

Appendix B

# **CEDAR MILL WETLAND**

## **MANAGEMENT PLAN**

**THE WETLANDS CONSERVANCY**

**July 2005**



## **Cedar Mill Wetland Management Plan**

Marshall Johnson

July 2005

**CONTENTS**

**PREFACE ..... 1**

**INTRODUCTION ..... 2**

**SITE DESCRIPTION AND HISTORY ..... 4**

    Location .....4

    Description.....5

    Site Acquisition .....6

    Structural/Physical Features .....6

    Legal Issues.....7

    Plant Inventory .....8

    Present Human Uses and Activities.....8

    Adjacent Properties .....8

**FEDERAL, STATE, REGIONAL, AND LOCAL MANAGEMENT POLICIES ..... 9**

**PHYSICAL SETTING..... 10**

    Watershed Setting ..... 10

    Topography..... 10

    Soils ..... 10

    Hydrology..... 11

**VEGETATION MANAGEMENT ..... 12**

    Goals ..... 12

    Existing Vegetation ..... 12

    Management History..... 12

    Non-native Invasive Weed Management Strategy..... 12

    Weed Management Plans and Schedule..... 13

    Enhancement of Native Plant Communities .....30

    Monitoring ..... 32

    Contingency Plans.....36

    Periodic Review of Vegetation Management Plan .....36

## **PREFACE**

The mission of The Wetlands Conservancy is to preserve, protect and restore the physical and ecological values of wetlands, other aquatic systems and related uplands through education, research, acquisition and promotion of private and public stewardship.

## INTRODUCTION

Wetlands are places where water and land meet. The Federal Clean Water Act defines wetlands as:

"...those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

There are three basic criteria that need to be satisfied in order for an area to be called a wetland. Wetland hydrology refers to the presence of water during at least part of the growing season, and is influenced by precipitation, topography, soil texture, and plant cover. Hydric soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Wetland vegetation, also referred to as hydrophytic or water-loving plants, that can grow under the influence of the other two criteria. Although wetlands all share these common characteristics, there are many different types of wetlands and each wetland performs a variety of different functions.

Wetlands in Oregon range from estuaries to seasonal "dryland" wetlands, and from forested wetlands to eelgrass beds. Many wetlands do not appear "wet" during certain seasons, and this makes it difficult to determine a wetland with an initial glance.

Historically, wetland values have been overlooked or ignored by most humans and instead were viewed as useless land that must be filled in order to be "more productive." It is estimated that Oregon has lost about 40 percent of its original wetland acreage. However, in recent years, we have learned a great deal about the value of wetlands and have likewise gained an appreciation for the many important ecological functions that wetlands provide; although wetlands continue to be lost at an unacceptable rate. Major functions provided by wetlands include:

- Groundwater recharge and discharge
- Water quality protection
- Flood and stormwater control
- Reduced erosion
- Habitat for a large variety of wildlife and plants, including nesting and feeding habitat for more than 50 percent of migratory bird species
- Recreational, educational, and aesthetic opportunities

Each wetland is unique and may possess any or all of these functions. The value of wetlands must continue to be recognized in society as development and short term thinking threaten the preservation of wetlands. There are still major threats to wetlands all over the United States. Locally, in the Portland metropolitan area, wetlands are still being lost to development, despite mitigation requirements that attempt to enhance existing wetlands or create new ones.

(Adapted from Washington State Department of Ecology Publication #95-100 and from Clyde Scott, Hart Memorial Management Plan)

The purpose of the management plan is to promote the management goals of The Wetlands Conservancy for wetland properties held in conservation. The management goals outlined below all center around one important quality - balance. Balance is an essential part of the natural world, and ensures a quality of life for all involved at the wetland, including wildlife, plants, and humans. The goals may overlap as they all relate to one another to achieve this balance. The major management goal objectives for wetlands managed by The Wetlands Conservancy are:

1. Enhance and maintain a diversity of viable wildlife habitats
2. Restore and maintain a healthy wetland/aquatic ecosystem
3. Provide low impact public access to facilitate passive recreation
4. Provide environmental education and research opportunities
5. Establishing a monitoring and maintenance program

## SITE DESCRIPTION AND HISTORY

### Location

Cedar Mill Wetland is located near Cedar Hills in Washington County, Oregon. It is west of Portland, along Barnes Road between NW Cornell Road and Cedar Hills Boulevard. The property is bordered by I-26 to the southwest, Teufels Nursery and residential development to the north, and undeveloped forested hillside, commercial and residential development to the south.



Figure 1. Vicinity Map (red star)

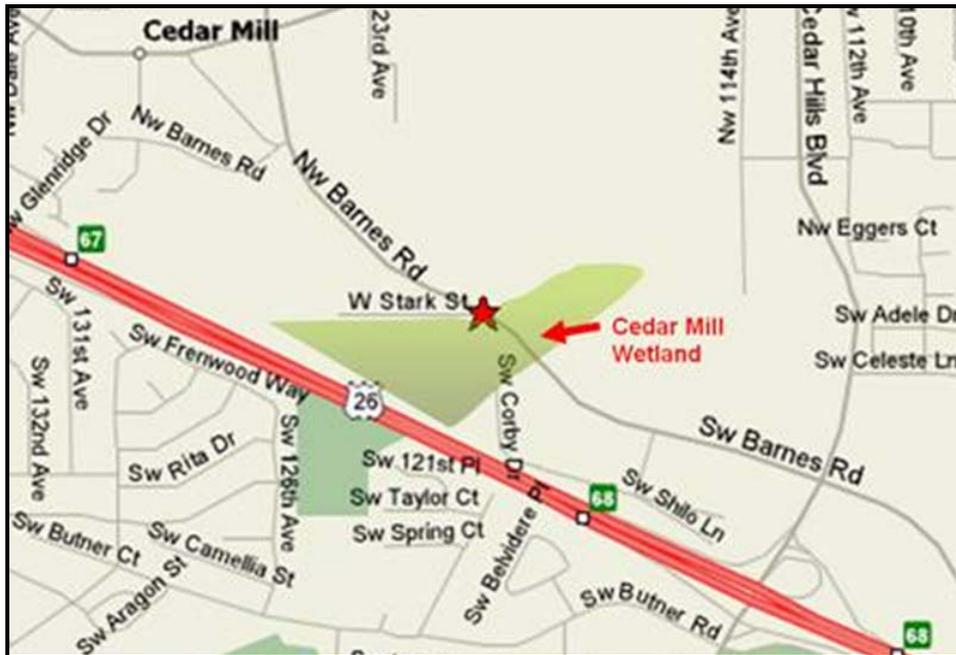


Figure 2. Vicinity Map Detail

## Description

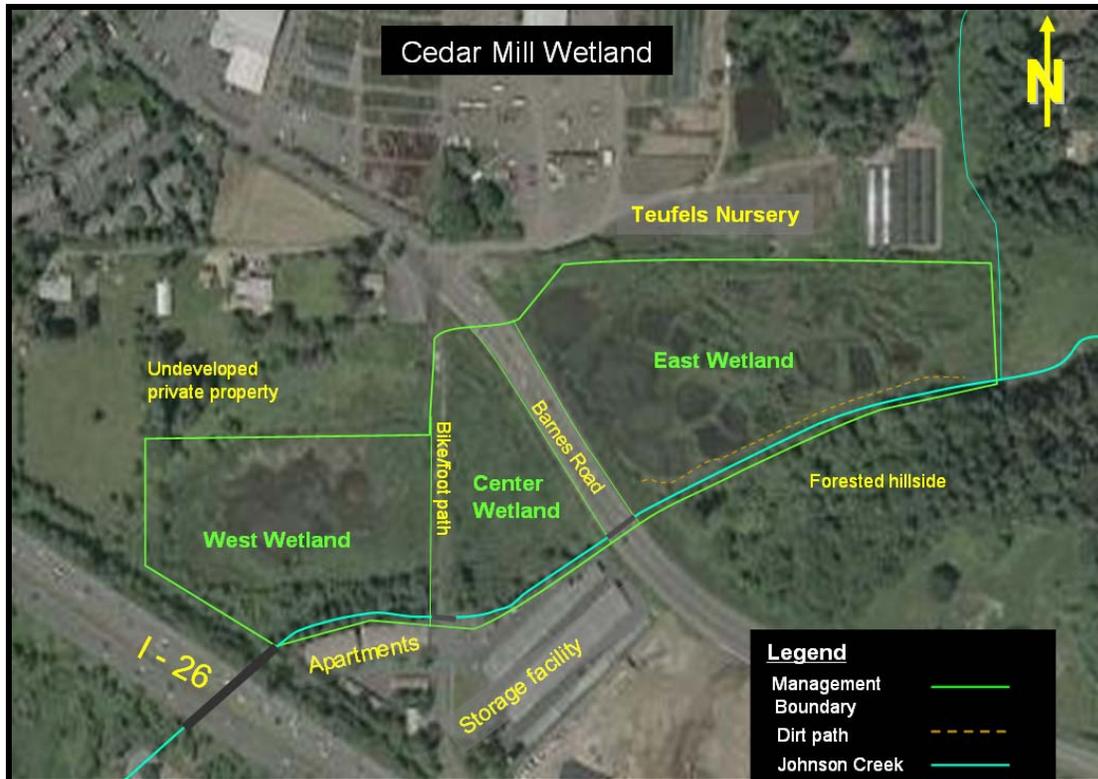
Cedar Mill Wetland is a 16.2 acre property owned by TWC. Historically, this property was a wetland, with North Johnson Creek meandering through a flood plain between the steep ridges on either side. The property was converted for agricultural use and horse pasture during the past century with the creek channelized along the south side of the valley. In the 1980-90's the site was converted back to wetland through mitigation projects by multiple agencies. Currently, there are diverse vegetation communities in the wetland. It includes year-round ponds, forested upland, scrub-shrub areas, and wet meadow communities.

The Cedar Mill Wetland system can be divided into three sections for descriptive purposes. The "east wetland" is a roughly triangular shaped parcel bordered by Barnes Road to its west, Teufels Nursery to its north and a forested hillside to its south. The "center wetland" is a triangular area delineated by Barnes Road to its east, the paved foot/bike path to its west and a storage facility to its south. The "west wetland" is a trapezoidal shape delineated by I-26 to its west, apartments to its south, undeveloped private property to its north and the paved bike path to its east. TWC also possesses an easement in a rectangular strip along Johnson creek, adjacent to the west wetland. The easement lies between the apartment complex and an old wire fence along the tree line at this location. The easement area is considered part of the west wetland. Throughout the management plan, these three general areas will be referred to as east, center and west wetlands. See Figure 3.

North Johnson Creek enters at the southeast corner and flows along the south side of the property. There is a paved path between center and west wetlands. A grass and dirt foot path parallels the creek along the south side of the east wetland. See Figure 4.



Figure 3. Property Lot lines



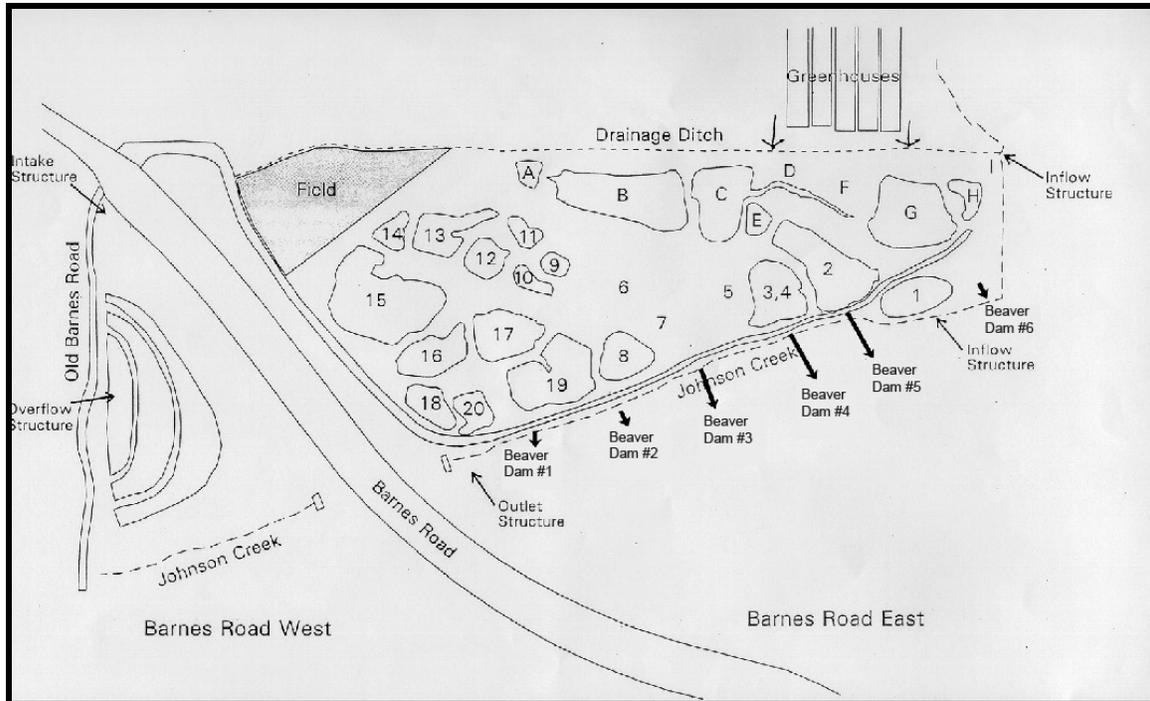
**Figure 4. Site Map – Practical Management Boundaries**

### Site Acquisition

Cedar Mill Wetland was acquired in four separate sections. Metro, Trimet and Washington County mitigation projects resulted in the reconstruction of wetlands at the site. The easement comprising the southern edge of the west wetland was acquired with the development of apartments to the south. Some of the projects that required mitigation resulting in Cedar Mill Wetland were the Trimet light rail line west of Portland, and the realignment of Barnes Road by Washington County.

### Structural/Physical Features

There are three concrete weirs in the Cedar Mill Wetlands system. One is at the upper east end of the creek. One is at the entrance of the tributary from the north. The third is at the channel between the west wetland pond and the creek. The weirs were used for hydrologic control after the original creation of the wetlands. None of the weirs are currently being used for hydrological control. There are two rip rap outfalls at the northern corner of the center wetland. One discharges water from the east wetland, the other discharges stormwater from the roadway north of the wetland.



**Figure 5. Diagram of excavated ponds and weirs (labeled “inflow structure”) in the east and center wetlands. Beaver dams along Johnson Creek are labeled for the east wetland.**

## Legal Issues

### Access

Access to the east wetland is from Barnes Road at its northwest corner. The rear entrance to the Teufels nursery provides access to a short gravel road down to the wetland. There is vehicle access through a gate at the bottom of this gravel road and a dirt/gravel drive along the west side of the wetland (at the bottom of the berm for Barnes). However, there is currently no easy vehicle access to the interior of the wetland due to the high water levels flooding the drive and overgrown vegetation at the gate. Access to the center wetland is the paved pathway which can be accessed through W Stark street at the bottom of the parking lot, or through a vehicle barrier at the end of SW Corby Drive to the other end of the path. A pedestrian gate from the path through the fence provides access to the west wetland. The gate is at the south end of the path, behind some large shrubs. The Farmers Insurance office parking lot has been open for use by TWC employees, however there may not be official agreement about continued use.

### Right-of-Ways

The paved path is Washington County right of way. The County is responsible for maintenance of the path.

### Zoning

The site is zoned for commercial and public facility use.

**Plant Inventory**

See vegetation monitoring results in the Vegetation Management section below.

**Present Human Uses and Activities**

There are no official human uses of this property. The paved path is used to traverse the wetland regularly by local residents. There may also be occasional pedestrians, wildlife observers and other low impact recreational users entering the wetland.

**Adjacent Properties**

Teufels Nursery to the north of the east wetland is currently used for commercial nursery activities. However, this property has been permitted for development with a school and residential units. The forested hillside to the south is undeveloped, and owned by a private property owner who may develop in the future. East of the east wetland there is a parcel belonging to the Peter Court company, which is involved in local residential development. That property contains wetlands and N. Johnson Creek upstream of Cedar Mill Wetland. The property south of the center wetland is used as a commercial storage facility. There is an apartment complex south of the west wetland which has been partially converted and sold as condo units. North of the center wetland is a commercial office building and its parking lot, currently used by Farmers Insurance. North of the west wetland is a demolished building and residential homes beyond the wreckage of the old building. This parcel does not currently appear to be in use.

**FEDERAL, STATE, REGIONAL, AND LOCAL MANAGEMENT POLICIES**

The TWC goals and objectives for the site are consistent with all federal, state, regional, and local governments regulations and management policies.

## PHYSICAL SETTING

### Watershed Setting

Cedar Mill Wetland is within the Rock Creek watershed. The Tualatin River basin contains the Rock Creek Watershed.

### Topography

Cedar Mill Wetland is generally flat, with a slight down gradient from northeast to southwest. There are steep hillsides surrounding the valley. A large berm for Barnes Road divides the east wetland from the rest of the property. Another large berm for I-26 blocks the lower end.

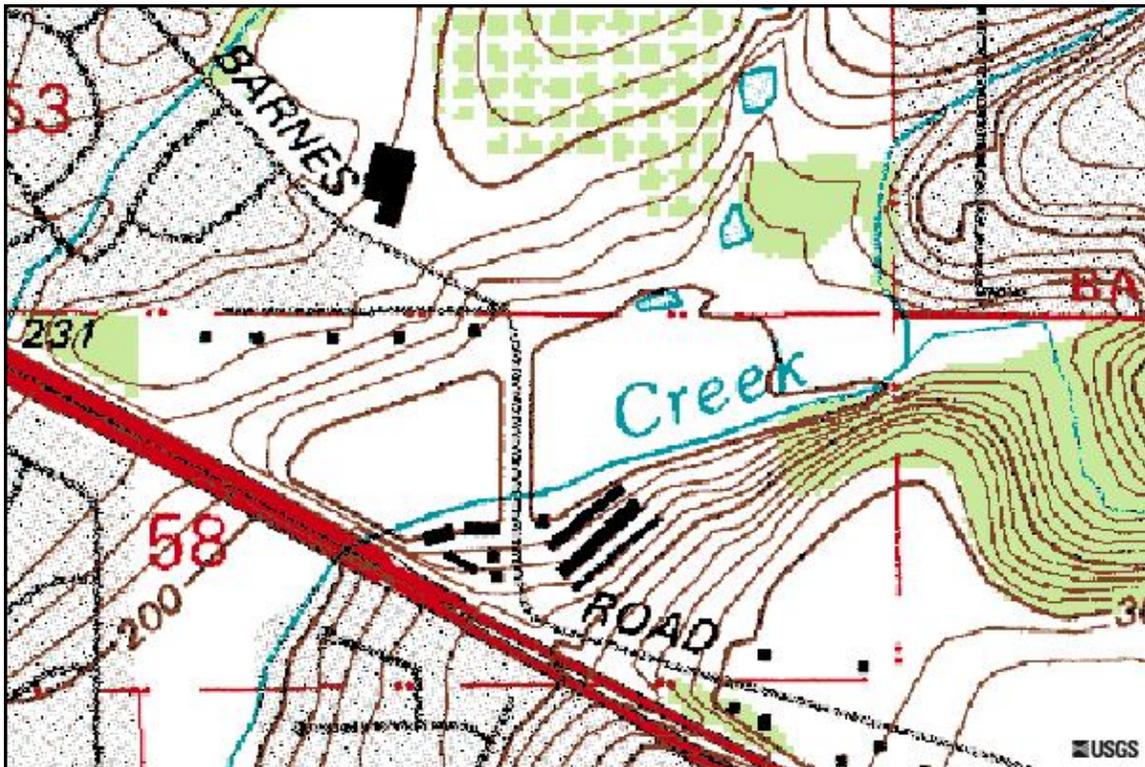


Figure 6. Topography of Cedar Mill Wetland

### Soils

The majority of the soil at the Cedar Mill Wetland consists of Wapato silty clay loam. The Wapato soils are poorly-drained and generally formed in the recent alluvium of flood plains and permeability is moderately slow. However, when N. Johnson Creek was channelized, it was directed through two additional soil types, Helvetia silt loam and Cornelius and Kinton silt loam. The Helvetia soil series are moderately well-drained and formed in the old alluvium of mixed origin on old terraces and permeability is moderately low. The Cornelius and Kinton silt loam soil series is characterized by moderately well-drained soils that are formed in loess-like material over fine silt old alluvium of mixed origin on the uplands and permeability is low.

**Hydrology**

N. Johnson Creek flows along the south side of the wetland, from east to west. The creek enters the system at the southeast corner. A small tributary also flows in a channel along the east property boundary. Together N. Johnson Creek and the tributary fill a large pond above the wetland. The pond has been created by a large beaver dam at the top of the creek on the TWC property. The creek flows from this pond, down the south side of the east wetland. It passes through a culvert beneath Barnes Road and continues along the south side of the center wetland. Then, it passes beneath the paved path in a culvert and continues along the south side of the west wetland. It flows away from the wetland into a culvert beneath I-26. In addition to the creek, a drainage ditch runs along the north side of the east wetland, flowing under Barnes Road in a culvert into the north corner of the center wetland from which it is discharged into the pond of the west wetland.

The mitigated wetlands were created as a series of ponds through which water flows via connecting rip rap channels. At the up-stream end (east) of the system, water from the creek is diverted out of the channel into the pond system. The water flows through the ponds and is piped back into the creek beneath the path, before it enters the Barnes Road culvert. Water enters the center wetland via the drainage ditch culvert under Barnes. The center wetland is also a series of concentric arch-shaped ponds through which water passes. At the down gradient side (west) of the center wetland, the water enters two pipes that carry it beneath the paved path. An outfall discharges this water into the large pond of the west wetland. A small channel at the southwest end of the pond allows water to return to the creek before it enters the culvert beneath I-26.

## **VEGETATION MANAGEMENT**

### **Goals**

1. Preserve natural resource and functional values of the wetland, including bio-diversity of local native vegetation communities, habitat, aesthetic, educational, flood control, water quality and all other values provided by urban wetlands.
2. Restore and enhance those resource and functional values of the wetland by continued invasive weed control and revegetation with native plants.

### **Existing Vegetation**

Vegetation was monitored in the late Spring of 2005 by the TWC land steward. The purpose of mapping vegetation is to document the extent of common plant species (weeds and desirable plants) in the wetland. The monitoring and mapping was used to produce the aerial photograph map with outlines of management zones and the percent cover of species within each management zone. These two tools may be used to track changes in vegetation from year to year. Tables 1 and 2 below contain the results of the vegetation monitoring (the tables also includes management tasks by management zone).

Wetland managers can either use GPS to collect spatial data on the plant populations, or make visual assessments of the percentage within a management zone. For the 2005 management plan, the vegetation was monitored using visual assessments and aerial photographs. The land steward walked the site with aerial photographs of the wetland overlaid with management zone boundaries, observing each management zone and visually estimating percent cover of dominant species. Each management zone was surveyed separately so that percent cover estimates could be collected for each species type. Vegetation was identified and the approximate canopy or ground cover estimated. The lowest value recorded was 5%. When other species were present, but not in large enough populations to be estimated the term "other" was used.

### **Management History**

There have been numerous small scale invasive removal and native revegetation projects throughout the wetland in the past several years. In the past two years, invasive removal projects typically involved teasel and thistle removal throughout the east wetland and reed canarygrass weed whipping throughout the property. Revegetation occurred along the south side of the pond and on the island in the west wetland, as well as on either side of the path and creek in the east wetland. Willow stakes were also planted in the reed canarygrass of the center wetland. Willows and other natives were planted along the creek in the center wetland in 2004 and 2005.

### **Non-native Invasive Weed Management Strategy**

#### **Introduction**

Weed control is part of the overall site management and restoration program. The focus is to establish native communities in place of the weed species, rather than simply eliminating weeds. Preventative programs should be implemented to keep the site free of species that are not yet

established, but which are known to be pests elsewhere in the region. Priorities should be set for the control or elimination of weeds that have already established on the site, according to their actual and potential impacts on native species and communities.

### Strategies

An adaptive management strategy will be used. This process includes the following steps:

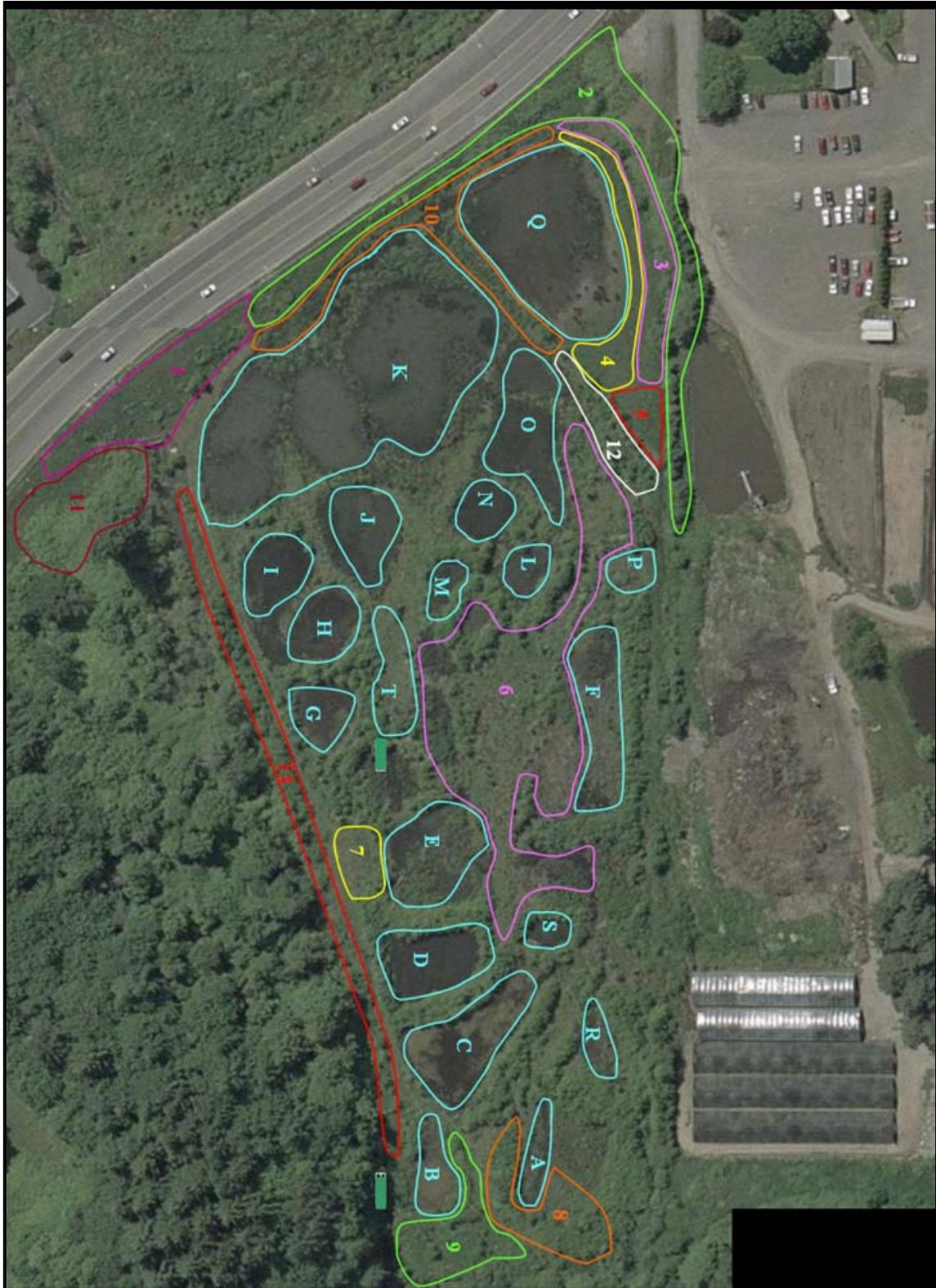
- Establish and record the goals for the site.
- Identify species that inhibit the goals and assign them priorities based on the severity of their impacts.
- Consider methods for controlling them or otherwise diminishing their impacts and, if necessary, re-order priorities based on likely impacts on target and non-target species.
- Develop invasive weed control plans based on this information.
- Implemented the plan and monitor results of management actions.
- Evaluate the effectiveness of the methods in light of the site goals, and use this information to modify and improve control priorities, methods and plans.
- Start the cycle again by establishing new/modified goals.

### Weed Management Plans and Schedule

#### Wetland Integrated Weed Management Plan

In addition to the results of vegetation monitoring, Tables 1 and 2 below contain the Cedar Mill Wetland Integrated Weed Management Plans. They provide a site specific set of instructions for actions that should be taken at different locations in the wetland, as well as the month of the year or season in which the action should be taken. Figures 7 and 8 delineate the management zones, which relate to the Table 1 and 2 management tasks. The wetland manager should use the tables and figures to implement the Integrated Weed Management Plan. The maps and tables focus on the management of the three dominant weeds at Cedar Mill: teasel, reed canarygrass and Himalayan blackberry. Tables should be updated in the future as monitoring documents the changes in vegetation populations. If another weed becomes a significant management issue, it should be added to the maps and management plans in the tables.

**It is critical to note that the weed management plans below do not address weeds present in smaller populations. New weeds or small populations will constantly be present or arriving in the wetland. The manager should walk the site every month or two searching for small or new invasive weed populations. Although they are not included in the tables below, these populations must be managed aggressively as part of the vegetation management tasks. Small populations should be dealt with as high priority weeds – to be immediately and thoroughly eliminated so that they do not become well established or spread. Examples of such weeds are purple loosestrife, Scots broom, lotus, yellow iris, knapweed, and thistles.**



**Figure 7. East Wetland Management Zones**

(Numbers = Management Zones; Letters = Pond Management Zones)

**Table 1. East Wetland Vegetation and Management Tasks**

East Wetland Vegetation			
Management Zone	Percent cover	Species	
		Common Name	Scientific Name
1	85	Grasses	
	5	Fir trees (planted Fall 2004)	
	5	Himalayan blackberry	
	5	Reed canarygrass	
<p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die</p> <p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p> <p><b>TSL – May through June</b> - Hand pull entire plant with roots. <b>June through the Fall</b> any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</p>			
2	80	Himalayan blackberry	
	10	Grasses	
	5	Scots broom	
	5	Ash	
<p><b>HBB – April through Sept</b> cut back shoots at the edge of patch to prevent spread into the wetland. These large patches in the buffer are too big to manually remove, but if possible hire contractors to remove them.</p>			
3	90	Reed canarygrass	
	5	Rush	
	5	Rice cutgrass	
<p><b>RCG</b> - Mow before seeds mature in <b>April and August</b>; Install plastic in <b>Spring 2006</b>, leave in place until at least the <b>Fall of 2007</b></p> <p><b>HBB - April through September</b> – any spreading from Zone 2 - Cut shoots, Dig out roots and dispose off site all year</p> <p><b>TSL – May through June</b> - Hand pull entire plant with roots. <b>June through the Fall</b> any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</p>			

4	80	Rush	
	10	Reed canarygrass	
	10	Rice cutgrass	
<b>RCG - In April and August - Mow before seeds mature</b>			
5	60	Reed canarygrass	
	40	Teasel	
<p><b>TSL – May through June - Hand pull entire plant with roots. June through the Fall any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</b></p> <p><b>RCG - In April and August - Mow before seeds mature.</b></p>			
6	65	Rush	
	10	Rose	
	5	Ash	
	5	Alder	
	5	Willow	
	5	Reed canarygrass	
	5	Teasel	
<p><b>TSL – May through June - Hand pull entire plant with roots. June through the Fall any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</b></p> <p><b>RCG - Satellite patches should be hand dug and eliminated from March through Sept.; Any not hand dug - Mow before seeds mature in late April and August.</b></p>			
7	80	Grasses	
	10	plantings	
	5	Fir (on either side)	
	5	Teasel	
<p><b>TSL – May through June - Hand pull entire plant with roots. June through the Fall any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</b></p>			
8	95	Willow	
	5	Other	
<p><b>HBB - March through September – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</b></p> <p><b>RCG - Satellite patches should be hand dug and eliminated from March through Sept.; Any not hand dug - Mow before seeds mature in late April and August.</b></p>			

9	90	Reed canarygrass	
	5	Common rush	
	5	Spirea	
<b>RCG - In April and August - Mow before seeds mature.</b>			
10	90	Reed canarygrass	
	5	Rush	
	5	Other	
<b>RCG - In April and August - Mow before seeds mature.</b>			
11	95	Himalayan blackberry	
	5	Other	
<b>HBB - During April through Sept cut shoots to contain the population and prevent spread into wetland</b>			
12	20	Alder	
	15	Pine	
	10	Rush	
	10	Rose	
	5	Teasel	
	5	Reed canarygrass	
	35	Other	
<b>TSL – May through June - Hand pull entire plant with roots. June through the Fall any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</b>			
<b>RCG - March through Sept satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late April and again in August.</b>			

13	60	Alder	
	5	Rose	
	5	Spirea	
	5	Fir	
	5	Willow	
	5	Himalayan blackberry	
	5	Reed canarygrass	
	5	Teasel	
	5	Rush	

**RCG - April and August** - mow before seeds mature to prevent spread

**HBB - March through September** – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.

**TSL – May through June** - Hand pull entire plant with roots. **June through the Fall** any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.

**East Wetland Ponds (Vegetation in and around ponds):**

Pond Management Zone	Percent Cover	Species	
		Common name	Scientific Name
A	75	Willow	
	10	Slough sedge	
	5	Spirea	
	5	Dogwood	
	5	Reed canarygrass	

**HBB - March through September** – Pull or dig out roots of any satellite patches – make sure they are placed where they will die

**RCG - March through Sept** satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late **April** and again in **August**.

B	40	Willow	
	30	Dogwood	
	10	Ash	
	5	Rush	
	5	Spirea	
	5	Alder	
	5	Reed canarygrass	

**RCG - April and August** - mow before seeds mature to prevent spread.

**HBB - March through September** – Pull or dig out roots of any satellite patches – make sure they are placed where they will die

C	85	Alder	
	5	Rush	
	5	Willow	
	5	Dogwood	
	5	Spirea	
	5	Rose	

**HBB - March through September** – Pull or dig out roots of any satellite patches – make sure they are placed where they will die

**RCG - March through Sept** satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late **April** and again in **August**.

D	85	Alder	
	5	Rush	
	5	Willow	
	5	Dogwood	
	5	Spirea	
	5	Rose	

**HBB - March through September** – Pull or dig out roots of any satellite patches – make sure they are placed where they will die

**RCG - March through Sept** satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late **April** and again in **August**.

E	85	Alder	
	5	Rush	
	5	Willow	
	5	Dogwood	
	5	Spirea	
	5	Rose	
<p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die</p> <p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p>			
F	85	Alder	
	5	Rush	
	5	Willow	
	5	Dogwood	
	5	Spirea	
	5	Rose	
<p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die</p> <p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p>			
G	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			

H	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
I	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
J	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
K	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			

L	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
M	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
N	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
O	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			

P	35	Rush	
	30	Alder	
	20	Reed canarygrass	
	15	Willow	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
Q	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
R	70	Rush	
	25	Alder	
	5	Willow	
<p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p> <p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			
S	85	Alder	
	5	Common rush	
	5	Willow	
	5	Dogwood	
	5	Spirea	
	5	Rose	
<p><b>HBB - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die</p> <p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p>			

T	75	Rush	
	10	Reed canarygrass	
	5	Spirea	
	5	Willow	
	5	Alder	
<p><b><u>RCG</u> - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b><u>HBB</u> - March through September</b> – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.</p>			



Figure 8. West and Center Wetland Management Zones

**Table 2. West and Central Wetland Vegetation and Management Tasks**

<b>West and Central Wetland Vegetation:</b>			
<b>Management Zone</b>	<b>Percent cover</b>	<b>Species</b>	
		<b>Common Name</b>	<b>Scientific Name</b>
1	95	Rush	
	5	Other	
2	80	Willow	
	20	Other	
3	90	Dogwood	
	10	other	
4	60	Foxtail	
	10	Rose	
	5	willow	
	5	Oregon grape	
	5	Cedar	
	5	Fir	
	5	Alder	
	5	Reed canarygrass	
<p><b>RCG - March through Sept</b> satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late <b>April</b> and again in <b>August</b>.</p> <p><b>TSL - May through June</b> - Hand pull entire plant with roots. <b>June through the Fall</b> any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</p>			
5	85	Alder	
	15	Reed canarygrass	
<p><b>RCG - April and August</b> - mow before seeds mature to prevent spread.</p> <p><b>TSL - May through June</b> - Hand pull entire plant with roots. <b>June through the Fall</b> any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.</p>			

6	60	Foxtail	
	10	Rose	
	5	Willow	
	5	Oregon grape	
	5	Cedar	
	5	Fir	
	5	Alder	
	5	Reed canarygrass	
<b>RCG - April and August</b> - mow before seeds mature to prevent spread.			
7	80	Willow	
	20	Reed canarygrass	
<b>RCG - April and August</b> - mow before seeds mature to prevent spread.			
8	90	Ash	
	10	Other	
9	95	Himalayan blackberry	
	5	Other	
10	90	Grass	
	10	Other	
11	40	Alder	
	40	Willow	
	10	Cattail	
12	60	Willow	
	30	Alder	
	5	Fir	
	5	Dogwood	

<b>Center Wetland (C) Vegetation:</b>			
<b>Management Zone</b>	<b>Percent cover</b>	<b>Species</b>	
		<b>Common Name</b>	<b>Scientific Name</b>
13	40	Willow	
	20	Rush	
	20	Rose	
	10	Alder	
	5	Cattail	
	5	Other	
14	60	Reed canarygrass	
	35	Willow	
	5	Rush	
15	70	Fir	
	20	Alder	
	10	Other	
16	30	Willow	
	30	Reed canarygrass	
	15	Alder	
	10	Spirea	
	10	Himalayan blackberry	
	5	Dogwood	
<b><u>HBB</u> - March through Sept cut shoots to prevent spread - dig roots when practical</b>			
17	85	Reed canarygrass	
	10	Willow	
	5	Other	
<b><u>RCG</u> - April and August - mow around natives to prevent loss of plantings, also mowing before seeds mature to prevent spread.</b>			

Priorities

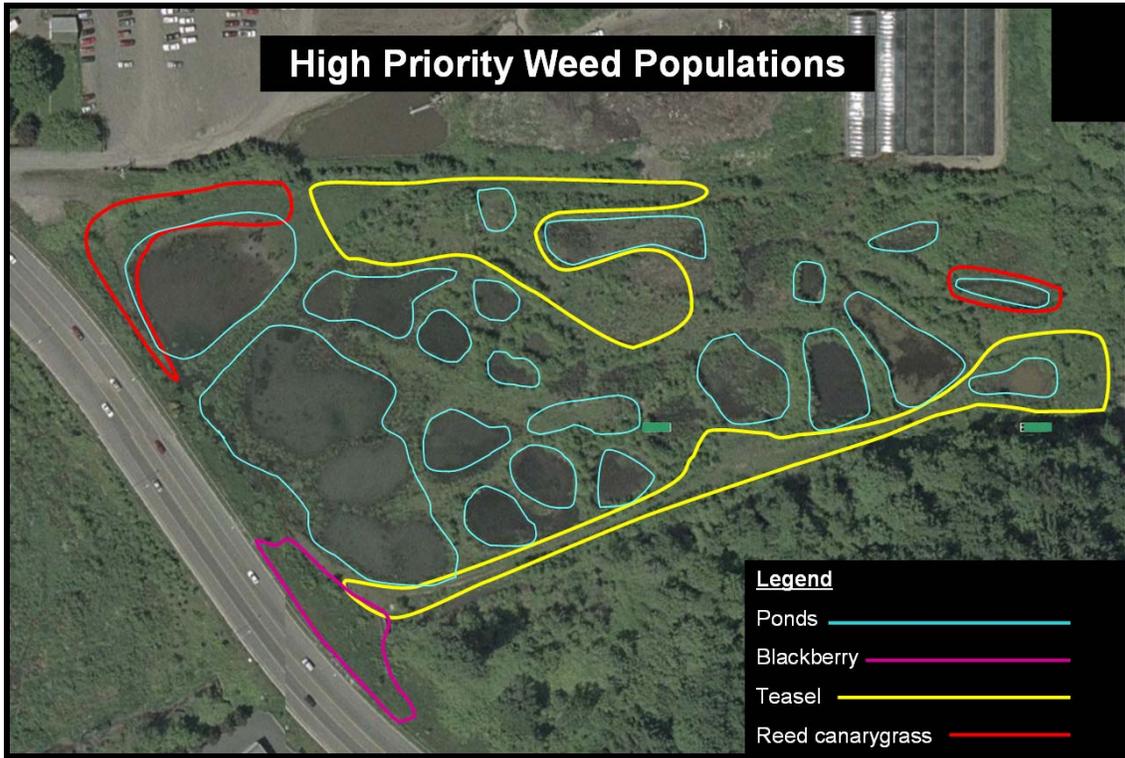


Figure 9. High Priority Invasive Weed Populations on East Wetland

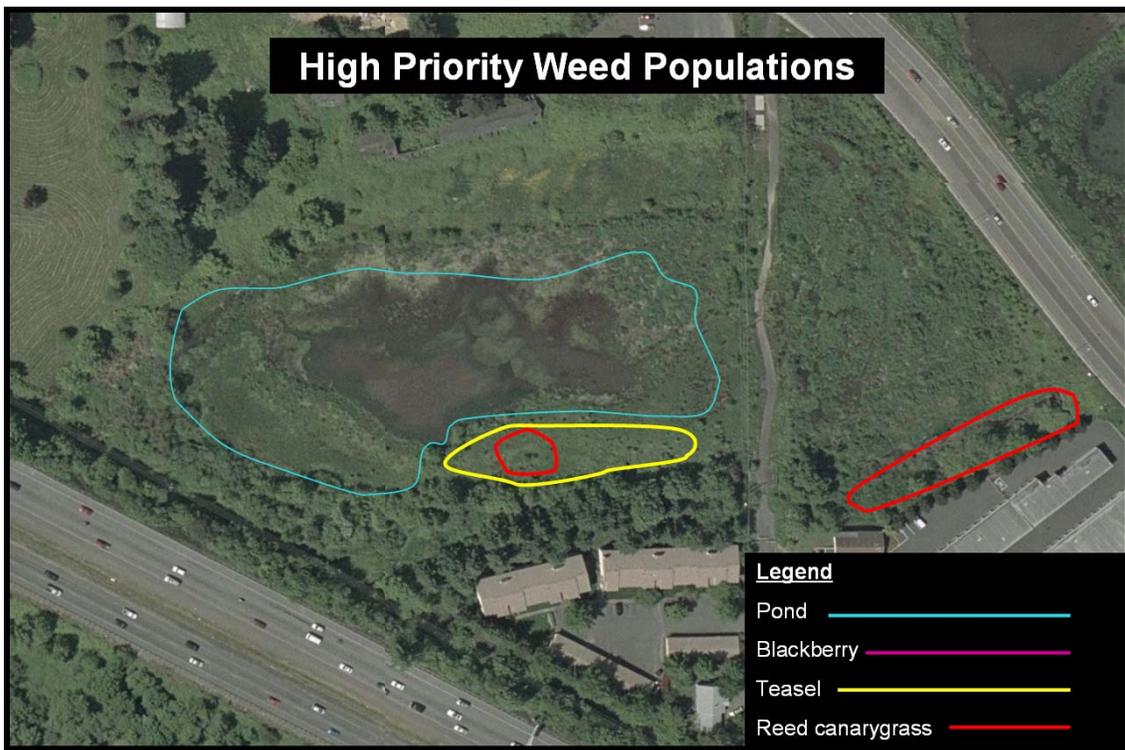


Figure 10. High Priority Invasive Weed Populations on Center and West Wetlands

High priority weed populations are those most in need of treatment. For example, teasel is spread throughout the wetland, however the locations indicated on the maps above are the areas in which teasel infestation should be immediately addressed due to many factors used to determine priority (see below). Similarly, reed canarygrass and blackberry are also spread throughout the wetland. The priority populations indicated above are those in most need of weed management actions. The Weed Management Tasks and Schedule tables are designed to address current priorities. The two High Priority maps above are only for general visualization. Instructions in the Weed Management Tasks and Schedule should be followed by the property manager.

Priorities are set in order to minimizing the total, long term workload. Therefore, it is important to prevent new infestations and assign highest priority to existing infestations that are the fastest growing, most disruptive, and affect the most highly valued area(s) of the site. The difficulty of control should be considered, giving higher priority to infestations that are most likely to be controlled with available technology and resources. Species listed in order of highest to lowest priority based on:

- Current extent
- Current and potential impacts
- Value of habitats/areas the species could impact
- Difficulty of control and replacing displaced species
- Degree of infestation

Note: The “degree of infestation” can be used to decide on site specific management actions throughout the wetland based on the following three degrees:

- Established core infestations – mow or manual removal before seeding to contain
- Satellites – eradicate with mowing, manual removal and mulching/solarization – plant native plants to prevent re-infestation
- Un-infested areas – monitor, determine vectors and block them, avoid allowing “safe sites” for weeds like open disturbed soil

## **Enhancement of Native Plant Communities**

### Introduction

Planting of native species will be used as a strategy to enhance the native wetland vegetation desired at Cedar Mill Wetland. As non-native species cover is reduced, native plant species will be planted to restore these areas to the desired native communities. Additionally, plantings will be needed to maintain the desired communities as changes occur to the area. Separate plant communities within the management areas have been identified and plant lists will be established for these areas. Table 3 below lists species, time to plant and location (as denoted in Figure # above) in the wetland. The wetland manager should use this table to guide revegetation. As these plantings become established, and monitoring of vegetation proceeds in the following years, the Planting Plan and Schedule should be updated. Managers should chose future sites for

revegetation and enhancement based on the priorities and goals outlined in this document, and based on results of monitoring changes in the vegetation throughout the wetland.

#### Priorities

Plantings will be implemented based on the need for enhancement from the criteria below.

- Areas devoid of vegetation from removal of invasive species.
- Buffer and Riparian communities generally lacking or devoid of vegetation.
- Areas in need of supplemental plantings to support the community.
- Reintroduction of rare or endangered species.

Planting Plan and Schedule:

**Table 3. Planting Schedule (Refer to Figures 7 and 8 Management Zones)**

<b>Mgmt. Zone</b>	<b>Location specifics</b>	<b>Species</b>	<b>Common Name</b>	<b>When to plant</b>	<b>Comments</b>
East 1, 2, 11	After removal of HBB		Fir, maple, alder	Fall-Winter	Only plant if HBB removal is adequate
East 3	After RCG solarization		Willow	Fall-Winter	After RCG is eliminated by solarization
East 4, 10	After RCG satellite removal		Rush, rice cutgrass	Fall-Winter	
East 9			Willow	Fall-Winter	Cuttings in/around beaver pond and shallow water
East K	Mudflats		Willow, rush, rice cutgrass, sedge	Fall-Winter	Once mudflats re-establish from pond water level lowering
West 4, 5, 6			Rose, willow, maple, fir, ninebark, Oregon grape, dogwood, other	Fall-Winter	Especially where RCG satellites are eliminated
Center 14, 17	Throughout RCG patches		Willow	Fall-Winter	Use tall cuttings in RCG patches

**Table 4. Supplemental Calendar for Management Tasks (See code key below)**

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>HBB S</b>			X	X	X	X	X	X	X			
<b>HBB C</b>				X	X	X	X	X	X			
<b>RCG S</b>			X	X	X	X	X	X	X			
<b>RCG C</b>				X				X				
<b>TSL E</b>					X	X						
<b>TSL L</b>						X	X	X	X	X		
<b>Water Plantings</b>						X	X	X	X			
<b>Mulch</b>				X								
<b>Monitor</b>								X	X			
<b>Revegetate/ Plant</b>										X	X	X

Code Key:

**HBB S** - Blackberry Satellites - March through September – Pull or dig out roots of any satellite patches – make sure they are placed where they will die.

**HBB C** – Blackberry Core Infestations - During April through Sept cut shoots to contain the population and prevent spread into wetland

**RCG S** - Reed canarygrass Satellites - March through Sept satellite patches should be hand dug and eliminated. Any not hand dug - Mow before seeds mature in late April and again in August.

**RCG C** - Reed canarygrass Core Infestations - April and August - mow before seeds mature to prevent spread.

**TSL E** - Teasel early enough to hand pull roots – non-mature seed heads - May through June - Hand pull entire plant with roots.

**TSL L** – Teasel late in the season with mature seed heads or too large to hand pull roots - June through the Fall any plants not pulled must be cut before seeds mature. If seeds are mature already, cut and bag seeds heads to dispose off site.

**Monitoring**

The monitoring goal is to record site observations and changes in vegetation in order to provide records from which the management plan can be updated. Monitoring will occur once a year in the late Summer or Fall. The information will be used to update the vegetation management section of this plan. Monitoring data should be collected and used to update the maps and tables in the Vegetation Management section of this document. A comparison of the previous year and

current year results should be used to update the Priorities, Weed Management Tasks, Planting Plan, and Goals (if necessary). Methods for vegetation monitoring are described below.

The vegetation management plan should be developed with the goals of preserving and enhancing the existing native plant communities. The focus of management will be in restoration of native plant communities by increasing their population size, and also in the mechanical removal of invasive weeds. Vegetation management is an ongoing process, especially when it involves controlling the spread of invasive species. It may take years to control or eradicate some species, so the purpose of this management plan is to document changes over time and help land managers prioritize where to focus treatment. This section describes methods for monitoring, organizing a yearly schedule, treatment methods and criteria for writing a yearly monitoring report. This system was designed to be an efficient means of organizing management strategies on a year to year basis.

### Mapping vegetation

The purpose of mapping vegetation is to document the extent of plant species (weeds and native plants) in the wetland. This process will produce two tools for tracking changes in vegetation from year to year. The first tool is the aerial photograph map with outlines of weed populations. The second tool is a numerical value of the percent cover of a species within a management zone. Since the wetland has been broken down into management zones, we calculate the percentage of species within each zone. Wetland managers can either use GPS to collect spatial data on the plant population, or make visual assessments of the percentage within a management zone.

**Mapping with GPS:** Spatial data is collected using an GPS unit. Map the approximate cover of populations by collecting spatial data (GPS points) to outline population boundaries in the wetland. The GPS spatial data should then transferred into a GIS map. Use the GIS tools for area measurement to measure the size of a population. Measure the area for the management zone in which the population is located. The cover for each species is then divided by the total area of the management zone in which it is located. The resulting number is a percent cover estimate for that species within that management zone.

**Mapping with Visual Assessment:** If GPS equipment is not available, a visual assessment of percent cover of a population within a management zone can be made by the wetland manager. Each management zone should be surveyed separately so that percent cover estimates can be collected for each species type. Surveys should be conducted by walking the length of each management zone a few times. While walking, the surveyor should visually scan approximately 10-20 feet to the left and right side of the walking route (similar to a transect). Weed populations should be identified and the approximate canopy or ground cover estimated. The cover estimates should be made by zone. Since some of the zones may be large in area, it may be useful to use a copy of the aerial photograph with management zone divisions in the field, so that the surveyor can draw approximate population locations and sizes onto the site map. This will make the total zone cover estimates easier to visualize.

If GIS is not available, the surveyor can estimate and record percentage cover of each species within each management area. If GIS is available, the surveyor should draw an outline around

weed populations on the aerial photo and label species and percentage while in the field. Shape files can later be added to the GIS map manually. Then the GIS area tool can be used to calculate percentage area of each population within a management area.

---

***Note: The following section is a work in progress – if used, calculate the values and present the priority results in a tabular form with a brief discussion of the results and how the priority list is used to modify the weed management table for the following year. You may also include the sections below to document the methods used to prioritize.***

Formula for prioritizing which management zone needs attention

The following is an equation that was developed to prioritize management zones by giving them a numeric value. This value is unit-less and should only be used as a guide for organizing management. Zones with higher numeric values have a larger amount of invasion by weed species. Once each zone priority value is calculated, they can be organized in descending order of numerical value to rank them in priority. The higher the zone priority value, the higher rank a zone will have.

**Zone Priority Value =**

**(zone size multiplier) x (weed value a + weed value b + weed value c...)**

- Zone Size Multiplier:

A zone size multiplier is developed for each zone based on the total area (m<sup>2</sup>) of each zone. The area for each zone in m<sup>2</sup> is divided by ten to produce the zone size multiplier value. This is done to reduce the size of the final zone priority values calculated, making the numbers easier to work with. The zone priority value is a unit-less number, so reducing it by a factor of ten for each zone will have no effect on their final priority ranking. The zone size multiplier is used in the final calculation to calculate a zone's priority value because it incorporates the size of the zone and the amount of weed invasion into the final value.

- Weed Values = (Species classification value) x (cover class) + (# of populations)

*(Note: The weed classification value should be calculated for as many species as are present in the zone)*

- Species Classification Value = value based on Criteria for classifying weeds:

Detrimental Effects:

1. A plant species that causes or has the potential to cause severe native vegetation losses or has an expensive control cost.
2. A plant species that is or has the potential to endanger native flora and fauna by its encroachment onto the site.
3. A plant species that is poisonous, injurious, or otherwise harmful to humans and/or animals.

Plant Reproduction:

1. A plant that reproduces by seeds capable of being dispersed over wide areas or produces a large number of seeds that can persist in the seed bank for long periods of time.
2. A plant species that reproduces by tubers, creeping roots, stolons, rhizomes or other natural vegetative means.

Difficulty of Control:

1. A plant species that is not easily controlled with current management practices. (physical methods, solarization, natural herbicide)

Distribution:

1. A weed which occurs on the site in small enough infestations to make eradication/containment possible; or not known to occur, but its presence on neighboring properties makes future occurrence seem imminent.
2. A weed which has not infested the full extent of its potential habitat on the site.

The value for each plant species is derived based on the number of criteria it meets when evaluating each of the classification criteria listed above. Weeds are classified based on the number of criteria they satisfy. The more criteria a species meets, the higher a rank it will receive in this system.

<u>Criteria Met</u>		<u>Rank Multiplier</u>
Meets distribution criteria #1	=	16
Meets at least five criteria	=	8
Meets four criteria	=	4
Meets three criteria	=	2
Meets two criteria	=	1

- Cover Class = The percentage cover of each species (based on vegetation mapping as described above) present in a management zone can be translated into a Cover Class value. The following system is used to convert percentage into five class values. Use the % below to determine a class value:

<u>% Cover</u>		<u>Cover Class</u>
1-5 %	=	1
5-25 %	=	2
25-50 %	=	3
50-75 %	=	4
75-100 %	=	5

- # of Populations = count number of separate populations of a species within the management zone

Once the Zone Priority Value has been calculated for each Management Zone, they can be put in order of highest to lowest priority. This list can be used to update the High Priority Invasive Weed maps and the management tasks table.

### **Contingency Plans**

The current level of management should meet the needs of the existing weed infestations. The weed control methods described in the Integrated Weed Management task tables (Tables 7 and 8) should be used to keep existing infestations from spreading, and to reduce the presence of weeds throughout the wetland. If new weed species are discovered in the wetland, the same methods can be expanded to manage them, or other currently accepted methods for the specific species can be implemented. The management tasks of this plan are designed to be conducted throughout the year by a part time employee with the periodic assistance of volunteers. As the management tasks set out in the table are implemented the current weed problems should be reduced. Thus, any increase in weed infestation will trigger modifications of Tables 7 and 8 to control the spread or introduction of weeds.

### **Periodic Review of Vegetation Management Plan**

Based on the results of yearly monitoring, the Tables 7 and 8 should be modified. The modifications should aim to keep abreast of changing weed infestations, and to continue the gradual process of weed removal coupled with re-vegetation. The modifications should take place yearly in the late Fall or early Winter, or after the results of monitoring are reviewed in relation to the previous years.