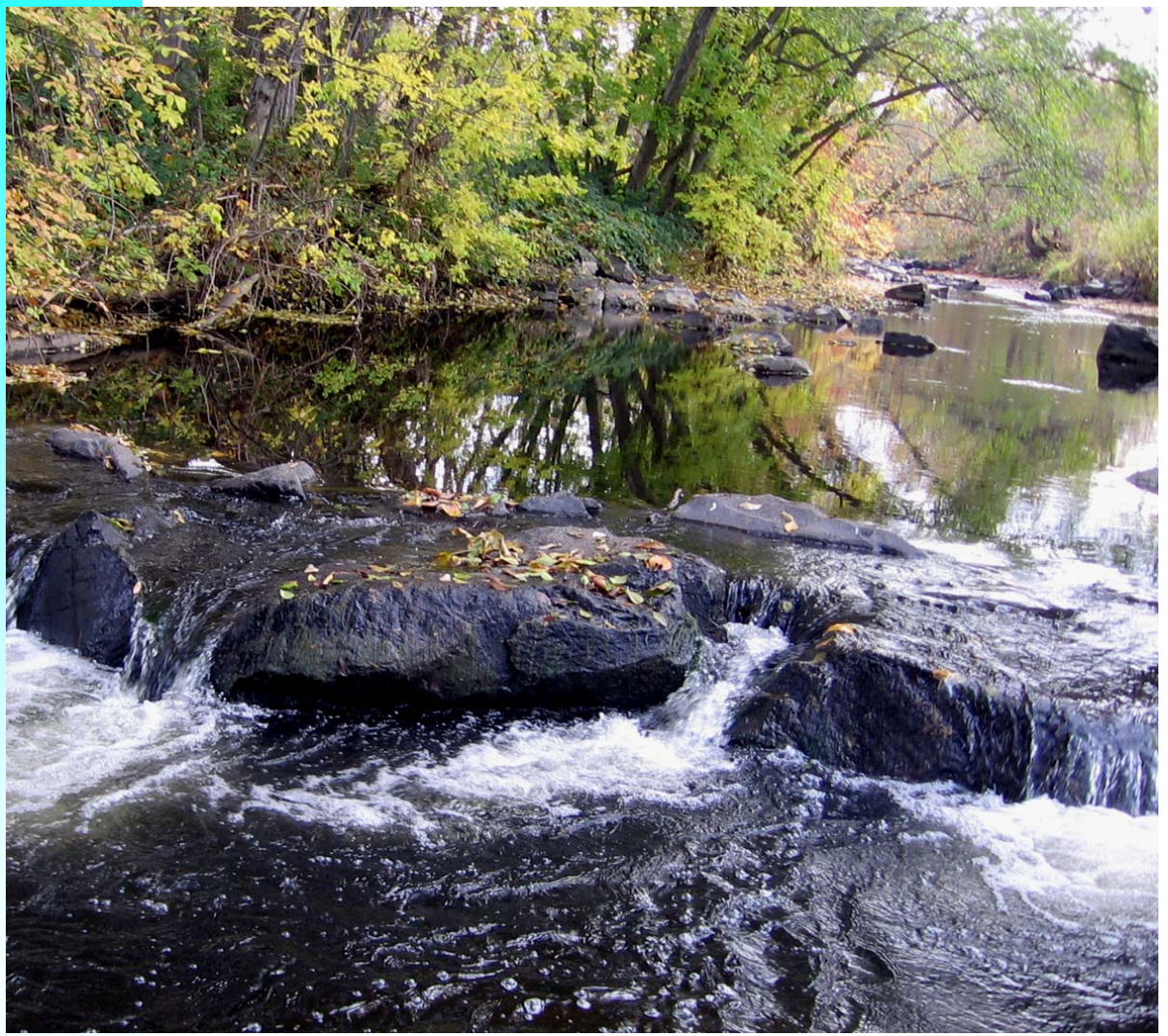
An introduction to:

Water of the Rogue Valley



North Mountain Park Nature Center

A division of the Ashland Parks and Recreation Department

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About This Booklet

This booklet is one piece of the North Mountain Park Nature Center's interpretation of the use of local resources. The area represented by the term "local" includes the Rogue Valley of southwestern Oregon, with an emphasis on the Ashland area.

While every attempt has been made to ensure accuracy, this booklet is not meant to be a formal work, but is rather to be used by educators and others seeking an introduction to the topic of local water use. We hope that readers of this booklet will be inspired to use this information to help make decisions that will enhance the livability of the Rogue Valley for both its people and its wildlife, now and into the future.

We invite any and all comments to this document, which will be updated periodically in an effort to reflect the most accurate information available.

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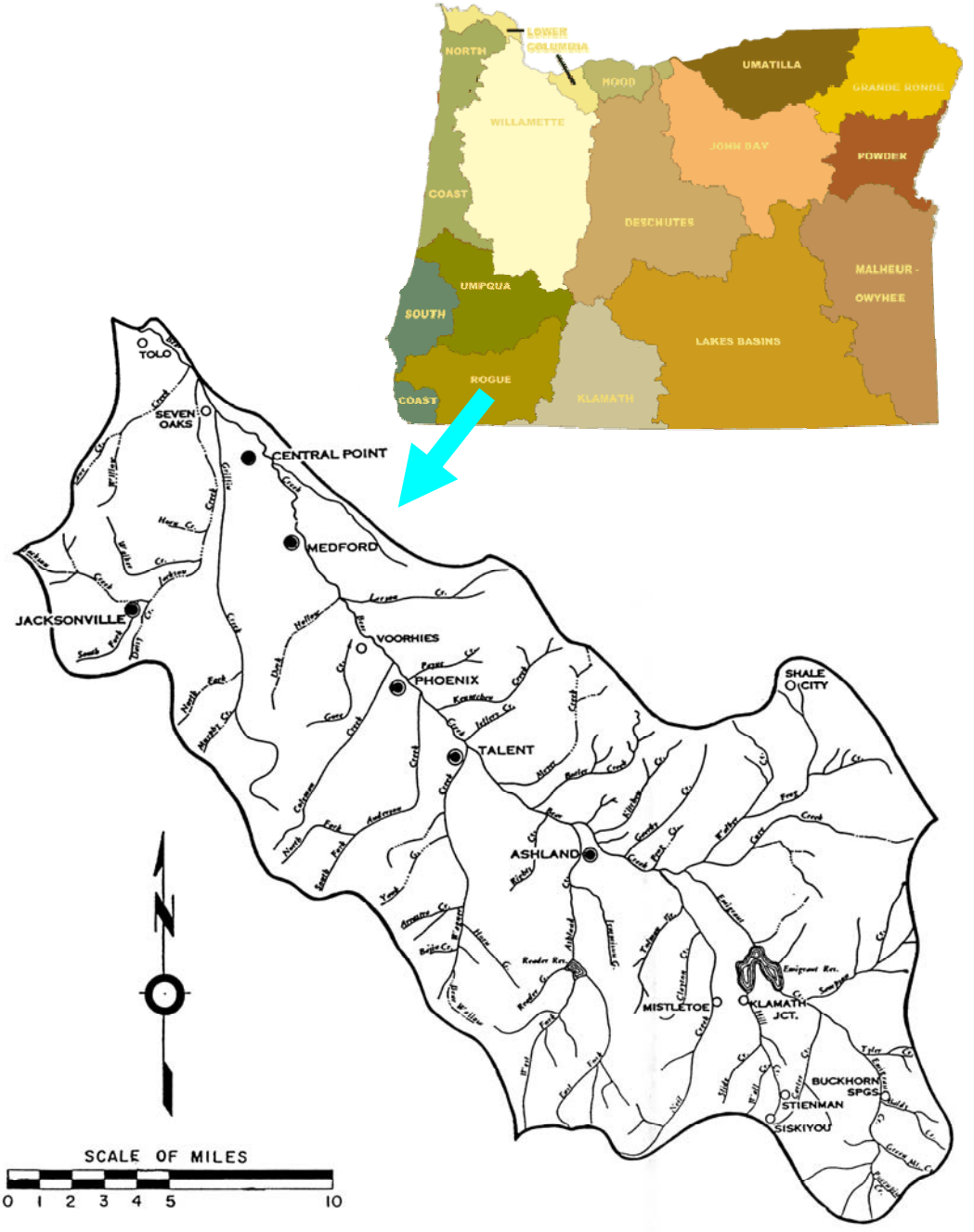


The Bear Creek Watershed is defined by 35-mile Bear Creek which flows in a northwest direction through the bottom of the 391 square mile valley. Bear Creek, which originates at the confluence of Neil Creek and Emigrant Creek just below Emigrant Lake, has approximately 21 tributaries that flow down from the volcanic Cascade Mountains that rise to the east and the granitic Klamath-Siskiyou range to the west. The lowest point in the Bear Creek Valley is where Bear Creek meets the Rogue River at 1,160 feet. The highest point is Mt. Ashland, which rises to 7,533 feet and averages approximately 280 cumulative inches of snowfall a year. Snowpack for the Klamath-Siskiyou Mountains is monitored by the Rogue River-Siskiyou National Forest Ranger District. The snow serves as a bank of frozen water, augmenting summer stream flows and reservoir storage. The snowpack is usually at its highest point in late March and early April.

The Bear Creek Valley, at an elevation of roughly 1500 ft., is located in a transitional area between four very different climate zones: Pacific Maritime to the west, Oregon High Desert to the east, Northern Temperate to the north and California Mediterranean to the south.

Because there are two mountain ranges between the Bear Creek Valley and the coast, Pacific-driven storms lose much of their precipitation before arriving. This can be clearly seen by comparing the average rainfall of Brookings, Oregon, which is located 74 miles west of Medford and receives about 78 inches of rain per year, to that of the interior Bear Creek Valley, which receives 23 inches on average. Most of the valley's precipitation falls between the months of November and January, but cool wet weather often continues well into May.

Summers, which are typically dry from July through September, see average highs around 87º F with common highs spiking at 95º F. Although winter lows fall to an average of 22º F in December, it is unusual to have snow persist below 3,000 feet.

The valley's growing season of 170 days begins on April 30th. Since the turn of the century, the orchard industry has played a prominent role in the valley's water history. The climate is also conducive to growing grapes, which may well impact the role of the valley's water for years to come.

Historic Conditions of the Bear Creek Watershed

Two hundred years ago, the Bear Creek Valley looked very different than it does today. With the Cascade and Klamath-Siskiyou Mountains framing the valley, Bear Creek and its many tributaries and natural features created a very different hydrology than what we are familiar with today.

Before Euro-American contact and settlement in the early- to mid-1800s, Bear Creek and its surrounding floodplain was a very dynamic, biologically rich environment. The lower reaches of the tributaries, along with Bear Creek itself, meandered back and forth across wide floodplains containing numerous seasonal wetlands. Beaver activity was prolific in low-lying areas with up to 10,000 beavers living in Bear Creek and the surrounding tributaries. Beaver dams created numerous side channels and wetlands. These wetlands, acting like a sponge, absorbed and held creek water before slowly releasing it over time. These wetlands slowed down the speed of the water, allowing nutrients and particles to settle out. The slower-moving water helped recharge groundwater, leading to stronger flows during the summer. Slow-moving areas were thick with emergent plants such as cattail and bulrush. Other wetland plants, such as dogbane, camas and ipos, were also common. Stream flows were seasonally influenced by storms and drought, but in general, water was plentiful during the wet winters, and less so during the hot, dry summers.

Camas

The stream bottom itself was covered with gravel and cobbles, allowing salmon to dig deep nests, or redds, to lay their eggs. Fall spawning brought Chinook salmon in such abundance that they blackened the stream bottom. One historical photograph shows a sign reading “Please scare off the salmon before crossing the stream” at a ford on Bear Creek where North Mountain Park is currently located.

The habitat was also conducive for Coho Salmon, summer and winter steelhead, fall and spring Chinook, as well as smallscale suckers, speckled dace and lamprey. At the end of their life cycle, the decaying carcasses of the adult salmon would have provided abundant and necessary nutrients for other organisms living in the creek.

In addition to the abundant wetland vegetation, the riparian area contained a variety of trees and shrubs, including big leaf maple, cottonwood, alder, and willow with a spattering of large conifers such as Ponderosa Pine. These native trees provided abundant shade during hot summer months while insulating water temperatures during the winter. The thick riparian buffer also provided a wide, protective corridor for a variety of animals. Forested riverbanks are important to mammals and birds as they journey up and down the river during daily movements and seasonal migrations. These areas were home to mammals such as fox, raccoon, bobcat, deer, bear and even wolf. In addition, a variety of wetland birds and waterfowl including ducks, geese, and heron flourished. There were also significant populations of amphibians and reptiles including Red-Legged Frogs, Western Pond Turtles, and various species of salamanders.

From the stream itself to the wetlands to the riparian corridor, it is easy to imagine a complex mosaic of various niches filled by birds, mammals, reptiles, amphibians, insects and fish. These animals' specific adaptations, which include webbed feet, gills, waterproof feathers, long legs, thin, breathable skin, insulating fur, and snorkel-like breathing apparatuses, allow them to not only survive, but to contribute to the health of the riparian ecosystem and watershed. Similarly, the plants that occupy these sites have special adaptations for this unique environment including buoyant leaves, free-floating roots, and varying reproductive methods depending on whether the surrounding conditions are wet or dry. Plants such as Ponderosa Pines, alders, cattails, bulrushes, and willows are some examples of those that have been reintroduced or specifically encouraged at North Mountain Park as part of the park's restoration effort.

First People and Their Use of Water

For thousands of years, the Bear Creek Watershed supported small bands of Native Americans, including the Shasta tribe, who traveled throughout the region to hunt and gather food and materials. These tribes named Bear Creek "Si'kuptat," meaning dirty water. They called the creek dirty because it carried a lot of sediment.

North Mountain Park's Native American village replicates a village that may have historically been found on Ashland Creek.

Their permanent, winter villages were located in the lowest reaches of the valley along the main stem of Bear Creek and its major tributaries. A Shasta village was located along Ashland Creek near present day Lithia Park.

The local tribes built their villages along steams because they conveniently provided easy access to water for cooking and cleaning, and gave them access to an abundance of water-dependent resources. One of the most important of these resources was fish, including the salmon, steelhead, and lamprey that could be trapped or speared. The creek's otter and beaver populations provided not only food, but their skins were also used in making water-resistant clothing, storage containers and quivers.

Local tribes used many riparian and wetland plants. For example, the Shasta used bulrush to make a variety of objects including sleeping mats, temporary shelters, and duck decoys. Willow, another important wetland plant, was harvested, processed, and woven into ornate caps and baskets. Some of these baskets were so water tight that they could be used for cooking. Camas and other water-loving bulbs provided important sources of carbohydrates.

Trappers, Miners & Settlers Enter the Valley

The first Euro-Americans to enter the area in 1826 were fur trappers working for the British Hudson's Bay Company. These men trapped hundreds and possibly thousands of beaver and other fur-bearing mammals in an effort to carry out the British plan to "trap-out the west" and deter American exploration.

Following on the heels of the trappers, gold miners came by the hundreds when gold was discovered near Jacksonville in 1851. The miners began searching for the gold using the simple gold pan, but were soon scouring the streams with pick and axe, and later with enormous jets of water. Because the gold was first observed in the waters that flowed from the quartz-rich Klamath-Siskiyou Mountains, miners quickly set up temporary camps along these streams. They built homes along the valley's main tributaries, and with them, claims to all-important water rights. A water right is an individual's legally protected right to use water from a particular water source. The first known water right in Oregon was filed by Jacob Wagner, also in 1851, near present-day Talent. The following year, Wagner built the state's first irrigation ditch at the junction of Wagner and Bear Creeks.

Artist's rendition of Ashland's early mills.

The city of Ashland grew as it supported the mining industry and supplied the nearby town of Jacksonville with needed mining supplies. Miners-turned-settlers, Abel Helman and Eber Emery, built a sawmill near present-day Lithia Park in 1852. A flour mill soon followed, and in 1855, Helman established the town of Ashland Mills, which he named after his hometown of Ashland, Ohio. The heart of the new town was, and still is, situated along the banks of Ashland Creek.

In 1856, Robert Hargadine, who had staked an earlier land claim near Ashland Creek, established the Ashland Woolen Mill. Like the other mills, power for the mill came from Ashland Creek.

The woolen mill garnered water through a flume and wooden pipe downstream from the flour mill. Fast-flowing water from the creek turned the mill's large Leffel turbine, creating enough energy for a 58 horsepower engine. The creek sloped 250 feet per lateral mile, and the flume was near the intake.

Pioneer Settlement Brings New Water Needs

Some of the first orchard seeds were brought to the Rogue Valley in covered wagons with pioneer families. Because most emigrant families hailed from the Midwest, where fruit trees were numerous, it did not take long for pioneers to begin growing trees in Oregon. With the climate of the Rogue Valley especially suitable for growing apples and pears, families began to favor these trees. By 1860, numerous small orchards were established in and around Ashland.

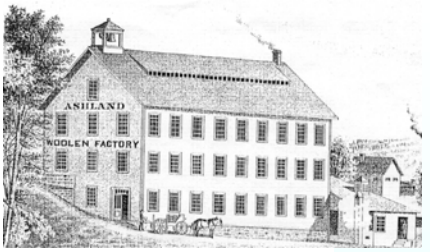
Early orchards, ranches and irrigation ditches. A canopy of native grapevine grows above the ditch.

From these early days, residents found ways to divert water from nearby streams for home use and to irrigate their crops. As was typical with many streams, ditches from Ashland Creek shunted water to different areas of town. The Hargadine Ditch (constructed in1854), the Million Ditch (1856), the Helman Ditch (1858) and the Smith-Myer-Roper Ditch (1864) were all built for domestic and agricultural uses.

The pioneers who built these ditches held some of the earliest water rights on Ashland Creek. The fair use of these rights, and many perceived injustices, often created intense discord among residents. This system of irrigation ditches and water rights benefited those farmers living close to streams, but for others, water was in short supply. As stream water was siphoned off for human use, salmon populations began to suffer due to a combination of chronically low water levels, degraded stream conditions and poor water quality.

Through the 1870s, with limited means of irrigation, farmers primarily grew wheat, grasses and corn and raised cattle, sheep and pigs. Wheat, which had never before been grown in the Rogue Valley, soon became as common as it had been back in Helman's home state of Ohio.

On frontier farms, native plants were cleared for exotic crops, and non-native weeds infiltrated the wild lands. This was detrimental to streams because native plants help prevent erosion on streambanks. Other uplands were used to graze livestock, including sheep for the woolen mill, which polluted streams and riparian areas, and damaged native plants. As the population increased, the land along Bear Creek and its tributaries was converted from floodplain and wetlands into farms, roads, homes, and businesses. The valley floor became valuable for commerce and agricultural orchards, however irrigation to support the new large-scale agricultural interests was slow to develop.



Ashland's Woolen Mill (upper right) and rows of Howell Pears at Eden Valley Orchard.

By 1874, despite its beautiful setting and growing prosperity, Ashland was experiencing serious problems. Poor sanitation, frequent fires, muddy, rutted streets and water shortages plagued the town's 300 residents. Livestock ran loose, garbage lay everywhere and outhouses were steeped in filth. Storm run-off drained directly into the creek, causing health problems from contaminated streams, polluted wells and stagnant drainage water.

Anderson Mine on Ashland Creek, 1885.

Meanwhile, citizens continued to depend on wells or water from the creeks and open ditches. The few wooden pipes installed in 1875 to bring water into the center of town were narrow and leaky. In most summers, the water supply simply ran out. Additional problems surfaced in 1885 when a hydraulic mining operation began work on Ashland Creek above town.

Population Growth and New Water Systems

The year 1887 saw the driving of the golden spike in Ashland and the completion of the railroad from San Francisco to Portland. The arrival of train transportation spurred growth in the logging and orchard industries as well as an accompanying surge in population.

To ensure enough water for its increasing population, the city of Ashland constructed a dam on Ashland Creek just above Lithia Park.

The dam pooled about 1.8 million gallons of water and is today known as Ashland's swimming reservoir.

Ashland's train depot and first municipal water storage site.

By the end of the century, however, Ashland still faced serious problems related to the distribution and quality of water. The historic ditches that were being used for domestic use and irrigation were now recognized as a menace to the growth and health of the city. In 1902, a sewer system was planned, but Ashland voters defeated the measure. Infectious diseases flourished, forcing city officials to construct a pest house in the lower part of town to house people sick with typhoid. Doctors and other prominent citizens wrote of the "unspeakably vile" conditions which included a detectable stench about town once evening fell. In 1903, Ashland voters approved the measure to build a sewer system. It is interesting to note that early drafts of the sewer system included language that stated the sewage would not be disposed of in Ashland or Bear Creeks, but on ground owned or leased by the city.

Water Districts Arrive in the Valley

At the turn of the century, the city was able to purchase several water rights including those of the flour mill and the iron works and later those of the Ashland Electric Power and Light and the Anderson Mining Ditch — one of the most important established water rights on Ashland Creek. These water rights would play a critical role in supplying water for the city.

By 1910, many lands were still without necessary irrigation water. In an effort to bring water to farmers, and especially fruit growers, water districts were established. A water district is a government district, or unit, specifically tasked with bringing water and sewer services to a community. The development of the districts marked an important transition in the way that water was both perceived and delivered. Prior to this time, the residents of the valley obtained their water from open diversion ditches for both irrigation and domestic use. Following the formation of the districts, these two needs began to be addressed separately. Irrigation water was soon supplied by the districts, but the municipalities struggled for several years to maintain clean and adequate supplies to their citizens.

Between 1915 and 1921, seven water districts were formed. The largest was the Talent Irrigation District (TID) which was formed in 1916 to serve residents in Talent and Ashland. The plan was described as the "diversion and use of such un-appropriated waters as may exist in Emigrant, Neil and Ashland Creeks." To deliver water to an anticipated 8,500 acres within the District boundaries, canals would need to be built on both sides of the valley to a point parallel with Phoenix.

The Medford Irrigation District (MID) was formed in 1917. The District contracted the construction of Fourmile Dam and the Cascade Canal, and the reconstruction of Fish Lake Dam which had been originally constructed by the Rogue River Valley Irrigation District (RRVID).

By the 1920s, with the help of the Bureau of Reclamation, the TID began to bring water to farmers by putting more water in Bear Creek and delivering it through a system of ditches and canals. This delivery came at a cost however, as Bear Creek became channelized, lost much of its wetland habitat and saw extreme reductions in the amount of downstream water.

The Popularity of Local Springs and Mineral Waters

While irrigation districts were being formed and the Bear Creek Valley was finally beginning to realize its potential as a productive fruit-growing valley, other residents were beginning to capitalize on another fortunate feature of the valley. The area in and around Ashland is home to 11 big mineral springs — the source of which is based in the volcanic faults that exist deep within the Cascade Range. These faults allow water to access heat from deeply buried rocks. As water travels through the rock layers, it attracts minerals such as boron, salt, arsenic and iron.

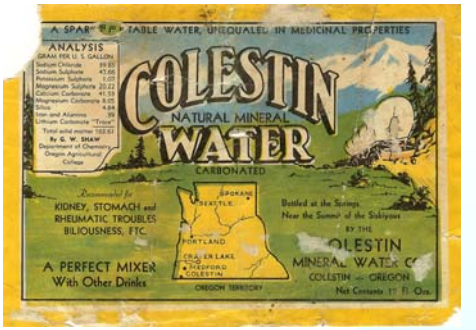
These hot springs have been used for thousands of years for their therapeutic values. Native Americans believed the hot springs were not only full of healing power, but were actually sacred. The early trappers failed to see their value and referred to some of the local springs as "poison waters." But the springs later became attractions for the local residents.

Twin Plunges and the Helman Baths (from the collection of George Kramer)

By the early 1900s, the area's hot and mineral springs were at their height of popularity. Big, colorful railroad posters described Ashland hot springs to the crows of tourists, usually from Portland, who would scurry off the passenger trains to cool off in the local pools.

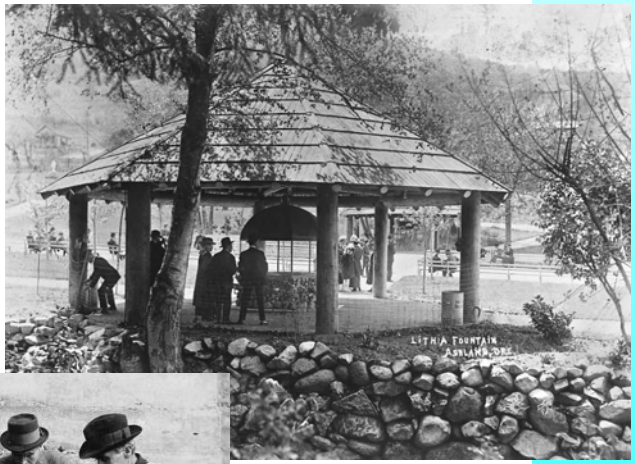
There were five public bathing pools near Ashland at that time: Buckhorn Springs, off Dead Indian Memorial Road, Colestine Springs, south of Ashland, Helman Baths, off Otis Street, Jackson Hot Springs, just north of town and the downtown Twin Plunges. Tourists enjoyed the Colestine Baths but locals preferred the Helman Baths.

In addition to hot springs, the area had numerous sources of mineral water including Colestine Natural Mineral Water, near the Siskiyou Summit and Siskiyou Soda Springs, located on Emigrant Creek.



Siskiyou Soda Springs was later owned by John Marshal Wagner who renamed it Wagner's Soda Springs and bottled the water. Most of the bottled water was consumed locally, though some was delivered by wagon or stagecoach to Hilt, Hornbrook or by railroad to Medford, Jacksonville, Grants Pass, Portland and San Francisco. The water gained popularity as a mixer with liquor, though changing tastes and habits as well as state prohibition in 1916 saw the demise of the business. The soda springs house itself burned in 1926.

Perhaps the most famous local water was Lithia Water, named for its unusually high content of lithium. This water contains a variety of minerals, acids, and dissolved salts including bicarbonate acid, calcium, and trace amounts of arsenic. The prominence of mineral springs reached a peak with the landslide passage of a bond issue designed to pipe Lithia water and other mineral waters into the city. The bond allowed for the pipes required to bring Lithia Water from a springs near the present-day airport into the Ashland Plaza and Lithia Park. Around this time, a few local businessmen made an attempt to parlay Ashland and its famous Lithia Water into an upscale resort town, but those dreams never materialized.



Today, visitors can still enjoy the unique carbonated elixir of Ashland's own Lithia Water at the Gazebo in Lithia Park near the bandshell and on the Ashland Plaza.

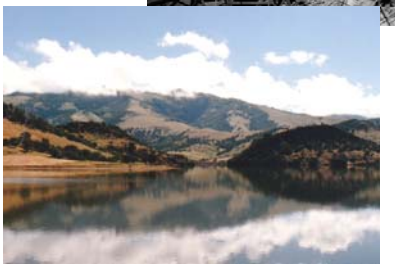
Expanding and Improving Water Delivery Systems

The 1920s saw abundant expansion projects within the newly developed water districts. Additional irrigation water became available due to the building of three new reservoirs, the first of which was Hyatt Reservoir.

With a capacity of 16,000 acre-feet of storage and gathering water from approximately 12 square miles, Hyatt Reservoir was completed by 1923.

A contract for the construction of Emigrant Dam, located south of Ashland, was awarded in April 1924. When completed, the 110-foot high concrete thin-arch dam created a reservoir with a capacity of 8,500 acre-feet and flooded a maximum of 230 acres.

Today, the area's three major irrigation reservoirs are all within an easy driving loop.



Emigrant Dam, constructed in 1924.

While irrigation needs were beginning to be addressed, problems related to the delivery of clean domestic water throughout the valley persisted. Medford, which originally took water out of Bear Creek, later diverted water from Little Butte Creek but still found it hard to keep up with the growing demand. In addition, the occasional pollywog that appeared from the tap could be a little off-putting. In Ashland, difficulties reached a crucial point in summer of1924, during an extreme drought.

Solutions came in the form of a 1926 vote whereby Ashland would build a storage dam in the Ashland canyon, construct a storage reservoir on Crowson Hill and purchase additional water from TID. In 1928, with a holding capacity that would reach 280 million gallons, Reeder Reservoir was constructed at the confluence of the East and West Forks of the upper Ashland Creek Watershed. About this same time, Medford completed construction of Big Butte Springs which brought cool, clean water from a source near Mt. McLaughlin. By 1930, with updated water and sewer facilities, both Ashland and Medford finally began to see a reduction in pollution and health problems that had plagued the towns for years.

1928: Construction of Reeder Reservoir in the upper Ashland Creek Watershed.

There were still, however, two issues that were causes of concern, the first one had to do with the quality of the water being supplemented through the TID. The mayor himself stated that purchasing water from the TID had been a failure and a big mistake due to the uncertain supply and poor quality, issues that still hold true today. The second area of concern had to do with the way the water from the new Reeder Reservoir was being cleaned.

Under normal conditions, Reeder Reservoir has enough flow to allow water to spill over the dam and flow downstream through Ashland Creek. By the end of a long hot, summer, this is no longer the case.

While the low-tech filtration system worked well under most circumstances, a January 1948 flood caused Reeder Reservoir to overflow. So much silt washed into the system that citizens had muddy water when they turned on their faucets. Soon after this flood, Ashland voters approved a water filtration plant along with several other upgrades. Fortunately, a consultant's suggestion to pave the floor of Ashland Creek as a means of increasing the flow by nearly twenty percent was not included in these improvements.

The Valley's Water Systems Grows More Complex

Following World War II, the Bear Creek Valley saw significant growth in population with a corresponding increase in competition for water, especially irrigation water. In December of 1953, with about 20,000 acres served by organized irrigation districts, a comprehensive plan was drawn to provide even more water for irrigation, power, and recreation. As part of the plan, existing features would be used to the extent possible, with some canals requiring enlargement. Works to be constructed included Howard Prairie Dam, Howard Prairie Delivery Canal, Power Canal, Penstock, Green Springs power plant, the reconstruction of Emigrant Dam, and extensions of Ashland and West Laterals, collection canals, diversion dams, and drainage works. The plan would provide a sufficient water supply for an additional 17,890 acres of irrigable lands, develop 10,000 kilowatts of power, reduce flood damage, and enhance recreation opportunities.

One of three main diversions, TID withdraws water from Bear Creek near Oak Street in Ashland.

Among some of the most popular recreation provided by the project was the boating and swimming at Emigrant Lake. In addition, Hyatt and Howard Prairie provide exceptional fishing along with camping and other accommodations.

With completion of the Talent Division, TID, MID and RRVID were intricately tied to each other in a complex system of reservoirs and canals that included 7 storage dams, 20 diversion dams, and 250 miles of canal. All three districts obtained water from Howard Prairie Lake, Hyatt Reservoir, Emigrant Lake, Keene Creek Reservoir, and Bear Creek and its tributaries with TID taking out water near Oak Street in Ashland, MID near Phoenix, and RRVID, taking out water from Bear Creek near Jackson Street in Medford. Four-Mile Lake and Fish Lake also provided a partial water supply to RRVID and MID and Agate Reservoir provided water to RRVID.

These Same Systems Still Exist Today

Today, the Bear Creek Watershed is home to over 200,000 people and the quest for additional water continues, not only for domestic and irrigation uses, but also for recreational uses, fish and wildlife. Water for irrigation remains the major out-of-stream water use involving Bear Creek and many of its tributaries. The irrigation system is complex, involving both withdrawals and return flows. Currently, the three irrigation districts in the Bear Creek valley utilize both stream flow and stored water rights serving almost 40,000 acres during the irrigation season with another 30,000 acre feet of water each year being imported from Hyatt and Howard Prairie Reservoirs which are located within the Klamath Basin.

The number of commercial pear growers in the valley has diminished although wine grape production has increased dramatically.

Despite this extensive system of streams, reservoirs, canals, tunnels, and pumps, recent studies have shown that the water districts of the Bear Creek Valley will need an additional 50,000 acre feet of water in order to meet irrigation demands during severe drought conditions. These figures take into account the changes that have taken place within the valley as the number of commercial pear growers has diminished at the same time that hobby farms and growing grapes for wine production has increased. Other issues related to importing water from the Klamath Basin, the use of chemical moss control in open ditches, and the loss of orchard land to housing developments have made the management of irrigation water increasingly challenging.

Water in the Valley: Too Little vs. Too Much

Too Little: While irrigation demands continue to be an issue, providing an adequate supply of domestic water also remains challenging, especially during the hot, dry summers. As an example, water use in Ashland increases from roughly 2.0 million gallons/day (mgd) in the winter, to peak daily use of over 7.0 mgd in the summer - a 375% increase! To augment the water that flows into Reeder Reservoir from the upper Ashland Watershed, the city is still contracting with the Talent Irrigation District for additional water.

During a drought year, Emigrant Reservoir can go completely dry as it did during the mid 1990's

While this seems like a protective measure, because both systems are dependent on the winter rains and snows, in lean water years both Reeder Reservoir and the reservoirs that supply TID water can run dry.

Unlike Ashland, Medford has a very different way of supplying water to the city. In 1927, the Medford water Commission developed Big Butte Springs to supply domestic water from water rights on Big Butte Creek near Mt. McLoughlin. This delivery remained adequate for several years, but with the population surge following World War II, Medford proactively obtained water rights from the Rogue River and then developed an accompanying delivery system.

By the late 1990's, the small city of Talent found itself in such a dire situation that they had to enact a growth moratorium (a limit on house construction) due to lack of water. To ensure an adequate supply, Talent residents voted to partner on a project called the Talent/Ashland/Phoenix Pipe, or TAP. The TAP provides water to the cities of Talent and Phoenix from Medford's two sources of Big Butte Springs and the Rogue River.

As of 2009, the Ashland city council had chosen not to connect to the TAP, relying instead on increased water conservation measures to ensure adequate supplies.

The Medford Water Commission expects that, with current population projections and proactive water conservation, water supplies will be adequate for the Bear Creek Valley through the year 2050.

During the flood of 1997, water of Ashland Creek flooded the downtown plaza.

Too Much: Flooding is nothing new to the Bear Creek Valley. In fact Ashland Creek is highly prone to flooding due to the geology of the land in the mountains above town. Although flooding is nothing new, the amount of damage that results from these events has increased for several reasons. The biggest reasons is that the majority of the town and its population are situated on, or very near, a floodplain. Channelizing Bear Creek (redirecting the creek out of its natural path) has also exacerbated floods. It is interesting to note that Bear Creek used to flow under the highway near the Jackson Hot Springs. Around the 1960s when the highway was straightened, Bear Creek was "moved" to the other side of the highway. As a result, during the flood event of 1997, the creek returned to its former channel and deposited enough sediment in the Jackson Wellsprings pool to almost fill it in.

Other reasons that flooding seems to be getting worse has to do with impervious surfaces. Instead of soaking into the ground during a high rain event, all of the water that falls on roads and parking lots is shunted into storm drains and then directly into the nearest stream, increasing flows precipitously.

Salmon: Concern for Water Quantity and Quality

For over 150 years, pioneer emigrants and the settlers that followed have been manipulating the natural water systems of the Bear Creek Valley. While all of the various canals, wells, pipes, pumps, dams, reservoirs, and drains have helped supply clean water to a burgeoning population, these engineering feats have also come at price. Few streams of the Bear Creek Valley are left to meander freely as they once did and habitat for waterfowl, beaver and especially salmon have been greatly compromised.

In addition to historical photos and accounts of stream bottoms running black with spawning salmon, a big indication of the former health of the salmon run was the fact that Ashland had a salmon cannery for years along Ashland Creek. However, today it is fairly difficult to find spawning salmon. The loss of salmon cannot be attributed to a single issue, but the lack of water in the creek certainly isn't helping their plight. While the irrigation districts put extra water into Bear Creek during the summer from Emigrant Reservoir, they also remove that water in several places, leaving a dearth of water by the time the creek enters the Rogue River.

There are actually enough water rights attributed to Bear Creek that if they were all put to use, there would not be a drop of water left in the creek during the summer. While this does not usually happen, the flows often become so low by the time the salmon are ready to head up in the early fall that the fish can barely swim.

An associated repercussion of the lack of water is a dangerous increase in temperature. Salmon are not evolved to live, and in fact will often perish, in streams that are warmer than about 60 degrees. Bear Creek temperatures are consistently warmer than this by late summer. Part of the problem with the warm temperatures have to do with an associated lack of oxygen but there is also a connection between warm water and harmful bacteria.

Other ways that the streams of the Bear Creek valley have become compromised have to do with basic water features. Salmon need gravels to spawn, deep pools to rest, overhanging trees to provide nutrients, and cool, clean water. All of these features have been compromised by floodplain development, stream channelization, irrigation draws, sedimentation from roads and construction, and pollution. There are also impacts that have most likely affected salmon that are related to

inputs of drugs from treatment plants, inputs of chemicals from pesticides, introduction of non-native species such as bullfrogs and carp in the water, and introduction of invasive plants such as Himalayan blackberry along the shoreline.

Recognizing these issues, a number of habitat improvement projects have been undertaken in recent years with the primary goal being to restore adequate flow quantities and patterns historically present for salmonid habitat. At the top of the list, recent studies have shown that Bear Creek needs an additional 50,000 acre feet to meet instream needs even during normal water years. Ideally, this additional water would result in a more natural flow pattern, especially during the critical summer irrigation season. Other efforts include restoring riparian habitat through temperature reductions (by increasing canopy and flows) and allowing Bear Creek to return to a natural meandering nature.

By the time the TID water is turned off in early fall, Bear Creek, which has been scoured to bedrock, can be reduced to a trickle.

As a result of the many ongoing projects addressing these and other issues, Bear Creek is no longer rated among the worst in Oregon and overall water quality has improved. Today, Medford is one of a handful of metropolitan areas in the Pacific Northwest where fall Chinook spawn within city limits. A lesser number of Coho salmon and good numbers of summer and winter steelhead also use Bear Creek for spawning and rearing. The creek also hosts populations of resident rainbow trout and several warm water fish species. Urban development, water management and public education may ultimately decide the future of native fish in the Bear Creek Watershed.

Water Quality Issues Today

Just as the problems related to loss of salmon and their habitat are interrelated, so are the solutions. Today, a variety of agencies, businesses, citizen groups, and individuals are working together towards the goal of restoring Bear Creek and the surrounding watershed. City and regional planners are recognizing the problems and are attempting to mitigate, while at the same time, providing adequate supplies of water for domestic and agricultural uses. There are several factors that are currently being identified as main areas of concern for the health of Bear Creek and its associated tributaries but there are also corresponding solutions.

Issue: Decreased water quantity
Because the total amount of water rights allocated to Bear Creek exceeds the amount of water in the creek, water flow is often compromised.

Solution: This is a multi-faceted approach which includes the purchase of water rights, increasing the efficiency of irrigation delivery, and educating and enticing citizens in the pursuit of water conservation.

Issue: Increased water temperature
Anadromomous fish (salmon and steelhead) become compromised and often die if the water rises above 60 degrees F. Factors leading to increased water temperature include lack of riparian cover or shade along the stream corridor, reduced water flow, and inputs from treatment plants and private ponds.

Solution: There are numerous efforts underway to increase the shade canopy along Bear Creek and many of the tributaries, many of which focus on the reduction of non-native species and the planting of native trees and shrubs. Other efforts are focusing on ensuring that inputs from outside sources do not exceed acceptable temperature limits.

Issue: Sedimentation

Sediments, or suspended particles, cloud the water and make it hard for fish and other aquatic organisms to obtain oxygen. Increased sedimentation comes from a variety of sources including hillside erosion from road building and use, development, and inputs from impervious surfaces such as parking lots, roads, and roofs.

Solution: Since much of the problem is associated with inputs into storm drains, much of this effort is focused on educating the public and those in the construction industry so they will prevent sediment from entering storm drains and streams. Sediment ponds, such as the ones at North Mountain Park, are also being constructed in key locations throughout the watershed. Sediment pond slow the water and collect sediment from streams, which increases the clarity of the water and lowers pollution levels.

Issue: Non-point sources of pollution

While much has been done to stem the destructive point-source inputs of the 1950's and 60's, non-point sources including pesticides, fertilizers, detergent, domestic animal waste, and leaking septic tanks remain problematic.

Solution: This effort is being conducted on a variety of levels with everything from fencing livestock out of stream corridors to investing in organic gardening programs.

Exploring the history of the Bear Creek Watershed provides insight into the challenges that the watershed faces and the goals that have been established to meet these challenges. There has been demonstrated progress to date, but much more needs to be done. Because the Bear Creek Watershed covers such a large, diverse area, there are currently in place numerous sub-basin management plans that fit together in the larger effort of improving watershed health. While some of the efforts being made toward this end are mandated by law, others go above and beyond what is required. It is readily apparent that the effort to restore the Bear Creek Watershed will take an enormous and continuous effort involving municipalities, larger. agencies, and individual citizens.

A Timeline of Local Historic Water Events

1851: First water right claimed in Oregon by Jacob Wagner on Wagner Creek in Talent. Gold discovered near Jacksonville.
1852: Abel Helman and Eber Emery arrive in Ashland, build sawmill on Ashland Creek.
1854: Hargadine Ditch constructed. Ashland's flour mill constructed on Ashland Creek.
1856: Million Ditch constructed. Native Americans marched to reservation.
1858: Helman Ditch constructed.
1859: Oregon becomes 33rd state.
1861: Ashland flood. Anderson Mining Ditch located.
1864: Smith-Myer-Roper Ditch constructed.
1867: Ashland's woolen mill constructed on Ashland Creek.
1874: Ashland's poor sanitation and water shortages leads to town charter.
1885: Hydraulic mining operation begins work on Ashland Creek.
1887: Water-piping system for fire protection completed. Railroad reaches Ashland from north and south — golden spike driven in on April 16th.
1890: Ashland's waterworks constructed—city piping system replaces old ditches, open reservoir on upper Granite Street, and electric power plant constructed. Ashland becomes the first town in Jackson County to have electric power.
1893: Creation of Ashland Forest Reserve to protect the city's municipal water supply.
1899: Oregon passes a statewide ban on beaver trapping.
1904: Ashland city takes over power and light plant; city purchases water rights from flour mill and Iron Works.
1905: Ashland Electric Power and Light Company shuts down their power plant.
1909: Ashland Municipal Electric Light plant opens. Dams and small reservoirs constructed on the east and west forks of Ashland Creek to divert creek flow for power production and domestic use in the high elevation sections of the city. City purchases Anderson Mining Ditch.
1914: Passage of a bond issue designed to pipe Lithia water and other mineral waters into Lithia Park and the plaza.
1923: Ashland City Council votes to acquire permanent stored water from the Talent Irrigation District (TID).
1924: Contract for TID to construct Emigrant Dam and reservoir.
1927: Medford develops new domestic water supply in Big Butte Springs. Construction of Crowson Hill Reservoir.
1928: Hosler Dam constructed with the resulting Reeder Reservoir supplies Ashland with domestic water.
1929: City and Forest Service craft agreement that Ashland Creek Watershed is to be protected and managed for domestic water use. Timber harvest halted.

1940s: Ashland builds a secondary wastewater treatment plant.

1950s: Passenger service discontinued between Portland and Ashland on the Southern Pacific Railroad.

1952: Concrete cover for Crowson Reservoir constructed to protect the purity of the stored water. Ashland City Council changes name of Reeder Gulch Dam to the Earl Hosler Dam as Hosler retires.

1955: USFS puts Ashland Creek Watershed under multiple use management. Roads constructed and logging operations continue until 1965. Flood.

1959: Bear Creek closed to water withdrawals due to over-appropriation.

1960 : Talent Project enlarged bringing Hyatt, Howard Prairie and Emigrant reservoirs to current storage capacity. Mt. Ashland Ski Resort opens.

1962: Flood Control Act authorizes construction of Lost Creek, Applegate and Elk Creek Dams.

1964: Water treatment plant updated to high rate filtration system and increased capacity to 8 million gallons per day. Flood.

1966: Ashland buys another large chunk of TID to augment Ashland's supply during the summer months either by pumping it into the water treatment plant or by releasing it into Ashland Creek. Reeder Gulch Reservoir dredged. 57,000 cubic yards of silt had accumulated as a result of the 1964 flood.

1971: Medford completes secondary wastewater treatment facility on Kirtland Road. Ashland pumping station to carry TID water to the treatment plant below Hosler Dam completed.

1972: Clean Water Act sets national water quality goals and addresses point and non-point pollution sources. Resultant monitoring shows Bear Creek has excessive fecal bacteria (indicating human/animal waste in the water), sediment, algae, low, erratic flows and high temperatures.

1974: Flood knocks out water filtration plant in Ashland.

1977: Ashland purchases temporary pipeline and pumps to carry TID water to treatment plant.

1980s: Oregon, along with other states, prioritizes streams with excess nutrient levels. Bear Creek selected for remediation. The Endangered Species Act raises awareness (and controversy) about certain declining species such as salmonids.

1990s: Total Maximum Daily Loads (TMDLs) for nutrients established for Ashland and agriculture by the Department of Environmental Quality (DEQ) to reduce algae and increase dissolved oxygen. Local Agricultural Water Management Plan adopted. Ashland begins major upgrade of its treatment facility.

1995: Renovation of Ashland's Water Treatment Plant.

1997: Major flood. Discussion of TAP line begins (water line intertie from Medford).

2000s: Concerns raised about water imported from the Klamath Basin. Additional TMDL's are proposed for the entire Rogue River Basin that will further impact Bear Creek.

Interesting Places to Visit

To learn more about the places mentioned in this booklet, visit the
North Mountain Park Nature Center where the following Interpretive Cards are on display.

Water Features

of the Bear Creek Valley

Agate Desert Preserve
Buckhorn Springs
Butte Creek Mill
Confluence of Beach and Bear Creeks
Confluence of Bear Creek/Rogue River
Emigrant Lake
Helman Baths
Howard Prairie Lake
Hyatt Lake
Jackson Wellsprings
Lithia Water Gazebo
Lyn Newbry Park
Mount Ashland
North Mountain Park Bioswales
North Mountain Park Sediment Pond
Oak Street Fish Ladder
Reeder Reservoir
Rogue River Estuary
Savage Rapids Dam
Sewage Treatment Plant
Tub Springs
Wagner Creek Road