



# Oregon

Theodore R. Kulongoski, Governor

## Water Resources Department

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**TO:** Water Resources Commission

**FROM:** Jerry Rodgers  
Technical Services Administrator

**SUBJECT:** Agenda Item H, November 20, 2008  
Water Resources Commission Meeting

### Umatilla Basin Critical Area Study

#### I. Issue Statement

The February 2008, Legislative Assembly approved Senate Bill 1069. The Governor signed the bill which provides \$750,000 to the Department for a study to determine the feasibility of storing surface water below ground in the Umatilla Basin critical ground water areas. Storing water below ground is commonly referred to as ASR (Aquifer Storage and Recovery) or AR (Artificial Recharge).

#### II. Background

Over the last three decades the Oregon Water Resources Department (OWRD) has designated four critical ground water areas and one limited use area in the Umatilla River Basin (Fig 1).

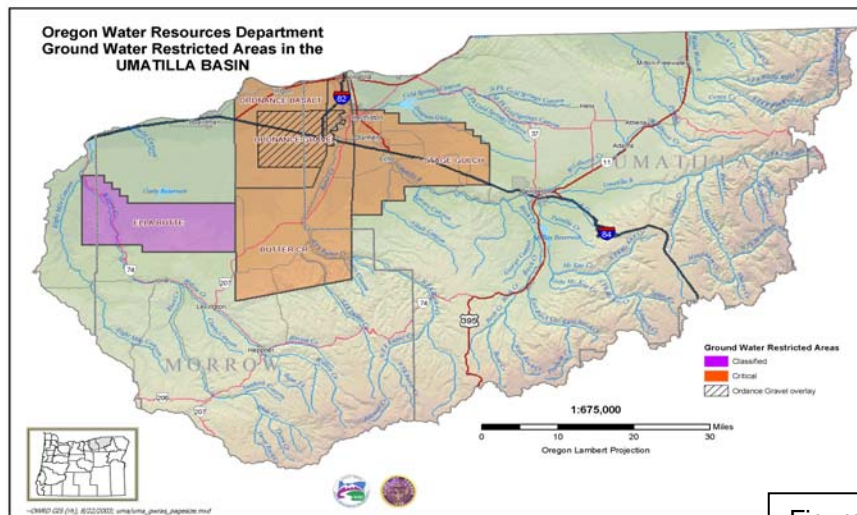


Figure 1

Limitations have been placed on ground water because the rapid development of this resource resulted in over appropriation. The OWRD has identified more than 600 square miles of Critical Groundwater Areas (CGAs) in the Umatilla Basin where current demand for water exceeds natural availability. As a result of continued declines, only 30 percent of water permitted for use in the

critical areas was allocated for use in 2007 (Fig 2). Further reductions in groundwater allocations are likely to occur until groundwater levels stabilize within these CGAs. Surface water sources in the Umatilla Basin are either fully allocated or not available due to listed fish species needs during summer months. Declining groundwater supplies have serious economic implications for one of the State's top food producing areas.

**Curtailed Groundwater Amounts**

Critical Groundwater Area	Sub-Area	Irrigated Acreage (acres)	Groundwater Right <sup>(a)</sup> (acre-feet)	SAY <sup>(a)</sup> (acre-feet)	Curtailment	
					(acre-feet)	%
<b>Ordnance Gravel</b>	Lost Lake	5,667	17,000	9,000	8,000	47%
	Westland Road	2,000	6,000	6,000	0	0%
<b>Ordnance Basalt</b>	Ordnance Basalt	2,267	6,800	6,800	0	0%
<b>Butter Creek Basalt</b>	North	898	2,693	250	2,443	91%
	Section 21	17	52	28	24	46%
	Echo Junction	3,702	11,106	1,260	9,846	89%
	4 Mile Canyon	1,688	5,064	1,300	3,764	74%
	East	790	2,370	720	1,650	70%
	West	15,022	45,066	5,670	39,396	87%
	Pine City	3,936	11,808	4,150	7,658	65%
South	866	2,598	1,000	1,598	62%	
<b>Stage Gulch Basalt</b>	A	10,990	32,971	11,450	21,521	65%
	B	1,138	3,414	200	3,214	94%
	C	1,111	3,333	400	2,933	88%
	D	2,933	8,799	3,250	5,549	63%
	E	50	150	150	0	0%
	F	140	420	200	220	52%
	G	4,224	12,672	2,750	9,922	78%
	H	6,050	18,150	8,850	9,300	51%
<b>Totals</b>		<b>63,489</b>	<b>190,466</b>	<b>63,428</b>	<b>127,038</b>	<b>67%</b>

Figure 2

In the recent past the Umatilla Basin agricultural community organized an advocacy group concerned with obtaining additional water from the Columbia River. Considerable attention was given to this proposal by the 2007 Legislative Assembly. During the special 2008 Session a bill was introduced to set aside Columbia River water for summer use. Because of Oregon's long standing commitment for support of Columbia River biological needs and target flows at the Bonneville and McNary Dams, the Governor continues to oppose the use of new summertime appropriations from the Columbia River. However, the Governor is equally committed to finding a

way to help Umatilla Basin irrigators. The Governor asked the OWRD for an alternative solution that would meet the needs of all Umatilla Basin water interests.

A water availability analysis, completed by the Oregon Water Resources Department and endorsed by the Oregon Department of Fish and Wildlife, indicates water is available for diversion from the Columbia River during winter months. Columbia River water can be diverted during the winter and stored until it is needed during the irrigation season. During the fall of 2007, OWRD staff began putting together a proposal for diverting Columbia River water during winter months, storing it somewhere in the basin, and making it available to irrigators when they need it.

### **III. Discussion**

Senate Bill 1069 was passed out of the 2008 Special Session of the Legislative Assembly and signed by the Governor on March 5, 2008. The Bill provides two major obligations for implementation by OWRD:

1. Administration of a state-wide grant program for water supply feasibility studies. Department activities completed under the authorization of this portion of SB 1069 are presented to the Commission in a separate staff report.
2. OWRD was tasked with conducting a feasibility study of aquifer recovery in the Umatilla Basin. A total of \$750,000 was provided for the study which includes:
  - ▶ An engineering and hydrological study regarding the cost and feasibility of extracting surface water during times that avoid impacts on limited species and on existing rights;
  - ▶ Evaluating the feasibility of recharging ground water in the Ordnance and Echo Meadows aquifers;
  - ▶ Evaluating the feasibility of injecting water into the Ordnance, Butter Creek, and Stage Gulch basalt aquifers;
  - ▶ Identifying monitoring requirements to evaluate impacts to stream flows, ground and surface water quality;
  - ▶ Identifying options for the treatment of above-mentioned ground and surface water;
  - ▶ Identifying permitting and jurisdictional issues; and
  - ▶ Identifying opportunities to protect fish and increase stream flows on the lower Umatilla.

OWRD issued a Request For Information (RFI) on January 18, 2008. The RFI was issued in anticipation of the passage of Senate Bill 1069. The intent of the RFI was to acquaint prospective contractors with the project and obtain enough information that would enable OWRD to develop a Request for Proposal (RFP) that would cover the requirements expected to result from SB 1069. Two consultants responded to the RFI.

As the Legislature moved through the process and passage of SB 1069 appeared probable, OWRD

convened a meeting of Umatilla Basin water interests and the two RFI respondents. The purpose of the meeting was to continue to discuss the project framework and provide an opportunity for dialogue about project implementation. It was important to OWRD that prospective contractors were included in the dialogue and have a chance to fully understand what was expected by basin interests. With the information gained from the RFI and the meeting, OWRD developed a Request for Proposal (RFP). The RFP was issued on March 5, 2008, with a proposal due date of March 17, 2008. Knowing all work must be completed no later than June 30, 2009, OWRD continued to fast-track the process and thereby provide maximum time for contract implementation.

Two respondents, the same two who responded to the RFI, provided proposals for the work. On April 15, 2008, a contract was awarded to a team of Oregon Consultants lead by IRZ Consulting based in Hermiston, Oregon.

The investigation is divided into three phases:

Phase I consists of the contractor defining a complete project that meets the water needs of the Umatilla Basin critical ground water areas. Once the project is defined, the contractor is tasked with developing a phased plan for construction.

Phase II consists of defining high priority/most feasible portions of the project for immediate development. Once these parts of the project are determined, they are to be investigated with the intent of developing operational models.

Phase III of the project provides funding for verification of the operational models developed under Phase II. Surface water is to be stored below ground under the authority of limited licenses, providing the contractor an opportunity to observe and monitor scaled versions of project operation.

Storing surface water below ground in the project area can be separated into two categories: Storing water in the alluvial aquifer system and storing water in the Columbia River basalt aquifer system. Both aquifer systems are being investigated. The contractor is tasked with defining the optimum methods for charging the aquifer systems with surface water, the amount of storage space available, and developing operational procedures for meeting water quality requirements. Meeting water quality requirements is a high profile part of this project because the issue generates considerable public concern, and because of the implications to the long term viability of the aquifer systems. Water quality issues are coordinated carefully with the Department of Environmental Quality and the Oregon Department of Human Services Drinking Water Program.

Figure 3 is a map of the project area that generally defines the locations of the aquifer systems under

investigation. The deep basalt aquifer system and the alluvial aquifer system are both being investigated on the limits to recharge rates and storage volume. Additionally, the alluvial aquifer system is being investigated to: 1) determine the effectiveness of “treating” the recharged water to obtain a water quality standard meeting the requirements for basalt recharge (essentially, surface water is being filtered by running it through the shallow alluvial aquifer prior to injection into the basalt system), and 2) for the effectiveness of surface water return flow to the Umatilla River.

The issue of using the alluvial aquifer system as a means to obtain water that meets the drinking water quality standards necessary for recharge to the basalt aquifer system is a technology that will likely dictate the economic feasibility of large scale basalt aquifer recharge for agricultural use.

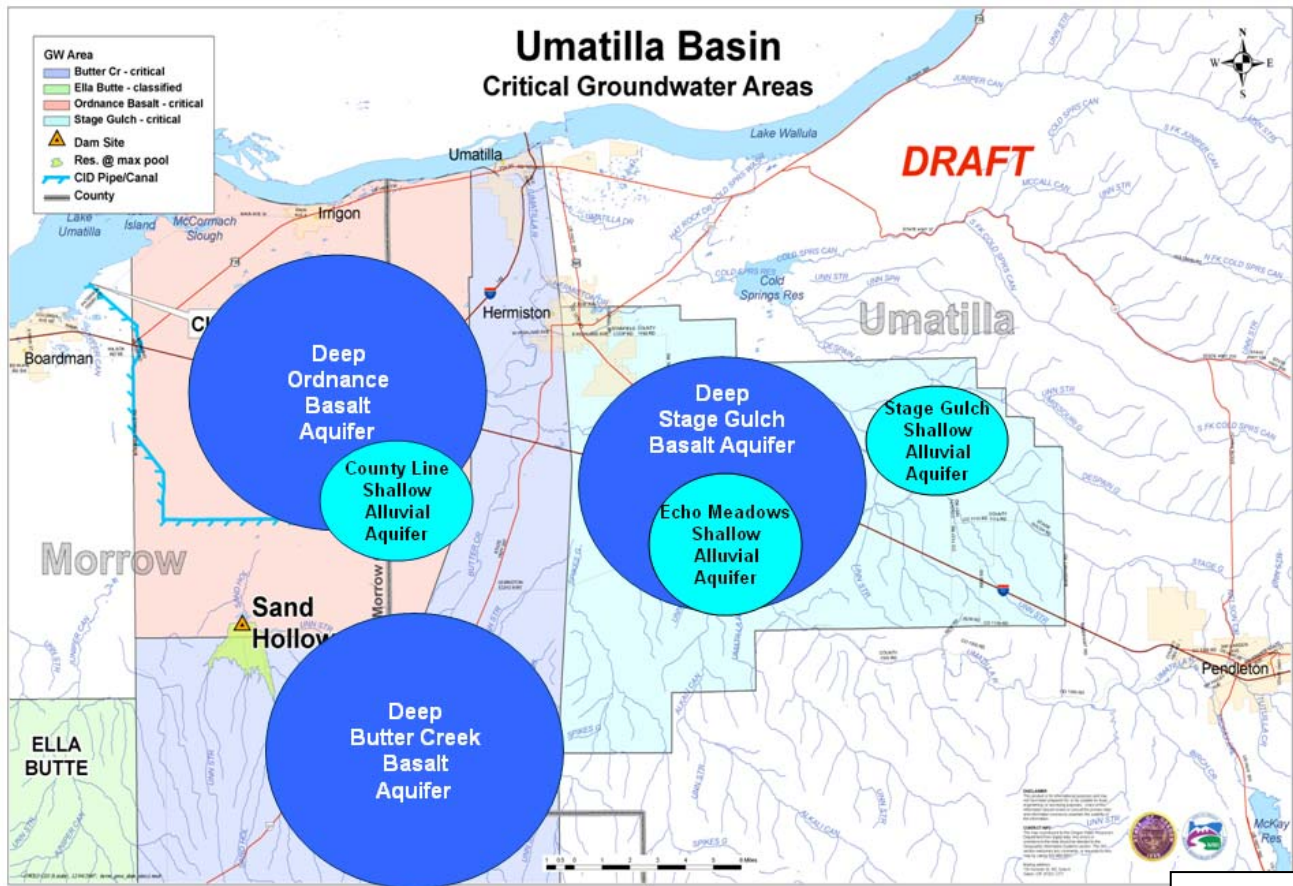


Figure 3

During the 2008 winter season the contractor was able to apply approximately 600 acre-feet of Umatilla River water to the Echo Meadows alluvial aquifer system. The contractor completed a considerable amount of monitoring for both water quality and storage parameters. Additionally, considerable monitoring was completed on two existing basalt recharge projects underway in the study area. These projects apply surface water to the alluvial aquifer system, monitor for water quality, and then withdraw the water for injection into the basalt aquifer system. Results from these activities indicate, with continued monitoring and careful project management, the alluvial aquifer system can be used to bring surface water up to required water quality standards and use it for basalt aquifer recharge.

In addition to investigating the Echo Meadows alluvial aquifer, the contractor is investigating the County Line alluvial aquifer. Monitoring wells are in place to measure storage parameters and obtain water quality data. Similar plans have been made for the Stage Gulch alluvial aquifer.

Preliminary results indicate the Echo Meadows alluvial aquifer has limited storage capability. However, this aquifer has good potential for providing return flow to the Umatilla River and for serving as a means to meet water quality standards for injection into the basalt aquifer system. Investigation of the Stage Gulch alluvial aquifer is anticipated to produce similar results.

The County Line alluvial aquifer has been used as a recharge site for nearly 4 decades. Approximately 6000 acre-feet are recharged annually for use by the County Line Improvement District. However, preliminary investigation indicates there is potential for approximately 70,000 acre-feet of storage. Additionally, there is good potential for using the aquifer to meet water quality standards for basalt injection, and for providing return flow to the Umatilla River.

The contractor is in the final stages of completing a report on the Columbia River Basalt aquifer system. The available data in the project area have been compiled to provide a description of the geologic and the hydrogeologic framework. The contractor developed a method to rank the potential for surface water storage in the basalt aquifer as it relates to several aquifer characteristics that can be measured. Generally, ASR has high potential throughout the project study area.



Figure 4

The contractor has also mapped the existing water conveyance infrastructure throughout the project area (Fig 4). There is considerable infrastructure with an array of ownership including private parties, irrigation districts, and the Federal Government. For example, there are 9 pumping stations located on the Columbia River that provide a means to convey Columbia River water to various individuals and groups of users. The contractor has spent a considerable amount of time coordinating activities with the various irrigators and other basin interests in an effort to promote cooperation and an understanding of the goals of the project. Basin meetings have been held monthly, and the contractor has met often with individual interests including irrigation districts, individual users, and the Confederated Tribes of the Umatilla Indian Reservation. Additionally, the contractor maintains a web site where meeting notes, technical memorandum and other project information can be viewed. This coordinated effort has been successful in developing considerable cooperation and participation.

The information coming from this investigation will be beneficial elsewhere in the state because it establishes a protocol for the investigation of below ground storage on a “regional” basis. This is a complex project dealing with varied water interests, varied infrastructure ownership, and new technologies for meeting basalt injection water quality requirements. All of this information will be useful as Oregon works to meet future water needs throughout the state.

#### **IV. Summary**

The Umatilla Basin Critical Ground Water Area Investigation was funded by the February session of the Legislature. The contractor began work in March. Considerable work has been completed investigating the potential for recharging the alluvial and basalt aquifers in the study area. Preliminary results indicate there is high potential for storing water in the County Line alluvial aquifer, and in the basalt aquifer system throughout the project area. All three alluvial aquifer areas offer high potential for providing return flow to the Umatilla River, and for bringing water quality of the source surface water up to standards that allow for injection into the basalt aquifer system. Additionally, there is a considerable amount of water conveyance infrastructure that, with some minor modification and some additional new construction, allow for fast-track construction of a portion of the project.

The results from this investigation will be important as this technology, storage of surface water below ground, expands elsewhere in the state.

#### **V. WRC Action**

This is a discussion item. No Commission action is requested.

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