

# The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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## YAKIMA RIVER BASIN INTEGRATED WATER PLAN

STRANGE BEDFELLOWS TAKE RISKS, FIND COMMON GROUND

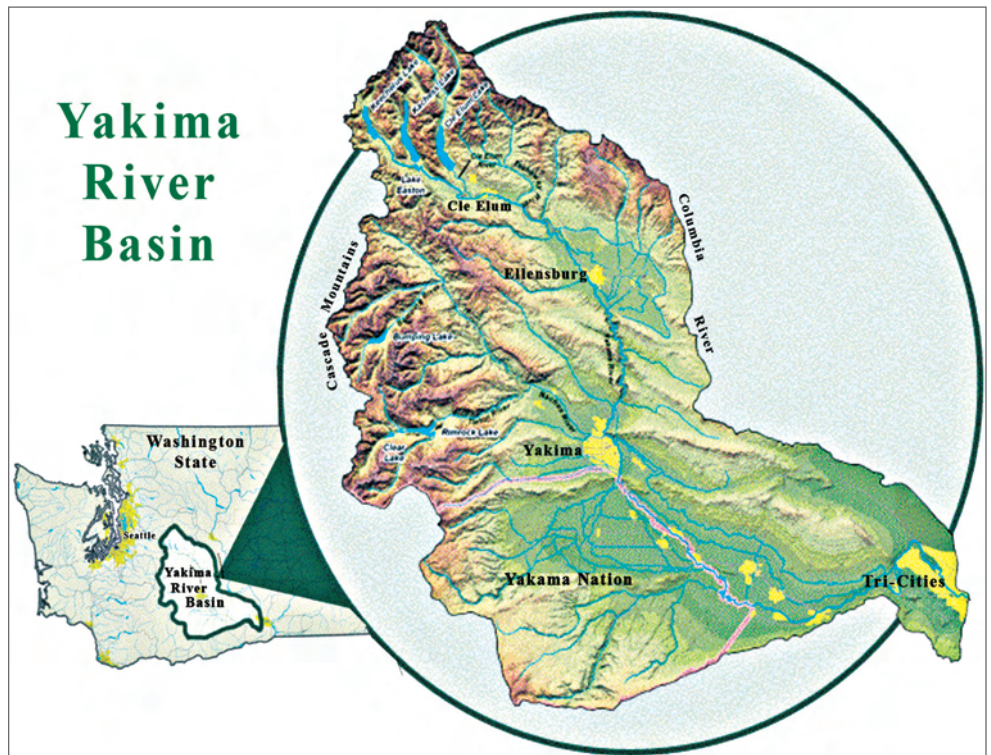
by Steve Malloch, National Wildlife Federation and Michael Garrity, American Rivers

### INTRODUCTION

As with almost every major river basin in the American West, the Yakima River Basin (Basin) has a history of instituting ambitious water schemes in pursuit of economic development. As is also all too typical, this development came with many initially unconsidered costs: environmental degradation; long-ignored but resurgent tribal treaty rights; litigation; and, most recently, concern — even in this reliably conservative river basin — about an increasingly uncertain climate future.

In an effort to go beyond the decades of water conflicts spawned by this history, the Basin is now also home to another ambitious plan — the Yakima Basin Integrated Water Resources Management Plan (Yakima Plan) — designed to secure a healthy future for the Basin's fish, farms, forests, and families. The Yakima Plan is the result of an array of interests in the Basin recognizing that digging entrenched positions still deeper is unlikely to result in a satisfactory resolution for anyone.

The Yakima River is located on the arid east side of Washington state, nestled between the Cascade Mountain crest and the Columbia River.



**Yakima Basin Plan**

**Ag Economy**

**Yakama Nation Treaty Rights**

**Reclamation Project**

**1945 Consent Decree**

Water development in the Basin has worked spectacularly well to grow crops and the Basin’s agricultural economy. There are roughly 500,000 acres of irrigated land in the 6,155 square mile basin, supporting an agricultural economy valued at \$3.4 billion. Average annual water supply is about 3.3 million acre-feet, with deliveries of about 1.7 million acre-feet. Notable crops include: apples; sweet cherries; most of the hops grown in the US; wine grapes; along with dairy and beef cattle, timothy hay exported to feed exotic horses, and a variety of other crops (despite the recent change in Washington laws, there appears to be no discernable marijuana crop — as yet).

One theme in the Basin’s story concerns the Confederated Tribes and Bands of the Yakama Nation, whose treaty rights — ratified in 1859 — include traditional rights to hunt and fish. Annual pre-development salmon runs in the Basin are estimated to have included from 300,000 to 960,000 fish. Subsequent to irrigation and other development, sockeye, summer Chinook, and coho were extirpated. The average annual returns for all salmonids during the 1980s dropped to as low as 8,000 — roughly one percent of pre-development levels. Thus, while treaty rights to fish were left intact, there were no fish left to catch. This situation was untenable for the Yakama Nation and also a critical indicator of the Basin’s degraded environment.

Another theme, and one directly related to the decline of the fishery, is repeated rounds of irrigation development. Starting in the 1850s, private (eventually including railroad-sponsored) irrigation projects were built. By the turn of the century irrigation fully consumed the Yakima River’s natural flow. The next phase was the 1905 authorization of the Bureau of Reclamation’s (Reclamation’s) Yakima Project, which claimed all unappropriated water to augment supplies through construction of five main storage reservoirs. The associated dams were all built without fish passage. This sealed the fate of sockeye salmon and blocked access to higher elevation, cold-water spawning habitat for spring chinook, coho, and steelhead, as well as isolating bull trout populations above or below the dams.

A 1945 *Consent Decree* created an unusual water rights structure in the Basin (the decree was issued in *Kittitas Reclamation District v. Sunnyside Valley Irrigation District*, Civil Action No. 21 (Eastern District of Washington, Southern Division, Jan. 1945)). Pursuant to the 1945 *Consent Decree*, Reclamation annually determines the Total Water Supply Available (TWSA). Pre-1905 rights amounting to about half of the Basin’s surface water rights receive their full water supply before junior right holders receive any. Next up are users whose rights date to the 1905 Reclamation appropriation. These rights are termed “proratable” and are cut back equally in any shortage. Post-1905 rights receive no water if the proratable rights are shorted and there is a “call” (i.e., a senior water right owner requests regulation of junior users so that the senior user receives the full amount of their right). The most senior rights holders thus had little concern about their water supplies because they historically have never been shorted. However, the largest and most economically productive water districts rely in large part on proratable rights. Prior to the regionally historic 1977 drought, proration was of only modest concern for the Reclamation irrigators — there had not yet been a serious shortage of water that resulted in significant proration. Since the Seventies, however, there have been seven years where proratable rights holders received less than 70% of their water, the threshold irrigators see as causing very serious economic pain.

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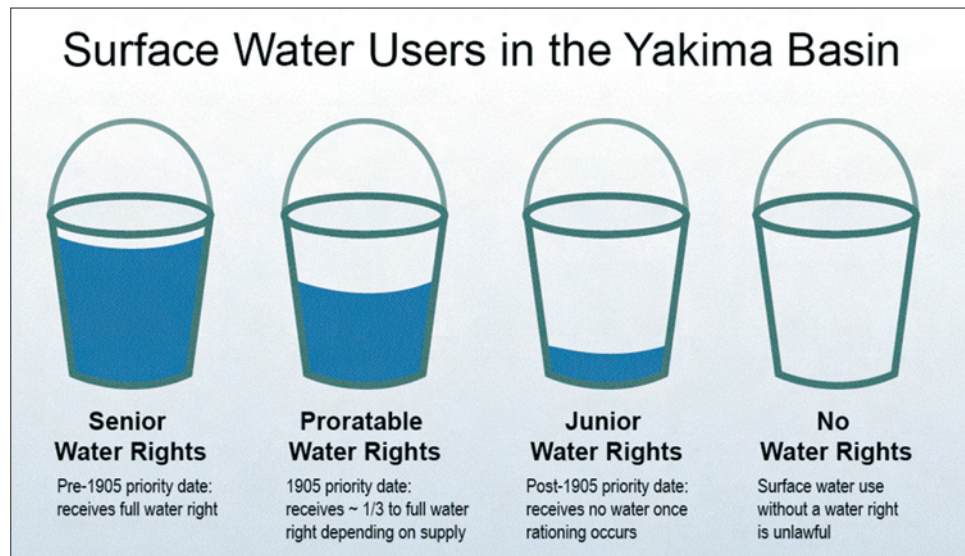
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**Yakima Basin Plan**

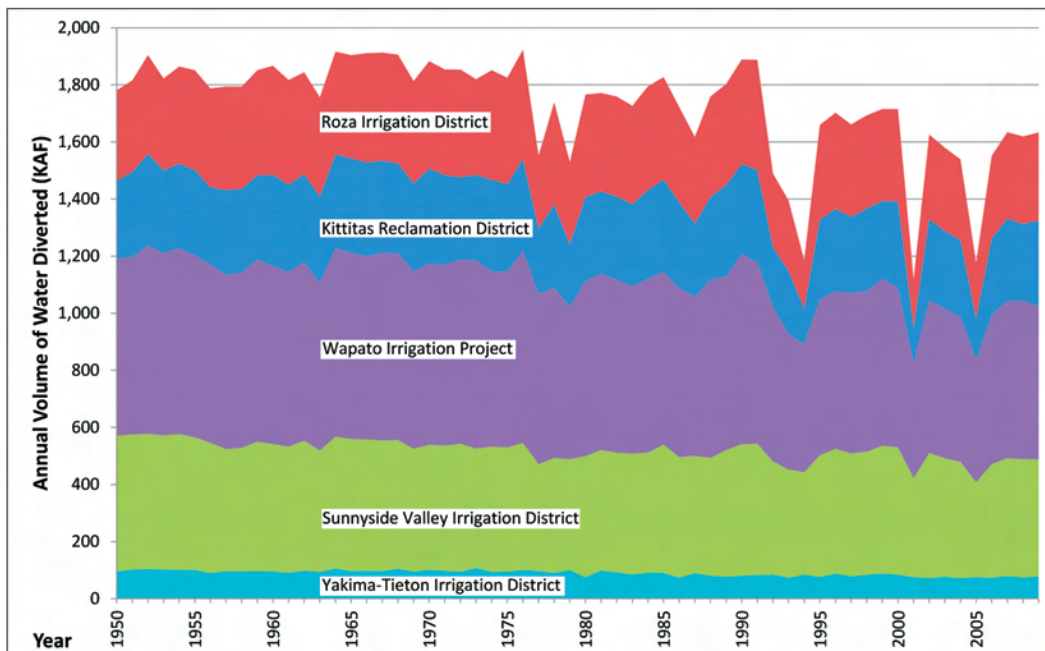
**Enhancement Project**

**Water Diversions**

**Black Rock Project**

**Climate Change & Storage Capacity**

The 1977 drought prompted renewed interest in new storage to improve the reliability of the proratable supply. Federal legislation in 1979 and then 1984 authorized what is known as the Yakima River Basin Water Enhancement Project (YRBWEP) Phase I, which included a focus on installing fish screens and fish passage at irrigation facilities in the middle and lower parts of the Basin. After additional severe droughts in 1992 and 1993, YRBWEP Phase II was implemented in 1994. Phase II focused on water conservation and efficiency along with some habitat acquisition and restoration. It has resulted in significant system improvements and continues as funding allows.



Proponents of YRBWEP Phase I and Phase II envisioned this work as preparing for a Phase III that would include significant additional storage. In 2003, Congress authorized a feasibility study for new surface supplies involving a transbasin diversion of Columbia River water into the Basin coupled with development of a 1.3 million acre-foot off-stream storage facility known as the Black Rock Project. The Black Rock proposal foundered in 2008, due to a cost/benefit analysis that concluded the project returned only 13 cents on the dollar and had significant potential to speed the movement of radioactive groundwater at the Hanford Nuclear Reservation Superfund cleanup site towards the Columbia River.

The State of Washington, urged on by the unusual alliance exhibited in a joint comment letter from the Yakima Indian Nation and Roza Irrigation District, as well as separate input from conservation organizations, concluded that the process followed in developing Black Rock would not satisfy State requirements that a broader range of alternatives be evaluated. In an Environmental Impact Statement (EIS), the State developed the nucleus of what became the Yakima Plan by balancing fishery improvements, better water management, and supply enhancements.

At the same time, concern was growing in the Basin about the effects of climate change. Both fish and farms rely upon the low to mid-elevation Cascade Range snowpack — the so-called “sixth storage reservoir.” Due to projected reductions in snowpack and earlier melt-off, modeling conducted by the University of Washington’s Climate Impacts Group (CIG) concluded that the Basin will become subject to increasingly severe instream and out-of-stream water shortages. The CIG scenarios show the chances of severe water shortages (now about 14% per year) doubling by as soon as 2020 and becoming much higher thereafter.

For such a thoroughly “plumbed” river system, the Yakima is surprisingly sensitive to loss of snowpack. Compared to many other developed agricultural river basins in the West, Basin storage is quite limited compared to annual flow — a condition made possible by the historically reliable and abundant Cascade snowpack. About 30% of the Yakima’s average annual runoff can be stored in reservoirs. This is much less than major rivers in California, where 67% to more than two times annual flow can be stored, and far less than the major storage systems of the Colorado River or the Missouri River, where several times annual runoff can be stored (see Table).

**TABLE**  
**Western Rivers Impounded Runoff Index**  
(Surface Storage divided by average annual flow)

Yakima River, WA	30%
Sacramento River, CA	80%
American River, CA	67%
Tuolumne River, CA	194%
Stanislaus River, CA	293%
Yuba River, CA	75%
Feather River, CA	129%
San Joaquin River, CA	120%
Merced River, CA	101%
Trinity River, CA	206%
Missouri River	222%
Colorado River	492%
Columbia River	28%

**Reclamation Basin Studies**

Reclamation Basin Studies are being conducted on selected river basins or sub-basins in the 17 Western US Reclamation States. Each Basin Study must include at least these four basic components:

- Projections of water supply and demand within the basin, or improvements on existing projections, taking into consideration the impacts of climate change;
- Analysis of how existing water and power infrastructure and operations will perform in the face of changing water realities such as population increases and climate change;
- Development of structural and nonstructural options to improve operations and infrastructure to supply adequate water in the future;
- A trade-off analysis of the options identified and findings and recommendations as appropriate. Such analysis simply examines all proposed alternatives in terms of their relative cost, environmental impact, risk, stakeholder response, or other attributes common to the alternatives. The analysis can be either quantitative or qualitative.

The Studies are funded and conducted jointly by Reclamation and local/regional cost-share partners. Thus far Reclamation has initiated 17 studies, which are in various stages of development and completion, these include the following: Los Angeles Basin (California); Pecos River Basin (New Mexico); Republican River Basin (Colorado, Kansas and Nebraska); Sacramento-San Joaquin Rivers Basin (California); Upper Washita River Basin (Oklahoma); Hood River Basin (Oregon); Klamath River Basin (California/Oregon); Lower Rio Grande Basin (TX); Santa Fe Basin (NM/CO); Henry’s Fork of the Snake River Basin (ID); Niobrara River Basin (NE); Santa Ana River Watershed Basin (CA); Southeast California Regional Basin (CA); Truckee River Basin (CA/NV); Colorado River Basin (AZ/CA/CO/NV/NM/UT/WY); St. Mary and Milk River Basins Study (MT); Yakima River Basin (WA).  
For Info: [www.usbr.gov/WaterSMART/bsp/studies.html](http://www.usbr.gov/WaterSMART/bsp/studies.html)

Comprehensive assessment of water supply and demand in selected major watersheds was authorized under the Federal SECURE Water Act of 2009. The Act directed Reclamation to focus on river basins or sub-basins in the 17 Western Reclamation States where imbalances in water supply and demand exist or are projected. The Yakima Basin was selected as one of the first three basins to be comprehensively studied in terms of long-term water supply, long-term water demands, climate change, and environmental issues.

From the outset, the Yakima Basin Study was designed and conducted to gather information to develop a “Comprehensive Water Resource Management Implementation Plan” for the Basin (see [www.usbr.gov/WaterSMART/bsp/docs/fy2009/Yakima%20River.pdf](http://www.usbr.gov/WaterSMART/bsp/docs/fy2009/Yakima%20River.pdf)).

Basin stakeholders recognized that they had to work together. They already had extensive information developed as a result of the divisive Black Rock project as well as extensive fisheries recovery planning and knowledge of water conservation developed under YRBWEP Phases 1 and 2. As a result, the Yakima Plan moved relatively quickly to a basic set of agreements hammered out by an unusually broad set of agricultural, tribal, environmental, and governmental (federal, state, and local) stakeholders. The “*Yakima Basin Study/ Proposed Integrated Water Resources Management Plan*” was released in April, 2011 (see: [www.usbr.gov/pn/programs/yrbwep/2011integratedplan/plan/integratedplan.pdf](http://www.usbr.gov/pn/programs/yrbwep/2011integratedplan/plan/integratedplan.pdf)) followed by a Programmatic Environmental Impact Statement in March 2012 (see: [www.usbr.gov/pn/programs/yrbwep/reports/FPEIS/fpeis.pdf](http://www.usbr.gov/pn/programs/yrbwep/reports/FPEIS/fpeis.pdf)).

**Yakima Basin Plan**

**Plan Elements**

**Dams & Fish**

**YAKIMA BASIN INTEGRATED WATER RESOURCES MANAGEMENT PLAN**

The Yakima Plan consists of seven elements intended to restore the Basin’s native fisheries and improve the reliability of instream and out-of-stream water supplies in the face of climate change and population growth. Those elements are: 1) Fish Passage; 2) Structural and Operational Changes; 3) Surface Water Storage; 4) Groundwater Storage; 5) Habitat Protection and Enhancement; 6) Enhanced Water Conservation; and 7) Market Reallocation of Water.

**Fish Passage**

All five of Reclamation’s major water supply dams in the Basin (Keechulus, Kachess, Cle Elum, Bumping, and Tieton/Rimrock) were built between 1910 and 1933. None included fish passage. Even when Keechelus Dam was rebuilt for safety reasons in the early 2000s, fish passage was not added. The Yakama Nation and the Washington Department of Fish and Wildlife (WDFW) initiated litigation to force Reclamation to include fish passage in the rebuild. Reclamation refused due to the agency’s then-current policy not to

include environmental measures in dams’ safety repairs because to do so could put funding for such projects at risk. In 2006, however, a settlement was reached. The settlement included commitments to: an assessment of fish passage at all five major Basin water supply reservoirs; interim juvenile fish passage at Cle Elum Dam; and a feasibility study of passage at Cle Elum and Bumping Reservoir dams. The Yakima Plan builds on that settlement, calling for the installation of fish passage at all five of the headwaters dams to allow threatened steelhead, spring chinook, coho, and sockeye access to the Basin’s extensive and cold high-elevation habitat. Access to this clean, cold habitat will greatly benefit all four of these anadromous species. Sockeye stand to benefit in the largest numbers, as they require rearing in lakes and have not had access to any of them since the early 20th century. Until an experimental sockeye reintroduction program got underway at Cle Elum Reservoir, the last time a sockeye had been seen in the Basin was 1933.

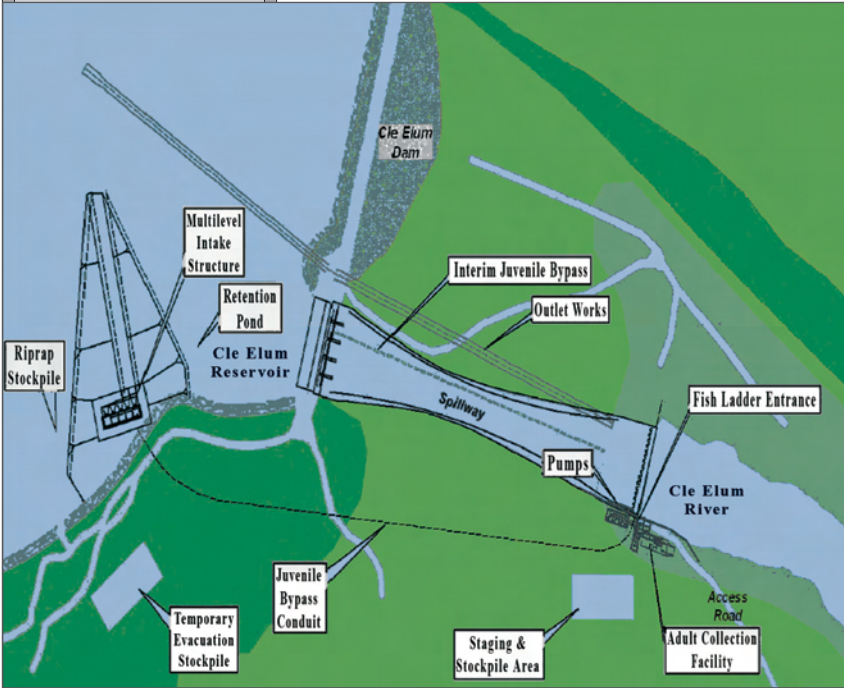
**Members of the YRBWEP Workgroup**

<b>Federal Agencies</b> Bureau of Reclamation National Marine Fisheries Service U.S. Fish and Wildlife Service U.S. Forest Service <sup>1</sup>	<b>Washington State Agencies</b> Department of Ecology Department of Agriculture Department of Fish & Wildlife
<b>Yakama Nation</b> Yakama Nation Natural Resources Yakima/Klickitat Fisheries Project	<b>Local Governments</b> Benton County Kittitas County Yakima County City of Yakima
<b>Irrigated Agriculture</b> Kennewick Irrigation District Kittitas Reclamation District Roza Irrigation District Sunnyside Valley Irrigation District Yakima-Tieton Irrigation District	<b>Other Stakeholders</b> American Rivers National Wildlife Federation <sup>2</sup> Yakima Basin Fish & Wildlife Recovery Board Yakima Basin Storage Alliance

<sup>1</sup>Joined Workgroup in 2012 <sup>2</sup>Alternate for American Rivers

**Basin Plan**

The Basin's resident bull trout (listed under the federal Endangered Species Act (ESA)) also stand to benefit from the fish passage element of the Yakima Plan, as existing populations are isolated above the headwaters dams. This isolation prevents genetic interchange among the Basin's bull trout.



Fish passage in the Yakima plan will include both juvenile and adult passage facilities. Juvenile passage will be designed to allow for downstream out-migration at various reservoir levels so as to ensure a natural migratory window as the reservoirs begin to be drawn down during the spring.

The Yakima Plan prioritizes fish passage at Cle Elum Dam and this project is already receiving federal and state funding for design work. The order and timing of fish passage at other dams remains subject to negotiation about the overall phasing-in of Plan implementation. To gain the access to the most river miles of habitat, passage priorities are Tieton (36.8 miles), Cle Elum (29.4 miles), Keechelus (up to 16.8 miles), Bumping (5-6 miles), and Kachess (2.4 miles). Cle Elum was chosen to proceed ahead of Tieton due to the technical complexity and expense of designing and constructing juvenile (downstream) fish passage at Tieton, although restoring access to the Tieton system is vital to meeting the promise of the Yakima Plan. The Yakima Plan also calls for installing fish passage for bull trout into Clear Lake, a small reservoir in the Tieton River drainage.

**Facility Changes Proposed**

**Structural and Operational Changes to Existing Dams and Irrigation Facilities**

The Yakima Plan includes several changes to existing dams and irrigation facilities for the benefit of river flows and salmon and steelhead habitat.

Facility changes include:

- Reduced (or "subordinated") water diversions for hydropower production at Roza and Chandler diversion dams on the Yakima River mainstem. This will help restore flows below these facilities for the benefit of salmon and steelhead.
- Construction of a pipeline between Keechelus and Kachess reservoirs. This pipeline will allow for more natural flow levels in the 11 mile river reach between Keechelus and Kachess reservoirs for the benefit of salmon and steelhead. This will also allow Kachess to refill more quickly after it is drawn down further in drought years pursuant to the Kachess "inactive storage" proposal discussed below.
- Raising Cle Elum Dam three feet in order to increase storage in the Reservoir by nearly 15,000 acre-feet.
- Improvements to the Kittitas Reclamation Canal that will reduce leakage, unblock fish passage barriers created by irrigation infrastructure, and allow for flow improvements in Kittitas Valley creeks.
- Piping and lining the Wapatox canal could allow for consolidation of diversions, which may allow for the removal of a diversion dam from the Naches River.

**Storage Increases**

**Surface Water Storage**

The Yakima Plan calls for significantly increasing the Basin's surface storage by: accessing inactive storage at the existing Kachess Reservoir; expanding Bumping Reservoir; and building the new off-channel Wymer dam and reservoir:

- Kachess inactive storage will tap Kachess Reservoir below the existing dam outlet so that 200,000 acre-feet of water could be accessed during drought conditions.
- Bumping Reservoir will be expanded from 34,500 acre feet to 200,000 acre-feet. The additional water will be used to provide drought year supplies and more natural flows during the out-migration of juvenile salmon and steelhead. This proposal was reduced from a larger 458,000 acre-foot expansion in order to protect the bulk of bull trout spawning habitat in Deep Creek and to ensure a higher probability of refill. The reservoir will be expanded by building a new dam about 3/4 of a mile downstream of the existing dam at Bumping Reservoir. The expanded reservoir's footprint will be about 3,500 acres, up from roughly 1,500 acres today. The Bumping Reservoir expansion is the most politically controversial component of the Yakima Plan, as it will inundate: about 980 acres of old growth forest; three-quarters of a mile of bull trout spawning habitat in Deep Creek; private cabins leased from the Forest Service; and a campground. The Bumping Reservoir expansion remains in the Yakima Plan in part to provide managed storage to meet fishery goals in the Naches arm of the Yakima River system. It is also about half as expensive as the Wymer Dam proposal for the same amount of new storage.

## Yakima Basin Plan

### New Dam

Wymer Dam and reservoir will be built on Lmuma Creek, a small tributary of the mainstem Yakima River that flows into the Yakima in the Lower Yakima Canyon between Ellensburg and Selah. The 162,500 acre foot reservoir will be filled by pumping from the Yakima River, most likely from just above the mouth of Wymer Creek. The water will be stored behind a 450-foot high dam. The reservoir will have a footprint of about 1,400 acres, including 1,055 acres of shrub steppe habitat. Half of the water stored at Wymer will be used to improve flows for salmon and steelhead; the other half will be used to improve the reliability of the water supply for existing irrigators. If Wymer Reservoir is able to supply the Roza Irrigation Canal directly, it could allow for the removal of Roza Dam from the mainstem Yakima River.

### Groundwater Recharge

#### Groundwater Storage

The Yakima Plan proposes several projects to recharge the Basin's aquifers and groundwater. The idea is to capture water during high flow periods (while still allowing for the environmental benefits of peak flow). Depending on the project, the captured water can be stored for later out-of-stream use or allowed to passively return to the river to improve flows and cool summer water temperatures for the benefit of salmon.

### Habitat Restoration

#### Habitat Protection and Enhancement

In addition to the separate fish passage elements, the Yakima Plan includes numerous actions to improve the quality and quantity of habitat for the Basin's anadromous and resident fish populations — as well as enhancing protections for significant blocks of privately and publicly owned lands.

The Plan proposes to spend \$450 million on habitat restoration, including significant restoration of the Yakima River's floodplain in the Ellensburg, Selah, and Yakima areas as well as extensive tributary restoration. Much of this restoration work is outlined in the Yakima Subbasin Plan and the Yakima Steelhead Recovery Plan.

### Private Lands

The protection and enhancement provisions of the Plan's habitat element include protecting 70,000 acres of private land that is a high priority for conservation purposes and has a nexus with the goals and impacts of the Yakima Plan. This includes 15,000 acres of shrub steppe land in the Yakima Canyon or possibly near the lower Yakima, at least 10,000 acres of Plum Creek lumber company's forest lands in the central Cascade Mountains (currently in a "checkerboard" pattern with federal ownership), and 46,000 acres of private forest lands in the Teanaway River basin. The Teanaway watershed has long been identified by the environmental community as a high priority conservation target. The Teanaway River is a free-flowing tributary of the upper Yakima that is a very high priority for steelhead, spring chinook, coho, and bull trout restoration — but only if the land is protected from future development. It is also prime habitat for an array of wildlife, including a recently arrived wolfpack, and is heavily used for recreation.

### Federal Lands

The Plan also proposes to enhance protections for much of the Basin's upper watersheds (mostly federal land) through new wilderness and wild and scenic river designations as well as improved management for the benefit of fish, wildlife, and stream flows on US Forest Service lands in a manner that is compatible with a variety of recreational activities.

#### Enhanced Water Conservation

The enhanced water conservation element of the Yakima Plan includes agricultural, municipal, and domestic water conservation measures.

### Agricultural Conservation

Agricultural conservation under the Plan will save up to 170,000 acre-feet of water in wet years, which will both extend existing water supplies and improve flows for salmon and steelhead in several reaches of the Yakima and Naches rivers. Types of agricultural conservation projects to be funded include: lining or piping existing canals and laterals; constructing re-regulating reservoirs on irrigation canals; installing gates and automation on irrigation canals; improving water measurement and accounting systems; installing higher efficiency irrigation systems on-farm; and implementing irrigation management systems to reduce seepage, evaporation, and operational spills. As noted above, these kinds of projects are already being accomplished as federal funding allows — the previously initiated Yakima River Basin Water Enhancement Project promises to greatly expand the funding for implementation of water conservation throughout the agricultural lands of the Basin as well as the scope of where the projects occur (*see: [www.ecy.wa.gov/programs/wr/cro/yakimabasin.html](http://www.ecy.wa.gov/programs/wr/cro/yakimabasin.html)*).

### Municipal & Domestic Use

The Yakima Plan will allow for access to new water supplies by municipal and domestic users. However, to access this water these users will need to demonstrate that they met efficiency standards identified by a multi-stakeholder advisory body.

### Water Market

#### Market Reallocation of Water

The water marketing element of the Yakima Plan will build on existing efforts in the Basin to reallocate existing water supplies through a water market and/or water bank. Under this program, water rights are purchased, sold, or leased on a temporary or permanent basis to improve out-of-stream water supply and instream flow conditions — especially during drought years. The Plan proposes to increase the amount of water moved from low-value annual crops to higher-value perennial crops and reduce the delay for

## Yakima Basin Plan

### Law & Policy Changes

such transactions. This will occur in two phases (both of which will require more fleshing out). The first phase will involve a near-term effort to build on the Basin's existing water market by providing additional administrative and technical support to encourage more transactions. The second phase will require more substantial changes to law and policy to facilitate more inter-irrigation district water exchanges in addition to the intra-district exchanges that are more common in the Basin today. The initial goal for this program is to market up to 60,000 acre-feet. However, as the price of water increases and institutional barriers are reduced, some parties are estimating that much more water will be marketed on a temporary basis during low-water years.

### Fisheries Benefits

#### RESULTS

As the Yakima Plan is implemented it will bring significant on-the-ground benefits in terms of a more reliable water supply and significantly improved fisheries and overall environmental health. There are also economic benefits from both the fisheries and out-of-stream water supply elements.

On the fisheries side, the Plan is projected to increase escapement of salmon and steelhead to their spawning grounds from a mid-range estimate of 26,828 annually without the Yakima Plan to 225,350 with it — a ten-fold improvement. The range of salmon and steelhead numbers without the plan is 12,139-91,580 compared to 132,215-401,154 with it. The biggest component of the restored fishery will be sockeye; with access to all five reservoirs, between about 110,000 and 250,000 sockeye are projected to return to the Basin each year. Other fish species will benefit from the Plan as well. Threatened bull trout will be able to migrate above and below the reservoir dams for the first time in about a century, reconnecting physically and genetically isolated populations. Other resident trout — including rainbow and westslope cutthroat — will benefit from restored floodplain, riparian, and stream habitat and healthier flows in tributary streams and the mainstem of the Yakima River.

### Water User Benefits

On the out-of-stream water user side, the Yakima Plan will help protect proratable irrigators from the impacts of drought and the impending effects of climate change, greatly increasing the likelihood that even in dry years they will have at least 70% of their full allotment of water — the level needed for their economic viability. In addition, municipal and domestic water rights will be more secure and able to meet growth in water demand over time.

### Probable Costs

#### THE ECONOMICS

While the Yakima Plan is a terrific piece of political work that finely balances the many competing interests and priorities, it is also expensive. In 2012 dollars, the most probable cost is estimated at \$4.2 billion (with a range of from \$3.2 to \$5.4 billion), which when reduced to present value nets a current cost of \$3.12 billion. The major water supply elements in undiscounted 2012 dollars are: Wymer Reservoir and conveyance (\$1.4 billion); Bumping Reservoir expansion (\$571 million); and the Kachess inactive storage plus the Keechelus to Kachess pipeline (\$476 million). Water conservation projects are estimated at \$427 million. Fishery recovery and enhancement costs include passage at the six reservoirs (\$433 million) and mainstem/tributary restoration (\$480 million).

### Benefits

However, these costs are far outweighed by the benefits — primarily the fishery benefits. In October of this year, Reclamation released a preliminary economic analysis that found the economic benefits are more than double the costs of the project (see [www.usbr.gov/pn/programs/yrbwep/2011integratedplan/plan/framework.pdf](http://www.usbr.gov/pn/programs/yrbwep/2011integratedplan/plan/framework.pdf)).

Reduced to present value and 2012 dollars, Reclamation found that total benefits range from \$6.2 to \$8.6 billion, resulting in a benefit cost ratio of at worst 1.4 to 1 and at best 3.2 to 1. Restoring the fishery is the overwhelming benefit of the project. Using a “willingness to pay” approach the present value of fishery restoration is \$6.2 billion, 7.75 times the irrigation benefit of \$800 million and 15.7 times the domestic and municipal water supply benefit of \$395 million. The preliminary cost allocation analysis placed \$2.44 billion of cost on ecological restoration, \$729 million on irrigation, and \$31 million on municipal and domestic water supply. These numbers are preliminary because Reclamation based them on a programmatic analysis rather than the usual project-specific analysis. As each specific project is proposed, Reclamation will presumably perform project specific economic analysis.

### Funding Questions

So who's going to pay for this? As this article goes to press, the news stories are all about the “fiscal cliff” and the struggles of the federal government to raise revenue and cut spending. Clearly, the old model of 90% or more subsidy for Reclamation water projects make no sense. The assumption of most participants in Yakima Plan is that there will be some federal money — but that much, perhaps most, of the funding will have to be a combination of beneficiary, state, and local funding. In other words, water users will be paying substantially for the project, along with some spreading of the public costs of environmental restoration on the counties and the state. The balance of payment is an active topic of discussion, and presumably Congress and the Administration (particularly the Office of Management and Budget) will have strong opinions.

## Yakima Basin Plan

### Tenuous Status Quo

### Way Forward

### Broad-Based Approach

### Project Sequencing

### Comprehensive Approach

In addition, this \$4 billion dollar program will not and could not be built immediately. The Yakima Plan sets up a series of projects that will be tackled over time — perhaps three or four decades. That makes the \$4 billion dollar project a still ambitious, but much more manageable target. Of course time also raises the thorny issue of sequencing — how to create groups of projects that address enough of the interests to keep the political coalition together. This is also a topic of serious current discussion.

#### THE NEED FOR A NEW COMPREHENSIVE APPROACH

Yakima Plan participants recognize that the existing situation increasingly does not work for any of the Basin's interests. Agriculture dependent on a proratable water supply is facing increasingly frequent severe shortages. Fishery restoration has made modest progress from the 8,000 fish average returns of the 1980's to around 25,000 now. However, this is far short of restoration of healthy abundant runs that biologists and recreationalists desire and the Yakama Nation seeks to fulfill its Treaty rights — and climate change puts even these tenuous current conditions at risk. Basin interests recognize that something has to change.

The result is that each set of Basin interests has acknowledged the legitimacy of other's interests. The only way forward is to take steps that, in a balanced way, move all interests to better positions. Make no mistake, the Yakima Plan is at its heart a political document. It reflects an outline of a possible way forward where a series of steps can be taken whereby each step makes all of the interests better off. As obstacles arise, the Plan will need to adapt to reach politically and technically feasible solutions — all premised on the goal of making everyone better off.

In many respects, Reclamation succeeded in its mandate to develop a robust agricultural economy in the West. However, readers of *The Water Report* know all too well that in fulfilling that mission the environmental tradeoffs could be devastating. One result was that practically every major river system in the West is now run as much by Endangered Species Act biological opinions as by water managers. Reclamation has struggled with new missions of water management and environmental stewardship and is preparing for the challenges to water resources that climate change presents.

In the Yakima Basin, Reclamation is party to a broad-based new approach being crafted to supply solutions to a broad set of problems. Yakima has relatively modest surface storage because of its reliable snowpack. As the snowpack dwindles, additional storage will be needed for both fish and farmers. There is general agreement that it makes sense to first make the best use of existing infrastructure. This includes accessing inactive storage and then building economically justifiable new or expanded storage, assuming that the Bumping Lake expansion and Wymer Dam proposal withstand National Environmental Policy Act and Endangered Species Act scrutiny. At the same time, these projects will be embedded in an overarching program of environmental restoration — this is not the approach of the old dam building era.

As is undoubtedly true for most Yakima Plan participants, discussions inside your authors' organizations — American Rivers and National Wildlife Federation — have been, shall we say, vigorous. However, the outcome has been a general recognition that in the Yakima there is an opportunity to accomplish a project with enormous environmental benefits — starting with restoring hundreds of thousands of salmon to a river that essentially lost its fish. This is a project that has embedded climate adaptation at its core and aimed at doing what is needed to have the condition of the fish, farms, forests, and families of the Basin be sustained and improved in light of the changes to hydrology that climate change is bringing. The Plan is an opportunity to rectify some of the damage inherent in Reclamation's earlier mission. The Basin is already a thoroughly "plumbed" system. Environmental progress here requires new engineering along with a suite of restoration and protection measures. Rather than write the Basin off, our organizations are willing to consider adding to that plumbing.

We also have a firm belief that the Yakima Plan is going about the situation in the right way. On the water side, a tremendous amount of conservation has already been accomplished and more is hard-wired into the Plan. Preliminary plans for sequencing the infrastructure projects are appropriate, as we make best use of existing infrastructure (e.g. the Kachess Lake inactive storage proposal) before we would build new or expanded surface water storage (the Wymer and Bumping proposals). The enormous restoration and protection included in the Yakima Plan is why we're willing to support the Plan as a whole even though we would likely oppose some of its specific elements in isolation.

It is not only that environmental restoration and protection are embedded in the project, it is that they are part of a comprehensive approach that is the only way the project makes any sense.

For instance, conservation, efficiency, and marketing are essential parts of the solution — but they do not provide fish passage at the major dams, and they do not fund the habitat work needed to restore the fishery. They also do not address the fact that Yakima has modest surface storage compared to its water supply and water demand. Without the reality of climate change and the reduction in water storage provided by snow pack, conservation, efficiency and marketing might be enough; but with climate change, they are not enough. We also believe that as the high cost of new water supplies is factored into the thinking of Basin interests, marketing, conservation, and efficiency will look much more attractive, and may reduce the need to do some of the infrastructure projects.

**Steven Malloch** joined the National Wildlife Federation in 2008, as Senior Western Water Program Manager. Steve's responsibility at NWF is creating a program that links providing habitat for fish and wildlife with adapting water systems to climate disruption. Prior to joining NWF, he consulted with foundations and NGO's on water policy and campaigns, served as Executive Director for the Western Water Alliance, and worked as Washington DC counsel for Trout Unlimited's Western Water Project. Before shifting to the non-profit sector, Steve practiced environmental law and litigation in San Francisco with Graham & James. Steve started his career in water as a hydrogeologist, working on water supply and contamination projects primarily in the Western US. His degrees are in geology and law from the University of California at Davis, and an MS in Water Resources Administration from the University of Arizona. He is admitted to the bar in Washington and California.

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A decade ago, the conservationist approach to the Yakima would have been to address water needs through conservation, efficiency, and marketing, do the fishery restoration, and call it a day. With climate change, that approach is no longer enough. We need to augment water storage to make up for loss of snow pack. We need to have water supplies that can be managed for fish. We need to align how watershed land is managed so that it supports water retention, water temperature, and habitat goals. We live in an increasingly complicated world, and for the Basin, that means that "just doing the fishery part" now involves coordinating water supply and land management.

Land acquisition and protection fit into a water project in several ways:

- Fishery restoration requires good habitat, and proper management of land in the watershed is needed for that habitat. The Teanaway acquisition is a great example — it is the best major riverine salmon restoration prospect, but cannot be done without resolving ownership in a way that supports conservation. Further, the US Forest Service needs to manage its land to support fisheries.
- Almost all of the water in the system is ultimately runoff. How the land is managed will affect the timing, amount, and quality of the runoff. While land management for water supply timing, snowpack retention, and quality is far from a perfected art, as climate change effects are increasingly apparent, it is increasingly important. The Yakima Plan is a test case for integrating land management (particularly National Forests) with water systems (especially Bureau of Reclamation projects). As a result of the Yakima Plan, the Forest Service is now engaging with the Bureau of Reclamation on several SECURE Water Act basin plans — evidence that the Yakima is already changing the frame of reference for watershed issues and climate change. Additionally, the Forest Service is expected to release a new policy on water in the coming months, which may serve to shape land protection for water ecosystem services projects.
- Impacts from some components of the Yakima Plan will need to be further addressed. Projects like the Bumping Reservoir expansion will require project-specific analysis and project-specific mitigation in the form of land acquisition and protection beyond that included in the Yakima Plan's present habitat protection and enhancement element.

## CONCLUSION

### IS THE YAKIMA PLAN A MODEL FOR THE WEST?

The most important lesson of the Yakima Plan is that the interests realized they had to work together to accomplish anything. Putting aside historical enmity is undeniably difficult, but likewise undeniably necessary if progress is to be made. At a critical point in the process leading to the Yakima Plan, the Yakama Nation and Roza Irrigation District put aside historical positions and found common ground on a key issue, which was critical in leading to a broadly supported approach.

The second main lesson is that the Yakima Plan is not a water project. Rather it is a comprehensive fishery restoration project, an ecosystem sustainability project, a long term economic sustainability project and a hybrid land-water-climate adaptation project that has elements of a traditional water project.

In order to address our current problems and prepare for the radically different conditions that disruption of the climate brings, we need to work together and think broadly. That is the model the Yakima Plan represents for the West. While some may see new or expanded water storage as the preeminent feature of the Yakima Plan, we see it as a targeted solution that is one component of a much larger strategy to meet the specific needs of the Yakima Basin's fisheries and agricultural industry.

Other river basins can learn from the Yakima model, but that lesson needs to be tailored to the needs of each basin. For instance, additional storage likely makes much less sense in the Colorado River Basin, where little water ever reaches the Gulf of California, or in California, where Delta problems result from reduced outflow, or in other Columbia Basin tributaries that can meet fisheries and irrigation needs with smaller changes to existing systems.

What's replicable about the Yakima Plan is the process and the comprehensive approach — one that involves reaching out to historical adversaries and in taking a broad view of the Yakima Basin's environment, economics, and future climate.

FOR ADDITIONAL INFORMATION:

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