An aerial photograph of the Upper Klamath Lake region. A long, narrow dam or causeway extends from the left side of the frame into the vast, blue lake. The surrounding landscape is a mix of green fields and forested hills. In the far distance, a range of mountains is visible under a clear sky, with a prominent snow-capped peak. The overall scene is serene and expansive.

FROM THE TOP OF A FAULT FORMED RIDGE
OVERLOOKING THE EXPANSIVE UPPER KLAMATH
LAKE, the rest of the world seems to fall away.
Unbroken blue skies and dry, thin air stretches
the horizon impossibly far. To the east, parched
buttes roll through deep, green farm-filled
valleys. To the west, only the rugged, snow-
capped Cascades can rein in the view. The
feeling of freedom that defines the American
West is alive in this place.

RESOLVING THE KLAMATH

THE KLAMATH BASIN DEFIES THE SOGGY NORTHWEST STEREOTYPE. The Cascade Mountains steal the moisture from eastward winds, transforming the damp, green Oregon known to most of the country.

Away from the mountainsides, Lodge Pole and Ponderosa Pines supplant the water-dependent firs. The moss-covered logs and thick tangles of plants of the western forests are gone. In their place, reddish-black volcanic rocks speckle hillsides adorned with dusty sage. Sandy pumice soils are exposed to the wind and sun by the sparse ground cover. Everything seems to crack and crumble underfoot.

Despite these desert-like conditions, an oasis of lakes, rivers, and marshes teams with wildlife. The remnants of a huge prehistoric lake once provided a cache of resources that allowed the Basin's earliest human inhabitants to thrive in an otherwise formidable environment. Much time has passed and cultures have changed, but the reliance on these same resources has not. For more than 100 years, settlers, homesteaders, and their descendants have defied the desert by transforming vast lakes and marshes into farms and pasture—creating a heritage in the process.

About 15 miles south of Klamath Falls, tucked in a winding valley lined with stunted junipers, Bob Flowers takes advantage of the last light of day to load hay bales into a shed. From his perch in the converted earth mover, he surveys the fields that make up his 275-acre ranch. Sun stretches across the yellow windrows. The air is thick with the sweet smell of fresh hay.

On a nearby field, his 16-year-old son collects neatly lined bales of hay with an aging bale stacker. Unconcerned by the tractor, a small herd of deer help themselves to the alfalfa. It is obvious from the animals' disregard for the machine, that they consider these fields to be their own. Flowers agrees. Closely tied to the land, he values the wildlife that make this farm into their home.

On this perfect August evening, it is easy to see why Flowers continued the family tradition. His ranch wraps around a small butte dotted with juniper, sage, and volcanic rocks. Cattails line the small irrigation ponds which double as refuge for ducks, cranes, and egrets. It is a piece of land he would never trade.

Flowers hopes his son will take over the ranch when he is ready to retire—just as he and his father both did. While he knows the sense of satisfaction and pride his son would inherit, Flowers also knows



the stresses and pitfalls inherent in his way of life.

Competition from Canada and other countries keeps grain prices hovering at the break even point. To make matters worse, in mid-July evening temperatures dipped below freezing and damaged his grain crop. Flowers may end up selling it as hay or feeding it to his cows. The hay he and his son are harvesting now has also suffered. An uncharacteristic thunderstorm hit shortly after it was cut, leaching out the hay's nutrients and slashing its value in half.

He still hopes to break even this year. Without irrigation water from the Klamath River, even these modest hopes would be dashed.

During the droughts of 1992 and 1994 Flowers went without irrigation and his crops burned beneath the summer sun. Remarkably, he suffered the loss voluntarily. The Bureau of Reclamation, which



delivers irrigation water to more than 100,000 acres in Oregon, left the water instream in order to protect endangered fish in Oregon and California. Flowers has an independent right to Klamath River water, but would not exercise it. He refused to profit while his friends and neighbors suffered. Although devastating, the droughts were temporary. Without a reliable water supply, farming would not be possible and the value of Flowers' land will wither to twenty-five cents on the dollar. If this happens, he suspects someone will purchase the property and build a house on it. Other farms in the area have met the same fate.

Despite the threat, Flowers remains optimistic that future water shortages can be avoided. He believes that if people work together, there will be enough water for everyone.

BRINGING IN THE HAY

Deer graze from a comfortable distance under the last remnants of sun while farmer Bob Flowers scrambles to salvage a second cutting of hay. Working with fading light and aging equipment, Flowers still hopes to break even this year, despite an unexpected thunderstorm that leached the hay's nutrients, lessening its market value.



REBUILDING A WETLAND—A cooperative effort among environmental groups and the Tribes, the Wood River restoration project (above) is the largest of its kind in the country. The Tribes hope that by restoring the filtering quality of the wetland, water quality problems (below) will no longer hamper fish survival.

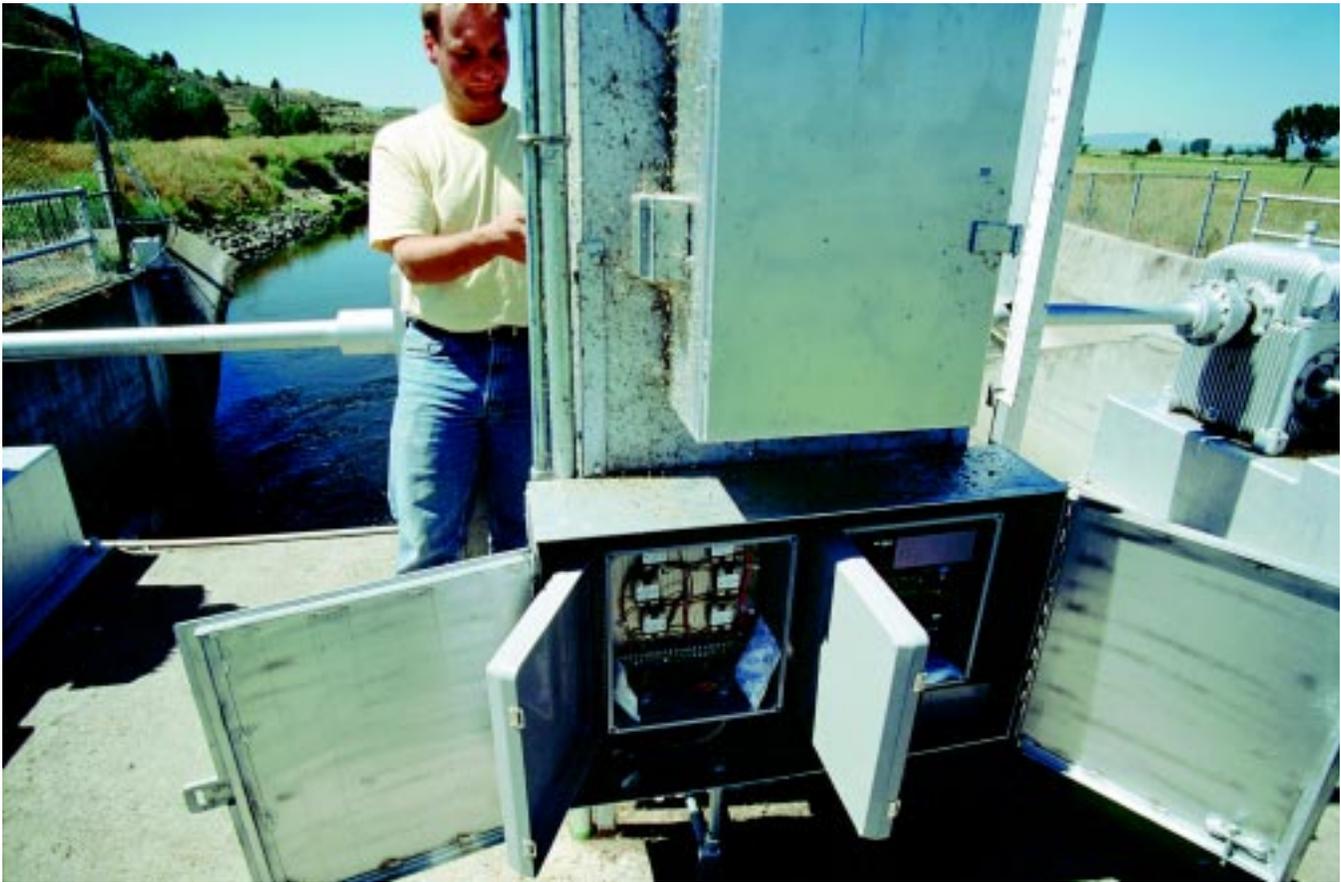
Thirty miles north of where Bob Flowers is working to salvage his crops, Elwood Miller works to salvage the endangered shortnose and Lost River suckers. He adjusts his baseball hat—embroidered with the word “KLAMATH”—and surveys the most recent work along the Wood River Ranch wetland restoration project. Previously diverted and channelized to irrigate almost 3,000 acres of pasture, the Wood River is being returned to its original, deeper channel. Plants from a neighboring wetland are also being transplanted by several young men that Miller has recruited. Despite all the commotion, birds and other wildlife are busy taking advantage of the restored habitat.

As his hat proclaims, Miller is a Klamath Indian and for thousands of years, the history of his people have been tied to this land. To members of the Klamath Tribes, the Basin is more than just their home. It is the place where they were created—the place chosen for them by God, *Blaydalknii*, “the one from above.” Despite losing the tribal land in 1954, after the Klamath Reservation was terminated, Miller sees the Tribes as stewards of the land. Although title to the land was lost, the Tribes never gave up their reserved rights to hunt and fish.

The suckers the Tribes seek to revive have a special



significance. They are part of what Miller calls the Tribes’ “traditional economy.” Great runs of the fish provided the Klamaths with enough food to survive the Basin’s long, cold winters. Not so long ago, the suckers were still so abundant that farmers would snag them from the rivers to use as fertilizer for their fields. In 1988 both species were placed on the Endangered Species List by the U.S. Fish and Wildlife Service. The decline of the sucker populations mirrors the decline in abundance and size of other



SWITCHES AND LEVERS—The Klamath Irrigation Project is an elaborate system of canals, diversions, pumping stations, and headgates. To improve management of the diversion gates, the Bureau has replaced many of the switching stations with computer controls. Now an adjustment is simply a phone call away.

species, explains Miller. He remembers a time when mule deer weighed 240-300 pounds. Now, the deer they hunt are less than 150 pounds. He sees the diminished wildlife as a direct threat to the Tribes.

A needs assessment conducted by the Tribes in 1988 showed that more than 75 percent of its members were living in a state of poverty. Subsistence hunting and fishing helped them to survive. With so many in the Tribes already in poverty, there isn't much room left to give—which is why Miller and the Tribes have taken the initiative in restoring the Basin's ecosystem. Central to this goal is improving the water quality and quantity of Upper Klamath Lake. Without an abundant supply of clean water, Miller's hopes for restoring the sucker populations and bringing salmon back to the Basin and the Klamath people, will be lost. By returning the Basin's waterways to a more natural, balanced state—through efforts like the Wood River Ranch—he knows he can succeed.

Caught between the interests of Elwood Miller and Bob Flowers is Karl Wirkus, the Area Manager for the Bureau of Reclamation's Klamath Project. Wirkus knows that if a water shortage occurs, irrigators and the Tribes will look to him for water. It is a position he does not savor. Past litigation and other legal guidance have pre-determined the choices he will make.

Wirkus believes that, as a federal agency, the Bureau must honor its responsibility to protect Tribal reserved rights. This duty was described in *Seminole Nation v. U.S.* as requiring "moral obligations of the highest responsibility and trust," holding the Bureau to "the most exacting fiduciary standards." The Bureau must also conduct its operations to protect the endangered sucker species and further the goals of the Endangered Species Act. The Bureau interprets this to mean that if shortages are severe enough to affect water quality, Wirkus will need to satisfy these obligations first.

The Project, as it is known, was established in 1905 to provide water for farming. Today, it provides

irrigation to about 200,000 acres of farmland and two National Wildlife refuges in Oregon and California. While equally dependent upon the Bureau for water, the wildlife refuges are subservient to agriculture because they were established after the Project. In addition to this hierarchy, distributions are further broken down within the project depending on the contract; some lands would be the first to go dry if irrigation deliveries were curtailed.

Fortunately, this year an above-average rainfall has alleviated these concerns. However, relying on this kind of abundance will not solve the underlying problem. A concerted effort will be required if all needs are to be met.

It is under these tensions and concerns that the State of Oregon will adjudicate Klamath River Basin water rights for those with claims dating prior to 1909. The process is necessary because, like most western states, water use in Oregon follows a version of the prior appropriation doctrine where “first in time, first in right” is the rule. The value of the “right” referred to is found not so much in the right to use water, as it is in the right to exclude others from doing so. If a senior water user is not receiving an adequate supply, the local watermaster may shut off a junior upstream user until the more senior user is satisfied. This distribution system is not without its conflicts.

On February 24, 1909, the State of Oregon interposed itself between disputing neighbors and took on the responsibility of regulating surface water distribution. However, the permits required for diversions were only enforced prospectively. As a result, claims originating before 1909 were never formally recognized by the State and have been left in a form of limbo where rights could neither be asserted nor denied. By finally adjudicating the dates and quantities of each claim, proper enforcement of these valuable rights will at last be possible.

Along several tributaries of the Klamath River, successful adjudications have already been completed. Water users along the North and South Forks of the Sprague River, Annie Creek, Cherry Creek, Four and Seven Mile Creeks, and the Wood River have had their claims settled. This does not mean that these

water users are disinterested in the current adjudication—just the opposite is true. Because the unadjudicated claims along the other waterways will have a direct impact on the water available to these users, they will have a significant interest in ensuring the validity of these pre-1909 claims.

Despite the age of the claims involved in the current adjudication, the list of claimants is surprisingly large. It includes: several federal agencies, irrigation districts, the Klamath, Modoc, and Yahooskin Band of Snake Indians (collectively referred to as the Tribes), people who purchased Tribal lands, and individuals whose families have farmed and

ranching in the Basin for generations.

The State commenced the process of settling the priority date of the claims, the rate of diversion, and the total amount of water that may be used for each claim in 1975. After receiving notice from prospective claimants on their intent to apply for a water right, several lawsuits drastically impeded the State’s efforts. The federal government unsuccessfully fought to exempt itself from the State’s adjudication authority and the Tribes successfully fought to have standing to claim a right to water. With the completion of this litigation, progress has since resumed.

In the traditional adjudication process, the Director of the Oregon Water Resources Department submits a final determination to the Court for approval. The Department has also initiated a second process for rights settlement. This process, known as Alternative Dispute Resolution (ADR), provides a forum for claimants to negotiate water use with each other before submitting their agreements to the Director for approval. Apprehension of both processes is high as many participants feel that their way of life is at stake.

A diversity of claimants, each with a stake in the outcome, and a complex web of environmental, legal, and cultural issues underlies every discussion of water rights. To fully understand the Basin’s water reliance, and to realize the implications of these issues, demands a closer look at all aspects of the Basin—from its geography to its people, from its history to its economy.

Like most western states, water use in Oregon follows a version of the prior appropriation doctrine where “first in time, first in right” is the rule.



Without question, water is the single most valuable resource of the Klamath Basin. As the Basin’s waterways exist today, they are as diverse in characteristics as they are vital to the economy and culture of the people who live there. The shallow, turbid Upper Klamath Lake contrasts sharply with the deep, clear Crater Lake. The Klamath River boasts of world-class white water near the California border but is lazy and meandering just below Upper Klamath Lake. Regardless of their physical attributes, the waterways share the tremendous burden of supporting the local economy.

The Klamath Basin is one of the poorest areas of the state.¹ Without its water resources, the per capita income of \$13,500² would undoubtedly be decimated. With so much pressure on a single resource,

each contributing river and stream is important.

By geographic definition, the Klamath Basin is the area drained by the Klamath River and its tributaries. As the Klamath is one of only three rivers that pierce both the Cascades and the Coastal mountain range before emptying into the Pacific Ocean, the entire Basin is an area encompassing portions of south-central Oregon and northern California – an area roughly twice the size of Massachusetts. In Oregon, the Klamath Basin occupies more than 5,600 square miles and covers almost all of Klamath County and smaller portions of Jackson and Lake Counties to the west and east. Although the geography defines the

Basin’s true boundaries, for purposes of the Adjudication, the Oregon-California border (in some cases the Tule Lake Basin) effectively marks its southern limit. At the border, the Klamath River Canyon marks the Basin’s low point and at an elevation of 2,755 feet, is its drain point. To reach this common point, the waters of the Basin must travel from every corner and through every type of environment.

The confluence of the Sprague and Williamson is Upper Klamath Lake’s greatest water source. At an average of 758,800 acre feet per year, it contributes almost half of the lake’s total annual water supply and could fill it in a year.

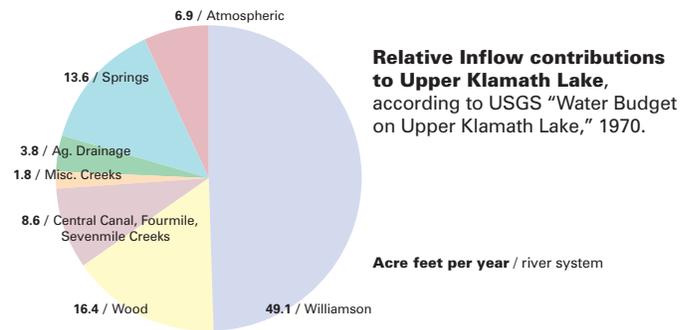
On a map, the Williamson River resembles an old crooked cane. With its headwaters accumulating in the north central part of the basin off of Booth Ridge, it curves north and west and picks up Jackson and Jack Creeks before flowing into the Klamath Marsh Refuge.³

There it breaks up into sloughs and channels while filling the marsh’s shallow ponds before buttes force the waters to resume southward. Joining the Williamson as it makes its exit, is the appropriately named Spring Creek. During summer months, there is usually no discharge from the marsh and Spring Creek maintains the Williamson until it joins the Sprague River near the town of Chiloquin.

The Sprague River starts its 90-mile journey on the timbered slopes of Coleman Rim and 8,364 foot Gearhart Mountain in the east. Near the center of the Basin, the Sprague meets its major tributary, the Sycan River. The Sycan collects the waters flowing off Winter Ridge and drains the northeastern portion of the Basin while passing through the 25,000-acre Sycan Marsh, 23,000 acres of which are now owned by The Nature Conservancy. According to 1998 water resources data from the U.S. Geological Survey, the Sycan and Sprague collectively deliver an annual average of 424,200 acre feet to the Williamson River. The confluence of the Sprague and Williamson is Upper Klamath Lake’s greatest water source. At an average of 758,800 acre feet per year (USGS, 1998), the Williamson contributes

almost half of the lake’s total annual water supply and could fill it in a year.

Joining the Williamson in its effort to fill Upper Klamath Lake is the Wood River. Spring fed at first, the Wood River is bolstered by waters from the slopes of Mt. Mazama flowing through the channels of Annie and Sun Creeks. The Wood delivers 172,000 acre feet which must pass through Agency Lake before flowing into Upper Klamath Lake.



Upper Klamath Lake’s nutrient-rich waters fluctuate between elevations of 4,137 and 4,143 feet.⁴ At an average depth of only eight feet, these variations in the water level have drastic effects on its surface area.⁵ Regardless of its shortcomings, the lake is Oregon’s largest and remains the central feature of the Klamath Basin. Located mostly on its western shore,⁶ the 15,000 acre Upper Klamath Wildlife Refuge was established in 1928 and preserved the final quarter of remaining Wood River Valley wetlands. To the south, the Link River begins at the Link River Dam and makes the very brief journey into the remnants of Lower Klamath Lake. Lake Ewauna swells slightly before the Klamath River slowly wanders off into the state-run Klamath Wildlife Area. Courtesy of the Bureau of Reclamation, the Klamath has the Lost River as one of its last tributaries before it leaves Oregon.

The Lost River is a naturally closed sub-basin. It formally begins its journey at Clear Lake in California and picks up water from Gerber Reservoir through Miller Creek while wandering in a 90-mile arc back to California and into Tule Lake—only 9 miles from its Clear Lake source. Canals and diversion channels constructed near the town of Olene control the Lost River’s downstream flow and prevent it from flooding reclaimed lands in Tule Lake. This water is rerouted into the six miles of Klamath River that lie between Lake Ewauna and Keno Dam. Keno also acts to back the Klamath up so that the same chan-



VIOLENT BEGINNINGS—Crater Lake may look placid now, but Oregon's deepest lake began with a volcanic eruption 42 times greater than the noted eruption of Mount St. Helens in Washington.

nels and canals can be used to replace Lost River supplies with the Klamath. Below Keno, the Klamath encounters the J.C. Boyle Dam, its final obstruction in Oregon. The final eleven miles, though regulated by the hydropower dam's releases, descend rapidly in class IV and V white-water rapids through the scenic Klamath River Canyon.⁷

This collection of lakes, marshes, and rivers represents the Basin's most significant free flowing water features. While they have played an important role in the area's development, they ultimately answer to a more subtle and powerful influence: the geographical features of the landscape itself.

Of course the Basin's landscape does far more than simply funnel the surface water to a common source. It ultimately defines what resources are available and the limits at which they can be harvested. By examining the entire landscape, the choices and life-styles of the people who live here are more easily understood.

For the past several hundred million years, what is now Oregon was being scraped off the floor of the Pacific Ocean. When North America separated from Europe and created the Atlantic Ocean, the North American tectonic plate began colliding with various plates in the Pacific Basin. Because the Pacific plates are denser, they dive, or *subduct*. In the process the top layer of sediment from the ocean floor is scraped off and fused to the North American plate. The more widely known side-effect of this process was the creation of the Cascade Mountain range.

The Cascade Mountains make up the western boundary of the Klamath Basin and are geologically divisible into two separate regions—the Western Cascades and the High Cascades. The Western Cascades are older and were born while the Pacific ocean still broke on the shores of the Willamette Valley. The process of erosion has whittled the peaks to their current height, about half that of the 11,000-foot High Cascades. Only five million years ago, the Western Cascades were tilted upward, creating a sloping ramp on the west and a precipitous drop on

the east. It is actually this ramp of the Western Cascades, rather than the more prominent High Cascades, that casts the rain shadow affecting much of the Klamath Basin.

While the peaks of the High Cascades provide Oregon with much of its identity, their formation has been considerably less spectacular than much of the rest of the state. The volcanism associated with the High Cascades was only one-sixth that of their western brothers.

Despite the decreased activity, the more recent High Cascade volcanism created much of Oregon's current topography. Perhaps the most spectacular evidence of this is Crater Lake.

Mt. Mazama is estimated to have been 10,000 to 12,000 feet high. About 7,700 years ago, the mountain erupted in what has been called "Oregon's most cataclysmic geologic event." Ash from the eruption has been found in eight states and three Canadian provinces. When the mountain's cone finally collapsed, Mt. Mazama was diminished to its current height of 8,151 feet. Over time, precipitation and springs gradually filled the six-mile-wide caldera. At its greatest depth of 1,932 feet, Crater Lake is now the deepest lake in the United States and in 1902 became Oregon's only National Park.⁸

To a lesser extent, the volcanic arc of the cascades crept into the Basin. The region's timbered buttes are littered with volcanic rocks describing the mountain's formation. While these low-lying hills provide the area with some of its mountainous landscape, the majority of the Klamath Basin receives its features from the geologic province known as *basin and range*. The Klamath Basin occupies the northwest corner of this province which stretches south as far as Mexico and east to Utah. The north-south running ranges that separate the broad, flat basins are actually the fault lines between two separate blocks where one has been pushed up, or *horst*, while the other has recessed, or *graben*. Extensive geological mapping of the Basin has revealed hundreds of these fault lines.⁹

The fault-formed grabens offered ideal areas for water to collect. During the last ice age, mountain

runoff and heavier precipitation spawned many large, rainfall-dependant (pluvial) lakes. In Oregon, none was larger than Lake Modoc. By comparison, Lake Modoc's most prominent legacy, Upper Klamath Lake, is only one tenth its ancestor's estimated 1,100-square-mile expanse. It was in this lake that the Basin's famed redband and bull trout developed. When the climate changed and became drier about 11,000 years ago, runoff from the mountains and

seeping springs could no longer compete with the dry, thirsty air and the draining Klamath River. As the lake receded, many of the Basin's lakes, rivers, and valleys were left behind.

Whether standing on Stukel Mountain overlooking the Project or driving through Klamath Marsh on Silver Lake Road, evidence of Lake

Modoc lies everywhere. The lake acted as a natural landfill for the eroded materials washed from its shores or carried in by streams laden with glacial till. Contributing to the composition of the valley floors was the single celled diatom. These microscopic plants fabricate a protective shell for themselves out of silica. As volcanic activity provided ample supplies of this material, the lake was ideal for their abundant growth. When the plants died, their white shells settled to the lake floor in thick layers of diatomaceous earth or chalk. Total deposits in the some of the region's valleys measure in the hundreds of feet. It is not unheard of for a well driller's log to report sediment deposits of more than 1,000 feet.

Despite the porous quality of the soils, the expansive valleys were unwilling to surrender the water that took more than a million years to collect. Upper Klamath Lake was connected to the 85,000-acre Lower Klamath Lake and Tule Lake reached across the California border. Lining these lakes were huge expanses of marsh, rivaled in size only by the wetlands to the north and east. Winter runoff and springs continued to fill the channels and pools left by Modoc's retreat, enabling these lakes to survive while many of eastern Oregon's pluvial lakes evaporated. By the time white explorers first arrived, the marshy lakes still covered more than 375,000 acres. There were, however, people present who's collective history witnessed the complete transformation.

In an eruption 42 times greater than Mount St. Helens, an estimated six cubic miles of magma poured from the mountain and areas more than 70 miles away were covered with volcanic debris six inches deep.

The eruption of Mt. Mazama, 7,700 years ago.

For 11,000 years the Klamath, Modoc, and Snake Indians, all shared portions of the Basin. At the time of contact with white explorers, the Modocs had settled around Tule Lake and the lava beds in California. The Yahooskin Band of Snake Indians preferred the arid conditions of the easternmost reaches of the Basin while the Klamaths made the central marshes, lakes, and rivers their home.¹⁰ Altogether the three Tribes controlled almost 22 million acres of Oregon and California. Because of the association forced through the Treaty of 1864, the Tribes have lost their individual identity and are collectively referred to as the Klamaths.

Although many of the Basin's features bear the Klamath name, it was not one they gave themselves. In the 1860s, Captain Oliver Cromwell Applegate recorded the phonetic spelling of the native name as *Ouse-kanee* or *Oux-kanee*, meaning "people of the lake" or "people of the marsh." Applegate hypothesized that the name Klamath most likely originated from French trappers, as one of the first written recordings of the name, *Clammitte*, was derived from the French *Clair-Metis*, meaning "light mist" or "cloud." In all, eleven different spellings of the name have been used, but Klamath has best withstood the test of time.

Many of the hypothesis concerning the prehistoric culture and life-style of the Klamaths has been drawn from artifacts and the personal records and observations of scientists and early explorers. From these accounts, Cressman concluded "[t]he Klamath Indians had built a culture that was integrated around the resources of the rivers and the swamps of the area, with lesser emphasis on the exploitation of the open lake." From the name they gave themselves to the clothes they wore, the Klamaths were as much a part of the Basin's waters as the fish and waterfowl. The abundant, marsh-growing tule was indispensable—providing the Klamaths with clothing, baskets, and building material. Arrows designed to skip across the water when shot into a flock of birds and the marsh shoe (similar to a snowshoe) further exhibit the Basin's influences on Tribal life. The Basin's marshes and waterways changed the Klamath's very way of life.



A Klamath woman weaves a reed basket.

ANCIENT PEOPLE OF THE BASIN

"Their dress appears rather strange - their leggins being made of reeds, also their shoes of the same - well adapted for snow but would not answer in the summer season."

Peter Skene Ogden, a trapper from the Hudson Bay Company and one of the first whites to visit the basin, 1826.



Drying suckers at the Lost River.
Historical photos courtesy of Klamath County Museum.

Plentiful waterfowl, salmon, suckers, and wocas seed all provided the food supplies that allowed the Klamaths to forsake the nomadic life of the “Great Basin” Indians. Archaeological digs reveal that the presence of animal bones (other than dog bones) is all but absent in the upper, more recent layers of abandoned developments. Instead of traveling to follow herds of mule deer, the Klamaths needed only relocate to where the next seasonal supply of food would be found. In the winter, when such an infusion was not available, many of the individual bands would return to a semi-permanent settlement near the present location of Chiloquin. The springs in this area prevented the Sprague and Williamson Rivers from freezing—allowing fish and muscles to sustain the Tribe.

While the Klamaths had no need to venture beyond their traditional homeland, they were not an isolated group. Cressman believed that tribes along the coast and the Columbia River could access the Klamaths and impact their culture. By the time European Americans contacted the Klamaths, the Tribe had already been influenced indirectly through its dealings with neighboring tribes.

The first white man known to have explored the Basin was Finan McDonald. Employed by the Hudson Bay Company, McDonald trapped the Klamath Marsh for beaver through the

winter of 1825-26 without success. He abandoned some of his traps and did not return the following winter when Peter Skeen Ogden led a Bay Company party into the Basin.

In September 1826 Ogden left The Dalles with 43 men and 100 horses for the Upper Klamath Lake region. The journey would become incredibly brutal. Following weeks of poor hunting and harsh weather, Ogden wrote in his journal on Saturday, December 3: “Two horses killed for food; terrible storms of snow and sleet! What will become of us?”

Fortunately, trading with the “Clammite” Indians (as Ogden called them) gave the party some relief. The Klamaths kept such a large number of dogs that Ogden acquired 40 of them for food and named the Upper Klamath “Dog Lake.” Although Ogden’s encounters with the Klamaths were peaceful and he commended their honesty for returning traps, beavers, and an ax left by Finan McDonald, his later experiences with the Modocs apparently changed his opinion on how to deal with native people.

By the time the Bay Company party arrived at the Pit River in California on February 10, 1827, after traveling through Modoc lands, only eight men out of 43 men in Ogden’s party still survived. Bloody confrontations with the Modocs caused Ogden to write: “Whenever an opportunity to offers of murder or theft, they allow it not to pass. I am of opinion if on first discovery of a strange tribe a dozen of them

CREATING AND TERMINATING A KLAMATH INDIAN RESERVATION

The tumultuous events surrounding the Klamath Reservation, its termination, and reinstatement continue to produce many points of contention. The Tribes feel that their history has been mischaracterized and that government manipulation and mismanagement caused the loss of their lands and degraded the quality of the environment. Irrigators dispute the Tribes’ claim to water rights for lands they do not even own. Although the renewed debate over water rights has reopened many old wounds, the current controversy is just one in a long battle for rights the Tribes have waged since before the Reservation



were shot, it would be the means of preserving many lives. . . . Why allow ourselves to be butchered and property stolen by such vile wretches who are not deserving to be numbered among the living the sooner dead the better?"

The next documented exploration of the area by John Charles Fremont, also known as "The Pathfinder," came during the winter of 1843-44. Apprised of the potential for violence, Fremont actually dragged a cannon across the frozen marshes and at the first site of an Indian settlement, fired off a salvo. When he returned to the area again in 1846, after being ordered out of California by Mexican authorities, he was without his cannon and the conflict he feared in 1843 found him the second time around.

On the evening of May 8, 1846, one of Fremont's companions, the legendary Kit Carson, was awakened by the sound of a hatchet striking the head of one man and arrows impaling another. Fending off the attack but losing three men, Fremont and this party went on a rampage for revenge. Of the events that followed Fremont wrote: "When the 'Tlamaths' tell the story of the night attack where they were killed, there will

"When the 'Tlamaths' tell the story of the night attack where they were killed, there will be no boasting. They will have to tell also of the death of their chief and of our swift retaliation.

Charles Fremont, May 1846

be no boasting. They will have to tell also of the death of their chief and of our swift retaliation; and how the people at the fishery had to mourn for the loss of their men and the destruction of their village. It will be a story for them to hand down while there are any 'Tlamaths' on their lake."¹¹

Such were the relationships between the native tribes and explorers at the time when the Basin's settlement began. Assisting in the settlement was a family who would have a prolonged and significant involvement in the region, the Applegates. In 1843 near The Dalles, the Applegates' raft capsized and brothers Lindsay and Jesse each lost a 10-year-old son. This, combined with the fact that the English-owned Hudson Bay Company owned every fort along the Oregon Trail, prompted the brothers and 15 other men to create a southern route to Oregon in 1846.¹²

The Applegate Trail provided passage for many of Oregon's earliest emigrants. However, stories of Modoc attacks abounded. A so-called "History of Central Oregon" relayed a rather fantastic account of the perils faced by settlers.

"The Modoc Indians. . . earned the character of

was formed on October 14, 1864.

In that treaty, 27 chiefs from the Klamath, Modoc, and Yahooskin Band of Snake Indians agreed to give up almost 20 million acres of their aboriginal lands. In exchange, the Tribes, historically adversaries, were reserved an area one-tenth the size of their former lands and the exclusive right to hunt, fish, trap, and gather within the Reservation boundaries. The location of these boundaries immediately sparked debate.

Four different boundaries have been extrapolated from the vague language of the Treaty of 1864. Ultimately, it was determined that a survey conducted by the government in 1871 had erroneously excluded 621,824 acres from the reservation. To compensate for the loss, the Tribes received 83 cents per acre. 68 years later, the Tribes

successfully petitioned the Indian Claims Commission for an additional \$4.16 million, about \$6.69 an acre.

In addition to this loss, the Tribes' land was further diminished after construction of the Oregon Central Military Road was authorized through the middle of the Reservation. To pay for the road, the construction company was granted title to land along the right of way. Eventually title was passed to the California and Oregon Land Company. In 1906 Congress exchanged this strip of land for an 87,000 acre tract near Yamsay Mountain and reduced the Reservation to 862,622 acres. Initially, the Tribes were paid \$1.25 an acre for the loss, but successfully sued to receive an additional \$2.3 million.

In 1954 the Reservation would once again be diminished. On August 13, 1954, the Congress

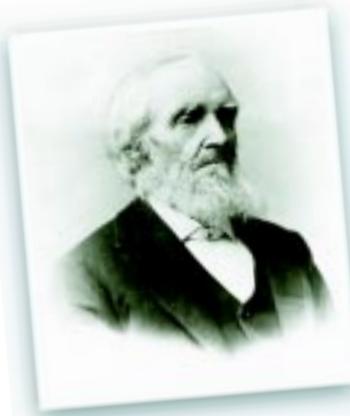
elected to remove itself from Klamath affairs and passed the Klamath Termination Act.

Representatives of the Tribes point out that contrary to popular opinion, they did not elect to terminate their relationship with the federal government. Instead, termination was imposed on the Tribes over their elected leader's objections and against the recommendations of the Bureau of Indian Affairs. With the government removed from its managerial role, each Tribal member was given two options: they could give up their individual property interest for cash and opt out of the Tribe, or they could elect to stay in the Tribe and have their interests managed by a third party. There was no option for the property to be parceled into individual allotments or for the entire Reservation to be turned over to a

the most barbarous and blood-thirsty savages west of the Rocky Mountains. . . . Innocent and unoffending immigrants, accompanied by their families . . . were attacked and butchered indiscriminately by these painted savages. . . . More than three hundred immigrants are known to have been slain in this manner by Modoc Indians (facts ascertained by actual count of their bleaching skeletons along the road).”

Eyewitness accounts of confrontations are somewhat different. In 1852, a group of volunteers assembled to assist immigrants with the dangerous passage. Lead by Ben Wright, they met with a contingent of 60 Modoc Indians and brokered a peace agreement. After learning of an apparent trap set by the Modocs from two captive Modoc women, Wright determined “it would have been criminal negligence for him not to have his men attack first thing in the morning.” Almost all of the Modocs were killed. Amidst such encounters, travelers began to view the Basin as more than a place they passed through on the way to the Willamette Valley: its undeveloped lands had become a place of opportunity.

During the 1850s, the Klamath Basin was tentatively used for pasturing cattle. Individuals such as Wallace Baldwin, Judge F. Adams, and Wendolen



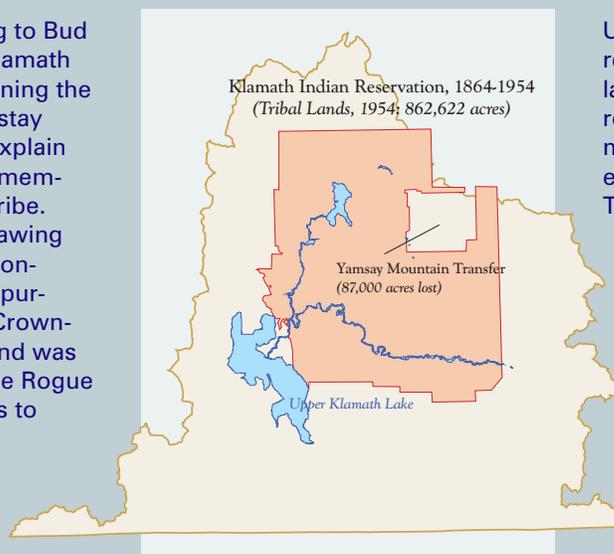
Nus all pastured herds at various times through this decade but made no attempts to permanently reside there. In order to add stability to the Basin, Fort Klamath was established on September 5, 1863 by Major Charles C. Drew of the First Oregon Volunteer Cavalry. The Fort was supposed to provide protection to the emigrants from attack but was located too far from the Applegate trail to properly perform this function.¹³ The Treaty of 1864 created the Klamath Reservation and ended these concerns.

Despite Fort Klamath’s presence and the Treaty with the Tribes, it would not be until 1866, when Wendolen Nus returned, before the Basin would have its first permanent white settler. Soon after, in 1867 George Nurse established a one room store and ferry at the base of Upper Klamath Lake and Linkville was born.¹⁴ Nurse secured the land for his store and the rest of the town from the State and immediately (although improperly) platted the entire area. Nurse offered his land for free to anyone who would build there and the town slowly began to take shape. Five years after Linkville was established, the town had only 40 residents but the 1872 Modoc War, a six-month skirmish in which U.S. troops were

tribal government. According to Bud Ulman, an attorney for the Klamath Tribe, misinformation concerning the fate of those who elected to stay abounded. This might help explain why 80 percent of the Tribal members chose to abandon the Tribe.

In order to pay the withdrawing members, the Government condemned all but 90,000 acres purchased by timber company Crown-Zellerbach. The remaining land was combined with lands from the Rogue and Fremont National Forests to create the Winema National Forest.

For the 474 Tribal members who decided to remain, their land was held in trust by the U.S. National Bank of Oregon. In 1971, the remaining members elected to remove the trustee. Apparently, the bank interpreted this as a vote to



terminate the trust itself and it liquidated the remaining lands. Once again, the United States acquired the property through condemnation.

Ultimately, the Klamath people have received about \$220 million for their lands. Despite the amount of money received over time (withdrawing members only received \$43,000 each initially), to Tribal members Termination was a disastrous event.

“Termination hit like a big bomb,” said Elwood Miller of the Klamath Tribes. “Ever since termination, we’ve been scratching and clawing to stay alive.”

Indeed, jealousy over the Tribe’s “windfall” is a wasted emotion. A drive through Chiloquin, the hub of the Tribes, reveals a more accurate state of affairs for the Klamath people. Chiloquin consistently earns the recognition of Oregon’s poorest town – in 1996, Tribal members existed on a per capita income of only \$5,672 and an unemployment rate of 17.2 percent.

defeated repeatedly and a U.S officer was killed, helped increase the town's notoriety. As written in *The History of Central Oregon*: "the name of Linkville was upon the lips of everyone who read the bloody deeds enacted in that short, fierce struggle. Linkville was advertised in blood; the most catchy advertising ink in the world."

Although growth was boosted by the notoriety, Linkville suffered a huge setback in 1889 when a fire destroyed \$50,000 worth of the town's businesses. While rebounding from the destruction, residents decided that the name Linkville did not keep with their ambitious vision of the town. On April 1, 1892, the Linkville post office officially became Klamath Falls. Seven days later another fire struck \$20,000-\$30,000 damage to the Grand Central Block. After a third fire in 1894, a census recorded the Klamath Falls population to be 452 people. By 1900, a federal census showed that the town's population had actually decreased to 447. If stability and prosperity were going to embrace the region, some source of consistency was needed to tie people's lives together. Remarkably, in an area of baked earth and soaked swamp, the stabilizing force would be agriculture.



SETTLING THE BASIN

Founding father of Klamath Falls, merchant "Uncle George" Nurse, facing page, opened a store and ferry at the base of Upper Klamath Lake in 1867, above. He later platted the area and offered land for free to entice settlers. Five years later "Linkville" had 40 residents.

Even with termination, the liquidation of their lands, and revoked recognition as a Tribe, the Tribal elders never disbanded their government says Miller. Under these circumstances, the Tribes sued for a declaration of their remaining rights in 1979. After more than four years of litigation, the Ninth Circuit Court of Appeals in *United States v. Adair*, determined that the Tribes' reserved rights to fish and hunt include the necessary water to support those rights. A 1995 memorandum from the Department of the Interior's Office of the Solicitor interpreted this to mean that the Tribes have a right to water quality conditions that will support all stages of fish life. It is also the Department of the Interior's position that the Tribes' water right extends to waters necessary to support a fishery within the former Reservation—even waters outside

"Termination hit like a big bomb. Ever since termination, we've been scratching and clawing to stay alive."

Elwood Miller,
Klamath Tribes

the former Reservation's boundaries. The priority date for this unquantified right was judicially held to be "time immemorial."

The Adair decision, as the court case is known, is not the only step the Tribe has made in revitalizing itself. A year after the final decision was handed down, the Klamath Restoration Act of 1986 restored the Tribes to a federally recognized status. After this recognition, the

Tribes were able to open its Kla-Mo-Ya casino on part of the 500 acres acquired since the Termination Act was passed.

To Elwood Miller, restaking the Tribes' rights and restoring the Basin's waters is more than preserving a piece of cultural heritage, it's about survival. "When 70 percent of the Tribe was living below the poverty line, the Trust resources got them over."

The hunting, fishing, and gathering also satisfy an aspect of the Tribes' spirituality, which to Miller, is fundamental to a person's basic well being.

"If you're not healthy there (spiritually), you're not healthy nowhere," he said.



DEFYING CONSTRAINTS: AGRICULTURE IN THE BASIN

A bank of sprinklers works non-stop to keep thirsty crops green and to ward off the encroaching desert. The ever-present threat of frost, a naturally dry climate, and the basin's sandy soils force farmers to rely heavily on irrigation to support crops.

The Basin's geographic features dealt the land a withering fate. The Cascade Mountains and the Basin's high elevation create formidable obstacles for agriculture. After the moisture-laden air ascends the Cascades and deposits 65 inches of precipitation, the amount it must descend on the east determines how much rain will be available. The farther the air descends, the drier it becomes. The town of Chemult, located in the northern point of the Basin, at 4,760, can get 20-30 inches of precipitation annually. This is double the amount received in the 4,100-foot-high town of Malin. Unfortunately, higher elevations result in cooler temperatures. The 660-foot change in elevation between Malin and Chemult is accompanied by only a five-degree average temperature difference during the growing season,



water applied to the plant will release heat as it changes from a liquid to a solid, keeping the plant alive. Despite this preventative measure, most farmers prefer to stick with the cold-resistant grasses as a way to battle the frost. Pastures cover almost 41,000 of 128,000 acres of Project lands within Oregon and remains the single largest land use. Cattle grazing may be the most common land use in the Project, but it is not the most profitable. That distinction belongs to potatoes. In 1995, 7,350 acres of potatoes had a gross value of \$23,149,000 while pasture land’s total gross value was only \$3,683,000.

GROSS VALUE OF CROPS GROWN IN THE KLAMATH BASIN

	Oregon Lands in Klamath Project		Langell Valley ID and Horsefly ID	
	acreage	gross value	acreage	gross value
Barley	24,495	\$7,137,843.00	692	\$201,649 00
Oats	2,086	\$520,666.00	854	\$213,159.00
Wheat	1,670	\$783,564.00	0	\$0 00
Rye	1,040	\$255,970.00	0	\$0 00
Alfalfa	33 203	\$19,722,582.00	8,670	\$5,149,980.00
Grass/Hay	14,366	\$2,686,442.00	5,699	\$1,065,713.00
Pasture	40,927	\$3,682,530.00	9,270	\$834.096.00
Sugar Beets	2,744	\$2,361,239 00	0	\$0 00
Onions	0	\$0 00	0	\$0 00
Potatoes	7,349	\$23,149,350.00	400	\$1,260,000.00
Misc. Veg.	0	\$0 00	0	\$0 00
Total	127,880	\$60,300,186.00	25,585	\$8,724,597.00

**Bureau Report, Klamath Project, Draft Annual
Operations Plan, Environmental Assessment. 1999.**

but the effect on agriculture is severe.

Steve Cheyne of the OSU Extension Service says that the Basin has recorded frost in every month of the year. With this ever-present threat, the five-degree temperature difference effectively prevents farming from outside Project lands. The northern valleys are filled from mountain base to mountain base with pasture land. Grasses are the only “crop” hearty enough to withstand the cold air that rolls down from the surrounding hills in the evening. Even within Oregon’s side of the Project, the short growing season (only 110 frost-free days) and potential for plant-killing frosts dictate the agricultural practices that take place.

For row crops like sugar beets and potatoes, sprinkler irrigation can save a crop. During a freeze,

Although agriculture in the Basin must adapt to the constraints placed on it by the cold, such deference is not shown to the arid sky. According to Rodney Todd of the OSU Extension Service, irrigation is the reason why agriculture is successful. Without a reliable supply of water, agricultural experts agree that farming would be almost impossible and land values would plummet to only a fraction of what they are presently worth. These observations echo that of geologist James Dwight Dana who, in 1838 remarked:

“Although Oregon may rank as the best portion of Western America, still it appears that the land available for the support of man is small. . . . The middle section is in some parts a good grazing tract; the interior is good for little or nothing.”

If farming would be fruitless without irrigation, then the face of the Basin would be drastically different without the Bureau of Reclamation. The Reclamation Act of 1902 laid the ground work for transforming land that was once described as “sunbaked prairie and worthless swamps” into a “broad expanse of lush, green fields.”¹⁵ To do this, the Bureau appropriated all unclaimed waters in the Basin and on February 9, 1905, Congress officially authorized the Project’s development.

ENGINEERED OASIS

A concrete testimony to the power of engineering, the Klamath Project has turned the arid parts of the basin to a green oasis while “reclaiming” 125,000 acres of former lake and marsh. The extensive project uses hundreds of miles of canals and floats a river in two directions.



Before the vision of bringing 235,000 acres under irrigation could be realized, the cooperation of California and Oregon was needed. The Lower Klamath and Tule Lake shared 125,000 acres in both States—an area almost twice the size of the Upper Klamath.¹⁶ In 1905 each State government ceded the “good land [that] lay wasting beneath the surfaces” to the United States for reclamation. By May 16, 1907, the first project lands were being irrigated.¹⁷

By 1957, 500,000 acre feet of water “which formerly were entirely wasted,” according to the Bureau’s 1957 report, was being successfully conserved.¹⁸ Making this possible is a labyrinth of 18 main canals totaling 185 miles, 516 miles of lateral canals, and 728 miles of drains. This list of Project features is made even more impressive when considering that much of the Project was constructed more than 75 years ago. Although construction continued

through 1966, major facilities such as the Link River, Clear Lake, and Gerber Dam were completed before 1926. Even the “earliest reclamation plans” had the same canal divert-

ing water in two

directions: to and from the Lost and Klamath Rivers. To make use of the reclaimed lands, the federal government opened portions of the Project to homesteading. Starting in November 1908, and continuing until after World War II, the Project provided settlement opportunities to more than 600 veterans of the World Wars. The homesteading was accomplished by lottery, with the successful entrant allotted a parcel, rather than the land rush associated



“A half century of progressive irrigation development has brought a balanced and prosperous economy to the Klamath area. . . . More than 1,600 farmers and their families and scores of independent merchants and tradesmen owe their precious business opportunities to this 200,000 acre reclamation project.”

Bureau report, “A Half Century of Progress on the Klamath Federal Reclamation Project”



with the Midwest. Many of homesteaders came with practically nothing and lived in tents or purchased the barracks used to house Japanese-Americans just across the California border during World War II.

“They broke their backs and put a lot of sweat equity into this land,” said Don Boyd, who owns a farm equipment dealership in Merrill, while speaking of the homesteaders. Boyd credits the veterans’ pride and patriotism with creating a sense of community

and higher quality of life than other towns. “The people here are good people,” he said, pointing to the thousands of dollars in farming equipment sitting in front of his business. “I never have to worry about coming here and finding things missing.”

Homesteading is not the only creative use of Project lands. With 80 percent of the Pacific Flyway waterfowl passing through the Basin to reach wintering grounds, the area has long been recognized for its importance to migrating birds. The Basin's marshes attracted so many birds, in fact, that an 1826 journal entry by Peter Skene Ogden reported that the Klamath Indians actually made blankets from the feathers. After settlement began, hunting was so pervasive that even professional hunters called for a moratorium on shooting during breeding season. In 1908 the Basin was officially recognized for its importance to waterfowl when President Theodore Roosevelt issued Executive Order 924 establishing the Lower Klamath National Wildlife Refuge which straddles the Oregon-California border. It was the first wildlife refuge established specifically for waterfowl in the nation.

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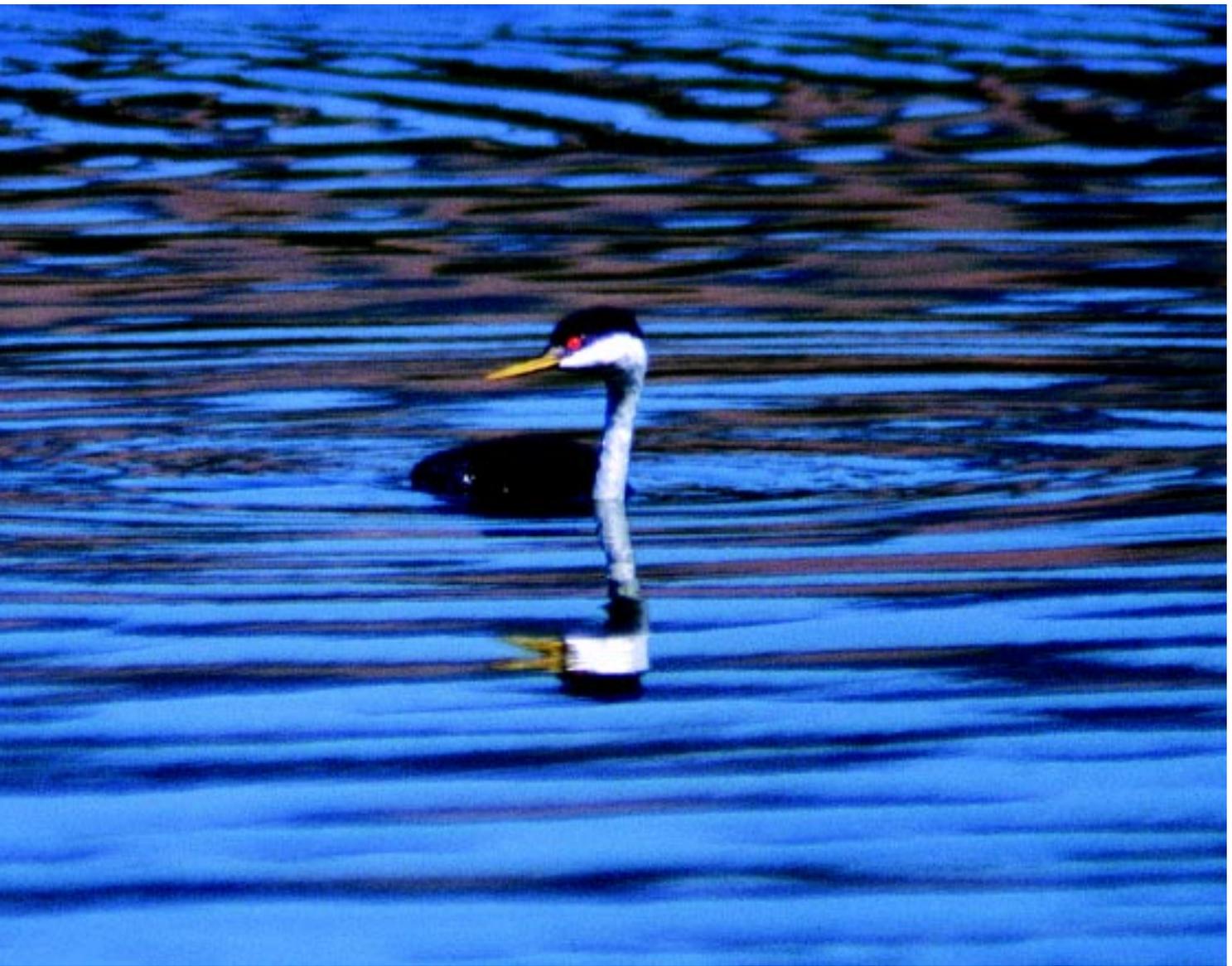
Today during fall migration, the Bureau of Reclamation estimates that 2-4 million birds will use the Lower Klamath Refuge. This concentration of birds is not always healthy for the bird populations. Avian botulism and cholera outbreaks in the Refuge claim anywhere from 20,000 to more than 50,000 birds each year.

Of course these uses—homesteading, refuges, irrigation—were only incidental to the Project's true purpose. Providing water for farming was to be the first step in creating a thriving economy for the region and wealth to the entire country. The introduction to a Bureau report, "A Half Century of Progress on the Klamath Federal Reclamation Project," says as much:

"Slowly, as the frontiers were pushed back, farming and permanent commerce replaced the passing trapper, the hapless prospector, and the transient trader. A half century of progressive irrigation development has brought a balanced and prosperous economy to the Klamath area. . . . More than 1,600 farmers and their families and scores of independent merchants and tradesmen owe their precious business opportunities to this 200,000 acre reclamation project."



Still, farming and ranching under such adverse conditions extracts a hefty toll from the Basin's water volume. Exactly how much water is used for irrigation and the number of irrigated acres is not precisely known. The absence of finally adjudicated rights in the Basin adds to the difficulty in determining the precise quantities of water being used. Because pre-1909 water claims cannot be regulated under the law—water cannot be denied to these unadjudicated claimants—many irrigation delivery systems do not have flow meters and diversion limits are seldom enforced. Within the Project, the absence of adjudication means that individual farmers pay a fee based on the number of acres they will irrigate rather than the amount of water they will use. Ultimately, the quantity of water used for irrigation can only be



FOWL AND FLYWAYS

Abundance in wildlife brought hunters to the Klamath marshes seeking unlimited bounty. While hunters once bagged carloads of waterfowl in the Basin's marshes and wetlands, the migrating birds are now protected by a federal wildlife refuge.



ICON OF EFFICIENCY?

While environmental groups argue against the less-efficient “flood” irrigation, many farmers contend that center pivots are equal culprits. The towered, mechanized water delivery systems can be controlled by computer to measure out water exactly. But a hot wind can send the water into the wrong place or, worse yet, evaporate it before reaching the ground.

approximated. Because irrigation accounts for more water than all other uses combined, this uncertainty of information is not to be taken lightly. Without precise information, it is impossible to say which area is receiving the most water, what it is being used for, or if it is being applied in the most economically, environmentally, and agriculturally efficient manner. This leaves many facts concerning these issues in contention.

Statewide, irrigation accounts for 87.3 percent of all water withdrawals. In Klamath County, which has the distinction of having the largest amount of water manipulation and recycling in the state, this figure jumps to about 93 percent.¹⁹



While irrigated pasture used for cattle (and some sheep) accounts for almost half of all agricultural lands in the Basin, it is the method of irrigating these lands that is a source of controversy.

Unlike the sprinkler systems used for irrigating row crops and grain fields, ranchers prefer flood irrigation. While environmentalists like Water Watch's Bob Hunter and Oregon Trout's Rich McIntyre point to instances of cows wading through flooded fields as examples of waste, farmers and ranchers defend the practice. Ron Hathaway of the OSU Extension Service notes that sprinkler irrigation systems are only better at applying water uniformly and that as part of the hydrological cycle,

flood-irrigated waters are never truly wasted. He also emphasized that flood irrigation is vastly superior when it comes to efficient use of energy, time, and money.

Farmers like Bob Flowers agree with Hathaway. Some farmers contend that sprinkler systems can actually waste water, arguing that on a hot windy day, water from center pivot sprinklers is blown hundreds of yards away and evaporates before it even reaches the ground.

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Unfortunately, the debate over flood irrigation does not end with the amount of water diverted from the stream. With a decrease in water quantity comes concerns of water quality. Exacerbating quality concerns related to low instream flows is the poor quality of the return flows from excess irrigation, damaged riparian areas, and the Basin's hot summer months.

Oregon's Department of Environmental Quality (DEQ) is required by Section 303(d) of the Clean Water Act to identify water bodies that do not meet standards for conditions such as temperature, pH, or toxics. The standards set by DEQ are designed to protect beneficial water uses like drinking, agricultural use, recreation, industrial water supply, and cold water fisheries. The Klamath Basin has portions of 46 different rivers and lakes which, for one reason or another, have failed to meet these standards. While the area's scorching summer temperatures account for many of the listings, water bodies such as the Klamath and Lost River fail several different standards, some of which persist throughout the year.²¹

The poor health of the Basin's waters is not disputed. Once abundant fish populations have disappeared and others are threatened with extinction. The causes of these conditions and how they should be corrected, on the other hand, is fiercely debated.²² Although some may argue the correlations between certain farming or ranching practices, water quality, and fish populations, few would dispute that the Basin's fisheries are in decline. According to the

Oregon Department of Fish and Wildlife's Fish Management Plan, the Endangered Species Act has become the driving force behind fisheries management in the Klamath Basin. But disappearing fish populations are not a recent phenomena.

Salmon and steelhead were once part of the Klamath Basin fisheries. According to a paper by R. D. Hume, in 1850 the Klamath River was so choked by the "finny tribe" that settlers could scarcely induce their horses to ford it. But by 1900, the spring run was reduced to the point of being characterized as "of little importance." Overfishing, placer mines, and irrigation withdrawals were blamed for the drastically reduced numbers. In 1917, the completion of the Copco Dam permanently barred fish passage into the basin. A study conducted in 1913 at the request of Copco (Pacific Power and Light's predecessor) found that the dam was not the cause of the salmon disappearance. State fish and wildlife experts along with Copco officials exonerated the electric company and found that the actual barrier to fish migration was fish racks constructed in 1910 by the U.S. Bureau of Fisheries near Klamathon. Although the racks certainly curtailed fish migration, the absence of fish ladders (neither required, nor built) at the Copco dam meant that the presence of salmon and steelhead in the Klamath Basin would be limited to the pages of old reports.

Evidence of diminished fisheries is not limited to the loss of anadromous fish, however. Along many of the Basin's waterways, residents relate stories of days when fish were bigger and more abundant. Ivan Bold has lived next to Lost River nearly his entire life and has seen it change from a productive trout stream to one he no longer fishes. The Bold family moved to Bonanza in 1910 and owned a general store until 1989. Bonanza is a small farming town and is known as the "Cloverleaf" because of the pattern that the Poe, Yonna, and Langell Valleys make as they stretch

out from this junction. According to Bold, the reason for the town's location was not so much its proximity to prime agricultural lands, but rather the accessibility of water provided by Big Spring.

Bold described the springs which feed into the Lost River as pure as the driven snow. "Back in the 1920s, people would just come down to the springs and scoop the water up with buckets and carry it back to their houses for drinking," said Bold. He recalled when a father and son from Los Angeles witnessed someone drinking right from the spring. "The boy turned to his dad and said 'look, they drink right from the stream!'—they couldn't believe it. That's how good the water here was."



FISHING DAYS

"We thought nothing of catching a five- or six-pound trout," reminisces Basin resident Ivan Bold, remembering days of better fishing. Fishing guides are also noting declining catches as the Basin's waterways struggle to support the demands placed on them.

BOOM, BUST, ADAPT

Economic Trends in the Basin

Although the droughts of 1992 and 1994 were the first time irrigators had ever been denied Project water, it was not the first time the Endangered Species Act altered land use policy in the Basin. More than 80 percent of the Basin is forested, and before the 1980s logging and timber industry were its greatest sources of revenues. Listing the Spotted Owl changed that.

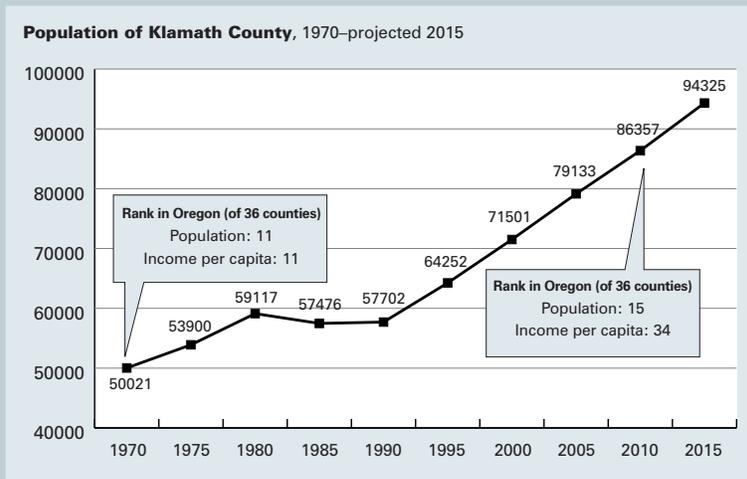
Trey Senn of the Economic Development Association noted that the County's population decline caused by the timber industry's layoffs during the 1980s was the County's economic low-water mark. According to Rodney Todd of the OSU Extension Service, \$18 an hour jobs available to high school graduates for unskilled jobs during the 1970s—like sweeping up the mill—disappeared as timber giants like Weyerhaeuser all but pulled out of the Basin.

Bob Reitman, a silviculturist for the Winema National Forest said that the 1,040,000 acre Winema is currently being logged at about 10 percent of its former rate. In addition to the volume of logging, the method has also changed: clear cuts have been replaced by selective cutting. Reitman is quick to point out that the change in practices has not necessarily produced a universal benefit. "Selective cutting is very invasive. You are always returning to the same area. With a clear cut, you stay out of that section of woods for a number of years afterwards." He also points out that habitat created by clear cuts can benefit certain species that do not do as well in the older growth. Additionally, the reduced cut has raised new concerns for the Forest Service.

"What is the unharvested wood becoming?" asked Reitman. "Food for insects, disease, and fire." Of the ultimate effect of the timber

"Every town in Oregon is saying 'tourism is the gong to save us.' How many people are going to come here when everyplace else is competing for the tourist's dollar?"

Ron Hathaway,
OSU Extension Service



POPULATION TRENDS in Klamath County support an optimistic view of the Basin's economy. However, Klamath County still ranks low in per capita income and higher in unemployment than many parts of the state.

industry's departure Reitman argues "We are exporting our environmental damage. The price of wood hasn't changed much, labor and environmental costs have priced local timber right out of the market."

Despite this economic downturn also suffered elsewhere in the state, the Klamath Basin is slowly being rejuvenated. A report by the Klamath County Economic Development Association states that "[a] surging local economy has caused population growth to rebound significantly in the 1990s." The report cites increases in the median age of county residents from 28, in 1970, to 35, in 1990, and cites the increasing

number of female residents as a sign that the county is transitioning from a resource-based community to a regional trade center. This forecast is reflected in a compilation of major Basin employers by the Chamber of Commerce. It lists the Merle West Medical Center as the single largest employer with 1,039 employees. Additionally, new businesses such as Sykes Communications, which handles technical support calls for several different companies, have positioned the Basin for even more growth. Perhaps most importantly, tourism is playing an ever-increasing

role in the Basin's economy. Eco-tourism generated by the wildlife refuges, Crater Lake, white-water rafting, and world-class trout fishing have traditionally been the backbone of the Basin's tourism industry. New developments like the \$35 million Running Y ranch resort, which features an award winning golf course designed by Arnold Palmer, and the Klamath Tribe's Kla-

Mo-Ya casino are expanding the scope of Basin tourism.

Even with this new found growth, the Basin's economy still has improvements to make. Senn reports that unemployment is at 9 percent, more than double the national rate of 4.3 percent. Rural areas don't see much of the tourists' money. "I'm glad I'm retired," said Ivan Bold, commenting on business opportunities in Bonanza.

Residents like Ron Hathaway, Staff Chief for the OSU Extension Service, caution that tourism alone is not the answer to the Basin's economic development. "Every town in Oregon is saying 'tourism is the gong to save us.' How many people are going to come here when everyplace else is competing for the tourists' dollar? Natural resources have to stay the focus. Agriculture provides over \$120 million a year. If you figure a tourist spends \$100 a day, you'd need 120,000 tourist days to replace agriculture."



THE “LOST” RIVER

Water quality in some sections of the Lost River is notably poor. While fish and wildlife apparently survive the conditions of the degraded river, their numbers are suffering.

The purity of the ground water in Bonanza no longer enjoys such a sparkling reputation. Since July 1991, fecal coliform has been found in several of the town’s domestic wells. Studies compiled by Klamath County hypothesize that consecutive drought years forced farmers and ranchers to irrigate more heavily with ground water. The drawn down aquifer permitted infusions of Lost River water which carried in the contaminants.

Mr. Bold also recalled fishing in the Lost River. “We thought nothing of catching a 5 or 6 pound trout.” While standing next to the muddy Lost River where it collects the waters of the spring he commented. “The river’s no good for fishing now.”



Rich McIntyre of Oregon Trout agrees. “I call it the Doomed River,” he said. McIntyre has more than just an emotional interest in the health of the Basin’s waters; he owns the Crystalwood Lodge, a fishing guide business which is frequented by people from all over the world. According to McIntyre, “the Upper Klamath is home to the largest native trout in the world, period.”

McIntyre also says, that the Basin has the world’s greatest diversity of rainbow trout races—different genetic versions of the same species. “The Columbia River, which drains the better half of four states, has eleven different races of rainbow trout. They have looked at about half of the streams in the Klamath

Basin and have already found about 15 separate and new races of fish,” said McIntyre.

He also believes that this number is in jeopardy. Records kept by his guides documenting the number of fish caught reveal diminishing numbers. McIntyre says that the lack of fish screens on diversion channels is one of the main contributors to this decline. “The fisheries have been harmed irreparably by unscreened diversions. Tens of thousands of fish die in the ditches,” he said. Another major contributor to the diminished fishery is the health of Upper Klamath Lake itself.

The poor health of the Basin’s waters is not disputed. Once abundant fish populations have disappeared and others are threatened with extinction. The causes of these conditions and how they should be corrected, on the other hand, is fiercely debated.

Upper Klamath Lake is the most significant fish nursery in the Basin and water quality problems within it have “profound effects on a significant portion of Klamath County’s fish resources.”²³ The lake is also dying from its own naturally eutrophic condition—a problem that has persisted throughout its documented history. An 1855 federal survey crew report commented on the lake’s water. “The water taken from the lake had a dark color and a disagreeable taste, occasioned apparently by decayed tule . . . the taste of the water was so disagreeable that several vain attempts were made to discover a spring in the vicinity.”

Historically, the source of the lake’s nutrients was the Basin’s volcanic soils. Heavy spring runoffs would increase sediment loads in the lake and wind blowing across its broad surface exacerbated water quality concerns by constantly stirring up the sediments that had settled to the bottom. Today, environmentalists and Tribal members believe that the lake’s demise has been accelerated by farming and ranching practices. Studies which examined return flows from pastures along the heavily ranched Wood River Valley revealed phosphorous levels seven to ten times higher than the river’s water. Jake Kann, the aquatic ecologist for the Klamath Tribes who performed the study, explained that a cow will produce seven to ten times as much

phosphorous as a human. Kann concluded that with Wood River Valley cattle populations somewhere between 50,000 and 100,000, it is the equivalent of having a town with 350,000 people without sewage treatment living along the river.

The nutrient loading in the lake produces spectacular blue-green algae blooms. “In the summer, the algae gets thick enough to plow,” said Van Landrum, a 72-year resident of Klamath Falls.

Although the lake’s algae provides companies like Cell-Tech, of Klamath Falls, with the source for its dietary supplement product and about 540 people with jobs, the lake simply produces far more than can be harvested. When the algae dies, the decaying plant matter decreases the lake’s dissolved oxygen and elevates pH levels to 10.0 in some areas.²⁴ Both of these conditions are lethal to the Lost River and shortnose suckers which were placed on the federal Endangered Species List in 1988. To help ensure the survival of these species, the Bureau of Reclamation followed the recommendations of the U.S. Fish and Wildlife Service and established minimum lake elevations in 1992.²⁵ That same year, a withering drought forced the Bureau to honor its responsibility to the suckers as well as the endangered salmon in the lower Klamath River. Basin farmers were cut off from Project water for the first time in history. Another blistering drought in 1994 again caused the Bureau to curtail irrigation use as lake levels reached an all-time low of 4,136 feet.

The Bureau’s decision to leave water instream affected the Basin’s irrigators beyond the monetary losses suffered. It was the announcement of a change in water distribution policy. Landrum, commented, “originally, agriculture was second in priority for receiving water behind domestic use. Now, its fourth or fifth.”

Don Boyd said that farmers feel betrayed by the Bureau’s shift in policy. “The Project was set up for agriculture and the farmers feel like they have paid for it.”

The years following the droughts of 1992 and 1994 were not as dry, but the Bureau’s water management policies could not escape criticism from the irrigating community. Although the Bureau met its targeted lake levels in 1995, 1996, and 1997, fish kills plagued the already endangered shortnose and Lost River suckers. These fish kills actually increased local skepticism of claims that the Basin’s fish were in trouble. The sheer number of suckers that died in these years raised questions over whether the fish

should be listed at all.²⁶ Further, of all the suckers that had been previously tagged for study, not one was found among the dead.

Members of the Basin’s agricultural community, like Farm Bureau representatives Bob Flowers and John Bodner, feel that the Bureau’s decision to curtail irrigation in favor of maintaining instream flows for salmon and suckers is in error. Bodner argues that before the Link River Dam was built, a rock reef prevented the lake from dropping below 4,140 feet and that there were times when the Link River actually ran dry. Bodner believes that if instream flows would not have existed naturally, irrigators should not have to suffer in order to create an artificial environment. Flowers agrees and also believes that the water released from Upper Klamath Lake during drought situations may actually be detrimental to the downstream salmon. If the released lake water is too warm for the salmon to survive in, Flowers wonders how keeping it instream would be beneficial. For many sympathetic to the irrigating community, issues such as these are thought to be overlooked in favor of the more heavily represented environmental positions.²⁷

The Klamath Basin adds value to Oregon and the rest of the country in ways that do not readily show up on paper. Even the view from a car window is enough to impart a sense of uniqueness. The juxtaposition of marsh and desert, the incredible diversity of wildlife, the awe inspiring expanse of farmland. Learning more about the Basin enhances the appreciation: Crater Lake, Oregon’s only national park is also the country’s deepest lake; Upper Klamath Lake, once part of a huge prehistoric lake, is Oregon’s largest—and home to the largest native trout in the world; The wildlife refuges that straddle the Oregon-California border are considered the most important staging area for waterfowl on the Pacific Flyway and see concentrations of Bald Eagles greater than anywhere else in the lower 48 states. The fact that the Klamath Basin’s most noted features also share its most coveted resource is not surprising. The Basin’s water resources have always played the central role in its development.

Over time, changes in population and, more importantly, cultures, have altered the way the water and land provide for its inhabitants. For the Tribes, an abundant water supply provided food in the form of ample fish runs, muscles, and waterfowl. Seeds from water lily or wocas, have been called the corn of the Klamaths. Even the clothing of the Klamath



KLAMATH SUNSET—Every person in the Klamath Basin is linked in some way to Klamath waterways. For many, it fuels a family business, watering enough crops to feed thousands. For others it is a cultural identity, providing sustenance both materially and spiritually. Still for others, it brings peace of mind, whether through recreational pursuits or simply by looking upon it.

Indians was derived from the marshes. Ultimately, the Basin's waters and their bounty became completely infused into the culture of this ancient people.

Today, dependence on the water still exists. More than 400,000 acres of pasture and farmland use the equivalent of the entire volume of Upper Klamath Lake to fend off the arid summers. Desired by many of the residents, this way of life is not without costs. Water diversions and return flows off irrigated lands are cited by environmentalists as aggravating water quality problems that resulted in federal protection for the bull trout and two species of sucker. As a result of its responsibilities to these species and the Tribes of Oregon and California, the Bureau of Reclamation has adjusted its position on which uses have priority to the water it distributes.

Tourism, however, continues to provide another and slightly different take on the relationship between water and economy. Rafting white-water in the Klamath River, catching trophy trout in Upper Klamath Lake, bird watching at the five wildlife

refuges, and sightseeing at Crater Lake all mean important sources of income for Klamath Falls' businesses that would otherwise not exist without abundant and high quality water sources.

Clearly, water and its distribution are critical to the residents of the Basin. The Oregon Water Resource Department's adjudication of water rights within the Klamath River Basin will clarify relative rights to the use of the Basin's water. By creating a record of enforceable water rights for each water user, residents will be able to use this information to ensure that water is being managed properly for the highest and best use. □

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FOOTNOTES

- p7 ¹For purposes of demographic and economic analysis, “Basin” figures are actually those of Klamath County. Klamath County’s per capita income is ranked 33 of 36 Counties according to the Klamath County Economic Development Association.
- ²In 1994, the per capita income for the state was \$15,700. (Klamath County Economic Development Association, *Klamath County Demographics*. Undated.)
- p8 ³The Klamath Marsh Refuge was established in 1958 with only 16,400 protected acres. Now with 40,646 acres, it encompasses virtually all of the of the marsh’s original acreage.
- ⁴The Bureau of Reclamation keeps the lake at a maximum elevation of 4,143.3 feet to protect against the possibility of overflow caused by a significant runoff event.
- ⁵Gearheart et al. report that the lake’s surface area can fluctuate between 60,000–90,000 acres.
- ⁶Hanks Marsh, which is located on the east side of Klamath Lake, is also part of the Refuge but is insignificant in size by comparison.
- p9 ⁷The eleven miles of the Klamath River that lie between the J.C. Boyle Dam and the California border were designated as Wild and Scenic on September 22, 1994. This stretch of

- river was given the Bureau of Land Management’s highest scenic classification and is known for its class IV and V white-water rapids. Discovery of 40 prehistoric sites in the river’s canyon also make it eligible for the National Register of Historic Places as an Archaeological District.
- p10 ⁸Closer to the base of the mountain, Sand, Sun, and Annie Creeks continue to erode ash-gray canyons and leave behind “pinnacles” of debris. Although the sandy, pumice-laden soils provide little value to agriculture, they are an effective archaeological tool. Each ash and pumice layer effectively marks the year for in-the-field dating.
- ⁹This does not mean that such geologic forces are a thing of the past. The two earthquakes in 1993 acted as gentle reminders that more are to come. The two quakes measured 5.9 and 6.0 and did \$10 million in damage. Not everyone was affected however. Van Landrum, who as an engineer designed several of the buildings in town reported that “not one of them lost a brick.”

- Besides these gentle shifts in the earth’s crust, a more prominent reminder of the Basin’s volcanic past can be seen on Main Street in Klamath Falls. Steam rising from storm grates and manhole covers tell of the geothermal waters being used for heat. In fact, nowhere in the United States has this resource been more widely used as a heat source than in Klamath Falls. The geothermal waters are also surprisingly pure. Steve Cheyne, the agriculture irrigation specialist for the OSU Extension Service used to raise tropical fish for pet stores in ponds that had the volcanically heated waters pumped directly into them. Although this is probably the most creative use of the hot springs, they remain mostly undeveloped. For example, the Geysers, a geothermal powerplant near San Francisco, produces roughly the same amount of electricity as the Bonneville Dam near Portland. Although citizen opposition effectively restricted further development of this resource, the Winema National Forest has expressed interest in exploring geothermal resources on the flanks of Mt. Mazama.
- p11 ¹⁰The Klamath Tribe was not one large gathering of people. Instead, the Tribe was a collection of individual groups, each with their own leader, spread throughout the central Basin.
- p13 ¹¹Fremont calls the attackers ‘Tlamaths,’ but accounts by the Applegate trail-blazing party, who arrived at the point of attack only two months later, believed the Indians to actually be Modocs.
- ¹²The Applegate Trail would eventually become the path that Route 66 and Interstate 5 would follow through Klamath Falls and Ashland on the way to Polk County.
- p14 ¹³For the most part, life at Fort Klamath consisted of manual labor, policing the countryside, and helping to arrest Indians once the Klamath Reservation was established in 1864. In 1867 federal troops finally replaced the Oregon volunteers. Boredom, miserable food, and the occasional “French leave” (as deserting was called at the time) were the biggest adversities faced at the fort until 1872, when a group of Modocs lead by Kientpoos (or Captain Jack as he was also known) decided to leave the Reservation. During the six-month 1872 Modoc War, U.S. troops were defeated repeatedly in their attempts to dislodge the Modocs from their stronghold in the California lava beds. The battle attracted national attention and, when General Canby was killed, marked the only time after

the Civil War that an officer was killed by a Native American. Finally, on June 1, 1872, Kientpoos was captured and the conflict ended. Four of the Modoc leaders were tried under Military law for the murder of Canby and other white settlers and were executed.

After the Modoc War, soldiers at the fort resumed their duties, constructing a telegraph line from Fort Bidwell in California to Jacksonville, Oregon, and building a new hospital. By the time President Cleveland signed the executive order on May 4, 1886, closing the fort, it was the only active federal army post in Oregon. Citizen outcry against this decision was so great that the Secretary of War postponed Fort Klamath's abandonment until August 9, 1889, when the garrison flag was lowered for the last time.¹⁴⁴ "Uncle George" Nurse, as he was known, moved from California to Oregon in 1863 and grew hay for the Fort Klamath horses. In 1867, he moved to the mouth of the Link River and established the town of Linkville. While there, Nurse opened a store and hotel, operated a ferry service, and built the first bridge over the river. He was generous to a fault. In 1883 he was forced to sell his businesses to pay off debts he had co-signed. He died in Yreka, California in 1895.

p18 ¹⁵Bureau of Reclamation, *A Half Century of Progress on the Klamath Federal Reclamation Project*, May 1957.

¹⁶The Upper Klamath's surface area can be between 60,000 and 90,000 acres.

¹⁷In 1882, the Van Brimmer brothers were the first to use irrigation in the Basin.

¹⁸Jim Bryant, Bureau of Reclamation Chief of the Water and Lands Division for the Bureau, estimates that the Project removes between 350,000 and 500,000 acre feet of water annually from the Basin. This represents only a fraction of the amount of water actually diverted as return flows are constantly being recycled, making the Project an extremely efficient water user according to Bryant.

p22 ¹⁹This figure is made even more impressive when considering that agriculture and pasture land account for only 12.6 percent of the Basin's land use. Municipal and industrial uses consume the remaining 7% of the total water used while accounting for only 0.2% of the land use. The remaining land in the Basin is either forested (80%), open water (3.6%), or marsh (2.6%). (Gearhart, R.A., et al., *Watershed Strategies for Improving Water Quality in the Upper Klamath Lake, Oregon*. Humbolt State University. Arcata, California. 1995.)

p23 ²⁰According to the Bureau and the OSU Extension Service, only 361,100 acres are being irrigated.

²¹The Klamath River is listed for failing to meet standards set for pH, temperature, dissolved oxygen, and toxics (ammonia). Its dissolved oxygen listing persists from April 1 to November 30 and unacceptable ammonia concentrations persist in summer and winter. The Lost River is listed for temperature, chlorophyll A, and pH during the summer while unacceptable levels of dissolved oxygen and bacteria occur all year. (Oregon Department of Environmental Quality, *Final 1998 Water Quality Limited Streams—303(d) List*. Web page. 1999.)

²²Previous management practices are now the focus of concern. Exotic species such as yellow perch, pumpkin-seeds, brook trout, and bull frogs were all "officially" introduced and continue to compete with indigenous

species. More recently, the unauthorized introduction of the fathead minnow has raised alarm as the species has proliferated rapidly.

p27 ²³Forbes, Margaret G., and Darla Elswick. *Report on the Condition of Water Resources in Klamath County*. June, 1995.

p28 ²⁴Id. According to studies cited by Gearheart et al., even when the plants are alive they create a lethal environment for fish. Dissolved oxygen levels of 115 to 125 percent create a supersaturated environment that can be deadly to fish. Dissolved oxygen levels in Upper Klamath Lake have been recorded as high as 247 percent during summer months.

²⁵According to Karl Wirkus, the Project's area manager, lake levels were not to go below 4,139 feet six out of ten years, could not go below 4,137 feet four out of ten years, and could not go below 4,139 feet for two consecutive years.

²⁶In 1995, 450 dead suckers were collected. In 1996, 6,049 dead suckers were collected. In 1997, 750 dead suckers were collected. According to Andy Hamilton of the Klamath Basin Ecosystem Restoration office, a bacterial infection in the fish's gills caused the deaths.

²⁷Not all of the proposed water quality solutions come at the expense of agriculture. Wetland restoration projects at the Sycan Marsh, Tulana Farms, and the Wood River Ranch are designed to improve water quality and wildlife habitat and required nothing from the irrigating community except a willing seller. Because these efforts are so recent, widespread benefits to the Basin have not been observed.

THIS PUBLICATION:

This publication was prepared by staff of the Water Resources Department.

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