

EXHIBIT 84

Walker River Chronology

**A Chronological
History
of the
Walker River
and
Related Water Issues**

January 1996



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Walker River Chronology

A Chronological History Of the Walker River And Related Water Issues

**JANUARY 1996
[First Revision]**

**A Publication in the
Nevada Water Basin Information and Chronology Series**

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WALKER RIVER CHRONOLOGY

A Chronological History of the Walker River and Related Water Issues

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A Chronological History of the Walker River and Related Water Issues

Introduction

Nevada is truly a land of contrasts and contradictions. As the driest state in the nation, it may seem somewhat peculiar for the State of Nevada to claim the remains of a prehistoric marine reptile as the official state fossil. Over 200 million years ago, in the Late Triassic period, the sixty-foot long Ichthyosaur—a term meaning “fish-lizard”—ruled the earth’s oceans as the preeminent marine predator. Of course Nevada was much different in those days and was actually the floor of an ancient equatorial sea. In fact, the west coast of the continental United States at that time was very near the western border of the State of Wyoming, and a continental shelf covered much of eastern Nevada and western Utah with the deep ocean stretching from central Nevada westward.

It was in these warm, shallow equatorial waters of central and eastern Nevada that the prehistoric Ichthyosaurs roamed at will. As the land mass gradually rose and the seas receded ever westward, some 40 of these giant creatures became stranded in shallow mud flats in what is now the northwest corner of Nye County in central Nevada. Here they would remain, to be covered by thousands of feet of sediment, which gradually compressed into rock, and then to be thrust violently upward as part of the formation of the Shoshone Mountain Range, finally coming to rest 7,000 feet above the level of the sea in which they once lived and ruled. Their final resting place would eventually be uncovered in 1926 through geological exploration in the Union Mining District near the town of Berlin. In 1977, after reigning the world’s oceans for approximately 135 million years, and some 200 million years after their final entombment, *Ichthyosaurus shonisaurus popularis*, named after the mountain range in which it was discovered, would become immortalized as Nevada’s official state fossil.

From this ancient seabed, Nevada was formed by a gradual uplifting of the ocean floor and the effects of plate tectonics, a geological process which, on several occasions, fused huge land masses appearing out of the western ocean to Nevada’s western shoreline. These continental collisions not only added to Nevada’s land mass, moving the continent’s coastline ever westward to its present location, but through the subduction process, or the sliding of older, heavier plates under newer, lighter plates, land masses were buckled and mountain ranges were thrust upwards. Further, as the submerging land masses were pushed ever deeper into the earth’s molten depths, they were heated to such extremes that they caused volcanic eruptions and hydrothermal venting across vast portions of the State. Today, Nevada’s geologic foundations consist primarily of igneous rock formations as the result of extensive volcanic activity, and sedimentary layers as a by-product of its early existence as a sea bed and the eventual wearing down of the mountain ranges that were subsequently created.

The Nevada we know today has existed for only the last few seconds on the geologic clock of time. As recently as 10,000 years ago Nevada was considerably wetter than today and much of the land was covered with ancient lakes and expansive and lush grasslands formed during the

last Ice Age. The largest of these lakes were the prehistoric Lake Lahontan in northwestern Nevada and Lake Bonneville, which covered most of northwestern Utah and extended into northeastern Nevada as well. As the massive ice sheet receded northward, the land dried, withering the abundant vegetation and leaving Nevada's water resources located primarily in shrinking desert lakes and locked beneath the sedimentary layers of the State's numerous elongated valleys.

Today, only Pyramid Lake and Walker Lake in west-central Nevada provide an indication of the prior existence of Lake Lahontan and this glacial epoch period. Surrounding these few remaining remnants of this bygone era, the watermarks etched high above the present lake levels provide a fleeting testament of Nevada's previous environment.

Geology, geography, and climate would combine to have profound effects on the nature of Nevada's future development. The lofty peaks of the Sierra Nevada Mountains, stretching along much of Nevada's western border, would interrupt the prevailing easterly flow of storm systems and the State's access to natural precipitation from the moisture-laden storm fronts coming in off the Pacific Coast. The resultant "rain shadow" rapidly dried up the land. Over much of Nevada a massive elevated bowl formed, an area we now call the Great Basin. This relatively high, but inward sloping region effectively stretched from the City of Reno in the west to Salt Lake City in the east and from Southern Oregon in the north to Death Valley, California in the south. From within this vast expanse, no surface waters flow outward to the sea.

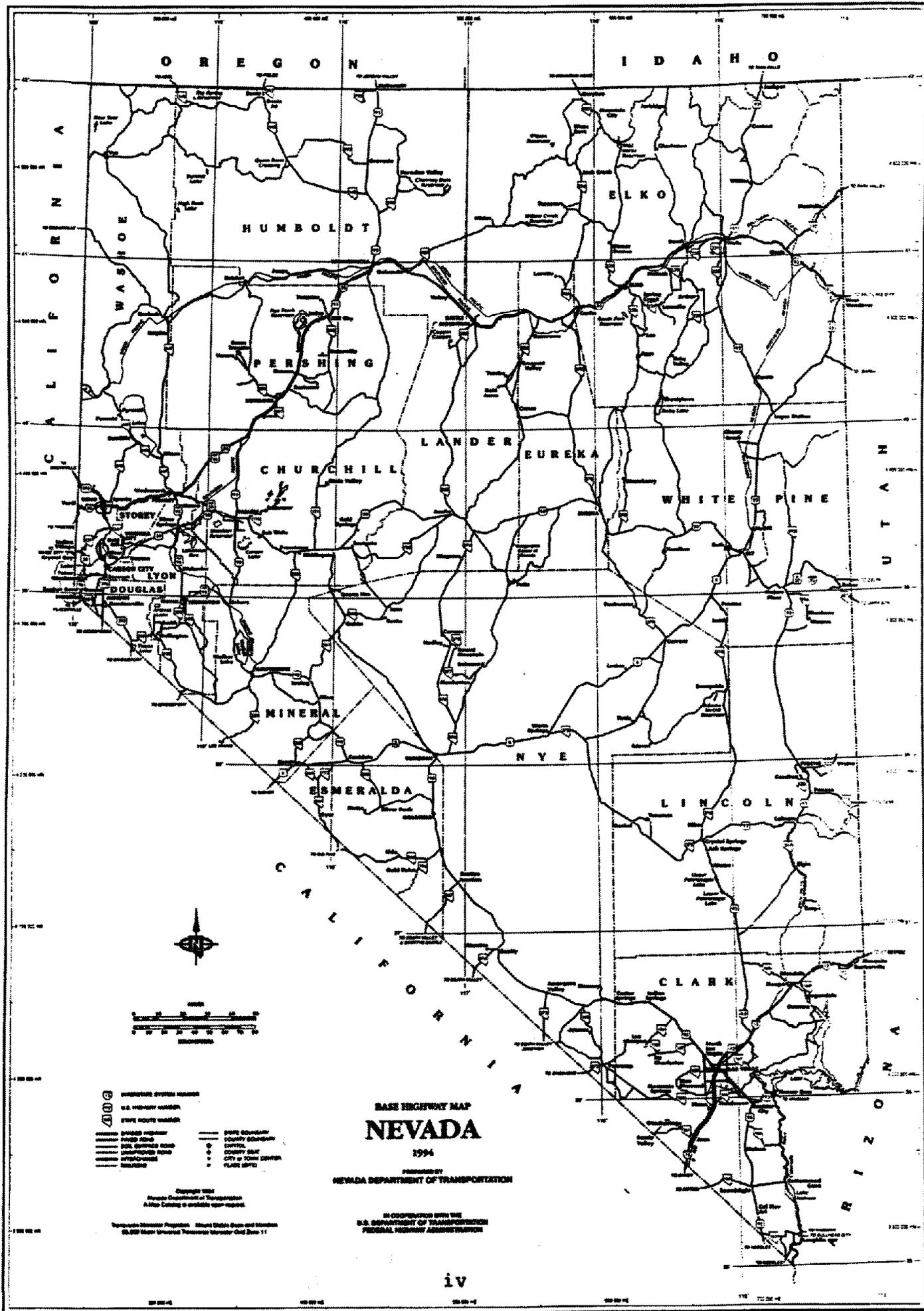
The only readily available surface waters entering this huge depression are the seasonal rivers fed by melting snow and flowing from the mountain ranges along Nevada's western frontier and out of a range of lofty peaks in north-central Nevada called the Ruby Mountains. The resultant rivers consist principally of the Humboldt River, the only major river wholly contained within Nevada, flowing out of the Ruby, Jarbidge, Independence, and East Humboldt Mountain ranges and running approximately 265 miles mostly westward towards the Humboldt Sink, and the Truckee, Carson, and Walker rivers which flow eastward out of the Sierra Nevada Mountains in the west.

These river systems would become crucial to the future development of Northern Nevada. The Truckee River, flowing out of the Sierra Nevada Mountains above Lake Tahoe and draining the Lake Tahoe Basin, courses its way over 140 miles to its terminus at Pyramid Lake. The Carson River drains an area south of Lake Tahoe and flows over 180 miles to the Carson Sink (Playa) and provides waters to important wetland habitat in that area. The Walker River drains an area in the Sierra Nevada Mountains southeast of Lake Tahoe and flows almost 160 miles to its terminus at Walker Lake. Eventually, all these river terminus locations have become stressed and natural habitat and animal species threatened, as ever greater human demands are placed on the available flows.

[The above introduction was provided courtesy of Gary A. Horton and was extracted from his NEVADA: A Historical Perspective of the State's Socioeconomic, Resource, Environmental, and Casino Gaming Development, © March 1995, Business & Economic Research Associates.]

The map outlining the Walker River Basin was provided courtesy of U.S. Geological Survey (USGS), Water Resources Division, Nevada District Office, Carson City, Nevada.

Nevada base highway map was provided courtesy of the Nevada Department of Transportation (NDOT).



BASE HIGHWAY MAP
NEVADA

1994

PREPARED BY
 NEVADA DEPARTMENT OF TRANSPORTATION

IN COOPERATION WITH THE
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION

- | | | | |
|--|--------------------------|--|----------------------|
| | INTERSTATE SYSTEM ROUTES | | STATE BOUNDARY |
| | U.S. HIGHWAY NUMBER | | COUNTY BOUNDARY |
| | STATE ROUTE NUMBER | | CITY |
| | EXPRESSWAY | | COUNTY SEAT |
| | FREEWAY | | CITY OF HOME CONTROL |
| | ROAD | | STATE ROUTE |

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Transportation Planning, Road Data Base and Studies
 25,000 Scale (General Transportation Data Sheet 11)

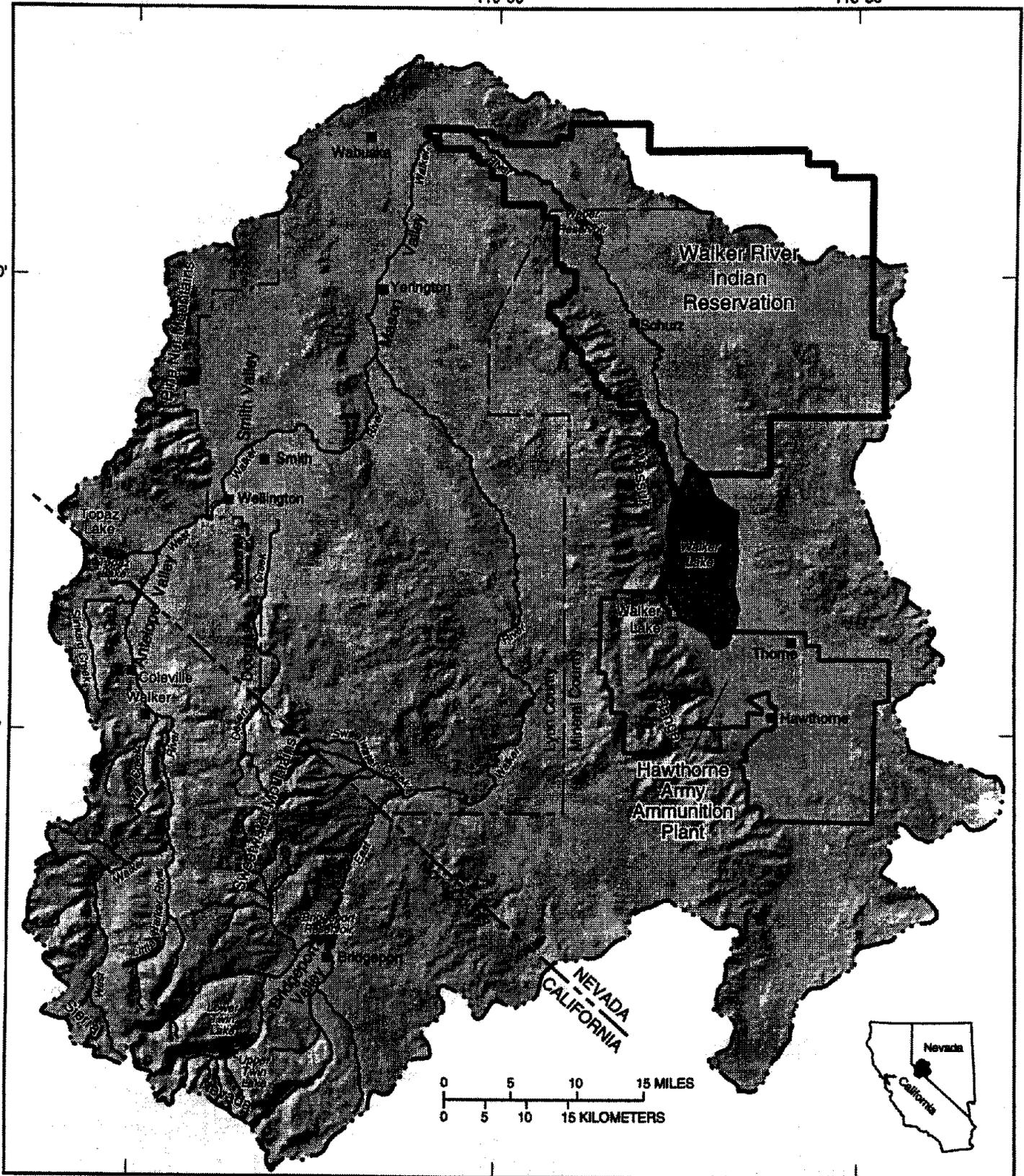
119°30'

119°00'

118°30'

39°00'

38°30'



Base from U.S. Geological Survey digital elevation data, 1:250,000, 1987, and digital data, 1:100,000, 1979-85; Universal Transverse Mercator projection, Zone 11. Shaded-relief base from 1:250,000-scale Digital Elevation Model; sun illumination from northwest at 30 degrees above horizon.

Geology from Jennings (1977), Stewart and Carlson (1978)

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HYDROLOGIC FEATURES OF THE WALKER RIVER BASIN, WESTERN NEVADA AND EASTERN CALIFORNIA

WALKER RIVER CHRONOLOGY

A Chronological History

of the

Walker River and Related Water Issues

The following information in **PART I—OVERVIEW** of this Walker River Chronology contains general background information and a description of the Walker River Basin and its physical, geologic, and hydrologic characteristics. **PART II—PRE-TWENTIETH CENTURY** and **PART III—TWENTIETH CENTURY** contain a detailed chronological listing of some of the more important events associated with the Walker River Basin, the Walker River, its east and west forks, upstream storage reservoirs, Walker Lake, and related water supply, water use, water rights, and water quality issues.

PART I—AN OVERVIEW OF THE WALKER RIVER BASIN

Introduction

The Walker River Basin encompasses an area of approximately 4,050 square miles (2,591,990 acres)¹ and stretches in a primarily northeasterly direction from its higher elevations in the Sierra Nevada Mountains in the southwest, beginning just north of Mono Lake, California, to the basin's terminus, Walker Lake, located on the basin's eastern edge. Between the headwaters of the Walker River, located in Mono County, California, and Walker Lake located in Mineral County, Nevada, the basin includes part of Douglas County, a large portion of Lyon County, and a very small portion of Churchill County, all Nevada counties.

As is typical in other hydrographic basins in western Nevada, such as the Truckee and Carson River basins, there exists a considerable imbalance in the locations of the Walker River Basin's sources of water and uses of water. While only approximately 25 percent of the Walker River Basin's total area lies within California, this area accounts for the vast majority of the precipitation and origin of surface water flows. Meanwhile, the vast majority of consumptive water use within the basin, including irrigation, evapotranspiration, and evaporation from surface waters, particularly Walker Lake, takes place within Nevada. The basin's principal agricultural water use occurs in Bridgeport and Antelope valleys in Mono County, California, and the Smith and Mason valleys located in Lyon County, Nevada. According to one estimate, in 1969 water withdrawals for irrigation in the Nevada portion of the basin alone accounted for more than 90 percent of this portion of the basin's total consumptive water use (excludes evaporation, seepage, and phreatophyte use).² While admittedly dated, this figure still depicts the relative importance of agricultural water use in the Walker River Basin.

The Walker River Basin is bordered on the southwest by the Sierra Nevada Mountains, on the west by the Pine Nut Mountains, on the north by the Desert Mountains, on the east by the Gabbs Valley and Gillis Mountain ranges, and on the southeast by the Excelsior Mountains. The east and west forks of the Walker River system are separated by the Sweetwater Mountain Range and the Pine Grove Hills. The east fork of the Walker River is separated from Walker Lake to the east by the Wassuk Range, dominated by Mount Grant, which, at 11,239 feet, rises over 7,000 feet above the surface of Walker Lake. Within the basin, valley floor elevations range from approximately 4,000–7,000 feet, with mountain ranges rising from 2,000–5,000 feet above the adjacent valleys. The highest peak in the Nevada portion of the basin is Mount Grant

(11,239 feet) located in the central part of the Wassuk Range, near the south end of Walker Lake. The highest peak in the California portion of the Walker River Basin is the Matterhorn Peak (12,264 feet) located in the Sierra Nevada Mountains between Robinson and Green creeks, tributaries to the Walker River's east fork.

The Nevada portion of the Walker River Basin is located in west-central Nevada and encompasses approximately 3,048 square miles (1,949,440 acres) and accounts for just over 75 percent of the basin's total area. The Nevada portion of the Walker River Basin is contained within parts of principally three counties (Douglas, Lyon, and Mineral)³ and is composed of five hydrographic areas—Antelope Valley, East Walker Area, Mason Valley, Smith Valley, and Walker Lake Valley.⁴ The basin is drained by the Walker River system which ultimately discharges into Walker Lake, a terminal (i.e., without outflow) desert lake located some 160 miles from the river's headwaters in the Sierra Nevada Mountains to the west. Table 1 presents a listing of the hydrographic areas and sub-areas contained within the Nevada portion of the Walker River Basin.

Table 1—Nevada Hydrographic Areas in the Walker River Basin
Hydrographic Areas and Sub-Areas by County, Surface Area, and Area Number

Hydrographic Area/Sub-Area [Nearest Cities]	County(ies)	Surface Area (acres)	Surface Area (sq. mi.)	Area Number
Antelope Valley [Topaz, Wellington]	Douglas	73,600	115	106
East Walker [Bridgeport, Yerington]	Lyon, Mineral	375,040	586	109
Mason Valley [Yerington, Mason]	Lyon, Mineral	330,240	516	108
Smith Valley [Wellington]	Douglas, Lyon	306,560	479	107
Walker Lake Valley Consisting of:	Lyon, Mineral	864,000	1,350	110
Schurz Sub-Area [Schurz]	Lyon, Mineral	321,280	502	110A
Walker Lake Sub-Area [Walker Lake, Hawthorne, Schurz]	Mineral	196,480	307	110B
Whiskey Flat-Hawthorne Sub-Area [Hawthorne, Babbit]	Mineral	346,240	541	110C
Total Walker River Basin		1,949,440	3,048	

Sources: *Nevada Hydrographic Basin Statistical Summary*, Division of Water Planning, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1988, and Office of the State Engineer, Division of Water Resources, Department of Conservation and Natural Resources, Carson City, Nevada.

The Walker River Basin Agricultural Water Use

Aside from evaporation, by far the greatest consumptive use of water within the Walker River Basin is due to agriculture.⁵ Virtually all surface water flows within the basin are appropriated for agricultural use and extensive ground water pumping is also undertaken to meet the water needs of this important sector of the region's economy during low-water years. Table 2 shows the major agricultural areas located within the Walker River Basin and their consumptive use of surface water flows. Bridgeport Valley, fed by the East Walker River and several other major tributaries, is wholly contained within California. Antelope Valley, located on the West Walker River, is shared by California and Nevada; however, most agricultural lands are located in California. Smith and Mason valleys, on the other hand, are the principal agricultural water-using areas within the basin and both of these areas are wholly contained within Nevada.

**Table 2—Walker River Basin Major Agricultural Areas
Principal Agricultural Basin Areas and Water-Righted Acreage**

LOCATION	STATE	Surface Water Righted Acreage ^[1]	Surface Water Righted Acreage ^[2]
Bridgeport Valley—Upper East Walker Basin above Bridgeport Reservoir	California	26,277	29,862
Antelope Valley and Adjoining Upper West Walker River areas	Mostly in California	17,511	20,020
Smith Valley Area	Nevada	20,439 ^[3]	20,439 ^[3]
Mason Valley Area	Nevada	58,648 ^[3,4]	58,648 ^[3,4]
Walker River Indian Reservation	Nevada	2,100	2,100
TOTALS		124,975	132,023

Table Notes:

[1] Figures obtained from *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, page 20, and *WALKER RIVER ATLAS*, page 76.

[2] Figures provided by the Federal Watermaster, Walker River, Yerington, Nevada.

[3] According to the Federal Watermaster, the total for Smith and Mason valleys is 80,041 acres, thereby leading to the total of 132,023 acres.

[4] This figure is further broken out in *Alternative Plans for Water Resource Use—Walker River Basin, Area I* (page 21) by location: West Walker River, Tunnel Ditch area of Mason Valley—6,587 acres; East Walker River, Strosnider Ranch (on south)—9,121 acres; East Walker River, Mason Valley—14,928 acres; and Main Walker River, Mason Valley—28,012 acres.

Sources: *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, State Engineer's Office, Division of Water Resources, State of Nevada, Carson City, Nevada, 1971, *WALKER RIVER ATLAS*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1992, and personal communication with Roger Bazayiff, Federal Watermaster, 1995.

Table 3 presents estimates of the surface water consumptive use of the Walker River Basin's principal areas based solely on surface water inflows to, and outflows from, each area. As shown from this table, almost 85 percent of total surface water consumption occurs in Nevada in Smith (21.7 percent) and Mason (42.6 percent) valleys and along the lower river's reach extending from the north end of Mason Valley to Walker Lake and running through the Walker River Paiute Indian Reservation (20.2 percent).

Table 3—Walker River Basin Water Use by Major Valley or Area
Surface Water Consumed for Average Annual Streamflows—1939–1993
(Acre-Feet† per Year, Rounded)

Valley/Area	Surface Water Inflow	Surface Water Outflow	Surface Water Consumed	Percent of Total Consumed
Bridgeport	132,000	107,000	25,000	9.7%
Antelope	195,000	180,000	15,000	5.8%
Smith	189,000	133,000	56,000	21.7%
Mason	238,000	128,000	110,000	42.6%
Lower Reach‡	128,000	76,000	52,000	20.2%

Table Notes: Figures include only surface waters entering and leaving the valleys or areas; specifically excludes ground water pumping and surface waters originating within a valley. Consumption includes, primarily, those uses by irrigation, evaporation, groundwater recharge (seepage), and phreatophytes.

† One acre-foot equals 325,851 gallons.

‡ The lower reach is measured between the Wabuska gaging station, located at the north end of Mason Valley, and Walker Lake.

Source: "Water Budget and Salinity of Walker Lake, Western Nevada," Fact Sheet FS-115-95, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, April 1995.

The Walker River System—The West Fork

The Walker River system consists of an east and west fork, with the West Walker River being the larger of the two forks. The confluence of these two forks is located approximately seven river miles upstream from the town of Yerington at the south end of the Mason Valley. The West Walker River has its origins just below the divide that separates the Walker River Basin from Yosemite National Park to the west. Here, below Hawksbeak Peak (9,790 feet), Ehrnbeck Peak (11,240 feet), and Tower Peak (11,755 feet) the West Walker River begins its flow. From its headwaters, this fork of the river travels due north, descending very rapidly, and drops by more than 4,000 feet over a distance of 14 miles by the time it enters the southern end of Leavitt Meadows.

At Leavitt Meadows, the West Walker River picks up Leavitt Creek, which drains Leavitt Lake (9,556 feet) and other smaller lakes—Ski Lake, Koenig Lake, and Latopie Lake—as well

as the tributary Sardine Creek. At the north end of Leavitt Meadows the West Walker River picks up Brownie Creek and then turns generally east by northeast and enters Pickel Meadows. Within Pickel Meadows, which runs in a generally east by northeasterly direction, the west fork picks up a number of small tributaries, including Poore Creek from the south, which drains Poore Lake (7,214 feet) and Little Wolf, Cloudburst, Wolf, and Silver creeks from the north.

Upon exiting Pickel Meadows, the west fork travels generally east until it reaches U.S. Highway 395 where it picks up a major tributary, the Little Walker River, near Sonora Junction. From this point, the west fork turns due north and runs for 10 miles through a narrow canyon before entering the south end of Antelope Valley. Along the river's route between Sonora Junction and Antelope Valley, the west fork picks up a number of smaller streams and creeks, including Burcham Creek, Driveway Creek, Grouse Creek, and Deep Creek. Other tributaries feeding the Walker River's west fork include Lost Cannon Creek⁶, which feeds into Mill Creek, which, in turn, enters the Walker River at the head of Antelope Valley. This represents the first major agricultural area encountered by the West Walker River.

Just before leaving the State of California, the West Walker River picks up what waters remain of Slinkard Creek that have not been diverted for irrigation purposes. This creek flows out of the Sierra Nevada Mountains through Slinkard Valley and is used extensively for irrigation along the western portion of Antelope Valley. At the California-Nevada state line, the West Walker River has traveled nearly 50 miles⁷ in a generally northerly direction from its mountain sources below Tower Peak. Before crossing the state line, however, a major diversion canal takes off to the north from the Walker River west fork, providing waters for storage in Topaz Lake. Topaz Lake is a storage reservoir which straddles the California-Nevada border and is owned by the Walker River Irrigation District (WRID). The WRID provides surface and storage water rights for approximately 80,000 acres of agricultural lands in Nevada, primarily located in Smith and Mason valleys.

After entering Nevada, the Walker River's west fork skirts Topaz Lake on the east. The lake occupies a low point in the basin and was called Alkali Lake prior to its development as a storage reservoir for WRID farmers. The main body of the West Walker River meets the outflow of Topaz Lake approximately four (air) miles downstream from the state line. The west fork then flows generally in a northeasterly direction through Hoye Canyon and into Smith Valley, the first major agricultural area (aside from the northern portion of Antelope Valley) lying within Nevada on the West Walker River's course. From Smith Valley, the west fork then passes through Wilson Canyon and into Mason Valley, another primary agricultural area of the Walker River Basin. Soon after entering Mason Valley, the West Walker River merges with the East Walker River, forming the mainstem of the Walker River, which then continues in a northerly direction through Mason Valley.

The Walker River System—The East Fork

The waters feeding the east fork of the Walker River arise in the high Sierra Nevada Mountains just north of Mono Lake and include Virginia Creek, which drain Virginia Lakes and an area between Mount Olsen (11,086 feet) on the south and Dunderberg Peak (12,374 feet) to the north. Also contributing to the East Walker River above Bridgeport Valley are Green Creek, draining Green, West, and East lakes, and Summers Creek. The East Walker River enters

Bridgeport Reservoir, built in 1924, from the south, while from the west enter two additional principal tributaries to Bridgeport Reservoir (and eventually the east fork of the Walker River). These include Robinson Creek, which drains the Twin Lakes area, and Buckeye Creek draining an area south and east of Hanna Mountain (11,486 feet) stretching through Big Meadow and picking up Eagle Creek, flowing down from Eagle Peak (11,844 feet). Combined, these tributaries to Bridgeport Reservoir and the East Walker River drain a number of other high mountain peaks, including Matterhorn Peak (12,264 feet) and Twin Peaks (12,314 feet).⁸

Below Bridgeport Reservoir, the East Walker River flows in a generally north by northeast direction through a narrow valley for approximately 6.5 miles until it reaches Devils Gate, at which point the valley begins to open and the first irrigation ditch occurs. From Devils Gate the river begins to flow in a generally easterly direction for approximately six miles, then reaches the "Elbow," a canyon in which the east fork performs a backward "S," subsequently turning from east to northeast and then north as it parallels the Wassuk Range, which lies between the east fork of the Walker River and Walker Lake to the west.

It is along this stretch of the east fork of the Walker River, where it lies parallel to, and west of, the northern Wassuk Range, that irrigation ditch diversions and agriculture water uses become more numerous and extensive. The valleys through which it flows are still relatively narrow compared to Mason Valley, which it enters shortly. After passing between Gray Hills on the east and Cambridge Hills on the west, the east fork of the Walker River enters the southern portion of Mason Valley. After emerging into Mason Valley, the east fork flows in a northwesterly direction for almost seven miles before merging with the Walker River's west fork. At the point of confluence with the west fork, the east fork's volume is considerably depleted, having fed a number of major irrigation ditches serving the south, central, and eastern portions of Mason Valley. These irrigation ditches constitute an extensive arterial system feeding much of Mason Valley's agricultural water needs, and include the Strosnider west and east ditches, the High Ditch, Hillbun Ditch, Nelson Ditch, Fox Ditch, Mickey Ditch, Greenwood Ditch, Hall Ditch, and Woods Ditch, to name some of the more prominent.

The Walker River System—Confluence and Mainstem

The merged west and east forks, now the mainstem of the Walker River, continue in a generally northerly direction, flowing some four miles to the community of Mason and then another three miles to a point where it comes nearest the City of Yerington. It is generally held, and topography seems to bear this out, that during certain periods when the ancient Ice Age Lake Lahontan was in its ascension or descension, the Walker River actually continued from this point in a more north by northwest direction, flowing through the Adrian Valley and into the Carson River to the north.⁹

Even today, during particularly wet periods, or as a result of excessive irrigation, waters of the Walker River Basin can overflow into the Carson River Basin through Adrian Valley, a narrow, low-lying relatively flat valley connected to the north end of Mason Valley above Wabuska.¹⁰ The possible connection between the Walker and Carson River basins has important implications for Walker Lake. Evidence indicates that during certain historical periods the course of the Walker River went through the Adrian Valley and diverted water away from Walker Lake. Furthermore, it was only when Lake Lahontan reached a surface elevations over

4,294 feet (the “sill” height of the Adrian Valley)¹¹ that the waters of this ancient lake would spill into the Walker Lake Basin and fill Walker Lake. It is likely that during the late Pleistocene period (65,000–10,000 years ago), when Lake Lahontan’s level dropped below 4,294 feet *and* the Walker River flowed northward into the Carson River, that if Walker Lake existed at all, it would have been much smaller.¹²

Today, in the absence of Lake Lahontan, the Walker River’s course continues some seven miles further downstream from Yerington where it runs adjacent to the Mason Valley Wildlife Management Area, maintained by the Nevada Division of Wildlife. Just beyond this area, at the north end of Mason Valley, the Walker River begins a swooping clockwise turn from north to east to southeast and enters the Walker River Paiute Indian Reservation. Here the Walker River flows through Campbell Valley and after some 13 miles enters Weber Reservoir. From Weber Reservoir, the Walker River continues mostly south for another 21 miles across alluvial flats of dried lakebed before entering Walker Lake.

Principal Storage Facilities of the Walker River Basin

Major storage facilities of the Walker River Basin (excluding Walker Lake) include:¹³

- [1] **Black (sometimes known as Junction) Reservoir**—(West Walker River) Fed by Black Creek, this reservoir has a storage right of 350 acre-feet, a priority date of 1907, and a decreed place of use of stored waters in the Sonora Junction area.
- [2] **Green Lakes**—(East Walker River) Actually consisting of three lakes—East Lake, West Lake, and Green Lake—the lakes are fed from Green Creek, have a collective storage right of 400 acre-feet, a priority date of 1895, and a decreed place of use of stored waters in the Bridgeport Valley area.
- [3] **Lobdell Lake**—(West Walker River) Fed from Deep Creek, this lake has a storage right of 500 acre-feet, a priority date of 1864,¹⁴ and a decreed place of use of stored waters in the south end of Smith Valley.
- [4] **Poore Lake**—(West Walker River) Fed from Poore Creek, this lake has a storage right of 1,200 acre-feet, a priority date of 1901, and a decreed place of use of stored waters in the Antelope Valley area.
- [5] **Upper Twin Lake**—(East Walker River) Fed from Robinson Creek, this lake has a storage right of 2,050 acre-feet, priority dates of 1905 and 1906, and a decreed place of use of stored waters in the Bridgeport Valley area.
- [6] **Lower Twin Lake**—(East Walker River) Fed from Robinson Creek, this lake has a storage right of 4,050 acre-feet, priority dates of 1888 and 1905, and a decreed place of use of stored waters in the Bridgeport Valley area.
- [7] **Bridgeport Reservoir**—(East Walker River) Owned and operated by the WRID, Bridgeport Reservoir was completed in 1924 and is fed from Robinson, Buckeye, and Green creeks, and the east fork of the Walker River, has a storage capacity of 42,455 acre-feet, a refill right of almost 15,000 acre-feet yielding a fill and refill right of some 57,000 acre-feet (storage and releases are controlled by the California State Water Resources Control Board—SWRCB) and is used for downstream users, primarily agricultural interests in the East Walker River’s bottom lands below the reservoir and farmers in the Mason Valley area.

- [8] **Topaz Lake (Reservoir)**—(West Walker River) Owned and operated by the WRID, Topaz Reservoir is fed by a diversion canal from the West Walker River, has a usable storage capacity of 59,439 acre-feet (decreed rights are for 50,000 acre-feet and 35,000 acre-feet refill for a total water right of 85,000 acre-feet), and an outlet that connects further downstream with the West Walker River through a 1,200 foot tunnel. Dead storage below the level of the tunnel's outlet totals approximately 65,000 acre-feet, providing a total lake capacity of almost 125,000 acre-feet. Waters are used primarily for agricultural interests in the Smith and Mason Valley areas.
- [9] **Weber Reservoir**—(Walker River) Fed from the Walker River, Weber Reservoir is located on the Walker River Paiute Indian Reservation in Nevada and is the only reservoir located on the mainstem of the Walker River. The dam was completed in 1935 with a built-in capacity of 13,000 acre-feet; however, in 1972, the U.S. Geological Survey (USGS) estimated that sedimentation had reduced the reservoir's storage capacity to 10,700 acre-feet. Stored waters have no priority date; however, the reservation does have a priority date of 1859 for a flow rate of 26.25 cfs at the Wabuska gage which may be used to fill this reservoir, with such waters subsequently being used for the irrigation of lands on the reservation.

Diversions from the Walker River Basin

Currently, only one out-of-basin diversion exists within the Walker River Basin. This consists of a long-standing irrigation diversion, with priority dates of 1860 and 1863, of six cubic feet per second from Virginia Creek, a tributary of the East Walker River. The diversion takes off approximately 0.6 miles above Conway Summit on U.S. Highway 395 and flows down towards the south into the Mono Lake Basin.

Diversions from the Walker River's Main Course

Upon the West Walker River's entry into Antelope Valley and the East Walker River's entry into the Bridgeport Meadows (Valley) above Bridgeport Reservoir, both forks are subject to an extensive labyrinth of weirs, water diversions, canals, ditches and laterals, greatly reducing already limited instream flows. The facts that these forks of the Walker River are not especially voluminous to begin with, and that agricultural demands generally exceed the river's ability to satisfy them even in normal years, only exacerbate the river's inability to adequately serve downstream uses and has jeopardized the maintenance of minimum instream flows during drought years. These effects, particularly on Walker Lake, became evident during the most recent drought period of 1988-1994, as will be discussed [see "Walker Lake and the Drought of 1988-1994" later in Part I].

Table 4 lists a number of potential reservoir sites which have been studied in the Walker River Basin for agricultural water supply purposes. Development of reservoir sites on the upper reaches of the West Walker River and its tributaries, particularly those at Pickel Meadows and Leavitt Meadows, has been largely precluded by the California Wild and Scenic Rivers Act of 1972, although this Act does not preclude federal dam and reservoir development based on hydropower generation requirements.¹⁵

Table 4—Walker River Basin Potential Reservoir Sites
Potential Major Reservoir and Dam Sites Studied by Various Agencies†

Site Name	Location	Agencies Studying†	Potential Reservoir Capacity (acre-feet)
Pickel Meadows	West Walker, California	DWR, USBR, WRID, USACE	75,000-160,000
Leavitt Meadows	West Walker, California	DWR, USBR, NRCS	25,000-40,000
Roolane	West Walker, California	DWR, NRCS	26,000-35,000
Mountain Lakes	Upper watershed, California	DWR, NRCS	2,200 (7 small lakes)
Hoye Canyon	West Walker, Nevada	USBR, WRID	75,000-91,000
Hudson	Wilson Canyon, West Walker, Nevada	WRID	16,000
Upper Piute Meadows	Headwaters area, West Walker	USGS	50,000
Strosnider	East Walker, Nevada	WRID, NRCS	10,000-46,000
Willow Flat	Headwaters area, Little Walker River	NRCS	20,000

† Agency acronyms used above:

DWR=Department of Water Resources, The Resources Agency, State of California;

USBR=U.S. Bureau of Reclamation, Department of the Interior;

WRID=Walker River Irrigation District;

USACE=U.S. Army Corps of Engineers;

NRCS=Natural Resources Conservation Service (formerly the Soil Conservation Service—SCS), U.S. Department of Agriculture;

USGS=U.S. Geological Survey, Department of the Interior.

Source: *WALKER RIVER ATLAS*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1992, page 63.

Table 5 presents average annual stream flows at selected points (gaging stations) measured by the U.S. Geological Survey (USGS). The numbers in brackets beneath these average annual flows are the corresponding instantaneous (continuous) rates of flow in cubic feet per second (cfs).

Table 5—Walker River Basin Stream Flow Rates
Average Annual Rates of Flow on Principal Streams—1939–1993
(Average Annual Flows in Acre-Feet, Corresponding Rates of Flow in Cubic Feet per Second)

Site Description	Average Flow†/[Rate‡] 1939–1993	Period of Record
Total of six streams flowing into Bridgeport Valley (Reservoir)	132,000 [182 cfs]	1954-1974
East Walker River below Bridgeport Reservoir	107,000 [148 cfs]	1923, 1926-1993
East Walker River above Strosnider Ditch	105,000 [145 cfs]	1948-1977
West Walker River below confluence with Little Walker River	185,000 [256 cfs]	1939-1993
West Walker River near Coleville	195,000 [269 cfs]	1916-36, 1958-93
West Walker River at Hoye Bridge	180,000 [249 cfs]	1921, 1926-28, 1958-93
West Walker River near Hudson	133,000 [184 cfs]	1915-23, 1948-77
Walker River near Wabuska	128,000 [177 cfs]	1903-04, 1921-22, 1926-34, 1939-40, 1944-87, 1990-93

Note: See Table 6 for corresponding gaging station numbers, where applicable.

† One acre-foot equals 325,851 gallons.

‡ A continuous rate of flow of one cubic foot per second (cfs) is equivalent to approximately 723.97 acre-feet per year.

Source: "Water Budget and Salinity of Walker Lake, Western Nevada," Fact Sheet FS-115-95, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, April 1995.

Table 6 on the following page presents Walker River Basin stream flow measures for selected gaging stations for an "Average Water Year," a "Low Water Year," and a "High Water Year." [See table note with respect to breaks in the period of record noted in Table 5, above.]

Table 6—Walker River Basin Gaging Station Flow Rates
(Average Annual Flows in Acre-Feet†, Rates of Flow in Cubic Feet per Second‡)

By Gaging Station Location (See notes below as to respective average, low, and high water years)	Average Year (see notes)	Low Water Year (see notes)	High Water Year (see notes)
West Walker River below Little Walker River, above Coleville, CA (Gaging Station 10296000) ¹	183,890 [254 cfs]	47,280 [65.3 cfs]	388,770 [537 cfs]
West Walker River near Coleville, CA (Gaging Station 10296500) ²	195,470 [270 cfs]	53,940 [74.5 cfs]	484,340 [669 cfs]
West Walker River at Hoye Bridge (Gaging Station 10297500) ³	173,030 [239 cfs]	44,160 [61 cfs]	448,860 [620 cfs]
West Walker River near Hudson, NV (Before confluence with East Walker) (Gaging Station 10300000) ⁴	135,380 [187 cfs]	40,830 [56.4 cfs]	296,100 [409 cfs]
Robinson Creek at Twin Lakes Outlet, near Bridgeport, CA (East Walker) (Gaging Station 10290500) ⁵	43,440 [60 cfs]	24,470 [33.8 cfs]	72,040 [99.5 cfs]
East Walker River near Bridgeport, CA (Gaging Station 10293000) ⁶	102,080 [141 cfs]	27,150 [37.5 cfs]	320,720 [443 cfs]
East Walker River above Strosnider Ditch near Mason, NV (Gaging Station 10293500) ⁷	102,080 [141 cfs]	28,020 [38.7 cfs]	290,300 [401 cfs]
Walker River near Wabuska, NV (Gaging Station 10301500) ⁸	116,560 [161 cfs]	9,340 [12.9 cfs]	602,340 [832 cfs]

† Gaging station flow measurements are based on average annual flows in acre-feet per year. Bracketed [] figures beneath these figures represent the corresponding instantaneous rates of flow in cubic feet per second (cfs). One acre-foot equals 325,851 gallons. As a conversion, a continuous flow rate of one cubic foot per second is equivalent to approximately 723.97 acre-feet per year.

Gaging Station Notes:

[Note: Years of record listed below may contain breaks in data series. See Table 5 for detailed period of record with respect to these gaging stations.]

¹ For years of record 1938-1994; High water year: 1907; Low water year: 1977.

² For years of record 1903-1994; High water year: 1983; Low water year: 1977.

³ For years of record 1910-1994; High water year: 1983; Low water year: 1977.

⁴ For years of record 1915-1994; High water year: 1969; Low water year: 1977.

⁵ For years of record 1954-1994; High water year: 1969; Low water year: 1961.

⁶ For years of record 1922-1994; High water year: 1983; Low water year: 1931.

⁷ For years of record 1948-1994; High water year: 1969; Low water year: 1961.

⁸ For years of record 1902-1994; High water year: 1983; Low water year: 1931.

Source: *Water Resources Data, Nevada, Water Year 1994*, U.S. Geological Survey Water-Data Report NV-94-1, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, 1995.

Walker River Issues

Similar to many other hydrographic basins in the arid west, the Walker River Basin faces a number of crucial water issues pertaining to growing and evolving demands for finite water resources. Such issues along the Walker River center primarily on the full appropriation of surface water resources within the basin, extensive groundwater pumping to augment surface water diversions during low-water years, resultant lowered water tables from groundwater pumping, reduced flows along the river's lower reach and particularly into Walker Lake, concurrent river and lake water quality issues, and conflicting water demands for varied uses. The most prominent of these issues are described below. A more extensive discussion is provided in "Walker River Issues" (now in preparation), Randy Pahl, Nevada Division of Water Planning.

- [1] ***Decline in Walker Lake's Level, Volume and Water Quality***—Since initial readings were taken in 1882,¹⁶ Walker Lake's surface elevation has declined by over 134 feet from 4,080 feet above mean sea level (MSL) recorded by Russell in 1882 (resulting in a lake depth of 224 feet) to a more recent peak surface elevation of 3,945.9 feet MSL (resulting in a lake depth of only 90 feet) recorded by the USGS on August 3, 1995.¹⁷ This change in surface elevation reflects a dramatic change in Walker Lake's total volume, from an estimated 10.7 million acre-feet in 1882 to approximately 2.06 million acre-feet presently. The deterioration of Walker Lake's water quality has followed closely its declining water levels. Because Walker Lake is a terminal lake, there exists a natural build-up of total dissolved solids (TDS), particularly salts. As a result of the decline in Walker Lake's surface elevation, and an even more pronounced decline in its volume,¹⁸ the TDS concentrations have increased significantly. Reduced lake volumes have also resulted in dramatically increased water temperatures and lowered levels of dissolved oxygen, severely stressed the lake's wildlife and seriously jeopardized its viability as a fishery. Initial recordings taken in 1882 by Russell reported Walker Lake's TDS concentrations at approximately 2,560 milligrams per liter (mg/l), whereas more recent readings show TDS concentrations in excess of 13,000 mg/l. Studies have shown that TDS concentrations approaching 16,000 mg/l will precipitate a 100 percent mortality rate on the lake's Lahontan cutthroat trout population.¹⁹
- [2] ***Preservation of a Viable Agricultural Industry***—Agriculture (including farming and ranching) represents a primary industry sector in Lyon County and particularly in its Smith and Mason valley agricultural areas. In 1992, for example, cash receipts from farm marketings in Lyon County totaled \$65.817 million and comprised almost 22 percent of Nevada total cash receipts from farm marketings, making Lyon County the most important agricultural-producing county in the state.²⁰ In addition, incomes from farming in Lyon County totaled \$23.812 million in 1992, and comprised 34.7 percent of the Nevada's total farming-related incomes and 12.9 percent of the total amount of income—\$184.671 million—earned within the county during that year.²¹ And finally, farm-related employment in Lyon County in 1992 totaled 566 workers, or 7.5 percent of the county's total employment.²² Water rights to farmers in this industry sector date back to the late-1800s when settlement

in these valleys was encouraged by the federal government's various Homestead Acts (beginning in 1862) and the Desert Land Entry Act (1877). Increased demands on finite and frequently unreliable Walker River flows have forced agricultural interests to begin extensive groundwater pumping operations as a backup to limited surface water supplies. This has increased the cost of farm production and dramatically lowered groundwater levels in certain areas. In addition, any dramatic shift in the uses of water resources in this basin (e.g., increased Indian water rights, increased flows to Walker Lake, greater instream flows for fish and wildlife, etc.) are destined to have far-reaching socioeconomic impacts upon the basin, as well as alter a way of life that has existed for generations.

- [3] ***Walker River Paiute Indian Reservation Water Claims***—After considerable pressure from state and federal officials, and particularly mining interests, in 1906 the Walker River Paiute Indian Tribe ceded back to the federal government 268,000 acres of their original 318,810 acres (granted in 1864) of reservation land, including all their rights to the land surrounding and underlying Walker Lake. Subsequently, various land grants²³ were made to the Indian Tribe from public domain lands restoring much of the area previously ceded. Even so, returned lands do not include any portion of Walker Lake or any lands adjoining Walker Lake. Consequently, the Indian Tribe is now pursuing a study, based on the reservation (Winters) doctrine, to determine the practicably irrigable acreage (PIA) within these returned lands so that new Indian water rights may be determined and, possibly, new, additional water rights sought. Any subsequent change in the allocation of existing waters to the Indian Tribe, which now has the most senior priority on the Walker River system, is destined to further diminish upstream uses and particularly the water rights of existing agricultural water users in Smith and Mason valleys. The Walker Lake Indian Tribe recently filed a lawsuit for a Motion to Intervene with the intent to open Decree C-125, which represents the current adjudication of Walker Basin water rights, to reassess water rights for the reservation. In addition, water rights for storage in Weber Reservoir, located on the reservation, have never been established. However, such rights have been included in the California-Nevada interstate compact which is now part of Public Law 101-618.
- [4] ***Recreational Water Use***—Increasingly, the importance of the recreational and environmental aspects of the waters within this basin is becoming evident. In the summer of 1988, after a particularly dry year and at the request of desperate downstream farmers, the WRID drained Bridgeport Reservoir on the east fork of the Walker River, flushing warm, silt-laden waters into the river below the dam and subsequently creating a massive fish kill downstream. Subsequent litigation, still not fully resolved, has dramatized the interrelationships of various users along this river system and the growing importance of environmental and recreational considerations in water use and allocation. The importance of recreational use of Walker Lake, Topaz Lake, Bridgeport Reservoir, and other lakes and reservoirs in the upper reaches of the Walker River system is currently being studied by the University of Nevada, Reno, Department of Agricultural Economics.

- [5] **Interstate Water Allocation**—In September 1970, the California Legislature ratified the California–Nevada Interstate Compact, which was subsequently ratified by the Nevada Legislature in March 1971. The major purposes of this compact were to: (1) provide for the equitable apportionment of water between the two states; (2) promote interstate comity and to further intergovernmental cooperation; (3) protect and enhance existing economies; (4) remove causes of present and future controversies; and (5) permit the orderly integrated and comprehensive development, use, conservation and control of the waters within the Lake Tahoe, Truckee River, Carson River, and Walker River Basins.²⁴ However, this compact was never received Congressional approval. Consequently, since 1971, Nevada and California have been living under the terms of a “gentlemen’s agreement” pertaining to the shared use of the waters of the Walker River system. Whether or not the compact is ratified by Congress and in what form will affect the primary distribution of the waters in the Walker River Basin and tends to foreshadow the ultimate resolution of all other water issues within this basin. While many of the provisions of this interstate compact have been incorporated into the 1990 Negotiated Settlement Act (Public Law 101–618), specifically for Lake Tahoe and the Truckee and Carson rivers, any reference to the interstate apportionment of the waters of the Walker River was omitted. This only further clouds the eventual settlement of apportioned waters between California and Nevada within the Walker River Basin.

Walker Lake and the Drought of 1988–1994

During the five-year period of 1988–1992, no surface waters from the Walker River entered Walker Lake. In 1993, the Walker River Paiute Indian Tribe released 4,500 acre-feet from Weber Reservoir (as part of 6,000 acre-feet of water released by the WRID from Bridgeport Reservoir), a portion of which made it to the lake. In 1994 the U.S. Army Hawthorne Ammunition Depot allowed approximately one million gallons per day of water to flow out of its water system on Mount Grant into Walker Lake. These releases lasted for about one month and totaled only approximately 92 acre-feet.²⁵ Consequently, over the 7-year period of 1988–1994, virtually no surface waters entered Walker Lake. Based on Walker Lake’s current annual rates of evaporation of approximately 137,000 acre-feet (based on a surface water rate of evaporation of 4.1 feet per year),²⁶ and accounting for estimates of annual lake surface precipitation (14,000 acre-feet per year), ground water inflows (11,000 acre-feet per year), and local surface water inflows (3,000 acre-feet per year), this has resulted in a Walker Lake water deficit of at least 110,000 acre-feet per year or 760,000 acre-feet for the entire drought period of 1988–1994.²⁷

Allowing for the effects of the drought on precipitation and groundwater and local surface water inflows, this result closely correlates to Walker Lake’s volume changes reported by the USGS over this same period of record. On September 30, 1987, the USGS reported Walker Lake’s surface elevation at 3,968.6 feet MSL and its volume was estimated at 2,942,000 acre-feet.²⁸ On September 30, 1994, seven years later, the corresponding figures were 3,942.4 feet MSL and 2,016,000 acre-feet.²⁹ This resulted in a decline in Walker Lake’s surface elevation

of 26.2 feet and a reduction in the lake's volume (deficit) of 926,000 acre-feet. Disallowing for all groundwater and local surface water inflows, and reducing lake surface precipitation to approximately 50 percent of normal, brings the estimated lake deficit of 760,000 acre-feet (above) up to almost 910,000 acre-feet,³⁰ a figure very close to the USGS actual measurements.

Walker Lake, Lake Fluctuations, and Climatic Changes

Walker Lake and Pyramid Lake (located approximately 78 miles north and northwest of Walker Lake), both of which lie along the western border of the Great Basin in west-central Nevada, represent the last remnants of Ice Age Lake Lahontan. This ancient lake covered a highly irregular area throughout much of northwestern Nevada as recently as 11,000 years ago and experienced a number of fluctuations in its extent over the last 360,000 years. The importance of this lake's fluctuations lies in the corresponding climatic conditions that fostered its existence and, equally important, the changes in those conditions that led to its rapid rise and fall and, on occasions, the complete desiccation (drying up) of some of its major basins, including Walker Lake.

Lake Lahontan was fed by the Truckee, Carson, Walker, Humboldt, Susan, and Quinn rivers. Lake Lahontan's extent consisted of seven major sub-basins in western Nevada including (1) Smoke Creek/Black Rock Desert; (2) Carson Desert; (3) Buena Vista; (4) Walker Lake; (5) Pyramid Lake; (6) Winnemucca Dry Lake; and (7) Honey Lake. Associated with each of these basins was a primary "sill," defined as the lowest point on the divide between adjoining basins. The sills were important to the existence of Lake Lahontan because only at the lake's surface water elevations above these threshold levels would its waters, originating in the basin's lowest point—Pyramid Lake—spill over into the adjacent basins. These sills include (listed respectively according to sub-basin numbers above): (1) Pronto and Emerson Pass; (2) Darwin Pass; (4) Adrian Valley; (5) none (Pyramid Lake was Lake Lahontan's lowest point in the basin); (6) Mud Lake Slough; and (7) Astor Pass.³¹

It was only at lake surface elevations above approximately 4,294 feet (1,308 meters) that all the basins of Lake Lahontan were joined into one continuous lake. This particular elevation represented the highest point within the Adrian Valley, a narrow valley, almost 10 miles in length, connecting the Carson River Basin to the north with the Walker River Basin to the south. This valley constituted the sill through which a rising Lake Lahontan spilled from the Carson River Basin into the lower Walker River Basin and the Walker Lake sub-basin. It was, therefore, these lower reaches of the Walker River and the Walker River Basin which constituted the last of Lake Lahontan's basins to fill during its periodic ascension phases. Conversely, this area was also the first to dry up after its descension, particularly when the waters of the Walker River would shift its course and follow the receding waters of Lake Lahontan out through the Adrian Valley and on to the Carson River to the north.

Waters from an ascending Lake Lahontan flowed south through the Adrian Valley and into the Walker River Basin, up Mason Valley to the present-day location of the City of Yerington, and down Campbell Valley to fill Walker Lake and the Walker Lake sub-basin and continued southward to a point just beyond present-day Hawthorne, Nevada. Extensive evidence based on sophisticated X-ray diffraction petrographic and radiocarbon analyses,³² as well as detailed analysis of Walker Lake's lakebed core samples,³³ indicates that Lake Lahontan and its various

hydrographic sub-basins have been subject to extensive fluctuations over the last 40,000 years and most of the sub-basins, with the possible exception of the basin's lowest point—Pyramid Lake—have completely dried up on numerous occasions.

This apparent repetitive cycle of lake ascension and descension and related pluvial (wet) and inter-pluvial (dry) periods, has important implications on our own time period and the present hydrographic cycle, climatic conditions, and our expectations of natural versus man-caused changes within this basin. Evidence shows that from 360,000–130,000 years ago, Walker Lake was frequently shallow or completely dry. Between 130,000–21,000 years ago, Walker Lake was at moderate or high levels and between 21,000–15,000 years ago Walker Lake was extremely shallow and was probably fully desiccated on numerous occasions.³⁴

Between 15,000–13,500 years ago, Lake Lahontan went through a maximum stage, attaining a surface elevation of approximately 4,380 feet MSL,³⁵ a surface area of approximately 8,600 square miles,³⁶ and the connection of all basins. Lake Lahontan's (and Walker Lake's) last highstand occurred some 12,500 years ago. Between 11,000 and 10,000 years ago, Lake Lahontan's surface level fell to approximately 3,871 feet, an elevation equivalent to that which existed in Pyramid Lake during the early 1880s.

Warm and arid conditions prevailed throughout the Great Basin from approximately 10,000 years ago to the present. Further evidence indicates that during this period Walker Lake has completely dried up on two more recent occasions—some 4,700 years before the present and again 2,600 years before the present. However, it is not certain whether these more recent periods of Walker Lake's desiccation were attributed to the region's climatic changes, or to the natural re-routing of the Walker River's mainstem along the west side of Mason Valley and then on through the Adrian Valley, in which case the Walker River became a tributary of the Carson River.³⁷

Notes to Part I:

1. *Water Resources Data, Nevada, Water Year 1994*, U.S. Geological Survey Water-Data Report NV-94-1, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, 1995, page 147. Another earlier (1965) source estimates the Walker River Basin's area at 2,665,300 acres (4,165 square miles) of which 2,069,600 acres (3,234 square miles), or 78 percent, is located in Nevada, and 595,700 acres (931 square miles), or 22 percent, is located within California. [See *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, State Engineer's Office, Division of Water Resources, State of Nevada, Carson City, Nevada, 1971, page 12.]
2. *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, State Engineer's Office, Division of Water Resources, State of Nevada, Carson City, Nevada, 1971, page 18. Also see *WALKER RIVER ATLAS*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1992, page 77.
3. The basin also includes an extremely small portion of the southwestern corner of Churchill County near Brown Knob in the Terrill Mountains, approximately 16 miles north of Walker Lake.
4. *Nonpoint Source Pollution Assessment Report*, Bureau of Water Quality Planning, Division of Environmental Protection, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, October 1989, page II C-1.
5. Omitted from this assessment are waters "lost" to (or consumed by) phreatophytes along the Walker River's course. One species of plant of particular concern within the lower Walker River Basin is tamarisk, or saltcedar, which is most prevalent along the lower reaches of the Walker River, particularly from the Wabuska gaging station at the north end of Mason Valley all the way to Walker Lake. In fact, tamarisk has become a major concern throughout the entire Southwest, where it was introduced as an ornamental tree around 1837. The Walker Lake Paiute Indian Tribe has identified approximately 1,000 acres on its reservation just above Walker Lake that are severely infested with this plant. This non-native species is well-known for its deep roots, its extremely high water consumption, its relative immunity of extermination efforts, and its relative uselessness as wildlife habitat or forage. [See *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, Public Resource Associates, Reno, Nevada, September 1994, page 6.] In places where tamarisk has taken hold, it tends to crowd out native species, particularly willows and cottonwoods. Tamarisk species found in Nevada include *Tamarix aphylla*, *Tamarix chinensis*, *Tamarix parviflora*, and *Tamarix ramosissima*. Of all these species of tamarisk, the *Tamarix ramosissima* is the one most prevalent in the Walker River Basin. [See John Thomas Kartesz, *A Flora of Nevada*, Ph.D. Dissertation, Biology Department, University of Nevada, Reno, July 1987, pages 341-342.] The U.S. Agricultural Research Service, in cooperation with Tel Aviv University in Israel, is planning to release manna scale insect egg sacs along Arizona's Rio Grande River and the lower Gila River by the spring of 1996. The manna scale insect (*Homoptera kermidae coccoidea*), a pea-size insect that feeds on the sap of the saltcedar tree, is a native of the arid lands around the Mediterranean. Without this insect to suck its sap and keep this plant species in check, the saltcedar has proliferated as a weed along streams in the Western United States. [See *Business Week*, A Publication of the McGraw-Hill Companies, November 27, 1995, page 109.]
6. Lost Cannon Creek was named for the area where John C. Frémont's party abandoned their Army howitzer in deep snows while traversing the Sierra Nevada Mountains during February 1844. In 1861 the "lost" cannon was supposedly recovered and taken to Virginia City where it was put on display. Sometime during World War I it disappeared, presumably sold for its scrap value. [See *WALKER RIVER ATLAS*, *op. cit.*, page 8, and Samuel G. Houghton, *A Trace of Desert Waters: The Great Basin Story*, University of Nevada Press, Reno, Nevada, 1994, page 105.]
7. These distances, measured generally straight line, include 14 miles from the river's sources below Tower Peak to the south end of Leavitt Meadow, 8 miles through Leavitt and Pickel meadows out to Sonora Junction and U.S. Highway 395, 10 miles through the West Walker River canyon above Antelope Valley, and 12 miles from the south end of Antelope Valley to the California-Nevada state line.
8. Houghton, Samuel G., *A Trace of Desert Waters: The Great Basin Story*, University of Nevada Press, Reno, Nevada, 1994, page 102.
9. Grayson, Donald K., *The Desert's Past: A Natural Prehistory of The Great Basin*, Smithsonian Institution Press, Washington, D.C., 1993, page 94.
10. *WALKER RIVER ATLAS*, *op. cit.*, page 17.

11. Lake Lahontan's peak surface elevation was estimated to be approximately 4,380 feet above mean sea level (MSL). [See Grayson, *op. cit.*, pages 92–97.] Other authors and researchers have estimated this highstand level of Lake Lahontan to be approximately 1,330 meters (4,364 feet). [See Larry V. Benson, "Fluctuation in the Level of Pluvial Lake Lahontan During the Last 40,000 Years," *Quaternary Research*, Volume 9, Number 3, University of Washington, 1978, page 316.]
12. Grayson, *op. cit.*, pages 94–96. Also see Wendy Milne, *A Comparison of Reconstructed Lake-Level Records Since the Mid-1800s of Some Great Basin Lakes*, Department of Geology and Geologic Engineering, Colorado School of Mines, Golden, Colorado, December 1987, page 32. Also see Larry Benson, "Fluctuation in the Level of Pluvial Lake Lahontan During the Last 40,000 Years," *Quaternary Research*, Volume 9, Number 3, University of Washington, 1978, and Larry Benson, "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *Water Resources Investigations Report 87-4258*, U.S. Geological Survey, U.S. Department of the Interior, Denver, Colorado, 1988.
13. *WALKER RIVER ATLAS*, *op. cit.*, pages 22–31.
14. The priority date of 1864 actually only applies to 30 acre-feet. The remaining 470 acre-feet of storage rights were granted to the State of California with a priority date of 1951.
15. The major difference between federal and state designation is that if a river is designated wild and scenic under a state act, the Federal Energy Regulatory Commission (FERC) can still issue a license to build a dam [for power production] on that river. For this reason, designation under the National Wild and Scenic Rivers Act of 1968 is generally preferred if it is desired to preclude virtually all future development. [See *California Water Plan Update*, Volume I, Bulletin 160–93, Department of Water Resources, The Resources Agency, State of California, October 1994, pages 28–33.]
16. Russell, Israel Cook, *Geological History of Lake Lahontan, A Quaternary Lake of Northwestern Nevada*, Monograph XI, Geological Survey, U.S. Department of the Interior, Government Printing Office, Washington, D.C., 1885.
17. U.S. Geological Survey, Water Resources Division, Carson City, Nevada, September 29, 1995.
18. For example, due to the bathymetry of the lake, in 1882 the surface level of Walker Lake was recorded by Russell at 4,080 feet MSL (maximum depth 224 feet) while its volume was estimated to be 10,700,000 acre-feet. In July 1994, the USGS recorded Walker Lake's surface elevation at 3,943.5 MSL (maximum depth 87.5 feet) and its volume was estimated at 2,053,000 acre-feet. This resulted in nearly a 61 percent decline in the lake's depth since 1882 and a 81 percent in the lake's volume.
19. *Water Resources in the Walker River Basin*, *op. cit.*, page 5.
20. Other important agricultural-producing counties for Nevada in 1992 included Elko County at \$47.363 million (15.5 percent of state total), Humboldt County at \$40.091 million (13.1 percent of state total), and Churchill County at \$38.711 million (12.7 percent of state total). [Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), Nevada socioeconomic databases, 1994.]
21. This income figure includes all wages and salaries, other labor income, and proprietors' incomes. [Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), *op. cit.*]
22. U.S. Department of Commerce, Bureau of Economic Analysis (BEA), *op. cit.*
23. Specifically, in 1906, 50,809 acres were added to the Walker River Indian Reservation; in 1918, 34,000 acres were added; in 1928, 69,000 acres were added; and in 1936 171,200 acres were added, which, along with minor adjustments to the reservation's boundaries, brought the it's area up to 324,323 acres.
24. *California–Nevada Interstate Compact Between the State of California and Nevada*, Ratified by [the] State of California, September 19, 1970 (Chapter 1480, California Statutes 1970), Ratified by [the] State of Nevada, March 5, 1971 (Nevada Revised Statutes 538.600), Congressional Consent Pending, April 25, 1971, page 1.
25. *Water Resources in the Walker River Basin: A Search for Water to Save Walker Lake*, *op. cit.*, Public Resource Associates, Reno, Nevada, November 1994, pages 6-8.
26. For the entire period of record, 1939–1993, the USGS estimated that Walker Lake's annual average water deficit amounted to 33,000 acre-feet. [See "Water Budget and Salinity of Walker Lake, Western Nevada," Fact Sheet FS-115-95, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, April 1995.]

27. This figure, no doubt, represents a minimum deficit, as it allows for historical annual average inflows of local surface water of 3,000 acre-feet, 11,000 acre-feet of ground water, and 14,000 acre-feet (4.9 inches per year) of lake surface precipitation, based on a 1939-1993 period of record. Obviously, these figures were considerably lower during the drought period of 1987-1994 and therefore this deficit represents a most conservative estimate. [See "Water Budget and Salinity of Walker Lake, Western Nevada," *op. cit.*]
28. *Water Resources Data, Nevada, Water Year 1988*, U.S. Geological Survey Water-Data Report NV-88-1, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, 1989, page 92.
29. *Water Resources Data, Nevada, Water Year 1994*, U.S. Geological Survey Water-Data Report NV-94-1, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, 1995, page 147.
30. This deficit figure is based on the assumption of an annual evaporation from Walker Lake's surface of 137,000 acre-feet less 7,000 acre-feet of annual lake surface precipitation (50 percent of the normal year 14,000 acre-feet of surface precipitation), resulting in a 130,000 acre-feet annual water deficit (without Walker River inflows) times 7 years of drought, or 910,000 acre-feet total deficit. The purpose of this exercise is to use existing, measured flow rates and evaporation levels to verify the actual measured lake volume reduction (deficit) of 926,000 acre-feet. The difference between these figures is less than 2 percent.
31. Benson, Larry V., "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *op. cit.*, page 2.
32. See Larry V. Benson, "Fluctuation in the Level of Pluvial Lake Lahontan During the Last 40,000 Years," *op. cit.*
33. See Benson, "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *op. cit.*
34. *Ibid.*, page 1.
35. Houghton, *op. cit.*, page 73.
36. Benson, "Fluctuation in the Level of Pluvial Lake Lahontan During the Last 40,000 Years," *op. cit.*, page 316.
37. Benson, "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *op. cit.*, page 1.

Walker River Chronology

PART II—PRE-TWENTIETH CENTURY

75,000–10,000 Years Ago

As recently as 10,000 years ago much of the area now contained within the upper Walker River Basin was covered in snowpack and glaciers, while much of the lower Walker River Basin was covered by the pre-historic Lake Lahontan. Lake Lahontan, along with Lake Bonneville, which covered northwestern Utah and parts of eastern Nevada, represented the Great Basin's major Ice Age lakes. These lakes covered vast portions of Nevada and Utah. The cooler temperatures and far more abundant precipitation that were prevalent at that time resulted in a more lush and hospitable environment for both flora and fauna throughout this region. Now, only the Great Salt Lake remains to provide an indication of the prehistoric presence of Lake Bonneville, and only Pyramid Lake and Walker Lake remain to provide testament of the presence of Lake Lahontan.

Lake Lahontan experienced several peaking enlargements at approximately 65,000, 45,000, 30,000, and as recently as 12,500 years ago, and at other times nearly dried up.¹ At its peak surface elevation (highstand), which occurred approximately 65,000 years ago, Lake Lahontan covered an estimated 8,655 square miles in northwestern Nevada, an area equal to almost 8 percent of the State of Nevada's present surface area. This Ice Age lake, which was fed by the flows of the Truckee, Carson, Walker, Humboldt, Susan and Quinn rivers, attained a maximum surface elevation of approximately 4,380 feet above mean sea level (MSL) and reached a maximum depth of at least 886 feet where Pyramid Lake, the lowest point in the system, now remains.² Lake Lahontan also covered the Lahontan Valley Wetlands (Stillwater Wildlife Refuge in the Carson River Basin) to a depth of 500 feet³ and the Fallon townsite by almost 420 feet, and created a pool in Walker Lake some 520 feet deep.⁴

At its peak surface elevation, the north-south extent of Lake Lahontan stretched from just below the Nevada–Oregon border in the north to present-day Hawthorne, Nevada, a point some eight miles south of Walker Lake's present southern shoreline. Lake Lahontan also extended well up the lower Truckee River canyon towards the Truckee Meadows and the present-day City of Reno to a point near the present-day location of Lockwood near Lagomarsino Canyon.⁵ In the Carson River Basin to the south, Lake Lahontan extended up the Carson River to a point just below the present-day community of Dayton. And in the Walker River Basin even further to the south, Lake Lahontan extended its reach through the Adrian Pass, a low-lying valley connecting the Carson River to the north end of Mason Valley, and then up the Walker River to a point just downstream from the present-day town of Yerington.

Waters from the expansion of Lake Lahontan only spilled over into the lower Walker Lake Basin at surface elevations of approximately 4,294 feet or greater.⁶ During certain times, the Walker River's course was believed to have periodically shifted from its present route south of Yerington. Instead of turning to the east at Wabuska and flowing through the lands now occupied by the Walker River Paiute Indian Reservation and eventually into Walker Lake itself, the river's course took a route more to the west along the eastern slopes of the Singatse Range and flowed north by northwest through the Adrian Valley (Pass) and into the Carson River Basin.

Adrian Pass, located at the northwestern end of Mason Valley, connects the Carson River Basin to the north and the Walker River Basin to the south. The pass lies at elevations ranging from 4,211 feet MSL at the Carson River (northern) end and rises to 4,294 feet MSL where it connects with Mason Valley to the south. This pass represents the most accessible connection between these adjoining basins, and the primary "sill" through which the ascending waters of ancient Lake Lahontan spilled southward into the Walker River Basin to fill Walker Lake and cover the lower portion of the Walker River Basin. When the Walker River's course strayed to the north through the Adrian Pass into the Carson River Basin, but Lake Lahontan's level was below the 4,294 foot level, water was precluded from spilling into Walker Lake and the lake lost its primary source of surface water inflows. During these times the lake most assuredly went into rapid recession and very probably dried up (desiccated).⁷

Wisconsin (Glacial) Age—75,000–10,000 Years Ago

Lake Wellington, the only lake known to have formed in the Walker River drainage basin during the pluvial, or wet periods which were interspersed during the later Wisconsin Age, was created in Smith Valley by stream blockage. Located 5 miles east of Smith at Wilson Canyon and covering approximately 90 square miles to a maximum depth of 300 feet, Lake Wellington's overflow continued down the Walker streambed to Lake Lahontan, which during its highstand lay just beyond in Mason Valley below the present-day City of Yerington.⁸

14,000–12,500 Years Ago

Lake Lahontan and Walker Lake underwent their last highstands or peaking enlargements. Throughout the Great Basin, Lake Lahontan rose to an elevation of some 4,380 feet MSL and covered almost 8,600 square miles of northwestern Nevada.⁹ At this surface elevation, all seven major sub-basins comprising the maximum extent of Lake Lahontan—(1) Smoke Creek/Black Rock Desert; (2) Carson Desert; (3) Buena Vista; (4) Walker Lake; (5) Pyramid Lake; (6) Winnemucca Dry Lake; and (7) Honey Lake—were connected.¹⁰

11,200 Years Ago

Man's recorded presence in the Lahontan Basin began at Fishbone Cave, located on the eastern shore of the dry lakebed of Winnemucca Lake in the Truckee River Basin. In addition to burned human bones, excavation of the cave revealed bones of horses, camels, and marmots. Little else was revealed about these Paleo-Indians who lived on the shores of Lake Lahontan at the end of the Wisconsin period. This period of time corresponds, however, to the approximate period when the last land bridge existed between Siberia and Alaska. For extended periods during the Wisconsin age, a period that lasted from 75,000 to 10,000 years ago, the level of the sea separating these continents was some 300 to 330 feet below its current level. During certain periods of this Wisconsin age when such a land bridge existed, namely 40,000–35,000 years ago, 28,000–23,000 years ago, and 13,000–10,000 years ago, migrations of hunters and prey were possible between the Asian and North American continents and down the Pacific coastline, which was relatively free

of glaciers.¹¹ Groups of native Americans were also living as hunter-gatherers around Walker Lake at this time. For their sustenance, these peoples relied on pine nuts, various insects, game and fish, particularly Lahontan cutthroat trout which lived in Walker Lake and spawned in the Walker River in the spring.¹²

4,700 and 2,600 Years Ago

Based on extensive studies of lakebed core samples, it is believed that these periods represented the most recent desiccations of Walker Lake. These periods were attributed to either climatic changes or the natural diversion of the Walker River's mainstem below present-day Yerington through the Adrian Valley and on into the Carson River Basin.¹³

Pre-History

Various tribes of Paiute, Shoshone, and Washoe (Washo) Indians inhabited the area now encompassing the Walker River, Carson River, and Truckee River Basins.¹⁴ The abundant fish in Walker River and Walker Lake allowed the native people to become dependent on the river system's bounty. It is estimated that in these early times Walker Lake received the total combined flow of the East and West Walker Rivers, amounting to some 250,000–300,000 acre-feet of water per year. Such an inflow was sufficient to maintain the lake's surface level at 4,080 feet MSL, creating a total lake volume of over 10 million gallons with a maximum depth at 225 feet.¹⁵

Recent History

- 1823** Most maps of this period showed vast regions of unexplored territory in the western United States. Some also showed the mythical Buenaventura River, which was believed to run due west from the Rocky Mountains and into San Francisco Bay.¹⁶ The seed of the existence Buenaventura was originally planted by Spanish missionaries who explored the area around the Great Salt Lake in 1776 and imagined a mighty inland waterway flowing out of this lake to the west across terrible deserts, through the Sierra Nevada Mountains, and onward to the ocean.¹⁷
- 1826** (Fall) Jedediah Strong Smith, leader of a party of fifteen trappers of the Rocky Mountain Fur Company, traversed the southern tip of Nevada along the Virgin and Colorado Rivers, ending up at the San Gabriel Mission near the present site of Los Angeles. Disregarding the Mexican government's request to leave California and to return the way he had come, Smith left Los Angeles in early 1827 and headed north through the San Joaquin Valley. Then, with only two other companions, he crossed the Sierra Nevada Mountains near Ebbetts Pass, crossed the Walker River and skirted Walker Lake to the south.¹⁸ After enduring incredible hardships crossing the central portion of Nevada in 44 days, Smith finally returned to his Great Salt Lake trapping headquarters in early July of 1827.¹⁹
- 1828** (November) Peter Skene Ogden, a trapper for the Hudson's Bay Company, led a party south from the Columbia River basin and first discovered the Humboldt River, arriving near the vicinity of Winnemucca. At first the weather was accommodating and his party enjoyed a few days of trapping. However, a sudden blizzard forced a hasty evacuation of Ogden's party eastward along the Humboldt River Valley towards the Salt Lake

Valley.²⁰ Known by many names—Ogden's River, Mary's River, Paul's River, Barren River, and Unknown River—the Humboldt River was later named by John C. Frémont after Baron Alexander von Humboldt, a German scientist whom Frémont admired (but who had never even seen the river).²¹ This river would soon become the most important transportation corridor for early emigrants traversing the Great Basin on their way to California.

- 1829** (Spring) Peter Ogden returned to the Humboldt River and, not pressed by adverse weather as he had been the previous November, his party followed the river along its course to the Humboldt Sink, where the remaining waters disappeared completely. While camped along the Humboldt River near Lovelock, local Indians recounted to Ogden the first description of any of the rivers further to the west—the Truckee River—stating that it had no beaver but was abundant with salmon (trout).²²
- 1829** (Summer–Fall) It is believed that during Peter Ogden's second trip to the Humboldt River area in 1829, for which virtually no records were kept, he continued beyond the Humboldt Sink and discovered the Carson and Walker rivers, and perhaps Walker Lake as well. Despite his early exploration of Northern Nevada, which preceded the arrival of Frémont by almost 15 years, few geographic features within Nevada bear Peter Ogden's name. Later explorers would claim considerably more honor and fame than this pioneering British fur trapper and explorer.²³
- 1833** Joseph Walker, chief lieutenant for Captain Benjamin Louis Eulale de Bonneville, both of whom were in the employ of the Hudson's Bay Company, led a party of explorers and trappers along Ogden's "Unknown River" (the Humboldt) all the way to California via the Humboldt River, the Humboldt Sink, the Carson Sink, and then up into the Sierra Nevada Mountains by either the Carson River or the Walker River.²⁴ This represented the first recorded east to west passage through Nevada using the Humboldt River corridor, a route later travelers and emigrants would soon follow.
- 1837** Washington Irving's *Adventures of Captain Bonneville in the Rocky Mountains and Far West* was published, and aroused widespread interest in the region we now call the Great Basin. This publication also led to the commissioning of Captain John Charles Frémont to explore the territory more extensively.²⁵
- 1837** (Circa) It was around this time that the tamarisk, or saltcedar, was introduced into the Southwest U.S. as an ornamental tree. Eventually, this non-native species of plant would take hold along many streams throughout this region, particularly along the lower reaches of the Walker River from the Wabuska gaging station at the north end of Mason Valley all the way to Walker Lake. By the 1990s, the Walker Lake Paiute Indian Tribe had identified approximately 1,000 acres on its reservation just above Walker Lake that were severely infested with this plant. This plant species is well-known for its deep roots, its extremely high water consumption, its relative immunity to extermination efforts, and its relative uselessness as wildlife habitat or forage.²⁶ In places where tamarisk has taken hold, it tends to crowd out native species, particularly willows and cottonwoods. Tamarisk species currently found in Nevada include *Tamarix aphylla*, *Tamarix chinensis*, *Tamarix parviflora*, and *Tamarix ramosissima*. Of all these species, the *Tamarix ramosissima* is the one most prevalent in the Walker River Basin.²⁷
- 1841** (Spring) The Bartleson–Bidwell emigrant party made the first successful crossing of the

Great Basin, reportedly without a guide or even a map.²⁸ Coming down the Humboldt River the party became divided but were then reunited. Many of the party fell ill and were subsequently befriended by local Indians who gave them pine nuts and fish. Having reached the base of the Sierra Nevada Mountains on the West Walker River in October, the party spent the next two weeks crossing the mountains, most probably near Sonora Pass.²⁹ Finally, on the last day of October 1841, six months after their trip had begun near Independence, Missouri, they reached the San Joaquin Valley in California without loss of life. Reports of their successful passage would inspire others to attempt the passage.

1842 Influential U.S. Senator Thomas H. Benton of Missouri made arrangements for his son-in-law, John Charles Frémont, to lead exploring expeditions into the little-known region beyond the Rocky Mountains. Frémont was a lieutenant in the Army Topographical Corps and had considerable experience as a surveyor and map maker.³⁰

1844 (January 10th) Traveling south from the Columbia River basin, John C. Frémont, conducting an expedition for the U.S. Bureau of Topographical Engineers, became the first white man recorded to have seen Pyramid Lake and five days later, on January 15th, Frémont reached the lower Truckee River.³¹ Based on the large pyramid structure on the lake's eastern side, Frémont gave the lake its present name, but his naming of the Truckee River as the Salmon Trout River would not prove enduring. Frémont's party benefitted from the hospitality of the local Paiute Indians and the munificence of the local waters for an "incredibly large" species of trout, the Pyramid Lake cutthroat trout (*Salmo clarkii henshawi*), some weighing over 40 pounds and attaining a length of four feet.³²

From Pyramid Lake the Frémont Expedition followed the Truckee River to a location near present-day Wadsworth, where the river appears to come out of the west. As Frémont was looking for the mythical San Buenaventura River that was supposed to drain westward through the Sierra Nevada Mountains to the Pacific Ocean, he did not continue up the Truckee River, but instead proceeded further south, soon crossing the Carson River.³³ Later Frémont named this river after his even more famous expedition guide, Kit Carson.

From the Carson River, Frémont continued south to the Walker River and Bridgeport Valley, passing through Devil's Gate, turned north and then proceeded up into the Sierra Nevada Mountains. Frémont named the Walker River for another guide who had accompanied his party, Joseph Walker, who had been through the area in 1833. After ignoring the warnings of his local Indian guides, Frémont's party persisted in their efforts to cross the mountains and suffered many hardships in the deep winter snows, eventually abandoning the howitzer they had brought with them in Deep Creek Canyon above Antelope Valley in the Walker River Basin just west from present Topaz Lake.³⁴

From Deep Creek Canyon, Frémont and his party traveled northwest through the mountains, crossed over into the Carson River Basin and discovered Grover Hot Springs in Hot Springs Valley above Markleeville, California.³⁵ From here his party proceeded further up into the mountains traveling through Hope Valley and crossed the summit in the vicinity of Carson Pass. At this point Frémont viewed Lake Tahoe for the first time on February 14th from Red Lake Peak (10,061 feet), located 16 miles due south of the

lake. Frémont party's difficulties only intensified as they continued down the western slope of the Sierras into the Sacramento Valley. Eventually, on March 6, 1844, they arrived at Sutter's Fort near the American River in present-day Sacramento and were able to rest their remaining livestock and replenish their supplies. From Sutter's Fort, Frémont headed south down through the San Joaquin Valley and then recrossed Nevada through Las Vegas, perhaps camping very near the street named in his honor in the heart of that city.³⁶ It was Frémont who first recognized the unique geophysical structure of the Great Basin and named it so.³⁷ Interestingly, for all his exploration and extensive documentation of the Great Basin and Nevada, other than a street in Downtown Las Vegas and a relatively abundant species of cottonwood (*Populus fremontii*), little remains as a tribute to this individual's extensive and remarkable accomplishments.³⁸

- 1845** (December) John C. Frémont undertook his third expedition into the west and his second into the Great Basin region.³⁹ The Third Frémont Expedition separated at Whitton Spring (now known as Chase Spring) in Independence Valley east of the Ruby Mountains in eastern Nevada. The main group, under Theodore Talbot and guided by Joseph Walker, journeyed down the Humboldt River while a smaller party under the command of Frémont headed off to the south, eventually arriving at Walker Lake nineteen days later. The Talbot-Walker group joined them at the lake three days later. From this point, Frémont sent the main party south via the Owens Valley while he took a smaller group up to the north and through the upper Truckee River Canyon and over Donner Pass.⁴⁰
- 1848** The Treaty of Guadalupe Hidalgo was signed with Mexico ending the Mexican War and ceding to the United States what was to become the "Southwest," consisting of all or parts of the future states of California, Nevada, Arizona, New Mexico, Colorado, and Wyoming. While no fighting took place in Nevada, Americans in California, assisted by John C. Frémont, staged a successful revolt against Mexico.⁴¹
- 1848** (January 24) Gold was discovered by James W. Marshall and a construction crew at Sutter's sawmill on the South Fork of the American River at Coloma, California. This discovery would precipitate the greatest gold rush in American history. Reports of the discovery did not begin to circulate widely in the eastern United States until late summer, when it was too late to begin the long overland trip to California. In December, the discovery received widespread attention when President James K. Polk spoke of the gold fields in his message to Congress.⁴²
- 1849** The rush to the gold fields of California began in earnest and an unprecedented era of westward migration began. In January alone, more than 50 sailing ships left East Coast ports on the extended journey to California.⁴³ California's population would explode from approximately 14,000 persons in 1848 to over 100,000 persons by 1850 and to 250,000 persons by late 1852.⁴⁴ Early overland travelers used the natural transportation corridor afforded along the route of the Humboldt River. Those travelers electing the more southern route of the Carson Pass (Carson River Basin) and the Sonora Pass (Walker River Basin) found the Forty-Mile Desert, located at the western end of the Humboldt Sink, presented an imposing and forbidding barrier to their passage. Similarly, those traveling the more direct Truckee River route found that Donner Pass afforded a no less formidable obstacle to overland travel through this area.

- 1850** Congress established the Utah Territory comprising most of what is now the State of Utah, most of Nevada, and parts of Colorado and Wyoming.⁴⁵ Brigham Young, leader of the Mormon Church in Salt Lake City, became the first Territorial Governor and dispatched Mormon settlers throughout the new territory, establishing the first farming operations and trading posts.
- 1850** California became the 31st state of the Union. Eventually, California adopted the "California Doctrine" with respect to the administration of water rights, a doctrine consisting of a combination of both the common law doctrine of riparian water rights and the statutory doctrine of prior appropriation (appropriative water rights). The principles underlying these two doctrines are diametrically opposed. Riparian water rights allow persons who own land adjacent to a body of water to make reasonable use of those waters without regard to the time of use or to any actual use at all. Such rights cannot be sold or transferred for use on other (nonriparian) lands. In the western states where the land along and contiguous to a stream had not passed from government ownership into private ownership, no riparian rights prevailed and the appropriation doctrine would apply, but would be subject to other upper or lower riparian rights. This has provoked many legal battles.⁴⁶
- 1856** (August) Herdsmen consisting of Cyrus Smith, R.B. (Salty) Smith, T.B. (Timothy) Smith, Chandler Stratton, Simon Baldwin, Bill Paterson, and John A. Rogers, settled along the west fork of the Walker River. Their settlement came to be known as Smith's Station and, eventually, Smith Valley.⁴⁷
- 1858** The partnership of Miller and Lux (Miller et Lux) was formed between Henry Miller and Charles Lux. From humble beginnings as an emigrant from the small town of Brackenheim, Germany, Miller, born Henry Alfred Keiser,⁴⁸ would one day own a million acres of land in five states, over one million head of livestock, two banks and their branches, reservoirs, and other properties valued at some 50 million dollars.⁴⁹ He would also figure prominently in the history and development of the Walker River Basin.
- 1859** Settlement of Antelope Valley began when pioneer stockmen began moving into the valley with herds of cattle.⁵⁰
- 1859** Nathan Hockett Allen ("Hoc") Mason, a stockman who, several years earlier, had noted the favorable conditions when driving cattle through the Mason Valley and the present-day area of Yerington, Nevada, returned to settle along the Walker River in the valley that now bears his name.⁵¹ Mason took advantage of the region's suitability for large-scale livestock production and put together a ranching and cattle operation covering over 30 square miles and some 20,000 acres⁵² known as the Walker River Ranch, centered in Mason Valley and financed in part by California cattle baron Henry Miller.⁵³
- 1859** (June 7) Captain James H. Simpson reported that the Walker River near its mouth was some 100 yards wide and from 6 to 10 feet deep. Simpson also noted that the river appeared to be at a high stage with a color much like the Missouri, a rather dirty yellow and in taste quite soft and palatable. Simpson wrote that the river's banks were vertical, about four feet above the surface of the water, and the adjacent river-bottom lands consisted of a rich, dark loam soil which could be "readily and copiously irrigated and made very productive."⁵⁴
- 1859** (June 12th or 13th) Gold was discovered near present-day Virginia City in Storey

County, Nevada. Before the end of the summer the voluminous quantity of black mud emanating from the diggings was assayed and found to contain high quantities of silver.⁵⁵ The Comstock Lode, as it would come to be called, began a population influx to northern Nevada in search of precious metals which would rapidly accelerate the demands for the region's natural resources, particularly lumber and water, as well as stimulate demand for agricultural production.⁵⁶

- 1859** (November 29) Lands were withdrawn for the establishment of the Walker River Paiute Indian Reservation to include Walker Lake and approximately 318,809 acres of land surrounding it.⁵⁷ Reservation water rights for irrigation would eventually be adjudicated in 1939 with this priority date.
- 1859** Waterman S. Body (Bodey), a placer miner, made the first discovery of gold in a mountainous area approximately 12 miles east southeast of Bridgeport, California. Shortly after making his discovery, Body froze to death in a snowstorm, a forewarning of the extremely harsh weather that frequented this site, located at an elevation of almost 8,370 feet above sea level in the Bodie Hills. The mining boom at Bodie, as the town would later be named, actually did not begin until the late 1870s when the peak of the Comstock Lode mining had been reached and that area began a gradual decline. Bodie's population subsequently peaked in 1880 at some 10,000 persons. The town itself was destroyed by fires in 1882 and again in 1932, and was a ghost town by the late 1930s. In 1962 the ghost town of Bodie was added to the California State Park system.⁵⁸
- 1860** Federal court records indicate that white men began irrigating lands on the upstream tributaries of the Walker River system in this year.⁵⁹
- 1860** (August) Gold was discovered at Aurora, a area that would soon come to be disputed between California and the yet-to-be-formed Territory of Nevada.⁶⁰
- 1860s** Deposits of copper ore were discovered in the Singatse Range, a mountain range bordering the western portion of Mason Valley and the eastern portion of Smith Valley.⁶¹
- 1861** (March 2) By an Act of Congress, signed by President James Buchanan, the region of Nevada achieved territorial status, separate from Utah. Later, President Abraham Lincoln appointed James W. Nye of New York to serve as Nevada's first Territorial Governor. The new Territorial Secretary, Orion Clemens, arrived this year, bringing with him his brother Sam, who later became a reporter for Virginia City's *Territorial Enterprise* and began using the pen name "Mark Twain" for his news stories.⁶²
- 1861** Gold was discovered in Aurora⁶³ and the California State Legislature made the bustling mining town, located approximately 12 miles north of Bodie, the county seat of the newly created Mono County. The eastern border of the new county was to mark the state line between California and Nevada, although its exact position had not yet been determined.⁶⁴ In fact, for a while Aurora claimed the unique distinction of being the county seats for both Mono County, California and Esmeralda County, Nevada Territory. By 1863 Aurora's population had peaked at about 5,000 persons and the mining activity supported seventeen stamping mills. Aurora's heyday was very brief, however, with a general collapse occurring in 1864. Some lesser mining activity took place again from 1884 to 1886 and then again from 1906 to 1918.⁶⁵ Today, virtually nothing remains of the original city in which gold and silver fortunes were briefly, but warmly contested

- by the two states.⁶⁶
- 1861** This represented a period of extensive ditch construction in Mason Valley. In this year the Mason–Wheeler ditches were built; in 1862 the McLeod ditch; in 1863 the Joggles, Sprague, and Woodcock ditches; in 1864 the Lane–Johnson, Alex McLeod, and Milton–Root (now Fox) ditches; and in 1865 the Greenwood, Mickey, Spragg, Alcorn, and Bowley ditches were dug.⁶⁷
- 1861** (November) The First Territorial Legislature of Nevada approved the creation of Esmeralda County, one of nine counties into which the new territory was divided. The county included all of Smith Valley and part of Mason Valley. The county seat was designated in Aurora, which was also the county seat of Mono County, California.⁶⁸
- 1862** Priorities attributed to appropriative water rights indicated that irrigation began in Antelope Valley about this time.⁶⁹
- 1862** (May 20) As a means for the federal government to encourage the settlement of the Western states and territories and promote the spread of small farms in the sparsely settled West, President Abraham Lincoln signed the Homestead Act. This law, still in force, permitted any single person over 20 years of age to select 160 acres of land in the public domain and acquire title to it after residing on the land for a period of five years and completing certain requirements as to cultivation. The period of residence was later reduced to 14 months, and entry by anyone already owning 160 acres of other lands was prohibited. The act contained no water-development requirements or restrictions.⁷⁰ The subsequent opening of federal property under this act, and the Desert Land Entry Act which followed in 1877, would create land rushes as immigrants and existing citizens alike were lured by the prospect of owning their own land on very reasonable terms.⁷¹
- 1862** (December 20) The Nevada Territorial Legislature granted J.H. Rose, doing business as the Walker Lake Ferry Company, a 10–year franchise to operate passenger service on Walker Lake by ferry from any point on one side to any point on the other side. While this obviously demonstrated the lake’s navigability and hence the Territory of Nevada’s ownership of the submerged lands of Walker Lake, the issue later became clouded since the lake was located wholly within a federal enclave (the Walker Lake Indian Reservation, established November 29, 1859) at the time statehood was conferred (October 31, 1864).⁷²
- 1863** Daniel Wellington purchased a station house in the southwest end of Smith Valley near a bridge across the West Walker River and established a stage line to Aurora. Eventually the site became known as Wellington.⁷³
- 1864** (March 19) By Executive Order of President Ulysses S. Grant, the Walker River Indian Reservation was officially established by the withdrawal order of 1859 and as surveyed by Eugene Monroe in December 1864. The Reservation consisted of approximately 318,810 acres and encompassed all of Walker Lake.⁷⁴
- 1864** During the third session of the Nevada Territorial Legislature, a franchise was granted to W.G. Alban and his associates to float logs and timber on the West Walker River in Nevada Territory for a period of five years. Territorial lawmakers included a disclaimer with the franchise: *Provided, that nothing in this Act shall be so construed as to constitute said river a navigable stream.*⁷⁵ Despite this disclaimer, the franchise was later used to infer the navigability of the West Walker River and, by extension, the

- navigability of the mainstem of the Walker River.⁷⁶
- 1864** (October 31) Nevada was admitted to the Union as the 36th state. Ultimately, Nevada adopted the prior appropriation doctrine with respect to the state's administration of water rights. Under this doctrine, the first person to take a quantity of ground water or surface water and put it to beneficial use has a higher priority of right than a subsequent user. Under drought conditions, the demands of higher priority users are satisfied before junior users receive water.⁷⁷ This statutory doctrine of prior appropriation used exclusively in Nevada would come into conflict with the common law doctrine of riparian water rights in use in the State of California regarding the diversion and use of upstream waters of water systems shared between these two states, specifically, Lake Tahoe and the Truckee, Carson, and Walker rivers.
- 1866** (March 3) The Nevada State Legislature made its first attempt to obtain a record of water diversions in the state by approving Chapter 100 of the Nevada Revised Statutes. This act required any person intending to construct a ditch or flume to file a certificate with the county recorder setting forth the name by which the ditch would be known and the description of the places of use. The act also allowed for the "appointment of appraisers" to assess land through which ditches were to run when the consent of existing owners could not be obtained.⁷⁸
- 1870** Although first discovered in 1859, extensive mining did not begin in Bodie until this time. The development of this mining site, located approximately 16 miles south of Aurora, would put considerable demands on the freight traffic through Smith Valley. The mining site put considerable demands on the area's agricultural production, particularly from Mason Valley ranches up the East Walker River. Traffic was especially heavy throughout the summer and fall before the winter snows completely blocked out the roads.⁷⁹
- 1875** Recognition of the doctrine of riparian ownership of water rights in Nevada was provided through an early court case: *Barnes v. Sabron*, 10 Nev. 217,232 (1875). It would not be until 1885 that the Nevada Supreme Court would formally approve and adopt the prior appropriation doctrine for all the state's water supplies.⁸⁰
- 1877** (March 3) The Desert Lands Entry Act (Desert Lands Act) was passed by Congress in recognition of the limited application of the 1862 Homestead Act. As first approved, it provided that title to 640 acres (one section) of arid land could be procured by conducting water to the land and reclaiming 20 percent of it. In 1890, the acreage was reduced to 320 acres. In order to receive a patent, at least 40 acres had to be irrigated.⁸¹
- 1878** After purchasing the Wellington Station in the southwest end of Smith Valley on the West Walker River, Mr. and Mrs. John Hoyer moved to the foot of the canyon between Antelope Valley and Smith Valley and built a store and residence that still stand today. The canyon was later named for the Hoyes.⁸²
- 1879** Congress created the U.S. Geological Survey (USGS) as part of the U.S. Department of the Interior to undertake a serious exploration, mapping, and scientific study of the nation's resources, particularly water resources of the arid West.⁸³
- 1880** The Carson & Colorado Railroad laid a narrow-gauge (three-foot wide) track along the eastern shore of Walker Lake to facilitate the shipment of mineral ore from the mining community of Bodie, California.⁸⁴

- 1880 (October) The town of Hawthorne, Nevada, located approximately four miles south of Walker Lake in Mineral County, was laid out by the superintendent of the Carson & Colorado Railroad, H.M. Yerington.⁸⁵
- 1881 (March 15) The *Nevada State Journal* (Reno, Nevada) reported that an article appeared in the *Lyon County Times* (Yerington, Nevada) newspaper pertaining to the imminent completion of an Indian Fish Treaty. One of the treaty provisions noted that once the Carson & Colorado Railroad line across Walker Lake Indian Reservation lands was completed, the Indian's Lahontan cutthroat trout would be shipped by the railroad into Dayton (east of Carson City) free of charge.
- 1881 (March 31) An article in the *Gold Hill News* reported that fine Lahontan cutthroat trout were being caught at the north end of Walker Lake (where the fresh waters of the Walker River enter the lake), but due to great amounts of alkali none were to be found at the southern end of the lake.
- 1881 (April) A spur line was laid to the town of Hawthorne, Nevada from the Carson & Colorado line along the east side of Walker Lake.⁸⁶
- 1881 (April 22) An article in the *Gold Hill News* reported on a lively fish export business from Walker Lake. Walker Lake Indians were selling considerable quantities of trout to the local communities, particularly those serviced by the Carson & Colorado Railroad which had waived all transportation charges to the Indians in exchange for its right-of-way across Walker Lake Indian Reservation lands.
- 1881 A German immigrant named John Ludwig worked the first major copper mine and erected a smelter on the east side of the Singatse Range, which borders the western side of Mason Valley near Yerington, Nevada. Copper deposits in this area had first been discovered in the 1860s.⁸⁷
- 1881 (June) Israel Cook Russell reported that the Walker River was running at 400 cubic feet per second (almost 290,000 acre-feet per year) at a location some 3 miles upstream from Walker Lake. Several months later, in October, he noted virtually no flow in the lower Walker River and attributed the stream's demise as due "...in great measure to the extensive use of its waters for irrigation in Mason Valley." His rough flow estimates for this location indicated an average annual discharge of approximately 200 cubic feet per second or about 145,000 acre-feet entering Walker Lake.⁸⁸
- 1881 With the waning of fortunes at the Comstock mines, Nevada's "Twenty-Year Depression" began.⁸⁹ Eventually, this depression (1881-1900) would cause Nevada's population to fall by 32 percent from 62,266 persons in 1880 to only 42,355 persons by 1900. Lyon County's population (Yerington, Smith and Mason valleys, primarily) fell from a peak of 2,409 persons in 1880 to 1,987 persons by 1890, then rose to 2,368 persons by the turn of the century.⁹⁰
- 1881 (July 3) Nevada Fish Commissioner Parker had 2,000 land-locked salmon introduced into the Walker River at Schurz Station along the Carson & Colorado Railroad line. The salmon eggs had been brought to Nevada from Buckport, Maine and hatched at Carson City.⁹¹
- 1882 (June 3) An article in the *Esmeralda Herald* (Aurora, Nevada) reported that there existed a "regular slaughter" of Lahontan cutthroat trout by the Paiutes at Spragg's Dam on the Walker River in Mason Valley. From reliable authority, it was reported that "tons upon

- tons” of the fish were being caught in willow nets, in direct violation of state law which forbids the use of nets. The story reported that the river was being “blackened by [diversion] dams” and the trout—the pride of Nevada waters—were being exterminated.
- 1882 Israel Cook Russell undertook the first extensive survey of the geology and hydrology of Walker Lake, recording its surface elevation at 4,080 feet MSL,⁹² its maximum length to be 25.6 miles, a width of 4.5 to 5 miles, a total surface area of approximately 95 square miles, a total volume of 10.7 million acre-feet, and a maximum depth of 224 feet. Total dissolved solids (TDS) levels in the lake were measured at approximately 2,560 milligrams per liter (mg/l).⁹³
- 1883 By an act of the Nevada Legislature, Mason and Smith valleys were annexed into Lyon County, Nevada.⁹⁴
- 1883 (July 18) An article in the *Walker Lake Bulletin* (Hawthorne, Nevada) reported that “the bathing in Walker Lake can scarcely be equalled and as soon as the [Walker River Paiute Indian] reservation is abandoned [for the season], the fishing will be another attractive feature.” Apparently, as Walker Lake lay completely within the Walker Lake Indian Reservation,⁹⁵ the Paiute Tribe went to considerable lengths to protect their virtual monopoly on fishing the lake and the lower reaches of the Walker River up into Mason Valley. Their efforts included the destruction of any boats they could find on the lake (see entry under February 28, 1885). Consequently, non-Indian fisherman would wait until the Indians performed their annual migration upriver before undertaking their own fishing. After 1906, when the Indians ceded the lake and the lands surrounding it to the federal government, access to the lake was no longer an issue.
- 1884 A Smith Valley (Wellington, Nevada) farmer, A.H. Hawley, received first prize in a contest sponsored by the *San Francisco Bulletin*. The terms of the contest required that each contestant plant one pound of a new wheat seed known as Royal Australian with the winner being the one who could document the most pounds of wheat subsequently produced. Mr. Hawley produced 342 pounds of wheat from his single pound of seed, well ahead of the second place finisher from Brentwood, California, who produced 307 pounds.⁹⁶
- 1884 (May 24) The *Candelaria True Fissure* reported that Walker Lake Lahontan cutthroat trout weighing in at twenty pounds and a yard long were being sold at one dollar apiece.
- 1880s Thomas Rickey began his cattle ranching operations upstream on the West Walker River in California. His holdings would come to be known as the Rickey Land and Cattle Company and include much of Antelope Valley and adjoining valleys, plus extensive acreage in Bridgeport Valley.⁹⁷ In 1907 Rickey would suffer financial failure and his extensive holdings would be sold to the Antelope Valley Land and Cattle Company.⁹⁸
- 1885 (February 28) The *Candelaria True Fissure* reported that the Walker Lake Paiute Indians had recently destroyed all the boats put on Walker Lake by the whites and it was now being proposed that the Indians be kept on their reservation and not allowed to sell their fish to nearby communities.
- 1885 (March 25) The *Walker Lake Bulletin* (Hawthorne, Nevada) reported that Walker Lake was so crowded with Lahontan cutthroat trout that during the middle of the day long rows of the fish could be seen lying at the water’s edge on the sand sunning themselves. While obviously an exaggeration, the report did probably accurately allude to the relative

- abundance of the fish at that time.
- 1885** The Nevada Supreme Court formally approved the doctrine of prior appropriation for all the state's water supplies, although an earlier (1875) lower court decision had given recognition to the doctrine of riparian ownership.⁹⁹
- 1885** In his report to the Secretary of the Interior for the year 1885,¹⁰⁰ Nevada Indian Agent W.D.C. Gibson reported that the Walker River Reserve "abounded with trout, but of a different species, being much larger and not as marketable as those of Pyramid Lake..." This is an interesting comment as the Pyramid Lake cutthroat trout subspecies of the Lahontan cutthroat trout has generally been considered as being larger than that of Walker Lake, reaching some 40–60 pounds in weight and attaining over four feet in length.¹⁰¹ The Walker Lake variety generally came in at a maximum size of around 20 pounds in weight and three feet in length.¹⁰²
- 1889** The U.S. Geological Survey began limited measurement of Nevada streams.¹⁰³
- 1889** (March 9) The Nevada State Legislature enacted Chapter 113 of the Nevada Revised Statutes, a very lengthy and comprehensive act designed to regulate the use of water for irrigation and other purposes, to settle the priority of water rights, to provide for the condemnation of land for reservoirs, to record claims to water rights, and to appoint water commissioners. The act, which contained 33 sections, clearly indicated the state's increased interest in protecting the control and use of water for irrigation purposes brought about by the great expansion of irrigated lands along the Carson, Walker, Truckee, Humboldt, and Muddy rivers, their tributaries, and many smaller streams. Of importance, Section 9 of this act required that any water user make a filing prior to September 1, 1889, under oath, with the proper county recorder, giving the pertinent data regarding his diversion and use of water. The county recorders were required to prepare an index book of such claims.¹⁰⁴ This chapter was repealed (Chapter 127) by the 1893 legislature.¹⁰⁵
- 1889** The combination of a multi-year drought and a particularly severe winter in the late 1880s bankrupted Hoc Mason who had formed the Walker River Ranch with partial financing of California cattle baron and German immigrant, Henry Miller. Consequently, title to this ranch passed to Miller et Lux. Mr. Miller was a driving force in the prominent partnership of Miller et Lux, a land and cattle company with extensive holdings in California, Oregon, and Nevada. To support his vast cattle empire, Miller's tenacious pursuit of water rights throughout his domains would become well known through a number of court actions.¹⁰⁶
- 1890** The Colony Ditch was constructed, tapping the waters of the West Walker River for portions of Smith Valley. The diversion dam for this ditch is located in Hoye Canyon approximately 3.5 miles downstream from the Hoye Bridge and 1 mile upstream from Wellington, Nevada. This canal, which runs along the northern side of the West Walker River, serves the western and northern portions of Smith Valley as well as Beaman Lakes and eventually drains into Artesia Lake, located approximately 12 miles north of Wellington. Another important irrigation canal in this area, the Saroni Canal, runs along the opposite side of the West Walker River. It was constructed in 1920 and has its diversion dam at the western entrance to Hoye Canyon, diverting waters from the southern bank of the West Walker River at a point 2.2 miles downstream from the Hoye

- Bridge and 2.4 miles upstream from Wellington.
- 1891** Annual National Irrigation Congresses began to be held in major Western cities as a recognition that irrigation (reclamation) projects represented the “salvation” of the arid West. These meetings typically ended with a petition to the federal government to provide direct financial assistance for reclamation efforts, in a manner similar to the various Homestead Acts. It was strongly suggested that it was the federal government’s obligation to provide water to arid Western lands so that they could be settled and farmed on the same advantageous basis.¹⁰⁷
- 1892** (January 20) The first report that Walker Lake’s Lahontan cutthroat trout had become scarce appeared in the *Walker Lake Bulletin* (Hawthorne, Nevada). The article first states the general belief that young perch or bass were killing the trout, which expired when they tried to swallow the bony little non-native fish. The article goes on to report that “diversion dams along the Walker River in Mason Valley were the cause of the declining fish populations.” It was also reported that “nearly every farmer in the valley had a [diversion] dam to divert the river water for irrigation purposes, thereby making it virtually impossible for the trout to go upstream to spawn.”
- 1893** A severe national recession, lasting from 1893 through 1897, precluded serious efforts by the federal government to undertake any new spending programs, particularly public spending for reclamation irrigation projects in the West.¹⁰⁸
- 1894** (February 6) The town of Yerington, Nevada was established near the Walker River in Mason Valley in the east-central portion of Lyon County, Nevada. Before being named for Henry Marvin Yerington, superintendent of the former Virginia and Truckee (V&T) Railroad, this community had been known by several other names including Greenfield, Willow Switch, Pizen Switch, and originally Poison. The initial name originated in recognition of a saloon owned by a Mr. Downey, who manufactured his own unique brand of liquor.¹⁰⁹
- 1894** (August 18) Congress approved what was commonly called the “Carey Act,” which was expected to be a major milestone in the reclamation of desert lands in the western states. The act’s purpose was to aid the public-land states in the reclamation of desert lands, provide for the granting to each of the states containing desert lands an amount not to exceed one million acres and direct that the states cause these lands to be reclaimed, occupied, and irrigated. It was further provided that 20 acres out of each 160 acres be cultivated by settlers within 10 years after passage of the act. With few exceptions, the Carey Act did not measure up to expectations.¹¹⁰
- 1895** (March 20) The *Walker Lake Bulletin* (Hawthorne, Nevada) reported that one Johnny Miller had caught a 2-pound trout in Walker Lake, the first trout caught by a white man for several years.
- 1897** The Nevada Fish Commissioner reported that the Walker River Paiute Indians were “selling extraordinarily large Lahontan cutthroat trout and perch from Walker Lake to grateful nearby communities.”¹¹¹

Notes to Part II:

1. Benson, Larry V., "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *Water Resources Investigations Report 87-4258*, U.S. Geological Survey, U.S. Department of the Interior, Denver, Colorado, 1988, page 1. Also see Houghton, *op. cit.*, page 63.
2. Houghton, Samuel G., *A Trace of Desert Waters: The Great Basin Story*, University of Nevada Press, Reno, Nevada, 1994, page 73.
3. Strickland, Rose, "Stillwater: Its Friends and Neighbors," *Dividing Desert Waters*, Nevada Public Affairs Review, Number 1, 1992, Senator Alan Bible Center for Applied Research, University of Nevada, Reno, page 68.
4. Computed from information presented in Horne, Alex J., Ph.D., James C. Roth, Ph.D., and Nicola J. Barratt, M.S., *Walker Lake—Nevada, State of the Lake, 1992-94*, Report to the Nevada Division of Environmental Protection, Department of Civil and Environmental Engineering, University of California, Berkeley and the Environmental Engineering and Health Sciences Laboratory, Richmond, California, December, 1994, page 17.
5. Houghton, *op. cit.*, page 63.
6. According to Donald K. Grayson (*The Desert's Past: A Natural Prehistory of The Great Basin*, Smithsonian Institution Press, Washington, D.C., 1993, page 95) this "spill elevation" was 4,291 feet MSL. However, topographic maps of this region indicate that the maximum elevation in Adrian Valley (Pass) is 4,294 feet MSL, which constitutes the threshold "sill" which the waters of a rising Lake Lahontan would have to overcome before reaching the Walker River Basin and Walker Lake.
7. These instances have been confirmed by Benson to have occurred most recently at approximately 4,700 and 2,600 years before the present. [See Larry Benson, "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *Water Resources Investigations Report 87-4258*, U.S. Geological Survey, U.S. Department of the Interior, Denver, Colorado, 1988, page 1.]
8. Houghton, *op. cit.*, page 102.
9. Benson, Larry V., "Fluctuation in the Level of Pluvial Lake Lahontan During the Last 40,000 Years," *Quaternary Research*, Volume 9, Number 3, University of Washington, 1978, page 316.
10. Benson, Larry V., "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *op. cit.*, page 2.
11. Houghton, *op. cit.*, pages 26-27 and 78-79.
12. Hulse, James W., *The Nevada Adventure*, Sixth Edition, University of Nevada Press, Reno, Nevada, 1990, page 24.
13. Benson, "Preliminary Paleolimnologic Data for the Walker Lake Sub-Basin, California and Nevada," *op. cit.*, page 1.
14. Houghton, *op. cit.*, pages 30-35.
15. *Water Resources in the Walker River Basin: A Search for Water to Save Walker Lake*, Public Resource Associates, Reno, Nevada, November 1994, page 2.
16. Land, Barbara and Myrick, *A Short History of Reno*, University of Nevada Press, Reno, Nevada, 1995, page 8.
17. Murphy, Shane, *The Lore and Legend of the East Fork—A Historical Guide for Floating the East Carson River*, The Carson River Conservation Fund, Zephyr Cove, Nevada, 1982, page 21.
18. Houghton, *op. cit.*, page 104.
19. Hulse, *op. cit.*, pages 34-36.
20. *Ibid.*, pages 34-35.
21. *Ibid.*, page 47.
22. Townley, John M., *Tough Little Town on the Truckee*, History of Reno Series, Volume One, Great Basin Studies Center, Reno, Nevada, 1983, page 24.
23. Hulse, *op. cit.*, pages 36-37.
24. *Ibid.*, page 37.
25. Houghton, *op. cit.*, page 29.

26. *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, Public Resource Associates, Reno, Nevada, September 1994, page 6.
27. Kartesz, John Thomas, *A Flora of Nevada*, Ph.D. Dissertation, Biology Department, University of Nevada, Reno, July 1987, pages 341-342.
28. Hulse, *op. cit.*, pages 49-52.
29. Houghton, *op. cit.*, page 105.
30. Hulse, *op. cit.*, page 40.
31. Houghton, *op. cit.*, page 63.
32. *Ibid.*, page 81.
33. Towndley, John M., *The Truckee Basin Fishery, 1844-1944*, Water Resources Center Publication 43008, Desert Research Institute, University of Nevada System, November 1980, page 1.
34. *WALKER RIVER ATLAS*, Department of Water Resources, The Resource Agency, State of California, Sacramento, California, June 1992, page 8. In 1861 the "lost" cannon was eventually discovered and taken to Virginia City where it was put on display. Then sometime during World War I it disappeared, presumably sold for its scrap metal value. [See Houghton, *op. cit.*, page 105.]
35. Murphy, *op. cit.*, page 22.
36. Horton, Gary A., *Nevada: A Historical Perspective of the State's Socioeconomic, Resource, Environmental, and Casino Gaming Development*, Business & Economic Research Associates, Reno, Nevada, page 5.
37. Houghton, *op. cit.*, page 23.
38. While Frémont has certainly lacked visible notoriety in Nevada, he has been remembered through a number of plant species patronyms in California and the Great Basin. Some of these include the flannelbush (*Fremontodendron*), freckled milkvetch (*Astragalus lentiginosus fremontii*), pigweed or goosefoot (*Chenopodium fremontii*), silk tassel bush (*Garrya fremontii*), peppergrass (*Lepidium fremontii*), box thorn (*Lycium fremontii*), bush mallow (*Malacothamnus fremontii*), phacelia (*Phacelia fremontii*), polyctenium (*Polycgenium fremontii*), and psorothamnus (*Psorothamnus fremontii*), to name the most commonly recorded. [Information provided courtesy of the Natural Heritage Program, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada.]
39. Frémont's first expedition west was conducted in 1842 and left from St. Louis, Missouri, but only got just beyond South Pass in the northern Rocky Mountains of Wyoming. [See Grayson, *op. cit.*, pages 3-4.]
40. Houghton, *op. cit.*, page 105.
41. Hulse, *op. cit.*, page 59.
42. *Ibid.*
43. *Ibid.*
44. *Multimedia Encyclopedia*, (Electronic Encyclopedia), The Software Toolworks.
45. Hulse, *op. cit.*, page 68.
46. The doctrine of riparian rights to the use of water has been completely abrogated in the states of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. The Pacific Coast states of Washington, Oregon, and California and the tier of six states, starting with North Dakota on the north and extending southward to Texas, recognize to varying degrees both the appropriation and the riparian doctrines. The effect of court decisions as statutes have made the existence of the riparian doctrine of minor significance in Washington, Oregon, and Kansas. [See Hugh A. Shamberger, *Evolution of Nevada's Water Laws, as Related to the Development and Evolution of the State's Water Resources, From 1866 to About 1960*, Water Resources Bulletin 46, U.S. Department of the Interior, Geological Survey, in cooperation with the Nevada Division of Water Resources, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1991, page 4.]
47. Matheus, Phyllis, *The Valleys of the Walker Rivers*, 1995, page 4.
48. In March 1958 he successfully petitioned the California Legislature to have his name changed to Henry Miller. [See Matheus, Phyllis, *The Valleys of the Walker Rivers*, 1995, page 43.]
49. *Ibid.*, page 43.
50. *West Walker River Investigation*, Bulletin No. 64, The Resources Agency, Department of Water Resources, State of California, April 1964, page 49.

51. Houghton, *op. cit.*, page 106.
52. Today, the former Miller et Lux holdings are the site of Sierra Pacific Power Company's Fort Churchill Power Plant, the Nevada Division of Wildlife's Mason Valley Wildlife Management Area and Fish Hatchery, the Yerington City Airport, and several smaller ranches. [See Matheus, *op. cit.*, pages 43-44.]
53. *WALKER RIVER ATLAS*, *op. cit.*, page 54.
54. Simpson, Captain James H., *Explorations Across the Great Basin of Utah*, Washington, D.C., page 87.
55. Hulse, *op. cit.*, pages 80-82.
56. Horton, *op. cit.*, pages 9-10.
57. *Water Resources in the Walker River Basin*, *op. cit.*, pages 1-3.
58. *WALKER RIVER ATLAS*, *op. cit.*, page 14.
59. *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, State Engineer's Office, Division of Water Resources, State of Nevada, Carson City, Nevada, 1971, page 18.
60. Houghton, *op. cit.*, page 106.
61. *Ibid.*
62. Horton, *op. cit.*, pages 8-9.
63. Matheus, *op. cit.*, page 8.
64. *WALKER RIVER ATLAS*, *op. cit.*, page 76.
65. Carlson, Helen, S., *Nevada Place Names: A Geographical Dictionary*, University of Nevada Press, Reno, Nevada, 1974, page 43.
66. Currently, there does exist an open-pit mining operation near this site.
67. Matheus, *op. cit.*, page 79.
68. Matheus, Phyllis, *op. cit.*, page 2.
69. *West Walker River Investigation*, *op. cit.*, page 49.
70. Shamberger, *op. cit.*, page 90.
71. *WALKER RIVER ATLAS*, *op. cit.*, pages 52-54.
72. Stewart, Robert E., *Navigability—Walker Lake and Walker River, Nevada*, draft manuscript, Nevada Division of State Lands, Department of Conservation and Natural Resources, Carson City, Nevada, August 1995, page 13.
73. Matheus, *op. cit.*, page 8.
74. *Ibid.*, page 15.
75. *Laws of the Territory of Nevada*, 1864, page 35ff. Robert Stewart has suggested that one possible reason for this disclaimer may be found in the Act creating the Nevada Territory, which stated that "...no law shall be passed interfering with the primary disposal of the soil..." By definition, designation of navigability would have assigned ownership of the Walker River's bed and banks to the Territory of Nevada. [See Stewart, *op. cit.*, page 11.]
76. Transporting of logs for commercial purposes was later considered by the Nevada Supreme Court to be satisfactory evidence of navigability for the Carson River. [See *The State of Nevada v. Julius Bunkowski, et al.*, Trout Unlimited and Carson Water Subconservancy District, 1972, 503 P.2d 1231.] Even so, before upstream reservoirs were built along the West Walker River (Topaz Reservoir—1922) and on the East Walker River (Bridgeport Reservoir—1924), there were times when these rivers were virtually without flow, consequently limiting their ability to conduct "year-round" commerce and possibly jeopardizing the claim to navigability.
77. The appropriation principle, in the form in which it is recognized throughout the west, originated from the requirements of a mining region for protection in the use of water supplies needed to work mining claims on lands not contiguous to streams or other sources of water. The appropriation doctrine is recognized on surface waters in all states west of the 100th Meridian (100 degrees west longitude); however, only eight of the western states—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming—are exclusively (prior) appropriation states. [See Shamberger, *op. cit.*, pages 4-5.]
78. Shamberger, *op. cit.*, page 5.
79. Matheus, *op. cit.*, pages 13-17.
80. Shamberger, *op. cit.*, page 5.
81. Shamberger, *op. cit.*, page 90.

82. Matheus, *op. cit.*, page 10.
83. Houghton, *op. cit.*, page 119.
84. *Ibid.*, page 106.
85. *Ibid.*
86. *Ibid.*
87. *Ibid.*
88. Russell, Israel Cook, *Geological History of Lake Lahontan, A Quaternary Lake of Northwestern Nevada*, Monograph XI, Geological Survey, U.S. Department of the Interior, Government Printing Office, Washington, D.C., 1885.
89. Hulse, *op. cit.*, page 153.
90. *Population of Nevada Counties and Communities, 1860-1980*, compiled by Waller H. Reed, RSVP Volunteer, Nevada Historical Society, Winter 1983-1984.
91. *Nevada State Journal*, July 3, 1881, Reno, Nevada.
92. Other sources report this initial recorded surface level of Walker Lake to be 4,083 feet MSL.
93. Russell, *op. cit.*
94. Matheus, *op. cit.*, page 2.
95. There was a reported "reservation line" at the southern end of Walker Lake below which whites were apparently allowed to fish, although due to salinity differences between the northern (freshwater inflow) end and the southern end, fishing was generally not very good. Whether this reservation line's location was due to rising lake levels submerging the reservation's previously established boundary (which originally encompassed all of Walker Lake), or due to some tacit understanding by reservation Indians on lake access by non-Indians, is not certain.
96. *Land Commission Report, 1885-86*, Division of State Lands, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada.
97. *WALKER RIVER ATLAS*, *op. cit.*, page 55.
98. *West Walker River Investigation*, *op. cit.*, page 50.
99. Shamberger, *op. cit.*, page 5.
100. *Annual Report of the Commissioner of Indian Affairs to the Secretary of the Interior for the Year 1885*, Nevada Agency, Nevada, W.D.C. Gibson, Agent, Government Printing Office, Washington, D.C., August 20, 1885.
101. The largest recorded Pyramid Lake cutthroat trout was caught in 1925 and weighed 41.5 pounds. It was believed, however, that much larger ones were taken in preceding years before anyone made note of such matters. [See *TRUCKEE RIVER ATLAS*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1991, page 27.]
102. In this same Indian agent's 1886 report to the Secretary of the Interior, he again made this claim, stating that the Walker Lake Lahontan cutthroat trout species weighted in at 4 to 28 pounds. (*Annual Report of the Commissioner of Indian Affairs to the Secretary of the Interior for the Year 1886*, Government Printing Office, Washington, D.C., September 15, 1886.)
103. Shamberger, *op. cit.*, page 92.
104. Shamberger, *op. cit.*, page 13.
105. *Ibid.*, page 7.
106. *WALKER RIVER ATLAS*, *op. cit.*, pages 54-55.
107. Rowley, William D., "The Newlands Project: Crime or National Commitment," *Dividing Desert Waters*, Nevada Public Affairs Review, Number 1, 1992, Senator Alan Bible Center for Applied Research, University of Nevada, Reno, page 39.
108. *Ibid.*
109. Carlson, *op. cit.*, page 250. According to Vera Balaam, an historian of this region, another individual named Horton Aldrich, also a saloon keeper of this establishment, was a very ingenious man who, when the contents of the whiskey barrel began to get low, would extend the supply by adding anything and everything he could, including turpentine, alcohol, chewing tobacco, snuff, and liniments. [See Matheus, Phyllis, *The Valleys of the Walker Rivers*, 1995, page 42.]

110. Shamberger, *op. cit.*, page 85.
111. *Water Resources in the Walker River Basin, op. cit.*, page 2.

Walker River Chronology

PART III—TWENTIETH CENTURY

- 1900** Theodore (“Teddy”) Roosevelt, a Republican, was elected the 26th President of the United States (1901–1909) and ushered in a new era of Populism, a democratic movement supporting “the greatest good for the greatest number” and, among other things, public ownership of utilities, an income tax, and support of labor and agriculture. As a result of this movement’s philosophical underpinnings came some of the most significant spending for water projects and dam building in the history of the United States.
- 1900** Water use in the West Walker River Basin, principally for agriculture, developed rapidly from 1859 until the turn of the century when the flow of the West Walker River became insufficient to meet all demands.¹
- 1902** (June 17) Congress passed the National Reclamation Act, which created the Reclamation Service (renamed the U.S. Bureau of Reclamation—USBR—in 1923) as a separate entity within the U.S. Department of the Interior, apart from the U.S. Geological Survey (USGS). This act committed the federal government to construct irrigation projects in the West. While a number of sites in the Walker River Basin were surveyed by the U.S. Reclamation Service and USBR for further development under this act, particularly potential reservoir sites at Bridgeport (on the East Walker River) and Topaz (at Alkali Lake near the West Walker River), no projects resulted. Even so, the passage of the act did intensify the government’s desire to construct reservoirs and encourage agriculture in the West.²
- 1902** Thomas Rickey of the Antelope Valley Land and Cattle Company began to advance his plan to divert the waters of the West Walker River above Smith and Mason valleys into the natural reservoir site occupied by Alkali Lake (later renamed Topaz Reservoir). Miller et Lux filed suit against Rickey in federal district court (*Miller et Lux v. Rickey*) claiming that such waters, according to then-current appropriations, rightfully belonged to Henry Miller’s Walker River Ranch located in Mason Valley. After winning a significant court case in California based on the primacy of riparian water rights, Miller was now arguing against that very concept in Nevada in favor of the prior appropriation doctrine.³
- 1903** The Nevada State Legislature passed the Irrigation Law 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. 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.⁴ 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 Reclamation Act of 1902. State Engineer offices in Western states were an essential corollary to the Reclamation Act. The unstated agreement in this federal–state union was the primacy of the U.S. Department of the Interior and its Reclamation Service. Individual state sovereignty was so limited with respect to water matters that candidates

to the office of State Engineer had to be approved by the U.S. Department of the Interior before appointment by the governor.⁵

- 1903** (May 29) The first State Engineer for Nevada, A.E. Chandler, appointed by Governor John Sparks, took office.⁶
- 1905** The main line of the Carson & Colorado Railroad, which ran along the east side of Walker Lake, was converted from narrow (three-foot) gauge to standard (four-foot, eight and one-half inch) gauge. In doing so, the spur line to the town of Hawthorne, which had been in operation since April 1881, was abandoned (much to the outrage of the local residents).⁷
- 1905** The Nevada State Legislature amended the Irrigation Act of 1903 requiring that any person desiring to appropriate water file an application with the State Engineer for a permit to appropriate. The application form was to contain information as to 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 6 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, the State Engineer could issue a certificate of appropriation. The act also provided a method to adjudicate existing water rights.⁸
- 1906** (July 20) After years of pressure from state and federal government officials and particularly mining interests, the Walker River Paiute Indian Tribe ceded 268,000 acres of reservation land to the United States, including all the land surrounding Walker Lake. With this action, these Native American peoples of the lower Walker River, who called themselves *Agai Ticcutta* (for trout eaters), became separated from their traditional homeland lake, *Agai Pah* (Trout Lake), their name for Walker Lake.⁹ It was believed that the relinquished lands contained extensive mineral deposits, although later exploration failed to find significant ore bodies. Of the reservation's remaining approximately 50,809 acres, 492 twenty-acre parcels were allotted to tribal members, 37,390 acres were set aside for grazing, and 3,355 acres were reserved for timber in the Wassuk Range.¹⁰ It would come to be argued by the Tribe that as the reservation was established in 1859 and Nevada did not become a state until 1864, the water and submerged lands of Walker Lake were part of the reservation when Nevada became a state. The issue is complicated as the Tribe ceded back to the federal government the lands surrounding Walker Lake and the lake itself. As part of their claimed ownership of the lake, the Tribe has argued that lands exposed by reliction (declining lake levels) still belong to the Tribe.¹¹
- 1906** (September 26) By official proclamation of President Theodore Roosevelt, all lands within the Walker River Indian Reservation in the State of Nevada which had not been allotted, set apart and reserved were opened to settlement at the hour of twelve o'clock noon, Pacific Standard Time, on Monday the twenty-ninth day of October, A.D., 1906. This proclamation essentially opened and made available for public settlement the reservation lands ceded by the Indians the previous July.¹²
- 1907** (February 26) The Nevada State Legislature repealed the Irrigation Law 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 acts of 1903 as amended in 1905.¹³
- 1907** Thomas B. Rickey of the Rickey Land and Cattle Company suffered failure in the panic of 1907 and sold his ranching properties in Antelope Valley to the Antelope Valley Land and Cattle Company.¹⁴ The suit filed by Miller and Lux in 1902 against Rickey was thus transferred to this new entity.
- 1908** The U.S. Supreme Court issued its precedent-setting Winters Rights Decision (*Winters v. United States*) in which the Court prohibited any uses by non-Indians that interfered with Indian tribes' use of their reserved water. The Court held that when reservations were established, the United States implicitly reserved, along with the land, sufficient water to fulfill the purposes of the reservations. The Court also recognized these rights as having a priority date coinciding with the date the reservation was established, thus providing a means to integrate federally reserved rights with appropriative water rights recognized under state law.¹⁵ By means of the Winters Rights Doctrine and under the terms of Decree C-125 (see June 1939 entry), the priority date of the Walker River Paiute Indian Tribe's claim to any waters of the Walker River would be established as of November 29, 1859, the effective date of land withdrawal.¹⁶
- 1908** (September 27) The USGS recorded its "extreme high" Walker Lake level at 4,078.0 MSL (maximum lake depth of 222 feet). Its volume was estimated at 8,622,000 acre-feet. This lake level was only two feet lower than that recorded by Russell in 1882. By comparison, the lake's level in July 1994 (before the 1995 high-water year effects) was recorded at 3,944.0 feet MSL and its volume was 2,060,000 acre-feet. This represented a decline of 134 feet in surface elevation and the lake's depth, or 60.4 percent, and a decline of 6,562,000 acre-feet in total lake volume, or a 76.1 percent.¹⁷
- 1909** It was estimated that approximately 58,000 acres of land were under irrigation in the Walker River Basin.¹⁸
- 1909** The Nevada Copper Belt Railroad was constructed. This railroad was a small feeder line which served the west side of Mason Valley and the copper mining district located in the Singatse Range between Smith and Mason valleys and ran through Wilson Canyon to serve the Ludwig Mine. It also provided freight and passenger service in this area for a number of years, but would eventually succumb to the vagaries of such small feeder lines in less populous areas and go out of business in 1947.¹⁹
- 1910** Heavy filing began for relatively marginal agricultural lands in Smith and Mason valleys under the Desert Lands Entry Act and Homestead Acts. Such filings would continue until 1916.²⁰
- 1911** Dr. James E. Church, University of Nevada, Reno, developed the present-day techniques of determining the water content of snow. His techniques were first applied to the Lake Tahoe Basin but eventually made possible the accurate prediction and control of the seasonal rise in lake, reservoir, and river levels throughout northwestern Nevada and northern California and particularly along the Truckee, Carson, and Walker rivers.²¹
- 1913** (March 22) The Nevada State Legislature repealed the water law of 1907 and its amendments and approved the so-called "1913 General Water Law" which 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 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."²²

- 1918 (September 30) Applications 1097 and 1098 for storage rights at Pickel Meadows and Leavitt Meadows (as future reservoir sites) were filed with the State Water Commission of California (now the California State Water Resources Control Board—SWRCB)²³ by Nevada agricultural interests who would later (1919) form the Walker River Irrigation District (WRID).
- 1918 By Executive Order of the President of the United States, 34,000 acres of land east of Schurz were added to the Walker River Paiute Reservation.²⁴ This brought the reservation's total acreage up to 84,809 acres.
- 1919 (March 24) In response to the suit filed in 1902 (*Miller et Lux v. Rickey*), subsequently renamed to the *Pacific Livestock Company v. Antelope Valley Land and Cattle Company*, water rights adjudication in the Federal District Court for Nevada resulted in the issuance of Decree 731.²⁵ The Decree addressed the amount of water to which each party was entitled, the source of the water, the area to which it was to be applied, and the priority for each use.²⁶ The Decree also encompassed many, but not all, of the other water users on the river, particularly the water rights of the smaller agricultural water users as well as the irrigation rights of the Walker River Paiute Indian Reservation. Five separate water rights for the reservation were quantified with priorities ranging from 1868 to 1886 (the reservation was established on November 29, 1859) and the government was permitted to purchase additional rights from the proposed Topaz Reservoir to supply the reservation.²⁷ In effect, the Decree addressed essentially only direct diversions from the river and its tributaries. Except for some general provisions pertaining to the Antelope Valley Land and Cattle Company's storage rights, particularly those relating to the prospective development of Alkali Lake (Topaz) Reservoir, no other storage rights were quantified. As an interim measure, Decree 731 did assign priorities and amounts of water for irrigating specified lands of the parties and allowed incidental domestic and stock-watering uses to be served under the irrigation rights.²⁸
- 1919 (April) The litigation of *Pacific Live Stock Company v. Antelope Valley Land and Cattle Company* and the issuance of Decree 731 caused a number of farmers in Smith and Mason valleys to band together and form the Walker River Irrigation District (WRID). The WRID included all irrigated areas in Nevada on the East Walker River, the West Walker River, and the main Walker River, except those areas within the Walker River Indian Reservation.²⁹ The WRID moved to obtain the financing and rights to both Bridgeport and Topaz reservoir sites, sites which had earlier been selected and surveyed by the U.S. Reclamation Service. The water rights for Topaz Reservoir were obtained from the liquidation of the Antelope Valley Land and Cattle Company. Although the district was established as a Nevada agency serving lands entirely within Nevada, its reservoirs would be located either entirely (Bridgeport Reservoir—1923) or partially (Topaz Reservoir—1922) in California.³⁰ Funding for dam and reservoir construction and operation was obtained privately with water recipients obligated to pay off the debt. Initial funding was held down as the WRID assumed no responsibility for the

- construction or maintenance of irrigation canals, ditches, or laterals.
- 1919** The WRID approved the issuance of bonds totaling \$918,500 for the construction of Topaz Reservoir on the West Walker River and Bridgeport Reservoir on the East Walker River.³¹
- 1919** It was reported by the U.S. Census of Agriculture that approximately 103,000 acres were being irrigated in Smith and Mason valleys and along the east fork of the Walker River below Bridgeport Reservoir.³²
- 1919** Walker Lake's surface levels began to decline. Studies by the USGS show that Walker Lake's level changed little over the years of 1909–1918, suggesting that river inflows had been at or greater than approximately 200,000 acre-feet per year.³³
- 1920** This marked another period of heightened activity in homesteading marginal lands in Smith and Mason valleys under the 1877 Desert Lands Entry Act and the 1862 Homestead Act.³⁴
- 1920** The Saroni Canal, located on the opposite bank of the West Walker River from the Colony Ditch (1890) was constructed. The diversion dam for this canal, located at the western entrance to Hoyer Canyon, diverted waters from the southern bank of the West Walker River at a point 2.2 miles downstream from the Hoyer Bridge and 2.4 miles upstream from Wellington, Nevada. This canal, along with Desert Creek, which flows into Smith Valley from the south, provides irrigation water to much of the southern and central portions of Smith Valley from Hoyer Canyon to Wellington. Originally, the canal was intended to irrigate some 10,000 acres; however, inadequate water supplies limited its irrigation capacity to only about 3,800 acres, causing many farms to fail.³⁵
- 1921** (April 8) The WRID was paid the proceeds from the first sale of its bonds (authorized in 1919) in the amount of \$253,778.25 by Redmond & Page and Company (contractors) and drawn on The Anglo & London Paris National Bank of San Francisco, California. In an accompanying "prospectus," it was noted that the WRID, located in Lyon, Mineral, and Douglas counties, Nevada, comprised 185,000 acres of irrigable land, and that the normal flow of the Walker River "irrigates all of the land part of the time, and part of the land all of the time." The District therefore had authorized the bond sale such that "all of the land may have water for irrigation all of the time."³⁶
- 1922** (June 30) Waters of the West Walker River were first stored in Topaz Reservoir, a storage facility constructed by the WRID.³⁷ This reservoir, which straddles the California–Nevada border just east of the West Walker River, was created from an expansion of the original Alkali Lake, a fault-block basin separated from the west fork by an alluvial fan of Slinkard Creek. To fill Topaz Reservoir, a two-mile long diversion canal was run from the river into Alkali Lake with a 2.5 mile outlet tunnel and canal flowing back into the west fork approximately 5 river miles downstream from the original diversion point and about 3 miles upstream from Hoyer Bridge in Nevada. The original capacity of the reservoir was 45,000 acre-feet; in 1937 a new levee was constructed raising its capacity to 59,440 acre-feet.³⁸
- 1923** (December) WRID's Bridgeport Reservoir was completed with a capacity of 42,460 acre-feet.³⁹ Storage rights to waters in both Bridgeport and Topaz reservoirs were awarded by WRID to those farmers without adequate decreed rights (i.e., 1874 priority dates or later). By this action, those irrigated farmlands in the district which had the most

- tenuous water rights (and hence faced being potentially the least productive during low-water years) were obligated to pay off the bonds issued by the WRID for the construction of these reservoirs.⁴⁰
- 1924** Drought conditions led to low flows and increased upstream diversions causing the Walker River to cease flowing at the Wabuska gage in both this year and in 1925.⁴¹
- 1924** (July) On behalf of the Walker River Indian Reservation, whose reserved (i.e., the 1908 Winters Rights Doctrine) water rights were omitted from the 1919 issuance of Decree 731, the United States initiated an action (*United States v. Walker River Irrigation District, et al.*) to determine the rights of the upstream water users and to guarantee rights for the Indian Tribe.⁴² The Tribe attempted to acquire water rights for 150 cubic feet per second (cfs) of water during the irrigation season.⁴³
- 1925** WRID records showed that 93,600 acres were being irrigated within the Irrigation District and that 272,000 acre-feet of water was being used consumptively (at an average water duty of 2.9 acre-feet per acre per year).⁴⁴
- 1926** (June 18) In response to applications 1097 and 1098 filed in 1918 for storage rights in Pickel Meadows and Leavitt Meadows (as future reservoir sites), the California Water Rights Board issued permits 2534 and 2535 to the WRID.⁴⁵
- 1928** (March 14) A high within the period of record (1928-current) for Walker Lake was recorded by the U.S. Department of the Interior, Bureau of Indian Affairs (BIA) at a water surface elevation of 4,051.8 feet MSL and 6,955,000 acre-feet in volume.⁴⁶ In the 20 years since 1908, Walker Lake's depth had declined by 11.8 percent and its volume had declined by 19.5 percent.
- 1928** The Walker River, Carson River, and Truckee River basins experienced the beginning of a severe drought lasting from 1928 through 1935. Due to its severity, this period of time would later establish water planning criteria for many of the hydrographic basins in northwestern Nevada and would not be exceeded in drought severity until the most recent drought period which began in 1987.⁴⁷
- 1928** The West Side Canal was constructed along the western edge of Mason Valley in the foothills of the Singatse Range. Success of this operation was limited, however, as the canal proved difficult to maintain and users of its waters were few.⁴⁸
- 1928** An Act of Congress added another 69,000 acres of grazing range to the Walker River Paiute Reservation.⁴⁹ This brought total reservation acreage up to 153,809 acres.
- 1929** (1929–1932) The continuation of a severe drought, combined with the effects of the nation's Great Depression and plummeting agriculture prices, forced the WRID to become delinquent on 85 percent of its bonds used to pay for the construction of Topaz Reservoir and Bridgeport Reservoir. WRID would eventually default on its outstanding debt obligations.⁵⁰
- 1929** Walker River flows into Walker Lake declined to an average of just over 28,000 acre-feet per year, down from lake inflows of 250,000 acre-feet estimated in the 1800s and an inflow 174,000 acre-feet recorded as recently as 1919 (before upstream storage in Topaz Reservoir from the West Walker River and Bridgeport Reservoir on the East Walker River). Walker Lake's surface elevation was recorded at 4,034 feet MSL, 46 feet below its 1882 level while the lake's volume was estimated to be 6,060,000 acre-feet. This represented a 20.5 percent decline in Walker Lake's depth and a 43.4 percent

- decline in its volume relative to figures reported by Russell in 1882.⁵¹
- 1930** The U.S. Navy selected the Hawthorne–Whiskey Flat portion of the lower Walker Lake Valley as the site for its ammunition depot. The storage facilities grew over the years and became the Navy’s largest such facility. The town of Babbitt was subsequently built on the north edge of the facility to house required personnel.⁵² The town of Hawthorne, Nevada and Mineral County underwent significant growth due to this facility, with the county’s total population expanding from 1,863 in 1930 to 5,560 by 1950 and eventually peaking at 7,051 person by 1970.⁵³ Mineral County’s current (1995) population is estimated at approximately 6,700 persons.⁵⁴
- 1931** Drought conditions intensified in the Walker River Basin such that the Walker River ceased flowing at the Wabuska gage this year.⁵⁵
- 1931** The Walker River Irrigation District applied for a permit to construct a dam on the West Walker River at Hoye Canyon. The completed reservoir would contain between 75,000 and 90,000 acre-feet of water, cover nine square miles of land along the river, and extend up into Antelope Valley towards Topaz Lake.⁵⁶
- 1932** Continued drought conditions and upstream reservoir requirements reduced this year’s total inflows to Walker Lake to approximately 25,000 acre-feet.⁵⁷
- 1933** The WRID, having defaulted on its debt obligations for the construction of Topaz Reservoir on the West Walker River and Bridgeport Reservoir on the East Walker River, applied for a Reconstruction Finance Corporation loan to pay off the debt.⁵⁸
- 1933** In conjunction with the effort to obtain refinancing from the Reconstruction Finance Corporation, the University of Nevada Reno Agriculture Experiment Station prepared an economic study on the WRID to determine its ability to pay off its debt. The study’s conclusions recommended that the WRID’s irrigated acreage should be reduced to a more long-term, economically feasible and sustainable level of only 58,000 acres, thereby necessitating that approximately 30,000 acres should be stripped of water storage rights. (Interestingly, this was approximately the same amount of acreage that was being irrigated in the basin in 1909.) This slightly over 30,000 acres in unsustainable agricultural lands, in fact, represented much of the acreage added to the irrigation district since 1910 as Homestead Act (1862) and Desert Land Act (1877) patents.⁵⁹
- 1934** The federal Indian Service (later renamed the Bureau of Indian Affairs) constructed Weber Reservoir on the Walker River Indian Reservation in Nevada. Initial reservoir capacity was approximately 13,000 acre-feet, which could provide sufficient water storage to irrigate between 3,100–5,000 acres.⁶⁰ However, this reservoir had no storage rights and even the 1939 completion of Decree C–125 allowed a flow rate (26.25 cfs) for the irrigation of only 2,100 acres. The dam’s presence has prevented the upstream spawning of Walker Lake Lahontan cutthroat trout.⁶¹
- 1936** (April 14) In adjudication of the 1924 filing of *United States v. Walker River Irrigation District, et al.*, Decree C–125 was issued by the Federal District Court for Nevada. In addition to recognizing the water rights defined in Decree 731 (March 24, 1919) as to priority date, amount and place of use, and defined other storage and diversion rights, the Walker River Indian Reservation’s attempt to acquire a right to divert 150 cubic feet per second for the irrigation of reservation lands was rejected.⁶² While Decree C–125 adjudicated most of the irrigation rights of the Walker River system, the court did not

define domestic rights, irrigation uses on natural forest land, some private riparian lands, and any storage rights for Weber Reservoir, which had recently been constructed on the Walker River Indian Reservation.⁶³ Also, no rights were included for Walker Lake itself. A federal watermaster would be responsible for its enforcement.

- 1936** Another 171,200 acres were added to the Walker River Paiute Indian Reservation which, along with other small reservation acreage adjustments, brought it to its current 324,323 acres, an area approximately equal to the original 318,809 acres of land set aside on November 29, 1859. This was the last major adjustment to the reservation's size. Mineral rights on all transferred lands were reserved to the United States.⁶⁴ Unlike the original reservation lands which encompassed all of Walker Lake, no portion of the present reservation includes or borders any part of Walker Lake.
- 1937** Topaz Reservoir's capacity was increased from its original 45,000 acre-feet to 59,440 acre-feet.⁶⁵
- 1939** (March 25) The Underground Water Act was passed by the Nevada State Legislature. Along with many subsequent amendments and additions, this act is now one of the most comprehensive ground-water laws in the western United States.⁶⁶ This act provided the mechanism for designating ground-water basins that the State Engineer determines are in need of additional administration. Such designation usually occurs when ground-water withdrawals and 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 ground-water basin.⁶⁷ Currently, approximately 116 of Nevada's 232 ground-water basins are designated.⁶⁸
- 1939** (June) Decree C-125 (the 1936 adjudication of the 1924 filing of *United States v. Walker River Irrigation District, et al.*) was modified on appeal to the U.S. Circuit Court of Appeals, Ninth Circuit (104 Fed 2d 334 [1939]). The Walker River Indian Reservation was granted a right to divert 26.25 cubic feet per second (they had asked for 150 cfs) for 180 days (amounting to 9,450 acre-feet from natural flows) at the Parker Gage at the north (outlet) end of Mason Valley.⁶⁹ All defendants agreed to the stipulation which granted the Walker River Indian Reservation a November 29, 1859 priority date for its water rights for the irrigation of 2,100 acres of reservation land.⁷⁰
- 1948** Relatively high total dissolved solids (TDS or salinity) levels in Walker Lake of 6,850 mg/l caused the Sacramento carp population to die out.⁷¹
- 1950** The Walker River Basin was subjected to particularly damaging floods, although property damage was not as severe as the flooding which occurred along the Truckee River (and particularly in downtown Reno, Nevada) at the same time due to the limited amount of urbanized land within the Walker River watershed.⁷²
- 1952** To support its growing copper mining operations in the Yerington Mining District, located in the central portion of the Singatse Range, the Anaconda Copper Company built the industrial town of Weed Heights in Lyon County just across the Walker River from Yerington. The town was named for Clyde E. Weed, vice president in charge of all Anaconda operations.⁷³
- 1953** Beginning in this year, hatchery-reared Lahontan cutthroat trout (primarily from the Verdi fish hatchery) were stocked annually in Walker Lake to keep the fishery viable.⁷⁴

1953 (August 25) Paragraph (Section) 15 of Decree C-125, the “Rules and Regulations for the Distribution of Water, of the Walker River Stream System under Provisions in Paragraph 15 of the Decree in Equity No. C-125,” was adopted by the U.S. Board of Water Commissioners.⁷⁵ By these rules, lands in California above Bridgeport Reservoir on the East Walker River (primarily Bridgeport Valley) and above the Topaz Lake intake canal on the West Walker River (primarily Antelope Valley and surrounding areas) were reaffirmed a water duty⁷⁶ of 1.6 cfs per 100 acres of land. The remaining decreed acreage downstream was reaffirmed a water duty of 1.2 cfs per 100 acres of land. Most notably, these rules and regulations exempted the Bridgeport Valley Division water users from the requirement in Decree C-125 that all water users measure their withdrawals at the point of diversion.⁷⁷ The irrigation season was also reaffirmed to be from March 1 to September 15 (199 days) for East Walker River lands above Bridgeport Reservoir and for West Walker River lands above the Coleville streamflow gage. The remainder of the basin’s irrigation season was set to run from March 1 to October 31 (245 days).⁷⁸ [Interestingly, by the June 1939 modification of Decree C-125, the Walker River Indian Reservation was granted a right to divert for only 180 days during the irrigation season.] For such purposes as rules and regulations for the distribution of water, the Walker River Basin was divided into six (6) divisions with areas described as follows:⁷⁹

- [1] *Division No. 1*—That area on the Main Walker River consisting of the Schurz Indian Reservation, and extending from Walker Lake to the Weber Dam;
- [2] *Division No. 2*—That area consisting of lands served from the Main Walker River from the Yerington Weir to the confluence of the East and West Walker Rivers;
- [3] *Division No. 3*—That area consisting of lands served from the East Walker River from the confluence of the East and West Walker Rivers to Bridgeport Dam;
- [4] *Division No. 4*—That area consisting of lands served from the East Walker River and its tributaries above Bridgeport Dam, consisting principally of Bridgeport Valley;
- [5] *Division No. 5*—That area consisting of lands served from the West Walker River and its tributaries from the confluence of the East and West Walker Rivers to the Intake Canal for Topaz Reservoir; and
- [6] *Division No. 6*—That area consisting of lands served from the West Walker River and its tributaries above Topaz Lake Intake Canal and consisting principally of Antelope Valley.

1953 Walker Lake’s surface level was recorded at 3,988 feet MSL, making the lake’s surface elevation 92 feet lower than its 1882 level of 4,080 feet MSL as recorded by Russell, a decline of 41.4 percent to Walker Lake’s depth. Further, its volume was now estimated to be 4,000,000 acre-feet, a loss of 6,700,000 acre-feet, or a 62.6 percent decline, from its estimated volume of 10.7 million acre-feet in 1882.⁸⁰

1954 The U.S. Bureau of Reclamation (USBR) published its *Washoe Project*, a study on potential Sierra Nevada Mountains eastern slope water projects for the Truckee and Carson rivers. This study would form the genesis for the appointment of a

- California–Nevada Interstate Compact Commission in 1955 to address disputes over water rights and allocations along the Truckee, Carson, and Walker rivers and within the Lake Tahoe Basin.⁸¹
- 1954** The Nevada State Engineer approved the WRID's request for a permit, submitted in 1931, to build and fill a dam and reservoir proposed for Hoye Canyon on the West Walker River.⁸²
- 1955** The Walker River Basin was again subjected to particularly damaging flooding.⁸³
- 1955** (March 26) The State of Nevada purchased 8,766 acres of land in the northern portion of Mason Valley east of the main stem of the Walker River and established the Mason Valley Wildlife Management Area (WMA). The lands purchased came from an existing cattle ranch which was originally part of the Miller et Lux holdings in the valley. The Nevada Department of Wildlife was tasked with the management of this area.⁸⁴
- 1955** (August) Public Law 353 was passed whereby Congress granted its consent to the states of California and Nevada to negotiate and enter into a compact with respect to the distribution and use of the waters of the Truckee, Carson, and Walker rivers, Lake Tahoe, and the tributaries of such rivers and lakes in these states.⁸⁵ Interestingly, sixteen years later, after both states had passed legislation approving just such a California–Nevada Interstate Compact to address lingering issues affecting the uses of the waters of the rivers it jointly shared, Congress refused to ratify the compact.
- 1955** After two subnormal flow years, California farmers and ranchers in Antelope and Little Antelope valleys requested that the California Department of Water Resources (DWR) undertake an extensive study of the water resources of the West Walker River.⁸⁶
- 1955** California and Nevada each appointed their own commission with the same name—the California–Nevada Interstate Compact Commission—in response to the interstate issues continually raised on matters pertaining to the allocation and use of lakes and rivers in the Truckee, Carson, and Walker River basins. When the two commissions met as one body, it was referred to as the Joint California–Nevada Interstate Compact Commission.⁸⁷ This body worked until 1968 when a Draft Interstate Compact was produced for consideration by each state's legislature.
- 1957** (September 23) The California Department of Water Resources issued a report on the WRID's Public Law 984 (Small Reclamation Projects Act) loan application to make modifications to Bridgeport Reservoir. The report included comments from the California Department of Fish and Game which emphasized the need to formalize reservoir operations and monitor and stabilize water releases so as to avoid endangering fishermen and other stream users, prevent scouring of the stream channel, stranding of fish, and destruction of fish habitat.⁸⁸
- 1957** (December) Based upon a request made by farmers and ranchers in 1955, the California Department of Water Resources issued a preliminary report on water resources of the West Walker River. Recommendations called for a more extensive analysis of potential reservoir sites. The final report would eventually be published in April 1964.⁸⁹
- 1958** The WRID received a federal loan in the amount of \$563,000 to raise the level of the spillway at Bridgeport Dam to increase its storage capacity from 42,000 acre-feet to 48,000 acre-feet. Funds were also used to line and improve supplemental distribution canals and clear the channels of the Walker River.⁹⁰

- 1960 Due to severe drought conditions, many wells were drilled in the Walker River Basin for irrigation purposes and for the first time groundwater pumping became a significant source of overall water use.⁹¹
- 1960 The increased development of ground water in the Nevada portion of the Walker River Basin caused the Nevada State Engineer to classify Smith Valley (Nevada Hydrographic Basin Number 9, Area 107) as a designated ground water basin, thus establishing an intensive program of water level studies, drilling restrictions, and management controls to assure orderly development of the ground water resource.⁹² Later, Mason Valley (Hydrographic Area 108) and Walker Lake Valley (Whiskey Flat-Hawthorne Hydrographic Sub-Area 110C) would also be so designated within the basin.⁹³
- 1961 (April 4) The WRID authorized the issuance of bonds in the amount of \$957,000 for the construction of a proposed Hoyer Canyon Dam and Reservoir project to be located on the West Walker River in Nevada less than 10 river miles downriver from Topaz Reservoir between Antelope and Smith valleys.⁹⁴ Several sites had been studied in this area by both the WRID and the USBR. Estimated storage capacity of the resultant reservoir was between 75,000 and 91,000 acre-feet.⁹⁵
- 1961 The California Legislature passed Assembly Concurrent Resolution 97 in response to the WRID's intention to fund a dam and reservoir on the West Walker River at Hoyer Canyon. Resolution 97 noted that both states were then engaged in negotiations for an interstate compact over the equitable division of the Walker River's waters and that such proposed storage of virtually all presently unused waters in a Nevada reservoir would gravely prejudice California's rights to an adequate share of the river's waters. The resolution called for the California Attorney General to bring action against the State of Nevada in the U.S. Supreme Court should proposed financing and development for such a reservoir be pursued.⁹⁶
- 1961 The California Water Rights Board (later renamed the California State Water Resources Control Board—SWRCB) revoked permits 2534 and 2535 which it had issued to the WRID in June 1926. These permits had been based on applications 1097 and 1098 filed in 1918 for storage rights in Pickel Meadows and Leavitt Meadows as future reservoir sites for the WRID.⁹⁷
- 1963 (February 5) An agreement between the California Department of Fish and Game and the WRID allowed the WRID to enlarge and modify Bridgeport Reservoir and Dam so long as the WRID would maintain a minimum pool in the reservoir of 1,500 acre-feet for the protection of fish life, except during defined years when the WRID would maintain a minimum pool of at least 300 acre-feet. The agreement also specified minimum streamflow releases, generally the lesser of 50 cfs or natural inflow during the irrigation season and 8 cfs the rest of the year, subject to dry year provisions.⁹⁸
- 1963 Relatively high total dissolved solids (TDS or salinity) levels in Walker Lake of 8,440 mg/l caused the Sacramento perch population to die out.⁹⁹
- 1964 (July) The USBR published its *Walker River Project*, a study on potential Sierra Nevada Mountains eastern slope water projects for the Walker River. This study, along with the earlier 1954 *Washoe Project* study for the Truckee and Carson rivers, would provide needed information for the California-Nevada Interstate Compact Commission in meeting their objectives on surface water allocations.¹⁰⁰

- 1964 (April) Based upon a 1955 request made by California ranchers located in Antelope and Little Antelope valleys, the California Department of Water Resources completed its water resources investigation of the West Walker River. In December 1957 a preliminary report had been issued, but the recommendations of that report called for more extensive analysis of potential reservoir sites. An important observation contained within this investigation was the recognition of the variability of West Walker River flows, which over a 35 year period of record encompassing 1920–1955, varied from a minimum of 67,900 acre-feet per year to a maximum of 372,700 acre-feet per year. It was determined that this range of flows greatly limited this fork's potential as a stable source of surface water for agriculture. It was also noted that potential water requirements within this portion of the basin exceeded the available water supply. Recommendations called for:¹⁰¹
- [1] Construction of surface water storage reservoirs at the Leavitt Meadows, Pickel Meadows, and Roolane Reservoir sites;
 - [2] Utilization of ground water; and
 - [3] Improvement of irrigation efficiencies.
- 1964 Walker Lake's surface water level was recorded at 3,972 feet MSL, a decline of 108 feet from an elevation of 4,080 recorded in 1882, resulting in a 48.2 percent decline in the lake's depth. Walker Lake's total volume was estimated to be 3,158,000 acre-feet, a decline of 7,542,000 acre-feet, or 70.5 percent, since Russell performed the first extensive hydrologic and geologic surveys of Walker Lake and the Walker River system in 1882.¹⁰²
- 1966 The Endangered Species Preservation Act was passed. This act constituted the initial version of the Endangered Species Act (ESA) of 1973.
- 1966 Total TDS concentrations in Walker Lake were recorded at approximately 8,500 mg/liter,¹⁰³ up significantly from a TDS concentration level of approximately 2,560 mg/liter recorded by Russell in 1882.
- 1967 Sierra Pacific Power Company (SPPCo) purchased approximately 5,500 acres in the northern portion of Mason Valley on the west (left) bank of the Walker River for the construction of their Fort Churchill Power Station.¹⁰⁴
- 1968 (May 17) It was reported in the *Mason Valley News*, a Yerington (Lyon County, Nevada) newspaper, that the area development council had, for the past several months, been urging the WRID to consider the construction of a reservoir at Hudson on the West Walker River above Wilson Canyon between Smith and Mason valleys. It was estimated in WRID studies that such a Hudson Reservoir would provide a storage capacity of approximately 16,000 acre-feet.¹⁰⁵
- 1968 (July) After thirteen years of negotiations between the two states, the joint California–Nevada Interstate Compact Commission approved a provisional Interstate Compact for the division of the waters of Lake Tahoe, and the Truckee, Carson, and Walker rivers. This provisional compact, with some modification, eventually would be ratified by both states (California in September 1970 and Nevada in March 1971). However, the compact was never ratified by Congress which would have made it law. Even so, both states have since chosen to implement its terms under a "gentlemen's agreement."¹⁰⁶

- 1968** Congress passed the National Wild and Scenic Rivers Act to preserve in their free-flowing condition rivers which possess “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.” Based upon such designation, rivers or sections of rivers so designated, would be free of dams, reservoirs, diversions, or other water impoundments. Diversions for domestic water supply may be authorized. Importantly, national designation precludes the Federal Energy Regulatory Commission (FERC) from issuing a license to build a dam on such rivers for hydropower generation.¹⁰⁷ The passage of this act would promote the passage of a similar state act in California in 1972 which would affect the west fork of the Walker River.
- 1969** The National Environmental Protection Act (NEPA) was passed establishing the U.S. Environmental Protection Agency (EPA) and requiring Environmental Assessments (EAs) and Environmental Impact Statements (EISs) for major construction projects.
- 1969** The WRID applied for and received from the Nevada State Engineer certificated water rights for flows in excess of earlier decreed rights between May 1st and July 31st on the East Walker River (349 cfs, not to exceed 63,688 acre-feet per year) and on the West Walker River (491 cfs, not to exceed 89,612 acre-feet per year).¹⁰⁸
- 1970** (February 19) Sierra Pacific Power Company sold to the State of Nevada 3,264.52 acres of surplus land that they had purchased in 1967 for the construction of their Fort Churchill Power Station. This land, located on the west side of the Walker River, was incorporated into the Mason Valley Wildlife Management Area managed by the Nevada Department of Wildlife. Along with existing lands on the east side of the Walker River, the management area now totaled approximately 12,030.52 acres.¹⁰⁹
- 1970** (September 19) The California Legislature ratified legislation adopting the California–Nevada Interstate Compact.¹¹⁰ Due to the subsequent failure to obtain Congressional consent, this compact has become a “gentlemen’s agreement” between these two states providing for the means to allocate the waters of Lake Tahoe and the Truckee River, Carson River, and Walker River basins. With respect to the Walker River Basin, the compact confirmed all water rights under Decree C-125¹¹¹ and, in addition, added storage rights for the Walker River Paiute Indian Reservation in Weber Reservoir of 13,000 acre-feet (diversions allowed from November 1 to October 31) and additional irrigated land (9,450 acre-feet of water to be diverted from natural flows from March 1 to October 31 at a maximum rate of 60 cfs). Both the new storage rights and additional flow rights for the reservation carried a priority date of 1933.¹¹² Further, “unused water” above Mason Valley was to be divided between California (to receive 35 percent) and Nevada (to receive 65 percent).¹¹³ As previously noted, Congressional approval has never been received; however, many of the provisions of the interstate compact pertaining to Lake Tahoe and the Truckee and Carson rivers have been included in Public Law 101-618 (November 1990) as part of The Negotiated Settlement Act, but no compact provisions for the Walker River have been included in this document.¹¹⁴
- 1971** (March 5) The Nevada Legislature formerly adopted the terms of the California–Nevada Interstate Compact which the California Legislature had approved on September 19, 1970.¹¹⁵
- 1972** The Clean Water Act (CWA) passed based on the 1965 Water Quality Act. The new

act dramatically increased the goals of zero toxic discharges providing for “fishable” and “swimmable” surface waters. Major enforceable provisions of the CWA included:¹¹⁶

- [1] Technology-based effluent standards for point sources (PS) of pollution;
- [2] State-run control program for nonpoint sources (NPS) of pollution;
- [3] Construction grants program to build and/or upgrade municipal sewage treatment plants;
- [4] Regulatory system for spills of oil and other hazardous wastes; and
- [5] Wetlands preservation program (Section 404).

The CWA Section 404 on wetlands provisions have since become a crucial factor in the preservation efforts of wetlands throughout the United States.

- 1972** The California Wild and Scenic Rivers Act was passed requiring that certain rivers possessing extraordinary scenic, recreation, fishery, or wildlife values be preserved in their free-flowing states. The act specifically prohibited the construction of dams, reservoirs, and most water diversion facilities on river segments included in the wild and scenic river system.¹¹⁷ The California wild and scenic river system would come to include portions of the Klamath, Scott, Salmon, Trinity, Smith, Eel, Van Duzen, and American rivers, and the upper portion of the West Walker River (included in 1989), as well as the upper portion of the east fork of the Carson River. The major difference between the national and state acts is that if a river is designated wild and scenic under the state act, the Federal Energy Regulatory Commission (FERC) can still issue a license to build a dam for hydropower generation on that river. For this reason, designation under the National Wild and Scenic Rivers Act (1968) affords enhanced protection.¹¹⁸
- 1972** Dr. Robert Taylor of the University of Nevada, Reno, studied the effects of increased salinity on Lahontan cutthroat trout. His research showed that a TDS concentration of 16,000 parts per million (approximately equivalent to milligrams per liter—mg/liter) caused a 100 percent mortality rate among cutthroat trout.¹¹⁹
- 1972** The USGS estimated that, due to extensive sedimentation, the capacity of Weber Reservoir, located on the Walker Lake Paiute Indian Reservation, had been reduced from approximately 13,000 acre-feet at its time of construction in 1934 to 10,700 acre-feet presently.¹²⁰
- 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) would share the authority and responsibility to list endangered species, determine critical habitat, and develop recovery plans for listed species. The act must be reauthorized by Congress every five years.¹²¹
- 1974** (June) The USGS, in cooperation with the Nevada Department of Conservation and Natural Resources, published *Water Resources-Information Series Report 21: Hydrologic Regimen of Walker Lake, Mineral County, Nevada*, in which they predicted that in order to maintain Walker Lake at its 1968 stage of 3,970 feet MSL (118 foot depth) and its volume of about 3 million acre-feet, an average annual inflow of nearly 140,000 acre-feet would be required from the Walker River. However, since 1918, Walker River inflows had averaged only 85,000 acre-feet. Therefore, based on this water deficit and existing rates of evaporation, Walker Lake would stabilize between the

- years 2010 and 2060 at an elevation of 3,896 feet MSL corresponding to a maximum depth of about 40 feet and a volume of approximately 600,000 acre-feet. Under this equilibrium condition, Walker Lake's TDS levels would approach 50,000 mg/l and be saltier than sea water, which has a TDS of approximately 35,000 mg/l, thereby making the lake largely devoid of life.¹²²
- 1975** (October 24) Based upon the accumulation of stream gaging data compiled since 1954 demonstrating a lack of adverse impacts on prior water rights, the Board of United States Water Commissioners' petition under Decree C-125 filed with the U.S. Federal District Court for Nevada was approved. This petition, filed on July 3, 1975, sought to amend the "Rules and Regulations" adopted on August 25, 1953. The intent was to show that the cost of maintaining the required gaging stations far outweighed any further benefits and consequently the Board should no longer be required to maintain the gaging stations on Virginia, Swauger, Green, Buckeye, and Robinson creeks.¹²³ These gaging stations had been required for the Bridgeport Valley Division in lieu of individual water flow measurements at the point of diversion as required of other water users under the 1953 "Rules and Regulations."¹²⁴
- 1976** The Safe Drinking Water Act (SDWA) was passed establishing uniform drinking water standards for the nation.¹²⁵
- 1978** The U.S. Census of Agriculture reported that approximately 86,000 acres were being irrigated in Smith and Mason valleys in Lyon County, Nevada. This represented an increase of almost 20 percent from 72,000 irrigated acres reported in 1974.¹²⁶
- 1980** After installing a temporary gage just above Weber Reservoir, the USGS estimated that the flow losses (due to evaporation, seepage, and phreatophytes) between Wabuska, at the north end of Mason Valley and at the river's entrance to the Walker River Indian Reservation, and Weber Reservoir, located some 13 miles further downstream, amounted to 3,600 acre-feet based upon river flows of 22,400 acre-feet.¹²⁷ This corresponded to a water loss rate of over 16 percent. It was therefore determined that in order to deliver 26.25 cfs to the point of use on the reservation, an amount closer to 30 cfs should be delivered to the Wabuska gage to account for these instream losses.¹²⁸
- 1983** Wettest water year ever recorded for the Walker River Basin. This year would become the standard "High Water Year" for virtually all creeks, streams, and rivers within the Walker River Basin. The extraordinary winter runoff caused inflows into Walker Lake of approximately 580,000 acre-feet and raised the lake's surface water level by approximately 15-16 feet and increased its volume to 3,022,000 acre-feet. This sudden return of generous freshwater inflows into Walker Lake would temporarily mitigate growing concerns over the lake's near-term survival.¹²⁹
- 1983** The first major application of the "Public Trust Doctrine" to water rights decisions by the California State Supreme Court was determined in *National Audubon Society v. Superior Court*. The Court ruled in favor of a balancing of public trust uses of water (e.g., minimum instream flows, habitat restoration and protection, wetland preservation) against typical consumptive uses of water during the water rights application process. Further, the California Court ruled that the state, and specifically the grantor of water rights—the California State Water Resources Control Board, or SWRCB)¹³⁰—may reconsider the effects of past allocations based on this concept.¹³¹

- 1983** (September) The State of Nevada Department of Wildlife (presently the Division of Wildlife, Department of Conservation and Natural Resources) was issued a water right of 575,850 acre-feet per year for surplus (flood) Walker River flows with a priority date of September 17, 1970. Waters would only be available for delivery to Walker Lake during the higher flow water years.¹³²
- 1986** A graduate thesis written by Wendy Milne, a student in the Department of Geology and Geologic Engineering, Colorado School of Mines, reconstructed Walker River flows without upstream agriculture diversions and other human intervention. From these simulations, it was hypothesized that Walker Lake would have stabilized above its recent highstand of the late 1800s had pristine (natural) conditions prevailed in the basin.¹³³
- 1986** U.S. Senator Paul Laxalt (Nevada), after attempting to negotiate outstanding issues of the California–Nevada Interstate Compact pertaining to the apportionment of the waters of the Truckee, Carson, and Walker rivers between these two states, failed in his effort to have Congress ratify the compact. A major issue of contention was a phrase in the compact stating that the use of waters by the federal government, its agencies, instrumentalities, or wards was to be charged against the use by the state in which it is made. This limitation, combined with new court interpretations of the federal reserved (reservation) water rights (the Winters Doctrine of 1908), waters required for Pyramid Lake fish species under the Endangered Species Act (ESA), and public trust doctrine issues effectively derailed Congressional approval.¹³⁴
- 1986** Based on the failure to obtain Congressional approval of the California–Nevada Interstate Compact, and continuing conflicts and litigation over Truckee and Carson river water rights, in particular, U.S. Senator Harry Reid (Nevada) began negotiations among state, federal, and other interests. These negotiations eventually led to the November 1990 passage of Public Law 101-618, the Negotiated Settlement Act, which was to incorporate a final interstate settlement of waters shared between California and Nevada.¹³⁵
- 1987** A record drought period began in the Sierra Nevada Mountains. This would adversely affect stream flows, reservoir levels, agricultural production, recreation, habitat and wildlife throughout the Walker, Carson, and Truckee River basins.
- 1987** The U.S. Census of Agriculture reported that 87,624 acres were being irrigated in Smith and Mason valleys in Lyon County, Nevada. This represented an increase of less than 2 percent over the 86,000 irrigated acres reported in 1978.¹³⁶
- 1988** (Summer) In response to farmers' desperate need for irrigation water, the WRID drained Bridgeport Reservoir, flushing warm water and considerable quantities of sediment from the bottom of the reservoir into the East Walker River, subsequently causing an extensive fish kill downstream.¹³⁷
- 1988** In response to the draining of Bridgeport Reservoir by the WRID, the California Trout, Inc., a sport-fishing association, filed a complaint with the California SWRCB claiming that the WRID's draining of the reservoir violated several state fish protective statutes and caused a loss of fisheries in the reservoir and downstream (see entry under February 5, 1963). When subsequent negotiations between the California Department of Fish and Game and the WRID proved fruitless, the SWRCB moved ahead with an investigation and eventual water rights hearing.¹³⁸
- 1988** Mono County, California, in which Bridgeport Reservoir is located, filed suit against the

- WRID for its draining of that reservoir earlier in the summer.¹³⁹ In 1993 the WRID was subsequently convicted in Justice Court of Mono County of misdemeanor violations under the California Fish and Game Code. Terms of probation imposed on WRID included a monetary fine, the maintenance of a minimum pool within the reservoir, temporary instream flow release requirements, and the requirement to remove some of the sediment deposited in the East Walker River below Bridgeport Reservoir.¹⁴⁰
- 1988** In *The State of Nevada v. Morros* (766 P.2d 264, Nevada 1988) 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.¹⁴¹ 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,¹⁴² 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.
- 1989** Most of the upper West Walker River in California was added to the California Wild and Scenic River System under the 1973 California Wild and Scenic Rivers Act.¹⁴³ This action would effectively prohibit any further state development of potential reservoir sites, particularly the Leavitt Meadows, Pickel Meadows, and Roolane sites which had been so recommended for possible future development in a 1964 West Walker River Investigation by the California Department of Water Resources.¹⁴⁴
- 1989** The Nevada Legislature passed Assembly Bill (AB) 322 which stated that "the watering of wildlife, and the establishment and maintenance of wetlands, fisheries, and other wildlife habitats" constitutes a beneficial use of water.¹⁴⁵
- 1990** The U.S. Supreme Court ruled on *California v. Federal Energy Regulatory Commission*, commonly called the "Rock Creek Decision." In this decision, the Court rejected the State of California's claim that the Federal Power Act clause required deference to state water law.¹⁴⁶ This decision would permit the construction of hydroelectric power dams on rivers designated as wild and scenic under California law, including the upper West Walker River which had received such designation in 1989 by the State of California.
- 1990** (April 5) Operations began at the Mason Valley Fish Hatchery, located wholly within the Mason Valley Wildlife Management Area in the northern portion of Mason Valley.¹⁴⁷ In a typical year, the hatchery would produce nearly three-quarters of a million fish and stock the waters of the western nine counties of Nevada. All water used in the hatchery operations comes from five wells drilled to depths ranging from 460 to 520 feet. Permitted groundwater rights limit total pumpage to a maximum 4,703.62 acre-feet per year. The tailwaters from the hatchery are not permitted to enter Walker River and are used instead to maintain 250–300 acres of wetlands and ponds adjacent to the fish hatchery.¹⁴⁸
- 1990** With the participation of the WRID, California Trout, Inc., and the Lahontan Regional Water Quality Control Board, the California SWRCB completed its hearing process for

the draining of Bridgeport Reservoir in the summer of 1988 by the WRID. The SWRCB amended the WRID's license for water storage in Bridgeport Reservoir, requiring minimum downstream flows and minimum reservoir pool requirements.¹⁴⁹

1990 (November) The Negotiated Settlement Act (Public Law 101-618) was enacted into law in two titles:¹⁵⁰

[1] Title I—The Fallon Paiute-Shoshone Indian Tribal Settlement Act; and

[2] Title II—The Truckee-Carson-Pyramid Lake Water Rights Settlement Act.

Of note with respect to the Walker River Basin was that the passage of this act was intended to implement many of the provisions of the California-Nevada Interstate Compact, which was ratified by California in September 1970 and by Nevada in March 1971, and apportioned the waters of Lake Tahoe and the Truckee, Carson, and Walker rivers between these two states. However, The Negotiated Settlement Act dealt only with Lake Tahoe and the Truckee and Carson rivers; there was no mention of the interstate compact's provisions contained in Article VIII for the allocation of the waters of the Walker River.

1991 Based on the 1990 actions of the California SWRCB in amending WRID's license for water storage in Bridgeport Reservoir, the WRID filed suit against the SWRCB in federal district court having jurisdiction over Decree C-125. The suit challenged the SWRCB's authority to impose state law requirements on water rights specified by Decree C-125.¹⁵¹

1991 Walker Lake's volume was estimated at 2,403,000 acre-feet, down by over 20 percent from an estimated lake volume of 3,022,000 acre-feet recorded in 1983.¹⁵² This represented the fourth consecutive year that Walker Lake was without any freshwater inflows from the Walker River.¹⁵³

1993 (February) The Walker Lake Working Group was formed. The group is open to all members with an interest in the future of Walker Lake and was organized specifically to obtain sufficient and secure water supplies to maintain Walker Lake as a viable fishery and recreational area.¹⁵⁴

1993 (April) On behalf of the Walker River Paiute Tribe (Plaintiff-Intervenor), the United States filed a suit (*U.S. v. Walker River Irrigation District, et al.*) to contest the Tribe's water rights allocation under Decree C-125. The Decree, as was finally amended on April 24, 1940, specified that the Walker River Indian Reservation would receive 26.25 cfs of natural flow of the Walker River during the irrigation season (of 180 days) to be measured at the Parker Gage at the north end of Mason Valley (essentially at the same location as the present-day USGS Wabuska gaging station). The Tribe argued that while this location does lie just above the reservation boundary, it is a substantial distance (12-15 river miles) from Weber Reservoir and any of the Tribe's irrigation facilities and diversion points. Estimates have shown that conveyance losses (evaporation and seepage) over this distance reduce the allowed amount of 26.25 cfs by as much as 16 percent.¹⁵⁵

1993 (July) A fisheries biologist with the Nevada Division of Wildlife predicted that without substantial inflows of fresh water Walker Lake's Lahontan cutthroat trout fishery would be lost in from 5 to 11 years and at levels of decline experienced during the 1987-1992 drought, the fishery would be wiped out in as few as 2 years.¹⁵⁶

- 1993** The Walker River Irrigation District was convicted in Justice Court of Mono County of misdemeanor violations under the California Fish and Game Code. Terms of WRID's probation required:¹⁵⁷
- [1] the WRID to pay compensation of \$633,000 to the State of California;
 - [2] WRID was to pay a fine of \$250,000 to California Department of Fish and Game to cover the costs of legal fees and fishery research;
 - [3] WRID was ordered to maintain a minimum pool for Bridgeport Reservoir in the amount of 2,000 acre-feet;
 - [4] WRID was ordered to flush the sediment out of the East Walker River below Bridgeport Reservoir; and
 - [5] California Department of Fish and Game was allowed to monitor the fishery of the East Walker River.
- 1993** (September 9) An additional 1,147.26 acres of agricultural lands were purchased by the State of Nevada for incorporation into the Mason Valley Wildlife Management Area, which is operated by the Nevada Division of Wildlife. This area, first created in 1955 with the purchase of 8,766 acres of former farmlands, now totaled 13,177.78 acres, 4,945.92 acres of which were with water rights,¹⁵⁸ thereby allowing for the maintenance of approximately 2,100 acres of wetlands. The Mason Valley Fish Hatchery was incorporated into this area in 1990. Currently this management area provides important habitat and wildlife protection not only to waterfowl, but to a highly diverse population of other species making it one of the most diverse wildlife management areas in Nevada.¹⁵⁹
- 1993** (September 30) Walker Lake's surface water level was recorded by the USGS at 3,946.0 feet MSL and its volume was estimated at 2,136,000 acre-feet. This represented a lake level decline of 3.9 feet from September 1992 (3,949.9 feet MSL) and a decline in volume of 132,000 acre-feet from September 1992's estimated volume (2,268,000 acre-feet). This represented the lowest lake level and lake volume since the period of record began in August 1928.¹⁶⁰
- 1993** (November) In accordance with a Court settlement, WRID was ordered to release 6,000 acre-feet of stored water from Bridgeport Reservoir to flush accumulated sediment in the East Walker River below the reservoir. In response to this release, the Walker River Paiute Indian Tribe released 4,500 acre-feet of water from Weber Reservoir, a portion of which made it to Walker Lake and constituted the only river water to reach the lake in six years.¹⁶¹
- 1994** (January) As part of the Nevada Interim Legislative Committee on the use, allocation, and management of water, a hearing was conducted in Yerington, Nevada (Lyon County) to receive comments on the water problems associated with the Walker River and the lack of flows into Walker Lake. Mineral County representatives took the position that Walker Lake should receive a minimum inflow from Walker River of 130,000 acre-feet per year.¹⁶² Under "normal" conditions, this inflow, when off-set by a long-term average of 137,000 acre-feet (4.1 feet per year) in lake surface evaporation, and combined with 14,000 acre-feet in lake surface precipitation, 11,000 acre-feet in groundwater inflows, and 3,000 acre-feet of local surface water inflows, would provide a positive balance (water budget) for Walker Lake of approximately 21,000 acre-feet per

year.

1994 (March 28) Senator Reid (Nevada) held a meeting to discuss Walker Lake and its future. Those attending were from agencies and universities with interests in the condition and restoration of Walker Lake. Major participants at the Hawthorne (Mineral County), Nevada meeting included:¹⁶³

- [1] Desert Research Institute (DRI, a unit of the University of Nevada System);
- [2] University of California at Berkeley (Department of Civil and Environmental Engineering);
- [3] U.S. Geological Survey (USGS, Nevada District Office);
- [4] Bureau of Land Management (BLM);
- [5] U.S. Fish and Wildlife Service (USFWS);
- [6] U.S. Forest Service (USFS);
- [7] Federal Watermaster;
- [8] State of California (Department of Water Resources);
- [9] State of Nevada (State Engineer, Division of Wildlife);
- [10] Representatives of Mineral, Douglas, and Lyon Counties;
- [11] Walker River Irrigation District (WRID);
- [12] The Sierra Club;
- [13] Walker Lake Paiute Indian Tribe;
- [14] Working Group to Save Walker Lake; and
- [15] Nevada Outdoor Recreation Association (NORA).

1994 (March 28) In testimony before Senator Reid (see meeting item, above), Patricia Hicks, Chairwoman of the Walker River Paiute Indian Tribe, reported that the Tribe's Weber Dam should be considered a high hazard structure and potentially life threatening should it breach during high flows. The study, sub-contracted to the USBR by the Tribe's Safety of Dams, recommended designing an early warning system in the event of a flood as well as structural repairs, estimated at approximately \$10 million.¹⁶⁴

1994 (April) Anticipating attempts to obtain increased water rights for the Walker Lake Indian Reservation and Walker Lake, a group of water users and water rights holders in Smith and Mason valleys in Nevada, and Bridgeport Valley in California, with the support of the WRID, formed the Walker River Basin Water Users Group. The Antelope Valley farmers declined to participate. The group's intent was to protect decreed water rights of all farmers along the Walker River located upstream from Walker Lake and the Walker River Indian Reservation and to explore solutions to major issues concerning the Walker River system, to include:¹⁶⁵

- [1] the protection of existing water rights;
- [2] the recreation needs of Walker Lake;
- [3] the Walker River Indian Reservation claims to additional waters; and
- [4] the allocation of water between Nevada and California.

The group requested the University of Nevada, Reno to study the economic, socioeconomic, and environmental situation in the Walker River Basin. The group also retained legal counsel to represent their interests. In order to support these studies and fund legal representation, \$1.00 per acre-foot was assessed of all members.¹⁶⁶

1994 (April 29) Sam Stegeman, Walker River Paiute Tribe Water Resources Director,

announced that a study was currently being conducted to determine the amount of practicably irrigable acres (PIA) contained in the 171,200 acres that were returned to the Tribe in 1936.¹⁶⁷ Under the Winters Doctrine (1908), practicably irrigable acres must meet two fundamental criteria:

- [1] the land must be able to reasonably sustain crops; and
- [2] the cost of supplying the water must not be unreasonable.

It was stated in the announcement that this determination of irrigable lands may be the basis for future water claims by the Tribe.¹⁶⁸

- 1994** Surveys conducted by the U.S. Department of Agriculture, Soil Conservation Service (SCS), as part of a 1994 Resource Conservation Act Appraisal update, showed that in Smith and Mason valleys and along the East Walker River 77,640 acres were being irrigated. On the Walker Lake Indian Reservation 3,375 acres were irrigated.¹⁶⁹
- 1994** (July) USGS recorded Walker Lake's surface elevation at 3,943.5 feet MSL, its total volume at 2,053,000 acre-feet, its depth at 88 feet, and its TDS level at 13,300 mg/liter. These compare to a surface elevation of 4,080 feet MSL measured in 1882, a volume of 10.7 million acre-feet (now down by 80.8 percent), a lake depth of 224 feet (now down by 60.7 percent), and a TDS of 2,500 mg/liter (now up by 432.0 percent).¹⁷⁰
- 1994** The Nevada Division of Wildlife reported that tui chub eggs remained viable and live fry were seen in Walker Lake; however, their low numbers also suggested a decline in the population of this species which constitutes an important food source for the lake's Lahontan cutthroat trout population.¹⁷¹
- 1994** The U.S. Army Hawthorne Ammunition Depot allowed approximately one million gallons per day of water to run from its water system on Mount Grant into Walker Lake. This release lasted for about one month and constituted the only fresh water to enter Walker Lake during the year.¹⁷²
- 1994** (September) In a study of Walker Lake's recovery prepared for Pubic Resource Associates of Reno, Nevada, several scenarios were studied based on normal flows; maintenance flows (flows in addition to normal flows); special, one-time recharge flows; and the resultant lake levels. Based on these scenarios, it was estimated that:
- [1] Without any extraordinary flows into Walker Lake and without any future maintenance flows (i.e., flows into Walker Lake in addition to historical average flows for the 1928–1994 period of record consisting of approximately 90,000 acre-feet per year), the lake's volume will decline from its current volume of approximately 2.2 million acre-feet and will stabilize at 840,000 acre-feet by the year 2046;
 - [2] Without any extraordinary one-time surface water recharge to the lake and maintenance inflows of 45,000 acre-feet per year (a total of 135,000 acre-feet to include normal flows), the lake will stabilize at its current volume of approximately 2.2 million acre-feet;
 - [3] With a one-time recharge inflow of 300,000 acre-feet and maintenance inflows of 62,000 acre-feet per year (152,000 acre-feet total) thereafter, the lake will stabilize at an estimated volume of approximately 3 million acre-feet by 1998; and
 - [4] with a one-time recharge (inflow) of 300,000 acre-feet and maintenance

inflows of 75,000 acre-feet (165,000 acre-feet total) thereafter, the lake will stabilize at approximately 4 million acre-feet by the year 2003.¹⁷³

- 1994** (September) USGS measurements showed Walker Lake's surface elevation at 3,942.4 feet MSL and its estimated volume at 2,016,000 acre-feet. This represented a decline of 3.6 feet from September 1993 (3,946.0 feet MSL) and a decline of the lake's estimated volume of 120,000 acre-feet from September 1993's estimated 2,136,000 acre-feet.¹⁷⁴ This represented a surface level decline (and the lake's depth) of almost 138 feet since readings were first taken by Russell in 1882.
- 1995** (January 3) The U.S. federal court held a hearing on Mineral County's motion to open Decree-125 to obtain additional water inflows for Walker Lake. In order to gain "standing" as a legal entity of unified interests in anticipation of litigation on this matter, the Walker River Basin Water Users Group, which had been formed in April 1994 and included water-rights holders in Smith, Mason, and Bridgeport valleys, changed their structure into a unified, formal body with representative capacity: The Walker River Basin Users Association, Inc. The new body constituted a non-profit organization designed to represent the interests of most of the water users upstream from Walker Lake and the Walker River Indian Reservation.¹⁷⁵
- 1995** (February 22) Based on a request by U.S. Senator Harry Reid (Nevada), the first general meeting was held to assess the viability of the Walker Lake-Arimetco Pit Pumping Project. It was suggested that Walker Lake inflows could be enhanced by pumping the 25,000-30,000 acre-feet of water in this pit directly into the Walker River. The Arimetco pit is located approximately one-quarter mile from the Walker River near Yerington, Nevada. A number of problems were noted with respect to the use of this supplemental water source. First, the pit's surface level is about 300 feet below that of the Walker River and the water in the pit is approximately 400 feet deep, thereby necessitating a costly pumping operation. More importantly, however, the pit water contains considerable concentrations of copper, molybdenum, and especially selenium. In fact, the concentrations of selenium would necessitate such slow pumping rates in order to dilute the pit's waters with the river's flows as to make the entire project unfeasible.¹⁷⁶
- 1995** (March) The Walker River Paiute Tribe was granted an extension to serve holders of water rights under Decree C-125 with a Motion to Intervene in Decree C-125 for the purpose of increasing the Tribe's water rights under the decree. The motion was an effort to ask the court to open up the decree and permit the Tribe to argue for an increase of its water rights.¹⁷⁷
- 1995** (May) Mineral County, in which Walker Lake is situated, mailed waivers of service to holders of water rights under Decree C-125. By this action, it was the intent of Mineral County to serve water rights holders with a Motion to Intervene in Decree C-125 for the purpose of increasing Walker River's flows into Walker Lake. In its complaint, Mineral County claimed that Walker Lake constituted an important recreational feature of the county and the town of Hawthorne, Nevada.¹⁷⁸ In September 1995, Mineral County was granted an extension until February 1, 1996 to perform service on this motion.
- 1995** (July) Arimetco submitted an application to the Nevada Department of Environmental Protection (NDEP) for a discharge permit to allow pumped water from their pit near

- Yerington, Nevada to enter the Walker River at a 10:1 dilution rate to accommodate the high concentrations of selenium in the pit's water. This ratio was well below the 24:1 ratio previously determined necessary based on selenium concentrations and Walker River average flows past the pit site (see entry and related footnote under February 22, 1995, above).¹⁷⁹ This application was subsequently denied by NDEP.
- 1995** (August) Due to near-record snowpack in the Sierra Nevada Mountains, which totaled over 200 percent of normal, both forks of the Walker River were subjected to extensive flooding with threats to dams and levees along the river system. Due to the lack of residential and industrial buildup along the river, however, property damage was minimal. Even so, there was extensive flooding of agricultural lands.
- 1995** (August 3) The level of Walker Lake attained its highstand (peak) of 3,945.90 feet MSL for the current water year. This figure represented an increase of 5.15 feet in Walker Lake's surface elevation from its lowest point on record of 3,940.85 feet MSL recorded on December 7, 1994.¹⁸⁰
- 1995** (August 30) SPPCo restored 92 acres of wetlands at its Fort Churchill Power Station located north of Yerington, Nevada in Mason Valley. Previously, water from a holding pond was continuously recycled until evaporation created room for additional water to be pumped from two on-site wells. In order to reduce the buildup of salts in its recycled cooling waters, SPPCo elected to more frequently pump fresh water for cooling and then release the water from its cooling ponds, which are located adjacent to the Mason Valley Wildlife Management Area.¹⁸¹
- 1995** (September) It was reported that due to the unusually wet year and considerable quantities of fresh water reaching Walker Lake, the lake's TDS concentration was measured at 12,645 parts per million (equivalent to mg/l), down from 13,894 ppm reported in September 1994. During the 1995 water year (October 1, 1994–September 30, 1995) Walker Lake rose 3.9 feet; however, as virtually no Walker River water had reached the lake during the recent 8-year drought period, the lake's surface level had dropped by 30.7 feet between August 1986 and September 1994. It was also estimated that the lake's surface level (and its depth) had fallen by 136 feet since the turn of the century.¹⁸²
- 1995** (September 29) The Nevada Division of Water Planning (NDWP) organized a meeting of the principal researchers and stakeholders of the Walker River Basin in an attempt to exchange information, improve data dissemination, facilitate the exchange of ideas, coordinate research projects, and minimize the duplication of efforts with respect to research into the basin's water-related issues. Attendance was widespread among water rights holders and basin stakeholders and included WRID, Walker River Water Master, Senator Reid's Office, USBR, BLM, USGS, USFWS, Natural Resources Conservation Service (NRCS), U.S. Forest Service (USFS), Walker Lake Paiute Indian Tribe, Walker River Basin Water Users Association, Walker Lake Working Group, Desert Research Institute (DRI), Nevada Division of Wildlife (NDOW), Nevada Division of Water Resources (NDWR, State Engineer), Nevada Division of Environmental Protection (NDEP, Bureau of Water Quality Planning), Nevada Division of State Lands, Nevada Division of Conservation Districts, Douglas County, Lyon County, California Department of Fish and Game, Mono County, California, Sierra Club, various

universities, and numerous private interests. The group named themselves the Walker River Basin Technical Network and agreed to meet 3–4 times per year to exchange information. First drafts of the *Walker River Chronology*, “Walker River Basin Bibliography” and “Research Project Summaries” (all NDWP publications) were distributed for comment. The Technical Network agreed to establish a Walker River modeling working group to pool efforts to develop a water budget and hydrologic model for the Walker River.¹⁸³

- 1995** (November) It was reported that the U.S. Agricultural Research Service, in cooperation with Tel Aviv University in Israel, was planning to release manna scale insect egg sacs along Arizona’s Rio Grande and lower Gila River by the spring of 1996. The manna scale insect (*Homoptera kermidae coccoidea*), a native of the arid lands around the Mediterranean Sea, is a pea-size insect that feeds on the sap of the saltcedar tree. Without this insect to suck its sap and keep this plant species in check, the saltcedar has proliferated as a weed along streams in the Western United States.¹⁸⁴ It has been estimated that approximately 1,000 acres of land on the Walker River Indian Reservation just above Walker Lake are infested with tamarisk and that the plant has proven exceedingly difficult to eradicate by a variety of methods to include burning, drought, freezing, hypersalinity, submersion, and repeated ground-level cutting.¹⁸⁵
- 1995** (November 20) The first meeting of the Walker River Water Budget/Modeling Working Group was held in Carson City. This group was formed from the Walker River Technical Network meeting held in September 1995. Its purpose is to share data, methods, and results of hydrologic studies on the Walker River Basin. In attendance was NDWP, acting as host and facilitator, WRID, Walker River Water Master, Walker River Paiute Indian Tribe, NDWR, DRI, and the University of Nevada, Reno (UNR) Department of Applied Economics and Statistics and the Graduate Program of Hydrologic Sciences. At this meeting, the WRID and Indian Tribe requested that the NDWP develop a memorandum of understanding to formally recognize the group and its goals and work products.¹⁸⁶
- 1995** (December 5) Several representatives from various Walker River users groups met in Hawthorne to discuss the difficulties in getting water to Walker Lake while at the same time insuring the rights of agricultural interests and other upstream water users. Represented at the meeting were the Mineral County Board of Commissioners, the Walker Lake Working Group, the Walker River Basin Water Users Association, the WRID, and the county supervisor of Mono County, California, who brought valuable experience pertaining to Mono Lake’s similar problems. [The headwaters of both forks of the Walker River also originate in Mono County.] Discussion topics included the desire to preclude litigation on water issues pertaining to both Walker Lake and the Walker River Indian Reservation, support of an effort by the Nevada Division of Water Planning to compile and disseminate information on the basin, the need for a joint California–Nevada effort to address the basin’s problems, issues relative to salt management of Walker Lake, funding of university economic studies, and water banking with the basin.¹⁸⁷

Notes to Part III:

1. *West Walker River Investigation*, Bulletin No. 64, The Resources Agency, Department of Water Resources, State of California, April 1964, page 45.
2. There had been some question as to whether the Salt River Project in Arizona or the Truckee–Carson Irrigation Project in Nevada as the first reclamation project. Actually, the Truckee–Carson Project was one of five projects to be recommended by the Director of the U.S. Reclamation Service. It was authorized on March 14, 1903 and the first water became available on April 1, 1905. The Salt River Project was also authorized on March 14, 1903, construction began August 24, 1903 and the first water became available May 15, 1907, two years after the Truckee–Carson project. [See Hugh A. Shamberger, *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, Prepared by the U.S. Department of the Interior, Geological Survey in cooperation with the Nevada Division of Water Resources, 1991, page 19.]
3. *WALKER RIVER ATLAS*, Department of Water Resources, The Resources Agency, State of California, Sacramento, California, June 1992, page 55.
4. Shamberger, Hugh A., *Evolution of Nevada's Water Laws, as Related to the Development and Evolution of the State's Water Resources, From 1866 to About 1960*, Water Resources Bulletin 46, Prepared by the U.S. Department of the Interior, Geological Survey in cooperation with the Nevada Division of Water Resources, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1991., pages 17–20 and 31.
5. 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 were taken by the federal government officials, the Governor could proceed to make the appointment. [See Shamberger, *op. cit.*, page 18.]
6. Shamberger, *op. cit.*, page 19.
7. Houghton, Samuel G., *A Trace of Desert Waters: The Great Basin Story*, University of Nevada Press, Reno, Nevada, 1994, page 106.
8. Shamberger, *op. cit.*, page 20.
9. *Water Resources in the Walker River Basin: A Search for Water to Save Walker Lake*, Public Resource Associates, Reno, Nevada, November 1994, page 15.
10. *Ibid.*, page 1.
11. *Ibid.*, pages 3–4.
12. Letter and copy of proclamation from Acting Commissioner, Department of the Interior, General Land Office, Washington, D.C., dated October 16, 1906. Proclamation published in the 1906 Public Record 659, page 3237.
13. Shamberger, *op. cit.*, page 21.
14. *West Walker River Investigation, op. cit.*, page 50.
15. *Indian Water Rights: Negotiating the Future*, Water Resources Research Center, University of Arizona, College of Agriculture, Tucson, Arizona, June 1993, pages 8–10.
16. *A Study of Water Rights and Their Enforcement [in the] Lake Tahoe, Truckee and Carson River Basins*, Prepared by Water Rights Study Group, Pyramid Lake Task Force, [for the] U.S. Department of the Interior, Office of the Solicitor, Sacramento Region, August 1971, page 157.
17. "Water Budget and Salinity of Walker Lake, Western Nevada," Fact Sheet FS-115-95, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, April 1995.
18. *Water Resources in the Walker River Basin, op. cit.*, page 3.
19. Houghton, *op. cit.*, page 106.
20. Unpublished notes, Public Resource Associates, Reno, Nevada.
21. *TRUCKEE RIVER ATLAS*, Department of Water Resources, The Resource Agency, State of California, June 1991, pages 32 and 41.
22. Shamberger, *op. cit.*, pages 23–28.

23. *West Walker River Investigation, op. cit.*, page 52.
24. *Water Resources in the Walker River Basin, op. cit.*, page 1.
25. During the Nevada gold mining boom of the early 1900s, Thomas B. Rickey was actively involved in both mining and banking as well as ranching. So much so, in fact, that he suffered failure in the panic of 1907 and his ranching properties were sold to the Antelope Valley Land and Cattle Company. Also, the agricultural holdings of Muller and Lux were taken over by the Pacific Livestock Company. [See *West Walker River Investigation, op. cit.*, page 50.]
26. *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, State Engineer's Office, Division of Water Resources, State of Nevada, Carson City, Nevada, 1971, page 19.
27. These five water rights included: (1) 1868 priority date—4.70 cfs, 385.95 acres irrigated; (2) 1872 priority date—3.55 cfs, 295.80 acres irrigated; (3) 1875 priority date—6.15 cfs, 512.80 acres irrigated; (4) 1883 priority date—7.50 cfs, 625.20 acres irrigated; and (5) 1886 priority date—1.03 cfs, 85.80 acres irrigated. [See Case in Equity, C-125, Final Decree, *United State of America v. Walker River Irrigation District et al.*, United States District Court for the District of Nevada, filed April 15, 1936, as amended April 24, 1940, page 10.]
28. *WALKER RIVER ATLAS, op. cit.*, pages 55–56.
29. *Alternative Plans for Water Resource Use—Walker River Basin, Area I, op. cit.*, page 19.
30. *WALKER RIVER ATLAS, op. cit.*, page 57.
31. *Water Resources in the Walker River Basin, op. cit.*, page 3.
32. *Ibid.*
33. *Ibid.*
34. *Ibid.*
35. *Ibid.*
36. Copy of certified check representing proceeds of first sale of bonds of the Walker River Irrigation District and accompanying narrative, courtesy of Georgia Fulstone, Yerington, Nevada, 1995.
37. *Alternative Plans for Water Resource Use—Walker River Basin, Area I, op. cit.*, page 19.
38. *West Walker River Investigation, op. cit.*, page 51.
39. *Alternative Plans for Water Resource Use—Walker River Basin, Area I, op. cit.*, page 19.
40. *Water Resources in the Walker River Basin, op. cit.*, page 3.
41. *WALKER RIVER ATLAS, op. cit.*, page 40.
42. *West Walker River Investigation, op. cit.*, page 51.
43. *Water Resources in the Walker River Basin, op. cit.*, page 4.
44. *Ibid.*, page 3.
45. *West Walker River Investigation, op. cit.*, page 52.
46. *Water Resources Data, Nevada, Water Year 1993*, U.S. Geological Survey Water-Data Report NV-93-1, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, 1994, page 151.
47. *TRUCKEE RIVER ATLAS, op. cit.*, page 34.
48. *Water Resources in the Walker River Basin, op. cit.*, page 3.
49. *Ibid.*, page 1.
50. *Ibid.*, page 3.
51. *Ibid.*, pages 3–4.
52. Houghton, *op. cit.*, pages 106–107.
53. *Population of Nevada Counties and Communities, 1860–1980*, compiled by Waller H. Reed, RSVP Volunteer, Nevada Historical Society, Reno, Nevada, Winter 1983–1984.
54. "Population of Nevada's Counties and Incorporated Cities," Preliminary, Nevada State Demographer, Bureau of Business and Economic Research, College of Business Administration, University of Nevada, Reno, November 1, 1995.
55. *WALKER RIVER ATLAS, op. cit.*, page 40.

56. *Reno Gazette-Journal*, January 10, 1996.
57. *Water Resources in the Walker River Basin*, *op. cit.*, page 13.
58. *Ibid.*, page 4.
59. *Ibid.*, pages 13–15.
60. *West Walker River Investigation*, *op. cit.*, pages 53–54.
61. *Water Resources in the Walker River Basin*, *op. cit.*, page 4.
62. The District Court refused the Tribe's claim (for right to a rate of flow of 150 cfs), stating that even if an implied tribal water right was included with reservation lands, the white pioneers were in "an inexpugnable position" and the "court was not about to take fifty years of beneficial farming use away from these settlers for the sake of supplying the tribe with guaranteed water." [See *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, Public Resource Associates, Reno, Nevada, September 1994, pages 2–3.]
63. *West Walker River Investigation*, *op. cit.*, page 53.
64. *Water Resources in the Walker River Basin*, *op. cit.*, page 1.
65. *Alternative Plans for Water Resource Use—Walker River Basin, Area I*, *op. cit.*, page 19.
66. Shamberger, *op. cit.*, page 31.
67. "Nevada Water Supply and Use," U.S. Geological Survey Water-Supply Paper 2350, Water Resources Division, USGS, Carson City, Nevada, 1987, page 359.
68. *Nevada Hydrographic Basin Statistical Summary*, Division of Water Planning, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1988, and Office of the State Engineer, Division of Water Planning, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada.
69. This diversion period is in contrast to upstream users who have an irrigation season of up to 245 days as reaffirmed in the "Rules and Regulations for the Walker River System" under Decree C-125. [See *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, *op. cit.*, page 3.]
70. *West Walker River Investigation*, *op. cit.*, page 51.
71. Personal communication with Michael Sevon, Mason Valley Fish Hatchery, Nevada Division of Wildlife, January 3, 1996.
72. *WALKER RIVER ATLAS*, *op. cit.*, page 40.
73. Carlson, Helen, S., *Nevada Place Names: A Geographical Dictionary*, University of Nevada Press, Reno, Nevada, 1974, pages 242–243 and 250.
74. Personal communication with Michael Sevon, Mason Valley Fish Hatchery, Nevada Division of Wildlife, January 3, 1996.
75. *West Walker River Investigation*, *op. cit.*, pages 52–53.
76. Conceptually, the water duty establishes the volume of irrigation water required to mature a particular type of crop. The duty will typically include the crop's consumptive use, evaporation and seepage from on-farm ditches and canals, and the water that is eventually returned to streams by percolation and surface runoff. When stated in a decree or water right, the duty is set in terms of an allowable rate of flow (cubic feet per second) for a specific period of time, or in terms of a total volume (e.g., acre-foot) per area to be irrigated (acre), or some combination of flow, volume, time, and acreage (e.g., cfs per acre). [For additional information, see *WATER WORDS DICTIONARY*, Division of Water Planning, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada.]
77. The Rules and Regulations allowed that "gaging stations shall be established at the points of entry into Bridgeport Valley on Virginia Creek, Green Creek, Summers Creek, Robinson Creek above and below Twin Lakes, Buckeye Creek and Swauger Creek, and a daily record maintained as to the inflow during the irrigation season, and these stations shall be deemed to be the points of diversion for the Bridgeport Valley Division." [See "Rules and Regulations for the Distribution of Water of the Walker River Stream System under the Provisions of Paragraph 15 of Decree in Equity, No. C-125," page 2.]
78. *WALKER RIVER ATLAS*, *op. cit.*, page 76.
79. *Rules and Regulations for the Distribution of Water of the Walker River Stream System under the Provisions of Section [Paragraph] 15 of Decree Case in Equity C-125, in the United States District Court for the District of Nevada*, Water Commissioners of the Walker River Stream System, September 3, 1953, page 1.

80. *Water Resources in the Walker River Basin, op. cit.*, page 5.
81. *WALKER RIVER ATLAS, op. cit.*, page 67.
82. *Reno Gazette-Journal*, January 10, 1996.
83. *Ibid.*, page 40.
84. Mason Valley Fish Hatchery Fact File, Division of Wildlife, Department of Conservation and Natural Resources, State of Nevada, November 1995.
85. *A Study of Water Rights and Their Enforcement [in the] Lake Tahoe, Truckee and Carson River Basins, op. cit.*, page 64.
86. *West Walker River Investigation, op. cit.*, pages 115 and 141-144.
87. *TRUCKEE RIVER ATLAS, op. cit.*, page 59.
88. *WALKER RIVER ATLAS, op. cit.*, page 71.
89. *West Walker River Investigation, op. cit.*, pages 115 and 141-144.
90. *Water Resources in the Walker River Basin, op. cit.*, page 5.
91. *Ibid.*
92. *Alternative Plans for Water Resource Use—Walker River Basin, Area I, op. cit.*, page 24.
93. *WATER WORDS DICTIONARY, op. cit.*, Appendices D-1, D-2, and D-3.
94. *WALKER RIVER ATLAS, op. cit.*, pages 65-66.
95. *Ibid.*, page 63.
96. *Ibid.*, page 65.
97. *West Walker River Investigation, op. cit.*, page 52.
98. *WALKER RIVER ATLAS, op. cit.*, page 71.
99. Personal communication with Michael Sevon, Mason Valley Fish Hatchery, Nevada Division of Wildlife, January 3, 1996.
100. *Walker River Project, Nevada-California, A Report on the Feasibility of Water Supply Development*, U.S. Department of the Interior, Bureau of Reclamation, Region 2, Sacramento, California, July 1964.
101. *West Walker River Investigation, op. cit.*, pages 115 and 141-144.
102. *Water Resources in the Walker River Basin, op. cit.*, page 5.
103. "Water Budget and Salinity of Walker Lake, Western Nevada," Fact Sheet FS-115-95, Nevada District Office, Water Resources Division, U.S. Geological Survey, U.S. Department of the Interior, Carson City, Nevada, April 1995.
104. Mason Valley Fish Hatchery Fact File, *op. cit.*
105. *WALKER RIVER ATLAS, op. cit.*, pages 63 and 66.
106. *TRUCKEE RIVER ATLAS, op. cit.*, pages 75-76.
107. *California Water Plan Update*, Volume 1, Bulletin 160-93, Department of Water Resources, The Resources Agency, State of California, October 1994, pages 28-30.
108. *Water Resources in the Walker River Basin, op. cit.*, page 5.
109. Mason Valley Fish Hatchery Fact File, *op. cit.*
110. *California-Nevada Interstate Compact Between the State of California and Nevada*, Ratified by [the] State of California, September 19, 1970 (Chapter 1480, California Statutes 1970), Ratified by [the] State of Nevada, March 5, 1971 (Nevada Revised Statutes 538.600), Congressional Consent Pending, April 25, 1971.
111. *Ibid.*, page 20.
112. *Ibid.*, pages 23-24.
113. *Ibid.*, page 26.
114. See *TRUCKEE RIVER ATLAS, op. cit.*, Appendix 1, pages 99-117.
115. *California-Nevada Interstate Compact, op. cit.*
116. *WATER WORDS DICTIONARY, op. cit.*, page 46.
117. *WALKER RIVER ATLAS, op. cit.*, page 7.

118. *California Water Plan Update, op. cit.*, pages 28–30.
119. *Water Resources in the Walker River Basin, op. cit.*, page 5.
120. *WALKER RIVER ATLAS, op. cit.*, page 30.
121. *Ibid.*, pages 90–91.
122. Rush, Eugene F., “Water Resources–Information Series Report 21: Hydrologic Regimen of Walker Lake, Mineral County, Nevada,” Prepared cooperatively by the Geological Survey, U.S. Department of the Interior and the Division of Water Resources, Department of Conservation and Natural Resources, State of Nevada, Carson City, Nevada, 1974.
123. Lake level gages (on Twin Lakes) and a stream gage on Robinson Creek have been maintained since May 1992. [Personal communication with Roger Bezayiff, Federal Watermaster, Walker River System, Yerington, Nevada, January 3, 1996.]
124. Order [for Amendment], *United State of America v. Walker River Irrigation District et al.*, United States District Court for the District of Nevada, Equity No. C–125, October 24, 1975.
125. *WATER WORDS DICTIONARY, op. cit.*, page 250.
126. *Water Resources in the Walker River Basin, op. cit.*, page 6.
127. Flows were estimated over the years 1977–78.
128. *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, Public Resource Associates, Reno, Nevada, November 1994, page 6.
129. *Ibid.*, page 18.
130. The California State Water Resources Control Board (SWRCB) consists of five members (to include a Chairman and Vice Chairman) whose responsibility it is to “protect water quality and allocate water rights” within the State of California. To assist in these functions, the SWRCB is served by a staff to include an Executive Director, a Chief Deputy and nine (9) Regional Board Executive Officers serving the regions of: [1] North Coast Region; (2) San Francisco Bay Region; (3) Central Coast Region; (4) Los Angeles Region; (5) Central Valley Region; (6) Lahontan Region; (7) Colorado River Basin Region; (8) Santa Ana Region; and (9) San Diego Region. [These regions generally correspond, with some combinations and renaming, to the ten (10) California Hydrologic Regions or Hydrologic Study Areas (HSAs). See *1995 Conservation Directory*, 40th Edition, National Wildlife Federation, Washington, D.C., page 169.]
131. *TRUCKEE RIVER ATLAS, op. cit.*, page 95.
132. The place and manner of use was described as “Walker Lake, downstream from Schurz, Nevada, where the water is used to help maintain the lake at a stable level to support public use for recreation and improve water quality to sustain and help prevent loss of the fishery in Walker Lake.” [See *Water Resources in the Walker River Basin, op. cit.*, page 18.]
133. Milne, Wendy, *A Comparison of Reconstructed Lake-Level Records Since the Mid–1800s of Some Great Basin Lakes*, Department of Geology and Geologic Engineering, Colorado School of Mines, Golden, Colorado, December 1987, page 38.
134. *WALKER RIVER ATLAS, op. cit.*, pages 69–70.
135. *Ibid.*, page 70.
136. *Water Resources in the Walker River Basin, op. cit.*, page 6.
137. *WALKER RIVER ATLAS, op. cit.*, page 70.
138. *Ibid.*
139. *Ibid.*, pages 70–72.
140. *Water Resources in the Walker River Basin, op. cit.*, pages 6–7 and 18–19.
141. *Ibid.*, page 28.
142. *TRUCKEE RIVER ATLAS, op. cit.*, page 95.
143. *Ibid.*, page 72.
144. *West Walker River Investigation, op. cit.*, pages 142–144.
145. *Water Resources in the Walker River Basin, op. cit.*, page 28.
146. *California Water Plan Update, op. cit.*, page 22.

147. Total construction costs of the Mason Valley Fish Hatchery were \$8.1 million of which the Federal Wallop/Breaux program (now known as the Sport Fish Restoration Program) provided \$2.7 million, the sale of the Verdi Fish Hatchery property provided \$1.9 million, a state bond sale raised \$3.065 million, and trout stamp funds raised \$435,000. Operating costs totaled \$394,912 in fiscal year 1994/95 equating to a cost of approximately \$2.00 per pound of fish produced or \$0.40 per fish. Of that total operating cost amount, \$296,184, or 75 percent, was paid by the Federal Sport Fish Restoration Program. [Mason Valley Fish Hatchery Fact File, *op. cit.*]
148. Mason Valley Fish Hatchery Fact File, *op. cit.*
149. WALKER RIVER ATLAS, *op. cit.*, page 72.
150. WATER WORDS DICTIONARY, *op. cit.*, pages 193-195.
151. WALKER RIVER ATLAS, *op. cit.*, page 72.
152. USGS Water Resources Data, Nevada, *op. cit.*
153. Water Resources in the Walker River Basin, *op. cit.*, page 6.
154. Personal communication with Louis D. Thompson, Chairman, Walker Lake Working Group, January 4, 1996.
155. Water Resources in the Walker River Basin, *op. cit.*, page 32.
156. Sevon, Michael, "Walker Lake, 'An Endangered Ecosystem,' How Much Time is Left for the Lahontan Cutthroat Trout Fishery?", draft report, Nevada Division of Wildlife, July 1993, page 5.
157. Water Resources in the Walker River Basin, *op. cit.*, page 7.
158. Total annual water allotment for the Mason Valley Wildlife Management Area is 20,216.22 acre-feet and is based on the full delivery of both decree and storage water from the Walker River System and the use of underground water rights to bring the supplemental underground acreage up to the permitted 4.0 acre-feet per acre. Water rights consist of 4,412.73 decree rights, 9,356.18 decree plus supplemental storage rights, 1,008.76 storage rights, and 5,438.55 underground water rights. [Mason Valley Fish Hatchery Fact File, *op. cit.*]
159. Mason Valley Fish Hatchery Fact File, *op. cit.*
160. Water Resources Data, Nevada, Water Year 1993, *op. cit.*, page 151.
161. Water Resources in the Walker River Basin, *op. cit.*, page 7.
162. The Basin Beat, Volume 1, Number 1, A Publication of the Walker River Basin Water Users Association, February 23, 1995, page 2.
163. Horne, Alex J., Ph.D., James C. Roth, Ph.D., and Nicola J. Barratt, M.S., Walker Lake-Nevada, State of the Lake, 1992-94, Report to the Nevada Division of Environmental Protection, Department of Civil and Environmental Engineering, University of California, Berkeley and the Environmental Engineering and Health Sciences Laboratory, Richmond, California, December, 1994, page 84.
164. Water Resources in the Walker River Basin, *op. cit.*, page 24.
165. The Basin Beat, *op. cit.*, page 2.
166. *Ibid.*, page 3.
167. The Walker River Paiute Indian Reservation was originally established on November 29, 1859 with 318,809 acres, including all of Walker Lake and the lands surrounding it. On July 20, 1906, the Tribe ceded back to the federal government 268,000 acres including all of Walker Lake and surrounding lands. Subsequent grants to the reservation included: 1906—50,809 acres; 1918—34,000 acres; 1928—69,000 acres; and 1936—171,200 acres, for a total of 325,009 acres which, when combined with boundary adjustments (686 acres) resulted in the reservation's current size of 324,323 acres.
168. A Brief Outline of Water Resources on the Walker River Paiute Reservation, *op. cit.*, page 4.
169. *Ibid.*, page 8.
170. "Water Budget and Salinity of Walker Lake, Western Nevada," *op. cit.*
171. Water Resources in the Walker River Basin, *op. cit.*, page 8.
172. *Ibid.*
173. Myers, Tom, The Hydrology of the Walker River Basin as Related to Inflows to Walker Lake, Public Resource Associates, Reno, Nevada, September 1994, as reprinted in Water Resources in the Walker River Basin, *op. cit.*, page 26.
174. Water Resources Data, Nevada, Water Year 1994, *op. cit.*, page 147.

175. *The Basin Beat*, *op. cit.*, page 3.

176. Selenium concentrations were recorded by the Nevada Department of Environmental Protection (NDEP) on March 15, 1995 at 120 micrograms per liter ($\mu\text{g/l}$), and also at this same level of concentration by the U.S. Bureau of Reclamation (USBR) on May 2, 1995. Both Nevada and the EPA have a selenium standard of 5 $\mu\text{g/l}$, but some studies have found that even levels over 2 $\mu\text{g/l}$ should be considered hazardous. To obtain this level of dilution (5 $\mu\text{g/l}$) would require a mixing ratio of Walker River water to pit water of at least 24:1 (120/5). However, existing Walker River rates of flow abreast of the pit location would rarely support a cost-effective pumping rate. In fact, the pit's estimated recharge rate of 2,200 acre-feet per year would exceed the 1,350 acre-feet allowed to be pumped out yearly in order to maintain allowable selenium concentrations in the Walker River. [See "July 1995 Status Report: Walker Lake-Arimetco Pit Pumping Project," U.S. Bureau of Reclamation, Lahontan Basin Projects Office, Carson City, Nevada.]

177. *The Basin Beat*, *op. cit.*, page 1.

178. *Ibid.*

179. "July 1995 Status Report: Walker Lake-Arimetco Pit Pumping Project," U.S. Bureau of Reclamation, Lahontan Basin Projects Office, Carson City, Nevada.

180. USGS records of Walker Lake surface water level taken near Hawthorne, Nevada, U.S. Geological Survey, Water Resources Division, Carson City, Nevada, August 14, 1995.

181. *Mineral County Independent*, August 30, 1995.

182. *Reno Gazette-Journal*, December 4, 1995, page 1C.

183. Meeting minutes, Division of Water Planning, Department of Conservation and Natural Resources, State of Nevada, September 29, 1995.

184. *Business Week*, A Publication of the McGraw-Hill Companies, November 7, 1995, page 109.

185. *A Brief Outline of Water Resources on the Walker River Paiute Reservation*, *op. cit.*, page 6.

186. Meeting Minutes, Walker River Water Budget/Modeling Working Group, Nevada Division of Water Planning, Carson City, Nevada, November 20, 1995.

187. *Mineral County Independent-News*, Hawthorne, Nevada, December 6, 1995.

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Notes

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