# CITY OF MEDFORD URBAN RESERVE LOCAL WETLANDS INVENTORY REPORT JACKSON COUNTY, OREGON

Prepared for

**The City of Medford Planning Department**
200 South Ivy Street
Medford, Oregon 97501

Prepared by

**SWCA Environmental Consultants**
1220 SW Morrison Street, Suite 700
Portland, Oregon 97205
503.224.0333
www.swca.com

September 2015

SWCA Project No. 31802

# CONTENTS

**1. Introduction ... 3**
**2. General Description of the Study Area ... 3**
2.1. Landscape Setting, Topography, and Land Use ... 3
2.2. Watershed ... 4
2.3. Climate, Precipitation, and Growing Season ... 5
2.4. Sensitive Species ... 6
2.5. Water Quality ... 7
2.6. Soils ... 7
2.7. Vegetation ... 8
**3. Wetland Inventory Process and Methodology ... 9**
3.1. Public Involvement ... 9
3.2. Inventory Methodology ... 9
3.2.1. Off-Site Inventory Procedures ... 10
3.2.2. On-Site Inventory Procedures ... 10
3.3. Wetland Assessment ... 11
3.3.1. The Oregon Freshwater Wetland Assessment Methodology ... 11
3.3.2. Wetlands of Special Interest for Protection ... 12
3.4. Mapping and Map Transfer Procedures ... 12
**4. Local Wetland Inventory Results ... 14**
4.1. Study Area Summary ... 14
4.2. Oregon Freshwater Wetland Assessment Ranking ... 17
4.3. Locally Significant Wetland Criteria ... 18
4.4. OFWAM, LSW, and Wetlands of Special Interest for Protection Results ... 19
**5. Literature Cited ... 22**
5.1. Literature Cited in this Report ... 22
5.2. Other Literature and Data of Interest ... 23
5.2.1. Websites ... 24

# APPENDICES

**Appendix A.** Oregon Local Wetlands Inventory Administrative Rules
**Appendix B.** Abbreviations and Definitions
**Appendix C.** Vegetation List and Sampling Plot Data Forms
**Appendix D.** Wetland Summary Sheets
**Appendix E.** OFWAM Wetland Characterization Questions, Function Answer Sheets, and Function and Condition Summary Sheets
**Appendix F.** Maps and Figures
Figure A. Project Location
Figure B. Index Map for Figure Series C (Soil maps), D (Topography maps), and E (NWI and County Hydrography Maps)
Figure Series C. NRCS Soil Maps
Figure Series D. USGS Topography Maps
Figure Series E. NWI and Hydrography Maps
Figure Series F. Index map and Drainage Basin Guide; and LWI Maps
**Table F1.** Figure Number Index for Figure Series F
**Appendix G.** Staff Qualifications
**Appendix H.** Example Landowner Letter

# TABLES

**Table 1.** Key to Drainage Basin Codes ..... 4
**Table 2.** Assessed Rainfall for the Preceding 3-month Period, Medford Airport Weather Station ..... 5
**Table 3.** Rare, Threatened, and Endangered Flora and Fauna Records within 2 Miles of the Study Area ..... 6
**Table 4.** Hydric Soils, Soils with Hydric Inclusions, and Non-hydric Soils in the Study Area (by map unit number and name) ..... 7
**Table 5.** Mapping Data Layers Used for Development of the Local Wetland Inventory ..... 12
**Table 6.** Local Wetlands Inventory Spatial Layers Included in the Georeferenced Database ..... 13
**Table 7.** Summary of Wetlands Delineated within the Study Area ..... 14
**Table 8.** Types of Wetlands in the Study Area ..... 17
**Table 9.** Key to OFWAM Ranking ..... 18
**Table 10.** Criteria for Determining Goal 5 Locally Significant Wetlands ..... 18
**Table 11.** OFWAM Rankings, LSW Determination, and Wetlands of Special Interest for Protection Results ..... 20~~19~~

# 1. INTRODUCTION

SWCA Environmental Consultants (SWCA) conducted a local wetlands inventory (LWI) for the Urban Reserve portions that are being considered for inclusion in the City of Medford's Urban Growth Boundary (UGB). An LWI is a systematic survey of a large geographic area to locate and map wetlands, classify them by type, and evaluate their function and value. This study builds upon an earlier LWI conducted for the city (Wetland Consulting 2002).

This report documents the LWI for the City of Medford urban reserve study area in Jackson County, Oregon. The inventory was conducted according to standards and guidelines outlined in the Department of State Lands (DSL) Oregon Administrative Rules (OAR) 141-086-0180 through 141-086-0390 (Appendix A). Inventory methods included a mixture of on-the-ground surveys and remote sensing. A list of abbreviations used in this study and selected definitions are included in Appendix B. The LWI wetland vegetation list as well as the data forms for each sample plot are provided in Appendix C. Appendix D provides the wetland summary sheets. The *Oregon Freshwater Wetland Assessment Methodology* (OFWAM) wetland characterization questions, function answer sheets, and function and condition summary sheets are provided in Appendix E. Maps of the LWI are provided in Appendix F, and staff qualification are in Appendix G. Appendix H provides an example landowner letter explaining the project and seeking permission for study area access.

SWCA determined the location and size of wetlands (with a required minimum threshold of 0.5 acre) throughout the study area, and grouped these wetlands into assessment units according to OFWAM guidelines. The quality and condition of assessment units were determined by applying the OFWAM and then determining whether wetlands were locally significant by applying the criteria outlined in OAR 141-86-300 through 141-86-350. This report presents the results of the wetland inventory and assessment as well as the identification of streams in the study area. Fieldwork took place in April and July 2015.

# 2. GENERAL DESCRIPTION OF THE STUDY AREA

The urban reserve study area comprises 6,428 acres of urban reserve areas in Townships 36, 37 and 38 South, Ranges 1 and 2 West, Jackson County, Willamette Meridian, Oregon. The study area comprises 11 labeled "MD" units surrounding the City of Medford's existing UGB in all cardinal directions except to the northwest. Study units MD-1 through MD-9 total 4,628 acres, and parklands (MD-Ps) Chrissy and Prescott total an additional 1,800 acres along the foothills on the eastern edge of the study area. Background maps for this project are included in Appendix F. (Figure A shows the project location, Figure B is an index map for the Figure Series C–E, Figure Series C shows the soil mapping, Figure Series D shows the topographic mapping, Figure Series E shows the National Wetland Inventory [NWI] and Jackson County hydrography maps, and Figure Series F includes the LWI maps.).

## 2.1. Landscape Setting, Topography, and Land Use

The City of Medford is in Jackson County, Oregon, southeast of Grants Pass, northwest of Ashland, along Interstate 5 and approximately 30 miles north of the California/Oregon border. Medford lies within the Klamath Mountain physiographic province (Franklin and Dyrness 1988), a complex of variously formed ranges with rugged, deeply dissected terrain. Medford is in the Bear Creek Valley and is bordered by the Siskiyou Mountains to the west and the Cascade Range to the east. Most of the study area is relatively flat and is on the valley bottom floor (see Figure Series D in Appendix F). Study area units to the east are on the foothills of the Cascade Mountains.

The existing City of Medford UGB includes 18,069 acres in which there are extensive commercial and residential developments. Within the urban reserve study area, large undeveloped areas dominate, ranging in elevation from 1,280 feet to 3,580 feet above sea level. Lands within the northern and southern portions of the study area are mostly grass, pasture, or abandoned orchards converted to pasture, many of which receive routine flood-irrigation throughout the irrigation season (April–October). Also included in the study area are extensive paved roads, light industrial use, residential use, and recreational use including the Centennial Golf Club and Prescott Park. Coker Butte and Roxy Ann Peak are located in the eastern portion of the study area.

Twenty-seven types of hydric and hydric-inclusion soils are mapped in the study area (see section 2.5). A number are characterized by high clay content, low water infiltration rates, and poor internal drainage.

## 2.2. Watershed

The City of Medford, and the majority of the study area is in the Middle Rogue unit of the Rogue River drainage basin (4$^{th}$-field/Hydrological Unit Code [HUC] 8, 17100308). A small eastern portion of the study area extends into the Upper Rogue HUC8, 17100307. Within the Middle Rogue unit of the study area are two 6$^{th}$-field/HUC12 watershed boundaries: Whetstone-Rogue River in the north (171003080202); and Larson Creek-Bear Creek in the south (171003080110). Within the Upper Rogue unit of the study area is the Lower Antelope Creek HUC12 (171003070811). Portions of eight local drainage basins are also present in the study area. Mapping of these basins was derived from the 2002 City of Medford LWI report (Wetland Consulting 2002) and provides a finer-scale watershed boundary for the dispersed study area units (See index Figure F, Appendix F). A key to the four relevant drainage basin abbreviations used for the study is provided in Table 1.

**Table 1.** Key to Drainage Basin Codes

| Drainage Basin Code | Drainage Basin Name |
|---|---|
| MWC | Midway Creek drainage basin (also known as Upton Slough) |
| BCS | Bear Creek South drainage basin |
| LSC | Larson Creek drainage basin |
| LPC | Lone Pine Creek drainage basin |

Swanson Creek, Larson Creek, and Bear Creek are the dominant hydrological features in the study area. Swanson Creek flows to Whetstone Creek north of Medford. Bear Creek flows northwest to the Rogue River and receives flow from Larson Creek, Lazy Creek, and a number of unnamed streams that cross the study area. Headwaters for Midway Creek (also known as Upton Slough) are located in the study area; however, most of the creek is located within the previously studied UGB. Gore Creek and Crooked Creek are Bear Creek tributaries located southwest of the Medford city limits; they run close to, but outside of, the study area.

Most ponds in the study area are artificial and are most likely maintained for farm and stock watering, and some residential use.

Many streams in the study area have been modified through channelization, underground piping, removal of riparian vegetation, and installation of water storage ponds. Medford Irrigation District, Rogue River Irrigation District, and Talent Irrigation District maintain an extensive network of irrigation and drainage ditches and canals throughout much of the study area, many of which connect with natural streams.

Irrigation features of significance include the Phoenix Canal in the southwest and the East Lateral Canal in the east.

Medford Irrigation District–stored waters include Fourmile Reservoir, Fish Lake, Hyatt Lake, Howard Prairie Lake, and Emigrant Lake (Medford Irrigation District 2015). Water delivery to users is achieved through the use of stream channels, irrigation canals, and ditches. The Medford Irrigation District's 2015 drought plan notes that irrigation water storage for 2015 is at 42% of full, with users facing a 30% usage reduction goal so that irrigation can continue through to late summer (Medford Irrigation District 2015). Flood-irrigation is a common practice in the study area and is evidenced by distinctive seasonal flood signatures on historical aerial imagery.

## 2.3. Climate, Precipitation, and Growing Season

Medford's climate is characterized by cool winters and hot summers. Average winter temperature is 40 degrees Fahrenheit (°F) with an average daily minimum of 32°F. Snowfall averages 4.8 inches annually. Summer temperatures average 70°F, with an average daily maximum of 87°F. Rainfall averages 18 inches per year (National Weather Service 2015). Summer rainfall is light, with more frequent rains from late fall through spring. Based on the wetlands climate analysis (WETS) table for the Medford Rogue Valley Airport, it is estimated that there is a 50% probability that the growing season begins on March 25 and ends on November 10 (lasting 230 days), for a temperature threshold of 28°F (Natural Resources Conservation Service [NRCS] 2015a). The *Corps of Engineers Wetlands Delineation Manual*, hereafter the 1987 Manual (Environmental Laboratory 1987) defines "growing season" as the portion of the year when soil temperature (measured 20 inches below the surface) is above biological zero (5 degrees Celsius or 41°F). This period "can be approximated by the number of frost-free days" (Environmental Laboratory 1987). Estimated starting and ending dates for the growing season are based on 28°F air temperature thresholds at a frequency of 5 years in 10.

During the month of April, the National Weather Service noted that temperatures remained on the cooler side of normal. Cold, wet fronts moved through the area during fieldwork on the 7th, and again on the 13th, after which high temperatures returned (as much as 10-15 degrees above normal). A high pressure system moved in at the end of April, triggering warmer than normal temperatures once again.

Table 2 provides a summary of rainfall measured at the Medford airport during the 3 months preceding fieldwork. Using the NRCS method of assessment, rainfall for the prior period was at the low end of normal.

**Table 2.** Assessed Rainfall for the Preceding 3-month Period, Medford Airport Weather Station

| Prior Month (most recent first) | | WETS Rainfall Percentile (inches) | | Measured Rainfall (inches) | Condition (dry, wet, normal) | Condition Value (1=dry, 2=normal, 3=wet) | Month Weight | Multiply Previous Two Columns |
|---|---|---|---|---|---|---|---|---|
| | | 30th | 70th | | | | | |
| 1st | April | 0.82 | 1.59 | 0.6 | Dry | 1 | 3 | 3 |
| 2nd | March | 1.21 | 2.23 | 1.45 | Normal | 2 | 2 | 4 |
| 3rd | February | 1.16 | 2.56 | 3.20 | Wet | 3 | 1 | 3 |
| | | | | | | | Sum* | 10 |

* Rainfall of prior period was drier than normal (sum is 6–9), normal (sum is 10–14), wetter than normal (sum is 15–18).

## 2.4. Sensitive Species

The Oregon Biodiversity Information Center (ORBIC) conducted a data system search on behalf of SWCA for rare, threatened, and endangered plant and animal records occurring within 2 miles of the study area on April 2, 2015 (Table 3). The Agate Desert Preserve and the Whetstone Savanna Preserve are within 2 miles of the study area and therefore account for a significant number of the potential sensitive species listed by ORBIC.

**Table 3.** Rare, Threatened, and Endangered Flora and Fauna Records within 2 Miles of the Study Area

| Common Name | Scientific Name | Federal/State Status |
|---|---|---|
| **Amphibians** | | |
| Foothill yellow-legged frog | *Rana boylii* | SOC/SC and SV |
| **Arthropods** | | |
| Franklin's bumblebee | *Bombus franklini* | SOC/-- |
| Vernal pool fairy shrimp | *Branchinecta lynchi* | LT/-- |
| **Birds** | | |
| Grasshopper sparrow | *Ammodramus savannarum* | --/SV |
| Lewis's woodpecker | *Melanerpes lewis* | SOC/SC |
| Tricolored blackbird | *Agelaius tricolor* | SOC/-- |
| **Fish** | | |
| Chinook salmon (southern Oregon//northern California coasts ESU, fall run) | *Oncorhynchus tshawytscha* | --/SV |
| Coho salmon (southern Oregon//northern California coasts ESU) | *Oncorhynchus kisutch* | LT/SV |
| Steelhead (Klamath Mountains Province ESU summer run, winter run) | *Oncorhynchus mykiss* | --/SC and SV |
| **Mammals** | | |
| Long-legged myotis | *Myotis volans* | SOC/SV |
| **Reptiles** | | |
| California mountain kingsnake | *Lampropeltis zonata* | SOC/SV |
| Western pond turtle | *Actinemys marmorata* | SOC/SC |
| **Vascular Plants** | | |
| Agate Desert lomatium/desert parsley | *Lomatium cookii* | LE/LE |
| Bellinger's meadow-foam | *Limnanthes floccosa* ssp. *bellingeriana* | SOC/SC |
| Big-flowered wooly meadow-foam | *Limnanthes pumila* ssp. *grandiflora* | LE/LE |
| Coral seeded allocarya/popcorn flower | *Plagiobothrys figuratus* ssp. *corallicarpus* | SOC/SC |
| Gentner's fritillaria/fritillary | *Fritillaria gentneri* | LE/LE |
| Southern Oregon buttercup | *Ranunculus austrooreganus* | --/SC |

*Notes*: ESU = Evolutionarily Significant Unit; SOC = species of concern; LT = listed threatened; LE = listed endangered; SC = state candidate; SV = state vulnerable.

Essential salmonid habitat (ESH) mapping for the study area was sourced from the DSL (2010) and includes Bear Creek, Larson Creek, and Lazy Creek.

## 2.5. Water Quality

Water quality data were sourced from the Oregon Department of Environmental Quality's (DEQ's) *1988 Statewide Assessment of Nonpoint Sources of Water Pollution* (DEQ 1988), and subsequent updates. The Oregon DEQ's 2012 integrated report and 303(d) database were also searched. Bear Creek is water quality–limited for temperature, sediment, and bacteria, and Larson Creek is water quality–limited for temperature and dissolved oxygen. Additional information was gathered from the Oregon Explorer Website.

## 2.6. Soils

Clay-textured soils are common on the alluvial fans and valley floor in areas surrounding Medford. These soils undergo considerable expansion and contraction with wetting and drying (Franklin and Dyrness 1988). Hydric soils, soils with hydric inclusions, and non-hydric soils mapped within the study area (NRCS 2012) are listed in Table 4 and shown on Figure Series C in Appendix F.

**Table 4.** Hydric Soils, Soils with Hydric Inclusions, and Non-hydric Soils in the Study Area (by map unit number and name)

| | |
|---|---|
| **Hydric Soils** | |
| 139A | Padigan clay, 0%–3% slopes |
| 141A | Phoenix clay, 0%–3% slopes |
| 35A | Cove clay, 0%–3% slopes |
| 76A | Gregory silty clay loam, 0%–3% slopes |
| **Soils with Hydric Inclusions** | |
| 6B | Agate-Winlo complex, 0%–5% slopes |
| 17C, 17E | Brader-Debenger loams, 1%–15%,15%–40% slopes |
| 23A | Camas-Newberg-Evans, 0%–3% slopes |
| 27B, 27D | Carney clay, 0%–3%, 5%–20% slopes |
| 28D, 28E | Carney cobbly clay, 5%–20%, 20%–35% slopes |
| 30E | Carney-Tablerock association, 20%–35% slopes |
| 33A, 33C | Coker clay, 0%–3%, 3%–12% slopes |
| 34B | Coleman loam, 0%–7% slopes |
| 43B, 43D | Darow silty clay loam, 1%–5%, 5%–20% slopes |
| 44E | Debenger-Brader loams, 15%–40% slopes |
| 61A | Foehlin gravelly loam, 0%–3% slopes |
| 112F | McMullin-Medco complex, 12%–50% slopes |
| 113E, 113G | McMullin-Rock outcrop complex, 3%–35%, 35%–60% slopes |
| 114G | McNull loam, 35%–60% slopes |
| 125F | Medco-McMullin complex, 12%–50% slopes |
| 127A | Medford silty clay loam, 0%–3% slopes |

**Table 4.** Hydric Soils, Soils with Hydric Inclusions, and Non-hydric Soils in the Study Area (by map unit number and name)

| | |
|---|---|
| 158B | Ruch gravelly silt loam, 2%–7% slopes |
| **Non Hydric Soils** | |
| 81G | Heppsie clay, 35%–70% slopes |
| 82G | Heppsie-McMullin complex, 35%–70% slopes |
| 146 | Pits, gravel |
| 186H | Tablerock-Rock outcrop complex, 35%–110% slopes |

* This table serves as a key for Figure Series C, Appendix F.

Hydric soils mapped in the study area are described as follows (NRCS 2015b):

- **Cove clay** (map unit 35A) is a deep, poorly drained soil on floodplains that formed in mixed alluvium from sedimentary and basic igneous rocks. The soil matrix color between 0 and 16 inches below ground surface (bgs) is typically very dark gray (10YR 3/1), with many fine distinct yellowish brown and dark reddish brown masses of iron accumulation. A seasonal water table occurs within 1 foot of the surface from December through June.
- **Gregory silty clay loam** (map unit 76A) is a deep, poorly drained soil on stream terraces that formed in recent alluvium from sedimentary and basic igneous rocks. The soil matrix color between 0 and 29 inches bgs is typically very dark grayish brown (10YR 3/2), with common distinct mottles occurring below 18 inches. A seasonal water table occurs within 1 foot below ground surface from December through May.
- **Padigan clay** (map unit 139A) is a very deep, poorly drained soil on alluvial fans and in basins that formed in clayey alluvium weathered from tuffs, breccias, and andesite. The soil matrix color between 0 and 25 inches bgs is usually very dark gray (2.5Y N3/0). The seasonal water table varies from 1 foot above to 0.5 foot below ground surface from November through May.
- **Phoenix clay** (map unit 141A) is a moderately deep, poorly drained soil on alluvial fans that formed in alluvium and colluvium from clayey sediments. The soil matrix color between 0 and 12 inches bgs is usually dark gray (10YR 4/1). A seasonal water table occurs within 0.5 feet below ground surface from December through May.

## 2.7. Vegetation

Historically, natural vegetation typical to the area includes oak woodland with a grass understory in drier areas, and hardwood riparian forests made up of cottonwood (*Populus* sp.), willow (*Salix* sp.), and alder (*Alnus* sp.) (Franklin and Dyrness 1988). Native vegetation communities in the Medford urban reserve areas have been altered by farming, grazing, and urban and light industrial development activities. Remnant native plant communities include Oregon white oak savanna on Roxy Ann Peak and on the foothills east of the study area, and riparian areas along Swanson Creek, Bear Creek, and in some locations along Larson Creek. Observed plant species associated with Medford urban reserve wetlands are listed in Table C1, Appendix C.

# 3. WETLAND INVENTORY PROCESS AND METHODOLOGY

## 3.1. Public Involvement

The City of Medford organized the public outreach efforts for this project. Letters explaining the project and seeking permission for study area access (Appendix H) were sent to all property owners whose tax lots 1) intercepted hydric soil layers and/or NWI mapped wetlands and streams, 2) showed a potential wetland signature in aerial photographs, or 3) provided key access to tax lots identified as having potential wetlands. Of the 265 private property parcels requested for access, 53 were accessed for survey; this number includes city-owned parcels and excludes parcels that were visually confirmed from adjacent access. The overall permission rate was 28%.

Public meetings were held in the Medford Carnegie Building, 413 West Main Street on March 18 and July 1, 2015, each from 5 to 7 p.m. A short overview of the LWI process was presented at the initial March 18 meeting. At the final public meeting on July 1, the draft results of the LWI were presented. Most of the time at each meeting was used to address questions from local landowners and the public. For each meeting, approximately 20 members of the public were in attendance.

## 3.2. Inventory Methodology

Wetlands are those areas that are inundated or saturated by surface water or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The OARs outline that both on-site and off-site inventory methods are employed to determine if a site contains wetland soils, hydrology, and vegetation. The methodology used for determining the presence of wetlands followed the 1987 Manual (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers' Wetland Delineation Manual for the Western Mountains, Valleys, and Coast Region, (Version 2.0)* (USACE 2010), as approved by both the USACE and DSL.

Following the technical approach outlined in the OARs, SWCA used existing data to build base maps to support the initial screening for potential wetlands in the study area, and to support the on- and off-site wetland determination work. Base maps included comprehensive hydrography data sourced from the NWI, Jackson County, the City of Medford, and DSL. Base maps also included aerial imagery, NRCS mapped hydric soils, Federal Emergency Management Agency (FEMA) 100-year floodplains, 2-foot contours derived from light detection and ranging (LiDAR) data, tax lots, and study area boundaries. Refer to Table 5 in section 3.4 for a complete list of base map resources used.

Following the approach described above, identified "potential" wetlands were defined as areas with mapped hydric soils, previously mapped wetland features (NWI, county, city, or DSL data), and aerial imagery that suggest the presence of wetland vegetation and/or saturation, ponding, or ditching. Additionally, aerial imagery layers were reviewed to interpret wetland types where visual confirmation was not possible.

County- and city-level hydrography data were reviewed and confirmed to incorporate NWI data and to provide more detailed local data (see Figure Series E, Appendix F). Where there were multiple previously mapped wetlands in one area, the most recent data layer was used. Where access was granted, available hydrography data were confirmed visually, or by collecting sample plot data. Over the course of the field surveys, efforts were made to ground-truth aerial interpretation wherever possible.

Dominant Cowardin (Cowardin et al. 1979) and hydrogeomorphic (HGM; Adamus 2001) classes and subclasses were identified for all mapped wetlands. Appendices B3 and B4 provide descriptions of Cowardin and HGM system classes. Observed water regime and special modifier codes are included in the Cowardin classification if they are known or could be approximated based on desktop review. For wetlands observed or estimated to contain multiple Cowardin classes greater than 0.25 acre in size, each classification was mapped and labelled as a separate wetland.

### 3.2.1. Off-Site Inventory Procedures

Where site access was not granted, wetlands were identified based on 1) the presence of wetland (hydrophytic) vegetation as documented in aerial photographs, or by binoculars from off-site viewing locations; 2) an aerial signature showing saturation or ponding (a hydrologic signature); 3) the presence of mapped hydric soils; or 4) the presence of a mapped wetland or water feature (referencing NWI, Jackson County, and City of Medford hydrologic data [existing data]). Off-site viewing locations included roads, public property, commercial parking lots, and private tax lots with access granted.

In accordance with DSL guidelines, off-site wetlands larger than 0.5 acre (approximately 148 × 148 feet) were mapped as polygons. Off-site wetlands less than 0.5 acre were labelled with a Probable Wetland (PW) point or in some cases mapped as a polygon if a previous delineation boundary was available in the existing data. In many cases where existing data were utilized, visual confirmation was not possible and therefore the dataset was not altered or refined. As a result, there are locations where mapping data do not accurately align with aerial imagery interpretations.

### 3.2.2. On-Site Inventory Procedures

Field surveys were conducted April 6–9 and 20–23, 2015, and selected sites were revisited on July 1, 2015. Where property access permission was granted, each potential wetland was verified with at least one sampling plot that best characterized the feature. Vegetation, soils, and hydrology were documented on standard USACE regional wetland determination data forms, additional notes were recorded in field log books, and each wetland was photographed. SWCA used a Trimble GeoExplorer XT global positioning system (GPS) unit to record the location of each sampling plot in the field. Field-collected data were downloaded into the LWI geodatabase using the industry standard Esri ArcGIS software, version 10.1.

In accordance with DSL guidelines, wetlands assessed on-site that were less than 0.5 acre in size were recorded with a PW point in the field, using a Trimble GPS. Wetlands confirmed to be larger than 0.5 acre were mapped as polygons using a combination of GPS and hand-sketched boundary lines on field base maps.

Each potential wetland where land-use activities such as ditching, water diversion, or agricultural practices had significantly altered site conditions were verified with at least one sampling plot. Any potential wetlands with unreliable indicators (e.g., a dominant plant that grows in both wetlands and non-wetlands, such as reed canarygrass, *Phalaris arundinacea*) were verified with at least one sampling plot. Any previously mapped wetlands no longer apparent were verified with a sampling plot.

All sampling plot data recorded on the USACE data forms are included in Appendix C. All sampling plot and PW point locations are shown on the LWI maps provided in Appendix F (Figure Series F). Refer to section 3.4 for a detailed description of mapping methods used.

# 3.3. Wetland Assessment

## *3.3.1. The Oregon Freshwater Wetland Assessment Methodology*

The OFWAM (Roth et al. 1996) was used to evaluate fish and wildlife habitat, water quality, and hydrologic control functions for each wetland assessment unit in the study area. Following OFWAM guidance, assessment units were established by grouping mapped wetlands based on their proximity, vegetation, and hydrologic characteristics (see Table 7 in section 4.1). Following the criteria outlined in OAR 141-086-0350, OFWAM results were used to identify Goal 5 Locally Significant Wetlands (LSWs). Where applicable, other measures to determine LSWs were implemented, as discussed later in this report. OFWAM and LSW results are used primarily for planning and educational purposes.

**Wetland Functions and Values**

Wetlands vary greatly by type and location; therefore, not all perform the same functions and not all are equally valued. Wetland assessment may involve one or all of the following aspects:

- **Functions**: The ecological processes in wetlands, such as nitrogen cycling
- **Values**: The societal importance attached to those functions, such as water quality improvement
- **Condition**: The degree to which a wetland is altered or degraded, generally by human impacts

The OFWAM uses indicators that allow an evaluation of the extent to which a specific wetland may perform a given function, and helps compare wetlands and evaluate their relative importance (value). Each wetland function evaluated by OFWAM is described below:

- **Wildlife habitat**: Wetlands provide essential water, food, cover, and reproductive areas for many wildlife species. OFWAM evaluates the habitat diversity for species usually associated with wetlands, without emphasizing one particular species.
- **Fish habitat**: OFWAM evaluates how a wetland provides fish habitat in streams, ponds, or lakes associated with a wetland. The assessment incorporates both warm water and cold water fish, and no particular species is emphasized.
- **Water Quality**: Wetlands are highly effective at removing nitrogen and phosphorous, some chemicals, heavy metals, and other pollutants from water. For this reason, artificial wetlands are often constructed for cleaning stormwater runoff and for tertiary treatment (polishing) of wastewater. Wetlands bordering streams and rivers and those that intercept runoff from fields and roads may provide this function.
- **Hydrologic control**: Wetlands can hold water during storm events and reduce flood impacts. OFWAM evaluates the effectiveness of a wetland to reduce downstream flood peaks and store floodwaters.

The OFWAM methodology for this study was streamlined to include only those wetland characterization questions that were relevant for determining whether the wetlands were LSWs. Therefore, questions 39–58 of the methodology were not included.

### 3.3.2. Wetlands of Special Interest for Protection

The first filter of OFWAM is to determine whether the wetland is covered by a management plan, protected by regulation, or is uncommon in Oregon. A "yes" answer to any of the ten assessment questions places the wetland into the "Special Interest for Protection" category. According to OFWAM, Wetlands of Special Interest indicate that management decisions should be made to protect the site. OARs do not require Wetlands of Special Interest to be labelled as such on LWI maps. Instead, this information is discussed in section 4.3, and included in Table 11 and the Wetland Summary Sheets in Appendix D.

## 3.4. Mapping and Map Transfer Procedures

SWCA used ArcGIS to prepare base mapping for the study area in accordance with the standards outlined under OAR 141-086-0210 (Inventory Development Process and Standards). All mapping layers used for development of the LWI are listed in Table 5. Data were reviewed to identify tax lot parcels that contained potential wetlands, and to generate a list of landowners for which access requests were made by the city. For field use, D-size (22 × 34 inches) map series were printed at a scale of 1 inch = 200 feet, and included a selection of suitable mapping layers (noted in Table 5).

**Table 5.** Mapping Data Layers Used for Development of the Local Wetland Inventory

| Resource | Sources |
|---|---|
| Study area boundaries* | City of Medford (2015) |
| Tax lot boundaries and codes* | Jackson County (2015) |
| Tax lot access permission* | City of Medford (2015) |
| Most recent aerial imagery* | City of Medford (2015), flown by David C. Smith and Associates in 2013 |
| Esri world imagery | Environmental Systems Research Institute (2015) |
| Historical aerial imagery | U.S. Geological Survey (1974), Google Earth (2015)† |
| Streets and street names* | Jackson County (2015) |
| Wetland mapping data* | Combination of data from the NWI (USFWS 1994), Jackson County (2015); and City of Medford (2015) |
| DSL wetland polygons* | Oregon DSL (2015) |
| Hydric/hydric inclusion soils* | NRCS Soil Survey Geographic database (SSURGO; NRCS [2015b]) |
| Stream data* | Combination of National Hydrography Dataset (NHD), Jackson County, and City of Medford |
| HUC12 identifier and boundaries* | NHD (USGS 2014; accessed 2014) |
| Drainage basin boundaries | City of Medford LWI (Wetland Consulting 2002) |
| ORBIC data* | Oregon Biodiversity Information Center (Portland State University) |
| Oregon Hydrography – Whole Stream Routes | Oregon Department of Fish and Wildlife (ODFW 2014) |
| Contour data (100 foot and 2 foot) | Jackson County (2015) and City of Medford (2015), respectively |
| FEMA 100-year flood zone | Federal Emergency Management Agency (accessed 2015) |

* This data layer was included on field reference maps. This location data is confidential.

† Google Earth photograph dates include August 5, 1994 (black and white); July 23, 2000 (black and white); August 17 and November 30, 2003; August 14, 2005; August 17, 2006; July 20, 2010; November 16, 2011; August 13, 2012; and July 4, 2014.

Scanned DSL maps of wetland polygons that had previously been identified in the same township section and ranges as the study area were obtained directly from DSL by request (DSL, 2015). These maps were reviewed by the City, and wetlands that were found to be located within the study area were manually converted to digital format for incorporation into the project geodatabase. Where possible, these wetlands were visually confirmed, and where deemed necessary, additional sample plot data were collected.

Subsequent to creating the base maps for the inventory, SWCA created an ArcGIS georeferenced database to house spatial data, attribute tables, and metadata for the study. The geodatabase is projected using the Oregon Lambert conformal conic. Table 6 summarizes the inventory's spatial data layers that are included in the database.

**Table 6.** Local Wetlands Inventory Spatial Layers Included in the Georeferenced Database

| Layer | Type/Code |
|---|---|
| Wetlands | Polygon/W00<br>(wetlands < 0.5 acre in size that had been previously mapped are included in these data) |
| Probable wetland | Point/PW00<br>(wetlands < 0.5 acre in size) |
| Stream | Width < 6 feet = line, > 6 feet = polygon/name or unique number |
| Natural waters | Polygon/WA00 |
| Artificial wetlands and waters | Ponds = Polygon/AW00<br>Ditches = line/Unique number<br>(no artificial wetlands were recorded) |
| Sample plots | Point/P00 |

*Notes*: The LWI database provided to the DSL additionally includes watershed boundaries, drainage basin boundaries, study area boundaries, tax lot lines and numbers, major streets, and metadata per OAR 141-086-0225.

Attribute data for each layer include a "data source" field.

Using the off- and on-site methods described in section 3.2, wetland and water features were mapped and characterized. GPS-collected field data were post-processed to ensure sub-meter accuracy, and polygons that were sketched on printed field maps were digitized to an approximate accuracy of 5 meters (16.4 feet), where visibility was available.

Each mapped feature in the LWI database was assigned a unique identifier. In addition, each wetland polygon includes the following attributes:

- Visual confirmation (yes/no)
- Prior wetland determination or delineation (WD) DSL file number
- Data source(s), which references the origin(s) of the data
- Cowardin classification and modifiers
- HGM classification; size (acres)
- LSW determination (yes/no)

# 4. Local Wetland Inventory Results

## 4.1. Study Area Summary

The study area encompasses 6,428 acres within the urban reserve areas surrounding the city's UGB. In all, 82 wetland polygons were delineated in the study area, totaling 185 acres (not including rivers and streams, deepwater habitats, or artificially created waters). LWI wetlands are shown on maps contained in Figure Series F, Appendix F. Included in this appendix is a figure number index table (Table F1), sorted by wetland identifier code.

Table 7 lists the unique identification codes assigned to each of the 82 wetlands identified in the study area, with each associated OFWAM/drainage basin group code, Cowardin and HGM class, visual confirmation status, wetland size, and DSL file number. While conducting site visits, 13 upland sampling plots and 12 wetland sampling plots were recorded. Sampling plot data forms are found in Appendix C.

**Table 7.** Summary of Wetlands Delineated within the Study Area

| OFWAM Grouping* | Unique Identifier | Cowardin Class† | HGM Class‡ | Visually Confirmed | Size (acres) | LSW Determination | DSL File Number |
|---|---|---|---|---|---|---|---|
| BCS-1 | W01 | PEMCh | SV | Yes | 3.50 | No | None |
| BCS-1 | W02-A | PEMCh | SV | Yes | 0.77 | No | None |
| BCS-1 | W02-B | PEMCh | RI | Yes | 0.36 | No | None |
| BCS-9 | W03 | PEMBh | SV | Yes | 2.33 | No | None |
| MWC-1 | W04-A | PEMCd | SV | Yes | 1.67 | Yes | None |
| MWC-1 | W04-B | PEMCh | RI | Yes | 0.15 | Yes | None |
| MWC-1 | W04-Mosaic | PEMC | SV | Yes | 6.20 | Yes | None |
| MWC-2 | W06 | PSS1C | RI | Yes | 0.30 | Yes | WD2012-0181 |
| MWC-3 | W07 | PEMBh | SV | Yes | 1.35 | Yes | WD2005-0692 |
| MWC-4 | W08 | PEMB | SV | No | 1.76 | Yes | None |
| MWC-4 | W09 | PEMBh | SV | Yes | 11.52 | Yes | WD2009-0470 |
| MWC-5 | W10-A | PEMCd | RFT | Yes | 3.06 | Yes | WD2007-0106 |
| N/A | W10-B | PEMB | SV | Yes | 0.05 | N/A | WD2007-0106 |
| N/A | W10-C | PEMB | SV | Yes | 0.05 | N/A | WD2007-0106 |
| MWC-5 | W10-D | PEMC | SV | Yes | 0.60 | Yes | WD2007-0106 |
| MWC-5 | W10-E | PEMC | SV | Yes | 0.61 | Yes | WD2007-0106 |
| MWC-5 | W10-F | PEMFh | DCNP | No | 3.80 | Yes | WD2007-0106 |
| MWC-5 | W10-G | PABHh | DCP | Yes | 1.84 | Yes | WD2007-0106 |
| MWC-6 | W11 | PEMCx | SV | Yes | 0.98 | Yes | None |

**Table 7.** Summary of Wetlands Delineated within the Study Area

| OFWAM Grouping* | Unique Identifier | Cowardin Class† | HGM Class‡ | Visually Confirmed | Size (acres) | LSW Determination | DSL File Number |
|---|---|---|---|---|---|---|---|
| BCS-2 | W13 | PEMCx | RFT | Yes | 0.96 | Yes | None |
| LSC-1 | W14 | PSS1A/PEMA | RI | Yes | 0.59 | Yes | None |
| LSC-2 | W15 | PSS1d | RFT | Yes | 2.05 | Yes | None |
| BCS-6 | W17 | PEMCx | RI | Yes | 0.87 | No | WD2004-0551 |
| BCS-5 | W18 | PFO1h | SV | Yes | 0.96 | Yes | None |
| BCS-7 | W19-A | PEMCd | SH | Yes | 6.75 | Yes | None |
| BCS-7 | W19-B | PSS1 | DCP | Yes | 0.49 | Yes | None |
| BCS-8 | W20 | PEMC | SV | Yes | 3.77 | No | None |
| MWC-6 | W21 | PFOd/PABFx | SV | Yes | 2.06 | Yes | None |
| MWC-5 | W22 | PEMC | SV | Yes | 1.49 | Yes | None |
| MWC-2 | W23 | PEMA | RI | No | 6.41 | Yes | None |
| MWC-2 | W24 | PEMA | RI | No | 0.19 | Yes | None |
| MWC-8 | W25 | PEMA | Flats | No | 7.71 | Yes | None |
| N/A | W29 | PSS1/PEM | SV | No | 0.19 | N/A | None |
| N/A | W30 | PEMB | SV | No | 0.14 | N/A | None |
| MWC-9 | W31 | PEMA | RI | Yes | 0.52 | No | None |
| N/A | W32 | PEMA | Flats | No | 0.49 | N/A | WD2012-0181 |
| N/A | W33 | PUBFx | Flats | No | 0.14 | N/A | None |
| MWC-2 | W34 | PSS1F | RFT | Yes | 0.41 | Yes | None |
| MWC-2 | W35 | PSS1F | RFT | Yes | 0.66 | Yes | None |
| MWC-1 | W36 | PEMCx | RI | No | 0.28 | Yes | None |
| N/A | W37 | PSS1C | LFV | Yes | 0.12 | N/A | None |
| MWC-3 | W38 | PEMCd | RFT / SV | Yes | 5.90 | Yes | WD2012-0181 |
| MWC-4 | W39-A | PSS1/PEM | RFT / SV | No | 3.61 | Yes | WD2009-0470 |
| MWC-4 | W39-B | PSS1F | RFT | Yes | 0.97 | Yes | None |
| MWC-4 | W40 | PEMB | SV | No | 0.29 | Yes | WD2009-0470 |
| MWC-4 | W41 | PSSF | SV | No | 1.80 | Yes | None |
| MWC-4 | W42 | PEMCh | SV | No | 0.58 | Yes | None |
| MWC-4 | W43 | PSS1B | SV | No | 0.63 | Yes | None |
| N/A | W44 | PEMC | SV | No | 0.15 | N/A | None |
| N/A | W45 | PEMCx | RI | No | 0.16 | N/A | None |
| MWC-6 | W46 | PABHh | DO | No | 1.34 | Yes | None |
| MWC-6 | W47 | PEMBd | RFT | No | 5.74 | Yes | None |

**Table 7.** Summary of Wetlands Delineated within the Study Area

| OFWAM Grouping* | Unique Identifier | Cowardin Class† | HGM Class‡ | Visually Confirmed | Size (acres) | LSW Determination | DSL File Number |
|---|---|---|---|---|---|---|---|
| MWC-6 | W48 | PSSC1h | RFT | No | 0.39 | Yes | None |
| MWC-6 | W49 | PSS1Cd/PEMC | RFT | No | 6.96 | Yes | None |
| MWC-6 | W50 | PUBHx/PSS1Bh | SV | Yes | 2.04 | Yes | None |
| MWC-6 | W51 | PSS1Bh/PEMB | SV | No | 0.52 | Yes | None |
| MWC-6 | W53 | PEMBd | SV | Yes | 1.18 | Yes | None |
| MWC-6 | W54 | PEMB | SV | Yes | 2.25 | Yes | None |
| MWC-6 | W55 | PEMBd | SV | Yes | 0.51 | Yes | None |
| MWC-6 | W56 | PEMBd | SV | No | 1.87 | Yes | None |
| MWC-6 | W57 | PEMBd | SV | No | 0.65 | Yes | None |
| LPC-1 | W61 | PEMh/PSSh | RI | No | 1.83 | No | None |
| LSC-4 | W62 | PSS1d | RFT | No | 0.72 | No | None |
| LSC-3 | W63 | PEMBh | RI | No | 2.31 | No | None |
| LSC-3 | W64 | PEMBh | RI | Yes | 5.19 | No | None |
| BCS-2 | W66 | PEMCd | RFT | Yes | 0.79 | Yes | None |
| BCS-3 | W68 | PEMB | SV | No | 0.73 | No | None |
| N/A | W69 | PUBFx | SV | No | 0.16 | N/A | None |
| BCS-4 | W70 | PSS1Cd | RI | Yes | 2.32 | Yes | None |
| BCS-4 | W71 | PEMC | SV | No | 2.51 | Yes | None |
| BCS-4 | W72 | PEMC | SV | No | 2.28 | Yes | None |
| N/A | W73 | PEMC | SV | No | 0.35 | N/A | None |
| BCS-4 | W74 | PEMC | SV | No | 5.83 | Yes | None |
| BCS-5 | W79 | PFO1B/R3UB | RFT | Yes | 2.82 | Yes | None |
| N/A | W81 | PEMB | SV | No | 0.09 | N/A | None |
| MWC-7 | W82 | PEMA | Flats | Yes | 37.15 | Yes | None |
| MWC-2 | W83 | PEMC | RFT | No | 0.04 | Yes | None |
| MWC-2 | W84 | PSS1C/PEMC | RFT | No | 0.47 | Yes | None |
| MWC-2 | W85 | PSS1C/PEMC | RFT | Yes | 0.71 | Yes | None |
| MWC-2 | W86 | PSS1C/PEMC | RFT | No | 1.87 | Yes | None |
| MWC-2 | W87 | PEMC/PSS1C | RFT | No | 0.42 | Yes | WD2002-0010 |
| MWC-2 | W88 | PSS1C/PEMC | RFT | No | 0.35 | Yes | None |

* OFWAM assessment codes: MDW = Midway Creek Drainage; BCS = Bear Creek South Drainage, LSC = Larson Creek Drainage; LPC = Lone Pine Creek Drainage, N/A = Below the 0.5 acre minimum threshold for OFWAM assessment

† Class descriptions are provided in Table 8. Water regime and special modifiers are described in Appendix B3.

‡ HGM Classification codes: SV = slope valley; RI = riverine impounding; RFT = riverine flow-through; DCNP = depressional closed nonpermanent; DCP = depressional closed permanent; SH = slope headwater; DO = depressional outflow. Refer also to Appendix B4.

An analysis of Cowardin classification wetland types shows that the emergent type makes up approximately 80%, and the scrub-shrub type makes up approximately 14% of the delineated wetlands in the study area. Table 7 provides a summary of identified wetland types by class, acres, and percentage of total wetlands. Wetland summary sheets for each wetland are found in Appendix D.

Sixty-eight PWs were identified in the study area and are depicted in Figure Series F, Appendix F. PW65 and PW66 each have the potential to be locally significant wetlands if future on-the-ground investigation at this location were to delineate wetland/s larger than 0.5 acre in size.

**Table 8.** Types of Wetlands in the Study Area

| Wetland Classification* | Classification Description | Approximate Acres | Percentage of Wetlands |
|---|---|---|---|
| Palustrine Emergent (PEM)† | Wetlands with rooted herbaceous vegetation that stands erect above the water or ground surface. | 147 | 80% |
| Palustrine Scrub-shrub (PSS)‡ | Wetlands dominated by shrubs and tree saplings less than 20 feet high. | 26 | 14% |
| Palustrine Forested (PFO)‡ | Wetlands dominated by trees that are greater than 20 feet high. | 5 | 3% |
| Palustrine Aquatic Bed (PAB)/Unconsolidated Bottom (PUB)‡ | PAB: Greater than 30% vegetation cover, growing on or below the water's surface for most of the growing season most years<br>PUB: At least 25% cover of particles smaller than stones, and a vegetative cover less than 30%. | 6 | 3% |
| **Total** | | **185** | **100%** |

* Where two wetland types were present in one wetland polygon, the predominant class type has been assigned in this table.

† Where NWI wetland data were incorporated in to the inventory, water regime classification was retained.

‡ Includes multiple subclasses and water regimes

## 4.2. Oregon Freshwater Wetland Assessment Ranking

The OFWAM provides qualitative information on the relative value of wetlands. Details of OFWAM function questions and rationale are included in Appendix B. Categories of high (H), medium (M), and low (L) were assigned to the assessment criteria to easily compare the results. H was assigned to wetlands receiving the highest function or condition result (e.g., intact, diverse), L was assigned to the wetlands receiving the lowest result (lost or not present), and M was assigned to the results that do not fit the other criteria (impacted or degraded, potential). This system is summarized in Table 9.

**Table 9.** Key to OFWAM Ranking

| | |
|---|---|
| **Wildlife Habitat** | H. Wetland provides diverse wildlife habitat.<br>M. Wetland provides habitat for some wildlife species.<br>L. Wetland does not provide wildlife habitat. |
| **Fish Habitat** | H. Wetland's fish habitat function is intact.<br>M. Wetland's fish habitat function is impacted or degraded.<br>L. Wetland's fish habitat function is lost or not present. |
| **Water Quality** | H. Wetland's water-quality function is intact.<br>M. Wetland's water-quality function is impacted of degraded.<br>L. Wetland's water-quality function is lost or not present. |
| **Hydrologic Control** | H. Wetland's hydrologic control function is intact.<br>M. Wetland's hydrologic control function is impacted or degraded.<br>L. Wetland's hydrologic control function is lost or not present. |

## 4.3. Locally Significant Wetland, and Wetlands of Special Interest for Protection Criteria

LSW determinations were based on OAR 141-086-300 through 141-086-350 (Identifying Significant Wetlands). If the assessed wetland unit provided "diverse" wildlife habitat, "intact" fish habitat, "intact" water quality function, or "intact" hydrologic control function, then the wetland was determined to be locally significant. Table 10 provides the criteria for determining whether a wetland is locally significant. All wetlands, even those not determined to be locally significant, may still be regulated by the DSL and the USACE. Refer to Table 7 and the wetland summary sheets (Appendix D) for details of each wetland.

**Table 10.** Criteria for Determining Goal 5 Locally Significant Wetlands

| ***Exclusions*: A wetland cannot be designated as significant if the answer to any of the criteria below is "Yes".** | |
|---|---|
| 1. | Is this wetland artificially created entirely from upland and: |
| a. | created for the purpose of controlling, storing, or maintaining storm water |
| b. | is used for active surface mining or as a log pond |
| c. | is a ditch without a free and open connection to natural waters of the state and does not contain food or game fish |
| d. | is less than 1 acre and created unintentionally from irrigation or construction |
| e. | created for the purpose of wastewater treatment, cranberry production, farm watering, sediment settling, cooling industrial water, or a golf hazard |
| 2 | Is the wetland or portion of the wetland contaminated by hazardous substances, materials or wastes as per the conditions of ORS 141-86-350 1(b)? |

| ***Mandatory Locally Significant Wetland Criteria*: *A wetland is locally significant if "Yes" is the answer to any of the criteria below.*** | |
|---|---|
| 1 | Does the wetland provide *diverse wildlife habitat*? |
| 2 | Is the wetland's *fish habitat function intact*? |
| 3 | Is the wetland's *water quality function intact*? |
| 4 | Is the wetland's *hydrologic control function intact*? |
| 5 | Is the wetland less than 1/4 mile from a water body listed by DEQ as a water quality limited water body (303(d) list) <u>and</u> |

**Table 10.** Criteria for Determining Goal 5 Locally Significant Wetlands

| | |
|---|---|
| | is the wetland's *water quality function intact, or impacted or degraded*? |
| 6 | Does the wetland contain a rare plant community? |
| 7 | Is the wetland inhabited by any species listed federally as threatened or endangered, or state listed as sensitive, threatened or endangered? |
| 8 | Does the wetland have a direct surface water connection to a stream segment mapped by ODFW as habitat for indigenous anadromous salmonids and<br>is the wetland's *fish habitat function intact, or impacted or degraded*? |
| ***Optional Locally Significant Wetland Criteria*: Local governments may identify a wetland as significant if "Yes" is the answer to the criteria below** | |
| 1 | Does the wetland represent a locally unique native plant community and |
| | provides *diverse wildlife habitat or habitat for some species* or |
| | has an *intact, or impacted or degraded fish habitat function* or |
| | has an *intact, or impacted or degraded water quality function* or |
| | has an *intact, or impacted or degraded hydrologic control function*. |
| 2 | Is the wetland publicly owned and used by a school or organization and |
| | does the wetland provide *educational uses*? |

Adapted from OAR 141-086-0350.

Wetlands of Special Interest for Protection were identified by addressing the 10 “first filter” questions outlined in Chapter 5 of the OFWAM. Responses to these questions identify whether the wetland is in a management plan, is protected by regulatory rules or statutes, or is uncommon in Oregon.

## 4.4. OFWAM, LSW, and Wetlands of Special Interest for Protection Results

OFWAM ranking and LSW determination results for each wetland are shown in Table 11. Of the 23 OFWAM assessment units identified in the study area, 14 units meet the criteria for local significance. These 14 units cover a total of 160 acres (58 mapped wetland polygons), which is approximately 85% of the total mapped wetland acreage within the study area. Detailed results are contained in Appendix E, which includes OFWAM wetland characterization questions and answers, and function and condition summary tables.

Three OFWAM assessment units in the Midway Drainage basin (MWC-1, MWC-7, and MWC-8) and one unit in the Bear Creek South drainage basin (BCS-5) met the criteria for wetlands of special interest for protection. Table 7 provides a listing of the wetland codes contained in each OFWAM assessment unit.

**Table 11.** OFWAM Rankings[‡], LSW Determination, and Wetlands of Special Interest for Protection Results

| Wetland Assessment Code and unit size*, † | Wildlife Habitat | Fish Habitat | Water Quality | Hydrologic Control | General Description and LSW Criteria (where applicable) | LSW (yes or no)? |
|---|---|---|---|---|---|---|
| MWC-1<br>8.3 acres | M | N/A | M | H | This is a wetland of special interest for protection; it includes an Agate Desert vernal pool mosaic (W04-Mosaic), and the unit is located within the Swanson Creek 100-year flood zone. May contain plant species listed as endangered by the State of Oregon. | Yes |
| MWC-2<br>11.8 acres | H | H | H | H | Comprises mostly riparian vegetation along Swanson Creek. | Yes |
| MWC-3<br>7.3 acres | M | M | H | M | This complex is more than 7 acres in size. | Yes |
| MWC-4<br>21.2 acres | H | M | H | H | Comprises mostly riparian vegetation along Swanson Creek. | Yes |
| MWC-5<br>11.4 acres | M | M | M | H | Coker Butte complex. Unit is more than 5 acres in size. Extensive ponding in growing season. Streams and ponds present. | Yes |
| MWC-6<br>26.5 acres | M | M | M | H | PSS/PEM complex at the headwaters of Midway and Swanson Creeks. Unit is more than 5 acres in size, with extensive ponding in growing season. Streams and ponds present. | Yes |
| MWC-7<br>37.2 acres | M | M | M | H | Wetland of special interest for protection; this is a mapped Agate Desert vernal pool mosaic. May contain plant species listed as endangered by the State of Oregon. | Yes |
| MWC-8<br>7.7 acres | M | M | M | H | Wetland of special interest for protection; this is a mapped Agate Desert vernal pool mosaic. May contain plant species listed as endangered by the State of Oregon. | Yes |
| MWC-9<br>0.52 acre | M | M | M | M | This is a minor wetland just over the 0.5-acre threshold; runs along a ditch line. | No |
| BCS-1<br>3.5 acres | M | M | M | M | Comprises flood-irrigated fields adjacent but not connected to the irrigation canal. Unit is more than 0.25 mile away from Bear Creek (horizontal distance). | No |
| BCS-2<br>1.8 acres | M | M | M | M | This Larson Reservoir complex is not connected to the "water quality–limited" Larson Creek; however, it is within 0.25 of a mile and therefore passes LSW criteria. | Yes |
| BCS-3<br>0.7 acre | M | M | M | M | This unit comprises a small wetland behind a house that is more than 0.25 mile south of Larson Creek. | No |
| BCS-4<br>12.9 acres | H | M | H | H | Unit is located on east side of I-5, opposite the Bear Creek Greenway (connected via culvert). Intact water quality and hydrological control functions. Unit is within 0.25 mile of water quality–limited Bear Creek. | Yes |

**Table 11.** OFWAM Rankings[‡], LSW Determination, and Wetlands of Special Interest for Protection Results

| Wetland Assessment Code and unit size*, † | Wildlife Habitat | Fish Habitat | Water Quality | Hydrologic Control | General Description and LSW Criteria (where applicable) | LSW (yes or no)? |
|---|---|---|---|---|---|---|
| BCS-5<br>3.8 acres | H | H | M | M | Bear Creek Greenway unit (within 0.25 mile of Bear Creek), a wetland of special interest for protection. Intact fish habitat function present. Bear Creek contains areas of critical habitat for Coho salmon (as designated by the National Marine Fisheries Service on May 5, 1999). The BCS-5 wetlands within Bear Creek's riparian area may provide off-channel habitat during high flows. | Yes |
| BCS-6<br>0.9 acre | M | M | M | M | This is a golf course wetland unit located along parcel boundary. | No |
| BCS-7<br>7.2 acres | M | N/A | M | H | This is a groundwater-fed complex north of South Stage Road. Intact hydrological control function in place. | Yes |
| BCS-8<br>3.8 acres | M | N/A | M | M | This is a groundwater-fed wetland with a small pond, north of South Stage Road. | No |
| BCS-9<br>2.3 acres | M | M | M | M | Flood-irrigated field with a downslope surface-water connection to an irrigation district canal. | No |
| LSC-1<br>0.6 acre | M | N/A | H | M | Unit is a scrub-shrub wetland located on an ephemeral drainage, east of Cherry Lane. Intact water quality function. | Yes |
| LSC-2<br>2.1 acres | M | M | H | M | This Mud Creek complex has intact water quality function due to ponding and dominance of scrub-shrub vegetation. | Yes |
| LSC-3<br>7.5 acres | M | M | M | M | Unit is a scrub-shrub wetland on ephemeral drainage, east of Cherry Lane. Intact water quality function. Separated from LSC-1 by a raised road. | No |
| LSC-4<br>0.7 acre | M | M | M | M | This is a scrub-shrub wetland north of Mud Creek, fed by an ephemeral drainage. No visual confirmation. | No |
| LPC-1<br>1.8 acres | M | M | M | M | This unit is surrounded by orchards off of Foothill Road. It connects to the Phoenix irrigation canal. | No |

[‡] OFWAM ranking key: H = High (Intact / Provides diverse wildlife habitat); M = Medium (Impacted or degraded / Provides habitat for some species); N/A = Criteria not applicable

* Wetland assessment codes: MDW = Midway Creek Drainage; BCS = Bear Creek South Drainage, LSC = Larson Creek Drainage; LPC = Lone Pine Creek Drainage.

[†] Refer to Table 7 for the itemization of individual wetland codes (and sizes) that are included in each OFWAM assessment unit.

# 5. LITERATURE CITED

## 5.1. Literature Cited in this Report

Adamus, P.R. 2001. *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles*. Salem, Oregon: Oregon Division of State Lands.

City of Medford. 2015. GIS Data provided to SWCA by City of Medford Planning Department before field surveys, 2015. Attribute data in the Project geodatabase cite data sources.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf#search=%22Classification of Wetlands and Deepwater Habitats of the United States%22. Accessed February 5, 2015.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. Available at: http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf. Accessed February 5, 2015.

Environmental Systems Research Institute (Esri). 2015. World Imagery downloaded March 2015.

Federal Emergency Management Agency (FEMA). 2015. GIS dataset downloaded from FEMA Map Service Center, March 2015. Available at: https://msc.fema.gov/portal

Franklin, J.F., and Dyrness, C.T. 1988 *Natural Vegetation of Oregon and Washington*. Portland, Oregon: Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture.

Google Earth. 2015. Aerial photographs east of the Medford area, Oregon. Available at: http://earth.google.com. Accessed 2015.

Jackson County. 2015. Jackson County GIS data clearinghouse. Available at: http://gis.jacksoncounty.org/. Accessed March 2015.

Medford Irrigation District. 2015. *Medford Irrigation District's 2015 Drought Plan*. Available at: http://www.medfordid.org/mn.asp?pg=ThisMonthatMID. Accessed August 2015:

National Marine Fisheries Service. 1999. Designated Critical Habitat; Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon. *Federal Register* 64(86):24049–24062.

National Weather Service. 2015. Portland, OR. Available at: http://www.weather.gov/climate/index.php?wfo=pqr. Accessed May 2015.

Natural Resources Conservation Service (NRCS). 2012. Soil Survey Geographic (SSURGO) database for Jackson County Area, Oregon, Parts of Jackson and Klamath Counties. Accessed February 2015.

———. 2015a. WETS data search using FOTG County Locator for MEDFORD ROGUE VLY AP, OR225. Available at: http://efotg.sc.egov.usda.gov/efotg_locator.aspx?map=US. Accessed March 26, 2015.

———. 2015b. Official Soils Series Descriptions. Available at: https://soilseries.sc.egov.usda.gov/osdname.asp. Accessed February 5, 2015.

Oregon Department of Environmental Quality (DEQ). 1988. *1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution.* Available in house at SWCA, Portland, Oregon.

———. 2012. Oregon's 2010 Integrated Report – Assessment Database and 303(d) List. Available at: http://www.deq.state.or.us/wq/assessment/2010Report.htm. Accessed August 27, 2015.

Oregon Department of State Lands (DSL). 2010. Essential Salmonid Habitat, Jackson County. Available at: http://www.oregon.gov/dsl/PERMITS/docs/maps/jackson.pdf. Accessed August 27, 2015.

———. 2015. Wetland Delineation (WD) Scanned Paper Maps emailed to SWCA in March 2015.

Oregon Department of Fish and Wildlife (ODFW). 2014. Oregon Hydrography – Whole Stream Routes. Available at: https://nrimp.dfw.state.or.us/nrimp/default.aspx?p=259. Accessed June 2015.

Roth, E.M., R.D. Olsen, P.L. Snow, and R.R. Sumner. 1996. *Oregon Freshwater Wetland Assessment Methodology.* Revised Edition (including July 1997 Addendum). Edited by S.G. McCannell. Salem, Oregon: Oregon Division of State Lands.

U.S. Army Corps of Engineers (USACE). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service (USFWS). 1994. National Wetlands Inventory (NWI). Available at: http://www.fws.gov/wetlands/NWI/Index.html. Accessed March 2015.

U.S. Geological Survey (USGS). 1974. Medford NW, NE, SE, SW Quadrangles; 7.5 Minute Series Orthophotoquads.

———. 2014. National Hydrography Dataset (NHD). Available at http://nhd.usgs.gov/. Accessed November 2014.

Wetland Consulting. 2002. *Medford Local Wetlands Inventory and Locally Significant Wetland Determinations*. Prepared for Oregon Division of State Lands. Available at: http://www.ci.medford.or.us/Files/LWI%20Report.pdf. Accessed December 11, 2014.

## 5.2. Other Literature and Data of Interest

Anchor QEA. 2011. Rogue Valley International-Medford Airport Critical Habitat and Species Inventory / Master Plan Update. Available at: http://jacksoncountyor.org/airport/General/About-Us/Master-Plan?EntryId=26387&Command=Core_Download&method=attachment. Accessed April 2015.

Agate Desert Vernal Pool Planning Technical Advisory Committee. 2000. Spatial GIS data provided to SWCA by the City of Medford, March 2015.

Environmental Science Associates (ESA). 2006. *Agate Desert Wetland Conservation – Agate Desert HCP Baseline Report*. Prepared for Agate Desert Wetland Conservation Plan Advisory Partners

ESA/Adamus. 2007. *Agate Desert Vernal Pool – Final Draft Functional Assessment Methodology*. Prepared for Agate Desert Technical Advisory Committee.

Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press, Seattle.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List: 2014 Update of Wetland Ratings.* Phytoneuron 2014-41:1–42. Available at: http://www.phytoneuron.net/ and http://wetland_plants.usace.army.mil/. Accessed April 25, 2014.

Medford Hydrography CAD. 2013. Spatial GIS data provided to SWCA by the City of Medford, March 2015.

Munsell Color (x-rite). Year 2009 revised; 2012 production. Munsell Soil-Color Charts. Grand Rapids, MI: Munsell Color.

Natural Resources Conservation Service (NRCS). 2010. The PLANTS Database. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. Available at: http://www.plants.usda.gov/.

Oregon Department of Fish and Wildlife (ODFW). 2006. *Oregon Conservation Strategy*. ODFW, Salem, Oregon. Available at: http://www.dfw.state.or.us/conservationstrategy/contents.asp. Accessed June 2015.

Oregon Department of Transportation (ODOT). 2001. Salmon Resource and Sensitive Area Mapping Project (SRSAM). GIS data from 2004 supplied to SWCA by the City of Medford, March 2015.

ORMAP. 2015. Tax lot maps. Available at: http://www.ormap.net/index.cfm?opt=maplist. Accessed August 27, 2015.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson (eds). 2002. *Field Book for Describing and Sampling Soils, Version 2.0.* Lincoln, Nebraska: U.S. Department of Agriculture Natural Resources Conservation Service, National Soil Survey Center.

U.S. Fish and Wildlife Service (USFWS). 1994. Eagle Point, Medford East, Medford West, and Sams Valley, Oregon. 7.5-minute National Wetlands Inventory maps. Color infrared aerial photography flown 8/82 at 1:58,000. Washington, D.C.: U.S. Fish and Wildlife Service.

U.S. Geological Survey (USGS). Provisional edition 1983. Eagle Point, Medford East, Medford West, and Sams Valley, Oregon. 7.5-minute topographic quadrangles. 1:24,000. Reston, Virginia: U.S. Geological Survey.

Wilson, B.L., R. Brainerd, D. Lytjen, B. Newhouse, and N. Otting of the Carex Working Group. 2008. *Field Guide to the Sedges of the Pacific Northwest*. Corvallis: Oregon State University Press.

### 5.2.1. Websites

- Oregon Explorer: http://oregonexplorer.info/wetlands/orwap/
- DEQ: http://deq12.deq.state.or.us/lasar2/data.aspx?dt=0&mw=889&mh=432

- DEQ: http://www.deq.state.or.us/WQ/assessment/docs/rpt98.pdf
- ESH Maps: http://www.oregon.gov/DSL/PERMITS/esshabitat.shtml and http://www.oregon.gov/DSL/PERMITS/counties_ess.shtml