

3.8 Water Supply/Water Rights

This section describes the impacts on surface water supply availability and water rights compliance that would be associated with implementation of the Proposed Action and alternatives.

3.8.1 Area of Analysis

The area of analysis includes the Klamath Basin in south central Oregon and northwestern California. This discussion divides the Klamath Basin into Upper and Lower Basins based upon hydrologic sub-basins. The Upper Klamath Basin covers 5.6 million acres, and contains the reaches of the Klamath River upstream of Iron Gate Dam. Along this portion of the Klamath River, six dams exist, of which four are being considered for removal under the Klamath Hydroelectric Settlement Agreement (KHSA). The Upper Klamath Basin also contains Reclamation's Klamath Project, which diverts irrigation water from the Klamath River for two National Wildlife Refuges (NWRs) and agricultural use. The Upper Klamath Basin is the area that would be most directly affected by implementation of the Proposed Action. The Lower Klamath Basin covers approximately 4.5 million acres and includes seven hydrologic sub-basins. The lower reaches of the Klamath River are included from downstream of Iron Gate Dam to the river's mouth on the California coastline. Downstream of Iron Gate Dam, the Klamath River has no dams on its mainstem. The sections below are generally organized from upstream to downstream.

3.8.2 Regulatory Framework

This section describes the regulatory framework regarding water rights and supply at the federal and state levels. Section 3.2, Water Quality, discusses the regulations protecting water quality.

3.8.2.1 Federal Water Law

The Reserved Rights Doctrine

The Reserved Rights Doctrine was first articulated in the 1908 Supreme Court decision in *Winters v. United States*. The doctrine provides that when lands are set aside as Indian or other federal reservations, sufficient water to fulfill the purposes of the reservation is reserved as well. Federal reserved water rights arise expressly or by implication from federal treaties, statutes, and executive orders, and vest no later than the date the reservation was established. Unlike state appropriative rights, federal reserved water rights are for present and future uses and may be exercised at any time and are not lost through non-use. While federal reserved water rights may be quantified and administered by states in the context of comprehensive state water adjudication, they are otherwise governed by federal, not state, law.

3.8.2.2 State Water Law

States administer water resources within their boundaries in accordance with one of two state water law doctrines, or a combination of the two. Under the doctrine of prior appropriation, water rights are based on beneficial use, with the first person putting water to use accruing the best right to receive water in times of shortage, regardless of the proximity of the place of use to the source of water. Appropriative rights must be used to be retained. Under the riparian doctrine, rights are based on location rather than use, with landowners bordering waterways possessing corresponding rights to use the flow, and with any water shortages shared accordingly among riparian landowners. Riparian rights may be used at any time, and are not lost through non-use.

A number of states, including Oregon, recognize certain riparian rights, but require all water users, including riparian landowners, to obtain water use permits from the state. In California, riparian landowners may use natural flows for beneficial purposes on riparian lands without a permit, but appropriative rights may only be acquired by permit.

Oregon

Oregon enacted a comprehensive water use code in 1909, establishing a process by which all new water uses must be applied for and permitted. If appropriation of water was initiated prior to enactment of the 1909 water code and not forfeited or abandoned since then, the current property owner may have a vested water right. Such vested and Federal Reserved water right claims are determined in Oregon in a two-step administrative and judicial process known as a general stream adjudication. The Oregon Water Resources Department (OWRD) initiated an adjudication of all pre-1909 and federal reserved water right claims for the use of surface water in the Klamath Basin in 1975. The Klamath Basin Adjudication, which is ongoing, is the first adjudication in the State to include federal water right claims, including claims for and by the Klamath Tribes, for National Wildlife Refuges, for Reclamation's Klamath Project, for a National Park, for public water reserves, for the wild and scenic portion of the Klamath River in Oregon, for three other wild and scenic river segments in the Upper Klamath Basin, and for a National Forest.

Oregon's water laws are codified in Oregon Revised Statutes, Chapters 536 through 541.

California

California enacted a water use law in 1914, establishing a system of permitting and licensing of all new appropriative uses of water. Riparian rights continue to have higher priority in California, with riparian landowners retaining a right to use natural flows for beneficial purposes on riparian lands at any time without obtaining a permit from the State Water Resources Control Board (SWRCB). An adjudication may be initiated to determine relative rights to use water from a specific source, but California has not initiated a comprehensive Klamath Basin Adjudication which includes all federal reserved water rights. New permits are not accepted if the SWRCB determines the stream is already fully appropriated. The mainstem of the Klamath River, from 100 yards

downstream of Iron Gate Dam to the Pacific Ocean is declared fully appropriated during the entire calendar year by the SWRCB (2010).

California's water law is contained in the California Code of Regulations, Title 23.

Klamath Basin Adjudication

If an appropriation of water was initiated prior to the enactment of the 1909 water code and has not been forfeited or abandoned since then, a water user may have a “vested” water right. Federal reserved water rights vest no later than the date of the reservation, and as early as “time immemorial,” regardless of whether they have been used. A claim to a vested water right is determined and made a matter of record through an adjudication proceeding. The OWRD is responsible for gathering information about the use of water and presenting to the circuit court OWRD's findings of fact and order of determination, which states who has the right to use water, the amount and location of water use, period of use, and priority date. If nobody files an exception to OWRD's findings, then they are final. If any exceptions are filed, the circuit court hears the matter de novo (again) or delegates it for rehearing. A water right certificate is issued for each decreed right (State of Oregon 2009).

The Klamath Basin Adjudication is the adjudication process for pre-1909, federal reserved, and “Walton” (non-Indian successor to Indian allottees) water right claims for the use of surface water within the Upper Klamath Basin in Oregon. The Klamath Basin proceeding began in 1975. Claims of water use have been gathered and contests to the claims have been filed on all of those claims. Administrative law judges have been holding hearings and issuing proposed orders determining the claims and contests. The OWRD will review those proposed orders, and any proposed settlements of contests, and submit its Findings and Order of Determination to the Circuit Court in likely 2012 or 2013 (the last proposed orders are due to be issued in April 2012). Water right claims have been filed by private water users the Klamath Tribes, Klamath allottees, and the United States (for Indian and other federal reservations of land and the Reclamation's Klamath Project). Once OWRD's findings are submitted to court there will be an opportunity for parties to file exceptions to those findings. The Klamath Circuit Court will resolve the exceptions and issue a decree. As of July 2010, 97 percent of contests and 92 percent of the claims in the Upper Klamath Basin have reached a proposed resolution, either by issuance of an administrative law judge's proposed order or by a proposed settlement of contests (State of Oregon 2010a).

3.8.2.3 Interstate Water Allocation

Klamath Basin Compact

Allocations of water among states are generally made by compact – a negotiated interstate agreement made with the consent of Congress – or by federal judicial proceeding. No federal court proceeding has allocated the waters of the Klamath River between Oregon and California. However, in 1957, the two States ratified and Congress consented to the Klamath Basin Compact, to “facilitate and promote the orderly, integrated and comprehensive development, use, conservation and control” of water resources in the Klamath Basin. Subject to all vested rights, the Compact provides for

equitable distribution of water among the two states and the federal government, and for preferential rights to the use of water after the effective date of the compact for domestic and irrigation purposes in the Upper Klamath Basin. The Compact recognizes, and protects from any adverse impact, the rights, privileges, and immunities of tribes, as well as the rights, powers and jurisdiction of the United States.

3.8.3 Existing Conditions/Affected Environment

The following section describes the environment and environmental setting for water supply availability and water rights compliance that could be affected by implementing the KHSAs (including the Keno Transfer and decommissioning of PacifiCorp's East Side/West Side Facilities) and Klamath Basin Restoration Agreement (KBRA). The Klamath Basin water supply is described, including the relationship to Reclamation's Klamath Project and PacifiCorp's Klamath Hydroelectric Project.

The Klamath Basin is divided into two areas, the Upper and Lower Klamath Basins, as described in Section 3.8.1. The Upper Klamath Basin includes six hydrologic sub-basins: Sprague, Williamson, Upper Klamath Lake, Lost, Butte, and Upper Klamath East. The Lower Klamath Basin includes seven hydrologic sub-basins: Upper Klamath West, Shasta, Scott, Salmon, Lower Klamath, Trinity, and South Fork Trinity. Figure 3.8-1 shows the subset of Klamath River hydrologic sub-basins within the affected environment.

Average annual precipitation in Klamath Falls, Oregon is 13.3 inches, occurring primarily as rain during the fall and winter seasons. Precipitation amounts in the (Lower) Klamath Basin in northwest California can be more than seven times that amount. Surface water runoff is closely related to annual precipitation patterns and has historically defined distinct dry and wet cycles. Recent trends include dry periods from 1915 to 1940 and 1975 to 1994 and wet periods from 1885 to 1915 and 1940 to 1975 (Department of the Interior [DOI] 2011). Klamath River runoff patterns have been measured by United States Geological Survey gages dating back as far as 1905 and reflect these climatic cycles. These gages display a decreasing trend in runoff that follows a general decreasing trend in precipitation amounts.

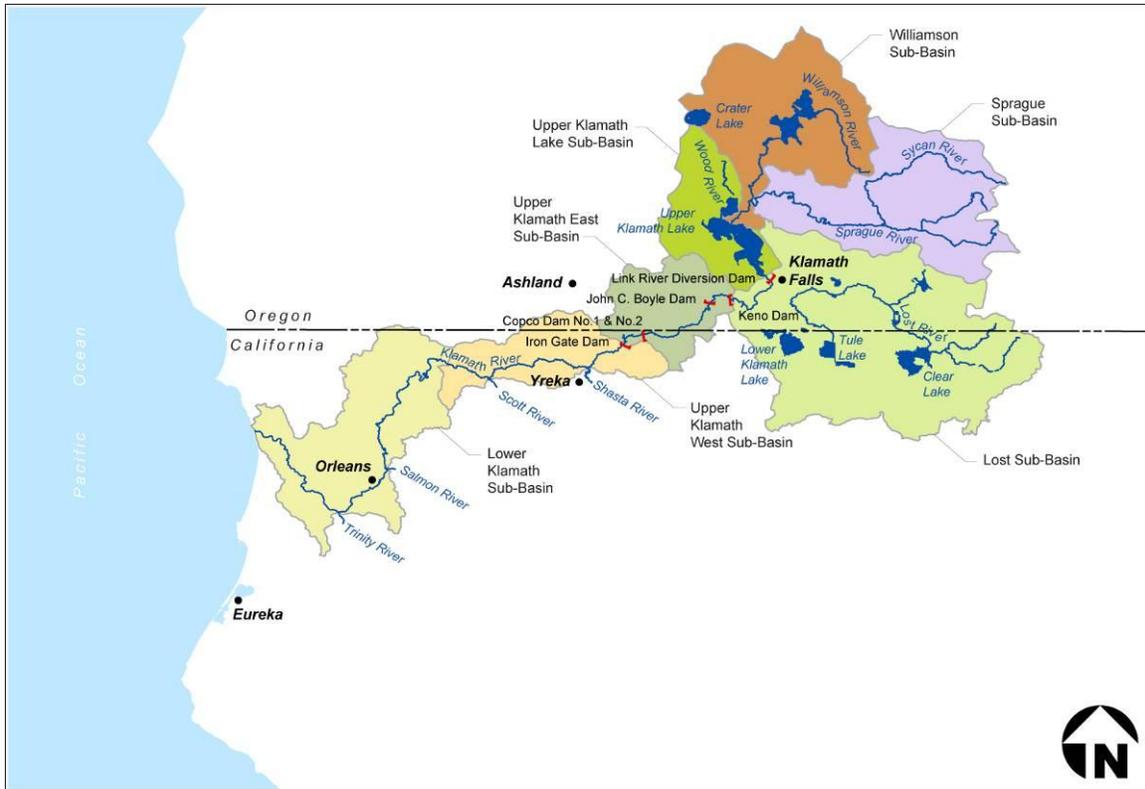


Figure 3.8-1. Area of Analysis

3.8.3.1 Upper Klamath Basin

Of the Upper Klamath Basin’s six hydrologic sub-basins, the Sprague, Williamson, and Wood Rivers provide the majority of the flow volume to the Klamath River via Upper Klamath Lake. Upper Klamath Lake is a controlled, natural lake that serves as a large, shallow storage basin. Several measures have increased storage in the lake during recent years. In 2007, two miles of levees were breached, restoring approximately 3,500 acres of wetlands in the Williamson River Delta area. Another 1,400 acres were flooded in 2008, which provided 28,800 acre-feet of additional storage in Upper Klamath Lake. Table 3.8-1 shows data for the six hydrologic sub-basins in the Upper Klamath Basin.

The Upper Klamath Basin has multiple entities that rely heavily on the availability of water supply. The Klamath Tribes, upper Klamath irrigators, Reclamation’s Klamath Project, Klamath Hydroelectric Project, and six NWRs are all included in the Upper Klamath Basin.

Table 3.8-1. Upper Klamath Basin Hydrologic Sub-Basins

Sub-Basin	Size (acres)	Irrigated Acres	Water Supply Source
Williamson River	928,000	65,100	90% diverted from streams, 10% groundwater
Sprague River	1,020,000	61,600	65% diverted from streams, 35% groundwater
Upper Klamath Lake	465,300	52,300	Diverted from streams or from Upper Klamath Lake
Lost River (Three sub-basins)			
<i>Upper Lost River Sub-basin</i>	<i>1,200,000</i>	<i>84,500</i>	50% of water coming from Reclamation's Klamath Project
<i>Middle Lost River Sub-basin</i>	<i>454,500</i>	<i>117,000</i>	70% of agricultural land is irrigated with Reclamation-supplied water; the rest is obtained from groundwater, individual surface water rights, or special Reclamation contracts.
<i>Tule Lake Sub-basin</i>	<i>296,600</i>	<i>64,800</i>	Groundwater provides 40–50% of water for irrigated pastures; most tailwater is reused from Reclamation
Butte Valley	388,100	52,300	Butte Valley sub-basin is an internal drainage basin with an artificial outlet. Groundwater flows from west to east out of the sub-basin toward Lower Klamath Lake. Irrigation water is from groundwater sources and diverted from surface water.
Upper Klamath River East	419,400	4,000	All irrigation water is diverted from the river or tributary streams; water withdrawals are insignificant along this stretch of the river.

Source: Natural Resource Conservation Service (United States Department of Agriculture 2004)

The Klamath Tribes

The Klamath Tribes consist of the Klamath and Modoc Tribes and the Yahooskin Band of the Snake Indians. In an 1864 Treaty with the United States, the Tribes ceded over 20 million acres of land in southern Oregon and Northern California to the United States, reserving for themselves an area extending northeast from Upper Klamath Lake, and containing over 2 million acres. Within the boundaries of the Klamath Reservation, the Treaty provided that the Tribes would retain exclusive fishing and gathering rights. Pursuant to the General Allotment Act of 1887, tribal lands within the Reservation were allotted to individual tribal members, and over the next decade, many of the allotted lands passed into non-Indian ownership. By the early 20th century, the Reservation had been reduced to approximately half its original size. In 1954, Congress terminated federal recognition of the Klamath Tribes and condemned the Tribes' remaining lands. However, the Tribes' fishing and gathering rights, as recognized in the 1864 Treaty, survived termination. The Klamath Termination Act expressly preserved the Tribes' water rights, fishing rights, and other treaty privileges, and the federal courts have since confirmed the existence, scope and priority of the Klamath Tribes' water rights in the Upper Klamath Basin. In a series of decisions in *United States v. Adair*, the courts held that the Tribes have a water right sufficient to support their treaty fishing, hunting and gathering rights,

with a priority date of "time immemorial" - thus senior to all other users in the basin. The courts also recognized a tribal water right for agrarian purposes, with a reservation date (1864) priority. Individual tribal members who received allotments pursuant to the General Allotment Act have a right to use a proportionate share of the tribal water for agrarian purposes, as do their non-Indian successors in interest under certain circumstances. The Klamath Tribes, the United States on behalf of the Tribes, individual Klamath Indian allottees, and non-Indian successors to Indian allottees have numerous claims in Oregon's Klamath Basin Adjudication.

Upper Klamath Landowners

Individual landowners within the Upper Klamath Basin have water rights for a variety of purposes, including but not limited to irrigation, domestic, livestock, instream use and wildlife purposes. All water right users in the Klamath Basin are subject to the senior federal reserved Tribal instream flow rights that may reduce the available water to junior water rights users. Private irrigators in the upper Klamath Basin have filed claims in the adjudication proceedings and some have organized themselves into an association to help support its members through the legal process of protecting their water rights. The Upper Klamath Water Users Association was created by a group of off-Project water users and is a non-profit organization protecting the interest of its members within the Klamath and Lost River Drainages. They are considered off-Project water users because they are outside of the Reclamation's Klamath Project.

Klamath Basin National Wildlife Refuge System

Between 1908 and 1958, six NWRs were established in the Upper Klamath Basin: Klamath Marsh (formerly Klamath Forest) (1958), Upper Klamath (1928), Bear Valley (1978), Lower Klamath (1908), Tule Lake (1928), and Clear Lake (1911). Klamath Marsh NWR is along the Williamson River, and the Upper Klamath NWR is on the northwest and southeast sides of Upper Klamath Lake. The other four are south of Klamath Falls in Oregon and California and are adjacent to, or within, the boundaries of Reclamation's Klamath Project.

The United States Fish and Wildlife Service (USFWS) manages the NWRs. These areas provide suitable habitat and resources for migratory birds and other fish and wildlife species. The USFWS has claimed vested water rights under the Reclamation's Klamath Project for two of the refuges, the Lower Klamath and Tule Lake NWRs, as well as federal reserved water rights for the two refuges. Water rights for these four refuges are being quantified in the Klamath Basin Adjudication.

Reclamation's Klamath Project

Reclamation's Klamath Project facilities provide irrigation water to approximately 1,400 farms covering about 235,000 acres (Congressional Research Service 2005) and to the Lower Klamath and Tule Lake NWRs. There are more than 250 contracts associated with Reclamation's Klamath Project; these contracts are with various irrigation districts and other water users (Reclamation 2000). In most cases, the contracts have no end date, and they specify acres to be covered rather than an amount of water to be provided

(Reclamation 2000). Water users formed the Klamath Water Users Association in 1905 to help protect the “on-Project” water interests inside the Reclamation’s Klamath Project.

The Upper Klamath Lake is one of the main sources of water for Reclamation’s Klamath Project. The project’s infrastructure and operation turned the Lost River hydrologic basin, once largely a closed basin, into a tributary to the Klamath River by returning flows through the Lost River Diversion Channel and Tule Lake to Lower Klamath Lake. The Lost River is another main source of water for Reclamation’s Klamath Project, as is the Klamath River from Keno Impoundment. Figure 3.8-2 shows a schematic of Reclamation’s Klamath Project.

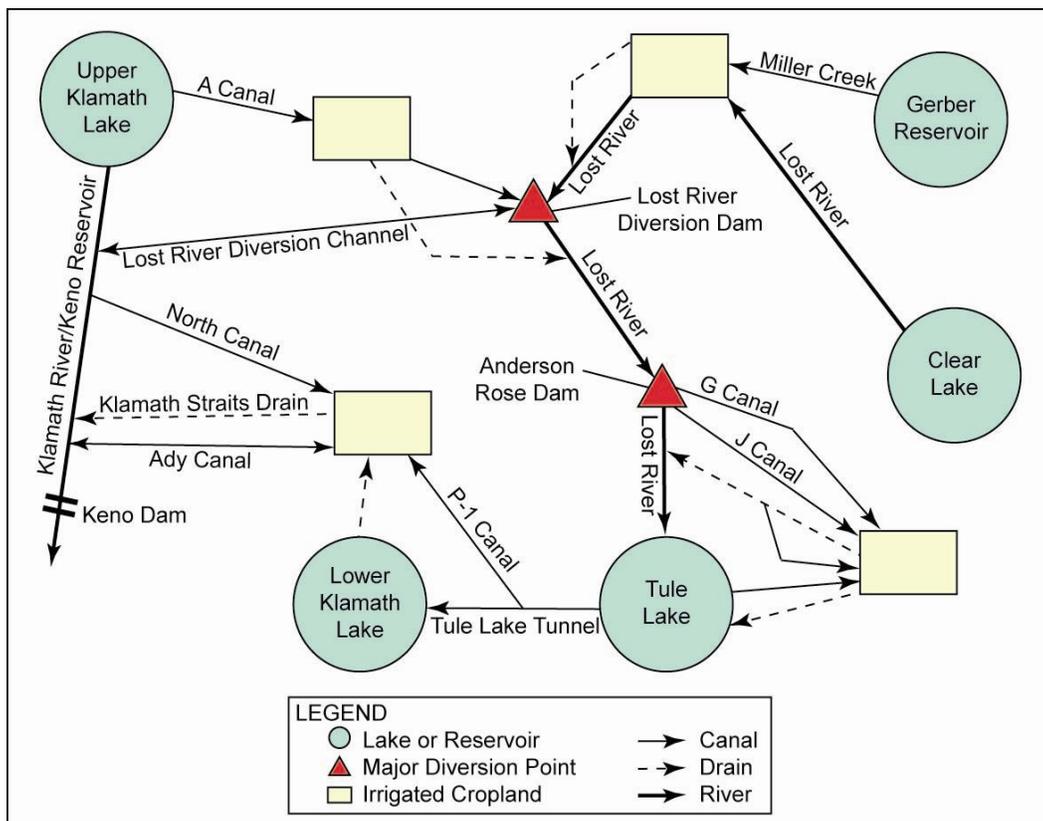


Figure 3.8-2. Schematic of Reclamation’s Klamath Project

Beginning in January, Reclamation forecasts the available water supplies and establishes a management plan for its Klamath Project for the coming year. Reclamation forecasts the condition of its Klamath Project systems supply based upon Natural Resource Conservation Service forecasts, watershed conditions, and projected water use for both irrigation and wildlife use. The annual operations plan delineates water availability and has been provided to the water users' community since 1995 (Reclamation 2000).

In 1905, Reclamation filed a formal application with the State of Oregon to secure a water supply for the lands within the Project area (Reclamation 2000).

Klamath River Dams

Multiple dams are associated with the Klamath Hydroelectric Project, which is in both Klamath County, Oregon and Siskiyou County, California and is owned and operated by PacifiCorp. Eight developments are part of the Klamath Hydroelectric Project, of which seven are on the mainstem of the Klamath River. Reclamation owns the Link River Dam, which forms Upper Klamath Lake. The East and West Side powerhouses, downstream of Link River Dam, indicate the upstream boundary of the Klamath Hydroelectric Project and the Iron Gate Development is the downstream boundary.

Flows through the Hydroelectric Reach (from Keno Dam downstream to Iron Gate Dam) are related to Upper Klamath Lake elevations, flows diverted to and returned from Reclamation's Klamath Project, relatively small storage capacities of the Klamath Hydroelectric Project developments, and the releases out of Iron Gate Dam (Federal Energy Regulatory Commission [FERC] 2007). Upper Klamath Lake holds 83 percent of the total storage capacity of the reservoirs on the Klamath River (FERC 2007) and approximately 98 percent of active storage (Greimann 2011). Associated reservoirs for J.C. Boyle, Copco 1, Copco 2, and Iron Gate Dams contain 14 percent of the total storage capacity and 2 percent of the active storage on the river. However, these dams were not designed for water supply storage purposes and are most often operated as run-of-the-river facilities.

A query on California's Electronic Water Rights Information Management System provided three water right listings upstream of Iron Gate Development (and within the State of California) that listed the Klamath River as the water source. These are held by PacifiCorp for irrigation and stock watering for a total of 5,475 acre-feet during April 1 through October 31. Their locations are approximately four miles upstream of the Copco 1 Reservoir. Three additional PacifiCorp water rights list Copco 1 Reservoir as the water source. Each is for 3,200 cfs and they are associated with power generation and impoundment of water for Copco 1 and 2 Powerhouses. PacifiCorp filed Statements of Diversion and Use for pre-1914 claims with the California SWRCB to use water at Iron Gate Dam for hydropower activities as part of their licensing application. The pre-1914 claims are for 1,800 cfs for power generation, 50 cfs for fish propagation facilities, 3,300 cfs to refill regulatory storage space in Iron Gate Reservoir, and 48 cfs for fish culture.

PacifiCorp has two Oregon water right permits, one associated with the J.C. Boyle Dam hydroelectric generation and the other for irrigation purposes on less than an acre. The irrigation water is drawn from the Link River. (Source: State of Oregon Water Resource Department Water Rights Information System (State of Oregon 2010b))

Municipal Water Rights

City of Yreka

The City of Yreka receives its water supply from Fall Creek, a tributary to the Klamath River in the Upper Klamath Basin that is approximately 23 miles northeast of the city. A California State Water Rights Permit 15379 allocates the City of Yreka up to 15 cfs or 9.7 million gallons per day (mgd) from this source, although the current demand is less than the permitted allotted amount (City of Yreka 2010). The City of Yreka's diversion was completed in 1969 and the public water systems facilities at Fall Creek include three impoundments; an intake structure with fish screens, a pump, and pre-treatment facility; a cathodic protection field at the Fall Creek Campground and Day Use Boat Ramp; and a 24-inch pipeline that crosses on the eastern upstream end of Iron Gate Reservoir. Water diverted from Fall Creek for the City of Yreka is mainly returned through subsurface drains, infiltration, and irrigation runoff to a tributary of the Shasta River (City of Yreka 2010). It should also be noted that the California Department of Fish and Game (CDFG) possesses a 10 cfs water right (SWRCB License 11681) for fish propagation at Fall Creek Hatchery between March 15 and December 15 each year, not to exceed 5,465 acre-feet per year. Shasta River flows into the Klamath River downstream of Iron Gate Dam.

3.8.3.2 Lower Klamath Basin

As described above, the Lower Klamath Basin includes seven sub-watersheds downstream of Iron Gate Dam. The area of analysis does not include the Shasta, Scott, Salmon, and Trinity Rivers (see Figure 3.8-1). Generally, the flow rate in the Klamath River increases substantially further downstream within the Lower Klamath Basin, as described in Section 3.6.3.3. The months of July through October generally have much lower flow volumes than the spring runoff months. The long-term average annual flow rate at Iron Gate Dam is just more than 2,000 cfs and approximately 17,600 cfs at the mouth of the Klamath River. Historic stream flows for the Klamath River are discussed in Section 3.6.3.3.

Klamath River Water Rights

Downstream of Iron Gate Dam, the mainstem of the Klamath River flows freely 190 miles through Siskiyou, Del Norte, and Humboldt Counties to the Pacific Ocean. A query on California's Electronic Water Rights Information Management System provided 32 water right listings with the Klamath River as the water source. Appendix L contains the query results and has a map that displays the locations.

Sixteen Statement of Diversion and Use water rights types were filed between 1967 and 2010; 6 of the 16 are currently inactive. Ten appropriative water rights are a state filing; these were all filed in 1956 by the SWRCB. There are four appropriative water rights with a licensed status: one with PacifiCorp in 1957, one with Klamath River Country Estates Owners Association Inc. in 1960, and two with individuals in 1964 and 1966.

The Klamath Community Services District holds one appropriative permitted water right from 1968, and there is one Small Domestic Registration water right from 2006. There are also multiple claims on a number of the creeks, unnamed springs, and groundwater sources scattered within the Lower Klamath Basin.

It is expected that each of these water rights listings will have associated intake facilities to draw water from the Klamath River however; the specific type, location, and layout of each of these intake facilities is unknown at this time.

Shasta Valley Irrigators

Shasta Valley Irrigators (Siskiyou County) claim that an application was submitted in 1956 on their behalf to the State of California to use 60,000 acre-feet from the Klamath River with a point of diversion at Iron Gate Dam. Application A016958 was submitted in 1956 on behalf of the SWRCB, but does not specifically name the Shasta Valley Irrigators as recipients of the water. As of December 2010, no diversion infrastructure exists or is planned for construction involving this water right application.

Indian Tribes

Quartz Valley Indian Reservation

The members of the Quartz Valley Indian Community are of upper Klamath (Karuk) and Shasta Indian ancestry. The 174-acre Quartz Valley Indian Reservation is in Siskiyou County near the community of Fort Jones within the Klamath watershed and area of study. Any fishing and concomitant water rights to which the Quartz Valley Community may be entitled have not yet been determined.

Karuk Tribe

Congress never formally ratified the treaty negotiated between the United States and the Karuk Tribe in 1851, and no statute or executive order otherwise set aside reservation lands for the Tribe. However, the United States has more recently taken lands into trust for the benefit of the Karuk Tribe, including over 810 acres in Siskiyou County and approximately 40 acres in Humboldt County. Most of the Tribe's aboriginal lands along the Klamath River, above the Klamath Trinity Confluence, now form part of the Klamath National Forest. Any fishing and concomitant water rights to which the Karuk Tribe may be entitled have not yet been determined.

Hoop Valley and Yurok Tribes

The Klamath River Reservation, consisting of a strip of land beginning at the Pacific Ocean and extending one mile in width on each side of the Klamath River for a distance of approximately 20 miles, was established by Executive Order in 1855. The Reservation was established on Yurok ancestral lands. In 1876, a second executive order established the Hoopa Valley Indian Reservation, a 12 mile square area southeast of the Klamath River Reservation, beginning at the confluence of the Klamath and Trinity Rivers, and bisected by the Trinity River. A third executive order in 1891 created an extended Hoopa Valley Reservation, which encompassed the original Hoopa Reservation, the Klamath River Reservation, and a strip down the Klamath River from the Klamath-Trinity confluence connecting the two original reservations. In 1988, Congress passed the

Hoopa-Yurok Settlement Act, 25 U.S.C. 1300i et seq, which partitioned the extended reservation between the Hoopa Valley and Yurok Tribes, with the Yurok Reservation comprising the original Klamath River Reservation and the connecting strip, and the Hoopa Reservation comprising the original 12 mile square area. The federal courts have confirmed that the United States reserved fishing rights for the Hoopa Valley and Yurok Tribes when it set aside reservations along the Klamath and Trinity Rivers. DOI has found that the original orders setting aside the Hoopa Valley and Yurok Reservations also reserved rights for instream flows sufficient to sustain fish within the reservation. Although the State of California has not commenced an adjudication to determine the quantity of water to which the Tribes have a right to support their reserved fishing rights, the recognition of such rights is consistent with the federal precedent set in *United States v. Adair*.

Resighini Rancheria

The 239-acre Resighini Rancheria is located near the mouth and on the south bank of the Klamath River, and is surrounded by the Yurok Reservation. The Rancheria Reservation was purchased by the Bureau of Indian Affairs in 1938 under the authority of the Indian Reorganization Act, and proclaimed an Indian reservation by Secretarial Order in 1939. Any fishing and concomitant water rights associated with the Resighini Rancheria have not yet been determined.

3.8.4 Environmental Consequences

The analysis of water rights focuses on changes to water supply and compliance with existing water rights laws. This analysis discusses the changes to river flows and water diversions throughout the affected environment in the Klamath Basin and whether the changes could affect existing water rights or water supplies.

3.8.4.1 Environmental Effects Determination Methods

The impact assessment is based on flow rates and water supply delivery data from the hydrologic modeling completed by the Lead Agencies, along with the methods and assumptions that were utilized in the model. The Lead Agencies applied a one-dimensional HEC-RAS model using historic flow data as input to the model. The modeling provided results for the No Action/No Project Alternative and the Proposed Action. The model's average daily instream flow data helps to describe how the flows would change under different alternatives. The Lead Agencies used this data to assess whether changes to instream flows as a result of the project would be adequate to meet water right requirements. The Lead Agencies also compared water supply diversions to baseline conditions and water rights to determine impact significance. The Hydrology, Hydraulics, and Sediment Transport Studies include more information on the modeling methods and assumptions (DOI 2011).

Specific analysis of changes in river flows and the resulting effect on fisheries are described in Section 3.3, Aquatic Resources. The assessment of the alternatives' effects on Safe Drinking Water Act requirements is presented in Section 3.2, Water Quality. The assessment of the alternatives' effects on Fire Suppression is presented in Section 3.18, Public Health and Safety, Utilities and public services, Solid waste, Power.

3.8.4.2 Significance Criteria

For the purposes of this Environmental Impact Statement/Environmental Impact Report (EIS/EIR), impacts would be significant if they would result in the following:

- Causing injury to existing water rights or adjudication claims.
- Decreasing water supplies beyond what is needed for public health and safety (i.e., needs for drinking water and fire suppression) for the current population.

3.8.4.3 Effects Determinations

Alternative 1: No Action/No Project

The J. C. Boyle, Copco 1, Copco 2, and Iron Gate Dams would not be removed under the No Action/No Project Alternative (with a Negative Determination) and operations similar to current operations would be in effect. The Klamath Hydroelectric Project and Reclamation's Klamath Project would be operated as they were before the Secretarial Determination process began, including operation requirements under the 2010 National Oceanic and Atmospheric Administration (NOAA) Fisheries Service Biological Opinion and 2008 USFWS Biological Opinion on Reclamation's Klamath Project. PacifiCorp would resume the FERC relicensing process and operational measures could change.

Under the No Action/No Project Alternative, continued operation of the Four Facilities could affect water supply operations. Under the No Action/No Project Alternative, water supplies would be similar to existing conditions depending on the water year type. However, the current demand for water exceeds the supply. As a result, low water years can be devastating to the Indian Tribes and other communities dependent on water to support fish for subsistence, religious, sport and commercial harvest, and to agriculture communities dependent on irrigation water for their livelihood. The No Action/No Project Alternative does not include any action to change water supplies from existing conditions. **Therefore, the No Action/No Project Alternative would have no effect on water rights or water supplies because the risk of decreasing water supplies beyond what is needed for the current population's public health and safety would not change from the existing conditions.**

Under the No Action/No Project Alternative, ongoing restoration actions would continue to be implemented and could affect water supply availability. These actions include the Agency Lake and Barnes Ranches Project, and ongoing fisheries restoration actions.

Reclamation purchased the Agency Lake and Barnes Ranches adjacent to Agency Lake in 1998 and is currently using portions of the ranches as pumped storage. These ranches have been transferred to the USFWS and are now part of the Upper Klamath NWR. USFWS is studying the possibility of breaching the dikes which would convert the 63,770 acre-feet of storage from pumped storage to passive storage in Upper Klamath Lake. The Agency Lake/Barnes Ranches Project would go through separate National Environmental Policy Act evaluations as plans are developed for future restoration activities. **Future changes would not substantively change the quantity of storage or water supply yield associated with that storage and therefore, there would be no change from existing conditions.**

Alternative 2: Full Facilities Removal of Four Dams (the Proposed Action)

Relocation of the Yreka water supply pipeline after drawdown of the Iron Gate Reservoir and could affect water supply. The existing water supply pipeline for the City of Yreka passes under the Iron Gate Reservoir and would have to be relocated prior to the decommissioning of the reservoir to prevent damage from deconstruction activities or increased water velocities once the reservoir has been drawn down. The pipeline would either be suspended from a pipe bridge across the river near its current location, or rerouted along the underside of the Lakeview Bridge just downstream of Iron Gate Dam. The water supply for Yreka, on Fall Creek, would be unaffected by the relocation work. The pipeline would be disconnected for a short amount of time, as dictated by the available storage supply for the city, to prevent interruption of service to the residents of Yreka. **The relocation of the Yreka Pipeline would result in no change from existing conditions.**

Removal of recreational facilities currently located on the banks of the existing reservoirs could affect water supply or water rights. The existing recreational facilities provide camping and boating access for recreational users of the reservoirs. Once the reservoirs are drawn down, these facilities would be removed. **The removal of the recreational facilities would result in no change from existing conditions.**

Dam removal could change surface water flows available for diversion downstream of Iron Gate Dam. Modeling efforts rely on historical flow data to create a set of flows under future operational prescriptions. The Lead Agencies compared the modeled flow rate at Iron Gate Dam under the Proposed Action to that of the No Action/No Project Alternative. Figure 3.8-3 shows the exceedance flow results for the No Action/No Project Alternative and the Proposed Action. The results showed either a slightly higher or slightly lower flow rate on the Klamath River downstream of Iron Gate Dam when compared to the No Action/No Project Alternative. Flows under the Proposed Action could change both because of the dam removal activities and the KBRA diversion and instream flow requirements, and these effects are combined in these figures. Figure 3.8-4 shows that these differences would diminish farther downstream from Iron Gate Dam. The modeling results show that at Seiad Valley, approximately 62 miles downstream from the Iron Gate Dam, the flow rates would be nearly identical.

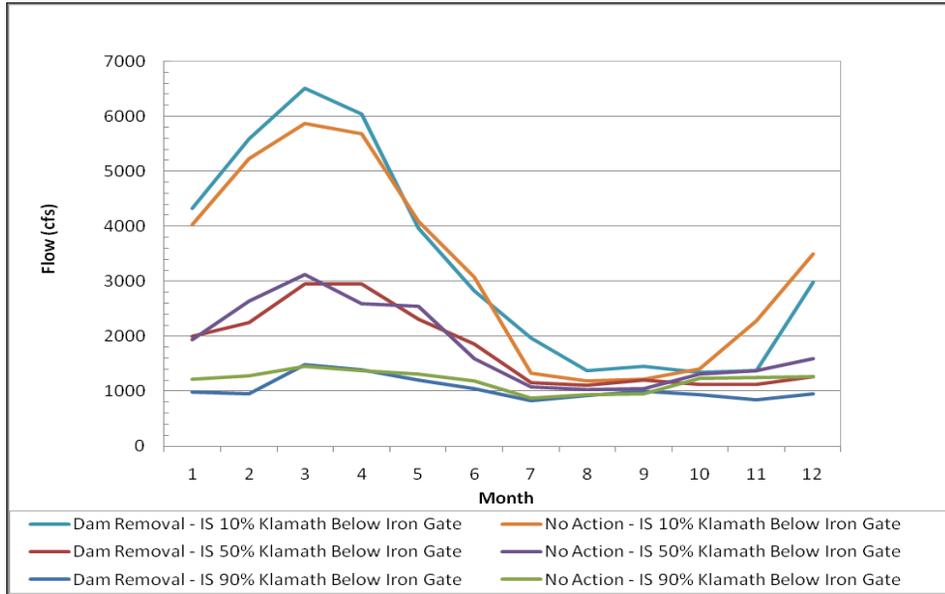


Figure 3.8-3. Flows for different year types under the Proposed Action and No Action Alternatives just downstream from Iron Gate Dam (DOI 2011)

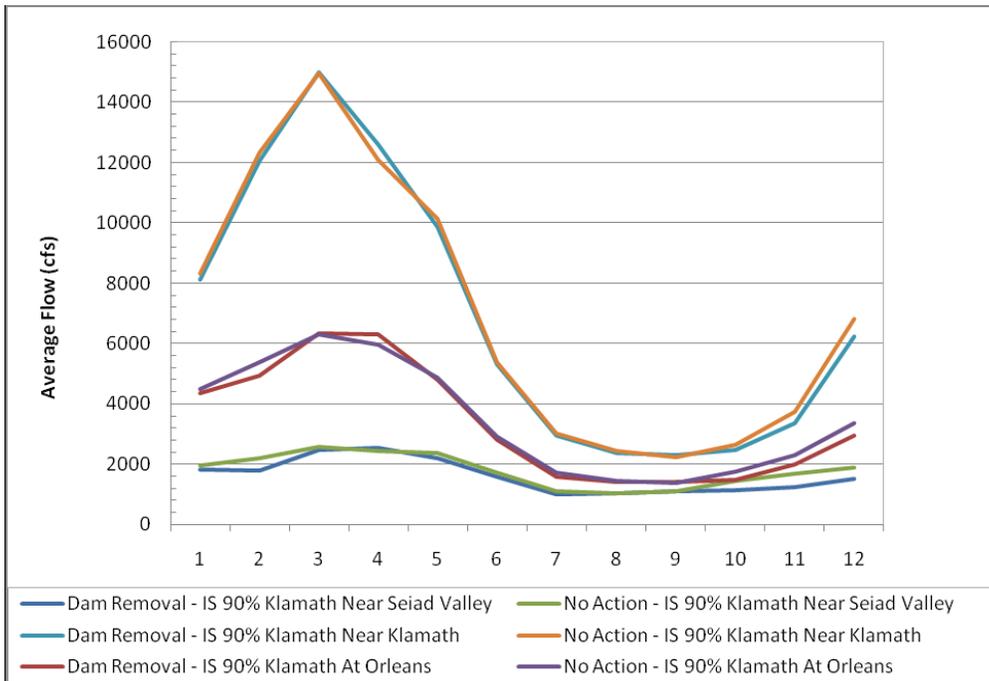


Figure 3.8-4. 90% Exceedance Flows Near Seiad Valley, Orleans, and Klamath for Dam Removal and No Action Alternatives (DOI 2011)

Because the flow rates at Seiad Valley would be nearly identical between the Proposed Action and the No Action/No Project Alternative, the Proposed Action is not likely to affect water supply downstream of Seiad Valley. As shown in Appendix L, approximately 8 of the 32 California water rights are downstream of Seiad Valley. **Under the Proposed Action, impacts on water supply downstream of Seiad Valley would be less than significant.**

Dam removal could be affected by the changes in water supply compared to the No Action/No Project Alternative. Flow rates just downstream of Iron Gate Dam are the lowest within this reach and provide a conservative estimate on available water supply when comparing to the downstream diversion amounts. There are 24 water right holders along this reach including one small domestic registration and 7 appropriative water rights; 4 are state filings with the SWRCB (reserve water for future use and development), 2 are listed with PacifiCorp and associated with facilities at Iron Gate Dam including operation of the fish hatchery, and 2 are for irrigation and fire protection purposes. As stated in Section 2.4.3.1, an alternate water source would need to be found for operation of the fish hatchery until the restoration and return of native fish at self sustaining population levels is achieved. The remaining 16 water rights are associated with riparian water rights (Statement of Diversion and Use permits) of which 6 are inactive. The monthly diversion flow rate associated with all of the active and inactive water rights, aside from the four reserved state filings and the PacifiCorp power diversion water right,¹ is approximately 64 cfs (based on water right information in Appendix L). During peak summer months, usage typically doubles. Since usage generally doubles between Iron Gate Dam and Seiad Valley during July and August, the peak short term diversion flow rate that would be diverted is 128 cfs if all users doubled their water diversion rate during the same period. This flow rate represents the peak flow diverted, and would likely be lower during wetter water years. The Proposed Action would change the flows in the river, but the flows would still be substantially greater than the peak diversion. The most conservative comparison is just downstream of Iron Gate Dam, where the flows would be the lowest in the potentially affected reach. Comparing the peak potential diversion with low flow conditions, the diversions would be approximately 16 percent of the Klamath River flows during a dry year². A 90 percent exceedance flow of 824 cfs was used to represent a dry year. The flow rate of 824 cfs was once the seasonal low during the month of July, when irrigation and livestock demands are the greatest. (These low flows were used to develop a conservative impact evaluation, but they are less than what is currently acceptable under the NOAA Fisheries Service biological opinion.)

¹ The four state filings with the SWRCB were not included because the water right is associated with a storage amount to preserve water for future use with no indication of the period of time during which the flow volume will be drawn. The PacifiCorp water right is associated with power generation at Iron Gate Dam and does not result in reduction of flows. For the diversion amount given in cubic feet per year (ID: WR-6), a diversion period of six months was assumed.

² The increase during July and August is an average based on reported values on Statement Diversion and Use forms available on California Electronic Water Rights Information Management System for the Klamath River.

Because the amount of flow diverted for water right users between Iron Gate Dam and Seiad Valley would be less than 20 percent of the flow in the Klamath River in the upstream portions of this reach during dry year, low flow conditions, water right users are not likely to experience decreased supplies because of the changes in flows. **Under the Proposed Action, impacts on downstream Klamath River water right users would be less than significant.**

Release of stored sediment during drawdown of reservoirs could change Klamath River geomorphology and affect water intake pumps downstream of Iron Gate Dam. Reservoir drawdown would release the sediment behind PacifiCorp dams downstream. Reservoir drawdown activities would begin on November 1, 2019 at Copco 1, on January 1, 2020 at J.C. Boyle and Iron Gate Dams, and on June 1, 2020 at Copco 2 Dam. During this period, individual downstream intake facilities could be inundated with sediment deposits, causing operational problems. Reclamation conducted modeling of the reservoir drawdown and erosion of reservoir sediment. The released sediment would likely exceed the carrying capacity of the river during some water year types, and would result in sedimentation and particle settling in slow-moving downstream areas. The fine fraction of the released sediment (silts, clays, and organics) would not be expected to deposit in substantial amounts in the river channel. The majority of this material would be transported to the ocean and would not interact substantially with the river bed. The amount of fine deposition would also decrease with distance from the dam. If drawdown occurred in a dry year, a substantial deposition of sands would be expected in the reach from Iron Gate Dam to as much as eight miles downstream of the dam, around Cottonwood Creek. There are 14 water rights registered on this reach; five are listed as inactive, two are a state filing with the SWRCB, and two are associated with PacifiCorp's Iron Gate Dam facility and fish hatchery. The remaining water rights are associated with domestic, irrigation, and/or fire protection use. The specific layout of these intake facilities is unknown, and they have potential to be affected by sediment deposits. **Under the Proposed Action, impacts to water intake pumps downstream of Iron Gate Dam would be significant. Implementation of mitigation measure WRWS-1 would reduce this impact to a less than significant level.**

Activities associated with Interim Measures (IMs) could result in changes to PacifiCorp's water rights. Prior to construction, "Interim Measures" as described in the KHSA (KHSA Section 1.2.4) would be implemented and would control operations of the hydroelectric facilities. IM 16 would eliminate three screened diversions from Shovel and Negro Creeks (the Lower Shovel Creek Diversion [7.5 cfs], Upper Shovel Creek Diversion [2.5 cfs], and Negro Creek Diversion [5 cfs]) and would seek to modify PacifiCorp's water rights to move the points of diversion to the mainstem Klamath River. The intent of this measure is to provide additional water for suitable habitat for aquatic species in Shovel and Negro creeks, while not diminishing PacifiCorp's water rights. While this measure would require a change to PacifiCorp's water rights, it would not affect the exercise of the water right (i.e., the quantity of water diversions) or flow in the Klamath River. **Therefore, the impact on water supply from implementation of the Interim Measures would be less than significant.**

Keno Transfer

Implementation of the Keno Transfer could cause changes to operations affecting water levels upstream of Keno Dam, which could cause changes to water supply or water rights. The Keno Transfer would be a transfer of title for the Keno Facility from PacifiCorp to the DOI. This transfer would not result in the generation of new impacts on water supply/water rights compared with existing facility operations. Following transfer of title, DOI would operate Keno in compliance with applicable law and would provide water levels upstream of Keno Dam for diversion and canal maintenance consistent with agreements and historic practice (KHSA Section 7.5.4). **Therefore, implementation of the Keno Transfer would result in no change from existing conditions.**

East and West Side Facilities

Decommissioning the East and West Side Facilities could cause adverse impacts to water supply and water rights. Decommissioning of the East and West Side canals and hydropower facilities of the Link River Dam by PacifiCorp as a part of the KHSA will redirect water flows currently diverted at Link River Dam into the two canals, back in to Link River. Following decommissioning of the facilities there will be no change in outflow from Upper Klamath Lake or inflow into Lake Ewauna. Water users currently reliant on a diversion from the West Canal would have their water supply connection extended to either Link River or Upper Klamath Lake. **Therefore, implementation of the East and West Side Facility Decommissioning action would result in no change from existing conditions.**

KBRA

The KBRA, which is a component of the Proposed Action, encompasses several programs that could affect water rights and water supply, including:

- Fisheries Reintroduction and Management Plan
- Wood River Wetland Restoration
- Water Diversion Limitations
- On-Project Plan
- Future Storage Opportunities
- Water Use Retirement Program
- Off-Project Water Settlement
- Off-Project Water Reliance Program
- Emergency Response Plan
- Climate Change Assessment and Adaptive Management
- Interim Flow and Lake Level Program
- Drought Plan

One of the goals of the KBRA includes improving water supply reliability by increasing storage capabilities and management plans, improving availability. Figure 3.8-5 presents Klamath Project Simulation Model results predicting the annual flow at Keno Dam and annual agricultural supply. The agricultural supply represents supply to Reclamation's Klamath Project and includes Tule Lake NWR and Lower Klamath NWRs (two NWRs in the area that are the most directly affected by the KBRA). The flows for the No Action/No Project Alternative are governed by operating requirements under the 2010

NOAA Fisheries Service Biological Opinion and 2008 USFWS Biological Opinion on Reclamation’s Klamath Project, while flows for the Proposed Action would change because of the dam removal activities and would be governed by KBRA diversion and instream flow requirements (as well as future biological opinions). Annual flows downstream of Keno Dam would be generally similar between the No Action/No Project Alternative and Proposed Action except for a few dry years when flow would continue to be supplied to Reclamation’s Klamath Project³.

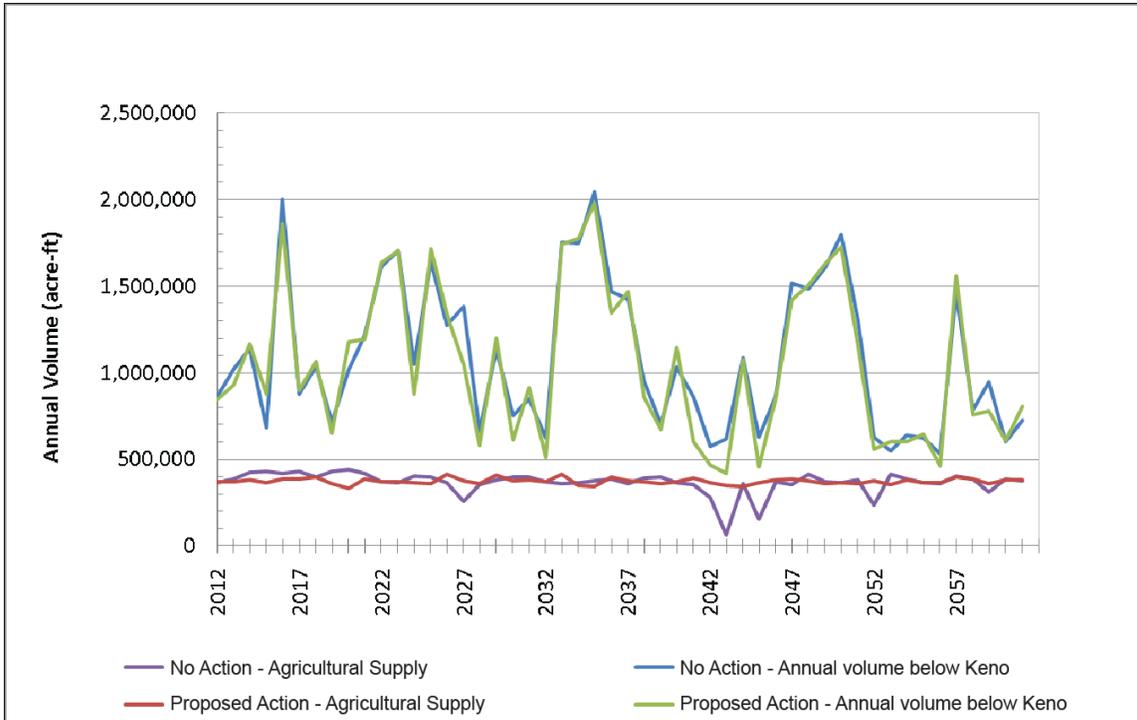


Figure 3.8-5. Annual flows under the No Action/No Project Alternative and Proposed Action (DOI 2011)

Fisheries Reintroduction and Management Plan

Implementation of the trap and haul element of the Fisheries Reintroduction and Management Plan would require water rights to divert water for the fish handling facilities. Fish handling facilities to collect fish downstream of Keno Dam and at Link River Dam would require water sources. The facilities would not consumptively use the water; the water would pass through the facilities for release back into the system. The geographic separation between this project and the hydroelectric facility removal actions analyzed above eliminate any potential for negative water supply effects generated by this program from contributing to water supply effects generated by facility removal.

³ Minimum flows may change in the future. Hydrologic modeling assumed that the Drought Plan would include a minimum flow of 800 cfs (DOI 2011). The final Drought Plan or future ESA actions could change the minimum flows; however, these assumptions reflect the best available information at the time of the modeling.

Because the fish handling facility would not increase consumptive use on the Klamath River system, the impacts of the trap and haul operations on water supply/water rights would be less than significant.

Wood River Wetland Restoration

Implementation of the Wood River Wetland Restoration Project would result in changes to storage opportunities at Agency Lake, which could affect water supply. A study of Wood River Wetland area management options would investigate providing additional storage for a total of 16,000 acre-feet of storage capacity at or adjacent to Agency Lake. This additional storage would improve water supply reliability and assist with alleviating short-term impacts related to water supply delivery during Water Diversion Limitations (another KBRA program) helping to offset a portion of the deficiencies. The geographic separation between this project and the hydroelectric facility removal actions analyzed above eliminate any potential for negative water supply effects generated by this program from contributing to water supply effects generated by facility removal. **Implementation of the Wood River Wetland Restoration Project would be a less than significant impact to water supply. Implementation of the Wood River Wetland Restoration will require future environmental compliance as appropriate.**

Water Diversion Limitations

Implementation of Water Diversion Limitations to Reclamation's Klamath Project could result in changes to water diversions, which may affect water rights and water supply. Water Diversion Limitations provide specific allocation of water for refuges and limitations on specific diversions for the Reclamation's Klamath Project intended to increase water availability for fisheries purposes. Water Diversion Limitations would be implemented during dry years to increase flows for fisheries by reducing Reclamation's Klamath Project diversion upstream of approximately 100,000 acre-feet. Water diversions could increase by 10,000 acre-feet for irrigation in some years if: 1) dam removal is implemented, 2) 10,000 acre-feet of new storage is created, or 3) Klamath Basin Coordinating Council concurs. Implementation of the diversion limitations would include assurances of increased reliability of diversions. The On-Project Plan, described in more detail below, provides the framework for management of Water Diversion Limitations implementation. While reducing diversions during the driest years would affect water supply for irrigation, it would not affect what is needed for public health and safety. Water may not be available to fulfill some water rights or adjudication claims during dry years; however the On-Project Plan, Drought Plan, and Future Storage Opportunities to be implemented as part of the KBRA would help to offset a portion of these deficiencies. These plans would provide mechanisms for irrigators to plan for water deliveries based on the type of water year. It is likely that health and safety issues related to water supply would be a priority whereas, water for irrigation would likely be less of a priority. The geographic separation between the Water Diversion Limitations and the hydroelectric facility removal actions analyzed above reduce the potential for negative water supply effects generated by this program from contributing to water supply effects generated by facility removal. **Implementation of Water Diversion Limitations is anticipated to have less than significant impact on water supply to Reclamation's Klamath Project. Implementation of the Water Diversion Limitations will require future environmental compliance as appropriate.**

On-Project Plan

Implementation of the On-Project Plan to allow for full implementation of Water Diversion Limitations to Reclamation's Klamath Project would result in changes to water diversions for irrigation in dry years, which could affect water rights or adjudicated rights. The purpose of the On-Project Plan is to provide additional water supply or reduce the demand for Reclamation's Klamath Project to make up the differences between anticipated use and actual diversion. These actions include: land fallowing and shifting to dryland crop alternatives, efficiency and conservation measures (i.e. drip irrigation), development of groundwater sources, or creation of additional storage. A specific objective is included in the plan that groundwater pumping would not reduce flow greater than 6 percent to springs upstream of Copco Dam; which includes the Klamath, Wood and Williamson Rivers. The voluntary water management plan would partially offset the expected supply reductions. The improvements in water supply generated by the On-Project Plan and Water Diversion Limitations would not be expected to contribute to effects of hydroelectric facility removal analyzed above.

Implementation of the On-Project Plan is anticipated to benefit water rights and supply. Implementation of the On-Project Plan will require future environmental compliance as appropriate.

Future Storage Opportunities

The study of additional off-stream storage opportunities in the Upper Klamath Basin to identify new storage opportunities could affect water supply. Reclamation plans to identify and study additional off-stream storage opportunities. KBRA parties would support ongoing investigations and acquisition of additional storage. The addition of 10,000 acre-feet of storage is a milestone in implementation of the KBRA. Off-stream storage is likely to improve water supply reliability and assist with alleviating short-term impacts related water supply delivery during Water Diversion Limitations (another KBRA program) helping to offset a portion of the deficiencies. Additionally the development of future storage opportunities would not be expected to contribute to any changes in water supply generated by the hydroelectric facility removal action.

Implementation of Future Storage Opportunities would result in no change from existing conditions for water supply. Implementation of the Future Storage Opportunities will require future environmental compliance investigations as appropriate.

Water Use Retirement Program (WURP)

Implementation of the WURP increases instream flow to Upper Klamath Lake which could affect water rights and water supply upstream of Upper Klamath Lake. The WURP is a voluntary program for the purpose of supporting fish populations restoration by permanently increasing inflow to Upper Klamath Lake by 30,000 acre-feet per year. A variety of management measures and irrigation water use changes would help to accomplish an inflow increase and are described in Section 2.4.3.9. Some measures include implementing water efficiency projects, increasing natural storage through wetland or improved riparian area performance, and purchase and retirement of water rights from willing sellers. Increases to inflow rates from these measures are for instream flows and are not meant for diversion and use and there would be no additional increases

available for downstream diversions. The geographic separation between the actions proposed under this program and the hydroelectric facility removal actions analyzed above eliminate the potential for negative water supply effects generated by this program from contributing to water supply effects generated by facility removal. **Implementation of the WURP is anticipated to have a less than significant impact to water rights because rights would be voluntarily retired. Implementation of the WURP is expected to have no effect to water supply because there would be no changes to diversions. Implementing the WURP will likely require future environmental compliance investigations as appropriate.**

Off-Project Water Settlement (OPWAS)

Implementation of OPWAS negotiations could affect water rights and adjudicated rights upstream of Upper Klamath Lake. The intent of OPWAS is to negotiate a settlement of long-standing water disputes between the Upper Klamath Water Users Association, Klamath Tribes, and the Bureau of Indian Affairs. OPWAS includes terms that: 1) resolve the Off-Project Irrigators' contests to claims in Tribal Cases; 2) in the event that not all such contests are resolved, provide reciprocal assurances for maintenance of instream flows and reliable irrigation water deliveries consistent with applicable law; and 3) in all cases provide for a WURP. The effects of these settlement actions could provide an amicable and quicker solution for those who are affected by the ongoing Klamath Basin Adjudication. The negotiated settlements would resolve certain contests to significant major water right claims in the Upper Klamath Basin. The improvements in water supply generated by the settlement of water disputes would not be expected to contribute to effects of hydroelectric facility removal analyzed above. **Implementation of OPWAS would be a beneficial effect to resolve water rights and adjudicated rights and a less than significant impact to unresolved cases due to reciprocal assurances. Implementation of OPWAS will require future environmental compliance as appropriate.**

Off-Project Water Reliance Program

Implementation of Off-Project Water Reliance Program could change water deliveries for irrigation upstream of Upper Klamath Lake to Off-Project water users affecting water supplies. The Off-Project Water Reliance Program would not be implemented until full implementation of the WURP and 30,000 acre-feet of additional flow is added to Upper Klamath Lake and Water Diversion Limitations are fully implemented. The agreement establishes a program consistent with the WURP to avoid or mitigate the immediate effects of unexpected circumstances affecting water availability for irrigation in the Off-Project area. Activities under the Off-Project Water Reliance Program may include: funding water leasing to increase water supply availability for irrigation in the Upper Klamath Basin or mitigating the economic impacts of lost agricultural production by Off-Project irrigators. The geographic separation between the actions proposed under this program and the hydroelectric facility removal actions analyzed above eliminate any potential for negative water supply effects generated by this program contributing to water supply effects generated by facility removal. **Implementation of the Off-Project Water Reliance Program to provide additional water availability and help minimize reductions in water supply in the Off-Project Area would help to maintain or**

improve water supply conditions but may not fully remedy negative water supply effects. This would be a less than significant impact. Implementation of the Off-Project Water Reliance Program will require future environmental compliance as appropriate.

Emergency Response Plan

Implementation of an Emergency Response Plan could result in a change to water supply deliveries in the event of failure to a facility in Reclamation's Klamath Project or dike on Upper Klamath Lake or Lake Ewauna. The purpose of the plan is to prepare water managers for an emergency affecting the storage and delivery of water needed for KBRA implementation. The components of the Emergency Response Plan are described in Section 2.4.3.9 and includes providing a supply and response in case of a failure of a Klamath Reclamation Project facility, such as a pump or dike. Response actions such as groundwater substitution or groundwater sharing, similar to the ongoing drought plan, and affects of these actions could improve short-term water supply reliability and could have short-term groundwater elevation effects. The improvements in water supply generated by development of off-stream storage would not be expected to contribute to effects of hydroelectric facility removal analyzed above. **Implementation of an Emergency Response Plan would be a beneficial effect to water supply deliveries during emergency periods because management actions would help to continue supply as well as improve water supply reliability. Implementation of the Emergency Response Plan will require future environmental compliance as appropriate.**

Climate Change Assessment and Adaptive Management

Implementation of Climate Change Assessment and Adaptive Management could result in changes to water deliveries depending on climatic changes. One of the main purposes of Climate Change Assessment and Adaptive Management is to respond to and protect basin interests from the adverse affects of climate change. Water deliveries could be affected during periods of water shortages or surplus conditions. Klamath Basin Parties including technical experts would be involved in development of the assessment and adaptive management strategies. Assessments and development of adaptive management strategies would be implemented continuously to respond to predicted climate changes. Climate change assessments would be conducted to identify indications of effects of climate change, such as a wider range of wet and dry years. Management of water resources would include actions such as improving storage capabilities during the wet years and conservation during dry years. The improvements in water supply generated by development of off-stream storage would not be expected to contribute to effects of hydroelectric facility removal analyzed above. **While water supply could be adversely impacted by climate change, implementation of Climate Change Assessment and Adaptive Management would be a beneficial effect to water supply because it will help to reduce the effects of climate change. Implementation of Climate Change Assessment and Adaptive Management will require future environmental compliance as appropriate.**

Interim Flow and Lake Level Program

Implementation of Interim Flow and Lake Program during the interim period could change water deliveries affecting water supply. The goal of the Interim Flow and Lake Level Program is to “further the goals of the Fisheries Program” during the interim period. This would be accomplished with, among other actions, an interim program of water purchases and leases during the interim period prior to full implementation of the On-Project Plan and WURP. Leases and purchases of water under this interim program shall be from willing sellers and counted towards instream water supply. Additionally the geographic separation between the actions proposed under this program and the hydroelectric facility removal actions analyzed above eliminate any potential for negative water supply effects generated by this program contributing to water supply effects generated by facility removal. **Therefore, implementation of the Interim Flow and Lake Level Program would cause a less than significant impact to water rights and water supply. Implementation of the Interim Flow and Lake Level Program will require future environmental compliance as appropriate.**

Drought Plan

Implementation of Drought Plan water and resource management actions could result in changes to water supply deliveries for Klamath Basin interests during drought years. The purpose of the plan is to take management actions so that no Klamath Basin interest shall bear an unreasonable portion of burdens imposed or the risk of loss or injury as a result of drought or extreme drought. Response actions could include releasing stored water, paid forbearance agreements, conservation, groundwater substitution, or groundwater sharing. The effects of these actions could improve short-term water supply reliability and could have potential short-term groundwater elevation effects. Because users would have a choice between irrigating and being compensated for not irrigating, the current priority system in place within the Klamath Project might not be necessary during most year types. The improvements in water supply generated by development of off-stream storage would not be expected to contribute to effects of hydroelectric facility removal analyzed above. **Implementation of a Drought Plan would be a beneficial effect to water supply deliveries during drought periods because management actions would help to offset shortfalls in supply as well as improve water supply reliability. Implementation of the Drought Plan will require future environmental compliance as appropriate.**

Alternative 3: Partial Facilities Removal of Four Dams

Under the Partial Facilities Removal of Four Dams Alternative the impacts would be the same as those described for the Proposed Action. **Impacts associated with relocation of the Yreka water supply pipeline and removal of recreation facilities at reservoirs would have no effect to water supply or water rights. Flow changes downstream of Iron Gate Dam and implementation of IMs would have a less than significant impact to water supply and water rights. Sediment release during reservoir drawdown has the potential to significantly affect water intake pumps by sediment deposits. Mitigation measure WRWS-1 would reduce this impact to less than significant.**

Keno Transfer

The effects of the Keno Transfer would be the same as those described for the Proposed Action.

East and West Side Facilities

The effects of the decommissioning of the East and West Side Facilities would be the same as those described for the Proposed Action.

KBRA

The KBRA would also be implemented under the Partial Facilities Removal Alternative. Impacts on water supply and water rights would be the same as described for the Proposed Action.

Alternative 4: Fish Passage at Four Dams

Under the Fish Passage at Four Dams Alternative, the drawdown and sediment impacts described under the Proposed Action would not occur. Flow rates downstream of Iron Gate Dam and water supply operations would be similar to those under the No Action/No Project Alternative to provide adequate flows for fish. **Under the Fish Passage at Four Dams Alternative, there would be no impact on water rights and water supply.**

Trap and Haul – Programmatic Measure

Implementation of trap and haul measures could require water rights to divert water for the fish handling facilities. Fish handling facilities to collect fish downstream of Keno Dam and at Link River Dam would require water sources. The facilities would not consumptively use the water; the water would pass through the facilities for release back into the system. **Because the fish handling facility would not increase consumptive use on the Klamath River system, the impacts of the trap and haul measures in the Fish Passage at Four Dams Alternative on water supply/water rights would be less than significant.**

Alternative 5: Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate

Under this alternative, only Iron Gate and Copco 1 Dams would be removed and fish passage would be installed at Copco 2 and J.C. Boyle Dams. The impact of sediments deposited downstream would be smaller, because sediment would be retained behind J.C. Boyle and Copco 2 Dams. After the drawdown period, flow rates downstream of Iron Gate Dam would be between the No Action/No Project Alternative and the Proposed Action.

Impacts associated with relocation of the Yreka water supply pipeline and removal of recreation facilities at reservoirs would have no effect to water supply or water rights. Flow changes downstream of Iron Gate Dam would have a less than significant impact to water supply and water rights. Sediment release during reservoir drawdown has the potential to significantly affect water intake pumps by sediment deposits. Mitigation measure WRWS-1 would reduce this impact to less than significant.

Trap and Haul – Programmatic Measure

Implementation of trap and haul measures could require water rights to divert water for fish handling facilities. The trap and haul measures around Keno Impoundment and Link River would have the same impacts under the Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative as the Fish Passage at Four Dams Alternative. **Because the fish handling facility would not increase consumptive use on the Klamath River system, the impacts of trap and haul measures in the Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative on water supply/water rights would be less than significant.**

3.8.4.4 Mitigation Measures

Mitigation Measure by Consequences Summary

Mitigation Measure WRWS-1 - Assess each pump location at legitimate points of diversion. Following dam removal, investigate intake and pump sites at the request of the water user. If effects on water supply intakes occur as a result of dam removal, the Dam Removal Entity (DRE) will complete modifications to intake points as necessary to reduce effects to a less-than-significant level.

Effectiveness of Mitigation in Reducing Consequences

Implementation of WRWS-1 will ensure that intake points of diversion affected by sediment deposition downstream of dam removal activities are dealt with individually and on an as-needed basis.

Agency Responsible for Mitigation Implementation

The DRE will coordinate with affected water users to determine appropriate solutions on a site-by-site basis.

Remaining Significant Impacts

No remaining significant adverse impacts on water rights and water supply are anticipated.

Mitigation Measures Associated with Other Resource Areas

Mitigation REC-1 would create a plan to develop new recreational facilities and access points along the newly formed river channel between J.C. Boyle Reservoir and Iron Gate Dam. Recreation facilities, such as campgrounds and boat ramps, currently located on the edge of the reservoir would need to be replaced in appropriate areas near the new river channel once the reservoirs are removed. Water supplies for the campgrounds would most likely be supplied through wells placed on the new sites as appropriate. **There would be no impact to water rights or supplies from the implementation of REC-1.**

3.8.5 References

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