1. **Data Set Title**: Decadal Spatial Output, 2010-2099, for Willamette Water 2100 Modeling Scenarios, Output Version 3.0

2. **Abstract**: Shapefiles containing output from modeling scenarios developed by the Willamette Water 2100 project. The output was generated by Willamette Envision, a computer model developed to explore future water supply and demand under different trajectories of climate change, demographic change and water management (http://inr.oregonstate.edu/ww2100). This output is called WW2100 3.0 and was generated by Willamette Envision code version 330 and 331 as archived in the WW2100svn repository (https://freshwater.ceoas.oregonstate.edu:8443/svn/WW2100svn). Shapefiles are grouped into zip files that specify modeling scenario name (e.g. Ref.zip, Extreme.zip). Refer to the scenario table (PDF) and Willamette Water 2100 web page (http://inr.oregonstate.edu/ww2100/model-overview/scenarios) for a description of each scenario. The shapefiles are of attributed map polygons called Integrated Decision Units (IDUs) that cover the spatial extent of the Willamette River Basin in Western Oregon, USA. Each shapefile consists of 164,892 polygons with 189 attributes representing aspects of landscape and hydrologic conditions such as land use type, annual maximum evapotranspiration, and long term farm rent. The shapefile for each decade includes attribute values for the last day of each decade of the simulation (e.g. December 31, 2019; December 31, 2029 etc.).

3. **Recommended data citation**: Willamette Water 2100 Project Team. 2016. Decadal Spatial Output, 2010-2099, for Willamette Water 2100 Modeling Scenarios, Output Version 3.0. Oregon Hydrologic Information Server.

4. **Data Contact person:** David Conklin, Oregon Freshwater Simulations,david.conklin@FreshwaterSim.com, http://www.freshwatersim.com/; Anne Nolin, Oregon State University, nolina@oregonstate.edu

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

6. **Methods**:

Willamette Envision is a whole watershed model, i.e. it attempts to represent all the significant processes related to the supply and fate of water in the entire basin. These processes are both natural (e.g. precip, snow dynamics, infiltration, runoff, evapotranspiration) and human (e.g. reservoir operations, irrigation, municipal water use, crop choice). The model takes exogenous projections of climate, population, and income as its drivers. It operates by simulating the processes across the entire basin for one time step, recording the effects on the landscape, and then advancing to the next timestep. Some processes are modeled at a daily timestep, for example streamflow and evapotranspiration, while others are modeled at an annual timestep,

such as population growth and urban expansion. Refer to the Willamette Water 2100 website for more details about Willamette Envision (http://inr.oregonstate.edu/ww2100).

The decadal shapefiles includes attribute values for the last day of each decade of the simulation (e.g. Map_Year2010 = December 31, 2009, e.g. initial conditions; Map_Year2020 = December 31, 2019; Map_Year2030 = December 31, 2029 etc.) for each IDU modeling polygon. Refer to the IDU metadata description for details about how the polygons were created. Some attributes store annual values (e.g. ET_yr = annual evapotranspiration for 2019) and others store daily values (e.g. ET_day = evapotranspiration on December 31, 2019). Refer to the data dictionary for more details about each attribute.

The decadal shape files are grouped into zip files that specify modeling scenario name (e.g. Ref_maps.zip, Extreme_maps.zip). There are a total of 22 scenarios, 20 representing future conditions (January 1, 2010 - December 31, 2099) and two representing historical conditions (January 1, 2050 - December 31, 2009). Refer to the scenario table (.pdf) and Willamette Water 2100 web page (http://inr.oregonstate.edu/ww2100/model-overview/scenarios) for a description of each scenario.

For WW2100 3.0, all of the scenarios except the two historical scenarios were run with Willamette Envision code v330. The two historical scenarios were run using v331, which differs from v330 in one way: it uses landscape conditions at the end of the first year of the Reference Case scenario (idu_2011.dbf). The Willamette Envision Code v330 and related input files can be downloaded at http://inr.oregonstate.edu/ww2100, other versions of the code can be accessed from an online repository located at: https://freshwater.ceoas.oregonstate.edu:8443/svn/WW2100svn.

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

8. **File format** SHP, DBF and related files

9. **Related Documentation**:
   IDU_DataDictionary.xlsx - includes data dictionary and lookup table
   idu.xml
   WW2100_ScenarioTable.pdf
   Notes.pdf - notes on how this version of code differs from previous versions
   Scenario_Comparison.xlsx - comparison of how model output differs from output from earlier code versions

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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