



Oregon Wetland Mapping Standard

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Please address comments to:

**Framework Implementation Team
Bioscience Features Subcommittee
in care of John Christy
Oregon Natural Heritage Information Center, OSU
john.christy@oregonstate.edu**

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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 Features Framework Implementation Plan and a prototype Wetland Mapping Data Content Standard to the Framework Implementation Team Bioscience Subcommittee (Bio-FIT). The Bioscience Features Framework is a collection of prioritized, spatially referenced digital representations of wetland feature sets for Oregon. 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 area boundary data.

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 (see Appendix A for definitions):

- All mappable wetlands

This standard is devised to be

- Simple, easy to understand, and logical
- Uniformly applicable, whenever possible
- Flexible and capable of accommodating future expansions
- 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. Each type of wetland dataset may require an extension of this umbrella standard to meet its needs.

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 will commence with the publication of the first draft, in June 2006 at the Seventh Oregon Standards Forum in June of 2006 and will continue until the Eight Oregon Standards Forum in November of 2006.

1.6 Maintenance of Standard

The OWMS will be revised on an as-needed basis, initiated by members of the standards process or through a logical expansion based on further attainment of broad participation in the creation 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 coverage 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.
- 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 rank 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.
- Oregon Department of State Lands (ODSL): DSL has many Local Wetland Inventories and Wetland Delineations that could be digitized and attributed to fit the OWMS model.
- 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 the resolution of related 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 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 data layer 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*.

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 10 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 zone 10 and UTM Zone 11 along the meridian at 120 degrees west longitude, and zone 11, which comprises all land to the east of 120 degrees west longitude), and the custom Oregon Lambert projection described at <http://egov.oregon.gov/DAS/IRMD/GEO/coordination/projections/projections.shtml>). Custodial stewards may provide boundary data in native coordinate reference systems. Oregon Lambert is preferred. The horizontal integrator will assemble and distribute Framework datasets in Oregon Lambert. The reference system 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

There are no wetland polygon covers for Oregon other than NWI and the cover developed by ORNHIC. 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 orthophotography (DOQs) from 2000 will be used until the color NAIP DOQs from 2005 become available from the Oregon Geospatial Enterprise Office. Wetland boundaries will conform to the DOQs whenever possible. If NWI linework 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. Descriptions of vegetation at some sites is supported by plot data, while others are based qualitative descriptions. The vast majority of sites delineated in NWI have no vegetation data at all, but in most cases it will be possible to predict vegetation based on modeling.

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* (NNSDA). Each wetland dataset should employ a single linear measurement unit, such as feet or meters (but not both).

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 boundary authorities for resolution. Some disagreements may be difficult to resolve, and horizontal integrators may have to accept some gaps or overlaps as exceptions. This will be a long-term, iterative process.

2.5.8 Feature Identification Code

A unique feature identification number 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. For instance, some features may require an agency identifier and an instance code to assure uniqueness.

2.5.8.1 Wetlands (polygons)

The unique feature identification number for wetlands governed by this standard should conform to standard naming conventions, permitting generalization to a regional or statewide extent. Geographic Names Information System (GNIS) codes should be followed wherever. Where FGDC codes or coding schemas are not available or not specific enough, conventions for generating unique identifiers must be established and followed. The horizontal integrator has responsibility for assigning unique feature identification numbers.

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. Later versions of this standard may specify linear features, and a standard set of line feature codes will be developed at that 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. To further complicate matters, each wetland type may have different requirements. To address this dynamic and custom environment, the standards under this umbrella addressing each boundary type will specify the appropriate requirements

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 integrator. 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)

ITEM NAME	TYPE	WIDTH	Description
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 Boundaries (lines)

None specified at this time.

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	254	GNIS name of site (e.g., Cathlamet Bay, Russian Island)
NWI_SYST	String	4	Major Wetland type (NWI System and Subsystem codes)
ECOL_TYPE	String	2	Ecological System Type
OBSERV	String	100	Name of observer
DATE	String	20	Date of observation (e.g., Jul 2006)

3.2.2 Boundaries (lines)

None specified at this time.

3.3 Optional Graphic Data Elements

None specified at this time.

3.4 Optional Attribute or Non-graphic Data Elements

3.2.1 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	String	20	NWI code
HGM	String	5	Hydrogeomorphic (HGM) code
VEG	String	254	Plant Association Group (PAG) or other descriptor, to be decided
ECOL_SYST	String	254	Ecological system
DATA_SOURC	String	100	Source and year of data for vegetation type (e.g., Scranton 2004)
PROTECT	String	10	Protected area status

None specified at this time.

3.2.2 Lines

None specified at this time.

Appendix A: Definitions of Terms

(Selected extractions 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.
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.
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.
Horizontal Integrator	The agency or organization responsible for assembling and providing access to a statewide boundary dataset of a particular type .
Line	A feature built of vectors connecting at least two points.
Maintenance Relationship	Relative dependency between two or more geographic areas for maintaining common boundary or area information.
Metadata	Data about data.
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, USFWS
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 Identification Number	Every feature is assigned an identification number that is unique to it.
Vertical Integrator	The agency or organization responsible for assuring that a boundary dataset of a particular type can be used with other boundary datasets and other Framework themes.

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_SYST: Wetland Inventory (NWI) System and Subsystem code, per Cowardin wetland classification adopted as standard by FGDC (1996).

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).

OBSERV: Name of individual entering data.

DATE: Date when data recorded.

Optional attribute or non-graphic data elements:

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

OWNER: Ownership of wetland. Standard for acronyms of agency owners to be developed. Private ownership indicated as "private."

NWI: Complete National Wetland Inventory (NWI) code as given in NWI mapping cover, per Cowardin wetland classification adopted as standard by FGDC (1996).

HGM: Hydrogeomorphic (HGM) code per Adamus (2001) (e.g., RI, SH, LFV, DCNP)

VEG: Plant Association Group (PAG) or other descriptor, standard to be developed. Will incorporate, in part, National Vegetation Classification adopted as standard by FGDC (1997).

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

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).

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

Appendix C: Classification of Attribute Elements

Ecoregion code (ECOREG). Source: Oregon Natural Heritage Program. 2003. *Oregon Natural Heritage Plan*. Department of State Lands, 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 code (OWNER). 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
USFS	USDA Forest Service
USFWS	USDI Fish and Wildlife Service

NWI code (NWI). 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.

NWI System and Subsystem (NWI_SYST). Coding will follow the NWI standard as shown on NWI maps (<http://www.fws.gov/nwi/MapCodesLegend.pdf>). There 12 types

M1	Marine Subtidal
M2	Marine Intertidal
E1	Estuarine Subtidal
E2	Estuarine Intertidal
R1	Riverine Tidal
R2	Riverine Lower Perennial
R3	Riverine Upper Perennial
R4	Riverine Intermittent
R5	Riverine Unknown Perennial
L1	Lacustrine Limnetic (deeper than 2 m)
L2	Lacustrine Littoral (shallows to 2 m depth)
P	Palustrine

HGM code (HGM). 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 embayment
FM	Flats mineral soil
FO	Flats organic soil
LFH	Lacustrine fringe headwater
LFV	Lacustrine fringe valley
RFT	Riverine flow-through
RI	Riverine impounding
SH	Slope headwater
SV	Slope valley

Vegetation code (VEG). USFS Plant Association Group (PAG) or other descriptor, to be decided. PAGs probably make the best fit for the standard because they are intermediate between plant associations and ecological systems. Plant associations often too small to map at 1:24,000 and ecological systems are coarse-filter units with similar physical environments and ecological processes. In most cases, PAGs would provide the best fine-scale resolution for delineating vegetation types in wetlands.

Ecological System Type (ECOL_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>

The major wetland types organized within this system.

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

Ecological System code (ECOL_SYST). 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>

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 should replace the Ecological System codes as the standards for mapping. Listed below are 40 Wetland Ecological Systems, or Ecological Systems containing significant wetland vegetation, currently known to occur in Oregon.

Map Code	Ecological System Name
9175	Boreal Depressional Bog
9170	Columbia Basin Foothill Riparian Woodland and Shrubland
9321	Columbia Plateau Silver Sagebrush Seasonally Flooded Shrub-Steppe
9168	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
9166	North Pacific Bog and Fen
9190	North Pacific Hardwood-Conifer Swamp
9106	North Pacific Lowland Riparian Forest and Shrubland
9108	North Pacific Montane Riparian Woodland and Shrubland
9173	North Pacific Shrub Swamp
9111	Northern Rocky Mountain Conifer Swamp
9155	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland
9156	Rocky Mountain Lower Montane Riparian Woodland and Shrubland
9187	Rocky Mountain Subalpine-Montane Riparian Shrubland
9171	Rocky Mountain Subalpine-Montane Riparian Woodland
9231	Columbia Plateau Vernal Pool
9297	Inter-Mountain Basins Alkaline Closed Depression
9262	Mediterranean California Coastal Interdunal Wetland
9255	Mediterranean California Serpentine Fen
9248	Mediterranean California Subalpine-Montane Fen
9264	Modoc Basalt Flow Vernal Pool
9222	North American Arid West Emergent Marsh
9225	North Pacific Hardpan Vernal Pool
9220	North Pacific Intertidal Freshwater Wetland
9230	North Pacific Maritime Eelgrass Bed
9251	Northern California Claypan Vernal Pool
9250	Northern California Volcanic Vernal Pool
9233	Northern Columbia Plateau Basalt Pothole Ponds
9217	Rocky Mountain Alpine-Montane Wet Meadow
9234	Rocky Mountain Subalpine-Montane Fen
9219	Temperate Pacific Freshwater Aquatic Bed
9260	Temperate Pacific Freshwater Emergent Marsh
9265	Temperate Pacific Subalpine-Montane Wet Meadow
9281	Temperate Pacific Tidal Salt and Brackish Marsh
9221	Willamette Valley Wet Prairie
9103	Inter-Mountain Basins Greasewood Flat
9330	Mediterranean California Foothill and Lower Montane Riparian Woodland
9325	Mediterranean California Serpentine Foothill and Lower Montane Riparian Woodland and Seep
5327	Northern Rocky Mountain Avalanche Chute Shrubland
3179	Inter-Mountain Basins Playa
3152	Inter-Mountain Basins Wash

Protected area code (PROTECT). 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)
NHCA	Natural Heritage Conservation Area (State of Oregon)
NM	National Monument (Federal)
NRA	National Recreation Area (Federal)
NWR	National Wildlife Refuge (USFWS)
RNA	Research Natural Area (Federal)
SIA	Special Interest Area (Federal)
SP	State Park
PVT	Preserve, Natural Area, or equivalent (Private)
SAC	Special Area of Concern (ODSL)
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

(Notes)

User issues vs. data structure packaged for exchange

Appendix E: Established Codes for Oregon Wetland Authorities

<u>Code</u>	<u>Name of Wetland Authority</u>
NWI	National Wetland Inventory
ODSL	Oregon Department of State Lands
ORNHIC	Oregon Natural Heritage Information Center

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

Environmental Systems Resource Institute. *ESRI shapefile technical description: An ESRI white paper (July 1998)* - <http://www.esri.com/library/whitepapers/pdfs/shapefile.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>.

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