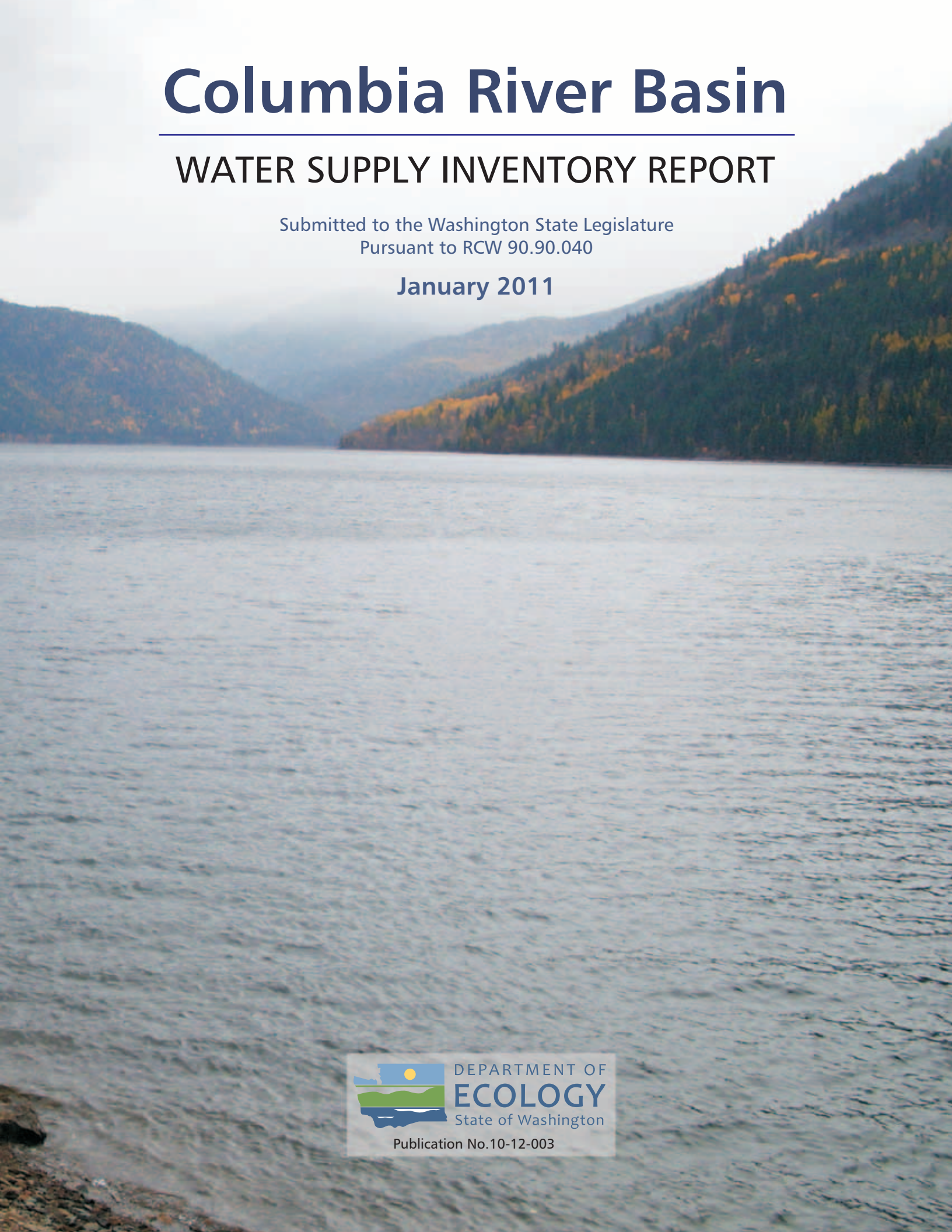
Columbia River Basin

WATER SUPPLY INVENTORY REPORT

Submitted to the Washington State Legislature
Pursuant to RCW 90.90.040

January 2011



DEPARTMENT OF ECOLOGY
State of Washington
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This 2010 Columbia River Basin Water Supply Inventory Report
was prepared by The Office of Columbia River

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Cover Photo:
Sullivan Lake, Pend Oreille County, WA

2010 Report to the Legislature

DEPARTMENT OF
ECOLOGY
State of Washington

Columbia River Basin Water Supply Inventory Report

submitted by The Office of Columbia River

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"With strong support and targeted investments from our Governor and the Legislature, our communities, tribes and state and federal agencies are pulling together on projects that secure the water needed for people, farms and salmon."

Ecology Director
Ted Sturdevant

Introduction

The Office of Columbia River (OCR) is pleased to provide the fifth annual Water Supply Inventory Report to the 2010 Washington State Legislature. The Report gives information and updates on projects, with particular emphasis on the progress and new efforts made in 2010. Some of the 2010 highlights reviewed in this report include preliminary work for issuing new municipal and industrial permits, delivering water to the Odessa Subarea and projects that provide water to irrigators and improve fish flows. In addition to project development, OCR is proposing 2011 legislative amendments to Chapter 90.90 RCW and the Hillis Rule, Chapter 173-152 WAC. Ecology Director Ted Sturdevant summed it up during an Eastern Washington tour of water supply projects: "With strong support and targeted investments from our Governor and the Legislature, our communities, tribes and state and federal agencies are pulling together on projects that secure the water needed for people, farms and salmon."

In 2006, the Washington State Legislature responded to the water needs of the Columbia River Basin. Chapter 90.90 RCW, Columbia River Basin Water Supply, directs the Department of Ecology (Ecology) to aggressively pursue the development of water supplies to meet the economic and community development needs of people and the instream flow needs of fish. To implement this legislation, Ecology established The Office of Columbia River. By working with tribes, environmentalists, growers, municipalities and other interested parties, OCR provides support for storage and conservation projects and voluntary regional agreements. To help OCR identify and evaluate policy issues and set project funding criteria, a policy advisory group (PAG) was created. Composed of agricultural, environmental, tribal and other representatives, the PAG brings a range of perspectives to policy discussions.

New water supplies and conservation projects are essential to successful water resource management in the Columbia River Basin. In RCW 90.90.020, the Legislature directed Ecology to focus its efforts on developing water supplies for:

- Alternatives to groundwater for Odessa Subarea
- Pending water right applications
- New supplies for interruptible water right holders
- New water supplies for municipal, domestic, industrial and irrigation
- Instream benefits

The "OCR Funded Project" map, on the following pages, illustrates OCR's dedicated work to find solutions to these five directives.

Office of Columbia River Policy Advisory Group Members

Dale Bambrick, NOAA Fisheries - U.S. Dept of Commerce

Dr. Brenda Bateman, Oregon Department of Water Resources

Gary Chandler, Association of Washington Business

Kathleen Collins, Water Policy Alliance

Jon Culp, Washington State Conservation Commission

Jim Fredricks, U.S. Army Corps of Engineers

Michael Garrity, American Rivers

Rick George, Confederated Tribes of the Umatilla Indian Reservation

Bill Gray, U.S. Bureau of Reclamation

Mike Leita, Yakima County Commissioners

Joe Lukas, Grant County PUD

Mo McBroom, Washington Environmental Council

Darryll Olsen, Columbia-Snake Rivers Irrigation Association

Merrill Ott, Stevens County Commissioners

Gary Passmore, Confederated Tribes of the Colville Reservation

Lisa Pelly, Trout Unlimited

Rudy Peone, Spokane Tribe of Indians

Rudy Plager, Adams County Commissioners

Phil Rigdon, Confederated Tribes and Bands of the Yakama Nation

Dave Sauter, Klickitat County Commissioners

Mike Schwisow, Columbia Basin Development League

Teresa Scott, Washington State Department of Fish & Wildlife

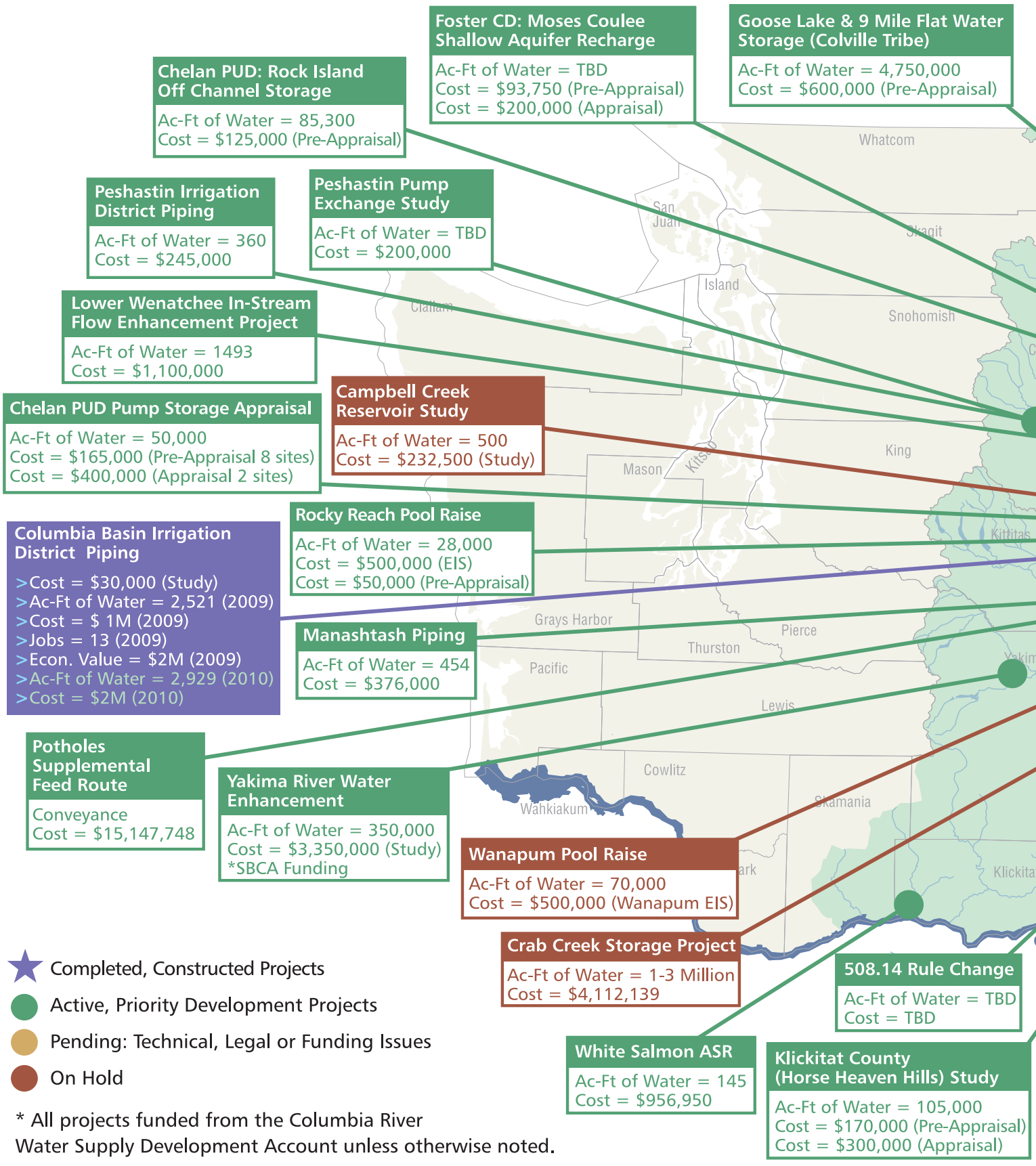
Craig Simpson, East Columbia Basin Irrigation District

Rich Stevens, Grant County Commissioners

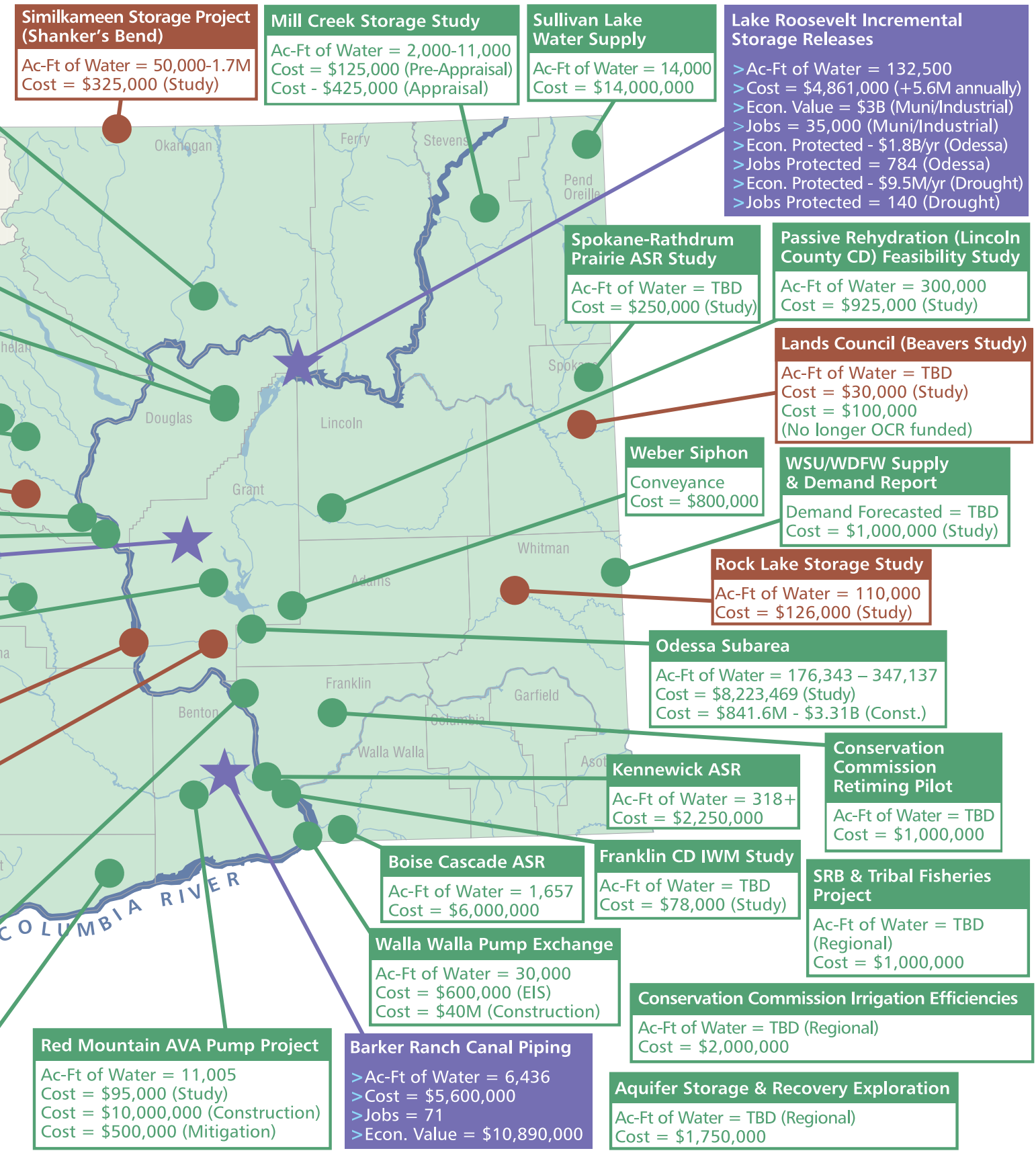
John Stuhlmiller, Washington State Farm Bureau

Rob Swedo, Bonneville Power Administration

Office of Columbia River Funded Projects



* All projects funded from the Columbia River Water Supply Development Account unless otherwise noted.



Similkameen Storage Project (Shanker's Bend)
Ac-Ft of Water = 50,000-1.7M
Cost = $325,000 (Study)

Mill Creek Storage Study
Ac-Ft of Water = 2,000-11,000
Cost = $125,000 (Pre-Appraisal)
Cost - $425,000 (Appraisal)

Sullivan Lake Water Supply
Ac-Ft of Water = 14,000
Cost = $14,000,000

Lake Roosevelt Incremental Storage Releases
>Ac-Ft of Water = 132,500
>Cost = $4,861,000 (+5.6M annually)
>Econ. Value = $3B (Muni/Industrial)
>Jobs = 35,000 (Muni/Industrial)
>Econ. Protected - $1.8B/yr (Odessa)
>Jobs Protected = 784 (Odessa)
>Econ. Protected - $9.5M/yr (Drought)
>Jobs Protected = 140 (Drought)

Spokane-Rathdrum Prairie ASR Study
Ac-Ft of Water = TBD
Cost = $250,000 (Study)

Passive Rehydration (Lincoln County CD) Feasibility Study
Ac-Ft of Water = 300,000
Cost = $925,000 (Study)

Lands Council (Beavers Study)
Ac-Ft of Water = TBD
Cost = $30,000 (Study)
Cost = $100,000
(No longer OCR funded)

Weber Siphon
Conveyance
Cost = $800,000

WSU/WDFW Supply & Demand Report
Demand Forecasted = TBD
Cost = $1,000,000 (Study)

Rock Lake Storage Study
Ac-Ft of Water = 110,000
Cost = $126,000 (Study)

Odessa Subarea
Ac-Ft of Water = 176,343 – 347,137
Cost = $8,223,469 (Study)
Cost = $841.6M - $3.31B (Const.)

Conservation Commission Retiming Pilot
Ac-Ft of Water = TBD
Cost = $1,000,000

Kennewick ASR
Ac-Ft of Water = 318+
Cost = $2,250,000

Franklin CD IWM Study
Ac-Ft of Water = TBD
Cost = $78,000 (Study)

SRB & Tribal Fisheries Project
Ac-Ft of Water = TBD (Regional)
Cost = $1,000,000

Boise Cascade ASR
Ac-Ft of Water = 1,657
Cost = $6,000,000

Walla Walla Pump Exchange
Ac-Ft of Water = 30,000
Cost = $600,000 (EIS)
Cost = $40M (Construction)

Conservation Commission Irrigation Efficiencies
Ac-Ft of Water = TBD (Regional)
Cost = $2,000,000

Red Mountain AVA Pump Project
Ac-Ft of Water = 11,005
Cost = $95,000 (Study)
Cost = $10,000,000 (Construction)
Cost = $500,000 (Mitigation)

Barker Ranch Canal Piping
>Ac-Ft of Water = 6,436
>Cost = $5,600,000
>Jobs = 71
>Econ. Value = $10,890,000

Aquifer Storage & Recovery Exploration
Ac-Ft of Water = TBD (Regional)
Cost = $1,750,000

2010 Milestones

Along with meeting the five legislative directives that provide benefits for instream and out-of-stream users, OCR-funded projects produce economic benefits by creating jobs and generating revenue.

The year 2010 resulted in landmark achievements in securing water for both instream and out-of-stream users. The Sullivan Lake Project makes water available to enhance instream flows and for future water rights to cities and towns. The Lake Roosevelt Incremental Releases Project advanced to a stage that allows OCR to begin issuing water rights in 2011. Also, upon completion of the Weber Siphon Project, 7,000 acre-feet of water from the Lake Roosevelt Releases will be delivered to Odessa farmers. The Red Mountain AVA Project will provide irrigation for additional wine grape acreage and improve stream flows in the lower Yakima River.

Along with providing these instream and out-of-stream benefits, OCR projects produce economic benefits by creating jobs and generating revenue. The Sullivan Lake Water Supply Project will generate $2 million annually for the economy. By irrigating an additional 1,785 acres of vineyards, the Red Mountain Pump Exchange Project will inject $9.2 million annually into Washington's economy. The Lake Roosevelt Incremental Storage Releases Project protects hundreds of jobs and creates $3 billion for the economy (*WA State Office of Financial Management*).

Sullivan Lake Water Supply Project

The Sullivan Lake Project provides a rare opportunity to create new water supplies in a part of the state where few opportunities exist. Located in Pend Oreille County, the lake is 1,200 acres in area and 330 feet deep. A hydropower facility on the lake is currently being decommissioned. In partnership with Pend Oreille Public Utility District (PUD), OCR negotiated an agreement to re-operate Sullivan Dam to make available 14,000 acre-feet of water for out-of-stream permits and instream flows. The water will be retimed from being released in the winter to being released during the summer when it is needed the most. To ensure that the northeast counties benefit from the water, OCR has proposed 2011 legislation to authorize that permits for this water be issued only to applicants in the Ferry, Pend Oreille, Douglas, Okanogan, Stevens and Lincoln Counties, with a focus on municipal and industrial demands. The project will also provide additional water to improve instream flows in the Pend Oreille River all the way to the mouth of the Columbia. The instream portion will be managed by Department of Fish and Wildlife's Fish Flow Releases Advisory Group, which is assisting OCR in the management of instream releases.

Ecology Director Ted Sturdevant and local officials sign the Sullivan Lake Water Supply Project Agreement

Lake Roosevelt Incremental Storage Releases

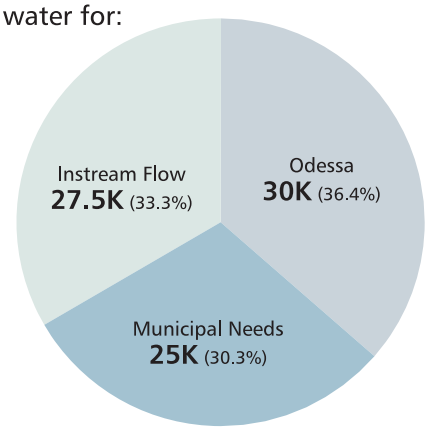
OCR will reach an important milestone when it begins issuing new municipal and industrial (M&I) permits from water made available through the Lake Roosevelt Incremental Storage Releases. Water-strapped cities and businesses, many who have been waiting years for relief, will be the recipients of the largest block of M&I water, 25,000 acre-feet, that has been developed in decades.

The storage releases would be diverted from The Bureau of Reclamation's existing 6.4 million acre-foot storage right for water behind Grand Coulee Dam. The releases would result in an additional one foot drawdown of the lake level during the spring and summer months (1.8 feet during drought years). This additional drawdown is small compared to the normal operating range of Lake Roosevelt, which can fluctuate up to 80 feet a year and up to 2.5 feet a day. In 2010, OCR took preliminary steps to evaluate which applicants are eligible to receive municipal and industrial water use permits from this project. Over one hundred eighty applicants are being contacted, site visits are being conducted, and hydrologic work has begun. Permits will be issued once OCR receives a final contract from the Bureau of Reclamation. The Washington Supreme Court's pending ruling on the definition of "municipality" may affect the status of some applications.

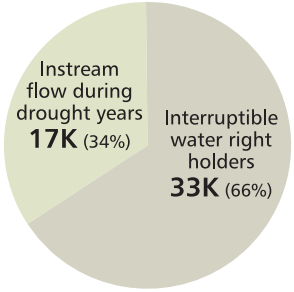
The releases will help endangered salmon and steelhead by adding 27,500 acre-feet to Columbia River stream flows. Additional water releases for fish will occur during drought years. In 2009, Washington Department of Fish and Wildlife chaired a Fish Flow Releases Advisory Group comprised of state, federal and tribal fisheries managers. The group developed recommendations for this project. These recommendations were incorporated into the annual water management plan for the Federal Columbia River Power System.

Another 30,000 acre-feet is being readied for the Odessa Subarea via water service contracts issued by the East Columbia Basin Irrigation District, where, according to Washington State University, declining aquifers could cost Washington thousands of jobs and hundreds of million dollars annually.

The Lake Roosevelt storage release would divert up to 82.5K ac-ft of water for:



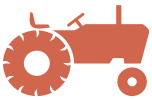
In a drought year an additional 50K ac-ft of water for:



Throughout the report, these symbols are used to identify the legislative directive that the project addresses:

: Alternatives to groundwater for Odessa Subarea

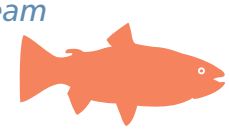
: Pending water right applications



: Future water supplies for interruptible water right holders

: Future water supplies for municipal, domestic, industrial and irrigation

: Instream benefits



Weber Siphon Project

The Weber Siphon Project is needed to deliver water from the Lake Roosevelt Incremental Storage Releases to the southern portion of the Columbia Basin. The project expands the capacity to convey Columbia Basin Project water which will be available for agricultural, municipal and industrial uses. The project constructs a second pipe, nearly 15 feet in diameter, alongside an existing pipeline at the Weber Siphon Complex. This will eliminate a water delivery bottleneck in the East Low Canal where it crosses Interstate 90 near Moses Lake. OCR contributed $800,000 of the $51 million project's budget. Federal stimulus money paid for the project's remaining cost. Project completion is scheduled for December 2011.

Washington Department of Fish and Wildlife (WDFW) is one of several contractors developing environmental information for the proposed delivery of project water to groundwater irrigators in the Odessa Subarea. They coordinate a Habitat Evaluation Procedure to estimate habitat damage and determine ways to mitigate, to investigate fish and invertebrate production in Banks Lake and to conduct a terrestrial wildlife survey. Reclamation engineers use the preliminary terrestrial survey data and biologists' recommendations to design and locate several canal escape ramps and crossings. These crossings maintain wildlife migration corridors that reduce entrapments of wildlife within canals. Together, these studies provide critical information on how to best respond to the impacts to fish and wildlife.

Construction phase of the Weber Siphon Project

Yakima River Basin Water Enhancement Project

Water shortages are a chronic problem in the Yakima River Basin. Demand for water to irrigate crops, provide drinking water and ensure salmon and steelhead survival is greater than supply. In June 2009 Ecology and the U.S. Bureau of Reclamation brought representatives from The Yakama Nation, irrigation districts, environmental organizations and federal, state and local governments together to form a working group. The goal was to develop a consensus-based solution to the Basin's water problems. By December 2009, the group agreed upon a preliminary integrated water resource management plan that included water supply, enhanced conservation, modification of existing operations, fish passage and habitat enhancement elements. The plan, which will be finalized by the end of 2010, identifies the type of work that will be done in two phases.

Red Mountain AVA Pump Project

This project highlights OCR's dual endeavors: benefitting instream needs and out-of-stream users. OCR and Kennewick Irrigation District (KID) worked together to develop a coalition of stakeholders, including the Bureau of Reclamation (Reclamation), the Yakama Nation, and WDFW, to fund and permit a Yakima River project that will help the economy and environment. Water savings from efficiency improvements and past land use changes were used to provide irrigation for additional wine grape acreage. Stream flows increased between Prosser and Benton City by moving the KID's diversion point down stream. An additional 1,785 acres of irrigated vineyard will inject $9.2 million annually into Washington's economy. Environmentally, 7,435 acre-feet of water – enough to cover over 11 square miles of land with one foot of water – will be released into a persistently low-flowing stretch of the Yakima River. This will enhance the instream flow for salmon and steelhead. Water from this project will be available in 2012.

Another feature of this project is shrub steppe mitigation. OCR and KID each contributed $500,000 dollars for a pilot project to purchase native shrub steppe lands elsewhere in the state. The land purchase serves to mitigate for the project's impact of converting lands from shrub steppe habitat to irrigated acres. In July 2010, Ecology, WDFW, KID, and Reclamation signed a Memorandum of Agreement to recognize and act on the potential impacts of OCR projects on shrub steppe habitats.

Columbia Basin Aquifer Storage and Recovery Exploration Project

OCR is investing $1.75 million to evaluate state-owned lands as potential aquifer storage and recovery storage sites. During the next two years, drilling and testing will occur at sites within the Columbia River Basin. Preferred sites will have minimal environmental impacts, low capital costs and will not impair existing water rights. If water supply is developed, two-thirds of the water will be for out-of-stream uses and one-third for instream benefit.

508-14 Project

Ecology is proposing to amend Chapter 508-14 WAC, "*Columbia Basin Project – Ground Waters*," which was adopted in 1969 and amended in 1988. This rule currently describes Ecology's permitting process for commingled naturally and artificially stored groundwater beneath the Columbia Basin Project. The purposes of the rule amendment are to:

- Determine the amount of naturally and artificially stored groundwater in the 508-14 Area
- Clarify the permitting approach for new applicants applying for use of naturally stored groundwater
- Clarify the permitting approach for new applicant applying for use of artificially stored groundwater
- Determine whether or not any existing permittees will receive groundwater certificates

Ecology plans to have the rule-making completed by September 2012.

The Red Mountain AVA Pump Project will result in improved flows in the Yakima River, shrub steppe mitigation and 1,785 additional irrigated acres of vineyard.

2009-2010 Projects

In 2006, the Legislature established the Columbia River Basin Water Supply Development Account and authorized $200 million to fund it. As stated in Chapter 90.90.010 RCW, expenditures from the account "... may be used to assess, plan, and develop new storage, improve or alter operations of existing storage facilities, implement conservation projects, or any other actions designed to provide access to new water supplies within the Columbia River Basin for both instream and out-of-stream uses." Each year, OCR has funded projects consistent with this legislative mandate and has developed separate grant processes for different types of water supply projects, including Modification of Existing Storage, New Large Storage, Conservation and Acquisition.

OCR's 2009 legislative report discussed a draft funding list for the 2009 competitive grant program. The competitive grant projects primarily focused on making water available for pending water right applicants and improved instream flows. After review by the Policy Advisory Group, OCR selected the competitive grant projects to fund. The corresponding table includes the newly funded competitive and non-competitive grant projects as well as the 2008 projects whose continuing phases were funded.

A wide range of projects were funded. A pilot program with the Conservation District will determine if conservation projects can retime non-consumptive return flows resulting in more water in the Columbia River during July and August. Sites for large storage and pump storage facilities are being studied at Goose Lake and Nine Mile Flat in Okanogan and Ferry Counties. OCR and Chelan Public Utility District (PUD) are collaborating on three projects. The first project involves initial evaluation of eight potential sites for a pump storage facility. From the eight sites, two will be selected for an in-depth evaluation. The second project with Chelan PUD expands the study of potential storage sites at Rock Island. The third project evaluates a three foot pool raise at Rocky Reach Dam. The raise would result in 28,000 acre feet of additional water to be used for instream and out-of-stream purposes. This project would also create power generation opportunities for the PUD. Information on all of the projects can be found at: *http://www.ecy.wa.gov/programs/wr/cwp/projects.html*

photo by Richard E. Swanson

The Columbia River near The Dalles.

Table 1: 2009-2010 Projects

Project	Description	Cost	Water	Status	Legislative Directive
Chelan PUD Pump Storage Pre-Appraisal and Appraisal Studies	Pre-appraisal of eight sites Appraisal of two sites	$165,000 (pre-appraisal) $400,000 (appraisal)	50,000 Ac-ft	Contract negotiations underway	Instream Flow Future Supplies Pending Apps
Chelan PUD Rock Island Off Channel Storage Pre-Appraisal Study	Phase II investigation of potential site	$125,000	151,200 Ac-ft	Contract negotiations underway	Instream Flow Future Supplies Pending Apps
Chelan PUD Rocky Reach Pool Raise	Evaluate a 3 ft pool raise at Rocky Reach Dam	$500,000 for EIS	28,000 Ac-ft	Contract negotiations underway	Instream Flow New Supplies Pending Apps
Conservation Commission Project	Water conservation projects	$2M	TBD	Project plan completed	
CBID Piping	Improve efficiency of water delivery systems	$2M	2,929 Ac-ft	Piping and lining underway	Instream Flow Odessa Subarea
Foster CD: Moses Coulee Shallow Aquifer Recharge Appraisal Study	Phase II investigation of shallow aquifer recharge at Moses Coulee	$200,000	4.4 M Ac-ft	Contract negotiations underway	Instream Flow Future Supplies Pending Apps
Goose Lake & Nine Mile Flat Storage Pre-Appraisal Study	Investigate pump storage and large sites in Okanogan and Ferry Counties	$600,000	4.75M Ac-ft	Contract negotiations underway	Instream Flow Future Supplies Pending Apps
Klickitat County Horse Heaven Hills Appraisal Study	Phase II investigation of surface and aquifer storage sites	$300,000	105,000 Ac-ft	Contract negotiations underway	Instream Flow Interruptibles Future Supplies Pending Apps
Lower Wenatchee Instream Flow Enhancement Project	Convert open canals to closed pipe	$1.1M	1,493 Ac-ft	Contract negotiations underway	Instream Flow
Manashtash Piping	Convert ditches to pipes	$376,000	454 Ac-ft	Project underway	Pending Apps
Mill Creek Storage Appraisal Study	Phase II continued investigation, additional storage study of possible alternatives	$425,000	2,000-11,000 Ac-ft	Work-plan under development	Instream Flow Future Supplies Pending Apps
Peshastin Irrigation District Piping	Convert open canal to closed pipe	$165,000	360 Ac-ft	Contract negotiations underway	Instream Flow Pending Apps
Peshastin Pump Exchange Study	Investigate pumping from mouth of Peshastin Creek to irrigation canals	$200,000	TBD	Contract negotiations underway	Instream Flow
Salmon Recovery Board & Tribal Fisheries Projects	Projects to enhance instream flows	$1 Million	TBD	Discussions underway	Instream Flow Mitigation of new uses

Funding of projects may be dependant on 2011 legislative appropriations

Legislative Proposals and Rulemaking

"Active water management means anticipating needs for water in the future and developing an awareness of where it is going to be difficult to meet those needs. We must pursue changes in planning, policy, rule-making and reforming our water laws to meet those challenges."

Brian Walsh, Ecology Policy and Planning Section Manager

To improve program implementation effectiveness and to maximize and sustain Columbia River water supply investments, OCR proposed the following amendments to Chapter 90.90 RCW:

1 **Expand Cost Recovery Authority:** The Office of Columbia River needs a non-federal cost recovery feature to be successful in developing long-term and sustainable water supplies. OCR already has authority in RCW 90.42.150 to recover costs associated with federal water service contracts, such as in the Lake Roosevelt Incremental Storage Release Project. The proposed legislation will create ways to recover invested funds that will then be available to finance future projects. OCR is currently negotiating cost recovery features into many of its new projects, including the Red Mountain AVA Pump Project and Rocky Reach Pool Raise Project.

2 **Expand Pump Exchange Authority:** RCW 90.90.010(2) (b) states: "Two-thirds of the funds placed in the account shall be used to support the development of new storage facilities; the remaining one-third shall be used for the other purposes listed in this section." OCR will request that funding for pump exchange projects be included in the two-thirds portion of the account. In many cases, pump exchanges have the storage-like benefits of instream and out-of-stream uses and use major tributaries as water sources for smaller tributaries. In addition, they often have smaller environmental footprints than storage projects. Moving pump exchange projects to the two-thirds portion will create a balance that provides sufficient money to fund pump exchanges, while retaining funds for conservation, instream flow enhancement and other projects. Examples of projects that could benefit from this legislation include the Walla Walla Pump Exchange Project and the Red Mountain AVA Pump Project.

photo by Tom Leonard

The Legislative Building in Olympia

3 **Expand Storage Allocation:** RCW 90.90.020(1) requires that one-third of the water developed from a storage project is allocated for instream uses and two-thirds for out-of-stream uses. Tying the allocation to specific projects makes it difficult for OCR to meet specific local needs and maximize its water supply development potential. The proposed legislation would allow OCR to distribute the one-third/two thirds balance across the full suite of its projects rather than applying it on a project-by-project basis.

4 **Allocation of Water in the Northeastern Counties:** Water supply projects are limited in northeast Washington. The Sullivan Lake Water Supply Project provides a rare opportunity to create new instream and out-of-stream water resources for this area. To ensure that these counties benefit from the project's water, this legislation authorizes that permits will be issued only to applicants in the six northeastern counties. It also requires that half of the out-of-stream water is for municipal, domestic and industrial uses.

photo by Therese Swanson

The Columbia River near Fort Okanogan State Park

To improve permit processing and clarify how permit applicants can access OCR-funded water supplies, OCR proposed the following amendments to Chapter 173-152 WAC, commonly referred to as the "Hillis Rule." The amendments would:

1 **Describe OCR's processing of permit applications** collectively within Ecology's Central, Eastern and a portion of its Southwest regions. (Currently Ecology organizes workload by regions.) Since OCR spans three regions, this change allows OCR to process specific applications independent of regional boundaries.

2 **Create a new priority processing opportunity for OCR water right applications**. For storage projects that do not conflict with fisheries objectives and are funded by OCR, Ecology may move new applications for diversionary rights into reservoirs ahead of competing applications. This will allow supply projects to be permitted first, which are necessary to fulfill the demand for earlier-filed water right applications for farms, cities and industry.

Water Development Progress
2010

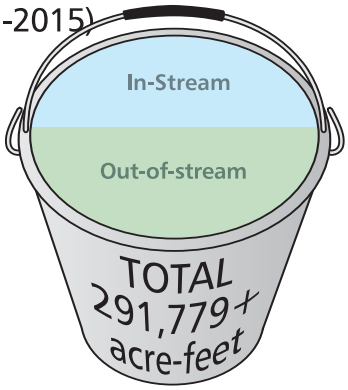
OCR has added nearly 150,000 acre-feet to Eastern Washington's water supply and continues to develop additional water resources through near term and long term projects. Once new water supplies are developed for instream flows, they are available for use. Minimal processing is required. However, making water available for out-of-stream uses requires several steps before permits are issued. Numerous requirements are followed and may include: consultations with government agencies, tribal councils and interested parties; environmental reviews and, sometimes, litigation. Typically, it takes one year or more to issue a permit. The graphic below shows the status of OCR's water supply development activity.

New Water Supply Developed by The Office of Columbia River

Developed

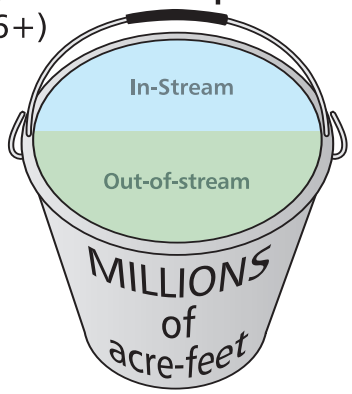
- Barker Ranch: *6,436 ac-ft*
- Columbia Basin Irrigation District Piping: *2,521 ac-ft*
- Donations: *6,066 ac-ft*
- Lake Roosevelt: *132,500 ac-ft*
- Potholes Supplemental Feed Route *(conveyance)*

Near Term Development (2011-2015)



- Boise Cascade ASR: *1,657 ac-ft*
- Columbia Basin I.D.: *2,929 ac-ft*
- Conservation Commission I.E.: *TBD*
- 508.14 Rule Change: *TBD*
- Kennewick ASR: *318+ ac-ft*
- Lower Wenatchee: *1,493 ac-ft*
- Manashtash: *454 ac-ft*
- Odessa Subarea: *250,000 ac-ft*
- Peshastin I.D.: Piping: *360 ac-ft*
- Red Mountain: *20,423 ac-ft*
- Rocky Reach: *28,000 ac-ft*
- SRB & Tribal Fisheries: *TBD*
- Sullivan Lake: *14,000 ac-ft*
- White Salmon ASR: *145 ac-ft*

Long Term Development (2016+)



- Aquifer Storage & Recovery Exploration: *TBD*
- Chelan PUD Pump Storage: *50,000 ac-ft*
- Conservation Commission Retiming: *TBD*
- Foster C.D. Moses Coulee S.A.R.: *TBD*
- Goose Lake & 9 Mile Flat Storage: *4,750,000 ac-ft*
- Klickitat County Horse Heaven Hills: *105,000 ac-ft*
- Lincoln CD Passive Rehydration: *300,000 ac-ft*
- Mill Creek Storage: *between 2000-11,000 ac ft*
- Peshastin Pump Exchange: *TBD*
- Rock Lake Storage: *110,000 ac-ft*
- Spokane-Rathdrum Prairie A.S.R.: *TBD*
- Walla Walla Pump Exchange: *30,000 ac-ft*
- Yakima River Water Enhancement: *350,000 ac-ft*

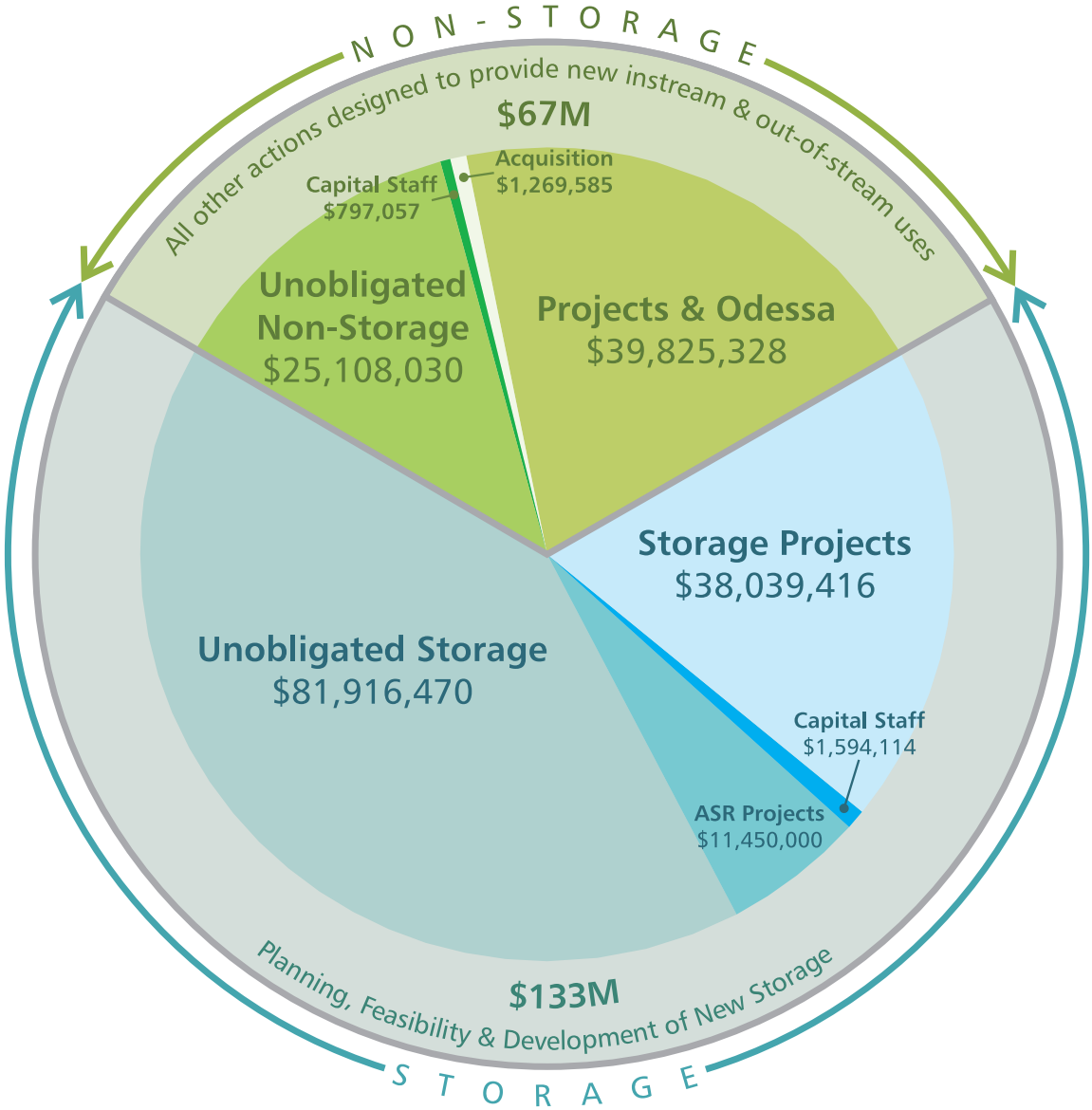
The first bucket shows the total amount of water currently developed through new projects for out-of-stream and instream uses. The second bucket shows the amount of water expected to be developed within 1 to 5 years. The third bucket shows the amount of water expected to be developed beginning 6 or more years from now.

Long term projects are either under study or waiting for federal or other approval. The results will determine if the projects move forward.

Status of the $200M Columbia River Basin Water Supply Account

(2/3 for storage and 1/3 for conservation and other non-storage projects)

The pie chart shows the current appropriation of funds from the Columbia River Basin Water Supply Development Account. Under RCW 90.90.010(2)(b), two-thirds of the account must be spent on storage and one third for "other purposes." The arrows surrounding the circle reflect this split. The pie slices in the circle reflect the allocated and remaining funds within each split.



Projects funded by other sources such as State Building Construction Account and Operating Budget include: Programmatic Environmental Impact Statement Mainstem Storage Alternatives Study, Walla Walla Pump Exchange, Metering, Odessa Subarea, Supplemental Feed Route, Lake Roosevelt Supplemental Environmental Impact Statement (SEIS), Crab Creek SEIS, Frenchman Hills Construction, Yakima Storage Study, Fish & Wildlife Project Support, Conservation Commission staff, Legislative Report Forecasting, and Yakima Basin Water Supply projects.

Completed Projects

Seven projects were completed in 2010. Projects included the study of potential sites for future surface storage, conversion of open irrigation ditches and canals to enclosed pipes, and assessment of the effects of diverting winter water from the Columbia River to a future storage site. Several projects were feasibility studies, with their results currently being evaluated.

Of the seven completed projects, two were construction projects. The Barker Ranch Irrigation Canal Piping project is located in Benton County. With funding from OCR to convert an open canal to a closed pipe system, water delivery is now more efficient. The increased efficiency allows Barker Ranch to divert less water from the Yakima River, which adds an additional 6,436 acre-feet of water to instream flows during critical times when fish need it most.

In partnership with three Columbia Basin Irrigation Districts, OCR funded a Coordinated Conservation Plan. This Plan identifies potential water conservation projects within each irrigation district. The net water savings from implemented projects will be used to supply the Odessa Subarea and to enhance Columbia River instream flows. The first project selected was lining and piping leaking canals. Along with local matching funds, OCR committed $1 million that replaced 25,961 feet of canals with pipe and lined 1,500 feet of canals. This conservation effort conserved 1,286 acre-feet of water that will be made available to Odessa farmers each year, starting in 2011.

The following table lists the completed projects. For more details, go to *http://www.ecy.wa.gov/programs/wr/cwp/projects.html*

Table 2: Completed Projects

Project	Description	Cost	Water	Status	Legislative Directive
Barker Ranch Canal Piping	Convert canal to closed pipe	$5.6M	6,436 Ac-ft	Construction Completed	Instream Flow
Columbia Basin Irrigation Districts Piping	1.Develop Conservation plan 2. Convert open canals to pipe and line canals	$30,000 Plan $1M piping	5,721 Ac-ft	Plan completed Piping and lining underway	Instream Flow Odessa Subarea
Foster CD Surface Storage Pre-Appraisal Study	Investigate small water storage sites	$93,750	TBD	Study completed; Phase II funded for Moses Coulee SAR and Rock Island Storage	Instream Flow Pending Apps
Klickitat County (Horse Heaven Hills) Pre-Appraisal Study	Investigate ASR and surface storage sites	$170,000	105,000 Ac-ft	Pre-Appraisal Study Completed Phase II, Appraisal Study funded	Pending Apps
Mill Creek Storage Pre-Appraisal Study	Investigate small surface storage	$125,000	2,000 – 11,000 Ac-ft	Pre-Appraisal Study completed; Phase II, Appraisal Study, funded	Instream Flow Pending Apps
Similkameen River Storage Pre-Feasibility Study	Investigate large storage site in Okanogan County	$325,000	50,000 – 1.7M Ac-ft	Study completed. Next phase being pursued by Okanogan PUD.	

Ongoing Projects

Each year OCR has funded projects consistent with the legislative mandate to aggressively pursue development of water supplies. The table lists previously funded projects that are underway. Information on each project is available at: *http://www.ecy.wa.gov/programs/wr/cwp/projects.html*.

Table 3: Ongoing Projects

Project	Description	Cost	Water	Status	Legislative Directive
Boise Cascade ASR Pilot	Installation of an ASR system	$6M	1,657 Ac-ft	Pilot under construction	Instream Flow Pending Apps
Conservation Commission Retiming Pilot	Franklin CD & WSCC/CRSIA VRA Retiming Project	$1M	TBD	In progress	
Crab Creek Storage Study	Investigate large storage site in Grant County	$4M	1 - 3M Ac-ft	On hold	
Franklin CD Irrigation Water Management (IWM) Feasibility Study	Investigate IWM practices and water saved	$78,000	TBD	In progress	Pending Apps
Kennewick ASR	Installation of an ASR system	$2.25M	318+ Ac-ft	Pilot under construction	Pending Apps Instream Flow
Odessa Subarea Special Study	Investigate options to provide surface water to replace current groundwater used for irrigation	$8.2M	250,000 Ac-ft	10/2010: Draft EIS 11/2010: Final EIS	Odessa Subarea
Passive Rehydration (Lincoln CD) Feasibility Study	Investigate rehydration of basalt aquifers in Lincoln & Adams Counties	$925,000	300,000 Ac-ft	6/2011 Estimated completion	Instream Flow Pending Apps
Potholes Reservoir Supplemental Feed Route	OCR & Reclamation project to improve delivery system to Potholes Reservoir	$15M (ECY)	Conveyance	Improvements to Crab Creek, Pinto Dam and Brooks Lake underway	Improves System Reliability
Rock Lake Storage Feasibility Study	Investigate potential storage site	$126,000	110,000 Ac-ft	Pending: technical, legal or funding issue	Instream Flow Pending Apps
Spokane Rathdrum Prairie ASR Feasibility Study	Investigate aquifer storage sites	$250,000	TBD	Project underway	Instream Flow Pending Apps
Walla Walla Pump Exchange Study	Investigate stream flow restoration through: acquisition, water conservation, ground water recharge, pump exchange	$650,000* EIS	30,000 Ac-ft	Project underway	Instream Flow
Wanapum Pool Raise Appraisal Study	Investigation of reservoir reoperation	$500,000	70,000 Ac-ft	Terminated	
White Salmon ASR Pilot	Installation of an ASR system	$956,950	145 Ac-ft	Pilot under construction	Instream Flow Pending Apps
Yakima River Basin Water Enhancement Project	OCR & Reclamation project to develop an integrated water management plan	$10M**	350,000 Ac-ft	Final plan due end of 2010	Instream Flow Pending Apps Future Uses Interruptibles

** SBCA Funding; ** Funded by General Fund Account*

Five of the ongoing projects involve storing water in aquifers located throughout the Basin. Underground storage of water for future recovery is a viable approach to augment water availability. The aquifer essentially functions as a water bank. Deposits are made in times of surplus, typically when river flows are high, and withdrawals occur when available water supplies fall short of demand.

Four of the projects are aquifer storage and recovery projects (ASR) and one, Lincoln County Passive Rehydration Project, is an aquifer recovery project (AR).

- An ASR project involves injecting water into an aquifer through wells or by surface spreading and infiltration. The water is then pumped out when needed.
- An AR project involves applying water in a controlled fashion for the purpose of replenishing the aquifer. The water is naturally released back to the environment.

Some recognized benefits of Aquifer Storage and Recovery are:

- Substantial amounts of water can be stored deep underground. This may reduce the need to construct large and expensive surface reservoirs.
- ASR systems are considered to be more environmentally friendly than surface reservoirs. They also offer more protection from tampering.
- ASR may restore and expand the function of an aquifer that has experienced long-term declines in water levels due to heavy pumping necessary to meet growing urban and agricultural water needs.

In addition to these ASR projects, drilling and testing will occur over the next two years on state-owned sites to evaluate potential aquifer storage and recovery storage sites

Water Supply and Demand Forecast

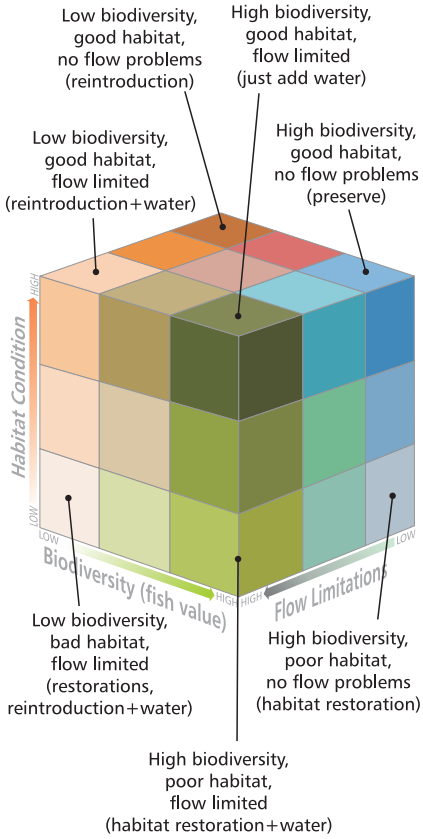
The second Water Supply and Demand Forecast is scheduled for completion in November 2011. The Forecast will serve as a capital investment planning tool for the state. It will identify and quantify critical water needs and guide decisions regarding state investments in water supply development projects. The Forecast evaluates supply and demand at three geographic levels: 1) basin-wide to include seven states and British Columbia; 2) watersheds within Washington; and 3) the one-mile corridor along the Columbia River Mainstem. Each tier reports on the existing regulatory framework for supply management in the Columbia River Basin and potential changes due to changing legal conditions, policy choices, climate change and water supply projects. Future demands for agriculture, municipalities, hydroelectric power and instream flows are evaluated.

To assist with this project, Ecology contracted with Washington State University (WSU) and Washington State Department of Fish & Wildlife (WDFW). This collaboration allows sharing of professional expertise, scientific data, and state of the art tools. In the first phase of this project, WSU made significant progress on preparing computer models to create different scenarios that use hydrologic, climatic, economic and cropping systems data. This is innovative technology and it is the first time that these computer models have been linked to predict future water supply and demand under changing circumstances. WSU will run modeling scenarios on Washington's major crops, climate change projections, water availability and distribution, and economic growth and trade options.

Agriculture plays a vital role in the health and vibrancy of Washington's economy. The foundation of the economic analysis is the baseline forecast of crop production. WSU analyzed data from USDA National Agriculture Statistics Service and other reliable data sources. They also developed baseline forecasts of crop acreage and began work on an economic model of Washington's agricultural sector that uses economic theory to describe how inputs, represented by quantities and prices, are used to produce outputs. The model will help us understand how changes in future conditions will affect production decisions and water demand.

WSU worked with the University of Washington Climate Impacts Group (CIG) to select and process the appropriate climate data to use for modeling future water availability. Using CIG's data, the Forecast examines supply and demand under projected 2030 climate conditions. The results of a climate change study by the Climate Impact Group will be incorporated into the 2011 forecast.

OCR in cooperation with WDFW will forecast instream flow demands. Compilation of instream flow data on the Columbia River and tributaries gives information on drought frequency, shows months when instream flows are met and identifies when there is an excess or deficit of water. WDFW will produce an Instream Atlas that prioritizes stream reaches for flow restoration and shows critical fish life stages. Overlaying the instream flow data with the Atlas will help OCR select projects to ensure that projects benefit instream flow and protect fish habitats.



Washington Department of Fish and Wildlife (WDFW) developed a three dimensional cube to help determine what projects provide the best benefits to fish, particularly salmon. Scenarios are evaluated based on the cube's three parameters; biodiversity, instream flow and habitat condition. For example: While a section of the lower Yakima River has a high biodiversity of salmonid, the poor habitat conditions and low summer flows are detrimental to fish. Therefore, a preferred water supply project would be one that restores the habitat and provides water to enhance instream flows. Knowing the environmental parameters helps OCR and WDFW understand how proposed projects may benefit fish.

Supply Inventory

Seven new projects were submitted for the 2010 inventory, bringing the total projects compiled between 2006-2010 to 6,182. Each year, Ecology screens the projects in its inventory and meets with project proponents as part of its annual grant program to determine grant eligibility. While the inventory shows approximately 11 million ac-ft of water supplies that could be developed, the inventory includes projects whose feasibility is untested, feasible projects lacking proponents, and feasible projects without adequate funding to construct, permit, and manage. OCR's prioritization of projects each year also seeks to balance where supply is available with the demands the Legislature directed OCR to solve (i.e. Odessa, fish, interruptibles and new applications). Finally, OCR's funding ($200 million) relative to the total cost to develop the projects in the inventory ($15+ billion) is small. OCR is favoring projects that leverage other federal, state and local funding sources to maximize the public return on investment.

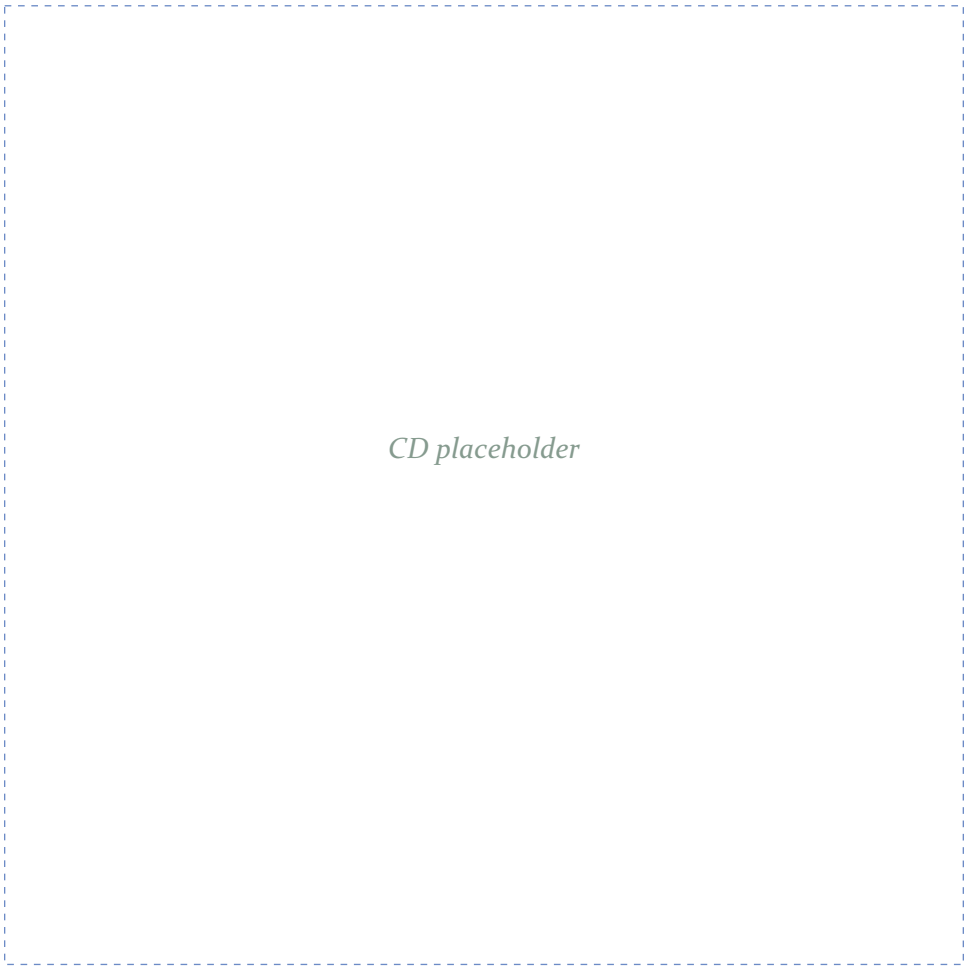
Table 4: Supply Inventory

Type of Project	Number of Projects Listed		Projects with Water Savings (Projects with Cost Data)		Projects with Water Savings & Cost Data		Estimated Water savings (ac-ft/year)		Estimated Cost		Estimated Cost per ac-ft	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
New Large Storage (>1,000,000 ac-ft)	5	5	5 (5)	5 (5)	5	5	9,580,000	9,580,000	$13,457,886,563	$13,457,886,563	$1,405	$1,405
New Small Storage (<1,000,000 ac-ft)	113	117	92 (56)	96 (60)	45	49	269,750	270,353	$762,920,425	$771,920,425	$2,828	$2,855
Aquifer Storage and Recovery	38	38	8 (14)	8 (14)	4	4	2,581	2,581	$8,857,000	$8,857,000	$3,432	$3,432
Modification to Existing Storage	8	9	7 (2)	8 (4)	1	2	70,300	84,300	$33,500,000	$47,500,000	$477	$563
Lining/ Piping	177	178	115 (131)	116 (132)	113	114	484,031	484,391	$546,692,587	$547,642,587	$1,129	$1,131
On-farm Efficiency	5,589	5,589	5,404 (5,412)	5,404 (5,412)	5,401	5,401	263,143	263,143	$343,079,425	$343,079,425	$1,304	$1,304
Irrigation Water Management^	34	35	2 (1)	2 (2)	1	1	243,503	243,503	$9,167,184	$9,167,184	$38	$38
Automation & System Control	46	46	21 (40)	21 (40)	21	21	26,307	26,307	$9,757,000	$9,757,000	$371	$371
General Water Conservation*	89	89	5 (9)	5 (9)	4	4	12,914	12,914	$7,196,300	$7,196,300	$557	$557
Tail Water Reuse	4	4	4 (4)	4 (4)	4	4	5,800	5,800	$1,040,000	$1,040,000	$179	$179
Surface to Groundwater Conversion	1	1	1 (1)	1 (1)	1	1	360	360	$200,000	$200,000	$556	$556
Reclaimed Water	1	1	0 (0)	0 (0)	0	0	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*
Municipal Conservation	0	0	0 (0)	0 (0)	0	0	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*
Partial Season Acquisitions/Leases^	10	10	5 (3)	5 (3)	3	3	80,360	80,360	$6,700,000	$6,700,000	$83	$83
Fallowed Corners/ Land Retirement	45	45	31 (31)	31 (31)	31	31	392	392	$392,100	$392,100	$1,000	$1,000
Crop Water Duty Reductions	15	15	0 (0)	0 (0)	0	0	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*
Land Conservation Programs	0	0	0 (0)	0 (0)	0	0	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*
Crop Change	0	0	0 (0)	0 (0)	0	0	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*	*unknown*
Total (all)	6,175	6,182	5,700 (5,709)	5,706 (5,717)	5,634	5,640	11,039,441	11,039,441	$15,187,388,584	$15,211,338,584		
Total (conservation & acquis. only)	6,011	6,013	5,588 (5,632)	5,589 (5,634)	5,579	5,580	1,116,810	1,116,810	$924,224,596	$925,174,596		

2010 numbers reflect 2009 data with added and updated data from 2010.

*^Annual cost per acre; *General Water Conservation projects include public education, planning, researching and developing innovative irrigation implementation.*

Expanded Supply Inventory



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Source of Information	Contact	Type of Entity who will implement Project	Name of Entity who will implement Project	Water Right Holder	Type of Project	Location of Project										Location of Diversion or water source											Estimated Water Savings (ac-ft/yr)	Estimated Cost	Year of Estimated Cost	When Project will be Implemented	Priority of Project by Entity Implementing the Project	Project Description (Include information such as number of acres, crop type, length of pipe or lining, and the entity's readiness to proceed. Provide enough detail to understand the project.)	Description of Secondary Benefits (Describe secondary benefits such as improvement in water quality, fisheries habitat, fish passage etc.)	Citation	Additional Information	Year Added	Year updated							
						WRIA No.	County	Township	Range	Section	1/4 Section	1/4 Section	Columbia River Mainstem Segment [placeholder] (See Map)	Parcel No.	Water Right No.	Additional Details	Irrigation Entity Name	Stream Name	Well Name or #	WRIA No.	County	Township	Range	Section	1/4 Section	1/4 Section	Columbia River Mainstem Segment [placeholder] (See Map)	Additional Details										2007 Water Savings, ac-ft/year	2007 Cost	2008 Water Savings, ac-ft/year	2008 Cost	2009 Water Savings, ac-ft/year	2009 Cost	2010 Water Savings, ac-ft/year	2010 Cost
Benton CD	Darrel Sunday (509)967-0705	Property owner	River Sun Ranch	River Sun Ranch (Clark properties)	On-Farm Efficiency	37	Benton								177		Private Landowner	Yakima River		37	Benton								40	$125,000	2007	0-5 yrs	medium	Project proposal is 25 acres of irrigated grapes, nursery trees and soil cover. The conversion would be the 5 acres of existing grapes and 10 of planned grapes converted to drip line. The project costs would also include enhance automated irrigation infra structure and conversion of irrigated acreage (tree nursery and ground cover) into high efficiency sprinklers. Work also would include the installation of an secondary irrigation pond to reduce irrigation friction loss for acres on the upper level grounds.	As a stand alone project it can increase in stream flow to the Yakima River and benefit listed species of fish	Interview with land owner		2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Lenzie Ranch	Lenzie Ranch	On-Farm Efficiency	31	Benton								Not known at this time		Private Landowner	Columbia River		39	Benton								Unknown	$250,000	2007	0-5 yrs	medium	Project proposal is to convert 90 acres of circle irrigated farm crops into drip irrigation to covert ground crop to grapes. soil cover. The conversion would be the 5 acres of existing grapes and 10 of planned grapes converted to drip line. The project costs would also include enhance automated irrigation infra structure and conversion of irrigated acreage into high efficiency sprinklers. Work also would include the installation of an secondary irrigation pond to reduce irrigation friction loss for acres on the upper level grounds.	As a stand alone project it can increase in stream flow to the Columbia River and benefit listed species of fish.			2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Barker Ranch	Barker Ranch	On-Farm Efficiency	31	Benton								1858 & 1859		Private Landowner	Yakima River		37	Benton								3,000-5,000	$2.8 million	2007	0-5 yrs	High	The project is approximately 2,000 of lowland habitat on the lower Yakima River at West Richland, Washington. The ranch is currently working with the NRCS on conservation wetlands and with WDOE on this aspect. The current irrigation canal draws at the Wanawish dam (north side) and conveys approximately 27, 000 acrft of water to supply the ponds and channels. This funding would be a full piping lining of the total water system for the entire ranch.	This Project has great potential for significantly increasing flows as part of their water rights. This could be used to "pay for the Pipe" and then called upon by the purchaser at any time. There has also been a great deal of On-Farm Efficiency planning at this site. The current pump station his metered, so flows are understood. This would make it relatively simple to calculate yearly needs for consumptive use and dedicate the remaining water to in-stream flow . In addition idle lands could also be identified and that water put in stream. Bottom line is that the Barker Ranch is a willing partner and is amenable to maximizing the water benefits of a pressurized piped system.			2006								
Benton CD	Darrel Sunday (509)967-0705	Irrigation District	Kennewick Irrigation Dist.	individuals of the Ditch Co.	Lining/Piping	37	Benton								629		Irrigation District	Yakima River		37	Benton								To be determined	$40 million	2007	0-5 yrs	High	This project would include the installation of a pump station in the Columbia River and piping the water to a point of diversion so that flows bypassed at the Prosser/Chandler diversion can become increased flows to the Yakima River. Currently the KID is working with WDOE and the BOR to secure the water right from the Columbia River, so it is a viable and realistic project.	No defined amount of water savings have been established and this allocation could contribute to determining the actual water conserved. However, the potential benefits to fish species could be significant, as flow is one the single largest limiting factor to migrating fish species and water temperatures.	Interview with KID personnel, Aquavella findings, and Pacific Northwest Project.		2006					OCR funded project, 20,000 ac-ft	OCR funded project, $600,000 (EIS)		$40M-TBD-construction
Benton CD	Darrel Sunday (509)967-0705	Irrigation District	Columbia Irrigation Dist	individuals of the Ditch Co.	Lining/Piping	37	Benton								977		Irrigation District	Yakima River		37	Benton								To be determined	$26.5 million	2007	0-5 yrs	High	This project would include the installation of a pump station in the Columbia River and piping the water to a point of diversion so that flows bypassed at the Wanawish Dam diversion can become increased flows to the Yakima River. Currently the CID is included in the KID proposal, but I also separated it as a stand-alone project to meet the objectives of this study and because CID is not a BOR regulated entity. CID is also working with WDOE to secure the water right from the Columbia River, so it is a viable and realistic project.	No defined amount of water savings have been established and this allocation could contribute to determining the actual water conserved. However, the potential benefits to fish species could be significant, as flow is one the single largest limiting factor to migrating fish species and water temperatures.	Interview with CID personnel, Aquavella findings, and Pacific Northwest Project		2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Crow Butte Park Association	Corps of Engineers	Lining/Piping	31	Benton								Not known at this time		Park District	Columbia River		39	Benton								100-150	$765,000	2007	0-5 yrs	High	This project would involved completely upgrading and old pump station, piping and irrigation system to increase watering efficiency. The original pump and system was installed around 1985 to supply park grounds operated by the Washington State Parks Dept.	The park district will eventually be managed by the Benton County Parks and Recreation Department in a lease agreement with the Corps of Engineers. They are open to water conservation and shoreline habitat mitigation that will benefit instream flows for anadromous fish.			2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Benton County Park Association	Benton County	Lining/Piping	37	Benton								Not known at this time		Park District	Yakima River		37	Benton								10	$465,000	2007	0-5 yrs	Medium	This project at Horn Rapids Park would involve improvements to the pump station, piping and irrigation system to increase watering efficiency. The Park is willing to provide additional conservation practices, such as, expanded riparian plantings for shading and LWD for fish.	The Park is willing to provide additional conservation practices	Interview with Park manager		2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Benton County Park Association	Benton County	Lining/Piping	31	Benton								Not known at this time		Park District	Columbia River		39	Benton								20	$465,000	2007	0-5 yrs	Medium	This project at Two Rivers Park would involve improvements to the pump station, piping and irrigation system to increase watering efficiency. .	The Park is willing to provide additional conservation practices			2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Small farm and residential water users	individuals users	On-Farm Efficiency	37	Benton								Not known at this time		Private Landowner	Yakima River		37	Benton								10,000-13,000	$6 million	2007	0-5 yrs	High	This allocation would involve those irrigators on the lower Yakima that may or may not receive water from irrigation districts. It is estimated there is approximately 25,000 to 30,000 irrigated acres in the Benton County portion of The Yakima River. It is assumed that a minimum of 10-15% on farm operational savings could be obtained by improving system efficiencies. This equates to the 3.5 acrft per acre operating costs that could be reduced to 2.5-3.0 acrft. per acre.	Obviously some funds would need to be dedicated to researching current out of non irrigation district users and then calculating the potential savings and required improvements to the water systems. All savings become critical to lower Yakima River flow improvements. While not as significant as the major irrigation district contribution, would still provide savings that will benefit fish.	Interview with Park manager		2006								
Benton CD	Darrel Sunday (509)967-0705	Irrigation District	Benton Irrigation District	individuals of the Ditch Co.	Lining/Piping	37	Benton								Not known at this time		Irrigation District	Yakima River		37	Benton								Unknown at this time	$5.5 million	2007	0-5 yrs	High	This allocation would involve those irrigators on the lower Yakima that are included in the Benton Irrigation District and would involve piping and lining the of The Yakima River. It is assumed that a minimum of 10-15% on farm operational savings could be obtained by improving system efficiencies.	Obviously some funds would need to be dedicated to researching current out of non irrigation district users and then calculating the potential savings and required improvements to the water systems. All savings become critical to lower Yakima River flow improvements. While not as			2006								
Benton CD	Darrel Sunday (509)967-0705	Irrigation District	Rosa/Sunnyside Irrigation Districts	individuals of the Ditch Co.	Lining/Piping	37	Benton								Not known at this time		Irrigation District	Yakima River		37	Benton								Unknown at this time	$3.5 million??	2007	0-5 yrs	High	This allocation would involve those irrigators in the Rosa/Sunnyside Irrigation District that lies within Benton County. This like all of the irrigation districts would involve piping and lining the of The Yakima River. It is assumed that a minimum of 10-15% on farm operational savings could be obtained by improving system efficiencies. This equates to the same relative calculations made for those small irrigators and residential users on the lower Yakima River.3.5 acrft per acre operating costs that could be reduced to 2.5-3.0 acrft. per acre.	No defined amount of water savings have been established and this allocation could contribute to determining the actual water conserved. However, the potential benefits to fish species could be significant, as flow is one the single largest limiting factor to migrating fish species and water temperatures.	Aquavella findings, BCD records and general knowledge of area. No personal discussion with irrigation district people (could not make contact).		2006								
Benton CD	Darrel Sunday (509)967-0705	Property owner	Small farm and residential water users	individuals users	On-Farm Efficiency	31	Benton								Not known at this time		Private Landowner	Columbia River		39	Benton								Unknown at this time	$3.5 million??	2007	0-5 yrs	Medium	This allocation would involve those irrigators on the Benton County portion of the Columbia River that may receive water from the Columbia or shallow wells. It is estimated there could be up to approximately 10,000 to 15,000 irrigated acres (assumed, not proven) in the Benton County portion of the Columbia River. It is assumed that a minimum of 10-15% on farm operational savings could be obtained by improving system efficiencies. This equates to the 3.5 acrft per acre operating costs that could be reduced to 2.5-3.0 acrft. per acre.	Obviously some funds would need to be dedicated to researching current out of non irrigation district users and then calculating the potential savings and required improvements to the water systems. All savings become critical to Columbia River flow improvements. While not as significant as the major irrigation district contribution, would still provide savings that will benefit fish.	Assumption from CD records and interviews and personal knowledge of area.		2006								
Kittitas County CD	Mark Crowley	Property owner	Kayser, Swedberg, Charlton, Aronica, German, Carlson	Kayser, Swedberg, Charlton, Aronica, German, Carlson	Lining/Piping	39	Kittitas	19N	19E								Private Landowner	Naneum Creek		39	Kittitas	19N	19E	20	NE	SE			1,522	$2,093,034	2003	Unknown	Unknown	This project would install approximately 44,530 feet of pipe in various sizes from 10" to 30". This project would also combine four gravity diversion into one and install an approved fish screen. The saved Qi is estimated to be a minimum of 6 cfs in May & June and 3 cfs July through October. The water for this project serves roughly 1300 acres.	Most of the water used on this 1300 acres does not return to Naneum Creek therefore the primary reach would be quit long. The enclosed system would create pressure to some landowners which would encourage them to convert from flood irrigation to sprinkler systems which in-turn save even more water.	Kittitas Co. CD prior planning with the landowners and NRCS.		2006								
Kittitas Co CD	Mark Crowley	Property owner	Wallace Ranch	Wallace Ranch	On-Farm Efficiency	39	Kittitas	19N	16E	11					02267		Private Landowner	Yakima River		39	Kittitas	19N	16E	2					431	$391,200	2006	Unknown	Unknown	This 130 acre irrigated area currently raises grass hay and pasture under wheel line and hand line sprinklers and the steel mainline is leaks a tremendous amount of water. The project would be to replace the mainline and upgrade the sprinklers to lateral move sprinklers and pivot sprinklers.		Kittitas Co. CD and NRCS communication with family property manager.		2006								
Kittitas County CD	Mark Crowley	Property owner	Bob Dodge	Betty Dodge	On-Farm Efficiency	39	Kittitas	17N	19E	23					00191		Private Landowner	Park Creek		39	Kittitas	17N	19E	23					304	$400,000	2006	Unknown	Unknown	This project would convert 152 acres of rill irrigated hay and crop land to sprinkler irrigation.	Improved water quality from a reduction of return flows would result. Approved fish screens and a water measurement device would be installed as part of the project.	Kittitas Co. CD communication with family property manager.		2006								
Kittitas County CD	Mark Crowley	Property owner	Brian Sims	Sweetgrass Investment	On-Farm Efficiency	39	Kittitas	17N	19E	29					01448		Private Landowner	Cherry Creek		39	Kittitas	17N	19E	29					200	$300,000	2006	Unknown	Unknown	This project would convert rill irrigated and wheel line sprinkler irrigated hay and crop land to more efficient pivot sprinkler irrigation.	Approved fish screens and a water measurement device would be installed as part of the project. A fish passage barrier will be eliminated.	Kittitas Co. CD communication with property owner.		2006								
Kittitas County CD	Mark Crowley	Property owner	Don Jacobs	Don Jacobs	Lining/Piping	39	Kittitas	17N	19E	29					00956		Private Landowner	Cherry Creek		39	Kittitas	17N	19E	29					270	$80,000	2006	0-5 yrs	High	This project will pipe 2000 feet of open dirt conveyance ditch.		Kittitas Co. CD communication with property owner.		2006								
Kittitas County CD	Mark Crowley	Property owner	Doug Gibb	Doug Gibb	On-Farm Efficiency	39	Kittitas	17N	19E	11					01334		Private Landowner	Caribou Creek		39	Kittitas	17N	19E	11					150	$250,000	2006	6-10 yrs	High	This project would convert 100 acres of rill irrigated hay and crop land to sprinkler irrigation.	Improved water quality from a reduction of return flows would result.	Kittitas Co. CD communication with property owner.		2006								
Kittitas County CD	Mark Crowley	Other	Manastash Project	Variety of Landowners	Lining/Piping	39	Kittitas										Private Landowner	Manastash Creek		39	Kittitas	17N	17E	14					Unknown	Unknown															
Kittitas County CD	Mark Crowley	Irrigation District	Cascade Irrigation District	Cascade Irrigation District	General Water Conservation	39	Kittitas										Cascade Irrigation District	Yakima River		39	Kittitas								1,000	$130,000	2005	0-5 yrs	High	Project would install a VFD on two of the eight pumps at the head end of the canal system.	Reduced electricity use.	Kittitas Co. CD communication with CID Manager		2006								
Kittitas County CD	Mark Crowley	Irrigation District	Cascade Irrigation District	Cascade Irrigation District	Tail Water Reuse	39	Kittitas										Cascade Irrigation District	Yakima River		39	Kittitas								2,000	$200,000	2005	Unknown	Unknown	Project would pump return flows from Johnson Drain back into the canal for reuse.		Kittitas Co. CD communication with CID Manager		2006								
Kittitas County CD	Mark Crowley	Property owner	Individual Landowners	Cascade Irrigation District	On-Farm Efficiency	39	Kittitas										Cascade Irrigation District	Yakima River		39	Kittitas								13,500	$22,500,000	2006	Unknown	Unknown	Conversion of 9,000 acres of rill irrigation to sprinkler irrigation.	Improved water quality from reduced return flows. Reduce risk of pesticide and fertilizer leaching.	Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	First Creek Water Assoc	First Creek Water Assoc	Lining/Piping	39	Kittitas	19N	18E						00648		First Creek Water Users Assoc	First Creek		39	Kittitas	20N	18E	30				First Creek is a tributary of Swauk Creek which is a medium priority stream.	1,500	$792,000	2006	Unknown	Unknown	Project would convert 5 miles of open ditch to a piped conveyance system. The water right has 6.95 cfs for conveyance loss.		Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	Tom Dodge	Ellensburg Water Company	On-Farm Efficiency	39	Kittitas	17N	19E	21							Ellensburg Water Company	Yakima River		39	Kittitas								150	$250,000	2006	Unknown	Unknown	This project would convert 100 acres of rill irrigated hay and crop land to sprinkler irrigation.	Improved water quality from a reduction of return flows would result.	Kittitas Co. CD communication with property owner.		2006								
Kittitas County CD	Mark Crowley	Property owner	Jeff Brunson	Bull Canal Company	Lining/Piping	39	Kittitas	17N	19E	18					00886		Bull Canal Company	Yakima River		39	Kittitas	17N	18E	10					384	$315,000	2006	Unknown	High	Project will pipe 1,800 feet of canal.		Kittitas Co. CD communication a Bull Canal Co board member		2006								
Kittitas County CD	Mark Crowley	Property owner	Bull Canal Company	Bull Canal Company	Lining/Piping	39	Kittitas	17N	19E	18					00886		Bull Canal Company	Yakima River		39	Kittitas	17N	18E	10					255	$225,000	2006	Unknown	High	Project will pipe 3,000 feet of canal.		Kittitas Co. CD communication a Bull Canal Co board member		2006								
Kittitas County CD	Mark Crowley	Property owner	Individual Landowners	Ellensburg Water Company	On-Farm Efficiency	39	Kittitas										Ellensburg Water Company	Yakima River		39	Kittitas								10,500	$17,500,000	2006	Unknown	Unknown	Conversion of 7,000 acres of rill irrigation to sprinkler irrigation.	Improved water quality from reduced return flows. Reduce risk of pesticide and fertilizer leaching.	Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	Individual Landowners	Westside Irrigation	On-Farm Efficiency	39	Kittitas										Westside Irrigation	Yakima River		39	Kittitas								4,950	$8,250,000	2006	Unknown	Unknown	Conversion of 3,300 acres of rill irrigation to sprinkler irrigation.	Improved water quality from reduced return flows. Reduce risk of pesticide and fertilizer leaching.	Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	Individual Landowners	Bull Canal Company	On-Farm Efficiency	39	Kittitas										Bull Canal Company	Yakima River		39	Kittitas								1,360	$1,700,000	2006	Unknown	Unknown	Conversion of 680 acres of rill irrigation to sprinkler irrigation.	Improved water quality from reduced return flows. Reduce risk of pesticide and fertilizer leaching.	Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	Westside Irrigation	Westside Irrigation	Lining/Piping	39	Kittitas										Westside Irrigation	Yakima River		39	Kittitas								300	$220,000	2006	Unknown	Unknown	Project will pipe 5,280 feet of canal.	Improved water quality from reduced return flows. Reduce risk of pesticide and fertilizer leaching.	Kittitas Co. CD knowledge of area		2006								
Kittitas County CD	Mark Crowley	Property owner	Westside Irrigation	Westside Irrigation	Tail Water Reuse	39	Kittitas										Westside Irrigation	Yakima River		39	Kittitas								900	$320,000	2006	Unknown	Unknown	Project will pipe water back up to the canal from gravel pit area.		Kittitas Co. CD communication with system Manager		2006								
Kittitas County CD	Roger Satnik	Irrigation District	Kittitas Reclamation District	Kittitas Reclamation District	Lining/Piping	39	Kittitas								465		Kittitas Reclamation District	Yakima River		39	Kittitas	20N	13E	11	SE	NW			47,046	$36,000,000	1999	6-10 yrs	Medium	Piping high loss laterals, construction of deregulation reservoir and canal automation	Provides pressure for landowner sprinklers, reducing pumping cost/electricity use. Reduces KRD maintenance and aquatic herbicide use.	KRD Water Conservation Plan, 1999		2006								
Kittitas County CD	Roger Satnik	Irrigation District	Kittitas Reclamation District	Kittitas Reclamation District	Lining/Piping	39	Kittitas								465		Kittitas Reclamation District	Yakima River		39	Kittitas	20N	13E	11	SE	NW			2,000	$3,000,000	2006	0-5 yrs	High	Replace leaking areas of Main Canal with new concrete liner	Decreased maintenance costs.			2006								
Palouse CD	Rob Bucheri	Hospital	Pullman Regional Hospital	Unknown	General Water Conservation		Whitman															Whitman											Need reverse osmosis treatment for cooling tower blowdown. Drip irrigation for landscape				2006								
Palouse CD	Rob Bucheri	Hotel	Hawthorne Inn	Unknown	General Water Conservation		Whitman															Whitman											Installation of low flow toilets				2006								
Palouse CD	Rob Bucheri	Hotel	Holiday Inn	Unknown	General Water Conservation		Whitman															Whitman											Installation of ozone laundry system				2006								
Palouse CD	Rob Bucheri	University	WSU	Unknown	General Water Conservation		Whitman															Whitman											Analyze the use of presently teasded 50,000 gpd cooling tower blowdown				2006								
Palouse CD	Rob Bucheri	University	WSU	Unknown	General Water Conservation		Whitman															Whitman											Waterless urinals				2006								
Palouse CD	Rob Bucheri	University	WSU	Unknown	General Water Conservation		Whitman															Whitman											Install service meters in zones of buildings to isolate water main leaks				2006								
Palouse CD	Rob Bucheri	University	WSU	Unknown	General Water Conservation		Whitman															Whitman											Conversion of old washing machines to front-load conservation machines using 1/3 less water				2006								
Palouse CD	Rob Bucheri	Municipality	City of Pullman	City of Pullman	General Water Conservation		Whitman															Whitman											Re-use of wastewater effluent to water university golf course and other potential recipients				2006								
Palouse CD	Rob Bucheri	Municipality	City of Pullman	City of Pullman	General Water Conservation		Whitman															Whitman											Rebate program for domestic homeowners and multi-family units for retrofit of conservation fixtures				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman								$40,000	2007			1 FTE for water conservation specialist				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman								$40,000	2007			funding AmeriCorps volunteers for full time water conservation education/outreach coordinator				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman											Need cost-share program for homeowners/landowners/businesses to convert from high use water systems to low use systems such as drip irrigation, xeriscape designs and use of grey water				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman											Need for dry hydrant development in rural areas.				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman											Need funding to implement impervious surface impact reduction program (roof gardens, rain gardens, storm water catchments/infiltration, etc.)				2006								
Palouse CD	Rob Bucheri		Palouse Conservation District	PCD	N/A	General Water Conservation		Whitman														Whitman								$12,000	2007			Need funding for creation and maintenance of xeriscape demonstration garden				2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Old Lowden Ditch		Lining/Piping	32	Walla Walla	7N	34E								Old Lowden Ditch	Walla Walla River		32	Walla Walla	07N	34E	33	NE				1,127	$970,000	2006		High	Pipe 31,500 feet of ditch and create a closed system with a variable frequency lift pump.	Improve fish passage in the lower Walla Walla River.		System includes sections 28, 29, 30	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Old Lowden Ditch		On-Farm Efficiency	32	Walla Walla	7N	34E								Old Lowden Ditch	Walla Walla River		32	Walla Walla	07N	34E	33	NE				765	$1,275,000	2006		High	Convert 510 acres from flood to sprinkler irrigation.	Improve fish passage in the lower Walla Walla River.		System includes sections 28, 29, 30.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Old Lowden Ditch		On-Farm Efficiency	32	Walla Walla	7N	34E								Old Lowden Ditch	Walla Walla River		32	Walla Walla	07N	34E	33	NE				78	$275,000	2006		High	Convert 110 acres from handline to center pivot.	Improve fish passage in the lower Walla Walla River.		System includes sections 28, 29, 30.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Lowden 2 Ditch		Lining/Piping	32	Walla Walla	7N	34E								Lowden 2 Ditch	Walla Walla River		32	Walla Walla	07N	34E	35	NW	SE			890	$800,000	2006		High	Pipe 26,000 feet of ditch and create a closed system with a variable frequency lift pump.	Improve fish passage in the lower Walla Walla River.		System includes sections 31-35.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Lowden 2 Ditch		On-Farm Efficiency	32	Walla Walla	7N	34E								Lowden 2 Ditch	Walla Walla River		32	Walla Walla	07N	34E	35N	NW	SE			107	$178,000	2006		High	Convert 71 acres from flood to sprinkler irrigation.	Improve fish passage in the lower Walla Walla River.		System includes sections 31-35.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Garden City Ditch		Lining/Piping	32	Walla Walla	7N	34E								Garden City Ditch	Walla Walla River		32	Walla Walla	07N	34E	35	NW	SE			250	$415,000	2006		High	Pipe 13,500 feet of ditch and create a closed system.	Improve fish passage in the lower Walla Walla River.		System includes sections 31-34.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Garden City Ditch		On-Farm Efficiency	32	Walla Walla	7N	34E								Garden City Ditch	Walla Walla River		32	Walla Walla	07N	34E	35	NW	SE			648	$1,080,000	2006		High	Convert 432 acres from flood to sprinkler irrigation.	Improve fish passage in the lower Walla Walla River.		System includes sections 31-34.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Mud Creek 7 Ditch		Lining/Piping	32	Walla Walla	6N	34E								Mud Creek 7 Ditch	Walla Walla River		32	Walla Walla	06N	34E	04	NW	NE	Touchet River		230	$341,000	2006		High	Pipe 12,100 feet of ditch and create a closed system with a variable frequency lift pump.	Improve fish passage in the lower Walla Walla River.		System includes sections 31, 32, 33.	2006								
WWCCD	Greg Farrens (509)527-4250	Other Irrigation Entity (ditch company,etc)	Mud Creek 7 Ditch		On-Farm Efficiency	32	Walla Walla	6N	34E								Mud Creek 7 Ditch	Walla Walla River		32	Walla Walla	06N	34E	04	NW	NE			336	$560,000	2006		High	Convert 224 acres from flood to sprinkler irrigation.	Improve fish passage in the lower Walla Walla River.		System includes sections 31, 32, 33	2006								
WWCCD	Greg Farrens (509)527-4250	Irrigation District	Touchet East Side Ditch		Lining/Piping	32	Walla Walla	7N	33E								Touchet East Side Ditch	Touchet River		32	Walla Walla	07N	33E	15	SE	NE			905	$825,000	2006		High	Pipe 26,600 feet of ditch and create a closed system with a variable frequency lift pump.	Improve fish passage in the Lower Touchet Walla Walla Rivers.		System includes sections 22, 26, 27, 34,35	2006								
WWCCD	Greg Farrens (509)527-4250	Irrigation District	Touchet West Side Ditch		Lining/Piping	32	Walla Walla	7N	33E								Touchet West Side Ditch	Touchet River		32	Walla Walla	07N	33E	15	SE	NE			880	$861,000	2006		High	Pipe 24,600 feet of ditch and create a closed system with a variable frequency lift pump.	Improve fish passage in the Lower Touchet Walla Walla Rivers.		System includes sections 15, 22, 27, 28, 33, 34.	2006								

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