



# **Joint Venture Implementation Plans**

# **Klamath Basin**

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# Joint Venture Implementation Plans for Eastern Oregon

## Introduction

A Joint Venture is a means of developing partnerships among willing and interested private and public individuals, groups, and agencies to achieve common goals of restoration, conservation, and protection of natural habitat values. All stakeholders in wetland and habitat issues are encouraged to join together to facilitate conservation in this collaborative effort. Partners in Joint Ventures work together to combine resources and find innovative ways to meet these goals.

The plans in this document are administered by the Oregon Wetlands Joint Venture (OWJV). This state-level organization serves as the implementation arm for two larger, regional joint ventures -- the Pacific Coast Joint Venture and the Intermountain West Joint Venture -- formed to implement the North American Waterfowl Management Plan. The plans in this document set forth habitat conservation strategies for the eastern Oregon portion of the Intermountain West Joint Venture. The Intermountain West Joint Venture encompasses habitats between the Rocky Mountains and the Sierra Nevada and Cascade mountains. In eastern Oregon, five areas have been identified for planning purposes (Figure 1). These include the Oregon Closed Basin, Klamath Basin, Blue Mountains, Deschutes Basin, and Snake River areas. Detailed descriptions of each area are included in individual Implementation Plans contained in this binder.

Information about the Intermountain West Joint Venture is available from: ***Intermountain West Joint Venture, 145 East 1300 South #404, Salt Lake City, Utah 84115.*** Information about Oregon Wetlands Joint Venture can be found on a web page at: <http://wetlands.dfw.state.or.us> or by writing to: ***Oregon Wetlands Joint Venture, 1637 Laurel Street, Lake Oswego, OR 97034-4755.***

The mission of the Oregon Wetlands Joint Venture is to “promote protection, restoration and enhancement of wetlands and the systems on which they depend.” The organization plays a statewide leadership role in encouraging and supporting efforts to conserve habitats through voluntary, cooperative means. The Joint Venture functions as a facilitator and coordinator, assisting public and private partners in accomplishing activities that support the organization’s mission. Partners retain their individual roles, responsibilities and decision-making authority.

## Oregon Wetlands Joint Venture Goals

- Provide an organizational framework at the state level for voluntary, cooperative efforts to conserve wetland habitats. Link to local, regional and continental habitat conservation initiatives.
- Use planning processes to identify habitat conservation needs and opportunities statewide and assess priorities at multiple levels (state, ecoregion, watershed).
- Develop financial and public support for specific projects and wetland conservation in general.
- Help establish partnerships to implement habitat conservation projects.
- Enhance communication and information sharing among Joint Venture partners.
- Expand public awareness and understanding of wetland values and conservation needs.

The intent of the joint venture includes maintaining biological diversity by providing quality habitats which will serve the needs of many native plant and animal species and prevent the need for future listings under the Endangered Species Act. Joint Venture projects can provide a wide range of benefits, including enhancement of wildlife and fisheries, watershed and water quality improvements, and other habitat values. Project priorities will primarily be driven by opportunities, which are in turn created by the various partners.



## **A Working Document**

This document is intended to be a dynamic document, amended as necessary to accommodate new initiatives and opportunities; hence the binder format. Since conservation is a process, not a one-time event, this document will evolve as some goals are achieved and new ones are conceived.

## **Funding**

Funding for Joint Venture projects comes from a wide variety of sources, including Joint Venture partners, federal and state programs, and private organizations. Some potential funding sources and contact information are summarized in Appendix 1 (not yet complete).

## **Objectives and Strategies**

This plan is intended to address multiple objectives and strategies related to conservation of wetlands and related habitats within the areas targeted for action by Joint Venture partners. The North American Waterfowl Management Plan, the 1986 international agreement that provided the original impetus for joint ventures' wetland habitat conservation efforts, included goals to restore and maintain the diversity, abundance, and distribution of waterfowl that occurred during the 1970s. Over the years, the North American plan has evolved to encompass broader goals that include benefits for other wetlands-dependent wildlife, hydrology and water quality. The 1998 update of the plan encouraged partners to expand that focus to include collaboration with other bird conservation efforts as well, and in 1999, the Intermountain West Joint Venture formally adopted an "all bird" approach as part of its mission.

In Oregon, the Oregon Wetlands Joint Venture has retained its focus on wetlands and related riparian and aquatic habitats. Because of this focus on habitats, and the landscape-scale approach typically used to frame options for potential projects, Joint Venture conservation strategies are broad enough to support a variety of goals and objectives.

Waterfowl goals will continue to be an important emphasis for the Joint Venture in Oregon. The Intermountain West Joint Venture Implementation Plan (Appendix 2) provides numerical goals for waterfowl. Step-down waterfowl objectives for Oregon, when developed, will also be included in Appendix 2.

Efforts are currently underway to develop a North American Bird Conservation Initiative. This endeavor would produce a national conservation plan which will address all birds. It will coordinate the efforts for waterfowl in the North American Waterfowl plan with three other bird initiatives: Partners in Flight, U.S. Shorebird Conservation Plan, and the North American Colonial Waterbird Conservation Plan. Partners in Flight is an international group, dedicated to conservation of migratory landbirds. The U.S. Shorebird Conservation Plan and the North American Colonial Waterbird Conservation Plan are being developed on a national scale to restore and conserve shorebird and colonial waterbird populations. These plans are in various stages of completion, and when finished, will provide goals for these other bird groups which can be delivered by the Joint Ventures. Regional plans developed from these initiatives will provide specific habitat objectives which will be adopted by the Joint Venture. These regional plans and their specific habitat objectives will be included in Appendix 2, as they become available. Appropriate habitat objectives from Pacific Flyway Management Plans will also be adopted by the Joint Venture and these will be summarized in Appendix 2.

The Oregon Wetlands Joint Venture will also assist in addressing goals and objectives from other relevant habitat initiatives which are consistent with the Joint Venture purposes. These will include watershed health goals and objectives developed by the Oregon Department of Environmental Quality, Oregon Watershed Enhancement Board and local Watershed Councils. The Joint Venture will also

support habitat initiatives for recovery of state and federal listed or sensitive species and goals to enhance habitat for native fishes, including improving fish passage and screening facilities.

# **KLAMATH BASIN: WETLANDS IMPLEMENTATION PLAN**

## **1. Introduction**

The Klamath Basin has been identified as a distinct geographic region within the Joint Venture for planning purposes. This plan focuses on wetland habitats and associated resources in this region. Other habitat goals and strategies will be incorporated at a later time. It also identifies potential projects to inspire partnerships to work cooperatively to achieve mutual goals and increase benefits derived from wetland systems.

The Klamath Basin in south-central Oregon and north-central California lies in a broad, relatively flat basin within a Pleistocene lakebed. It contains Oregon's largest lake, Upper Klamath Lake, and lies about 4,100 feet above sea level. The drainage basin extends along the east slope of the Cascade Range, and includes most of Klamath County and parts of Lake and Jackson counties in Oregon, and eastern Siskiyou and western Modoc counties in California. The basin is bordered on the east by Winter Rim, Gearhart Mountain, and Barnes Rim in the Fremont National Forest in Oregon, and by the Willow Creek and Boles Creek watersheds in California. On the west side, the Cascade slopes southeast of Crater Lake drain into the basin, which is then drained by the Klamath River to the Pacific Ocean. This planning area includes the Klamath River drainage from headwaters downstream to Scott's River Valley, and also the Lost River drainage including Clear Lake and its tributaries.

The Klamath Basin supports extensive marshes and dry forests with some sagebrush uplands. Much of the basin has been highly modified to accommodate agriculture, and water in most of the wetlands is actively controlled. Seasonally flooded flats and basins, deep and shallow marshes, open water, and riverine systems are wetland habitats represented in this region (Bottorff 1989). True forests border a few of the wetlands, such as Klamath Marsh, while agricultural areas or steppe vegetation border others. The edge between sagebrush steppe vegetation and true forest is often characterized by variable width bands of western juniper and associated grasses (Puchy and Marshall 1993).

The climate in the Klamath Basin is arid, with precipitation varying from less than 15 inches to 25 inches annually. Spring snowmelt from the mountains is largely responsible for the presence of water in the basin. Extreme summer temperatures of 100 degrees F. and extreme winter temperatures of -15 degrees F. sometimes occur, and a killing frost can occur during any month of the year.

The Klamath Basin is sparsely populated with the city of Klamath Falls as the main population center. The basin's economy relies heavily on agriculture, and the basin is famous for its potatoes, onions, and barley. Some areas also support alfalfa production for hay, and cattle production is widespread on both public and private land. While agriculture plays the most important role in the economy of the basin, it is restricted by a short growing season and by limited water. Most crops must be irrigated and agricultural needs have seriously limited water availability to fish and wildlife.

In 1905 the U.S. Bureau of Reclamation (BOR) initiated the Klamath Reclamation Project to "reclaim" the lakes and marshes of the Lower Klamath Basin to agricultural lands. As these wetlands receded, the reclaimed lands were opened to agricultural development and settlement. Today, less than 25 percent of the historic wetlands remain. Three storage reservoirs providing 1,121,000 acre-feet of water storage in the Klamath River and Lost River Basins were built for irrigation service to about 240,000 acres. More than 1,400 miles of canals and drains provide service to water users. Within the Klamath Project area there are hundreds of small diversion structures. These structures, along with levee construction and stream channelization, are used for flood control and diversion of water for

agriculture and municipal purposes. Record droughts in 1992 and 1994 focused attention of the diverse dependence on Klamath River water resources.

## 2. Fish and Wildlife Resources of Concern

The wetland systems in the Klamath Basin constitute some of Oregon's most important wildlife habitats and are critical to the survival of numerous species, ranging from local endemic fish and invertebrates to continental populations of migratory birds (Defenders of Wildlife 1998). These areas provide habitat for more than two dozen at-risk species and include a half-dozen streams and watersheds identified as aquatic diversity areas by the American Fisheries Society (Bottom et al. 1993). A portion of the Basin has also been identified by the Interior Columbia River Basin Ecosystem Management Project as one of nine "hotspots" of species rarity and endemism in eastern Oregon (ICBEMP 1997).

Historically, the shallow lakes and extensive marshes which dominated the Klamath Basin attracted fall concentrations of up to six million waterfowl which gathered to feed on the abundant wetland foods. These wetlands also provided vital nesting and brood-rearing habitat and supported large concentrations of waterbirds, including pelicans, cormorants, egrets, and herons. Native Americans depended on a multitude of resources in the Basin, including wocus (yellow water lily) in the lakes and fish in the lakes and rivers. Agriculture has forever changed the Basin's ecosystem. Reservoirs have inundated some former wetlands. Wetland staging and migration habitats for waterbirds are threatened due to competition for water resources. Damming of rivers, instream barriers, flow diversions, draining of marshes, dredging of Upper Klamath Lake, and other forms of water manipulation resulted in widespread decline of endemic fish species and adversely affected waterbirds and other wildlife as well.

Today, wetlands in the Basin are highly managed with modifications to natural hydrology. These remaining wetlands are critical to waterfowl and endemic fish and wildlife. The Klamath Basin still contains some of the most important wetland habitat in the Pacific Flyway for wildlife, and is especially noted for its waterfowl numbers. Peak fall waterfowl counts in the Basin from 1993-1998 represented 38 to 91 percent of Pacific Flyway waterfowl populations (Klamath Basin NWRs, unpubl. data). Recent surveys have shown the area to support more than 4,000,000 staging waterfowl, including nearly 2,000,000 pintails and 900,000 mallards. Spring and fall staging is a key life cycle function provided by Klamath Basin wetlands for many waterfowl species and availability of these key habitats is critical to healthy populations. Wintering populations of more than 1,000,000 ducks and 200,000 geese have also been recorded in the Basin. Large marshes provided by the major wetlands in the area also provide habitat for molting waterfowl. The lakes, marshes and reservoirs in the Basin are also breeding areas for a large number of waterbird species, including eared, red-necked and western grebes; white-faced ibis; sandhill cranes; yellow rails; Virginia rails; soras; willets; Wilson's phalaropes; Forster's and black terns; and California, ring-billed and Franklin's gulls.

The Klamath 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), currently with about 100 nesting pairs. Yellow rails, one of the rarest breeding birds in the West, have been documented breeding in the marshes in the Wood River Valley and in the Williamson River and Sycan drainages, including Klamath Marsh NWR and Sycan Marsh (Stern et al. 1993). A marsh near Rocky Point on the west side of Upper Klamath Lake NWR supports an active American white pelican colony, and continues to be the only place in Oregon where red-necked grebes consistently nest (Puchy and Marshall 1993). Clear Lake and Lower Klamath NWRs support large pelican and double-crested cormorant colonies, and Lower Klamath also hosts large colonies of white-faced ibises, egrets and black-crowned night-herons. Nesting colonies of white-faced ibises were also documented at Wood River Wetland in 1999 (W. Watkins, pers. comm.) and at Swan Lake in 2000 (G. Ivey pers. observ.). Butte Valley Wildlife Area's Meiss Lake hosted nesting pelicans in 1999 and 2000 (K. Novick, pers. comm.). Hank's Marsh on the east side of Upper Klamath Lake also supports nesting colonies of double-crested cormorants, black-crowned night-herons, and great egrets. These wetlands also

provide excellent habitat for aquatic furbearers. Trappers in the Oregon portion of the Basin take the highest number of muskrats and mink in the state (Bottorff 1989).

The Klamath Basin is also known for hosting several rare species of endemic fish. Isolating mechanisms account for at least 12 species and three subspecies of endemic fish in the Basin. Among these taxa, the Klamath Lake sculpin, the slender sculpin, and four species of lamprey occur only in Oregon. Klamath Basin bull trout are distinct from other Oregon bull trout and may represent a distinct subspecies. Three fish species are federally listed as threatened or endangered, including the shortnose and Lost River suckers, which are restricted to the Klamath Basin, and the bull trout. Upper Klamath Lake and its tributaries are now a primary refuge for both sucker species. In addition, a substantial population of shortnose suckers occurs in Copco Reservoir on the Klamath River in California and at Gerber Reservoir in Oregon. Clear Lake Reservoir in northern California contains the major population of Lost River and shortnose suckers in the Lost River system (Bottorff 1989). Anadromous salmon and steelhead spawn in the Klamath River and its tributaries below Iron Gate Dam, which blocked migration of these fish to the upper basin watersheds. Stocks of California coastal coho salmon which occur in the river are federally listed as threatened. Several populations of Oregon spotted frogs, a candidate for federal listing, also occur in the Basin. Recent inventories of springs in the area above Upper Klamath Lake have identified at least five species of freshwater snails found nowhere else (Defenders of Wildlife 1998).

Stream-side riparian habitats provide shade, cover and insect foods for fish and wildlife and help maintain water quality. These habitats meet the needs of well over half of the area's migratory landbirds, including species such as yellow warbler, willow flycatcher, tricolored blackbird, and black-headed grosbeak, as well as a great variety of other native flora and fauna.

### **3. Existing Habitat Protection**

Many of the Klamath Basin's existing wetlands are owned and managed by federal and state government agencies. However, guaranteed water rights for these areas are not assured. Since the droughts of 1992 and 1994, various agencies have been working with water interests, including tribal, agricultural, environmental, municipal, industrial, and hydroelectric, to develop an operation plan for the U.S. Bureau of Reclamation's Klamath Project to meet the diverse demands on water resources in the area.

Wetland habitat areas in the Klamath Basin that are currently receiving some degree of formal protection include 168,076 acres in the U.S. Fish and Wildlife Service's (FWS) Klamath Basin Refuges (including the Clear Lake, Klamath Marsh, Lower Klamath, Tule Lake, and Upper Klamath national wildlife refuges). Oregon Department of Fish and Wildlife (ODFW) manages the Klamath Wildlife Area (3,717 acres), which includes two units on Upper Klamath Lake and two units along the Klamath River south of Klamath Falls. ODFW also has an agreement to protect Furber Marsh, a 1,659-acre waterfowl hunting club which is protected under the Miller Island-Gorr Island Comprehensive Plan. California Department of Fish and Game (CDFG) manages the Butte Valley and Shasta Valley wildlife areas (13,200 and 4,657 acres respectively). The Bureau of Land Management (BLM) has restored 3,300 acres of wetlands on the Wood River floodplain as part of the Wood River Wetlands project. Sycan Marsh Preserve (31,328 acres) is owned by The Nature Conservancy (TNC), which is also working to protect and restore about 6,300 acres of wetland habitats at the Williamson River Delta on Upper Klamath Lake. Four national forests (Fremont, Klamath, Modoc, and Winema) administered by the U. S. Forest Service (USFS) own about 25,000 acres of Basin wetlands and have a number of restoration and enhancement projects planned and underway. The Bureau of Reclamation recently purchased about 7,200 acres on Agency Lake adjacent to BLM's Wood River Wetland to use to increase the storage capacity of Upper Klamath Lake.

In Oregon, about 5,400 acres of private lands in the basin have been enrolled in the Wetland Reserve Program and are subject to permanent conservation easements; an additional 2,000 acres are under application for easements. In California, about 6,300 acres have been enrolled in the Wetland Reserve Program (including 1,750 acres under a 30-year easement), and an additional 2,500 acres are under application for easements.

## **4. Challenges to Address**

An estimated 85 to 90 percent of historic wetlands in the Klamath Basin have been lost (Bottorff 1989). Akins (1970) estimated a total of 350,000 acres existed in the lower basin before 1900. Additionally, approximately 250,000 acres of wetlands existed in the various watersheds of the Basin. Less than 150,000 acres of wetlands remain, with only a portion of those areas holding water into the fall. Preventing further wetland losses and restoring lost wetlands are actions critical to the success of this Joint Venture.

Currently, the most critical threat to fish and wildlife in the Klamath Basin is the lack of secure water rights for wetlands and streams. Water rights adjudication is under way and some wetlands may only receive water after the needs for endangered species, the Klamath Tribes, and agricultural interests are met. Lack of a secure water supply for these areas could result in significant losses of fish and wildlife habitat in the Basin, with negative impacts on wintering bald eagles; breeding and migrating waterfowl; nesting pelicans, cormorants, white-faced ibises and egrets; and a myriad other waterbirds and wildlife. An associated threat made worse by a lack of water is disease. Avian cholera can kill thousands of waterfowl and spreads rapidly when waterfowl are concentrated. Avian botulism is another disease made worse by a lower water supply. These diseases severely limit waterfowl populations, and are habitat related.

Adequate water rights for rivers and streams are also needed to improve water quality, restore riparian habitats and floodplain functions, and improve habitat for fish and wildlife. Water rights should include maintenance of peak flows to facilitate natural hydrologic processes that will speed restoration of these habitats, and also maintenance of base instream flows to ensure survival of native fish during low water periods.

In addition to the water rights issue, agricultural developments, primarily draining of wetlands for crop and forage production and heavy grazing on remaining wetlands, continue to be primary problems in the Klamath Basin. Also, suburban development pressures are beginning to threaten wetland values in the Basin.

Wetland conservation efforts in the Klamath Basin will depend on three inter-related strategies. Securing a firm water supply for key basin wetlands is essential to sustain long-term aquatic habitat values. Improving management of existing wetlands to meet the needs of priority species will have positive impacts on these habitats and their associated wildlife resources. Restoring degraded wetlands and incorporating land use changes would bring about a return of more natural systems. Strategies to implement the latter two protection measures include conservation easements, cooperative agreements, and enrollment in programs such as the Natural Resource Conservation Service's (NRCS) Wetland Reserve Program, and acquisition from willing sellers.

Agricultural practices, water management, and grazing are the primary management practices in the Basin that could be modified to benefit wetland systems and associated fish and wildlife. Pesticides and agricultural runoff also pose problems by degrading water quality, which affects the integrity of wetlands in the Basin. Developing educational information and incentives for private landowners to use more compatible practices would reduce these problems. Restoration of wetland basins and development of shallow impoundments with manageable water sources and secure water rights on public and private lands would greatly enhance waterfowl and other waterbird production. In some

areas, upland nesting cover for waterfowl is limited by land use practices. Provision of incentives for management of natural nesting cover on private lands should also be explored.

Another significant change in wetlands in the Klamath Basin was the loss of woody riparian vegetation along streams, rivers and floodplains, primarily due to historic overgrazing by livestock. An estimated 70-90 percent of all natural riparian areas in the United States have been extensively altered (Hirsch and Segelquist 1978). Many streams have been degraded by overgrazing and water diversions, and many lack adequate fish protection or passage, limiting habitat availability and quality for native fish. A total of 90 streams within the region are on the Oregon Department of Environmental Quality's (DEQ) list of water quality limited streams, primarily because they are not cool enough to meet temperature standards (DEQ 1998). Woody riparian habitat is very limited along streams in the region, and streams are often too wide and shallow to provide optimal fish habitat. Projects should be developed on private and public lands to improve stream habitat conditions, including providing fish passage and screening, improving woody riparian vegetation and increasing shade, restoring natural hydrology, narrowing and deepening channels, and improving water quality. These actions will improve habitat conditions for a variety of native flora and fauna, including native fishes and riparian landbirds.

As in many other areas, non-native species threaten to displace native wildlife and disrupt natural systems. Invasions of exotic weeds are a problem in many wetland basins. Weeds often replace vast areas of native plant communities with negative impacts to native flora and fauna. For example, reed canarygrass and purple loosestrife form dense monotypic stands that essentially exclude wildlife and reduce biological diversity, and perennial pepperweed replaces native plant communities in seasonal wetlands and associated uplands. Partnerships to address problem weeds on public and private lands should be pursued, and weed invasions should be monitored and eradicated in a timely fashion.

## 5. Important Habitats

Major wetland systems in the Klamath Basin include Clear Lake, Lower Klamath, Klamath Marsh, Meiss Lake, Sycan Marsh, Tule Lake, and Upper Klamath-Agency lakes. The principal river systems in the Basin are the Lost, Klamath, Scott, Shasta, Sprague, Sycan, Williamson, and Wood. There are also numerous other small lakes and streams in this region which in combination, are very important to fish and wildlife. Most of these systems have been extensively modified by human activities, primarily by agricultural development and irrigation diversions. Flood irrigation is widely used and provides extensive seasonal wildlife habitat on private lands, as do the associated storage impoundments and distribution systems.

## 6. Habitat Objectives

This plan will incorporate compatible habitat goals and objectives from companion initiatives such as Partners in Flight; national shorebird and colonial waterbird plans; Pacific Flyway Plans; recovery plans for listed species; ODFW plans, including the Oregon Wildlife Diversity Plan; Oregon DEQ; Oregon Watershed Enhancement Board and local Watershed Councils; CDFG plans, and others as appropriate. Summaries of these companion initiatives are presented in Appendix 2 (not yet available). Planning for some of these initiatives is not yet complete and these will be added when they become available.

The following are broad wetland goals to work toward:

### Habitat Objectives

- Ensure long-term protection for at least 50 percent of the Klamath Basin's wetland and riparian habitats. Use easements, cooperative agreements, conservation easements and partnerships or acquisition where appropriate to achieve this objective.
- Secure adequate water, including adequate quality, quantity and timing, for existing streams and wetlands.
- Restore or enhance 208,000 acres of wetlands and 200 miles of riparian habitat using partnerships with willing landowners, agencies, tribes and conservation groups.

## 7. Target Areas and Strategies for Implementation

Target Areas are important wetland complexes that have been identified as priorities for conservation action through Joint Venture partnerships. These areas are detailed in the pages following with Oregon sites listed first, followed by California sites. Table 1 summarizes habitat objectives for these Target Areas.

Table 1. Wetland habitat objectives (in acres) for Target Areas in the Klamath Basin.

<b>Oregon Target Areas</b>	<b>Protect</b>	<b>Restore</b>	<b>Enhance</b>
Aspen, Buck, Long and Round lakes	3,000	20	0
Hog and Jack Creeks, Winema NF	8,300	5,710	0
Klamath Marsh NWR	20,000	20,000	0
Klamath River Floodplain	1,000	1,000	500
Klamath Wildlife Area	1,000	0	1,850
Langell, Poe, Swan Lake, Yonna, valleys	35,000	35,000	0
Sprague River and Lower Sycan River	15,000	16,000	3,000
Spring Lake Valley	1,500	0	0
Sycan Marsh	10,100	17,250	2,700
Upper Klamath Lake	5,000	5,000	0
Upper Klamath NWR	5,000	5,000	0
Upper Williamson River	8,400	8,445	0
Williamson River Delta	0	6,300	0
Wood River Valley	8,400	6,000	0
Wood River Wetland	0	3,000	400
<b>California Target Areas</b>			
Butte Valley private lands	2,000	500	2,000
Butte Valley National Grassland	0	500	0
Butte Valley Wildlife Area	200	200	1,230
Dry, Grass, and Orr Lakes	1,800	0	2,730
Lower Klamath NWR	11,000	11,000	0
Modoc NF wetlands	0	0	10,000
Scott and Shasta Valleys	10,000	10,000	0
Shasta Valley Wildlife Area	0	0	1,200
Tule Lake NWR	0	35,000	0
<b>Totals</b>	<b>146,700</b>	<b>185,925</b>	<b>25,610</b>

### Definitions: Protect, restore, enhance

**Protection** includes fee title acquisition from landowners willing to sell, exchange, or donate land. It also includes protection through long-term easements, conservation covenants, leases, management agreements, and other mechanisms. Lands are considered protected when they are controlled by agencies or owners that have demonstrated a long-term commitment to preserving the land's wildlife values.

**Restoration** is the process of altering a damaged or former wetland to produce a wetland with ecological relationships and characteristics that represent the site's natural hydrology, structure, function, diversity, and dynamics. Restoration of wetlands can be as simple as plugging a field drain or reflooding a converted wetland or as complex as reconfiguring a historic stream channel to restore a natural floodplain.

**Enhancement** (not always easily distinguished from restoration) involves increasing the carrying capacity of habitat or selected habitat values within an existing wetland. This can be accomplished by means such as water

management, managed fires, control of exotic species, and other practices. Enhancement efforts will not be undertaken at the expense of healthy functioning natural wetlands.

## Oregon target areas

### Aspen, Buck, Long, and Round lakes, Oregon

These private lakes total about 5,000 acres and provide habitat for moderate numbers of breeding and migrating waterfowl, several nesting sandhill cranes and bald eagles, and breeding Oregon spotted frogs. Round Lake is threatened by residential development. The north portion of Buck Lake is owned and managed by the Winema National Forest.

The Winema National Forest (U.S. Forest Service 1997) recommends wetland habitat and stream restoration within a 5,100 acre area north of Buck Lake. Stream restoration to enhance fish habitat is already underway on Spencer Creek, and additional work needs to be accomplished. Wet meadow restoration is also needed. The Forest Service plan recommends acquisition of 2,860 acres of private lands around Buck Lake and Desolation Swamp on a willing seller basis.

#### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect at least 3,000 acres by securing conservation easements from willing private landowners to maintain existing wetland values on these lakes.
- Develop locally coordinated habitat management guidelines for landowners to enhance wildlife production and use and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.
- Stabilize gullying in wet meadows in the Buck Lake area (10 acres).
- Plant riparian shrubs along Spencer Creek (10 acres).

### Hog and Jack Creeks, Winema National Forest, Oregon

The Winema National Forest manages lands in these two areas (U.S. Forest Service 1997). The Jack Creek area is located northeast of Klamath Marsh NWR and extends from the private Seller's Marsh to the Williamson River. It includes the riparian areas of Jack, God, Mosquito and Lane creeks. The wetlands consist of moderate to large wet meadows, narrow stream-side meadows, and moist lodgepole pine stands along streams and meadow edges. The Hog Creek area lies north of Applegate Butte, including Wilson Flat and much of the Hog Creek drainage. Historically, Hog Creek was a perennial stream. Extensive meadows in these areas provide habitats for nesting sandhill cranes, waterfowl, and common snipe, as well as great gray owls. Wetlands in this area also support Oregon spotted frogs. Riparian habitats are particularly important to landbirds and provide stream structure beneficial to native fish.

The USFS plans to restore hydrology in wet meadows and improve streamside riparian habitats as well as stream channel morphology and function. Lodgepole pine has encroached into wet meadows, primarily because of fire suppression and modified hydrology. In several areas meadows have been dewatered because of gullying, caused by culverts which were set below the grade of stream channel

at road crossings. On Hog Creek, areas dominated by exotic reed canary grass need to be restored to native vegetation. Several private inholdings in this area limit restoration and management options. Acquisition of easements or fee title on a willing seller basis is recommended for up to 8,300 acres (U.S. Forest Service 1997). Some of these private lands might be eligible for the Wetland Reserve Program, which would help reduce acquisition costs.

- Secure firm water supply for existing wetlands.
- Pursue acquisition of 8,300 acres of private lands within this area on a willing seller basis. Consider Wetland Reserve Program easements on private lands as appropriate to achieve conservation goals and help reduce acquisition costs.
- Restore 110 acres of riparian habitats through willow plantings.
- Restore 5,520 acres of wet meadow habitat through lodgepole removal and road crossing reconstruction.
- Restore 14 springs by fencing to exclude livestock.
- Restore 3 miles of dredged stream channel and 80 acres of riparian habitat on Hog Creek by eliminating exotic reed canarygrass. Remove a road crossing and 3 miles of unnecessary road to restore wetland function at Ray Ranch.

## **Klamath Marsh National Wildlife Refuge, Oregon**

Klamath Marsh National Wildlife Refuge was established in 1958 when approximately 16,400 acres were purchased from the Klamath Tribes with Federal Duck Stamp Funds. In 1990 and 1998, additional acquisitions boosted Refuge acreage to 40,646. About 4,000 acres of private inholdings remain within the current refuge boundary. Originally designated as Klamath Forest National Wildlife Refuge, the Refuge was recently renamed as almost all of the historic Klamath Marsh now lies within Refuge boundaries. Klamath Marsh was formed by a high, broad valley that allows the Williamson River to flood thousands of acres, both on and off the refuge. This large natural marsh provides important nesting, feeding, and resting habitat for waterfowl, while the surrounding meadowlands are attractive nesting and feeding areas for sandhill cranes, yellow rails, and various shorebirds and raptors. Trumpeter swans have recently begun to nest here, dispersing from their wintering grounds at Summer Lake where they have been translocated in an attempt to expand the breeding range of this species in the state. Oregon spotted frogs also breed here.

The refuge staff want to improve dispersion of emergent vegetation and open water in the marsh to enhance habitat diversity. The Klamath Tribes want to increase water depths to create more open water and habitat for wocus, a traditional tribal food plant.

There are about 31,000 acres of private wetland habitat adjoining Klamath Marsh NWR (including inholdings) and downstream to Soloman Flat that could be acquired and added to the refuge. Other potential acquisitions include 8,200 acres of private lands along the Upper Williamson River for addition to the refuge, plus 600 acres around Wocus Bay for Winema National Forest (U.S. Forest Service 1997).

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect and restore at least an additional 20,000 acres in this area through acquisition, conservation easements or agreements.
- Work with Klamath Tribes and FWS to develop a common plan for management of the marsh.

## **Klamath River Floodplain, Oregon**

This area includes the wetlands and agricultural lands along the Klamath River between Klamath Wildlife Area and Keno. These areas are particularly important to spring staging waterfowl and also support a few pairs of nesting sandhill cranes. They are also used by western pond turtles. There are opportunities to restore wetlands within the floodplain, and easements should be considered to protect vulnerable agricultural areas in this region from development. Restoration and enhancement of these overflow marshes could be designed to help improve water quality by filtering irrigation return flows.

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect and restore at least 1,000 wetland acres within this area.
- Enhance 500 acres of existing wetlands by improving wetland interspersion and water management ability.

## **Klamath Wildlife Area, Oregon**

The Klamath Wildlife Area, managed by ODFW, provides 3,717 acres of protected habitat in four units. The largest holding is the Miller Island Unit along the Klamath River south of Klamath Falls. The Gorr Island Unit is also located along the Klamath River, about 6 miles downstream from Miller Island. The other two units, Shoalwater Bay and Squaw Point are located along the west shore of Upper Klamath Lake. These small units support large concentrations of migrant waterfowl with spring peaks of more than 100,000 geese and 20,000 ducks. These units also support federally listed bald eagles, shortnose and Lost River suckers, and western pond turtles, which are candidates for federal listing. An endangered plant, Applegate's milkvetch, also grows on Miller Island.

Miller Island Unit only has Class C water rights and the value of the area would be assured for the future by securing water rights. The Long Range Management Plan (Fujishin 1993) for the wildlife area has identified about 1,000 acres for acquisition. Acquisition of lands around Miller Island downstream to Keno would help resolve water quality problems. There is also potential for Wetland Reserve Program easements in this area. Columbia Plywood needs to create wetlands in this region for mitigation and the city of Klamath Falls may need to develop several hundred acres of wetlands to remove discharge into the river.

### Recommended Actions:

- Secure firm water supply for existing wetlands.

- Pursue acquisition of lands identified in Management Plan (1,000 acres). Pursue transfer of land at Squaw Point Unit from Division of State Lands to ODFW.
- Enhance 1,000 acres of seasonal wetlands for moist soil management with nesting islands and open channels to improve water circulation, and open up marsh at Squaw Point and Gorr Island.
- Construct dikes with water control facilities in the Hamaker and Largent marshes to enhance 400 acres of wetlands.

## **Langell, Poe, Swan Lake and Yonna valleys, Oregon**

Langell Valley is the floodplain of the Lost River, which originates in California at Clear Lake Dam. After leaving the Langell Valley, the river flows through Poe Valley. Lost River supports redband trout, shortnose suckers and a few Lost River suckers. These species would benefit from stream improvements, improved water quality, watershed restoration, and improved passage and screening. Langell and Poe valleys contain about 45,000 acres, primarily private lands which are used for agriculture. The area provides an important migrational staging area for sandhill cranes, and currently supports moderate numbers of breeding waterfowl and other waterbirds. These valleys have great potential to become a very important wetland area if floodplain wetlands are restored. There is also potential to improve water quality by using restored wetlands for treatment of irrigation return water.

The Swan Lake and Yonna valleys together contain about 7,000 acres of private agricultural lands. Important wetlands exist at Swan Lake and Alkali Lake. These areas are particularly important to migrant ducks and swans. Swan Lake supported nesting colonies of double-crested cormorants and California and ring-billed gulls in 1999, and a white-faced ibis colony in 2000 (G. Ivey, pers. observ.).

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect and restore at least 35,000 acres of wetlands through cooperation from willing landowners through conservation easements such as Wetland Reserve Program for lands suitable for wetland restoration.
- Restore and enhance at least 30 miles of the Lost River channel and provide fish passage and screening where needed.
- Develop locally coordinated habitat management guidelines for landowners to enhance fish and wildlife and pursue opportunities for cooperative habitat enhancement with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.

## **Sprague River and Lower Sycan River, Oregon**

This target area contains about 50,000 acres of wetland habitats with high potential for restoration, particularly on private lands along the Sprague River. The Sprague River is a significant source of nutrient loading to Upper Klamath Lake and needs extensive riparian restoration. Its riparian zone is

nearly absent and the river rarely interacts with its floodplain. The most critical area for restoration is between the towns of Bly and Sprague River. Some areas have been diked and channelized, and irrigation removes water at critical times. The structure of the system is still in place, and the river remains generally connected to the floodplain, however, river channel restoration is needed along some reaches. Major problems include overgrazing by livestock, inadequate fish passage, and unscreened diversions. There are great opportunities to work towards conservation with the more than more than 200 landowners along these rivers, as many landowners along the Sprague have recently become interested in conservation efforts.

The Sprague River provides important habitat for endangered shortnose suckers, Lost River suckers, redband trout, and historic habitat for threatened bull trout, which are still found in the upper watershed. The adfluvial (lake dwelling) forms of these species are particularly in need of improvements in their upstream spawning habitats. Numerous springs and spring-fed creeks along the river provide freshwater and spawning habitat for suckers and trout. Wetlands in this area were known to historically support Oregon spotted frogs. Riparian habitats along the river and its tributaries are important to nesting and migrating landbirds, and moderate numbers of sandhill cranes and waterfowl nest in the wet meadows and wetlands. The area provides wintering habitat for waterfowl and bald eagles, as water generally remains ice-free. Kamkaun Springs is a particularly important site because of its wetland diversity and freshwater supply. Fish Hole Creek on the Fremont National Forest supports some riparian habitat, and more is needed throughout the watershed.

Currently there are about 1,000 acres under conservation easements in this region through the Wetland Reserve Program and FWS's Easement Program. There is great opportunity for additional conservation easements.

The Winema National Forest identified opportunities for wetland conservation in the Sprague River, Copperfield Draw (a tributary to the Sprague River), and the Trout Creek drainage (U.S. Forest Service 1997). These areas contain moderate to large wet meadows, narrow stream-side meadows and portions of riparian areas along intermittent streams in the watershed. Meadows in this area provide habitats for nesting sandhill cranes, waterfowl, and common snipe, as well as great gray owls. Riparian habitats are important particularly important to landbirds and provide stream structure beneficial to native fish.

USFS plans to restore hydrology in wet meadows and improve streamside riparian habitats as well as stream channel morphology and function. In several areas meadows have been dewatered because of gullyng, caused by channelization, irrigation diversions and culverts at road crossings. Several private inholdings in this area restrict restoration and management options. Acquisition of easements or fee title on a willing seller basis is recommended for up to 12,840 acres (U.S. Forest Service 1997). Some of these private lands might be eligible for the Wetland Reserve Program which would help reduce acquisition costs. On the upper Sprague River, the Fremont NF plans to restore aspen and wet meadow communities.

#### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Secure conservation easements and acquire ownership from willing private landowners for lands that would provide habitat suitable for wetland restoration. Protect and restore at least 15,000 acres of wetland habitats on private lands through conservation easements, and cooperative efforts with land owners.

- Develop locally coordinated habitat management guidelines for landowners to enhance wildlife production and use (e.g., develop more permanent water sites) and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.
- Restore 50 stream miles of riparian habitats (100+ feet from stream) by willow plantings and setting back or removing levees.
- Restore at least 1,000 acres of meadows by stabilizing 3 large and 20 small headcuts in the Copperfield Draw drainage, Dam's Meadow, and Rock Creek drainage. Stabilize major headcuts in other drainages.
- Enhance 3,000 acres of uplands adjacent to wetlands.
- Install fish passage and screening facilities where needed.
- Improve 100 miles of instream habitat for fish spawning by promoting improved livestock grazing practices in riparian areas to decrease sedimentation in spawning areas and improve water quality.
- Improve riparian vegetation conditions at springs to enhance habitat for fish spawning by fencing and improved livestock management.

## Spring Lake Valley, Oregon

The Spring Lake Valley contains about 3,000 acres of agricultural lands associated with Spring, Nuss, Tingeley, and Hunts lakes. This area provides important spring migration habitat for Ross' and white-fronted geese. The goal for this area should primarily be to protect existing values; because this area is relatively close to the town of Klamath Falls, it is threatened with further subdivision and development. Easements should be pursued to maintain open space and compatible land use on private agricultural lands within 2 miles of these lakes.

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Secure conservation easements to protect at least 1,500 acres in this area from development and to maintain compatible land uses.
- Develop locally coordinated habitat management guidelines for landowners to enhance wildlife production and use (e.g., develop more permanent water sites) and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.
- Develop incentives for farmers to maintain wildlife compatible crops such as green forage or small grains.
- Seek a county zoning ordinance to protect shorelines around existing wetlands from development.

## Sycan Marsh, Oregon

Sycan Marsh is a 35,000-acre montane meadow wetland system characterized by palustrine emergent and palustrine forested wetlands. Surrounded by pine forest and sagebrush habitats, the marsh lies at an elevation of about 5,000 feet near the headwaters of the Sycan River. Wetland function is based on the annual snowmelt and runoff provided through four perennial and four ephemeral streams, and groundwater from the surrounding 212,000-acre Upper Sycan watershed. The marsh provides critical habitat for migrating and breeding waterfowl, shorebirds, neotropical migrants and rare fish species. Birds include several priority waterfowl species (white-fronted goose, mallard, pintail, wood duck, greater scaup, lesser scaup, red head, canvasback, and ring-necked duck); several nongame migratory species of concern (sandhill crane, trumpeter swan, black tern, white-faced ibis, yellow rail, upland sandpiper). Sycan Marsh provides habitat for 13 federal or state threatened or endangered species, including lamprey, Cyprinidae, bull and redband trout, Oregon spotted frog, mussels and snails, and aquatic macroinvertebrates. More than 206 species of migrating and breeding birds use the marsh. Several rare Oregon breeding bird species are found at Sycan, including ring-necked ducks, horned grebes, and upland sandpipers (Stern and Rosenberg 1985). Sycan Marsh is also an important spring staging area for lesser sandhill cranes, geese, ducks and tundra swans (Stern et al. 1987). It is the second most important site in Oregon for breeding greater sandhill cranes (Littlefield et al. 1994).

In 1980, The Nature Conservancy acquired a majority of Sycan Marsh with the purchase of 24,065 acres. Since that time, the conservancy has focused efforts on restoration of wetlands and re-establishing the natural hydrologic function of the marsh and adjoining uplands. TNC has also added to its holdings as opportunities arose. In 1995, TNC received a \$370,000 NAWCA grant for a \$2,000,000 effort to restore hydrologic function and wetlands along the Sycan River as it flowed through the lower portion of the marsh. New water control structures benefited the entire marsh, and specifically contributed to the successful restoration of over 10,000 acres of emergent wetlands. Other restoration needs include the Chocktoot Drain Canal, as well as restoration of hydrologic function in the surrounding uplands in order to benefit water quality and water quantity on the marsh.

In January 1999, TNC purchased the 4,418-acre Brattain Tract, providing protection to a 3,000 acres of deep-water emergent palustrine wetlands in the northeast portion of the marsh, and approximately 1,400 acres of adjacent forested upland. In early 2001, the conservancy acquired an additional 2,845 acres (the Roseburg Tract) on the west side of the marsh, including extensive riparian habitats along Long Creek.

Sycan is open to the public, and current plans will expand educational and research programs and facilities in a manner compatible with wildlife protection goals. Diverse support for this project increases its value as a model for future habitat restoration efforts. Completion of this project will strengthen water rights claims for the marsh.

### Recommended Actions:

- Secure firm water supply.
- Acquire and restore 7,263 acres of palustrine emergent and palustrine forested wetlands and associated uplands.
- Restore an additional 5,000 acres by filling in the 2.5 mile Chocktoot Drain Canal and re-establishing the natural flow patterns of Chocktoot Creek. This canal bisects the east half of

the marsh, lowering the water table and effectively draining the wetlands extending for up to a mile on either side of the ditch.

- Acquire the 2,845 acres Roseburg Tract. This tract is a series of forested palustrine wetlands and adjacent uplands that wrap around the immediate perimeter of the marsh, providing critical habitat and protection to the Sycan Marsh wetland complex.
- Restore 5,000 acres of forested wetlands and surrounding forested uplands. The absence of wild fire in these forested wetlands and uplands has led to dense, overstocked woodlands, which in turn has altered the natural runoff patterns and increased nutrient and sediment loading on to the wetland habitats of the marsh. TNC is proposing to thin these forested wetland and forested upland sites using new and environmentally sensitive management techniques to re-establish healthy forest stands and improve hydrologic function and water quality on these lands.
- Enhance 2,700 acres of emergent wetlands by building 9.5 miles of fence to allow better management of livestock grazing. In addition, areas associated with aspen regeneration and riparian pastures need to be fenced.
- Provide fish passage in the Sycan River.
- Restore riparian corridors on at least 25 stream miles.
- Control exotic weeds such as musk thistle, Canadian thistle and reed canarygrass.

## Upper Klamath Lake, Oregon

Water quality is a major problem in Upper Klamath Lake, primarily caused by nutrient loading from tributaries draining the degraded watersheds that feed the lake. Water quality could be improved by restoration of former marshlands around the lake. Other actions that would improve water quality include restoring riparian zones and floodplain functions, and decreasing upstream water diversions. There are opportunities for wetland restoration and enhancement on private lands that were once part of the Upper Klamath Lake bed. These restorations would benefit endangered Lost River and shortnose suckers, as well as waterfowl, grebes, and other waterbirds. On the west side of the lake, the Running Y Ranch has started restoring wetlands at Caledonia Marsh, where there is potential for about 2,000 acres of restored wetlands. The west side of Upper Klamath Lake is threatened with development, mostly from the Pelican Butte developments. These developments could displace wildlife and further degrade water quality. These areas should be secured with conservation easements or acquisition. On the east side of Upper Klamath Lake, about 4,000 acres of former lakebed could be restored to provide habitat for fish and wildlife as well as increasing the water storage capacity of Upper Klamath Lake.

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect and restore at least 5,000 acres of private lands through conservation easements or acquisition from willing private landowners for lands that would provide habitat suitable for wetland restoration.

- Develop locally coordinated habitat management guidelines for landowners to enhance wildlife production and use (e.g., develop more permanent water sites) and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.

## Upper Klamath National Wildlife Refuge, Oregon

Upper Klamath National Wildlife Refuge was established in 1928 and is comprised of 15,000 acres of mostly freshwater marsh and open water. These habitats serve as excellent nesting and brood-rearing areas for waterfowl, yellow rails, and colonial nesting birds, including American white pelicans, several heron species, and the largest nesting population of red-necked grebes in Oregon. A few pairs of sandhill cranes nest on the refuge, and bald eagles and ospreys which nest nearby can often be seen fishing in refuge waters. Western pond turtles also reside on the refuge. Refuge waters are included in areas proposed for designation as critical habitat for endangered Lost River and shortnose suckers.

Winema National Forest recommends acquisition of 3,920 acres of private lands within the forest boundary in this area for addition to the national forest and an additional 5,000 acres outside of the forest boundary to be added to the refuge (U.S. Forest Service 1997). If lands are acquired, wetland and riparian restoration should be pursued, with priorities for providing shallow wetlands and wet meadow habitats for yellow rails and sandhill cranes.

### Recommended Actions:

- Secure firm water supply.
- Acquire and restore at least 5,000 acres on a willing seller basis for Upper Klamath NWR or Winema National Forest.
- Develop a cooperative management agreement for wetland areas between the Refuge and the Winema National Forest.

## Upper Williamson River, Oregon

The Upper Williamson River system has severe entrenchment problems in its lower third, where the floodplain is largely abandoned. This probably resulted from draining the Klamath Marsh and heavy grazing. Tributary headcuts probably reflect upstream migration of headcuts from the mainstem. The challenge in this system is to restore river connectivity with the floodplain.

The Winema National Forest has identified opportunities for wetland conservation within the Upper Williamson River area (U.S. Forest Service 1997). This area totals 54,000 acres and includes the Williamson River watershed upstream from Silver Lake Highway (near Klamath Marsh NWR office) to its headwaters. More than 35 miles of river and tributaries are included in this area. The primary conservation needs in this area are riparian and stream habitat restoration. The wetlands consist of moderate wet meadows, narrow streamside meadows, and moist lodgepole pine stands along streams and meadow edges. These meadows provide habitats for nesting sandhill cranes, waterfowl, and common snipe, as well as great gray owls. Wetlands in this area also support Oregon spotted frogs. Riparian habitats are important particularly important to landbirds and provide stream structure beneficial to native fish.

The USFS plans to restore hydrology in wet meadows and improve streamside riparian habitats as well as stream channel morphology and function. Several tributaries suffer from gulying caused by culverts that were set below the grade of stream channel at road crossings. Several private inholdings in this area limit restoration and management options. Potential candidates for acquisition of fee title or easements identified by the U.S. Forest Service (1997) include 16,600 acres (8,200 for Klamath Marsh NWR). Some of these private lands might be eligible for the Wetland Reserve program, which would help reduce acquisition costs.

Recommended Actions:

- Secure firm water supply for existing wetlands.
- Protect and restore 8,400 acres of private lands within this area on a willing seller basis. Consider Wetland Reserve Program easements on private lands as appropriate to achieve conservation goals and help reduce acquisition costs.
- Restore 45 acres of riparian habitats through willow plantings and streambank stabilization.

## Williamson River Delta, Oregon

The Nature Conservancy's 7,400-acre Williamson River Delta Preserve provides opportunities for one of the largest-scale wetland restoration projects in the Klamath Basin. Located at the confluence of the Williamson River and Upper Klamath Lake, the preserve was expanded in 2000 to include the entire lower six miles of the Williamson River. Diked, drained, and farmed for decades, the delta property was originally part of one of the most important wetland complexes in the Basin. The delta marshes historically provided critical habitat for the Lost River and shortnose suckers as well as a wide variety of waterfowl and other waterbirds. Initial restoration efforts restored 2,400 acres of wetlands and about 300 acres of uplands on the north side of the river. Future plans call for restoration of an additional 3,900 acres of wetlands, creation of a more natural river channel, and reestablishment of connections between the river, its floodplain, and the marsh and lake.

### Recommended Actions:

- Secure firm water supply for existing wetlands.
- Restore an additional 3,900 acres of wetlands. Develop wetland site for management of agricultural return water onsite to minimize discharge of nutrients into the river or lake habitats.
- Restore historic function of 10 miles of river channel and adjoining floodplain to benefit the two endangered suckers; integrate restoration design and old oxbow feature into restoration plans.

## Wood River Valley, Oregon

Wood River Valley is the floodplain of Wood River and Crooked and Annie creeks, which terminate in Agency Lake. These streams support endangered Lost River and shortnose suckers, which would benefit from stream improvements, improved water quality, watershed restoration and improved passage and screening. Meadows in the valley support a rare breeding population of yellow rails. Wood River Valley contains about 50,000 acres, mostly private lands used for livestock production. The valley currently supports moderate numbers of waterfowl and other waterbirds with high use by Canada geese. This area has potential to become a very important wetland area, if floodplain wetlands are restored. There is also potential to improve water quality by using restored wetlands for treatment of irrigation return water.

The 7,159-acre Agency Lake Ranch was recently purchased by the Bureau of Reclamation to increase the water storage capacity in Agency Lake (BOR 1999). Congressional authorization for the purchase included the stipulation that it "will be operated to make water available to all users." Final plans are not yet available, but the project may include acquisition of an additional 2,400 acres. To maintain fish and wildlife values, it is important to maintain emergent marsh habitat on this area.

There are opportunities for wetland restoration and enhancement on private lands which were once part of Agency Lake. The east side of the lake is threatened with development which could displace wildlife and further degrade water quality. These areas should be secured with conservation easements or acquisition.

BLM also owns an 800-acre parcel called Fourmile Creek Wetland, north of Upper Klamath NWR. This area supports yellow rails and Oregon spotted frogs. There is an opportunity to enhance an additional 400 acres at this site.

### Recommended Actions:

- Secure firm water supply.
- Acquire at least 2,400 acres of reclaimed land at Agency Lake for additional water storage and wetland restoration.
- Seek conservation easements or fee title acquisition to protect Agency Lake's shoreline from further development.
- Protect and restore at least an additional 6,000 acres of wetlands through cooperation from willing landowners through conservation easements such as Wetland Reserve Program for lands suitable for wetland restoration.
- Restore and enhance at least 15 miles of the Wood River and other stream channels and provide fish passage and screening where needed.
- Enhance 400 wetland acres at Fourmile Creek Wetland.
- Develop locally coordinated habitat management guidelines for landowners to enhance fish and wildlife, and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.

## **Wood River Wetland, Oregon**

BLM's Wood River Wetland Restoration Project is located on the historic delta of the Wood River, adjacent to Agency Lake. The purpose of the project is to construct levees, ponds, channels, and control structures necessary to facilitate the restoration of nearly 3,000 acres of wetland habitat. The primary objectives are to improve the water quality and quantity entering Agency Lake and to restore and enhance wetland habitats. Restoration of the wetland habitat is primarily intended to benefit two endangered species, the Lost River sucker and the shortnose sucker, but many other wildlife species will benefit.

Initial wetland restoration work was completed in 1998. Under BLM's 1995 management plan, the majority of the property (2,500 acres) will be managed for a diversity of wetland habitat types contained within two large cells. The water depth within these habitat types and flow of water between them will be regulated by control structures equipped with flashboards and screw gates. The plan also allows for one or more of these habitat types to be open to the influence of water levels in Agency Lake. Eventually, the option for allowing the entire project site to be managed by water levels in the lake could be explored.

Other phases of the restoration project will reestablish and restore 2.2 miles of the historic Wood River channel, and restore a more sinuous and vegetatively diverse edge along Sevenmile Canal. These phases will provide an improved refugia for juvenile fish, as well as improved nesting and brood rearing habitat for waterfowl and neotropical migrant birds.

Long term benefits expected from implementing the plan include improved water quality for the water leaving the wetland and entering Agency Lake, improved habitats for the Lost River and shortnose suckers, improved waterfowl habitat, and increased water storage. Additional benefits will be improved habitats for neotropical migratory birds, spotted frogs, and yellow rails. A wider floodplain along the west bank of the lower Wood River, influenced by river and lake levels, will provide an area

for deposition of sediments prior to the river entering Agency Lake. This will provide a riparian area similar to historic conditions.

Recommended Actions:

- Secure firm water supply.
- Restore 3,000 acres of wetland habitats.
- Restore 2.2 miles of Wood River channel.
- Restore Sevenmile Canal to a more natural channel with diverse riparian vegetation.

## California target areas

### **Butte Valley and Butte Valley National Grassland, California**

Butte Valley encompasses about 108,000 acres. In addition to those areas in public ownership (Butte Valley Wildlife Area and Butte Valley National Grassland), there are about 2,000 acres of ponds and wetlands scattered throughout the valley. Thousands of waterfowl use these wetlands. Pronghorn antelope, deer, bald and golden eagles, and nesting Swainson's hawks (state threatened) are also present. Up to 40,000 snow, Ross', white-fronted and Canada geese forage on private agricultural lands in the valley. In addition to thousands of waterfowl using the area, bald and golden eagles, pronghorn antelope and several pairs of nesting Swainson's hawks are present.

The 18,425-acre Butte Valley National Grassland is administered by Klamath National Forest and lies adjacent to the 13,200-acre Butte Valley Wildlife Area. The property contains thousands of acres of sagebrush, rabbit brush and perennial grasses. In addition, 1,130 acres of wetlands have been restored and the potential exists to restore an additional 500 acres.

#### Recommended Actions:

- Secure firm water supply.
- Restore 500 acres of seasonal wetlands on Butte Valley National Grassland and 500 acres of private wetlands.
- Enhance 2,000 acres of private wetlands.
- Secure conservation easements on all privately-owned wetlands (2000 acres).

### **Butte Valley Wildlife Area, California**

The California Department of Fish and Game's Butte Valley WA, nestled at the base of the Cascade Mountains, is located about five miles west of the town of Macdoel in eastern Siskiyou County. The 13,200-acre area is composed of 4,000-acre Meiss Lake, 4,400 acres of intensively-managed wetlands, and 4,800 acres of various other habitats including croplands, meadows, grasslands, brushfields, oak and juniper woodlands, pine-fir forests, and riparian areas. Meiss Lake is a shallow, alkaline lake which goes dry every 10 to 15 years.

Butte Valley WA provides essential foraging, resting and sanctuary areas for migrating waterfowl and other wetland birds, as well as nesting and brood rearing sites for breeding birds. The WA also provides important habitat for threatened species such as greater sandhill cranes, bald eagles and Swainson's hawks. It regularly hosts more than 100,000 ducks that stop here during fall and spring migrations, and the area is especially important to pintails. Green-winged teal, wigeon, mallards and canvasbacks also stage here in large numbers. Snow and Ross' geese are primary spring migrants with up to 40,000 birds present, and counts of 20,000 white-fronted geese, 4,000 Canada geese, and more than 5,000 tundra swans have also been recorded during migration.

Butte Valley WA provides nesting habitat for about 50 bird species including Canada geese, 13 duck species, three tern species, California and ring-billed gulls, greater sandhill cranes, Swainson's hawks and many others. Approximately 400 Canada goose goslings and 3,000 to 5,000 ducklings are produced annually. The most common nesting ducks are mallard, gadwall and cinnamon teal. Meiss Lake is used by nearly 2,000 molting Canada geese. Only a few state-listed threatened greater sandhill cranes and Swainson's hawks nest on the area. Meiss Lake is a major nesting area for colonial-nesting waterbirds. Nearly 3,000 pairs of California gulls and 2,500 pairs of ring-billed gulls nest on several islands in the lake, providing one of the more important nesting sites for these gulls in California. Other colonial-nesting birds at Meiss Lake are double-crested cormorants, American white pelicans, California and ring-billed gulls, and Caspian, black, and Forster's terns.

From the 1940s to the 1970s, the hydrology of Butte Valley and Meiss Lake, in particular, was extensively altered. Streams were channelized and diverted for irrigation. Wetlands were drained and farmed. Lake water was pumped out of the Valley to the Klamath River for flood protection as agricultural development encroached into the floodplain. Riparian and wetland areas were intensively grazed by livestock. More than 5,600 acres of wetlands have been restored or enhanced since the Department of Fish and Game acquired Butte Valley Wildlife Area in 1981. Some of these wetlands are on the adjacent Butte Valley National Grassland, managed by USFS. Riparian areas have also been enhanced with plantings of willow and cottonwood trees and have been rested from livestock grazing.

While a tremendous amount of wetland restoration work has been completed during the last 20 years, considerable work remains (Novick 1996). Wetland diversity could be improved with the construction of meandering channels within the wetlands and the development of loafing and nesting islands. Wetland vegetation should be managed to provide optimum food and cover for waterfowl and other wetland-associated birds as well as some open water. Wetland habitats available to fall migrating birds are often limited due to the lack of stream flow, fall rainfall, and carryover water in Meiss Lake. Extensive deep-well pumping has helped this problem but is expensive. Also, in very wet years there are insufficient wetland basins to store the spring runoff, and these floodwaters have been pumped to the Klamath River.

Invasive, exotic weeds such as Canada thistle are a current management problem. Weed problems will become worse if perennial pepperweed or purple loosestrife which are found nearby at the Lower Klamath Refuge arrive here.

Cereal grains are planted to provide food for migrating geese and sandhill cranes. In the process of restoring historic wetlands that had been farmed, cereal grain crop acreage was reduced from about 3,000 acres to about 600 acres planted. To offset some of this grain loss, more grain is left unharvested than before. About half of this grain is dryland farmed; consequently crop yields vary considerably from year to year. In good rainfall years, crop yields are sufficient to feed migrating geese and sandhill cranes at current population levels. An irrigation system is needed for all crop areas to more dependable crop yields.

#### Recommended Actions:

- Secure firm water supply.
- Install irrigation system in Unit 6C (230 acres) to provide better and more dependable cereal grain crop yields.

- Construct loafing and nesting islands in 500 acres of restored wetlands in Units 11B and 11C (20 islands).
- Construct loafing and nesting islands in Meiss Lake. (25 islands).
- Control invasive, exotic plants (enhance 500 acres).
- Investigate archaeological sites in Unit 7C and mitigate any effects of reflooding historic wetlands (restore 200 acres of wetlands).
- Secure a conservation easement on a 200-acre parcel to allow full flooding of Meiss Lake.

## **Clear Lake National Wildlife Refuge, California**

Established in 1911, this 46,460-acre Refuge is surrounded by Modoc NF lands and consists of approximately 20,000 acres of open water surrounded by upland habitat of bunchgrass, low sagebrush, and juniper. Small rocky islands in the lake provide nesting sites for the American white pelican, double-crested cormorant, and other colonial nesting birds. The upland areas serve as habitat for pronghorn antelope, mule deer, and sage grouse. The Clear Lake Reservoir is the primary source of water for the agricultural program of the eastern half of the Klamath Basin, with water levels regulated by BOR. Clear Lake NWR supports endangered Lost River suckers, and also contains one of the only three remaining American white pelican colonies in California, producing an average of 1,400 fledglings per year. Actions that improve the populations of suckers will enhance conditions for nesting pelicans.

Boles Creek and Willow Creek provide water to Clear Lake and these watersheds are managed by Modoc National Forest. Nearby Steele Swamp Ranch may offer opportunities for wetland restoration or easements.

### Recommended Actions:

- Secure firm water supply.
- Coordinate water level management with BOR to optimize habitat conditions for native fish and wildlife.
- Continue with cooperative wetland programs with adjacent private land owners to restore wetland and riparian habitats and improve the watershed above the Refuge.
- Work with USFS to improve land management around the lake.
- Implement a juniper control program for upland and riparian habitat enhancement and to help restore habitat for sage grouse.

## **Dry, Grass, and Orr Lakes, California**

Dry Lake is privately owned and encompasses about 300 acres of wetlands with restoration potential. A pair of sandhill cranes nest here. A diversion from Butte Creek supplements water to Dry Lake.

Grass Lake is mostly privately owned and is about 1,500 acres. Fruit Growers owns all but 30 acres which are owned and administered by CDFG. The 1,500 acres of wetlands are vegetated by hardstem bulrush, cattails and baltic rush. In addition to use by waterfowl and bald eagles, several pairs of nesting greater sandhill cranes use the area. Roosevelt elk are also common here.

The 4,562-acre Orr Lake is owned by the Klamath National Forest. The property contains the 110-acre Orr Lake, plus 930 acres of wetlands, and 110 acres of riparian habitat. Approximately seven miles of Butte Creek flows through the property. In addition to waterfowl the property is used by willow flycatchers, nesting greater sandhill cranes, and bald eagles. A 1999 North American Wetland Conservation Act (NAWCA) grant project will restore 800 acres of emergent wetlands. Riparian enhancement along Butte Creek is needed and there are additional wetland restoration opportunities.

#### Recommended Actions:

- Secure firm water supply.
- Restore seven miles of riparian habitat along Butte Creek.
- Enhance 930 acres of wetlands at Orr Lake.
- Enhance 1,800 acres of wetlands at Dry and Grass Lakes.
- Secure conservation easements or fee-title for privately-owned wetlands at Dry and Grass Lakes (1,800 acres).

## **Lower Klamath National Wildlife Refuge, California and Oregon**

Established by President Theodore Roosevelt in 1908, Lower Klamath Refuge is our nation's first waterfowl refuge. This 46,900-acre refuge contains about 30,000 wetland acres and is a varied mix of shallow freshwater marshes, open water, grassy uplands, and croplands that are intensively managed to provide feeding, resting, nesting, and brood rearing habitat for waterfowl and other waterbirds. This refuge is a focal point for waterfowl in Klamath Basin, regularly supporting from 40 to 60 percent of the Basin's migratory population, and is the most heavily used waterfowl area in the Pacific Flyway. It also sustains very high densities of nesting waterfowl as well as colonies of American white pelicans, double-crested cormorants, white-faced ibises, and great and snowy egrets. The refuge is also an important foraging area for wintering and migrating bald eagles. The White Lake area of the refuge supports high numbers of nesting American avocets, black-necked stilts, willets, Wilson's phalaropes and a few snowy plovers.

Historically, Lower Klamath Lake was a natural wetland of about 80,000 acres that filled during overflows from the Klamath River during peak runoff periods. As the river receded, this wetland gradually declined due to evaporation and infiltration, but still maintained 30,000 to 40,000 wetland acres during the summer period.

This refuge contains some of the most important and productive wetlands in the west. Lack of a secure water supply for this area would affect wintering bald eagles, breeding and migrating waterfowl, nesting pelicans, cormorants, white-faced ibises and egrets, and a myriad other waterbirds and wildlife.

Lower Klamath Lake was included in the original Refuge boundary. It consists of about 10,000 acres of private drained wetlands adjacent to the Straits Unit which are used for agriculture. Acquisition of this area for restoration, along with water rights and a secure water supply, would greatly enhance the value of Lower Klamath NWR. Potentially, this site could be managed to store water during peak Klamath River flows to help ensure better distribution of water for endangered salmon, wildlife, and irrigators, and still provide wetlands for breeding waterfowl and waterbirds.

There is also a 700-acre inholding within the Straits Unit and 900 acres in the White Lake area which would be desirable parcels to acquire for the Refuge.

#### Recommended Actions:

- Provide secure water sources for Lower Klamath NWR through the Klamath Basin adjudication, purchases of water rights, and if necessary, development of ground water resources.
- Protect and restore at least 10,000 acres of adjacent wetland and riparian lands on a willing seller basis for addition to the Refuge.
- Seek easements or other cooperative wetland programs with landowners on Cottonwood, Sheepy and Willow creeks to restore at least 1,000 acres of wet meadow and riparian habitats and improve watersheds above the Refuge.

## **Modoc National Forest Wetlands, California**

Modoc National Forest initiated its wetland development and enhancement program in 1965 and the program is still proceeding. Within the Klamath Basin drainage, the Forest manages about 10,000 acres of wetlands in the Clear Lake watershed, plus about two hundred miles of streams. There are numerous opportunities for wetland enhancement and riparian habitat restoration in this watershed.

Modoc NF wetlands support a wide variety of breeding waterfowl and waterbirds. The Forest's wetlands currently produce about 2,000 Canada geese and 10,000 ducks, with about one third of these are from the Clear Lake watershed. These wetlands also support moderate numbers of breeding sandhill cranes, black terns, Wilson's phalaropes, willets, black-necked stilts and American avocets. Boles and Willow creeks support endangered Lost River and shortnose suckers.

#### Recommended Actions:

- Secure firm water supply.
- Enhance 10,000 wetland acres in the Clear Lake watershed by reconstruction of dams, spillways, installation of headgates, excavating channels, reshaping bottom contours to increase open water area, building nesting islands and fencing for improved livestock management.
- Improve at least 25 miles of instream and streamside habitat in fish bearing streams through fencing and livestock management to achieve stream and riparian goals.

## Scott and Shasta Valleys, California

In Scott Valley, there are some oxbow-type wetlands that provide waterfowl habitat, and there are several miles of dredged river channel which could be restored.

Shasta Valley contains approximately 30,000 acres of private lands that would be suitable for wetland conservation with the most valuable wetlands occurring in the south end of the valley. These are properties that contain significant wetlands, riparian and riverine habitats with great potential to provide water and habitat for listed anadromous fish and a variety of wildlife. Acquisition on a willing seller basis is recommended in Shasta Valley WA's Conceptual Area Acquisition Plan (Burton 1989). These areas also provide prospects for conservation through the Wetland Reserve Program.

The principal opportunities for wetland conservation in Scott and Shasta valleys are riparian habitat restoration and anadromous fish habitat enhancement along the Klamath, Scott and Shasta rivers and their tributaries. Comprehensive Resource Management planning in cooperation with NRCS, and Wetland Reserve Program provide the primary opportunities for implementing conservation on private lands in these areas. As riparian zones are protected, buffer wetlands within those zones receive protection as well.

### Recommended Actions:

- Secure firm water supply.
- Secure conservation easements and acquire ownership from willing private landowners for lands that would provide habitat suitable for wetland restoration. Protect and restore at least 10,000 acres of wetland habitats on private lands through Wetland Reserve Program, conservation easements, and cooperative efforts with land owners.
- Develop locally coordinated habitat management guidelines for landowners to enhance wildlife production and use (e.g., develop more permanent water sites) and pursue opportunities for cooperative habitat enhancement efforts with private landowners. Additionally, seek assistance for providing funding and technical assistance to private landowners and other partners interested in restoration and enhancement projects.

## Shasta Valley Wildlife Area, California

Shasta Valley Wildlife Area (SVWA) is owned and managed by CDFG. The 4,657-acre area features a diverse blend of habitats including wetlands, riparian and native grasslands. At an average elevation of 2,600 feet, the Wildlife Area and surrounding Shasta Valley form a transition of habitats from Great Basin to coastal Klamath Province. The valley is bordered by the Cascades to the east and the Klamath Mountains to the west. Significant geologic features include numerous hills and mounds which resulted from a massive debris flow from a past volcanic eruption. The Shasta River runs south to north through the valley, draining into the Klamath River.

The Wildlife Area was acquired in 1990 by California's Wildlife Conservation Board. Development of the area began in 1993 and is ongoing. The area features 1,100 acres of permanent and seasonal wetlands. Historically, the Shasta Valley was heavily used by migrating ducks and geese. Such use prompted the Department of Interior to study the feasibility of acquiring land for a Refuge in the early 1960s. During that time, white-fronted geese were the most abundant species in the fall. Widespread conversion from cereal grain to irrigated pastures along with declining waterfowl populations may have

led to the overall decline in waterfowl use. Surveys done on SVWA in the fall of 1992 documented only about 5,000 ducks and 1,000 geese.

Use of the Wildlife Area by wetland-dependant species has grown steadily since the wetland development began. More than 25,000 ducks were counted in early October 1999. Spring use by cackling Canada geese and white-fronted geese has grown from a few dozen birds to well over 2,000. At least 22 pairs of greater sandhill cranes nest in Shasta Valley, with six pairs present on the Wildlife Area. Tule white-fronted geese have been using the area in increasing numbers during fall migration. SVWA provides breeding habitat to 65 bird species including 12 duck species and Canada geese. The Wildlife Area is an important migration corridor for neotropical migrants in spring and fall. The state endangered willow flycatcher also nests on the area.

The Little Shasta River provides a water source for SVWA with the majority of the water diverted during high winter flows and stored in three large reservoirs for use during the remainder of the year. The Klamath Province steelhead (a federal candidate species) is present in the Little Shasta River. The Wildlife Area operates a fish screen at the diversion and utilizes "fish friendly" diversion practices. SVWA is committed to long term riparian restoration along the Little Shasta and has involved local schools with annual planting and other riparian enhancement projects.

Since the area's acquisition, most of the emphasis has been on wetland and upland development and restoration. While a tremendous amount of work has been done to develop manageable wetlands, much work is still needed to properly to upgrade water delivery systems and infrastructure. Open ditches running through highly porous and erodible soils should be replaced with buried pipeline. A very old (30 years) and inefficient low lift 60 horsepower pump currently pumping water to Steamboat Reservoir needs to be replaced. Completion of these projects are essential to the management of water and ultimately the management of wetlands and uplands on SVWA.

Exotic weeds also are a major problem. Yellow starthistle is widespread and becomes a monoculture in the drier uplands. Other invasive exotics include whitetop and medusa head. Other species threatening the area are perennial pepperweed and purple loosestrife, currently found east of here in the Klamath Basin. Restoration of native grasslands should coincide with control and eradication of the exotics.

Currently, good roost or loafing sites for waterfowl are lacking. The construction of several large loafing islands in Bass Lake Reservoir will improve this area as a roost site for waterfowl.

#### Recommended Actions:

- Secure firm water supply.
- Install buried pipeline in key areas to prevent water loss and soil erosion. This will improve water delivery to 200 acres of wetlands and enhance up to 500 acres of uplands.
- Replace 60 horsepower low-lift pump.
- Control invasive, exotic weeds and restore 500 acres to native grasses.
- Construct five loafing islands on Bass Lake.

## Tule Lake National Wildlife Refuge, California

Historically, Tule Lake was a large dynamic wetland, fluctuating from 53,000 to more than 100,000 surface acres. The Klamath Reclamation Project “reclaimed” most of the lake bed and opened up the dried marsh for homesteading and agriculture early in this century. Tule Lake NWR was established in 1928, and was superimposed on BOR’s Klamath Project. The Refuge encompasses 39,116 acres of mostly open water and croplands. About 15,000 acres are leased by farmers from BOR. Refuge permit holders farm another 1,900 acres of cereal grain and alfalfa. These crops, together with the waste grain and potatoes from the lease program, are a major food source for migrating and wintering waterfowl.

During the 1950s through the early 1970s, the 13,000 acres of remaining wetland sumps of the Refuge were very productive and in combination with the adjacent croplands, supported peaks of more than 2.5 million ducks and one million geese. However, the productivity of the wetlands has declined, because the constraints on water management in the sumps eliminated the ecological processes critical to maintenance of wetland productivity. Sedimentation has reduced the depth of the wetlands and the capacity of the existing sumps. Also, stabilized water levels have reduced wetland diversity. The result of these problems is that Tule Lake NWR only supports a fraction of the waterfowl and other fish and wildlife as it did historically. A solution for this problem is a proposal to rotate the wetland units on the Refuge among the cropland units within the historic marsh bed. This would restore productivity to both the wetlands and the lands used for agriculture and would improve habitats for a multitude of fish and wildlife species, improve water quality, and increase the sustainability of agriculture while decreasing the inputs of fertilizers and pesticides.

### Recommended Actions:

- Secure firm water supply.
- Work with BOR, Environmental Protection Agency, CDFG, Tule Lake Irrigation District, Ducks Unlimited, California Waterfowl Association, and other partners to continue to pursue the concept of rotational land management, allowing the Refuge to be managed for permanent and seasonal wetlands, and agriculture through a rotational program to restore productivity to about 35,000 acres of refuge lands.

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