

**United States Department of Agriculture
Natural Resources Conservation Service**

**WORK PLAN FOR ADAPTIVE MANAGEMENT
Klamath River Basin
Oregon & California**

**May 19, 2004
Oregon & California
NRCS**

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

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Summary

Introduction: In the spring of 2001 drought and impacts of the Endangered Species Act prompted the U.S. Bureau of Reclamation to discontinue supplying project irrigation water to over 1,300 farms and ranches in the Klamath Basin. The Natural Resources Conservation Service (NRCS) immediately provided technical and financial assistance to these producers to minimize drought impacts. In cooperation with the Conservation Districts and landowners, NRCS was able to establish 41,000 acres of cover crops on highly erodible lands using Emergency Watershed Protection Program funds.

The Klamath Basin conservation districts in Oregon and California then requested NRCS assistance in developing a strategy to mitigate the impacts of drought on agriculture in the Klamath Basin. Later that year, the first of a series of strategic planning sessions was held. From these meetings, the local conservation districts developed a list of mutual resource goals and objectives for the Klamath.

To mitigate the effects of the drought on agriculture, conservation districts throughout the 10-million-acre Klamath Basin have focused on four resource concerns: (1) decreasing the amount of water needed for agriculture, (2) increasing water storage, (3) improving water quality, and (4) developing fish and wildlife habitat. To achieve these objectives, the conservation districts need timely, quality resource information with which to make decisions, set priorities, and determine the best conservation activities. The future conservation activities and accomplishments, however, will be subject to the availability of funding.

Recent Accomplishments: Substantial conservation planning and implementation was completed during fiscal years 2002 and 2003 (see Table 2). Conservation systems planning has been finalized on 58,922 acres to reduce agriculture's demand for water, improve hydrologic conditions, and restore habitat and water quality for fish and wildlife. Planning has been completed for specific practices to improve irrigation water management on 53,904 acres, with 15,569 acres applied. More practices will be installed as plans are completed and contracts are funded.

Rapid Subbasin Assessments: In addition to the conservation work implemented on private lands, NRCS, with the guidance of the local conservation districts, has nearly completed the first phase of the Adaptive Management Plan. In response to the conservation districts' request, the NRCS Water Resources Planning staff in Oregon and California initiated rapid subbasin assessments of the natural resources in January 2002. Currently, the conservation districts are reviewing and adapting the subbasin assessments in order to set priorities and determine the best conservation activities to achieve their goals.

Projected Accomplishments with the 2002 Farm Bill: Under the 2002 Farm Bill, NRCS estimates that it will allocate approximately \$76 million through FY 2007 to provide technical and financial assistance to producers in the Klamath Basin to address resource concerns. A portion of these funds is due to efforts by the Lava Beds/Butte Valley Resource Conservation District, Klamath Soil and Water Conservation District and others which led to a Congressional earmark for \$50 million in the 2002 Farm Bill, under the Ground and Surface Water Conservation provisions of the Environmental Quality Incentives Program. With this level of funding for the next five years, NRCS anticipates planning and applying 224,290 acres of conservation systems; 136,900 acres of irrigation water management; 194,800 acres of upland watershed management practices; and over 27,600 acres of wetland, wildlife, and conservation buffer enhancements. We are using technical services providers to assist in cultural resource surveys, forestry practice implementation and engineering design.

Basinwide Conservation Needs: Preliminary basinwide estimates indicate a need and demand (assuming a 70 percent level of participation) for 1,253,300 acres of applied conservation systems throughout the Klamath Basin. Approximately 391,300 acres of irrigation water management, 71,900 acres of fish and wildlife habitat, and 1,258,200 acres of upland watershed management need conservation treatment.

Additional basinwide planning will provide more accurate estimates of the total long-term (2 to 20 years) conservation needs and resource effects. The information can be used to achieve the conservation districts' goal of a reliable water supply for agriculture and the environment. Other conservation needs will include the tribes. The Hoopa Valley Tribe is using the NRCS irrigation design to procure outside funding which will increase agricultural income to the Tribe. Future work with the Hoopa Valley Tribe is likely to include the development of irrigated agriculture that is environmentally sustainable, the improvement of resource management, and a survey of soils on the tribal land. The Yurok Tribe is especially interested in NRCS's technical assistance and has identified the current conditions of roads as a major resource concern. NRCS is currently working with the Tribe, using the Environmental Quality Incentives Program, to address this concern. Priorities, practices, funding, and policies will be continually adapted as NRCS, conservation districts and others monitor and evaluate the effectiveness of applied conservation practices.

It is critical that NRCS and the conservation districts work jointly in this planning effort with other government agencies, special interest groups, organizations, and individuals. Resolution of the current water problems in the Klamath Basin requires cooperation, compromise, and creativity.

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INTRODUCTION

The Klamath River Basin gained national attention in the spring of 2001 when a combination of drought and the impacts of the Endangered Species Act triggered a shutdown of irrigation water during the growing season to more than 1,300 farms and ranches in the US Bureau of Reclamation (Reclamation) project area. NRCS immediately began providing technical and financial assistance to these producers to minimize drought impacts. In cooperation with conservation districts, NRCS was able to establish 41,000 acres of cover crops on highly erodible lands using Emergency Watershed Protection Program funds. Recognizing the broader implication of the resource issues, the Klamath Soil & Water Conservation District (SWCD) in Oregon and the Lava Beds/Butte Valley Resource Conservation District (RCD) in California met in the first of a series of strategic planning sessions. The basinwide nature of the resource issues subsequently brought the locally elected officials from these two conservation districts together with officials from the districts in the lower Klamath Basin: Humboldt RCD, Shasta Valley RCD, Siskiyou RCD, and Trinity RCD.

Goal and Objectives

The primary goal of the six Klamath Basin conservation districts is to achieve a reliable water supply for agriculture.

The core objectives of the conservation districts are to:

- Decrease water demand
- Increase water storage
- Improve water quality
- Develop fish and wildlife habitat

In response to the conservation districts' request, the NRCS Water Resources Planning staffs in Oregon and California initiated rapid subbasin assessments of the natural resources in January 2002. 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 that districts could make decisions, set priorities, and determine the best conservation activities to achieve their goals. Future planning assistance will include determinations of cumulative effects and specialized conservation applications.

At the same time, congressionally earmarked funds provided \$50 million for Ground and Surface Water Conservation efforts under the provisions of the Environmental Quality Incentives Program in the Klamath Basin. To date, NRCS has received over 500 applications for this program and has been able to begin work on implementing applications at current staffing levels. In addition NRCS has partnered with local sponsors to fund restoration efforts utilizing the Wetlands Reserve Program and the Wildlife Habitat Incentives Program.

The Klamath Basin conservation districts all met and developed an overall strategy to address resource conservation priorities and funding to achieve their goal for the entire basin. Following is a list of possible on-farm/ranch and basinwide outcomes the conservation districts and NRCS have identified that may result from conservation activities in the Klamath Basin.

Potential Outcomes

On-Farm/Ranch Outcomes:

- Reduce water use by improving irrigation systems and water management
- Improve water quality, soil quality, and watershed health through resource management on grazing lands, forestlands, and cropland
- Enhance wildlife habitat for upland and aquatic wildlife
- Restore wetlands to improve fish and wildlife habitat and water quality
- Maintain economically viable agricultural enterprises
- Mitigate agriculture power rate increases by exploring new energy and water efficient irrigation systems

Basin-Scale Outcomes:

- Preserve and protect the agricultural base that supports economically viable agricultural communities
- Screen diversions to enhance species recovery
- Reduce water use by improving non-Reclamation irrigation delivery systems
- Develop off-site water storage for irrigation, livestock, and wildlife
- Restore habitat and hydrologic conditions by restoring wetlands, ecosystem flows, floodplains, and forestlands

SETTING AND BACKGROUND

Land Use and Ownership

The Klamath Basin, located on the border between Oregon and California, covers slightly more than 10 million acres. There are approximately 3.7 million acres of private land, 6.2 million acres of public land, and 90,000 acres of tribal land in the Basin. On the private land, there are well over 2,000 farms operating on roughly 556,800 acres. Reclamation estimates that 447,000 acres, or 80 percent, of the agricultural lands in the Klamath Basin are irrigated. Only about 220,000 acres, or half, of these are irrigated with Reclamation-supplied water. A majority of the private range and forestland are used for grazing and timber production. Table 1, below, breaks down the land use/land cover acreage. Figures 1 and 2, on the following pages, show land ownership, land use, and land cover in the Klamath Basin.

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 USGS 1:250,000-scale Land Use and Land Cover (LULC) Data and 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.

Figure 1. Klamath Basin Land Ownership Map

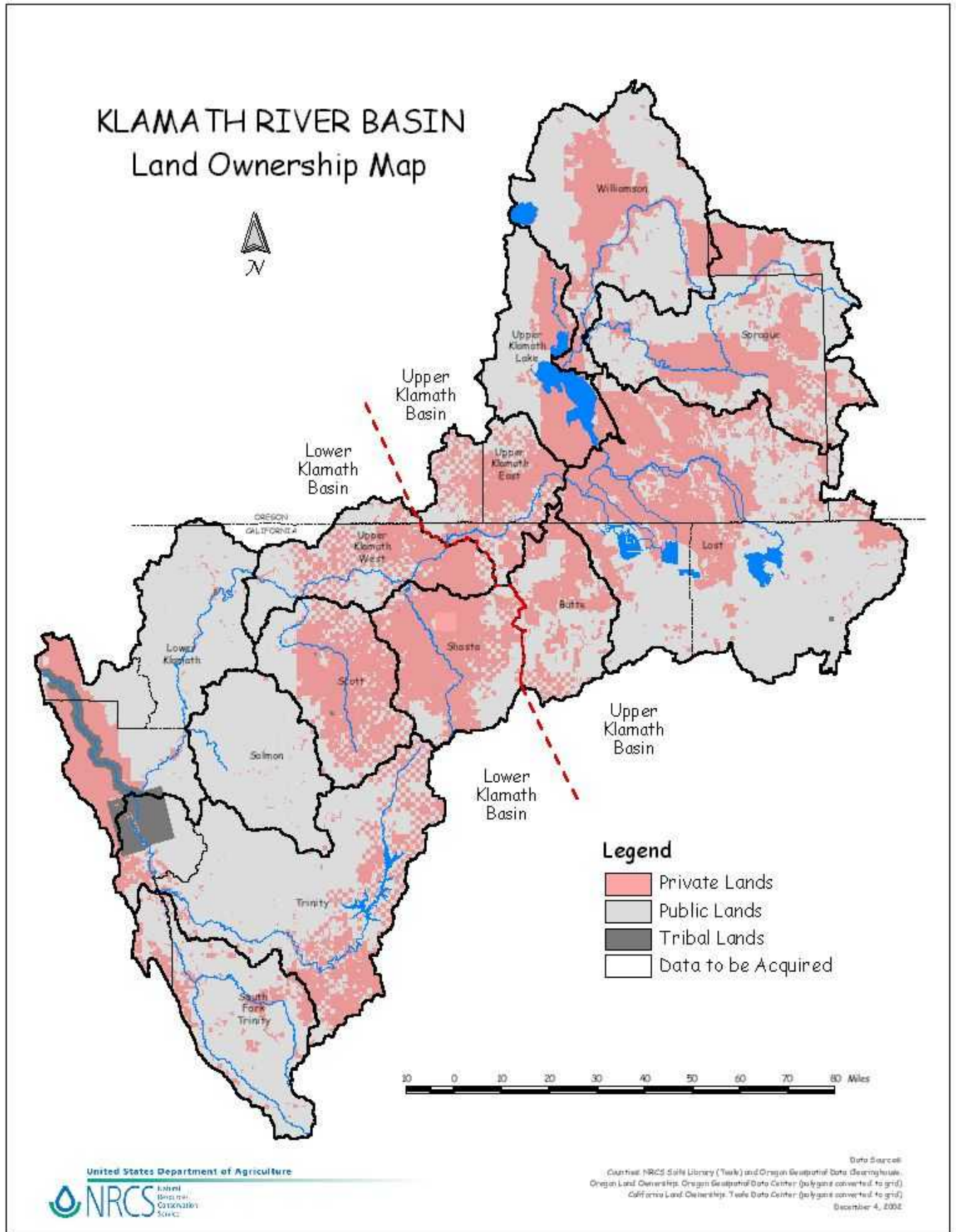
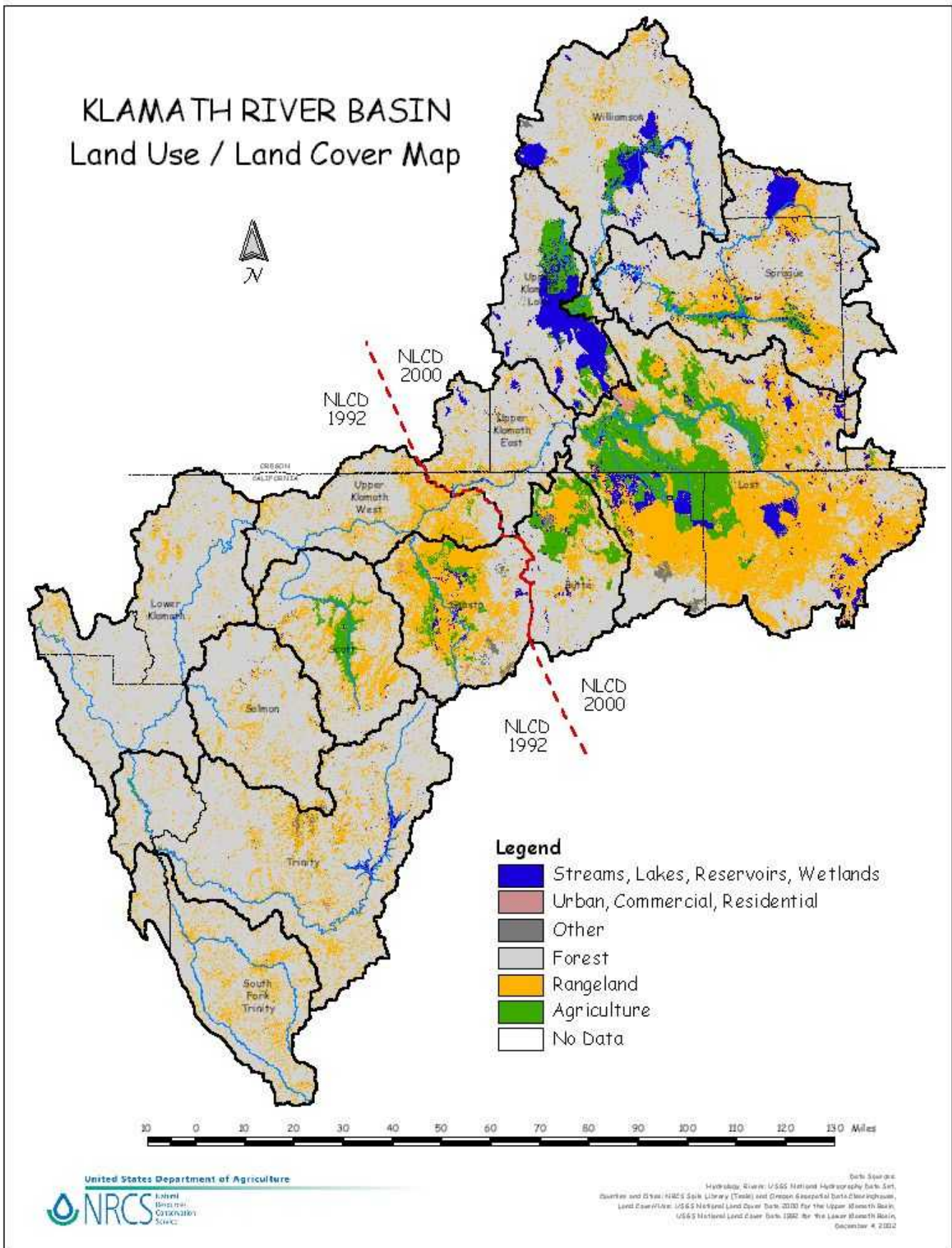


Figure 2. Klamath River Basin Land Use / Land Cover Map



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.

Socioeconomics and Demographics of the Klamath Basin

- *Economics:* The preliminary economic impact in the Upper Klamath Basin (UKB) in 2001, the year the irrigation water was shut off, was estimated by Oregon State University at \$157 million lost in total agricultural sales. An additional \$79 million was lost in reduced employment, proprietary income, and other property value. In the three-county region of the UKB, personal income was reduced by 3.1 percent (or \$70 million), while employment was reduced by 3.5 percent (about 2,000 jobs).
- *Tribes:* In the Klamath Basin there are six Tribes: the Yurok, Karuk, and Hoopa Valley Tribes in California; and the Klamath, Yahooskin, and Modoc Tribes (a confederation known as the Klamath Basin Tribes) in Oregon.
- *Communities:* The elimination of agricultural irrigation water had significant impact on the Basin communities. Conflicts among farmers, ranchers, environmentalists, government agencies, Tribal members, and agricultural workers caused polarization within and between communities. Uncertainty about the future of agriculture led to frustration and fear, and affected social service agencies, schools, state and federal agencies, and local businesses.

Other Policies and Regulations Impacting Resource Concerns

Biological Assessment and Opinions: In February 2002, the USBR published an Endangered Species Act (ESA) biological assessment of its proposed operation of the Klamath Project through March 2012. In May 2002, the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) each issued a biological opinion on the proposed operation. Both opinions concluded that the proposal would jeopardize the existence of endangered or threatened species, and each presented a reasonable and prudent alternative (RPA) to avoid such consequences. The RPAs propose actions to be taken by Reclamation that address water quality, water quantity, and aquatic habitat improvement. These actions would affect land users both within and outside of the Klamath Project service area. The NMFS opinion reports that the Project's service area comprises 57 percent of the irrigated area that affects flows in the Klamath River above Iron Gate Dam.

Total Maximum Daily Load (TMDL): The Oregon Department of Environmental Quality (ODEQ) has developed TMDLs for Upper Klamath Lake and associated tributaries. The Oregon DEQ and California North Coast Regional Water Quality Control Board are working cooperatively to develop TMDLs for the remaining water quality impaired water bodies in the Klamath Basin, including the Lost River, Klamath Straits Drain and the Klamath River from Link River to the Pacific Ocean. These rivers have both temperature and nutrient problems requiring interstate and interregional coordination. In addition, for portions of these rivers within Oregon and California, the TMDLs will also address problems with pH, dissolved oxygen, ammonia toxicity and bacteria. The Klamath River in California is listed for low dissolved oxygen. Tulelake and Lower Klamath Lake refuges in California are also listed for pH. Shasta, Scott and Trinity Rivers are also on California's 303d list of water quality limited water bodies. For both ESA-listed suckers and Coho salmon, poor water quantity has been identified as one of the limiting factors.

Adjudication: The State of Oregon is presently adjudicating the water rights in the Upper Klamath Basin. Water budgets that address timing, quality, and quantity in the basin are also needed to assess the cumulative impacts associated with NRCS program implementation, and to evaluate water quantity and availability for other identified beneficial uses.

Effects of Litigation on Klamath Conservation: The number, variety, and diversity of plaintiffs provide an indication of the degree of conflict and the lack of productive communication and trust occurring in the Klamath Basin. Collaboration among federal, state, and local agencies, tribes, organizations, and individuals can lead to solutions rather than further litigation, which often complicates efforts and diverts assets from solving natural resource problems.

RECENT ACCOMPLISHMENTS

During FY 2002 and 2003, NRCS planned conservation systems on 58,922 acres, irrigation water management on 53,904 acres, conservation buffers on 1,828 acres, wetlands and wildlife restoration or enhancement on 12,631 acres, and upland watershed management improvements on 13,736 acres (see Table 2).

ADAPTIVE MANAGEMENT PLANNING IN THE KLAMATH BASIN

To meet the goals and objectives of the conservation districts, NRCS is providing technical assistance under an adaptive management strategy (see Figure 3). Through NRCS Farm Bill programs, conservation systems are being implemented on private lands using the best applied science currently available. NRCS technical standards, quality criteria, and planning policies ensure positive on-farm effects on resource concerns.

Rapid subbasin assessments provide both NRCS and the conservation districts information to prioritize the application of conservation practices in the Basin. NRCS and the conservation districts also recognize the need to evaluate cumulative impacts beyond the farm boundaries to determine the extent that their conservation activities effectively address basinwide resource issues such as water quality and species recovery. The cumulative impact analysis needs to be done in partnership with the other natural resource agencies, organizations, and groups in the 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.

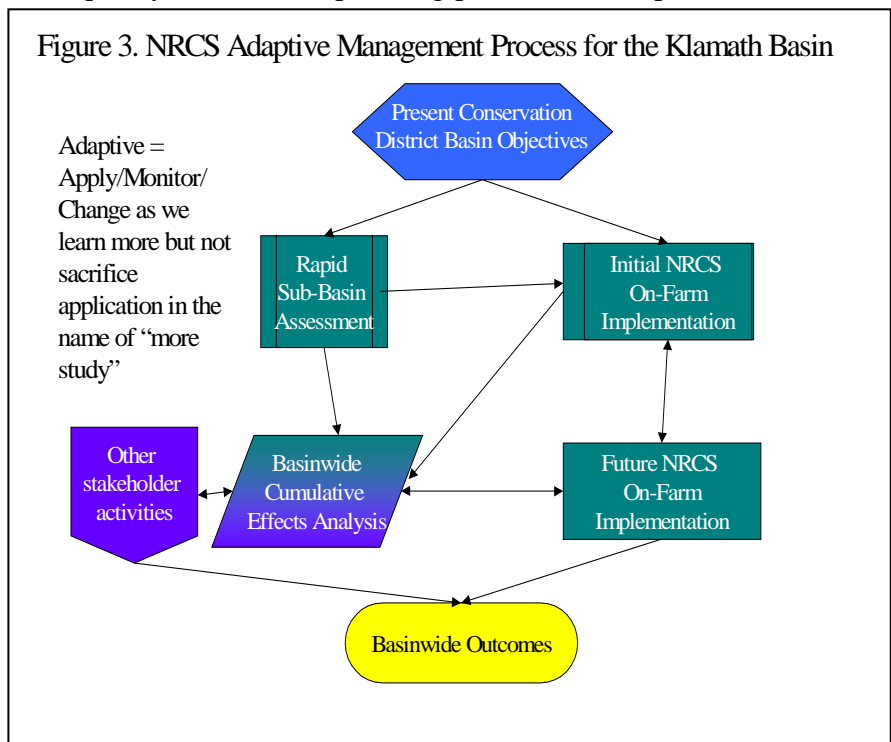


Table 2. On-Farm Klamath Basin Accomplishments for FY 2002 and 2003

Accomplishments	Program	Lower Klamath Basin	Upper Klamath Basin		Total Klamath Basin
		California	California	Oregon	
Customers Assisted (number)	CO-01	764	186	37	987
	EQIP	630	65	85	780
	KB EQIP	458	489	840	1787
	EQIP(GSW)	0	0	2	2
	WHIP	6	40	7	53
	GRP	16	2	16	34
	WRP	1	25	6	32
	CRP/CCRP	228	31	77	336
	Subtotal	2103	838	1070	4011
Conservation Systems Planned (acres)	CO-01	2432	822	0	3254
	EQIP	2009	2500	2538	7047
	KB EQIP	5896	21774	14928	42598
	EQIP(GSW)	0	0	0	0
	WHIP	25	1391	437	1853
	GRP	0	0	0	0
	WRP	0	1500	385	1885
	CRP/CCRP	1219	21	1045	2285
	Subtotal	11581	28008	19333	58922
Irrigation Water Management Planned (acres)	CO-01	0	100	0	100
	EQIP	497	1250	745	2492
	KB EQIP	5285	21487	22109	48881
	EQIP(GSW)	0	0	931	931
	WRP	0	1500	0	1500
	Subtotal	5782	24337	23785	53904
Irrigation Water Management Applied (acres)	EQIP	433	0	254	687
	KB EQIP	1662	1782	11128	14572
	EQIP(GSW)	0	0	310	310
	Subtotal	2095	1782	11692	15569
Conservation Buffers (acres)	EQIP	578	0	18	578
	CRP/CCRP	1219	31	914	1250
	Subtotal	1797	31	932	1828
Upland Watershed Management (acres) ¹	EQIP	1108	1500	520	3128
	KB EQIP	0	0	5668	5668
	GRP	0	0	4940	4940
	CRP/CCRP	0	0	0	0
	Subtotal	1108	1500	11128	13736
Wetlands Created, Restored or Enhanced (acres)	EQIP	100	0	0	100
	WHIP	0	8	0	8
	WRP	0	1500	723	2223
	CRP/CCRP	4	0	0	4
	Subtotal	104	1508	723	2335
Wildlife Habitat (acres)	CO-01	50	0	0	50
	EQIP	1003	1500	118	2621
	KB EQIP	12	0	1173	1185
	WHIP	25	1441	9	1475
	WRP	0	1500	1147	2647
	CRP/CCRP	1187	86	1045	2318
	Subtotal	2277	4527	3492	10296

MEASURING PROGRESS

NRCS and the conservation districts rely on the Performance Results System (PRS) to report and measure progress. The local planning staff in the Klamath Basin will be responsible for monitoring results and adapting resource management systems on private agricultural lands.

Measuring and evaluating progress for adaptive management in the Klamath Basin would be facilitated by:

- Creating a data entry page in PRS to track local resource concerns.
- Developing a GIS database to track Resource Management Systems and practices installed.
- Working with landowners to ensure appropriate installation of conservation systems and practices and meeting operation and maintenance requirements.
- Collaborating with local, state, and federal agencies, organizations, and individuals to develop a system to measure the cumulative effects of conservation systems.

ON-FARM PLANNING AND IMPLEMENTATION WITH THE FARM SECURITY AND RURAL INVESTMENT ACT OF 2002 (THE FARM BILL)

On-farm planning and implementation includes one-on-one landowner technical assistance by certified NRCS planners to develop individual farm and ranch conservation plans, and to obtain financial assistance for land owners and operators to apply conservation systems. Implementation of conservation systems and practices requires a combination of technical assistance (TA) and financial assistance (FA). TA is used to assist in conducting resource inventories, evaluating inventory data, providing tools and techniques to implement systems and practices, and installing many of the management practices that require minimal financial support. FA provides cost-share assistance, which is leveraged with contributions from the landowner or other sources and economic incentives to install more costly conservation systems and practices. This section displays the projected on-farm accomplishments (Table 3) using *estimates* of funding from the Farm Bill and Conservation Technical Assistance (CTA/CO-01). All future activities are subject to the availability of funding.

Projected On-Farm Accomplishments and Funding (2003–2007)

It is *projected* that for the duration of the 2002 Farm Bill, NRCS will plan and/or apply 224,290 acres of conservation systems; 136,900 acres of irrigation water management (IWM); 194,800 acres of upland watershed management practices; and over 27,700 acres of wetland, wildlife and conservation buffer enhancements (Table 3).

Note that the *applied* acres of conservation will lag behind *planned* acres based on the length and stipulations in landowner contracts and each individual landowner's planning horizon. Furthermore, conservation system and practice installation will vary based on the funds actually received and the availability of the field office staff and technical service providers.

Using *projected* Farm Bill assistance funds, NRCS intends to address resource issues in the Klamath Basin through all the appropriate programs available. NRCS estimates that the agency may allocate approximately \$54 million from available Farm Bill funds for landowner FA through FY2007 in the Klamath Basin. Based upon this level of FA funding, NRCS estimates it may need approximately \$22 million for TA—these are costs resulting from staffing, engineering, and design work and consulting with farmers and contractors in the Klamath Basin. Total technical and financial assistance funds *estimated* to be available for the Klamath Basin through FY2007 is approximately \$76 million.

Table 3. Projected 5-Year Farm Bill Accomplishments: FY2003 - FY2007

On-Farm Accomplishments	Lower Klamath Basin	Upper Klamath Basin		Total Klamath Basin
	California ¹	California ¹	Oregon	
Conservation Practices Needed				
Conservation Systems Planned (acres)	19,140	96,820	108,330	224,290
Irrigation Water Management/Irrigation Practices (acres)	13,000	55,400	68,500	136,900
Conservation Buffers (acres)	1,000	150	700	1,850
Upland Watershed Management (acres)	15,800	86,400	92,600	194,800
Wetlands Created, Restored or Enhanced (acres)	500	350	3,900	4,750
Wildlife Habitat (acres)	1,140	7,840	12,100	21,080

¹Source: Field office estimates.

BASINWIDE CONSERVATION NEEDS AND DEMAND

The objective of Klamath basinwide planning assistance is to provide the conservation districts, farmers, ranchers, and other conservation partners with timely resource information. This information will be presented so that it can be used to make decisions, set priorities, and determine the best conservation activities to achieve the goal of a reliable water supply for agriculture and to meet the core objectives of the local conservation districts (see page 1).

ESTIMATED LONG-TERM DEMAND (2 to 20 years, 2003-2027)

Through the rapid subbasin assessments in the Klamath Basin, NRCS developed estimates of basinwide conservation needs and demand. Basinwide need is the quantity of conservation systems needed to protect, restore, or conserve identified natural resource concerns. Basinwide demand is the number of landowners who are willing to participate in conservation activities. Initial estimates of long-term needs and demand for application of conservation systems on private farm and ranch lands is illustrated in Table 4.

The long-term demand by landowners will range from 40 to 80 percent of the total conservation need over roughly a 2-20 year period. The participation rate is estimated from detailed questioning of local landowners and professionals from numerous agencies and organizations. Different levels of participation are expected from each subbasin based on the individual characteristics of area landowners, their operations, and the recommended conservation practices or systems, as well as the capacity of the community to support conservation. The technique is based on over 50 years of adoption and diffusion research on agricultural innovations.² As part of the rapid subbasin assessment, NRCS has developed a planning cost estimator that local people can use to update their estimates of participation as outreach, education, and cost-share programs are delivered to the basin.

² Additional details can be found in NRCS Social Sciences Technical Note 1801, *Guide for Estimating Participation in Conservation Operations and Watershed Protection Projects*.

Table 4. Estimated Long-Term Demand for Conservation (2-20 years, 2003-2027)

Long-Term Conservation on Private Lands ^{1,4}	Lower Klamath Basin	Upper Klamath Basin		Total Klamath Basin
	California ³	California	Oregon	
Conservation Practices Needed				
Conservation Systems Applied (acres)	267,000	300,100	686,200	1,253,300
Irrigation Water Management/Irrigation Practices (acres)	41,000	91,300	259,000	391,300
Conservation Buffers (acres)³	1,500	150	3,600	5,250
Upland Watershed Management (acres)²	631,000	207,100	420,100	1,258,200
Wetlands Created, Restored or Enhanced (acres)³	500	2,000	7,300	9,800
Wildlife Habitat (acres)	63,000	1,800	7,100	71,900

¹ Long-term demand and participation in conservation by private landowners was estimated using NRCS Technical Note 1801 (revised), *Guide for Estimating Participation in Conservation Operations and Watershed Protection Projects*, except in those instances noted in Footnote 3.

² Includes conservation practices on range and forestland such as prescribed grazing, brush management, etc., to improve the ecological and hydrologic health of the watershed.

³ Source: Field Office estimates.

⁴ Assumes that current program will continue through subsequent Farm Bills.

The conservation practices and management systems identified in Table 4 will provide significant basinwide effects for reducing irrigation water demand, improving water quality, and enhancing fish and wildlife habitat. Collectively, these practices would contribute to a more stable agricultural economy and a better environment for fish and wildlife on private lands. Significant improvements in irrigation efficiencies on 391,300 acres will reduce on-farm water demand. Upland management practices on 1,258,200 acres will help improve overall watershed health and hydrologic conditions. Wildlife habitat and wetland restoration practices on 71,900 acres will improve conditions for all wildlife and fish species including those threatened and endangered. In combination, the resource management systems applied will also improve water quality, reduce erosion, and enhance resource productivity. Estimates of the actual amount of water available for other beneficial uses, as a result of these practices, need to be developed as part of a cumulative effects analysis done in partnership with NRCS, local, state, and federal agencies.

In order to make the best use of public and private resources, other conservation programs may be used in combination with, or to supplement, those of the Farm Bill.

BASINWIDE PLANNING PROCESS

Basinwide planning assistance occurs in three phases:

- **Phase 1** of the planning assistance consists of a rapid assessment of current resource conditions on private lands, recommendations on resource management systems to solve identified problems, and estimates (quantitative and/or qualitative) of on-farm effects. The

conservation districts are reviewing and adapting the subbasin assessments in order to determine the best conservation activities to achieve their goals.

- **Phase 2** would evaluate the cumulative effects of proposed resource management systems on a basinwide scale. This requires a local NRCS Klamath planning staff to be established pending available funding. With assistance from the NRCS state planning staffs and other technical specialists, the local planning staff would be responsible for completing a cumulative effects evaluation, other environmental studies, and peer reviews. Cumulative effects analyses can be used to meet NRCS's National Environmental Policy Act and Endangered Species Act responsibilities. Collaboration among interested parties, such as government agencies, tribes, organizations, groups, and individuals in the basin, will be necessary for timely on-farm and ranch implementation to occur. Cumulative effects analyses should continue throughout the duration of the project.
- **Phase 3** would provide specialized assistance with planning, designing, and implementing projects at the sub-basin or community level and also includes tasks to monitor and evaluate the effectiveness of conservation being applied. Phase 3 would be the responsibility of the newly formed local Klamath Planning Staff pending available funding.

Consultation

The conservation districts and NRCS recognized the opportunities that NRCS programs present for addressing the resource needs identified in both the Endangered Species Act (ESA) and Clean Water Act (CWA) documents. In order to accelerate the implementation of these programs in the Basin, NRCS and other partners need to estimate the cumulative impacts of the programs discussed in the plan. While NRCS programs are implemented on an on-farm basis with individual landowners, the goal of this accelerated program is to address basinwide needs in a short amount of time. While NRCS is reasonably confident in its assessment of the on-farm impacts associated with implementation of its programs, the agreement of those responsible for implementing the ESA or the CWA is necessary for the assessment of basinwide impacts. NRCS has identified a cumulative effects analysis, in partnership with all parties, as critical to the success of this program.

Other Planning Efforts

Other basinwide planning efforts are underway, such as restoration planning by the Upper Klamath Working Group (also known as the Hatfield Group); recovery planning for listed species (Reclamation, NMFS and USFWS); the Klamath River Basin Fisheries Task Force; groundwater management (USGS, Oregon Water Resources Department, and California Department of Water Resources); local watershed plans by watershed councils; and others. The NRCS/conservation district planning process is attempting to coordinate and collaborate with these other efforts.

OUTREACH

Current Status

To obtain the greatest, most widespread voluntary producer participation possible, farmers and ranchers must be: (1) aware of conservation alternatives, (2) informed as to how each

alternative works, and (3) motivated to adopt new management practices. To this end, NRCS local and state staffs have:

- Conducted six conservation and Farm Bill workshops; approximately 267 farmers and ranchers attended.
- Organized and participated in workshops and training related to conservation tillage production, irrigation water management, and agriculture management.
- Produced newsletters, brochures and provided information and copy to news media about conservation on agricultural land in the Klamath River Basin.
- Provided updates of USDA-NRCS activities at all conservation district meetings, as well as at the meetings of other local, state, and regional special interest organizations and groups.
- Held one-on-one technical conservation discussions with numerous farmers, ranchers, Klamath Tribal members, environmentalists, fish and wildlife advocates, and other stakeholders.
- Developed a Government-to-Government Memorandum of Understanding between the NRCS and Hoopa Valley Tribe.

Outcomes/Accomplishments of Outreach and Marketing

A strategic outreach and conservation marketing plan is essential for success in the Klamath Basin. A participation rate of 50–70 percent has been estimated for much of the Upper Klamath Basin due largely to (1) a high level of awareness of the resource problems, (2) familiarity and knowledge of the resource management systems being recommended, (3) availability of cost-share dollars, and (4) strong community support for conservation.

Two to three years from now, motivating Klamath producers to adopt conservation systems and practices will require more effort. Although some producers will be ready to adopt and implement conservation practices immediately, others will need additional time and information to evaluate their resource needs and conservation goals. A conservation marketing effort can address this potential gap in participation.

Outcomes of conservation marketing are:

- **Identify landowner needs**, problems, and concerns.
- **Identify ways to meet landowner needs** through the adoption of resource management systems.
- **Increase knowledge of clients** who can provide assistance to peers with decision making.
- **Identify ways to meet producers' needs for making resource decisions.**
- **Focus field office planning** on clients with critical resource needs.
- **Identify clients ready to try** new or innovative conservation practices.
- **Identify limited resource, minority, and beginning producers, and develops effective ways to reach them.**
- **Identify community issues**, leaders, and dynamics.

BUILDING AND MAINTAINING RELATIONS

Current Status

It is critical that NRCS and the conservation districts work jointly in this planning effort with other government agencies, special interest groups, organizations, and individuals.

Resolution of the current water problems in the Klamath Basin requires cooperation, compromise, and creativity. To that end, NRCS and the conservation districts have included numerous other agencies, organizations, and individuals in the subbasin assessment and planning process.

This approach requires a great deal of time and skill to maintain productive working relationships. As conservation planning and implementation evolves in the Klamath Basin, the time spent working with others increases, as does the need for specialized expertise in conflict resolution, negotiation, problem solving, and group dynamics.

It will be vitally important for all entities to work closely together to effectively satisfy ESA and National Environmental Policy Act (NEPA) requirements. This enables the implementation of on-farm conservation to proceed more efficiently and offer environmental assurances for individuals and agencies. Following is a partial list of partners:

- Local Farmers, Ranchers, and Dairy Producers
- Local Irrigation Districts
- Klamath Water Users Association
- Cooperative Extension Service
- California Department of Water Resources
- Oregon Department of Environmental Quality
- Tulelake & Klamath Experiment Station
- UKB Working Group (Hatfield Group)
- The Nature Conservancy
- Klamath Basin Tribes
- Yurok, Karuk, and Hoopa Valley Tribes
- US Bureau of Land Management
- US Fish & Wildlife Service
- US Forest Service

Potential Outcomes of Building and Maintaining Collaborative Relationships

Some of the advantages for NRCS and the Conservation Districts of developing productive, working relationships with the other principal government agencies, special interest organizations, and individuals follow:

- **Combines the technical expertise, funding, legal knowledge, and authority** of many agencies and organizations.
- **Results in more creative, enduring solutions** through cooperative efforts that may meet more than one set of goals or objectives.
- **Allows more risk taking** because responsibility for failure does not rest with any single agency or individual.
- **Shares the workload** among the appropriate agencies, organizations, and individuals.
- **Raises community awareness** and increases visibility of conservation projects and programs undertaken.
- **Provides opportunities for conservation partners** in the basin (federal, state, local, nongovernmental, Tribal, and private) to provide additional or matching funding for conservation needs in the basin.

SOIL SURVEY/TECHNICAL SOIL SERVICES

Soil surveys are the product of cooperative efforts between soil scientists, plant specialists, ecologists, soil engineers, extension specialists, and landowners. Reports include many kinds of basic information about the soils for the given survey area. This information serves as a foundation for management decisions related to a wide array of natural resource issues. Farmers can use the information to help select the most suitable crop for the kind of soil. Ranchers can use it to help determine the amount of forage production and the kinds of plants most suited to rangeland or woodland. Foresters can find information about tree types, potential for tree growth, and special soil features affecting forest harvest and tree planting in the surveys.

Soil survey reports are an excellent source of basic soil information. However, agricultural production is typically the primary focus of the reports. Other information included can depend on the age of the report and the priorities of the soil survey. Thus, information related to management options for wetland restoration and enhancement, wildlife habitat, soil quality, and other agricultural production goals may be minimal.

Soil Survey Current Status

The Klamath Basin includes portions of 16 Soil Survey Areas. Eleven of the soil surveys have been completed with the final reports either published or pending publication. The remaining five surveys are in progress. Table 5 indicates the current status of each survey.

Table 5. Klamath Basin Soil Surveys

Soil Survey Area	Status
CA600 Humboldt and Del Norte Area, CA	Mapping In Progress
CA602 Siskiyou County, Central Part, CA	Digital Data and Published Report Available
CA604 Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, CA	Digital Data Available
CA605 Humboldt Co., Central Part, CA	Mapping In Progress
CA606 Trinity Co., Weaverville Area, CA	Digital Data and Published Report Available
CA684 Butte Valley-Tule Lake Area, CA	Digital Data and Published Report Available
CA701 Six River NF Area, CA	Published Report Available
CA702 Klamath Falls NF Area, CA	Published Report Available
CA703 Modoc NF Area, CA	Published Report Available
CA707 Shasta-Trinity NF Area, CA	Published Report Available
OR632 Jackson County Area, OR	Digital Data and Published Report Available
OR640 Klamath County, Southern Part, OR	Digital Data and Published Report Available
OR680 Fremont NF Area, OR	Mapping Plans Incomplete
OR681 Klamath County, Northern Part, OR	Mapping In Progress
OR682 Crater Lake National Park, OR	Digital Data and Published Report Available
OR683 Winema NF Area, OR	Mapping In Progress

Current Status of Soil Technical Service

To be effective, the data in soil surveys must be current for the intended land use and be in a format readily available for the planner and decision maker. To this end, NRCS local and state staffs have:

- Collaborated on updating and correlating data for the two surveys: Klamath County, Southern Part; Oregon and Butte Valley-Tulelake Area, California.
- Developed soil interpretation fact sheets for use by landowners and planners within the Butte Valley-Tulelake Area.
- Initiated fieldwork related to analysis of seasonal changes in the water table within the Tulelake area.
- Initiated fieldwork related to soil interpretations for wetland restoration and enhancement options within the Sprague River Watershed.

Proposed Projects for Soil Survey/Technical Services in the Klamath Basin given available funding

- Finalize mapping with the surveys currently in progress by 2006.
- Correlate data in existing soil surveys for public and private lands.
- Update existing soil surveys to provide information on management options related to wetland restoration and enhancement, wildlife habitat, and soil quality.
- Initiate field trials for managing soil quality as related to improving irrigation water management, protecting highly erodible soils, and optimizing agricultural production.

CULTURAL RESOURCES

Based on the initial assessment of cultural resources for the area, the on-farm planning and implementation staff would need two additional archeologists through FY2007, one for the Upper Klamath Basin and one for the Lower Basin, given available funding. The archeologist for the Upper Basin could be a full-time position shared between Oregon and California NRCS. The Lower Basin archeologist would be available to assist with undertakings outside the basin. Both could be available to assist the basinwide planning team if funded.

In addition to regular field investigations, the archeologists will also conduct consultations with the State Historic Preservation Officer and federally recognized Native American tribes regarding cultural resources.

RESOURCE CONSERVATION & DEVELOPMENT

Ore-Cal and Trinity Resource Conservation & Development (RC&D) areas cover portions of five counties in the Klamath Basin.

Current Status

The following are RC&D projects impacting resource issues in the Klamath Basin:

- Two workshops on Alternative Energy Development from Biomass.
- A feasibility study looking at the potential for a biomass-fired co-generation power plant in Butte Valley.
- An assessment of biomass availability and technology suitability in Eastern Siskiyou County.
- Demonstrations of alternative power technologies that use excess waste and biomass, thereby minimizing the threat of wildfire.
- Explore potential to assist with workshops and training for technical service providers.

Potential Outcomes/Accomplishments Given Available Funding

- Reduced water use conflicts by working with local stakeholders to plan and implement an effective ground water monitoring plan.
- Reduced conflict through active promotion of consensus-building opportunities.
- Improved potential for sustained irrigation agriculture through identification of alternative power opportunities and activities that help make renewable energy systems competitive with standard power systems.

SNOW SURVEY/WATER SUPPLY FORECASTING

Better information about snowpack accumulation and the timing of spring melt would greatly improve water management decisions throughout the Basin. The Snow Survey/Water Supply Forecasting Program (SS/WSF) could install, pending available funding, up to 16 additional snow telemetry (SNOTEL) monitoring stations with full soil and atmospheric sensor arrays. Better coverage of the water producing areas would significantly improve the accuracy of the water supply forecasts.

The NRCS SS/WSF Program is also exploring supplementing the current seasonal volume forecast with short-term river discharge forecasts. The Klamath Basin will be one of two or three pilot projects, pending available funding, across the West to investigate collaborating with state agencies to produce new, short-term streamflow forecasts.

A hydrologic simulation model that integrates GIS technology could be developed for the Klamath Basin. Such a model would simulate snowmelt, evapotranspiration, soil moisture, surface and subsurface flow and their spatial and temporal variability. This model would also take into account the effects of terrain configuration and soil and vegetation characteristics. This would accomplish two goals: 1) provide an improved basis for making streamflow predictions, and 2) provide a methodology for understanding and predicting the complex interactions of water movement within the Klamath Basin. Such a model has the potential benefit of improving the accuracy of streamflow volume forecasts as well as providing additional information about streamflow timing and the spatial distribution of snowmelt, soil moisture, and streamflow generation.

(Note: Workload and Financial Data Have Been Omitted from this Work Plan)

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