



Oregon Wetland Mapping Standard

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Revision History

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1.0 Introduction

In 2006, under the direction of the Oregon Geographic Information Council (OGIC), the Oregon Framework Implementation Team delegated to its Bioscience Subcommittee (Bio-FIT) the development of a Bioscience Framework Implementation Plan and an Oregon Wetland Mapping Standard (OWMS). The Bioscience Framework Theme currently includes 15 framework elements used for delineating natural features and managing these resources. Version 1 of OWMS was endorsed by OGIC in December 2006.

The OWMS specifies a common content model for geospatial wetland data, intended to (1) facilitate integration and sharing of consistent wetland mapping data and (2) 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 wetland layer has relationships with other layers, and for the wetland 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, wetlands were tentatively listed under the Hydrography Framework theme. It later became clear that although wetlands contain water, the biological component of wetlands makes them a better fit in the Biosciences Framework team.

1.1 Mission and Goals of Standard

The 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 results in a manner appropriate for the need. Examples of applications that may 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 conforms as closely as possible to the current (September 2008) draft Federal Geographic Data Committee (FGDC) Wetlands Mapping Standard (FGDCWMS; Federal Geographic Data Committee 2008). 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 needed to support 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 of terms. The OWMS is devised to be:

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

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 wetland 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 the OWMS.

Per the FGDCWMS, the OWMS is "neither designed, nor intended, to support legal, regulatory, or jurisdictional analyses of wetland mapping products, nor does it attempt to differentiate between regulatory and non-regulatory wetlands."

1.5 Procedures for Development of Standard

The Bio-FIT is comprised of representatives from federal, state, regional, and local governmental agencies. This team created the wetland data structure and published the standard via email, open meetings, and through the Oregon Geospatial Data Clearinghouse website (<http://www.oregon.gov/DAS/IRMD/GEO/standards/standards.shtml>). The data structure will be included as a component of any Bio-FIT data development pilot project authorized by OGIC. Version 1 was endorsed by OGIC in December 2006. Major amendments to Version 1 were made by Oregon State University's Oregon Natural Heritage Information Center (ORNHIC) between March and December 2008 after consultation with ODSL, ODOT, The Wetlands Conservancy, Green Point Consulting, and revisions of the draft FGDCWMS released in July and September 2008.

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 resolutions, as geospatial applications mature, and as technology for capturing 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 described in the data structure. The content is focused on the essential data and metadata elements required for 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 wetland gains and losses at various scales
- 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 but are not limited to the following. Many smaller site-specific datasets have also been created by federal and state agencies as well as consultants, academics, and nongovernmental organizations. A common standard is needed to allow aggregation of data and, where needed, mapping at a finer scale than NWI:

- NWI: Polygon cover (and previously line cover no longer supported by NWI) for wetlands detected from air photos, attributed with Cowardin classification. All new and updated NWI mapping, including parts of Oregon digitized between 2006 and 2009, convert older NWI line data to polygons and integrate them with existing polygon data to create a single NWI polygon layer.
- NRCS: Hydric soils polygon cover, attributed with soil series name and a variety of soils attributes.
- NHD: Mapped wetlands and springs included in the National Hydrography Dataset (NHD).
- ORNHIC: Polygon cover for wetlands with ground-truthed vegetation data at various scales (plant association, ecological system, and ecological cell), hydrogeomorphic (HGM) class, and condition rank if known, with links to conservation status rank and source data. ORNHIC also has point and polygon covers for federally and state-listed plant and animal species, and rare species tracked only by ORNHIC that can be used to improve wetland data.
- The Wetlands Conservancy (TWC) and ORNHIC: Polygon cover of "Oregon's Greatest Wetlands," a subset of ORNHIC data with additional conservation-related attributes planned.
- Oregon Watershed Enhancement Board (OWEB): Polygon and tabular data on wetland restoration projects throughout the state, located in the Oregon Watershed Restoration Inventory.
- Oregon Department of Fish and Wildlife (ODFW): Polygon cover of Conservation Opportunity Areas created for Comprehensive Wildlife Conservation Strategy.
- Oregon Department of State Lands (ODSL): Point cover for tracking fill and removal permitting and mitigation.
- ODSL: 69 approved Local Wetlands Inventories (LWIs) and 17 LWIs pending approval. Recent LWIs are available digitally and older inventories are being digitized and attributed to fit the OWMS model.
- ODSL/ Corps of Engineers: Both agencies have approved wetland delineations for individual properties. These fine scale data could be integrated to fit the OWMS model, although most of them are subject to alteration in the regulatory process and may not persist as wetlands.
- USDA Forest Service (USFS), USDI Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), Oregon Parks and Recreation Department (OPRD): Polygon covers at varying scales depict known wetlands, vegetation, and general condition.

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.

2.4 Integration with Other Oregon Standards

The OWMS will follow the same format as other Oregon geospatial data standards, including the *Oregon Metadata Standard*. It is a minimum standard and does not preclude Oregon Administrative Rules (OAR) 141-086-0180 through 141-086-0 that apply to local governments for Local Wetlands Inventories (LWIs) and Wetlands Conservation Plans (WCPs).

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 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 currently used 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, the OWMS has been designed to accommodate the limitations of shapefiles, such as limiting attribute (field) names to ten characters. In a future version of this standard we may investigate other formats for data exchange that are able to preserve a more flexible data model. Use of lookup tables in the dataset is encouraged but not required. These tables provide descriptions of coded attributes (Appendix C) and enhance the utility of the database.

2.5.2 Reference Systems

The **required** coordinate reference system for the OWMS is Oregon Lambert projection, the OGIC exchange standard projection:

<http://egov.oregon.gov/DAS/IRMD/GEO/coordination/projections/projections.shtml>

Spatial reference information and datum **must** be clearly documented in metadata accompanying the dataset and the 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 four known statewide wetland datasets in Oregon: the NWI, LWIs, the "Oregon's Greatest Wetlands" dataset developed by ORNHIC and TWC, and the Oregon Department of Transportation's (ODOT) SRSAM dataset depicting wetlands within 500-1000 feet of major state highways. Older LWIs and datasets maintained by BLM and USFS 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 will be excluded from the minimum field requirements in this standard. Because of the focused nature of the data, and the existence of the FGDCWMS, 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 *Source Imagery, Base Imagery, and Spatial Resolution*

Per the FGDCWMS, minimum **source imagery** for the OWMS will be color infrared (CIR) at a minimum of 1 m resolution. Use of CIR imagery as source data is encouraged to enhance positional accuracy, but currently it cannot be required as minimum source data for the OWMS because it is not universally available on a statewide basis. Until such time as statewide CIR becomes available, the Oregon 2005 0.5 m color orthoimagery, available for the entire state at <http://oregonexplorer.info/imagery/>, will serve as an interim standard. Use of resolution finer than 0.5 m is acceptable and will enhance positional accuracy of the data.

Minimum **base imagery** data for the OWMS is the Oregon 2005 0.5 m color orthoimagery, available for the entire state at <http://oregonexplorer.info/imagery/>. Use of resolution finer than 0.5 m is acceptable and will enhance positional accuracy of the data. Per the FGDCWMS, required minimum mapping scale for the OWMS is 1:12,000, except for LWIs and WCPs for which the required minimum scale is 1:2,400, per Oregon Administrative Rules (OAR) 141-086-0180 through 141-086-0 that apply to local governments for LWIs and WCPs. Wetland boundaries will conform to the Oregon 2005 0.5 m color orthoimagery whenever possible and existing linework may be adjusted to that imagery as necessary.

The OWMS allows integration of wetland data from a variety of sources. In Oregon, wetland vegetation has been described and delineated over the years at various scales of resolution. Vegetation for some sites will need to be defined at different levels of classification until better data can be obtained. Some sites have very detailed coverage delineating mappable plant associations, 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 or lists of species. The vast majority of wetland polygons in NWI have no vegetation data at all, but in many cases it will be possible to predict vegetation at some level of resolution based on local knowledge or modeling.

2.5.6 *Horizontal Accuracy, Vertical Accuracy, and Target Mapping Unit*

Per the FGDCWMS, required minimum **horizontal accuracy** for the OWMS is 5 meters (16 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.

Per the FGDCWMS, **vertical accuracy** is not specified in the OWMS.

Per the FGDCWMS, the required minimum **target mapping unit** (TMU) for the OWMS is 0.2 ha (0.5 acres), except for WCPs for which the required minimum TMU is 0.04 ha (0.1 acre) per Oregon Administrative Rules (OAR) 141-086-0180 through 141-086-0 that apply to local governments for LWIs and WCPs. For polygons not included in WCPs, use of a TMU finer than 0.2 ha (0.5 acres) is acceptable and will enhance positional accuracy of the data.

2.5.7 Edge Matching

The OWMS is intended to be seamless across Oregon. Similar datasets 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 custodial stewards for resolution.

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. This is probably not necessary for wetlands data, given the ongoing cooperation between the primary data stewards.

2.5.8.1 Geometry (Feature) Type

Per the FGDCWMS, the OWMS supports only polygonal wetland datasets and does not include polyline or point datasets. While nothing in this standard precludes the capture of line or point data for referencing wetlands smaller than the TMU, only polygon features will be included in the OWMS. Linear or point features may be integrated into OWMS polygon layers by buffering.

Wetland polygons **must** be non-overlapping, and multiple spatial depictions of the same wetland are not permitted.

The unique feature identification number for wetland polygons 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.

2.5.9 Attributes

The attributes set forth in paragraph 3.0 of the OWMS will be included at a minimum.

2.5.10 Transactional Updating

Maintenance of wetland geospatial data is challenging because no single central authority exists to assure consistency, completeness, and currency among all the datasets. Where appropriate, it is recommended that an update process be defined for each dataset.

2.5.11 Records Management

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

Archiving is mandated under Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR). 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 Metadata Standard* for geospatial data. Metadata detailing the characteristics and quality of submitted wetland data must be provided. It is essential to the success of the OWMS that all aspects of wetland data be completely documented in metadata, either at the feature or data set level. 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.

3.1 Minimum Graphic Data Elements

3.1.1 Polygon Features

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
FID	Object ID	NA	Feature ID (generated internally)
Shape	Polygon	NA	Geographic area feature (generated internally)
Area	Double	NA	Feature area in square feet (ft ²) per required Oregon Lambert projection
Perimeter	Double	NA	Length of polygon boundary in international feet per required Oregon Lambert projection

3.1.2 Linear or Point Features (lines or points)

Per the FGDCWMS, the OWMS does not support linear or point features (see section 2.5.8.1).

3.2 Minimum Attribute Data Elements

More complete definitions of attributes are provided in Appendix B. Classifications for some attributes are given in Appendix C. NA = not applicable.

3.2.1 Polygon Features

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
SITENAME	Text	100	Name of closest mapped locality or nearest locality
DATA_S_YR	Text	100	Source and year of original data
CREAT_YR	Text	100	Creator and year of polygon if different than DATA_S_YR
DATA_METH	Integer	NA	Method of data creation
DATA_ACCU	Integer	NA	Accuracy of data
COWARDIN	Text	20	Cowardin code
COWAR_S_YR	Text	100	Source and year of Cowardin data if different than DATA_S_YR
HGM	Text	10	Hydrogeomorphic (HGM) code
HGM_S_YR	Text	100	Source and year of HGM if different than DATA_S_YR
POLY_S_ID	Text	100	Wetland polygon ID in original data
FIELD_OBS	Text	10	Field verified, onsite or offsite
DATA_S_TYP	Integer	NA	Data source type

3.2.2 Linear or Point Features (lines or points)

Per the FGDCWMS, the OWMS does not support linear or point features (see section 2.5.8.1).

3.3 Optional Graphic Data Elements

None specified at this time.

3.4 Optional Attribute Data Elements

3.4.1 Polygon Features

<i>ITEM NAME</i>	<i>TYPE</i>	<i>WIDTH</i>	<i>DESCRIPTION</i>
HYD_BAR	Text	2	Known or reported artificial hydrologic barrier
HYD_DRA	Text	2	Known or reported artificial drainage
HYD_FLO	Text	2	Known or reported unnatural inflow
WET_MGT	Integer	NA	Wetland management type
COV_TYP	Integer	NA	Cover type (Oregon name) and map code
VEG_SPEC	Text	100	Dominant vegetation per original data source
VEG_COND	Integer	NA	General condition of vegetation
VEG_S_YR	Text	100	Source and year of original vegetation data if different than DATA_S_YR
LSW	Text	2	Locally significant wetland
GOAL_5_16	Text	2	Goal 5 or Goal 16 wetland
SAC	Text	2	Special Area of Concern
DEVELOP	Text	2	Development status of wetland

3.4.2 Linear or Point Features (lines or points)

Per the FGDCWMS, the OWMS does not support linear or point features (see section 2.5.8.1).

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 .
Base Imagery	Orthorectified imagery used as a base map to overlay wetland data.
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	<p>Recurring groups of biological communities found in similar physical environments and influenced by similar dynamic ecological processes. A classification unit that is readily mappable and identifiable by conservation and resource managers in the field. Oregon's wetland ecological systems are described at:</p> <p>http://oregonstate.edu/ornhic/or_wetlands_systems.pdf</p>
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 Accuracy	Horizontal positional accuracy in relation to base imagery.
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 0.2 ha (0.5 acres) 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	Area within a perimeter (bounded surface) for which the interior configuration is not directly specified
Source Imagery	Imagery used to develop signatures and interpret wetland boundaries, seasonal hydrology, composition or structure of substrate and vegetation, degree of disturbance, etc.
Spatial Relationship	Relative spatial location of a geographic area in terms of one or more geographic areas.

Spatial Resolution	Detail with which a map depicts the location and shape of a geographic feature.
Special Area of Concern	Wetland of conservation concern, requiring careful evaluation to assure minimal impacts. Wetland type is difficult to replace and/ or is rare.
Target Mapping Unit	Estimated size class of smallest wetland polygon that can be mapped and classified consistently at a particular scale.
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 Steward	The agency or organization responsible for assuring that a dataset of a particular type can be used with other Framework datasets.
Vertical Accuracy	Positional accuracy of a dataset in relation to a specified vertical datum.
WCP	Wetlands Conservation Plan administered by ODSL. These are wetland conservation plans for local jurisdictions. Wetlands are mapped at a required minimum scale of 1:2,400, with a required minimum TMU of 0.04 ha (0.10 acre). WCPs are not a substitute for a detailed delineation of wetland boundaries.

Appendix B: Data Dictionary

Minimum graphic data elements:

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

SHAPE: Set of vertices comprising the boundary of a geographic area feature. Generated internally by proprietary digitizing software based on topological algorithms. Topology is usually expressed as Cartesian coordinates (matched x-y-z pairs) in the projection units specified. Oregon Lambert projection, the OGIC exchange standard projection, is **required** for final products.

AREA: Number generated internally representing the area of each polygon feature, in units specified by the projection.

PERIMETER: Number generated internally representing the length of the boundary delineating the polygon feature, in units specified by the projection.

Minimum attribute data elements:

SITENAME: Name of closest mapped locality (e.g., GNIS name)

DATA_S_YR: Source and year of original data (e.g., name of consultant, author of field notes).

CREAT_YR: Creator and year of polygon if different than DATA_S_YR.

DATA_METH: Method of data creation.

DATA_ACCU: Accuracy of data, indicating the level of precision of a mapped feature.

COWARDIN: System, subsystem, class, subclass, water regime, and special modifiers where applicable, per FGDCWMS.

COWAR_S_YR: Source and year of Cowardin data if different than DATA_S_YR

HGM: Hydrogeomorphic (HGM) class and subclass code.

HGM_S_YR: Source and year of HGM if different than DATA_S_YR.

POLY_S_ID: Wetland polygon ID in original data.

FIELD_OBS: Field verified, onsite or offsite.

DATA_S_TYP: Data source type.

Optional attribute data elements:

HYD_BAR: Known or reported artificial hydrological barrier (tide gates, flaps, culverts, dikes, seawalls, dams, levees, weirs, berms, causeways). Does not include beaver dams.

HYD_DRA: Known or reported artificial drainage (fill, excavation, drain tile, ditches, culverts, artificial channels).

HYD_FLO: Known or reported unnatural inflow (urban or suburban runoff, piped discharge, upstream diversion, impoundment, or controlled flows).

WET_MGT: Wetland management type, if known.

COV_TYP: Wetland cover type (Oregon name) and map code. Generalized or simplified names derived from NatureServe ecological systems, intended to simplify mapping of similar vegetation types.

VEG_SPEC: Dominant vegetation per original data source, in 6-letter acronym format.

VEG_COND: General condition of vegetation.

VEG_S_YR: Source and year of original vegetation data if different than DATA_S_YR.

LSW: Locally significant wetland, identified from LWI or other source.

GOAL_5_16: Wetland protected through local government or county ordinance as required by statewide planning Goal 5 or Goal 16.

SAC: Special Area of Concern. Wetland of conservation concern.

DEVELOP: Development status of wetland. Wetland may have been partially or completely developed since original polygon was created. Change is usually detected in recent aerial imagery.

Appendix C: Classification of Attribute Elements

Minimum attribute data elements:

SITENAME: Name of closest mapped locality (e.g., GNIS name).

DATA_S_YR: Source and year of original data (e.g., name of consultant, author of field notes).
For DSL documents, year = year of DSL approval. Assign one variable per polygon:

Source, year	Source and year. Enter as: Source 2005.
-----------------	---

CREAT_YR: Creator and year of polygon if different than DATA_S_YR. Assign one variable per polygon:

Source, year	Source and year. Enter as: Source 2005.
X	Not applicable

DATA_METH: Method of data creation. Assign one variable per polygon:

1	Imported from GIS, CAD, or resource grade GPS
2	Digitized from paper
3	Digitized from imagery

DATA_ACCU: Accuracy of data. Assign one variable per polygon:

0	Unknown
1	Resource-grade GPS
2	Surveyed
3	Digitized, scanned
4	Digitized, freehand

COWARDIN: System, subsystem, class, subclass, water regime, and special modifiers where applicable, per FGDCWMS.

Source: NWI standards (<http://www.fws.gov/nwi/MapCodesLegend.pdf>). There are too many possible combinations of code to list in the OWMS (over 6,000 nationwide, but many of these do not apply to Oregon).

http://www.fws.gov/nwi/wetlands_atts.txt

Assign one variable per polygon. If data source lists multiple codes per polygon, use first code listed. Where a code is lacking, add:

0	Unknown
---	---------

COWAR_S_YR: Source and year of Cowardin data if different than DATA_S_YR. Assign one variable per polygon:

Source, year	Source and year. Enter as: Source 2005.
X	Not applicable

HGM: HGM class and subclass code.

Sources:

1. 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.
http://egov.oregon.gov/DSL/WETLAND/hgm_guidebook.shtml
2. Adamus, P.R. 2006. *Hydrogeomorphic (HGM) Assessment Guidebook for Tidal Wetlands of the Oregon Coast, Part 1: Rapid Assessment Method*. Report to Coos Watershed Association, US Environmental Protection Agency, and Oregon Department of State Lands, Salem. 85 pp.
http://egov.oregon.gov/DSL/WETLAND/docs/tidal_HGM_pt1.pdf

Assign one variable per polygon. If data source lists multiple codes per polygon, use first code listed:

U	Unknown
X	Not applicable
D	Depressional (undifferentiated)
DA	Depressional alkaline
DB	Depressional bog
DCNP	Depressional closed nonpersistently flooded
DCP	Depressional closed persistently flooded
DOF	Depressional outflow
F	Flats
L	Lacustrine (undifferentiated)
LFH	Lacustrine fringe headwater
LFV	Lacustrine fringe valley
MSH	Estuarine fringe marine-sourced high tidal
MSL	Estuarine fringe marine-sourced low tidal
R	Riverine (undifferentiated)
RFT	Riverine flow-through
RI	Riverine impounding
RS	Estuarine fringe river-sourced
S	Slope (undifferentiated)

SF	Slope/Flats
SH	Slope headwater
SV	Slope valley

HGM_S_YR: Source and year of HGM if different than DATA_S_YR. Assign one variable per polygon:

Source, year	Source and year. Enter as: Author 2005.
X	Not applicable

POLY_S_ID: Wetland polygon ID in original data. Assign one variable per polygon:

ID#	Unique polygon ID in original data
U	Unknown

FIELD_OBS: Field verified, onsite or offsite. Assign one variable per polygon:

Month, year	Visually confirmed onsite or from nearby vantage point ("partial offsite"). Enter as: Jul 2005; if month unknown, enter as 000 2005.
Y	Visually confirmed but date not available
N	Not visually confirmed

DATA_S_TYP: Data source type. Assign one variable per polygon:

1	National Wetland Inventory
2	Local Wetland Inventory
3	Federal or state agency mapping
4	Private, academic, NGO, consultant
5	Local or regional government, service district, park district, watershed council
6	Other

Optional attribute data elements:

HYD_BAR: Known or reported artificial hydrological barrier (tide gates, flaps, culverts, dikes, seawalls, dams, levees, weirs, berms, causeways). Do not include beaver dams. Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

HYD_DRA: Known or reported artificial drainage (fill, excavation, drain tile, ditches, culverts, artificial channels). Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

HYD_FLO: Known or reported unnatural inflow (urban or suburban runoff, piped discharge, upstream diversion, impoundment, or controlled flows). Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

WET_MGT: Wetland management type, if known. Assign one variable per polygon:

0	Unknown
1	Mitigation site or mitigation bank
2	Restoration or enhancement site
3	Natural area management
4	Municipal, industrial, farm, rangeland, or forestry
5	Other

COV_TYP: Wetland cover type (Oregon name) and map code.

Source (with additions and modifications):

1. Kagan, J.S. 2008. Database of Ecological System names, technical descriptions, and simplified descriptions. Final Report, 2008 Update to Oregon Watershed Enhancement Board Basin Acquisition Priorities. Oregon Natural Heritage Information Center, Oregon State University, Portland.

Cover types, listed alphabetically with map codes. Assign one variable per polygon:

Map_Code	Cov_Type (Oregon Name)
9297	Alkaline and Brackish Wetland
5260	Avalanche Chute Shrub Swamp
9103	Black Greasewood
9155	Blue Mountain Foothill and Lower Montane Riparian
9156	Blue Mountain Low Elevation Riparian
9166	Bog and Fen (Non-serpentine)
9330	California Lowland Riparian
9170	Columbia Basin Lowland and Foothill Riparian
9229	Dune Wetland

9222	Eastside and Arid Land Marsh (freshwater, including prairie)
9171	Eastside Montane - Subalpine Riparian
9187	Eastside Montane - Subalpine Shrub Swamp
9219	Freshwater Aquatic Bed
3122	Freshwater Mudflat (Nontidal)
9168	Great Basin Lowland - Montane Riparian
2	Intertidal Brackish or Freshwater Shrub Swamp and Forested Wetland
9220	Intertidal Freshwater Marsh
3116	Intertidal Mudflat
9281	Intertidal Salt or Brackish Marsh
5	Mature Forested Wetland
9265	Montane - Alpine Wet Meadow
1	Not applicable
3179	Playa
5258	Salt Desert Scrub
9325	Serpentine Riparian, Spring, Seep, and Fen
9321	Silver Sagebrush
3	Spring, Cold
4	Spring, Hot
9230	Subtidal salt or brackish aquatic bed
0	Unknown
9251	Vernal Pool
11	Water (Unclassified)
9260	Westside Freshwater Marsh
9106	Westside Lowland Riparian
9108	Westside Montane Riparian
9190	Westside Shrub Swamp and Forested Wetland
9221	Westside Valley Wet Prairie

VEG_SPEC: Dominant vegetation per original data source.

Use 6-letter acronyms: first three letters of genus and first three letters of species (e.g., *Phalaris arundinacea* = PHAARU). If needed, a 7th letter for subspecies or variety is permissible.

1. If species are listed by layers (tree, shrub, herb): separate layers by forward slash (/) unless only herbaceous layer present. If more than one species is present per layer, list only the first two species given for each layer and separate them by a dash, (e.g., FRALAT – POPTRI / SALSIT – CORSTO / PHAARU – ELEPAL). If there is only one species in a given layer, use only that name (e.g., ELEPAL). If there is no name in a given layer, ignore that layer (e.g., FRALAT / PHAARU – ELEPAL).
2. If species are just a list, enter as listed with commas between the 6-letter acronyms.
3. If data source lists multiple vegetation types (or water) per polygon, use type with strongest overall wetland indicator status. If first type listed is water and subsequent types are vegetation types, use water (then VEG_SPEC = U, COV_TYP = 5). If none of the vegetation types are wetland indicators or are FACU, delete polygon.

If no species are listed:

N	No vegetation present
U	Unknown or information not provided

VEG_COND: General condition of vegetation. Intended for field assessments, less suited for mining of existing source material unless specific data are provided.

Source: adapted from Faber-Langendoen, D., G. Kudray, C. Nordman, L. Sneddon, L. Vance, E. Byers, J. Rocchio, S. Gawler, G. Kittel, S. Menard, P. Comer, E. Muldavin, M. Schafale, T. Foti, C. Josse, J. Christy. 2008. Ecological Performance Standards for Wetland Mitigation based on Ecological Integrity Assessments. NatureServe, Arlington, VA. 75 pp + Appendices.

Assign one variable per polygon:

0	Unknown
1	Relative total cover of native plant species 80-99% and exotic plant species 1-20%. Species composition close to that of reference stand, may contain some weedy species. Some indicator species may be absent.
2	Relative total cover of native plant species 50-79% and exotic plant species 21-50%. Species composition different from reference stand. Many indicator species may be absent.
3	Relative total cover of native plant species 1-50% and exotic plant species 51-99%. Species composition severely altered from reference stands. Dominated by weedy species or planted with non-characteristic species. Most or all indicator species absent.

VEG_S_YR: Source and year of original vegetation data if other than DATA_S_YR. Assign one variable per polygon:

Source, yyyy	Source and year
X	Not applicable

LSW: Locally significant wetland. Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

GOAL_5_16: Goal 5 or Goal 16 wetland. Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

SAC: Special Area of Concern. Wetland of conservation concern per list below. Assign one variable per polygon:

Y	Yes
N	No
U	Unknown
X	Not applicable

Types of SACs, listed alphabetically with COV_TYP codes:

9166	Bog and Fen (Non-serpentine)
9229	Dune Wetland
2	Intertidal Brackish or Freshwater Shrub Swamp and Forested Wetland
9220	Intertidal Freshwater Marsh
3116	Intertidal Mudflat
9281	Intertidal Salt or Brackish Marsh
5	Mature Forested Wetland
3179	Playa
9325	Serpentine Riparian, Spring, Seep, and Fen
3	Spring, Cold
4	Spring, Hot
9230	Subtidal salt or brackish aquatic bed
9251	Vernal Pool
9221	Westside Valley Wet Prairie

DEVELOP: Development status of wetland. Wetland may have been partially or completely developed since original polygon was created. Change is usually detected in recent aerial imagery. Assign one variable per polygon:

N	Not developed
P	Partially developed
F	Fully developed
U	Unknown
X	Not applicable

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>
ACE	U.S. Army Corps of Engineers
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
LWI	Local Wetlands Inventory (ODSL supervised)
NWI	National Wetland Inventory (U.S. 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: 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.
http://egov.oregon.gov/DSL/WETLAND/hgm_guidebook.shtml
- Adamus, P.R. 2006. Hydrogeomorphic (HGM) assessment guidebook for tidal wetlands of the Oregon coast, Part 1: rapid assessment method. Report to Coos Watershed Association, US Environmental Protection Agency, and Oregon Department of State Lands, Salem. 85 pp.
http://egov.oregon.gov/DSL/WETLAND/docs/tidal_HGM_pt1.pdf
- 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. 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
- Federal Geographic Data Committee. 2008. *Draft Wetlands Mapping Standard, September 2008*. FGDC Wetland Subcommittee and Wetland Mapping Standard Workgroup. 31 pp.
<http://www.fws.gov/nwi/fgdc/meetings/FINAL%20-%20FGDC%20Draft%20Wetland%20Mapping%20Standard%20September%202008.pdf>
- 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.
- 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>.