

Humboldt River Chronology

Part III—Twentieth and Twenty-First Centuries

- 1900 (February 8)** It soon became evident that the plea presented in the *Reese River Reveille* (Austin) in September 1898 to eliminate the carp from the Humboldt River had met with little success. The *Silver State* (Winnemucca) reported in a very long article that there was no apparent use for carp: “Before the carp were placed in the river, the Humboldt was one of the best trout streams in the State; now the carp have overstocked the river, taken all the feed and destroyed the spawn of the other fish, so today you can catch nothing but carp...”¹
- 1900 (February 27)** In an early reference to the eventual construction of Rye Patch Reservoir, the *Tuscarora Times-Review* reported that “The ranchers in the vicinity of Lovelocks [Lovelock] have spent over \$100,000 in litigation and this has not settled the water question and has not added a drop to the present supply. This [same] sum spent in storage reservoirs would have settled the water question in short order, but possibly the ranchers didn’t think of so simple a scheme as that.”²
- 1900** It was around this time that the annual cheatgrass began to replace the depleted climax perennial grass-forb understory and out-compete sagebrush that had been thinned or eliminated by range wildfires or excessive grazing by cattle and sheep throughout the Humboldt River Basin. This cheatgrass “invasion” would have extensive effects on trends in future wildfires as well as the habitats of animal species. For example, sharp-tail grouse and sage grouse, which relies on native grasses and sage brush, have been replaced in many areas by chukar partridge, which thrives on cheatgrass.³
- 1901 (March 28)** Four years after taking enforcement authority away from the Nevada Fish Commissioner (see March 22, 1897 entry) with respect to the requirement for installing fish ladders on all dams, the Nevada Legislature had a change of heart with the passage of “An Act to provide for the preservation of fish in the waters of this State, and matters properly relating thereto.” Section 2 restored that authority, at least jointly, and required that “All persons...who have erected, or may hereafter erect, all dams, water weirs, or other obstruction to the free passage of fish...shall construct and keep in repair, to the satisfaction of the Fish Commissioner, fish-ways or fish-ladders...and it shall be the duty of the Fish Commissioner and of the District Attorneys...so far as practicable, [to] enforce the requirements of this section...”⁴
- 1901 (June 7)** In a nostalgic reflection of by-gone days, the *Nevada State Herald* (Wells) reported on finding an idyllic place on the (Little) Trout Creek which resembled fishing conditions which probably existed when the first European settlers arrived in this area: “...about twelve miles from town... almost alive with mountain trout from four to ten inches in length...stream winds down through a wooded canyon for a mile or two before it enters a wide flat below where the water is used for irrigating...”⁵ [Note: Trout Creek is a tributary of Bishop Creek and is located about 12 miles due north of Wells. It drains the southern and eastern slopes of Antelope Peak in the Snake Mountain Range.]
- 1901 (August 31)** Showing high regard for abstinence, as well as a hint to the hunting impaired, the *Tuscarora Times-Review* noted that “The season for killing wild ducks and geese will begin Sunday, September 1st. There are plenty of ducks this year and hunting will be good. Poor marksmen and others who have, in conformance with law refrained from killing wild geese and ducks may now slaughter away with impunity mixed with properly charged

- shells.”⁶
- 1902 (June 17)** Congress passed the Reclamation Act which authorized the U.S. Secretary of the Interior to locate, construct, operate, and maintain facilities for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the Western States. To facilitate these functions, in July 1902 the Secretary of the Interior established the U.S. Reclamation Service (USRS) within the U.S. Geological Survey (USGS). In March 1907 the USRS was established as a separate entity apart from the USGS and in June 1923 the name was changed to the U.S. Bureau of Reclamation (USBR). The basic purpose of the Reclamation Act was to assist states and local governments to stabilize and stimulate local and regional economies, enhance and protect the environment, and improve the quality of life through the development of water and related land resources throughout the 17 contiguous western states and Hawaii.⁷ This act committed the federal government to construct water storage and irrigation projects in the West and reclaim arid lands for cultivation and settlement.⁸
- 1902 (July 18)** In reporting on a camping trip along Tabor Creek (which flows into the Humboldt River nearly 20 miles below Wells and two miles up from Deeth), the *Nevada State Herald* (Wells) painted a pastoral picture: “...shaded by large cottonwood trees, with green grass as a carpet. Roses and flowers in profusion...In this stream is found an abundance of solid, juicy, speckled trout of the native and eastern brook variety...”⁹
- 1903 (February 16)** The Nevada Legislature passed the Irrigation Act of 1903 which, among other things, created the Office of State Engineer to solve water problems, to protect existing water rights, and to bring about a better method to utilize the state’s water resources. This represented the state’s first step in providing a speedy and relatively inexpensive method of adjudicating existing (vested) water rights.¹⁰ According to this act, “All natural water courses and natural lakes, and the waters thereof which are not held in private ownership, belong to the public, and are subject to appropriation for a beneficial use...” Notably absent from this legislation was any provision to control new appropriations for water as well as wording as to the appropriation of underground water.¹¹ This act also provided for the cooperation of the State of Nevada with the Secretary of the Interior in the construction and administration of irrigation works for the reclamation of arid lands in the state under the recently passed National Reclamation Act of 1902. State Engineer offices in Western states were an essential corollary to the National Reclamation Act. Implied in the Reclamation Act was the primacy of the Department of the Interior (USDI) and its U.S. Reclamation Service over water development projects. In fact, with respect to water, individual state sovereignty was so limited that candidates to the office of State Engineer had to be approved by the USDI before appointment by the governor.¹²
- 1904** After the Southern Pacific Railroad realigned its railroad districts, a roundhouse was built at what was to become the town of Imlay, located approximately 32 “track” miles down the Humboldt River from Winnemucca. The station served the Imlay mine to the south where a 10-stamp mill had been built, and four other mining companies were headquartered there as well. A post office opened first in the town, and within another three or four years the bustling community had a restaurant, hotel, physician, church, boarding house, livery stable, mercantile company, three saloons and a few hundred people. During the 1950’s the railroad relocated their shop facilities and Imlay’s population quickly departed to where only about 60 people live there at present.¹³
- 1905 (March 1)** The Nevada Legislature amended the Irrigation Act of 1903 to require that any

- person desiring to appropriate water file an application with the Nevada State Engineer for a permit. The application form was to describe the source of water, location of proposed works, amount of water needed, purpose for which the water was to be used, and other information. If the State Engineer found that there existed unappropriated water, he could grant a permit. Within six months following such approval the applicant was required to file a map in support of such application. Upon satisfactory proof that the application had been “perfected,” i.e., the water had been diverted and put to beneficial use, the State Engineer could issue a certificate of appropriation. The act also provided a method to adjudicate existing water rights.¹⁴
- 1905 (March 16)** Either recognizing the impossibility of expecting a single individual to enforce the state’s fish ladder requirement or, more probably, wishing to diffuse such authority and avoid the issue altogether, the Nevada Legislature passed “An Act to provide for the appointment of a Board of Fish Commissioners and to define their duties.” Section 1 of this act established a three-member Board of Fish Commissioners and gave them rather vague duties: “...*may superintend and direct* the construction of fish-ways and fish-ladders that *may be built* in the streams and waters of this State...”¹⁵ [Emphasis added]
- 1906** After the disastrous cattle losses of the “White Winter” of 1889-90, sheep began to move into the North Fork of the Humboldt River sub-basin. By this year several large sheep outfits had bought, leased or homesteaded enough key acreage to effectively control the summer range in many of the basin’s upper watersheds. This was not only the case the Independence Mountains, but also the high country formerly used as Daniel Murphey’s¹⁶ summer range around Gold Creek and the headwaters of the Bruneau River in the Jarbidge Mountains, lying adjacent to the northern boundary of the North Fork sub-basin.¹⁷
- 1906 (May)** To protect the valuable watershed source areas of the North Fork of the Humboldt River sub-basin from the growing threats of severe grazing, the Independence Forest Reserve was established. This action made possible the initiation of a grazing management program aimed at preventing further deterioration and degradation of the high water-yielding lands in the Independence Mountain Range. Subsequent to the “White Winter” of 1889-90, cattle ranching in the upper reaches of this sub-basin had been largely supplanted by sheep ranchers. By now, heavy livestock grazing had dramatically changed the vegetation patterns and promoted depletion of native vegetation and extensive gully erosion.¹⁸
- 1906 (May 3)** By proclamation of President Theodore Roosevelt, the Ruby Mountains Forest Reserve was created. This represented the first organized effort in the Humboldt River Basin’s Ruby Mountains sub-basin towards the conservation and management of the soil, vegetation and water resources. Later, in 1908, this area would be combined with the Independence Forest Reserve and become part of the Humboldt National Forest.¹⁹
- 1906 (May 28)** In one of the worst flooding disasters in the Humboldt River Basin, heavy rainfall at the head of Pole Creek Canyon, south of Golconda, caused the failure of the Dutertre reservoir dam, which had been constructed in the 1890’s. Six men were drowned when a seven-foot high wall of water hit their sheep-shearing camp in the canyon about four miles below the dam. A house, shearing corrals, one horse, two mules, two wagons, 16 sacks of wool, as well as a boiler, engine and dipping vats located at the camp were entirely washed away. At Golconda, cellars were flooded and a mile of Southern Pacific’s railroad tracks were undermined.²⁰
- 1907 (February)** Significant flooding occurred on the lower Humboldt River from heavy rains on deep winter snowpack on the river’s tributaries below Battle Mountain. No flood flow

- records were available for this event.²¹
- 1907 (February 26)** The Nevada Legislature repealed the Irrigation Act of 1903 and provided a statutory method to determine existing water rights. The 1907 act, creating a new water law, did not differ in any essential particulars from the act of 1903, as amended in 1905.²²
- 1907 (March 6-April 21)** Heavy rains on a deep winter snowpack in the lower Humboldt River Basin below Battle Mountain, as well as in western Nevada, caused flooding in the middle and lower Humboldt River and tributaries. The flooding caused some miring and deaths of livestock, as well as the drowning of one person, who was attempting to move livestock to higher ground.²³ Considerable flooding was experienced in the Little Humboldt River sub-basin although there was little reported physical damage. Gumboot Lake formed at the southern end of Paradise Valley and eventually broke through the Sand Dunes formation, emptying the Little Humboldt River into the Humboldt River main stem. Both rivers were flooded throughout their entire lengths.²⁴
- 1907** Gold was discovered in western Elko County in the Midas (Gold Circle) District during the general upsurge in prospecting which took place all over Nevada following the fabulous gold strikes at Tonopah and Goldfield. A gold rush followed and a townsite – called Gold Circle at first, but later changed to Midas – was laid out just over 40 miles nearly due north of Battle Mountain. At its peak period of production from 1916 to 1921, the bustling mining town hosted 21 saloons, a post office, town water system, a newspaper, four general stores and several hotels and rooming houses and boasted a population of some 2,000 persons. By the end of 1921, the district had produced almost \$2.5 million in gold, silver and copper. After the Elko Prince Mill burned in 1922, however, Midas quickly lapsed into a near ghost town visited seasonally by hunters and curiosity seekers.²⁵
- 1907 (October 31)** Noting the introduction of another exotic (i.e., non-native) fish species to the Humboldt River system, in hopes that it might exterminate a previous unwise exotic fish introduction of carp, the *Central Nevadan* (Battle Mountain) reported that “G.C. Thomas of the Nevada Fish Commission, arrived in Battle Mountain on Monday of last week with about 150 black bass spawn which was planted in the Humboldt River at this point. The fish were taken from the Russian River in California, being sent to the Nevada [Fish] Commission through the courtesy of the California Commissioners. It is said that the black bass will kill the carp that now infest the Humboldt. The fish which were planted measured from three to seven inches.”²⁶ Contrary to hopes, the carp continued to multiply.
- 1907 (through 1908)** The Western Pacific Railroad, the second transcontinental rail link traversing the Humboldt River Basin at this time (the other being the Southern Pacific Railroad), was constructed along the Humboldt River from Wells to Winnemucca. From Winnemucca, the Western Pacific rail line would follow the Humboldt River on its north side for another 12 miles, then head due west through Pronto, then exit the Humboldt River Basin, cross Desert Valley and then skirt the Black Rock Desert along its southern side.²⁷
- 1908 (April 17)** The *Elko Free Press* reported on the activities of one of the state’s Fish Commissioners and the continued defiance of existing laws with respect to the installation of fish ladders: “H.H. Coryell of Wells, one of the three Fish Commissioners of Nevada returned from Carlin this morning where he went at the request of District Attorney Caine to investigate...dams in the river in that vicinity without fish ladders...Fish were being caught below these dams with dip nets...reports that he found dams without adequate fish ladders...owners did not realize...they were violating the law. Each promised to correct the evil at once...”²⁸

- 1908 (May 1)** In a rather lengthy article on persistent fishing abuses along the Humboldt River (particularly the lack of fish ladders and the use of chemicals and/or explosives), the *Elko Free Press* noted that these “criminal acts” have continued into the present era: “Complaint is made that the fishing laws are being grossly violated...number of dams in the Humboldt not provided with fish ladders...Fish have gathered in schools...caught by the thousands...being blasted with unslacked lime and with powder...”²⁹
- 1908 (July 1)** The Independence Forest Reserve (North Fork Humboldt River sub-basin) and the Ruby Mountains Forest Reserve (Ruby Mountains sub-basin) were consolidated into a new unit called the Humboldt National Forest. Forest headquarters were established at Elko, Nevada. This action made possible the initiation of a grazing management program aimed at preventing further degradation of the high water-yielding lands in the Independence and Ruby Mountain ranges. A managed grazing program for the remaining federally-controlled lands within these sub-basins would have to wait until 1935 when the new Grazing Service (now the U.S. Bureau of Land Management) would be established within the U.S. Department of the Interior.³⁰
- 1908 (November 17)** Noting the different types of waterfowl (ducks) frequenting the Humboldt River Basin, the *Elko Free Press* reported that “On Sunday Dr. Wilson and Mr. Ankeny were out for ducks and returned with specimens of canvasback, redhead, ringbill, widgeon, mallard and teal. They report thirty-one ducks as a proof of their skill as hunters. The first three varieties are deep water fowls and are seldom found in this part of the country.”³¹
- 1909 (January)** The Board of Fish Commission’s first biennial report, covering the years 1907 and 1908 (see related March 16, 1905 entry), noted that “We call the attention of our citizens to the matter of fishways in the dams in streams of this State, as this is a matter of the greatest importance. If the propagation of food fish in our waters is to attain any efficiency, it is absolutely necessary to have fishways in all dams, and they must be adequate and effective. At present there are but few dams in the State provided with any sort of a fishway or fish ladders. The Commission recommends legislation to remedy this negligence.”³² From this report several important points may be inferred: (1) The “negligence” and absence of fish ladders referred to tends to contradict prior reports of the Fish Commissioner (H.G. Parker) and imply that he may have over-estimated the state of compliance, or just that the condition of existing fish ladders may have deteriorated severely and rapidly; (2) the Board of Commissioners refers to the “propagation” of the “food fish” apparently in terms of its economic value and not in terms of its preservation for any intrinsic or biodiversity value; and (3) the Commission calls for still more legislation with respect to fish ladders when the record clearly shows that enforcement has been lacking since the 1860’s.
- 1909 (January 20)** The Bruneau addition to the Humboldt National Forest, which covers the upper Mary’s River sub-basin area, was effected to protect and administer land use on the vital watersheds of the Jarbidge Mountains. Since the beginning of ranching operations in the early 1870’s in this area, many itinerant herds of cattle and tramp sheep operations had extensively grazed the sub-basin’s range lands causing considerable rangeland degradation.³³
- 1909 (April)** In recognition of its strategic location, a second railroad, the Western Pacific Railroad, which was the last of the transcontinental railroads, was completed through to Winnemucca. Winnemucca was selected as a freight and passenger division point on the new line.³⁴
- 1909 (May 22)** Noting the rather belated completion of the first “real” fish ladder ever constructed in Elko County, along with providing detailed dimensions, the *Elko Free Press* noted that

“Game Warden Lindsay returned last night from the big R.R. [railroad] dam this side of Carlin where he has been the past two days seeing that the fish ladder was properly constructed and placed...first real fish ladder ever installed in Elko County. The ladder is 45 feet long, 4 feet wide and contains 18 water boxes; making each box 2-1/2 feet x 4 feet...inspected all other dams between the western county line and the North Fork, about 38 in number and finds them...in good condition for the fish getting over...”³⁵ The report does not explain how the fish effectively navigate these other 38 dams which apparently do not have “real” fish ladders.

1910 (February-April) Very probably the worst flooding in recorded history struck the Humboldt River Basin. In the Mary’s River sub-basin, high water and ice jams from wet-mantle flooding on the Mary’s River damaged the Western Pacific and Southern Pacific Railroad grades and bridges near Deeth, which itself was covered with water up to three feet.³⁶ In the Ruby Mountains sub-basin, wet-mantle flooding washed out the Bullion bridge on the South Fork of the Humboldt River, isolating the mining camp of Bullion for almost two weeks. The Bullion road was also so badly damaged during this flood event that much of it had to be entirely relocated. Other bridges on the South Fork and Tenmile, Huntington and Lamoille Creeks were severely weakened with considerable road damage being experienced in these same areas. Due to the severity of this flood event, it is generally believed that much of the present eroded channels on Dixie Creek, the lower South Fork, and Tenmile and Huntington Creeks had their inception at this time, although definite corroboration is lacking.³⁷ The North Fork of the Humboldt River headwaters, combined with outflows of Mary’s River, inflicted damage to the railroads above Elko and within the town itself. Considerable erosion damage was done to the sub-basin’s vegetation and soils from its junction with Beaver Creek downstream to the Humboldt River at Ryndon. Considerable loss of livestock was also reported.³⁸ In the Maggie Creek sub-basin, both Maggie and Susie Creeks flooded, adding to the inundation of Carlin. This was one of the worst flood events recorded within this sub-basin and it is generally believed that many of the present eroded channels and both of these creeks and their tributaries had their inception during this flood event.³⁹ In the Pine Valley sub-basin, nearly 30 miles of the Eureka and Palisade Railway line in lower Pine Valley were almost completely destroyed, forcing the railroad into foreclosure and causing this stretch of track to be closed until May 1912, when it resume operations as the Eureka Nevada Railroad.⁴⁰ The Reese River flooded along its entire length, washing out over five miles of Nevada Central Railroad trackage through Reese River Canyon between Bridges Station and Ledlie, as well as twelve railroad bridges. High water from Trout Creek and Mill Creek in the lower Shoshone Range washed out several sections of the railroad closer to Battle Mountain and that town was flooded extensively.⁴¹ In the Battle Mountain sub-basin, the area between Beowawe and Battle Mountain became an extensive lake and in March the Humboldt River was described as being four to five miles wide in the vicinity of Dunphy and Boulder Flat, and further downstream, Kelly Creek was reported to be one and one-half miles wide at its junction with the Humboldt River main stem. The railroad between Battle Mountain and Carlin was severely disrupted due to washouts and up to seven westbound passenger trains were stalled in the Palisade yards while the same number of eastbound trains were held up at Winnemucca or Battle Mountain. The damage to the Western Pacific Railroad track was so severe and extensive that arrangements were effected to use Southern Pacific Railroad trackage between Beowawe and Elko for about four months.⁴² In the Little Humboldt River sub-basin, considerable damage ensued with bridges and ranches washed out

and freight and supply routes closed. All tributaries in the sub-basin overflowed, Paradise Valley was flooded with a sheet of water at least two miles wide, and Gumboot Lake formed above the Sand Dunes, eventually breaking through to the Humboldt River.⁴³ System-wide flooding along the Humboldt River also caused extensive damage in the Lovelock Valley. Nearly all of the valley's major diversion and canal systems, to include the Pitt, Irish-American, Marzen, Rogers, Union, and Big Five, were washed out. Only one farthest upstream, the Young Dam at Woolsey, survived this flood event. After the Pitt diversion and canals were washed out, the wall of water hurtling down the Humboldt River took out all bridges and structures below it as well. With the destruction of the Big Five diversion dam and reservoir, at that time the largest such structure in the State of Nevada, the lands downstream were inundated with flood waters. Subsequently, all but the Marzen and Union diversion structures were rebuilt.⁴⁴ This was estimated to be the greatest flooding on the Humboldt River since settlement began, producing an estimated flow at Palisade of 17,000 cubic feet per second.⁴⁵ By comparison, an average (annual) rate of flow at Palisade is just over 400 cfs.

- 1910** (May) The Pacific Reclamation Company, a corporation composed of eastern capitalists, embarked upon an ambitious colonization and reclamation project in the lower portion of the Mary's River sub-basin. Approximately 40,000 acres of land at the mouth of Bishop Creek (Emigration) Canyon were purchased and by 1912 the company had constructed an earth-rock fill dam on Bishop Creek and a diversion canal to irrigate 30,000 acres of land. A town named Metropolis was created, along with a \$100,000 brick hotel, a brick school (Lincoln School), electric lights and parks. In December 1911, the Southern Pacific Railroad opened a branch office and by 1914 the population in the area had grown to almost 1,000 persons. As early as 1912, however, problems with water rights on Bishop, Burnt and Trout Creeks had dramatically reduced irrigable acreage to only 3,000 acres. Attempts at dryland farming, the first time this had been tried on a measurable scale in Nevada, proved disastrous when drier conditions set in after 1914. By 1924 the population had shrunk to only 200 persons, the railroad was dismantled in 1925, and droughts and the depression era of the 1930's eventually finished off the town.⁴⁶ If the elements were not enough, the Metropolis area also suffered from a severe jackrabbit infestation. As headlines reported on January 1, 1932 in the *Elko Free Press*: "Thousands of Rabbits Attack Hay Stacks in Metropolis District; Tons of Hay Destroyed Each Night." To eradicate the pests, ranchers resorted to poison and the local agricultural extension agent tried to find a market for dressed rabbit carcasses with one local rancher offering to supply up to 1,500 carcasses per day.⁴⁷ (Hopefully, not the same ones that were poisoned.) Today, only scattered ruins of the town remain; however, the Bishop Creek Reservoir (sometimes referred to as Metropolis Reservoir) and the diversion canal still exist, but the reservoir cannot be filled due to extensive leaks in the dam.⁴⁸
- 1910** During this year, and then periodically through the 1929-1930 spawning season, millions of eggs were removed from Pyramid Lake cutthroat trout for transplanting in streams of eastern Nevada. During the high water year of 1938 this subspecies of the Lahontan cutthroat trout made its last recorded spawning run up the Truckee River and by the early 1940's it became extinct. Decades later, in April 1977, in a small creek (later named Donner Creek) on the eastern slope of Pilot Peak in eastern Nevada and western Utah, biologists discovered an original strain of *Salmo clarki henshawi*, believed to have been introduced during this earlier fish transplanting period.⁴⁹
- 1910** Water storage projects developed by Lovelock Valley (Big Meadows) interests began with

- the commencement of work on the Pitt-Taylor Dams and Reservoirs, located approximately 35 miles upstream from Lovelock. Once completed, the reservoirs had a total storage capacity of 48,000 acre-feet.⁵⁰ A diversion structure and canal was constructed about two miles upstream from Mill City. The principal movers behind the project were William C. Pitt, prominent upper Lovelock Valley rancher, and John G. Taylor, an upper valley farmer and for many years Nevada's largest sheep rancher. The enterprise was operated under the corporate name of Humboldt-Lovelock Irrigation, Light and Power Company. L.H. Taylor served as the irrigation engineer in charge of construction, which was completed in 1913.⁵¹
- 1910 (September 24)** In making a not too subtle hint for “repayment” in the form of waterfowl by one in a position to favorably report on the keen hunting skills of local “Nimrods”, the editor of the *Reese River Reveille* (Austin) noted that “Nimrods report ducks plentiful. No trouble for the eagle-eyed to get the limit. Ye editor relishes duck, but has no gun.”⁵²
- 1911** Taking advantage of the disastrous cattle losses of the “White Winter” of 1889-90, sheep ranchers began to homestead the lower Beaver Creek area in the North Fork Humboldt River sub-basin, thereby controlling all of the former cattle range within this drainage area. In just a few years, the “huge” numbers of sheep of both resident ranchers and transient sheep outfits devastated the natural vegetation. The loss of plant cover reduced much of the soil-holding grasslands across much of the basin, effectively changing the landscape from a well-vegetated state of desirable perennial grasses and forbs to its present sheet and gully erosion-raddled condition.⁵³
- 1911** To fill the Pitt-Taylor Reservoirs then being constructed, the Humboldt-Lovelock Light & Power Company filed an application for 57,000 acre-feet of floodwater from the Humboldt River. In 1945 the Pershing County Water Conservation District purchased these water rights and presently uses the present safe storage capacity of 35,000 acre-feet in conjunction with Rye Patch Reservoir.⁵⁴
- 1911 (August 1)** Noting that certain wildlife protection requirements enacted by state law in the 1800's were still not being met or enforced, the *Elko Free Press* reported that “Trainmen of the Western Pacific [Railroad] report that thousands of fish are dying below a big dam in the Humboldt a few miles east of Beowawe in Eureka County...big pool below this dam is fairly seething with trout that were unable to get up stream because of no fish ladder...”⁵⁵
- 1912 (June 12)** The Ruby Division of the Humboldt National Forest was withdrawn, additional lands north of Overland (Hastings) Pass were added to these lands, and the new division was renamed the Ruby National Forest.⁵⁶
- 1913 (March)** The Big Six Mining Company laid out the town site of Lynn approximately 20 miles up Maggie Creek from Carlin. Gold was mined at the location in paying quantities and early estimates indicated the gold vein as one of the largest and richest in Nevada. Based on this estimate, the Big Six Mining Company proposed a diversion ditch from Lynn Creek and a mill at Lynn, however, the boom was short lived. By December 1914 the company was experiencing severe financial difficulties.⁵⁷
- 1913 (March 22)** The Nevada Legislature repealed the water law of 1907 and its amendments. Its replacement, the so-called “1913 General Water Law,” became the foundation of the state's present water law. For the first time underground water was included under provisions of the state's “doctrine of prior appropriation” for water rights. Section 1 of this legislation provided that “The water of all sources of water supply within the boundaries of the State, whether above or beneath the surface of the ground, belongs to the public.” Section 2 provided that “Subject to existing rights, all such water may be appropriated for

- beneficial use as provided in this Act and not otherwise.”⁵⁸
- 1913 (March 26)** For those dams (and there were many) not providing adequate fishways or fish ladders, the Nevada Legislature took action to insure that the local populace did not unfairly take advantage of the frustrated fish congregating just below the impassable dam by passing “An Act to provide for the protection and preservation of trout and other fish in the waters of the State of Nevada...” Apparently, however, if the dam had no fish ladder to begin with (and there were still many of those), you could not be charged under this act. Specifically, Section 10 of that act stated that “It shall be unlawful for any person...to catch...any species of fish, whatever, within the distance of one hundred feet above or below, any dam, in this state *containing* a fish-way or fish ladder.”⁵⁹ [Emphasis added] This continued circumvention of the law was evidenced in a May 21, 1913 article in the *Elko Free Press* which noted that “Complaints have been received by Game Warden Russell of several dams on the North Fork [of the Humboldt River] on which there are no fish ladders, and he has notified the owners that the law regarding the installation of ladders must be complied with.”⁶⁰
- 1913 (July 22-23)** The western portion of the Little Humboldt River sub-basin was struck by dry-mantle flooding from severe thunder and rain storms. Widespread flooding was experienced on both the east and west sides of the Santa Rosa Mountains with stream flooding causing widespread damage to hay fields in Paradise Valley.⁶¹
- 1913 (November 15)** The *Elko Free Press* reported on damage to agricultural lands by beaver along the North Fork of the Humboldt River: “...Yesterday Charles Nuckols came down from his ranch on the North Fork and asked permission of Game Warden Russell to destroy a colony of beaver that have taken up a home on his land...protect his meadow, which is being ruined by the overflow water...Another complaint along the same line comes from Samuel McIntyre, owner of the 71 ranch, near Halleck...”⁶²
- 1914 (January-April)** Wet-mantle flooding (typically, rain-on-melting snow) along the South Fork of the Humboldt River resulted in near-record flooding. The lower South Fork gage below Dixie Creek indicated a flow of 2,400 cfs on January 26. High waters resulted in considerable soil erosion and gulying on Huntington Creek, along the South Fork and on Dixie Creek with much erosion to nearby roads as well. The Bullion bridge, which previously had been washed out in 1910, was damaged so severely it had to be replaced (at a cost of \$400). The extensive gulying of stream beds in the Ruby Mountains sub-basin, apparently begun in 1910, was worsened during this flood event.⁶³ In the Pine Valley sub-basin, high water took out three bridges on the Eureka Nevada Railroad line, including a 60-foot trestle over Pine Creek one mile south of Palisade. As a result, the train from Eureka was stranded for almost three weeks.⁶⁴ The Humboldt River’s flow at Palisade was gaged at 3,100 cfs⁶⁵ and further downstream the peak flow at Comus was recorded at 1,750 cfs.⁶⁶ In the Little Humboldt River sub-basin, all streams draining into Paradise Valley were flooding. Gumboot Lake at the south end of Paradise Valley formed and broke through the Sand Dunes with the Little Humboldt River’s depth upon flowing into the Humboldt River main stem reported at 10.5 feet. Snow depths of twelve feet and more were reported in the Santa Rosa Mountains (maximum elevation of 9,732 feet MSL at Granite Peak).⁶⁷ In the Lovelock Valley, on February 14, the high waters of the Humboldt River again damaged the Big Five reservoir and diversion creating a 50-foot break in the reservoir’s west level, inundating four farms below the dam.⁶⁸
- 1914** The Nevada automobile highway system began when the old Butterfield Overland Stage

- Road and the Pony Express Trail through central Nevada was designated as the Lincoln Highway. Within the Humboldt River Basin this pioneer transcontinental highway crossed the Reese River Valley from Austin to Mount Airy.⁶⁹
- 1914 (September 11)** Clearly evidencing “great expectations,” the *Nevada State Herald* (Wells) reported on a recent fish stocking: “James H. Vogt, Superintendent of the hatcheries at Verdi, arrived here last Saturday night in charge of 18,000 small trout which were immediately taken to the Bishop Creek dam [Bishop Creek Reservoir, also known as Metropolis Reservoir] and turned loose...They are of the black spotted variety [indicating either the Pyramid Lake or Lahontan cutthroat trout varieties] and will grow to the weight of thirty-two [!] pounds.”⁷⁰ (Exclamation added)
- 1915** Drainage District Number 1 was formed in the lower portion of the Lovelock Valley. Ever since the buildout of the upper Lovelock Valley, irrigation tailwater from the upper valley had tended to saturate the lower valley’s soils and substantially increase the salt content of the soils, greatly reducing the productivity of the land. A drainage system was urgently needed to control harmful salt buildups. Initial construction included about 30 miles of open drains, including the deepening of the natural channel through the Humboldt dike. Ultimately, there would be constructed about 128 miles of such drains in the Lovelock Valley.⁷¹
- 1915 (May 20)** In another report on impediments to migrating fish, particularly trout, the *Elko Free Press* noted that “People who have been fishing in South Fork [of the Humboldt River] where it empties into the Humboldt River [main stem] say that there is but little water flowing in the stream, not enough going over the dam to enable the trout to get up the stream. There is no fish ladder at this dam and this is probably the reason why there are no big fish being caught in the stream higher up.”⁷²
- 1915 (August 28)** In an incident that was common to areas in and out of the Humboldt River Basin, the *Elko Free Press* reported on “Grain Fields in Ruby Valley Overrun by Wild Geese”: “...grain fields in that valley are being eaten up by the flocks of wild geese...for more than half a century has raised more grain than any other valley in the State...two large lakes in the valley [Ruby Lake and Franklin Lake], covering hundreds of acres... thousands of geese, ducks, and other water birds nest along the shores...but this year the ranchers say that the flocks of wild geese have come in from the outside...State and Federal laws protect the geese until the first of October, and the ranchers are compelled to shoo away the birds with olive branches.”⁷³
- 1915 (August 30)** Following up on a story about fish stocking (see September 11, 1914 entry), the *Nevada State Herald* (Wells) reported on a major obstacle to effective restocking: “...big dam on Bishop Creek [i.e., the Bishop Creek Reservoir], in Emigrant Canyon, which should be properly screened and then restocked with fish...thousands of large trout...have been flumed [siphoned through the dam’s diversion structure]...to the alfalfa and grain fields of Metropolis several times a year...”⁷⁴
- 1916** The main shaft for Nevada’s first effort to extract oil from shale was excavated near the City of Elko. A relatively short-lived oil extraction plant was constructed that reached peak production in the early 1920’s. Of several tries at extracting oil from shale, this was the only successful operation in Nevada. Robert M. Gatlin, Sr. spent many years experimenting on the extraction of crude oil from these shale beds before beginning the commercial production of oil. After a production period of less than two years, the plant was closed in the fall of 1924. The oil produced by this method was found to be too expensive to compete with the fossil oils of that day.⁷⁵

- 1917 (February-March)** A wet-mantle flood struck the Humboldt River Basin, but affected only those drainage areas above Beowawe. Considerable road and bridge damage was experienced below Lamoille Creek. High water on the South Fork and other tributary streams in late March caused heavy road damage between Jiggs and Elko with all but one bridge being washed out.⁷⁶ On the lower North Fork, the lowlands in the vicinity of Ryndon were inundated.⁷⁷ In the Pine Creek sub-basin, high water damaged the railroad grade and destroyed some small bridges over tributary streams, disrupting railroad traffic for two weeks.⁷⁸ Peak flows on the South Fork of the Humboldt River were measured at 1,700 cfs. On the Humboldt River at Palisade, flows peaked at 3,170 cfs, and further downstream at the Comus gage, a peak flow rate of 1,950 cfs was recorded.⁷⁹
- 1917 (March 27)** The Nevada Legislature continued to pass an endless procession of laws requiring fish ladders, but failed to provide the means to effectively enforce them. In this year the legislature combined the requirements to have fish ladders on all dams and the prohibition against fishing near dams with them: “An Act to provide for the protection and preservation of fish and game...” Section 13 of this act again stated the requirement in effect since the 1860’s: “All persons...who have erected, or who may hereafter erect, any dams, water weirs, or other obstructions to the free passage of fish in the rivers, streams, lakes, or other waters of the State of Nevada, shall construct and keep in repair fish-ways or fish-ladders...so that at all seasons of the year, fish may ascend above such dams, water weirs, or other obstructions, to deposit their spawn.” Section 22 reinforced the no-fishing “buffer zone”, but it still only applied to dams with fish ladders. According to the law’s wording, fish congregating in pools below dams without the ladders were still subject to legal exploitation: “It shall be unlawful for any person...at any time to take, catch...any...species of fish whatever, within a distance of one hundred feet above or below any dam in this state containing a fish-way or fish-ladder.”⁸⁰
- 1917 (June 6)** The Ruby and Santa Rosa National Forests were combined with the Humboldt National Forest and the new grouping was designated as the Humboldt National Forest, its present name.⁸¹
- 1917** The Nevada Department of Highways was formally established and with it the old California Emigrant Trail stretching through the Humboldt River Valley from Wells to Lovelock was pieced together, including portions of the Central Pacific Railroad’s grade that had been abandoned earlier, to form State Route 1. The Lincoln Highway through the Reese River Valley was designated as State Route 2.⁸² By late 1924, State Route 1, renamed the Victory Highway, was open to automobile travel through all of Nevada and across the Sierra Nevada⁸³ all the way to Sacramento and Oakland. By 1926, under its new U.S. Highway 40 designation, this primary automobile route across Nevada had been upgraded to the highway standard of the day, and was situated approximately on the present alignment of the current Interstate Highway 80.⁸⁴
- 1918 (June 22)** Dry-mantle flooding occurred in the Paradise Valley area of the Little Humboldt River sub-basin due to heavy rains on the western and eastern slopes of the Santa Rosa Mountains. Areas to the west and northwest of the town of Paradise Valley were affected by runoff from the eastern slopes of the Santa Rosa Mountains including the Singas, Lamance, Cottonwood, Mullinix, Solid Silver, and Indian Creek drainages.⁸⁵
- 1919 (January)** The Nevada Fish and Game Warden’s biennial report for 1917 and 1918 noted a long-standing problem that had been somewhat over-shadowed by concern focused on fish ladders: “Another problem with providing upstream access to spawning fish was just keeping

the fish in the river. Numerous diversion channels had been cut into the banks which, when opened, diverted fish onto irrigated crop and pasture lands.”⁸⁶ At first, the fish screens seemed a practical solution. Unfortunately, screens were shown not to be a long-term solution. According to one report of an inspection in Carson Valley (April 24 1918) which rather typified conditions in the river systems of northern and western Nevada: “...made an inspection of many screens that had been installed, and found that, owing to the muddy condition of the water and the amount of driftwood, leaves, and weeds running, it was almost impossible to keep the screens clear, the result being that the flow of water was retarded in the ditches, endangering the proper irrigation of crops...”⁸⁷ The State Fish and Game Warden then made his decision on the use of fish screens based on both a practical and patriotic [World War I] basis: “...About this time, began to receive many letters from all parts of the State complaining that screens installed were greatly retarding the flow of water, thereby endangering the raising of crops. I immediately began an investigation of the conditions reported and found it as reported. I therefore issued a general order to the effect that where screens were interfering with the full flow of water for irrigation purposes they might be removed, temporarily, for the reason that crops must be raised that our boys at the front might be fed.”⁸⁸

- 1919** In anticipation of the Humboldt Project and the construction of Rye Patch Reservoir, the U.S. Reclamation Service (now the U.S. Bureau of Reclamation) conducted a preliminary investigation of reservoir sites and a study of the Humboldt River runoff. Final investigations in 1933 resulted in the selection of the Rye Patch Dam site, located approximately 22 miles upriver from Lovelock, and indicated that a reservoir with a capacity of nearly 200,000 acre-feet could be constructed at this site.⁸⁹
- 1920 (February 14)** The *Reese River Reveille* (Austin) reported on an effort to restore beaver populations and thereby provide erosion controls to the Humboldt River Basin’s upper elevation watersheds: “Representative of the Forest Service appearing before the Board [of Lander County Commissioners] and proposing to plant beaver in the canyons near Austin on the Toiyabe National Forest, upon the condition that the authorities of Lander County agree to protect same, it was therefore ordered that the Board of Commissioners of Lander County will take all necessary steps to afford all legal protection for such beaver.”⁹⁰
- 1921 (February-March)** Another wet-mantle flood event struck the Humboldt River Basin with the effects confined primarily to the middle and upper portions of the basin. While extensive, the flood damages from this event were not so severe as the floods experienced in 1914 and 1917.⁹¹ In the Pine Creek sub-basin, snowmelt floods washed out approximately 600 feet of railroad track and several bridges in the Pine Creek narrows, just south of Palisade. Pine Valley’s meadow lands were also extensively eroded.⁹² The Humboldt River was gaged at 4,300 cfs at Palisade and further downstream peak flows were recorded at 3,800 cfs at the Comus gage.⁹³
- 1922 (April-June)** While most of the Humboldt River Basin did not experience a typical wet-mantle flood event in this year, conditions within the Maggie Creek and Little Humboldt River sub-basins resulted in flood or semi-flood conditions, particularly along Maggie Creek which experienced its highest flow on record, which would stand until 1962.⁹⁴
- 1923 (January 17)** To help resolve continuing water rights controversy on the Humboldt River, the Nevada State Engineer compiled and filed in the Sixth Judicial District Court of the State of Nevada, in and for the County of Humboldt, his “Final Order of Determination of the Relative Rights of Claimants and Appropriators to the use of the water of the Humboldt

- River Stream System and its Tributaries.” According to Nevada State Law, the filing allowed for subsequent individual claims of certain exceptions to the State Engineer’s findings of fact with respect to diversion rights (amounts) and dates of appropriation (priority date).⁹⁵ The matter would eventually be heard by the Honorable George A. Bartlett on January 5, 1925.⁹⁶
- 1923 (January 17)** At the time that the Nevada State Engineer submitted his “Final Order of Determination,” in order to facilitate the distribution of the waters of the Humboldt River system in accordance with existing priorities, four water districts were designated, being divided according to the reaches of the river as follows (downstream to upstream): (1) Lovelock Valley; (2) Oreana to Pinson’s Bridge; (3) Pinson’s Bridge to Palisade; and (4) Elko County and Pine Valley (most of which is located in Eureka County). The division had been found satisfactory in carrying out the general plan for the distribution of water and these larger districts were further divided by the river’s individual water commissioners.⁹⁷ However, the Bartlett Decree would only designate an upper basin and lower basin, with the dividing point being Palisade, specifically the U.S. Geological Survey’s Palisade gaging station located immediately above the inflow of Pine Creek.
- 1924** Late in this year, all the pieces of State Route 1 through the Humboldt River Basin and all the way across Nevada had been linked and then renamed the Victory Highway. Although not yet a finished and uniform thoroughfare, it was opened to traffic across Nevada and through the Sierra Nevada to Sacramento and Oakland. By 1926 it was re-designated U.S. Highway 40 and upgraded to the road standards of the day, approximately following the present alignment of present-day Interstate Highway 80 . State Route 2, which passed through the Reese River Valley, was also re-designated at about this time as U.S. Highway 50, thereby becoming part of the federal highway system.⁹⁸
- 1924 (Circa)** A small rod-square (approximately 16.5 feet on a side) “exclosure” was set aside to the east of the Stone Cabin Ranger Station in the upper Reese River Valley to assess the damage to vegetation caused by livestock grazing. After being protected from livestock use for approximately 40 years, a detailed assessment showed a dramatic contrast with the surrounding grazed vegetal coverage. Specifically, the exclosure showed a high incidence of bitterbrush and Great Basin wildrye, and a small amount of big sagebrush. Such conditions clearly indicated the potential improvement in vegetal coverage contingent upon improved grazing management. Since at least the 1870’s-1880’s, open-range livestock grazing, particularly nomadic sheep herding, was so widespread and intense in the Humboldt River Basin that the high watershed areas suffered severe reductions in herbaceous plant cover. This excessive stock grazing, combined with heavy timber cutting to meet lumber demands during the various mining booms of the late 1800’s, caused the upper watersheds to suffer severe topsoil losses and experience extensive sheet and gully erosion. This resulted in the well-developed gully systems at these drainage heads which have tended to amplify the effects of future flooding in these areas.⁹⁹
- 1925 (January 5)** Based on the Nevada State Engineer’s filing on January 17, 1923 in the Sixth Judicial District Court of the State of Nevada, in and for the County of Humboldt, his “Final Order of Determination of the Relative Rights of Claimants and Appropriators to the use of the water of the Humboldt River Stream System and its Tributaries,” a hearing was held before the Honorable George A. Bartlett, Acting District Judge, selected, chose and designated as such pursuant to section 34 of the Water Code. The purpose of this hearing was to rule on all exceptions filed with the court subsequent to the filing of the order by the State Engineer by appropriators of the waters of the Humboldt River system.¹⁰⁰

- 1925 (March 3)** The U.S. Congress appropriated \$25,000 for the purchase of land, with sufficient water rights attached, for the Te-Moak Band of “homeless” Indians in Ruby Valley, Nevada. Between 1937 and 1942, lands were purchased for the Tribe to create a reservation on the South Fork of the Humboldt River at Lee, for 20 families of the Te-Moak Band of Western Shoshone Indians. Along with additional purchases, the reservation now totals some 15,700 acres.¹⁰¹ The purchased lands included five ranches along with decreed water rights that were owned by A.J. Dewar, Clark Dtown, A.M. Griswold, J.J. Hylton and P.J. Ogilvie. These lands had been receiving water distributed by the Nevada State Engineer or court-appointed water commissioners ever since 1923 when the state Sixth Judicial District Court (Humboldt County) entered the Humboldt Decree (i.e., the January 17, 1923 State Engineer’s “Final Order of Determination”). On February 8, 1941, a proclamation by then-Acting Secretary of the Interior A.J. Wirtz officially established the South Fork Indian Reservation for the South Fork Band of the Te-Moak Tribe of Western Shoshone Indians in Elko County, Nevada.¹⁰²
- 1925 (March 21)** During this legislative session, it was recognized that the mere presence of a fish ladder did not insure that it would be used. Specifically, requiring fish ladders solved only part of the problem for spawning fish. Oftentimes the fish ladders were not useful due to insufficient stream flows. Irrigators deemed the use of water for fish a needless waste of the precious water backed up behind the dam, particularly during low flow periods. The legislature’s lack of resolve on requiring that water be diverted to fish ladders essentially made the act a paper exercise. To point, Section 1 of the new act stated that “It shall be unlawful for any person...to dry up, impede or interfere with the free flow of water through any fish ladder upon any stream in this state *when there is sufficient unappropriated or unused water* in such stream for use therein by diverting the same from above and around such fish-ladder...provided, that *this act shall not be construed to impair any subsisting right* to divert water from such stream for irrigation, domestic or culinary [i.e., cooking] purposes.”¹⁰³ [Emphasis added]
- 1925 (August 17)** In an early twentieth century study of irrigation water storage potential of the upper Lovelock Valley, two engineers from Reno, Nevada, assessed the feasibility of a number of dam sites throughout the upper valley. Interestingly, the six dam sites selected for their engineering and cost-benefit analysis bracketed the Rye Patch Reservoir dam site, but did not specifically select it. Two sites – Callahan No. 1 and 2 – were located above the Rye Patch reservoir site and several miles from Imlay. Two other sites – Oreana No. 1 and 2 – were located some eight miles below the Rye Patch dam site, and two other dam sites – Young No. 1 and 2 – were to be located just below the Oreana sites. The most feasible and cost-beneficial dam site chosen from all of these, Oreana No. 1, was located some 1.5 miles northwest of Oreana and approximately eight miles downstream from the present Rye Patch dam site. The proposed project consisted of a dam, eighty feet tall, impounding 116,000 acre-feet of water, covering approximately 8,000 acres, and providing sufficient irrigation water for 29,000 acres (at a 4-to-1 ratio) in the lower valley.¹⁰⁴
- 1926** In response to the drought years of the early 1920’s, the Lovelock Irrigation District was formed for the purpose of constructing a dam at Oreana, located almost 15 miles up the Humboldt River from Lovelock. After spending some \$100,000 for engineering and legal services, the proposed structure was not built after it was determined that it could not provide sufficient storage capacity to warrant its construction. In 1929, the Lovelock Irrigation District would change its name to the Pershing County Water Conservation District and it

- was this organization that lobbied for the construction of the Rye Patch Reservoir by the U.S. Bureau of Reclamation which was begun in 1935 and completed in 1936.¹⁰⁵
- 1927** Beginning in this year, the Nevada State Engineer's office, through its various water commissioners on the Humboldt River, began to gather sufficient data on each irrigation season. The data was to be used for a comparative study of the various distribution problems in order that recommendations might be made that would be based on fact instead of theory and speculation. As many as seven water commissioners could be employed by the Supervising Water Commissioner, exclusive of necessary guards. These commissioners were based in Winnemucca (the Supervising Water Commissioner), Lovelock (2), Battle Mountain (2) and Elko (1). With regard to the two other positions, one for the North Fork of the Humboldt River and one for Mary's River, it was felt at this time that full-time water commissioners were unnecessary since these streams furnished very little water to the Humboldt River.¹⁰⁶
- 1929 (October 1)** In preparation of the adjudication process for the Little Humboldt River, the Nevada State Engineer filed an "Abstract of Claims in and to the Waters of the Little Humboldt River and its Tributaries in Humboldt and Elko Counties, State of Nevada." After all hearings and corrections were made, the final E.P. Carville Decree was issued in January 1935 determining the rights and distribution of the waters of the Little Humboldt River.¹⁰⁷
- 1931 (January)** The biennial report of the new Nevada State Fish and Game Commission (presently the Nevada Wildlife Commission) provided an estimate of the fish losses due both to water diversions from the state's river systems and to the lack of effective fish screens on diversion structures: "Many people have called to the attention of the Commission the constant loss of fish that are passing from their proper channels into canals and irrigation ditches. Thousands and tens of thousands enter these diversion channels and are annually destroyed. It is believed that 90% of the young fish, as well as thousands partially matured, are lost...in this manner. While we have a law requiring screening, this is a question so involved in the past that there has been little action towards compelling a compliance therewith. The failure to find a screen that will function in a satisfactory manner is where the real difficulties seem to lie, and it is hoped that some practical device can be adopted in the near future that will save these losses of fish to the people."¹⁰⁸
- 1931 (April 5)** On this date the first recorded "run" of the lower Humboldt River below Palisade was initiated in order to gain scientific information on the river's rate of flow. A party using a light, portable canoe started floating down the river from the Duborg dam, which is located some 12 miles below the U.S. Geological Survey Palisade gaging station. The party making the trip down the river was cautioned against using any means of propulsion in order that the time interval in the flow of water from one point to another could be ascertained as accurately as possible. A complete and detailed log of the journey was recorded, including some 54 reference points and the travel times on both an interval (from point to point) and a cumulative basis. A similar float trip was planned for the upper Humboldt River from Deeth to Palisade, but low flows in this year prevented that run from being made. For the lower river run, the total time from just below Palisade to Lovelock was 13 days, 1 hour and 24 minutes. By major interval, it took 2 days, 13 hours and 11 minutes to reach Battle Mountain; 7 days, 16 hours and 48 minutes to reach Winnemucca; and 10 days, nine hours and 11 minutes to reach Imlay.¹⁰⁹ Using these times and estimates of the distances covered based on the Humboldt River's assumed sinuosity, flow speeds may be estimated at from 0.6 miles per hour to 1.9 miles per hour.¹¹⁰

- 1931 (April 21)** The U.S. Bureau of Reclamation provided its first insights into the need for reliable water storage in the lower Humboldt River Basin. This represented an alternative plan to increasing storage capacity in the upper basin, a program later unsuccessfully attempted by the U.S. Army Corps of Engineers through the Humboldt River Project. The BOR found that “The lower valley around Lovelock has, in the absence of river administration, suffered most from water shortage, particularly as its longer growing season and excellent marketing facilities favor the production of alfalfa.” And with respect to the placement of additional storage, the BOR noted that “Additional storage has been long desired, but steps taken for its provision have met defeat for various reasons, not the least of which was the active opposition of upstream interests to whom such reservoir construction appeared to be a menace to their water rights.”¹¹¹ This upper basin–lower basin schism over water use and water rights eventually brought adjudication to the basin.
- 1931 (October 20)** After nearly six years of taking evidence and testimony, the Bartlett Decree was issued by the Honorable George A. Bartlett, Acting District Judge for the Sixth Judicial District Court of the State of Nevada, in and for the County of Humboldt, based on the State Engineer’s 1923 filing of the “Final Order of Determination of the Relative Rights of Claimants and Appropriators to the use of the water of the Humboldt River Stream System and its Tributaries.”¹¹² In effect, the Bartlett Decree adjudicated water rights for the entire Humboldt River system to include the Humboldt River main stem and its tributaries.¹¹³ The decree contained sever unique determinations, some of which are described below. “Finding in fact” No. 44 recognized that the surface waters within the Humboldt River system were already fully appropriated, leaving no surplus water for irrigation during an average year. Finding in fact No. 45 first recognized the differences in growing seasons along the Humboldt River and therefore divided the river system into two districts, District Number 1 below Palisade and District Number 2 above Palisade. Later, in a modification of the Bartlett Decree by Judge H.W. Edwards (Edwards Decree), the establishment of districts was stricken and a new section on “Length of Season” for irrigation purposes was added.¹¹⁴ The Bartlett Decree established three classes of lands with different irrigation requirements (water duties) and irrigation periods: (1) Harvest crop lands (Class A) – included all lands devoted to cultivated crops, including irrigated native or other grass lands which normally receive sufficient water to produce a crop which will justify cutting for hay, although it may sometimes be pastured and not cut; (2) Meadow pasture (Class B) – included all grass lands free from brush which receive sufficient water to produce what may be classed as good pasture, but not sufficient to warrant cutting for hay; and (3) Diversified pasture (Class C) – included all lands from which the brush has not been cleared but which are artificially irrigated to some extent for the production of grasses for pasturage. Further, the irrigation periods within the Humboldt River system varied by both the class of the land and whether it was in District No. 1 (below Palisade) or District No. 2 (above Palisade).¹¹⁵
- 1931 (October 20)** Of importance later to Rye Patch Reservoir, the George A. Bartlett Decree and subsequent permits from the State Engineer’s Office determined the water rights for the Lovelock Valley. In general, the decreed rights provided for a flow of 0.81 cubic foot per second per 100 acres of decreed land, or at proportional rates for specific periods of time. Under this decree, and permits from the State Engineer, 33,300 acres of land within the Pershing County Water Conservation District were given water rights totaling 87,896 acre-feet per year. Subsequently, 867 acre-feet of water were transferred from 1,664 acres of land purchased for the Rye Patch Reservoir site, and 48,773 acre-feet of water from 32,182 acres

were purchased in the Battle Mountain area. Except for the small amount of water which is used on an acreage of land in the Battle Mountain basin where physical conditions rendered its transfer difficult, all this water has been transferred to the Humboldt Project.¹¹⁶

- 1931 (December 16)** The first of several rulings for the modification, correction and amendment of the Bartlett Decree was made by District Judge H.W. Edwards, in the Sixth Judicial District Court of the State of Nevada in and for the County of Humboldt.¹¹⁷ Additional minor changes and amendments followed on April 27, 1933,¹¹⁸ February 8, 1934,¹¹⁹ June 8, 1934,¹²⁰ October 1, 1934,¹²¹ November 19, 1934,¹²² February 11, 1934,¹²³ and finally on March 11, 1935.¹²⁴ Collectively, these modifications, corrections and amendments to the Bartlett Decree became known as the Edwards Decree. A particularly significant change to the Bartlett Decree was entered on February 8, 1934. It eliminated the original Bartlett Decree's formal division of the Humboldt River system into a District Number 1 below Palisade and a District Number 2 above Palisade. In its place, the Edwards Decree established irrigation seasons and reaffirmed the three classes of land for specific water rights, the water duty for each land class, and the time over which water was to be received by these lands.¹²⁵
- 1932 (March-June)** The melting of a heavy winter snowpack caused flooding in the Humboldt River Basin and flooding along the lower Humboldt, especially in Lovelock Valley. The Big Five Diversion, which had been destroyed or damaged previously in 1910 and 1914, was washed out and ultimately only partially replaced.¹²⁶
- 1934 (June 28)** Congress passed the Taylor Grazing Act which established the beginning of grazing management programs on those open range lands in Nevada and other western states that had not been designated as national forests lands. This act was the first federal effort to regulate grazing on federal public domain lands (then referred to as the national land reserve). It established grazing districts and used a permitting system to manage livestock grazing in the districts. The law regulates the use of public lands for grazing of cattle and sheep and directed the U.S. Secretary of the Interior "to stop injury to the public grazing lands by preventing overgrazing." Under the law, the "Secretary must: provide for the protection, administration, regulation and improvement of the grazing districts; adopt regulations and enter into cooperative agreements necessary to accomplish the purposes of the Act; regulate occupancy and use; preserve the land and resources from destruction or unnecessary injury; provide for orderly improvement and development of the range. The Secretary may continue the study of erosion and flood control and perform work to protect and rehabilitate areas subject to the Act."¹²⁷ This law would eventually end the unregulated and unlicensed use of public domain lands in the basin.¹²⁸ The law's author, Congressman Edward Thomas Taylor, served the State of Colorado in the U.S. House of Representatives for 32 years and authored more than 100 federal laws. The passage of the Taylor Grazing Act has not only influenced the ranching way of life in the West, but it continues to affect the western landscape more than six decades after enactment. But perhaps most importantly, the passage of the law reflected a change in both Congressman Taylor's own views on the issues of conservation and land management as well as a growing awareness by the American public as to the extent of western rangeland degradation.¹²⁹
- 1934** Two large mines located in eastern Humboldt County – the Riley Mine and the Getchell Mine – were developed in the Potosi Mining District of the Osgood Mountains to extract the scheelite tungsten and gold-bearing ores located there. The Getchell Mine was located some 15 miles due north of Red House and was acquired in 1935 by George Wingfield and Noble Getchell, prominent Nevada mining men. At first, the mine was operated primarily for

extraction of its gold oxide ores; however, during World War II the gold mining operations were ceased and extraction was concentrated on tungsten ores.¹³⁰ Presently, the Getchell Mine ranks as a major producer of gold along the Getchell Trend.

- 1934 (October 1)** The Pershing County Water Conservation District entered into a contract with the United States (i.e., U.S. Bureau of Reclamation) to repay the costs associated with the Humboldt Project over a term of 40 years without interest.¹³¹ The project would include the construction of Rye Patch Dam and Reservoir on the Humboldt River near Rye Patch, Nevada, the acquisition and transfer of old upstream water rights near Battle Mountain, Nevada, and the use of these stored waters on approximately 30,000 acres of patented land near Lovelock, Nevada. Later, the repayment terms were modified to be 36 equal annual installments, commencing in 1944. Ultimately, these construction costs came to a total of \$1,341,739.¹³²
- 1935 (January 24)** Based upon the State Engineer's filing of an "Abstract of Claims in and to the Waters of the Little Humboldt River and its Tributaries in Humboldt and Elko Counties," in October 1929 and hearings which had begun in November 1931, the E.P. Carville Decree, Case No. 3157, was issued for the Little Humboldt River. This sub-basin and the Reese River sub-basin are the only other Humboldt River sub-basins in which water rights were not regulated by either the Bartlett Decree of 1931 (lower Humboldt River Basin) or the Edwards Decree of 1935 (upper Humboldt River Basin). As with the Bartlett Decree (and later Edwards Decree), water rights for the Little Humboldt River were determined for three classes of lands: (1) Class A – Harvest crops; (2) Class B – Meadow pasture; and (3) Class C – Diversified pasture.¹³³ In general, the decree provided for a flow of 1.0 cfs per 100 acres of decreed land, or at rates proportional to this. When water was available, Class A rights are for the delivery of water at this rate of flow for a period of 180 days from March 15 to September 15, or a total water diversion during the season of 3.6 acre-feet per acre. Class B rights are for 90 days from March 15 to June 13, for a total of 1.8 acre-feet per acre. Class C rights are for 45 days from March 15 to April 28, for a total of 0.9 acre-feet per acre.¹³⁴ Water rights in the Carville Decree were not made appurtenant to the land, a fact which reportedly caused subsequent abuses in water diversions.¹³⁵
- 1935 (January 31)** As part of the Humboldt Project, construction began on Rye Patch Dam, located approximately 22 miles upstream from Lovelock. The Humboldt Project was intended to provide storage at Rye Patch Dam and Reservoir, to acquire lands and water rights upstream in the Battle Mountain area for supplementing the water supply for project lands in Lovelock Valley, and to utilize the Pitt-Taylor Reservoirs for supplemental storage. The project was designed to provide seasonal and long-term regulation of the lower Humboldt River and to increase the amount of water available. Rye Patch Dam is an earthfill structure with a structural height of 78 feet, a hydraulic height of 73 feet (raised by 3 feet in 1976) and a crest length of 1,074 feet. The outlet works will release 1,000 cubic feet per second and the spillway will discharge 20,000 cubic feet per second. The dam was completed and began storing water on June 1, 1936. The reservoir is 21 miles long, has a surface area of 11,970 acres and has an official capacity, based on an enlargement in 1976, of 194,300 acre-feet, based on a surface water elevation of 4,136.38 feet MSL. To augment the project's water supply, seven ranches totaling 32,182 acres (with water rights totaling 48,773 acre feet)¹³⁶ were purchased in the Battle Mountain area and stream channel modifications were made in that vicinity to facilitate water rights transfers to Rye Patch Reservoir.¹³⁷ Irrigation water from Rye Patch Reservoir was to be distributed in Lovelock Valley through

- the six diversion structures located there, with waters allocated on an acreage (and not a priority) basis to all conservation district participants.¹³⁸
- 1935 (October 8)** Based upon the January 17, 1923 State Engineer's "Final Order of Determination of the Relative Rights of Claimants and Appropriators to the use of the water of the Humboldt River Stream System and its Tributaries," and amendments to the October 20, 1931, Bartlett Decree, the Edwards Decree was issued correcting earlier adjudicated water rights in many of the Humboldt River Basin's sub-basins.¹³⁹ As most of the corrected water-rights in the Edwards Decree applied to lands above Palisade (upper Humboldt River Basin), the Bartlett Decree came to apply to and be used in the distribution of water below Palisade and the Edwards Decree was applied to and used for distribution of waters above Palisade.¹⁴⁰ In general, the Edwards Decree provided for a flow of 1.23 cubic feet per second per 100 acres of decreed land or at proportional rates for lands located above Palisade. Three land classes were established with different dates of use and number of days of allowed irrigation. These land classes included: (1) harvest crop, dates of use – 4/15-8/15, number of days of irrigation – 120; (2) meadow pasture, dates of use – 4/15-6/15, number of days of irrigation – 60; (3) diversified pasture, dates of use – 4/15-5/15, number of days of irrigation – 30. Each sub-basin had its unique amount of decreed land and decreed water within these land classes. Diverted water for irrigation purposes was to be measured where the main ditch enters or becomes adjacent to the land to be irrigated.¹⁴¹
- 1935** Under the auspices of the federal Taylor Grazing Act (1934), the Grazing Service (now the U.S. Bureau of Land Management, or BLM) was created in the U.S. Department of the Interior to administer the public domain lands (national land reserve). At this time, District N-1, now called the Elko Grazing District, was created with its headquarters in Elko.¹⁴² Also under the provisions of this act, the Winnemucca Grazing District was established (BLM) to manage the public domain lands. Subsequently, within the Winnemucca Grazing District, the Paradise Valley Grazing District was organized in 1946 and the Sonoma Grazing District was organized in February 1954.¹⁴³
- 1935 (November 1)** Although construction on Rye Patch Dam had already begun (see January 31, 1935 entry), the Humboldt Project was officially found feasible by the Secretary of the Interior and subsequently approved by the President on November 6, 1935.¹⁴⁴
- 1936** The U.S. Bureau of Reclamation (BOR), in cooperation with the Pershing County Water Conservation District (PCWCD), initiated another element of the Humboldt Project in order to facilitate the delivery of water to Rye Patch Reservoir, located in the lower Humboldt River Basin. Near Argenta, located approximately ten miles upstream from Battle Mountain, the BOR began to acquire water rights for transfer to Rye Patch Reservoir. Then in the 1950's, the U.S. Army Corps of Engineers, in cooperation with the BOR, channelized an extensive section of the Humboldt River between Argenta and Battle Mountain for the expressed purpose of draining the area's floodplain and moving the acquired water rights more efficiently to Rye Patch Reservoir.¹⁴⁵ The area drained had been commonly known as the Argenta Marsh (also known as the Argenta Swamp, Big Slough, the Lakes and, even earlier, the Tule Swamps before Argenta Siding was established by the Central Pacific Railroad in 1868). This area, in total, encompassed open water areas, river channels, and extensive intervening and surrounding riparian and wetland areas of lush vegetation, tules and dense willow stands, many of which grew some 12 feet tall. The area's proliferation of wildlife, particularly water fowl, was only surpassed by the near impenetrability of its vegetation, as early hunters attested. As a consequence of the channelization efforts of the

BOR and Corps, this entire wetland area was effectively drained and the riparian habitat and the wildlife that depended upon it lost. Presently, these lands are administered as common pasture (the Humboldt Project's so called "Community Pasture") by the PCWCD, which has been the primary beneficiary of the BOR's reclamation projects in the Humboldt River Basin.¹⁴⁶ As this pasture area of approximately 30,000 acres has no dedicated water rights and undergoes year-round "dryland grazing", useful forage is very limited for much of the year.¹⁴⁷

- 1936 (December 3)** Judge J.M. Lockhart of the Sixth Judicial District Court of the State of Nevada in and for the County of Humboldt upheld the Edwards Decree and denied an October 28, 1935 motion filed by John M. Marble and Robert E. Marble and others to strike from the files in this matter, and declare null and void and of no effect, that certain instrument or document, entitle "Amended, Changed and Corrected Findings of Fact, Conclusions of Law and Decree" filed in this matter with the clerk of this court on October 8, 1935, and signed by H.W. Edwards, as Former Judge Presiding (i.e., the Edwards Decree). One of the motion's points was that former Judge H.W. Edwards was not the presiding judge when he signed the decree. In denying the motion, Judge Lockhart noted that "ever since February 19, 1867, the power has been given to district judges to perform certain acts after they have retired from office."¹⁴⁸
- 1937 (December-May 1938)** Intermittent heavy snows and rain at lower elevations caused extensive flooding in the Little Humboldt River sub-basin. Flood flows out of Cottonwood Creek and other streams at the head of Paradise Valley caused extensive flooding and bridge damage. Gumboot Lake was formed, but did not cause a breakthrough of the Sand Dunes formation to the Humboldt River main stem.¹⁴⁹
- 1938 (November 26)** The Nevada Supreme Court refused to allow any further protests to the Edwards Decree and the case was declared closed, officially adjudicating the Humboldt River's water rights through the 1931 Bartlett Decree and the 1935 Edwards Decree.¹⁵⁰ This completed the adjudication process for the Humboldt River, although by no means were all water-rights issues resolved.
- 1939 (March 25)** The Underground Water Act was passed by the Nevada Legislature. Along with many subsequent amendments and additions, this act is now one of the most comprehensive groundwater laws in the western United States.¹⁵¹ This act provided the mechanism for designating groundwater basins that the State Engineer determines are in need of additional administration. The designation determination has been usually applied where groundwater withdrawals and new water rights applications approach the perennial yield of the basin or when pending competitive applications to appropriate water exceed the perennial yield. The State Engineer is empowered to designate preferred uses of limited water resources within any designated groundwater basin.¹⁵² At the present time, approximately 116 of Nevada's 232 groundwater basins are so designated.¹⁵³
- 1939 (May)** Three irrigation researchers from the University of Nevada, Reno, provided a number of interesting observations with respect to probable hydrologic conditions and causes for those conditions on the Humboldt River system before the arrival of European settlers: "Prior to the settlement of the area it appears that the beaver controlled the runoff very effectively on the tributaries and well down the main stream. The presence of swampy areas well up on the delta at Lovelock, at the time of the first settlement, would seem to indicate a stream of small volume but regular flow. The existence of a regular flow at the end of a stream of such great length as the Humboldt [River] must have required a strong reservoir

effect and a heavy return flow from the underlying sands and gravel along the stream. The soils of the river flood plain are remarkably resistant to erosion unless exposed to exceptional velocities, and the channel of the river is able to take care of itself very well if let alone. With the beaver long since gone, with the floods from the over-grazed watersheds increasing in severity, and with calculated efforts on the part of man to reduce the length of the channel and to confine the flows to a narrower cross section, the natural conditions may be so disturbed as to induce erosion.”¹⁵⁴

- 1939** The U.S. Bureau of Indian Affairs purchased three contiguous livestock and hay ranches, totaling 9,419 acres, along with existing water rights, on the South Fork of the Humboldt River at Lee, for 20 families of the Te-Moak Band of Western Shoshone Indians. The lands were acquired for the Western Shoshone Tribe as partial satisfaction of obligations incurred by the U.S. government in the treaty with Chief Te-Moak at Ruby Valley in 1863. The combined lands, designated the South Fork Indian Reservation, now totals approximately 15,700 acres and are under the jurisdiction of the Western Shoshone Indian Reservation, with agency headquarters at Owyhee, Nevada.¹⁵⁵
- 1939** The Yomba Indian Reservation was established at the southern end of the Reese River Valley when the U.S. Bureau of Indian Affairs purchased three ranches with grazing privileges on national forest and national land reserve lands for use by a band of Shoshone Indians. The total acreage purchased was 4,681, of which 2,044 acres are irrigable. The Reese River, which runs through the reservation, is the primary source of irrigation water.¹⁵⁶
- 1940 (June 30)** In the “Biennial Report of Predatory Animal and Rodent Control Activities in Nevada for the period of July 1, 1938 to June 30, 1940” the U.S. Fish and Wildlife Service (USFWS) reported on the beneficial effects of beaver introductions: “We are also desirous of reporting that through the efforts of the U.S. Forest Service and County Commissioners in White Pine and Humboldt Counties, cooperating with the State Department of Agriculture and the USFWS, beaver were purchased and planted in these counties with the result that additional stock water has been provided and rearing ponds and fish food provided in the dams constructed by the beaver in the various creeks in which they were planted.”¹⁵⁷
- 1940’s** By the late 1930’s and early 1940’s it was reported that mule deer populations in the Toiyabe Range of the Reese River sub-basin had reached fantastic proportions, and the range was designated a deer problem area by the U.S. Forest Service. Studies had indicated that the present large deer herds in this and other areas of the Humboldt River Basin were the result of changes in the plant community brought about through overuse by domestic livestock, lumber and cord wood cutting, and other forms of destructive resource exploitation coincident with early mining activities. Previously, antelope and bighorn sheep were much more common than deer; however, due to man’s activities, as ranges changed from predominantly perennial grass types to browse-annual grass-weed types, conditions became more favorable for mule deer and less so for antelope and bighorn sheep, which by this time had all but disappeared from the basin.¹⁵⁸
- 1941 (January 15)** Operation and maintenance responsibilities for the Humboldt Project, including Rye Patch Dam and Reservoir, were transferred from the U.S. Bureau of Reclamation to the Pershing County Water Conservation District.¹⁵⁹
- 1941 (June 30)** Noting that beaver introductions and protection had to be followed by control measures, in the “Annual Report of the USDI Fish and Wildlife Service for Fiscal 1941 (July 1, 1940 - June 30, 1941)”, G.H. Hansen, District Agent, Reno, Nevada, reported that “During the last year, in cooperation with Federal Service Agencies and State and County

Game Officials, there were 115 beaver live-trapped on ranches where their activities were considered of a damaging nature, and planted in head-waters of streams where their dam building activities will do a great deal of good.”¹⁶⁰

1942 (April 3-May 1) A wet-mantle event produced the greatest flooding in the Humboldt River Basin since 1910. Peak flows measured at the Palisade gage were 4,100 cfs; no records were available for the lower Humboldt River.¹⁶¹ Mary’s River and the North Fork of the Humboldt River produced the major portion of the flood flows during this event, causing inundation along the Humboldt River’s main stem through Elko.¹⁶² In the upper North Fork sub-basin, flooding, channel cutting and sediment damage developed along Dorsey, Pie, Beaver and other upper North Fork tributaries. High waters in the lower portions of the sub-basin contributed to extensive flooding in Elko.¹⁶³ In the Maggie Creek sub-basin, both Maggie Creek and Susie Creek experienced localized flooding from the warm rains on April 3-4.¹⁶⁴ At Beowawe along the middle Humboldt River Basin, floodwaters ran several feet deep in the streets and many residences were flooded to second floor levels. Battle Mountain was cut off from North Battle Mountain by the washout of the approach road and bridge over the Humboldt River and all “tight” (unregulated) dams on the Humboldt from Elko to Rye Patch Reservoir were dynamited to relived flood pressures. Extensive damage was inflicted on bridges, roads, irrigation structures, ranch buildings as well as erosion damage to cropland and range areas.¹⁶⁵ This was the first major flood in which Rye Patch Reservoir, completed in 1936, was able to keep flood waters effectively away from Lovelock Valley. It was also the first time that Rye Patch Reservoir, along with the Pitt-Taylor reservoirs, completely filled. However, the spillage from Rye Patch Reservoir was heavy enough to cause partial failure of the Young Dam (the farthest upstream in Lovelock Valley), which in turn probably caused the destruction of the Rogers Dam. The Young Canal, and its flume across the Humboldt River, were also damaged during this flood event.¹⁶⁶

1943 (January 21-27) Triggered by a terrific two-day statewide rainfall, a severe wet-mantle flood event struck the upper Humboldt River Basin, particularly on the Mary’s River and North Fork at Elko and on the main stem at Carlin. On the upper portion of Mary’s River, the Hot Creek reservoir dam was washed out above the Gibbs Ranch, producing localized inundation and considerable flood damage below the structure. While severe, this event did not match the 1910 event, which seemed to be exacerbated by ice jams on Mary’s River.¹⁶⁷ Considerable flooding occurred in the lower reaches of the North Fork resulting in the collapse of the U.S. Highway 40 North Fork bridge on January 23, causing it to dam the river for about seven hours. The eventual washout of this “dam” caused a wave crest which swept over the levees erected in Elko after the 1942 flood event. The highway was completely closed for 11 days.¹⁶⁸ Extensive flooding along both Maggie and Susie Creeks resulted in Carlin being partially covered by water, with a foot of water flowing over both the Southern Pacific and Western Pacific railroad tracks, severely undermining both rail lines. Maggie Creek so extensively flooded the Pacific Fruit Express ice pond that the levee was opened to save the icing installations, resulting in the total loss of the 1943 ice crop. The Pacific Fruit Express ice house was also extensively undermined by Maggie Creek’s floodwaters.¹⁶⁹ Beowawe was again flooded by the raging Humboldt River, but not as severely as in 1942.¹⁷⁰ This was estimated to be the third greatest flood on record on the upper Humboldt River with a flow of 6,250 cfs measured at Palisade. Extensive flooding was experienced in the Little Humboldt River sub-basin with damage to roads, bridges, and irrigation ditches. Martin Creek a tributary of the Little Humboldt River was discharging into Paradise Valley at a peak

flow of 9,000 cfs, Gumboot Lake as formed and broke through the Sand Dunes formation to the Humboldt River main stem, with the Little Humboldt showing a flow here of 4,000 cfs.¹⁷¹

- 1943 (April-May)** Nevada's Deputy State Engineer Edmund Muth submitted his investigation on water-related matters within the Little Humboldt River sub-basin titled "Water Distribution Report and Recommendations on Little Humboldt River and Tributaries in Nevada." The report covered the findings of two investigative field surveys conducted from April 1 to May 3, 1943 and from April 28 to May 3, 1943. The report termed the water distribution system within the sub-basin as "deplorable" and strongly recommended the removal of all "illegal obstructions such as dams and debris chokes, the installation of proper diversion structures at legal diversions, and the installation of headgates and measuring devices at all diversion points." It was also deemed critical to make all tributary streams, which were sometimes entirely diverted illegally into side ditches, actually tributary "to the main channels in order that the entire system may benefit by their peak or flood flow." The report made evident that the decreed water rights (from the 1935 E.P. Carville Decree) "have never been properly served with their decreed water..." According to the report, a major contributing factor in the water rights abuses along the Little Humboldt River was caused by the "unfortunate" fact that the water rights assigned in the Carville Decree were never made appurtenant to the land.¹⁷²
- 1943 (June 30)** Noting continued efforts to mitigate the damaging effects of beaver populations, in the "Annual Report of the U.S. Fish and Wildlife Service for Fiscal 1943 (July 1, 1942 - June 30, 1943)", G.H. Hansen, District Agent, Reno, Nevada, noted that "Beaver control was financed entirely by the Nevada Fish and Game Commission and participating counties. Beavers were live-trapped from hay meadow areas where their dam-building habits are detrimental and transferred to higher mountain streams. The U.S. Forest Service and Grazing Service [later the BLM] assisted in selecting planting sites and making the plantings. Generally speaking, ranchers and stockmen are very pleased with this live beaver transplanting project."¹⁷³
- 1945 (April-June)** While not considered a flood year, the year was a high-water year which came at the end of a number of wet years in the Humboldt River Basin. As a result, it caused Rye Patch Reservoir to reach its capacity early in the spring, necessitating a relatively lengthy period of spilling surplus water. This sustained period of spillage eventually caused considerable downstream damage in Lovelock Valley, particularly to the levee system along the west side of the Big Five diversion. Humboldt Lake was swollen beyond the capacity of the deepened natural drain through the Humboldt dike, resulting in an encroachment of the lake on irrigable lands in the south and west portions of the lower valley.¹⁷⁴
- 1945 (August 22)** The Elko Chamber of Commerce sponsored a meeting of federal, state and local interests to explore changes that may be effected to the Humboldt River and its operations. A number of the recommended changes from this meeting, particularly with regards to controlling flood flows and the need for additional upstream storage, remain issues of concern to this day. Principal agencies present included the Nevada State Engineer's Office which conducted the meeting, the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, U.S. Geological Survey, Soil Conservation Service (now the Natural Resources Conservation Service), Nevada Agricultural Extension Service, Farm Bureau, University of Nevada, Reno, and the Pershing County Water Conservation District. In addition, over seventy local business leaders and concerned citizens attended the evening conference. The major purpose

of the meeting was to discuss continuing water-related problems on the Humboldt River system centering on flood control, river regulation and improvements to agricultural practices and water conservation. It was noted that in the current water year, which followed several wet years, up to 600,000 acre-feet of water would be released to the Humboldt Sink, “gone to waste” as one representative termed its use, and that many agricultural fields, particularly in the lower Lovelock Valley, were flooded for several weeks, thereby restricting the output from this invaluable land resource. While general agreement existed that these objectives could only be attained through greater upstream storage, federal agencies noted the need for more extensive data on climate and hydrology. The State Engineer stated that any reservoir construction could only proceed if existing water rights were not impaired.¹⁷⁵

1946 (February 26) The Starr Valley Soil Conservation District, comprising the southern portion of the Mary’s River sub-basin was organized and furnished technical assistance by personnel of the U.S. Department of Agriculture, Soil Conservation Service, located at Wells.¹⁷⁶

1947 (March 22) In a comprehensive act of enforcement to again (1) require the construction of fish ladders; (2) require the installation of fish screens on diversion structures; (3) provide water for fish ladders; and (4) not take advantage of fish congregating in pools below impassible dams, the Nevada Legislature passed “An Act relating to and providing for the protection, propagation, restoration...of wild animals, wild birds and fish...”. Section 29 (fish ladders) stated that “Every person who has erected, or who may hereafter erect, any dams, water weirs, or other obstructions to the free passage of fish in the rivers, streams, lakes, or other waters of the State of Nevada, shall construct and keep in repair to the satisfaction of the fish and game commissioners, fishways or fish ladders at all such dams... so that at all seasons of the year fish may ascend above such dams...to deposit their spawn...” Section 30 (fish screens) required that “Any person, firm, or corporation, owning in whole, or in part any canal, ditch, or any artificial watercourse, taking or receiving its waters from any river, creek, or lake in which fish have been placed or may exist, shall place or cause to be placed, and such persons shall maintain at the intake or inlet... a grating, screen, or other device... as shall be designated by the state fish and game commissioners, to prevent any fish from entering such canal, ditch, or watercourse. In the event that such person...after due notice from the state fish and game commission, shall fail to install or maintain such grating, screen, or device, the state fish and game commission is authorized to, and may, enter upon lands adjacent to the inlet... and may install therein, and thereafter maintain such grating...as in the discretion of the said commission is proper...” Section 31 (water for fish ladders) noted that “It shall be unlawful for any person to dry up, impede, or interfere with the free flow of water through any fish ladder upon any stream in this state when there is sufficient unappropriated or unused water in such stream for use therein, by diverting the same from above and around such fish ladder... provided that this section shall not be construed to impair any subsisting right to divert water from such stream for irrigation, domestic, or culinary purposes.” And Section 37 (fishing below dams) stated that “It shall be unlawful for any person in the State of Nevada at any time to fish for any fish whatever within a distance of one hundred feet above or below any dam in this state containing a fishway or fish ladder.”¹⁷⁷

1948 (June 3) The Lamoille Soil Conservation District was created in the Ruby Mountains sub-basin to promote better management of the soil, water, and range resources on the sub-basins privately owned lands. The work plan for the district was approved in June 1949.¹⁷⁸

1948 (June 30) In noting the enactment of a more formal, and possibly financially self-sustaining

program, the “Biennial Report of the [Nevada] Fish and Game Commission for the period July 1, 1946 through June 30, 1948” noted efforts towards “Beaver Conservation”: “The State beaver conservation program has been very successful during the past year. During the winter beaver that are considered to be causing damage to ranchers are trapped and pelted by a State trapping force. One-fourth of the pelts are returned to the ranchers and the State’s returns are placed in the State Fish and Game Fund. Considerable revenue, above the cost of operation, was derived from this source during 1947-1948. During the summer months, beaver are live-trapped and redistributed to streams where they improve fishing conditions by deepening water with their dams. A number of mountain streams in Nevada have been greatly improved for fishing by this means.”¹⁷⁹

1948 (September 15) The U.S. Army Corps of Engineers completed its study of flood control measures for the Humboldt River Basin. The report of the District Engineer, entitled “Flood Control Survey Report on Humboldt River and Tributaries, Nevada” (also known as the “Humboldt River Project”), which was subsequently revised in April 1949, concluded that the best solution for the problems of the basin was a plan of improvement consisting of a 120,000 acre-foot reservoir at the Hylton reservoir site¹⁸⁰ on the South Fork of the Humboldt River (now occupied by the South Fork Reservoir), an 80,000 acre-foot reservoir at the Devils Gate reservoir site¹⁸¹ on the North Fork of the Humboldt River, and a 50,000 acre-foot reservoir at the Vista reservoir site¹⁸² on Mary’s River. Other drainage improvements called included minor local channel improvements along the tributaries and main stem of the river, a complete drainage system in Lovelock Valley consisting of lateral drains and appurtenant facilities (designated as a non-federal responsibility), and major drainage improvements comprising main drains, pumping plant, and protective dike. The total federal cost of the project was estimated at just over \$10 million with local participation costs of nearly \$1 million. The benefit-cost value of these three dams was not conclusively demonstrated as noted in the Corps’ own analysis: “The project reservoirs would not control floods of record throughout the river because of the relatively large drainage area which would remain uncontrolled, and although greater protection could be furnished the area by additional storage on other tributaries, the resulting benefits would not be commensurate with the costs.”¹⁸³ One particularly interesting observation in the report’s background study dealt with the meandering flow of the Humboldt River. The report noted that the river’s overall length from near Wells to the Humboldt Sink was approximately 300 miles. However, “the actual length of the river was much more than this due to its extensive meandering from side to side of the valleys. At numerous points along the river the direction of flow is transverse (sideways) and even opposite to (upstream) the general slope of the valley, and in one valley 130 miles long it is estimated the river flows 380 miles.”¹⁸⁴ This equates to a sinuosity ratio of 1:3 (or 3:1). (See April 5, 1931 entry on this matter.)

1949 The Nevada Legislature authorized the State Engineer to make a complete hydrographic study of the waters of the Humboldt River and tributaries in connection with the proposed upstream storage reservoirs and stream channel improvements based on the U.S. Army Corps of Engineers 1948 report (the Humboldt River Project). The study was subsequently made by Edmund Muth, Special Assistant State Engineer and submitted for review in January 1952. On April 27, 1952, the State Engineer’s report on the Corps’ 1948 proposal for additional upstream storage (Hylton Reservoir on the South Fork, Devil’s Gate Reservoir on the North Fork, Vista Reservoir on the Mary’s River, and channel and drainage improvements) was reviewed by the Humboldt River Advisory Board at a meeting in Battle Mountain.¹⁸⁵ The

board expressed their “wholehearted” agreement with the findings of the State Engineer; however, the board was opposed “to the financial responsibilities for the incidental irrigation benefits imposed upon the water users by the Army Engineers.” In essence, the Corps wanted some 90 water right owners to pay a total of \$2,782,000 in improvement costs on a prorated acre-foot water right basis.¹⁸⁶ Due to an inability of the board to accept these costs, the project’s recommended flood control structures were never completed, with the exception of the construction in 1987 of the South Fork Reservoir on the South Fork of the Humboldt River at the Hylton Reservoir site, which was built in 1987 by the State of Nevada and Elko County primarily for recreational use.

- 1949** The Northeast Elko Soil Conservation District, comprising the northern portion of the Mary’s River sub-basin was organized and furnished technical assistance by personnel of the U.S. Department of Agriculture, Soil Conservation Service, located at Wells.¹⁸⁷
- 1950** (**Circa**) The U.S. Grazing Service and the General Land Office (both separate agencies within the U.S. Department of the Interior) were combined to create the present U.S. Bureau of Land Management (BLM).¹⁸⁸
- 1950** (**March 20**) The Jiggs Soil Conservation District, covering the Huntington Creek and the upper portion of the South Fork of the Humboldt River was created. The work plan for this district was approved in June 1950.¹⁸⁹
- 1950** The Humboldt River Project was authorized by the Flood Control Act of 1950. This act was intended to implement the findings of the U.S. Army Corps of Engineers’ 1948 report entitled “Flood Control Survey Report on Humboldt River and Tributaries, Nevada” calling for the construction of the Hylton Reservoir on the South Fork of the Humboldt River, the Devil’s Gate Reservoir on the North Fork of the Humboldt River, the Vista Reservoir on the Mary’s River, and various channel and drainage improvements. Due to opposition by the Humboldt River Advisory Board to having water users assume the financial responsibilities for the incidental irrigation benefits which would total nearly \$2.8 million, the project was never undertaken. The total cost of the project was estimated at just over \$11 million, of which local interests’ share came to \$3.7 million. Of this amount, the aforementioned \$2.8 million consisting of the local contribution for the reservoirs was required to be paid in advance.¹⁹⁰
- 1952** (**February-May**) A wet-mantle, basin-wide flood event struck the Humboldt River and its tributaries, a result of the rapid melting of deep snowpack from the winter of 1951-52. This event resulted in the highest recorded snowmelt flood within the Humboldt River Basin with peak flows at the Palisade gage recorded at 6,050 cfs and further downstream at the Comus gage river flows peaked at 5,860 cfs.¹⁹¹ Heavy flooding occurred on Mary’s River and Bishop and Tabor Creeks, with extensive soil erosion and stream channel damage. The dam structure on Bishop Creek was only saved by judicious spilling of water prior to this event.¹⁹² While not as severe or as extensive as the 1910 flood, considerable damage was experienced throughout much of the Humboldt River Basin. Many roads were damaged and bridges washed out throughout Elko County, although a tabulation of specific damages was apparently not made.¹⁹³ Maggie Creek was swollen from its usual two to three foot depth to a roiling torrent seven to eight feet deep and began washing out the Southern Pacific Railroad tracks near Carlin, hampering rail movement for some time.¹⁹⁴ The melting snows of the extensive snowpack caused the first complete flooding of the Reese River since 1910 and for the first time since that date the Reese River was connected to the Humboldt River near Battle Mountain. While property losses were not extensive, there were crop losses and watershed damage from erosion, channel cutting and standing water throughout the Reese

River sub-basin. The north end of Crescent Valley and the semi-playa area in Carico Lake Valley became large lakes during this flood event.¹⁹⁵ High snow accumulations in the Little Humboldt River sub-basin caused extensive flood damage to ranches in April and May with bridges and roads being washed out entirely. Cottonwood Creek recorded a peak rate of flow of 1,050 cfs with high waters also reported on Martin, Indian, Singas and Lamance creeks. Gumboot Lake formed and broke through the Sand Dunes, with the Little Humboldt River flowing at 5,371 cfs into the Humboldt River main stem.¹⁹⁶ Rye Patch Reservoir and the Pitt-Taylor Reservoirs attenuated much of the flood damage in Lovelock Valley. However, there were damages to headgates at the Pitt-Taylor Dams, severe damage to the Big Five diversion levees, and damage to many smaller diversion gates in Lovelock Valley. In May, the Pershing County Water Conservation District and private interests raised and strengthened the upper six miles of the Big Five levee which had not been restored or improved after the 1945 flood. Also, the U.S. Army Corps of Engineers constructed an emergency dike 3.1 miles long to prevent encroachment of Humboldt Lake northward onto irrigable lands.¹⁹⁷

1952 (June 30) An excellent brief history on “Beaver in Nevada,” was provided in the “Biennial Report of the Fish and Game Commission for the period July 1, 1950 through June 30, 1952.” The report noted that “Nevada’s entire history and development have been affected by beaver. It was the fur of this animal that prompted the earliest explorer to enter the Great Basin Area. The findings of these men made it possible for later crossings of the great arid expanses that make up so much of the State. The existence of the beaver, in turn, came close to resulting in the extinction of the animal. Excessive trapping, population growth, water development and agriculture all but totally removed the beaver from Nevada. The value of the beaver to proper wildlife management was soon discovered. Through conservation and management measures, the animals have returned to the State to such a degree that they are now more widely distributed than ever before in the history of Nevada. Beaver are beneficial to many streams where their dams create more suitable habitat for fish. These same dams prevent erosion and cause sub-irrigation and water storage which improves the habitat and environment for wildlife. It is during the summer and fall months that the State Fish and Game Commission live traps and transplants the animals to the different streams of the State in its attempt to increase and distribute their benefits by their presence. When beaver, through overabundance, cause damage by blocking irrigation ditches or affect the water management of the land owners, the Commission is responsible for their removal. Animals so removed, if not live trapped, are pelted and sold. One-quarter of the proceeds from such sales is returned to the landowner and the balance is used by the Commission in its beaver program. Pelts taken on Indian lands remain the property of the Tribal Council. This program is operating efficiently toward an ultimate goal which, when reached, will insure a controllable beneficial beaver population.”¹⁹⁸

1952 (July 28) A violent summer convection thunder storm pattern was responsible for extensive flows of water, mud, rocks, logs and other debris emanating from many of the Toiyabe Range drainages south of Austin in the Reese River sub-basin. While no lives were lost and no property damages reported, the resultant erosion pattern of gulying, channel head-cutting and sheet erosion were extensive and indelibly etched into these watersheds. The principal drainages involved in this flood event were Washington, Tierney and Marysville Canyons. According to locals, the erosion effects had lasting impacts on causing these areas to drain more quickly, shortening the availability of a sustained water supply for irrigation, and

- severely damaging habitat and reducing fish populations in the affected streams. The net effect was to leave these watersheds more susceptible to the effects of flooding in the future.¹⁹⁹
- 1952 (August)** The Office of the Nevada State Engineer published a report on the need for additional research on the surface water–groundwater interchange in various reaches of the Humboldt River Basin. Differing from other basin geographic and hydrologic divisions,²⁰⁰ this report divided the Humboldt River Basin into four distinct sections or reaches based on presumed differences in the interchange of surface water and groundwater. By this division scheme, the entire basin was divided into (1) the Upper Humboldt River area lying above the confluence of Pine Creek with the Humboldt River just below Palisade; (2) the Argenta Swamp-Battle Mountain area extending from the confluence of Pine Creek to the narrows at Preble just below the Comus gaging station; (3) the Golconda-Winnemucca area which extends from the Preble narrows to the narrows just above the Rose Creek gaging station (which is no longer in operation, but Rose Creek is approximately 10 miles below Winnemucca); and (4) the Imlay-Lovelock area which includes the lower reaches of the Humboldt River from the Rose Creek station to the Humboldt Sink. These divisions were based on the gaining and losing characteristics of each reach and the apparent differences in the infiltration of surface water to groundwater and the recharge of surface waters from groundwater sources. The report noted that “...basic data regarding the precise amounts of ground-water and the detailed relationships of the ground-water to the surface water are lacking and development of the ground-water should and undoubtedly will be impeded, until such data is made available through careful studies.”²⁰¹ (These reaches correspond with the ones noted previously in the January 17, 1923 entry.)
- 1955 (October 6)** In support of the Humboldt Project and delivering water to Rye Patch Reservoir as efficiently as possible, the Pershing County Water Conservation District signed a contract to repay the costs of rehabilitation and betterment of works in the Battle Mountain water development and collection system with the amount of the obligation not to exceed \$123,000, to be repaid in 20 equal annual installments. The notice of completion of work and statement of final cost set the actual contract amount at \$122,998.²⁰²
- 1956** The federal Fish and Wildlife Act was passed giving additional impetus to the federal wildlife refuge program by authorizing the U.S. Fish and Wildlife Service to acquire land for refuge purposes for all kinds of wildlife.²⁰³
- 1956 (March)** In an assessment of rangeland deterioration more or less similar throughout extensive areas of the Humboldt River Basin, a cooperative study sponsored by the Humboldt River Soil Conservation District found that “...past use of this watershed is essentially similar to other areas of intermingled private land and public domain before the enactment of the Taylor Grazing Act...dominated by competition to harvest the annual forage crop...past twenty years substantial progress had been made...not been sufficient to reverse the downward trend in range condition or forage production...deteriorated condition is made evident by the decrease of more desirable forage species such as wheatgrasses, ryegrasses, needle grass and bitterbrush, while less desirable species such as sagebrush, rabbitbrush, cheatgrass and halogeton have increased or invade the area...only remnants of the original grass and browse species remain...total lack of excellent condition range...additional problem has developed as bottomlands which were originally heavy producers of forage have deteriorated...also an important factor in extending the grazing season and supplementing winter hay needs...loss of these bottomlands and meadows limits the economic return from

- all lands in and adjacent to the watershed²⁰⁴
- 1956** The Nevada Fish and Game Commission stocked smallmouth bass fish at four locations along the Humboldt River between Moleen in Elko County and Rock Creek in Lander County. Follow-up checks by Commission technicians using seines and electrical shocker equipment showed occasional encouraging results. For example, in 1959, a number of smallmouth bass, the off-spring of the 1956 release, were captured at the entrance to Carlin Canyon; however, this was the only significant indication of natural propagation of the species. Subsequent findings have failed to reveal any further propagation.²⁰⁵
- 1960** The Multiple Use-Sustained Yield Act was passed which directed the U.S. Forest Service to administer the lands within the Humboldt National Forest so as to coordinate the various uses of resources – outdoor recreation, range, timber, watersheds, and wildlife and fish – without impairment of the productivity of the land. Uses of these valuable mountain watershed lands, which contribute the majority of flows within the entire Humboldt River Basin from snowmelt, must be carefully managed to avoid damage.²⁰⁶
- 1960 (Circa)** Tall whitetop was believed to have been introduced into the Humboldt River Basin around this time, and possibly earlier, in either the Elko or Lovelock areas. The invasive plant was probably brought into the region through contaminated animal feed or carried by livestock. Typically, tall whitetop initially infests sites along streams, rivers and wetlands. It then quickly spreads to native hay meadows, abandoned agricultural lands, pastures, hayfields, as well as residential areas and disturbed areas such as roadsides. The seeds are readily dispersed by a number of human-related activities such as vehicle traffic, road maintenance, site preparation, construction, agricultural-related activities and off-road recreational pursuits. Livestock and waterfowl have also been known to disperse tall whitetop seeds. In addition, erosion of stream banks, along with tall whitetop root material, also facilitates the plant's spread downstream. However spread, the plant forms tall whitetop monocultures that dominate fields and riparian areas. Its potential for the contamination of Nevada's hay and alfalfa croplands is particularly serious and threatens the industry's export potential.²⁰⁷ Today, over 10,000 acres are infested within the Humboldt River system with this invasive weed. The most severe infestations have occurred in Lovelock Valley along the Humboldt River and along irrigation canals and ditches. The Humboldt Sink area is also heavily infested with several thousand acres. Tall whitetop's spread currently extends from just east of Elko all the way to the Humboldt Sink and is estimated to be expanding at rates up to 20 percent per year.²⁰⁸
- 1961** Shells of a large fresh-water clam (*Anodonta*) were collected by K. Cartwright as part of a University of Nevada, Reno, Master's Degree Thesis project. The shells were collected near Winnemucca, Nevada (northwest of the U.S. Highway 95 Bridge) at an elevation of 4,341 feet MSL (approximately 40 feet below Lake Lahontan's peak late Pleistocene highstand of about 4,380 feet).²⁰⁹ Radiocarbon dating by the Isotope Geology Branch of the U.S. Geological Survey placed the age of the shells at 13,200 ±400 years B.P.²¹⁰ Other shells collected in the area have been dated from 13,350 years B.P. to 12,700 years B.P. (±400 years), providing an indication of the approximate date of Lake Lahontan's last highstand when it reached up the Humboldt River to just above Red House.
- 1961 (Summer)** All available water was removed from Rye Patch Reservoir for irrigation in Lovelock Valley. In the fall, the lake was treated chemically to remove all remaining fish. Fish plantings were subsequently made in 1962 to rehabilitate the reservoir's fishery. These fish restockings in 1962 consisted of 42,960 channel catfish, 44,400 largemouth bass, 3,135

- crappie and 47,766 trout. In the absence of competition from carp, it was believed that three or more years of good fishing would be realized before the carp populations would again build up to where the trout, especially, could not successfully compete. However, floodwaters from the Battle Mountain sub-basin in February 1962 unexpectedly accelerated the reintroduction of carp into the reservoir.²¹¹
- 1961 (August 6-28)** A series of afternoon and evening thunderstorms resulted in severe channel cutting, mud-rock flows and sedimentation in Cottonwood, Brock, and adjacent streams that drain the western slopes of the Cortez Range in Crescent Valley (Battle Mountain sub-basin).²¹²
- 1962 (February 9-13)** Runoff from six days of intermittent snow, rain, and some hail in the upper and middle portions of the Humboldt River Basin above Battle Mountain resulted in severe and widespread damages comparable to that of the 1910 flood event. Ranches and hay lands on the lower Mary's River were inundated during the event. Low-lying buildings and residences at Deeth were also flooded. Both the Southern Pacific and Western Pacific railroad grades were weakened, hampering rail traffic.²¹³ Within the North Fork sub-basin, severe sheet erosion, channel cutting and sediment damage was experienced on Sixteen Mile, Dorsey, Pie and Beaver Creeks, as well as on the lower North Fork and its tributaries and Twelve Mile Creek. A North Fork flood crest caused the loss of the Western Pacific bridge at Ryndon.²¹⁴ Throughout the basin, damages to diversion structures, irrigation ditches, headgates and cultivated fields were extensive. In the Ruby Mountains sub-basin, approaches to the bridges north and south of Twin Bridges on the South Fork were washed out or severely damaged. The Western Pacific Railroad grade and bridge in the vicinity of the junction of the South Fork and the Humboldt main stem were nearly completely washed out, necessitating emergency repairs.²¹⁵ Portions of the Southern Pacific railway yard at Carlin were flooded by ice jams and high water on Maggie and Susie creeks while the Carlin crossover track between the Southern Pacific and Western Pacific main lines was flooded and put out of use during the entire period.²¹⁶ In the Reese River sub-basin the heavy rains on snow and frozen ground caused heavy flooding in the middle and lower sub-basin northward to the Humboldt. Floodwaters in Battle Mountain stood from two to five feet in depth over most of the town and over 200 of the town's 700 residents had to be evacuated from their homes.²¹⁷ In the area between Beowawe and Battle Mountain, some 1,500 head of cattle died from malnutrition and disease. Many diversion and irrigation structures throughout this area were damaged or destroyed.²¹⁸
- 1962 (February)** A devastating flood struck Battle Mountain, covering up to 95 percent of the city with up to five feet of water and causing some \$500,000 in damages. As a result of the flood, the U.S. Army Corps of Engineers constructed a 7,200-foot long, five-foot high levee along the eastern portion of the town from Interstate 80 to North Battle Mountain Road in order to better channel the flood flows of the Reese River.²¹⁹ This flood was also recorded as the greatest flood on the upper Humboldt River since 1910 with a peak flow of 6,610 cfs measured at the Palisade gage.²²⁰
- 1962 (March)** The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture (Economic Research Service, U.S. Forest Service and Soil Conservation Service) published Report Number One, Little Humboldt River Sub-Basin. This was the first of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. The series consisted of one report for each of the eleven defined sub-basins and a basin-wide report (report number 12) which was

completed in November 1966. The field party's studies showed that within the Little Humboldt River sub-basin, only Martin and Cottonwood Creeks could be considered as having continuous flows. At an 80 percent frequency level, it was estimated that the total flow of these combined drainage areas was about 20,500 acre-feet per year. However, no surface flows from this sub-basin reach the Humboldt River during normal water years. The study also found extensive erosion in the Martin and Cottonwood Creek areas in the upper portion of Paradise Valley which, if not controlled, would jeopardize the area's livestock industry. One proposal called for a reservoir on Martin Creek.²²¹ Reservoirs were also proposed for the North Fork of the Little Humboldt River at the Greeley site and along the South Fork of the Little Humboldt River at the Latons Spring site.²²²

1962 (June) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Two, Pine Valley Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The field party's studies showed that during an 80 percent frequency flow the sub-basin's water yield was nearly 20,000 acre-feet (af) of which the Henderson Creek watershed contributed 5,920 af, the Denay Creek watershed 3,030 af, the upper Pine Creek watershed 4,050 af, the middle Pine Creek watershed 5,320 af and the lower Pine Creek watershed 1,670 af. It was estimated that of this amount, 5,000 af reached the Humboldt River. The study found extensive head-cutting in the lower portion of Pine Creek which, if not stopped, would dessicate meadowlands and wash away agriculture lands. The study also noted that 77 percent of the range in the sub-basin was classified as low forage production and only about five percent of the acreage in the fairly high production class. To protect the watershed from further resource losses and increase the acreage of range in the fairly high forage production class, the study called for some 220 miles of allotment and management fencing, 15 stockwater developments (springs and wells), 17,500 acres of reseeding, and 75,000 acres of spraying for weed control.²²³

1963 (May) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Three, Ruby Mountains Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The field party's studies showed that during an 80 percent frequency flow the sub-basin's water yield was 214,400 acre-feet, of which 100,630 acre-feet represented an outflow to the Humboldt River main stem from the South Fork of the Humboldt River (50,650 acre-feet), the Lamoille watershed (32,460 acre-feet), the Starr Creek watershed (17,010 acre-feet), and the Willow Creek watershed (510 acre-feet). Watershed treatment recommendations included: (1) adjustment of range livestock numbers to safe capacities; (2) balance deer populations with food supply; (3) close steep slopes and basins to livestock use; (4) institute a system of rest and rotation for grazing; (5) vegetation improvement by sagebrush control and range re-seeding; (6) pinyon-juniper control in selected areas; (7) erosion control of roads in specific creeks and canyons; and (8) "gully-plugging at specific sites. No dam structures were recommended in this sub-basin."²²⁴

1963 (June) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Four, Mary's River Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The field party's studies showed that during an 80 percent frequency flow the sub-basin's water yield was 40,900 acre-feet, of which 21,560 acre-feet discharged into the Humboldt River from Mary's River (20,280 acre-feet), Tabor Creek (260 acre-feet)

and Bishop Creek (1,020 acre-feet). The report proposed the construction of an earth fill dam (up to 78 feet high and 430 feet long) across Mary's River just below its junction with Meadow Creek. The resulting reservoir would have a storage capacity of between 7,000 and 10,000 acre-feet and be used primarily for irrigation of croplands. Watershed protection and improvement proposals encouraged better livestock (both cattle and sheep) distribution, restricted grazing from areas of high erosion, control of jackrabbit and small rodent populations, particularly beavers in the upper watershed, prohibit motorized vehicle use on trails leading into the Jarbidge Wild Area and acquire scattered private land within the national forest through land exchanges. The report's recommendations aimed at erosion control and streambank and channel stabilization measures, construction of fences and wells for stock watering ponds.²²⁵

1963 (August) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Five, North Fork Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The field party's studies showed that during an 80 percent frequency flow the sub-basin's annual total water yield was estimated at 40,130 acre-feet, of which 17,930 acre-feet flowed into the Humboldt River. Of this amount, 16,530 acre-feet originated in the upper North Fork watershed, 2,570 acre-feet came from the Beaver Creek watershed, 3,960 acre-feet originated in the Pie Creek watershed and 1,120 represented miscellaneous inflows (the difference representing irrigation and phreatophyte use in the lower basin). The report called for a feasibility study to explore the construction of a 4,000 acre-foot reservoir on Pie Creek with the dam site at Devil's Gate; however, due to the fractured nature of the lava flow making up this natural structure, it was felt that water loss would be extreme without some form of sealing. Other measures called for channel and streambank stabilization efforts covering about 50 miles of channel, 150-200 gully control structures at selected sites, erosion treatment of 80-90 miles of roads in the sub-basin, sagebrush removal and range seeding on an estimated 42,000 acres, construction of 13 miles of allotment and management fencing, construction of numerous stockwatering facilities (springs, wells, and ponds), beaver control in aspen sites along drainages in the Independence Mountains, and adjustments to livestock and big game numbers to existing carrying capacities.²²⁶

1963 (October) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Six, Maggie Creek Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The field party's studies showed that during an 80 percent frequency flow the sub-basin's water yield was approximately 12,000 acre-feet per year, of which 6,340 acre-feet represented outflows of Maggie and Susie Creeks into the Humboldt River main stem just above Carlin. Of this water yield, it was estimated that the Maggie Creek watershed generated 9,950 acre-feet of the total annual water generated within the sub-basin while the Susie Creek watershed contributed 2,050 acre-feet. Major proposals of the study included both upper (narrows) and lower (narrows) Maggie Creek dam sites, as well as a proposed dam site on Susie Creek, which would be located just over six miles up the creek from the Humboldt River. The report noted that without some form of retention, nearly 75 percent of average streamflows occurred during the months of March-May, this leaving little stream flow to sustain crop production during the summer months. Other watershed improvements called for channel and streambank stabilization along approximately 40 miles of Maggie

Creek and its tributaries, gully control structures, road treatments to alleviate erosion, vegetation improvements, the development of some 30 springs, seeps and wells for stock-watering purposes, and adjustments to livestock numbers to better match carrying capacities.²²⁷

1964 (April) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Seven, Elko Reach Sub-Basin, one of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. The Elko reach segment covered the drainage areas contiguous to the Humboldt River main stem from Deeth downstream to the USGS Palisade gaging station, with the largest population center in the sub-basin being the city of Elko. Based on an 80 percent frequency flow of tributary streams, the water yield of drainage areas within this segment of the Humboldt River was estimated at only about 500 acre-feet per year. However, this reach receives major inflows from other important sub-basins, namely the Mary's River, the North Fork, and the Ruby Mountains (Lamoille, Rabbit and Starr Creeks and the South Fork).²²⁸

1964 In an extensive analysis of "underflow" into the Humboldt River Valley, which represents a characteristic of a number of seasonal tributary streams to the Humboldt River, the U.S. Geological Survey analyzed surface and groundwater flows of major tributary valleys in the Humboldt River reach around Winnemucca.²²⁹ During the course of the investigation, 19 streamflow measuring stations were established on the Humboldt River between the Comus and Rose Creek gaging stations to study seepage gains and losses during the year. Results from a normal water year showed that during the months of February through June the river showed typical water losses over this reach to groundwater storage, i.e., seepage and bank storage. Then, during July, August and September, as the river's stage declined, the river increased its surface water flows due to return flows from groundwater storage. During the months of November, December, and January, this reach of the Humboldt River showed gains from underflow emanating from Paradise Valley located to the north of Winnemucca. Similar underflow gains were observed from Grass Valley to the south of Winnemucca, and from the Pole Creek-Rock Creek area south of Golconda. These streams and valleys are not perennial tributaries to the Humboldt River, but did show sub-surface flows amounting to an average of 10,000-12,000 acre-feet per year from Grass Valley and the northwestern slope of the Sonoma Range, 2,000-3,000 acre-feet per year from Paradise Valley, and 2,000-3,000 acre-feet per year from the Pole Creek-Rock Creek drainages.²³⁰

1964 (June) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Eight, Reese River Sub-Basin, one of twelve reports analyzing water resources and opportunities for development within the Humboldt River Basin. The study results showed that during an 80 percent frequency flow the sub-basin's gross water yield was approximately 32,300 acre-feet per year, of which none normally flowed into the Humboldt River main stem. During unusually heavy runoff periods, Reese River flows would enter the Humboldt River near Battle Mountain. Of particular interest in the study of this sub-basin was the fragmented and isolated nature of component watersheds. While the overall sub-basin's runoff normally does not reach the Humboldt main stem, some watersheds within the sub-basin represent "closed basins." For example, the upper Reese River drainage generally shows no outflow from the Big Creek watershed; the Carico Lake Valley watershed, located to the southwest of the Crescent Valley watershed and separated from the Reese River Valley by the Shoshone Range, is also normally isolated

and shows no outflow into Crescent Valley; and the Crescent Valley watershed, located to the east of the Reese River Valley on the other side of the Shoshone Range, is also a closed basin. Another interesting aspect of this sub-basin was the fact that while it contains approximately eight percent more mountainous areas above 8,000 feet MSL than the Ruby Mountains sub-basin, the Ruby sub-basin produces and estimated six and one-half times more water. A probably reason is that the Reese River sub-basin is affected by the Sierra Nevada “rain shadow,” whereas the Ruby Mountains are much further to the east and receive more moisture from storms pushed in from the Pacific Northwest.²³¹

1964 (October) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Nine, Battle Mountain Sub-Basin, one of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. The Battle Mountain sub-basin covered the Humboldt River’s reach from the Palisade gage to the Comus gage and encompassed mostly areas to the north of the Humboldt River to include Bounder Creek, Rock Creek and Kelly Creek drainages. Based on an 80 percent frequency flow of tributary streams, the water yield of this segment of the Humboldt River was estimated at about 21,500 acre-feet per year, although essentially no surface water was found to reach the Humboldt River main stem. Also based on an 80 percent frequency flow, the Humboldt River was estimated to be attenuated by approximately 24 percent between the Palisade and Comus gages, due primarily to phreatophyte use, irrigation diversions, evaporation and municipal use by Battle Mountain.²³²

1965 (May) The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Ten, Sonoma Sub-Basin, one of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. The Sonoma segment covered drainages contiguous to the Humboldt River main stem from the Comus gage to the Rose Creek gage, the later gage being no longer in operation, but was located just upstream from the Humboldt-Pershing County line. The largest population center within the sub-basin is Winnemucca. Major drainage areas within the sub-basin consist of Grass Valley, south of Winnemucca, and Pumpernickel Valley. Pumpernickel Valley is considered a closed basin without either surface or groundwater outflows. Grass Valley also shows essentially no surface water outflow, but studies by the USGS have indicated a sub-surface outflow from this valley to the Humboldt River. Based on an 80 percent frequency flow, the Humboldt River was estimated to be attenuated by nearly 22 percent between the Comus and Rose Creek gages.²³³

1965 (October 19) In a continuing effort to keep the Humboldt River Project alive, the Nevada Division of Water Resources published an operational plan for a revised project.²³⁴ Previous versions of this project had called for the development of three flood control dam sites – a 120,000 acre-foot reservoir at the Hylton site on the South Fork of the Humboldt River, an 80,000 acre-foot reservoir at Devil’s Gate on the North Fork, and a 50,000 acre-foot reservoir at Vista on the Mary’s River – and channel and irrigation improvements. The current plan retained only the reservoirs, noting that most of the channel improvements had been built. The plan report stated that the primary purpose of the project was to maintain non-damaging flows in the river reaches below the project dams and in the main Humboldt River.²³⁵ Three areas of local benefit were identified and would be assessed a portion of the remaining local cost of \$2,762,000 for the three reservoirs: (1) irrigation benefits derived by decreed water right holders – \$1,583,000; (2) recreation benefits to be paid by the Elko County Fair and Recreation Board – 942,000; and (3) fish and wildlife benefits to be paid by

- the Nevada Fish and Game Commission – \$237,000. The reservoirs were to be operated by the U.S. Army Corps of Engineers and there would be no long-term retention of flood waters, other than that “necessitated by the requirement of maintaining non-damaging flows in the river system.”²³⁶ In addition to minimizing damages from peak flood flows, the project would also create more or less steady flows in the river for a more extended period of time, thereby extending the irrigation season.²³⁷
- 1965 (October)** The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Eleven, Lovelock Sub-Basin, one of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. The Lovelock sub-basin covered the Humboldt River’s reach from just upstream from the Humboldt-Pershing County line (the Rose Creek USGS gaging station) to the Humboldt Sink in Churchill County. The largest population center within the sub-basin is Lovelock and the most distinctive water-related features are the Rye Patch Dam and Reservoir and the basin’s terminus, consisting of the Humboldt and Toulon Lakes and the Humboldt Sink. Based on extended records (1895-1963), the sub-basin’s estimated gross water yield above Rye Patch Reservoir was 2,500 acre-feet per year and 1,800 acre-feet per year below Rye Patch Dam. The principal water use in the sub-basin was irrigation in Lovelock Valley. Long-term outflows to the Humboldt Sink were estimated at approximately 400 acre-feet per year.²³⁸
- 1966** The Endangered Species Preservation Act was passed (as the precursor of the Endangered Species Act (ESA) of 1973). Major provisions of this act included: (1) identification of native vertebrates in danger of extinction; (2) direction for federal agencies to preserve habitat when “practicable and consistent;” (3) authorization for establishment of National Wildlife Refuges (NWRs) to protect habitat; and (4) provision of protection only on wildlife refuges.²³⁹
- 1966 (November)** The Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture published Report Number Twelve, Basinwide Report, the last of a series of twelve reports analyzing water resources and opportunities for water development within the Humboldt River Basin. This particular report presented a recap of the previous reports on the eleven Humboldt River sub-basins. In total, this series represented the most comprehensive and extensive set of reports and analysis on the Humboldt River Basin and contained invaluable information on the basin’s geology, hydrology, climate, wildlife, vegetation, history and settlement patterns.²⁴⁰
- 1969 (January)** Heavy rain on snow caused flooding on the Little Humboldt River and on Martin Creek which enters Paradise Valley. Peak outflows of the Little Humboldt were recorded at 2,380 cfs.²⁴¹
- 1969** The Endangered Species Conservation Act was passed. This was the last such act before the final passage of the Endangered Species Act (ESA) of 1973. Major provisions of this act included: (1) identification of vertebrates and invertebrates in danger of worldwide extinction; (2) prohibition of interstate commerce of illegally taken species; (3) prohibition against import or subsequent sale within U.S. with only few exceptions; and (4) requirement to create an international agreement on trade in endangered species.²⁴²
- 1973** The Endangered Species Act (ESA) was passed superseding and strengthening the Endangered Species Preservation Act of 1966 and the Endangered Species Conservation Act of 1969. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) shared the authority and responsibility to list endangered species, determine

critical habitat, and develop recovery plans for listed species, among other provisions. The act also required Congressional re-authorization every five years.²⁴³ Other provisions of this act included: (1) emphasis on the conservation of ecosystems upon which species depend; (2) consolidation of existing U.S. and foreign lists; (3) establishment and definition of categories of “endangered” and “threatened” species; (4) lowering of the listing threshold to “in danger of extinction in a significant portion of range”; (5) making eligible all classes of vertebrates, invertebrates, and plants; (6) definition and prohibition against the “take” of endangered vertebrates and invertebrates; (7) establishing prohibitions on the taking of a threatened species available by special regulation; (8) restrictions on import and export; (9) requirement on federal agencies to undertake conservation programs; (10) prohibition of federal agencies from authorizing, funding, or carrying out actions that may jeopardize the continued existence of listed species; (11) authorization of the establishment of National Wildlife Refuges (NWRs) to protect critical habitat; (12) establishment of a state grant program; and (13) appropriation of funding for programs through 1978 (5-year cycle).²⁴⁴

1976 (April) The U.S. Army Corps of Engineers continued its study and analysis of the feasibility and cost effectiveness for the construction of three reservoirs to be located in the upper Humboldt River Basin (see September 15, 1948 entry on the Humboldt River Project). The updated feasibility report presented an assessment of the problems and benefits for the construction of a 120,000 acre-foot reservoir at the Hylton site on the South Fork of the Humboldt River (now occupied by the South Fork Reservoir), an 80,000 acre-foot reservoir at the Devils Gate site on the North Fork of the Humboldt River, and a 50,000 acre-foot reservoir at the Vista site on Mary’s River. In addition to providing more detailed engineering drawings of the dams for these reservoirs, the report also updated a number of project benefits to include flood control benefits, benefits from flood damage reduction, intensification (increased agricultural production) benefits, irrigation benefits, recreation benefits and fish and wildlife benefits. It was estimated that on an annual basis, the dollar value of benefits out-weighted the estimated costs by \$3,275,100 to \$2,447,000.²⁴⁵

1977 (April) Personnel of the Utah Division of Wildlife Resources discovered an unusual cutthroat trout population in a small stream on the eastern slope of Pilot Peak. The division’s biologists were conducting a survey of the Pilot Peak area in cooperation with the U.S. Bureau of Land Management as part of a research project of native trout species of the Bonneville basin. The unnamed creek, later called Donner Creek, was located in Morrison Canyon and is one of two creeks draining the east side of Pilot Peak into the Bonneville Basin. Donner Creek is the water supply for the city of Wendover and is diverted at an elevation of 5,900 feet MSL. Above the diversion point, Donner Creek is perennial for about two miles, with about half of this length in Nevada and the other half in Utah. During the period of June and August 1977, 17 specimens of the trout were collected and examined. The results showed that the fish represented an introduced population of Pyramid Lake cutthroat trout (*Salmo clarki henshawi*),²⁴⁶ a sub-species of the Lahontan cutthroat trout which lived in Pyramid Lake and its tributaries for some 100,000 years, becoming isolated from other trout species for about the last 10,000 years. This particular species became extinct in Pyramid Lake and the Truckee River Basin in the early 1940’s, having made its last recorded spawning run during the high water year of 1938. Due to ideal habitat conditions in Lake Lahontan and its tributary rivers, the Pyramid Lake cutthroat trout became the largest trout species native to western North America, obtaining a length of up to four feet and weighing in excess of 60 pounds.²⁴⁷ Further research found that more than a million eggs of

- Pyramid Lake cutthroat trout were shipped to several eastern Nevada counties in 1910, with the last such shipments being made in the 1929-1930 season when 3 million eggs were taken.²⁴⁸
- 1977** Congress passed the Surface Mining Control and Reclamation Act requiring that mine operators avoid acid or other toxic mine drainage. To correct existing acid drainage problems, the section of the law dealing with abandoned mine land states that land and water affected by mining that took place before 1977 can be cleaned up with fees paid by coal operators into the Abandoned Mine Reclamation Fund. It was estimated that about 90 percent of existing stream damage in the United States is from underground coal mining that took place before 1977. The enforcement agency is the U.S. Department of the Interior, Bureau of Mines, Office of Surface Mining Reclamation and Enforcement (OSM).²⁴⁹
- 1978** An important U.S. Supreme Court case (*California v. United States*) held that the federal government must obtain water rights under state law for reclamation projects, unless state law conflicted with clear Congressional directives. As a practical matter, the U.S. Bureau of Reclamation had normally participated in the state water rights permitting process since its inception (as the U.S. Reclamation Service) with the National Reclamation Act of 1902.²⁵⁰
- 1978 (December 7)** Lander County Commissioners (Lander County Fair and Recreation Board) and Eureka County (Eureka County Fair and Recreation Board) entered into an agreement establishing the Rock Creek Water Recreational Use and Management Board. The purpose of the agreement was to pursue the development of a water impoundment structure in Rock Creek Canyon that would benefit the outdoor recreational opportunities and agricultural development in the area. The Rock Creek Board would consist of seven members, two members from Eureka County, three from Lander County, one member from the Pershing County Water Conservation District and one member representing the T Lazy S (TS) Ranch. The Rock Creek Project, as it was called, consisted of the construction of the Rock Creek Reservoir to be located 22 miles northeast of Battle Mountain in the steep Rock Creek Canyon.²⁵¹ This site had been surveyed and shown to be a favorable location as early as 1919 by the U.S. Army Corps of Engineers and was further recommended by the Corps in 1948 and 1963 studies.²⁵² The maximum reservoir capacity was estimated at 80,000 acre-feet, with a maximum surface area of 1,790 acres, and a maximum water depth of 197 feet. The Rock Creek Dam embankment would be a zoned structure about 207 feet high with a crest length of about 3,400 feet. A low dike would also be required in a natural saddle northeast of the main embankment. Total project cost was estimated at just under \$9 million, of which the State of Nevada would contribute just over \$7 million.²⁵³ Due to a number of difficulties, however, the project was never begun, and by October 1995 the permit to impound water in the reservoir had been extended some 20 times.²⁵⁴ Finally, in November 1996 the Lander County voters and the county commission would terminate the project.²⁵⁵
- 1983** The Nevada Legislature enacted Senate Bill 153 which provided for State participation in the development of the South Fork State Recreation Area (SRA). The area consists of a 1,650 acre reservoir (South Fork Reservoir) which was created on the South Fork of the Humboldt River just upstream from the confluence with Ten Mile Creek. The surrounding land is comprised of approximately 2,200 acres of scenic meadow lands, low rolling hills and river terraces overlooking the river valley. The majority of the land within the acquisition area consisted of two ranches which totaled 3,210 acres, along with several other private holdings and acreage held in public domain by the Bureau of Land Management. The lands are managed under the jurisdiction of the Nevada Division of State Parks as a State Recreation

- Area and by interagency agreement with the Nevada Division of Wildlife as a Wildlife Management Area.²⁵⁶
- 1986 (February)** Lawrence Jarek completed a graduate thesis at the University of Nevada, Reno, on vegetation changes in the Humboldt National Forest in northern Nevada.²⁵⁷ While Jarek's study area did not lie within the Humboldt River Basin (it was actually in the Snake River Basin, just north of the Humboldt River Basin's North Fork sub-basin), the vegetative conditions and trends could reasonably be extended to many of the Humboldt River Basin's upper watershed grazing lands. The study used photographs from three time periods – 1909-1938, 1965-1966, and 1982 – to record changes in the Gold Creek Grazing Allotment of the Mountain City Ranger District. Most of the grazing lands studied were located at elevations of approximately 6,500 to 6,700 feet, where greater precipitation was a factor in more rapid rates of vegetative recovery than the open rangelands of the Humboldt River Basin which typically lie at elevations of between 4,000 and 5,000 feet. The study found that the most obvious change in vegetative conditions in recent years was the decrease in woody species with a corresponding increase in forbs and grasses. The thesis noted that several critical and controversial federal government reports published in the mid-1970's indicated continuing declines in Nevada rangeland conditions.²⁵⁸ Jarek proposed that without the benefit of photographic records, the reports' conclusions were "based less on solid information than on opinion and political expediency." Jarek made a number of observations from the earlier 1909-1938 and 1965-1966 photographic records.²⁵⁹ Compared to these prior periods, the 1982 photographs showed that on most sites the perennial grasses were recovering and becoming more dominant. Bearded bluebunch wheatgrass and Idaho fescue increased the most, but smooth brome and Great Basin wildrye also increased on some sites. Proposed as probable causes of the vegetative changes were: (1) improved resources management; (2) climate; (3) fire control; (4) insects and diseases; and (5) wildlife-related factors. Proper resources management was seen by Jarek as one of the primary reasons for the vegetative changes and included: (1) reduction of livestock grazing use; (2) implementation of grazing management systems; (3) vegetative manipulation; and (4) cooperative agreements with grazing permit holders.²⁶⁰
- 1986 (March)** Lovelock Valley farmers received their last full 3 acre-feet per acre water allocation from the Pershing County Water Conservation District before the onset of an 8-year drought. From 1987 through 1994, allocations were consistently below the 3 acre-foot level, seriously affecting farmers' agricultural productivity and financial well-being. Over this period, water allocations per acre were as follows: 1987, 2.5 acre-feet; 1988, 1.8 acre-feet; 1989, 2.18 acre-feet; 1990, 0.82 acre-foot; 1991, 0.40 acre-foot; 1992, 0.28 acre-foot; 1993, 2.40 acre-feet; and 1994, 0.95 acre-foot. Finally, in 1995, Lovelock farmers received their first full allocation in eight years, although it was not continuous and had to be issued in four increments.²⁶¹
- 1986 (October 1)** After five consecutive years of above normal percentages of snowpack water content, a period of drought began in the Humboldt River Basin. With the exception of water year 1989, this drought period would last for essentially nine years through 1995. Both the upper and lower Humboldt River Basins recorded average annual snowpack water content percentages of about 70 percent of normal, ranging from lows of 39 percent of normal (1992 upper basin) and 33 percent of normal (1992 lower basin) to highs of 103 percent of normal (1989 upper basin) and 141 percent of normal (1989 lower basin).²⁶²
- 1987** The Nevada State Museum published a comprehensive study of the archeology, geology and

paleontology of the Rye Patch Reservoir site in Pershing County. The construction of Pitt-Taylor Reservoirs in 1910 and Rye Patch Reservoir in 1934 flooded many archeological and paleontological sites. Wave action destroyed some of these sites and exposed buried deposits in other sites along the reservoir's shoreline. The study found a total of 115 sites, including 30 archeological and paleontological sites in the reservoir bottom and 85 around the shoreline. These sites have yielded evidence of human occupation during the past 7,000 to 12,000 years, with continuous occupation beginning sometime after 6,900 B.P. (before present).²⁶³

- 1988** In the *State of Nevada v. Morros*, the Nevada Supreme Court upheld the State Engineer's issuance of a water permit for using Blue Lake for public recreation and as a fishery. Blue Lake is located in north-central Humboldt County in the Black Rock Desert Hydrographic Region. It was stated that the permit was in the public interest and therefore constituted a beneficial use of water. This authorized an *in situ* use of water rather than a traditional diversionary consumptive use. An important distinction between this case and the 1983 California Public Trust Doctrine case (*National Audubon Society v. Superior Court*), in which the California State Supreme Court ruled that the State Water Resources Control Board may reconsider the effects of past water allocations and, possibly, even transfer existing water rights to other [more] beneficial uses,²⁶⁴ was that the Nevada permit was an original allocation, not a transfer. Furthermore, the Nevada case was based on existing Nevada water law rather than on the public trust doctrine, which Nevada does not recognize. The following year, the Nevada Legislature would take action to legislate these uses as beneficial.
- 1989** (**April**) Barrick Goldstrike Mines Inc. submitted a "Plan of Operations Amendment" to the U.S. Bureau of Land Management describing the proposal, known as the Betze Project. The project involved the expansion of an existing open-pit mine to recover ore which contained an estimated 15.1 million ounces of gold. The project also included the expansion of Barrick's existing processing facilities to process the ore mined from the Betze deposit. The dewatering of the Betze Pit was projected at a rate of 29,300 gallons per minute (47,260 acre-feet per year) and the subsequent discharge (after consumptive and processing uses) was projected to be 22,300 gpm (36,000 acre-feet per year). The discharge location was into the Boulder Valley drainage and discharges over and above agricultural uses would be discharged into Boulder Creek, a tributary of the Humboldt River.²⁶⁵ Eventually, the Betze-Post Mine, as it came to be called, would become the largest open pit mine in Nevada.
- 1990** (**May**) Barrick Goldstrike's mining operations began in the upper Boulder Flat area, located approximately 18 miles northwest of Carlin and along the Carlin Trend. Eventually, the Barrick Goldstrike and the Betze and the Post open pit mines became one mining operation under the combined Betze-Post Mine name. By the end of 1998, a period of almost nine years, some 856,000 acre-feet of water would be pumped (mine dewatering) from these mine pits. Of this amount, over 7 percent, or 63,500 acre-feet was used consumptively in mining operations, 55 percent, or some 470,800 acre-feet were re-injected or re-infiltrated to the groundwater, 20 percent, or 171,200 acre-feet, were used for irrigation of crops, 8 percent, or 68,500 acre-feet were lost to evaporation, and nearly 10 percent, or 82,000 acre-feet were discharged to the Humboldt River. This amount discharged to the Humboldt River constituted enough water to irrigate a 2,300-acre farm during this entire nine-year period. At its peak operation, the Betze-Post Mine was pumping at a rate of 68,000 gallons per minute (nearly 110,000 acre-feet per year). By early 2000, the rate of pumping had declined

- to 35,000 gpm, or about 56,500 acre-feet per year.²⁶⁶ (See March 1999 U.S. Geological Survey related entry on the extent of the drawdown of the water table as a result of these mine dewatering operations.)
- 1990 (June 8)** The Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation, issued a “Finding of Alleged Violation and Order” in connection with Newmont Gold Company’s Rain Mine, located near Elko. It was reported that surface water flows and the resultant acid drainage from the mine’s waste rock piles was contaminating some two miles of nearby Dixie Creek. Newmont acknowledged the potential for future acid mine drainage at the site and accepted responsibility for the necessary remediation.²⁶⁷
- 1991 (April 5)** The Nevada Waterfowl Association purchased for approximately \$20,000 from Tri-County Title of Nevada 38.91 acres of land with appurtenant water rights in Lovelock Valley. The land was entitled to three acre-feet per acre, for a total of 116.73 acre-feet of water rights. Subsequently, the association quit claim deeded these water rights to the Nevada Division of Wildlife (NDOW). It was the intent of NDOW to use this water as a dedicated water source for maintaining wildlife habitat in the Toulon area of the Humboldt Sink.²⁶⁸
- 1991** In an effort to deal with the potential socioeconomic implications of the interbasin transfer of water, the Nevada Legislature passed legislation approving the imposition of a tax on the transfer of appropriated groundwater between counties in Nevada (Nevada Revised Statute 533.438). The water transfer tax is to be levied by the county or counties of origin (containing the basin in which the source of the groundwater is located) at a rate of \$6.00 per acre-foot per year. All monies collected from this tax must be deposited in a trust fund for the county of origin and the principal and interest of this fund may only be used for the purposes of economic development, health care, and education. The State Engineer will determine the respective proportions of such a tax to be divided between counties of origin for shared water basins. Furthermore, passed at this same time was NRS 533.4385, which, as an alternative to the imposition of a groundwater transfer tax, allowed the county of origin to impose a mitigation plan on the water right applicant or his successor. The mitigation plan cannot violate a specific state statute or be impossible or impractical to put into effect. It may include, but is not limited to, the reservation of designated water rights to the county of origin and compensation for the foreseeable effects of the transfer.²⁶⁹
- 1992 (July)** The effects of the a severe drought which had existed since 1987 forced the complete draining of Rye Patch Reservoir by the Pershing County Water Conservation District (PCWCD). This was only the second time in 65 years of operation that the reservoir had been completely drained. Five of the six years since 1987 had produced below normal levels of snowpack and streamflow, with 1992 the lowest year thus far. In addition, below normal snowpack levels would persist in the Humboldt River Basin for the next three years through 1995. As of April 1, 1992, the upper Humboldt River Basin had received only 39 percent of its normal snowpack water content and the lower Humboldt River Basin had received only 33 percent of its normal snowpack water content. Both of these conditions represented the lowest snowpack water content percentages for the entire 1987-1995 drought period. As a result of the drought and the desperate need for irrigation water for withering crops in Lovelock Valley, Rye Patch Reservoir was emptied, leaving behind acres of more than a million dead fish, effectively spelling the near-term demise of a once-thriving sport fishery. According to officials of the PCWCD, which manages the water in the reservoir on behalf of Lovelock Valley farmers, 98 percent of the fish that died were “rough” (or “trash”) fish, mostly carp. The PCWCD also noted that if there is to be a minimum pool established for

- fish and wildlife, then the farmers who own the water will have to be compensated for the loss of available water supplies. By 1996, based on a more normal water year, the Nevada Division of Wildlife had restocked the reservoir with walleye, spotted bass, white crappie, yellow perch, rainbow trout and cutthroat trout.²⁷⁰
- 1992** European nations signed the Maastricht Treaty which laid the groundwork for the formation of the European Monetary Union and the creation of a new common currency, the euro.²⁷¹ The resultant common monetary policies, particularly relating to the gold reserve requirements for individual member nation central banks, would precipitate considerable gold sales by the central banks of a number of these EMU member nations. From 1992 to 1999, these central banks sold approximately 51.4 million ounces of gold, an amount slightly greater than the 50.3 million ounces of gold extracted from Nevada mines during the same time period. The result of these open market gold sales, when combined with other related factors affecting demand, caused the price of gold to slip from \$404 in February 1996 to \$268 by September 1999. This central bank gold liquidation precipitated a succession of reductions in mine production and the beginning of extensive layoffs throughout the Nevada gold mining industry, particularly affecting gold mines in the Humboldt River Basin.²⁷² This event clearly showed how the fortunes of Nevada's mining industry are tied to global events.
- 1992 (October)** Based on recently-acquired water rights obtained from the Nevada Waterfowl Association (see April 5, 1991 entry), the Nevada Division of Wildlife (NDOW) filed an application with the State Engineer's office to change the point of diversion, the place of use and the manner of use of the nearly 117 acre-feet of water to be diverted from Lovelock Valley to the Toulon area of the Humboldt Sink for wildlife habitat restoration and maintenance. NDOW intended to change the point of diversion from the Union Canal, which serves a large portion of lower Lovelock Valley farmers, and divert the water to the Toulon drain ditch. The Pershing County Water Conservation District (PCWCD) protested the water application on the basis that diverting water out of the valley would be inconsistent with district policy. Both the PCWCD and NDOW agreed that considerably larger diversions would be necessary to have a significant impact on habitat restoration in the sink area and NDOW representatives confirmed that greater purchases would be desirable.²⁷³
- 1994 (January)** In what was arguably one of the first efforts to look beyond the temporary benefits of mine dewatering, i.e., increasing instream flows, more water for irrigation, wildlife habitat improvements, etc., Dr. Glenn Miller, a biochemist with the University of Nevada, Reno, drew attention to the uncertainty over related long-term hydrologic and water quality impacts. Dr. Miller's analysis identified two potentially significant consequences when dewatering activities cease. First, once dewatering flows directly into the Humboldt River stop, the river's flows will briefly return to prior dewatering levels. Second, the near-surface groundwater deficit created by the pit dewatering operations will result in a drawdown of shallow groundwater and connected surface water. The pit lake "recharge" process will have two additional far-reaching consequences: (1) long-term reduced flows in the Humboldt; and (2) increased loss of groundwater from pit lake surface evaporation.²⁷⁴ While his conclusions remain controversial, his emphasis on a better recognition of the long-term uncertainties associated with this issue remain valid today.
- 1994 (January)** In an apparently difficult-to-quantify area of ecological assessment, the Sierra Club criticized a report by a U.S. Agricultural Research Service scientist over his conclusion that Nevada's rangelands are now in the best condition they've been in for over a century. The Sierra Club noted that, based on U.S. Bureau of Land Management data and a study by

the National Wildlife Federation and Natural Resources Defense Council, there have been no substantive changes in range conditions since 1989. The research scientist noted that rangeland management has improved in recent years and stock growers are showing more awareness of problems caused by erosion and extensive livestock grazing.²⁷⁵ In responding to the scientist's findings, the director of the Nevada Outdoor Recreation Association noted that "Wildlife habitat has suffered greatly" and that the cold weather of the Great Basin has seriously affected the ability of plant life to recover from "the abuse that's been inflicted upon it."²⁷⁶

- 1994 (February)** The U.S. Department of the Interior received continued criticism from both industry representatives and conservation groups to its proposed Western rangelands grazing policies. A draft copy of the proposed policy, called "Rangeland Reform", was obtained by *The Washington Post* and published. After a virtual political revolt by Western grazing interests, some of the aspects of that initial policy were tempered. The Interior Secretary formally unveiled the plan to the Society of Range Management in Colorado Springs, Colorado. The plan represented a new blueprint for managing sheep and cattle grazing on about 264 million acres of public lands located in 56 Bureau of Land Management districts, six of which are in Nevada.²⁷⁷ One major concession was that the federal government would delegate considerable authority over many fundamental range-management decisions to state and local advisory groups. To effect this, a 15-member Multiple Resource Advisory Council would be formed in each local district composed of ranchers, environmentalists and other public land users.²⁷⁸ This concept received considerable criticism as no provisions were made for having researchers and scientists on the advisory councils. Another controversial aspect of the grazing program included a dramatic rise in the grazing fees, which originally would increase from the current level \$1.86 per animal²⁷⁹ per month to \$4.28 per animal per month over three years. This was subsequently reduced to a maximum \$3.96 per animal per month. The new proposals also included an "incentive fee system" which would reward stockmen for improving rangelands and contributing to "healthy, functional ecological conditions by such actions as protecting stream areas and valuable wildlife habitat."²⁸⁰
- 1994 (March)** Hearings were held by the Bureau of Water Pollution Control, Nevada Division of Environmental Protection, without public dissent, for the final permit required for Newmont Gold Company to begin dewatering operations at its Gold Quarry Mine north of Carlin. The company planned to dewater up to 42,000 gallons per minute (93.6 cubic feet per second or 68,000 acre-feet per year) and discharge the water into Maggie Creek and the Humboldt River. Newmont had already constructed a water treatment plant and expected to build two cooling towers to meet the state's water quality and water temperature standards for discharges to surface waters. In December 1993, the State Engineer issued dewatering permits to Newmont Gold Company for up to 49,000 gallons per minute. It was noted by a representative of the Pershing County Water Conservation District that this discharge would be in addition to the current flow of 250 cfs measured at the Palisade USGS gaging station.²⁸¹
- 1994 (September 30)** Geologists at the University of Nevada, Reno, Mackay School of Mines and the Nevada Bureau of Mines and Geology (NBMG) reported on a cooperative project with the U.S. Bureau of Land Management to locate all abandoned mines in Nevada. Some guesses had put this figure as high as 300,000 ex-mining sites, to include every "mound and molehill." It was noted that while only a small percentage of the abandoned mines in Nevada represent either physical or environmental hazards, in the interests of public safety the

problem mine sites should be identified and corrected. The pilot program first looked at the abandoned mines in the Humboldt River Basin by generating a geographic information system (GIS) database of all related information.²⁸² For this project, NBMG digitized the mine shaft, prospect, mine tunnel or cave, quarry, and gravel-sand-clay or borrow pit locations from 7.5 minute U.S. Geological Survey topographic quadrangles. As a result of this program, a total of 101,296 “mine features” were digitized,²⁸³ with approximately 15,100 of these locations occurring in the Humboldt River Basin.²⁸⁴ The project’s participants noted that for every feature digitized, there were probably two or more other mine features (i.e., sites) that did not have symbols on the USGS maps.²⁸⁵

1994 (August) Secretary of the Interior Bruce Babbitt selected Pamela Wilcox, Administrator of the Nevada Division of State Lands, and Rose Strickland of the Sierra Club to represent Nevada in discussions of the incentive-based grazing fee formula being held in Park City, Utah. The Nevada Cattlemen’s Association took particular exception to the selection of these representatives, especially the fact that not one Nevada rancher was to be included in the discussions. The Cattlemen’s Association expressed its concern that the meeting appeared as a strategy for removing livestock from the public lands.²⁸⁶

1994 (November) In probably the first use of “phytoremediation”²⁸⁷ in the Humboldt River Basin, specially selected plants were used to assimilate organic pollutants in their root systems. The area selected was a 14-acre tar flat at Imlay that remained from old oil deposits left from the area’s railroad days. Subsequent to Southern Pacific Railroad’s district realignment in 1904, a roundhouse was built at Imlay and a thriving community built up around the railroad’s operations there. However, during the 1950’s the railroad relocated its facilities, leaving only about 60 people behind, as well as an extensive patch of tar ranging from several inches to several feet thick. In a cooperative arrangement between Remedial Technologies of Southern Pacific Railroad, the Nevada Division of Environmental Protection and the U.S. Department of Agriculture’s Natural Resources Conservation Service, the tar patch was ripped, rolled, flattened, covered with a foot of sand, planted with four kinds of drought-tolerant plants,²⁸⁸ covered with straw, fertilized and watered to promote early plant growth. By June of 1995 the grasses had sprouted over much of the site and begun the process of assimilating the accumulated hydrocarbon pollutants in the plant tissues.²⁸⁹

1995 (January) Elko County, on behalf of several ranchers,²⁹⁰ filed a lawsuit in the U.S. District Court in Reno, Nevada (Judge Edward C. Reed, Jr.). The suit sought to ensure the rights of ranchers who own water rights on federally-managed public lands to convey the water to their private property and maintain the conveyance systems without first getting a permit from the federal agency. In this particular case, the U.S. Forest Service had cited ranchers for ditch clearing in the Ruby Mountains of the Humboldt National Forest. While the suit involved a number of ranchers in the Ruby Valley area just to the east of the Humboldt River Basin’s eastern boundary, its outcome may have extensive implications on all Nevada’s ranching operations which derive irrigation and livestock water from sources on federally-managed lands. On April 24, 1996, Judge Reed ruled that Elko County lacked “standing” in the suit as the county “...cannot sue for interference with rights it does not even claim to possess,” and therefore it was the private individuals who had standing. By the time of this ruling, the county had already spend nearly \$320,000 on litigation and was advised by private counsel that another \$325,000 would be needed to contest the suit through the next fiscal year.²⁹¹

1995 (January 30) The U.S. Fish and Wildlife Service released their recovery plan for the

Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) (LCT). The purpose of the plan was to delist the species from its current threatened status under the Endangered Species Act (ESA). The USFWS plan also identified eight fishery management plans which had been completed or drafted for the LCT.²⁹² The plan noted that prior to 1900, eleven lacustrine (lake) populations of LCT occupied about 334,000 acres of lakes and an estimated 400 to 600 fluvial (stream) populations inhabited more than 3,600 miles of streams. Presently, the LCT exists in about 155 streams and 6 lakes and reservoirs in Nevada, California, Oregon and Utah, occupying approximately 0.4 percent of its former lake habitat and 10.7 percent of its former stream habitat within its native range. It was noted that the LCT has also been introduced outside its native habitat. It was reported that both lacustrine and fluvial forms are subject to unique high risk extinction factors. Principal threats to the LCT included habitat loss associated with livestock grazing practices, urban and mining development, water diversions, poor water quality, hybridization with non-native trout and competition with other introduced species of fish. Three distinct vertebrate population segments of LCT presently exist: (1) Western Lahontan basin comprised of the Truckee, Carson and Walker River basins; (2) Northwestern Lahontan basin comprised of Quinn River, Black Rock Desert, and Coyote Lake basins; and (3) Humboldt River Basin. It was suggested that delisting may be effected separately by basin. Recovery actions included: (1) Identify and coordinate interagency activities to secure, manage, and improve habitat for all existing populations; (2) revise the LCT recovery plan based on genetic, population viability and other research; (3) develop and implement LCT reintroduction plans; (4) regulate LCT harvest to maintain viable populations; and (5) manage self-sustaining LCT populations existing out of native range until the need is completed. The total cost of implementation was estimated at just over \$16 million spread out over 24 years (1995-2018).²⁹³

1995 (April 1) This was a very good year, hydrologically, for the water basins of western Nevada, but not necessarily for the Humboldt River Basin. For western Nevada, this marked the end of a drought period that had begun in 1987. However, recovery to the upper and lower Humboldt River Basins would have to wait for one more year. In this year, the Lake Tahoe, Truckee River, Carson River and Walker River Basins all recorded snowpack water content levels well above normal levels for this time of year;²⁹⁴ however, the upper Humboldt River Basin's snowpack water content was recorded at only 73 percent of normal and the lower Humboldt River Basin's snowpack water content was at 95 percent of normal. This marked the eighth year out of the last nine years (1989 was above normal snowpack water content levels for both the upper and lower basins) in which snowpack water content levels were below the average for this time of year.²⁹⁵

1995 (June) The Nevada State Engineer rejected project applications submitted by Eco-Vision to "mine" and possibly export out of the basin groundwater located in deep bedrock aquifers along the Humboldt River in the counties of Elko, Eureka, Lander, Humboldt and Pershing. Eco-Vision was formed by a partnership between Summit Engineering of Reno, Nevada, and Westpac Utilities, a subsidiary of Sierra Pacific Power Company, also of Reno. One of the reasons for rejecting the water right application was that the company needed a client to use the underground water before they could begin pumping (i.e., it must show beneficial use). Eco-Vision's application had set out plans to tap into 387,335 acre-feet of groundwater in the Humboldt River Basin and, until a customer could be found, place the pumped water into Rye Patch Reservoir, thence to Toulon Wildlife Area in the lower Humboldt River Basin and possibly divert some of the water into the Stillwater Wildlife Refuge in the lower Carson

River Basin.²⁹⁶

- 1995 (September 6)** The Pershing County Water Conservation District (PCWCD) Board of Directors approved a \$10 million “Safety of Dams Contract” with the U.S. Bureau of Reclamation for improvements to Rye Patch Dam. It was determined that Rye Patch Dam had to be modified to conform with the Safety of Dams Act. Experts determined that the dam is located in an earthquake fault area and in the event of a severe earthquake the base of the dam could liquify, causing considerable destruction downstream through Lovelock Valley. According to the contract, the dam foundation will be improved on the downstream side of the embankment and the dam embankment itself will be reinforced as needed to withstand the expected levels of seismic activity in the area. The contract called for the PCWCD to pay 15 percent of the contract’s cost and the federal government to pay the remaining 85 percent. To accommodate the construction, PCWCD must bring the water level down in the reservoir to 10,000 acre-feet by mid-October 1995.²⁹⁷
- 1995 (September 6)** In a meeting between two of the world’s largest gold operators – Barrick Goldstrike Mines Inc. and Newmont Gold Company – and state officials from the Nevada Department of Conservation and Natural Resources, a tentative agreement was reached over lingering disputes concerning mine dewatering in Boulder Valley north of Carlin. At issue was the fact that Barrick was pumping water from the Betze-Post open pit mine into the TS Reservoir. Under a previous cooperative agreement, Newmont owns the TS Reservoir and Barrick built it. Water from the reservoir presently is used to irrigate large areas of the TS Ranch, which is also owned by Newmont. The reservoir has a fissure and water leaking out through the crack resurfaces elsewhere in Boulder Valley as springs. During particularly wet periods, the springs flow down the valley threatening to enter the Humboldt River. Without correction, Barrick would face potential fines for illegally discharging into the Humboldt River. In August, Newmont attempted to fix the crack, but was obstructed by Barrick. Had the crack been sealed, then Barrick would have been forced to limit its dewatering volumes and mining operations. It was believed that the Barrick-Newmont dispute centered over the level of dewatering in the region, which may limit Newmont’s ability to begin its own dewatering operations. In addition to pumping the groundwater into the TS Reservoir, Barrick also recently completed four injection wells and a rapid infiltration basin to handle the water from the mine. Under the agreement reached among all parties, both mining companies agreed to jointly seek a permit to discharge 60,000-70,000 gallons of water per minute (97,000-113,000 acre-feet per year) into Rock Creek and then on to the Humboldt River. As part of the agreement, Barrick also agreed to explore new water management alternatives to include additional irrigation, creating a new wetland and more groundwater injection and infiltration sites.²⁹⁸
- 1995 (September 22)** At a meeting of the Humboldt River Basin Water Authority, a water-advisory body consisting of representatives from Elko, Eureka, Lander and Humboldt counties (Pershing County was to join later), it was proposed that the U.S. Geological Survey narrow the scope of its proposed basin-wide study of the impact of mine dewatering to only the middle Humboldt River Basin, to include the area between the USGS Palisade gage (Palisade Canyon) and its Comus gage (Emigrant Canyon). This would solve the USGS’s growing problem over funding the project as well as cover the area containing most of the basin’s mine dewatering activities, particularly the activities of Barrick Goldstrike Mines Inc. and Newmont Gold Company, both of which have operations located just north of Carlin. At this meeting a formal invitation was made to Pershing County to join the authority, which

- would bring the authority's membership up to the five counties originally envisioned.²⁹⁹
- 1995 (October)** The U.S. Geological Survey, in cooperation with the Nevada Department of Conservation and Natural Resources and the U.S. Bureau of Land Management, began an assessment of the regional water resources of the Humboldt River Basin. The assessment was undertaken in response to concerns over increasing demand for the limited water resources of the basin and the potential effects of mine dewatering during the past ten years. The assessment was focused on 14 hydrographic areas³⁰⁰ in the defined middle Humboldt River Basin³⁰¹ which included areas of irrigated agriculture and most of the large gold mining operations in northern Nevada. The Humboldt River Basin Assessment was planned in two phases. Phase 1 studies were to be undertaken from October 1995 through September 1998 and consisted of the following tasks: (1) the compilation and dissemination of hydrologic data via the Internet and a bibliography of reports pertinent to the middle basin; (2) a study of the hydrogeologic framework and groundwater levels; (3) water budgets for selected hydrographic areas; and (4) groundwater use. Phase 2 studies were to be conducted from October 1998 through September 2003 and consisted of: (1) a continuation of studies related to groundwater use in the middle basin; (2) water budgets for the remaining hydrographic areas; and (3) development of a computer model of groundwater and surface water flow in the middle basin. Several mining companies with operations in the middle Humboldt River Basin provided data, technical assistance and funding support for the project, including Barrick Goldstrike Mines Inc., Getchell Gold Corporation, Newmont Gold Company, and Santa Fe Pacific Gold Corporation (subsequently acquired by Newmont).³⁰² All information, data, bibliographic references and progress reports were to be posted on the USGS Humboldt Hydrology website.³⁰³
- 1995 (October)** The California-based Nevada Land & Resource Company acquired ownership of approximately 1.4 million acres of railroad land in northern Nevada from the Atchison, Topeka and Santa Fe Railroad Company, and immediately began efforts to resell it. The limited liability company was formed as a joint venture of Western Water Company of San Diego, California, and Morgan Stanley of Los Angeles, specifically to buy the railroad property in Nevada. The land represents the remnants of the inducement given the builders of the transcontinental railroad, which went through the Humboldt River Basin in 1868-1869. The Land Grant Act of 1862 gave the transcontinental railroad companies every other section (one square mile or 640 acres) of land for 20 miles on each side of the rail line. The company now owns 536,477 acres in Pershing County, 273,440 acres in Humboldt County, 200,998 acres in Lander County, 46,592 acres in Eureka County, and 163,637 acres in Elko County. The land purchase raised concerns within the basin, as expressed by the Humboldt River Basin Water Authority, which is comprised of representatives from the five counties mentioned above, that the Nevada Land & Resource Company had plans to export water out of the basin. The company noted that it has more reasons to keep the water rights in the basin to support the value of its newly-acquired real estate. The company owns approximately 20,000 acre-feet of water rights across several hundred miles of Nevada; however, the only water rights on the Humboldt River itself consist of 1,800 acre-feet at Carlin that the railroad acquired many years ago for ice making.³⁰⁴
- 1995 (October 5)** The Rock Creek [Dam and Reservoir] Advisory Board, after experiencing some 20 extensions since 1975 on its original state permit to impound water in the proposed Rock Creek Reservoir, was briefed on the current status of the project. In December 1978, Lander County Commissioners (Lander County Fair and Recreation Board) and Eureka County

(Eureka County Fair and Recreation Board) entered into an agreement establishing the Rock Creek Water Recreational Use and Management Board. The purpose of the agreement was to pursue the development of a water impoundment structure in Rock Creek Canyon that would benefit outdoor recreational opportunities and agricultural development in the area. After nearly 20 years, however, site testing was still being conducted and additional water rights were still being sought to fill the reservoir and offset evaporative losses. In addition, some Western Shoshone Indians opposed the project saying it would flood ancient religious sites and ancestral graves. It was noted that Lander County has only about \$1.3 million left out of a \$2 million bond issue approved by county voters in 1984 to pursue the Rock Creek Project.³⁰⁵

1995 (November 7) In a reversal of an agreement sought in September 1995, Newmont Gold Company, on behalf of its subsidiary, Elko Land and Livestock Co., filed a lawsuit in Washoe District Court against Barrick Gold Corporation seeking an injunction against further dewatering from Barrick's Betze-Post open pit mine north of Carlin. Newmont claimed that extensive groundwater pumping and water transfers to Newmont's TS Ranch Reservoir was saturating the ranch's lands due to a fissure in the reservoir, and was in violation of an agreement on the reservoirs use signed by both mining companies in 1992. In September, Barrick, which constructed the reservoir, prevented Newmont from attempting to repair the leak. Newmont claimed that any flooding next spring could result in illegal discharge into Boulder Creek and then into the Humboldt River.³⁰⁶

1995 (November) Two scientific reports were released by the U.S. Geological Survey, Water Resources Division, in Carson City, Nevada.. The first report, Water Resources Investigation Report 94-4222,³⁰⁷ begun in August 1988, studied the water resources and potential effects of groundwater development in Maggie, Marys, and Susie Creek basins, located in Elko and Eureka counties. This report was intended to address some of the concerns about the groundwater pumping (i.e., mine dewatering) at Newmont Gold Company's Gold Quarry Mine in the Maggie Creek sub-basin. It was found that groundwater levels had declined at the mine site as a result of the dewatering activities and from a prolonged drought. It also suggested that water flows in these creeks may be influenced by the dewatering activities. The second report, Water Resources Investigation Report 94-4233,³⁰⁸ studied the potential hydrologic effects of mining in the Humboldt River Basin, and particularly within six hydrographic areas in the middle portion of the basin which showed high potential for changes. This report, through an extensive presentation of maps and charts, considered a number of parameters, such as ground water levels, springs, perennial streams, shallow groundwater, sediment transport, agricultural irrigation and fish and wildlife habitat. It then looked at potential long-term changes based on the availability of water as a result of mining activity.

1995 (November 17) In a presentation to the Humboldt River Basin Water Authority, Newmont Gold Company representatives reported on dewatering operations at their Gold Quarry open pit gold mine north of Carlin. Newmont had previously estimated that at this point in time the company would be dewatering roughly 20,000 gallons per minute (32,260 acre-feet per year), going to a peak of 42,000 gpm (68,000 acre-feet per year). However, due to the nature of the carbonate aquifer, the current rate of dewatering was only 13,000 gpm (21,000 acre-feet per year). After passing through cooling towers, one-half of the pumped groundwater is piped to Maggie Creek. For all of 1994, Newmont reported that of the water pumped from the pit, 19.5 percent went to mining and milling operations, 28 percent was

used for irrigation on the Hadley Ranch, 2.5 percent was used for storage, and 50 percent flowed into Maggie Creek and eventually into the Humboldt River. In anticipation of the pit's dewatering operations, Newmont expanded the Maggie Creek Reservoir to hold 6,000 acre-feet.³⁰⁹

1995 (November 27) U.S. District Judge Edward Reed of Reno denied Elko County's motion for a preliminary injunction in its lawsuit against the U.S. Forest Service over access to water rights held within the Humboldt National Forest. The county had sought to bar the Forest Service from citing ranchers with criminal citations for clearing ditches on the Humboldt National Forest to get more water to flow from springs they had acquired water rights to on the public lands. Some of the "cleaning" operations, in fact, included removing vegetation at some distance back from the ditches. Elko County attorneys argued that if ranchers held a valid right-of-way on the public land, they did not need the permission of the federal government to clean ditches that deliver water to their property. The Judge countered that those rights-of-way are subject to reasonable regulation so long as they run across Forest Service land and that the ranchers have not even applied for permits or exhausted administrative remedies towards resolution. In favor of the ranchers, Judge Reed's decision also noted that Forest Service regulation "neither prohibits the ranchers from exercising their vested [water] rights nor limits their exercise of those rights so severely as to amount to prohibition."³¹⁰

1996 (January) Earthmoving work neared completion on the Tunnels Wetland Project on the south side of Interstate Highway 80 just west of the Carlin Tunnels (Carline Canyon). The wetland remediation project was undertaken by Newmont Gold Company in exchange for creek diversions for the Bootstrap Mine, which affected 13 acres of wetlands in the area. The Bootstrap mine project involves the reopening of the Bootstrap open pit mine and the expansion of the Capstone and Post Mines, and resulted in the diversion of portions of Boulder and Rodeo Creeks. The new wetlands are being created on 42.5 acres of property that Newmont owns along the Humboldt River that at one time included a sand and gravel pit operation. The wetland mitigation/remediation project will (temporarily) create one and one-half times as much new wetlands as are being affected, with the balance going to any future mining-related disturbance. Six ponds have been created to form shallow wetlands and islands were constructed to help create five different habitats based on the river's flow. Newmont will be planting vegetation in the months ahead to include habitats such as a freshwater marsh, willow scrub, meadow and upland areas. This was actually the second wetland area created by Newmont. The first is located further to the west along old U.S. Highway 40 and was established as mitigation for the dewatering operations at the Gold Quarry Mine.³¹¹ Subsequently, during a weekend in July 1996, 40 Newmont Gold Company employees and their families spent a day planting bullrush and spikerush plants around the new wetland ponds. In all, more than 11,000 individual plantings were made at the wetland site.³¹²

1996 (March 22) The Battle Mountain Te-Moak Band of Western Shoshone Indians met with other tribes and inter-tribal councils to discuss legal strategies for fighting Lander County's proposed Rock Creek Dam and Reservoir. At a press conference following the meeting, the Western Shoshone Nation and its allies declared that they will challenge every effort made to build the reservoir resulting in a very lengthy and very costly battle for the county. According to the Indians, the Rock Creek Canyon and other nearby areas contain many sites that have been used for centuries by native people to practice religion, to heal, to gather

plants and bury their dead, and their descendants continue to use the canyon area for religious and cultural purposes.³¹³

- 1996 (April 2)** A scoping session was held in Elko for a proposed Humboldt River Basin water resources scientific study to be conducted by U.S. Geological Survey, U.S. Bureau of Land Management and the Nevada Department of Conservation and Natural Resources. The study will concentrate on the middle Humboldt River Basin, stretching essentially from the USGS Palisade gage (Palisade Canyon) to the Comus gage (Emigrant Canyon) as this is where the region's hydrologic system is most dynamic and where the gold mines are currently doing extensive groundwater pumping (dewatering).³¹⁴ The draft proposal for the study called for a project in three phases. Phase one was to include hydrogeologic, hydrologic and climatic data of the Humboldt River Basin, the development of a hydrogeologic framework of the middle basin, groundwater budgets and a water balance of the middle basin, and measuring groundwater levels and water-level trends in the middle basin. Phase two would include flood characteristics of the Humboldt River, hydrodynamics of groundwater flow in the middle basin, variability of spring discharge for the full basin, groundwater budgets and water balance of the upper basin and climatology of the whole basin. Phase three would include analysis of multiple users of the water resources of the middle basin, effects of increased low flows on flood characteristics and riparian vegetation of the basin, interactions of surface and ground water in the middle basin and trends in sediment discharge in the whole basin. Funding for phase one had been completed,³¹⁵ and the remaining phases would proceed once funding was secured.³¹⁶
- 1996 (May 27)** The Elko County Commission declined to sign a memorandum of agreement with the U.S. Fish and Wildlife Service (USFWS) for a recovery plan to delist the Lahontan cutthroat trout (LCT) from the Endangered and Threatened Species List. The LCT was first listed as endangered in 1970 and then reclassified as threatened in 1975. The USFWS plan called for widespread habitat improvements, the elimination of non-native fish (primarily, rainbow, brook and brown trout), and recovery sometime after 20 years. It was estimated that the cost of this plan would be about \$16 million. The federal recovery plan identified three regions for implementation: (1) the Western Lahontan Basin consisting of the Truckee, Carson and Walker River systems; (2) the Northwestern Lahontan Basin consisting of the Quinn River, Black Rock Desert and Coyote Lake basins; and (3) the Humboldt River Basin.³¹⁷ In the Humboldt River, the federal plan called for 93 self-perpetuating LCT populations³¹⁸ before the fish could be delisted with delisting for an entire region and not individual streams. While a significant portion of the LCT habitat occurs on federally managed (Forest Service and BLM) lands, private land owners will also be impacted and hence the need for cooperative agreements with the county commissions. By contrast, Elko County had its own LCT recovery plan³¹⁹ which proposed establishing and/or maintaining 74 self-sustaining populations as opposed to the 93 such populations sought in the USFWS plan. The Elko County plan also called for surveys, water "enhancements", cooperation with private landowners, establishing a hatchery brood stock, and the study of the ecology of the LCT.³²⁰
- 1996 (June)** Northern Nevada horticulturists and weed experts raised the alarm over the spread of exotic, noxious weeds into major agricultural areas in Northern Nevada's water basins. In the Truckee River Basin, lower Carson River Basin and Humboldt River Basin, a primary concern was with the perennial pepperweed, commonly known as tall whitetop (*Lepidium latifolium* L.). Tall whitetop secretes a toxin poisonous to other plants and has reportedly

taken over thousands of acres and is a particular threat to alfalfa crops along the Truckee River. It currently constitutes a major problem in the Truckee Meadows and in the Fallon area (Newlands Project) and is expected to become a problem in Douglas County (Carson Valley) as well. It is also a growing problem in the Lovelock Valley area and is estimated to be expanding by approximately 20 percent per year. In locations along the Truckee River, it has proven very difficult to control as it grows near water and the use of herbicides could be a danger to the river's endangered fish species, the cui-ui. A special problem with tall whitetop is that the ideal time to spray herbicides also coincides with the cui-ui spawning season. Other problem plants include yellow starthistle (*Centaurea solstitialis*), Canada thistle (*Cirsium arvense*), puncture vine (*Tribulus terrestris*), and whitetop (*Cardaria draba*).³²¹

- 1996 (July 3)** A report noted that the Lovelock Meadows (Valley) Water District, based on the public utility's geographic area of service, was the second largest in the state after the Las Vegas Valley Water District (LVVWD). Currently providing drinking water service to about 1,250 separate meters, the water district covers a total area of approximately 250 square miles, stretching from Oreana in the north to Derby Field in the south and about four miles east and west from Lovelock. The water system is completely closed from the wellhead in Oreana to the reservoir tanks above Coal Canyon and then throughout its distribution piping system. The district reported current available water rights at 2,700 acre-feet per year, with current pumping at 1,600 acre-feet per year. Recent regional development around Rye Patch and particularly in Grass Valley south of Winnemucca, an area which is experiencing increasing nitrate problems in its individual water wells, may affect demand for service should these new developments require service from the district as a result of declining groundwater quality.³²²
- 1996 (July 6)** The flow (stage) reading of the USGS gage in the Maggie Creek Narrows, located approximately eight miles upstream from Carlin, went to zero. Subsequently, on August 2, a representative of the State Engineer's office out of Elko discovered that a fissure had opened in the creek bed causing the stream to completely disappear above the gaging station location. Within several days, Newmont Gold Company had by-passed the fissure and Maggie Creek's flows were returned to its natural channel.³²³ Further inspection by the State Engineer's office concluded that mine dewatering at Newmont's Gold Quarry Mine had caused the water table to drop by about 300 feet in the vicinity such that the surface soils over the fissure collapsed, allowing the creek's waters to rush in (i.e., an unintentional groundwater recharge). Newmont had been discharging the Gold Quarry Mine's pumped water, after cooling, into Maggie Creek downstream from the fissure.³²⁴
- 1996 (July)** Construction began on a joint project of Sierra Pacific Power Company (SPPCo) and Newmont Gold Company to build a four-mile pipeline from Newmont's Lone Tree Mine complex to SPPCo's Valmy Power Plant. By using the water pumped from Lone Tree Mine's dewatering operations in its power plant cooling towers, the power company estimated that it will save approximately \$200,000 annually in pumping and chemical treatment costs. In a win-win situation, the project also insures that less groundwater will be pumped from the Clovers Hydrographic Area and released into the Humboldt River. With the pipeline, SPPCo will need to retain only two or three of the 22 wells it was using to provide cooling water for its 500 megawatt, coal-fired power plant, which uses from 2,500 to 5,000 gallons per minute (4,000-8,000 acre-feet per year). The project was completed in late June 1997.³²⁵ The project represented a good example of the State Engineer's preferred

uses of groundwater pumped from mining operations, that is, the substitution of other pumped groundwater.

- 1996 (July)** The U.S. Geological Survey released a professional paper which indicated that increased groundwater pumping in Paradise Valley (Little Humboldt River sub-basin) beginning in the early 1970's has resulted in a change in the direction of groundwater flows in the valley. The study noted that groundwater levels had declined by more than 80 feet in the most heavily pumped areas in the valley and this has caused the groundwater to flow towards the pumped area versus generally in a southerly direction toward the Humboldt River. In an analysis using a computer model of underground flows, it was noted that the model indicated that prior to pumping, most of the groundwater was lost to evaporation and transpiration by native plants, and that little actually reached the Humboldt River. Model simulation of conditions prior to groundwater pumpage indicated that southward groundwater flow from Paradise Valley into the Humboldt River Valley was only 1,800 acre-feet per year, whereas as much as 1,300 acre-feet per year may have flowed north-westward from the Humboldt River Valley into Paradise Valley near Golconda Butte. Groundwater pumpage in Paradise Valley increased slowly from about 200 acre-feet in 1948 to 6,800 acre-feet in 1970. Pumpage increased dramatically in the 1970's when the southern end of the valley proved ideal for growing potatoes, and by 1982 groundwater pumpage totaled about 44,000 acre-feet.³²⁶ The report warned that concentrating pumping in the southern part of Paradise Valley might induce northward flow from the Humboldt River Valley and affect flow in the Humboldt River.³²⁷ (See previous 1964 reference to a study on the concept of "underflow" from Paradise Valley into the Humboldt River Valley.)
- 1996** In studies conducted between 1986 and 1996 on changes in mercury concentrations, the U.S. Fish and Wildlife Service and the U.S. Geological Survey found detectible levels of mercury in aquatic invertebrates and American coots in the Humboldt Sink. Over this time period, researchers witnessed a twofold increase in mercury levels in water boatmen, an invertebrate that's an important food source for migratory birds, and a fivefold mercury level increase in coot liver tissues and eggs. Scientists noted that there were a number of probable causes for this mercury loading besides the upstream mining industry. For example, some of the higher mercury concentrations during this period may have been caused by the effects of a severe drought which affected the basin from 1987 through 1995. It was noted that anything that accumulates in the Humboldt Sink is reflective of what is happening in the Humboldt River Basin.³²⁸
- 1996 (August)** In a revival of a long-simmering idea, Merlin McColm, a businessman and member of the Elko County Conservation Association, presented a 10-page detailed report to the Lander County Commission pertaining to the feasibility and benefits of the restoration of the Argenta Marsh. The area of restoration included a 46-square mile area (nearly 30,000 acres) upstream from Battle Mountain commonly referred to as the "Community Pasture". At one time this area contained two major marsh areas – the 2,040-acre Argenta Marsh and the 560-acre Confluence Marsh – which were interlaced with wetlands, sloughs and native pasture areas once home to an extensive variety of wildlife seeking refuge in its tangled willow growth. In addition, the confluence of Rock Creek and the Humboldt River supported a thriving fishery of crappie, bass and other warm-water species. The channelization done by the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers in the 1950's as part of the Humboldt Project resulted in a dramatic lowering of the region's water table which dried out the wetlands and eliminated the riparian habitat. McColm's idea was to rebuild the

- Argenta Reef and restore the marsh area at a possible cost of between \$4 and \$8 million.³²⁹
- 1996 (September)** A new community activist organization, SWEAT Co., an acronym for Soils and Water Enhancement Action Team Coalition, out of Elko announced its purpose and accomplishments of the previous summer. Founder John Dits stated that the coalition's purpose was to allow hunters, ranchers, environmentalists, miners and other outdoor recreationists an opportunity to work together to accomplish projects that benefit the entire region and put political agendas aside. The organization had been formed in April 1996 based on a similar community-based planning program undertaken in Beaverhead County, Montana.³³⁰ The organization's first project was to plant trees and repair a livestock enclosure along Dorsey Creek (located along State Route 225 approximately 24 miles north of Elko). A second project restored a nature trail in Lamoille Canyon, located approximately 18 miles southeast of Elko. A third project involved installing and repairing fencing to the Steve Boise Allotment in the Snake Range north of Wells. The coalition planned other projects in remote regions of Elko County which combined camping, recreation, socializing as well as restoration work.³³¹
- 1996 (September 24)** A nationwide study, titled "Dishonorable Discharge", was released by two environmental organizations, Public Interest Research Group and Environmental Working Group. The study showed that waterways in Nevada received less pollution from industry during the 1990-1994 time period than the waterways in any other state in the nation. Based on reports made to the U.S. Environmental Protection Agency (EPA), it was estimated that businesses legally dumped almost 1.5 billion pounds of toxic chemicals into America's waterways over this time period.³³² The figures were based on the EPA's "toxic release inventory", which is a yearly catalog of toxins released into the air, water and land. It was also estimated that the true amount may be 20 times higher because only a small segment of U.S. industry actually reports to the EPA. Also, the report specifically does not cover diffuse or "nonpoint" source pollution, such as sediment, nutrients and salts from agricultural runoff and pesticides, which today actually constitute the major sources of many pollutants in America's waterways. Two Nevada businesses were named in the report as releasing toxic chemicals: (1) M-1 Drilling Fluids Co. of Battle Mountain which released 751 pounds of chemicals into the Humboldt River; and (2) Titanium Metals Corp. in Las Vegas which 120 pounds of chemicals into the Las Vegas Wash.³³³
- 1996 (October)** It was reported that the Pershing County Water Conservation District (PCWCD) had hired a consulting firm³³⁴ to outline the costs and obstacles in gaining title to approximately 30,000 acres of federally-managed lands east of Battle Mountain known as the Community Pasture.³³⁵ This area also contained the former Argenta Marsh, before it was drained in the 1950's. The pasture lands, which are without water rights, are presently managed by the U.S. Bureau of Reclamation (BOR) and leased to the PCWCD for \$6,300 per year to graze 2,000 head of cattle. Water rights to these lands were transferred to Rye Patch Reservoir in 1935 as part of the "Humboldt Project". During the 1950's, the BOR sponsored the channelization of the Humboldt River through the Argenta Marsh area to improve flows to the lower basin. The U.S. Army Corps of Engineers, arguably today's strongest federal wetland proponents, actually performed the river channelization, draining the Argenta Marsh in the process. However, according to the terms of the repayment contract between the BOR and the PCWCD, even when the PCWCD repays its portion of the project's construction loan, these lands are to remain under federal control, requiring Congressional action for their transfer. One major requirement that must be met was the

development of a full resource management plan for the area. It was suggested that the PCWCD was making a preemptive move to secure ownership before other interests – i.e., Elko County Conservation Association, Sierra Club, Ducks Unlimited, Lahontan Valley Wetlands, and even the BOR – could place a different priority on this land’s use, possibly attempting to convert some portion of it back into wetlands.³³⁶

- 1996 (October 22)** Barrick Goldstrike Mines Inc. and Newmont Gold Company reached an out-of-court settlement of a mining dewatering lawsuit filed by Newmont in November 1995. The original suit claimed that Barrick was discharging excessive groundwater pumped from its Betze-Post open pit mine into the TS Reservoir, which was owned by Newmont. The reservoir has a fissure which caused the water to saturate the TS farmlands in Boulder Valley and threatened direct and illegal discharge into the Humboldt River. In April 1996 Newmont gained a temporary injunction against Barrick to limit their discharge into the reservoir. In the settlement, Barrick agreed to reimburse Newmont for its legal expenses and give to Newmont property containing an estimated 150,000 ounces in gold in exchange for access across Newmont’s lands.³³⁷ Barrick will construct a water treatment plant and conveyance system³³⁸ for an estimated \$50 million and then move water to the Humboldt River across Newmont’s property in Boulder Valley northwest of Carlin. It was anticipated that by September 1997, when the treatment and conveyance systems are scheduled to be completed, Barrick will be dewatering at a rate of 65,000 gallons per minute (104,845 acre-feet per year).³³⁹
- 1996 (November 5)** Lander County voters overwhelmingly defeated a proposal to continue efforts to construct the Rock Creek Dam and Reservoir. The 20,000 acre-foot reservoir was to be located approximately 30 miles northwest of Battle Mountain and create extensive recreational opportunities for Lander County. The Rock Creek Dam issue was defeated by 68 percent of the voters. Also, 52 percent of the voters voted not to proceed with the Argenta Marsh alternative proposal. The vote primarily reflected the rising costs of project delays, as well as a growing awareness and sensitivity for native American heritage, threatened litigation against the project and rising costs of an environmental assessment (EA) or a full-blown impact statement (EIS). Claims by the Battle Mountain Band of the Te-Moak Tribe of Western Shoshone noted that this area, termed “Bah Tza Gohm Bah”, has been of cultural and religious importance to their tribe for over 5,000 years.³⁴⁰ There remained the issue of what to do with the remaining \$1.28 million in proceeds from a 1984 bond issue of \$2 million for the project’s development.³⁴¹
- 1996 (November 8)** Responding to the overwhelming vote of the previous Tuesday (see November 5, 1996 entry), the Lander County Commission agreed to terminate and unwind the Rock Creek Dam Project, which had been actively pursued by the county since December 1978. The commissioners discussed the loose ends which needed to be wrapped up, including paying off the \$2 million in general obligations bonds, terminating contracts with environmental and engineering consultants, canceling a pending application to the Bureau of Land Management to acquire public land for the project, disbanding the Rock Creek Dam Advisory Board, and disposing of water rights acquired specifically for maintaining the 20,000 acre-foot reservoir.³⁴² This marked the official end of Lander County’s efforts to construct a recreational reservoir in Rock Creek Canyon.³⁴³
- 1996 (November)** Barrick Goldstrike Mines Inc. signed an agreement with Eureka County agreeing to pay \$100,000 per year to the county in water export fees and an additional \$4 per acre-foot if the amount of water exported from the company’s Betze-Post Mine dewatering

operations exceeds 250,000 acre-feet over 10 years. The fee was levied based on Barrick's intent to discharge up to 70,000 gallons per minute (112,900 acre-feet per year) of pumped groundwater into the Humboldt River. After payment of the first \$100,000, the State Engineer and the State Attorney General would rule in September 1997 against the agreement. NRS 534 allows for a water export fee of \$6 per acre-foot for water exported from one county for use in another county or state (per NRS 533.438). The Attorney General's ruling stated that the legislature's intent in enacting the statute was to compensate rural counties losing water to growing urban areas. In the case of mine dewatering, however, the economic benefits of the use of the water accrue to Eureka County and not to downstream users, hence no compensation is justified. In October 1997, this ruling would be appealed by Eureka County to the Seventh District Court.³⁴⁴

1996 (December) The U.S. Geological Survey, Water Resources Division in Carson City, released a study of the effects on groundwater levels of mine dewatering in the Carlin Trend in the Humboldt River Basin north of Carlin.³⁴⁵ The study, which analyzed data for the years of 1990 through 1993 showed that groundwater levels in silt-stones and carbonate rocks had declined by 800 feet at Barrick's Betze-Post Mine north of Boulder Flat and also declined by 200 feet at Newmont's Gold Quarry Mine north of Carlin and up Maggie Creek. It was noted that due to poor hydraulic connections between the rock structures at the Gold Quarry Mine, groundwater levels in nearby basin-fill deposits and volcanic rocks have not declined. However, near Barrick's Betze-Post Mine, the cone of depression extended through volcanic rocks of the Sheep Creek Range and into Rock Creek Valley to the east. Furthermore, it was found in the area of Boulder Flat and down gradient from the TS Reservoir, which is used by Barrick to hold water pumped from its Betze-Post Mine, water levels have risen by as much as 70 feet. The TS Reservoir has a fissure in its bottom that allows stored water to saturate Boulder Flat. The total dewatered amount from Barrick's and Newmont's efforts was roughly 100,000 acre-feet in 1993. It was also noted that the study was somewhat out of date, and that based on more recent conditions the effects of dewatering are even greater now.³⁴⁶

1996 (December 11) Lander County Commissioners sent a letter to members of the Nevada Congressional delegation opposing any effort by Congress to transfer ownership to the Pershing County Water Conservation District (PCWCD) of the 29,950 acres of rangeland commonly referred to as the Community Pasture located near Battle Mountain. County officials had expressed a desire to reestablish a marsh at the site as a recreational area. The Argenta Marsh, which once contained an estimated 12,000-15,000 acres of wetlands, was located in the area before the U.S. Bureau of Reclamation transferred the water rights in 1934 and the U.S. Army Corps of Engineers channelized and drained the marsh during the 1950's as part of the Humboldt Project. The letter from the county commission stated that "...the Bureau of Reclamation has grievously injured Lander County in the past...Since that occurrence, in 1934-36, they have channelized the Humboldt River through the area from which water rights were transferred; applied herbicides...to flora in what had been a thriving wetland ecosystem, and allowed over-grazing within that area by the preferred grazing permittee [PCWCD]." In response, the PCWCD questioned the county's intention to reestablish a marsh when during the recent November elections 52 percent of the county's voters turned the project down.³⁴⁷

1997 (Ongoing) Beginning in this year the issue of transferring title of the Humboldt Project from the U.S. Bureau of Reclamation to the Pershing County Water Conservation District

(PCWCD) gained renewed interest. Of particular concern to Lander County, state wildlife officials, and a number of environmental and wildlife organizations was the future status of the 30,000-acre area referred to as the “Community Pasture” which had once contained the Argenta Marsh. As a result of this renewed interest, the Nevada Division of Wildlife became more actively involved in the discussions of title transfer in an effort to resolve the PCWCD’s opposition to restoring some portion of the original Argenta Marsh, which was to be located between Argenta and Battle Mountain.³⁴⁸

- 1997 (January)** The Pershing County Water Conservation District (PCWCD) board members decided to continue their formal protest with the State Engineer against the Nevada Division of Wildlife’s (NDOW) request to transfer nearly 117 acre-feet of water outside the district for use in the Toulon Wildlife Area of the Humboldt Sink. In October 1992, NDOW had filed an application with the State Engineer’s office to change the point of diversion, the place of use and the manner of use of this water which had been quit claim deeded to it in 1991 by the Nevada Waterfowl Association. The PCWCD was concerned that the proposed diversion would undermine the integrity of the district and set a precedent for owners of water rights in Lovelock Valley. NDOW had stated that botulism outbreaks in the Humboldt Sink had been killing hundreds of birds and additional water supplies are necessary to flush out the impurities and better sustain wildlife.³⁴⁹
- 1997 (February 1)** Representing the most bountiful water year since 1984, the Natural Resources Conservation Service (NRCS) reported that snowpack water content conditions as of this date for the Humboldt River Basin were 160 percent of normal for the upper Humboldt River basin and 139 percent of normal for the lower Humboldt River basin.³⁵⁰ Also, based on snowpack conditions and weather forecasts for the rest of the year, the NRCS showed their “most probable” forecast for streamflow in the Humboldt River Basin to be at 192 percent of normal for the upper Humboldt River basin and 194 percent of normal for the lower Humboldt River basin.³⁵¹
- 1997 (February 12)** The Nevada Attorney General’s Office issued its legal opinion supporting the validity of Senate Bill 96, which was passed during the 1995 legislative session. The new state law prohibits the U.S. Bureau of Land Management (BLM), specifically, from applying for water rights for livestock. Essentially, the Nevada law states that those who hold grazing rights or lease public lands have the rights to the water; the BLM cannot hold stock watering rights because it does not own livestock. Because of the specific language in SB 96, however, the law only applies to the BLM whose lands are considered to be “public lands” as opposed to those lands managed by the U.S. Forest Service and the U.S. National Parks Service, which are considered to be “reserved lands” and therefore may fall under the “Reservation Doctrine”.³⁵² It was suggested by one Nevada legislator that this action will send shock waves to the other western public land states subject to the Secretary of the Interior’s recent range land proposal. In that reform effort, it was stated that “...any such water right shall be acquired, perfected, maintained and administered in the name of the United States.”³⁵³ The U.S. Justice Department, on behalf of the BLM, filed an appeal to the State Engineer’s subsequent rejection of nine BLM applications for stock water rights in Douglas County. The Justice Department argued that the Nevada Legislature reacted “incorrectly” to the Interior Department’s new grazing regulations which were published in 1995 and mistakenly interpreted them as a federal “water grab”.³⁵⁴
- 1997 (March 4)** Elko County’s Grand Jury issued a report citing the manipulative practices of federal land management agencies in local land exchanges and systematic federal government

efforts to gain control over Nevada water through such exchanges. The Grand Jury concluded that “Not only is federal control of water potentially harmful, it is another means by which the value of privately owned property is manipulated by the federal government.” According to the report filed with the county clerk, the Grand Jury attempted to answer two questions: Are federal agencies forcing these land exchanges to take place? And what are, and what will be, the effect of the exchanges on Elko County? The report made four specific recommendations: (1) the federal government should be required to provide sworn testimony and documentation to the Grand Jury;³⁵⁵ (2) the Elko County Commission should amend the current land use plan to include a requirement of notification by state and federal agencies regarding any land exchanges within the county; (3) the Elko County Commission should consider hiring or appointing a person to examine and monitor all land exchanges, keeping the county’s Public Land Use Advisory Commission as an active participant in all land use issues; and (4) the federal government should strictly abide by Nevada water law, which states that owners of water rights must put the water to beneficial use, and future land exchanges exclude the transfer of water rights to the federal government.³⁵⁶

- 1997 (April)** Vidler Water Company, a Fort Collins, Colorado-based firm that buys land and markets both land and water rights across the western U.S., bought the land holdings of the Nevada Land & Resource Company, which in October 1995 had acquired ownership of approximately 1.4 million acres of railroad land in northern Nevada from the Atchison, Topeka and Santa Fe Railroad Company. Most of that land consisted of a checkerboard pattern of some 1.4 million acres lying along the route of Interstate Highway 80 and the course of the Humboldt River. The company stated that it bought the holdings not for the land, but for the gold, geothermal energy and water rights that accompany the land. Vidler manages about \$150 million in water assets in Colorado, Nevada, California and Arizona. The company’s philosophy asserts that water, not land or population, will determine all future growth in the American Southwest. The company hopes to “guide” growth in its various markets by helping to match communities possessing excess water with arid regions where water is most scarce.³⁵⁷
- 1997 (April 16)** The Nevada State Engineer fired a “warning shot” at Elko County with respect to the effects of future growth and overdrafting groundwater in the basin. The letter, directed to the county’s planning director, recommended the cessation of all land development unless unused water rights are turned over to the state. At issue was the fact that anyone with a lot in the county can drill a well without having a permit from the State Engineer’s Office. Each such private well can pump up to 1,800 gallons per day (approximately 2.0 acre-feet per year), a volume considerably above normal residential water use of 0.5-1.0 acre-feet per year. The State Engineer recommended that before further parceling, the lot owner should acquire unused water rights and relinquish 2.02 acre-feet per year per lot to the state. One Elko County Commissioner acknowledged that “Sooner or later we are going to have to give up some irrigation rights for development rights.” Subdivisions specifically mentioned by the State Engineer were subdivisions in Adobe Summit, Meadow Valley Ranchos, Last Chance Ranch, Crestview and government tracts, with estimates that these developments would require up to 4,500 new wells (or potentially over 9,000 acre-feet per year).³⁵⁸
- 1997 (May 28)** The U.S. Army Corps of Engineers reported to the Lander County Commission that there is a 1 in 12 chance that the Reese River will overflow during peak runoff periods to flood part of Battle Mountain in any given year. The Corps also estimated that there is a 1 in 36 chance that the levee will fail entirely. After a devastating 1962 flood, the Corps

constructed a 7,200-foot long, five-foot high levee along the eastern portion of the town from Interstate Highway 80 to North Battle Mountain Road. The Corps' reconnaissance study urged raising 3,700 feet of the levee by one to five feet, extending the levee 6,800 feet farther upstream from Interstate 80, raising a 200-foot section of Highway 40 one foot, and constructing a gate at the Union Pacific Railroad bridge. The report noted that embankments on Interstate Highway 80, Highway 40 and the railroad run across the flood plain and block the normal flow of water to the north. The study stated that "most of the community is within the 100-year flood plain and damages from flooding of the Reese River can be substantial." The Corps estimated that the recommended improvements would lower the chance of flooding to 1 in 150.³⁵⁹

1997 (June) Assembly Bill 516 was introduced into the Nevada Legislature intended to impose a fee of \$10 per acre-foot of water for mining operations that pump (dewater) more than 500 gallons per minute (806 acre-feet per year). The bill would have been applicable to virtually all mine dewatering operations in the Humboldt River Basin. The bill was touted as an environmental protection measure by Professor Glenn Miller, and environmental scientist with the University of Nevada, Reno, who also represents the Sierra Club, and Tom Myers, a hydrologist and environmental activist representing Great Basin Mine Watch. Both of these individuals had previously provided "expert" testimony and raised a number of issues related to the long-term effects of mine dewatering operations on the groundwater, water quality in mine pit lakes, and the effects of groundwater pumping on surface water flows. Under the measure, the dewatering taxes would be used for projects intended to study the long-term effects of mine dewatering on the state's water resources and for projects to mitigate the effects of groundwater pumping.³⁶⁰ It was also suggested that these funds be established now while the mines are operational and can afford to make the payments. In this "face-off" with the environmental community, the mining industry countered that they are already conducting extensive studies of their own and also funding studies by the U.S. Geological Survey on the effects of mine dewatering. It was also noted that the Nevada State Engineer and the Nevada Division of Environmental Protection already place stringent restrictions on mining operations, dewatering and discharges before any mining permits are issued.³⁶¹ By session's end, the bill had never made it out of the Assembly's Committee on Natural Resources, Agriculture and Mining.

1997 (June 6) A portion of a heap leach pad failed at Newmont Gold Company's South Operations Area north of Carlin. The failure allowed 275,000 gallons of cyanide solution to leak into the James Creek diversion. Newmont workers were able to stop most of the solution from reaching Maggie Creek; however, it was estimated that approximately 18,700 gallons of the solution did reach the creek and later the Humboldt River. Subsequent test results showed cyanide levels at 12.9 parts per million where the spill entered Maggie Creek and between 0.11 and 0.4 parts per million at the Humboldt River (drinking water standard is 0.2 parts per million).³⁶²

1997 (June) Both the Pershing County Commission and the Pershing County Water Conservation District (PCWCD) approved a resolution that opposed "any restoration or redevelopment of the Argenta Marsh area, along the Humboldt River in Lander County, because of the possible adverse economic impact on agriculture and wildlife activities within Pershing County." The PCWCD has argued that (1) all waters of the Humboldt River have been adjudicated and allocated and none are available for marsh restoration or maintenance; (2) the Community Pasture where the Argenta and Confluence marshes were once located should belong to the

PCWCD as part of their loan repayment for the Humboldt Project;³⁶³ (3) the initial use of waters pumped from mine dewatering activities to “jump start” the Argenta Marsh restoration project are temporary, will terminate when the mining operations cease, and may result in later demands for other, i.e., agricultural waters to be used to maintain the marsh once it has been established; and (4) Pershing County’s \$40 million agricultural industry could be seriously jeopardized if Rye Patch Reservoir does not receive sufficient waters from upper basin sources. Marsh restoration advocates noted that Rye Patch Reservoir is actually filling up with silt, which a restoration project like the Argenta Marsh could mitigate to some degree. A study in 1995 estimated that due to silt buildup in the bottom of the reservoir, its design capacity had fallen by about 18 percent, from 190,000 acre-feet to approximately 160,500 acre-feet. Marsh proponents argued that riparian areas, like the Argenta Marsh, reduce the silt carried in the water by slowing streamflows and trapping sediment in root systems. In fact, the channelization of the Humboldt River through the marsh area in the 1950’s actually increased speed of flow and therefore enhanced the river’s ability to carry more silt downstream for deposition in Rye Patch Reservoir.³⁶⁴ The proposed Argenta Marsh would be located almost 110 miles upstream from Rye Patch Reservoir, so its effects on silt removal over that distance may require additional study.

1997 (June 26) Opposing sides met in Battle Mountain to contest the future ownership and use of a 30,000-acre area located upstream towards Argenta called the Community Pasture, the former site of the Argenta Marsh. Some estimates of the extent of this former marsh, swamp and wetland area run as high as 12,000-15,000 acres, including both open waters and sloughs, oxbows, and lush, productive riparian habitat. One former employee of the Nevada Division of Wildlife (NDOW) stated that wildlife surveys of the area conducted in the 1950’s were “unbelievable” in terms of the extent of native wildlife supported by this area. After water rights were transferred to Rye Patch Reservoir in 1935, the area was channelized and drained in the 1950’s and herbicide was applied to the riparian plant life, effectively removing all indication of the land’s former state. On the one hand, marsh restoration proponents anted to acquire and transfer water rights and re-establish a 2,500 to 3,000-acre wetland/riparian area in the pasture, possibly begun with “seed water” from nearby mine dewatering operations. On the opposing side was the Pershing County Water Conservation District (PCWCD) which leases the pasture from the U.S. Bureau of Reclamation (BOR) for livestock grazing. The PCWCD has applied to the BOR for ownership of the pasture based on its completion of payments for the Humboldt Project. The PCWCD only agreed to allow the establishment of some sloughs along Rock Creek, which passes on the north side of the pasture area. The PCWCD stated that the Humboldt River’s water rights have been adjudicated and none exist for setting up a marsh. By the end of the meeting a loose confederation of proponents known as the Argenta Marsh Committee was formed.³⁶⁵

1997 (June) The Nevada Mining Association conducted a tour of the Coeur Rochester Mine, owned by Coeur d’Alene Mines Corporation, located near Lovelock. The purpose of the tour was to demonstrate the level of reclamation being undertaken by the mining industry to return mined lands back as close as possible to their native state. Since the Coeur Rochester mine opened in 1986, miners have turned 13 acres of mountains and valleys covered with green grasses and scrubs into flat, dry, orange-colored dirt with open pits as deep as 400 feet. The mines are obligated by law to turn the disturbed areas back into vegetated natural-looking land. Under the Nevada Mining Reclamation Act passed in 1989, mining companies must pay a bond for reclamation before they can begin mining. The Coeur Rochester Mine

has an \$8.4 million bond for its reclamation work. At a cost of approximately \$6,000 an acre, Coeur has already reclaimed 148 acres of waste area by regrading it, smoothing it over, covering it with topsoil and reseeding it with a special seed mix approved by the BLM consisting of grasses native to Nevada.³⁶⁶

1997 (July 8) The Nevada Division of Wildlife (NDOW) provided for public comments from Humboldt County residents on their plan to restore Lahontan cutthroat trout (LCT) to their native habitat. During the fall, NDOW proposes to eradicate fish populations in segments of Rodeo and Raster Creeks so that those reaches can be repopulated with LCT in another two years. NDOW also proposed to stock LCT fingerlings in barren reaches of Andorno and Battle Creeks. NDOW representatives noted that past indiscriminate introductions of rainbow trout into historic LCT habitat by NDOW allowed the LCT and rainbow populations to hybridize, diluting the LCT gene pool. Furthermore, stocking of nonnative brown and brook trout into LCT streams resulted in increased competition for food and space. The eradication of fish populations in selected streams will require poisoning the stream with rotenone, an organic extract from plant roots that constricts blood vessels so that the fish suffocate. Rotenone has been used for years in sheep dip and is harmless to wildlife and livestock that could drink the treated stream water, although it will also kill invertebrates that the fish populations live off of. Streams will be treated with rotenone for two successive years, followed by three successive years of planting LCT.³⁶⁷

1997 (July 16) The U.S. Bureau of Land Management released a draft environmental impact statement (DEIS) describing the expansion plans for the Florida Canyon open pit mine. The mine, operated by Florida Canyon Mining Incorporated, a subsidiary of Pegasus Gold Corporation, is located approximately 35 miles northeast of Lovelock along Interstate Highway 80 and near the ghost town of Humboldt City, which was established in the early 1860's in the Imlay Mining District. The DEIS covered a proposed expansion of the mine from 3,157 acres in the current plan boundary to 5,519 acres and included an enlargement of the open pit, new waste rock storage areas, a new heap-leach pad, additional processing facilities and related development work. Without the expansion the mine could continue operations only through 1997; however, with the expansion operations would continue through at least 2002.³⁶⁸ The plan also called for partial backfilling of the mine's open pit such that the bottom of the pit will be above the water table and therefore no pit lake will form when mining operations cease. The mine pumps only about 70 gallons per minute and all the water is reused.³⁶⁹ For calendar year 1996, the Florida Canyon Mine reportedly produced just over \$71 million in gold and was the ninth largest gold producer in the State of Nevada in that year.³⁷⁰

1997 (July 17) The proposal to restore the Argenta Marsh upstream from Battle Mountain found another supporter when Lander County's Wildlife Board unanimously endorsed the idea. The Board noted its support while recognizing that it will not take a position on other issues, most notably the acquisition of the water rights necessary to support the creation and maintenance of the wetlands. Also during the meeting, the Nevada Division of Wildlife (NDOW) reported that in 1990 Nevada voters approved \$47.2 million in bonds for habitat restoration and state parks improvements. There remained about \$3 million in the NDOW habitat acquisition fund and another \$800,000 for habitat improvement projects. A number of misconceptions over the project were also noted to include the mistaken belief that the wetlands would necessarily mean more mosquitoes in Battle Mountain, that there would be no grazing on the remaining lands in the 30,000-acre Community Pasture, and that downstream water right holders, i.e.,

the Pershing County Water Conservation District, would find its water supplies jeopardized.³⁷¹

- 1997 (July 29)** At their July meeting, the Humboldt River Basin Water Authority began to take a serious look at the potential for “inadvertent” interbasin water transfers due to the dewatering operations of open pit mining in the basin. At question were the flows into the Carson Sink from the Humboldt Sink, the history behind the Humboldt Drain and Humboldt Slough, which together form the hydrologic connection between the sinks of these two water basins, why the connection has been preserved and not blocked, whether persons would expect continued flows into the lower Carson River Basin’s wetlands from the lower Humboldt River Basin, and could greater storage in the Humboldt River Basin preclude the loss of the Humboldt River’s increased flows due to rising mine discharges into the river? It was noted that presently, and in the near future, a number of mines would be directly and indirectly discharging into the Humboldt River. These included: (1) Newmont Gold Company’s Lone Tree Mine (30,000 gallons per minute, or 48,400 acre-feet per year); (2) Newmont’s Gold Quarry Mine (20,000 gpm, or 32,300 acre-feet per year discharged into Maggie Creek); and Barrick Goldstrike’s Betze-Post Mine, along with Newmont’s Leeville Project (70,000 gpm, or 113,000 acre-feet per year).³⁷² Therefore, from these four operations, theoretical (permitted) discharges could total up to 193,600 acre-feet per year, a significant portion of which would reach the Humboldt River. This is a significant level when compared to the Humboldt River’s long-term historical average flow of 291,040 acre-feet per year measured at the USGS Palisade gage.³⁷³
- 1997 (August 15)** Trout Unlimited, an organization representing fisherman and outdoor enthusiasts and claiming 98,000 members nationwide and 600 in Nevada, sent letters to Lander County Commissioners, the U.S. Bureau of Reclamation (BOR), and Nevada’s Congressional delegation, criticizing poor grazing practices on the BOR’s leased lands, called the Community Pasture, and supporting the restoration of the historic Argenta Marsh in the area. The Chairman of Nevada Trout Unlimited claimed that the pasture lands near Battle Mountain that the Pershing County Water Conservation District was attempting to acquire from the BOR are in “some of the worst shape that our members have seen on public land in the Western United States.” The state council of Trout Unlimited, as well as three local chapters, have joined the Argenta Marsh Committee in their efforts to restore some portion of the wetlands that once existed in this area between Battle Mountain and Argenta. In 1935 the water rights to these nearly 30,000 acres were transferred to Rye Patch Reservoir as part of the Humboldt Project, and then during the 1950’s the U.S. Army Corps of Engineers, working for the BOR, channelized the river below Argenta and effectively drained the land and destroyed the riparian vegetation and habitat.³⁷⁴
- 1997 (September 16)** The Mineral Policy Center, a Washington, D.C. lobbying group which is opposed to the 1872 Mining Law,³⁷⁵ released a 269-page report titled *Golden Dreams, Poisoned Streams*. The report represented an indictment of the mining industry, accusing it of recklessly polluting the nation’s waters. The report estimated the cost of cleaning up more than 557,000 abandoned hardrock mines, mostly in the Western states, at \$32 billion to \$72 billion. The Center said that from Alaska to Florida it had found 12,000 miles of streams contaminated with acid, heavy metals and sediments.³⁷⁶ In order to prevent imminent disaster to the nation’s waterways and drinking water supplies, the Center called for additional federal environmental regulations on the industry. The report made broad accusations against mining operations throughout the United States and the world; however, most of the specific

accusations against mines in northern Nevada were related to mine dewatering operations in the Humboldt River Basin. In addition to the concerns over mine dewatering, the report noted that water supplies in northern Nevada are also being threatened by acid mine drainage from waste rock piles (heap leaching).³⁷⁷ Specifically mentioned was Newmont Gold Company's Rain Mine near Elko. Specifically, in June 1990, the Nevada Division of Environmental Protection (NDEP) issued a "Finding of Alleged Violation and Order" in connection with the Rain Mine's acid drainage. NDEP reported that surface water drainage from the mine's waste rock piles was contaminating approximately two miles of nearby Dixie Creek. Newmont accepted responsibility for the problem and began performing necessary remediation.³⁷⁸

- 1997 (September 23)** The Nevada Attorney General's office found Eureka County's water export fee to be illegal. In November 1996 Barrick Goldstrike Mines Inc. agreed to pay Eureka County \$100,000 per year and an additional \$4 per acre-foot if its dewatering discharges exceed 250,000 acre-feet over 10 years. Such a fee was permitted under NRS 534 (\$6 per acre-foot) under conditions prescribed in NRS 533.438.³⁷⁹ The state argued that two key points were not met by Eureka County in its imposition of the fee. First, the "legislative intent" was to compensate rural counties for the "opportunity costs" of transferring water resources to urban counties. Second, the beneficial use of the transferred water should be outside the county of origin. That state noted that Barrick actually used its water for irrigation on Newmont's TS ranch, therefore the benefits remain within the county of origin.³⁸⁰ Also, the ruling found that the legislature has reserved to the State Engineer (Nevada Division of Water Resources) all authority to require mitigation payments for beneficial uses of water, hence Eureka County is not authorized to seek mitigation independently.
- 1997 (October 1)** In a test case of a county's efforts in allowing the federal government to obtain more water rights, the Elko County Commission rejected the U.S. Bureau of Land Management's plan to exchange approximately 70,000 acres of private land in the Big Springs Ranch for some 7,000 acres of BLM land in and around Wendover in eastern Elko County (both locations being outside the Humboldt River Basin). In large part, the rejection was based on the fact that water rights would also be acquired by the BLM along with the ranch lands. County commissioners asserted that according to the Federal Land Management and Policy Act (FLMPA) federal agencies are required to comply with local policies. After approving the Western Resource Management land exchange in August 1997, the county adopted a policy against federal acquisition of water rights. In addition, the county also claimed that a recent bill of the 1995 Nevada Legislature (Senate Bill 96) prevented the federal government (and specifically the BLM) from owning water rights. The BLM responded to Elko County's decision by claiming that (1) the county has no statutory jurisdiction over the BLM or the ranch holder; (2) the FLMPA only requires compliance with local policy "to the extent that is practical"; and (3) that SB 96 prevents a federal agency from filing for any new stock water rights, not acquiring existing water rights from willing sellers in conjunction with water-righted land sales.³⁸¹
- 1997 (October 6)** The Eureka County Commission decided to file a motion for a declaratory judgement with the Seventh District Court against the State Attorney General's September 23, 1997 ruling regarding the county's mitigation plan that assessed a water export fee on mine dewatering operations involving the discharge of pumped groundwater into the Humboldt River. In September 1997 the Attorney General ruled that since the economic

benefits of the dewatering operation accrue to the county of origin (Eureka) and not to downstream users, then the fee is not justified. Of growing concern was that future dewatering permits sought and obtained by Barrick Goldstrike Mines, Inc. called for additional levels of discharge totaling up to 70,000 gallons per minute (112,910 acre-feet per year). This additional pumped water would be discharged into the Humboldt River and not used beneficially in the county of origin, which was one finding presented in the Attorney General's ruling. In filing for the declaratory motion, the county felt that it could not proceed with a similar mitigation fee arrangement with Newmont's Gold Quarry Mine operations until the Barrick fee question was resolved. One suggestion was that if a downstream beneficial use of the mine's water discharges was shown, for example, restoration of the Argenta Marsh in Lander County, then perhaps benefits could be declared to have been transferred to another county.³⁸²

1997 (October) In a presentation before the Humboldt River Basin Water Authority, environmental scientist and University of Nevada, Reno Professor Glenn Miller reported on a new study of mine dewatering in the Humboldt River Basin sponsored by a \$767,000 grant from the U.S. Environmental Protection Agency and National Science Foundation. The grant was intended for Dr. Miller and a team of scientists to assess open pit lake water quality and groundwater effects of heap leaching with cyanide. Miller was one of the first persons in the scientific community to raise profound concerns over the long-term impacts of mine dewatering and pit lake refilling. Miller noted that the water quality in smaller pit lakes with oxidized ore is generally good, for example the old Cortez pit in Crescent Valley. However, preliminary studies have found that the deep pits that contain unoxidized ore will generally have poor water quality that will not support aquatic life or livestock watering. Particularly noted in this regard was the Getchell Mine pit lake located along the Getchell Trend to the west of the Carlin Trend. Miller estimated that the Barrick Goldstrike Betze-Post open pit mine will fill with more than 300,000 acre-feet of water when the mine shuts down and dewatering operations cease. Newmont's Gold Quarry open pit mine was estimated to fill with from 200,000 to 250,000 acre-feet of water upon termination of dewatering operations there. Based on current mining operations, Miller estimated that, within Nevada, open pit mine lakes will contain from one million to 1.5 million acre-feet of water when filled. The "water deficit" created by these open pits will create a strong groundwater "draw" towards the pits and away from springs and streams. Miller also suggested that while a recent proposal to enact a dewatering fee to fund mitigation and research efforts never made it out of committee during the 1997 legislative session, this idea should still be considered.³⁸³

1997 (Late)³⁸⁴ Beginning late this year, based on an unusually wet year and well-above normal snowpack water content in the upper and lower Humboldt River Basins, inflow from the Humboldt River filled the Humboldt Sink and overflow began into the Carson Sink.³⁸⁵ Using February 1, 1997 recordings (as opposed to April 1),³⁸⁶ the snowpack water content was recorded at 160 percent of normal in the upper basin and 139 percent of normal in the lower basin. In the past, such overflow out of the Humboldt River Basin has been relatively rare, with the most recent occurrence being in the mid-1980's. From this time and continuing through September 1999, overflows from the Humboldt Sink would continue, peaking at 930 cubic feet per second at a point slightly downstream of the Humboldt Bar. As part of the Lower Humboldt River Project, the U.S. Geological Survey began monitoring both the quantity and quality of the outflow. Their monitoring showed that between July 9 and July 20, 1998, the rate of outflow increased to a peak measured value of 930 cfs. By January 11,

1999, the flow rate had decreased to 303 cfs. During this July 1998 to January 1999 period, estimated dissolved-solids concentrations ranged from about 700 to 1,400 milligrams per liter, and the estimated dissolved-solids load varied from about 1,100 to 1,800 tons per day. For the six-month period between July 9, 1998, and January 11, 1999, the outflow from the Humboldt Sink (and basin) totaled almost 200,000 acre-feet.³⁸⁷

1997 (November) Recognizing that controversy continues to surround mine dewatering in the Humboldt River Basin, Nevada Division of Wildlife (NDOW) Habitat Bureau Chief Robert McQuivey stated that there’s no question that it’s been good for the region’s wildlife. It was noted that the Humboldt Sink and its 37,000-acre Wildlife Management Area, which is leased from the U.S. Bureau of Land Management and administered by NDOW, is the direct beneficiary of three major mine dewatering projects. Specifically, Newmont Gold Company’s Lone Tree Mine and Gold Quarry Mine and Barrick Goldstrike’s Betze-Post Mine together have permits to pump over 100,000 acre-feet of groundwater per year into the Humboldt River. A number of other mines in the basin are also involved in mine dewatering, but typically dispose of their pumped water by means of direct re-injection or into infiltration ponds. McQuivey noted that mine dewatering helps to restore some of the water that had historically been available to the river’s wetland areas, such as those in the Humboldt Sink, before people along the river began diverting and using the river’s waters so heavily. Primarily due to agricultural diversions along the entire Humboldt River system, little water reaches the Humboldt Sink during normal water years. Historically, this terminus area of the Humboldt River system represented an incredibly productive wildlife habitat, feeding and resting area for countless migratory birds that passed through this portion of the Pacific Flyway on their way to summer feeding grounds in Canada and Alaska.³⁸⁸

1997 (November) Hydrologic (Colorado) Consultants, Inc. (HCI) published a report for Newmont Gold Company³⁸⁹ which estimated current and proposed dewatering activities for a number of mining operations in the Humboldt River Basin. In total, seven mining operations were listed showing existing or proposed (Leeville Mine) groundwater pumping (dewatering) operations amounting to nearly 250,000 gallons per minute (gpm), or over 400,000 acre-feet per year. The mines, their 1997 water year dewatering (pumping) rates, water consumed on site for mining operations and dust control, and discharge locations were as follows:³⁹⁰

Humboldt River Basin Mine Dewatering 1997 Water Year – October 1996-September 1997			
Mine	Dewatered (gpm)	Consumed (gpm)	Discharge Location
Gold Quarry	21,000	2,000	Maggie Creek(1)
Post/Betze-Meikle	51,000	4,2000 - 5,800	TS Ranch Reservoir(2)
Cortez Pipeline	30,000	2,000	28,000 gpm through infiltration ponds
McCoy/Cove	30,000	n.a.	Infiltration ponds
Lone Tree	up to 75,000	2,000	3,000 gpm piped to Valmy Power Plan; rest to Humboldt River(3)
Twin Creeks	6,300	2,200 - 4,300	600 gpm infiltrated
Leeville (proposed)	35,000	n.a.	Discharged to Humboldt River

(1) Discharged to Maggie Creek after treatment and/or cooling. During peak spring runoff, water is stored in Maggie Creek Ranch reservoir. Dewatering operations have been as high as 45,000 gpm.
 (2) Includes injection wells and infiltration basins. Reservoir water used for irrigation on the TS Ranch during the growing season. Pumping has been as high as 70,000 gpm.
 (3) After treatment and cooling, pumped water is discharged to the Humboldt River via the Iron Point Relief Canal and Herrin Slough.
Source Data: Hydrologic (Colorado) Consultants, Inc.

The report also computed average monthly streamflow versus distance from the Carlin gage using USGS streamflow data. The report noted that from February to June Humboldt River flows generally decrease with increasing distance downstream due to the combined effects of irrigation during the growing season (March to October), evapotranspiration by riparian vegetation, and loss of surface water to the groundwater system. During the period of July through October, streamflow is affected primarily by irrigation. Increasing streamflow downstream occurs as a result of return flow from irrigation diversion and releases from dams below Rye Patch Reservoir. By November, irrigation ends and the beginning of winter precipitation causes a general increase in rates of flow from November to January. The report also noted that streamflow in the Humboldt River is characterized by both gaining and losing reaches above Imlay during this time and losing reaches below Imlay.³⁹¹ In addition to an analysis of the mines’ dewatering operations and the effects on river flows, the HCI report also estimated the ultimate size of the mine pit lakes which would form once pumping operations ceased. In total, it was estimated that the twelve mine lakes analyzed would fill with nearly 1,370,000 acre-feet of groundwater. Based on a total surface area of 2,952 acres, an estimated 11,300 acre-feet would be evaporated from the pit lakes each year.³⁹² The following table presents the mine, estimated pit lake surface area and pit lake volume when fully filled.³⁹³

Humboldt River Basin Mine Estimated Pit Lakes		
Mine	Pit Lake Surface Area (acres)	Pit Lake Volume (acre-feet)
Twin Creeks	870	460,000
Post/Betze	1,020	580,000
Lone Tree	384	93,000
Gold Quarry	371	175,000
Cortez/Pipeline	135	44,000
Getchell	85	n.a.
Genesis	40	5,700
Dee	19	1,800
Tara	25	2,300
Bootstrap	4	170
McCoy/Cove	n.a.	n.a.
Fortitude	n.a.	n.a.
Total, All Pit Lakes	2,952	1,361,970
n.a. = Information not available at time of report. <i>Source Data:</i> Hydrologic (Colorado) Consultants, Inc.		

1998 (January) Reacting to “areas of special concern” identified from a December 5, 1997 water

planning meeting of the Nevada Division of Water Planning's Advisory Board on Water Resources Planning and Development, the Elko County Commission decided to establish a county water planning commission and develop its own county water plan. Membership of the 7-member commission will consist of one county commissioner, four representatives from the county municipalities, and two at-large members elected from the general public. In outlining the reasons for the county water plan, a county planning official noted that the plan would: (1) be a tool for the general public to protect existing water resources and water rights; (2) provide pertinent information for viable development of affected areas; (3) ensure water rights are not removed from Elko County residents; (4) prevent over-development and insure existing and future owners that their water supply and water quality will not be adversely affected; (5) supplement the county master plan and provide additional information on land use issues; and (6) counteract the state water plan, which may not adequately protect water rights and water resources in Elko County.³⁹⁴

- 1998 (January)** In a hydrologic study of the effects of mine dewatering on the flows in the Humboldt River, hydrologists commissioned by Newmont Gold Company found little long-term effects from these activities. The hydrologic study was necessary for Newmont to obtain permits from the Nevada Division of Environmental Protection (NDEP) to dewater its new Leeville Mine. The modeling results indicated that water flowing into the open pits after dewatering has ceased will not substantially decrease the amount of water that reaches the Humboldt River. These predictive conclusions were derived from the construction of a hydrologic computer model which used historical information to calibrate and match past river flows. The model showed that the maximum decrease in Humboldt River flows that may be expected by pit lake infilling after the cessation of mining operations would be six cubic feet per second, which would occur by the year 2016. This amounts to a total volume difference of less than ten acre-feet per year. The model also predicted that Humboldt River flows would only be slightly affected by pit lake evaporation. The model's results were faulted by Professor Glenn Miller of the University of Nevada, Reno, as using prior data of individual mine's impacts which also showed no impacts.³⁹⁵
- 1998 (January)** The U.S. Fish and Wildlife Service (USFWS) announced a study to address the growing concern over water quality in the lower Humboldt River Basin, particularly in the Humboldt Sink. Scientists will be collecting water samples at various locations along the Humboldt River over the next two years and release a report of their findings in the year 2000. The need for the study was based on prior filed studies which showed that birds and vegetation at the Humboldt Sink showed high levels of arsenic, selenium, boron, and mercury in their tissues. The 1996 field study showed that concentrations of these toxins had actually increased in wildlife and plants from similar field studies conducted in 1986 through 1990. Winnemucca officials were interested in the results of the study to determine whether the relatively large groundwater discharges from Newmont Gold Company's Lone Tree Mine pit have contributed to the disappearance of aquatic invertebrates in the lower Humboldt River since 1995. It was noted that while dewatering discharges must comply with state and federal water quality standards, their contaminant levels may exceed background concentrations near discharge points. The threat to the wetlands in the Humboldt Sink are of special importance as this area has been identified as one of the most important wildlife habitats in Nevada and an important resting and nesting area on the Pacific Flyway. One goal of the study was to assess the adequacy of current state and federal water quality standards to protect fish and wildlife in the lower Humboldt River Basin.³⁹⁶

- 1998 (February)** In a cooperative arrangement to diminish the effects of mine dewatering on the Humboldt River Basin, Newmont Gold Company and Rayrock Mines reached an agreement whereby groundwater pumped from Newmont's Lone Tree Mine in the Clovers hydrographic area would be provided to Rayrock Mines's Marigold Mine, located some six miles south of the Lone Tree Mine site. The Marigold Mine's open pit is above the water table, but the mine is forced to pump groundwater for its ore processing, dust control and fire suppression. Currently, the Lone Tree Mine pumps about 31,000 gallons per minute (50,000 acre-feet per year) to dewater its open pit mine. It already supplies its Trenton Canyon Mine, a satellite property located 12 miles south of Lone Tree, with 500 to 750 gallons of water per minute and in addition provide the Marigold Mine with up to 1,000 gallons per minute, thereby reducing the 27,000 gallons per minute of water it discharges directly into the Humboldt River. In June 1997, Newmont effected an agreement with Sierra Pacific Power Company (see July 1996 entry) to supply from 2,500 to 5,000 gallons per minute for the cooling towers located at its Valmy Power Plant. The Lone Tree Mine expects to be pumping at least through 2006 with a predicted peak production of 75,000 gallons of water per minute (121,000 acre-feet per year).³⁹⁷
- 1998 (March 8)** The South Fork Band Council (South Fork Band of the Te-Moak Tribe of Western Shoshone Indians) passed a resolution to prevent state court-appointed water commissioners from regulating upstream turnouts that supply the South Fork Indian Reservation with irrigation water and to bar payments of water assessment fees charged for the water commissioners' service. This case would raise issues that are central to the State of Nevada's ability to control the distribution of water in the state. In response to this action, on May 22, 1998, the Nevada State Engineer issued Order No. 1145, which ordered the Tribal Council to rescind its March 8, 1998 resolution or otherwise signal its intent to permit water commissioners access to Tribal lands to regulate the river on the reservation and for the Tribe to pay its assessments. On June 2, 1998, the Tribe responded that it did not intend to comply with Order No. 1145. On June 11, 1998, the State Engineer file a motion with the state Sixth Judicial District Court (Humboldt County, the same court which decided both the Bartlett and Edwards Decrees) for an order to show cause why the South Fork Band Council should not be held in contempt of court. On August 11, 1998, the Tribe passed another resolution that declared "the State of Nevada Water Masters and employees must cease attempts to assess fees and regulate South Fork waters." On October 19, 1998, the original contempt action against the Tribe and the Band Council chairman was amended to name the United States as a respondent. In response to this, and despite previous state court rulings,³⁹⁸ in November 1998 the United States filed a notice of removal, removing the lawsuit to the federal court. In a subsequent ruling (July 1, 1999), the federal court removed itself from further jurisdiction in this matter, limiting the Tribe's options to state court.³⁹⁹
- 1998 (Spring)** In order to initiate and hasten Argenta Marsh's restoration efforts, the Nevada Division of Wildlife (NDOW) assembled a task force to assess the feasibility of utilizing water pumped (dewatered) from the Barrick and Newmont mining operations in Boulder Valley. It was believed that this water could be delivered to the proposed marsh restoration area via the existing White House and Blue House ditch systems and contained in a series of diked cells and open areas. Notwithstanding certain engineering and water rights issues, the mining companies agreed with the concept and in the summer of 1998 NDOW sought the assistance of Ducks Unlimited (DU) and their engineering staff to analyze the possibility of restoring the Argenta Marsh. Initially, NDOW and DU had envisioned the restoration of some 10,000-

12,000 acres, nearly equaling the wetland area estimated to have been lost when the U.S. Bureau of Reclamation and U.S. Army Corps of Engineers channelized the Humboldt River in the 1950's, effectively draining the Argenta Marsh and destroying riparian plant life. By contrast, the Pershing County Water Conservation District was considering a far more modest effort of only 600 acres of restored wetlands.⁴⁰⁰

1998 (March 23) The Lander County Commission detailed in a letter to the U.S. Bureau of Reclamation their conditions for the transfer of title to the Humboldt Project lands called the Community Pasture, which at one time contained the wetland area called the Argenta Marsh. The letter stated that Lander County would oppose the transfer of title unless the following conditions are met: (1) Lander County is a full participant in all meetings conducted by the BOR over the transfer; (2) the BOR mitigate past, present and potential fiscal implications on the Lander County tax base over ownership of the pasture and related water rights; (3) title to the land for Battle Mountain's rodeo grounds, a sewer plant and a potential park site/corridor should be granted to Lander County out of the Community Pasture acreage; (4) a transfer must protect the value of water rights held by Lander County; and (5) public access to the Humboldt River must be maintained. It was noted that there is a large public outcry for the restoration of a roughly 2,500-acre Argenta Marsh within the Community Pasture and that this restoration is one of the issues that the Pershing County Water Conservation District will have to satisfy before title transfer is effected.⁴⁰¹

1998 (June 18) In a reaction to unusually heavy flows in the lower Humboldt River, a representative of the Pershing County Water Conservation District informed the Humboldt River Basin Water Authority that the effects of mine dewatering were adversely affecting the district. It was noted that 200,000 acre-feet were currently stored in Rye Patch Reservoir, the Upper and Lower Pitt-Taylor reservoirs are both full, and the PCWCD was still having to release 3,000 cubic feet per second from Rye Patch. The district expressed concern that additional releases might destroy the delivery system in Lovelock Valley and that some fields are now saturated and cannot be drained. While mine dewatering was listed as one cause, it was generally noted that greater emphasis must be placed on looking at the entire river system and using upstream storage to a greater extent and, possibly, considering increasing upstream storage. The Metropolis Reservoir (now empty due to a leaking dam), the South Fork Reservoir (recreation only) and the Chimney Creek Reservoir were mentioned for consideration. Also suggested for remediation was greater discharges and pumping into the basin's wetland areas and, through drainage improvements, allowing those sinks to drain lower basin agricultural lands more effectively.⁴⁰²

1998 (Fall) The Nevada Division of Wildlife (NDOW) broadened the participation of interest groups in the Argenta Marsh restoration issue to approximately 20 agencies and entities.⁴⁰³ The resultant NDOW proposal encompassed a number of objectives:⁴⁰⁴ (1) Restore to the maximum extent practicable, the Argenta Marsh at or near its former location and under NDOW management; (2) Title to the balance of the pasture not converted to wetlands (i.e., the remaining "Community Pasture" lands) would pass to another entity (Pershing County Water Conservation District, U.S. Bureau of Land Management, Lander County, other); (3) Rye Patch Dam and all project lands, not specifically designated under the 6F Land and Water Conservation Funds (which would go to the Nevada Division of State Parks), would pass to the PCWCD; (4) As part of the transfer legislation, a water righted minimum pool of 3,000-5,000 acre-feet would be established in Rye Patch Reservoir to support the economically important fishery there; and (5) NDOW proposed a mutual commitment with the PCWCD

for greater cooperation on downstream water delivery to the Humboldt Sink and Wildlife Management Area. Presently, NDOW's plans call for the construction of approximately 5,000 acres of new wetland areas carved out of the existing 30,000 acres of the Community Pasture. It is anticipated that to maintain this area, some 15,000 to 20,000 acre-feet of water rights will have to be purchased.⁴⁰⁵

- 1999 (March)** The U.S. Geological Survey released a report which showed that the groundwater levels in the middle portion of the Humboldt River Basin have declined significantly as a result of pumping for agriculture and mine dewatering. The middle basin consists of 14 separate valleys or hydrographic areas⁴⁰⁶ covering an area of approximately 7,400 square miles and lying essentially between the Palisade and Comus gaging stations. This area includes virtually all of the basin's mine dewatering operations. The study included the results from 14 mining operations⁴⁰⁷ in the region which, for all of 1996, pumped a total of 113,000 acre-feet of groundwater. Of this total amount, 24,200 acre-feet were used for mining and milling operations, 45,700 acre-feet were infiltrated or injected into the groundwater, and 43,600 acre-feet represented discharges to surface-water drainages, i.e., the Humboldt River. The only mines conducting surface water discharges in 1996 included the Twin Creeks Mine (3,400 acre-feet into a channel of Kelly Creek) and the Lone Tree Mine (40,200 acre-feet representing excess water discharged directly into the Humboldt River). The report showed that groundwater levels had declined by as much as 70 feet during the past 30-40 years in several areas that are irrigated with groundwater and from 200 to more than 1,000 feet during the past 10 years at several large gold mines in northern Boulder Flat with active dewatering operations. The study also found that in 1916, 43 flowing wells in the vicinity of Battle Mountain were producing from depths of 100 to 300 feet and had artesian heads as much as 16 feet above the land surface. At present, no flowing wells are known in the vicinity of Battle Mountain.⁴⁰⁸
- 1999 (March)** Exemplifying the growing conflicts within the Humboldt River Basin with respect to mine dewatering, the Humboldt River Basin Water Authority was relieved to hear that both Newmont Gold Company and Barrick Goldstrike Mines, Inc. planned to curtail their groundwater discharges into the Humboldt River for the foreseeable future. This was taken as a goodwill gesture on the part of the mines towards Lovelock Valley farmers, who have complained that high water levels in the lower Humboldt River have contributed to the flooding and saturation of their fields in the spring of 1998. It was noted, however, that one important reason that the mining companies are discharging less water was that gold prices are so low and production levels have been correspondingly reduced. The tradeoff of lower discharges and benefits to lower basin agriculture therefore comes at a cost of reduced mining and related employment, less retail sales, declines in mining and sales tax revenues and general economic lethargy in virtually all five member counties of the water authority.⁴⁰⁹
- 1999 (April)** In testimony before the National Research Council, hydrologist Tom Myers of Reno, Nevada, who works for the Center for Science in Public Participation and is a director of Great Basin Mine Watch, stated that the effect of mine dewatering on groundwater resources in the Humboldt River Basin could be the most significant environmental issue facing northern Nevada. The National Research Council is the operating arm of the National Academy of Sciences and was in Reno conducting a Congressionally-mandated study of the need for new federal regulations on hard rock mining on public lands administered by the U.S. Bureau of Land Management. While scientists generally agree that mine dewatering poses no immediate threat to the quantity of northern Nevada's groundwater resources or to

the flows in the Humboldt River, there exists considerable debate over the long-term adverse effects. According to Myers, the open pits created by mining operations are essentially large pore spaces that after the cessation of mining activity will fill with water. The resultant flow of water back into these pits could reduce the amount of surface and near-surface water in the Humboldt River Basin.⁴¹⁰

- 1999 (May 27)** Coastal Power Company, a Colorado subsidiary of Coastal Corp. of Houston, Texas, filed three applications for the right to divert up to 3,500 acre-feet of water a year from three of Newmont Gold Quarry Mine's dewatering wells. If customers can be lined up, particularly large mines along the Carlin Trend, Coastal intends to build a 450-megawatt gas-fired power plant expected to cost some \$220 million. The plant would be located just to the northwest of Carlin either in Eureka County or Elko County. Property taxes from the structure are estimated to total approximately \$1.9 million per year. Key customers include both Barrick Gold Corp. and Newmont Mining Corp., which together operate several large, energy-intensive mines in the area. Because the power plant would become the region's largest natural gas user, its construction is also a major component in the pending decision to build the planned \$244 million Ruby Gas Pipeline that would carry natural gas from Price, Utah, through Elko County. The U.S. Bureau of Land Management protested one of the three applications based on concerns over the extended use of Newmont's wells after its dewatering operations are terminated.⁴¹¹
- 1999 (May-June)** By early summer, a shift from "El Niño"⁴¹² conditions to "La Niña"⁴¹³ conditions resulted in unusually high and persistent winds across much of northern Nevada, along with above normal temperatures and lower than normal fuel moisture. By late May and early June, the potential for wildfires had become extreme and was based on a combination of factors including high winds and temperatures, low relative humidity and fuel moisture, severe thunderstorm activity, and a high level of dead and dry fuels with low flash points carried over from prior good growing seasons. From a fuel-loading standpoint, fine flashy fuels, composed primarily of cheatgrass matted from prior years' growth, provided a situation where even fire retardant chemical drops from aircraft would prove largely ineffective due to the fire's ability to burn under and through the matted fuels. In combination, these conditions resulted in highly unusual fire conditions, frequently causing fires to "join" and spread at extreme and virtually uncontrollable rates.⁴¹⁴
- 1999 (June-July)** Scientists with the Nevada Division of Plant Industry (Department of Business and Industry) noted that after five wet winters in a row, "huge" numbers of grasshoppers with an "endless buffet of spring greenery" were depositing their eggs in the ground throughout much of north-central Nevada. As many as 100 grasshoppers per square yard were counted and it was expected that three times as many would emerge this spring to forage on the grasses. It was estimated that eight grasshoppers per square yard consume as much vegetation as one cow.⁴¹⁵ This situation may come to have particularly ominous overtones for the plight of new grasses which would be planted during the forthcoming winter as a result of the extensive rangeland fires which occurred in August 1999.
- 1999 (July 1)** With respect to the Nevada State Engineer's charges of violation and contempt of court originally filed in state court against the South Fork Band Council (see March 8, 1998 entry and subsequent related events), a lawsuit which had been moved from state to federal jurisdiction in November 1998 was now remanded back to state court. U.S. District Court Judge Edward Reed ruled in favor of the State Engineer's position that the state has the right to regulate its waters and the authority to bill the Te-Moak Tribe for water taken from

tributaries to the Humboldt River and inspect and regulate ditches on tribal lands. Specifically, Judge Reed ruled that when the United States purchased the [water] rights for the Tribe, it “could only purchase what the prior owners owned...” that is, the rights subject to the Humboldt (i.e., Bartlett and Edwards) Decrees. Furthermore, “...U.S./Tribe chose to put itself in a position where it would be subject to the [Humboldt] Decree, and thus waived its immunity...Humboldt Decree has been enforced in recognition of the U.S./Tribe’s entitlement to receive water in quantities defined by the decree...and thus [the Tribe] cannot assert such immunity in action to enforce that decree...the proper remedy is not the dismissal that the Tribe requests, but remand to state court.” On September 13, 1999, in a confrontation between Tribal members and three state court-appointed water commissioners who were attempting to regulate water deliveries on the South Fork of the Humboldt River, the commissioners were forcibly removed from Tribal lands. In response to the ejection of the water commissioners, on September 20, 1999, the State Engineer issued Order No. 1154 against the South Fork Band Council and its chairman ordering the Tribe to signal its intent to permit state water commissioners access to regulate upstream diversions that supply the reservation with water. The Tribe did not respond to that order.⁴¹⁶

1999 (July 12) The Lander County Commission voted to accept Pershing County Water Conservation District’s (PCWCD) effort to gain title to the nearly 30,000-acre site in Lander County known as the Community Pasture. PCWCD had been seeking Lander County’s support in this action for seven years. In payment for its support, Lander County was offered 1,098 acres of land⁴¹⁷ with the added stipulation that the county have some input into future negotiations between the PCWCD and the Argenta Marsh Committee. It was noted that the next step in the process for title transfer will be for the PCWCD to negotiate with the Argenta Marsh Committee and give over some land to form a wetland area on the site of the Community Pasture. The title transfer to Lander County will not take place, however, until the PCWCD actually gains title to the land.⁴¹⁸

1999 (July) The price of gold plunged to a 20-year low of \$253.20 a (troy) ounce.⁴¹⁹ Gold prices were driven downward due partly to producer hedging (forward contracts, short sales, options and futures) and sales of gold bullion by central banks, particularly banks aligned within the European Monetary Union (see 1992 entry). Producer sales of borrowed gold weigh on the gold market because they signal miners’ expectations of lower prices in the future, in addition to adding to the available supply.⁴²⁰

1999 (August) Based on favorable fuel and weather conditions, Nevada’s 1999 fire season⁴²¹ represented by far the worst incidence of wildfires in the state’s recorded history, and also produced the most extensive fire devastation ever recorded within the Humboldt River Basin. Throughout Nevada, primarily in its rural areas, approximately 1.6 million total acres were burned, equivalent to over two percent of Nevada’s total surface area, representing twice the burned acreage caused by the previous “worst” fire of 1985 when approximately 885,000 total acres were burned throughout Nevada. The most devastating and far-reaching burns occurred during a relatively brief period in early August. Five counties within the Humboldt River Basin absorbed the brunt of the fires’ devastating effects. Specifically, Elko, Eureka, Lander, Humboldt and Pershing counties together accounted for nearly 1.39 million burned acres, or nearly 87 percent of the state’s total burned acreage recorded during the 1999 fire season. During this fire season, rangeland fires in Elko County destroyed approximately 331,803 acres (20.8 percent of the state’s total burned acreage and 3.0 percent of Elko County’s total land area). Another 213,142 acres (13.4 percent of the state’s total burned

area and 8.0 percent of the county's total land area) were burned in Eureka County; 264,167 acres (16.5 percent of the state's total burned area and 4.2 percent of the county's total land area) were burned in Humboldt County; 219,351 acres (13.7 percent of the state's total burned area and 6.1 percent of the county's total land area) were burned in Lander County; and 364,118 acres (22.8 percent of the state's total burned area and 9.6 percent of the county's total land area) were burned in Pershing County. The majority of the 1999 fire damage, or about 1.22 million acres and approximately 76 percent of the state's total burned area, were due to 25 major fires that were wholly or partially located within the Humboldt River Basin. Of this burned acreage affecting the Humboldt River Basin, 905,000 acres, or nearly 75 percent, included lands which are managed by the U.S. Bureau of Land Management. Approximately 22.5 percent of the basin's total area burned was privately owned.⁴²²

1999 (August 31) The Governor's office hosted a meeting in Carson City to help resolve the complicated and frequently emotional issues related to restoring the Argenta Marsh. The focus of the meeting was on restoring the Argenta Marsh on land owned by the U.S. Bureau of Reclamation and leased to the Pershing County Water Conservation District. However, the representative for the Argenta Marsh Committee questioned the very foundation of the PCWCD's right to own this land in Lander County, that the land actually represented a very small part of the overall Humboldt Project, and that if that land is to be released by the BOR, Lander County should be asking for it instead.⁴²³

1999 (September) The Eureka County Commission noted its intention to file a formal protest to the State Engineer's Office against the U.S. Bureau of Land Management's application for water rights in Huntington Valley. (Huntington Valley actually lies mostly within Elko County and extends southward into White Pine County.) In what could be an alternative approach for attaining water rights on BLM lands, which were specifically prohibited through the 1995 passage of Nevada Senate Bill 96, the BLM was asserting a "secondary water right" to appropriate 0.074 cubic feet per second for wildlife from a well given to Silver State Ranches by Placer Dome Mining in 1998. The approval of this application could determine whether other land owners have to pay for pumping well water for wildlife as this permit would be on top of Silver State Ranches' present pumping level of 0.016 cfs for 500 head of cattle. It was believed that this situation could have widespread applicability to numerous other individual water rights on BLM land and would allow BLM to effectively circumvent SB 96 by "piggy-backing" current water rights for other beneficial uses that satisfy many public interests. As noted by the county: "It is not within the authority or purpose of the BLM to appropriate water for wildlife and wild horses." In response, the BLM has argued that it has this authority under the Wild Horse and Burro Act of 1971, the Federal Land Management and Policy Act of 1971, and the Public Rangelands Improvement Act of 1978.⁴²⁴

1999 (September 8) The Humboldt River Basin Water Authority made a request to the Nevada Legislative Committee on Public Lands for a \$150,000 grant to finance the second phase of a study to look at ways to store water upstream in high flow periods rather than let flood flows run into the Humboldt Sink and possibly further into the Carson Sink. The first phase of the study was being funded by a \$25,000 Community Development Block Grant and another \$5,000 was budgeted by the authority. Concerns were expressed by the Pershing County representative (actually, the Pershing County Water Conservation District) that the study's title implies a study to manage the Humboldt River system, a task which by decree

belongs to the State Engineer's Office. Authority members were also reminded that the surplus water in question, i.e., the river's flood flows that enter the Humboldt Sink, belong to the Nevada Division of Wildlife and are not necessarily available to be appropriated for upstream storage.⁴²⁵

- 1999 (October)** A doctoral candidate in biology at the University of Nevada, Reno, generated considerable interest in his thesis topic: The effects of wild horses on the ecosystem. The author attempted to steer a clear path between the ranchers, who see the wild horses as nothing less than "land sharks" gobbling up grass and ruining an ecosystem on which cows and native wildlife depend, and wild-horse advocates, who tended to pre-judge the research study and the researcher as being anti-wild horse and pro-public lands grazing. Doctoral candidate Erik Beever's research included the study of 19 sites in nine Nevada mountain ranges with nearly half the sites at high elevations and the rest at low elevations. The areas studied either had significant concentrations of wild horse populations or have had horses removed for the past 10-15 years. The research attempted to characterize and quantify any disturbances the horses have created. Not particularly surprising, the following represents his preliminary findings: (1) soil compression and compaction was much higher in areas frequented by wild horses; (2) areas with horses had significantly fewer species of plants, less coverage with native grasses, a lower relative percent cover of shrubs, and less vegetative cover overall; (3) areas with horses had a higher number of deer mice, which can carry hantavirus; and (4) sites without horses had a higher percentage of other possible mammal species than sites with horses, meaning that sites without horses have relatively richer communities (i.e., greater biodiversity) than sites with horses. Wild-horse advocates noted that if these adverse effects are proven, they are more likely the result of cattle grazing than the presence of wild horses.⁴²⁶
- 1999 (October 15)** In a letter to the Nevada State Engineer, the Pershing County Water Conservation District officially withdrew its protest for the issue of a water permit for Newmont Gold Corp.'s Leeville underground mine. The protest had been filed based on the effects of flooded and saturated farmlands in Lovelock Valley believed to be caused by dewatering's increased flows in the Humboldt River. The PCWCD noted that with recent changes in the nature of dewatering operations, particularly those of Barrick Goldstrike Betze-Post Mine, such a protest would be a "tough fight". The Betze-Post Mine had been discharging up to 70,000 gallons per minute (113,000 acre-feet per year) into the Humboldt River (through tributaries) during months that it was not irrigating on Newmont's T-S Ranch.⁴²⁷ During 1999, Barrick announced that rather than discharge any water into the Humboldt in the future, it will put all the water into underground storage (re-injection) in the winter and then withdraw it to water crops in the summer.⁴²⁸ Both the Humboldt River Basin Water Authority and Eureka County have separate protests in effect against Newmont's request for a dewatering permit for its Leeville Mine.⁴²⁹
- 1999 (October)** As part of the Pershing County Water Conservation District's continuing efforts to work out differences among interested parties in the transfer of ownership of the Humboldt Project from the U.S. Bureau of Reclamation, a tentative arrangement was made with the Nevada Division of Wildlife to restore the Argenta Marsh north of Battle Mountain. In early discussions, both sides appeared far apart. The PCWCD sought to limit marsh restoration to approximately 640 acres (one square mile). NDOW's proposal was to create a marsh of 7,500 to 8,000 acres. The present agreement called for the PCWCD to offer NDOW 1,280 acres out of the nearly 30,000-acre Community Pasture area and then include an option for

the State of Nevada to purchase another 3,720 acres to re-create the Argenta Marsh of 5,000 acres over a 10-year period. NDOW representatives had already received support from the region's mining companies to provide an initial inflow of water from mine dewatering operations so as to get the marsh established relatively quickly.⁴³⁰ The PCWCD expressed concern that once the marsh was established and mine dewatering operations were reduced in the future, there would be a need to acquire marsh "maintenance water" from existing water-right holders.

- 1999 (November 5)** Reflecting continuing concerns over the pervasive effects of mine dewatering, the Eureka County Commission enlisted the help of the University of Nevada, Reno, Center for Economic Development. The proposal called for an application of economic impact analysis and Input-Output (I-O) models to assess socioeconomic impacts of Newmont Mining Company's Leeville mine project.⁴³¹ Newmont estimated that the underground mine will initially require dewatering of approximately 25,000 gallons per minute (40,000 acre-feet per year), dropping to 6,000 to 10,000 gpm (9,700-16,000 acre-feet per year) once the water level fell below the level of the shaft.⁴³² The commission, concerned that mine dewatering operations will cause stock water wells to dry up, wanted the UNR team to perform an economic and fiscal analysis of the potential costs to the county from declines in livestock production and recreational opportunities. The county was also concerned over the possible effects on its economic diversification opportunities, particularly its future ability to attract water-dependent industries.⁴³³
- 1999 (November 16)** Carson City First District Judge Michael Griffin ruled in favor of Eureka County over a water export fee agreement with Barrick Goldstrike Mines Inc. In November 1996, Barrick signed an agreement with Eureka County agreeing to pay \$100,000 per year to the county in water export fees and an additional \$4 per acre-foot if the amount of water exported from the company's Betze-Post dewatering operations exceeded 250,000 acre-feet over 10 years, with a maximum discharge permitted of 302,000 acre-feet per year. The fee was levied based on Barrick's intent to discharge up to 70,000 gallons per minute (112,900 acre-feet per year) of pumped groundwater into the Humboldt River. On September 23, 1997, The Nevada Attorney General's office had found that Eureka County's water export fee was illegal. On October 6, 1997, the Eureka County Commission decided to file a motion for a declaratory judgement with the District Court against the State Attorney General's ruling. Griffin handed down a summary judgement ruling that the agreement was legal under Nevada Revised Statute 533.438, rejecting arguments in a Nevada attorney general opinion.⁴³⁴ The Attorney General's Office subsequently filed its notice of appeal on December 10, 1999, requiring that the issue now be considered by the Nevada Supreme Court.⁴³⁵
- 1999 (November)** A report "Out of Ashes, An Opportunity,"⁴³⁶ was published by a group of specialists who met in August 1999 in Boise, Idaho, to discuss the Great Basin's wildland fires and what their consequences might be. Some of the group's conclusions were: (1) The Great Basin's ecological resiliency is failing as annual grasses and noxious weeds dominate the landscape; (2) Traditional means of fighting invasive species and restoring native habitat are not enough to stop the downward spiral; (3) Traditional, post-fire rehabilitation, which mostly addresses soil stability, is not sufficient to resolve the ecological problems associated with wildland fires. A restoration effort, unlike any other attempted on western rangelands, must begin; (4) Such a restoration would be expensive, but the cost of doing nothing ultimately will be much higher, as non-native, invasive species dominate more land; (5) Close

cooperation with key individuals, local governments and agencies, and organizations is essential to successful restoration. These conclusions would later (April 2000) be incorporated in a Bureau of Land Management assessment of the August 1999 fires.

- 1999 (December 6)** In another fatality of the waning fortunes of the basin's gold mining industry, Humboldt County Commissioners were briefed that the development of a sewer system to mitigate the growing drinking water quality problems in Grass Valley would probably not be financially feasible. Due to the slump in the mining industry and a reduced outlook for population growth in the area, county officials estimated that there would be insufficient growth to pay for a new sewer system and treatment plant. Groundwater quality in the northern portion of Grass Valley, which is located immediately south of Winnemucca, has been declining over the last several years, and there were strong indications that this degradation in water quality was the result of the close proximity of several hundred septic tank systems. A county hydrology consultant had been sampling well water from 17 sites in the northern portion of the valley for the past three to four years. Of these 17 measuring sites, 14 have shown an increasing upward trend in the concentrations of both nitrates⁴³⁷ and total dissolved solids.⁴³⁸ One proposed solution was that all septic tanks in the valley be designed to remove nitrates from their effluent and that malfunctioning septic tanks be replaced with newer denitrifying tanks. Another relatively affordable solution discussed was to use the existing septic tanks to store the sewage sludge and then use small force (pressurized) mains to transport the wastewater effluent to a central treatment facility, thereby minimizing groundwater infiltration.⁴³⁹
- 1999 (December 15)** At an open meeting of the Nevada Legislative Committee on Public Lands the subject of the Humboldt River Basin's mine dewatering operations and recent studies was discussed. One State Senator called into question an apparent conflict of interest in the U.S. Geological Survey for accepting funds to conduct studies from the industry being studied. Another senator wanted to know if and to what extent the mining companies influenced research results. Thus far, regional mining interests have spent and/or pledged more than \$1 million for studying the effects of mine dewatering on the local hydrology. USGS representatives stated that the money for the studies is actually funneled through the Nevada Department of Conservation and Natural Resources (DCNR) and that no mining staff were involved directly in the studies. However, the USGS did admit to using data developed by the mines' engineers and technicians. USGS and DCNR representatives noted that without this funding, these studies would not be possible. In other testimony, the State Engineer noted that most recently impacts on the Humboldt River from mine dewatering have decreased significantly and at the present time only Newmont's Lone Tree Mine⁴⁴⁰ and Gold Quarry Mine⁴⁴¹ are discharging to the Humboldt River.⁴⁴²
- 1999 (December 15)** In testimony before the Nevada Legislative Committee on Public Lands held in Lovelock, mining industry representatives reported on the extent of current mine dewatering operations. Newmont Mining Corp. officials reported that a total of 33,000 gallons per minute (53,000 acre-feet per year) are currently being pumped into the Humboldt River by all mining operations in the basin. This includes 29,000 gpm at Newmont's Lone Tree Mine near Valmy and 4,000 gpm into Maggie Creek from Newmont's Gold Quarry Mine. Barrick Goldstrike Mines Inc. has ceased all direct discharges and instead pumps its Betze-Post Mine water withdrawals into the TS Reservoir for infiltration into Boulder Valley and, during the summer months, for irrigation of alfalfa fields on the TS Ranch. In a related matter, Glenn Miller, professor of environmental sciences at the University of Nevada, Reno,

and head of a team of scientists doing mining studies funded by the U.S. Environmental Protection Agency and the National Science Foundation, noted that three of the largest manmade lakes in Nevada will be abandoned open pit mines. The three include the Barrick's Betze-Post Mine which is expected to hold more than 500,000 acre-feet of water, Newmont's Twin Creeks open pit mine that will hold 460,000 acre-feet of water, and Newmont's Gold Quarry Mine, which will hold up to 300,000 acre-feet of water (see October 1997 entry for an earlier estimate of the volumes of these pit lakes). In addition to the water quantity concerns, Professor Miller also expressed concern to the committee about the water quality issues from the oxidation of metals and salts in the rock formations that previously had not been exposed to air.⁴⁴³

1999 (December 15) The Pershing County Water Conservation District's efforts for obtaining title to the lands of the Humboldt Project moved closer to reality based on information provided to the Nevada Legislative Committee on Public Lands meeting in Lovelock. Since the district made its final payment to the federal government for the costs of this project, it has been seeking title to lands now held by the federal government to include approximately 18,000 acres in Pershing County around and beneath Rye Patch Dam and Reservoir, nearly 30,000 acres in Lander County near Battle Mountain of lands referred to as the "Community Pasture", and about 32,000 acres of land within the Humboldt Sink lying in Pershing and Churchill counties. The U.S. Bureau of Reclamation had described the process of land transfer in a federal document called the "Framework for the Transfer of Title", which is composed of six major criteria.⁴⁴⁴ One of those criteria – satisfying the public interest concerns of the project through scoping sessions and negotiations with interested parties – was facilitated at the Committee meeting when several entities and agencies, including the Nevada Division of Wildlife and Lander County, provided their support of the title transfer. NDOW is attempting to work with the PCWCD to establish a wetland area within the Community Pasture which once contained the Argenta Marsh, and Lander County desired the transfer of certain pasture lands for use by Battle Mountain.⁴⁴⁵ A tentative agreement was reached among various parties with NDOW acquiring 5,000 to 5,500 acres to re-establish the Argenta Marsh north of Battle Mountain. This land transfer arrangement had been worked out between the PCWCD and NDOW in October 1999. Lander County and Battle Mountain were agreeable to the transfer based on the PCWCD's offer of 1,098 acres to be carved out of the Community Pasture for rodeo grounds, a sewer plant and industrial development. And finally, the Nevada Division of State Parks was to receive land around Rye Patch Reservoir to maintain a state park.⁴⁴⁶

1999 (December 15) In a presentation to the Nevada Legislative Committee on Public Lands held in Lovelock, research geologist P. Kyle House of the Nevada Bureau of Mines and Geology (NBMG) reported on recent studies on the "flexibility" and shifting of the Humboldt River's channel. The NBMG has performed intensive geologic mapping of the Battle Mountain area looking at various alignments of the Humboldt River channel over the last several thousand years. Specifically, the NBMG mapped the history of changes in the river's flood plain and earthquake faults which might affect flow patterns and river channel locations.⁴⁴⁷ One of the key findings of the NBMG's research was that the Humboldt River channel is very flexible and there is good evidence of the river jumping channels in recent history. Extremely large ancient meanders were found well to the north of the present channel near Battle Mountain providing an indication of very different flow patterns and, possibly, river gradient configurations. Evidence indicates that the shifting river channel has been active in the last

several thousands years when climatic conditions were probably not much different from those today (and not as opposed to those necessarily existing during the last Ice Age when climatic conditions were significantly different and more pluvial). Abandoned meanders also showed that the Reese River's channel once by-passed Battle Mountain to the southwest compared to the present channel which lies more to the northeast. House noted the presence of past organic-rich marshes in the Battle Mountain area, layers of volcanic ash,⁴⁴⁸ and abundant snail shells that can prove invaluable for aging deposit layers.⁴⁴⁹

- 2000 (January)** Two professors published a research paper⁴⁵⁰ calling for a modification to existing Nevada water law to more effectively utilize the additional flows in the Humboldt River created by mine dewatering operations. The authors noted that mines have been “disposing of nearly a half-million acre-feet (445,000 a.f.) per year [see November 1997 entry]. Approximately 65 percent of this water is discharged into tributaries of the Humboldt River. This discharge would be worth approximately \$223 million if valued at \$500 per acre foot.”⁴⁵¹ It was argued that more productive use of above-normal flows would help to mitigate declines in future net farm incomes. The paper proposed that as the mine pits begin to fill after dewatering operations cease, Humboldt River flows are likely to decline, forcing irrigators to grow less water-intensive crops. The authors explored whether additional benefits could be realized if supplemental water rights were granted to allow temporary access to the increased water supplies. Specifically noted was the fact that “Although groundwater [i.e. dewatering] rights were quickly granted to the gold mines, subsequent downstream user rights were not adjusted to allow full enjoyment of the externality [i.e., the surplus pumped water].” The authors also noted that while the Nevada State Engineer granted temporary rights for groundwater extraction and disposal to gold mining companies, a complete accounting of the economic and environmental impacts of this action may not be known for decades.
- 2000 (January 20)** Nevada's Legislative Committee on Public Lands decided against providing any funds for a Humboldt River Basin Water Authority study request. The authority had requested \$150,000 in total funding to study ways to store water in the Humboldt River Basin during wet years and also to capture some of the waters pumped into the Humboldt River or its tributaries from mine dewatering operations. It was stated that in denying the authority's request the committee took into account testimony from both Barrick Goldstrike Mines Inc. and Newmont Mining Company that they were reducing mine dewatering activities. As an alternative, a sum of \$40,000 was provided to the Nevada Department of Conservation and Natural Resources for the ongoing Humboldt River Basin water study being conducted by the U.S. Geological Survey. The money came with the condition that the study look at all ways to keep water pumped from gold mines within its own basin (i.e., hydrographic area) or at least within the overall Humboldt River Basin.⁴⁵²
- 2000 (January 26)** The South Fork Band of the Te-Moak Tribe of Western Shoshone Indians persisted in its defiance of the State Engineer's orders (Nos. 1145 and 1154) to allow the State of Nevada to regulate the distribution of water on Tribal lands and by its refusal to pay assessment fees and to allow court-appointed water commissioners on its lands to regulate water diversions (see related March 8, 1998 and August 20, 1999 entries). In mid-January, the Tribe was denied a restraining motion in federal court when it was found that “...it does not appear that [the federal court has] jurisdiction of the claim now presented by the Band...Such jurisdiction remains in the state court...” On January 21, 2000, the Tribe filed a motion in state court to dismiss the State Engineer's petition. The Tribe argued that the

Sixth Judicial District Court (Humboldt County) lacks jurisdiction, the Tribe has sovereign immunity, and the United States is a necessary and indispensable party to the action. On January 26, 2000, the state Sixth Judicial District Court held a hearing and denied the Tribe's motion to dismiss the State Engineer's action.⁴⁵³

2000 (February 16) The Humboldt River Basin's mine dewatering issue received greater national (and possibly international) attention from an article in *The Wall Street Journal*. The article indicated that "...a war is brewing over gold...little to do with the precious metal itself...over the huge amounts of water being diverted..." The story noted that as a result of extensive groundwater pumping by the mines in some areas the groundwater level had dropped more than 1,000 feet over the past decade (see March 1999 USGS entry). The growing conflict alluded to in the article was seen as one "...between the region's [middle Humboldt River Basin] farmers, ranchers, environmentalists and Native Americans – who want to keep this region largely agricultural – and the state's second-richest industry: mining." The article noted that extensive mine dewatering operations were drawing down groundwater levels resulting in adverse effects on springs and stream flows. Western Shoshone tribal members noticed in the early 1990's that some spiritually-important springs showed diminished flows. Some mine dewatering opponents have since rallied to a new environmental group called the Western Shoshone Defense Fund. Expanded groundwater surveys by the U.S. Geological Survey of about 500 water wells in 1996 showed that the water displaced by the mines had risen to some 200,000 acre-feet per year, causing significant declines to the water table. Also reported was that in 1996 Barrick's Betze-Post open pit mine had reached the 1,300-foot level and was pumping groundwater at a rate of about 50,000 gallons per minute (80,650 acre-feet per year). The article also noted that the groundwater pumping associated with Newmont's 1,600-foot deep Gold Quarry Mine had caused a sinkhole to form in nearby Maggie Creek, causing that stream to disappear entirely for a brief period until the hole could be plugged (see July 6, 1996 entry). While direct re-injection and infiltration were mentioned as partially mitigating groundwater overdrafts, these efforts provided only limited recharge. Meanwhile, seven more mines have been proposed for the region and mine dewatering opponents were trying to limit such expansions until the impacts of dewatering become more clear.⁴⁵⁴

2000 (March) In a report released this month, the U.S. Environmental Protection Agency (EPA) reported that Nevada's mines emitted so much mercury⁴⁵⁵ into the atmosphere in 1998 that the agency is considering enacting regulations to govern future releases of this highly toxic metal. In July 1999, Nevada's mines were required for the first time to submit Toxic Release Inventory Reports to the EPA and Nevada Division of Environmental Protection.⁴⁵⁶ Previously, these agencies had no data to determine the extent of the industry's mercury releases to the atmosphere. Four mines, all in the Humboldt River Basin, reported releasing a total of 13,560 pounds of mercury into the atmosphere in 1998. Mercury is naturally present in the gold ore that the mines process. It is released into the environment when the ore is heated to separate out the precious metals. Identified mines and their atmospheric mercury releases included Independence Mining Company's (now Anglogold North America, Inc.) Jerritt Canyon Mine (9,400 pounds of mercury), Newmont Gold Company's Twin Creeks Mine (2,200 pounds), Barrick Goldstrike's Betze-Post Mine (1,500 pounds), and Newmont's Carlin South Area mine (460 pounds). The EPA report noted that these releases amounted to about 4 percent of all human-caused mercury air pollution generated in the U.S. each year. In fact, these four Nevada mines exceeded the combined release of mercury from

the 21 reporting coal-burning power plants in Pennsylvania, which has the highest mercury emissions of any other power plants in the nation.⁴⁵⁷

- 2000 (April)** After a number of studies, reports, and conferences, particularly the November 1999 report “Out of Ashes, An Opportunity,” the Bureau of Land Management published an assessment of the severe rangeland fires which struck the Great Basin and Humboldt River Basin in August 1999. The BLM’s conclusions found that:⁴⁵⁸ (1) The Great Basin’s ecological health and resiliency are in jeopardy. Exotic annual grasses and noxious weeds now dominate roughly one-third of the land in the Great Basin and are spreading at an alarming rate; (2) The wildland fires of 1999, which burned 1.7 million acres in the Great Basin, called attention to rangeland health issues and accelerated the need for restoration work. If the wildland fires heightened awareness of the serious situation in the Great Basin, then it could be argued they left the faintest of silver linings at the black edges of the burned land; (3) A restoration effort, on a scale never seen before in this country, needs to be undertaken to stop the downward ecological trends in the Great Basin. The opportunity to do so is brief; (4) Restoration funding remains a huge question mark. No permanent account exists for restoration, which means funding may be allocated on an annual, piecemeal basis. That approach restricts the long-term planning and research critical to successful restoration; (5) Pending sufficient funding, BLM can accommodate the structure needed to manage restoration with few changes in its current organization; (6) The consequences of relying on traditional rehabilitation methods to address the Great Basin’s problems are severe in terms of cost, natural resource damage, effects on local economies, wildland fire intensity and occurrence, and public safety; (7) Restoration of the Great Basin ecosystem is a monumental challenge, perhaps the single most demanding land-management task faced by BLM. Successful restoration will require the commitment of not only BLM, but also many other agencies, private organizations and other interests.⁴⁵⁹
- 2000 (May 15)** In an apparent coup for grazing-reform advocates, the U.S. Supreme Court upheld three major components of Interior Secretary Bruce Babbitt’s 1995 range-reform regulations. Specifically, the court upheld the secretary’s authority to: (1) Change the definition of “grazing preference” to remove any references to a quantity of forage, expressed in animal unit months (AUMs), to which a rancher’s livestock is entitled. The court found that the secretary has broad authority under the Taylor Grazing Act to reduce grazing levels or cancel grazing permits. (2) Permit those who are not “engaged in the livestock business” to qualify for grazing permits. But there is a caveat: The court found that federal law requires anyone who seeks a grazing permit on federal land to own “base property” adjacent to public lands. And permits can be awarded only to “bonafide settlers, residents and other stock owners.” (3) Take federal ownership of range improvements such as water wells, stock tanks, pipelines and fences. Up to 1995, ownership in those improvements was often shared by ranching permittees and the federal government. Now, all future improvements will be owned exclusively by the federal government. However, the court shied away from making any blanket decision on the issue of who owns the water rights related to water improvements, probably recognizing that nearly every Western state has a different policy on who owns the water rights tied to water improvements.⁴⁶⁰
- 2000 (June 14)** After showing some progress in negotiations over re-establishing the Argenta Marsh, the State of Nevada declined to allow its Divisions of Wildlife and State Parks to enter into agreements with the Pershing County Water Conservation District with respect to the title transfer for the Humboldt Project. The state’s decision came in response to new

conditions placed upon its efforts to restore the Argenta Marsh in Lander County at the site of the Battle Mountain Community Pasture. In response to PCWCD's new conditions, Nevada Governor Kenny Guinn noted the state's most significant concerns: (1) if restoration of the historic Argenta Marsh is considered by all parties to be desirable, the Title Transfer should include a restoration effort at a minimum size of 5,000 acres; lands identified for marsh restoration should be transferred to the state as a marsh of smaller size would not be a good use of limited state resources; (2) Nevada could not commit to the vague and extensive financial liabilities referred to in PCWCD's proposal; and (3) due to the importance of the Rye Patch Reservoir fishery, the state felt that any transfer of title must agree to maintain a minimum pool of 3,000 acre-feet in the reservoir.⁴⁶¹ The Bureau of Reclamation did not participate in the State of Nevada-PCWCD discussions. However, for the last two years, BOR has indicated that one key criterion for transfer of title to PCWCD would be an agreed-upon plan to restore the Argenta Marsh.⁴⁶²

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Notes to Part III:

1. McQuivey, Robert, "Nevada Environmental, Water, Habitat, Wildlife and Fisheries Historical Media Database," Reno, Nevada, 1999.
2. *Ibid.*
3. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Seven, Elko Reach, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, April 1964, page 41.
4. McQuivey, *op. cit.*
5. *Ibid.*
6. *Ibid.*
7. *Water Words Dictionary*, Eighth Edition, Nevada Division of Water Planning, Department of Conservation and Natural Resources, Carson City, Nevada, September 1999.
8. Shamberger, Hugh A., *Evolution of Nevada's Water Laws, as Related to the Development and Evaluation of the State's Water Resources, From 1866 to About 1960*, Water Resources Bulletin 46, U.S Geological Survey, Department of the Interior, in Cooperation with the Nevada Division of Water Resources, Department of Conservation and Natural Resources, Carson City, Nevada, 1991, page 19.
9. McQuivey, *op. cit.*
10. *Biennial Report of the State Engineer, 1909–1910*, State of Nevada, State Printing Office, Carson City, Nevada, 1911, page 3.
11. Shamberger, *op. cit.*, pages 17–20 and 31.
12. Townley, John M., *Reclamation in Nevada, 1850–1904*, (unpublished Ph.D. dissertation, Department of History, University of Nevada-Reno, 1976), pages 310–312. In fact, Section 3 of this act set forth the qualifications for the State Engineer and gave the Secretary of the Interior or the Director of the U.S. Geological Survey 30 days to approve a name submitted to become State Engineer. If no action was taken by federal officials, the Governor could proceed to make the appointment. Also see Shamberger, *op. cit.*, page 18.
13. *Humboldt Sun* (Winnemucca), September 6, 1995.
14. Shamberger, *op. cit.*, page 20.
15. McQuivey, *op. cit.*
16. Dan Murphy was a son of Martin Murphy, of the famous Stevens-Murphy-Townsend wagon train which had traversed the Humboldt River Basin in 1844 en route to California. This was the first emigrant wagon train to use the Truckee River and Donner Pass route over the Sierra Nevada. See Hulse, James W., *The Nevada Adventure*, Sixth Edition, University of Nevada Press, Reno, Nevada, 1990, page 63.
17. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, North Fork Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, August 1963, page 4.
18. *Ibid.*, page 5.
19. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, Ruby Mountains Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, June 1963, page 4.
20. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Ten, Sonoma Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, May 1965, pages 31-32.
21. *Humboldt River and Tributaries – Hydrology*, Corps of Engineers, U.S. Department of the Army, Sacramento District, Sacramento, California, September 1975, revised June 1976, page 8.
22. Shamberger, *op. cit.*, page 21.
23. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, Battle Mountain Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, October 1964, page 37.
24. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, Little Humboldt Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, March 1962, page 102.

25. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, page 5.
26. McQuivey, *op. cit.*
27. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Twelve, Basinwide Report, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, November 1966, page 6.
28. McQuivey, *op. cit.*
29. *Ibid.*
30. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
31. McQuivey, *op. cit.*
32. “Biennial Report of the Fish Commission of the State of Nevada for the Years 1907 through 1908”, State Printing Office, Carson City, Nevada, 1909, from McQuivey, *op. cit.*
33. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, Mary’s River Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, June 1963, page 3.
34. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Ten, *op. cit.*, page 4.
35. McQuivey, *op. cit.*
36. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 18
37. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 23.
38. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, page 19.
39. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, Maggie Creek Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, October 1963, pages 15-16.
40. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Two, Pine Valley Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, June 1962, page 23.
41. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, Reese River Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, June 1964, pages 36-37.
42. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, page 37.
43. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 102.
44. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, Lovelock Sub-Basin, Nevada Department of Conservation and Natural Resources and the U.S. Department of Agriculture, October 1965, pages 50-51.
45. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 8.
46. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, pages 3-4.
47. Young, James A., Philip C. Martinelli, Richard E. Eckert, Jr., and Raymond A. Evans, *Halogeton: A History of Mid-20th Century Range Conservation in the Intermountain Area*, Miscellaneous Publication Number 1553, Agricultural Research Service, U.S. Department of Agriculture, August 1999, page 25.
48. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, pages 3-4.
49. Hickman, Terry J., Robert J. Behnke, “Probable Discovery of the Original Pyramid Lake Cutthroat Trout,” *The Progressive Fish-Culturist*, Vol. 41, No. 3, July 1979, pages 135-137.
50. With the completion of Rye Patch Reservoir in 1936, these reservoirs have only been used to store water during high flow years when it is apparent that Rye Patch will not hold the total flow. Current capacity of these reservoirs is only 25,000 acre-feet. It is reported that due to heavy evaporation losses, only approximately one-half of the water diverted into these reservoirs can be made available for release to Rye Patch Reservoir. See *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 27.
51. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 13.
52. McQuivey, *op. cit.*
53. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, pages 4-5.
54. “Humboldt Project Briefing Paper,” U.S. Bureau of Reclamation, Mid-Pacific Region, Lahontan Basin Area Office, Carson City, Nevada, U.S. Government Printing Office, Washington, D.C., 1972.

55. McQuivey, *op. cit.*
56. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
57. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 3.
58. Shamberger, *op. cit.*, pages 23–28.
59. McQuivey, *op. cit.*
60. *Ibid.*
61. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 103.
62. McQuivey, *op. cit.*
63. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 23.
64. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Two, *op. cit.*, page 23.
65. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 8.
66. *Ibid.*, page 9.
67. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 103.
68. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 51.
69. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Twelve, *op. cit.*, page 8.
70. McQuivey, *op. cit.*
71. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 13.
72. McQuivey, *op. cit.*
73. *Ibid.*
74. *Ibid.*
75. Nevada Historical Marker 229, “Oil from Shale.”
76. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 23.
77. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, page 19.
78. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Two, *op. cit.*, page 23.
79. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 9.
80. McQuivey, *op. cit.*
81. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
82. *Ibid.*
83. Padre Pedro Font originally gave the name Sierra Nevada to the mountain range on the eastern fringe of Spanish California in 1776. Sierra means mountains in Spanish and Nevada means snow-covered. Consequently, the name “Sierra Nevada” means snow-covered mountains and terms such as Sierra Nevada Mountains (snow-covered mountains mountains) or Sierra Mountains (mountains mountains) are not strictly appropriate. The term Sierra Nevada range may also be used.
84. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Twelve, *op. cit.*, page 8.
85. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 103.
86. “Biennial Report of the State Fish and Game Warden for the Years 1917-1918,” C.W. Grover, State Fish and Game Warden; State Printing Office, Carson City, Nevada 1919, from McQuivey, *op. cit.*
87. *Ibid.*
88. *Ibid.*
89. “Humboldt Project Briefing Paper,” *op. cit.*
90. McQuivey, *op. cit.*
91. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, pages 23–24.
92. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Two, *op. cit.*, page 23.
93. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 9.
94. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 16.

95. The date of establishment of a water right; the officially recognized date associated with a water right. The rights established by application have the application date as the date of priority. Relative to other water rights, the priority date may make a water right senior (predating other rights) or junior (subordinate to other rights). See *Water Words Dictionary*, *op. cit.*
96. *(The) Humboldt River Adjudication, 1923 – 1938*, Compiled by Gray Mashburn, Attorney General and W.T. Mathews, Deputy Attorney General, State Printing Office, Carson City, Nevada, 1943, Section No. 1, page 3.
97. Malone, George, W., State Engineer of Nevada, “Humboldt River Distribution and Different Features Affecting These Deliveries for the Years 1927 to 1931, Inclusive,” State Printing Office, Carson City, Nevada, 1932, page 13.
98. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Twelve, *op. cit.*, page 8.
99. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 49.
100. *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, Section No. 1, page 3.
101. *Elko Daily Free Press*, November 29, 1999.
102. State Engineer’s Office, Nevada Division of Water Resources, Legal Documents, Carson City, Nevada, January 2000.
103. McQuivey, *op. cit.*
104. Malone, George W., and Thomas R. King, “Report on Humboldt River Storage for Lovelock Valley, Lovelock, Nevada,” Reno, Nevada, August 17, 1925, pages 10-17.
105. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 13.
106. Malone, *op. cit.*, 1925, page 13.
107. *Abstract of Claims Little Humboldt River*, In the Matter of the Determination of the Relative Rights in and to the Waters of the Little Humboldt River and its Tributaries in Humboldt and Elko Counties, Office of the State Engineer, State of Nevada, 1929.
108. “Biennial Report of the Nevada State Fish and Game Commission for the Year 1929-1930,” State Printing Office, Carson City, Nevada, 1931, from McQuivey, *op. cit.*
109. Malone, *op. cit.*, 1925, page 19.
110. Converting this information to rate of flows is difficult due to the extensive meanders of the Humboldt and the inability to determine actual distances traveled, especially below Battle Mountain. However, using a range of calculations based on a 1:1 sinuosity ratio (i.e., the river follows the shortest line of the valley grade essentially without meanders), a 1:2 sinuosity ratio (one mile down channel and one mile of side-to-side meanders), and a 1:3 sinuosity ratio (one mile down channel and two miles of meanders) provides a reasonable range of flow rates for the Humboldt River. The Humboldt River over this extended distance is probably somewhere between a 1:2 and 1:3 sinuosity ratio. Using this technique, the rate of flow for the total distance from Palisade to Lovelock was between 0.6 miles per hour (1:1 sinuosity) to 1.9 mph (1:3 sinuosity). The flow rates from Palisade to Battle Mountain were the most rapid, ranging from 0.9 mph (1:1) to 2.6 mph (1:3), while the trip from Battle Mountain to Winnemucca, which includes extensive meanders (i.e., high sinuosity), showed flow rates of only 0.5 mph (1:1) to 1.6 mph (1:3). Source of estimate: Nevada Division of Water Planning, May 2000.
111. Malone, *op. cit.*, 1932, Chapter VI.
112. *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, Section No. 1, page 5.
113. Specifically excluded were water rights along the Little Humboldt River (Carville Decree) and on the Reese River (vested water rights but not adjudicated).
114. *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, Section No. 1, pages 9-11.
115. The rate of flow in District No. 1 was based upon an irrigation duration of the following approximate lengths: 180 days for Class A lands, 90 days for Class B lands, and 45 days for Class C lands. That in District No. 2 was 120 days for Class A lands, 60 days for Class B lands, and 30 days for Class C lands. Further, the water duty of the cultured areas was established as follows: Harvest Crop lands (Class A) 3 acre-feet; Meadow Pasture (Class B) 1.5 acre-feet; and Diversified Pasture, 0.75 acre-feet. See *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, page 52 and pages 242-243
116. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 31.
117. *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, Section No. 2, page 3.

118. *Ibid.*, pages 4-5.
119. *Ibid.*, pages 6-12.
120. *Ibid.*, pages 13-14.
121. *Ibid.*, pages 15-16.
122. *Ibid.*, pages 17-18.
123. *Ibid.*, pages 19-20.
124. *Ibid.*, pages 21-22.
125. *Ibid.*, pages 11-12.
126. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 51.
127. Taylor Grazing Act, 43 U.S.C. §§ 315-316, June 28, 1934, as amended 1936, 1938, 1939, 1942, 1947, 1948, 1954 and 1976.
128. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 3.
129. Kelly, Guy, "Grazing Act Still at Work to Protect Grasslands," *Denver Rocky Mountain News*, November 2, 1999.
130. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, page 6.
131. Contract IIR-774. The Humboldt Project was authorized pursuant to the National Industrial Recovery Act of June 16, 1933 and the National Reclamation Act of 1902. The project's major component, Rye Patch Reservoir, was completed in 1936. Personal communication, Mike Andrews, U.S. Bureau of Reclamation, Lahontan Region Projects Office, Carson City, Nevada, July 6, 2000.
132. "Humboldt Project Briefing Paper," *op. cit.*
133. *Proposed Findings of Fact, Conclusions of Law and Decree*, in the District Court of the Sixth Judicial District of the State of Nevada, in and for the County of Humboldt, No. 3157, In the Matter of the Determination of the Relative Rights in and to the Waters of the Little Humboldt River and Its Tributaries in Humboldt and Elko Counties, January 24, 1935 [E.P. Carville Decree], pages 73-74.
134. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 9.
135. Muth, Edmund, Deputy State Engineer, "Field Investigation: Water Distribution Report and Recommendations on Little Humboldt River and Tributaries in Nevada," Office of the State Engineer, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1943, pages 2-3.
136. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 31. The water rights obtained for the project came largely from the purchase of ranches owned by the Aldous family (purchased on January 17, 1935) and the Phillipini family (purchased on January 26, 1935). Water rights from five other ranches were also purchased in the Battle Mountain area, but those owners retained the surface water rights. The issue of ownership of the Battle Mountain Community Pasture has repeatedly surfaced, particularly most recently with the efforts of the Pershing County Water Conservation District to obtain ownership of the Humboldt Project. With respect to the purchase of these ranches, the PCWCD's original role was to negotiate prices and secure options to purchase from the landowners. All options to purchase were assigned to the U.S. Government and the deeds have been recorded with the U.S. Government. Personal communication, Mike Andrews, *op. cit.*
137. "Humboldt Project Briefing Paper," *op. cit.*
138. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, pages 8, 13 and 27.
139. *(The) Humboldt River Adjudication, 1923 – 1938*, *op. cit.*, Section No. 2, pages 1-105.
140. Hennen, George W., *Humboldt River Water Distribution*, Part I – Problems, Part II – Priority Tables, Division of Water Resources, Nevada Department of Conservation and Natural Resources, April 1964, page 9.
141. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 18.
142. *Ibid.*
143. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Ten, *op. cit.*, page 7.
144. "Humboldt Project Briefing Paper," *op. cit.*
145. Rawlings, Marcus S., Larry A. Neel, *Wildlife and Wildlife Habitats Associated with the Humboldt River and Its Tributaries*, Biological Bulletin No. 10, Nevada Department of Wildlife, Reno, Nevada, 1989, page 47.
146. Rawlings, *op. cit.*, page 47.

147. Personal communication, Doug Hunt, Habitat Bureau Chief, Nevada Division of Wildlife, Reno, Nevada, January 26, 2000.
148. *(The) Humboldt River Adjudication, 1923 – 1938, op. cit.*, Section No. 4, pages 1-6.
149. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 104.
150. Hennen, *op. cit.*, page 3.
151. Shamberger, *op. cit.*, page 31.
152. “Nevada Water Supply and Use,” U.S. Geological Survey Water-Supply Paper 2350, U.S. Geological Survey, Water Resources Division, Department of the Interior, Carson City, Nevada, 1987, page 359.
153. *Nevada Hydrographic Basin Statistical Summary*, Office of the State Engineer, Division of Water Resources and Division of Water Planning, Nevada Department of Conservation and Natural Resources, Carson City, Nevada, 1988.
154. Hardman, George, Cruz Venstrom and Howard G. Mason, “Irrigated Lands of the Humboldt River Area, Nevada,” Irrigation Bulletin No. 1 (Preliminary Copy), Agricultural Experiment Station, Department of Irrigation, University of Nevada, May 1939, pages 8-9.
155. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
156. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 28.
157. McQuivey, *op. cit.*
158. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 56.
159. “Humboldt Project Briefing Paper,” *op. cit.*
160. McQuivey, *op. cit.*
161. *Humboldt River and Tributaries – Hydrology, op. cit.*, page 9.
162. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 18.
163. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, page 19.
164. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 16.
165. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, page 38.
166. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 51.
167. *Ibid.*
168. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, pages 19-20.
169. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 16.
170. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, page 38.
171. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 104.
172. Muth, *op. cit.*, 1943, pages 2-3.
173. McQuivey, *op. cit.*
174. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 50.
175. “Humboldt River Meeting,” Transcript of Proceedings, Alfred Merritt Smith, State Engineer, presiding as Chairman, Commercial Hotel, Elko, Nevada, August 22, 1945.
176. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 3.
177. McQuivey, *op. cit.*
178. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
179. McQuivey, *op. cit.*
180. The proposed Hylton Reservoir was to be located at the mouth of Tenmile Creek, about 10 miles south of Elko, Nevada. In 1987 the 42,000 acre-foot South Fork Reservoir was constructed on this site. The Hylton Reservoir was to have a drainage area of some 970 miles, a maximum capacity of 120,000 acre-feet at a pool elevation of 5,244 feet MSL. The Hylton dam would be a rolled earthfill structure 99 feet high and 1,610 feet long at its crest, containing about 1,425,000 cubic yards of fill. See “Flood Control Survey Report on Humboldt River and Tributaries, Nevada,” Department of the Army, Corps of Engineers, Sacramento District, Sacramento, California, September 15, 1948, pages 24-25.

181. The proposed Devils Gate Dam would be constructed across the North Fork of the Humboldt River 26.4 river miles above its mouth and some 18 miles northeast of Elko, Nevada. The reservoir would have a maximum capacity of 80,000 acre-feet. The dam structure would consist of approximately 605,000 cubic yards of rolled earthfill, with a maximum height above the stream bed of 124 feet and a crest length of 400 feet. See “Flood Control Survey Report on Humboldt River and Tributaries, Nevada,” *op. cit.*, pages 25-26.
182. The proposed Vista Dam would be located on Mary’s River 23.7 river miles above its mouth and some 41 miles northeast of Elko, Nevada. The reservoir would have a maximum capacity of 50,000 acre-feet. The dam would be a rolled earthfill structure 73 feet high and 6,410 feet long at its crest, containing some 1,200,000 cubic yards of embankment. See “Flood Control Survey Report on Humboldt River and Tributaries, Nevada,” *op. cit.*, pages 26-27.
183. “Flood Control Survey Report on Humboldt River and Tributaries, Nevada,” *op. cit.*, page 48.
184. *Ibid.*, page 4.
185. The full board consisted of Warren Monroe and George Ogilvie of Elko, Elmer Hill and Rene Lemaire of Battle Mountain, A.V. Tallman of Orovida, Jack Kearns of Winnemucca, and Lester Munk and Robert Leighton (representing Victo Arobio) of Lovelock. See Muth, Edmund, Special Assistant State Engineer, “Humboldt River Survey,” Office of the State Engineer, Nevada Department of Conservation and Natural Resources, Carson City, Nevada, January 1952, Foreword.
186. Muth, *op. cit.*, 1952, pages 11-12.
187. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 3.
188. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 4.
189. *Ibid.*
190. Muth, *op. cit.*, 1952, pages 6-7 and 12.
191. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 9.
192. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 18.
193. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 24.
194. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 16.
195. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 37.
196. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, page 104.
197. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, pages 51-52.
198. McQuivey, *op. cit.*
199. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 39-40.
200. Initially, the Humboldt River Basin was divided into an upper basin and a lower basin with the dividing point being the U.S. Geological Survey gage at Palisade. Typically, river flows above this point are increasing and below this point they are decreasing. This division point was also recognized in the Bartlett and Edwards Decrees and also reflected a recognition in changes in the irrigation season and different irrigation requirements in the upper basin (shorter growing season) versus the lower basin (longer growing season). This upper and lower basin configuration is used in this chronology as well. In the 1980’s and 1990’s, the USGS adopted another basin division scheme in terms of an upper basin, a middle basin and a lower basin. Under this USGS designation, the upper basin remained the same (i.e., all drainage areas above the Palisade gage) while the middle basin extended from the USGS Palisade gage to the Comus gage and included 14 hydrographic areas (out of a total of 34 in the entire Humboldt River Basin) and specifically included the major gold mines in this region. This allowed the USGS to more closely monitor surface water and groundwater conditions and specifically the effects of mine dewatering on this area’s hydrologic conditions. Under this basin division scheme, the lower basin extended from the Comus gage to the Humboldt Sink. See Plume, Russell, W., and David A. Ponce, “Hydrologic Framework and Ground-Water Levels, 1982 and 1996, Middle Humboldt River Basin, North-Central Nevada,” Water-Resources Investigations Report 98-4209, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1999.
201. Maxey, George B., and H.E. Winchester, “The Humboldt River Drainage Basin Program,” Office of the State Engineer, State of Nevada, Carson City, Nevada, August 1952, page 2.
202. “Humboldt Project Briefing Paper,” *op. cit.*
203. ToolWorks electronic encyclopedia, Grolier Electronic Publishing, Inc., 1992.

204. "Watershed Work Plan – Susie Creek Watershed, Elko County, Nevada," prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), Sponsoring agency: Humboldt River Soil Conservation District, March 1956, pages 3-4 and page 7.
205. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Seven, *op. cit.*, page 41.
206. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 14.
207. Donaldson, Susan, and Wayne Johnson, "The War Against Tall Whitetop," Fact Sheet FS 99-95, University of Nevada, Reno, Cooperative Extension, January 1999, page 1.
208. Larraneta, Martin, "Fact Sheet: Tall Whitetop in the Humboldt River," Nevada Department of Agriculture, Winnemucca, Nevada, February 7, 2000.
209. The early Pleistocene Epoch highstand of Lake Lahontan has been estimated to be approximately 4,590 feet MSL, over 200 feet higher than the highstand of the late Pleistocene of approximately 4,380 feet MSL. See Reheis, Marith, "Highest Pluvial-Lake Shorelines and Pleistocene Climate of the Western Great Basin," *Quaternary Research*, 52, 1999, page 197.
210. Hawley, John W., and William E. Wilson III, *Quaternary Geology of the Winnemucca Area, Nevada*, Technical Report No. 5, Desert Research Institute, University of Nevada, Reno, November 1965, page 47.
211. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, page 69.
212. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 40.
213. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, page 18.
214. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, page 20.
215. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, page 24.
216. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, pages 16-17.
217. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, page 37.
218. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, pages 38-39.
219. *Elko Daily Free Press*, May 29, 1997.
220. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 9.
221. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number One, *op. cit.*, pages 59-60.
222. *Ibid.*, pages 34-36.
223. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Two, *op. cit.*, pages 39-40.
224. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Three, *op. cit.*, pages 43-45.
225. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Four, *op. cit.*, pages 67-70.
226. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Five, *op. cit.*, pages 62-63.
227. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Six, *op. cit.*, page 10 and pages 32-35.
228. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Seven, *op. cit.*, page 14.
229. This USGS gaging station (10331500) was located approximately 18 miles downstream from Winnemucca, but is no longer active.
230. Cohen, Philip, *Preliminary Results of Hydrogeologic Investigations in the Valley of the Humboldt River Near Winnemucca, Nevada*, Geological Survey Water-Supply Paper 1754, Prepared in Cooperation with the Nevada Department of Conservation and Natural Resources, U.S. Geological Survey, Department of the Interior, U.S. Government Printing Office, Washington, D.C., 1964, pages 36-48.
231. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eight, *op. cit.*, pages 18-19.
232. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Nine, *op. cit.*, pages 22-23.

233. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Ten, *op. cit.*, page 17.
234. For details on the original Humboldt River Project specifications, see September 15, 1948 chronology entry, 1949 entry, and 1950 entry on the Flood Control Act of 1950.
235. Interestingly, this is approximately the same function that the beaver provided to the Humboldt River and its tributaries in the 1800's before extensive trapping virtually extirpated them from the basin. See May 1939 chronology entry on this matter.
236. Inactive storage pools would be created in each reservoir consisting of 10,000 acre-feet at Hylton, 5,000 acre-feet at Devil's Gate and 5,000 acre-feet at Vista. These "minimum pools" would be used for recreational purposes, including the benefit of fish and wildlife. See *Operation Plan for the Humboldt River Project*, developed by the Humboldt Engineering Associates (Elko, Nevada) for the Division of Water Resources, Department of Conservation and Natural Resources, Carson City, Nevada, October 19, 1965, page 11.
237. *Operation Plan for the Humboldt River Project*, *op. cit.*, pages 5-7.
238. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Eleven, *op. cit.*, pages 28-29.
239. Fact Sheet: "Endangered Species Act History and Overview," U.S. Fish and Wildlife Service (USFWS), Nevada State Office, U.S. Department of the Interior, Reno, Nevada, February 1995.
240. *Humboldt River Basin, Nevada, Water and Related Land Resources*, Report Number Twelve, *op. cit.*
241. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, page 9.
242. Fact Sheet: "Endangered Species Act History and Overview," *op. cit.*
243. *Humboldt River and Tributaries – Hydrology*, *op. cit.*, pages 90-91.
244. Fact Sheet: "Endangered Species Act History and Overview," *op. cit.*
245. *Preliminary Feasibility Study, Humboldt River and Tributaries, Nevada*, Prepared under contract by CH2M Hill for the Department of the Army, Sacramento District, Corps of Engineers, Sacramento, California, April 1976, pages 28-34.
246. Fortunately, *Salmo clarki henshawi* is the most conspicuously differentiated subspecies of *Salmo clarki*. Three characteristics, in particular, allow for positive identification of this subspecies: (1) the more-or-less uniform distribution of moderately large, roundish spots over the sides of the body and onto the ventral surface; (2) the large number of gillrakers (21-28, modal, and mean values typically of 23-25 versus 17-21 in other subspecies); and (3) the large number of pyloric caeca (typically 45-80 versus 25-50 in other subspecies). To the biologists studying this find, the circumstantial evidence was convincing that the original introduction was made from eggs collected from *Salmo clarki henshawi* of Pyramid Lake. See Hickman, *op. cit.*, page 136.
247. The official world record Lahontan (Pyramid Lake) cutthroat trout, taken from Pyramid Lake in 1925, weighed 41.5 pounds. Even so, it is commonly believed among the older Paiute Indians around the lake that much larger trout were once regularly caught by the Indian fishermen. Furthermore, Nevada historian Sessions Wheeler reported a trout of 62 pounds taken from Pyramid Lake in 1916. See Wheeler, Sessions S., *The Desert Lake – The Story of Nevada's Pyramid Lake*, The Caxton Printers, Ltd., Caldwell, Idaho, 1967, page 100.
248. Hickman, *op. cit.*, page 137.
249. *Water Words Dictionary*, *op. cit.*
250. *Walker River Atlas*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1992, page 53.
251. The dam site was to be situated at the mouth of Rock Creek Canyon, located just upstream from the USGS gaging station site (10324500) and straddling the Lander and Eureka County border, with most of the reservoir lying in Lander County. Rock Creek Canyon is formed as the creek cuts through the Sheep Creek Mountains before emptying into Boulder Valley. At this location, the canyon walls rise nearly vertically as much as 800 feet above a generally narrow valley floor. See "Rock Creek Reservoir – Preliminary Proposal," Prepared by Chilton Engineering for the Rock Creek Recreational Use and Management Board, February 1979.
252. *Battle Mountain Bugle*, October 17, 1995.
253. "Rock Creek Reservoir – Preliminary Proposal," Prepared by Chilton Engineering for the Rock Creek Recreational Use and Management Board (A Bi-County Agency of Eureka and Lander Counties), Elko, Nevada, February 1979, pages 1, 10-11, 13-15 and 17-19.
254. *Battle Mountain Bugle*, October 5, 1995.
255. *Battle Mountain Bugle*, November 12, 1996.

256. *System Plan – 1997*, Nevada Division of State Parks, Department of Conservation and Natural Resources, Carson City, Nevada, 1997, page 4-53.
257. Jarek, Lawrence Brian, *A Photographic History of Vegetation Changes on the Humboldt National Forest*, Thesis requirement for a Masters Degree in Environmental Science, University of Nevada, Reno, February 1986.
258. “Effects of Livestock Grazing on Wildlife, Watershed, and Recreation in Nevada,” U.S. Department of the Interior, 1975, and “Public Rangelands Continue to Deteriorate: A Report to Congress,” U.S. Government Accounting Office, 1977. *Ibid.*, page 1.
259. The 1909-1938 photographs showed that during this time shrubs had become established on sites that were once dominated by grasses. Herbaceous cover was conspicuous on many sites, but was heavily utilized, i.e., extensively grazed. In the 1965-1966 photographs, most sites had become more dominated by shrubs. Fire sensitive shrubs including bitter brush, sagebrush and curleaf mountain mahogany had increased in cover. Crown sprouting plants such as serviceberry had increased in size and density. Ceanothus stands had deteriorated. On sites heavily impacted by livestock, the aspens and willows had decreased or disappeared. On sites sprayed with herbicides in the early 1960s, perennial grasses had increased and shrubs and wyethia had decreased. *Ibid.*, page 48.
260. *Ibid.*, page 49.
261. *Lovelock Review-Miner*, March 13, 1997.
262. “Nevada Basin Outlook Report”, various issues, Natural Resources Conservation Service, U.S. Department of Agriculture, Reno, Nevada.
263. *System Plan – 1997, op. cit.*, page 4-52.
264. *TRUCKEE RIVER ATLAS, op. cit.*, page 95.
265. *Draft Environmental Impact Statement – Betze Project*, Barrick Goldstrike Mines Inc., Bureau of Land Management, Elko District Office, U.S. Department of the Interior, January 1991, pages ii, vi, and 4-29.
266. *Battle Mountain Bugle*, January 4, 2000.
267. *Humboldt Sun*, September 16, 1997.
268. *Lovelock Review-Miner*, January 23, 1997.
269. See Nevada Revised Statute 533.438, “Imposition of tax on transfer of [ground] water by county of origin; limitation on use of money collected from tax” (Added to NRS by 1991, 1368), and Nevada Revised Statute 533.4385, “Plan to mitigate adverse economic effects caused by transfer of water; contents of plan; modification of plan by state engineer” (Added to NRS by 1991, 1368).
270. *Reno Gazette-Journal*, June 14, 1996.
271. European Monetary Union member nations and their respective currencies included the Austrian schilling, Belgian franc, Dutch guilder, Finnish markka, French franc, German mark, Irish punt, Italian lira, Luxembourg franc, Portugese escudo, and the Spanish peseta. Source: Horton, Gary A., *Financial Dictionary*, Nevada Research Associates, Reno, Nevada, 1999.
272. *Reno Gazette-Journal*, September 26, 1999.
273. *Lovelock Review-Miner*, January 23, 1997.
274. *Nevada Weekly*, January 5-11, 1994, pages 6-7.
275. *Las Vegas Review Journal*, January 11, 1994.
276. *Reno Gazette-Journal*, January 10, 1994.
277. The Nevada BLM districts included Las Vegas, Carson City, Ely, Battle Mountain, Elko and Winnemucca.
278. *Nevada Appeal*, February 15, 1994.
279. Fee based on one cow or one horse, or an equivalent five sheep or goats.
280. *Reno Gazette-Journal*, March 4, 1994.
281. *Elko Daily Free Press*, March 5, 1994.
282. *The Record-Courier* (Gardnerville), August 4, 1994.
283. These mines were broken out by location and land ownership as follows: (1) Bureau of Land Management – 74,051 mines (73.1%); (2) U.S. Forest Service – 6,641 mines (6.6%); (3) Private – 17,069 mines (16.8%); and (4) Other mine land ownership – 3,544 (3.5%). See Hess, Ronald H., Gary L. Johnson, Steve Castor, Christopher Henry, and Lisa Shevenell, “Abandoned Mines Data Base Compilation Project, Humboldt Basin,” Nevada Bureau of Mines and Geology in Cooperation with the U.S. Bureau of Land Management, University of Nevada, Reno, September 30, 1994.

284. Hess, et al., “Abandoned Mines Data Base Compilation Project, Humboldt Basin,” *op. cit.*
285. Personal communication, Lisa Shevenell, Nevada Bureau of Mines and Geology, University of Nevada, Reno, February 1, 2000.
286. *Tahoe Daily Tribune*, August 3, 1994.
287. The use of plants to cleanse polluted and contaminated soils. Under this process, certain plants (e.g., sunflowers and Indian mustard) are highly effective in removing heavy metals and other toxic wastes through their uptake of water in the soil, a process which may be enhanced by the addition of chemicals to facilitate the absorption process. The plants are then harvested and discarded in a specially designated site or sent to a smelter where the metals can be extracted and sold off. The process, of course, is limited to the depth of the plant’s roots. See *Water Words Dictionary*, *op. cit.*
288. These included Indian ricegrass, needle and thread grass, crested wheatgrass and four-wing saltbrush, which were chosen to provide variety and food for wildlife.
289. *Humboldt Sun* (Winnemucca), September 6, 1995.
290. The county was a party in the suit with Duval Ranching Company, S&D Company, Kirk and Ramona Dahl and Sandra L. and Randall Sharp. See *Elko Daily Free Press*, April 25, 1996.
291. *Elko Daily Free Press*, April 25, 1996.
292. These plans included: (1) “Lahontan Cutthroat Trout Fishery Management Plan for the Humboldt River Drainage Basin” (Coffin, P.D., Project Report F-20-17, Study IX, Job No. 1-P-1, Nevada Department of Wildlife, Reno, Nevada, 1983); (2) “Fishery Management Plan for Lahontan Cutthroat Trout (*Salmo clarki henshawi*) in California and Western Nevada Waters” (Gerstung, E.R., Inland Fisheries Branch, California Department of Fish and Game, Sacramento, California, 1986); (3) “Fisheries Management Plan – Summit Lake Indian Reservation” (U.S. Fish and Wildlife Service, Reno, Nevada, 1977); (4) “Walker Lake Fisheries Management Plan” (Sevon, M., Nevada Department of Wildlife, Reno, Nevada, 1988); (5) “DRAFT Lahontan Cutthroat Trout Fishery Management Plan for the Quinn River Drainage Basin” (French, J. and J. Curran, Nevada Department of Wildlife, Reno, Nevada, 1991); (6) “Pyramid Lake Fishery Conservation Plan” (Pyramid Lake Fisheries of the Pyramid Lake Paiute Tribe, Sutcliffe, Nevada, 1992); (7) “Final Draft Lahontan Subbasins Fish Management Plan” (Hanson, M.L., W. Bowers, and R. Perkins, Oregon Department of Fish and Wildlife, Hines, Oregon, 1993); and (8) “Draft Native Cutthroat Trout Management Plan” (UDWR 1993). See Coffin, Patrick D., and William F. Cowan, *Lahontan Cutthroat Trout Recovery Plan*, U.S. Fish and Wildlife Service, Region 1, U.S. Department of the Interior, Portland, Oregon, 1995, pages 31-32.
293. Coffin, Patrick D., and William F. Cowan, *Lahontan Cutthroat Trout Recovery Plan*, U.S. Fish and Wildlife Service, Region 1, U.S. Department of the Interior, Portland, Oregon, 1995, pages iii-iv.
294. Specifically, the Lake Tahoe Basin, excluding the Truckee River Basin below the Lake Tahoe dam, was at 168% of normal snowpack water content for this time of year; the Truckee River Basin (excluding the Lake Tahoe Basin) was at 184% of normal; the Carson River Basin was at 157% of normal; and the Walker River Basin was at 185% of normal. For a more extensive analysis of these trends and possible causes for differences, see Volume 1, Part I, Overview, “Humboldt River Basin Snowpack Water Content Analysis” in this chronology.
295. “Nevada Basin Outlook Report”, *op. cit.*
296. *Lovelock Review-Miner*, January 18, 1996.
297. *Lovelock Review-Miner*, September 7, 1995.
298. *Elko Daily Free Press*, September 8, 1995.
299. *Elko Daily Free Press*, September 23, 1995.
300. The numbered 14 hydrographic areas in the USGS designated middle Humboldt River Basin include: (1) 53 – Pine Valley; (2) 54 – Crescent Valley; (3) 55 – Carico Lake Valley; (4) 56 – Upper Reese River Valley; (5) 57 – Antelope Valley; (6) 58 – Middle Reese River Valley; (7) 59 – Lower Reese River Valley; (8) 60 – Whirlwind Valley; (9) 61 – Boulder Flat; (10) 62 – Rock Creek Valley; (11) 63 – Willow Creek; (12) 64 – Clovers Area; (13) 65 – Pumpnickel Valley; and (14) 66 – Kelly Creek Valley.
301. The “middle portion” of the Humboldt River Basin is generally defined as the river’s reach between Palisade Canyon and Emigrant Canyon, or between the USGS Palisade gage and the Comus gage. This area is of particular concern as it includes virtually all of the basin’s major mine dewatering operations. See Plume, Russell, W., and David A. Ponce, “Hydrologic Framework and Ground-Water Levels, 1982 and 1996, Middle Humboldt River Basin, North-Central Nevada,” Water-Resources Investigations Report 98-4209, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1999.

302. "Humboldt River Basin Assessment Briefing Paper, Phase One Progress, Phase Two Plans," U.S. Geological Survey, U.S. Department of the Interior, Water Resources Division, Carson City, Nevada, December 1998.
303. Website address: < <http://nevada.usgs.gov/humbl>>
304. *Reno Gazette-Journal*, February 23, 1996.
305. *Battle Mountain Bugle*, October 5 and October 17, 1995.
306. *Nevada Appeal*, Carson City, November 12, 1995.
307. Plume, Russell, W., "Water Resources and Potential Effects of Ground-Water Development in Maggie, Marys, and Susie Creek Basins, Elko and Eureka Counties, Nevada," Water-Resources Investigations Report 94-4222, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1995.
308. Crompton, E. James, "Potential Hydrologic Effects of Mining in the Humboldt River Basin, Northern Nevada," Water-Resources Investigation Report 94-4233, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1995.
309. *Elko Daily Free Press*, November 25, 1995.
310. *Elko Daily Free Press*, November 28, 1995.
311. *Elko Daily Free Press*, January 13, 1996.
312. *Ely Daily Times*, December 26, 1996.
313. *Reno Gazette-Journal*, March 21, 1996 and March 23, 1996.
314. Mines currently dewatering in this area included Santa Fe Pacific Gold's Twin Creeks and Lone Tree Mines, Echo Bay's McCoy-Cove Mine, Newmont Gold Company's Gold Quarry Mine and Barrick Goldstrike's Betze-Post Mine. Cortez Joint Venture's new Pipeline Project will also be dewatered. See *Elko Daily Free Press*, April 6, 1996.
315. Money for the first phase for fiscal years 1996-1998 totaled \$950,000 and was obtained from Barrick Gold Corp. (\$500,000), Santa Fe Pacific Gold Corp. (\$150,000), and the USGS (\$300,000). See *Elko Daily Free Press*, April 6, 1996.
316. *Elko Daily Free Press*, April 6, 1996.
317. The following is a listing of rivers and streams in the Humboldt River Basin that the USFWS deemed best suited for their LCT recovery plan. The streams are listed by sub-basin, stream name, the number of miles LCT currently inhabit and who manages the rivers, U.S. Forest Service (FS), Bureau of Land Management (BLM), or private property owners (PP). ND stands for no data on stream length or management/ownership. (1) Mary's River sub-basin – Mary's River, 25 (FS, BLM, PP); Anderson Creek, 2.1 (FS, BLM, PP); Camp Draw Creek, 0.5 (FS); Chimney Creek, 2 (FS, BLM); Conners Creek, 1 (BLM); Cutt Creek, 5 (BLM); Draw Creek, 2 (FS, BLM); East Fork Mary's River 4 (FS); Hanks Creek, 14 (BLM); Mary's River Basin Creek, 2.3 (FS); T Creek, 5.2 (FS, BLM, PP); West Fork Mary's River 3.8 (FS); Wildcat Creek, 0.8 (FS, BLM, PP); Basin Creek, 0.5 (FS); Gaws Creek, 0.1 (FS); Short Creek, 0.1 (FS); Williams Basin Creek, 0.3 (FS). (2) North Fork Humboldt River sub-basin – North Fork Humboldt River, 20 (FS, BLM, PP); California Creek, 2.4 (FS, PP); Foreman Creek, 6 (FS, PP); Gance Creek, 2.8 (FS, PP); Cole Canyon Creek, 1 (FS); Road Canyon Creek, 1.3 (FS); Warm Creek, 1 (FS, PP); Mahala Creek, 1.6 (FS, BLM, PP). (3) East Humboldt River Area – Fourth Boulder Creek, 3.9 (FS); Second Boulder Creek, 0.7 (FS); East Fork Sherman Creek, 2 (BLM, PP); Sherman Creek, 2 (BLM, PP); Conrad Creek, 1.5 (FS); North Fork Cold Creek, 3.1 (FS, PP); (4) South Fork Humboldt River sub-basin – Dixie Creek, 7 (BLM, PP); Lee Creek, 1.3 (FS); North Furlong Creek, 4.5 (FS); Pearl Creek, 4 (FS, BLM, PP); Welch Creek, 2.2 (FS). (5) Maggie Creek sub-basin – Maggie Creek, 4 (BLM, PP); Beaver Creek, 2.8 (BLM, PP); Coyote Creek, 4.8 (BLM, PP); Little Jack Creek, 1 (BLM, PP); Toro Canyon Creek, ND (ND); Williams Canyon Creek, 1 (BLM, PP); Little Beaver Creek, ND (ND); (6) Rock Creek sub-basin – Frazier Creek, 1.5 (BLM, PP); Lewis Creek, 3.8 (BLM, PP); Nelson Creek, 2.6 (BLM, PP); Upper Rock Creek, 10 (BLM, PP); Toe Jam Creek, 6 (BLM, PP); Upper Willow Creek, 1 (BLM, PP). (7) Reese River sub-basin – Marysville Creek, 5 (FS, PP); Tierney Creek, 8 (FS, PP); Washington Creek, 7 (FS, PP); Crane Canyon Creek, 1 (FS). (8) Little Humboldt River sub-basin – South Fork Little Humboldt River, 16 (BLM, PP); Secret Creek, 2.5 (BLM); Sheep Creek, 3 (BLM); Pole Creek, 4.3 (BLM, PP); Indian Creek, 5.5 (FS, BLM, PP); South Fork Indian Creek, 4.5 (FS); Abel Creek, 4 (FS); Long Canyon Creek, 4.5 (FS); Lye Creek, ND (FS); Mullinex Creek, ND (FS). Source: *Elko Daily Free Press*, May 28, 1996.
318. Self-perpetuating or viable populations are defined as those that have been established for five or more years and have three or more age classes of self-sustaining trout as determined through monitoring. See *Elko Daily Free Press*, May 28, 1996.
319. Prepared by Natural Resources Consultants of Buhl, Idaho.
320. *Elko Daily Free Press*, May 28, 1996.

321. *Reno Gazette–Journal*, June 17, 1996.
322. *Lovelock Review–Miner*, July 3, 1996.
323. Assuming all Maggie Creek’s waters flowed into the crevice over a period of July 6th through August 5th, at a constant rate of 2,830 gallons per minute as recorded above the Maggie Creek Narrows gage on July 25th, then approximately 122,256,000 gallons, or 375 acre-feet, are estimated to have been returned (i.e., unintentionally recharged in this case) to the aquifer.
324. *Elko Daily Free Press*, August 19, 1996.
325. *Battle Mountain Bugle*, June 26, 1997.
326. Pumpage actually peaked in 1982 at 47,000 acre-feet, and then declined slightly in 1983 and 1984 due to above-average streamflows. See Prudic, David E., and Marc E. Herman, “Ground-Water Flow and Simulated Effects of Development in Paradise Valley, A Basin Tributary to the Humboldt River in Humboldt County, Nevada,” U.S. Geological Survey Professional Paper 1409-F, U.S. Geological Survey, Department of the Interior, U.S. Government Printing Office, Washington, D.C., 1996, pages F28-F29.
327. Prudic, et al., *op. cit.*, pages F1-F2.
328. *Reno Gazette–Journal*, March 2, 2000.
329. *Battle Mountain Bugle*, September 3, 1996.
330. *Elko Daily Free Press*, April 29, 1996.
331. *Elko Daily Free Press*, September 19, 1996.
332. This amount, according to the referenced report, consisted of over one billion pounds of toxic chemicals dumped directly into the nation’s waterways and another 450 million pounds discharged into sewer systems. See *Las Vegas Sun*, September 25, 1996.
333. *Las Vegas Sun*, September 25, 1996.
334. The firm hired was HYA Consulting Engineers, a Dames & Moore Company based in Sacramento, California. See *Lovelock Review–Miner*, December 12, 1996.
335. The issue of ownership of the Battle Mountain Community Pasture has repeatedly surfaced, particularly most recently with the efforts of the Pershing County Water Conservation District to obtain ownership of the Humboldt Project. With respect to the purchase of the original five ranches, the PCWCD’s original role was to negotiate prices and secure options to purchase from the landowners. All options to purchase were assigned to the U.S. Government and the deeds have been recorded with the U.S. Government. The original 1934 contract between the U.S. Bureau of Reclamation and PCWCD was not a contract-for-deed, and therefore, according to BOR sources, the BOR has no authority to transfer title; only Congress and the President can effect that. Personal communication, Mike Andrews, *op. cit.*
336. *Battle Mountain Bugle*, October 29, 1996.
337. The property Newmont is receiving will become an extension of Newmont’s Deep Star underground mine. The deposit was on Barrick’s property, but Barrick would have had a difficult time reaching it. Personal comments by Jack Morris, Vice President of Corporate Relations, Newmont Gold Company. See *Elko Daily Free Press*, October 22, 1996.
338. The conveyance system will consist of approximately 20 miles of lined canal plus pipelines. See *Elko Daily Free Press*, October 22, 1996.
339. *Elko Daily Free Press*, October 22, 1996.
340. *Battle Mountain Bugle*, October 1, 1996.
341. *Elko Daily Free Press*, November 6, 1996.
342. Early estimates had placed the volume of the proposed Rock Creek Reservoir as high as 80,000 acre-feet. See Table 1, Humboldt River Basin Proposed Dam and Reservoir Sites, Volume 1, Part I, Overview, of this chronology.
343. *Battle Mountain Bugle*, November 12, 1996.
344. *Elko Daily Free Press*, October 7, 1997.
345. Maurer, Douglas K., Russell W. Plume, James M. Thomas, and Ann K. Johnson, “Water Resources and Effects of Changes in Ground-Water Use Along the Carlin Trend, North-Central Nevada,” Water-Resources Investigation Report 96-4134, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1996.
346. *Elko Daily Free Press*, December 14, 1996.
347. *Elko Daily Free Press*, January 2, 1997.

348. “Briefing Paper on Efforts to Restore Argenta Marsh as Part of the Proposed Humboldt Project Title Transfer,” Nevada Division of Wildlife, Reno, Nevada, July 19, 1999.
349. *Lovelock Review-Miner*, January 23, 1997.
350. Normally, snowpack water content readings for the snow season are recorded as of April 1 of each year; however, due to the effects of unusual weather conditions and an early runoff after the extensive flooding in early January 1997 throughout northern Nevada, an alternative “peak” snowpack period has been chosen which more accurately reflected 1997’s relatively extreme climatological conditions. For more information on this matter, see the section “Humboldt River Basin Snowpack Water Content Analysis” contained in Volume 1, Part I, Overview, of this chronology.
351. “Nevada Basin Outlook Report – February 1, 1997”, Natural Resources Conservation Service, U.S. Department of Agriculture, Reno, Nevada, pages 1 and 3.
352. The Reservation Doctrine is based on the legal rule which states that when the United States reserves public lands for a particular purpose it also reserves sufficient water to accomplish that purpose. Those who initiate water rights after the date of the reservation are subject to the reserved right. The doctrine was first announced by the United States Supreme Court in the case of *Winters v. United States*, 207 U.S. 564 (1908), involving a dispute between an Indian reservation and a rancher. For many years it was thought that the doctrine only applied to Indian reservations, but in recent years it has been extended to other types of federal reservations, such as national parks and forests. See *Water Words Dictionary, op. cit.*
353. *Elko Daily Free Press*, February 12, 1997.
354. *Elko Daily Free Press*, July 28, 1997.
355. According to the Elko County Grand Jury records, it subpoenaed U.S. Forest Service Supervisor to provide background information about the agency’s policies and practices, but the Forest Service refused to honor the subpoena and the issue was taken before the Ninth Circuit Court of Appeals in San Francisco for resolution. See *Elko Daily Free Press*, March 6, 1997.
356. Previously, on February 13, 1997, the Elko County Grand Jury had reported a finding of criminal activity on public lands involving employees of the Nevada Division of Wildlife and the U.S. Forest Service. It was alleged that these state and federal workers had used “the color of office” to illegally coerce Independence Mining Company into paying \$500,000 toward mule deer habitat mitigation in exchange for mining permits. The jurors concluded, however, that the statute of limitations prohibited prosecution of the “crime”. See *Elko Daily Free Press*, March 6, 1997. These charges were later found without merit by the Nevada Attorney General.
357. *Reno Gazette-Journal*, November 13, 1997.
358. *Elko Daily Free Press*, April 19, 1997.
359. *Elko Daily Free Press*, May 29, 1997.
360. *Humboldt Sun* (Winnemucca), June 11, 1997.
361. *Reno Gazette-Journal*, June 5, 1997.
362. *Elko Daily Free Press*, September 11, 1997.
363. The original 1934 contract between the U.S. Bureau of Reclamation and Pershing County Water Conservation District was not a contract-for-deed, and therefore, according to BOR sources, the BOR has no authority to transfer title; only Congress and the President can effect that. Personal communication, Mike Andrews, *op. cit.*
364. *Lovelock Review-Miner*, June 19, 1997.
365. *Battle Mountain Bugle*, July 1, 1997.
366. *Reno Gazette-Journal*, June 30, 1997.
367. *Humboldt Sun* (Winnemucca), July 9, 1997.
368. *Lovelock Review-Miner*, July 17, 1997.
369. *Elko Daily Free Press*, June 28, 1997.
370. “Net Proceeds of Minerals, 1996-97”, Nevada Department of Taxation, Division of Assessment Standards, Centrally Assessed Properties, Carson City, Nevada, April 20, 1997, page 8.
371. *Battle Mountain Bugle*, July 22, 1997.
372. *Elko Daily Free Press*, August 2, 1997.
373. *Water Resources Data, Nevada, Water Year 1998*, Water-Data Report NV-98-1, U.S. Geological Survey, Water Resources Division, Department of the Interior, Nevada District Office, Carson City, Nevada, 1999, page 217.

374. *Battle Mountain Bugle*, September 11, 1997.

375. The 1872 mining law, according to the Center's report, contains no environmental provisions like those found in the federal coal law, i.e., the Surface Mining Control and Reclamation Act. The mining law allows companies to mine on public lands at a maximum cost of \$5 per acre. The 1872 act was, in fact, never designed to regulate the mining industry, but rather to encourage Americans to settle the West. See *Reno Gazette-Journal*, September 17, 1997.

376. *Reno Gazette-Journal*, September 17, 1997.

377. Heap leaching is a chemical process used to extract precious and other metals from vast amounts of earth and rock material. Tiny gold and silver particles dispersed throughout massive ore bodies can be economically recovered by leaching operations. However, due to the reactive nature of the chemicals used, environmental hazards may be created if care is not taken. Large quantities of naturally-occurring heavy metals and mineral salts are exposed and concentrated through this mining process. In the case of gold mining, a dilute cyanide solution is sprinkled over heaps of crushed rock, underlain by synthetic liners. The cyanide chemically bonds with the microscopic gold particles, which are then collected at the bottom of the heap in plastic liners for further processing. When the gold has been removed by this process, the heaps become a waste product requiring management and control well into the future. Heaps are typically full of residual dilute cyanide solution which, along with precipitation directly on the heap, will continue to drain through the heap. Because the heaps may contain residual cyanide, selenium, arsenic, mercury and various salts, the drainage solution may be hazardous to surface and groundwater supplies and the environment. Quite often, the least-costly manner in which to dispose of this continuous heap drainage is through a leach field and into the ground, where it may have adverse affects on the quality of groundwater, potentially contaminating water supplies for agriculture, human consumption and wildlife. See *Water Words Dictionary, op. cit.*

378. *Humboldt Sun* (Winnemucca), September 16, 1997.

379. *Elko Daily Free Press*, September 23, 1997.

380. *Elko Daily Free Press*, September 26, 1997.

381. *Elko Daily Free Press*, October 3, 1997.

382. *Elko Daily Free Press*, October 7, 1997.

383. *Elko Daily Free Press*, October 27, 1997.

384. Because these locations, i.e., the Humboldt Drain and Humboldt Slough, are not gaged and are infrequently monitored, only an approximate date can be given as to when these basin outflows actually began. Once they were observed, however, monitoring began for both water quantity and water quality until the flows ceased in September 1999.

385. It should be noted that overflow or outflow from the Humboldt Sink does not necessarily imply that the water is reaching the Carson Sink. Waters leaving the Humboldt Sink first flow into the Humboldt Drain and then into the Humboldt Slough. Once these waters leave the defined White Plains hydrographic area, they have then more or less "officially" left the Humboldt River Basin. However, for all intents and purposes, once the water has left the Humboldt Sink it has essentially been lost to the basin. Personal communication, Steve VanDenburgh, U.S. Geological Survey, Water Resources Division, Carson City, Nevada, March 23, 2000.

386. See Volume 1, Part I, Overview, "Humboldt River Basin Snowpack Water Content Analysis" for a more detailed analysis of this period and the justification for using February 1 recordings versus the more normal date of April 1.

387. Flow readings were taken at the lower Humboldt Drain at the Humboldt Bar. Additional preliminary stage readings were also taken at the Humboldt Slough at the north crossing of U.S. Highway 95 and at the Humboldt Slough at the south crossing of U.S. Highway 95. See Thodal, Carl, Armando Robledo, Angela Paul and Steve VanDenburgh, "Information File: Quantity and Quality of Outflow from Humboldt River Basin to Carson River Basin," U.S. Geological Survey, Water Resources Division, Carson City, Nevada, modified October 27, 1999.

388. *Humboldt Sun* (Winnemucca), November 17, 1997.

389. "Preliminary Assessment of Cumulative Impacts on Humboldt River Streamflow from Mining Operations in Humboldt River Basin," HCI-1718, Hydrologic Colorado Consultants, Inc., Lakewood, Colorado, November 1997.

390. *Ibid.*, pages 6-10.

391. *Ibid.*, page 14.

392. This estimate is based on a total surface area of 2,952 acres and an average annual rate of evaporation of 46 inches (3.83 feet).

393. “Preliminary Assessment of Cumulative Impacts on Humboldt River Streamflow from Mining Operations in Humboldt River Basin,” *op. cit.*, page 10 and Table 3.
394. According to Professor Glenn Miller, the use of old data to produce the new model is its major weakness. Specifically, “When you add no impacts [from individual mine studies] together, you get no impact.” See *Elko Daily Free Press*, January 5, 1998.
395. *Humboldt Sun* (Winnemucca), January 27, 1998.
396. *Humboldt Sun* (Winnemucca), January 27, 1998.
397. *Humboldt Sun* (Winnemucca), February 16, 1998.
398. The Sixth Judicial District Court (Humboldt County) has considered legal issues arising out of the enforcement of the Humboldt Decree (i.e., Bartlett and Edwards Decrees) on numerous occasions. Most recently, this state court ruled that “litigation concerning the Humboldt Stream System water rights should be carried out and resolved only in the Sixth Judicial District Court” of Nevada. *State Engineer v. Sustacha*, 108 Nev. 223, 226, 826 P.2d 959 (1992). See State Engineer’s Office, Nevada Division of Water Resources, Legal Documents, Carson City, Nevada, January 2000.
399. State Engineer’s Office, Nevada Division of Water Resources, Legal Documents, Carson City, Nevada, January 2000.
400. “Briefing Paper on Efforts to Restore Argenta Marsh as Part of the Proposed Humboldt Project Title Transfer,” Nevada Division of Wildlife, Reno, Nevada, July 19, 1999.
401. *Elko Daily Free Press*, March 26, 1998.
402. *Lovelock Review-Miner*, June 25, 1998.
403. The principal participants (aside from the U.S. Bureau of Reclamation, Pershing County Water Conservation District and the Nevada Division of Wildlife) included the following (in alphabetical order): Argenta Marsh Committee, Battle Mountain Shoshone Tribe, Coalition for Nevada’s Wildlife, Ducks Unlimited, Elko County Conservation Association, Great Basin Bassers, Great Basin Bird Observatory, Intermountain West Joint Venture, Lahontan Audubon Society, Lahontan Valley Wetlands Coalition, Lander County Commission, (The) Nature Conservancy, Nevada Bighorns Unlimited, Nevada Farm Bureau, Nevada State Council of Trout Unlimited, Nevada Wildlife Federation, Newmont Gold Company, Rocky Mountain Elk Foundation, Sierra Club and Truckee River Fly Fishers. Source: Personal communication, Doug Hunt, Habitat Bureau Chief, Nevada Division of Wildlife, Reno, Nevada, February 11, 2000.
404. “Briefing Paper on Efforts to Restore Argenta Marsh as Part of the Proposed Humboldt Project Title Transfer,” Nevada Division of Wildlife, Reno, Nevada, July 19, 1999.
405. Personal communication, Doug Hunt, Habitat Bureau Chief, Nevada Division of Wildlife, January 24, 2000.
406. These 14 hydrographic areas, along with the hydrographic number in parentheses, include Pine Valley (53), Crescent Valley (54), Carico Lake Valley (55), Upper Reese River Valley (56), Antelope Valley (57), Middle Reese River Valley (58), Lower Reese River Valley (59), Whirlwind Valley (60), Boulder Flat (61), Rock Creek Valley (62), Willow Creek Valley (63), Clovers Area (64), Pumpnickel Valley (65), and Kelly Creek Area (66). See Plume, Russell, W., and David A. Ponce, “Hydrologic Framework and Ground-Water Levels, 1982 and 1996, Middle Humboldt River Basin, North-Central Nevada,” Water-Resources Investigations Report 98-4209, U.S. Geological Survey, Department of the Interior, Carson City, Nevada, 1999.
407. The mines studied included Twin Creeks, Getchell, Pinson, Lone Tree, Marigold, North Copper Basin, McCoy Cove, Cortex, Pipeline, Mule Canyon, Dee, Betze-Post, Genesis (to include groundwater withdrawals at two nearby mines), and Carlin. See Plume, *op. cit.*, 1999.
408. Plume, *op. cit.*, 1999.
409. *Humboldt Sun* (Winnemucca), March 26, 1999.
410. *Humboldt Sun* (Winnemucca), April 27, 1999.
411. *Elko Daily Free Press*, November 27, 1999.
412. Derived from the Spanish for “child” (i.e., the “Christ child” due to its occurrence near Christmas), the name given to a southward-flowing ocean current off the coast of Peru causing an irregularly occurring flow of unusually warm surface water along the western coast of South America that is accompanied by abnormally high rainfall in usually arid areas and that prevents upwelling of nutrient-rich cold deep water causing a decline in the regional fish population. It typically results in a warm inshore current flowing along the coast of Ecuador and about every seven to ten years it extends southward down the coast of Peru with frequently devastating effects on weather, crops, and fishing (due to adverse effects on plankton). El Niño’s warm and nutrient-poor waters cause great damage to the

fishing industry and also to the birds feeding there, which are an important source of guano. The climatic effects of large-scale El Niño disturbances also cause flooding and drought conditions over a wide area, sometimes extending as far as the southern Pacific Ocean, Europe, Africa, and Asia. Such disturbances have taken place in 1953, 1957-58, 1972-73, 1976, 1982-83, 1992 and over an extended period of 1995-1999. It is also believed that this condition (the “El Niño effect”) has more far-reaching effects on climatological patterns in the Western Hemisphere and also has influenced storm patterns in the western Atlantic Ocean region (Caribbean and Gulf of Mexico). It has generally been found that the presence of El Niño tends to reduce hurricane activity while the presence of La Niña, or cool eastern Pacific waters, tends to increase hurricane activity. See *Water Words Dictionary, op. cit.*

413. Derived from the Spanish for the “little girl”, the name given to the weather phenomenon characterized by abnormally cold ocean surface water temperatures in the eastern Pacific Ocean near the equator. According to the National Oceanic and Atmospheric Administration (NOAA), during a La Niña occurrence temperatures are typically warmer than normal in the southeast United States and cooler than normal in the northwest, bringing drier than normal conditions to southern California and the Southwest. With the cold water in the Pacific tropics characterizing a La Niña event, the chill, west-to-east high-altitude winds known as the jet stream no longer move southward attracted by the temperature differential which exists during the El Niño warm-water event. Therefore, instead of being “pulled” downward as the jet stream hurls across the United States, it tends to shift northward, producing unusually wet springs in the Northwestern U.S. and summer droughts in the mid-Atlantic region. It also means that there are no strong upper elevation winds in the middle Atlantic to blow the tops off of any big tropical storms forming, consequently allowing for the formation of more hurricanes. See *Water Words Dictionary, op. cit.*

414. Stewart, Robert, “Summary, May-August 10, 1999 Nevada Fire Season,” U.S. Bureau of Land Management, Nevada Office, September 1999.

415. *Reno Gazette-Journal*, November 11, 1999.

416. State Engineer’s Office, Nevada Division of Water Resources, Legal Documents, Carson City, Nevada, January 2000.

417. The acreage to be transferred to Lander County included 933 acres of land west of Battle Mountain, a 30-acre recreation area along the Humboldt River and 135 acres surrounding the Battle Mountain rodeo grounds. See *Battle Mountain Bugle*, July 13, 1999.

418. *Battle Mountain Bugle*, July 13, 1999.

419. Troy weight is a system of units of weight in which the grain is the same as in the Avoirdupois Weight System and the pound contains 12 ounces, 240 penny weights, or 5,760 grains. See *Water Words Dictionary, op. cit.*

420. *Reno Gazette-Journal*, February 8, 2000.

421. While not precisely defined such as a “water year” (i.e., October 1 through September 30), the “fire year” or fire season generally begins in April, or even late March in southern Nevada, when moisture conditions are such that timber and grasses are prone to the effects of ignition. From this time, the fire season moves northward in latitude and upward in elevations from valley floors to the mountain ranges as drying conditions increase, until around October when moisture conditions increase sufficiently and most of the danger of fire has passed. Much of this definition is derived from an operational point of view as the time when the various fire suppression agencies (i.e., BLM, Forest Service, BIA, etc.) hire temporary workers and put fire crews on alert or standby. Source: Oral communication, Mark O’Brien, U.S. Bureau of Land Management, Nevada Office, September 13, 1999.

422. All figures related to burned areas were obtained from source data supplied by the U.S. Bureau of Land Management, Nevada Office, September 1999.

423. *Battle Mountain Bugle*, September 9, 1999.

424. *Elko Daily Free Press*, September 10, 1999.

425. *Elko Daily Free Press*, November 17, 1999.

426. *Reno Gazette-Journal*, October 1, 1999.

427. *Elko Daily Free Press*, November 10, 1999.

428. *Battle Mountain Bugle*, January 6, 2000.

429. *Elko Daily Free Press*, November 10, 1999.

430. *Elko Daily Free Press*, December 20, 1999.

431. *Elko Daily Free Press*, November 9, 1999.

432. *Battle Mountain Bugle*, January 6, 2000.

433. *Elko Daily Free Press*, November 9, 1999.

434. The Nevada Attorney General's Office had argued that Eureka County received the principal benefits of dewatering and therefore were not entitled to the tax. The Judge stated, however, that "Although Eureka County may economically benefit from Barrick's gold mining activities, it suffers basically a permanent loss from the water table being lowered, considering the great length of time that it takes for the underground water aquifer to replenish itself." The Judge also rejected the Attorney General's opinion that Eureka County was required to perform a cost-benefit analysis of the effect of the loss of the groundwater before signing the agreement with Barrick. The Judge noted that the legislature already valued the loss of water to the county when it originated the (up to) \$6 per acre-foot of tax for such water transfers. See *Elko Daily Free Press*, November 26, 1999.

435. *Elko Daily Free Press*, December 28, 1999.

436. "The Great Basin: Healing the Land," Bureau of Land Management, U.S. Department of the Interior, April 2000, page 3.

437. Nitrates represent a class of chemical compounds having the formula NO_3^- . Nitrate salts are used as fertilizers to supply a nitrogen source for plant growth. Nitrate additions to surface waters can lead to excessive growth of aquatic plants. The presence of nitrates in groundwater occurs from the conversion of nitrogenous matter into nitrates by bacteria and represents the process whereby ammonia in wastewater, for example effluent discharges from septic tank systems, is oxidized to nitrite and then to nitrate by bacterial or chemical reactions. High groundwater nitrate levels can cause methemoglobinemia in infants. See *Water Words Dictionary, op. cit.*

438. Total dissolved solids, or TDS, is measure of the amount of material dissolved in water (mostly inorganic salts). Typically this measure includes aggregates of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc. of calcium, magnesium, manganese, sodium, potassium, and other cations which form salts. An important use of the measure involves the examination of the quality of drinking water. Water that has a high content of inorganic material, i.e., high TDS levels, frequently has taste problems and/or water hardness problems. See *Water Words Dictionary, op. cit.*

439. *Humboldt Sun* (Winnemucca), December 7, 1999.

440. The Lone Tree Mine is pumping approximately 36,000 gallons per minute (58,000 acre-feet per year) of which 2,200 gpm are used by the mine (consumptively), 150 gpm are used by the Trenton Canyon Mine and Glamis Gold's Marigold Mine, 4,200 gpm are used by Sierra Pacific Power Company's Valmy Power Plant, 8 gpm are used to replenish Brooks Creek, and approximately 29,000 gpm are discharged to the Humboldt River. See *Battle Mountain Bugle*, January 6, 2000.

441. The Gold Quarry Mine began dewatering in 1993 and is currently pumping 7,000 gallons per minute (11,300 acre-feet per year) of which the mine uses 2,900 gpm and 3,500 gpm are used seasonally for irrigation, and 4,100 gpm are discharged into the Humboldt River. See *Battle Mountain Bugle*, January 6, 2000.

442. *Nevada Rancher* (Sparks), January 2000.

443. *Elko Daily Free Press*, December 18, 1999.

444. These six transfer criteria include: (1) The Federal Treasury, and thereby the taxpayer's financial interest, must be protected; (2) There must be compliance with all applicable State and Federal laws; (3) Interstate compacts and agreements must be protected; (4) The Secretary's Native American trust responsibilities must be met; (5) Treaty obligations and international agreements must be fulfilled; and (6) The public aspects of the project must be protected. See "Framework for the Transfer of Title - Bureau of Reclamation Projects," U.S. Bureau of Reclamation, Lahontan Basin Projects Office, Department of the Interior, Carson City, Nevada, August 7, 1995, page 3.

445. *Lovelock Review Miner*, December 30, 1999.

446. *Elko Daily Free Press*, December 20, 1999.

447. House, P.K., A.R. Ramelli and C.T. Wrucke, "Geologic Map of the Battle Mountain Quadrangle, Nevada." Nevada Bureau of Mines and Geology, University of Nevada, Reno, 1998, and Ramelli, A.R. and P.K. House, "Geologic Map of the Stoney Point Quadrangle, Nevada." Nevada Bureau of Mines and Geology, University of Nevada, Reno, 1999.

448. Approximately 6,900 years before present (B.P.) the Mount Mazama eruption of tephra (clastic volcanic materials, such as dust, ashes and pumice, which are ejected during an eruption and carried through the air before deposition) occurred at Crater Lake (Oregon) resulting in a distinctive layer of ash found in many archeological sites and geologic localities in northern Nevada and particularly within the Humboldt River Basin. The ash from this eruption formed easily-identifiable bed layers which exhibit particular chemical and petrographic characteristics and allow it to be distinguished from all other known tephra beds in the area. Consequently, it has become a particularly useful time marker soil horizon throughout much of the basin. See Elston, Robert G., Jonathan O. Davis, Sheryl Clerico, Robert Clerico, and Alice Becker, "Archeology of Section 20, North Valmy Power Plant, Humboldt

County, Nevada,” Social Sciences Technical Report No. 19, Desert Research Institute, Social Sciences Center, University of Nevada System, Reno, Nevada, January 1981, page 25.

449. *Elko Daily Free Press*, December 16, 1999.

450. Lambert, David K. and W. Douglass Shaw, “Agricultural and Recreational Impacts from Surface Flow Changes Due to Gold Mining Operations,” Forthcoming, *Journal of Agricultural and Resource Economics*, revised, January 2000.

451. This was the price being paid by the U.S. Fish and Wildlife Service to purchase water rights on a permanent basis from farmers in the Truckee-Carson Irrigation District located in the Carson River Basin and the Lahontan Valley.

452. *Elko Daily Free Press*, January 18, 2000.

453. State Engineer’s Office, Nevada Division of Water Resources, Legal Documents, Carson City, Nevada, January 2000.

454. *The Wall Street Journal*, February 16, 2000.

455. Mercury affects the central nervous system of animals and humans and in severe cases irreversibly damages the brain. Children and fetuses are especially sensitive to the effects of mercury. Mercury in aquatic environments is particularly harmful because bacteria convert the mercury to methylmercury. Unlike elemental mercury, methylmercury is 100 percent absorbed by living tissues, and when methylmercury enters the food chain, it becomes progressively more concentrated with each step up the food ladder. See *Reno Gazette-Journal*, March 2, 2000.

456. Under the Federal Emergency Planning and Community Right-to-Know Act, companies with ten or more employees that manufacture or use large amounts of toxic materials must keep an accounting of these substances and report to the public through the EPA what amounts escape into the environment and what gets shipped out for disposal or recycling. See *Reno Gazette-Journal*, March 2, 2000.

457. *Reno Gazette-Journal*, March 2, 2000.

458. “The Great Basin: Healing the Land,” *op. cit.*, page 35.

459. The BLM’s restoration objectives included: (1) Resolve the problems of the Great Basin from an ecosystem perspective rather than a programmatic or issue basis; (2) Protect healthy, functioning ecosystems consisting of native plant communities; restore degraded landscapes with high potential; and restore decadent shrublands; (3) Develop a common basis for an approach to problem identification and resolution; (4) Develop criteria for prioritizing restoration work and funding; (5) Leverage limited current capability by combining funding sources on priority areas identified through the restoration criteria; (6) Capitalize on external partnerships to maximize restoration capability and success; and (7) Promote scientific research and studies [“The Great Basin: Healing the Land,” *op. cit.*, pages 7-8]. The BLM’s restoration guiding principles included: (1) Restoration will encompass all landscapes in the Great Basin and not just those areas that burned in 1999; (2) Restoration will be consistent with BLM’s “Standards for Rangeland Health”; (3) Decisions about restoration activities must be made, with involvement of local communities and tribes; (4) Restoration work will be based on the best available science; (5) Restoration must incorporate sound fire management strategies; (6) Funds will be devoted to on-the-ground work to the extent possible; (7) Native species should be given preference in seeding projects, pending seed availability, cost and chance of success; (8) All restoration projects will include monitoring, data evaluation and information sharing to improve restoration success in the future; (9) Restoration activities must balance ecological needs with social, political and economic considerations; and (10) The Great Basin must be managed for no net loss of sagebrush habitat and salt desert shrub habitat [*Ibid.*, pages 17-19].

460. *High Country News*, June 5, 2000.

461. Letter, dated June 14, 2000, from Nevada Governor Kenny C. Guinn to Mr. Mike Gottshalk, President, Pershing County Water Conservation District.

462. Personal communication, Betsy Rieke, Area Manager, Lahontan Basin Area Office, Bureau of Reclamation, U.S. Department of the Interior, Carson City, Nevada, July 24, 2000.