

**Oregon Geographic Information Council (OGIC)
Framework Data Development Program**

**Oregon Hydrography Framework Funding Request
For the 2009 – 2011 Biennium**

Activity #1: PNW Hydrography Clearinghouse—Incorporating Edits from Oregon partners

Background:

The PNW Hydrography Framework (PNWHF) is a cooperative effort between several federal, state, local, and private organizations in the Pacific Northwest. It was formed to define, implement, and maintain high-resolution hydrography and hydrologic unit boundary (HU) datasets for the states of Oregon and Washington. The Partners in the PNW Hydrography Framework are the Oregon State Office of the Bureau of Land Management, Region 6 of the U.S. Forest Service, and the States of Oregon and Washington. The PNWHF collaborates with the Geographic Information Councils and Framework Implementation Groups in Oregon and Washington, as well as, the U.S. Geological Survey and U.S. Natural Resources Conservation Service at the national level.

The PNWHF is the steward for the National Hydrography Dataset (NHD) in our region. The NHD interconnects and uniquely identifies the stream segments or reaches that make up the Nation's surface water drainage system. Since it provides a nationally-consistent framework for addressing and analysis, water-related information linked to reach addresses by one organization (national, state, or local) can be shared with other organizations and easily integrated into many different types of applications to the benefit of all.

Activity #1 continues with the implementation of the PNW Hydrography Clearinghouse to handle transactions on the hydro data from our partners in the region. This will also include a separate mechanism for the Clearinghouse to use its in-house staff of trained NHD editors to make edits on behalf of those entities in Oregon that do not have editors.

Detailed Project Narrative:

Hydrography data, representing lakes, rivers, and springs, to name a few, is a priority theme for the state of Oregon. It is currently complete and seamless for the state and has been compiled from 1:24,000-scale, and larger, source materials. There is a broad need for this theme by several agencies and programs in the region, from the local to the federal level.

The data are maintained in the ArcGIS geodatabase structure and comply with a nationally accepted data model (the NHD) which includes standard metadata. The principal stewards for the theme in Oregon are Dan Wickwire (BLM, Oregon State Office) and Bill Kaiser (Forest Service, Region 6 Supervisor's Office). Their contact information is included at the end of this grant proposal.

Business Purposes Served

- Mapping and analysis of threatened and endangered aquatic species as required by the Oregon Plan for Salmon and Watersheds.
- Mapping and analysis of water rights (consumptive & instream).
- Mapping and analysis of fish presence in support of the Oregon Forest Practices Act.

- Mapping and analysis of water quality limited streams for compliance with the Federal Clean Water Act.

Citations

- The Oregon Plan for Salmon & Watersheds
- Oregon Water Rights Act (ORS 537)
- Oregon Forest Practices Act (ORS 527)
- Oregon Water Quality Act (ORS 468B)
- Federal Clean Water Act (CWA), Section 305(b) and Section 303(d)

The PNW Hydro Clearinghouse is the primary conduit for submitting edits to the NHD. Transactions on the national NHD repository from the region have occurred but a comprehensive and a well-defined maintenance process is not in place.

The immediate goal of this project is to define and document the NHD transaction maintenance process given the current NHD geodatabase design and USGS supported tools. Individual PNWHF partner organizations, with the proper tools and training from the NHD, can initiate transactions on the national repository, complete those edits, and provide them back to the USGS for posting to the national repository. This activity occurs within the context of the stewardship and governance guidelines provided in the PNWHF Memorandum of Understanding. Use of the NHD/WBD Data Maintenance Tracker, developed by the BLM, will facilitate this process.

Data synchronization procedures will be developed and these procedures will address the synchronization of the NHD at the national repository with copies that reside in the PNWHF Clearinghouse and in individual partner organizations. Initially, the USGS will provide XML updates on an agreed-upon schedule to the PNWHF Clearinghouse and partners organizations. In the long term, these procedures will expand to include the latest ESRI ArcSDE synchronization functionality.

The BLM has initiated transactions on the NHD based on edits identified by its field units. It has established a test environment to test loading the Oregon/Washington NHD into an ArcSDE database. It will also test incorporating XML updates provided by the USGS following successful updates to the national repository.

Successful maintenance of the NHD requires a high level of skill and proficiency in the use of the tools provided by USGS for this purpose. The BLM's experience with the recent NHD densification project has highlighted the advantages of retaining a centralized staff experienced in the use of the NHDGEO Editor. The complexity of the Editor precludes its use by inexperienced, infrequent, and/or casual editors. The BLM has started working with the State of Oregon and Portland Metro to incorporate their edits into the NHD.

Deliverables:

- PNW Hydro Clearinghouse—handle edits to the NHD for trained editors
- Incorporate edits, not covered in bullet #1, from Oregon partners into the NHD

Amount Requested: \$15,000

Preliminary budget breakdown for entire project:

- Budget request based on BLM estimate.
- Funds from partners, other project related funds, matching funds, etc. (*also applies to Activity #2*):

PNWHF and other partners provide funding support to a variety of PNW Hydro Framework projects in Oregon and Washington. Funding is pooled to support specific projects. In addition, PNWHF Partners provide substantial support to the national programs for the development and stewardship of the NHD and WBD. These efforts ultimately benefit the PNWHF.

Below is a summary of support for the current federal fiscal year and pertains to the period of *October 1, 2008 to April 24, 2009*. Reimbursable agreements are entered into with federal partners to accomplish a subset of this work. BLM and USFS contribute significant support via staff work months.

Funding Partner	Project Description	Estimated Funding Level
BLM	PNWHF Project Management	\$38,127
BLM	Support to national NHD and WBD programs (benefits to PNWHF)	\$29,654
BLM	Technical Support to PNWHF	\$9,558
BLM	Technical Support to national NHD and WBD programs	\$12,787
BLM	Centralized edit of NHD for BLM districts in Oregon	\$24,929
USFS	PNWHF Project Management	\$20,720
USFS	Support to national NHD and WBD programs (benefits to PNWHF)	\$14,800
USFS	PNWHF NHD Data Migration, QC, etc.	\$41,813
USFS	Data Migration, Hardware/Software Upgrade. \$60,000 total available for projects. Total amount available.	\$60,000
USGS	Development of business requirements, web application, etc. \$50,000 total for Agreement.	\$17,800
EPA	Hydro Event Management Tool. Carry over project from FY2008. Total support to project is \$50,000.	\$22,193
		\$292,381

Activity #2: Continuation of LiDAR pilot

Background:

The PNWHF initiated a LiDAR pilot project in Oregon to address these issues during the '07/'09 biennium using Framework data development funds. The project began the process of defining "best practices" for the delineation of stream networks from LiDAR data. Pilot locations were identified in the Upper Wilson in Tillamook County and the Ashland Watershed in Jackson County.

Further funding will pay for expanding the pilot to other areas of the state that have since been flown with LiDAR, ground truthing a subset of the areas to check the accuracy of the methodology, and conflation of the NHD data structure (routes & attributes) to the new centerlines.

Acquisition of LiDAR data within Oregon continues through the efforts of individual organizations and interagency consortiums. Delineation of stream networks and hydrologic unit boundaries is an important use for these data.

The scientific literature contains some documentation of “best practices” for LiDAR-based delineations; however, standard approaches have not been examined within the context of the PNWHF and the national NHD/WBD repositories. This type of assessment needs to occur prior to PNWHF partners moving forward with LiDAR-based delineations and updates to the framework datasets.

Detailed Project Narrative:

Continuation of the project will allow testing and refining delineation methodologies in other landscape regimes in the state, especially east of the Cascade crest. The project team will use recently acquired LiDAR data. PNWHF partner hydrologists will be asked to assist in these new areas, investigating the use of local regression equations to determine stream initiation points and periodicity, i.e., perennial or intermittent. We also hope to test the use of other physical and climatic characteristics such as precipitation and soils data. The project will also examine the inclusion of these resulting data into the national repositories for the NHD/WBD, as well as, within the context of the PNWHF partners.

Deliverables:

- Methodology for incorporating derived streams into the NHD through the PNW Hydro Clearinghouse
- Inclusion of pilot areas into the NHD national repository

Amount Requested: \$13,000

Preliminary budget breakdown for entire project:

- Budget request based on BLM and Forest Service estimate.
- Funds from partners, other project related funds, matching funds, etc. (*see chart under Activity #1*).

Activity #3: Oregon Water Well Attribute Exchange Standard

Development of a water well attribute exchange standard for the state of Oregon that would link to the points theme in the NHD, and identification of available water well location data.

Background:

Water well data, and their locations, are collected by a variety of public and private entities in Oregon at all levels—local, state, and federal— with little coordination. The Oregon Water Resources Department (OWRD) is the custodian of well logs filed by well drillers when they drill, deepen, or abandon a well. Location information provided by most well logs is, at best, defined by a Public Land Survey quarter-quarter section description. OWRD locates wells using GPS for inspections or groundwater studies. Additionally, staff from other government and private organizations visit wells and determine more precise location information for their purposes. The data is not collected or stored according to a standard nor is it easily available to be shared amongst the various users.

For example, the OWRD was contacted by the City of Milwaukie when they were examining the proposed expansion of a MAX light rail line through their area. They needed to know the depth of the water table along the route because they would have to pump water from excavation sites where the water table is close to the surface. This information is gathered from well logs, but can only be used from wells located with some precision, i.e., better than a PLS description. The alternative is to drill new wells and take samples which drives up the cost of the project.

The City also needed to assess the effects of construction on existing water and monitoring wells, a task that also requires reasonably precise well locations. There are several other examples listed under “Business Purposes”.

Well locations portrayed on U.S.G.S. quadrangle maps, the primary source for the Digital Line Graph (DLG) data files and, subsequently, the NHD, are not reliable, either. The maps are dated and most wells were not shown on a given quad map when they were compiled. For example, only representative wells were portrayed on the map where they were part of a large cluster of closely spaced wells (Thompson, Morris. 1982. *Maps for America*, 2 ed. Washington, D.C.: USGPO. p. 42).

Business Purposes

- Support land use planning by the cities and counties
- Provide data vital to ground water hydrology research which supports water planning and the development of water supply strategies
- Assist the Oregon DEQ, US EPA, and USGS with water pollution tracking and mitigation. This is also of great importance to local government.
- Assist with the identification and monitoring of sites suitable for aquifer storage and retrieval
- Up to date and accurate location information can help provide better security and protection of municipal water supplies
- Facilitate real estate transactions. Having ready access to water contributes to property value, especially in rural areas.
- Geothermal energy development

Citations

- Oregon Water Quality Act (ORS 468B)
- Federal Clean Water Act (CWA)
- Oregon Water Rights Act (ORS 537)

Narrative

In order to share the information that agencies collect on water wells a data exchange standard needs to be defined. The process begins by identifying potential partners—those public and private entities that collect and manage water well data. They include, but are not limited to, the following:

- OWRD
- Oregon Dept. of Environmental Quality (DEQ)
- Oregon Dept. of Human Services (DHS), Health Division, Drinking Water Section
- Oregon Dept. of Geology and Mineral Industries (DOGAMI)
- Counties
- Universities
- Real Estate community
- Oregon Ground Water Association
- Consulting firms
- U.S. Environmental Protection Agency (EPA)
- U.S. Geological Survey (U.S.G.S.)
- U.S. Bureau of Reclamation (BOR)
- U.S. Natural Resources Conservation Service (NRCS)
- Tribes

A forum will be convened to discuss the objective behind and scope of a data exchange standard. Then, a working group would be put together to draft a “proto-standard”. There may be more meetings of the larger group to review the draft standard. This phase of the process would include identification of data holdings held by the partners and testing the draft standard against those data. Finally, the draft standard must go through the “Oregon Standards Development Effort” process to become an OGIC approved standard. It is defined on the [GEO web site](#). The OWRD will test the standard by populating a theme with its data. It will start with those well logs that have latitude/longitude location values.

While the data exchange standard is being formulated a list of available water well databases maintained by the partners will be created. This will be a valuable resource for those seeking well data for the state. It will also form the basis for cleaning up and sharing data about wells maintained by multiple agencies.

Deliverables:

- An OGIC approved standard for sharing water well information
- A sharable data set of water well information, initially populated with OWRD well data, and implemented following the water well data exchange standard
- Inventory of available well data in the state

Amount Requested: \$ 41,500

Preliminary budget breakdown for entire project:

The Oregon Water Resources Dept. will undertake the following activities as a part of this project and provide in-kind work:

- Develop standard: 6 months; (\$37,500 OWRD in-kind)
- Test, revise where necessary, & implement: 6 months; \$16,500
- Compile & publish information on existing well data: 6 – 9 months; \$ 25,000

Summary:

- Approximate OWRD in-kind funds - \$37,500
- Approximate partner in-kind funds - unknown
- Requested framework funds - \$41,500

Additional Information (for all proposed activities):

Have you applied or been awarded Framework funding in the past? If yes list projects, dates and outcomes:

2007-09 biennium:

BLM, Oregon State Office
Amount awarded: \$50,000

Deliverables:

- Complete migration of the PNW hydro data for Oregon into the NHD
 - Status: Completed
- Redesign the PNWHF (edit transaction web site)
 - Status: In progress
- Pilot the compilation of hydrography data derived from LiDAR data
 - Status: Phase I nearing completion. Will be done by 6/30/09.

2005-07 biennium:

BLM, Oregon State Office:

Amount awarded: \$20,000

Deliverables:

- On-going O&M Support for the PNW Hydrography Framework Clearinghouse
 - Status: Completed
- Hydro Event Management Application
 - Status: Completed

Oregon Water Resources Dept.:

Amount awarded: \$ 5,000

Deliverables:

- Extract statewide hydrography Framework elements (stream centers, water bodies, water points, and hydrologic units) from the PNWHF Clearinghouse, append, put in the standard state projection, and serve from a central location (GEO).
 - Status: Completed

2003-05 biennium:

BLM, Oregon State Office:

Amount awarded: \$25,000

Deliverables:

- On-going O&M Support for the PNW Hydrography Framework Clearinghouse
 - Status: Completed

By submitting this application I understand and agree that all members of the project team shall recuse themselves from participation in the current proposal evaluation process.

Contact Information:

Activities #1, 2, & 3:

Robert Harmon, GISP

PNW Hydrography Framework Steering Committee, Oregon representative

GIS Coordinator

Oregon Water Resources Dept.

725 Summer St. NE, Suite A

Salem, OR 97301-1266

(503) 986-0866, robert.c.harmon@wrd.state.or.us

Activities #1 & 2

Dan Wickwire

Physical Scientist

Geospatial Infrastructure Team Lead

Bureau of Land Management

333 S.W. First Ave.

Portland, OR 97204

(503) 808-6272, Dan_Wickwire@or.blm.gov

Activities #1 & 2

William Kaiser

Data Standardization Team Lead

U.S. Forest Service

333 S.W. First Ave.

Portland, OR 97204

(503) 808-2812, wkaiser@fs.fed.us