

Appendix 9. Methodology for Creation of Terrestrial Ecological Systems Model

This GIS model was developed to depict the distribution of terrestrial ecological systems at the ecoregional level and at a coarse geographic scale. This involved integrating a variety of GIS datasets and multiple iterations of expert review and interpretation.

Section I lists and describes the source GIS data. Section II lists the model rules and describes how the source GIS datasets were integrated to predict the distribution of the four terrestrial ecological system targets.

I. Source GIS Data

These datasets are listed in order of their geographical location and extent

A. Entire Ecoregion

1. Biophysical Landscape Classification (Ecological Land Units)

In a GIS, Elevation zones, landform types, and surficial geology classes were intersected and re-attributed to yield a biophysical landscape classification of ecological land units (ELUs). (A subset of these map units was selected by Chris Chappell, WA NHP, to predict the distribution of Dry Evergreen Forest in Washington.)

B. Portions of Ecoregion

1. British Columbia

- Regional and Zonal Ecosystems of the Shining Mountains.

Depicts regional and zonal ecosystems of British Columbia, provided by the BC Ministry of Sustainable Resource Management, Broad Ecosystem Inventory, Shining Mountains project.

See <http://srmwww.gov.bc.ca/ecology/bei/shiningmntns.html> for metadata.

- Baseline Thematic Mapping Present Land Use Mapping at 1:250 000.

Landcover classification of Landsat 5 TM satellite imagery. Developed by British Columbia Ministry of Environment, Lands and Parks, Surveys and Resource Mapping Branch, 1995.

See <http://srmwww.gov.bc.ca/bmgs/products/btmspecn.pdf> for metadata.

- Sensitive Ecosystems Inventory, East Vancouver Island and Gulf Islands.

Canadian Wildlife Service, Environment Canada, 1998. See

<http://srmwww.gov.bc.ca/cdc/sei/vancouverisland/publications/technical/ttitle.htm> for methods and ecosystem descriptions.

- Fraser Lowland Wetland Inventory.

Canadian Wildlife Service, Environment Canada, 1998.

2. Washington & Oregon

- **A GIS Map of Existing Grasslands and Oak Woodlands in the Puget Lowland and Willamette Valley Ecoregions, Washington.**

Developed by Chris Chappell et al., WA NHP, WA DNR. Unified digital map of: (1) untilled grasslands now existing in landscapes that formerly supported native dry grasslands, and (2) oak dominated or co-dominated canopies.

3. Washington

- **USGS National Land Cover Dataset (NLCD)**

Early version of the National Land Cover Dataset developed and released by Pacific Meridian, 1999. See http://edc2.usgs.gov/lccp/nlcd/show_data.asp?code=wa&state=washington for metadata.

- **USFWS National Wetlands Inventory**

Wetland delineations from the National Wetlands Inventory (NWI) were appended to cover the portion of the ecoregion in Washington. See <http://wetlands.fws.gov/index.html>.

- **Riparian Areas in Washington**

Forested riparian areas in Washington State were delineated using FEMA 100-year floodplain data and the National Land Cover Dataset. Metadata available from the Nature Conservancy of Washington, upon request.

- **Washington DNR Soils**

Developed by WA DNR State soils mapping program, Forestland Soil Survey, 2000. See <http://www.dnr.wa.gov/dataandmaps/metadata/soilsmeta.html> for metadata. A subset of soil types was selected by Chris Chappell, WA NHP, to predict the distribution of Dry Evergreen Forest in the southern Puget Trough.

4. Oregon

- **Willamette Valley Vegetation Map**

Created by Oregon Natural Heritage Program, using data from OR NHP Wetland Survey, WDFW wildlife habitats and species associations layer (O'Neil & Johnson), Hullse landcover classification (OSU).

- **Willamette Valley Pre-Settlement Vegetation, c. 1851.**

Developed by Oregon Natural Heritage Program, The Nature Conservancy of Oregon and Oregon State University. Downloaded via <http://www.fsl.orst.edu/pnwhrc/wrb/access.html>; see http://www.fsl.orst.edu/pnwhrc/wrb/metadata/veg1851_v4.html#TOC. This data was re-classified by Ed Alverson, OR NHP, to identify the following historic vegetation classes:

- Oak Woodland
- Dry Evergreen Forest - Woodland
- Douglas Fir – W. Hemlock – W. Redcedar Forest

- **Native Wetland and Riparian Plant Communities in the Willamette Valley, Oregon.**

Titus et al., Oregon Natural Heritage Program and The Nature Conservancy of Oregon, 1996.

II. GIS Model

This portion of the appendix lists the model rules and describes how the source GIS datasets were integrated to predict the distribution of the following four terrestrial ecological system targets. (Ecoregional sections are those described in Appendix 3.)

A. Oak Woodland

Puget Trough and Lower Columbia sections within Washington:

Any occurrences depicted in the WA NHP Oak Grassland dataset (7.), excluding any occurrences coinciding with residential or commercial development, per the NLCD (8.).

Willamette Valley section:

Any occurrences of Oak Hardwood, as depicted in the Willamette Valley vegetation dataset (12.).

Deciduous forest, per the Willamette Valley vegetation dataset (12.), occurring within the 'Oak Woodland' 1851 historic vegetation class (13.).

B. Riparian Forests and Shrubland

British Columbia

All areas identified in the BC Sensitive Ecosystems Inventory (5.) as Riparian (RI).

Washington

Riparian forest as represented in the Washington Riparian Forest coverage (10.).

Oregon

Riparian forest as represented in the Willamette Valley vegetation dataset (12.).

Erroneous occurrences along irrigation canals and upland from the riparian corridor were eliminated.

C. Dry Evergreen Forest & Woodland

British Columbia

All areas identified in the BC Sensitive Ecosystems Inventory (5.) as Woodland (WD).

Within the Shining Mountains 'Coastal Western Hemlock' vegetation zone (3.), all forest defined by the BC landcover dataset (4.) occurring on Dry Evergreen-specific ELU types (2.).

Within the Shining Mountains 'Coastal Douglas Fir' vegetation zone (3.), all forest defined by the BC landcover dataset (4.) occurring on steep, southwest facing slopes.

Washington

Within the Georgia Depression section (1.), all evergreen forest defined by the NLCD (8.) occurring on steep, southwest facing slopes (2.).

Within the Puget Trough and Lower Columbia sections (1.), all evergreen forest defined by the NLCD (8.) occurring on Dry Evergreen-specific ELU (2.) and soil (11.) types.

Oregon

Closed and Open Conifer forest, as depicted in the Willamette Valley vegetation dataset (12.), excluding wetlands, per OR Native Wetlands dataset (14.), and occurring within the 'Dry Evergreen' 1851 historic vegetation class (13.).

Mixed forest, as depicted in the Willamette Valley vegetation dataset (12.), excluding wetlands, per OR Native Wetlands dataset (14.), and occurring on steep, SW-facing slopes (2.).

¹ In areas outside the extent of the Willamette Valley vegetation dataset, Evergreen forest was used as a surrogate for Closed and Open Conifer forest, per the Pacific Meridian landcover classification (lulc90-puget).

D. Douglas Fir - Western Hemlock - Western Redcedar Forest

British Columbia

All areas identified in the BC Sensitive Ecosystems Inventory (5.) as Second Growth Forest (SG).

Washington

All evergreen, deciduous, and mixed forest, per the NLCD (8.), excluding wetlands, per NWI (9.), and NOT occurring on sites previously predicted to support Dry Evergreen forest, i.e. NOT steep, SW-facing slopes (2.) and NOT the Dry Evergreen-specific ELU and soil types (11.).

Oregon

Closed Conifer, Open Conifer, Deciduous, Closed Mixed, and Open Mixed Forest, as depicted in the Willamette Valley vegetation dataset (12.), excluding wetlands, per OR Native Wetlands dataset (14.), and occurring within the 'Douglas Fir' 1851 historic vegetation class (13.).