



The Oregon Water Data Portal Project

Legislative Report

FEBRUARY 17, 2023

EXECUTIVE SUMMARY

The 2021 Oregon Legislature directed the Department of Environmental Quality (DEQ) and state water agencies to “begin initial scoping and design” and “develop a funding request for further development” of a water database framework. In response, the DEQ, in collaboration with other state water agencies, initiated the Oregon Water Data Portal (OWDP) Project.

The OWDP envisions a modernized, single point of access for public data about water and water infrastructure. This could include data and information relevant to or about water quality and quantity, habitat and ecosystems, and natural and built infrastructure used to store, deliver or treat water. The portal will help state and local governments use and share data more effectively, saving state and local resources. State agencies, Tribes, stakeholders, and people living in Oregon will have better and more efficient access to water data. This access will allow decision-makers to better prioritize water investments, help more people understand or identify issues of water availability and quality in communities across the state, and improve access to information needed to make short- and long-term water management decisions. The portal will also include modernized security systems to protect sensitive data when appropriate.

During 2021-2023 (Stage 1), the OWDP began its scoping and design by engaging 68 participants representing more than 40 state, local, and Tribal agencies, community organizations and other interested groups. The OWDP Project Team inventoried currently existing water data sets held by the 17 state agencies with water-related missions or functions, assessed their readiness for inclusion in the OWDP, and identified additional critical data needs. Based on meetings with representatives from states who have initiated similar water data modernization projects and meetings with private sector representatives, the OWDP Project team evaluated the technical aspects of the portal platform that will be needed.

Based on the work completed for Stage 1, the OWDP Project Team developed a set of recommendations and associated tasks for work to be performed in OWDP Stage 2 (2023-2025):

Recommendation 1: Develop a governance structure for the OWDP.

Recommendation 2: Develop Standard Operating Procedures for submission, curation, and integration of data in the OWDP.

Recommendation 3: Develop a pilot OWDP based on an iterative process.

Recommendation 4: Based on agency- and stakeholder-identified needs, determine short- and long-term priorities for data readiness and integration.

Recommendation 5: Where appropriate and possible, use existing software systems to build on staff knowledge and expertise.

To pursue these recommendations for Stage 2 of the data portal initiative, the OWDP Project Team has estimated necessary resources, including costs to support technical staffing and contract services, for project development and implementation during the 2023-2025 biennium at approximately \$2.5M.

LEGISLATIVE REPORT

THE OREGON WATER DATA PORTAL PROJECT

INTRODUCTION

The Oregon Water Data Portal (OWDP) will be a modernized, single point of access for public water and infrastructure data to inform water resource decision-making in Oregon. The portal framework will make it easier for water decision makers and the public to find, integrate, and analyze data. The OWDP will be responsive to the recommendations of the 2017 Integrated Water Resources Strategy (IWRS), the 2020 100-Year Water Vision, and the Secretary of State's 2023 Water Security Advisory Report by aggregating data currently fragmented across many different agencies and processing those data into answers to key water questions.

Improved coordination of inter-agency data management, sharing, and processing are the foundation of the OWDP and will enable public, private, and non-governmental organizations to make better informed decisions about water management, use, conservation, and investment. Moreover, by leveraging consistent and modern data management practices and technologies, the OWDP will increase the accessibility and utility of required data reported from regulated entities and agencies and improve the security of public water data managed by state agencies. The OWDP will enable agencies to address ongoing water management challenges identified by multiple stakeholders, including, but not limited to:

- Tracking the capacity and condition of dams, canals, and other critical public water infrastructure.
- Developing a standardized portal to support the interoperability and accessibility of reported data between agencies.
- Integrating existing and new groundwater data to characterize aquifers to support aquifer-specific groundwater budgets.
- Forecasting water availability and demand under climate and population change scenarios.
- Developing a statewide assessment of Publicly Owned Treatment Works infrastructure improvement needs to ensure compliance with the Clean Water Act and address future water quality and climate challenges.
- Documenting outcomes of water planning efforts, such as instream flow conservation programs.

BACKGROUND

The state of Oregon has undertaken several efforts focused on improving cross-agency water planning and management. These efforts included initiatives around water planning and collaboration, such as the Oregon Water Core Team (WCT), the 2017 IWRS, and the 2020 100-Year Water Vision, among others. A consistent and growing theme across these initiatives has been the need for better data access and integration across agencies.

In 2021, the Oregon Legislature directed the Oregon Department of Environmental Quality (DEQ) and the state water agencies to “begin initial scoping and design” and “develop a funding request for further development” of a water database framework.¹ This authorized work is also responsive to Recommendations A and B² of the 2022 *Report of the Work Group on State-Supported Regional Water Planning & Management*.

To implement this work, the partnering agencies developed a Project Concept Document that introduced the OWDP and outlined three stages of work: Stage 1 from 2021-2023, Stage 2 from 2023-2025, and Stage 3 beyond 2025 (see Appendix A). The OWDP project, led by DEQ, established three working groups, known collectively as the **OWDP Project Team** (see Appendix B):

- **Subject Matter Expert (SME) Team** represents each of the 17 Oregon water agencies with knowledge of each water agency’s processes, data, and supporting business systems.
- **Technical Team** provides expertise for the platform and technologies to be considered for the OWDP. Team members include several water agencies, Oregon Department of Administrative Services, and three external organizations (see below).
- **Steering Committee** consists of water data agency and IT executives to guide the project and serve as its change control board.

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1 HB 5006 SECTION 112: “In addition to and not in lieu of any other appropriation, there is appropriated to the Department of Environmental Quality, for the biennium beginning July 1, 2021, out of the General Fund, the amount of \$350,000, to begin initial scoping and design of a database framework of water and infrastructure data.”

2 HB 5006 Report of the Work Group on State-Supported Regional Water Planning & Management, Recommendation A: “The Legislature should allocate increased funding to support state agency capacity and resources for collecting, processing, interpreting, and distributing the water data needed for more effective water planning and management of instream and out-of-stream needs.” Recommendation B: “The Legislature should fund, and the Governor should direct, the appropriate level of agency capacity needed for interagency data collection and analysis, technical support, and coordinated work-planning and budgeting to ensure robust engagement by and between agencies in support of water planning in alignment with each agency’s mission and authorities.”

In addition to these agency-based teams, DEQ commissioned three external organizations to assist with the OWDP Project: Oregon State University's Center for Applied Systems and Software (CASS); Oregon State University's Institute for Natural Resources (INR); and the Internet of Water team at Duke University (IoW). CASS has special expertise in planning, managing, and executing data and information technology projects with Oregon state agencies; INR has special expertise in geospatial server applications and great familiarity with a wide variety of public data types in Oregon; and the IoW has assisted several US states in their water data modernization efforts (e.g., NM, TX, CA, NC), and developed a set of standard water data integration templates and best practices suitable for national use.

STAGE 1: 2021 - 2023

STAGE 1 ACCOMPLISHMENTS TO DATE

As of January 2023, the OWDP Project Team has completed or is nearing completion of many of the stated goals of Stage 1, including:

- **Engagement and Listening Sessions:** Members of the SME Team conducted a series of Tribal Government and stakeholder engagement and listening sessions. The goals of these sessions were to hear from users, Tribes, and stakeholders about water data issues including: data needs and gaps; challenges in accessing existing data; concerns about portal development and data management; and prioritization of data use case themes (e.g., plausible data use and decision scenarios) to inform development of a pilot portal. Following these sessions, the SME team distributed a survey to gather additional information to inform the design and development of the OWDP to best fit data and user needs. These engagements included 68 participants representing more than 40 state and local agencies, Tribes, community organizations, industry groups, and non-governmental organizations (See Appendix E).
- **Data Inventory:** The OWDP Project Team compiled an initial draft data inventory of currently existing water data sets held by the 17 state agencies with water-related missions or functions. The inventory includes available information on the managing agency, data type, and current need and condition. The inventory does not include or address federal or local water agency data (unless those data are reported to state agencies). Over 200 distinct data sets were identified and preliminarily assessed for level of readiness, level of need by user groups, and priority for inclusion in the OWDP (See Appendix H). Further development of the content of the data inventory will continue as part of Stage 2 recommended tasks.

- **Data Needs Assessment:** The OWDP Project Team began a Data Needs Assessment to identify data sets that are essential for responding to consistent water data-related questions, but either do not exist or have low “readiness” (e.g., not readily available in digital or interoperable formats, only available across fragmented spreadsheets). The OWDP Project Team identified a baseline of datasets that are needed but not yet collected or available for inclusion in the OWDP; several of these datasets were further identified as a significant need, key data, or both (See Appendix L). Data Needs Assessment work will continue as part of Stage 2 recommended tasks.
- **Data Prioritization Framework:** The SME Team and Technical Team collaborated with IoW to develop a preliminary framework to prioritize data for incorporation into the OWDP. This framework was informed by stakeholder, user, and Tribal Government engagement (see above).
- **Technical Team Engagements and Report:** The OWDP Project Team engaged with peers from Texas, New Mexico, and California, who have initiated and managed similar water data modernization projects. Additionally, the Technical Team solicited presentations from data management vendors (e.g., Foundry Spatial, Google, True Elements) to better understand the technical options available, and how those interacted with currently adopted technology and expertise in the various water agencies. The Technical Team produced a report that analyzes the options available to Oregon to establish the OWDP and includes recommendations for technical aspects of the portal platform (described below) to be implemented in 2024 (See Appendix I).

STAGE 1: WORK REMAINING THROUGH JUNE 2023

For the remaining period of Stage 1 (to conclude in June 2023) the OWDP Project Team will continue improving the draft data inventory and planning the portal and its technical components. The team will also focus on developing use cases and identifying options to deliver useful water information and data visualization tools for decision-making. Scoping during Stage 1 has found that across state agencies, there are data that are not ready for use in a portal because they are collected only on paper; located in outdated spreadsheets or isolated databases; or not currently collected by state agencies. In some cases, the remedies for these situations will be substantive projects for agencies to pursue during subsequent stages of the OWDP Project. In June 2023, an OWDP Project Stage 1 Final Report will be issued that will include detailed summaries of the activities and analysis conducted and may identify that additional resources are needed to optimize the pilot OWDP. Further evaluation of data readiness and supporting information will continue as part of the recommended tasks of Stage 2.

RECOMMENDATIONS AND TASKS FOR STAGE 2: (2023-2025)

Recommendation 1: Develop a governance structure for the OWDP.

Task 1.1: In collaboration with participating agencies, develop a governance structure and process that includes the designation of a lead agency, articulation of portal-related decision-making processes, procedures for incorporation of feedback, and development of a detailed plan for the ongoing maintenance and governance of the OWDP.

Task 1.2: Develop resources to support the implementation of the OWDP, including, but not limited to, writing position descriptions, identifying recruitment opportunities, creating contract language, and identifying applicable grant funding.

Recommendation 2: Develop Standard Operating Procedures for submission, curation, and integration of data in the OWDP.

Task 2.1: In collaboration with participating Oregon state agencies, develop and draft a library of standard operating procedures, data privacy and quality guidelines, and standards for data to be included in the OWDP.

Task 2.2: Determine, define, and draft criteria for data readiness.

Recommendation 3: Develop a pilot OWDP based on an iterative process.

Task 3.1: Build a pilot OWDP based on guidance and recommendations from the OWDP Technical Team. This product will have enough data sets and features to attract early users and validate technology assumptions and processes for data integration.

Task 3.2: Engage in an iterative design process that incorporates feedback throughout the development process by testing pilot versions of the interface for usability and functionality with potential user groups.

Task 3.3: In partnership with the IoW, secure Federal grant funds, such as Water Smart grants from the Bureau of Reclamation, to engage special service districts and local and Tribal governments in the development and testing of a pilot OWDP.

Recommendation 4: Based on agency- and stakeholder-identified needs, determine short- and long-term priorities for data readiness and integration.

Task 4.1: Add, refine, and prioritize use cases that will be supported by the OWDP, to ensure that critical water management decisions can be made using appropriate data.

Task 4.2: Continue to assess and analyze data sets in the OWDP Draft Data Inventory and Draft Data Needs Assessment, to determine the requirements to meet the standards for inclusion in the OWDP.

Task 4.3: Employing the standards and guidance developed in Recommendation 2, evaluate and catalog the status of and requirements for data and organizational readiness.

Task 4.4: Formally assess necessary long-term projects for both data with high priority and low readiness and data with high readiness.

Task 4.5: Draft project evaluation plans and Policy Option Package suggestions for agencies to address water data and information technology gaps.

Task 4.6: Work with state water agencies to communicate the implications of projects and resulting data at the regional and state level.

Recommendation 5: Where appropriate and possible, use existing software systems to build on staff knowledge and expertise.

Task 5.1: Where appropriate, deploy tools and software products included in existing state software systems to build on staff knowledge and create efficiencies in developing the pilot OWDP infrastructure and interface. Where state-licensed technologies are insufficient, analyze additional software options.

Task 5.2: Determine the appropriate platform(s) for data storage, data reporting, and data analysis based on OWDP Technical Team recommendations.

At the conclusion of Stage 2, a final report and legislative request will be drafted in collaboration with the SME Team, Technical Team, and Steering Committee.



ESTIMATED RESOURCE NEEDS FOR STAGE 2: (2023-2025)

This report, the current concept of the portal, and the resource estimates below are well supported by our work to date as part of the “initial scoping and design” process commissioned by the legislature. However, project work and learning will continue until the end of the 2021-2023 biennium and these estimates will be further refined.

As of January 2023, resources needed for the Oregon Water Data Portal project:

	CATEGORY	DESCRIPTION	AMOUNT
1.	LIMITATION	“Limitation” is permission from the Oregon Legislature to spend funds acquired via Federal grants, including the Bureau of Reclamation Water Smart grant.	\$250,000
2.	CONTRACTORS SERVICES	loW, CASS, INR, DAS rotation project Quality Assurance contractor, additional contracting TBD	\$1,000,000
3.	SOFTWARE SYSTEMS AND HOSTING	ESRI, FME software licenses, other software licensing fees TBD, hosting and central data storage	\$125,000
4.	STAFFING	3.56 FTE <ul style="list-style-type: none"> •Two half-time Data Specialists (ISS-4) •One Geographical Information Specialist (ISS-5) •One Business Analyst/Developer (ISS-6) •One System Architect/Lead Developer (ISS-7) 	\$1,136,846
	TOTAL		\$2,511,846

LIMITATION

\$250,000 of limitation for an anticipated Federal Bureau of Reclamation Water Smart data grant, expected to begin in September of 2023. This grant will be used to fund engagement with state and local Oregon community agencies, discover and process useful data sets to offer on the OWDP, communicate how to use the portal in decision-making, and get feedback on the state’s portal plan.

CONTRACTOR SERVICES

Contractor cost estimates are based on 2021-2023 project contractor spending. OWDP used contractors for approximately 12 months of the 2021-2023 biennium and spent approximately \$300,000 of the allocated project money on the three main project contractors. Those three contractors, doing similar work for 24 months should be approximately \$600,000. An additional contractor is added to perform an ongoing project Quality Analysis, per the state Chief Information Officer’s recommendations, for

an additional \$200,000.

The project team anticipates several substantive but currently unassigned contractor tasks to be necessary during the development of the pilot portal. These are likely to be for software system setup, data transformation and setup of data flows, especially for data toolset providers. These tasks will be assigned to the \$200,000 allocation titled “Additional Contracting”.

CONTRACTOR	DESCRIPTION	AMOUNT
IoW	IoW will format water data families, engage local governments, draft plans for missing-but-needed data, analyze water data sets, move water data sets to the prototype portal via standard data communication protocols, consult on national water policy and its applicability to the OWDP	\$250,000
CASS	CASS will be responsible for Project Management assistance, administrative work, assistance with project planning paperwork and project reporting, meeting facilitation, and other miscellaneous duties. CASS is an experiential learning program and will include internships.	\$250,000
INR	INR will supply technical leadership, project component execution, perform INR stakeholder engagement, and other miscellaneous duties.	\$100,000
QA CONTRACTOR	DAS rotational project QA contractor	\$200,000
ADDITIONAL CONTRACTING	Consulting, development, application development, and other subject matter expert tasks as discovered during the course of the project.	\$200,000
TOTAL		\$1,000,000

SOFTWARE SYSTEMS AND HOSTING

DESCRIPTION	DURATION	AMOUNT
ESRI ACCESS LICENSES	1 year	\$15,000
DATA INTEGRATION TOOL LICENSES	1 year	\$15,000
OTHER SOFTWARE LICENSING FEES	1 year	\$20,000
HOSTING AND CENTRAL DATA STORAGE	2 years	\$75,000
TOTAL		\$125,000

STAFFING

This staffing request is largely based on the OWDP Technical Team’s recommendation. (The Technical Team report is included in Appendix I.) The staffing outlined below assumes that the project lead and some ancillary project management roles will be performed by existing agency staff.

POSITION	PT/FT	START DATE	COMMENT	AMOUNT
ISS-4	PT (.5)	9/1/23	Data Analyst	\$149,185
ISS-4	PT (.5)	1/1/24	Data Analyst	\$117,018
ISS-5	FT	9/1/23	GIS Specialist to participate in data analysis and portal development	\$278,005
ISS-6	FT	10/1/23	Business Analyst/Developer for agency backlogs and long-term projects, general Portal developer for Portal Tech Stack	\$277,507
ISS-7	FT	9/1/23	Architect, lead developer and data analyst, data communication standards	\$315,131
TOTAL				\$1,136,846

ISS-7: This position is the operational technical lead and will serve as the SME team technical advisor. They will be primarily responsible for the success of the project’s overall technology setup and secondarily responsible for the data acquisition, analysis, and transformation portions of the project. This position could eventually develop into the OWDP system operator.

ISS-6: This position is the application lead and will actively participate the project’s Technical Team. They will be primarily responsible for leading and executing the building of the pilot portal and secondarily responsible for developing OWDP Standard Operating Procedures (SOP).

ISS-5: This position will be primarily responsible for developing the OWDP’s mapping display and managing geospatial components of the data sets and secondarily responsible for defining and maintaining geospatial data standards. They will participate in the development of SOP and provide subject matter expertise on geospatial topics. They will be a member of the Technical Team, responsible for acquiring and setting up various geospatial contract data sets.

ISS-4: These two positions will be graduate-level student data analysts. They will be primarily responsible for analyzing available data sets to determine transformations needed for integration with similar data sets from other agencies intended to be

offered on the OWDP and secondarily responsible for assisting in technical tasks as necessary and requested by the project management and senior technical staff.

These two ISS-4 positions will be half time. They will be expected to accomplish data analysis work for the OWDP project while gaining valuable experiential learning. This will include occasional state agency field work with the intention of conceptually connecting the data they are working on to real world operations Oregon agencies perform.

In all cases, during the project stages, technical staff will work with the contracting organizations to produce project outputs as planned and be responsible for meeting the stated goals and expectations of project governance bodies.

Funds allocated to project staffing will be used to meet the fund matching requirements of Federal grants, including the 2023 Bureau of Reclamation grant which is a 1-1 matching grant.

