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Water Resource Issues in the Klamath River Basin
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Chairman Wyden, Ranking Member Murkowski and members of the Committee, I am Mike Connor, Commissioner of the Bureau of Reclamation (Reclamation). I am pleased to represent the Department of the Interior (Department) today to discuss water resource issues in the Klamath River Basin.

The Klamath River Basin has a long history of conflict driven by scarce water resources that have been over-allocated among competing uses. While we are not far removed from the events of 2001, when water to Reclamation's Klamath Project (Project) was not delivered in the spring, or 2002, when 30,000 adult salmon perished in the lower Klamath River, or 2006, when the commercial ocean fishery closed along the Oregon and California Coasts due to poor Klamath Basin stocks; we only need to look at the conditions in 2013 to understand the importance of a long-term, comprehensive, and durable solution for the Klamath Basin. Consistent with eight out of the last twelve years, project irrigators will again not receive a full supply of water, and the power rates they are paying continue to escalate and are among the highest charged to irrigation projects in the West. Both of these issues directly and adversely affect the Klamath Project water users and the $600 million a year their agricultural products and jobs contribute to the local economy.[1]

With the Upper Klamath Basin experiencing a drier than normal water year, last week the Department and the Klamath Tribes exercised their adjudicated water rights for rivers flowing into the Upper Klamath Lake, which I will go into further detail later in my testimony. In addition, the tribal fishery in Upper Klamath Lake continues to be closed to all but a ceremonial catch of two to three fish per year and the abundance of these endangered fish populations have continued to decline for the last 20 years. Wildlife refuges that support some of the most important habitat on the Pacific Flyway struggle for water and suffer bird die offs, water quality continues to be degraded, and species in both Upper Klamath Lake and the Klamath River continue to be at risk of extinction. Private irrigators in the upper basin will struggle to maintain crops and livestock in this drought year. And, finally, a relatively large run of Chinook salmon is expected to return home to the Klamath River this fall. While this should be a reason to celebrate, this year's drought conditions have raised concerns about how to avoid another salmon

[1] Revised Cost Estimates for the Klamath Basin Restoration Agreement. June 17, 2011. http://216.119.96.156/Klamath/2011/06/RevisedCostEstimates.pdf

die-off in the Lower Klamath River. Our analysis shows all of these problems will likely worsen and may occur more frequently in the coming years due to impacts of climate change unless a long term solution is found.[2]

Moreover, these very same scenarios have played out in three of the four years since over 40 parties have signed the Klamath Agreements; the Klamath Hydroelectric Settlement Agreement (KHSA), and the Klamath Basin Restoration Agreement (KBRA) in February 2010. The Klamath Agreements were crafted to address these ongoing impacts and risks to the Basin's resources while strengthening communities that rely on these resources by charting a path of collaboration and cooperation. The Klamath Agreements hold great promise to transform what was once a landscape of turmoil and conflict to one that is built on cooperation and trust with the recognition that we cannot take care of ourselves if we fail to also take care of our neighbors.

While visiting the Basin several times over the past few years, I have been personally struck that tribal members, fishermen, and irrigators--who only a few short years ago could not even stand in the same room together--are no longer arguing with each other but are now advocating for each other and for the protection of each other's interests. The Klamath Agreements stand as a common vision for these diverse parties, and the commitment to cooperation and collaboration contained in these agreements is nothing short of historic.

Our perspective is that a long-term, durable solution that is driven at the local level by those who are most directly affected is the best and perhaps only opportunity to avoid the year to year crises that are endemic to this basin. Under this approach, there is a mutual commitment to a shared resource, the economy is strengthened and jobs are created, and those who are most directly affected have a say in how the resource is managed. It is for these reasons that the framework embodied in both Klamath Agreements holds such promise for addressing the needs of the Klamath Basin in a manner that fits the above criteria.

To be sure, implementing these agreements and accomplishing the parties' collective goals will take substantial resources. From a Federal perspective, we have significant concerns about overall costs in light of the current fiscal climate. Whatever the final costs might be, there should be an appropriate cost share that follows the 'beneficiary pays' principle and is in line with other restoration programs that have been enacted in the recent past. We also acknowledge there are a handful of parties that have not signed the Klamath Agreements despite the non-partisan development of this framework over several federal and state administrations. We need

[2] As stated in section 4.1.1.2 of the Secretarial Determination Overview Report, our analysis shows all of these problems will likely worsen and may occur more frequently in the coming years due to impacts of climate change. For example, models show that, while there is some uncertainty, over a period of 50 years (2012 to 2061), water temperatures in the Klamath Basin would increase 1 to 3 degrees C (2 to 5 degrees F) and earlier snow melt would decrease summer flows. Removing the Klamath River dams would restore salmon access to critical cool-water habitat for spawning and rearing in the upper basin, thereby helping to buffer against effects of climate change. Removing the dams would also immediately improve late summer and fall water temperatures for salmon below this reach, thereby buffering against future impacts of climate change.

to continue our efforts to find common ground with these groups. But we also believe that the time is ripe for action and that we have a unique opportunity to heal and restore the basin in a lasting manner. We should not lose this opportunity.

KHSA

The KHSA is a unique combination of environmental and business interests striking an agreement that combines both business sense and protection of natural resources. It is an agreement to study the potential removal of four privately owned hydroelectric facilities on the Klamath River and to determine, based on a host of scientific and engineering studies, whether removal of these facilities is in the public interest, including consideration of the interests of local and tribal communities, and whether it will advance restoration of the fisheries. The KHSA calls for removal to occur in 2020, should there be a determination that removal is in the public interest. Congressional authorization is necessary for the Secretary to make this determination. Should there be a decision to remove these facilities; the costs shall be borne by a combination of PacifiCorp's electricity customers in Oregon and California, through a minimal surcharge, and a water bond from the State of California. Consequently, there are no federal costs associated with any potential dam removal under the KHSA.

The KHSA also includes certain protections for PacifiCorp in the facilities removal process should there be a determination to remove these dams. The current cost estimate is below the protection levels provided to PacifiCorp, though it remains uncertain at this point who would bear any costs in excess of those protections, should such a situation arise. The KHSA also provides a commitment for PacifiCorp to transmit and deliver federally generated power to the Klamath Project, which could provide savings to water users on power costs, making for efficient project operations, which in turn makes more water available for conservation purposes. On this point, discussions are underway between PacifiCorp, the Department, Bonneville Power Administration, and the Klamath Water Users on developing a plan that can be approved by the Public Utility Commission in Oregon to provide federal preference power to the Klamath Project water users. In 2006, that Commission terminated the Klamath Water Users' preferential power contract as discriminatory; then gradually increased the water users' power rates over a period of seven years to equilibrium with market rates for agricultural use in the region. We could have similar discussions with Western Area Power Administration for the California part of the Project. Although we do not have the authority to provide such federally generated, below-market-rate power to off project irrigators, and doing so would be an expansion of Reclamation's typical project arrangements, there are provisions in the Klamath Agreements, if approved by Congress that would approve such an arrangement.

KBRA

The KBRA is a restoration agreement that includes water allocation and fish habitat restoration actions, predicated on, and working in conjunction with dam removal, to restore the Klamath

Basin. The KBRA includes agreements among tribal and non-tribal entities resolving water rights disputes and provides the means for Reclamation's Klamath Project to conserve water supplies and develop sources of power that will place the Project on par with other similarly sized irrigation projects in the West. The KBRA provides real water to wildlife refuges, and if funded will put tribal members to work on habitat restoration actions needed in the Basin. Through the establishment of a Federal Advisory Committee Act charter, the KBRA will return many decisions regarding the Basin resources back to local control. While most of the items in the KBRA, especially those involving tribal and fisheries programs, are presently authorized under existing law, key items associated with making Reclamation's Klamath Project more efficient and flexible would require additional Congressional authorization.

To illustrate how the Klamath Agreements would change the impacts of the current water year, if fully authorized, the Project allocation would be 353,000 acre-feet instead of the current projected 319,125 acre-feet, wildlife refuges would be allocated 51,000 acre-feet compared to no available water this year, and 30,000 acre-feet of depletions above Upper Klamath Lake would be dedicated towards fishery purposes, with the system managed on a real-time basis able to react to changes in hydrology. Tribal members would be at work implementing habitat restoration actions. There would also be more tools to address fishery needs in the fall. Without the framework of the Klamath Agreements, we are managing a system that simply cannot meet all the competing demands year in and year out. Without the Klamath Agreements, the current cycle of crisis management, disaster relief, animosity between communities, and unfulfilled tribal rights will continue. A more permanent solution that provides greater predictability as to the availability of water and improved fishery resources is an investment that will be more cost-effective in the long run.

KHSA/KBRA Science Process

Between the signing of the Klamath agreements in early 2010 and today, many federal studies have been undertaken and completed that analyze the potential effects of Klamath River dam removal and implementation of KBRA on local communities, tribes, and the environment. A Final Environmental Impact Statement analyzed the proposed action to remove the four lower PacifiCorp dams on the Klamath River in 2020 and to implement the KBRA, as well as three alternatives where some or all of the dams would remain in place.

The process undertaken to develop new information for a Secretarial Determination was rigorous, open and transparent, provided multiple opportunities for stakeholder and public participation, included independent subject-matter experts to provide a breadth of perspectives, and relied on multiple levels of independent peer review to ensure objectivity and accuracy of findings, as described in more detail below.

- A team of more than 50 federal experts, scientists and engineers, from eight separate federal agencies and offices, prepared or oversaw the preparation of 50 new technical

reports covering areas such as engineering, hydrology, fish biology, economics, cultural resources, recreation, and real estate. Agency guidelines governed the peer review process for these published reports.

- Completely separate from the development of these new technical reports, four independent expert panels were convened to provide additional perspectives regarding the likely impacts of dam removal and KBRA implementation on four groups of fish species. The four reports from the expert panels benefited from broad public and stakeholder input as well as independent peer reviews.
- The major findings from these 50 reports, the findings from the four independent expert panel reports, and many other existing reports were summarized in a single Klamath Overview Report. This Overview Report was treated as a "Highly Influential Scientific Assessment" and received a second round of peer review from an independent panel of six nationally-recognized experts. The peer reviewers were also provided public comments on the Overview Report to consider during their peer-review deliberations. As part of the peer review process, an independent "referee" ensured that the federal scientists adequately addressed each of the peer review comments and recommendations in the Final Overview Report.

All of these studies and materials are available to the public and can be found at http://klamathrestoration.gov/.

Public Involvement

Over 80 meetings and workshops were held throughout the Basin over a period of two years that allowed for public and stakeholder participation in the science process. The public and stakeholders provided input on hypotheses to be tested, study designs, available sources of information, data analysis, and conclusions to be drawn from the analyses. The public involvement improved the quality of reports. A summary of the findings from the science process is attached as an Appendix.

Parties that have not signed the Klamath Agreements

We acknowledge that despite our best efforts, there are a small number of parties who participated in the negotiations but have chosen not to sign the Klamath Agreements. We respect that each party has its own unique concerns and must make its own decisions as to what it believes is in its best interest. Some of those who oppose the Klamath Agreements want to maintain the status quo or have general concerns about dam removal; others believe their resources are being inappropriately harmed or their rights are being terminated; or, in the case of homeowners around the reservoirs, that they are bearing an unfair share of the adverse consequences of the Klamath Agreements.

As to those who want to maintain the status quo or have general concerns about dam removal, I wish to be clear that as Commissioner of the Bureau of Reclamation, which owns 476 dams and annually generates 40 billion kilowatt-hours of electricity, I understand the importance of dams to both the economy and the communities of the American West. I also believe that given the ongoing challenges and increasing demands for limited water resources, we should continue to evaluate opportunities to develop additional storage and power generation opportunities where it makes sense. But we should also not be afraid to evaluate potential dam removal when the specific circumstances warrant. The KHSA reflects the unique circumstances of the Klamath Basin, where the owner of these private dams, in making a business decision that is in the best interests of its electricity customers and the company, has agreed to evaluate whether their removal would advance fisheries and be in the overall public interest as part of a Basin-wide restoration effort that addresses many of the systemic problems that continually plague the Klamath Basin. Dam removal in this instance has been given a hard look because, with the passage of time, it is clear that the ongoing costs of these facilities most certainly outweighs the benefits – something now confirmed based on the analyses completed.

While no final determination has been made on the removal of these PacifiCorp dams, there are several specific facts that bear emphasizing: these dams are privately owned and their owner has agreed, as part of a business decision, to evaluate their potential removal, which could still occur as an independent business decision even without any Congressional action on the Klamath settlements. In addition, these dams provide no water storage for purposes of irrigation, drinking water, or flow augmentation for fish. Nor are they designed or currently operated for downstream flood control. Moreover, these dams generate a limited amount of electricity, approximately 82 megawatts, which PacifiCorp has already made up with other power sources.

Just as importantly, if these dams are retained, PacifiCorp would have to obtain a new long-term operating license, which would require retro-fitting the dams for fish passage and remedying water quality and temperature issues below the lowermost dam. Provisions of a new license, plus additional operational restrictions, would decrease power production by 20 percent and result in the loss of the majority of peaking power at J.C. Boyle Dam. PacifiCorp's estimated that relicensing would involve *at least* $400 million in capital costs for retro-fits, and $60 million in operation and maintenance cost over the 40-year life of the new operating license. The Public Utilities Commissions for both Oregon and California agreed that relicensing would include substantial costs and that there was a significant risk that ratepayers would face much higher costs if PacifiCorp sought relicensing than they would under the KHSA. When this is combined with flow requirements that will decrease hydropower generation and peaking power, both Commissions determined that dam removal as laid out in the KHSA, was preferable to relicensing. Simply operating these dams as they have been operated for the last 50 years is not a viable option. Additionally, our climate change analysis shows that water temperatures will increase 2-5 degrees Fahrenheit over the coming decades, exacerbating the warming influence on the river from the dams and reservoirs, further impacting salmon, and increasing costs to

ratepayers for keeping the dams in place. These additional facts are why we have undertaken an analysis of potential facilities removal within the context of the great promise of the Klamath Agreements to restore resources and help struggling communities in the basin.

There are others who favor of dam removal but do support the Klamath Agreements because they either want to remove or significantly limit irrigated agriculture from the Basin or believe that the assurances in the Agreements regarding water supply and, the connected issue of river flows, terminate tribal rights. As to the former, irrigated agriculture is part of the societal fabric of the Basin and, as mentioned earlier, provides significant jobs and economic support to all communities of the Basin. While the KBRA does provide further funding for voluntary retirement of up to 30,000 acre-feet of irrigation water on a willing seller or buyer basis, total removal of irrigated agriculture is simply not consistent with a comprehensive and durable restoration program meant to restore the communities of the basin. As to the concern regarding tribal rights, there is nothing in the Klamath Agreements that would "terminate" the rights of any non-signatory Tribe. The United States believes the Klamath Agreements are consistent with any federal trust obligations to Tribes in the Basin and provide the best hope for restoration of thriving fisheries in the Basin. Our analysis of the fishery with dams removed and under the management of the KBRA shows significant improvement for many fish populations, such as steelhead, coho salmon, and redband trout, and increases in the annual production of Chinook salmon by about 80 percent in the Klamath Basin. Improvements in fish production would result from restoring fish access to the Upper Basin through dam removal, including access to critical cool-water streams, and from actively restoring spawning and rearing habitats. Thus, we respectfully disagree with those who point to comparisons of flow rates in the KBRA to current or recent conditions as a reason to challenge the sufficiency of the Klamath Agreements. Our view is that a comparison of only flows in the river tells an incomplete story. You must also account for the habitat improvements and habitat expansion that will occur as a result of both dam removal and restoration actions. Chinook salmon are critically important for commercial, sport, and tribal fisheries in the river and the ocean and are a cultural, subsistence, and economic mainstay of the Basin's Tribes. After much study and evaluation, the scientific record shows that the Klamath Agreements provide significant benefits to the resources of the Tribes in the Basin, a conclusion validated by the support of most of the affected Tribes.

We have also heard the concerns of those around the reservoirs whose properties and businesses would be most directly impacted by removal. On this point, we believe that if the Klamath Agreements are ultimately authorized, consideration should be given to establishing a fund to be managed by representatives in local communities to recompense land owners for any lost value that occurs as a result of dam removal. The size and scope of this fund can be worked out with the interested parties at the appropriate time in the legislative process. This would however, increase the costs of implementing the settlement and create an additional burden on the general taxpayer.

2013 Operations and Biological Opinion

This year, the Klamath Falls area reported the second driest January through March period on record and precipitation has been below average throughout the Klamath Basin. As a result, in April the Klamath Basin Area Office implemented a 10-day delay for the startup of the irrigation season to ensure that the water elevation in Upper Klamath Lake would rise above critical elevations identified in the 2008 U.S. Fish and Wildlife Service (USFWS) BO. As a result of the dry hydrologic conditions, Reclamation is anticipating that full water user demand will not be met in 2013 consistent with eight of the last ten years. Reclamation is working with the Klamath Water and Power Agency (KWAPA), which administers the Water User Mitigation Program, to address potential water shortages to the extent possible given existing authorities and available appropriations. Shortages of approximately 75,000 – 100,000 acre-feet or more are currently expected, depending on weather conditions and the associated irrigation demand during the 2013 irrigation season. Additionally, it is possible that little or no water will be available for the Lower Klamath National Wildlife Refuge.

Over the past two years, Reclamation, NOAA Fisheries and USFWS worked together to develop an new water management approach for Reclamation's Klamath Project that has the flexibility to optimize the benefits of available water for federally-listed species while providing more certainty related to irrigation deliveries to the Project. Late last month, NOAA Fisheries and USFWS jointly issued an integrated Endangered Species Act (ESA) biological opinion on Reclamation's new water management strategy for the Klamath Project. They concluded that this approach adequately protects the federally-listed fish in the lake and river under the ESA for the next 10 years and is not likely to jeopardize their continued existence or to result in the destruction or adverse modification of their critical habitat. This new water management process relies upon real-time hydrologic conditions in the Upper Klamath Basin, provides more flexibility, ensures more water certainty for farmers (even in drought years), and includes a process where a team of agency and tribal technical staff work together to track real-time ecological conditions in Upper Klamath Lake and the Klamath River to support adaptive management changes that would provide additional conservation benefits to listed fish. Such innovation is absolutely critical, especially with the limited water supplies of the Upper Klamath Basin.

Just like the Tribes, farmers and fishermen who have found a new working paradigm under the Klamath Agreements, agency staffs have also discovered a better way. Building off a shared goal of enhanced inter-agency efforts to develop a proposed action that protects listed fish while also providing more certainty of water supply for the Klamath Project farmers, agency staff built effective relationships which enabled a collaborative process that produced tangible results. An early decision by the Regional Directors to bring the ESA analyses from each agency together into one document, instead of two biological opinions, encouraged higher levels of coordination

among the agencies than ever before and served to ensure that terms and conditions for the Project from one fishery resource agency did not conflict with those from the other.

While Reclamation's new water management system is more flexible, provides more certainty for irrigation deliveries, and adequately protects endangered species as required by the ESA, I do not believe any biological opinion is the long-term and comprehensive solution for the Klamath Basin. NOAA Fisheries and the USFWS have concluded that Reclamation's new water approach is protective enough for listed fish; the ESA's "no jeopardy" conservation standard means that Reclamation's Klamath Project will not stand in the way of recovery. However, it does not mean that the new approach will recover listed fish or fully address tribal interests without other recovery actions occurring throughout the Basin that go well beyond the discretion of Reclamation. The recovery and restoration of listed fish species in the Klamath Basin requires a basin-wide solution that is built, supported, and undertaken by those that live and work in the Basin. While ESA biological opinions are fundamental to ensuring that federal actions protect listed species, Congress did not intend these consultations to be the sole tool for recovery. Building a better and holistic solution that will advance recovery of listed fish while also building sustainable fisheries for fishing and tribal communities, as well as creating sustainable agricultural communities, requires a more comprehensive solution with Basin support. The Klamath Agreements hold great promise for being such a solution.

Adjudication

In March of this year, the Oregon Water Resources Department issued its Final Order of Determination (FOD) in the Klamath Basin Adjudication. A number of federal entities received water rights under the FOD including the National Park Service, USFWS, Forest Service, Reclamation, and the Bureau of Indian Affairs. The most senior rights in the basin were jointly awarded to the Klamath Tribes and the United States to support tribal trust resources. Although not as senior as the tribal water right, the Klamath Project was also awarded a relatively senior water right. Because of the current water year, and our obligations to the tribes, water users, and refuges, we are exercising these water rights. Because of the current water year, and to project the tribal, refuge, and irrigation interests that rely on our water rights, we are exercising these rights.

To be clear, we believe the impacts of regulation of water rights can be addressed through the KBRA or similar negotiated agreements. For parties to the KBRA, issues surrounding the enforcement of water rights have largely been resolved through agreements among the parties that are included in the KBRA. Once again, the goal of the parties has been to provide increased certainty and overall sustainability for all parties to the agreements. There are still a number of water rights holders in the basin, however, that have not settled their disputes regarding either the tribal or Project water rights. With the assistance of the Governor, we are continuing to reach out to those water rights holders in an effort to secure a resolution of these longstanding issues and are hopeful that a solution can be had.

Conclusion

This concludes my written statement. I am pleased to answer questions at the appropriate time.

APPENDIX

Summary of Key Findings Regarding Klamath River Dam Removal and Implementation of KBRA[3]

Dam removal, sediment processes, and impacts on flooding:

- The most probable cost for full dam removal, which is the preferred alternative identified in the FEIS, is about $292 million and is under the State cost cap of $450 million (1 percent and 99 percent probability for removal costs range from $238M to $493M, in 2020 dollars).
- Dam removal would mobilize between one-third and two-thirds of the 13 million cubic yards of sediment behind the dams. The majority of the sediment is fine-grained material that would be readily transported to the Pacific Ocean 2 to 3 months following the drawdown of reservoirs in the winter of 2020.
- Extensive chemical testing of sediments behind the dams shows that human health would not be at risk due to contact with these sediments.
- Dam removal would immediately restore more natural water temperatures and dissolved oxygen concentrations important to downstream fish and fisheries.
- Dam removal would immediately eliminate toxic algae produced in the reservoirs; toxic algae create health concerns in the reservoirs and downstream in the Klamath River for people, fish, and wildlife.
- Long-term flood risks would increase slightly for about 18 miles downstream of the location of Iron Gate Dam. Analyses show that some additional structures currently outside the 100-year flood plain would be located in a new 100-year floodplain following dam removal. If dam removal were to proceed, the Dam Removal Entity would work with willing landowners to reduce or eliminate flood risk for these additional structures.

Impacts of dam removal and KBRA on fish and fisheries:

- The timing of reservoir drawdown in a single winter season was designed to minimize negative impacts of released sediments on sensitive fish species, particularly federally listed Coho salmon.
- Basin-wide adult and juvenile salmon mortality is expected to be less than 10 percent in the year following dam removal, even under worst-case flow conditions.
- In the long run, opening up fish passage to the Upper Klamath Basin through dam removal and restoring aquatic habitat under the KBRA would increase salmon and

[3] This document is intended to serve as a summary and, as such, numbers cited herein represent averages and/or aggregates which may include associated levels of uncertainty that are explained fully in the contributing studies. All of the scientific studies, which include the complete scientific analysis and associated uncertainties, are available at klamathrestoration.gov.

steelhead production. For example, annual Chinook salmon production would increase about 80 percent (ranging from 40 to 190 percent among modeled years).

- The increased production would increase Chinook salmon harvest about 50 percent for commercial and sport ocean fisheries, as well as for in-river tribal fisheries.
- Coho salmon would be expected to access 68 miles of stream habitat upstream of Iron Gate Dam, including 23 miles currently inundated by the reservoirs, thereby advancing the recovery of this federally listed species.
- Steelhead trout would be able to migrate to historical habitat above Iron Gate Dam, including up to 420 additional miles of stream, and thereby advancing the most prized game fishery in the Basin.
- Dam removal would also expand the distribution and number of trophy redband rainbow trout, another prized game fishery, throughout the hydroelectric reach of the river.
- Dam removal would totally eliminate a large non-native game fishery on the reservoirs, which includes bass and yellow perch.

Climate change impacts on water temperatures, fish, and flows:

- Over a period of 50 years (2012 to 2061), climate change models show that water temperatures in the Klamath Basin would increase 1 to 3 degrees C (2 to 5 degrees F) and earlier snow melt would decrease summer flows.
- Removing the Klamath River dams would restore salmon access to critical cool-water habitat for spawning and rearing in the Upper Basin, thereby helping to buffer against effects of climate change.
- Removing the dams would immediately improve late summer and fall water temperatures for salmon below this reach, thereby buffering against future impacts of climate change.
- Decreased summer flows will worsen already strained water supplies needed to support farms, refuges, and fisheries.

Impacts on jobs and regional economies:

- Dam removal and full KBRA implementation would create a number of full time, part time, and temporary jobs:
    - Hundreds of commercial fishing jobs in five management areas from northern California to central Oregon;
    - 1,400 jobs during the year of dam removal;
    - 300 annual average jobs over 15 years for KBRA programs;
    - 70 to 695 farm jobs in drought years depending on drought intensity.

  Dam removal would also result in the loss of about 70 jobs associated with the operation and maintenance of the dams and changes in the recreational industry (reductions in whitewater rafting and reservoir fishing/boating).

Tribal and Cultural Impacts:

- All of the native people residing in the Klamath River environment have spiritual beliefs and traditional practices that are inseparable from the River and surrounding homeland environments. Dam removal and implementation of the KBRA would help address tribal trust and social issues identified by the Klamath River Basin Tribes as detrimental to their traditional way of life. Dam removal would have beneficial effects on water quality, fisheries, terrestrial resources, and traditional cultural practices. Dam removal would enhance the ability of Indian tribes in the Klamath River Basin to conduct traditional ceremonies and other traditional practices.
- Dam removal and reservoir drawdown could affect Native American cultural resources sites reported to be currently submerged beneath the reservoirs. Human remains may be associated with these sites. Plans to identify cultural resources and to avoid, minimize, or mitigate impacts to those resources would be developed in consultations with the appropriate State Historic Preservation Office, Tribes, and other Native American organizations.
- The removal of the dams and associated facilities, all part of the Klamath Hydroelectric Project, would result in effects to those historic properties. Plans to avoid, minimize, or mitigate effects to historic era properties would be developed in consultation with the appropriate State Historic Preservation Office and other historic preservation entities.

Hydropower, Green House Gas emissions, and electricity customers:

- Dam removal would eliminate about 82 megawatts of hydropower in 2020 (enough power for 70,000 homes), which would be made up by a mix of other energy sources.
- Following dam removal in 2020, approximately 526,000 metric tons of carbon dioxide equivalents (MTCO2e) per year would be emitted to the atmosphere from replacement power assuming PacifiCorp's current resource generation mix. This number would decrease to approximately 451,000 MTCO2e per year assuming PacifiCorp met California's goal for replacement power sources.
- A 2010 analysis by PacifiCorp prepared for the Oregon and California PUCs demonstrates that dam removal as laid out in KHSA would be less costly for their customers (about $251 million), and less risky, as compared to likely customer costs associated with relicensing the four dams, which would be in excess of $460 million over a 40-year license term.

Wildlife refuges:

- Dam removal and KBRA implementation would allow the refuges associated with Reclamation's Klamath Project to have greater certainty about water deliveries with

newly established allocations, even during drought years, and increased flexibility in the timing of water deliveries.

- Full refuge needs would likely be met in 88 percent of years; currently refuge needs for water are met in less than 10 percent of the years. These NWRs wetlands are critical components of the Pacific Flyway, the corridor for migrating birds from as far away as Alaska and Mexico.
- The additional water deliveries—and the increased predictability of those deliveries—would mean that greater numbers of migratory waterfowl, non-game water birds, wintering bald eagles, and other sensitive species would be supported by the refuges and would increase recreational wildlife viewing.
- The estimated increase of over 190,000 waterfowl in the fall would result in an additional 3,600 hunting trips annually.

Real Estate:

- Upstream of Iron Gate Dam studies identified 668 parcels near Copco 1 and Iron Gate reservoirs which either have water frontage, water access, or views of reservoirs. Of these 668 parcels, 127 include single family homes. These 668 land parcels would decline in value if dams were removed and reservoirs drained.
- Land values of parcels downstream of Iron Gate Dam, with river views and river access, may increase in the long-term because of restoration of the river, including improved water quality and more robust salmon and steelhead runs.

Flows:

- The differences in monthly average flows between dams remaining in place and dam removal options are relatively small; however, without the dams, pulse flows and other seasonal fluctuations beneficial to fish would occur more often.
- The absolute minimum flow target under the KBRA would be approximately 800 cubic feet per second (cfs) at the location of Iron Gate Dam. In most months and years, however, flows would be much greater. In extreme drought years, flows could drop slightly below this target, but never drop below 700 cfs owing to the water-management provisions in the KBRA.