



*Lake County Umbrella*

**WATERSHED  
COUNCIL**

# ACTION PLAN

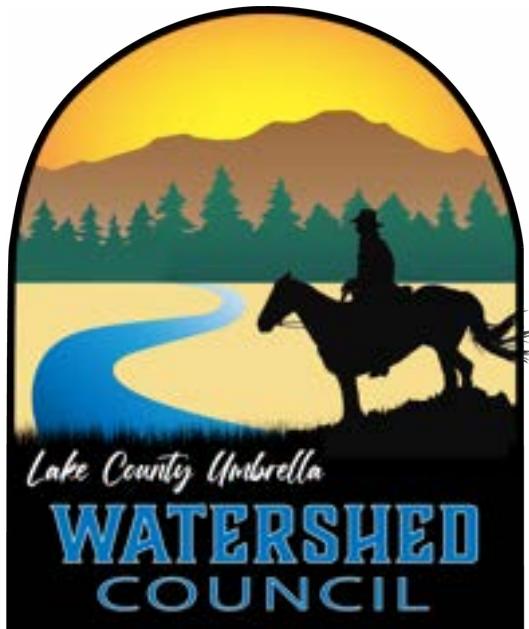
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## MISSION

The Mission of the Lake County Umbrella Watershed Council is to promote cooperative watershed restoration across jurisdictional boundaries, to enhance Lake County's watersheds for present and future generations.

## OUR STORY

Established in the mid 1990s, five independent Watershed Councils were formed to represent each distinct watershed in Lake County. The Councils (made up of local residents) assisted landowners with watershed projects to improve and promote watershed health. Over time, the Councils merged to become the Lake County Umbrella Watershed Council. With the aid of many partners, the Council plans, secures grant funding, implements, and monitors watershed restoration and enhancement projects.

## OUR LAKE COUNTY HOME

Lake County is made up of multiple, diverse watersheds, each of which have characteristics the State of Oregon recognizes as having priority significance. These characteristics provide the foundation for our restoration and enhancement efforts. Understanding and appreciating our working landscape in Lake County, we help design and implement projects that are beneficial to the land, water, and wildlife...but to the landowner as well. We focus on Ridgetop to Ridgetop Restoration.

## BACKGROUND

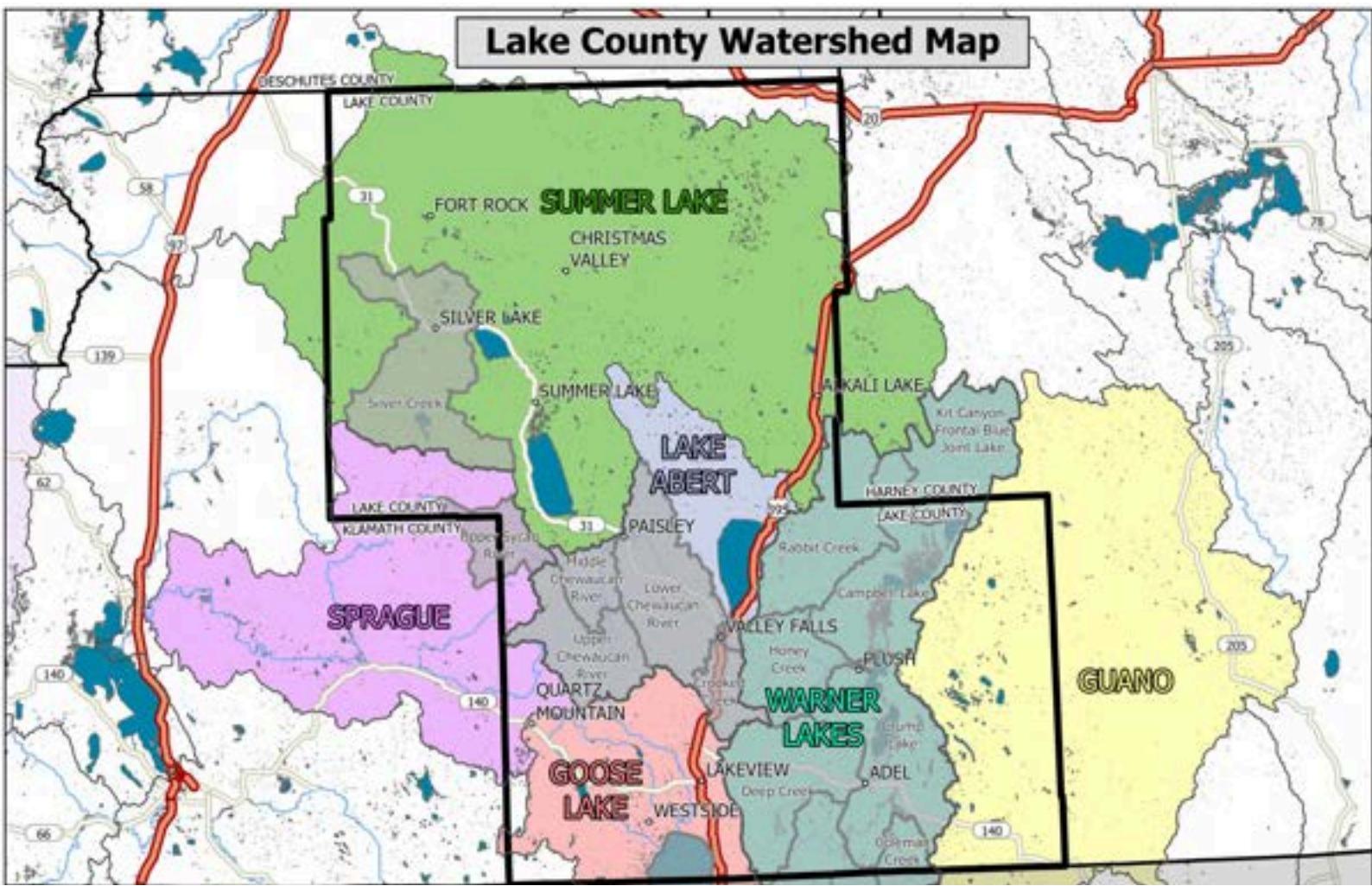
The council provides services and support to all watersheds and sub-councils in the region. Its board of directors and its contracted employees are names familiar to Lake County: Tom O'Leary, Matt Withers, Jack O'Leary, John Taylor, Jayna Ferrell, Pete Talbot, Colleen Withers, Brandi Neider, Autumn Muir, and Riane Miles.

Quality outcomes are reliant on Action Plans to provide guidance towards future Council activities. The Lake County Umbrella Watershed Council's Action Plan presents the goals, objectives, and proposed action items for the protection and enhancement of watershed resources county wide. This action plan is based on a variety of watershed assessments, watershed analysis, stream reconnaissance plans, and regional and state documents that provide direction for quality planning in Lake County.

Just as the natural resources within a watershed are related and interconnected, many of the primary issues of concern within Lake County are closely linked. Water quality and quantity, channel modifications, fish habitat conditions, juniper encroachment, forest health, fire and fire management, and noxious weeds inherently affect and are affected by each other in ways that are important for watershed managers to understand. The conditions that have contributed toward impacting watershed resources are interwoven throughout each analysis, assessment and reconnaissance plan; therefore, action items may appear in multiple sections when issues of concern impact a variety of watershed issues.

The key findings and recommendations within the above document identify and prioritize opportunities that are directed toward improving fish and wildlife habitat and water quality.

A summary of the key findings within the document follows on pages 5-8.



# Limiting Factors

## **Historic Stream Modifications**

Historical stream channel alterations in Lake County have removed vegetation that provided shade, cover and habitat for aquatic species. Alterations also removed large woody debris that helps stabilize banks, capture sediment, and create complex habitats. The number of rock gravel bars were reduced, which impacted stream flow velocities and habitat for aquatic species. The following practices have fundamentally altered stream function: channelization, roads, dams, culverts, irrigation diversions, livestock grazing and watering. As a result, there are multiple stream reaches that suffer from poor habitat quality caused by loss of riparian vegetation and increased erosion. For example, 25% of Thomas Creek (10 stream miles) was channelized in the 1940's, resulting in significant loss of riparian wetlands, in-stream habitat and floodplain connectivity. These channelized reaches are important for native fish and other aquatic species. LCUWC actively collaborates with private landowners and local, state, and federal conservation resource agencies to restore existing conditions.

## **Water Quality**

Every two years the Department of Environment Quality is required to assess water quality and report to the Environmental Protection Agency on the condition of Oregon's waters. DEQ prepares an Integrated Report that meets the requirements of the federal Clean Water Act for Sections 305(b) and 303(d). Water bodies that exceed protective water quality standards are identified as impaired, (which is also referred to as the "303(d) List"). Identifying a waterbody as impaired initiates the prioritization and development of a Total Maximum Daily Load. The 2022 Integrated Report identified approximately 70 sites in Lake County water quality limited due to temperature, bio criteria, or dissolved oxygen concerns. These conditions can be attributed primarily to low stream flows in the summer and fall months, low shade levels along streambanks, and stream widening in segments located in the valley bottoms. More recently, water quality has been temporarily impacted by wildfire.

## **Fish Passage**

Land management practices that historically altered the characteristics of the closed basin watersheds took place in the 1940's and 50's. Land was developed for agriculture production which led to alterations in the course and character of the streams. As the streams were altered, irrigation diversion structures were installed to divert creek water and irrigate fields. The resulting impact has negatively impacted instream fish habitat and migration of native fish species throughout the closed basin watersheds. In some locations, populations are only connected during consecutive high-water years, severely limiting the opportunities for the expression of a migratory life history and inter-population mixing. Lack of a migratory life history and degraded habitat impacts the potential productivity.

<b>Fish Passage Continued</b>	<p>Efforts to assess the quality of aquatic habitats are ongoing and understanding of natural temperature and water quality dynamics in the ecoregion is a research priority. The LCUWC is working aggressively to address passage and screening issues throughout the county. A number of stream reconnaissance plans and assessments with action items have been developed to address fish passage, population persistence among species, opportunities to improve habitat, and species recovery in some of the basins. Project action items have been prioritized based on fish species and habitat potential.</p>
<b>Riparian Areas</b>	<p>Altered riparian function is a common concern along the stream corridors throughout Lake County. Stream channel modifications, increased width to depth ratios, conifer and juniper encroachment, dramatic flows, reduced vegetation, and historical grazing activities have led to stream systems that function at an impaired rate. Long term effects lead to lateral erosion of streambanks, land loss, diminished water quality, and loss of riparian habitat. In addition, invasive plant species can take advantage of the good growing conditions found in riparian zones and will invade these areas. As these plants dominate native plants, the overall vegetative diversity decreases, resulting in less favorable habitat for most wildlife species and livestock.</p>
<b>Wildlife</b>	<p>Lake County watersheds provide valuable habitat for a variety of wildlife species. Specifically, there are four key habitat types that provide food, shelter, and water for the threatened sage grouse, white-headed woodpecker, wintering mule deer, and the unique waterfowl that migrate to the SONEC Region- Pacific Flyway in Lake County annually. These habitat types consist of sagebrush steppe, aspen stands, open large stands of Ponderosa pine, flood irrigated pastures that mimic natural wetlands and wetland areas located throughout the county. Restoring and maintaining complex habitat types for these species is a priority for area resource managers.</p>
<b>Degraded Wetland Conditions</b>	<p>Wet meadows provide critical waterfowl habitat as the area lies in the Southern Oregon-Northeastern California (SONEC) region of the Pacific Flyway. This region stands out as highest priority habitat across the 11-state geography. SONEC sustains more than six million migrating and breeding birds each year. Latest data indicates that wetlands across this landscape are threatened not only by land use changes but also drying as a result of climate change. Most of lower Lake County is made up of both natural and manmade wetlands that provide important habitat for numerous wildlife species, as well as providing essential water for agricultural purposes. Protecting and enhancing these wetlands by sustaining flood irrigation and restoring proper stream function is valuable for the local economy and imperative for sustaining migratory bird populations. Continued loss of these critical habitats would result in altered distribution of waterfowl during spring migration, thereby concentrating birds in less productive foraging habitats and increasing competition for food resources.</p>

**Noxious Weeds  
Infestations**

Noxious weeds are found in ever-increasing numbers throughout Lake County. The spread of noxious weeds signals the decline of entire native plant communities. Noxious weeds severely impact the plant diversity of occupied environments and cause widespread economic impacts. Invasive weeds are considered one of the most serious natural resource and economic issues facing Lake County. Without a major increase in management efforts, noxious weeds will continue to spread across the county and project landscape, facilitating further degradation of productive lands that are critical to Lake County's livelihood.

With the increase in ground disturbance from mechanical treatments, increased road travel during the various stages of these forest health treatment projects, and the prescribed burning proposed by the KLFHP, a strong noxious weed management plan is needed to adequately and proactively address the potential for further noxious weed dispersal across private and public lands. Knowing that noxious weed population growth can be both local (at the current site) and distal (spreading to new sites), this Noxious Weed Management Plan (NWMP) will attempt to address the potential causes for noxious weed proliferation and growth.

The LCUWC is on the Lake County Cooperative Weed Management Area (LCCWMA) Board. The LCUWC is promoting noxious weed control throughout the county by working cooperatively with the LCCWMA on educational efforts and through restoration and upland enhancement projects.

**Juniper  
Encroachment**

Western juniper has significantly expanded its range since the late 1800's by encroaching onto landscapes once dominated by shrubs and herbaceous vegetation. This expansion affects soil resources, plant community structure and composition, water, nutrient and fire cycles, forage production, wildlife habitat, and biodiversity. Lake County sagebrush steppe ecosystems provide extensive sage grouse and mule deer habitat. Encroaching juniper have degraded many of these habitat areas by reducing plant community diversity, limiting water storage, and increasing overland flow of fine sediments. In addition, aggressive juniper and conifer encroachment has led to a reduction in aspen stand health and abundance. Aspen stands are vital to the health of many varieties of wildlife and are a key species in our forest systems. The Lake County Umbrella Watershed Council is actively working with private landowners and neighboring agencies to partner on large landscape scale projects to address juniper encroachment issues. Projects are focused on improving habitat conditions for wildlife, enhancing aspen stands, reducing dense forest canopies, and increasing vegetation abundance and diversity.

**Forest Health  
Conditions**

A healthy forest is a key contributor to a highly functioning watershed. Forest landscapes across the Great Basin are suffering from unhealthy management, which increases risk of disease, dense canopy cover, overcrowding, and catastrophic fire. Ultimately, precipitation captured in the top of the watershed affects the health of everything within it. Specific focal areas have been identified in Lake County as high priority treatment areas. These landscapes are unique due to the extensive stands of old legacy ponderosa pine mixed with aspen, open meadows and streams. Greater sage grouse, woodpecker, antelope, and mule deer habitat are also immersed in these areas.

**Forest Health  
Continued**

The landscape is at severe risk of intense wildlife disturbance due to heavy fuel loading and stand densities which could result in the loss of old legacy ponderosa pine and greater sage grouse focal habitat. Intense wildfire poses a significant risk to local streams through sedimentation and habitat fragmentation impacting endemic fish and other aquatic species in our watersheds.

Primary vegetation zones within the project area are: mixed conifer forest, juniper woodlands, sage shrub steppe, and aspen stands. The forest understory and meadow systems should be composed of a healthy mix of grasses, forbs, and shrubs that provide habitat for a multitude of wildlife species and are essential components for healthy working lands, however, many native grasses and forbs have been displaced or out-competed by invasive species, especially western juniper. Concurrently, aspen stands that exist in the upland meadows have also been impacted by pine and juniper encroachment. Today these meadow systems are suffering from drier conditions and loss of natural diversity from the impacts of juniper and mixed conifer encroachment creating dense multi-layer conditions. Some ponderosa pine stands now have over 500 trees per acre, as compared to historical averages of 26-32 trees per acre. Overall, growth rates for trees are low, as water, nutrients, and growing space is limited by competition. The decreased growth rates and decreased stand vigor makes trees more susceptible to insect attack and disease mortality. Unhealthy forest stands affect a watershed's ability to properly capture, store and release water into a landscape. This trickle down effect adversely impacts a multitude of resources.

**Altered Fire  
Regimes**

Fire plays an important role in the natural disturbance and recovery patterns of native species and ecosystems in Lake County's watersheds. Fire suppression activities have altered the historic frequency and intensity of fires in Lake County. Through collaborative planning on a landscape level the Klamath Lake Forest Health Partnership, USFS, BLM, ODF, OSU Extension, and NRCS are implementing forest health treatments that will lead to prescribed fire in the future. These collaborations are establishing Fire Councils in preparation of future treatments.

**Climate Change**

Assessments for South-Central Oregon highlight the significant impacts of climate change on ecosystems, particularly in dry forests and rangelands. Increasing temperatures and reduced soil moisture will shift the abundance and distribution of tree and shrub species, favoring drought-tolerant ones. Wildfires and insect outbreaks will drive vegetation changes, with younger forests and smaller trees becoming more common. The recent Bootleg and Cougar Peak fires in Lake County, which were intensified by climate change, demonstrate these trends.

Climate data reveals rising temperatures and more extreme weather patterns, including longer periods of drought and shifts in snowpack. In Lake County, decreasing snowpack threatens water availability, as the region relies on it for streamflow. Additionally, changes in precipitation patterns, warmer winters, and altered runoff are expected to impact water resources, wildlife habitats, and aquatic species.

## PRIORITIES

Prioritizing projects and actions to meet the six limiting factors of Lake County is key to the success of the Lake County Umbrella Watershed Council. In order to prioritize effectively and efficiently the Lake County Umbrella Watershed Council relies on assessments and documents that have been developed for individual watersheds and wildlife management units. The following is a list of documents used to prioritize projects:

- *Crooked Creek Stream Reconnaissance and Action Plan*—2012
- *Deep Creek Watershed Analysis*—1998
- *Drews Creek Watershed Analysis*—2006
- *Goose Lake Fishes Working Group Conservation Strategy* —2008
- *Goose Lake Tributaries Reconnaissance and Fish Passage Plan* - 2017
- *Inner Mountain West Joint Venture Management Guide*—2010
- *Lake County All Lands Restoration Initiative Noxious Weed Management Plan* —2021
- *Lake County All Lands Restoration Initiative Strategic Action Plan* --2023
- *ODFW's Greater Sage Grouse Conservation Assessment and Strategy Plan for Oregon*—2011
- *ODFW's Mule Deer Plan* --2024
- *ODFW's Oregon Sage-Grouse Action Plan* -- 2015
- *ODFW Warner Sucker Recovery Plan*-- 2009
- *ODFW Warner Mule Deer Initiative*—2009
- *Silver Lake Watershed Assessment; Creating a Healthy Watershed through Cooperative Watershed Management*—2003
- *Upper Chewaucan Watershed Assessment; A Guide for Sustaining a Healthy Watershed for Future Generations*— 1999, 2025
- *Upper Deep Creek Stream Reconnaissance and Action Plan* – 2015
- *Upper Sprague and Sycan Watershed Assessment*—2007
- *Upper Sycan Watershed Analysis*—2002
- *Upper Thomas Creek/Cox Flat Assessment*--2012
- *Upper Thomas Creek Watershed Analysis*—1996
- *Warner Basin Aquatic Habitat Strategic Action and Design Plan* - 2018

*In order for the LCUWC to consider a project, it must meet the management objectives of the listed resources and/or address one of the Council's ten limiting factors.*



## OPPORTUNITIES TO IMPROVE WATERSHED CONDITIONS

The Lake County Umbrella Watershed Council (LCUWC) is committed to building partnerships with private landowners and other conservation specialists to achieve the goal of planning and implementing holistic watershed restoration projects throughout Lake County. The restoration efforts that have been on-going in the County for decades now have taught us valuable lessons to assess project effectiveness. The LCUWC supports actions that meet the following objectives:

<b>ASSESSMENT</b>	To evaluate current health of the watershed and its relevance to the social, economic, and ecological resources of the county.
<b>AWARENESS</b>	To provide awareness, understanding and education of the value of healthy watersheds and the restoration actions that can improve or enhance each specific resource.
<b>ENHANCEMENT</b>	To lead efforts and implementation actions that improve, restore, and protect watershed function for Lake County's streams, wildlife, fish, and people.

To meet these objectives the Lake County Umbrella Watershed Council seeks to:

- Collaborate with local stakeholders to restore, protect, and enhance watershed resources.
- Achieve a balance between conservation actions, the local people, and the working landscapes that embody Lake County.
- Provide educational and learning opportunities for those interested in restoring and protecting Lake County's Watersheds.
- To plan and implement priority restoration actions throughout Lake County.

The following section lists the types of projects the LCUWC plans to implement within each watershed to address the limiting factors outlined within this action plan.



# LIMITING FACTOR #1: HISTORIC STREAM MODIFICATIONS

## Issue

In the 1940's many stream systems throughout Lake County were channelized or modified to improve agricultural production. It was also common to remove woody vegetation from streams to improve irrigation practices. Many ranches have adapted and become dependent on the modifications that were created along stream systems. In numerous areas this has led to degraded riparian and streambank conditions affecting water quality, fish habitat conditions, and a decline in riparian vegetation. The LCUWC annually works alongside property owners to improve and stabilize these conditions, while maintaining the integrity of working lands. Streambank stabilization, willow plantings, low-tech process based restoration strategies, and livestock management practices are all things that can be done to improve these systems.

## Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide educational opportunities to landowners regarding grazing management alternatives, off-site water opportunities, riparian fencing, vegetation plantings, and bank stabilization techniques, and low-tech process based restoration strategies.
<b>TECHNICAL ASSISTANCE</b>	Provide technical assistance to landowners interested in addressing stream issues on their property. Utilize area reconnaissance plans and assessments to determine core issues. Assess opportunities for a larger landscape level project.
<b>COLLABORATION</b>	Collaborate with local, state, and federal agencies to develop alternatives for addressing issues and support project development.
<b>IMPLEMENTATION</b>	Develop projects for grant funding opportunities that will lead to project implementation and address associated issues. For instance (willow plantings, bank shaping, riparian fencing, bioengineering, grazing management, off-site water, head cut repair, and erosion control).
<b>MONITORING &amp; ASSESSMENT</b>	Provide pre and post treatment monitoring to assess effectiveness of the project 3 - 5 year.

## Priority Areas

Will be determined through reconnaissance plans and assessments and by working with area resource specialists.

## LIMITING FACTOR #2: WATER QUALITY

### Issue

Water quality conditions in Lake County are intrinsically tied to water quantity and flow levels. Parameters monitored by the Oregon Department of Environmental Quality (ODEQ), such as stream temperature, dissolved oxygen, and turbidity, are significantly influenced by the widespread low-flow conditions observed across the county. These conditions exacerbate the impacts of climate variability, land use changes, and upstream water diversions, which collectively contribute to water quality degradation and habitat stress for aquatic species.

### Action Items

<b>EXPAND MONITORING EFFORTS</b>	Continuously monitor key water quality parameters, with an emphasis on stream temperature, dissolved oxygen, turbidity, and nutrient levels, to identify trends and potential sources of impairment.
<b>ENHANCE STREAM RESILIENCE</b>	<ul style="list-style-type: none"> <li>Collaborate with property owners to develop and implement projects that enhance riparian vegetation, increase shade, and improve streambank stability.</li> <li>Promote practices that increase in-stream habitat complexity, such as the installation of large wood structures and the restoration of natural meanders.</li> </ul>
<b>ENGAGE COMMUNITY</b>	<ul style="list-style-type: none"> <li>Organize workshops and presentations at local events to inform the public about current watershed issues, water conservation strategies, and the benefits of maintaining healthy aquatic ecosystems.</li> <li>Partner with schools and community groups to develop educational programs focusing on watershed stewardship.</li> </ul>
<b>PROMOTE WATER CONSERVATION</b>	<ul style="list-style-type: none"> <li>Support the adoption of water-saving technologies and irrigation efficiency improvements among agricultural users.</li> <li>Encourage the use of voluntary water-sharing agreements to maintain critical instream flows during peak demand periods.</li> </ul>

### Priority Areas

Priority areas are identified in the Lake County Limiting Factors Analysis and detailed in watershed assessments for individual basins within the county. Focus will remain on areas where water quality impairments pose the greatest risk to ecological and community health, such as high-priority fish habitat zones and locations with recurring low-flow conditions.

## LIMITING FACTOR #3: FISH PASSAGE, ENTRAPMENT

### Issue

Historic irrigation practices have led to fragmented stream systems throughout the county. Drop board irrigation systems and other instream structures are impeding migration of many key fish species. In addition, very few irrigation ditches in the county are screened to prevent fish entrapment. The combination of the two issues has the potential to negatively impact native fish populations. In addition, many roadways throughout Lake County contain culvert crossings that are undersized and perched. These conditions lead to isolated populations of fish and prevent aquatic species from accessing better habitat in the headwaters. Developing alternatives that will provide for passage at culvert locations and passage and screening at irrigation structures is critical to native fish species and the ranching community who depend on irrigation water to sustain agriculture practices.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide opportunities for landowners to attend workshops and tours to learn about the importance of fish passage, fish screening, and culvert replacement.
<b>TECHNICAL ASSISTANCE</b>	Provide technical assistance to landowners interested in addressing fish barriers and installing fish screens on their property. Determine possible alternatives, understand flow regimes and specific aquatic species requirements.
<b>COLLABORATION</b>	Collaborate with partners to assess cross boundary conditions. Utilize opportunities to address more than one issue at a time, multiple barriers may exist within one stream segment or system.
<b>IMPLEMENTATION</b>	Develop projects for grant funding to implement fish passage and fish screening where barriers exist and fish entrapment is occurring.
<b>MONITORING &amp; ASSESSMENT</b>	Continue to monitor the project to assess effectiveness for 3 - 5 years.

### Priority Areas

Priority areas for fish passage and screening will be determined by key fish species. Current high priority watersheds include Goose Lake Watershed, Warner Lakes Watershed, and Lake Abert Watershed.

## LIMITING FACTOR #4: RIPARIAN AREAS

### Issue

Beneficial Riparian function along many of the streams in Lake County has been altered. The multiple issues associated with riparian conditions have led to accelerated stream flows, increased erosion, and a hydrological disconnection between the stream and associated riparian areas. A healthy stream floods, moderately erodes and deposits within a riparian area, giving it shape and structure. Riparian areas typically recover high flow events rapidly if functioning properly, however the long-term effects of channelization, removal of woody material, and loss of vegetation can lead to streambank incision, loss of floodplain, diminished habitat for fish and wildlife, and increased stream temperatures. These modifications significantly alter the movement and storage of water that is so important to the riparian system. Water withdrawals from streams also may reduce base flow, depriving riparian areas of moisture. Riparian plant composition, habitat structure, and productivity are determined by the timing, duration, and extent of flooding.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide opportunities for landowners to attend workshops and tours to learn about the value of the riparian for habitat, water quality, bank stability, and proper stream function.
<b>TECHNICAL ASSISTANCE</b>	<ul style="list-style-type: none"><li>Provide technical assistance to landowners interested in addressing riparian area function.</li><li>Provide information on strategies and techniques to support riparian area function and livestock management.</li></ul>
<b>COLLABORATION</b>	Collaborate with partners technical assistance opportunities. Utilize opportunities to address more than one issue at a time. Several restoration treatments may be possible within the stream reach or segment.
<b>IMPLEMENTATION</b>	Develop projects for grant funding to support project implementation to provide riparian fencing, off site water, water gaps, riparian plantings, flood plain development, streambank stabilization and noxious weed treatments.
<b>MONITORING &amp; ASSESSMENT</b>	Continue to monitor the project to assess project effectiveness for 3 to 5 years.

### Priority Areas

The priority areas for riparian restoration are county wide.

## LIMITING FACTOR #5: WILDLIFE

### Issue

Lake County's watersheds provide crucial habitat for various wildlife, with ongoing restoration projects aiming to benefit priority species, particularly those at risk in Oregon. These include the Warner sucker, Great Basin redband trout, Modoc sucker, gray wolf, and several bird species like the black-backed woodpecker, greater sage grouse, and northern goshawk.

Restoration efforts have focused on key areas like Thomas Creek, supporting a diverse range of native fish species and helping address challenges like low water flow and drought. The Modoc sucker, once endangered, was delisted in 2015 due to successful collaboration with landowners. Gray wolves, delisted in 2021, also roam the region.

Priority habitats for preservation include sagebrush steppe, aspen stands, wetlands, and open ponderosa pine forests, essential for species like mule deer, white-headed woodpeckers, and wetland birds. These habitats are central to local resource management efforts aimed at sustaining the region's biodiversity.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	Raise awareness and provide landowners with information about the impacts on these habitat types
<b>COLLABORATION</b>	Collaborate with local agencies to inventory and assess wildlife habitat conditions.
<b>IMPLEMENTATION</b>	Plan and implement projects that improve these habitats on small- and large-scale restoration opportunities.

### Priority Areas

Priority areas include: Goose Lake Basin (mule deer habitat, wetland waterfowl), Warner Basin (sage grouse, white headed woodpecker, wetland waterfowl), Chewaucan & Crooked Creek Watersheds (mule deer, white headed woodpecker, waterfowl), Silver Lakes Basin (mule deer).

## LIMITING FACTOR #6: DEGRADED WETLAND CONDITION

### Issue

Lake County's lowlands are part of the Southern Oregon-Northeastern California (SONEC) region, a key area for migratory waterfowl. Historically, natural flooding has been replaced by human-controlled flooding for agriculture, which still benefits wetlands and migratory birds. Research shows that flood-irrigation, haying, and grazing, combined with snowmelt runoff, create ideal conditions for spring waterfowl, especially short grasses with shallow ponding. However, many of Lake County's irrigation systems are outdated and inefficient, leading to the loss of valuable wetlands. If this continues, it could negatively impact waterfowl populations by disrupting migration patterns and causing food shortages. Conserving wetlands in Lake County is essential for maintaining these vital habitats for migrating birds.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide educational opportunities to landowners about the importance of improving wetland conditions and irrigated wet-meadow resilience.
<b>TECHNICAL ASSISTANCE</b>	Provide technical assistance to landowners interested in improving wetlands and wet meadow resilience on their property, involving strategies and techniques to implement practices that promote wetland conditions through low tech process based restoration and wet meadow resilience through irrigation improvement projects.
<b>COLLABORATION</b>	Collaborate with local, state, and federal agencies and Ducks Unlimited to develop alternatives for addressing the loss of wetlands and wet meadows.
<b>IMPLEMENTATION</b>	Develop projects for grant funding to support implementation of projects to address the loss of wetlands and wet meadow resilience.
<b>MONITORING &amp; ASSESSMENT</b>	Provide pre and post treatment monitoring

### Priority Areas

The priority areas for wetlands enhancement are county wide, including Silver Lake Watershed, Summer Lake Watershed, Lake Abert Watershed, Warner Lakes Watershed, and Goose Lake Watershed.

# LIMITING FACTOR #7: NOXIOUS WEED INFESTATIONS

## Issue

Noxious weed and annual grass invasions are a significant issue in Lake County, affecting both the environment and local economy. While much of the county's landscape remains intact with native vegetation, many areas are still impacted by invasive species. Landowners lose thousands of dollars annually due to land damage and the cost of chemical treatments, and wildlife habitats are also affected. Lake County has one of the state's most active Cooperative Weed Management Areas (CWMA), of which the LCUWC was a founding member in 2004. The LCUWC partners with the CWMA to produce the Lake County Noxious Weed Management Plan (NWMP), a strategy to guide coordinated weed management across both public and private lands for the future.

## Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide public awareness and education of the ecologic and economic implications of noxious weed establishment and persistence through stakeholder engagement.
<b>TECHNICAL ASSISTANCE</b>	<ul style="list-style-type: none"><li>• Limited to funding, identify the priority of noxious weed species to be treated.</li><li>• Comply with federal, state, and local laws, regulations, and policies regarding noxious weed control</li><li>• Reduce economic and environmental losses to landowners and managers caused by noxious weeds</li><li>• Recommend noxious weed management strategies and plans for each priority species as it relates to forest management treatments</li></ul>
<b>COLLABORATION</b>	<ul style="list-style-type: none"><li>• Encourage and facilitate cooperation and coordination between jurisdictions, agencies, land managers, and private landowners.</li><li>• Maintain an active role on the Cooperative Weed Management Area Board</li></ul>
<b>IMPLEMENTATION</b>	<ul style="list-style-type: none"><li>• Implement a Weed Policy and Classification System</li><li>• control and reduce the spread of invasive noxious weeds within the project area following the USFS Fremont Winema Prevention Practices document.</li></ul>
<b>MONITORING &amp; ASSESSMENT</b>	Provide pre and post treatment monitoring

## Priority Areas

High priority areas for weed treatment include roads, waterways, and restoration project areas with disturbed soils. Mule deer winter range and sage grouse habitat are also a high priority for noxious weed treatment.

## LIMITING FACTOR #8: JUNIPER ENCROACHMENT

### Issue

Decades of fire suppression in Lake County watersheds has led to the expansion of juniper woodlands. Juniper encroachment led to landscape conditions where juniper became the dominant species. Habitats that were once covered with grass and shrubs in the uplands and sedge/willow/aspen in the riparian zones are now heavily impacted by this invasive species. As junipers expand across the landscape native grasses and shrubs become less abundant.

Junipers have the ability to utilize ground water in a highly effective way, leaving very little water for native grasses and shrubs in an area with such limited water as this one. If the trend of fire suppression and associated juniper expansion is not reversed, it is expected that riparian vegetation such as aspen will continue to decline, and upland shrubs and grasses will continue to be crowded out, leaving more soil exposed and surface erosion. Degraded upland conditions will lead to poor wildlife habitat and overall watershed condition.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	Provide public awareness and education of the ecologic and economic implications of noxious weed establishment and persistence through stakeholder engagement.
<b>TECHNICAL ASSISTANCE</b>	<ul style="list-style-type: none"> <li>Provide technical assistance to landowners interested in treating juniper.</li> <li>Assist landowners with project prescriptions, layout and contracting.</li> </ul>
<b>COLLABORATION</b>	Coordinate treatment efforts with partners including: ODFW, USFS, BLM, USFWS and ODF.
<b>IMPLEMENTATION</b>	<ul style="list-style-type: none"> <li>Assess current encroachment levels in key watersheds.</li> <li>Obtain grant funding for treatment.</li> </ul>
<b>MONITORING &amp; ASSESSMENT</b>	<ul style="list-style-type: none"> <li>Conduct post-treatment monitoring.</li> <li>Conduct follow up treatments if needed and assist with slash treatment and pile burning.</li> </ul>

### Priority Areas

The highest priority for treating juniper will be in current and historic sage grouse habitat and in important mule deer winter range areas. The LCUWC will rely on Oregon Department of Fish and Wildlife biologists and plans for prioritizing projects.

# LIMITING FACTOR #9: FOREST HEALTH CONDITIONS

## Issue

Healthy forests are crucial for a functioning watershed, but the Great Basin's forests are suffering from poor management, leading to issues like disease, overcrowding, and higher wildfire risks. Dense forests and heavy fuel loads threaten old-growth ponderosa pine and greater sage grouse habitats, while intense wildfires can harm local streams, sedimenting waters and fragmenting aquatic habitats. Whitebark pine, an endangered species in Lake County, relies on Clark's nutcracker for seed dispersal, but this tree species is also at risk. Meanwhile, meadow systems and forest understories have been overtaken by dense timber and juniper, displacing native grasses and forbs. Overcrowded ponderosa pine stands are reducing growth rates and making trees more vulnerable to disease and pests. The increased tree density has worsened watershed health, reducing water infiltration, increasing erosion, and decreasing overall site productivity. To address these issues, the LCUWC aims to restore a healthy, resilient forest landscape, integrate fire as an ecological process, and mitigate wildfire threats to forests, wildlife habitats, water quality, and communities.

## Action Items

<b>EDUCATION &amp; OUTREACH</b>	<ul style="list-style-type: none"> <li>Provide educational opportunities for landowners regarding forest health issues and proper management.</li> <li>Educate property owners regarding future maintenance and weed treatments</li> </ul>
<b>TECHNICAL ASSISTANCE</b>	<ul style="list-style-type: none"> <li>Provide mapping and inventory on private land to assess conditions, develop priorities and design treatment prescriptions.</li> <li>Assist with grant funds: contracting, project layout, and oversight of projects.</li> </ul>
<b>COLLABORATION</b>	<ul style="list-style-type: none"> <li>Collaborate with a wide range of partners on private and public land to plan and address issues.</li> <li>Collaborate with Fremont- Winema National Forest and ODF to address the National Cohesive Wildland Fire Management Strategy.</li> </ul>
<b>IMPLEMENTATION</b>	<ul style="list-style-type: none"> <li>Plan large scale project across boundaries utilizing the USFS Integrated Landscape Restoration</li> <li>Assist with pile burning and future prescribed fire.</li> </ul>
<b>MONITORING &amp; ASSESSMENT</b>	<ul style="list-style-type: none"> <li>Monitor project areas for project effectiveness</li> </ul>

## Priority Areas

Current priority areas include the Lake County All Lands Restoration Initiative (LCALRI) which includes Crooked, Mud, Honey, and Thomas Creek Watersheds.

## LIMITING FACTOR #10: ALTERED FIRE REGIMES

### Issue

Fire is a natural part of the ecosystem and essential for the health of Lake County's watersheds, but public awareness of its role is limited. In recent years, wildfires have become larger, more severe, and more destructive, with 281,336 acres burning in Lake County alone in 2020–2021. Past fire exclusion practices, along with drought, overcrowding, and insect outbreaks, have stressed forests. Human-caused fires account for 84% of wildfires in the U.S. and contribute to longer fire seasons and greater burn areas. The increasing severity of wildfires harms water quality, wildlife habitats, and soil integrity. To address these challenges, the National Cohesive Wildland Fire Management Strategy promotes collaboration among stakeholders to achieve three goals: resilient landscapes, fire-adapted communities, and safe wildfire responses.

### Action Items

<b>EDUCATION &amp; OUTREACH</b>	<ul style="list-style-type: none"> <li>• Raise community awareness about the roles that fire and fire suppression play in our forests.</li> <li>• Participate with partners hosting workshops and develop educational brochures and news articles to begin education efforts.</li> </ul>
<b>TECHNICAL ASSISTANCE</b>	Plan training for local staff (private individuals and agencies) to develop these teams (future TREX Training).
<b>COLLABORATION</b>	Support and participate in establishment of community fire teams or prescribed burn associations (PBAs)

### Priority Areas

Focal areas include the Lake County All Lands Restoration Initiative (LCALRI) which includes Crooked, Mud, Honey, and Thomas Creek Watersheds, encompassing over 600,000 acres. These watersheds are considered the highest priority areas for treatment, however, watersheds county wide are in need of forest health treatments followed by prescribed fire.

# LIMITING FACTOR #11: CLIMATE CHANGE

## Issue

Climate change in South-Central Oregon is expected to increase temperatures, which will affect soil moisture and change the distribution of tree and shrub species, favoring drought-tolerant species. Wildfires and insect outbreaks will drive vegetation changes, potentially leading to younger, smaller forests. These shifts have already impacted Lake County, with severe wildfires like the Bootleg and Cougar Peak fires in 2021, which burned large areas of dense forests. Adaptation strategies include thinning dry forests to reduce drought stress and improve tree growth, controlling nonnative plants on rangelands, and using mechanical treatments or prescribed fire to manage juniper expansion.

Climate change also threatens water availability in Lake County, which relies on snowpack for streamflow and lake levels. Declining snowpack since 1955 is expected to worsen, leading to earlier and reduced spring flows, increased winter flows, and prolonged drought. These changes could harm aquatic habitats, wildlife, and local economies. Predictions include higher temperatures, more rain/snow mix, prolonged drought, and altered runoff patterns that could reduce water quality and affect species diversity.

## Action Items

<b>EDUCATION &amp; OUTREACH</b>	<ul style="list-style-type: none"> <li>• Reintroduce and promote the idea of fire as an ecological process</li> <li>• Engage with communities on water use efficiency, forest restoration, fire and smoke</li> </ul>
<b>COLLABORATION</b>	<p>Foster cooperation among landowners and agencies to effectively manage nonnative plants and improve rangeland health, focusing on landscape-scale restoration efforts to maintain biodiversity and resilience to climate change.</p>
<b>IMPLEMENTATION</b>	<ul style="list-style-type: none"> <li>• Strategically thin dry forests using mechanical treatments and prescribed fire</li> <li>• Increase understory abundance, diversity, and overall forest resilience</li> <li>• Enhance habitat for Oregon Conservation Strategy Species</li> <li>• Address recommended Conservation Actions within Oregon Conservation Opportunity Areas</li> </ul>
<b>MONITORING &amp; ASSESSMENT</b>	<ul style="list-style-type: none"> <li>• Regularly assess climate impacts on ecosystems and adjust management strategies accordingly.</li> </ul>

## Priority Areas

The Lake County All Lands Restoration Initiative (LCALRI) focuses on the Crooked, Mud, Honey, and Thomas Creek Watersheds, covering over 600,000 acres, which are top priority for forest health treatments and prescribed fire. While these watersheds are a primary focus, other areas in the county, including Summer Lake All Lands, also require urgent restoration to address environmental concerns.

