

Potential Storage Opportunities in Oregon

Water Resources Commission Meeting
March 6, 2014

Jon Unger, Water Supply Development Coordinator

BACKGROUND

- 1992 - Commission adopted the State's Water Storage Policy;
- 1993 - Oregon Legislature codified policy;
- 2012 - Oregon's IWRS identified the need to Improve Access to Built Storage;
- 2013 – SB 839 established Water Supply Development Account.

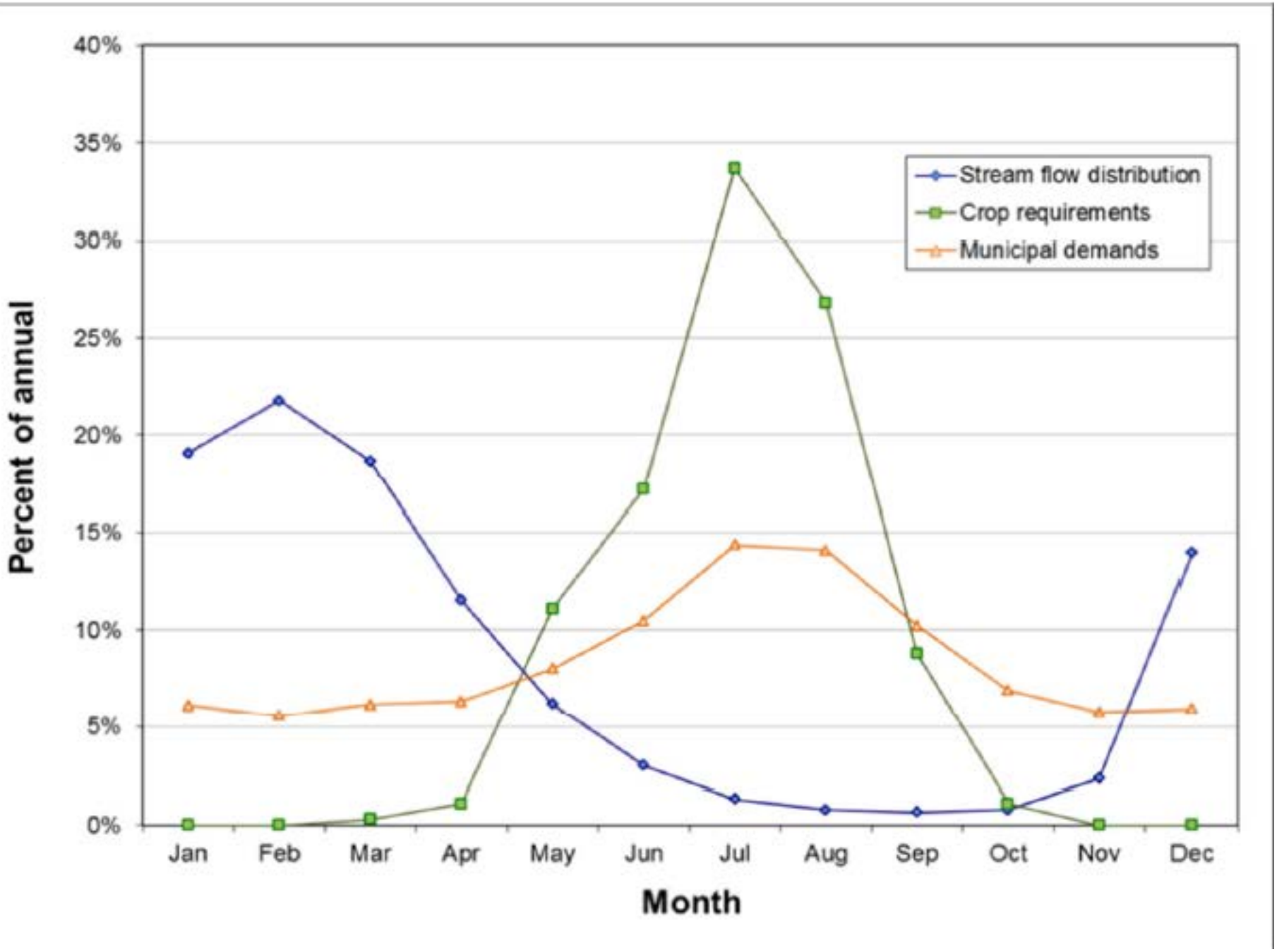
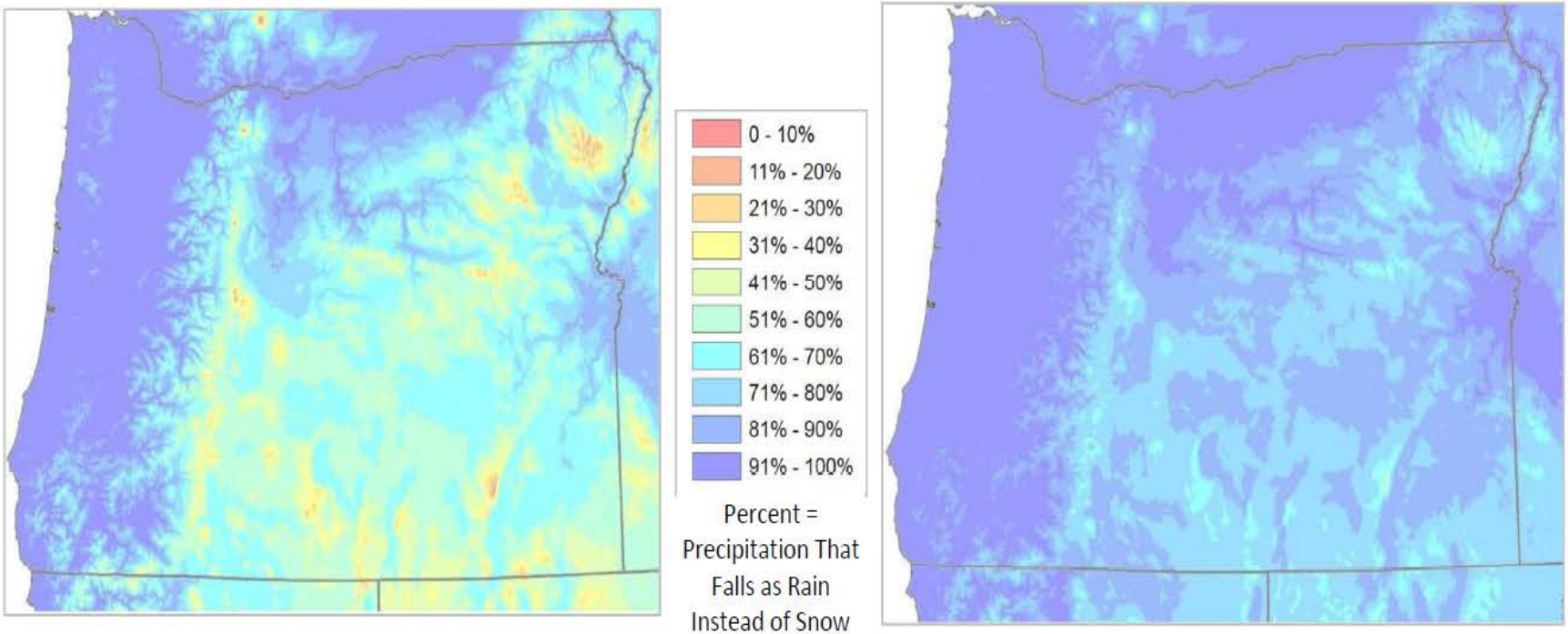

40%
35%
30%
25%
20%
15%
10%
5%
0%
Percent of annual
Stream flow distribution
Crop requirements
Municipal demands
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

Figure 3. Current Precipitation Conditions Versus Future Scenario (3° C Temperature Increase) [5.4° F]



Red, yellow, and orange hues represent areas where a large percent of precipitation falls as snow.

Blue represents areas where a large percent of precipitation falls as rain.

IWRS RECOMMENDED ACTION #10B

Improve access to built storage:

- **Develop additional below-ground storage sites;**
- **Re-allocate water in federal reservoir systems that have not undertaken formal allocation processes in Oregon;**
- **Develop additional above ground, off-channel storage sites when needed;**
- **Evaluate the status of storage infrastructure;**
- **Authorize and fund the State to invest in and purchase water from stored water facilities.**

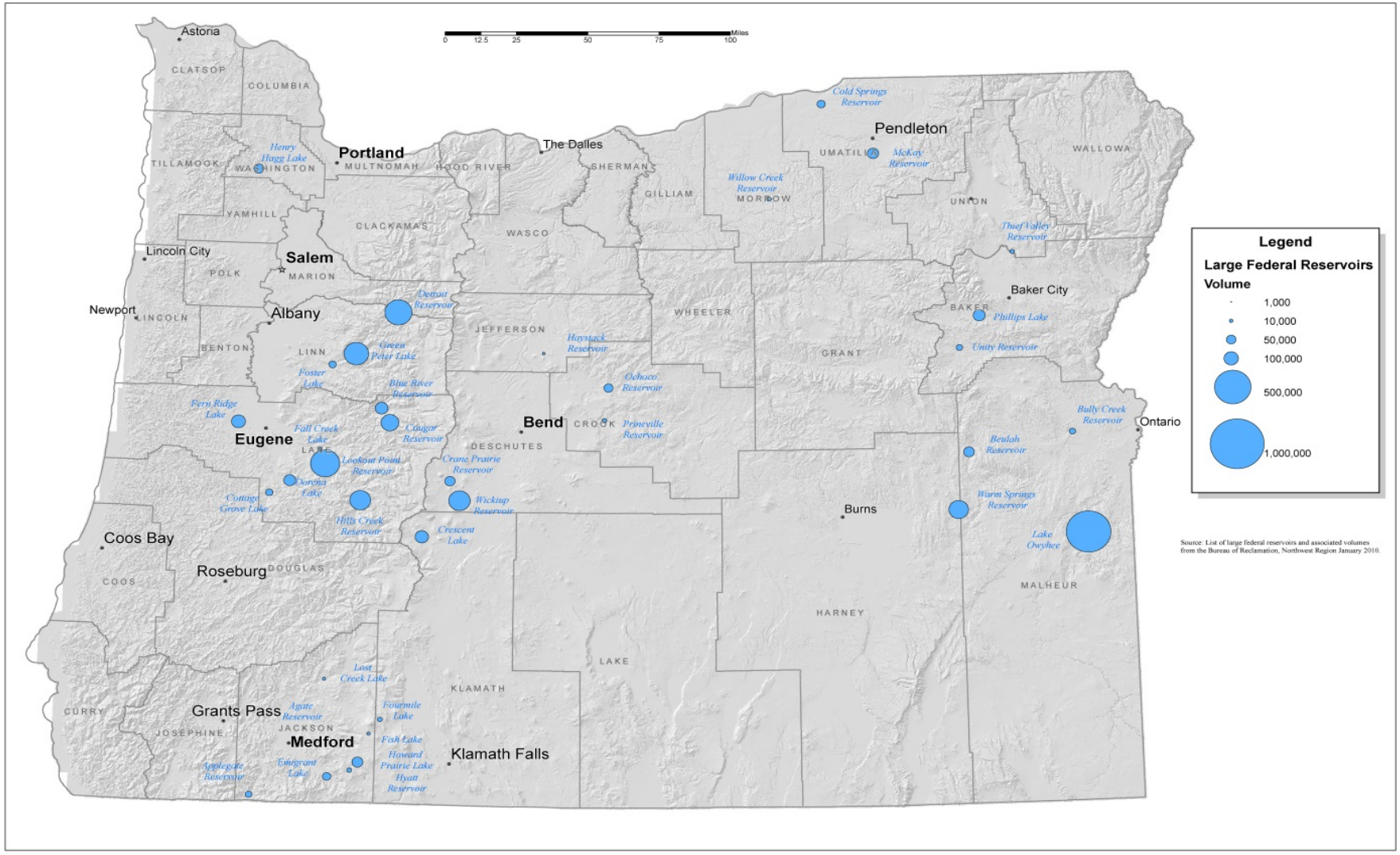
TYPES OF STORAGE

Above-Ground Storage (Reservoirs)

- 15,000 water rights authorizing storage of surface water.
- 60 Reservoirs with capacities exceeding 5,000 acre feet.
- 1,200 potential above ground storage sites have been mapped to date.

Large (Existing) Federal Storage Reservoirs

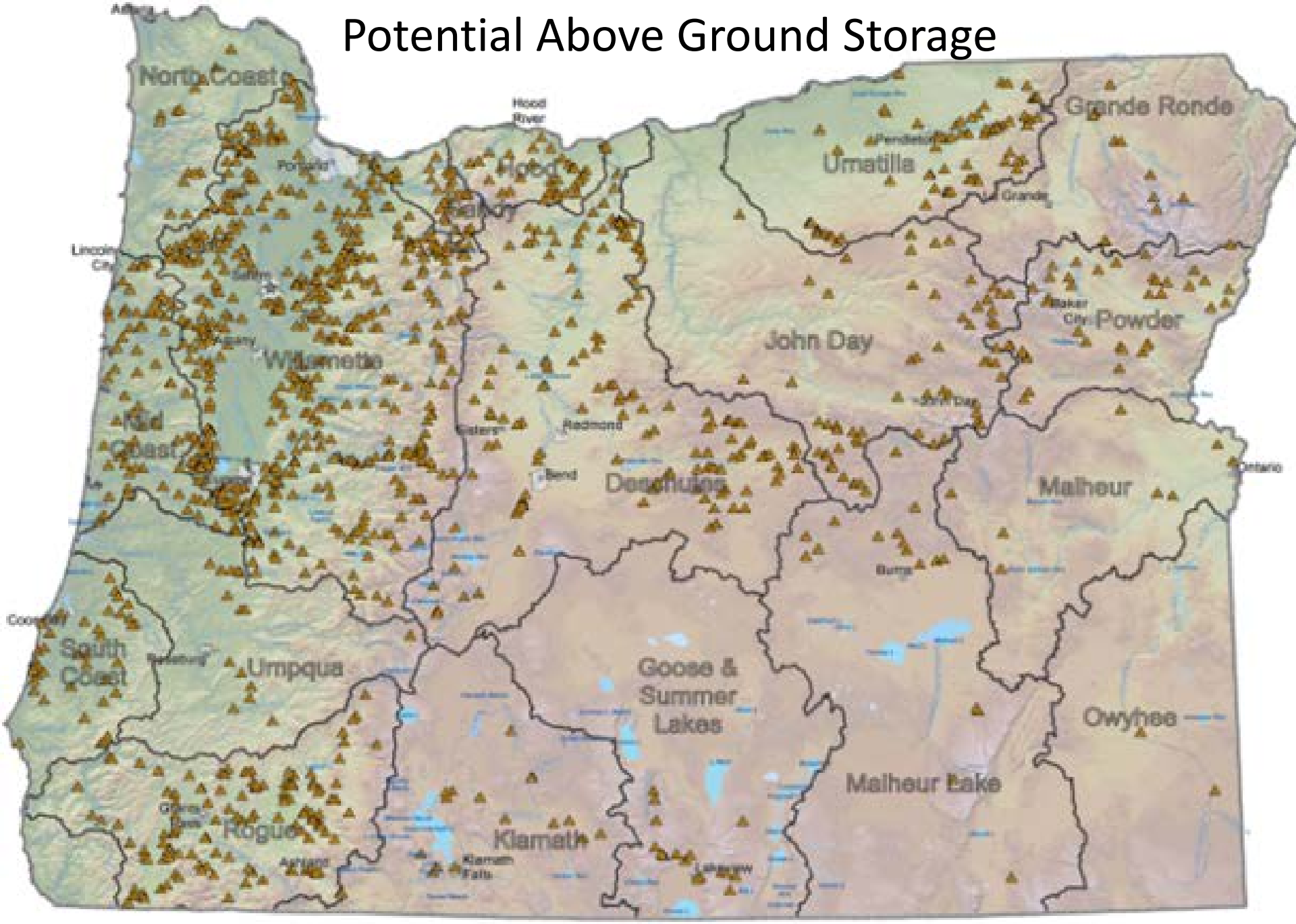
Oregon Water Resources Department
February 2010



Source: List of large federal reservoirs and associated volumes from the Bureau of Reclamation, Northwest Region January 2010.

G:\dev\arcmap\projects\state\TeaCup\ArcMap\TeaCupReservoirs_Map_20100112.mxd D. Mortenson

Potential Above Ground Storage



TYPES OF STORAGE

- Above-Ground Storage (Reservoirs)

- Two Types of Below-Ground Storage:
  - Artificial Recharge
  - Aquifer Storage and Recovery

Artificial Recharge

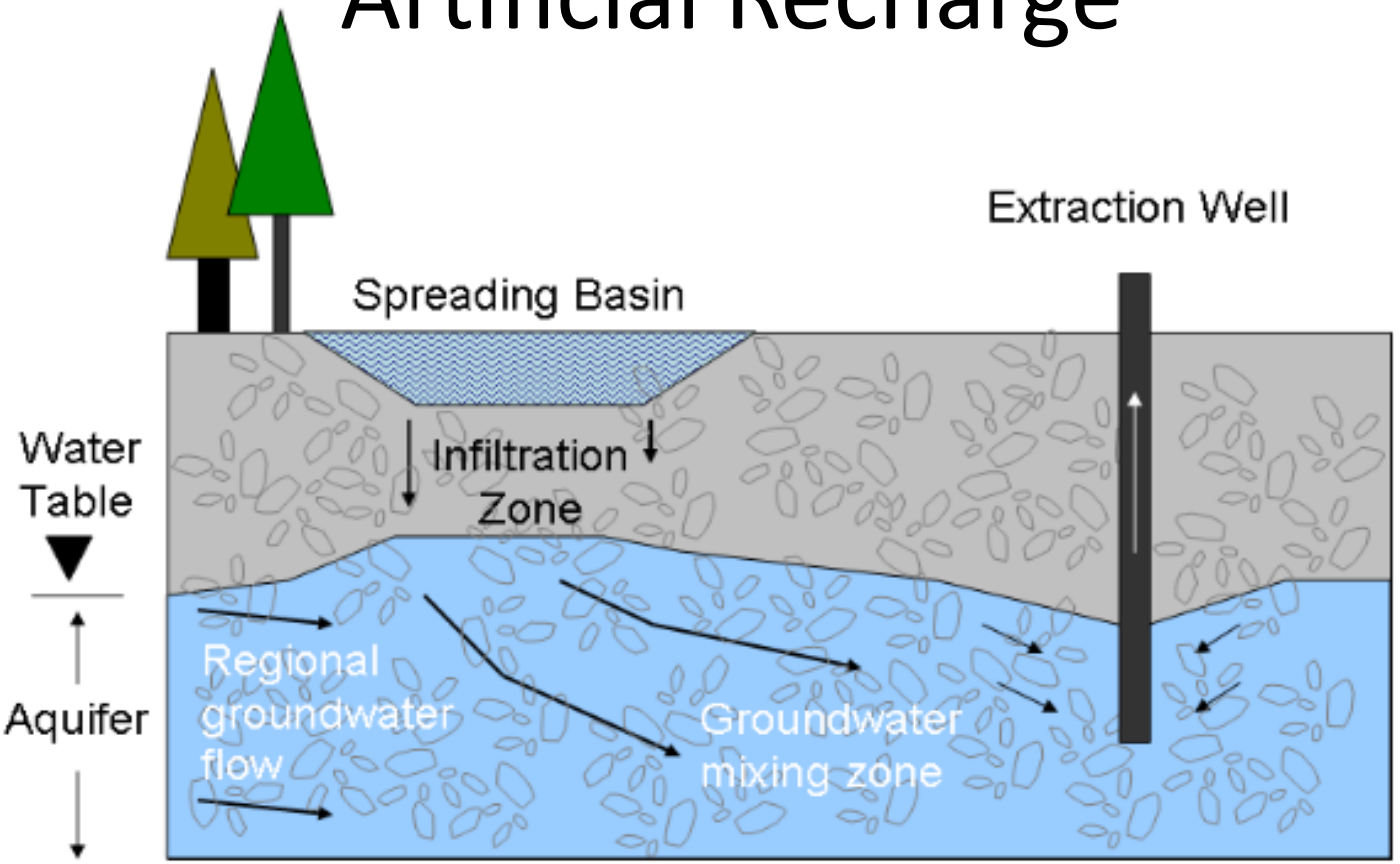


Figure 3. In a typical spreading basin project, water infiltrates through shallow basins or canals. Withdrawal occurs down gradient through a well or the water discharges to the surface and augments stream flow.

Aquifer Storage and Recovery

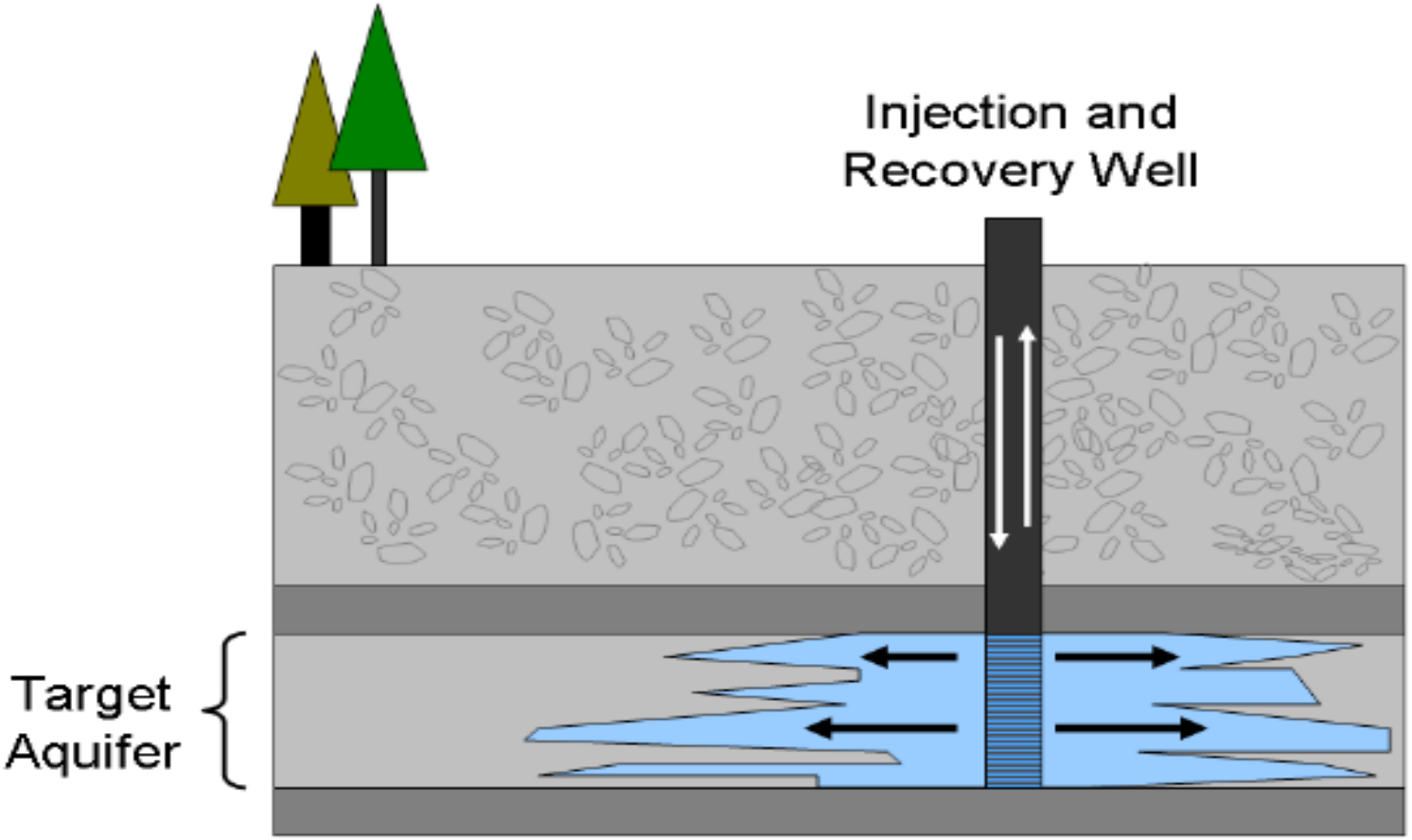
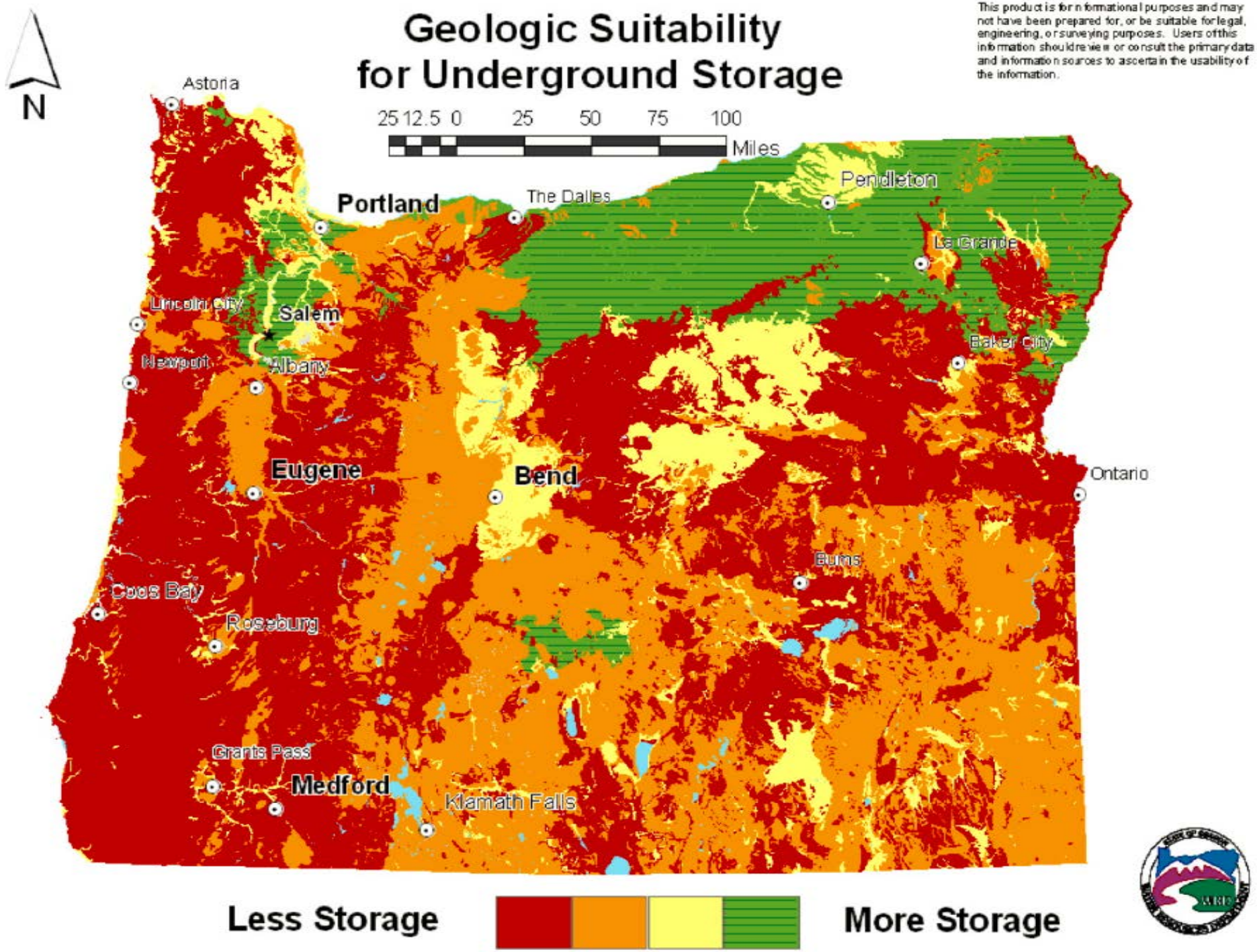
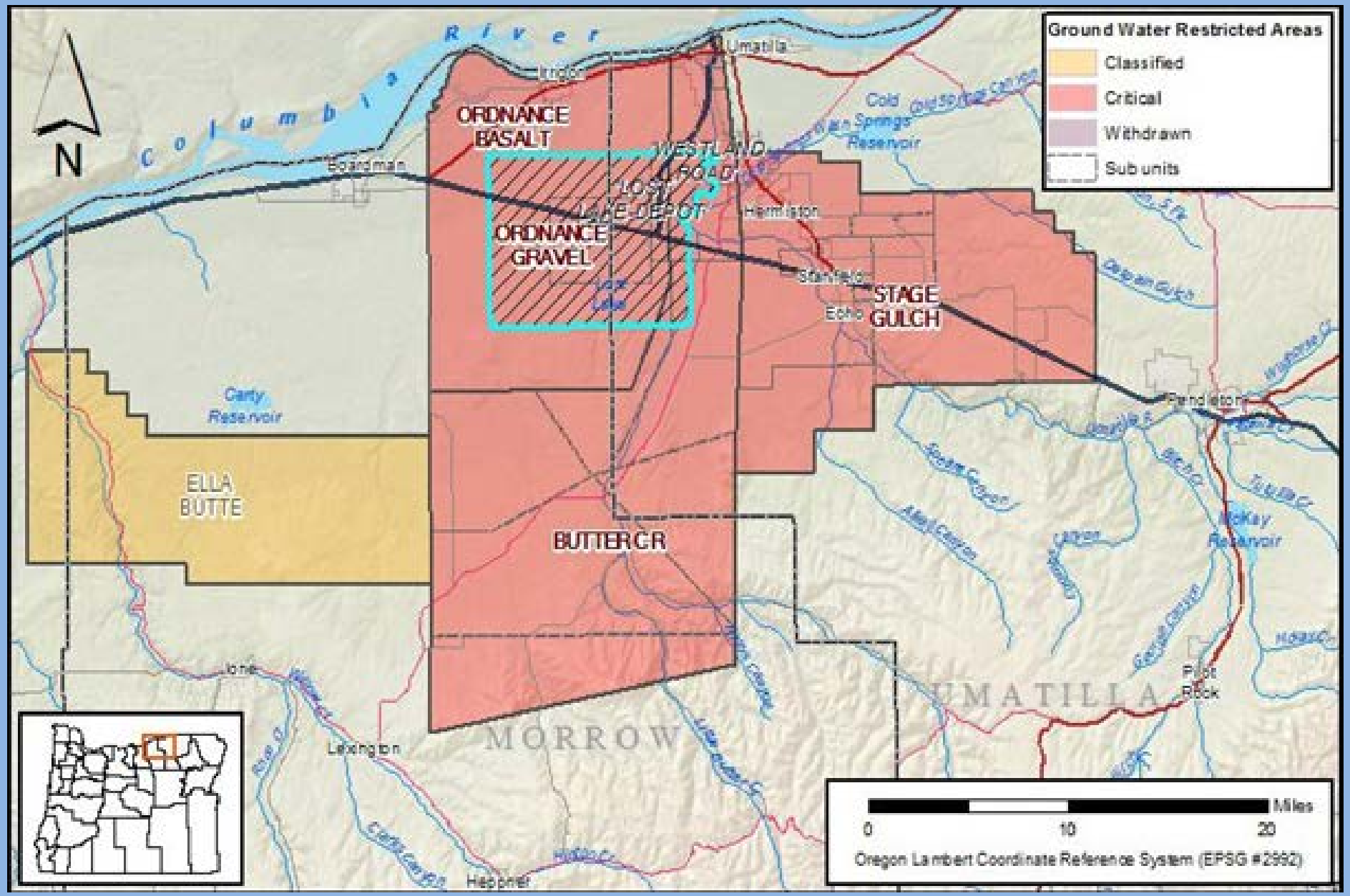


Figure 2. In a municipal injection and recovery system, surface water is treated to drinking water quality, stored underground, and later withdrawn and distributed to water customers.

Geologic Suitability for Underground Storage



CURRENT PROJECTS (CRUST)



CURRENT PROJECTS (CRUST)

- Umatilla Basin Aquifer Recovery Project
- Develop additional below-ground storage sites (IWRS #10B)
- Juniper Canyon Storage Reservoir
- Develop additional above ground, off-channel storage sites when needed (IWRS #10B)
- Wallowa Lake Dam Repair
- Improve Dam Safety (IWRS #7A)
- Similkameen Project
- Authorize and fund the State to invest in and purchase water from stored water facilities (IWRS #10B); Partner with neighboring States to improve access to additional stored water (IWRS #9C)

Agency Resources

Resources For:

Well Constructors

Exempt Use Water Well Recording

Realtors®

Certified Water Right Examiners

Water Conservation

Drought Watch

Conservation and Supply Resources and Programs

Deschutes Basin Mitigation Program

Environmental Justice

Gold Mining: FAQ

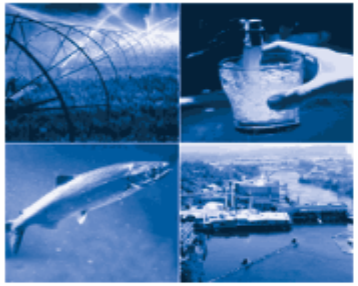
Assignments and Ownership Updates

Water Conservation, Reuse and Storage Grant Program

The Water Conservation, Re-use and Storage Grant Program, established by Senate Bill 1069 (2008), is designed to fund the qualifying costs of planning studies that evaluate the feasibility of developing water conservation, re-use or storage projects. The 2013 Legislature approved $750,000 of grant funds for continuation of this grant program for the 2013-15 biennium. Applications for this grant program will be accepted from August 15 through November 1, 2013.

Oregon Water Supply and Conservation Initiative

The Oregon Water Resources Department (the Department) recognizes that water resources needs in Oregon are many, while our resources are finite. The Oregon Water Supply and Conservation Initiative gives the Department an opportunity to take a bird's eye view of water demands and water availability throughout the state, and to strategically develop the tools, methodologies, and budgets required to ensure that those who need water—both in-stream and out-of-stream—will have access to the resource for generations to come.



The Department has several programs and efforts to assist with water conservation. These include planning tools and resources, modifications to water rights, information about watershed restoration and instream activities.

Potential Water Storage Sites

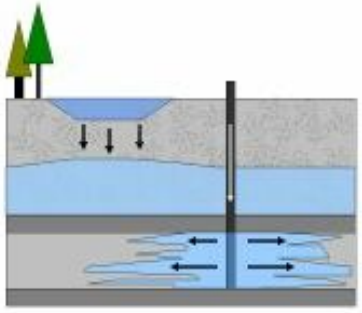
Overview

Department staff has constructed an inventory of potential water storage opportunities in Oregon, including both above and below-ground sites. In this first phase, the project team collected as much existing information as possible so that the Department can serve as a clearinghouse for storage information. No attempt was made during this stage to assess the ecological or economic feasibility of these projects. The Department is providing this information so that communities can avoid "reinventing the wheel," in terms of site investigation. This information will also help the state identify and prioritize possible future projects.

Above Ground Storage

To date, the Department has mapped the location of more than 1,200 potential above-ground storage sites. This information came from staff, other state, local, and federal agencies, and the general public. The Department has marked each site and linked all available information to the project, including capacity curves, reservoir inundation areas, and site maps.

Above Ground Storage Site Search - This tool allows you to list sites by county and/or basin, view them on a map, see detailed information about the site, and view associated documents such as maps, studies, graphs, etc.



At this time, the Department has compiled hydrogeologic data and extent estimates for more than 70 geologic units. This represents the major aquifers across the state. Information was collected from state and federal technical publications, staff and databases, as well as private sector studies. Based on available data about the aquifers' ability to accept water into storage, the Department presents an analysis of below ground storage potential. Data sources, data quality and evaluation results are linked to each potential site.

Below Ground Storage Site Search - This tool allows you to list sites by county and/or basin, view them on a map, see detailed information about the site, and view associated documents such as maps, studies, graphs, etc.

Below Ground Storage Assessment Report - The study collected existing aquifer data about more than 50 hydrogeologic units statewide. A weighted aquifer rating system assessing the physical capacity of aquifers to accept water into storage indicates that approximately 30% of aquifers are highly suitable. A secondary analysis of storage capacity suggests there is more than 8.4 x 107 ac-ft of potential underground storage available statewide, based on storage coefficient, depth to static water level and aquifer extent.

Above Ground Potential Storage Project Search

Area of Interest: All Counties / All Basins

Map Format: Google Maps / Google Earth (kml)

Map projects in area

Project #	Name	Site	Type	County	Basin #	T-R-S	Information Source	
443	ABIQUA LOWER	1	Future project	MARI	2	6.00S-1.00E-30		Map Details
444	ABIQUA UPPER	1	Future project	MARI	2	7.00S-1.00E-13		Map Details
2082	ABRAMS #1	1	Future project	LANE	2	22.00S-2.00W-5	USGS RIVER PLANS AND PROFILES 1971	Map Details
2083	ABRAMS #2	1	Future project	LANE	2	22.00S-2.00W-9	USGS RIVER PLANS AND PROFILES 1971	Map Details
2252	ADAMS CREEK	1	Future project	DOUG	16	23.00S-4.00W-6	DOUGLAS COUNTY WATER RESOURCES PROGRAM 2008 VOL I	Map Details
1522	AGATE	1	Existing project with enlargement potential	JACK	15	36.00S-1.00W-25	ROGUE RIVER BASIN STUDY; OWRD. JANUARY, 1985.	Map Details
446	AGENCY	1	Future project	POLK	2	6.00S-7.00W-8		Map Details
447	AGENCY	1	Future project	POLK	2	6.00S-8.00W-12	WILLAMETTE RIVER BASIN WATER OPTIMIZATION STUDY DAM SITE REVIEW - OWRD/USBR 1991	Map Details
448	AGENCY CREEK	1	Future project	YAMH	2	5.00S-8.00W-26		Map Details
449	AIRLIE	1	Future project	POLK	2	9.00S-5.00W-15		Map Details

1 2 3 4 5 6 7 8 9 10 ...

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Above Ground Potential Storage Project Search

Area of Interest: All Counties / Grande Ronde Basin

Map Format: (•) Google Maps ( ) Google Earth (kml)

Map projects in area

Project #	Name	Site	Type	County	Basin #	T-R-S	Information Source	
2116	RONDOWA UPPER	1	Future project	WALL	8	3.00N-40.00E-14	USGS RIVER PLANS AND PROFILES 1948	Map Details
2118	SHEEP CREEK	1	Future project	WALL	8	3.00N-40.00E-14	USGS RIVER PLANS AND PROFILES 1934	Map Details
2159	WALLOWA	1	Future project	WALL	8	2.00N-42.00E-31	USGS RIVER PLANS AND PROFILES 1959	Map Details
2258	WALLOWA LAKE	1	Existing project with enlargement potential	WALL	8	3.00S-45.00E-5	WALLOWA LAKE DAM REHABILITATION PROGRAM PHASE 1 ASSESSMENT AND PRELIMINARY ENGINEERING DESIGN FINAL -- DEC 2002	Map Details

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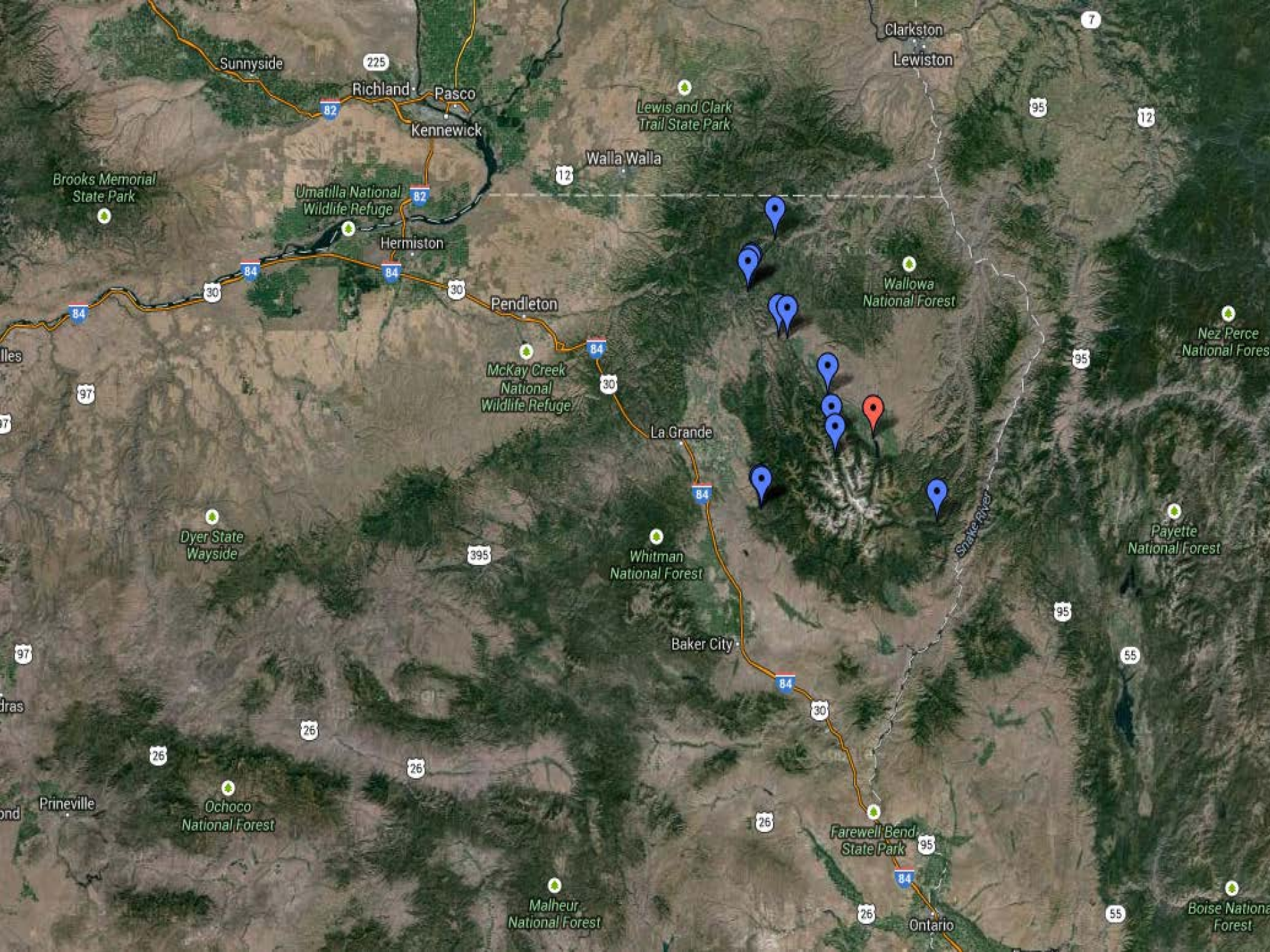
Sunnyside
225
Richland
Pasco
82
Kennewick
Clarkston
Lewiston
7
Lewis and Clark Trail State Park
95
12
Walla Walla
Brooks Memorial State Park
Umatilla National Wildlife Refuge
82
Hermiston
84
30
Pendleton
Wallowa National Forest
Nez Perce National Fores
McKay Creek National Wildlife Refuge
97
La Grande
Dyer State Wayside
395
Whitman National Forest
Snake River
Payette National Forest
Baker City
55
26
Prineville
Ochoco National Forest
Farewell Bend State Park
Malheur National Forest
Ontario
Boise National Forest

Above Ground Potential Storage Project Search

Area of Interest: All Counties / Umatilla Basin

Map Format: (•) Google Maps ( ) Google Earth (kml)

Map projects in area

Project #	Name	Site	Type	County	Basin #	T-R-S	Information Source	
1462	I-84	1	Future project	UMAT	7	2.00N-33.00E-16	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
1463	JOE WEST	1	Future project	UMAT	7	5.00N-36.00E-21	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
1464	JUNIPER CANYON	1	Future project	UMAT	7	6.00N-30.00E-35	OREGON WATER RESOURCES DEPARTMENT; 2007.	Map Details
1465	KLONDIKE CREEK	1	Future project	UMAT	7	1.00N-36.00E-30	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
1466	LACY POCKET	1	Future project	UMAT	7	3.00N-37.00E-17	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
1467	LITTLE JOHNSON CREEK	1	Future project	UMAT	7	1.00S-34.00E-26	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
2242	LUNCEFORD CANYON	1	Future project	MORR	7	4.00S-27.00E-19	RHEA CREEK WATERSHED - PRELIMINARY INVESTIGATION REPORT - JUNE 1972	Map Details
1468	MCKAY CREEK	1	Future project	UMAT	7	1.00S-34.00E-29	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details
2161	MCKAY RESERVOIR	1	Existing project with enlargement potential	UMAT	7	2.00N-32.00E-34	TECHNICAL MEMORANDUM MK-8383-6 APPRAISAL STUDY - INCREASE STORAGE FOR MCKAY DAM UMATILLA PROJECT, OR USBR MAY 2001	Map Details
1469	MEACHAM CREEK	1	Future project	UMAT	7	1.00N-37.00E-30	UMATILLA BASIN PROJECT PHASE III FEASIBILITY STUDY: STORAGE OPPORTUNITIES. USBR, JULY 1999.	Map Details

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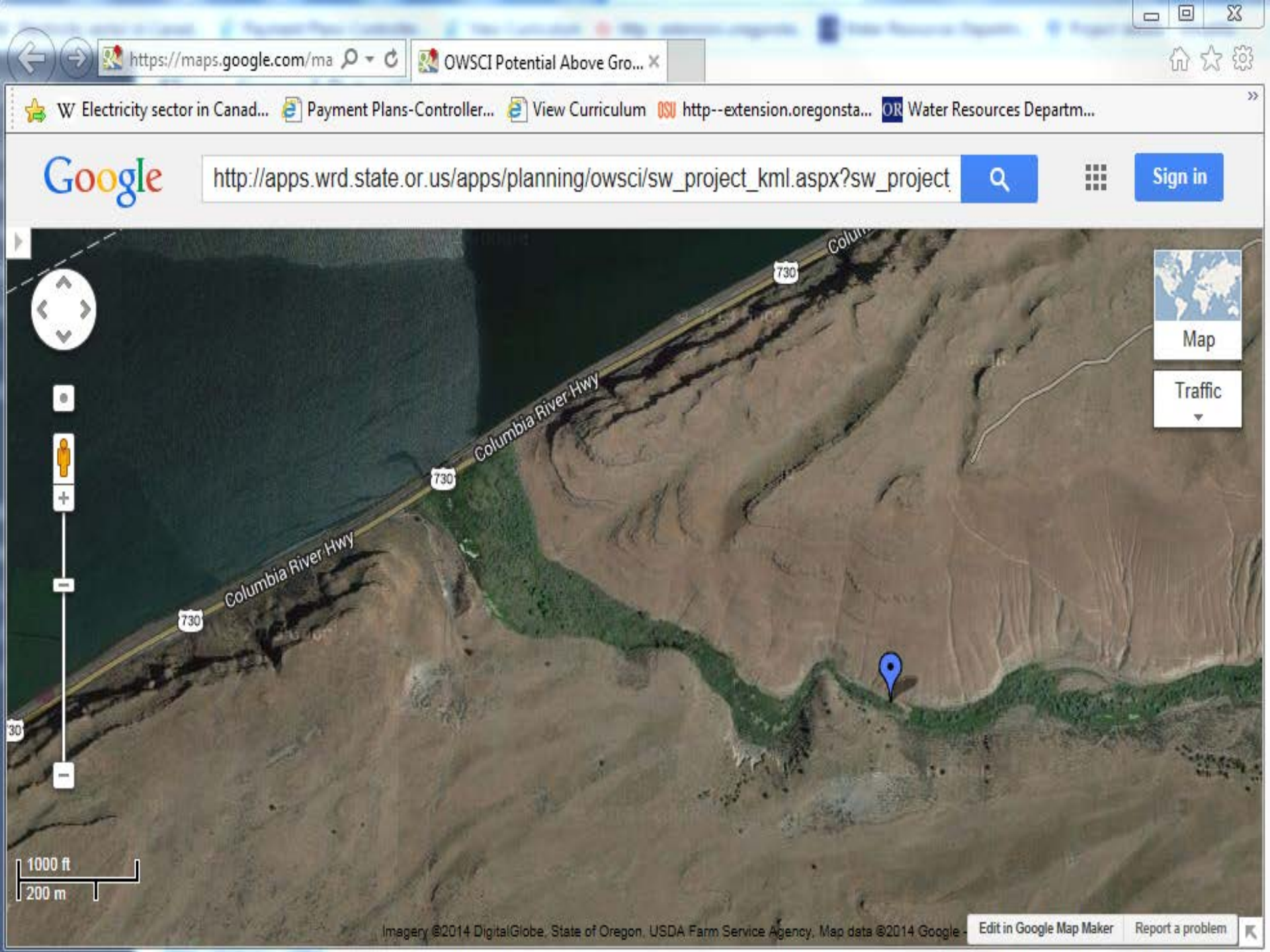
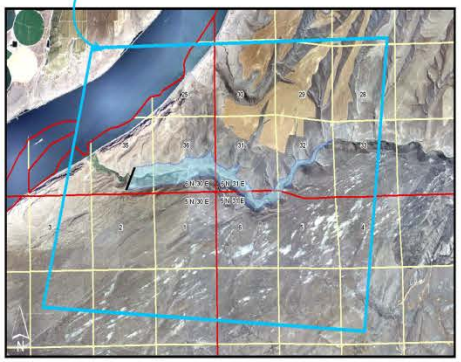

https://maps.google.com/ma
OWSCI Potential Above Gro...
Electricity sector in Canad...
Payment Plans-Controller...
View Curriculum
http--extension.oregonsta...
Water Resources Departm...
Google
http://apps.wrd.state.or.us/apps/planning/owsci/sw_project_kml.aspx?sw_project
Sign in
Columbia River Hwy
730
Map
Traffic
1000 ft
200 m
Imagery ©2014 DigitalGlobe, State of Oregon, USDA Farm Service Agency, Map data ©2014 Google
Edit in Google Map Maker
Report a problem

JUNIPER CANYON: 3D Perspective View of the Proposed Dam Site & Inundation Area

Approximate area covered by the 3D perspective

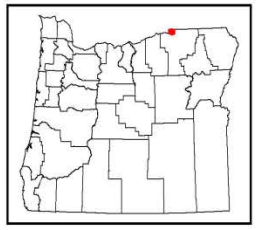


Dam
Township
Inundation area
Section

DRAFT

Imagery from the Farm Service Agency (FSA) flown in June 2005. It is draped over 10-meter (32.808-ft) digital elevation model (DEM) data from the U.S. Geological Survey.

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



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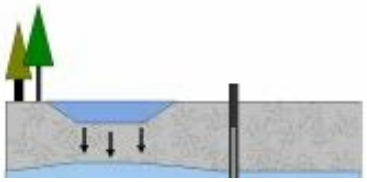

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Below Ground Storage Site Search

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Map Format: (•) Google Maps ( ) Google Earth (kml)

Map projects in area

Name	Type	County	Basin #	Status	
UMATILLA BASIN WATER COMMISSION	AR			ACTIVE	Map Details
UMATILLA COLUMBIA RIVER BASALT	ASR		7	NOT AN EXISTING PROJECT	Map Details
UMPQUA BASIN WESTERN CASCADES	ASR		16	NOT AN EXISTING PROJECT	Map Details
UMPQUA FORMATION SHALE AND SANDSTONE	ASR		15	NOT AN EXISTING PROJECT	Map Details
UMPQUA MARINE DEPOSITS	ASR		17	NOT AN EXISTING PROJECT	Map Details
WALLA WALLA RIVER IRRIGATION DISTRICT (AKA HALL-WENTLAND)	AR		7	ACTIVE	Map Details
WARNER VALLEY TUFFS AND BASALTS	ASR		13	NOT AN EXISTING PROJECT	Map Details
WESTERN CASCADES VOLCANICS	ASR		2	NOT AN EXISTING PROJECT	Map Details
WILLAMETTE MIDDLE SEDIMENTARY UNIT	AR/ASR		2	NOT AN EXISTING PROJECT	Map Details
WILLAMETTE VALLEY BASEMENT CONFINING UNITS	ASR		2	NOT AN EXISTING PROJECT	Map Details

1 2 3 4 5 6 7 8

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Below Ground Storage Site Details

Project Name: UMATILLA BASIN WATER COMMISSION
Authorized: LIMITED LICENSE
Status: ACTIVE
Type: AR

Location Information

Location (longitude, latitude): -119.47503400 , 45.79282900

View on a map

Associated Documents

Title	Type	Description
2009 UMATILLA BASIN REGIONAL AQUIFER RECOVERY ASSESSMENT	RPT	FEASIBILITY ASSESSMENT
CONCEPTUAL HYDROGEOLOGY OF ALLUVIAL AQUIFERS: UMATILLA BASIN	RPT	HYDROGEOLOGY REPORT
ECONOMIC BENEFITS ANALYSIS		
FIGURES FOR CONCEPTUAL HYDROGEOLOGY OF ALLUVIAL AQUIFERS: UMATILLA BASIN	RPT	MAPS AND HYDROGRAPHS
INFRASTRUCTURE ASSESSSMENT	RPT	
ODEQ LOWER UMATILLA HYDROGEOLOGY CHAPTER 2	RPT	GEOLOGIC FRAMEWORK, ALLUVIAL AND SHALLOW BASALT AQUIFER CHARACTERISTICS (1995)
STAGE 1 WATER YEAR 2012 ANNUAL REPORT	RPT	AR TESTING RESULTS FROM WATER YEAR 2012

FINAL REPORT
ECONOMIC BENEFITS ANALYSIS

Umatilla Basin Regional Aquifer Recovery Assessment
Task 1.K

April 2009

Prepared By:

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Resource Economist

For:

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505 East Main Street
Hermiston, OR 97838
541-567-0252

Optimizing Water Resources Through Technology

CLOSING AND RECOMMENDATION

The Commission may consider the following options:

1. **Direct the Department to continue efforts to support the development of water storage projects consistent with the IWRS recommended action of improving access to built storage.**

2. **Request the Department staff to return with more information.**

Recommendation: The Director recommends Option 1

THANK YOU