Overview of the Upper Klamath Basin

Upper Klamath Basin Quick Facts

- The Upper Klamath Basin includes the Klamath, Williamson, Sprague, Lost, and Wood rivers, among others
- Several state and federal wildlife refuges are a part of the Upper Klamath Basin
- Migratory birds like the American White Pelican and the Red-necked Grebe use croplands in the Klamath Basin as a stop on the Pacific Flyway
- Deer and elk graze on wheat and barley fields and pheasants use both crop and rangelands for their nesting and feeding grounds

Background

In a landscape formed by seemingly endless cycles of drought and flood, it's no wonder that for hundreds of years, competition for water has dominated the landscape of the West.

Stretching across southern Oregon and northern California, the Klamath Basin has become synonymous with the water challenges that western water users face.

As one example, agricultural commodities that need irrigation water to thrive – providing Americans with the cheapest domestic food supply in the world, face competition from the critical water needs of sucker fish, salmon and other threatened and endangered species.

While that competition is understandable, more and more, conservation leaders in all industries have come to recognize that these water needs aren't necessarily at odds with one another, and can in fact be compatible.

While an example of the challenges today's agricultural producers and conservationists face, the Klamath Basin has emerged as an example of how diverse interests can work together successfully.

Overview of the Upper Klamath Basin

Upper Klamath Basin Description

The Upper Klamath Basin is an area of high desert, wetlands, and the Klamath River. The river extends 250 miles from its headwaters at Upper Klamath Lake in south central Oregon to the west coast of northern California.

The Upper Klamath Basin includes the US Bureau of Reclamation's (USBR) Klamath Project Area and the drainage area above Irongate Dam on the Klamath River.

The basin's lakes, marshes, and wetlands host an abundance of plant and animal species and include national wildlife refuges, parks, and forests.

Agricultural production began around the turn of the 20th century, and with the creation of the Klamath Irrigation District in 1905, water diversions for irrigation began in earnest.

A portion of these irrigated lands are in the USBR's irrigation project. The 'project area,' as it is commonly called, includes 188,000 of the 502,000 acres of private irrigated land in the basin. This includes lands leased from the various wildlife refuges that are supplied with water by the USBR. Privately irrigated acreages can vary from year to year, depending on USBR contracts and annual cropping cycles. In comparison, the majority of the private irrigated land - about 314,000 acres - in the basin is located outside the project area.

Upper Klamath Basin Quick Facts:

- Over 2.2 million acres are privately owned in the Upper Klamath Basin
- 188,000 of the irrigated acres are in the US Bureau of Reclamation's Irrigation Project
- Approximately 502,000 acres of privately owned lands are irrigated
- 314,000 acres of irrigated lands are outside the Project area

Overview of the Upper Klamath Basin

Conservation District Priorities

1) Conserve Water
2) Increase Water Storage
3) Improve Water Quality
4) Enhance Fish & Wildlife Habitat

The Role of Agriculture in the Basin

Agricultural lands play a key role in a healthy ecosystem. Located on the Pacific Flyway, migratory birds like the American White Pelican and the Red-Necked Grebe use croplands in the Klamath Basin as an important feeding and resting stop. Deer graze on wheat and barley fields, and pheasants use both crop and rangelands for their nesting and feeding grounds.

Progressive conservation leaders recognize that farming and fish and wildlife habitat are not mutually exclusive. Well-maintained farmland creates fish and wildlife habitat, contributing to a healthy watershed. They also recognize that opportunities will always exist to improve the condition of natural resources in the basin.

To address those opportunities, conservation leaders in Oregon's Klamath Falls Soil and Water Conservation District and California's Lava Beds/Butte Valley Resource Conservation District have proactively identified four key priorities tied to natural resource conservation.

The districts asked experts at the USDA's Natural Resources Conservation Service to help them develop a plan to determine what could be done on-farm to conserve water, increase water storage, improve water quality, and enhance fish and wildlife habitat.

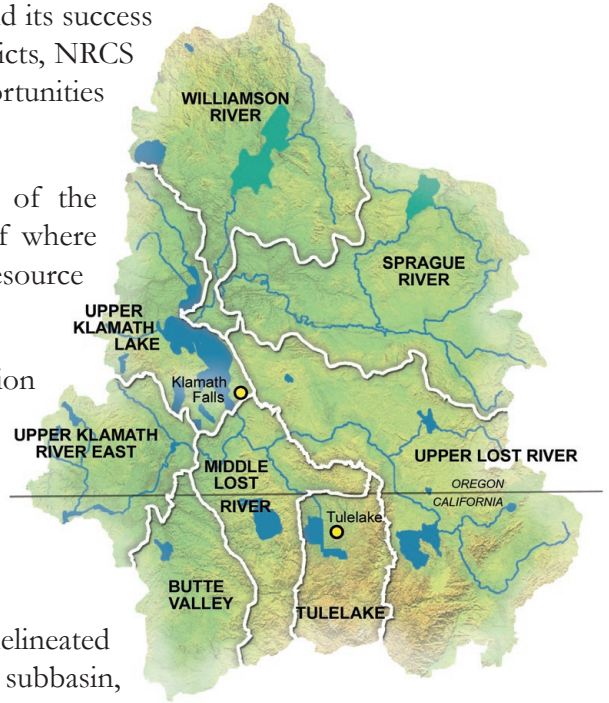
While so much of the attention to date in the Klamath Basin has been focused on water demand, these conservation leaders recognize demand is only one piece of the puzzle. Comprehensive solutions must also address water quality, storage and wildlife habitat.

Rapid Subbasin Assessments

Conserving natural resources is the ultimate goal throughout the basin, and its success hinges on long-term solutions. At the request of local conservation districts, NRCS undertook an 18-month study of resource concerns, challenges and opportunities throughout the Upper Klamath Basin.

The study was not intended to provide a detailed, quantitative analysis of the impacts of conservation work, but rather, to provide an initial estimate of where conservation investments would best address the districts' four priority resource concerns.

Beginning in the spring of 2002, NRCS planners collected information to enable the conservation districts, agencies, organizations, farmers, ranchers and others to make informed decisions in a timely manner about conservation and resource management in the basin. These *Rapid Subbasin Assessments* are intended to help leaders set priorities and determine the best actions to achieve their goals.



As a part of the rapid subbasin assessment process, eight subbasins were delineated (see map at left). A watershed planning team traveled through each subbasin, inventorying agricultural areas, identifying conservation opportunities and current levels of resource management, and estimating the impacts of these opportunities on the

conservation districts' priority resource concerns. They focused their recommendations on areas that would provide the best benefit to the wide array of stakeholders in the Upper Klamath Basin. They also identified a number of socio-economic factors that must be taken into consideration when helping producers adapt to new management styles and conservation activities.

Through NRCS, conservation districts and other federal, state and local entities, private land managers are working to identify ways they can more efficiently use – and share – the water they need.

In the face of increasingly complex and politically polarized circumstances, a clear purpose and direction has arisen. The commitment of the local conservation partnership to identify the impacts of water shortages and to find solutions that will improve natural resource conservation will be key to the long-term viability of both endangered species and industries in the Upper Klamath Basin.

The information that follows provides a summary of the conservation challenges and opportunities that NRCS staff found in their assessment. Recommendations for where financial and other resources can best be invested to improve natural resources, while sustaining the economy of the Upper Klamath Basin, are also identified.

Private Lands Conservation Accomplishments

One component necessary to understanding future conservation opportunities in the basin is to recognize the current conservation work of private land managers. An indicator of these efforts is the work that has been undertaken in partnership with NRCS and the local conservation districts.

In federal fiscal years 2002 and 2003, Upper Klamath Basin farmers and ranchers improved resource conditions on 18,877 acres of privately owned agricultural lands, with assistance from NRCS and the conservation districts.

During this time, private land managers have worked with the conservation districts in the basin to:

- improve the condition of 11,800 acres of grazing lands
- conserve water and improve water quality on 13,656 acres
- restore and establish 4,138 acres of wetlands and riparian areas
- improve 281 acres of forest stands
- establish resource management systems on 1,351 acres of cropland

These conservation efforts were accomplished with a combination of private, state and federal funding.

Conservation in the Upper Klamath Basin

Upper Klamath Basin Quick Facts:

- 1,400 farm families live in the Upper Klamath Basin
- The Upper Klamath Basin is home to sucker fish, bull trout and redband trout

Summary of Conservation Opportunities

In addition to recognizing current conservation activities, the assessments define what can be accomplished with a strong conservation partnership in the Upper Klamath Basin.

All too often, the debate about multi-use of water in the basin has focused on ways to reduce water demand. However, the basin's many water users - including fish and wildlife - benefit just as much from improvements to water quality, water storage and wildlife habitat. Taken together, the recommendations that follow seek to utilize a comprehensive approach to all four resource priorities - with the goal of contributing to a sustainable, multi-use water system.

While quantification of the results of conservation work in these four areas is difficult, there is no question that a comprehensive approach to natural resource improvement in the Upper Klamath Basin will result in accumulative long-term benefits for endangered fish species, wildlife habitat, agriculture, urban and other water uses.

Agriculture cannot undertake these efforts alone. Private landowners and the general public both benefit from natural resources conservation in the Upper Klamath Basin. Because of this, public and private sources of funding from in and outside the region are necessary. Solutions of this magnitude also come with other social, political, and cultural costs.

For example, all stakeholders in the Upper Klamath Basin need to identify and address social, economic, and cultural resource-based values they have historically enjoyed. Politically, there must be resolution and agreement on water rights, endangered species, and water quality.

Water Conservation

Because few water use measurements have been taken in the past, it is difficult to quantify where specific water efficiencies can be gained.

Throughout the Upper Klamath Basin, water that leaves one irrigated field generally re-enters streams or enters the groundwater, providing the opportunity for it to be utilized again later.

Because of this, water delivery systems both in and outside the USBR project area are generally efficient.

As a result, the most significant benefit of reducing water demand on individual farms is an improvement in water quality and reduction in water temperatures, rather than an increase in available water.

Conservation in the Upper Klamath Basin

Conservation measures that reduce water demand on private agricultural lands can be accomplished in a variety of ways. New technologies for managing when and where water is applied on crop and pasture lands will help to ensure that water is only applied when it is of the best benefit to the plant.

Tupper Ansel Blake/USFWS

Water conservation opportunities include improving irrigation water-use efficiency, retaining and conserving drainage water, and making use of new technologies that more accurately forecast the impacts of drought and floods.

The subbasin assessments indicate an opportunity to conserve water and improve water quality on 130,000 acres of irrigated lands within the USBR project. *Outside* the project area there is an opportunity for water conservation on approximately 220,000 irrigated acres.

If all potential conservation practices are implemented on all irrigated lands, on-farm water use efficiency could increase by up to 25 percent in the Upper Klamath Basin. A potential two to five percent increase in water yield could be achieved by increasing management in upland range and forestland areas. In all cases, these are *preliminary* estimates and require validation. This estimate does not account for evaporation, transpiration, seepage or other loses that may occur at the sites receiving conserved water nor does it evaluate irrigation delivery or conveyance efficiencies.

This level of water conservation cannot be reached without a concerted federal/state/private partnership that works together to apply water conservation practices in targeted areas throughout the Upper Klamath Basin.

Improving Water Quality

Water quality has a direct impact on many fish and wildlife species. Within the Upper Klamath Basin, most rivers and lakes do not meet federally mandated Clean Water Act standards for temperature, dissolved oxygen, pH, or other pollutants. Water quality is affected by water temperature, low in-stream flows and the condition of adjacent land riparian areas, among other items. Private landowners are just one of many groups who have an opportunity to improve water quality throughout the basin.

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 that track pest and weed cycles to ensure that 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.

Increasing Water Storage/Yield

In recent years, drought has been a large contributing factor to reduced water levels in the Upper Klamath Basin. One solution to address low water flows would be to store water for times of water shortage. There are at least two challenges to this solution: finding a place to store water and finding water to store.

Tupper Ansel Blake/USFWS

To evaluate this option, potential storage values were calculated for 41 years of record from 1961 to 2002. This analysis reinforced the observation that, as has been seen in recent years, drought years normally occur in a multi-year cycle. Because of this, in the years where extra water is most needed, it is often not available from previous years to store.

One promising, small-scale, water storage solution may lie in subsurface irrigation water storage in suitable locations, such as the Tulelake Subbasin. In this scenario, there exists a potential to store water in the soil profile and reduce irrigation water demand during the irrigation season.

Another option for subsurface storage of water includes the restoration of streams and their surrounding wetlands and riparian areas. This can increase the "sponge" effect allowing for the slow release of water through the long, dry summer months.

Enhancing Fish and Wildlife Habitat

The Upper Klamath Basin is home to a wide variety of aquatic and terrestrial species of wildlife and fish. Much of the water used in the Klamath wildlife refuges and associated marshes, ponds, streams and wetlands originates in the Upper Klamath Lake Subbasin. The Klamath Basin 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.

Tupper Ansel Blake/USFWS

Streams in the Upper Klamath Basin provide spawning and rearing habitat to threatened and endangered suckers and bull trout, as well as redband trout, which is listed as a species of concern by the US Fish and Wildlife Service. Several streams are highly valued "catch and release" sport fisheries. There is high landowner and public interest in restoring and maintaining riparian habitat along these streams.

Many of the conservation opportunities outlined under water conservation and water quality provide direct benefits to fish and wildlife as well. In addition, creating and restoring wetland areas, planting trees and developing wildlife habitat along the edges of crop fields all contribute to enhancing wildlife habitat in the basin.

Overview of Conservation Effectiveness

Tupper Ansel Blake/USFWS

In order for the Upper Klamath Basin to successfully move forward with solutions, agriculturists, environmentalists, Tribes, government agencies, organizations, and others need to develop unified leadership to arrive at a common vision for the future.

In addition, stakeholders and others must commit to a long-term investment of public and private funding as well as other resources.

Based on the Upper Klamath Basin Rapid Subbasin Assessments, the Oregon and California NRCS planning staff rated the potential benefit of recommended conservation practices and resource management systems based on the conservation districts' four resource priorities.

Many state and federal agencies have invested in conservation work throughout the basin. While the recommendations in this document focus on private land and agriculture, the assessments can also be applied to help prioritize conservation practices on other land uses basin-wide.

Overall, based on the planning team's analysis, conservation activities in the Sprague River Subbasin would produce the greatest benefit, and conservation practices in the Upper Klamath River East Subbasin would yield the least overall benefit based on the conservation district's priorities.

Conservation in the Upper Klamath Basin

While recognizing that any science-based conservation focus in the Upper Klamath Basin would be beneficial, the charts on pages 18-19 specifically focus on work that can be accomplished on private lands. They provide a breakdown of recommended conservation practices on each of the conservation districts' priorities by subbasin.

For example, the water demand chart shows that investing in conservation practices in the Sprague River Subbasin has the greatest potential for reducing agriculture's water demand by implementing improved irrigation practices. The Sprague also provides the best opportunity to address water quality and wildlife habitat.

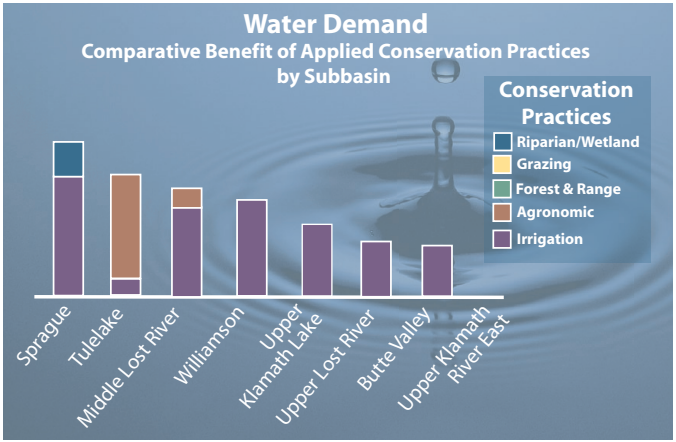
Investment in conservation activities in the Tulelake and the Upper Klamath Lake subbasins offers the greatest potential to address water storage/yield.

Tupper Ansel Blake/USFWS

Investing in Conservation: Enabling farmers, ranchers and other private land managers to successfully address the four resource priorities will require:

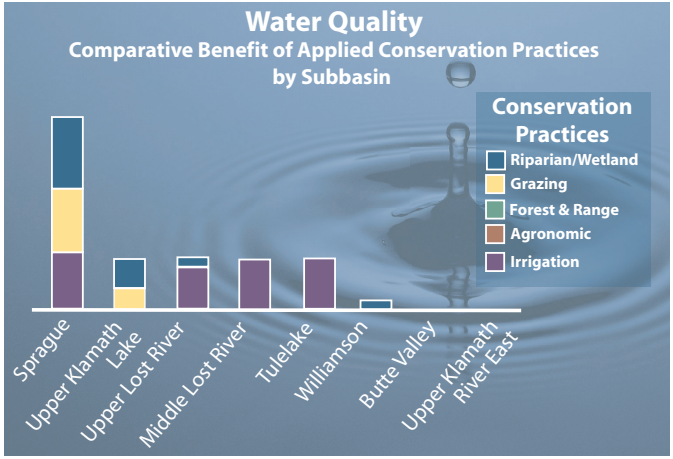
- The adoption of conservation on 350,000 acres of private farmland, range, and forests,
- Financial resources estimated at $200 million for installation and another $27 million annually to operate, and
- Twenty or more years to complete with the current financial and technical resources available.

Conservation in the Upper Klamath Basin



Comparative Benefit: Water Demand

The chart at left provides an overview of the comparative benefit by subbasin of various conservation practices that **reduce water demand**. Based on research completed by NRCS planning staff, the greatest potential to reduce water demand exists by implementing irrigation and riparian/wetland conservation practices in the Sprague Subbasin. This is followed by implementing agronomic and irrigation conservation practices in Tulelake. There is no measurable water demand benefit achieved by implementing conservation practices in the Upper Klamath River East Subbasin.



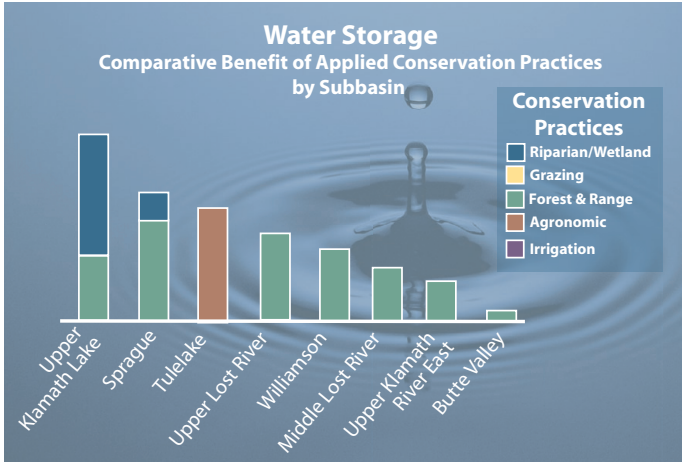
Comparative Benefit: Water Quality

The chart at left provides an overview of the comparative benefit by subbasin of various conservation practices that **improve water quality**. Based on research completed by NRCS planning staff, the greatest potential to improve water quality occurs when riparian/wetland, grazing and irrigation conservation practices are implemented in the Sprague Subbasin. In comparison, no measurable water quality benefits are achieved by implementing conservation practices in Butte Valley or the Upper Klamath River East subbasins.

Conservation in the Upper Klamath Basin

Comparative Benefit: Water Storage/Yield

The chart at right provides an overview of the comparative benefit by subbasin of various conservation practices that **enhance water storage and yield**. Based on research completed by NRCS planning staff, the greatest potential to enhance water storage and yield occurs by implementing riparian/wetland, forest and range conservation practices in the Upper Klamath Lake Subbasin. In comparison, the Tulelake Subbasin gains water yield through agronomic practices like subsurface drains to allow for winter irrigation. Overall, implementing forest and range practices in most subbasins will result in greater water yield within the soil profile and water table.



Comparative Benefit: Habitat/Fish Survival

The chart at right provides an overview of the comparative benefit by subbasin of various conservation practices that **improve wildlife habitat and fish survival**. Based on research completed by NRCS planning staff, the greatest potential to improve habitat is in the Sprague Subbasin, using wetland/riparian, forest, range and irrigation practices. In comparison, no measurable habitat benefits are achieved by implementing additional conservation practices in the Middle Lost River, Tulelake, Butte Valley or Upper Klamath River subbasins.