



Oregon Wetland Mapping Standard

Version 1
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1.0 Introduction

Under the direction of the Oregon Geographic Information Council (OGIC), the Oregon Framework Implementation Team has delegated the development of a Bioscience Framework Implementation Plan and a prototype Wetland Mapping Data Content Standard to the Framework Implementation Team Bioscience Subcommittee (Bio-FIT). . The Bioscience Framework Theme currently includes 15 framework elements used for delineating natural features and managing these resources.

This document, the Oregon Wetland Mapping Standard (OWMS), specifies a common content model for geospatial wetland data. The common content model is intended to facilitate integration and sharing of wetland mapping data and to increase dissemination and public use of accurate, up-to-date geographic wetland information. The common content model can decrease costs that agencies incur to acquire and exchange geographic wetland data.

Like many spatial themes the wetlands layer has relationships with other layers. For the wetlands layer this is especially true. Wetlands are a combination of hydrography, plant communities, animal communities, soils and geomorphology. When the Oregon framework teams were established the wetlands were tentatively listed under the Hydrography Framework theme. It became clear that although there is a component of water included in wetlands, the biological component makes it a better fit in the Biosciences Framework team.

1.1 Mission and Goals of Standard

The Oregon Wetland Mapping Standard (OWMS) will provide a consistent and maintainable structure for wetland data producers and users, which will help to ensure the compatibility of datasets within the same theme and between other Framework elements and themes. Specifically, this standard will assist agencies responsible for the creation, maintenance, and distribution of wetland datasets by reducing the costs of data sharing, data development, and data maintenance among custodial and integration stewards. It will also help to ensure that wetland attribution (including geometry) is as current as possible by relying on custodial stewards' expertise and their local mandates for data quality (e.g., completeness, positional accuracy, attribute accuracy). Furthermore, the OWMS will ensure that mapping applications are able to acquire data from disparate sources and use and display the results in an appropriate manner for the need. Examples of applications that will use data developed with or compiled under this standard are mapping, wetland fill and removal permitting, local and regional planning, resource allocation, and wetland conservation.

1.2 Relationship to Existing Standards

The OWMS uses as a base the draft standard currently being used by the U.S. Fish and Wildlife Service (USFWS) for the National Wetlands Inventory (NWI). The draft NWI standard has been proposed by the Wetland Mapping Workgroup of the Federal Geographic Data Committee (FGDC) Wetland Subcommittee to be used as the *National Standards for Wetlands Mapping*. The draft is dated February 2006 and is expected to be adopted in summer 2007. As with all

Oregon Framework datasets, those developed under the OWMS must adhere to the *Oregon Metadata Standard*.

1.3 Description of Standard

The OWMS establishes the essential elements and data structure necessary to adequately describe, develop, exchange, and use wetland location data produced in Oregon. The OWMS is primarily concerned with a core set of geospatial information to support the need for an accurate and current representation of the extent and spatial relationship of an array of wetland types. This standard is intended to support a single type of wetland representation per dataset.

The types of wetlands addressed in this standard are all mappable wetlands. See Appendix A for definitions. This standard is devised to be:

- Simple, easy to understand, and logical
- Uniformly applicable, whenever possible
- Flexible and extensible
- Dynamic in terms of continuous review.

1.4 Applicability and Intended Use of Standard

The OWMS is applicable to the feature sets that represent the extents and boundaries of a variety of wetland types in Oregon. This standard is intended to support the automation, integration, and sharing of publicly available wetland information. It is intended to be usable by all levels of government, industry, and the general public to achieve consistency in the graphic representation of wetlands, as well as the attributes associated with those wetlands. This standard will be relied on to provide a naming convention and method of generating unique identifiers that are stable and consistent.

This standard does not preclude agencies from developing and maintaining wetland data differently for internal purposes. However, shared versions of the datasets must meet the requirements set forth in this standard.

1.5 Standard Development Procedures

The Oregon Framework Implementation Team Bioscience Subcommittee (Bio-FIT) is comprised of representatives from federal, state, regional, and local governmental agencies. This team created the draft of a wetland data structure and published that draft standard via email lists, open meetings, and through the Oregon Geospatial Data Clearinghouse website (<http://www.oregon.gov/DAS/IRMD/GEO/standards/standards.shtml>). The data structure (Appendix B) will be included as a component of any Bio-FIT data development pilot projects authorized by the Oregon Geographic Information Council. The public review and comment period began with the publication of the first draft and presentation at the Seventh Oregon Standards Forum in June 2006, and continued until the standard was approved to forward to OGIC at the Eighth Oregon Standards Forum in December 2006.

1.6 Maintenance of Standard

The OWMS will be revised on an as-needed basis. Revisions can be initiated by members of the standards process or by anyone in the community with significant revisions, needs or expertise related to the creation, maintenance or integration of wetland geospatial data. It is anticipated that as wetland data are collected at higher spatial accuracies, as geospatial applications mature, and as technology for capturing that higher resolution data improves, this standard will need to be updated. The range of attributes or the refinement of attribute quality in the existing standard may also need revision.

2.0 Body of the Standard

2.1 Scope and Content of the Standard

The scope of the OWMS is for publicly available vector data accompanied by required metadata. The unique identification of wetlands is also within the scope of this standard (as identified and discussed in the prototype data structure in Appendix B). The content is focused on the essential data and metadata elements required for the locally maintained datasets, as well as the regional or statewide datasets.

2.2 Need for the Standard

The Oregon wetland community has for some time discussed the need for a straightforward means by which to share wetland geometry and attribution among agencies and the public. Federal, state, and local natural resource agencies and non-profits all collect, manage and analyze information about wetlands, but each entity often does it alone with little or no coordination. This often results in single-focused data collection and analysis, duplication of efforts and resources, and conflicts. Data from different agencies cannot be aggregated because it is in different formats and scales or uses different standards and definitions. The exchange of this valuable information (including the many descriptive attributes routinely collected and related to those geometries) will be greatly simplified through the adoption of a minimum data specification.

Accurate and current wetland data is necessary to:

- Quantitatively measure gains and losses in wetlands.
- Develop wetland monitoring and assessment programs.
- Develop efficient and effective regulatory, mitigation, and enforcement programs.
- Develop restoration plans at various scales.
- Assist state, tribal, and local wetland and watershed planning efforts.

Current sources for wetland datasets in Oregon include the following, but a common standard is needed to allow aggregation of data and, where needed, mapping at a finer scale than NWI:

- NWI: Polygon and line cover for wetlands detected from air photos, attributed with Cowardin classification.

- NRCS: Hydric soils polygon cover, attributed with soil series name and a variety of soils attributes.
- NHD: Mapped swamps included in the National Hydrography Dataset (NHD), should be integrated into the NWI. If not, they will be included in the Oregon dataset.
- Oregon Natural Heritage Information Center (ORNHIC): Polygon cover for wetlands with ground-truthed vegetation data at various scales (plant association, ecological system, ecological cell), hydrogeomorphic (HGM) class, and condition rank if known, with links to conservation status and source data.
- The Wetlands Conservancy (TWC): Polygon cover of "Oregon's Greatest Wetlands," a subset of ORNHIC data with additional conservation-related attributes planned.
- Oregon Department of State Lands (ODSL): Point cover for tracking fill and removal permitting and mitigation.
- ODSL: 63 Local Wetlands Inventories (LWIs) have been approved and an additional 15 are pending approval. Recent LWIs are available digitally and older inventories could be digitized and attributed to fit the OWMS model.
- ODSL/Corps of Engineers: Both agencies have reviewed and approved wetland delineations for individual properties. These fine scale sites could be digitized or acquired in digital form, although most of them are subject to alteration in the regulatory process and may not persist as wetlands for very long.
- USDA Forest Service (USFS) and USDI Bureau of Land Management (BLM): Polygon covers at local district level depicting known sites and vegetation.

2.3 Participation in Standards Development

This standard, and the process by which it will be updated or enhanced, is open to all agencies concerned with the development, maintenance, and application of wetland geospatial data to important business functions. As with all Oregon framework standards, public review of and comment on the OWMS is encouraged. An outline of Oregon's process for the development and extension of a geospatial data standard can be found at http://egov.oregon.gov/DAS/IRMD/GEO/standards/docs/Standards_Development_Effort.pdf.

Participation in the Bio-FIT spans the spectrum of governmental agencies in Oregon. Currently, Bio-FIT is led by the Institute for Natural Resources at OSU and the City of Eugene, although it was directed for the last three years primarily by staff from the Oregon Watershed Enhancement Board. Other members include staff from the Oregon Department of State Lands, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, Metro, Lane Council of Governments, the Bureau of Land Management and the U.S. Geological Survey. The Bio-FIT has not been extremely active, focusing most of the work on the development of the wetlands dataset and classification and on an effort to build consistent fish barrier information statewide.

2.4 Integration with Other Standards

The OWMS will follow the same format as other Oregon geospatial data standards, including the *Oregon Metadata Standard*. The Oregon Wetland Mapping Standard is a minimum standard and does not preclude the Local Wetlands Inventory Oregon Administrative Rules (141-086-0180 et

seq.) outlining LWI Inventory Development Process and Standards including Digital Map Standards (141-086-0225).

2.5 Technical and Operation Context

2.5.1 Data Environment

The data environment for OWMS is a vector model, comprised of areas (polygons) and lines and spatial and maintenance relationships between areas. The exchange medium for wetland spatial data files is the ESRI shapefile, which is a public domain data structure relating feature geometry and feature attributes. This exchange medium is supported by all known GIS software suites in use in Oregon. Information about the technical specification for the ESRI shapefile can be found at <http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf>. In designating the shapefile as the exchange format, this standard has been designed to accommodate its limitations, such as limiting attribute (field) names to ten characters. In a future version of this standard, we will investigate other formats for data exchange which are able to preserve a more flexible data model.

2.5.2 Reference Systems

Three coordinate reference systems are typically used within Oregon: the Oregon State Plane system (divided into State Plane North and State Plane South along the county boundaries near 44 degrees north latitude), Universal Transverse Mercator (divided into UTM zones 10 and 11 along the meridian at 120 degrees west longitude), and the custom Oregon Lambert projection. These are described online at: <http://egov.oregon.gov/DAS/IRMD/GEO/coordination/projections/projections.shtml>). Custodial stewards may provide wetlands data in native coordinate reference systems. Oregon Lambert is preferred. The spatial reference information and datum **must** be clearly documented in the metadata accompanying the dataset and a projection defined in the shapefile.

2.5.3 Integration of Themes

The standard will allow for integration of all wetland polygon datasets. Currently, there are only three statewide wetland datasets in Oregon: the NWI, LWIs, and a dataset jointly developed by ORNHIC and The Wetlands Conservancy. Older LWIs and datasets maintained by the BLM and the U.S. Forest Service will eventually need to be updated to the current standard to allow for integration. There is no expectation that when digitizing older LWI or other wetland datasets, additional fieldwork will be required to address required fields. It is assumed that existing data will allow for attributing minimum fields, but if not, these legacy datasets are excluded from the minimum field requirements in this standard. Because of the focused nature of the data, and the existence of national standards, integration of themes should be fairly straightforward.

2.5.4 Encoding

Encoding translates user formats into standard formats, like the shapefile specified here for exchange. All GIS software used in Oregon has the capability of encoding its format to the shapefile format.

2.5.5 Resolution and Mapping Base

The OWMS specifies mapping at a scale of 1:24,000. Black and white digital orthophoto quads (DOQs) from 2000 will be used until the color NAIP DOQs taken in 2005 become available. Wetland boundaries will conform to the DOQs whenever possible. If NWI line work does not conform to the DOQs, adjustment of lines may be necessary.

This OWMS allows integration of wetland data from a variety of sources. In Oregon, wetland vegetation has been described and delineated at various scales of resolution. While the universal scale of the OWMS will be 1:24,000, vegetation for some sites will need to be defined at different scales of resolution until better data can be obtained. Some sites have very detailed coverage delineating mappable plant associations at 1:24,000, while others describe only dominant species and whether the understory is native or exotic. Vegetation at some sites is documented by plot data, while at others it is based on qualitative descriptions. The vast majority of sites delineated in NWI have limited or no vegetation data at all, but in many cases it will be possible to predict vegetation based on modeling.

As is the case with most framework data layers, the resolution for the statewide dataset is represented by the best available data. The minimum resolution of the wetlands dataset is 1:24,000. The wetlands dataset also includes a finer resolution scale, for mapping of Local Wetland Inventories, at a scale of 1:7,200, and the finest scale mapping for Wetlands Conservation Plans, at a scale of 1:2,400. This standard requires the use of one of these three scales.

The minimum mapping unit for LWI is 0.5 acres.

2.5.6 Accuracy

As with resolution, the intention of the OWMS is to support varying levels of positional and attribute accuracy. However, it is essential to the success of the data standard that all aspects of wetland data be completely documented in the associated metadata (either at the feature or data set level). The target positional accuracy is 40 feet or less, reported by the method set forth in *Part 3: National Standard for Spatial Data Accuracy* (NSSDA). Each wetland dataset should employ a single linear measurement unit, such as feet or meters (but not both). It is assumed that the positional accuracy for Wetland Conservation Plans and Local Wetland Inventory data is considerably less than 40 feet, but it is not specified in the standard.

2.5.7 Edge Matching

The OWMS is intended to be seamless across Oregon. Similar data sets from adjacent states using the same projection and horizontal/vertical datum should merge with the OWMS data without gaps. Data resulting in gaps and overlaps between adjacent jurisdictions submitted to a horizontal integrator will be referred back to the custodial stewards for resolution.

2.5.8 Feature Identification Code

A unique feature identifier is necessary to link geographic areas and associated boundaries to their attributes and to external databases. The identifier may be a simple number or formed from the concatenation of two or more numbers, codes or abbreviations. This is probably not necessary for wetlands data, given the ongoing cooperation between the primary data stewards.

2.5.8.1 Wetlands (polygons)

The unique feature identifier for wetlands governed by this standard should conform to standard naming conventions, permitting generalization to a regional or statewide extent. USGS Geographic Names Information System (GNIS) standard names and codes should be used wherever possible.

2.5.8.2 Wetlands (lines)

Lines are geospatial objects that represent the extent of linear wetland features that are being digitally captured in compliance with this standard. Digital line data are currently not being served on the USFWS NWI mapper and will not be included in this standard for the present time. Since the designated exchange format is the shapefile, polygons are the feature type shared under this standard. Future versions of this standard may include linear features buffered out to a standardized width and included in the polygon shapefile, but flagged to prevent their misinterpretation as actual wetland boundaries or their inclusion in calculations of acreage. A standard set of line feature codes could be developed at a later time.

2.5.9 Attributes

The attributes set forth in paragraph 3.0 of this standard will be included at a minimum.

2.5.10 Transactional Updating

Maintenance of wetland geospatial data is a particular challenge because there is no one central authority that exists to assure consistency, completeness and currency among all the datasets. It is recommended that an update process be defined for each dataset, where appropriate.

2.5.11 Records Management

The nature of digital records is such that new expectations for records management are likely, and at the very least, consistent practices for retention of dynamic files is needed.

Archiving is mandated under Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR). At the minimum, those mandates will be satisfied. Past versions of the wetland spatial data will be available through the respective custodial stewards, and an annual version of Framework wetland elements will be saved indefinitely by the horizontal steward. It is recommended that the custodial stewards become conversant with industry standards for archival information and retention policies, such as the standards of good practice published by the American Records Management Association (ARMA).

2.5.12 Metadata

The OWMS follows the *Oregon Core Metadata Standard* for geospatial data. Metadata detailing the characteristics and quality of submitted wetland data must be provided. Metadata should make every effort to meet the more rigorous standards set forth in the Federal Metadata Content Standard, where feasible. Metadata must provide sufficient information to allow the user to determine whether that dataset will meet the intended purpose, as well as telling the user how to access the data.

3.0 Data Characteristics

The data characteristics for geometry and attribute content defining wetlands are areas and boundaries. Given the current exchange format, only areas (polygons) are defined at this time. Each of the attributes listed below is described more completely in Appendix B, Data Dictionary.

3.1 Minimum Graphic Data Elements

3.1.1 Geographic Areas (polygons)

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
Id	Object ID		feature id (generated internally)
Shape	Polygon		geographic area feature (generated internally)
Area	Number	17	feature area (internally generated in units of the coordinate system)
Perimeter	Number	17	length of boundary delineating area (internally generated in units of the coordinate system)

3.1.2 Linear Features (lines)

None specified at this time (see section 2.5.8.2).

3.2 Minimum Attribute or Non-graphic Data Elements

A classification of attribute elements is given in Appendix C.

3.2.1 Geographic Areas (polygons)

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
SITENAME	String	240	GNIS name of site (e.g., Cathlamet Bay, Russian Island)
NWI_CLASS	String	20	NWI code without modifiers
ECOL_TYPE	String	2	<i>Ecological System Type</i>
HGM	String	5	Hydrogeomorphic (HGM) code
AUTHOR	String	100	Name of person entering data
AUTH_DATE	String	10	Date of data entry (mm/dd/yyyy)
METHOD	String	100	Method of data collection

3.2.2 Linear Features (lines)

None specified at this time (see section 2.5.8.2).

3.3 Optional Graphic Data Elements

None specified at this time.

3.4 Optional Attribute or Non-graphic Data Elements

3.4.1 Geographic Areas (polygons)

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
ECOREG	String	2	Oregon Ecoregion Code
OWNER	String	10	Ownership Code
NWI MOD	String	20	NWI code with modifiers
VEG	String	254	Plant Association Group (PAG) or other descriptor, to be decided
VEG SOURC	String	100	Source and year of data for vegetation type (e.g., Scranton 2004)
<i>ECOL SYST</i>	String	254	<i>Ecological System Type</i>
<i>ECOL CODE</i>	Number	4	<i>Ecological System Code (ESLF Code)</i>
PROTECT	String	10	Protected Area Status
VERIF OBS	String	100	Name of field observer
VERIF DATE	String	20	Date of field observation (e.g., Jul 2006)
ACCURACY	String	254	Accuracy based on equipment or method used to collect data

3.4.2 Linear Features (lines)

None specified at this time (see section 2.5.8.2).

Appendix A: Definitions of Terms

(Extracted from Parts 0 and 5 of the Geographic Information Framework Data Content Standard)

<u>Term</u>	<u>Definition</u>
Accuracy	<p>Absolute - A measure of the location of features on a map compared to their true position on the face of the earth.</p> <p>Relative - A measure of the accuracy of individual features on a map when compared to other features on the same map.</p>
All mappable wetlands	Wetland polygons mappable at 1:24,000. Minimum mapping size will be congruent with that used in NWI, or finer to be congruent with LWI or WCP data (1:72,000 or 1:2,400).
Areal	Two-dimensional.
Attribute	Attributes are the characteristics of features .
Boundary	Set that represents the limit of a feature .
Custodial Steward	Agency or organization responsible for specific tasks relating to maintaining certain geospatial data.
Ecological Systems	Recurring groups of biological communities found in similar physical environments and influenced by similar dynamic ecological processes. They are intended to provide a classification unit that is readily mappable and identifiable by conservation and resource managers in the field. Oregon's wetland ecological systems are described in: http://oregonstate.edu/ornhic/or_wetlands_systems.pdf
Feature	Abstraction (point, line or polygon) of a real world phenomenon stored within geospatial software.
Feature Delineation	Criteria or rules for defining the limits of a feature and how it will be represented geometrically in a dataset.
FGDC	Federal Geographic Data Committee
GNIS	Geographic Names Information System. The official repository of geographic names in the United States, managed by US Geological Survey.
Geospatial Software	Mapping software with analytical capabilities.

HGM	Hydrogeomorphic classification of wetlands, based on geomorphic setting, water source, and hydrodynamics. It provides indicators of function and ecological significance.
Horizontal Steward	The agency or organization responsible for assembling and providing access to a statewide dataset of a particular type .
Line	A feature built of vectors connecting at least two points.
LWI	Local Wetlands Inventory, administered by ODSL. These are comprehensive maps and information about wetlands within urban areas. LWIs replace NWI in urban areas, and map all wetlands at least 0.5 acres or larger at an accuracy of approximately 25 feet on a parcel-based map. LWIs are not a substitute for a detailed delineation of wetland boundaries.
Maintenance Relationship	Relative dependency between two or more geographic areas for maintaining common boundary or area information.
Metadata	Data about data.
NRCS	Natural Resources Conservation Service, US Department of Agriculture
NSDI	National Spatial Data Infrastructure. The effort of the FGDC to create and implement a shared data collection and maintenance resource for geospatial data sets.
NWI	National Wetland Inventory, US Fish and Wildlife Service
Polygon	Bounded surface for which the interior configuration is not directly specified
Spatial Relationship	Relative spatial location of a geographic area in terms of one or more geographic areas.
Type	Class of real world occurrences with common characteristics.
Unique Identifier	Every feature is assigned an identifier that is unique to it.
Vertical Steward	The agency or organization responsible for assuring that a dataset of a particular type can be used with other Framework datasets.

Appendix B: Data Dictionary

Minimum graphic data elements:

ID: Feature ID internally assigned to each feature by the geospatial software.

SHAPE: This field represents the collection of vertices that comprise the boundary of the geographic area feature. It is considered an “internal” field, since it is captured by proprietary digitizing software in a manner consistent with its topological algorithms. This topology generally takes the form of Cartesian coordinates (matched x-y-z pairs) in the projection units specified. For Bio-FIT pilot projects, the OGIC exchange standard projection (a customized Lambert conical projection) is required for the final implementation.

AREA: Internally generated number representing the area of each polygon feature (in units specified in the projection parameters).

PERIMETER: Internally generated number representing the length of the boundary delineating the polygon feature (in units specified in the projection parameters).

Minimum attribute or non-graphic data elements:

SITENAME: Name of site. Recommend using GNIS names whenever possible, nesting smaller sites within larger sites (e.g., Cathlamet Bay, Russian Island).

NWI_CLASS: System, subsystem, and class code WITHOUT MODIFIERS from National Wetland Inventory (NWI), per Cowardin wetland classification adopted as standard by FGDC (1996). Variables defined in Appendix C.

ECOL_TYPE: Ecological System Type code, a coarse filter for Ecological Systems based on structural components (woody, herbaceous, barren) and culturally-influenced (farmed, constructed, exotic vegetation), per Comer et al. (2003). Variables defined in Appendix C.

HGM: Hydrogeomorphic (HGM) class and subclass code, per Adamus (2001) (e.g., RI, SH, LFB, DCNP). Variables defined in Appendix C.

AUTHOR: Name of person entering data.

AUTH_DATE: Date of data entry.

METHOD: Method used to create and/or attribute polygon (e.g., digitized from air photo or map, GPS points, modeling, etc.). **Optional attribute or non-graphic data elements:**

ECOREG: Two-letter code for nine state ecoregions per Oregon Natural Heritage Information Center (2004). Variables defined in Appendix C.

OWNER: Ownership of wetland. Variables defined in Appendix C.

NWI_MOD: System, subsystem, and class code WITH MODIFIERS from National Wetland Inventory (NWI), per Cowardin wetland classification adopted as standard by FGDC (1996). Variables defined in Appendix C.

VEG: Vegetation code. USFS Plant Association Group (PAG) or other descriptor, standard to be developed. Will incorporate, in part, National Vegetation Classification adopted as standard by FGDC (1997). PAGs probably make the best fit for the standard because they are intermediate between plant associations and ecological systems. Plant associations are often too small to map at 1:24,000, but ecological systems are coarse-filter units with similar physical environments and ecological processes. At 1:24,000, PAGs may provide the best fine-scale resolution for delineating vegetation types in wetlands.

VEG_SOURCE: Source and year of data for vegetation type (e.g., Scranton 2004).

ECOL_SYST: Ecological System name per Comer et al. (2003).

ECOL_CODE: Ecological System mapping code (4 digit) per ReGAP and LandFire programs. Variables defined in Appendix C.

PROTECT: Administratively protected status of wetland as given in Oregon Natural Program (2003) and elsewhere (e.g., Special Area of Concern, Goal 5 or 17 site, Research Natural Area, Wilderness Area, Natural Heritage Conservation Area, Area of Critical Environmental Concern). Variables defined in Appendix C.

VERIF_OBS: If verified in field, name of observer. If no field verification, leave blank.

VERIF_DATE: Date of field observation.

Appendix C: Classification of Attribute Elements

Minimum attribute or non-graphic data elements:

NWI_CLASS: NWI system, subsystem, and class code WITHOUT MODIFIERS. Coding will follow the NWI standard as shown on NWI maps (<http://www.fws.gov/nwi/MapCodesLegend.pdf>). There are 59 types:

E1AB	Estuarine subtidal aquatic bed
E1UB	Estuarine subtidal unconsolidated bottom
E2AB	Estuarine intertidal aquatic bed
E2EM	Estuarine intertidal emergent
E2FO	Estuarine intertidal forested
E2RF	Estuarine intertidal reef
E2RS	Estuarine intertidal rocky shore
E2SB	Estuarine intertidal streambed
E2SS	Estuarine intertidal scrub-shrub
E2US	Estuarine intertidal unconsolidated shore
L1AB	Lacustrine limnetic aquatic bed
L1RB	Lacustrine limnetic rock bottom
L1UB	Lacustrine limnetic unconsolidated bottom
L2AB	Lacustrine littoral aquatic bed
L2EM	Lacustrine littoral emergent
L2RB	Lacustrine littoral rock bottom
L2RS	Lacustrine littoral rocky shore
L2UB	Lacustrine littoral unconsolidated bottom
L2US	Lacustrine littoral unconsolidated shore
M1AB	Marine subtidal aquatic bed
M1RB	Marine subtidal rock bottom
M1RF	Marine subtidal reef
M1UB	Marine subtidal unconsolidated bottom
M2AB	Marine intertidal aquatic bed
M2RF	Marine intertidal reef
M2RS	Marine intertidal rocky shore
M2US	Marine intertidal unconsolidated shore
PAB	Palustrine aquatic bed

PEM	Palustrine emergent
PFO	Palustrine forested
PML	Palustrine moss-lichen
PRB	Palustrine rock bottom
PSS	Palustrine scrub-shrub
PUB	Palustrine unconsolidated bottom
PUS	Palustrine unconsolidated shore
R1AB	Riverine tidal aquatic bed
R1EM	Riverine tidal emergent
R1RS	Riverine tidal rocky shore
R1SB	Riverine tidal streambed
R1UB	Riverine tidal unconsolidated bottom
R1US	Riverine tidal unconsolidated shore
R2AB	Riverine lower perennial aquatic bed
R2EM	Riverine lower perennial emergent
R2RB	Riverine lower perennial rock bottom
R2RS	Riverine lower perennial rocky shore
R2UB	Riverine lower perennial unconsolidated bottom
R2US	Riverine lower perennial unconsolidated shore
R3AB	Riverine upper perennial aquatic bed
R3RB	Riverine upper perennial rock bottom
R3RS	Riverine upper perennial rocky shore
R3UB	Riverine upper perennial unconsolidated bottom
R3US	Riverine upper perennial unconsolidated shore
R4SB	Riverine intermittent streambed
R5AB	Riverine unknown perennial aquatic bed
R5RB	Riverine unknown perennial rock bottom
R5RS	Riverine unknown perennial rocky shore
R5UB	Riverine unknown perennial unconsolidated bottom
R5US	Riverine unknown perennial unconsolidated shore
U	Upland

ECOL_TYPE: Ecological System Type Source: Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Arlington, Virginia. 75 pp.
<http://www.natureserve.org/library/usEcologicalsystems.pdf>
<http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol>

There are seven wetland ecological system types:

NW	Natural Woody Wetlands
NH	Natural Herbaceous Wetlands
NM	Natural Mixed Wetlands
NB	Natural Barren Wetlands
FW	Farmed Wetlands
MM	Man Made Wetland
EX	Exotic Vegetated Wetlands

HGM: HGM class and subclass code . Source: Adamus, P.R. 2001. *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles*. Oregon Division of State Lands, Salem. 162 pp.

DA	Depressional alkaline
DB	Depressional bog
DCNP	Depressional closed nonpermanently flooded
DCP	Depressional closed permanently flooded
DO	Depressional outflow
EFB	Estuarine fringe river-sourced
EFR	Estuarine fringe marine-sourced
F	Flats
LFH	Lacustrine fringe headwater
LFV	Lacustrine fringe valley
RFT	Riverine flow-through
RI	Riverine impounding
SF	Slope/Flats
SH	Slope headwater
SV	Slope valley

Optional attribute or non-graphic data elements:

ECOREG: Ecoregion code . Source: Oregon Natural Heritage Program. 2003. *Oregon Natural Heritage Plan*. DSL, Salem. 167 pp. http://oregonstate.edu/ornhic/ornh_plan.pdf

BM	Blue Mountains
BR	Northern Basin and Range
CP	Columbia Plateau
CR	Coast Range
EC	East Cascades
KM	Klamath Mountains
SP	Snake River Plain
WC	West Cascades
WV	Willamette Valley

OWNER: Owner code . Source: Oregon Natural Heritage Program. 2003. *Oregon Natural Heritage Plan*. Department of State Lands, Salem. 167 pp. [with additions]
http://oregonstate.edu/ornhic/ornh_plan.pdf

ACE	U.S. Army Corps of Engineers
BLM	USDI Bureau of Land Management
BOR	USDI Bureau of Reclamation
BPA	DOE Bonneville Power Administration
CITY	City
COUNTY	County
DOD	Department of Defense
NPS	USDI National Park Service
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ODSL	Oregon Department of State Lands
OPRD	Oregon Parks and Recreation Department
PVT	Private
TRIBE	Tribal
USFS	USDA Forest Service
USFWS	USDI Fish and Wildlife Service

NWI_MOD: NWI system, subsystem, and class code WITH MODIFIERS Coding will follow the NWI standard as shown on NWI maps (<http://www.fws.gov/nwi/MapCodesLegend.pdf>). There are over 6,000 possible

combinations of code nationwide (http://www.fws.gov/nwi/wetlands_atts.txt), but many of these will not apply to Oregon.

ECOL_CODE: Ecological System mapping code. USGS is working with NatureServe to develop a standard set of Ecological System Mapping Codes, currently to be used for mapping by the PNW ReGAP program and the LandFire Program of the US Forest Service. These 4 digit codes will replace the Ecological System (CES) codes currently available on the NatureServe Explorer website as the standards for mapping. Currently, 43 wetland Ecological Systems, or systems containing significant wetland vegetation, are known to occur in Oregon:

MapCode	Ecological System Name	CES-CODE
WOODY WETLANDS AND RIPARIAN SYSTEMS		
9175	Boreal Depressional Bog	CES103.871
9170	Columbia Basin Foothill Riparian Woodland and Shrubland	CES304.768
9321	Columbia Plateau Silver Sagebrush Seasonally Flooded Shrub-Steppe CES	CES304.084
9168	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland CES	CES304.045
9166	North Pacific Bog and Fen CES	CES204.063
9190	North Pacific Hardwood-Conifer Swamp CES	CES304.090
9106	North Pacific Lowland Riparian Forest and Shrubland CES	CES204.869
9108	North Pacific Montane Riparian Woodland and Shrubland	CES204.866
9173	North Pacific Shrub Swamp	CES204.865
9111	Northern Rocky Mountain Conifer Swamp	CES306.803
9155	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	CES306.804
9156	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	CES306.821
9187	Rocky Mountain Subalpine-Montane Riparian Shrubland	CES306.832
9171	Rocky Mountain Subalpine-Montane Riparian Woodland	CES306.833
HERBACEOUS WETLAND SYSTEMS		
9231	Columbia Plateau Vernal Pool	CES304.057
9297	Inter-Mountain Basins Alkaline Closed Depression	CES304.998
9262	Mediterranean California Coastal Interdunal Wetland	CES206.951
9255	Mediterranean California Serpentine Fen	CES206.953
9248	Mediterranean California Subalpine-Montane Fen	CES206.952
9264	Modoc Basalt Flow Vernal Pool	CES204.996
9222	North American Arid West Emergent Marsh	CES300.729
9229	North Pacific Coastal Interdunal Wetland	CES204.062
9225	North Pacific Hardpan Vernal Pool	CES204.859
9220	North Pacific Intertidal Freshwater Wetland	CES204.875
9230	North Pacific Maritime Eelgrass Bed	CES200.882
9251	Northern California Claypan Vernal Pool	CES206.948
9250	Northern California Volcanic Vernal Pool	CES206.949
9233	Northern Columbia Plateau Basalt Pothole Ponds	CES304.058
9217	Rocky Mountain Alpine-Montane Wet Meadow	CES306.812
9234	Rocky Mountain Subalpine-Montane Fen	CES306.831
9219	Temperate Pacific Freshwater Aquatic Bed	CES200.876
9260	Temperate Pacific Freshwater Emergent Marsh	CES200.877
9265	Temperate Pacific Subalpine-Montane Wet Meadow	CES200.998
9281	Temperate Pacific Tidal Salt and Brackish Marsh	CES200.091
9221	Willamette Valley Wet Prairie	CES204.874
MIXED UPLAND AND WETLAND SYSTEMS		
9103	Inter-Mountain Basins Greasewood Flat	CES304.780
9330	Mediterranean California Foothill and Lower Montane Riparian Woodland	CES206.944
9325	Mediterranean California Serpentine Foothill and Lower Montane Riparian Woodland and Seep	CES206.945
9327	Northern Rocky Mountain Avalanche Chute Shrubland	CES306.801
SPARSELY VEGETATED SYSTEMS		
3179	Inter-Mountain Basins Playa	CES304.786
3152	Inter-Mountain Basins Wash	CES304.781
3122	Temperate Pacific Freshwater Mudflat	CES200.878
3116	Temperate Pacific Intertidal Mudflat	CES204.879

PROTECT: Protected area code . Source: Oregon Natural Heritage Program. 2003. *Oregon Natural Heritage Plan*. Department of State Lands, Salem. 167 pp. [with additions]
http://oregonstate.edu/ornhic/ornh_plan.pdf

ACEC	Area of Critical Environmental Concern (BLM)
Goal 5, Goal 17	Goal 5 or Goal 17 site (County)
LSW	Locally Significant Wetland (ODSL)
NHCA	Natural Heritage Conservation Area (State of Oregon)
NM	National Monument (Federal)
NRA	National Recreation Area (Federal)
NWR	National Wildlife Refuge (USFWS)
ONA	Outstanding Natural Area (BLM)
OSW	Outstanding State Wetland (ODSL)
PNA	Privately owned natural area, preserve, or equivalent
RNA	Research Natural Area (Federal)
SIA	Special Interest Area (Federal)
SP	State Park
WA	Wilderness Area (Federal)
WMA	Wildlife Management Area (ODFW)
WSA	Wilderness Study Area (Federal)
WSR	Wild and Scenic River (Federal)

Appendix D: Issues Addressed and Resolved

User issues vs. data structure packaged for exchange

Appendix E: Established Codes for Oregon Wetland Authorities

<u>Code</u>	<u>Name of Wetland Authority or Type</u>
LWI	Local Wetlands Inventory (ODSL supervised)
NWI	National Wetland Inventory (US Fish and Wildlife Service)
ODSL	Oregon Department of State Lands
ORNHIC	Oregon Natural Heritage Information Center
SWI	Statewide Wetlands Inventory
WCP	Wetlands Conservation Plan

Appendix F: ODSL Local Wetland Inventory (LWI) Mapping Standards and Guidelines

141-086-0180

Purpose

Pursuant to ORS 196.674 pertaining to the Statewide Wetlands Inventory (SWI), these rules establish a system for uniform wetland identification and comprehensive mapping. These rules also establish wetlands inventory standards for cities or counties developing a wetland conservation plan (WCP) pursuant to ORS 196.678. A Local Wetlands Inventory (LWI) is developed for all or a portion of a city or county according to the standards and guidelines contained in these rules (OAR 141-086-0180 through 141-086-0240).

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 – ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0185

Uses

- (1) Once approved by the Division of State Lands (Division), the LWI shall be used in place of the National Wetlands Inventory (NWI) and is incorporated into the SWI.
- (2) The approved LWI shall be used by cities and counties in lieu of the NWI for notifying the Division of land use applications affecting mapped wetlands (ORS 215.418 and ORS 227.350).
- (3) A LWI fulfills the wetlands inventory requirements for Goal 5 and Goal 17 (OAR 660-023-0000 through 660-023-0250 and OAR 660-015-0010). A LWI that meets the additional WCP requirements specified in these rules shall be used as the wetlands inventory basis for a WCP.
- (4) In order to designate significant wetlands (OAR 141-086-0300 through 141-086-0350) as required for Goal 5, or to assess wetland functions for a WCP, a wetland function and condition assessment of mapped wetlands must be conducted as part of the LWI using the *Oregon Freshwater Wetland Assessment Methodology (OFWAM)* published by the Division in 1996. An

equivalent functional assessment methodology may be used or adjustments may be made to OFWAM upon written approval by the Director.

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 – ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; Renumbered from 141-086-0190(1) & (4); DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0190

Policy

(1) A LWI provides good information for planning purposes on the location of potentially regulated wetlands and streams, but is generally not of sufficient detail for permitting purposes under the state Removal-Fill Law (ORS 196.800 through 196.990). A wetland delineation is usually needed prior to site development.

(2) Wetland determinations conducted for the purpose of developing the LWI shall be conducted according to the criteria, methodologies and guidance currently accepted by the Division.

(3) All wetlands inventory procedures and products are subject to review and approval by the Division before the products:

(a) Are incorporated into the SWI;

(b) Can be used in lieu of the NWI for Wetland Land Use Notification purposes; or

(c) Can be used by a city or county for Goal 5, Goal 17 or WCP purposes.

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 – ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; Renumbered to 141-086-0185(1) & (4); DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0200

Definitions

(1) "Coverage" means a set of digital data files that store a single layer or theme of geographic information such as roads or wetlands.

(2) "Cowardin Class" means the wetland classification according to the U.S. Fish and Wildlife Service's *Classification of Wetlands and Deepwater Habitats of the United States*, Cowardin et al., 1979.

(3) "Director" means the Director of the Oregon Division of State Lands or designee.

(4) "Division" means the Oregon Division of State Lands.

- (5) "Field-Verify" or "Field Verification" means to walk over and/or visually check an area to make a wetland determination and map wetlands. This may or may not include collecting sample plot data.
- (6) "Georeference" or "Geographical Reference" means linking geographic data to known coordinates on the surface of the earth.
- (7) "GIS" or "Geographic Information System" means a system of hardware, software and data storage that allows for the analysis and display of information that has been geographically referenced.
- (8) "HGM class or subclass" means the hydrogeomorphic classification of the wetland based upon its landscape position and hydrology characteristics, according to the HGM key developed by the Division.
- (9) "Indicator" means the soil, vegetation, and hydrology characteristics or other field evidence that indicate that wetlands are present.
- (10) "Inventory" means a systematic survey of an area to identify, classify and map the approximate boundaries of wetlands, and includes the supporting documentation required by these rules.
- (11) "Mapping" means representing the identified wetlands and their approximate boundaries on a map.
- (12) "Offsite Determination" means a wetland determination conducted without field verification using NWI maps, soils maps, and aerial photographs.
- (13) "Other Waters" means waters of the state other than wetlands, such as streams and non-vegetated ponds.
- (14) "Possible Wetland" means an area noted during the course of LWI development that appears to meet wetland criteria but is too small to require its inclusion in the LWI.
- (15) "Rectified" means correcting the scale variation and image displacement from aerial photos and similar imagery that results from ground relief and airplane tilt.
- (16) "Sample Plot" means a specific area on the ground where soils, vegetation and hydrology data are recorded on a field data form in order to make a wetland determination.
- (17) "Statewide Wetlands Inventory" or "SWI" means an inventory which contains the location, wetland types and approximate boundaries of wetlands in the State of Oregon. This inventory is continually revised as additional information is received or obtained by the Division.
- (18) "Stream" means a watercourse created by natural processes, or one that would be in a natural state if it were not for human-caused alterations.
- (19) "Wetlands" means those areas that are inundated or saturated by surface or ground water 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 (ORS 196.800(16)).

(20) "Wetland Delineation" means a determination of wetland presence that includes marking the wetland boundaries on the ground and/or on a detailed map prepared by professional land survey or similar accurate methods.

(21) "Wetland Determination" means identifying an area as wetland or non-wetland.

(22) "Wetland Mosaic" means a complex of several wetlands smaller than one-half (0.50) acres in size each, or less than one-tenth (0.10) acres in size for a WCP, that are interspersed between areas of non-wetland.

(23) "Wetland Boundary" means a line marked on a map that identifies the approximate wetland/non-wetland boundary.

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 – ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0210

Inventory Development Process and Standards

(1) Sources of inventory information shall include:

(a) U.S. Natural Resources Conservation Service (NRCS) county soil survey and county list of hydric soils and soils with hydric inclusions, or other available soil surveys;

(b) NWI maps;

(c) NRCS-certified wetland determinations, where available;

(d) Federal Emergency Management Act floodplain maps, where available;

(e) Other available local wetlands inventories or wildlife habitat inventories that include wetlands;

(f) Division wetland determination files; and

(g) Color and/or color infrared aerial photos, or other aerial photography approved by the Division, taken within five (5) years of inventory initiation. The minimum photo scale shall be 1 inch = 600 feet (1 inch = 200 feet for a WCP) unless another scale is approved by the Division.

(2) Sources of inventory information may include but are not limited to:

(a) U.S. Department of Agriculture Farm Services Agency aerial color slides;

(b) Local knowledge of area (e.g., residents);

(c) Oregon Natural Heritage Program data;

- (d) Division permit files; and
 - (e) Resource agencies, including the Oregon Department of Fish and Wildlife and U.S. Fish and Wildlife Service.
- (3) Before beginning field verification, a field map such as an aerial photograph with a mylar overlay shall be prepared and shall include the approximate location of:
- (a) Any wetlands and deepwater habitats (other waters) from the NWI;
 - (b) Any wetlands from the Division's wetland determination files or other inventories;
 - (c) Hydric soils and soils with hydric inclusions (each coded separately);
 - (d) Wetlands or possible wetlands identified on aerial photos; and
 - (e) Sites to field-verify based on other leads.
- (4) Aerial photo interpretation shall be tested early in the inventory process by interpreting several wetland types, ground truthing the interpretations, then completing the aerial photo interpretations.
- (5) The local government shall be responsible for requesting property access permission from landowners in the study area for parcels identified by inventory staff and/or the Division as possibly containing wetlands.
- (6) All probable wetlands, other waters and streams identified through the process described in OAR 141-086-0210(1) through (3) of these rules shall be field-verified.
- (7) Sample plot data shall be provided according to the following minimum standards:
- (a) At least one (1) sample plot that best characterizes each wetland or each portion of a wetland that has a distinctly different character (e.g., different landscape position, land use and Cowardin classification);
 - (b) Verify any uncertain wetland/non-wetland boundaries with paired sample plots;
 - (c) Verify with at least one (1) sample plot each probable wetland where land use activities such as ditching, water diversion, or agricultural practices are likely to have significantly altered site conditions, making observations from a distance or a site walk-over unreliable; and
 - (d) Verify with at least one (1) sample plot probable wetlands with unreliable indicators (e.g., one dominant plant that grows in both wetlands and non-wetlands, such as *Phalaris arundinacea*).
- (8) If the LWI will be used for a WCP, in addition to the requirements in OAR 141-086-0210(6) and (7), a minimum of one (1) sample plot shall be provided that best characterizes each dominant wetland plant community.
- (9) If the landowner denies access permission, employ off-site wetland determination methods and map those areas as wetland that appear to have wetland indicators.

(10) All wetlands one-half (0.5) acre and larger shall be identified and mapped. For a WCP, all wetlands one-tenth (0.10) acre and larger shall be identified and mapped.

(11) Each wetland shall be assigned a unique identification code. Contiguous wetlands assigned different codes may be grouped into a single OFWAM assessment unit based upon the guidance in OFWAM and/or in consultation with the Division.

(12) All previously delineated wetlands from the Division's files shall be field-verified, if possible, to determine if wetlands are still present and are approximately the same size and configuration as when delineated.

(13) All identified wetlands shall be classified:

(a) To Cowardin "class" level including special modifiers (i.e., "farmed" or "excavated"); and

(b) By dominant HGM class and subclass.

(14) When a wetland contains more than one (1) adjoining Cowardin classification, the minimum wetland class which must be differentiated shall be one-half (0.5) acre.

(15) Artificially created wetlands or other waters (such as a stormwater detention pond) shall be included in the inventory regardless of their jurisdictional status, and their purpose shall be labeled on the inventory maps.

(16) Where a wetland/non-wetland mosaic occurs, the site shall be labeled as a wetland/upland mosaic on all inventory maps and so described on the wetland summary sheet.

(17) Streams shall be mapped, but no further documentation such as wetland summary sheets (OAR 141-086-0220(6)) or OFWAM assessment (OAR 141-086-0220(7)) is required.

(18) Possible wetlands noted during inventory development shall be mapped as point data on the appropriate parcel(s) and shall all be assigned the code "PW" and so labeled on the maps. No sample plot data is required and no further documentation such as wetland summary sheets (OAR 141-086-0220(6)) or OFWAM assessment (OAR 141-086-0220(7)) is required.

(19) Vacant, former wetlands, consisting mostly of relict (dewatered) hydric soils, which are five (5) acres or larger in size shall be identified and mapped as potential wetland mitigation or restoration sites and shall be described in the LWI report as follows:

(a) Assign a unique identification code for mapping and reference in the text;

(b) Briefly describe easily-observed soil, vegetation and hydrologic alterations; and

(c) Identify the most likely water source (e.g., stream, groundwater) for restoring wetland hydrology.

[Publications: The publication(s) referenced in this rule is available from the agency.]

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 – ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0220

Maps and Reports

(1) Maps shall be developed and submitted to the Division in both paper and electronic format. If the study area is covered by more than one (1) wetland map, a single, smaller scale reference map of the complete study area is required. The reference map shall be indexed to the individual, large-scale maps and show, at a minimum, the Public Land Survey System grid, the location and code of all identified wetlands, the study area boundary, and major, named streets.

(2) Wetland maps shall include:

(a) Map name;

(b) Scale bar;

(c) Geographic reference to the Public Land Survey System;

(d) Roads, with major roads named, and railroads;

(e) Streams and stream names;

(f) Property boundaries if a parcel-based coverage of the study area exists;

(g) Watershed boundaries;

(h) Legend that explains all map symbols, line work and patterns;

(i) Map date (month and year final map prepared);

(j) All wetlands, clearly and accurately drawn and clearly identified by a unique wetland code that relates each wetland to field data forms, tables, databases, wetland summary sheets, and OFWAM summary forms;

(k) Previously delineated wetlands labeled with the Division's file number;

(l) Distinctive symbol or pattern for wetlands or significant portions of wetlands that were field-verified as opposed to those not field-verified;

(m) Disclaimer that reads: "Information shown on this map is for planning purposes only and wetland information is subject to change. There may be unmapped wetlands subject to regulation and all wetland boundary mapping is approximate. In all cases, actual field conditions determine wetland boundaries. You are advised to contact the Oregon Division of State Lands and the U.S. Army Corps of Engineers with any regulatory questions;"

(n) Numbered sample plots; and

(o) Study area boundary.

(3) A separate map shall be provided showing the approximate location of potential wetland mitigation/restoration sites and which includes the map elements described in Section 0220(2)(a) through (i) and (o) of this rule.

(4) Minimum map scale shall be 1 inch = 600 feet (1:7, 200) or 1 inch = 200 feet (1:2, 400) for a WCP.

(5) The inventory and mapping process shall be fully documented in order to ensure accuracy and consistency throughout the process. Documentation shall include:

(a) Wetland verification procedures used;

(b) Date(s) and scale(s) of source maps and aerial photos used;

(c) Technical staff members and qualifications;

(d) Sample plot data on standard field data forms, including data for sites sampled that failed to meet wetland criteria;

(e) Aerial photos or other field maps with an overlay of wetland mapping, sample plots, and any measurements taken; and

(f) All mapping and map transfer procedures used.

(6) A wetland summary sheet shall be prepared for each wetland. The summary sheet shall at a minimum include:

(a) The unique wetland code;

(b) Street address or equivalent location description;

(c) Township, Range, Section, Quarter Quarter Section and tax lot(s) that contain the mapped wetland;

(d) Approximate wetland size (in acres);

(e) Cowardin wetland classification(s);

(f) Soil type(s);

(g) Hydrologic basin;

(h) HGM classification;

(i) Sample plot numbers;

(j) Common name of dominant plant species;

(k) Primary hydrology source, including hydrology source and use of artificially created wetlands;

(l) Field verification date(s);

- (m) Summary of OFWAM assessment results;
 - (n) Significant wetland determination, if made; and
 - (o) Comments which describe the wetland, including topographic position, land uses, alterations (including agricultural) and the basis for the wetland boundary determination.
- (7) OFWAM assessment results shall be submitted for each wetland assessment unit and shall include:
- (a) Wetlands of Special Interest for Protection (OFWAM, Chapter Five (5));
 - (b) Wetland Characterization results (OFWAM, Appendix B);
 - (c) Answer sheets for all wetland assessment questions (OFWAM, Appendix C);
 - (d) Function and condition summary sheet (OFWAM, Appendix C); and
 - (e) Assessment results represented in table format.
- (8) A study area summary shall be prepared that includes:
- (a) Total acreage in the study area;
 - (b) Total acreage of wetlands in the study area, excluding actively used, artificially created wetlands such as detention ponds or aggregate extraction ponds; and
 - (c) Total number of wetlands in the study area.
- (9) A minimum of two (2) sets of final LWI products shall be prepared; one (1) set shall be provided to the Division for inclusion in the SWI and the other shall be provided to the local government.
- (10) LWI maps and documents provided to the Division are public record and may be made available at cost to the public and state and federal agencies.

[Publications: The publication(s) referenced in this rule is available from the agency.]

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 - ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0225

Digital Map Standards

- (1) Digital versions of map materials and associated databases are required and shall be submitted to the Division according to the requirements in OAR 141-086-0225(2) through (8). GIS products are preferred.
- (2) GIS files shall have a linked database containing descriptive attributes and be georeferenced.

(a) GIS coverages shall be submitted in an ArcView shape file, ArcInfo export file or a format that is compatible to these, or in other formats approved by the Division.

(b) The following attributes must be included for each wetland polygon: a unique wetland identification label, Cowardin class code, field verified or not, and the Division's wetland delineation file number, if any. Sample points must be attributed with unique identification labels, and linear waterways must be attributed with unique identification labels.

(3) If GIS is not available, then other map files (such as AutoCAD drawing files) shall be submitted.

(a) Non-GIS maps shall be in a digital format such as .dxf, .dwg, or Microstation .dgn files, or other formats approved by the Division.

(b) Digital database information associated with the data layers shall be provided, including: a unique identification label for each wetland polygon, a unique identification label for each sample point, and a unique identification label for each linear waterway segment.

(c) A database must be included that links the wetland polygon layer to the Cowardin class, field verification status, and wetland delineation file number, if any, for each wetland polygon.

(4) If the digital product is not georeferenced and rectified, a minimum of five (5) points, evenly distributed within the LWI area, shall be recorded with a Geographical Positioning System (GPS) unit and include:

(a) A record of the positional accuracy of each point;

(b) Brand and model type of the GPS equipment used; and

(c) GPS points established at identifiable stable landmarks in the field and located on the final map.

(5) All georeferenced data sets shall report the following projection parameters:

(a) Projection (Oregon Lambert preferred);

(b) Zone (if UTM);

(c) Units of Projection;

(d) Datum; and

(e) Spheroid.

(6) Separate coverages or data layers shall be submitted showing:

(a) Wetland polygons;

(b) Streams;

(c) Study area boundary;

- (d) Tax lot lines (if they exist in digital format);
 - (e) Wetland and upland sample points;
 - (f) Potential mitigation/restoration sites, if any; and/or
 - (g) Other coverage combinations approved by the Division.
- (7) Attribute or layer code list and metadata (description for each coverage or dataset and source material citations) shall be provided, including date and a disclaimer as is described in OAR 141-086-0220(2)(m) of these rules.
- (8) Digital maps shall also be provided in a print file (such as .eps, .rtl, .cgm or .gra).

Stat. Auth.: ORS 273.045

Stats. Implemented: ORS 196.668 – ORS 196.686 & ORS 196.692

Hist.: DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0228

Review and Approval Process

- (1) A draft of all the LWI products required in OAR 141-086-0220 of these rules shall be provided to the Division (if the inventory was not developed by the Division) and the local government(s) for review.
- (2) The local government shall provide opportunity for public review of and comment on the draft LWI products.
- (3) Public and local government comments on draft LWI products shall be provided to the Division. The Division shall request in writing from the party responsible for preparing the LWI any revisions or additions required in order for the LWI to be approved.
- (4) The Division shall review final products to ensure that all changes requested by the Division have been adequately addressed.
- (5) If the final LWI products meet the requirements in these rules, the Division shall send a letter of approval to the local government.

Stat. Auth.: ORS 273.045

Stats. Implemented: ORS 196.668 – ORS 196.686 & ORS 196.692

Hist.: DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0230

Revisions

- (1) When local jurisdictions are required by the Department of Land Conservation and Development to review and update their LWI, the provisions of OAR 141-086-0230(1)(a) through (d) of these rules shall be followed.

(a) All Urban Growth Boundary expansion areas or other areas not included in the original LWI study area shall be inventoried according to the requirements in these rules.

(b) Within the previous LWI study area, wetland additions or boundary changes equal to or greater than one-half (0.5) acre shall be identified, mapped and assessed using OFWAM. A summary report including the results and any map changes shall be provided to the Division and is subject to Division review and approval.

(c) Sources of information for review of the previous study area shall at a minimum include:

(A) Wetland delineation reports approved by the Division or map errors verified by the Division after the date of the approved LWI;

(B) Color and/or color infra-red aerial photos, or other aerial photos approved by the Division, taken within three (3) years of inventory revision initiation; and

(C) A field reconnaissance of the study area.

(d) Wetlands not previously mapped on the LWI shall be field verified as required in OAR 141-086-0210(7) through (9) of this rule; previously mapped wetlands no longer apparent on aerial photos shall also be field verified as necessary to confirm their absence.

(2) If the LWI was used as the basis for an approved WCP, the local jurisdiction shall instead:

(a) Provide to the Division, as part of the annual report (OAR 141-086-0035), a revised map and report indicating wetlands filled and wetlands restored, enhanced or created for mitigation; and

(b) Every five (5) years, in conjunction with the Division's five (5) year WCP review (ORS 196.684(6)), conduct a LWI review and incorporate new information, as required in OAR 141-086-0230(1)(b) through (1)(d) of these rules.

Stat. Auth.: ORS 196.674 - ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 - ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef. 2-26-01

141-086-0240

Landowner Notification

When the LWI is approved by the Division, the local jurisdiction shall notify by mail within one hundred twenty (120) calendar days all landowners of record whose parcel contains a wetland or possible wetland that:

(1) Their parcel(s) was included in the wetlands inventory study area; and

(2) There is a wetland mapped on their parcel.

Stat. Auth.: ORS 196.674 – ORS 196.681 & ORS 196.692

Stats. Implemented: ORS 196.668 - ORS 196.692

Hist.: LB 11-1991, f. & cert. ef. 11-15-91; LB 9-1994, f. & cert. ef. 12-15-94; DSL 2-2001, f. & cert. ef.

Appendix G: Referenced Documents and Web Links

- Adamus, P.R. 2001. *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles*. Oregon Division of State Lands, Salem. 162 pp.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Arlington, Virginia.
<http://www.natureserve.org/library/usEcologicalsystems.pdf>
- Cowardin, L.M., V. Carter, F.C. Golet & E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. USDI Fish & Wildlife Service, Biological Services Program. FWS/OBS-79/31. 103 pp.
http://www.fws.gov/nwi/Pubs_Reports/Class_Manual/class_titlepg.htm
- Environmental Systems Resource Institute. *ESRI shapefile technical description: An ESRI white paper (July 1998)* - <http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf>.
- Federal Geographic Data Committee. 1996. *Classification of Wetlands and Deepwater Habitats of the United States*. Cowardin wetland classification endorsed as standard by FGDC in 1996.
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands/index_html
- Federal Geographic Data Committee. 1997. *National Vegetation Classification Standard*. NVC endorsed as standard by FGDC 1997-1998.
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/vegetation/index_html
- Federal Geographic Data Committee. 2001. *Revisions to the National Standards for the Physiognomic Levels of Vegetation Classification in the United States*. Standard proposed by the FGDC Vegetation Subcommittee.
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/physiognomic-levels/index_html
- Federal Geographic Data Committee. 2006. *National Standards for Wetlands Mapping*. Standard proposed by the Wetland Mapping Workgroup of the FGDC Wetland Subcommittee.
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping/index_html

NatureServe Explorer. Current Ecological System classification and coding. NatureServe website. Arlington, Virginia.

<http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol>

Oregon Geographic Information Council. *Oregon Metadata Standard*. Proposed adoption of FGDC metadata standard as standard for Oregon.

http://egov.oregon.gov/DAS/IRMD/GEO/standards/docs/Metadata_Opportunity.pdf

Oregon Department of State Lands. Local Wetlands Inventory (LWI) Standards and Guidelines. OAR 141-086-0180 to 141-086-0240.

Oregon Natural Heritage Program. 2003. *Oregon Natural Heritage Plan*. Department of State Lands, Salem. 167 pp.

http://oregonstate.edu/ornhic/ornh_plan.pdf

Oregon Natural Heritage Information Center. 2004. *Rare, threatened and endangered species of Oregon*. Institute for Natural Resources, Oregon State University, Portland. 104 pp.

http://oregonstate.edu/ornhic/2004_t&e_book.pdf.

. US Geological Survey. National Map Accuracy Standard -

<http://rockyweb.cr.usgs.gov/nmpstds/acrodocs/nmas/NMAS647.PDF>.

US Geological Survey. Geographic Names Information System (GNIS) -

<http://geonames.usgs.gov>.