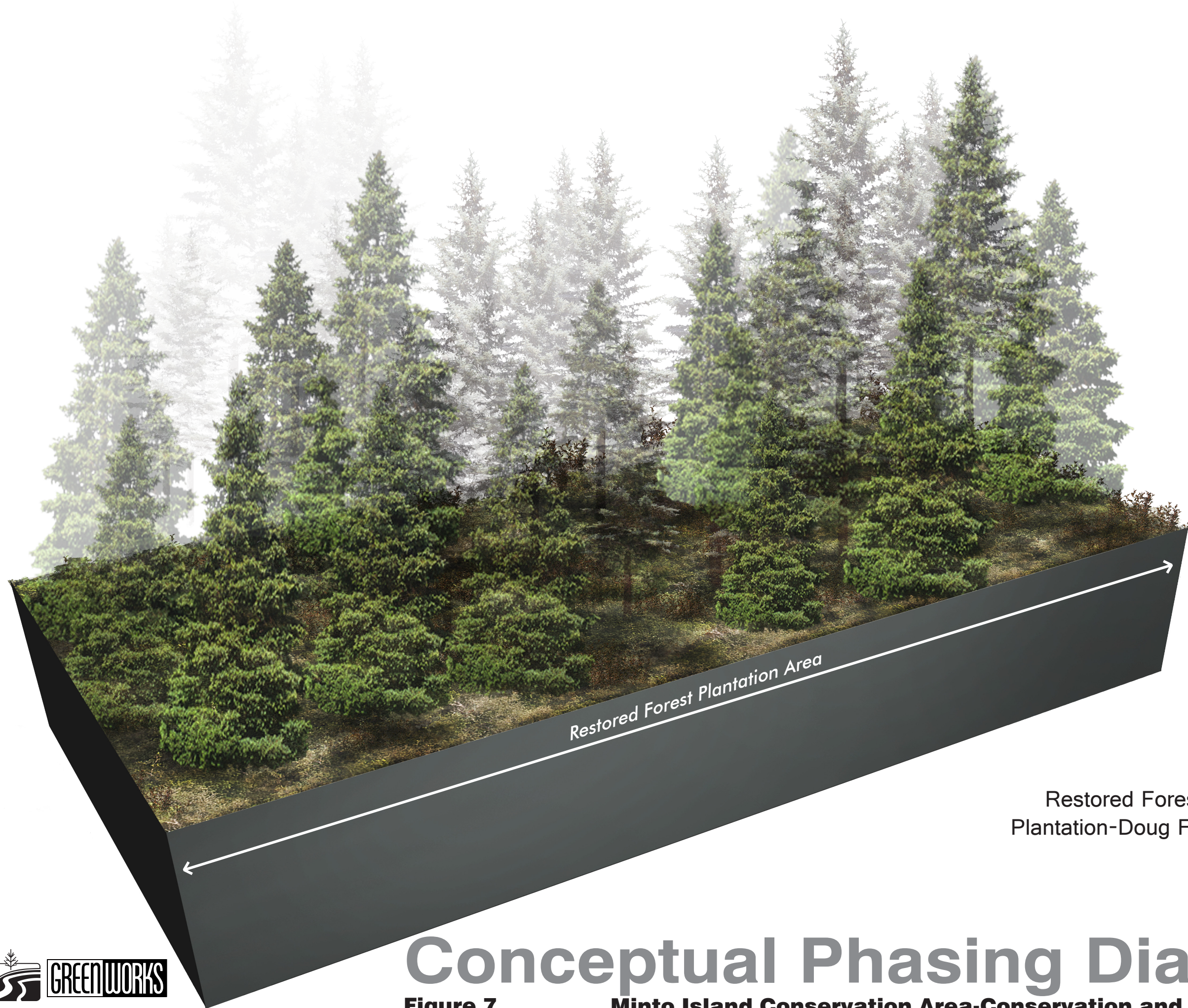
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HABITAT CONSERVATION TARGETS

Minto Island Conservation Area - Conservation and Management Plan
Salem, Oregon

FIGURE
6



Restored Forest
Plantation-Doug Fir



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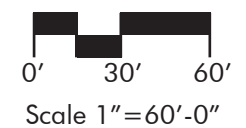
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**PAVED TRAIL AND
POTENTIAL TRAIL OPTIONS**
Minto Island Conservation Area - Conservation and Management Plan
Salem, Oregon

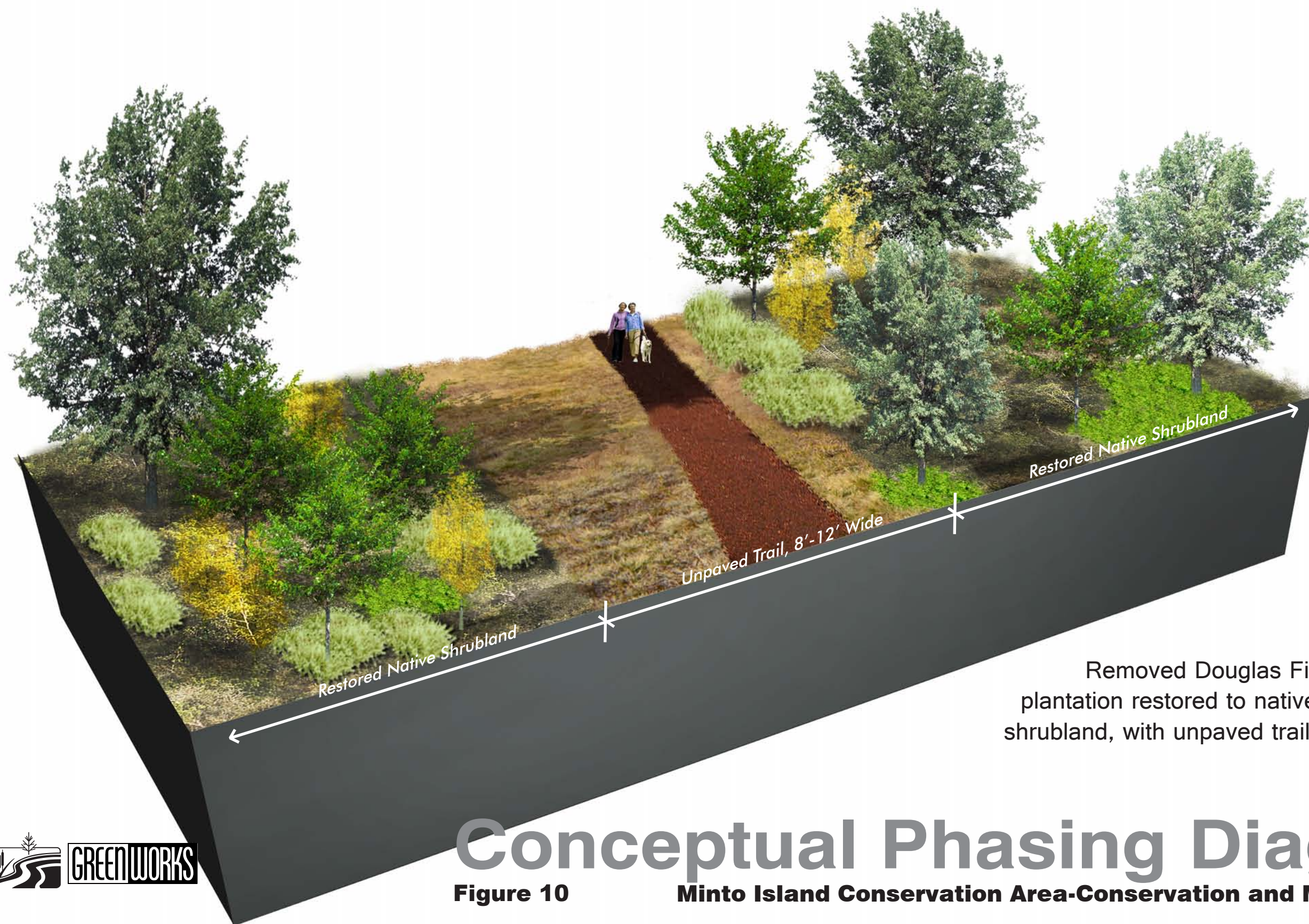
**FIGURE
8**

02-20-2015



Conceptual Siteplan Diagram

Figure 9 **Minto Island Conservation Area-Conservation and Management Plan**



Removed Douglas Fir
plantation restored to native
shrubland, with unpaved trail.



Structure with stool type seating



Silhouettes of wildlife incorporated into the structure



Overhead canopy provides shelter for viewers



Floating structures provide less impact on sensitive ground areas

Bird Blinds-

Structures provide opportunities for trail patrons to view birds and native wildlife while not disturbing natural habitats.



Salvaged tree slightly carved for seating



Removed tree cut on-site for seating



Salvaged tree cut and shaped by local fabricators



Tree milled and fabricated into seating

Interpretive Seating Elements-

Trees removed during the initial restoration phase of the project can be used for seating along new and existing trails. The positioning of seating elements can suggest the fabrication sequence of a tree to a bench, as pictured from left to right.



Messages engraved into natural materials



Rough cut timber used as fencing



Local or historic symbols engraved into fence



Historic site images printed onto fencing elements

Trails and Edges-

Throughout trail areas and paths, patrons can learn about the contextual history of the site through the use of signage, paving materials, and relative site elements.



Steel cut panels incorporated into signage



Engraved timber used for signage



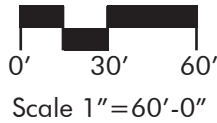
Figurative signs created by local school children



Informational graphics incorporated into site elements

Signage and Interpretive Graphics-

Personal and humorous messages incorporated into signage can provide a unique and distinct experience for users.



Precedent and Example Images

Minto Island Conservation Area-Conservation and Management Plan

Appendix B

Technical Advisory Committee Meeting Notes

Minto Island Conservation Area Management Plan

Technical Advisory Committee Meeting #1

Thursday, June 19, 2014

1:30-4:30 pm

Meeting Notes

Attendees:

Committee List

	Laura Tesler	Oregon Dept. of Fish and Wildlife (ODFW)
✓	Karen Hans	ODFW
	Elise Kelley	ODFW
✓	Les Bachelor	National Resources Conservation Service (NRCS)
	Eric Jones	Meyer Memorial Trust
✓	Chris Seal	US Fish and Wildlife Service (USFWS)
	Dorie Welch	Bonneville Power Administration (BPA)
✓	Lawrence Schwabe	Confederated Tribes of Grand Ronde
	Robert Kentta	Confederated Tribes of Siletz Indians
✓	Ray Temple	Salem Audubon Society
✓	Ken Bierly	Glenn Gibson Watershed Council
	Susan Turnblom	Oregon Dept. of Environmental Quality

City Staff

✓	Patricia Farrell	Project Manager
✓	Keith Kever	Parks Operations and Planning Manager
✓	John Kleeman	Parks Operations Supervisor
✓	Don Christensen	Salem Parks and Recreation Advisory Board

Consultant Team (Pacific Habitat Services)

✓	John van Staveren	Project Manager
✓	Christie Galen	Senior Ecologist
✓	Dale Shank	Restoration Ecologist

Welcome & Introductions

Attendees introduced themselves and briefly stated their agencies' interest in the Minto Island project area.

Project Area Overview – Patricia Farrell

Patricia opened with a brief overview of the role of the TAC and the goals of the Management Plan. She then presented a series of powerpoint slides of the development

of the property, historical vegetation, the acquisition of property, the future pedestrian bridge and trail, and a summary of site restrictions based on the conservation easement.

Baseline Habitat Conditions – Christie Galen

Christie presented powerpoint slides documenting the types of vegetation communities and approximate wetland boundaries and wetland types on the property. Many of the areas are overgrown with blackberry and reed canarygrass, making access difficult to perimeter areas. There are also areas mapped as native deciduous forest, forest plantation (Douglas fir and hybrid cottonwood), upland meadow, wet meadow, mud flat/emergent, and open water. Copies of the maps were provided to the attendees.

Discussion

Following the slide shows the group discussed wildlife known to be present on the site and how that may influence the management plan. Audubon has identified over 150 bird species that use the Minto-Brown Island area. The project area has many over wintering waterfowl and shorebirds, including approximately 300 Dusky Canada geese. Unidentified turtle species were spotted basking on old aerator concrete footings in the central mud flat area (former 100 MG pond). Red legged frogs may use the ponds seasonally. ODFW will check on any data on turtles for this site. Bald eagles and osprey frequent the area and nest nearby. Yellow breasted chat and willow flycatcher have also spotted on the site.

There were questions about the hydrology, soils, contamination issues, and restrictions on soil disturbance in the former industrial areas. Since the entire property is within the Willamette River floodway, how does flooding of the ponds affect fish? Is there entrapment? ODFW thought not much of a problem for the native fish. Non native fish may become trapped as water recedes from the enclosed ponds. Seasonal high flows show surface water connection through sloughs near the Audubon property and along the mainstem Willamette. There were questions about Ordinary High Water elevation and 2 year flood elevations.

Site Visit

Attendees went out to the property and viewed areas from the pond perimeter berms. Discussion ensued about ideas for management and restoration. The group returned to Pringle Hall. USFWS requested a map showing the former industrial areas where restrictions apply and LiDAR contour data. The City asked the TAC members to think about the site and options.

Next Steps

Follow up information will be sent and the second TAC meeting will be scheduled via a Doodle poll for late July or early August. There may be an interim survey sent out to elicit ideas about restoration and enhancement measures and short and long term actions.

Minto Island Conservation Area Management Plan

Technical Advisory Committee Meeting #2

Thursday, August 7, 2014
9-12 am

Meeting Notes

Attendees:

Committee List

✓	Laura Tesler	Oregon Dept. of Fish and Wildlife (ODFW)
	Karen Hans	ODFW
	Elise Kelley	ODFW
✓	Les Bachelor	National Resources Conservation Service (NRCS)
	Eric Jones	Meyer Memorial Trust
✓	Chris Seal	US Fish and Wildlife Service (USFWS)
	Dorie Welch	Bonneville Power Administration (BPA)
✓	Briece Edwards	Confederated Tribes of Grand Ronde
	Robert Kentta	Confederated Tribes of Siletz Indians
✓	Tim Johnson	Salem Audubon Society
✓	Ken Bierly	Glenn Gibson Watershed Council
✓	Susan Turnblom	Oregon Dept. of Environmental Quality

City Staff

✓	Patricia Farrell	Project Manager
✓	Keith Kever	Parks Operations and Planning Manager
✓	John Kleeman	Parks Operations Supervisor
✓	Don Christensen	Parks and Recreation Advisory Board

Consultant Team (Pacific Habitat Services)

✓	John van Staveren	Project Manager
✓	Christie Galen	Senior Ecologist
✓	Dale Shank	Restoration Ecologist
✓	Robin Craig	Landscape Architect

Consultant Team (Parks Masterplan)

✓	Tracy Johnson	ESA/Vigil Agrimis
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Welcome & Introductions

Attendees introduced themselves.

Overview and update

Patricia opened with an overview of the status of the project and the purpose of the meeting. John followed by explaining the process that PHS is following to develop the restoration options for the project. This process is called Conservation Action Planning (CAP) and is used by the Nature Conservancy to develop a plan of action for restoration strategies. Metro uses this process for restoration planning at their properties. John handed out a flow chart that included the five steps of CAP: Define conservation targets, define key ecological attributes (KEAs), analyze threats and sources, develop an action plan, and develop a monitoring plan.

Christie followed this discussion by presenting the specific KEAs that PHS have assigned to the conservation area and by distributing handouts. Updated graphics showing the vegetation communities and wetlands within the project area were also available. She explained that PHS has assigned five KEAs for the project area: Forest Habitat, Shrubland, Aquatic/Mudflat/Emergent Habitat, Salmonid Rearing Habitat, and Meadow Habitat. PHS also identified Dusky Canada Geese as a species conservation target.

Discussion

Susan (DEQ) opened the general discussion by stating that her agency's preference is that City employees can plant trees and shrubs within the cells (of the 50 MG and 100 MG ponds), but that members of the public should not be exposed to soil disturbance due to the potential for contamination. DEQ is concerned with long term exposure, especially of children, so exposure should be minimized.

Briece (Grande Ronde) discussed the cultural heritage of the island. Although a large cultural site is known to be located close by, there is nothing specifically documented within the project area, however this area of slackwater between the slough and the river is of significance. This could be due to the fact that the course of the river has changed through the years and that the northern portion of the island was only relatively recently created (as recently as 1952). The Tribes would assist in monitoring during any soil disturbing activities.

Educational opportunities were discussed. Keith informed the group that the bridge project will construct signs along the pathway through the project area. The proposed path will be 10 to 12 feet wide and will have 3 "pullouts" and 4-5 educational signs. The project team requested the plans showing the locations of the signs.

There is a concern about structures being located within the project area. Any structure, such as a blind, should not have a roof due to the potential for transients using them as

shelters. The structures may also need to be constructed to ensure they do not impede flood flows and would need City permits for floodway permit.

Dusky Canada geese were discussed. Tim (Audubon) discussed how they are an important species on the island. They are known to feed, forage and roost within the island. Tim suggested that reed canarygrass throughout the 100 MG and 50 MG ponds be mowed to enhance habitat. The idea of just mowing channels, which was previously suggested by Chris (USFWS), was also discussed. Chris discussed how although dusky Canada geese are important, there are refuges close by that also provide habitat for this species. It was suggested, and agreed by the group, that the plan should not have a particular species be conservation targets as there is rich diversity of other wildlife there. Instead, the report should focus on habitat types. The concern is that species can be transitory and could stop using the island as habitat.

Laura (ODFW) described how important it is to limit human presence to the main trail through the island, though a smaller trail through the Douglas fir and cottonwood plantations could be acceptable. As an example, she described how northern shovelers (ducks) may stop using the island habitat if they are repeatedly disturbed. Laura also explained how she does not support the concept of opening up a backwater channel just downstream of the new bridge abutments. Her concern is that warm water fish could start using the backwater channel and that the new bridge abutments might be undermined.

Keith (Parks) described how the concrete water control structures will have to be removed at some point, but that more investigation is needed. No one knows exactly how they functioned or if they can function now. They are seen as a safety liability.

A discussion was had by the group as to the future use of the berms around the two main ponds. Specifically, the group discussed what to do with the berm along the western side of the 100 and 50 MG ponds. John suggested a gate be constructed to keep people away from the western side of the ponds during the winter and spring. While the concept of keeping people away from species during nesting periods was agreed by all, Laura pointed out that gates are not effective and that people would find a way to go around the gate. It was suggested that a portion of the berm be removed and a seasonal crossing be installed. This was dismissed as being too expensive and difficult to manage. Removing the berms completely or perhaps removing the tops of the berms was discussed to effectively bar people ever accessing the backside of the ponds. Not mowing the blackberries along this edge of the berm was also suggested as a way to keep people out. Perhaps the southern edge of the 100 MG berm could be maintained to allow access for mowing and a short loop to the adjacent park trail.

Susan stated that as DEQ has so little data on the contamination within the island additional information on soils is needed before any removal of the berms can take place. She also stated that the hydrologic effect of removing the berms would need to be studied to ensure the removal didn't scour the soil surface of the ponds.

The group discussed the future of the Douglas fir and the hybrid poplar plantations. It was agreed that the Parks Department should start thinning the firs soon as they are seen as a place where transients can hang out (they also effectively block light, which precludes the growth of a healthy understory). The group also agreed that the firs should all be removed in the future as they are not native to the island. However, the removal should not happen all at once, so that replanting with natives trees and shrubs can occur on a piecemeal basis. It was agreed that the hybrid poplars be removed and replaced with native hardwoods. The chip value of the plantation trees should be investigated.

Other items discussed included:

- The Parks Department should not mow from mid-April through mid-July to ensure that nesting is not disrupted
- That fencing is not constructed within the island
- That the whole of the 100 and 50 MG ponds be mowed and that the Parks Department will need to construct a ramp to ensure they have access.
- C2 – emergent species will be planted within this area, though reed canarygrass will be a long term problem
- A spur trail will be proposed to the C1/C2 areas.
- C1 – basking logs should be added to this area
- E – maintain and manage invasives in this area
- A split rail fence could be installed along the main trail to define access
- Provide a place of entry from the new bridge and distinguish the Conservation area from the rest of the park so public knows expectations.
- The Minto-Brown Island Park masterplan is underway and public outreach can include the Conservation Area.

Minto Island Conservation Area Management Plan

Technical Advisory Committee Meeting #3

Thursday, October 19, 2014
9-12 am

Meeting Notes

Attendees:

Committee List

✓	Laura Tesler	Oregon Dept. of Fish and Wildlife (ODFW)
✓	Karen Hans	ODFW
	Elise Kelley	ODFW
✓	Les Bachelor	National Resources Conservation Service (NRCS)
		Meyer Memorial Trust
	Chris Seal	US Fish and Wildlife Service (USFWS)
	Dorie Welch	Bonneville Power Administration (BPA)
✓	Briece Edwards	Confederated Tribes of Grand Ronde
	Robert Kentta	Confederated Tribes of Siletz Indians
✓	Tim Johnson	Salem Audubon Society
✓	Ken Bierly	Glenn Gibson Watershed Council
✓	Susan Turnblom	Oregon Dept. of Environmental Quality

City Staff

✓	Patricia Farrell	Project Manager
✓	Keith Kever	Parks Operations and Planning Manager
✓	John Kleeman	Parks Operations Supervisor
	Don Christensen	Parks and Recreation Advisory Board

Consultant Team (Pacific Habitat Services & Greenworks)

✓	John van Staveren	Project Manager
✓	Christie Galen	Senior Ecologist
	Dale Shank	Restoration Ecologist
	Robin Craig	Landscape Architect (Greenworks)

Consultant Team (Parks Masterplan)

✓	Tracy Johnson	ESA/Vigil Agrimis
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Welcome & Introductions

Attendees introduced themselves.

Review of Draft Minto Conservation Area Management and Restoration Plan

The draft document and graphics had been provided to the TAC team prior to the meeting. Comments were provided, discussed, and collected by the consultants for revisions.

Discussion

The TAC suggested revisions and clarifications. Below are some of the primary items to address in final document and in reference to Figure 5 Habitat Types:

- In the hybrid poplar Plantation (Habitat Unit B): leave some standing for snags located away from future trails.
- In the Doug fir Plantation (Habitat Unit B): there is a breeding pair of Coopers hawk here, as well as Barred owls. Team agreed to retain 30% of DF forest plantation to maintain legacy nesting sites and provide educational opportunities.
- How to manage herbicide and mowing activities during nesting season which can last from mid April to mid August? Concern from Parks was expressed about how to manage for weeds and tall grass along trail. Suggestions included mowing early to prevent nearby nesting, have Audubon survey for nests along areas that must be mowed and prior to restoration activities such as non native removal or spraying. Nest sites could be flagged and avoided. Referred to a management time schedule in the document *Terrestrial Ecology Enhancement Strategy. Guidance: Avoiding Impacts on Nesting Birds During Construction and Revegetation Projects, October 2010*. Little willow flycatcher and yellow-breasted chat are State sensitive species and both are present in this part of the island.
- Blackberry management: provide alternative native habitat for shrub nesting birds prior to removal of the blackberries. Do it in sections.
- In C3- (Figure 6) could we add material? It might be jurisdictional wetlands and would need a permit.
- Berm: could be nesting habitat for turtles. They like south-facing, gravelly slopes. Nest in early spring.
- C2: add rose/willow.

- Comments from Mark Becketl, Parks and Transportation Manager, were provided by email. His concerns included: the restrictions on mowing or removing blackberries along the trails and the need for safety, whether the perimeter berm trail could be open at least seasonally, and the impacts of off-leash dogs and enforcement. The TAC discussed each of these topics.

- Mowing and Invasive Removal along trails: as mentioned previously, the group felt that by doing early mowing or removal along the trails nesting would be precluded. In later mowing scenarios, nest surveys could be done prior to mowing to reduce impacts. All trails need to be maintained for safety.
- Perimeter Berm Trail. Figure 8 shows the perimeter trail closed. The question was whether it could be open seasonally. The TAC discussed this again. It was felt that, with the new bridge and paved trail, wildlife will be stressed by the presence of people and dogs. Giving waterfowl an area where they can move away from the human pressure may keep the waterfowl from leaving the site. Once the ponds dry up in the summer, the trail could be opened, however several management issues were raised including: how to manage access (gates? fences?); possible nesting turtles; increased likelihood for dogs and humans in the old ponds during the summer; increased likelihood of transient camps becoming established along western side of island.

It was decided that the perimeter trail should not be shown, but that language could be added to allow for future trail depending on more information of wildlife and human usage of the site after the new bridge and trail open. It was decided to revise the graphics and just show trails on Figure 9.

- Dogs: Off leash dogs are a big problem in the park and all entrances to park need to be posted. Enforcement is a problem. Need some educational outreach at end of bridge and entrances to Minto.
- Confederated Tribes of Grand Ronde suggested something be added to the document about pre-contact and historic context of site as well as information about historic artifacts and the SHPO process. The City might want to obtain an “inadvertent discovery plan” for cultural resources. Since the property was purchased with BPA funds and federal pass through, all construction needs to meet 106 requirements.
- Audubon and Friends of Two Bridges should be contacted for funding viewing blinds.

- How will documents be reviewed? Final draft to agencies (BPA, ODFW, DEQ) for one month review process. Then out for public notice. Keep it separate from the overall park masterplan process as different requirements (i.e. contractual conservation easement).

Appendix C

List of Nesting Birds

Nesting Birds of Minto-Brown Island Park

*"Special Status Species", meaning the species has been listed by the International Conservation Union as rare, in decline or otherwise of special concern.

American Crow	Evening Grosbeak	Pine Siskin
Bald Eagle	Golden-crowned Kinglet	Purple Finch*
Black-headed Grosbeak	Great Blue Heron	Red-tailed Hawk
Black-throated Gray Warbler	Great-horned Owl	Sharp-shinned Hawk
Bullock's Oriole	House Finch	Cooper's Hawk
Cedar Waxwing	Mourning Dove	Steller's Jay
Cooper's Hawk	Olive-sided Flycatcher*	Western Tanager
Double-crested Cormorant	Osprey	
American Goldfinch	Green Heron	Swainson's Thrush*
American Robin	Lazuli Bunting	Warbling Vireo
Anna's Hummingbird	Lesser Goldfinch	Western Wood-pewee*
Brewer's Blackbird	Pacific-slope Flycatcher*	Willow Flycatcher*
Brown-headed Cowbird	Rufous Hummingbird*	Yellow Warbler
Bushtit	Western Scrub-Jay	
Cassin's Vireo	Song Sparrow	
American Coot	Mallard	Savannah Sparrow
Blue-winged Teal	Marsh Wren	Sora
California Quail	Northern Harrier*	Spotted Sandpiper
Canada Goose	Northern Shoveler	Spotted Towhee
Cinnamon Teal	Orange-crowned Warbler	Turkey Vulture
Common Yellowthroat	Pied-billed Grebe	Virginia Rail
Dark-eyed Junco	Ring-necked Pheasant	White-crowned Sparrow
Killdeer	Ruddy Duck	Wilson's Warbler
American Kestrel	European Starling	White-breasted Nuthatch
Black-capped Chickadee	Hairy Woodpecker	Red-breasted Sapsucker
Brown Creeper	Hooded Merganser	Tree Swallow
Bufflehead	House Wren	Violet-green Swallow
Chestnut-backed Chickadee	House Sparrow	Vaux's Swift
Common Merganser	Northern Flicker	Wood Duck
Downy Woodpecker	Pileated Woodpecker	
	Red-breasted Nuthatch	
Pacific Wren*	Bewick's Wren	

Appendix D

Photographs of Major Habitat Types



Riparian Forest:

The riparian forest shown in the background is typical throughout the Conservation Area. This mudflat area near the Willamette Slough is ponded in the winter.

Forest Plantation:

This Douglas Fir stand is very dense, with almost no herbaceous or shrub understory.



5417

9/18/14



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area



Forest Plantation:

This area is dominated by hazelnut trees that were part of an abandoned commercial orchard.

Forest Plantation:

This area is dominated by hybrid cottonwood trees, with reed canarygrass throughout.



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Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area



Blackberry Thicket:

This illustrates the dense Himalayan blackberry thickets found throughout the site.

Blackberry Thicket:

This is the road/berm that surrounds the 50 and 100 MG ponds. It will become a dense blackberry thicket if left undisturbed.



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9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area



Upland Meadow:

This upland meadow area is along the bank of the Willamette River. It floods on a regular basis.

Emergent Wetland:

This wetland is within the 50 MG pond. Typically, It stays ponded until late spring.



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Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area



Emergent Wetland:

This wetland is located in the 100 MG pond. It is dominated by reed canarygrass. The 50 MG pond is seen in the background.

Emergent Wetland:

This is the north end of the 100 MG pond. The berm/road is behind the blackberry thicket on the left of the photo.



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Major Habitat Types - Minto Island Conservation Area



Emergent Wetland:

This is a small plantation of birch trees within the southern end of the 100 MG pond.

Emergent Wetland:

This wetland on the northeast corner of the site is dominated by very dense reed canarygrass.



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Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area



**Mud Flat/ Emergent
Wetland/ Seasonal Water:**

This mix of seasonal water and emergent wetland extends from the open water pond on the west to near the Willamette Slough across from the mouth of Pringle Creek. It may be considered for native fish habitat.

**Mud Flat/ Emergent
Wetland/ Seasonal Water:**

This mudflat near the Willamette Slough is ponded during the winter. Blackberry thickets are dense along its west bank.



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Major Habitat Types - Minto Island Conservation Area



Open Water:

This perennial pond is directly linked to the Willamette River on the west side of the site.

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9/18/14



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Major Habitat Types - Minto Island Conservation Area

Appendix E

Key Ecological Attributes Tables

Key Ecological Attributes
Conservation Target - Forest: A1 Native Forest (86.26 acres)

Condition	Large, interior habitat patches	Forest patches>30 acres with at least 200 feet from center to edge	Large habitat patches lacking or all narrow strands	1-2 patches ≥30 acres and at least 400 feet across	3-5 patches ≥30 acres and at least 400 feet across	>5 patches ≥30 acres and at least 400 feet across	Estimated one patch	Fair	Fair	A 30-acre patch is the size at which certain species that either need a larger territory or avoid edge habitats (e.g. ermine and neotropical migratory songbirds) are present or increase in numbers (Metro 2006)
Condition	Native tree and shrub richness	Number of native tree and shrub species per acre	<2 species per acre	2-5 species per acre	6-9 species per acre	>10 species per acre	Estimated 6-10 species per acre	Good	Good	Native tree and shrub species richness provides greater food, cover, and nesting opportunities.
Condition	Vegetative structure: tree layer	Percent native tree canopy cover	<20% cover	20-60% cover	60-80% cover	>80% cover	Mostly >80%	Very Good	Very Good	Riparian forests characterized by high percent canopy cover. Willow flycatcher abundance positively correlated with dense mature deciduous riparian forest (Porasky et. al. 1992 cited in PIF 2000)
Condition	Vegetative structure: shrub layer	Percent native shrub canopy cover	< 10% cover or > 60 percent cover	10-20% cover	20-40% cover	40-60% cover	Varies	Good	Good	PIF (2000) biological objective for yellow warbler (sub-canopy, tall shrub foliage in riparian woodland)
Condition	Native tree recruitment	Number of native tree saplings per acre	Native tree saplings absent from understory	1-5 native tree saplings present per acre	5-10 native tree saplings present per acre	>10 native tree saplings present per acre	Estimated very good	Very Good	Very Good	Recruitment of native trees necessary for long-term health of riparian forest. Saplings are <2m tall.
Condition	Key habitat feature presence: snags	Number of snag per acre	Snags absent	1-2 per acre	3-5 per acre	>5 per acre with 2 per acre> 10” dbh	Estimated good	Good	Good	PIF biological objective for downy woodpecker (snags in riparian deciduous woodland) (PIF 2000)

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration)

Key Ecological Attribute
Conservation Target - Forest: A2 Douglas Fir Plantation (22.17 acres)

Condition	Large, interior habitat patches	Forest patches >30 acres with at least 200 feet from center to edge	Large habitat patches lacking or all narrow strands	1-2 patches ≥30 acres and at least 400 feet across	3-5 patches ≥30 acres and at least 400 feet across	>5 patches ≥30 acres and at least 400 feet across	None	Poor	Poor	A 30-acre patch is the size at which certain species that either need a larger territory or avoid edge habitats (e.g. ermine and neotropical migratory songbirds) are present or increase in numbers (Metro 2006)
Condition	Native tree and shrub richness	Number of native tree and shrub species per acre	<2 species per acre	2-5 species per acre	6-9 species per acre	>10 species per acre	<2 species per acre	Poor	Fair	Native tree and shrub species richness provides greater food, cover, and nesting opportunities.
Condition	Vegetative structure: tree layer	Percent native tree canopy cover	<20% cover	20-60% cover	60-80% cover	>80% cover	>80% cover	Very Good	Good	Riparian forests characterized by high percent canopy cover but existing plantation is too dense. Willow flycatcher abundance positively correlated with dense mature deciduous riparian forest (Porasky et. al. 1992 cited in PIF 2000)
Condition	Vegetative structure: shrub layer	Percent native shrub canopy cover	< 10% cover or> 60 percent cover	10-20% cover	20-40% cover	40-60% cover	<5%	Poor	Fair	PIF (2000) biological objective for yellow warbler (sub-canopy, tall shrub foliage in riparian woodland)
Condition	Native tree recruitment	Number of native tree saplings per acre	Native tree saplings absent from understory	1-5 native tree saplings present per acre	5-10 native tree saplings present per acre	>10 native tree saplings present per acre	None	Poor	Good	Recruitment of native trees necessary for long-term health of riparian forest; creating openings will promote natural recruitment.
Condition	Key habitat feature presence: snags	Number of snag per acre	Snags absent	1-2 per acre	3-5 per acre	>5 per acre with 2 per acre> 10” dbh	None	Poor	Very Good	PIF biological objective for downy woodpecker (snags in riparian deciduous woodland) (PIF 2000); girdle some trees to create snags.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration)

Key Ecological Attribute
Conservation Target - Forest: A3 Cottonwood Plantation (16.88 acres)

Condition	Large, interior habitat patches	Forest patches>30 acres with at least 200 feet from center to edge	Large habitat patches lacking or all narrow strands	1-2 patches ≥30 acres and at least 400 feet across	3-5 patches ≥30 acres and at least 400 feet across	>5 patches ≥30 acres and at least 400 feet across	None	Poor	Poor	A 30-acre patch is the size at which certain species that either need a larger territory or avoid edge habitats (e.g. ermine and neotropical migratory songbirds) are present or increase in numbers (Metro 2006)
Condition	Native tree and shrub richness	Number of native tree and shrub species per acre	<2 species per acre	2-5 species per acre	6-9 species per acre	>10 species per acre	<2 species per acre	Poor	Good	Native tree and shrub species richness provides greater food, cover, and nesting opportunities.
Condition	Vegetative structure: tree layer	Percent native tree canopy cover	<20% cover	20-60% cover	60-80% cover	>80% cover	60-80% cover	Good	Good	Riparian forests characterized by high percent canopy cover. Willow flycatcher abundance positively correlated with dense mature deciduous riparian forest (Porasky et. al. 1992 cited in PIF 2000)
Condition	Vegetative structure: shrub layer	Percent native shrub canopy cover	< 10% cover or> 60 percent cover	10-20% cover	20-40% cover	40-60% cover	<10% cover	Poor	Good	PIF (2000) biological objective for yellow warbler (sub-canopy, tall shrub foliage in riparian woodland)
Condition	Native tree recruitment	Number of native tree saplings per acre	Native tree saplings absent from understory	1-5 native tree saplings present per acre	5-10 native tree saplings present per acre	>10 native tree saplings present per acre	None	Poor	Good	Recruitment of native trees necessary for long-term health of riparian forest; creating openings will promote natural recruitment.
Condition	Key habitat feature presence: snags	Number of snag per acre	Snags absent	1-2 per acre	3-5 per acre	>5 per acre with 2 per acre > 10” dbh	None	Poor	Good	PIF biological objective for downy woodpecker (snags in riparian deciduous woodland) (PIF 2000); girdle some trees to create snags.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Conservation Target - Forest: A4 Restored Forest (6.31 acres)

Condition	Large, interior habitat patches	Forest patches>30 acres with at least 200 feet from center to edge	Large habitat patches lacking or all narrow strands	1-2 patches ≥30 acres and at least 400 feet across	3-5 patches ≥30 acres and at least 400 feet across	>5 patches ≥30 acres and at least 400 feet across	None	Poor	Fair	A 30-acre patch is the size at which certain species that either need a larger territory or avoid edge habitats (e.g. ermine and neotropical migratory songbirds) are present or increase in numbers (Metro 2006)
Condition	Native tree and shrub richness	Number of native tree and shrub species per acre	<2 species per acre	2-5 species per acre	6-9 species per acre	>10 species per acre	None	Poor	Good	Native tree and shrub species richness provides greater food, cover, and nesting opportunities.
Condition	Vegetative structure: tree layer	Percent native tree canopy cover	<20% cover	20-60% cover	60-80% cover	>80% cover	None	Poor	Very Good	Riparian forests characterized by high percent canopy cover. Willow flycatcher abundance positively correlated with dense mature deciduous riparian forest (Porasky et. al. 1992 cited in PIF 2000)
Condition	Vegetative structure: shrub layer	Percent native shrub canopy cover	< 10% cover or> 60 percent cover	10-20% cover	20-40% cover	40-60% cover	None	Poor	Good	PIF (2000) biological objective for yellow warbler (sub-canopy, tall shrub foliage in riparian woodland)
Condition	Native tree recruitment	Number of native tree saplings per acre	Native tree saplings absent from understory	1-5 native tree saplings present per acre	5-10 native tree saplings present per acre	>10 native tree saplings present per acre	None	Poor	Fair	Recruitment of native trees necessary for long-term health of riparian forest; creating openings will promote natural recruitment.
Condition	Key habitat feature presence: snags	Number of snag per acre	Snags absent	1-2 per acre	3-5 per acre	>5 per acre with 2 per acre> 10” dbh	None	Poor	Fair	PIF biological objective for downy woodpecker (snags in riparian deciduous woodland) (PIF 2000); girdle some trees to create snags.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
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Key Ecological Attribute
Conservation Target - Shrubland: B Restored Shrubland (45.68 acres)

Condition	Native shrub richness	Number of native shrub species per acre	<2 species per acre	3-5 species per acre	>6 species per acre		None	Fair	Good	Existing vegetation is dense blackberry or reed canarygrass
Condition	Vegetative structure: shrub layer	Percent native shrub canopy cover	<30% cover or>80% cover	30-50% cover	50-70% cover	70-80% cover	No native cover	Poor	Very Good	Shrub wetlands have minimum 30 percent shrub cover (Cowardin 1979).PIF biological objective for willow flycatcher and yellow-breasted chat up to 80% shrub cover with scattered herbaceous openings (PIF 2003)
Condition	Vegetative structure: tree layer	Percent native tree canopy cover	>30% cover	30-20% cover	20-10% cover	<10% cover	None	Very Good	Very Good	Trees not a dominant vegetative component of shrub wetlands (Cowardin et al. 1979).
Condition	Transition to bottomland and riparian forests	Vegetative type and cover in transitional zone	Monotypic cover by reed canarygrass,	Large gaps with few trees and shrubs present common	Large gaps with few trees and shrubs present rare	Contiguous transition to bottomland and riparian forests	Monotypic reed canary-grass or blackberry	Poor	Very Good	The shrubland will form a transition from emergent wetland to riparian forest.

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- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Conservation Target – Seasonal Waterie/Mudflat/Emergent Wetland: C1 & C4 Seasonal Pond/Mudflat

Condition	Seasonal exposure of mud flats	Extent and duration of seasonal low water	Water level above 2m from June - November	Water level from 1m-2m from June - November	Water level at or below 1m from June - November		Estimated annual water level at or below 1m (45.05 acres), exposing ~40 acres of mudflats.	Good	Good	Exposure of mudflats and shallow water benefits migratory shorebirds. Open water in winter provides winter waterfowl (e.g. dusky Canada goose) and turtle habitat.
Condition	Native hydrophytic forb and graminoid abundance	Cover of native hydrophytic herbaceous species	<20%	20-30%	30-50%	>50%	>90% reed canarygrass	Poor	Poor*	*Although non-native cover is not desired, C3’s reed canarygrass cover will be annually mowed, allowing habitat for Dusky Canada geese and other waterfowl to continue
Condition	Vegetative structure: tree and shrub layer	Percent tree/shrub canopy cover	>20% cover	20-15% cover	15-5% cover	<5% cover	No woody plant encroachment	Very Good	Very Good	Woody vegetation provides <20% cover in emergent wetlands(Cowardin et al. 1979). As reed canarygrass is the dominant plant, we will want to increase trees and shrubs within the emergent wetlands.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Conservation Target – Seasonal Water/Mudflat/Emergent Wetland: C2 Seasonal/Emergent

Condition	Seasonal exposure of mud flats	Extent and duration of seasonal low water	Water level above 2m from June - November	Water level from 1m-2m from June - November	Water level at or below 1m from June - November		Estimated annual water level at or below 1m (~25.36 acres), exposing ~5 acres of mudflats.	Good	Good	Exposure of mudflats and shallow water benefits migratory shorebirds. Open water in winter provides winter waterfowl (e.g. dusky Canada goose) habitat.
Condition	Native hydrophytic forb and graminoid abundance	Cover of native hydrophytic herbaceous species	<20%	20-30%	30-50%	>50%	>90% reed canarygrass	Poor	Poor*	* Although cover of reed canarygrass is not desired, it is very unlikely that native hydrophytic forb and graminoid abundance can be increased by planting.
Condition	Vegetative structure: tree and shrub layer	Percent tree/shrub canopy cover	>20% cover	20-15% cover	15-5% cover	<5% cover	No woody plant encroachment	Very Good	Very Good	Woody vegetation provides <20% cover in emergent wetlands(Cowardin et al. 1979). As reed canarygrass is the dominant plant, a long term goal could be to increase trees and shrubs within the emergent wetlands.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Conservation Target – Seasonal Water/Mudflat/Emergent Wetland: C3 Managed Non-native Seasonal/Emergent

Condition	Seasonal exposure of mud flats	Extent and duration of seasonal low water	Water level above 2m from June - November	Water level from 1m-2m from June - November	Water level at or below 1m from June - November		Emergent habitat 31.07 acres; No Mudflat	Good	Good	Exposure of mudflats and shallow water benefits migratory shorebirds. Open water in winter provides winter waterfowl (e.g. dusky Canada goose) and turtle habitat.
Condition	Native hydrophytic forb and graminoid abundance	Cover of native hydrophytic herbaceous species	<20%	20-30%	30-50%	>50%	>90% reed canarygrass	Poor	Poor*	*Although non-native cover is not desired, C3’s reed canarygrass cover will be annually mowed, allowing habitat for Dusky Canada geese and other waterfowl to continue
Condition	Vegetative structure: tree and shrub layer	Percent tree/shrub canopy cover	>20% cover	20-15% cover	15-5% cover	<5% cover	>5% Woody plant encroachment (Birch Grove)	Fair	Very Good	Removing birch grove and annual mowing will prevent tree/shrub encroachment and provide forage for dusky Canada geese and other waterfowl.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Potential Future Conservation Target: Native Fish Habitat (D)

Size	Length of backwater channel						Size: 1,672 linear feet (3.84 acres)			Restore off channel fish habitat by removing blockage; provide refugia from heavy currents during winter high flows; and improve forage and cover habitat.
Condition	Temperature of backwater channel	Channel depth, seasonality, and shade	Too warm for salmonids			Temperature suitable for salmonids	Too warm for salmonids	Poor	Very Good	
Condition	Refugia from strong current	Suitable habitat orientation to mainstem Willamette River	Floodwaters flow directly into channel			Floodwaters backup into channel		Poor	Very Good	
Condition	In-channel habitat diversity	Presence of wood, rock for substrate roughening	Lacks habitat structure			Suitable habitat structure	None/limited	Poor	Very Good	
Condition	Seasonal drainage	Completely drains to avoid stranding of salmonids	Potential for stranding; year-round pools			Seasonal access; drains completely	NA	NA	Very Good	
Condition	Anadromous fish passage	Connectivity to Willamette River	Connectivity to Willamette River blocked				Blocked	Poor	Good	

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Key Ecological Attribute
Conservation Target - Meadow Habitat (E) – 6.75 acres

Condition	Native forb and graminoid abundance	Native herbaceous cover	<20%	20-30%	30-50%	>50%	<20%	Poor	Poor*	* Although not necessarily a desired rating, the current dominance of forbs and graminoids of <20% will be maintained by annual flooding regime.
Condition	Native woody species cover	<5% cover	>15% cover	10-15% cove	5-10% cover	<5% cover	Very Good	Very Good	Very Good	Maintained by annual flooding regime. Control of non-native species, such as blackberry could be a long term goal.

- **Very Good:** The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to “natural” as possible and has little chance of being degraded by some random event).
- **Good:** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.
- **Fair:** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- **Poor:** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly, and/or uncertain to reverse the alteration).

Appendix F

**Tree and Shrub Species
Appropriate for Restoration**

Recommended Plant List for Minto Island Conservation Area (by Conservation Target)

BOTANICAL NAME	COMMON NAME	USFWS Wetland Rating*	Shade- Tolerant?	Forest A1	Forest A2	Forest A3	Forest A4	Shrubland B1	Shrubland B2	Aquatic/ Mudflat/ Emergent C1
TREES										
<i>Acer macrophyllum</i>	bigleaf maple	FACU	x		X		X			
<i>Alnus rubra</i>	red alder	FAC				X	X			
<i>Crataegus douglasii</i>	black hawthorn	FAC	x		X	X				
<i>Fraxinus latifolia</i>	Oregon ash	FACW				X	X			
<i>Populus balsamifera</i> v. <i>trichocarpa</i>	black cottonwood	FAC				X	X			
<i>Quercus garryana</i>	Oregon white oak	FACU			X					
<i>Rhamnus [Frangula] purshiana</i>	cascara	FAC				X	X			
<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific willow	FACW				X				
<i>Salix scouleriana</i>	Scouler's willow	FAC	x	X	X		X			
<i>Thuja plicata</i>	western red cedar	FAC	x	X	X	X	X			
SHRUBS										
<i>Acer circinatum</i>	vine maple	FAC	x	X	X		X			
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	FACU			X				X	
<i>Cornus sericea</i>	red osier dogwood	FACW						X		X
<i>Corylus cornuta</i>	hazelnut	FACU	x	X	X					
<i>Gaultheria shallon</i>	salal	FACU	x		X					
<i>Holodiscus discolor</i>	oceanspray	FACU	x		X				X	
<i>Lonicera involucrata</i>	four-line honeysuckle	FAC			X	X		X		X
<i>Mahonia aquifolium</i>	tall Oregon grape	FACU							X	
<i>Mahonia nervosa</i>	Cascade Oregon grape	UPL	x	X	X					
<i>Malus fusca</i>	Pacific crabapple	FACW							X	
<i>Oemleria cerasiformis</i>	Indian plum	FACU	x	X	X					
<i>Philadelphus lewisii</i>	mockorange	FACU	x						X	
<i>Physocarpus capitatus</i>	Pacific ninebark	FAC				X		X		
<i>Ribes sanguineum</i>	flowering red currant	UPL	x		X		X		X	
<i>Rosa nutkana</i>	Nootka rose	FAC				X		X	X	
<i>Rosa pisocarpa</i>	clustered rose	FAC				X		X		X
<i>Rubus parviflorus</i>	thimbleberry	FACU	x	X	X		X		X	
<i>Salix hookeriana</i> (piperi)	Piper's willow	FACW						X		X
<i>Salix sitchensis</i>	Sitka willow	FACW						X		X
<i>Sambucus nigra</i> ssp. <i>caerulea</i>	blue elderberry	FACU	x		X		X		X	
<i>Sambucus racemosa</i>	red elderberry	FACU	x	X	X	X	X		X	
<i>Spiraea douglasii</i>	Douglas' spirea	FACW				X		X		
<i>Symphoricarpos albus</i>	common snowberry	FACU	x	X	X	X	X		X	
FORBS/GRAMINOIDS										
<i>Polystichum munitum</i>	swordfern	FACU	x		X					
<i>Sagittaria latifolia</i>	wapato	OBL								X
<i>Schoenoplectus tabernaemontanii</i>	softstem bulrush	OBL								X
<i>Sparganium eurycarpum</i>	broadfruit burreed	OBL								X

Conservation Target Communities Categories:

A1: Forested---Natural. Mostly comprised of black cottonwood riparian gallery forest or Oregon ash wetland forest overstory

A2: Forested---Douglas fir plantation; to be enhanced through thinning, interplantings.

A3: Forested---Hybrid cottonwood plantation; to be enhanced through thinning, interplantings.

A4: Forested---Non-forested, weed-dominated; to be converted to forest overstory through plantings, invasives control.

B1: Shrubland---This is a willow-dominated conservation area only---no enhancement plantings proposed

B2: Shrubland---Thickets primarily dominated by Himalayan blackberry; to be enhanced through plantings, invasives control

C1: Aquatic/Mudflat/Emergent Habitat---to be enhanced through mowing, trial emergent plantings

*USFWS Wetland Rating: Scores indicate plant species' hydrologic preferences (ranging from wetland to upland); to be utilized when determining appropriate locations for plant placement