

Klamath River Basin

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Key Points:

- Objectives of the local conservation districts are: decrease agricultural water demand, increase storage, improve water quality and develop fish and wildlife habitat, and maintain agricultural productive capacity.
- Farmers converting from surface to sprinkler irrigation report an increase in crop yields and labor savings.
- Ranchers adopting brush control removing juniper report a renewed flow of springs.
- Endangered species found in the basin include Lost River sucker, short nose sucker, and Coho salmon. These species are culturally significant to the area Tribes.
- Wetlands in the basin are a critical component of the Pacific Flyway. More than 35,000 acres are protected or restored. More than 10,000 acres are enrolled in the Wetland Reserve Program (WRP).

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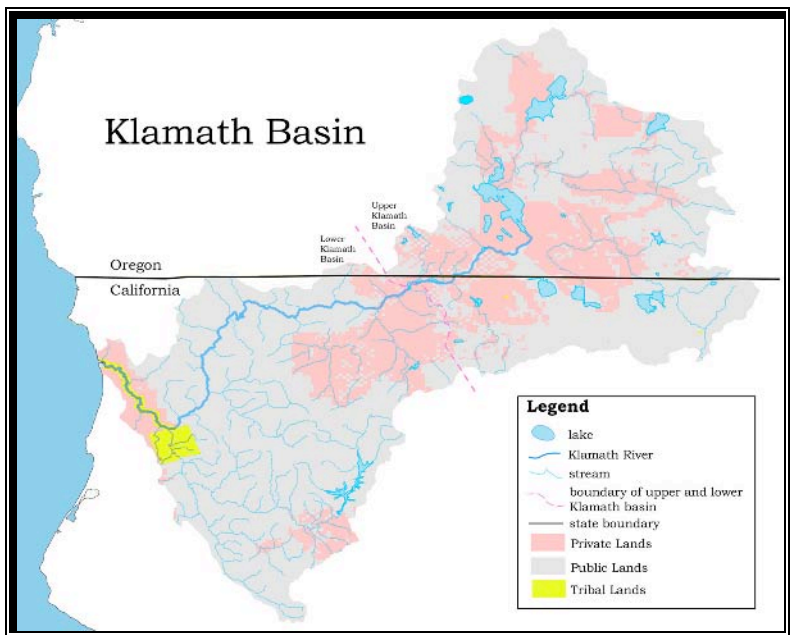
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Introduction

The Klamath River Basin, located on the border between Oregon and California, covers slightly more than 10 million acres. The Klamath Basin is comprised of the Upper Klamath and Lower Klamath basins, which are divided by the Iron Gate Dam located on the Klamath River. On the private land, there are more than 2,400 farms operating on about 556,800 acres of cropland and pastureland (agricultural lands). The majority of this land is irrigated.

The Klamath River Basin has become synonymous with the water challenges faced by western water users. The Basin gained national attention during the spring 2001 growing season when a combination of drought and the impacts of the Endangered Species Act (ESA) triggered a shutdown of irrigation water during the growing season to more than 800 farms and ranches in the Reclamation Project Area.



Natural Resource Conditions and Trends

Land Use/Ownership	Lower Klamath Basin	Upper Klamath Basin		Total Klamath Basin
	California ²	California ²	Oregon ¹	
Private Lands				
Cropland and Pasture	85,100	122,700	349,000	556,800
Rangeland	448,000	125,800	221,400	795,200
Forestlands	953,900	153,000	1,077,100	2,184,000
Urban or Developed Lands	3,700	1,400	1,500	6,600
Commercial/Industrial	8,300	2,500	5,700	16,500
Residential	2,500	200	7,200	9,900
Streams and Lakes	3,400	3,000	85,800	92,200
Other	19,800	11,500	52,500	83,800
Subtotal - Private	1,524,700	420,100	1,800,200	3,745,000
Federal/State/Tribal	3,309,900	1,144,300	1,881,600	6,335,800
Total	4,834,600	1,564,400	3,681,800	10,080,800

¹ US Geological Survey (USGS) 1:250,000-scale Land Use and Land Cover (LULC) Data and US Forest Service (USFS) Interior Columbia Basin Ecosystem Management Project-Ownership for Oregon and Northern California.

² USGS National Land Cover Data (NLCD), for the Lower Klamath (1992) and the Upper Klamath (2000). Data processing used USGS hydrologic boundaries edited by NRCS to define the Upper and Lower Basins.

The Klamath River Basin

In the Upper Klamath Basin, the Bureau of Reclamation (BOR) initiated one of the earliest Federal reclamation projects, starting in 1905. Construction was authorized by the Secretary of the Interior on May 15, 1905, for project works to drain and reclaim lakebed lands of the Lower Klamath and Tule Lakes in order to open them for agriculture and to store water, divert irrigation supplies, and control flooding.

Project costs were to be repaid through the sale of water rights to homesteaders on the reclaimed project lands. Homesteading of these public lands was opened in March 1917 and ended in 1948. Veterans were the only applicants eligible to acquire a 60 to 100 acre homestead through a lottery-style drawing. In order to repay the project costs, farmers formed irrigation districts. There are currently 20 active irrigation districts/drainage districts serving the project area in the Upper Klamath Basin. The Klamath Water Users Association serves as a multi-state, multi-county advisory board for water users in the basin.

There are four irrigation districts in the Lower Klamath Basin, three in Shasta Valley and one in Scott Valley. These districts serve some of the irrigated lands, but most of the irrigation infrastructure involves informal arrangements among landowners to share diversion and conveyance facilities. The Hoopa Valley Public Utilities District serves irrigated areas on Hoopa tribal land.

The BOR Project: Three reservoirs providing 1,121,000 acre-feet of storage in the Klamath River and Lost River basins were built for irrigation service to more than 220,000 acres. Within the Klamath Project area, more than 1,400 miles of canals and drains, as well as hundreds of small diversion structures provide water to farmers. These structures, along with levee construction and stream channelization, are used for flood control and diversion of water for agriculture and municipal purposes.

Water Allocation: Water has always been a contentious issue in the West and even more so in the Klamath Basin. In Oregon alone, there are more than 700 claims to water rights that overlap in 5,600 places within the Basin. The State initiated its adjudication process more than 26 years ago; tied up in litigation ever since, it is far from complete. The Courts have ruled that the Tribes retain tribal hunting and fishing rights, including water and other natural resources necessary to sustain them. This same water which supports species listed under the Endangered Species Act, and supplies the two National Wildlife Refuges, has also been allocated to irrigators.

Klamath River Water Diversions: Approximately 2.5 percent of the Klamath River flows, above the Iron Gate Dam, are diverted to the Rogue River Basin. Below the Iron Gate Dam, 75 to 90 percent of the Trinity River (a tributary to the Klamath River) flow is diverted to the Central Valley of California.

Agriculture: The Klamath River Basin presents numerous challenges as well as opportunities for its many water users. For years, farmers and ranchers in the basin have recognized the vital role they play in the health of their watershed. Working with conservation districts, the Natural Resources Conservation Service (NRCS) and others, land managers continue to find ways to enhance natural resources in the Basin, benefiting wildlife and the environment in conjunction with their farms and ranches. However, drought continues to affect the Klamath.



Farmers grow a large variety of crops, including, barley, oats, wheat, potatoes, sugar beets, horseradish and forage. According to BOR data for the year 2000 in the Klamath Project, approximately 110,000 acres were planted in forage; 57,000 acres in cereal crops (including barley, oats and wheat); 16,000 acres in vegetables (including potatoes); 7,000 acres in miscellaneous crops (including sugar beets); 289 acres in seed crop, and 227 acres in nursery crops. The average size of a farming operation is approximately 172 acres; however most typical farm units range from 40 to 100 acres.



Range and forest land dominate the landscape in the lower Basin. Irrigated agriculture is found primarily in the Shasta and Scott Valleys. There are also small amounts in the Hayfork Valley in the South Fork Trinity Sub-basin and on Hoopa tribal lands. The irrigated land is almost all pasture and hayland. Forestland management is a major resource concern in much of the lower Basin.

Water Quality

Water quality has a direct impact on many fish and wildlife species within the basin. Many of the rivers and lakes do not meet Federally mandated Clean Water Act standards for temperature, dissolved oxygen, pH, or other pollutants. The Lost River and several other Lower Klamath streams are on Oregon's and California's Clean Water Act 303(d) lists of water bodies with impaired water quality. For both ESA-listed suckers and Coho salmon, poor water quality has been identified as one of the limiting factors.

The Oregon Department of Environmental Quality has completed a draft total maximum daily load (TMDL) report for Upper Klamath Lake and its tributaries. The North Coast Regional Water Quality Control Board in California is working on TMDL reports for the Lost, Klamath, Shasta, Scott, and Salmon rivers.

Water quality in the Basin is affected by water temperatures, low in-stream flows and the condition of adjacent land riparian areas, among other factors. Private landowners are one of many groups who have an opportunity to improve water quality in the Klamath.



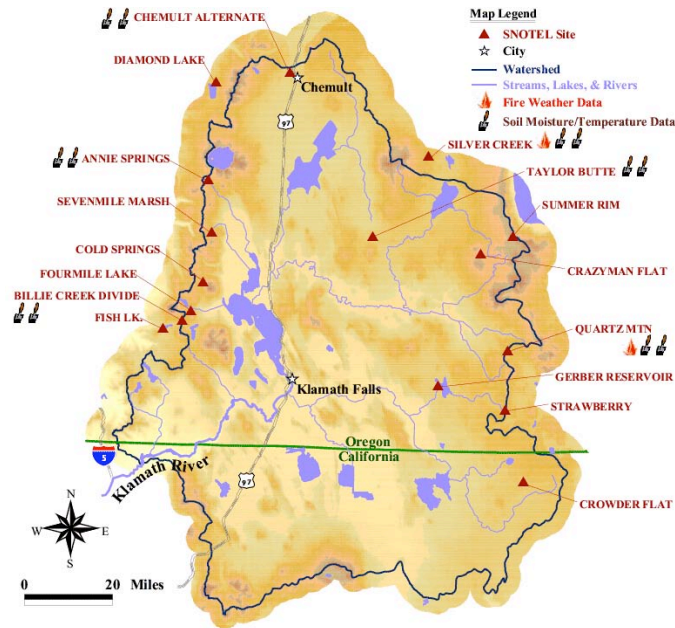
Water quality improvement opportunities on private agricultural lands in the Basin range from improving the management of livestock near streams and rivers, to utilizing new technologies to track pests and weed cycles to ensure pesticides are only applied when they will be most effective. Water conservation practices that reduce tailwater runoff from irrigated fields can provide extensive improvements in water quality. Conservation practices implemented on rangeland and forestland reduce soil erosion which will also have a direct impact on water quality.

Water Supply

The majority of resource issues in the Klamath Basin revolve around adequate water supplies. In recent years drought has been a large contributing factor to reduced water levels in the Klamath Basin. Agriculture, fish and wildlife depend on above average snow pack levels and precipitation in order to thrive over the dry summer months.

Mountain snowpack is largely responsible for the presence of water in the basin. NRCS monitors snowpack and forecasts streamflow through 13 snow telemetry (SNOTEL) sites. Two additional SNOTEL sites are in the process of being installed. The Water and Climate Center operates one Soil Climate Analysis Network (SCAN) site in the Upper Klamath Basin. The SCAN site is located on lower elevation agricultural lands and measures precipitation, temperature, soil moisture, and wind as well as other weather and soil data.

Klamath Basin NRCS SNOTEL Site Locations



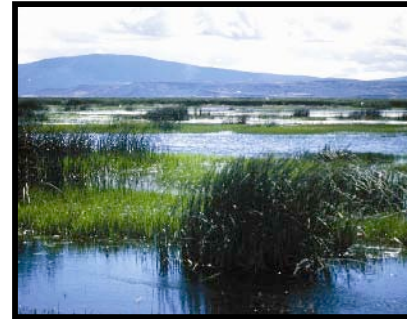
Wetlands

The Upper Klamath Basin is a historic marsh area with rich wildlife and fish diversity. There are two U.S. Fish and Wildlife Service (USFWS) National Wildlife Refuges located in the Upper Klamath Basin. These wildlife refuges provide a stopover for 85 percent of the ducks, geese and other birds that migrate through the Pacific Flyway from Alaska to South America. The Basin supports the largest wintering population of bald eagles in the contiguous United States and the highest number of nesting pairs in Oregon (Puchy and Marshall 1993). Streams in the Basin provide spawning and rearing habitat for threatened and endangered suckers, Bull trout and Coho salmon, as well as Redband trout, which the USFWS has listed as a species of concern.

Sixty-five percent of the natural wetlands in the Klamath Basin have been drained for agriculture, beginning in the late 1800s. Today, less than 25 percent of the historic wetlands remain. State and Federal agencies protect about 17,400 acres of nearly 50,000 acres of natural wetlands that once surrounded Upper Klamath Lake and Agency Lake. There are significant efforts to restore wetlands by individuals, organizations and Federal agencies. Wetlands restored or under restoration total an additional 18,200 acres.

NRCS in Klamath Basin has enrolled nearly 10,500 acres in the Wetland Reserve Program (WRP). Conservation partner groups have also targeted the Basin for future wetlands development projects.

There is high landowner and public interest in restoring and maintaining riparian habitat along these streams. NRCS is also working with landowners and other agencies on projects to improve fish passage, particularly along the Shasta River.



Socio-Economic

Since irrigation water was shut off in the spring of 2001, farmers, ranchers, local conservationists, resource agencies and organizations, Klamath Tribes, and local communities are working to solve a number of natural resource, and associated economic, political, and social, concerns in the basin.

Resource concerns initially focused largely on decreasing agricultural water demand, increasing water storage, improving water quality, and developing fish and wildlife habitat. However, since the delivery of irrigation water was discontinued in 2001, a number of other related issues, concerns, and problems have emerged. For example:

- Economics and Agricultural Viability:
 - It is estimated that \$79 million was lost in reduced employment, proprietary income, and property value as a result of the 2001 irrigation water loss.
 - Personal income was reduced by 3.1 percent and employment decreased by 3.5 percent.
 - PacifiCorp, the local utility company, intends to raise electricity rates as much as 1,000 percent to match market rates when a current 50-year contract expires in April, 2006. This will adversely affect 1,300 customers on the Klamath Reclamation Project and neighboring lands.
 - Groundwater levels have been decreasing which adds pumping costs and creates uncertainty over its continued use in lieu of surface water.
- Culture and Community:
 - Among the Indian Tribes in the Klamath Basin, serious concerns have surfaced over the survival of culturally important fish species and habitat restoration needed to ensure their survival.
 - In communities throughout the Klamath Basin, discussions continue among farmers who need scarce water for their crops, and others, who believe it should be used to preserve threatened and endangered fish.
- Policies and Regulations
 - The USFWS and the National Marine Fisheries Service (NMFS) have concluded that the BOR biological assessment of its proposed operation of the Klamath Project would jeopardize the existence of endangered or threatened species. An acceptable, long-range plan for the recover of listed species has yet to be developed.
- Litigation
 - Although litigation continues, some local landowners, conservationists, and other stakeholders believe that collaboration, negotiation, and the acceptance of new approaches to resource management in the Upper Klamath Basin may hold more promise for conflict resolution and environmental conservation than litigation.

Program Activities

Funding

NRCS administers a wide range of programs to help producers protect, restore, and enhance natural resources on private lands.

In addition, congressionally earmarked funds provided \$50 million for Ground and Surface Water Conservation (GSWC) efforts under the provisions of the Environmental Quality Incentives Program (EQIP) in the Klamath Basin over the life of the 2002 Farm Bill.

NRCS Program Funding, Klamath River Basin
2002 – 2005

NRCS Program	Financial Producer Incentives Funding from 2002 through 2005	Producer Technical Assistance Funding from 2002 through 2005
Conservation Technical Assistance	na	\$5,022,322
Conservation Reserve Program (and Enhancement Program)	\$3,306,851	\$97,915
Environmental Quality Incentives Program	\$3,045,980	\$795,815
Environmental Quality Incentives Program (GSWC)	\$649,348	\$199,491
Environmental Quality Incentives Program Klamath (GSWC)	\$35,731,700	\$7,176,715
Wetland Reserve Program	\$11,446,943	\$648,863
Grassland Reserve Program	\$432,250	\$79,979
Wildlife Habitat Incentives Program	\$616,000	\$73,200

Conservation Measures

Conservation programs assisted producers in applying a broad range of conservation measures on the landscape in the Klamath River Basin between 2002 and 2004:

Conservation Measure	Acres
Conservation Systems Planned	126,071 acres
Irrigation Water Management	23,344 acres
Wildlife Habitat	13,863 acres
Upland Habitat	9,689 acres
Prescribed Grazing	35,833 acres
Wetlands Created, Restored, or Enhanced	2,281 acres
Buffers	2,786 acres
Fish Habitat Protection	5,572 acres

In the spring of 2001, the combination of drought and the impact of the Endangered Species Act triggered a shutdown of irrigation water during the growing season. NRCS, in cooperation with local

conservation districts, provided a quick infusion of technical assistance and \$2 million in cost-share funding for 41,000 acres of cover crops through the Emergency Watershed Protection Program. The ability of the local office to receive funding, engage community members and other partners, plan resource improvements, implement actions, and monitor success proved to be an invaluable asset for the community.



NRCS assistance to address resource concerns is not limited to on-farm conservation practices. Through its Resource Conservation and Development program, NRCS helps the Ore-Cal and Trinity RC&D Councils to address various issues. A focus of the councils are projects that demonstrate the use of biomass for cogeneration and space heating.

NRCS is strengthening its partnership with tribes in the Basin. In 2002, NRCS and the Hoopa Tribe formalized their working relationship with a memorandum of understanding. In 2003, the Yurok Tribe undertook its first EQIP project. NRCS is working with the Karuk Tribe on its first CRP project.

Helping private landowners and tribes develop and apply practical, common-sense solutions to complex resource issues will be the challenge of the conservation partnership well into the future. USDA, in concert with the local conservation districts, will continue to play a critical role by delivering technical and financial assistance to Klamath Basin farmers and ranchers.

Conservation Effects

Resolving water and ESA issues in the Klamath Basin is dependent on the effectiveness of conservation efforts implemented on private lands. Studies are being initiated to evaluate conservation effects. Landowners who have adopted conservation practices are noticing changes in the landscape. Some examples are:

- Farmers, who have converted from surface to sprinkler irrigation, report increased crop yields and labor savings. Changes in water use with improved irrigation seems to be variable depending on location, soils, water source (surface or well) and level of management. On-farm water savings ranges from _ foot to more than 1 _ feet per acre. NRCS is collecting data and developing models to calculate cumulative impacts to the watershed.
- Ranchers, who have conducted brush control to remove juniper, report renewed flow of springs on their property suggesting a reduction of evapotranspiration rates.
- The Nature Conservancy has measured increased larval sucker survival associated with wetland restoration projects funded with WRP on Tulana Farms.
- Wetlands restored provide critical habitat to a variety of migratory birds, including sensitive species such as the Pintail duck. The majority of acres associated with flood plains restoration are working to restore the land to historic hydrologic conditions.
- Ranchers, who have participated in stream restoration projects funded by CREP or USFWS, see improved stream bank vegetation and a corresponding reduction in bank erosion and loss of land. Associated with these changes is a narrowing of the stream channel which raises water levels and lessens thermal warming. This improves water quality and habitat for aquatic species.

Scientists continue to study resource concerns and issues in the Klamath Basin, including surface and groundwater hydrology, limnology of Upper Klamath Lake, water quality relationships in area streams, value and function of wetlands and riparian areas, sucker biology, among others. These studies will provide decision makers with sound information to ensure conservation efforts are focused on the most cost efficient and effective solutions.



The Independent Multidisciplinary Science Team (IMST), a scientific review panel charged with advising the State of Oregon on matters of science, concluded in their study of the Klamath Basin that wetland and riparian restoration could lower the risk of sucker die-offs and enhancement of tributary spawning habitat would improve their survival.¹ Similarly, the National Research Council of the National Academies of Science emphasized the importance of wetland/riparian restoration and improvement of water quality as key factors regarding the survival of suckers and downstream coho salmon.²

From 2002 to 2004, an interdisciplinary planning team from NRCS conducted a rapid assessment of the Upper Klamath Basin.³ A similar assessment for the lower basin has been initiated. These assessments include estimates of present resource conditions, conservation treatment recommendations, resource effects, and identification of programs for addressing resource concerns. This information was provided so the districts could make decisions, set priorities and determine the best conservation activities to achieve their goal of achieving a reliable water supply for agriculture. Overall, the planning team concluded implementation of conservation activities in the Sprague River Subbasin would produce the greatest environmental benefit. Specifically, the greatest potential for improving water quality, restoring aquatic habitat and reducing irrigation water demand exists in the Sprague.

Most scientists studying water and ESA issues in the Upper Klamath Basin agree that water quality and habitat conditions are at least equal, if not more important than, water conservation. They also understand the impact of more research and monitoring through collaborative efforts to quantify effects and prioritize the most effective conservation activities and locations.

Recognizing this need, NRCS initiated a Conservation Effects Assessment Project (CEAP) on the Sprague River watershed. The project will focus on understanding how conservation and land management activities affect the hydrologic budget, water quality and habitat. The assessment will be accomplished through collection of existing data, monitoring conservation activities in the field, and applying the best science to evaluate the results. The key to the Sprague CEAP project depends on close collaboration with scientists in other organizations, such as USGS studying groundwater hydrology, the Klamath Tribes monitoring water quality and habitat, and many others. Preliminary results should be available in early 2007. The results will help NRCS identify the effectiveness of conservation practices such as wetland or riparian restoration, upland management (forest stand improvement and juniper control), and irrigation water management to improve late summer stream flow, water quality and aquatic habitat.

Potential Farm Bill Initiatives

Based on the research and assessments completed by NRCS and other agencies combined with the implementation of conservation activities by private landowners, the following potential Farm Bill initiatives have emerged.

Program priorities in the 2002 Farm Bill and initial limited understanding of the source and cause of resource problems in the Basin have narrowed some conservation decisions from what they might have been. Even so, the Farm Bill funding provided has helped to empower and mobilize solutions within the agricultural community. This momentum could be sustained by moderate policy changes in the 2007

¹ IMST Review of the USFWS and NMFS 2001 Biological Opinion on the Management of the Klamath Reclamation Project and Related Reports, Technical Report 2003-1, October 2003, <http://www.fsl.orst.edu/imst/reports/2003-01.pdf>

² Endangered and Threatened Fishes in the Klamath River Basin-Causes of Decline and Strategies for Recovery, 2004, National Academy of Science, <http://books.nap.edu/catalog/10838.html>.

³ Upper Klamath Basin-Opportunities for Conserving and Sustaining Natural Resources on Private Lands, NRCS, 2004.

Farm Bill to address what has been learned. NRCS has strengthened community and agency partnerships focusing on the key issues within the Basin. This strong conservation partnership is well positioned to provide leadership in the future to assist in resolving long standing problems associated with drought, endangered species and the health of the farming and ranching communities.

The next Farm Bill could be broadened so its priorities, policies, and criteria can be further adapted and modified throughout its duration. In this way the programs and available funding can be focused on the most effective solutions to water, ESA-related issues, and other environmental concerns. As stated in the NRCS Chief's *2004 Work Plan for Adaptive Management in the Klamath Basin*, "...as NRCS, conservation districts, and others learn more about the effectiveness of the conservation being applied, priorities, practices, funding, and policies can then be adapted to continually improve future efforts." ⁴

Recommendations for consideration:

- Continue the Conservation Reserve Enhancement Program and Wetlands Reserve Program to restore wetland and riparian areas and improve water quality, habitat and water storage in the soil profile.
- Similar to WRP, permit limited grazing on CREP land to control vegetation to meet both landowners' and restoration objectives.
- Allow more opportunity through EQIP or similar programs so funding can be targeted to address unique resource concerns identified for each watershed.
- Modify the EQIP Ground and Surface Water Program to allow for water quality and wetland/riparian restoration as resources concerns. The use of current Klamath EQIP funds are limited by the primary resource concern of the GSWP, preventing NRCS from using Klamath EQIP funding for conservation practices that would address these resource issues.
- Design program policies so criteria can be adapted and modified as conditions change and knowledge about resource problems and solutions increases.
- Establish policies in all programs that provide the opportunity to leverage Farm Bill funding with cost shares from other Federal and state agencies, tribes and local organizations.
- Re-establish the Small Watershed Program (authorized by PL 83-566) or create a new program to address resource solutions that must be addressed on a watershed basis (e.g. water storage) or involves many landowners (e.g. improved irrigation delivery system).
- Continue to support funding for monitoring and evaluation, like CEAP, so additional information can be gathered and used to improve and adapt conservation solutions

⁴ Work Plan for Adaptive Management, Klamath River Basin, Oregon & California, NRCS, May 19, 2004
Conservation Resource Brief *Klamath River Basin*