

# Columbia River Basin

## WATER SUPPLY INVENTORY REPORT

Submitted to the Washington State Legislature Pursuant to RCW 90.90.040

December 2008



DEPARTMENT OF  
**ECOLOGY**  
State of Washington  
OFFICE OF COLUMBIA RIVER

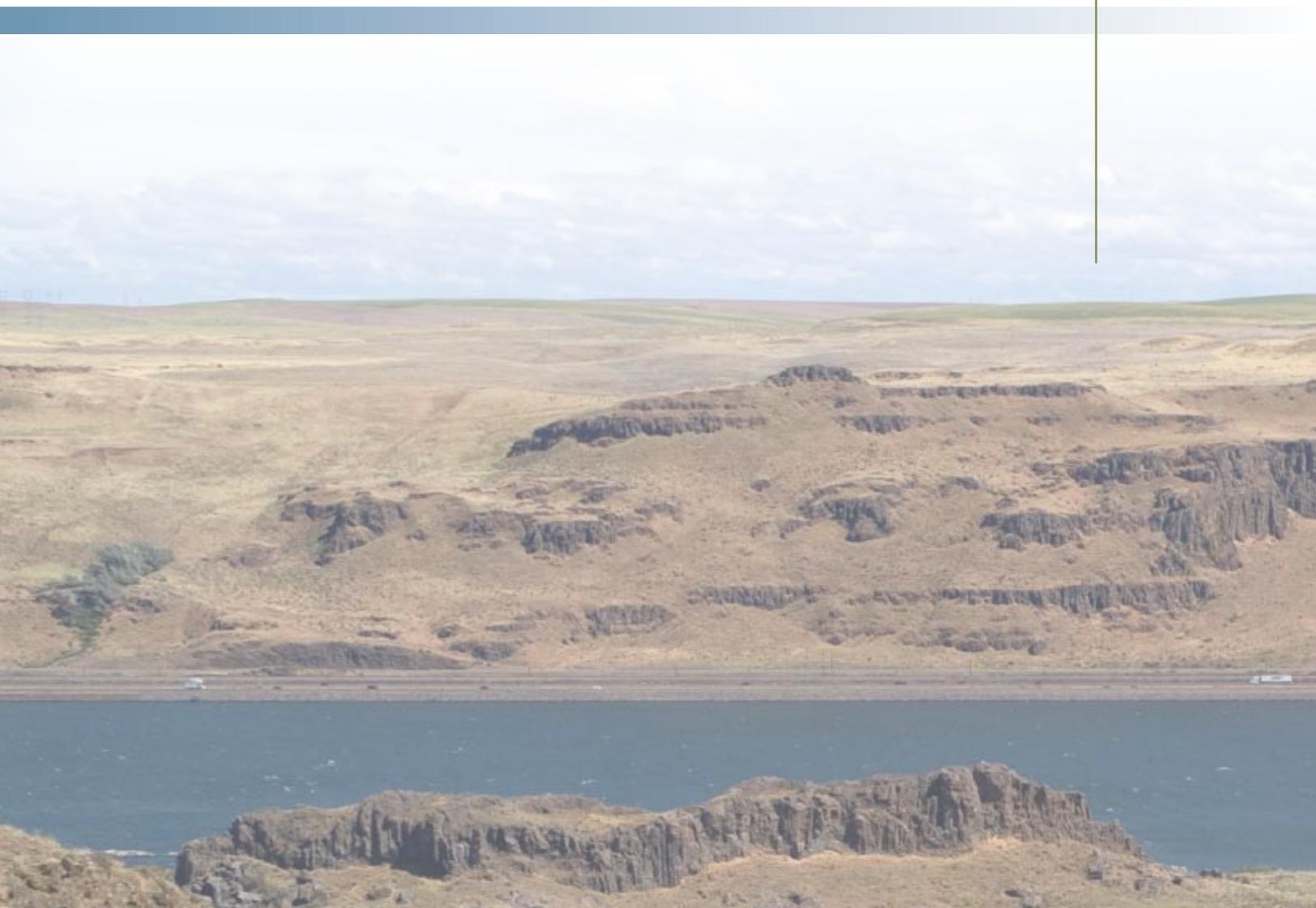
2008 Report to the Legislature

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# Columbia River Basin Water Supply Inventory Report

*submitted by Office of Columbia River*



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**This report is available on the Department of Ecology website at:**  
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Publication No. 08-11-042 and contact :**

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## Office of Columbia River - Columbia River Basin Water Management Program

In 2006, the Legislature passed ESSHB 2860, An Act Relating to water resource management in the Columbia River Basin (codified as Chapter 90.90 RCW, Columbia River Basin Water Supply). The Legislature recognized that developing new water supplies is essential to successful water resource management in the Columbia River Basin. The goal of the Act is to meet the economic and community development needs of people and the stream flow needs of fish. Ecology intends this report to provide program transparency to the public and to help the Program communicate and coordinate with other agencies and interested parties.

This third annual Columbia River Water Supply Inventory Report provides information and updates on our work regarding:

- Water made available through the Program.
- Projects Ecology is currently funding.
- A comprehensive inventory of all conservation and storage opportunities Ecology is tracking.
- A “sneak peak” at efforts Ecology is undertaking to forecast demand in preparation for the 2011 Legislative Demand Forecast Report.

This report meets the requirement in RCW 90.90.040 which directs Ecology to publish a water supply inventory annually and a long-term water supply and demand forecast every five years. This report includes a 23-page abridged version that provides an overview of the key elements of the report, along with more detailed descriptions on CD.

### RCW 90.90.040

Columbia river water supply inventory — Long-term water supply and demand forecast.

(1) To support the development of new water supplies in the Columbia river and to protect instream flow, the department of ecology shall work with all interested parties, including interested county legislative authorities and watershed planning groups, adjacent to the Columbia river, and affected tribal governments, to develop a Columbia river water supply inventory and a long-term water supply and demand forecast. The inventory must include:

- (a) A list of conservation projects that have been implemented under this chapter and the amount of water conservation they have achieved; and
- (b) A list of potential water supply and storage projects in the Columbia river basin, including estimates of:
  - (i) Cost per acre-foot;
  - (ii) Benefit to fish and other instream needs;
  - (iii) Benefit to out-of-stream needs; and
  - (iv) Environmental and cultural impacts.

(2) The department of ecology shall complete the first Columbia river water supply inventory by November 15, 2006, and shall update the inventory annually thereafter.

(3) The department of ecology shall complete the first Columbia river long-term water supply and demand forecast by November 15, 2006, and shall update the report every five years thereafter.

## Implementation Issues

The Columbia River Basin Water Management Program's (CR Program) 2006 Legislative Report contained a new section, called Implementation Issues. Ecology provided this section to keep the Legislature and external stakeholders informed about the issues Ecology is facing as it works to aggressively pursue new water supply development. Solutions to these issues could come in the form of outreach and coordination, policy decisions, funding, rulemaking, or proposed legislation. In 2006, Ecology identified two issues:

1. **Water for Columbia River or Water for Tributaries.** Ecology continues to work with watershed planning units and other stakeholders to find balance between a tributary focus and mainstem focus in administering the CR Program. While some elements of the legislation focus on the one-mile corridor of the Columbia River, others reference the Columbia River basin at large. Ecology's granting of \$46.4 million for projects this year will provide an opportunity for on-the-ground implementation of this issue. Ecology is recommending continued outreach to seek effective strategies for coordinating and where appropriate, integrating CR Program activities with watershed planning efforts.
2. **Allocating Water Savings.** The tension created by the backlog of pending water right applications continues. Proponents want both money for projects and water for new permits, whereas the CR Program typically spends money on a project at the request of one party, it gives the water saved or stored from that project to someone else (who may have been waiting for up to 20 years). While there are potential legislative fixes to this problem, it can also be solved by eliminating the backlog. New water supplies are coming on-line in 2009 that will enable Ecology to start issuing new permits. For now, Ecology is recommending an emphasis on permit processing to resolve this issue.

Ecology has identified three additional implementation issues that merit discussion this year.

1. **Columbia River Program Reorganization.** The Columbia River Basin Water Management Program has been reorganized under a new director. Ecology Director Jay Manning announced in September that Derek Sandison will lead the department's new "Office of Columbia River" (OCR) to be headquartered in Wenatchee. Sandison will report directly to Manning under the new organizational structure, while maintaining a side-by-side relationship with the agency's water resources program. The new organizational structure is more streamlined, geographically located in Wenatchee, which is closer to the center of the Columbia River constituency, and provides prominence to the water supply development focus of the program which is responsive to external stakeholder comments. Ecology will continue to monitor ways to improve the efficiency of the program.
2. **Implementing the Storage Goals of the Program.** Ecology is funding many studies for new storage projects—large and small, surface and underground. There are some aquifer storage and recovery (ASR) and small surface storage proposals that appear promising. Ensuring that these projects can be permitted if they prove feasible is an important goal of the program. Feasible projects would likely be those that take water surplus to fish needs (for example, in the winter) and re-time it to benefit both instream and out-of-stream uses (for example, in the spring/summer).

Under the water code, up to three separate permits may be needed for a new storage facility: a right to divert water, a right to store water, and a secondary use permit to release water from storage and put it to beneficial use. Given the backlog of applications, new storage cannot be easily permitted

without finding a way to priority process applications for permits. Two of the three permits (storage and secondary use) can be moved to the front of the line under RCW 90.03.380. Ecology has adopted rules for priority processing of other water rights (WAC 173-152) based on the Supreme Court ruling in *Hillis v. Ecology*<sup>1</sup>. Ecology is considering amending WAC 173-152 to address this processing issue.

3. **Columbia River Program Needs.** Ecology is evaluating how best to meet the Columbia River water supply development mandate in the legislation with its current work force. The fiscal note for the CR Program allocated four FTE's for permitting work and assumed 15 permits per FTE per year, or 60 permits each year. Based on the development of the 132,500 acre-feet of supply from the Lake Roosevelt Incremental Releases project alone, over 500 permits are projected to be issued for instream and out-of-stream uses. At 60 permits per year, it would take approximately nine years to permit all the water. Ecology is evaluating ways to streamline this process to shorten permitting time during the current budget shortfall, particularly among the drought permits which are the bulk of the 500 permits, and will report on its progress in the next legislative report. In the meantime, additional supplies are also being developed (see "We Are Getting Water" section of this report), which will create additional permitting work. Permitting all of these newly available water supplies in a timely manner will remain a significant challenge.



Columbia River and City of Wenatchee located on State of Washington map (new office location)

<sup>1</sup> Hillis resulted in requirements for prioritizing the order in which water rights are processed.



## We Have Water

### Lake Roosevelt Incremental Storage Releases

This project involved negotiating with the Bureau of Reclamation (Reclamation), Columbia Basin irrigation districts, Washington Department of Fish & Wildlife (WDFW), local governments, and other interest groups. A historic partnership agreement with the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians was the final key. Under the agreement, the Confederated Tribes of the Colville Reservation and the Spokane

Tribe of Indians will receive around \$3.75 million and \$2.25 million each year respectively, adjusted for inflation<sup>2</sup>. They will use the funds to enhance fisheries, protect the environment, to preserve cultural resources, and other activities. Local governments around Lake Roosevelt will receive \$2 million to address impacts from the new releases.

The Lake Roosevelt Incremental Storage Releases Project involves releasing more water to provide for drought relief, municipal and industrial supply, replacement of groundwater use in the Odessa Subarea, and enhanced stream flows for fish. The storage releases would come from Reclamation's existing 6.4 million acre-foot storage right behind Grand Coulee Dam.

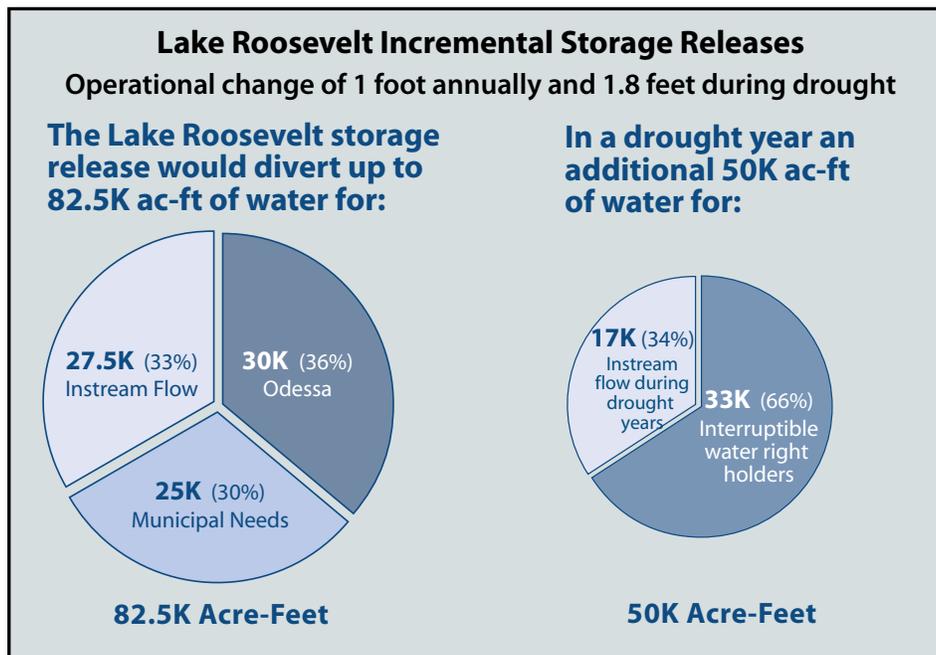
Annually, 82,500 acre-feet will be released to:

- Supply municipal and industrial uses.
- Provide increased stream flows.
- Offset some groundwater use in the Odessa Subarea.

In drought years, under the agreement, 132,500 acre-feet would be released to:

- Serve the above uses.
- Provide another 50,000 acre-feet for stream flows.
- Supply interruptible water rights.

Water would be released from Lake Roosevelt according to an adaptive management strategy that will maximize fish benefits. In general, releases would occur from April to August and lake levels would return to normal by the end of September.



<sup>2</sup> A one-time fisheries, cultural resources, and parks mitigation payment of \$1.35M is also incorporated in the state's agreement with the Colville Tribes.

The storage releases would result in one foot of added drawdown of the lake level during spring and summer months, and 1.8 feet during drought years. This added drawdown is small compared to the normal operating range of Lake Roosevelt, which fluctuates up to 80 feet a year and up to 2.5 feet a day.

This new water will create significant public benefits. Based on the Lake Roosevelt releases, Ecology will:

- Issue new water rights for municipal and industrial uses, bolstering the state's economy.
- Issue standby/reserve permits for interruptible water rights holders, providing them more certainty in times of drought.
- Issue new trust water rights for in-stream flow to help ensure the survival of salmon by increasing flows when fish need it most.
- Supply surface water to irrigators of 10,000 acres of land east of Moses Lake (Odessa). This will reduce further impacts on the dwindling Odessa aquifer, which threatens on-going farming and the loss to the region of \$600 million a year in revenue and the elimination of 7,500 jobs.

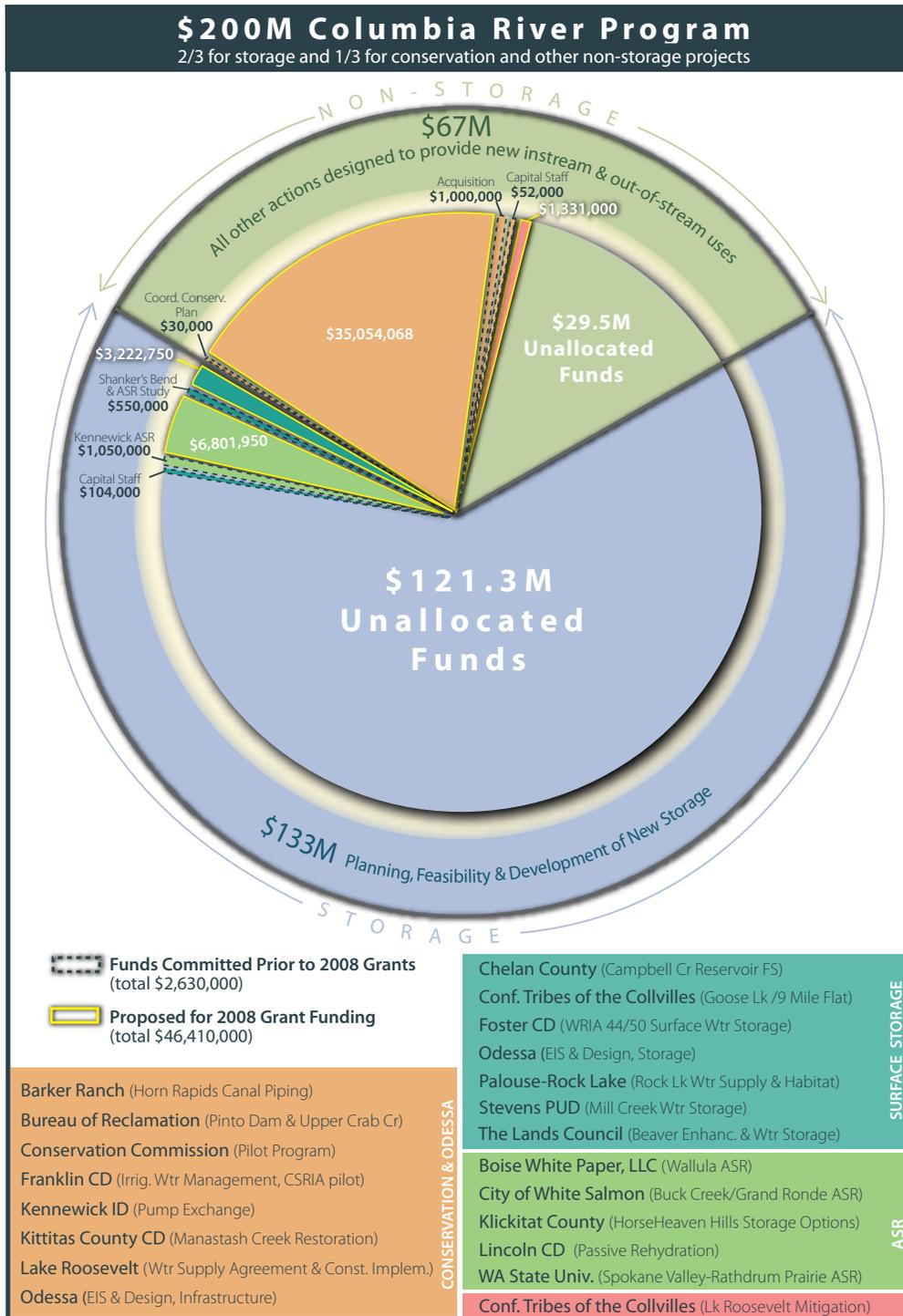


View of Lake Roosevelt & Kettle River from top of Mt. Bisbee (Photos left & above by: Lori Aull)

# WE ARE GETTING WATER

## We Are Getting Water

Ecology is continuously working toward acquiring water for in-stream and out-of-stream use. In doing so, the CR Program ran the first competitive grant funding cycle to solicit projects to help achieve the Program's goals. Ecology has also continued to work on projects that we invested in prior to the 2008 grant funding cycle. This section discusses Ecology's on-going efforts to aggressively pursue the development of new water supplies. The pie chart below shows a summary the current use of funds from the Columbia River Account.



This section is organized in a way to reflect our current priorities on water supply project development:

- **Modification of existing storage.** This offers an opportunity for increasing supply capacity with current infrastructure at a reduced environmental footprint.
- **Conservation and pump exchanges.** Controlling demand (through decreased diversions or transferring demand from smaller, more vulnerable water sources to larger ones) is another way to develop supply.
- **Aquifer storage.** Utilizing underground reservoirs allows for retiming stream flows in a way that minimizes environmental impacts.
- **Small surface storage.** Creating small surface storage opportunities in areas close to the demand it will serve allows incremental progress on capturing and using surplus water in the winter and spring.
- **Large surface storage.** Understanding whether large surface storage is necessary in light of forecasted demand, and which site is most competitive at the appraisal stage, is Ecology’s current focus.

This section concludes with an update on other projects that are called for in the legislation, but not identified specifically as “new” water supply projects. These include replacement of declining groundwater with surface water supplies for the Odessa Subarea, an update on Voluntary Regional Agreements, supplemental feed routes for Potholes Reservoir, Ecology’s Drought Insurance Program and others.

## Modification of Existing Storage

### Wanapum Pool Raise

Ecology is working with Public Utilities District No.2 of Grant County to assess the possibility of raising the pool at Wanapum Dam of the Priest Rapids Project. The working group also includes federal, state, and tribal fishery interests, the Bonneville Power Administration (BPA), and other interested parties.

Increasing the normal maximum operating elevation 3.5 feet at Wanapum Dam could provide about 70,000 acre-feet of added Columbia River storage. Currently, expected cost of this project is around \$33 million<sup>3</sup> (Draft Wanapum Pool Raise Effects Evaluation Study 2008).



Wanapum Dam

### Reoperation of Banks Lake (Drawdown and Raise)

Ecology continues to partner with Reclamation on the Odessa Subarea Special Study. The goal of the study is to assess the feasibility of replacing groundwater irrigation—on lands now served by declining aquifers—with surface water from the Columbia River.

Reclamation is assessing several options to provide replacement water including operation changes at Banks Lake. Reclamation estimates that 50,000 acre-feet of storage is available from Banks Lake for every two-foot rise or drawdown. The project requires both storage (for water available from the Columbia River in the winter/spring) and transmission infrastructure.

Reclamation is preparing an Environmental Impact Statement (EIS) in cooperation with Ecology to comply with the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). Scoping for the EIS occurred in September 2008 and we expect to issue the draft in 2010.



Banks Lake

<sup>3</sup> This cost includes projected expenses for fish bypass gates, fish bypass gate guides, attraction flow prototype structure (structure designed to shape stream flow in a way that attracts migrating fish), electrical cable gallery, spillway gates, and a trash sluice gate (for removing debris).

## Conservation and Pump Exchanges

### Barker Ranch Canal Piping

This project converts the Horn Rapids Canal from an open ditch system to a closed pipe system. Reducing conveyance losses conserves water in the lower Yakima and Columbia rivers. Less water will be diverted to the Canal during low flow times resulting in water saved from June through October. This project scored high for in-stream benefits and would enable us to issue permits for out-of-stream uses.

### Kittitas Conservation District (CD) Manastash Ditch Piping

The project will pipe around 4,440 feet of the Manastash Water Ditch Association's unlined earthen ditch, from the Kittitas Reclamation District's south branch to Hanson Road. This project has good in-stream benefits.

### Franklin Conservation District Irrigation Water Management Feasibility Study

Franklin Conservation District proposed this feasibility study to develop a program for capturing the conserved water gained through Irrigation Water Management (IWM). This study is a Columbia Snake River Irrigators Association (CSRIA) voluntary regional agreement (VRA) pilot project to explore a large amount of conservation potential. Outcomes for this study include:

1. Measurement of on-farm water conservation.
2. Technical evaluation of fate of non-consumptive water saved.
3. Proposed use of saved water through seasonal transfers.
4. Evaluation of institutional barriers to water saved by IWM in the Columbia Basin Project.

### Conservation Commission Pilot Conservation Proposal

The Washington Conservation Commission will pilot a project to identify, evaluate and fund water conservation projects using a \$1 million dollar grant from the CR Program. The pilot will evaluate the efficacy of employing conservation districts to assist Ecology in meeting the dual goals of the bill; instream flow benefit and out-of-stream permits. The pilot will begin in 2009.



Photo source: USGS ([http://water.usgs.gov/ogw/gwrp/photo\\_gallery/](http://water.usgs.gov/ogw/gwrp/photo_gallery/))

**Coordinated Conservation Plan (Columbia Basin Irrigation Districts)**

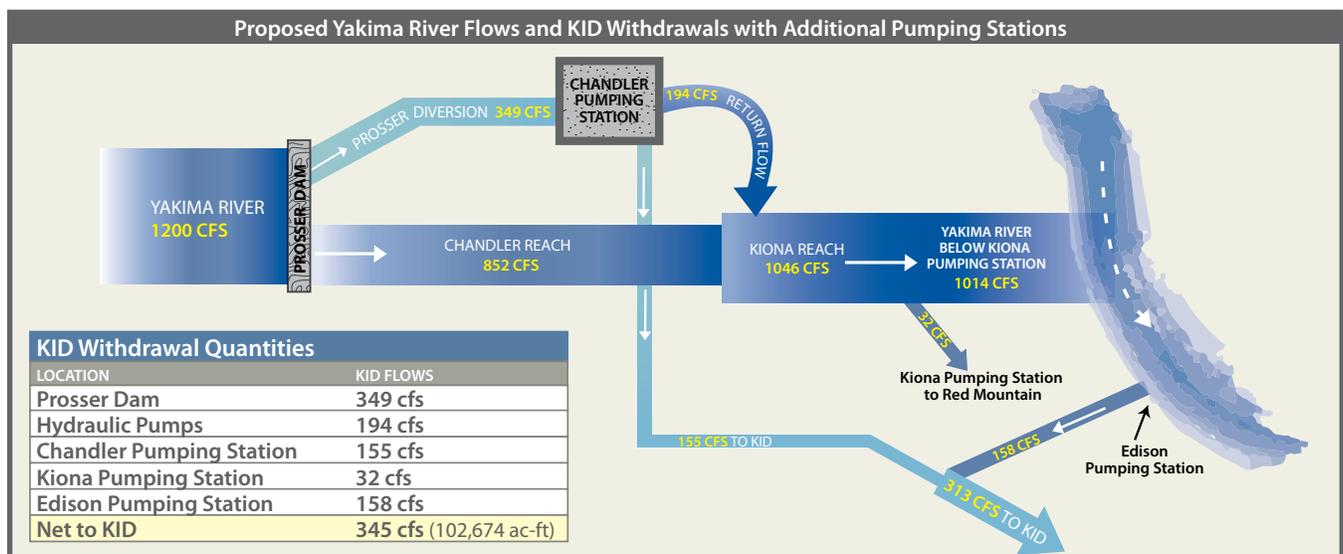
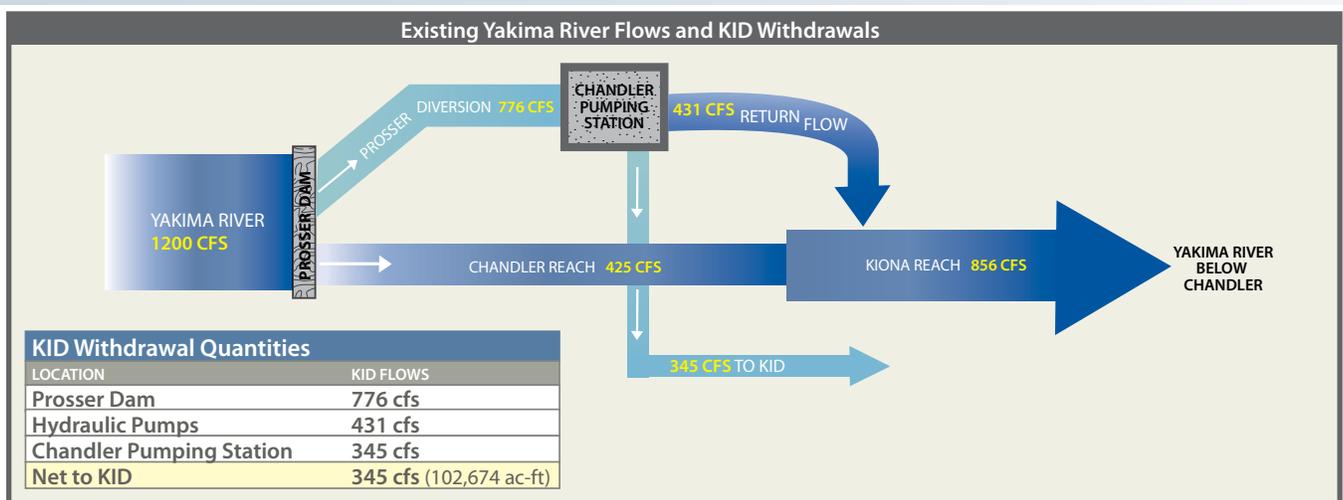
Ecology has provided \$30,000 to the Columbia Basin Project Irrigation Districts to develop a Coordinated Conservation Plan. This plan includes a strategy to maximize water conservation opportunities in each district. Net water savings from the conservation projects will be used to supply the Odessa Sub-Area and to enhance Columbia River stream flows.

**Kennewick Irrigation District Pump Exchange**

The Kennewick Irrigation District (KID) proposes to forgo a portion of their 782 cubic feet per second (cfs) water right at Prosser Dam and Chandler Powerhouse on the Yakima River. Instead, they would divert an equal amount of water downstream:

- From the Yakima River, 45 cfs would be taken at Kiona.
- From the Columbia River, 195 cfs would be taken at Edison Street.

Under this proposal, the flow in a critical reach of the lower Yakima River would double and KID would develop added acreage on Red Mountain. Ecology has provided a \$95,000 grant to assess piping alignments to reduce costs and improve the operational efficiency of the project. Ecology has also reserved \$15 million towards construction of the project.



KID pump exchange proposed changes

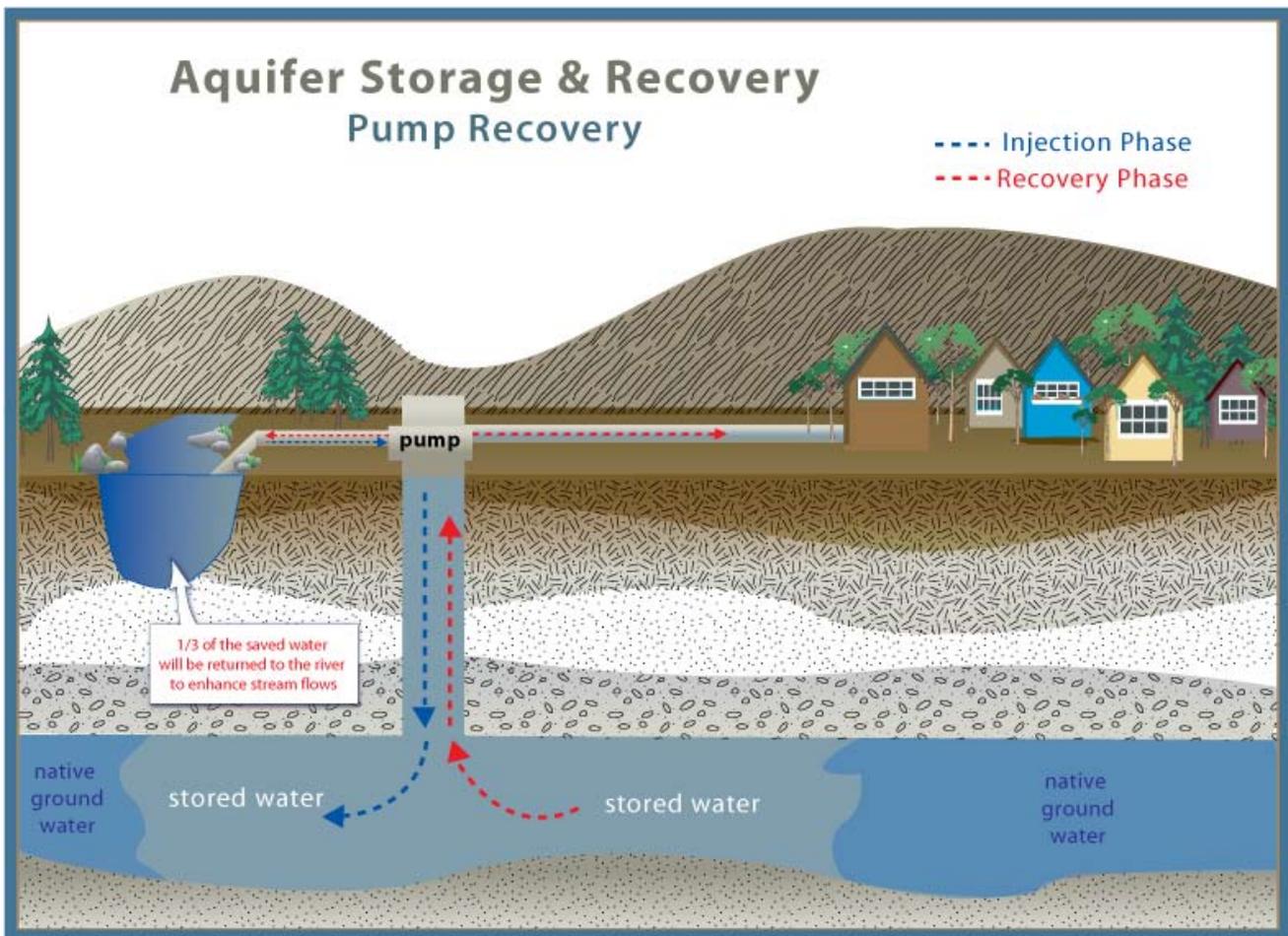
**Wymer Pump Exchange**

The Wymer pump exchange is part of a range of proposals that Ecology and Reclamation are assessing in the Supplemental EIS for the Yakima River Basin Water Storage Feasibility Study. A draft of the Supplemental EIS is expected by January 2009. The Wymer pump exchange includes options for both pumping water from the Columbia River into the Yakima Basin and storage. Up to 174,000 acre-feet of storage and a pump exchange of up to 1,200 cfs are being considered. The cost of the Wymer reservoir and Yakima pump exchange is approximately \$380 million, of which about \$200 million is for the pump exchange.

**Walla Walla Pump Exchange**

Ecology has allotted \$400,000 to the Confederated Tribes of the Umatilla Indian Reservation for a cooperative study in the Walla Walla River Basin. Due in 2009, the four-year study assesses the feasibility of restoring stream flows through several options, including:

- Acquisition.
- Water conservation.
- Groundwater recharge.
- Replacing Walla Walla River irrigation water with Columbia River water.



## Aquifer Storage and Recovery (ASR) and Rehydration

### Kennewick ASR

In 2008, Ecology allotted \$1.05 million to fund a pilot for the Kennewick ASR project. The pilot will be funded and conducted in two phases:

1. Ecology will spend \$200,000 on testing whether the aquifer can meet or exceed its projected capacity and if water quality standards can be met.
2. If the project passes testing in phase 1, the remaining funds will be used to construct and test the injection well, develop an appraisal-level facility design, and provide cost estimates to construct and operate the facility.

Once the facility is successfully constructed and operating, Ecology will manage the water stored (proportionate to Ecology funding of the project), according to statute, at two-thirds for out-of-stream uses and one-third for in-stream uses. The figure on left shows an example of how water is injected underground, stored, and recovered.

### Lincoln County Passive Rehydration Study

This feasibility study will examine rehydration of the basalt aquifers in Lincoln and Adams counties (Odessa sub aquifer) through passive infiltration of water from the Columbia River. This project is well located to provide another option for potentially serving the Odessa.

### Boise Wallula ASR

This project creates an aquifer storage system to provide cold water during the summer and reduce the overall water used by the facility. Cold water, pumped into the aquifer during the winter months, can be withdrawn during the summer months. Return flow to the Columbia will be cleaner and cooler. This project has good fish benefit and potential for new out-of-stream permits.

### City of White Salmon ASR

This project will evaluate whether the City's proposed filter plant, equalization reservoirs (reservoirs that manage the water supply to make the system work efficiently), and pipeline can be used to inject surplus capacity water during winter months into wells for storage in the City's aquifer. The water would be withdrawn during the summer months to meet City municipal needs and enhance stream flows in the Columbia River. Due to a declining aquifer, the City of White Salmon is undergoing a serious water shortage. A surface water source is needed immediately for the city to meet its most basic water needs and an accompanying aquifer storage project will increase the reliability of the City's supply.

### Washington State University Spokane Valley-Rathdrum Prairie ASR Feasibility Study

This study will examine the viability of aquifer storage and recovery in the Spokane Valley-Rathdrum Prairie (SVRP) aquifer. Water would be diverted from the Spokane River and Lake Pend Oreille during high flow periods, injected into the SVRP aquifer and gravity would drain the water back to the Columbia River.

### Regional ASR Study

Ecology is looking at the merits of funding a Columbia River Basin ASR Appraisal Study in 2009. We believe there are many options and a large potential for artificial groundwater storage in the Columbia Basin. The hydrology of the basin suggests that significant quantities of water are available during periods of low demand and high availability (runoff). The geology of the basin suggests that suitable underground storage sites may be available. At minimum, the ASR study will discuss the following areas of interest:

- Optimum geologic characteristics for artificial groundwater storage and where such conditions exist in the Basin.
- Potential recharge sources, considering both physical and legal availability.
- Volume estimates of the water available for storage, including timing and frequency of availability.
- Availability of infrastructure required to deliver water to ASR site.
- Risks and benefits of potential groundwater storage projects, including estimated benefits to stream flow.
- Available water quality information for both potential source water and the aquifers identified as potential storage sites.
- Cost estimates for each acre-foot of water injected or proposed for recovery.
- Ranking of potential sites. (Rated by geologic conditions, available storage, source reliability, available infrastructure for injection and dispersal, and nearness to the area of use.)

### Small Storage

#### Foster Creek CD WRIA 44/50 Surface Water Storage Feasibility Study

When implementing the Watershed Management Plan, the Watershed Planning Association identified two potential small water storage sites in Water Resource Inventory Areas (WRIA) 44 and 50. This project has a high potential for new out-of-stream permits, and is close to Columbia Basin Project infrastructure. The feasibility study will assess the two potential small storage sites.

		Acre-feet	Estimated Cost	Cost per Acre-foot
Rock Island Creek (WRIA 44)		60,000 AF	\$204 M	\$3,397
Foster Coulee* (WRIA 50)	2 Low	126,000	\$223-251 M	\$1,772-1,994
	2 High	96,250	\$266-299 M	\$2,768-3,114
	2 High, 1 Low	194,700	\$399-449 M	\$2,051-2,308

\*Three different dam heights and configurations will be evaluated.

### Stevens PUD Mill Creek Water Storage Feasibility Study

The feasibility study will examine the possibility of a small surface storage facility on Mill Creek. If the project proves feasible, it will provide additional storage capacity for instream and out-of-stream uses that would benefit tributaries in the Northeast region of the state. Three potential dam heights would determine the acre-feet (AF) of water stored:

- 100 feet = 2,050 AF
- 150 feet = 5,400 AF
- 200 feet = 10,700 AF

### Palouse-Rock Lake CD Water Supply and Habitat Enhancement Feasibility Study

The feasibility study will assess the potential to construct a small storage facility on Rock Lake. This project would provide increased in-stream flows and has a high potential for new out-of-stream permits. In addition, the project could produce a small amount of hydroelectric power. Phase one of the study will address whether there is enough water available from the catchment basin to warrant a storage facility. Phase two will address the potential constraints on the water.

### Chelan County Natural Resources Department Campbell Creek Reservoir Feasibility Study

This feasibility study will look at constructing an off-stream reservoir to store water for release to the Peshastin Irrigation District to replace Peshastin Creek diversions. Releases from the storage facility would occur in July through September. This project is well located, has good in-stream benefits, and allows for new out-of-stream permits.

### Lands Council Beaver Population Enhancement and Water Storage Feasibility Study

This project is a study of the natural ecosystem small storage potential by the reintroducing beaver to the upper Columbia basin and tributaries. Wetlands created by the beavers would capture peak spring runoff and allow that water to be released during the rest of the year.

### Klickitat County Horse Heaven Hills Surface Storage & Conveyance Feasibility Study

This study assesses the possibility for diverting water from the John Day-McNary Pool during the winter and spring months to a new surface storage site in the Glade-Fourmile Sub-basin in WRIA 31, and creating a new conveyance system.

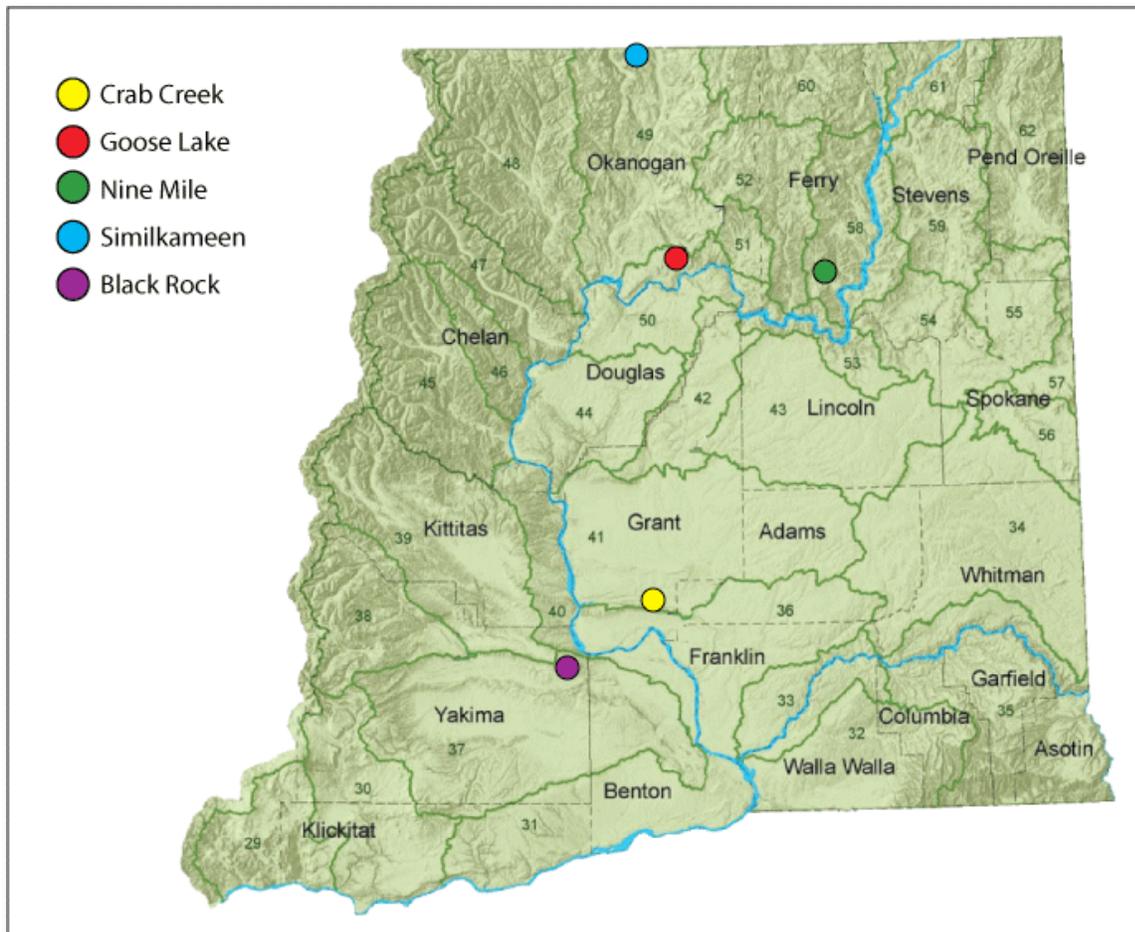
### Large Storage (Crab Creek, Goose Lake, Nine Mile, Similkameen, Black Rock)

Ecology’s investigation of opportunities for large storage (more than 1 million acre-feet) predates the CR Program in 2006. Chapter 90.90 RCW added focus to Ecology’s efforts by requiring that two-thirds of all money in the account be spent on storage. It also directed that Ecology manage water generated from Program-funded storage projects as two-thirds for out-of-stream uses and one-third for in-stream uses.

Currently, Ecology is considering five potential large storage options. One of these of these, Crab Creek, rose to the top of a list of 21 different sites considered in Ecology’s Off-Channel Mainstem Appraisal Report. Two others (Goose Lake and Nine Mile<sup>4</sup>) are sites on the Colville Reservation that are only at the pre-appraisal stage. Black Rock<sup>5</sup> is part of the EIS and Feasibility Study that Reclamation is working on in the Yakima Basin. Shanker’s Bend<sup>6</sup> (on the Similkameen River in Okanogan County) is also at the Pre-Appraisal stage of an evaluation by Okanogan County PUD.

Ecology plans to bring all these sites up to the Appraisal stage to resolve which site might best meet the needs of the greater Columbia River Basin. At the same time, Ecology is working to forecast future demand to determine how much new storage is needed.

### Large Storage Project Locations



4 [http://www.ecy.wa.gov/programs/wr/cwp/images/pdf/crssr\\_final\\_12062005.pdf](http://www.ecy.wa.gov/programs/wr/cwp/images/pdf/crssr_final_12062005.pdf)

5 [http://www.usbr.gov/pn/programs/storage\\_study/reports/ts-yss-07/index.html](http://www.usbr.gov/pn/programs/storage_study/reports/ts-yss-07/index.html)

6 [http://www.ecy.wa.gov/programs/wr/cwp/cr\\_shankers\\_storage.html](http://www.ecy.wa.gov/programs/wr/cwp/cr_shankers_storage.html)

## Other Columbia River Program Goals

### Odessa

RCW 90.90.020 directs Ecology to focus efforts on alternatives to groundwater from Odessa subarea aquifer for agricultural users. Reclamation's Odessa Subarea Special Study looks at continued phased development of the Columbia Basin Project to replace groundwater irrigation in the Odessa Subarea with surface water use. An estimated 170,000 acres within the Odessa Subarea are now irrigated with groundwater. About 140,000 of these acres are eligible to receive Columbia Basin Project surface water. Ecology is taking part in the Study to ensure support for any state and local agency permit decisions needed for the selected alternative.

On April 1, 2008, Reclamation released an appraisal-level engineering investigation of four water delivery alternatives and six water supply options. The four water delivery alternatives looked at possible infrastructure (canals, pumping plants and laterals) and layouts for delivering replacement surface water to groundwater irrigated lands in the Study area<sup>7</sup>. The study also includes storage options, such as reoperation of Banks Lake and construction of Rocky Coulee Dam. The Bureau began scoping for an EIS in September 2008 and plans to issue a Draft EIS in 2010.

### Potholes Reservoir—Supplemental Feed Route

Since 2005, Ecology has invested \$2.1 million to partner with Reclamation in studying the need for adding a feed route to provide water to the South Columbia Basin Irrigation District. The Legislature authorized more funds through Chapter 90.90 RCW. In August 2007, Reclamation issued a final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the Potholes Reservoir Supplemental Feed Route.

Reclamation identified Crab Creek and Frenchman Hills Wasteway as the preferred alternative for the Potholes Supplemental Feed Route. This alternative would release feed water from Billy Clapp Reservoir into Brook Lake, a natural water body within the Crab Creek channel. Crab Creek would then convey the water into Moses Lake and Potholes Reservoir. Water would also be released from Billy Clapp Reservoir through the Main and West canals, to the Frenchman Hills Wasteway, and into Potholes Reservoir (Reclamation, 2007 EA).

After studying potential impacts to the environment, Ecology determined that with appropriate mitigation, there will be no probable significant adverse environmental impacts. On January 17, 2008, Ecology issued a Mitigated Determination of Nonsignificance under the State Environmental Policy Act (SEPA) for Phase 1 (Frenchman Hills Wasteway) of the project. Construction of Frenchman Hills Wasteway was finished in March 2008. In August 2008, we began SEPA review and permitting for Phase 2 (Crab Creek), which has received \$10 million from the 2008 Grant Funding Cycle for construction activities.



Aerial view of Potholes Reservoir

<sup>7</sup> The study will focus on lands currently irrigated with groundwater in Adams and Grant Counties and a small portion of Franklin County. The study area is within the Columbia Basin Project boundary and is generally defined by the area bounded on the west by the Project's East Low Canal, on the east by the City of Lind and extending north to Wilson Creek and south to the Connell area. Previous Reclamation studies have determined these lands to have irrigation development potential. They are also located within the Odessa groundwater subarea as designated by the Washington Department of Ecology.

## Acquisitions and the Drought Insurance Program

Acquisition is one of the water supply development tools that the Legislature directed Ecology to use in RCW 90.90.010. Ecology set aside \$1 million to begin to meet this goal. Ecology has contracted \$50,000 with Washington Water Trust (WWT) and Washington Rivers Conservancy (WRC) to develop a pilot program to identify and acquire water supplies for implementation of the CR Program. The pilot project is focused on developing drought supplies to augment Ecology's Drought Insurance Program<sup>8</sup> to benefit interruptible water right holders. Additional tools, such as permanent acquisition and term leases of at least five years are being explored and tested.

The Trust Water Rights Program gives Ecology the ability to reallocate water for new permits and enhance stream flows for healthier fish habitat by providing conservation for fisheries and economic stability via drought permits for local needs.

The Trust Water Rights Program allows Ecology to reallocate water for new permits and enhance stream flows for healthier fish habitat.

Ecology acquires trust water by purchasing or leasing water rights from willing water right holders who may choose to temporarily or permanently donate all or a portion of their water right. Trust water may also come from water conservation resulting from on-farm irrigation improvements. By taking part, water right holders keep their water right in good standing without losing it through relinquishment.

The Trust Water Rights Program operates in collaboration with:

- Water Resource Inventory Areas (WRIA)
- Fisheries experts and wildlife biologists
- Community & private citizen groups
- Local governments
- Non-profit environmental organizations

In June 2008, telephone interviews were conducted among those who hold water rights in eight water resource inventory areas (WRIAs)—all in eastern Washington. Of the 172 respondents who participated, 116 were from individuals with small farms and 56 came from organizations farming 40 acres or more.

The survey's primary objectives were to explore perceptions and preferences among water rights holders primarily focused on organizations and other entities involved in negotiating the sale, lease, or purchase of water rights, and the various format options that could be used to facilitate the sale or lease of water rights.

<sup>8</sup> The Drought Insurance Program will include a portfolio of trust water and storage supplies for us in drought. Currently, the 33,000 acre-feet of supply from Lake Roosevelt Incremental Storage Releases is the only drought water available.

The results of the survey provided insight to where potential trust water acquisitions might be, the attitudes of water right holders toward water right transactions, how much water right holders understand the importance of their water, and who water right holders are most comfortable with to negotiate water rights transactions. The survey found that over half of the respondents had heard of the acquisition program and 33% of them are interested in participating. Their desire to participate varied according to how the sale would be conducted:

- 40% preferred direct negotiations.
- 12% liked an open format
- 6% wanted an auction.
- Only 1% preferred a reverse auction (the method employed by Ecology in the last acquisition attempt.)

The report's executive summary is available for viewing or download at the Office of Columbia River web site; [http://www.ecy.wa.gov/programs/wr/cwp/cr\\_trust.html](http://www.ecy.wa.gov/programs/wr/cwp/cr_trust.html).

### Voluntary Regional Agreements (CSRIA)

Ecology and the Columbia-Snake River Irrigators Association (CSRIA) entered into the first Voluntary Regional Agreement (VRA) on July 18, 2008. The purpose of this VRA is to provide new water for issuing:

- Drought permits to holders of existing interruptible water rights.
- New water rights on the Columbia and Snake Rivers.

New water rights issued under the VRA cannot reduce or negatively impact Columbia River stream flows in the months of July and August, or Snake River flows from April through August. To meet this standard, Ecology and CSRIA will pursue conservation, storage, acquisition, and other methods to provide new water to offset new withdrawals during the summer months. Ecology completed an interim legislative report (required in RCW 90.90.030) on VRAs in December 2008, which provides further detail on VRA implementation<sup>9</sup>.

### Cultural Resource Management Plan

Ecology is preparing to fund the development of a Cultural Resource Management Plan (CRMP) for the CR Program. The CRMP will be a set of guidelines for the treatment and management of cultural resources affected by projects aimed at acquiring water for in-stream and out-of-stream needs. The CRMP will be consistent with the cultural resource laws and national policies of environmental stewardship and fulfill the requirements of Washington state Executive Order 05-05. The CRMP will respond to and support the Program's mission, to "aggressively pursue development of water supplies to benefit both in-stream and out-of-stream water uses" (90.90.005 RCW).

<sup>9</sup> [http://www.ecy.wa.gov/programs/wr/cwp/images/pdf/csria\\_vra/csria\\_vra.pdf](http://www.ecy.wa.gov/programs/wr/cwp/images/pdf/csria_vra/csria_vra.pdf)

# SUPPLY INVENTORY

## Summary of Water Supply Inventory Table for 2007 and 2008

Type of Project	Number of Projects Listed		Projects with Water Savings (Projects with Cost Data)		Projects with Water Savings & Cost Data	
	2007	2008	2007	2008	2007	2008
New Large Storage (>1,000,000 acre-feet)	5	5	5(5)	5(5)	5	5
New Small Storage (<1,000,000 acre-feet)	104	112	89(49)	91(55)	43	45
Aquifer Storage and Recovery	31	37	6(10)	8(14)	2	4
Modification to Existing Storage	5	7	4(0)	6(1)	0	1
Lining/Piping	165	173	109(124)	113(128)	107	111
On-farm Efficiency	5,587	5,589	5,402(5,410)	5,404(5,412)	5,399	5,401
Irrigation Water Management <sup>^</sup>	33	34	1(1)	2(1)	1	1
Automation & System Control	46	46	21(40)	21(40)	21	21
General Water Conservation <sup>*</sup>	88	89	5(9)	5(9)	4	4
Tail Water Reuse	4	4	4(4)	4(4)	4	4
Surface to Groundwater Conversion	1	1	1(1)	1(1)	1	1
Reclaimed Water	0	1	0(0)	0(0)	0	0
Municipal Conservation	0	0	0(0)	0(0)	0	0
Partial Season Acquisitions/Leases <sup>^</sup>	9	10	5(3)	5(3)	3	3
Fallowed Corners/Land Retirement	45	45	31(31)	31(31)	31	31
Crop Water Duty Reductions	15	15	0(0)	0(0)	0	0
Land Conservation Programs	0	0	0(0)	0(0)	0	0
Crop Change	0	0	0(0)	0(0)	0	0
<b>Total (all)</b>	<b>6,138</b>	<b>6,168</b>	<b>5,683 (5,687)</b>	<b>5,696(5,704)</b>	<b>5,621</b>	<b>5,632</b>
<b>Total (conservation &amp; acquis. only)</b>	<b>5,993</b>	<b>6,007</b>	<b>5,579 (5,623)</b>	<b>5,586 (5,629)</b>	<b>5,571</b>	<b>5,577</b>

2008 numbers reflect 2007 data with added and updated data from 2008.

\* General Water Conservation projects include public education, planning, researching and developing innovative irrigation implementation.

<sup>^</sup> Annual cost per-acre feet

## Supply Inventory

Ecology compiled this 2008 inventory building on the 2006 / 2007 inventory. We made use of more planning documents and on-the-ground project reviews (from the 2008 Grant Cycle). We also invited input from watershed planning units, conservation districts, and tribal governments.

In order to solicit projects, Ecology launched the first web based Water Supply Inventory Form. The 2008 Inventory Web Form was made available for new project entries from July 28th to August 30th. Ecology decided to use Web-based inventory updates for greater transparency and because the number of projects in our inventory each year has begun to peak. For example, in 2006 (the first inventory), we collated information

## SUPPLY INVENTORY

	Estimated Water savings acre-ft/year		Estimated Cost		Estimated Cost per acre-feet	
	2007	2008	2007	2008	2007	2008
	6,000,000	9,580,000	\$10,392,000,000	\$13,457,886,563	\$1,732	\$1,405
	251,240	269,740	\$727,952,510	\$762,832,510	\$2,897	\$2,828
	343	2,581	\$3,400,000	\$8,857,000	\$9,913	\$3,432
	unknown	70,000	unknown	\$33,000,000	unknown	\$471
	451,310	478,030	\$505,691,321	\$540,667,321	\$1,120	\$1,131
	259,952	263,143	\$338,459,565	\$343,079,425	\$1,302	\$1,304
	243,503	243,503	\$9,167,184	\$9,167,184	\$38^	\$38
	26,307	26,307	\$9,757,000	\$9,757,000	\$371	\$371
	12,914	12,914	\$7,196,300	\$7,196,300	\$557	\$557
	5,800	5,800	\$1,040,000	\$1,040,000	\$179	\$179
	360	360	\$200,000	\$200,000	\$556	\$556
	unknown	unknown	unknown	unknown	unknown	unknown
	unknown	unknown	unknown	unknown	unknown	unknown
	80,360	80,360	\$6,700,000	\$6,700,000	\$83^	\$83
	392	392	\$392,100	\$392,100	\$1,000	\$1,000
	unknown	unknown	unknown	unknown	unknown	unknown
	unknown	unknown	unknown	unknown	unknown	unknown
	unknown	unknown	unknown	unknown	unknown	unknown
	7,332,481	11,033,130	\$12,001,955,980	\$15,180,775,403		
	1,080,898	1,110,809	\$878,603,470	\$918,199,330		

on about 5,400 storage and conservation projects. In 2007 there were about 6,138 projects (an increase of only 12%). Thirty new projects were submitted in 2008, which suggests that Ecology has been successful in documenting the full range of storage and conservation options in the Columbia River Basin.

Future legislative reports will continue to update the inventory, but will focus more on showcasing how the investments in projects selected from the inventory are meeting the in-stream and out-of-stream objectives of the legislation. The above table summarizes the types of storage and conservation projects for which data was gathered.

## Instream and Out-of Stream Benefits

Ecology has been working to ensure that Program funded projects provide fisheries benefits. In doing so, Ecology has been working with the Washington Department of Fish and Wildlife to determine what projects provide the best instream benefits as well as water for out-of-stream use. With the exception of funding for the inland Columbia Basin projects (Odessa and the Supplemental Feed Route), every project funded this year has significant fisheries benefits for salmon and steelhead. These occur through direct flow increases (such as the one-third of Lake Roosevelt releases), tributary flow and habitat benefit (such as Barker Ranch, Manastash), aquifer storage projects (both flow and temperature benefits), and the feasibility studies for surface storage if constructed (one-third for fish).

To meet the balanced objectives of the Program, out-of-stream benefits are also needed from water supply investments. In some cases, these will occur through new permits. For example, the Lake Roosevelt drawdown project alone will allow us to issue about 500 new permits. As feasibility studies yield more construction opportunities, more permitting will occur. Other out-of-stream benefits will accrue from the projects:

- The Boise Cascade ASR project will yield temperature benefits to the paper mill allowing them to save energy and take a chiller off-line.
- Reliability will increase for the City of White Salmon, Barker Ranch and Kennewick Irrigation District.

Ecology will continue to evaluate the balance between out-of-stream and instream benefits each year as it makes funding decisions.



Photo source: WA State Dept. of Fish & Wildlife ([http://wdfw.wa.gov/fish/wild\\_salmon\\_monitor/index.htm](http://wdfw.wa.gov/fish/wild_salmon_monitor/index.htm))

## Sneak Peek at Demand Forecasting for 2011

RCW 90.90.040 directs Ecology to prepare a long-term water supply and demand forecast and to update it every five years. The purpose of the supply and demand forecast is to work in conjunction with the supply inventory. By forecasting how supply and demand will change, we can project the need for adding new water supplies from storage and conservation.

Ecology submitted our first Water Supply and Demand Forecast on November 15, 2006. It describes the Columbia River's existing physical, legal, and management framework. Without accurate forecasting, Ecology cannot accurately determine the role of conservation in providing water supply, how large a storage facility needs to be, and how much staff time and funding we need to meet Program mandates. Ecology is working to improve forecasting for the 2011 report including the following efforts:

### Flow Data

Ecology is compiling existing data on historical stream flows in order to project in-stream needs. At present, Ecology has obtained Columbia River flow information from BPA, dating from 1929 to present. Ecology is analyzing the data to consider seasonal changes and drought occurrences, as we work to best match available water supplies to projected demand. In the same manner, Ecology is also assessing tributary flow data. By placing this information in our Water Resources Information System, it will be available to the public through the internet in 2009. The first phase is already available on Ecology's website. The 2011 report will contain a summary of this information.

### Climate Change Study

Ecology is taking part with other state and federal agencies in funding a study by the Climate Impacts Group that will provide greater accuracy in predicting climate change in the Columbia River Basin - with a particular focus on the Yakima, Walla Walla, Wenatchee, and Okanogan watersheds. We expect the completed study in 2010, and will include the results in the 2011 report.

As well as changing available water supply, climate change has the potential to affect existing crop demands. For example, within Washington's portion of the greater Columbia River Basin, US Geological Survey reports about 1.7 million acres of irrigated crops. If in 20 years, we have hotter weather and decreasing summer rain it could result in the need for an added inch of water per acre. This would amount to 140,000 acre-feet more water needed to maintain current crop production. There is also 5.3 million acres of non-irrigated agriculture in the basin (such as dry-land wheat). Increased temperatures and shifted water availability due to climate change may result in some of these lands needing irrigation to maintain yield, or a decrease in yield for those unable to obtain irrigation water. This issue will be included in the next Ecology agricultural demand study in 2009.

### Future Agricultural Demands

While Washington State University (WSU) has identified agricultural demands, due to time constraints, they had to rely only on historical USDA agricultural statistics for their modeling. That data does not reflect changing global market conditions that could alter demand for various U.S. crops. There are also several emerging crop markets for which historical statistics were not available. These include the fast-paced wine industry in Washington State and renewable fuel crops. Using Columbia River operating funds, Ecology plans to begin a study in 2009 to evaluate these future demands. The timing will coincide with completing our commitments to the climate change study, and allow us to integrate both into the 2011 legislative report.

### Drought Insurance Program

Ecology is developing a Columbia River Drought Insurance Program. Currently, interruptible water rights total about 300,000 acre-feet. However, the degree to which these water uses are affected varies depending on the duration and effect of interruption. It is clear that municipalities and farmers with high-value crops (such as 50 year-old cherry trees) have a greater need for a reliable water supply than a farmer with a hay crop. This was evidenced in 2001, when a portion of the interruptible water users chose not to take part in an Ecology-sponsored drought program. Ecology has chosen to allocate new drought supplies to interruptible water users from the 33,000 acre-feet of water associated with the Lake Roosevelt Incremental Storage Release.

### Hanford Reach Fluctuations

ESA-listed salmonids in the Hanford reach suffer increased mortality from flow fluctuations caused by dam operations. As Ecology continues to evaluate storage supplies, we plan to consider how storage could be used with existing river operations to reduce these flow fluctuations. This instream demand could have significant benefits for the Hanford Reach.

### In-Stream Demands

One-third of all new storage is dedicated for in-stream uses. The 2004 Study by the National Academy of Sciences characterizes July and August as the period where low mainstem flows provide the greatest fish risk. As with most things on the Columbia River, the fish situation is not that simple. In fact, desirable flows vary between different fish and different life stages—making river management much more difficult. Ecology continues to work with our fish-expert partners to better understand in-stream demands and how best to use water supplies as they are developed. Part of this understanding came from the Supplemental EIS for Lake Roosevelt, as we consider options on how to release nearly 50,000 acre-feet of water from storage for fish benefit.

### Water Quality

Benefits to fish from the CR Program goes beyond water in-stream. Many of the projects being considered in the Columbia River Grant Program would also have water quality benefits (e.g. temperature, turbidity), remove fish barriers, or have other fish benefits. As Ecology funds conservation and storage improvements, Ecology will track and account for these other non-flow fish improvements on the Columbia River Web map and in future legislative reports.

### Hydropower

Ecology will incorporate feedback from Columbia River dam operators to better understand how new storage would affect power generation and demand. Diverting water to a reservoir in the winter can result in lost power production in those months. However, the opportunity to produce power returns when that water is released from storage before its diversion out-of-stream. There may also be an opportunity to develop integrated pump-storage in the Columbia River system and, thereby, give dam operators more flexibility to manage fluctuation in hydropower demand that may arise as more wind-based electrical generation is developed. In some cases, this may also provide a benefit by reducing entrained gases. All new storage developments will require extensive coordination with dam operators so that state water supply actions do not result in unanticipated consequences for hydropower generators.

### Fish Benefits in Tributaries

The CR Program grant funding contains scoring guidelines that favor projects that provide fish benefit to Columbia River tributaries; in particular those tributaries that WDFW has listed as priority streams. Ecology plans to continue recommending specific projects for future funding and begin to measure and account for the specific fish benefits gained from new conservation and storage projects. We will provide this data on the Columbia River Webmap, as it becomes available.

### Stream Reaches

WDFW last updated priority stream reaches in 2003. Since that time, local, state and federal funding partners have invested in many conservation, habitat and fish barrier improvements. Stream reaches also need to become consistent with federal recovery plans, watershed plans and subbasin plans that have been completed since 2003. Ecology is working with WDFW to update this information for use in the Columbia River Grant Program, as well as other local, state and federal funding programs.

### Municipal Demand and Conservation

Ecology plans to work with the Washington State Department of Health to better understand municipal demand and opportunities for municipal conservation. For example, in the 2006 legislative report, we estimated municipal demand (using data from the Washington State Office of Financial Management, U.S. Geological Survey, and DOH) at 170 gallons per capita per day (gpcd). However, in 2003, the Legislature passed the Municipal Water Law, which includes new conservation mandates for municipalities. DOH adopted a new water use efficiency rule (Chapter 246-290 WAC) in 2007, which is expected to alter municipal water use goals in the future. For example, new demand would drop from 67,500 acre-feet to about 60,000 acre-feet if the 170 gpcd average was reduced by just ten percent for the 350,000 additional people projected in the Columbia River Basin over the next 20 years.

We also cannot yet predict how much of the projected savings from municipal conservation efforts will offset new consumptive demand from the river (e.g. xeriscaping, lawn watering controls) versus timing of returns to the river (e.g. fixing leaky pipes). Ecology is working to compile this information as municipalities submit their new water system plans.

CD placeholder

Winery overlooking Columbia River near George, WA (photo by: Wendy Valdez)

