1. **Data Set Title**: Integrated Decision Units for the Willamette Water 2100 Project

2. **Abstract**: Attributed map polygons called Integrated Decision Units (IDUs) that cover the spatial extent of the Willamette River Basin in Western Oregon, USA. The IDUs were developed for use in Willamette Envision, a computer model developed to explore future water supply and demand under different trajectories of climate change, demographic change and water management. Willamette Envision is based on Envision, a modeling tool for planning and environmental assessments that was developed at Oregon State University (J. Bolte, http://envision.bee.oregonstate.edu). Willamette Envision incorporates a suite of sub-models to simulate processes that affect the distribution, movement, supply and demand for water in the Willamette Basin. As these component models run, they retrieve and store information from attributes within the IDU layer. Refer to the Willamette Water 2100 website for more details about Willamette Envision (http://inr.oregonstate.edu/ww2100). The dataset archived here consists of 164,892 polygons. Each IDU has 189 attributes representing aspects of land use, economics, hydrology, and water use such as land use type, annual maximum evapotranspiration, and long term farm rent. Variable attributes are calculated during model runs and may not have meaningful values in this dataset, which represents initial conditions.

3. **Recommended data citation**: Willamette Water 2100 Project Team. 2015. Integrated Decision Units for the Willamette Water 2100 Project. Oregon Hydrologic Information Server.

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5. **Related publications**
   http://inr.oregonstate.edu/ww2100/publications

6. **Methods**:

The IDU dataset is stored as an ESRI shapefile. The polygons that comprise the shapefile were developed by intersecting a set of two independent shapefiles. The first was the catchment shapefile taken from the National Hydrography Dataset (NHD+V2). This dataset provides information needed by the hydrology model to connect the landscape to individual stream reaches. The second was a composite dataset representing landuse and landcover in the Willamette Basin. This dataset was developed from (1) a US Forest Service dataset (GNN) representation of the forested portions of the basin and (2) as US Department of Agriculture datasets (NASS CDL) representing all other portions of the basin. The NASS data is derived from LANDSAT imagery and is designed to closely capture the crops grown as part of the agricultural system. Primary steps in the construction of the IDU polygons involved the following:

1. Develop WW2100 Land Use Land Cover Classification

a. Compromise between USGS NLCD, PNW-ERC
b. Reclass NLCD 2001 to WESP 2010 (see crosswalk_wesp_to_nlcd.xls)

2. Create ag classes with NASS 2007 Cropland Data Layer (CDL) 56 meter data
a. Resample using nearest neighbor (30x30)
b. Reclass using following assignments:

CDL		WESP
Grass/Pasture/Non-Ag	=	21 Pasture/Hay
Misc. Crops	=	22 Row Crops
Apples/Grapes/ Other Tree Nuts/ Other Tree Fruits	=	23 Orchard/Vineyard
Christmas Trees	=	24 Christmas Trees
Woodland/Water/Wetlands	=	0
All NLCD categories	=	0

c. Replace pixels from NLCD 2001 covered by ag classes (21-24) with reclassed CDL

3. Create forest classes with USFS GNN 30 meter data
a. Use masked GNN 2006 imagery
b. Classify forest type based on BAH_PROP into

GNN BAH_PROP	WESP
< 0.2	42 Conifer
>= 0.2 and <0.65	43 Mixed Forest
>= 0.65	41 Hardwood

c. Age Conifer based on AGE_DOM into:

GNN AGE_DOM	WESP
0 - < 20	421 Conifer 0-20 yrs
20 - < 40	422 Conifer closed 21-40
40 - < 60	423 Conifer closed 41-60
60 - < 80	424 Conifer closed 61-80
80 - < 120	425 Conifer closed 81-120
120 - < 200	426 Conifer closed 120-200
200+	427 Conifer closed 200+

d. Replace pixels of NLCD + ag covered by forest from GNN
e. Remaining pixels in NLCD Class 42 Evergreen Forest reclassed using unmasked GNN data

4. Create version 1 of IDU polygons
a. Resample 30 meter pixels from step 3e to 60 meter pixels
b. Filter out singleton pixels in 3x3 window (3 times)
c. Filter out singleton pixels in 2x2 window (3 times)
d. Filter out singleton pixels in 3x3 window (1 time)
e. Filter out singleton pixels in 5x5 window (1 time)

f. Filter out singleton pixels in 2x2 window (1 time)
g. Vectorize
h. Eliminate polygons < 7.5 ha by combining using max area

5. Create version 2 of IDU polygons
   a. Use NHD+ catchments
   b. Intersect catchments with version 1 IDU polygons
   c. Eliminate polygons < 100 m2 by combining using max border

6. Create version 3 of IDU polygons by subdividing large polygons
   a. Clip version 2 polygons > 100 ha with 700 x 700 meter (49 ha) grid
   b. Eliminate polygons < 25 ha by combining using max area (2 times)

7. **Location:** Hydrologic Unit Code: 170900

8. **File format** SHP, DBF and related files. Look up table and idu.xml contains attributes for categorical fields.

9. **Related Documentation**:
   IDU_DataDictionary.xlsx - includes data dictionary and lookup table
   Crosswalk_wesp_to_nlcd.xls
   Idu.xml

10. **Sponsorship**: Generation of this data set was supported by the National Science Foundation under Grants No. 1039192 (OSU), 1038925 (PSU) and 1038899 (UO).

11. **Overview of project and disclaimer**: The Willamette Water 2100 project was a six year collaborative research effort by Oregon State University, Portland State University and the University of Oregon to evaluate how climate change, population growth, and economic growth will alter the availability and the use of water in the Willamette River Basin on a decadal to centennial timescale. The project team developed a computer model, called Willamette Envision, that integrates aspects of hydrology, ecology, and human systems, and allows scientists and stakeholders to explore the interaction between land and water management policies, economics, climate, and ecology. The project was supported by grants from the National Science Foundation and was carried out between 2010 and 2016. Any opinions, findings, and conclusions or recommendations expressed by this work are those of the authors and do not necessarily reflect the views of the National Science Foundation.

12. **Keywords**: Envision, Water Sustainability and Climate, water scarcity, Willamette River Basin

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