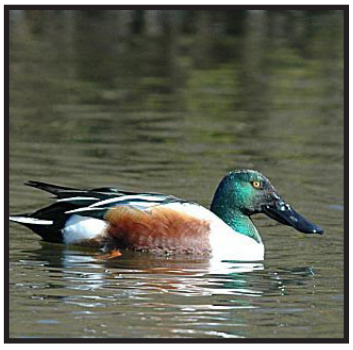
Coburg Wastewater Facility

Habitat Enhancement Concept Plan



June 2008

Cover Photos:

Irrigation Channel, Marsh Wren, West Pond

Northern Shoveler, Agricultural Wetland, Oregon Chub

Coburg Wastewater Facility

Habitat Enhancement Concept Plan

Prepared for

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June 2008

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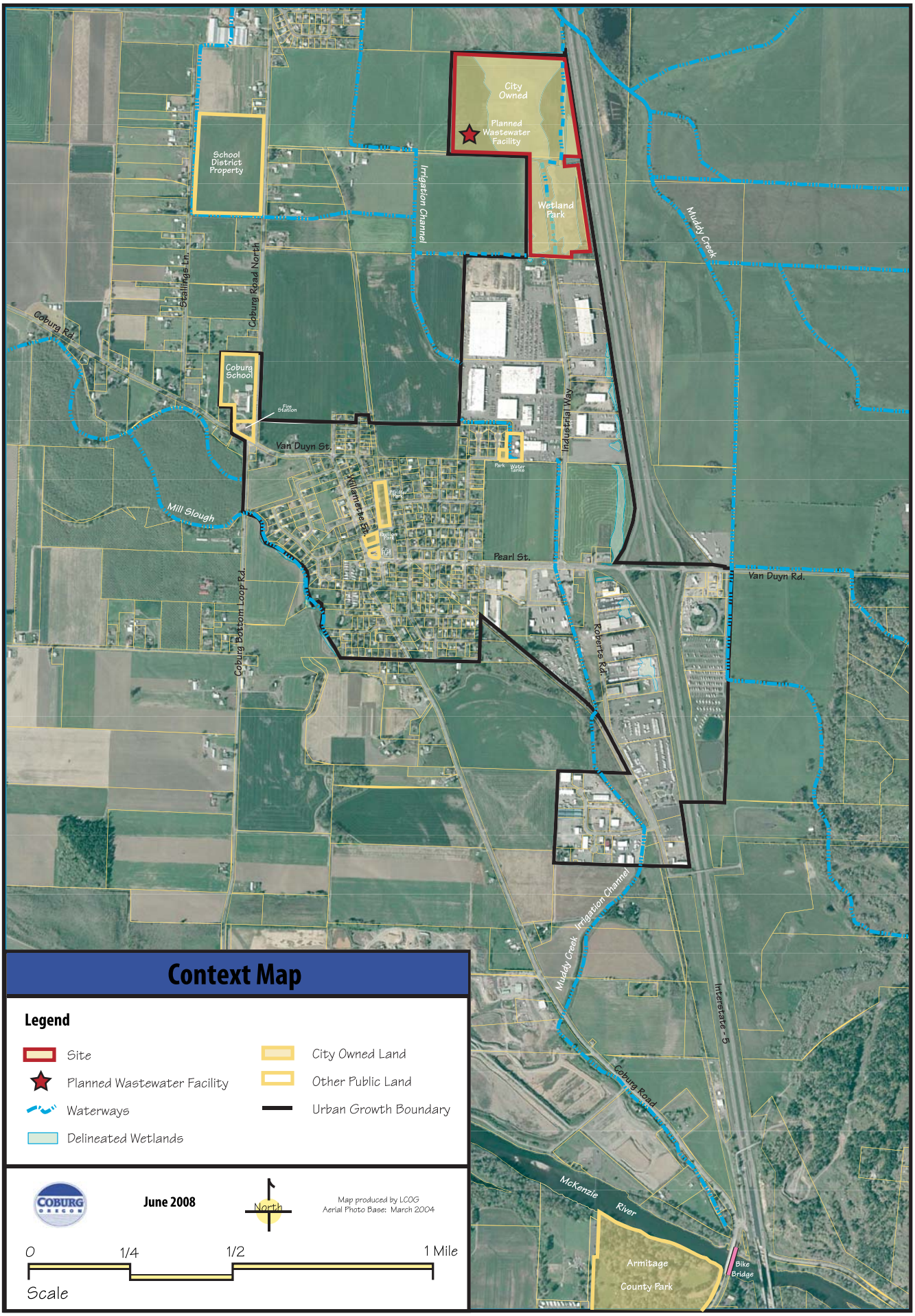
Background

The City of Coburg is in the process of completing final plans for the construction of a long-planned wastewater reclamation system, which will serve the city's existing population and future projected growth. A number of habitat enhancements will be included as part of the overall project and are described in this report. This new facility will be state of the art, using Septic Tank Effluent Pumping (STEP) collection and a Membrane Bio Reactor (MBR) treatment system. The system is considered environmentally friendly because it uses pressurized lines that will not be plagued by infiltration of groundwater, a common problem in gravity systems. In addition, the facility will produce extremely clean discharge, which will meet the DEQ's most stringent requirement for water reuse, Level IV. This level of treatment allows nearly unrestricted reuse of reclaimed water for irrigation on crops and landscaping. The facility will have an estimated maximum outflow of approximately 0.7 cubic feet per second (cfs) when fully developed, but will be much less initially approximately 0.3 cfs. The water will likely be utilized for irrigation of nearby park land and agricultural fields during the summer months and would add supplemental flows to the adjacent irrigation canal and Muddy Creek for the remainder of the year. The overall footprint of this facility is estimated to be approximately five acres in size.

Coburg, with a current population of just over one-thousand, is anticipating significant growth in the coming years (photo looking north).

The proposed wastewater facility will be sited in the upland portion of the City owned property, which is currently in agricultural use.

Because the City now owns 72.3 acres of land around the planned facility, there is great opportunity to provide a significant amount of additional environmental benefit on the site in conjunction with the development of the wastewater project. The proposed enhancements include the addition of side channel habitat and riparian vegetation along 1,200 lineal feet of irrigation canal; restoration of 2.2 acres of native wetland prairie; riparian enhancements and invasive species control in and around the Coburg Ponds; and improvements to the hydrologic condition of the western pond. These proposed enhancements will provide excellent habitat conditions for native wildlife species including



Context Map

Legend

- Site
- Planned Wastewater Facility
- Waterways
- Delineated Wetlands
- City Owned Land
- Other Public Land
- Urban Growth Boundary

COBURG OREGON

June 2008

North

Map produced by LCOG
Aerial Photo Base: March 2004

0 1/4 1/2 1 Mile

Scale

the federally listed Oregon chub, Western pond turtle, American beaver, Western meadowlark, and numerous other native species of birds, reptiles, and amphibians. In addition, this enhanced natural area will serve as an excellent recreational and educational resource for residents, visitors, and students of the Coburg Elementary School.

Implementation of the proposed enhancements would likely be done in conjunction with the development of the wastewater facility and long-term management of this area would likely be conducted by the City (as part of the wastewater facility maintenance program), volunteers (Coburg School and other local interest groups), and potential partners such as Oregon Department of Fish and Wildlife (ODFW).

Site History and Existing Conditions

Site Context

The overall site includes 72.3 acres of City owned land on the northern edge of Coburg, all within the urban growth boundary. There are two quite distinctive portions of the site. The southern area includes 20.0 acres in and around the Coburg Ponds. This area is dedicated as *open space* and has been in City ownership for a number of years. The northern portion of the site totals 51.3 acres and was purchased recently by the City to accommodate the planned wastewater facility. Originally, it was thought that the City would need most of that land to accommodate the planned facility, but because the MBR system was ultimately selected, less than five acres will actually be needed. This portion of the site is currently in agricultural use and contains a significant amount of jurisdictional wetland area based on recent delineations. However, because the wastewater facility has a relatively small footprint, it will be fully accommodated on an upland portion in the southwest corner of the site.

Immediately to the south of the site is Coburg's major industrial district, which includes recreational vehicle manufacturers and numerous other businesses. The land to the north and the west of the site is located outside of the urban growth boundary and is in active agricultural use. Interstate-5 forms the site's eastern edge.

Site History

Based on interpretation of the Natural Resource Conservation Service (NRCS) Soil Survey Data (2006) and historic vegetation mapping (Christy et al. 1999 based on the General Land Office surveys of the 1850s), the site was most likely dominated historically by a mix of upland and wetland prairie. This was part of a much larger expanse of prairie that historically covered much of the southern Willamette Valley. It is thought that the landscape was kept in that open condition by periodic fires set by the native tribes including the Kalapuyans. The historic vegetation maps also shows that in the 1850s, a wide swath of riparian forest was present to the south of Coburg along the McKenzie River and areas of ash swamp were located along Muddy Creek to the north. Otherwise, the entire area was generally in an open prairie condition.

The Coburg Ponds were created during the construction of I-5 and contain a diversity of plant and wildlife species.

Like most of the flat and fertile areas in the Willamette Valley, the area around Coburg was converted to pasture and cropland during early Euro-American settlement in the late 1800s and the northern portion of the site continues to be in agricultural use, most recently for ryegrass production. The two shallow ponds located in the southern portion of the site date back to the construction of the adjacent Interstate-5 (ca. 1960) and were utilized as *borrow pits* for the creation of the road sub-base. The ponds, which have re-vegetated over time, were subsequently deeded to the City of Coburg and have remained in a natural, but essentially unmanaged condition. Another significant feature on the site is the irrigation canal, which transports water pumped by the Muddy Creek Irrigation Company from the McKenzie River to Muddy Creek. This channel is first evident on aerial photos dating back to 1940 and probably pre-dated that.

Soils

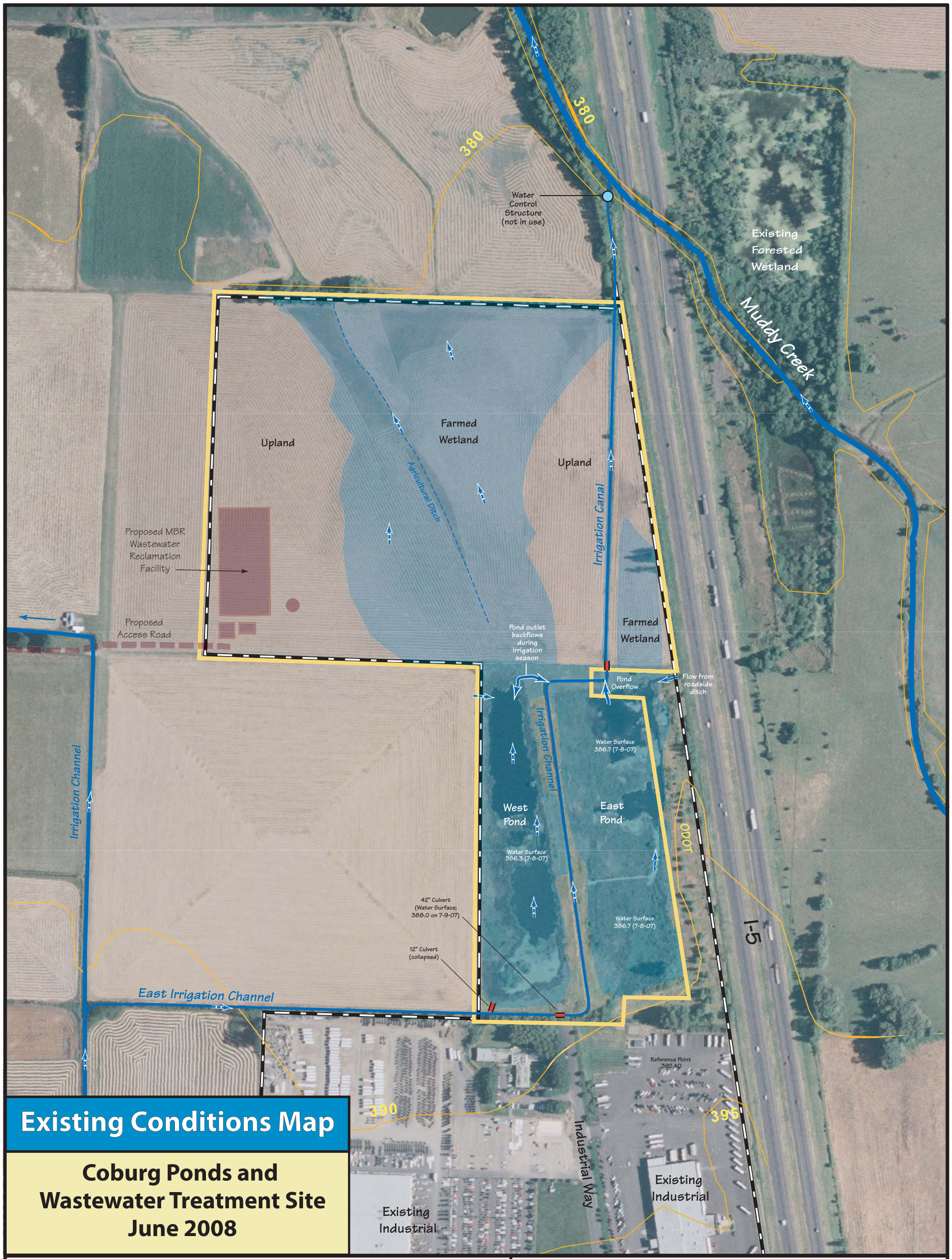
The soils in the area were mapped by the USDA Soil Conservation Service of Lane County (1987). The majority of the site is mapped as having Bashaw clay, a deep poorly drained soil. Bashaw soils are listed as a *hydric* soil type (SCS, 1990), which is an indication that they are slow draining and contain wetland hydrology. The far western edge of the site is mapped as Coburg silty clay loam, which is a relatively well drained soil and not considered a hydric soil type. These soils types and subsequent field observations were the basis for the wetland delineations conducted on the site (see below).

Hydric soils support wetland hydrology on much of the agricultural land in the northern portion of the site.

Wetland Delineations

Two separate wetland delineations were conducted on the site and the results are mapped on the Existing Conditions Map. Of the 72.3 acres that make up the site, a total of 43.6 acres were determined to contain jurisdictional wetlands based on these delineations.

The first delineation was conducted by Fishman Environmental Services in 2003 for the 51.3 acres on the northern agricultural portion of the site. This delineation identified a total of 25.1 acres of jurisdictional wetland within this area. This included a large swath of wetland running through the center of the site that is associated with a shallow agricultural drainage and a smaller area of wetland situated just to the east of the irrigation channel (see



Existing Conditions Map

Coburg Ponds and Wastewater Treatment Site June 2008

Legend:

- Coburg UGB
- Existing contours (5-foot)
- City of Coburg Ownership
- Existing Waterways
- Delineated Wetland*
- Direction of Flow
- Existing Culverts
- Proposed Facility (footprint)

0 250 500 Feet

Scale

N W E S

One Acre

* The wetland delineation for the area around the ponds was conducted in July 2007 by SWCA. The delineation for the northern half of the site was conducted by Fishman Environmental Services in 2003 and verified by Environmental Solutions, LLC in 2004.

Produced by LCOG

Aerial Photo Base: March 2004

for delineation map). This delineation was confirmed by Environmental Services LLC in 2004, but was not officially submitted to the Department of State Lands at that time. The irrigation canal itself passes through an upland portion of the site.

The second delineation was conducted by SWCA Environmental Services (formerly known as Fishman Environmental Services) in 2007 on the 20.0 acres in and around the ponds on the southern portion of the site. This delineation identified a total of 18.5 acres of palustrine emergent / open water wetlands present with some small upland areas located to the east of the ponds and in areas parallel to the irrigation canal between the two ponds (see Appendix B for delineation map).

Surface Hydrology

Due to past and current human alterations in the area, the site contains a mix of complex hydrologic conditions including upland, seasonal agricultural wetlands, ponds, and an irrigation canal. The surface hydrology of these areas is described below and is based on field observations, flow records, and the wetland delineation reports.

Irrigation channel (shown in April 2007 prior to irrigation flow, looking north from the ponds)

Irrigation Channel

The irrigation channel that passes through the site is approximately three to four feet in depth and was created to carry water pumped from the McKenzie River by the Muddy Creek Irrigation Company. The irrigation water, which flows from south to north on its way to Muddy Creek, is used further downstream for irrigation purposes. Flows vary during the irrigation period, which typically runs between June and September, but can be as high as 5 cfs. During the non-irrigation season, the channel continues to carry flow, but typically at a much reduced level. Non-irrigation flow originates primarily from localized runoff, groundwater, and outflow from the ponds. The irrigation channel continues north for another 250 feet after leaving the site to its confluence with Muddy Creek. The irrigation channel passes through a concrete water control structure about 30 feet above Muddy Creek. This structure is currently not in use and does not appear to create a significant barrier to fish passage.

Irrigation channel (shown in June 2007 during irrigation flow)

Coburg Ponds

The two ponds located in the southern portion of the site were created during the construction of I-5 in the early 1960s when fill material was excavated. Based on field observations in 2007, both ponds contain water throughout the year, although water levels fluctuated to varying degrees though the seasons. These ponds are unofficially referred to as West Pond and East Pond.

West Pond (April 2007)

On April 20, 2007, three staff gauges were installed at the Coburg Ponds. One staff gauge was put in the northern edge of East Pond near the outlet. Two additional staff gauges were put in West Pond (one on the north end of the pond and the second on the south end). The purpose of the staff gauges are to record seasonal fluctuation in the pond levels. The pond elevations shown below are based on a site survey conducted on July 8, 2007, which established the pond elevations at that time.

West Pond is the most hydrologically stable of the two, with water levels fluctuating only about 18 inches over the year. This pond has an outlet at the north end, which drains through a narrow ditch on its way to the nearby irrigation channel. This outlet allows water to leave the pond when it reaches a certain level, and carries flow out of the ponds throughout the winter months. However, when the adjacent irrigation channel is transporting larger volumes of water between June and September, backflow occurs and water flows from the irrigation channel and into the pond. This results in the water levels in the pond and the irrigation channel being essentially the same throughout the summer. At one time, a small culvert at the south end of the pond also diverted water from the irrigation channel and into the pond, but his culvert is currently blocked and does not function. The pond is fairly shallow throughout with two somewhat deeper pockets located on the northern and southern ends. These reach a depth of approximately three feet. During the late spring, the water level in the pond reaches its lowest point, with water only present within the two deeper pool areas. The pond recharges as soon as the irrigation water begins to flow.

West Pond at its lowest water level (June 2007)

Table 1: Staff Gauge Elevations

	Pond Surface Elevations			
Date	**East Pond Gauge**	**West Pond Gauge 1 (north end)**	**West Pond Gauge 2 (south end)**	**Notes**
4-20-07	386.9	386.1	386.1	Normal winter hydrology
5-07-07	387.9	386.0	386.0	Normal winter hydrology
5-28-07	387.7	385.9	385.9	Dryer than normal
6-18-07	387.5	385.3 (lowest)	385.6 (lowest)	Dry spring – no significant rainfall for several weeks
7-13-07	386.7	386.3	386.3	Irrigation channel is back flowing into West Pond
8-16-07	385.8 (lowest)	386.5	386.5	East pond mostly dry; West pond at level of irrigation channel
2-14-08	388.7 (highest)	386.8 (highest)	386.8 (highest)	Both ponds appear to be at full pool with water flowing out toward the irrigation canal.

East Pond is the most hydrologically active of the two, with water levels fluctuating by nearly three feet during the year. This pond is fed through a combination of stormwater runoff, rainfall, and most likely ground water during the winter, but appears to receive no direct inflow from the adjacent irrigation channel. This pond is also relatively shallow, with the deepest water located at the north end, reaching a depth of up to about five feet when the pond is full. This pond retains water throughout the year, but only in the deepest pools during the dry summer months. There is no formal outfall from this pond, but spill-over occurs on the north end during the winter months, with water flowing from the pond and into the irrigation channel, which is about five feet away. The water levels in this pond are two to three feet higher than the adjacent irrigation channel throughout the winter, which indicates that there is limited if any subsurface connectivity between the two.

West Pond at full pool at outlet to the irrigation canal (April 2008)

Agricultural Area

The surface hydrology in the farmed area ranges from standing water of up to six inches in depth in the central portion of the delineated wetland to saturated soils on the wetland fringes. The remainder of this agricultural area is upland and does not generally have standing water or saturated soils at any time during the year. A shallow agricultural drainage ditch runs from south to north through the center of the field, but does not appear to significantly drain the area. The wetlands in this portion of the site are seasonal and are typically dry between May and September.

Agricultural wetland

Existing Vegetation

The site currently contains three distinctly different vegetation zones with a mix of both native and non-native species as described below:

Irrigation Channel

Approximately 3,200 lineal feet of irrigation channel pass through the site. This channel is approximately 16 feet in width from top-of-bank to top-of-bank and three to four feet deep with steep sided banks (approximately 1:1 slope). Due to the fluctuations in hydrology in this waterway and fast moving flow during irrigation season, the channel bottom is generally devoid of vegetation. The channel banks have been managed as part of the adjacent agricultural operation for many years so currently contain very little woody vegetation, with the exception of some scattered rose (*rosa* sp.) and Oregon ash (*fraxinus latifolia*) along the northern end. The plant community along the

The ponds contain large quantities of native marsh pennywort (*Hydrocotyle ranunculoides*), which creates dense floating mats and provides good habitat conditions for waterfowl.

channel generally consists of non-native vegetation such as annual ryegrass (*Loliumm multiflorum*), teasel (*Dipsacus fullonum*), and tall fescue (*Schedonorus phoenix*) along with a small component of native species such as meadow foxtail (*Alopecurus pratensis*), cow parsnip (*Heracleum maximum*), soft rush (*Juncus effusus*), water-starwort (*Callitriche* sp.), and slough sedge (*Carex obnupta*).

Coburg Ponds

The Coburg Ponds area is by far the most diverse portion of the site from a vegetation standpoint, with a diverse mix of native and non-native species present in multiple habitat zones. The ponds themselves contain large quantities of native marsh pennywort (*Hydrocotyle ranunculoides*), which creates dense floating mats on both ponds. This native perennial floating forb provides a good food source for waterfowl, but tends to clog open water areas. The pond fringes contain some native shrubs and trees including willow (*Salix* sp.) and some widely scattered Oregon ash (*Fraxinus latifolia*) and black cottonwood (*Populus balsamifera*). Native common rush (*Juncus effuses*) and slough sedge (*Carex obnupta*) are also common along the fringes of the ponds, mixed in with smaller patches of non-native reed-canarygrass (*phalaris arundinacea*), Aremenian blackberry (*Rubus armeniacus)* and teasle (*Dipsacus fullonum*). Teasle, blackberry, and reed-cannarygrass can all be problematic in natural areas because they tend to form large monocultures if not controlled.

The shallow banks of the ponds provide excellent transitional habitat between open water, emergent wetland, wetland prairie, and upland. This results in a diverse mixture of native and non-native vegetation in the area.

The upland areas adjacent to the ponds are dominated by tall fescue (*Schedonorus phoenix*), orchard grass (*Dactylis* sp.) meadow foxtail (*Alopecurus pratensis*), and other weedy non-native herbaceous species. However, some native species are present in this zone in small quantities including cow parsnip (*Heracleum maximum*) and camas (*Camasia quamash*).

Agricultural Area

The agricultural area is currently in production for annual ryegrass (*Lolium multiflorum*), which makes up the majority of the vegetation present. In the wetter portion of the site in and around the low agricultural drainage, reed mannagrass (*Glyceria grandis*) is also present in smaller quantities. Native vegetation is not present in this area.

Invasive non-native vegetation such as Armenian blackberry, teasle, and reed-cannarygrass are present across much of the site, but in small enough quantities that they could be controlled.

Wildlife

Although no formal wildlife surveys have been conducted for birds, mammals, reptiles, or amphibians, the site clearly provides good habitat conditions for many native and non-native species, especially in and around the ponds. American beaver activity is evident around both ponds. Non-native nutria and rabbits are quite abundant with nutria burrows evident along the ponds and irrigation channel. A diverse mix of bird species are commonly seen around the ponds including great blue heron, great egret, Northern shoveler, wood duck, green-winged teal, mallard, Canada goose, long-billed dowitcher, pied-billed grebe, turkey vulture, and red-winged blackbird.

In October 2007, ODFW biologists set fish traps in the ponds, along the irrigation channel, and in Muddy Creek to determine the presence of fish. The most significant finding of this survey was the occurrence of Oregon Chub (status: Federally Endangered, ODFW listed as sensitive) in several locations along Muddy Creek including the area where the irrigation channel flows into the creek. No Oregon chub were located within the irrigation channel itself or the ponds. The survey did confirm the presence of non-native bull frogs in both ponds and mosquito fish in West Pond.

Oregon chub (Federally endangered) were located in Muddy Creek at the confluence with the irrigation channel, just to the north of the site.

Canada geese and numerous other bird species utilize the area around the ponds for nesting (goose eggs from a nest adjacent to West Pond)

Site Enhancement Goals

The following goals were established to help guide the proposed enhancement and management for the site:

Habitat Goals

- Establish a mosaic of habitat types on the site including riparian, side channel, wet prairie, and open water.
- Create suitable Oregon chub habitat along the irrigation canal and within the Coburg Ponds by providing more consistent hydrology, native cover, and quiet backwater conditions.
- Enhance overall habitat conditions for native wildlife species including Western meadowlark, short-eared owl, wood duck, chorus frog, Western pond turtle, Northern red-legged frog, Dusky Canada goose, little willow flycatcher, and American beaver.
- Enhance riparian habitat along the Irrigation canal and the Coburg Ponds.
- Reduce non-native wildlife species such as mosquito fish (East Pond), bull frogs, and nutria that compete with native species.

Water Quality Goals

- Provide shading along the irrigation canal and ponds for temperature benefits.
- Reduce bank erosion along the irrigation canal.
- Improve dissolved oxygen levels.

Vegetation Goals

- Maintain native vegetation where it is present across the site.
- Control non-native vegetation, especially highly invasive species such as Armenian blackberry, teasel, and reed-canarygrass.

Access

- Provide site access for restoration, maintenance, and monitoring activities.
- Provide controlled public access to the Coburg Ponds for educational and passive recreational purposes.

Hydrology

- Maintain more consistent hydrologic conditions in East Pond (currently fluctuates significantly).
- Utilize reclaimed water from the treatment facility to supplement flows in the irrigation canal during the non-irrigation period.
- Maintain year-round water within portions of the irrigation canal and West Pond to help maximize potential as Oregon Chub habitat.
- Maintain water transport function of the irrigation canal.

Maintenance

- Control invasive exotic plant species throughout the enhancement areas.
- Maintain or replace culverts where they exist to allow vehicles and equipment to access to the site as needed for farming, restoration, and maintenance activities.
- Maintain prairie habitats over the long-term through a combination of mowing and burning.

Proposed Actions

The proposed enhancement actions will likely be implemented in conjunction with the construction of the Coburg MBR Wastewater Reclamation Project. The enhancement actions described in this section are conceptual and additional engineering and design will be completed once funding is secured. In particular, grading plans and specifications will be prepared for the proposed irrigation channel enhancements.

The proposed enhancements are broken into three distinctive habitat areas:

- Irrigation Channel Enhancements
- Coburg Pond Enhancements
- Wetland Prairie Enhancements

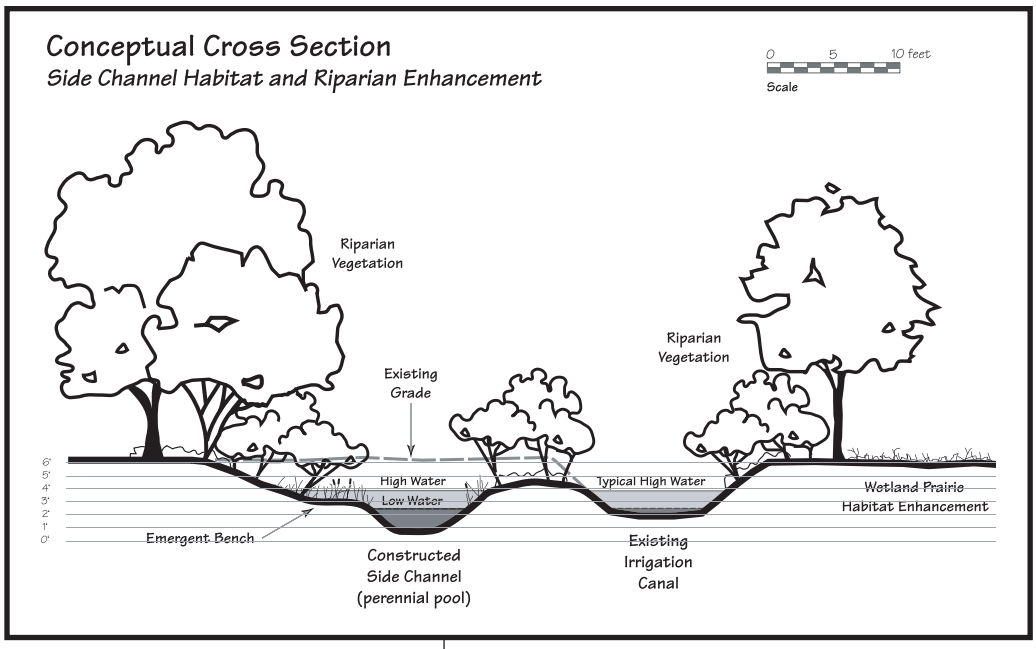
Irrigation Channel Enhancements

As currently proposed, the outfall for the reclaimed water would be located on the irrigation channel just to the north of the ponds. This outfall would contribute as much as 0.7 cfs of water to the channel when the system reaches full capacity, although this would typically be much lower between June and September when much of this water will be utilized by the City for irrigation of parks and cropland. During that period, the irrigation channel will be carrying flow from the McKenzie River of up to 5 cfs, so the channel itself will receive flow throughout the year, either from the wastewater facility and runoff during the winter months or from the irrigation diversion in the summer.

The outfall for the treated water will be designed to cascade over a series of boulders similar to this example.

Approximately 1,200 lineal feet of irrigation channel from the outfall of the reclaimed water (just north of the ponds) to the property boundary will be significantly enhanced for habitat benefits. This will include the creation of two side channels designed to provide backwater habitat that would serve as refuge for aquatic species. These side channels, will be designed with deep pools (2-3 feet) and contain water throughout the year. The side channels will be vegetated with native submergent and emergent vegetation and could provide excellent habitat for Oregon chub and other aquatic species. The Oregon chub is known to inhabit Muddy Creek, approximately 250 feet to the north. It is thought that the chub currently do not utilize the irrigation channel for habitat due to the current lack of cover, high flow velocities, and lack of slower moving backwater areas. During the channel work, two grade control features will be added help stabilize the channel bottom. These feature will consist of rock placed in a trench perpendicular to the channel and filled with crushed rock (1 ½" minus) to stabilize the grade and prevent any potential further downcutting. These features will ensure the side channels remain charged and will not be visible once complete.

The outfall will be located in approximately this location



In conjunction with the addition of side channel habitat, the banks of the irrigation channel will be heavily planted with native riparian trees and shrubs to improve both the habitat and water quality function of the waterway. The proposed channel enhancements will result in no reduction in channel capacity or irrigation water transport and the additional shading and aquatic vegetation will provide water quality benefits.

The outfall for the reclaimed water will be designed to cascade over a series of rock ledges before entering the irrigation channel. This will provide additional oxygenation of the water and create a barrier preventing chub or other aquatic species from inadvertently entering the outfall pipe.

The Coburg Ponds would benefit greatly from exotic vegetation control and planting of riparian trees and shrubs (West Pond pictured).

Coburg Pond Enhancements

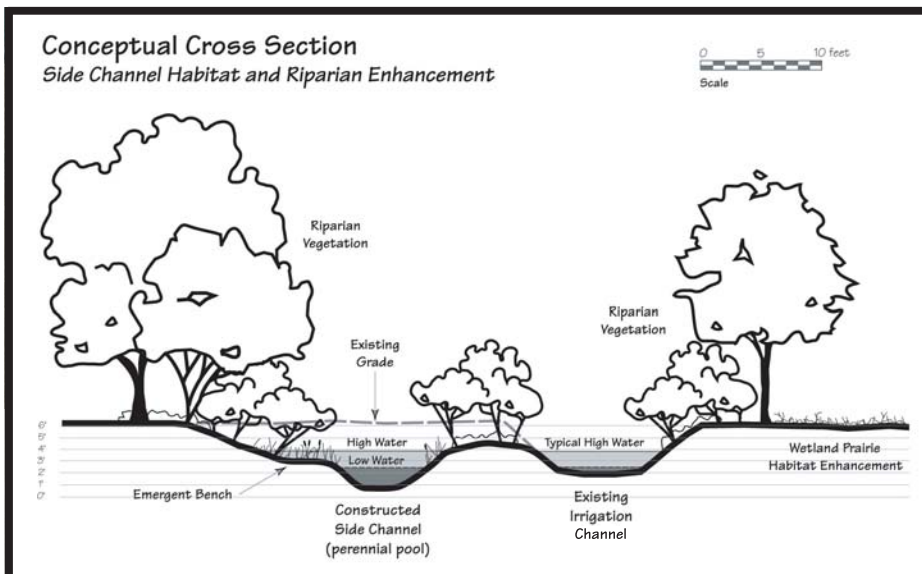
The Coburg Ponds currently contain the site's highest quality habitat, but a number of relatively low cost enhancements are proposed for this area which will greatly improve those benefits.

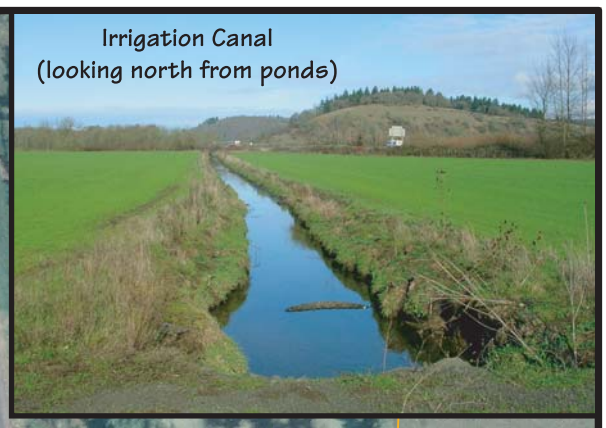
<u>Pond Enhancements</u>

West Pond, with its direct connection to the irrigation channel, has the highest potential for the creation of Oregon chub habitat. To do this, a better open water connection between West Pond and the irrigation channel will need to be created. The current connection is a shallow ditch which would not allow for consistent fish passage between the channel and the pond. Likewise, the pipe connection between the south end of West Pond and the irrigation channel is not currently functioning and will be repaired to provide supplemental flow through the pond during the summer months. This connection will be in the form of a water control structure (gate) to allow for some hydrologic control if needed for management. The water will pass through the pond and back into the irrigation channel, so no irrigation water will be lost. Further proposed habitat improvements for

Conceptual Cross Section

Side Channel Habitat and Riparian Enhancement





380

380

Work with property owner to control exotic vegetation along channel banks

Existing Forested Wetland

Muddy Creek

Farmed Wetland

Agricultural Ditch

Waterway Enhancements: Creation of side channel habitat, riparian plantings, deeper pools, and grade control to prevent erosion

Proposed MBR Wastewater Reclamation Facility

Proposed Access Road

See Cross Section

Outfall (Estimated flow: 0.7 cfs Oct - May; Intermittent June - Sept)

Wetland Enhancement Area (approximately 2.2 acres)

Harden Outfall (rock)

Reclaimed Water (piped)

Create open water connection to allow fish passage (Phase-II)

Pond Overflow

Pond Enhancements: Invasive vegetation control and riparian plantings along pond edges

Irrigation Channel

Water Surface 386.7 (7-8-07)

Irrigation Channel

Deepen the West Pond in two locations to improve habitat conditions for Oregon Chub and other aquatic species (Phase-II).

West Pond

East Pond

ODOT

Board walk and dip net platform for improved educational access (Phase II)

Water Surface 386.3 (7-8-07)

Irrigation canal flow diversion from McKenzie River (0 to 2 cfs from Oct to May; up to 5 cfs June to Sept)

Repair existing culvert and install water gate to allow limited flow to move through pond during irrigation season

View Point

Public access for passive recreation and education (soft surface trail, interpretive signage, view point, and designated parking).

I-5

Water Surface 386.7 (7-8-07)

East Irrigation Channel

Install Gate

Reference Point 392.40

42" Culvert (Water Surface: 386.0 on 7-9-07)

390

Access Parking (on-street)

Industrial Way

395

Existing Industrial

Existing Industrial

Habitat Enhancement Concept Diagram

Coburg Ponds and Wastewater Treatment Site June 2008

Legend:

- Coburg UGB
- Existing contours (5-foot)
- City of Coburg Ownership
- Existing Waterways
- Delineated Wetland*
- Treated Wastewater (Piped)

Enhancements Key:

- Constructed Side Channels
- Riparian Forest
- Grade Control Features
- Prairie Enhancement
- Deep Water Habitat Areas
- Water Control Structure
- Interpretive Trail

0 250 500 Feet

Scale

N W E S

One Acre

* The wetland delineation for the area around the ponds was conducted in July 2007 by SWCA. The delineation for the northern half of the site was conducted by Fishman Environmental Services in 2003 and verified by Environmental Solutions, LLC in 2004.

Produced by LCOG

Aerial Photo Base: March 2004

West Pond include the deepening of two areas to create pools of about four to five feet in depth (currently the depth is two to three feet in depth). This will greatly improve the aquatic habitat conditions for the chub and other species and ensure that the ponds will not fully dry up at any time during the year. Prior to the proposed excavation, West Pond will be allowed to fully dry out if possible to make excavation easier and to reduce the population of mosquito fish and bull frog. These non-native species tend to compete with the Oregon chub for habitat. Following excavation, submergent vegetation (see planting list) will be introduced to these deeper areas to further improve habitat conditions for the chub. No direct open water connection or deepening is currently planned for East Pond, but this could be done at a later date if these improvements in West Pond prove to be effective. These improvements will likely be completed as a second phase following successful establishment of chub habitat in the irrigation side channels.

Proposed tree and shrub plantings along the ponds and irrigation channel would create better habitat structure and provide additional shading similar to this example at Delta Ponds in Eugene.

Riparian Enhancements

Further habitat improvements to the ponds will include planting riparian tree and shrub species (see planting list) along the edges of both ponds and the irrigation channel that passes between them. These plantings will improve overall habitat structure in the area and provide shading for water quality benefit.

Exotic Vegetation Control

Non-native vegetation is abundant around the ponds, but of particular concern are Armenian blackberry, reed-canarygrass, and teasel. These species are present in small quantities at the ponds currently, but tend to be very invasive and out-compete native vegetation if not controlled. A combination of cutting and herbicide application will be used to control these species. The shading provided by the riparian trees and shrubs will also help control these sun loving invasive species over the long-term.

Recreational and Educational Access

Access to the ponds for recreational and educational purposes is currently limited and no formal facilities are present. The Coburg Parks and Open Space Master Plan (2005) proposed enhancements to the ponds which would include signed parking at the end of Industrial Way and a short trail with a viewpoint. In order to limit impacts to wildlife, a soft surfaced trail would extend approximately 300 feet onto the site to an area between the two ponds. This spot provides an excellent vantage of both ponds and would be an ideal destination for bird watchers, elementary school classes, and employees from the adjacent employment area. The trail will be surfaced adequately to

The Coburg Ponds will serve an important recreational and educational function for the community.

allow for wheel chair access to the viewpoint. The trail will likely be lined with geotextile fabric to prevent settling and control vegetation and would be covered with bark or wood chips. Further site access will be discouraged in order to limit impacts to wildlife.

Utility Corridor

The wastewater lines to and from the facility are planned to run parallel to the irrigation channel in between the ponds. This area will have to remain clear of large woody vegetation over the long-term to allow for periodic maintenance access to the pipes if needed. Following pipe installation, this area will be seeded with an aggressive native upland prairie seed mix (see planting list) to establish native cover and would be mowed once annually, or as needed, in order to control establishment of woody vegetation. Mowing would be done in August or September to avoid impacting ground nesting birds and to allow native grasses and forbs to seed.

Wetland Prairie Enhancement

Approximately 2.2 acres immediately east of the irrigation channel will be restored to native wetland prairie from its existing agricultural use. Currently this area is being farmed for annual ryegrass (*Lolium multiflorum*) production. Based on the wetland delineation and historic vegetation mapping, it is thought that this area historically supported a wet prairie community.

The proposed wetland prairie enhancement would follow a technique similar to that used at the recently restored Dragonfly Bend site in west Eugene pictured above.

Restoration Technique

The technique to be used for wetland prairie restoration will first involve the eradication of the existing non-native vegetation through two applications of a glyphosate based herbicide during the fist year. This will be followed by the planting of native wetland forb species in the fall of the first year. In the fall of the second year, native grasses will be seeded into the restoration area. Based on the other successful prairie restoration efforts in the region, exclusively planting forbs in the first year allows these species to better establish before the more aggressive native grasses are introduced. This technique also allows for the use of a grass specific herbicide during the first year of restoration if exotic grasses are still present in large quantities. The native forbs and grasses will be planted primarily as seed using a broadcast seeder to minimize surface disruption. Additional planting of forb plugs and bulbs may be also be used to help supplement the first round of seeding.

Buffer Zones

Because this restoration area is somewhat small and bordered by areas containing weedy vegetation, a buffer zone of approximately ten feet in width will be established to help prevent non-native species such as hairy cat's ear (*Hypochaerus radicata*), annual ryegrass (*Lolium multiflorum*), and reed-canarygrass (*Phalaris arundinacea*) from

spreading into restoration area. These buffer areas will be planted with an aggressive native grass mix (see Plant Species List), likely using a no-till seed drill if available to insure good coverage.

Table 2: Prairie Enhancement Schedule

Task	Approximate Date
	Year One
Herbicide Application #1	May (possible follow-up in June if needed)
Herbicide Application # 2	September (after green-up)
Native Forb Planting (seeding)	Late September
Buffer Planting (aggressive seed mix)	Late September
	Year Two
Evaluate Plant Community	Spring/Summer
Spot Herbicide Application	Summer
Grass Specific Herbicide Application (if needed)	September (after green-up)
Native Grass Planting	Late September

Weed Control
Follow-up spot herbicide application will likely be conducted in the spring and summer of the first year following planting to control non-native species. If necessary, a grass specific herbicide application may be used prior to planting of the native grass species in the second year. Evaluation of the post planting site conditions will dictate the precise weed control approach to be used on the site.

Phasing of Proposed Enhancements
Ideally, the majority of the proposed enhancements would be completed in conjunction with the construction of the wastewater facility as a cost saving measure. However, two phases of implementation are recommended:

Phase-I: This first phase would incorporate the bulk of the proposed enhancements. This would include the creation of the side channels along the irrigation channel; exotic vegetation control throughout the site; riparian planting along the irrigation channel and the ponds; wetland prairie enhancement; and trail construction.

Phase II: If the creation of Oregon chub habitat within the side channel area is successful, a second phase of enhancements may be implemented to further expand this habitat. This would include the deepening of two areas within West Pond; introduction of native submergent vegetation within the deeper pools, and creation of an open water connection between the irrigation channel and West Pond. This would allow the chub to move from the irrigation channel and into the pond. This second phase could also include the temporary draining of West Pond to eradicate the non-native mosquito fish, which would compete for habitat with the Oregon chub. The implementation of the phase II enhancements would be coordinated closely with ODFW biologists to help ensure success.

Long-Term Maintenance and Management

The proposed habitat enhancements are intended to require minimal maintenance once established. However, some routine maintenance activities must be conducted over the long-term to maintain the quality of the proposed habitat enhancements. The following table includes anticipated on-gong maintenance requirements for the project area:

Table 3:
Management Activities

Management Actions	Frequency	Description
Irrigation Canal		
Monitor for flow, erosion, vegetation, and sedimentation	Quarterly	Note problem areas
Remove sediment build-up from side channels	As-needed (unlikely to be a significant problem)	Excavator would be used to remove sediment build-up
Monitor for presence of Oregon chub and other aquatic species	Yearly	Work with ODFW to set up monitoring program
Exotic vegetation control	As-needed (summer and fall)	Control blackberry, Scot's broom, and other exotic vegetation with hand tools or herbicide application
Culverts and water control structures	As-needed	Inspect to ensure function and repair if needed
Wet Prairie		
Monitor vegetation	Bi-annual	Note problem areas
Mow	Bi-annual	Rough mow prairie in summer on a bi-annual basis to prevent woody vegetation from establishing in prairie
Control exotic vegetation	As needed	Control aggressive exotic vegetation with spot herbicide application as needed
Supplemental planting	As needed	Add additional grass and forb species to increase cover and diversity as needed (especially in areas where exotic vegetation control has occurred)
Coburg Ponds		
Monitor hydrology and vegetation	Quarterly to Yearly	Take staff gauge readings, note problem areas (nutria damage and exotic vegetation)
Monitor for presence of Oregon chub and other aquatic species	Yearly	Work with ODFW to set up monitoring program
Install permanent staff gauges	Monitor quarterly	Install staff gauge in East Pond and West Pond to monitor water levels
Mow	Once annually	Mow upland area between ponds to keep open for maintenance access (mow in late August to prevent impact to ground nesting birds)
Trail	As needed	Resurface trial with woodchips or bark as needed to maintain accessibility
Litter collection	As needed	Remove any litter
Exotic vegetation control	As-needed (summer or fall)	Control blackberry, Scot's broom, reed-canarygrass, teasel, thistle and other aggressive exotic vegetation. Use a combination of hand removal, mowing, and herbicide application (re-seed areas with aggressive native grass mix)
Maintain utility corridor	Once annually (late August or September to avoid ground nesting birds)	The wastewater lines are planned to run between the ponds parallel to the irrigation canal. This area should remain clear of large woody vegetation to allow for maintenance if needed.

Maintenance Access
Vehicular access to the site will be required for construction and long-term maintenance of the proposed enhancements.

Maintenance access to the northern portion of the site, including the wetland prairie and side channel enhancements, will be achieved from the access road that will be constructed to the wastewater facility from the west. Vehicles can cross the agricultural land during the dry season, so no formal access road will be required. The existing large culvert on the irrigation channel should be retained to allow access across the irrigation channel to the wetland prairie area for bi-annual mowing.

Maintenance access to the ponds will be provided from the end of Industrial Way. Vehicles would be able to traverse the upland area between the two ponds as needed. A gate will be installed at the end of Industrial Way to prevent unauthorized vehicular access, but will allow pedestrian access (including wheel chairs) from this point. The area between the two ponds will be kept open through seasonal mowing.

Proposed Planting Lists

The proposed plantings listed below will likely vary somewhat based on availability at the time of implementation.

Table 4: Wetland Prairie Planting List*

Scientific Name	Common Name	Form
Forbs (planted year one)		
Achillea millefolium	Western yarrow	seed
Asclepias speciosa	Showy milkweed	seed
Camassia leichtlinii	Leichtlin's camas	Seed, bulb
Camassia quamash	Common camas	Seed, bulb
Clarkia amoena	Farewell to spring	seed
Epilobium densiflorum	Spiked primrose	seed
Lupinus polyphyllus	Bigleaf lupine	seed
Madia elegans	Showy tarweed	seed
Plagiobothrys figuratus	Fragrant popcorn flower	seed
Plectritis congesta	Rosy plectritis	seed
Potentilla gracilis	Slender cinquefoil	seed
Sanguisorba occidentalis	Western burnet	seed
Sidalcea campestris	Meadow checkerbloom	seed
Symphyotrichum hallii	Hall's aster	seed
Wyethia angustifolia	Mules ear	seed
Grasses (planted year two)		
Deschampsia cespitosa	Tufted hairgrass	seed
Danthonia californica	California oatgrass	seed
Agrostis exarata	Spike bentgrass	seed

* *The proposed planting list above is based on available seed from Heritage Seedlings Inc. Use seeding rates recommended by Heritage or other vender. The planting list will be modified and fine tuned based on seed availability at the time the project is implemented.*

Table 5: Native Riparian Planting List (pond edges and irrigation channel)*

Scientific Name	Common Name	Form
Alnus rubra	red alder	br or container
Cornus sericea	red osier dogwood	br or container
Fraxinus latifolia	Oregon ash	br or container
Lupinus polyphyllus	Large-leaf lupine	seed
Pinus ponderosa	Willamette ponderosa pine	br or container
Populus balsamifera	black cottonwood	br or container
Salix lasiandra	pacific willow	cuttings or container
Salix sitchensis	Sitka willow	cuttings or container
Spiraea douglasii	Douglas spiraea	br or container
Symphoricarpus albus	snowberry	br or container

* *The planting list will be modified and fine tuned based on availability of plants at the time the project is implemented.*

Table 6: Native Submergent Planting List (deepened pools and side channels)

Scientific Name	Common Name	Form
Callitriche hermaphroditica	Northern water starworts	seed or plug
Ceratophyllum demersum	hornwort	seed or plug
Elodea canadensis	Canadian waterweed	seed or plug
Fontinalis antipyretica	water moss	seed or plug
Polygonum amphibium	Water smartweed	seed or plug
Ranunculus aquatilis	Aquatic buttercup	seed or plug

* *Sources of submergent plants can be somewhat difficult to locate commercially, so a smaller subset of the species above will likely be used based on availability.* ***CAUTION:*** *Great care should be taken to ensure that only native plant species are utilized. Many varieties of non-native submergent plant species are commonly used for acquariums and can be highly invasive.*

Table 7: Aggressive Native Prairie Planting List (to be used in disturbed areas)*

Scientific Name	Common Name	Form
Grasses		
Agrostis exarata	spike bentgrass	seed
Danthonia californica	California oatgrass	seed
Deschampsia cespitosa	tufted hairgrass	seed
Elymus glaucus	blue wildrye	seed
Hordeum brachyantherum	meadow barley	seed
Forbs		
Achillea millefolium	Western yarrow	seed
Eriophyllum lanatum	Oregon sunshine	seed
Lupinus rivularis	Streambank lupine	seed
Lupinus polyphyllus	Large-leaf lupine	seed
Madia gracilis	Common madia	seed
Prunella vulgaris var. *lanceolata*	Lance self-heal	seed

* *Use seeding rates recommended by vender. The planting list will be modified and fine tuned based on seed availability at the time the project is*

Cost Estimation

The site enhancements proposed in this plan are conceptual and will undergo additional design and engineering prior to construction. Therefore, the cost estimates shown below are approximate and based on rough calculations and costs of similar projects that have recently been implemented in the region. The estimates have been sorted by elements that could be implemented independently based on funding availability. The cost estimates assume that contract labor will be used to implement each of the planned enhancement elements. However, a number of these components such as riparian planting, exotic species control, and trail construction could potentially be implemented using some degree of volunteer labor.

Table 8: Phase I Cost Estimation:

Activity	Assumptions	Quantity	Unit Price	Cost
Wet Prairie Restoration	Includes site preparation, two phases of planting (forbs year one, grasses year two), and follow-up weeding	2.2 acres	$10,500/ac	$23,100
Irrigation Channel Side Channel Excavation and Grading	500 lf of channel widening (excavation for two side channels with disposal of fill on-site, addition of some rock and jute fabric);	500 lf	$220/lf	$110,000
Irrigation Channel Riparian Planting	Riparian planting along 1,200 lf of channel including new side channels (bare root trees/shrubs; willow stakes; grasses and forbs by seed) with one season watering	0.8 acres	$17,500/ac	$12,000
Coburg Ponds: Invasive vegetation control	Teasel, blackberry, and reed-canarygrass control (mechanical and/or spot herbicide application)	4.0 acres	$1,500/ac	$6,000
Coburg Ponds: Riparian Planting	Riparian trees and shrubs planted along pond edges (bare root and willow stakes) with one season watering	2.0 acres	$12,000/ac	$24,000
Interpretive Trail	Bark or chip surfacing with geotextile base	300 lf	$7/lf	$2,100
Signage	Interpretive, park rules, etc.	2	$300	$600
			Total for Phase I Elements:	**$177,800**
Construction Engineering and Contingencies	Construction drawings and specifications for irrigation channel enhancement and outfall	-	15% of total	$26,670
			Total for Phase I with Engineering and Contingencies:	**$204,470**

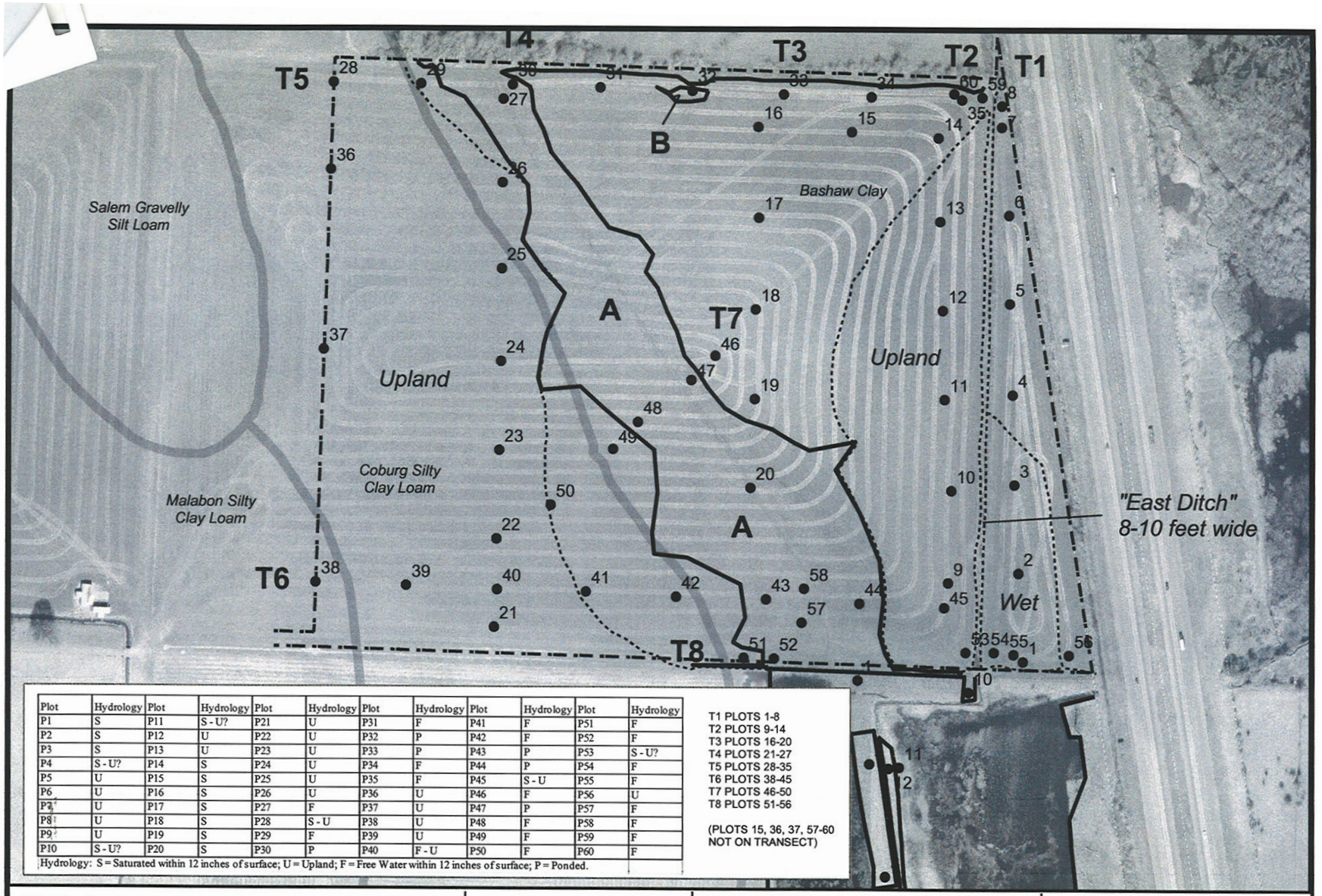
Phase II Cost Estimation:

Phase II elements would likely be implemented following successful completion of the proposed phase I enhancements. The value of the proposed pond deepening and addition of water control structures to improve flow in West Pond would be evaluated based on the presence of Oregon chub utilizing the phase I side channel habitat. The proposed boardwalk extension and the dip-net platform would function better following the pond deepening, but could still be constructed independently if desired.

Table 9: Phase II Cost Estimation:

Activity	Assumptions	Quantity	Unit Price	Cost
West Pond deepening	Temporarily drain pond and deepen using excavator and dump trucks (excavated material disposed of on-site or in close proximity).	25,000 cy	$5/cy	$125,000
West Pond supplemental plantings	Native emergent and submergent species seeded into area of excavation	Coverage for approx. 1.5 acres	$1,500/ac	$2,250
Excavation of open channel between West Pond and irrigation canal	Excavation of channel approximately one foot in depth and three feet in width with rock at outfall for grade control and plantings	60 lf	$25/lf	$1,500
Water control structure at south end of West Pond	12” culvert with water gate	25 lf	-	$1,200
Boardwalk and dip net platform	4’ wide boardwalk extending over marsh and pond constructed with treated or composite lumber	150 lf	$50/lf	$7,500
			Total for Phase II with Engineering and Contingencies:	**$137,450**
Construction Engineering and Contingencies	Construction drawings and specifications for irrigation channel enhancement and outfall	-	15% of total	$20,618
			Total for Phase II with Engineering and Contingencies:	**$158,068**

Appendices



Plot	Hydrology	Plot	Hydrology	Plot	Hydrology	Plot	Hydrology	Plot	Hydrology	Plot	Hydrology
P1	S	P11	S - U?	P21	U	P31	F	P41	F	P51	F
P2	S	P12	U	P22	U	P32	P	P42	F	P52	F
P3	S	P13	U	P23	U	P33	P	P43	P	P53	S - U?
P4	S - U?	P14	S	P24	U	P34	F	P44	P	P54	F
P5	U	P15	S	P25	U	P35	F	P45	S - U	P55	F
P6	U	P16	S	P26	U	P36	U	P46	F	P56	U
P7	U	P17	S	P27	F	P37	U	P47	P	P57	F
P8	U	P18	S	P28	S - U	P38	U	P48	F	P58	F
P9	U	P19	S	P29	F	P39	U	P49	F	P59	F
P10	S - U?	P20	S	P30	P	P40	F - U	P50	F	P60	F

Hydrology: S = Saturated within 12 inches of surface; U = Upland; F = Free Water within 12 inches of surface; P = Ponded.

T1 PLOTS 1-8
T2 PLOTS 9-14
T3 PLOTS 16-20
T4 PLOTS 21-27
T5 PLOTS 28-35
T6 PLOTS 38-45
T7 PLOTS 46-50
T8 PLOTS 51-56

(PLOTS 15, 36, 37, 57-60 NOT ON TRANSECT)

Key to Features

- Sample Plots (accuracy +/- 10 ft.)
- Ponded Corps Wetland Boundary (PLS Survey by OBEC)
- Saturated DSL Wetland Boundary (accuracy +/- 50 ft.)
- Soils
- Site Boundary

1 inch equals 300 feet

0 150 300 Feet

Fishman Environmental Services, LLC

CONSULTANTS IN ECOLOGY AND NATURAL RESOURCE MANAGEMENT

City of Coburg Site 4
Proposed Wastewater Treatment Plant

Ponded and Saturated Wetland Delineation Map

Figure 5

Date: 05/22/03

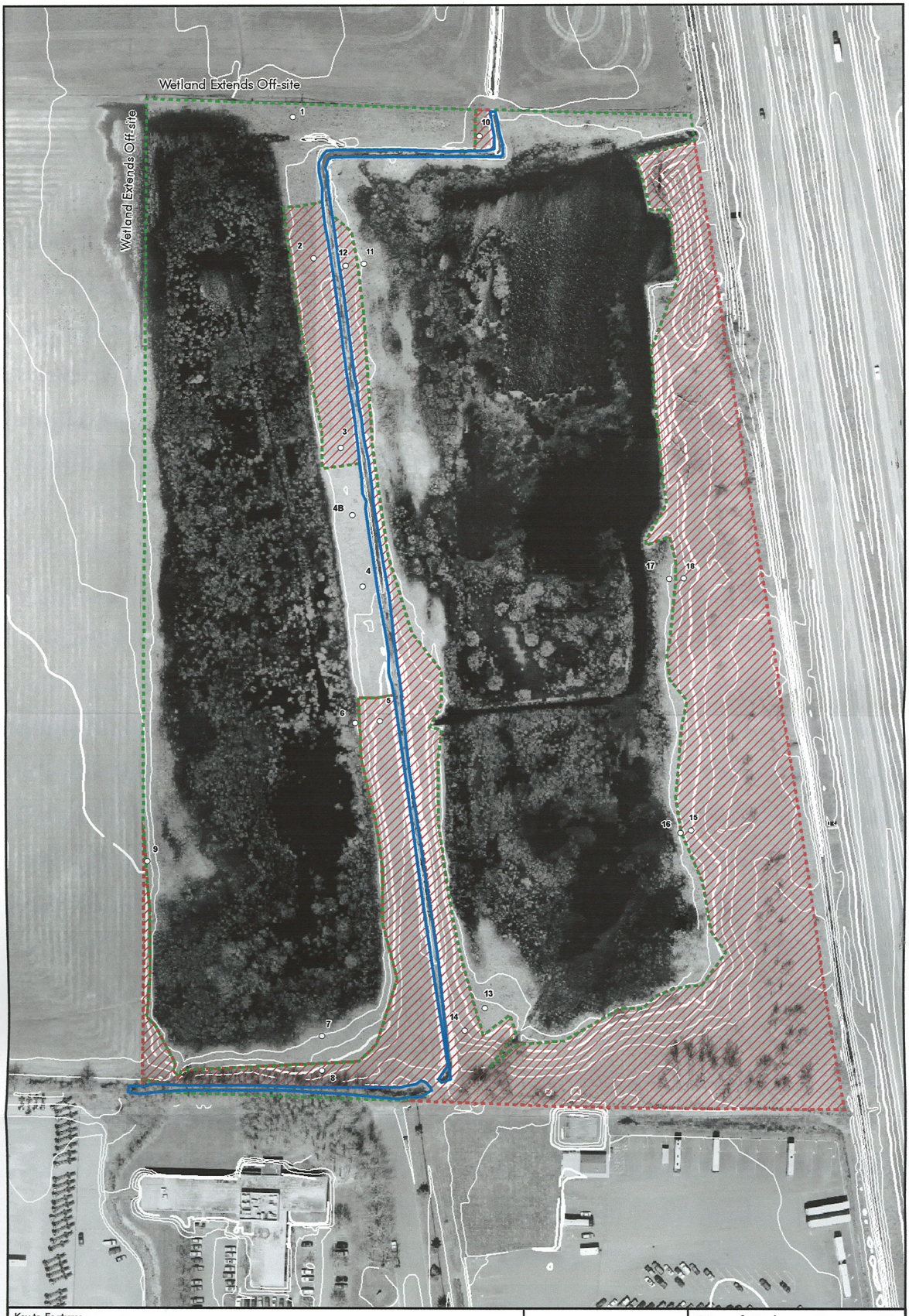
GIS:R.Gutierrez

Location:g:\2002\02053_Coburg\gis\apr\Wetland Survey and Field Plots North.mxd

Aerial Photo source: Brown & Caldwell, photo date: April 02, 2002.

Appendix - A

Appendix - B


Wetland Extends Off-site
Wetland Extends Off-site
1
10
2
12
11
3
4B
4
17
18
6
5
16
15
9
13
14
7
8
Key to Features
Sample Plots
Wetlands (PLS Survey by OBEC)
Uplands
Top of Streambank of East Channel of Muddy Creek Irrigation District Canal
Contours (One Foot - 1')
1 inch equals 125 feet
July 2007
0 50 100 200 Feet
SWCA
ENVIRONMENTAL CONSULTANTS
NORTH
City of Coburg Borrow Pit Ponds Wetland and Waters Delineation
Figure 5. Wetland Delineation Map