Robert B. Griffith Water Project

(formerly Southern Nevada Water Project)

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Although Las Vegas had been a way-station and small agricultural community since the Nineteenth Century, its potential had not even been imagined until Lake Mead offered the promise of an inexhaustible supply of water. Las Vegas was at first dependent on southern Nevada's rich underground aquifer, but it became quickly apparent in the 1950s that this water source would not be able to keep up with the development and growth anticipated in the post-war era. Clark County officials sought assistance from the Federal government to develop a system of water transport from Lake Mead to the thirsty, growing metropolis of Las Vegas. The Bureau of Reclamation built the pumping plant and distribution system, while the county agreed to built the treatment plant and to pay for the construction costs and water pumped from the reservoir. Completed in the early 1980s and subsequently improved and expanded by Reclamation in partnership with the Southern Nevada Water Authority, the Robert B. Griffith Water Project (before 1982 known as the Southern Nevada Water Project) supplies water to Las Vegas, North Las Vegas, Henderson, Boulder City, and Nellis Air Force Base in Nevada.[1] The history of the project says much about the increasing urbanization of the American West and of the fundamental role of water in its future developments.

Project Location

The celebrated Colorado River is one of the most overworked rivers in the West and is the lifeblood of the Colorado Plateau and the Southwest. A series of dams and water systems stretching from Flaming Gorge in northern Utah to the Morelos Dam near the U.S.–Mexico border supply water for agriculture, industrial, and municipal purposes, used by millions of

1. U.S. Department of the Interior, Water and Power Resource Service, *Project Data* (Denver, Colorado: Government Printing Office, 1981), 1177.

people living mostly in clusters of urban areas. No crops grow in the Las Vegas area without the aid of irrigation, and in fact very few plant or animal life forms survive in southern Nevada's desert environment. The Basin and Range Province of southern Nevada is one of the driest regions in the United States with less than 10 inches of rain annually and an average daily temperature in July around 90 degrees. Due to this scarcity of water, every drop from the Colorado River has been carefully allocated to varying interests. This is especially true in southern Nevada where every drop of Nevada's 300,000 acre-feet annual allotment is used to support the municipal demands of the nation's fastest growing city, as of this writing.

Historic Setting

The rugged, broken desert of the Southwest was only occasionally traversed by explorers, traders, and overland travelers. No one knows who the first white European was to pass through what is now Las Vegas and the area surrounding it, but it probably occurred in 1826 by William Ashley, Jedediah Smith, or Francisco Garces. Smith actually came through twice, once in the summer of 1826 traveling south on the eastern edge of the Colorado River, and again the following year in the general direction of his earlier travels though this time on the western side of the Colorado, closer to the future site of Las Vegas. John C. Fremont charted and mapped much of the West, including parts of Nevada, in the 1840s and 1850s.

The Old Spanish Trail—"the longest, crookedest, most arduous pack mule route in the history of America"–was a vital trade link between the Spanish colonies in New Mexico and California through the deserts from Las Vegas to Los Angeles. The traders used as one of their stops a valley they named Las Vegas, or "the meadows." It was a rough trail but still the best way to get to California from the Southwest. In 1849–50, one overland party befell disaster—as serious as the Donner party several years before—when a large group decided to bypass the Old

Spanish Trail and take a westward route over the Walker Pass. Of the approximately 122 people and their twenty-seven wagons that entered Death Valley, many of them never made it out.[2]

The Mormons also recognized the site of Las Vegas as an ideal rest stop on a route between Salt Lake City and southern California. Some Mormons, under the direction of Brigham Young, settled in there in 1855 only to abandon the venture two years later. Not until a railroad was run through the area, in 1905, did the frontier outpost take on the likeness of a city. But only 945 people resided there in 1910, and it would be two decades before the city really began to grow, spurred on by the Federal government's mammoth Boulder Canyon Water Project.[3]

The history of Hoover Dam need not be recounted here, but the men who worked on the project and their families dramatically increased the population in the Las Vegas area. The company town, Boulder City, housed workers and their families; on the weekends tired workers found respite in the saloons, gambling halls and brothels in the big city, or in any number of "resorts" between the work site and Las Vegas. The city offered glamour and more conventional entertainment like Airdome or El Portal theaters, or dancing at the Apache Hotel, the Golden Camel, or the Meadows.[4]

In 1931, three events—the construction of Hoover Dam, passage of the six-week divorce law (previously three months, and before that six months), and legalization of casino gambling in Nevada—would have a profound impact on the growth of Las Vegas and its thirst for water in

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2. Warren A. Beck and Ynez D. Haase, *Historical Atlas of the American West* (Norman: University of Oklahoma Press, 1989), 29, 33.
3. Russell R. Elliott, "Las Vegas, Nevada," in *The New Encyclopedia of the American West*, Howard R. Lamar, ed. (New Haven, Connecticut: Yale University Press, 1998), 620.
4. William Joe Simonds, "The Boulder Canyon Project," Bureau of Reclamation History Program, Denver, Colorado, 38-9.

the desert environment.[5] But while these events had a profound impact on Las Vegas' future development, by a means was the need for Lake Mead water pressing. The story was different in Los Angeles when city official looked to the Colorado River for a fresh water supply to support its burgeoning population. The city drew up plans to construct the Colorado River Aqueduct, which was to be financed through bonds guaranteed by the Metropolitan Water District of Southern California. The 242-mile aqueduct—which began at Lake Havasu and stretched to the east side of the Santa Ana Mountains—was completed in 1943 and made growth in southern California possible.

Unlike Los Angeles, there was little reason to believe that the Las Vegas area would grow much beyond the 8,000 souls that inhabited the city in 1940. Some believed Hoover Dam would surely attract development, but there was no need nor any plans to divert water for municipal use.[6] In the next several decades, however, Las Vegas and its periphery did grow, thanks to the overwhelming presence of the Federal government (Atomic Energy Commission, Nevada Test Site, Nellis Air Force Base, etc.) and the development of large-scale resort hotels along the Las Vegas Strip, beginning with the Flamingo in 1946.[7] These developments pressed the available water supply to its limit. Although before the SNWP a small percentage of water came from Lake Mead, via the Basic Management Inc. waterline constructed during the Second World War, most water came from artesian wells, tapped by the Las Vegas Valley Water District and North Las Vegas. The city struck new wells to keep a pace with the demand, but with each new well the groundwater table level lowered. In some parts of the valley the ground actually settled a few feet. By the 1950s, more water left the wells than was coming in. A new water

5. This point is made in Barbara Land and Myrick Land, *A Short History of Las Vegas* (Reno: University of Nevada Press, 1999), xiv.
6. Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Lincoln: University of Nebraska Press, 1985).
7. Robert Laxalt, *Nevada: A Bicentennial History* (New York: Norton, 1977), 114-5.

source would be needed to keep up with the growth of America's newest entertainment capital.[8]

Project Authorization

Nevada's claim to a portion of the water sitting idle in Lake Mead dates back to the Colorado River Compact of 1922. There, led by Secretary of Commerce Herbert Hoover, delegates from six of seven states with claim to the river's water agreed to an intrastate compact (Arizona was the only state not to sign the compact). The water was evenly divided between the "upper" (Arizona, California, Nevada) and the "lower" (Colorado, New Mexico, Utah, Wyoming) basin states. Nevada received 300,000 acre-feet of the seven and one half million acre-feet per year allocated to the states in the lower basin. In 1963, just before authorization of Southern Nevada Water Project, the Supreme Court upheld the allotments in the important decision, *Arizona v. California*.

The earliest water venture was in 1948 when the Nevada State legislature established the Las Vegas Valley Water District. The purpose of the new district, which replaced the Las Vegas Land and Water Company, the original water company formed in 1905, was to divert water through a pipeline from Lake Mead to the growing community in the Las Vegas Valley. The changes were not immediate: transfer of the Land and Water Company was not completed until 1954, and it took more than a decade after that to receive authorization and funding for the water diversion project.[9]

Field inspections and investigations were carried out between 1932–1944 and 1953–56 on the potential of providing municipal, industrial, and agricultural water to the Las Vegas area. Although irrigation was to be a major purpose of the project, it became increasingly clear that

8. "Project History, Southern Nevada Water Project," Vol. 1, 1968, p. 1, 8NN-115-92-130, Records of the Bureau of Reclamation, Record Group 115 (RG 115), National Archives and Records Administration–Rocky Mountain Region, Denver, Colorado (NARA).
9. *Project Data*, 1181.

the project would best serve municipal and domestic purposes. In a 1959 investigation on the delivery of water from Lake Mead to the Eldorado Valley, southwest of Boulder City, Reclamation reported that an irrigation project was impractical "due to a small area of arable land, high pump lift, high water requirements, and a possible drainage problem." Other independent investigations were undertaken by the LVVWD, the city of Henderson, and the Nellis Air Force Base to find the best way to provide water for the area's increasing populations.[10]

The demand for water and the investigations on the feasibility of a project led to the most important meeting to date, held on August 10, 1960, arranged by Governor Grant Sawyer and attended by Nevada's two senators, a congressman, the director of the Department of Conservation and Natural Resources for Nevada, and other federal, state, and local representatives. The interests represented in the meeting concluded that a master plan was needed to address a comprehensive water plan for the greater Las Vegas area. The Bureau of Reclamation engineer C. E. McClaren, at the head, undertook the investigation with federal funding made available in June 1961 thanks to the efforts of Senator Alan Bible and Commissioner Floyd Dominy. In 1962 the Boulder City Development Office was established. Officials adopted a two-stage construction schedule—an idea first proposed by consulting engineer James M. Montgomery in 1960.[11] In 1965 the Colorado River Commission (CRC) of Nevada formed a committee composed of representatives of each of the water user groups to help prepare the Definite Plan Report. The next year a revised alternative plan was drafted, later approved by the CRC.[12]

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10. "Project History, Southern Nevada Water Project," Vol. 1, 1968, pp. 2-3, RG 115, NARA.
11. "Project History, Southern Nevada Water Project," Vol. 1, 1968, pp. 3-4, RG 115, NARA.
12. "Project History, Southern Nevada Water Project," Vol. 5, 1977, pp. 22-3, 8NS-115-93-213, Project Histories, 1911-91 (PH 1911-91), Records of the Bureau of Reclamation, Record Group 115 (RG 115), National

(continued...)

The process leading up to the passage of the SNWP was marked by all the political wrangling and intrastate conflicts common to the politics of water in the West. One roadblock was Stewart Udall's Pacific Southwest Water Plan, designed to coordinate water development and to solve the problems of the lower Colorado River "through a new breed of thinking." The plan also had the support of Senator Carl Hayden from Arizona but was met with disdain from California's delegation. And with a $1 billion price tag there was no guarantee that Congress would ever authorize the plan. This was a concern for Nevadans as Udall and Hayden insisted that SNWP be a part of the regional plan. So despite the 1963 Supreme Court ruling in *Arizona v. California* that Nevada was guaranteed 300,000 acre-feet of the Colorado River, it was not at all clear that Nevadans could find a way to use that water independent of a regional approach.[13]

The man primarily responsible for wresting the Nevada water plan from Udall's regional plan was Alan Bible, Nevada's long-time Senator. Bible, in fact, was an assiduous defender of the development of southern Nevada. Dependent on the political capital of his southern Nevada constituency convinced that Nevada's future lay in the southern part of the state, Bible championed the water project for what it would do to expand Nevada's economic base. He enjoyed a close association with Lyndon B. Johnson and used that relationship to further his objectives for water development and to negotiate the murky political waters occasioned by the stalemate of the regional plan. Pressed by Bible, Johnson told the senator in private that he would support a separate Nevada water plan. Udall and Hayden also agreed to support the SNWP independent of the regional plan, and they were joined by Commissioner Floyd Dominy and Nevada's Democratic governor Grant Sawyer. Sponsored by Bible and Senator Howard

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12. (...continued)
Archives and Records Administration—Rocky Mountain Region, Denver, Colorado (NARA).
13. Gary E. Elliott, *Senator Alan Bible and the Politics of the New West* (Reno: University of Nevada Press, 1994), 151.

Cannon, Senate Bill 32 went through hearings before the Committee on Interior and Insular Affairs and sailed through on a unanimous vote.[14]

As often is the case, several unexpected roadblocks stalled the legislation. One was the opposition of Nevada congressman Walter Baring who resisted the provision for a 3 percent interest rate on the repayment schedule. The bill passed the House despite Baring's obstinance but Johnson let the bill sit for several weeks out of his dislike for Baring. More serious than Baring's resistance was congressional appropriation to fund the project. Johnson and Congress apparently had not been concerned that it would be impossible to recoup the costs of construction on a project like SNWP, but with the Vietnam war running up the cost of government, funding was slow in coming. In fact, in mid-September 1966, the House Appropriations Committee cut $1.4 million from the project, only to be restored when Bible and Cannon lobbied to overturn it. Johnson signed a new bill that included the funds targeted by the House. With funding secure for the year 1966, Congress had committed to the project—which meant funding in subsequent years would be easier to come by. The next year, 1967, Johnson froze all funding on public works projects but turned loose the funds as a personal favor to his good friend, Alan Bible.[15]

By the 1960s the Federal government was solidly in the business of building water projects for non-agricultural purposes, so SNWP was not an exception to the rule. Bible knew as well as anybody that the future of southern Nevada depended on the SNWP. He and other Nevadans foresaw population growth in that area, and a lot of it. No one could know where or how fast the development would occur, however, so it was decided to build the project in stages to accommodate needs as they arose. The irony was that however inevitable population

14. Elliott, 152-4.
15. Elliott, 154-8.

expansion was, it could not happen without water, which meant that SNWP facilitated growth as much as it responded to it. SNWP, perhaps unwittingly, put southern Nevada on a course of rampant and in some ways irresponsible development.

Construction History

Congress authorized approximately $81 million for construction of the project, and over $46 million of that was for the first phase of construction. With planning completed late 1967, the construction phase of the project could begin. Personnel and financial records were kept in the regional office in Boulder, but the project headquarters was located in Henderson, Nevada. The construction engineer, Gerald A. Samson, began work with about sixty-three permanent employees.[16]

Construction proceeded in two stages, the first beginning in 1968. All water that was to make its way into the project system was to be diverted at Saddle Island in Lake Mead, about six miles north of Boulder, Nevada. From Saddle Island, water would be pumped through a concrete aqueduct to a treatment plant, then into pumping plant no. 1A and into the main aqueduct. From the main aqueduct line some of the water would flow into a lateral south to Boulder City, but the rest of the water would be pumped into the four-mile-long River Mountain Tunnel and dispersed through the lateral system leading into Henderson, East Las Vegas, Paradise Valley and North Las Vegas. These features would have the capacity to deliver 132,200 _ acre-feet of water. The features constructed during the second stage—the"B" line, which ran parallel the main aqueduct, the Hacienda Forebay and Pumping Plant, and laterals running south through Paradise Valley and north along the western edge of the Las Vegas

16. "Project History, Southern Nevada Water Project," Vol. 1, 1968, pp. 5, 7, RG 115, NARA.

area—accommodated an additional 166,800 acre-feet of water.[17]

The Federal government financed most of the project and built most of its features, but the State of Nevada also picked up some of the tab and workload. In addition to paying out approximately $21 million on second-stage features, Nevada built the Alfred Merritt Smith Water Treatment Facility, where water is treated then returned to the project pipelines.[18]

First Stage (1968–71)

Contractors operated from a barge floating on the lake in order to access the intake tunnel. From the inlet on the lake the water would be pumped by pumping plants to the distribution system. For each of the pumping plants, Reclamation opened bids for the motor-driven pumping units and cone valves and valve-operating system. Layne and Bowler, Inc., a company from Memphis, Tennessee, won the bid to deliver the pumping units for Pumping Plant No. 1. A company from Portland, Oregon won the bid for the cone valves and valve-operating system for pumping plant no. 1, and Hitachi New York, Ltd., for the pumping units, cone valves, and valve-operating system for pumping plants nos. 1A, 2A, 4, and 5. The work required for these features included drafting shop plans, ordering materials, and making the steel casings. The labor on the pumping units was completed by late 1970 pr early 1971.[19]

Construction on the pumping plant no. 1, surge tank no. 1, and main aqueduct and switchyard no. 1 began in December 1968 by Morrison-Knudsen Co., Inc. of Boise, Idaho.[20] At the same time, S. S. Mullen, Inc., from Seattle won the bid and began work on the actual construction of the pumping plant no. 1A, forebay no. 1A, and switchyard no. 1A. In this case the contractor did excavation work using a Caterpillar scraper and loader. Mullen, Inc., also won

17. "Project History, Southern Nevada Water Project," Vol. 1, 1968, pp. 5-7, RG 115, NARA.
18. "Project History, Southern Nevada Water Project," Vol. 5, 1977, p. 42, PH 1911-91, RG 115, NARA.
19. "Project History, Southern Nevada Water Project," Vol. 1, 1968, pp. 13, 14, 16, 17, RG 115, NARA.
20. "Project History, Southern Nevada Water Project," Vol. 1, 1968, p. 17, RG 115, NARA.

the bid for the underground construction and open-cut excavation on pumping plant no. 1, for which construction began in August 1968—first on an access road, completed in September, then on tunneling and rock excavation work. Excavation progressed rather smoothly, as at first contractors faced little or no water seepage. But as the tunnel inched its way toward the lake, water seepage became common and was only alleviated by pumping the water out. Grouting at headings about sixty feet apart also held back water, but the water "flowing into the tunnel and the time required to stop these flows of water was substantially exceeding the amount required by the specifications." Reclamation arranged to provide additional funding to carry out the grouting.[21]

After passing through pumping plants Nos. 1A and 2A, the water was to be lifted through a tunnel bored through the River Mountain Range. Construction began in June 1968 for the four-mile-long, concrete-lined tunnel, which included assembling the boring machine and laying the track from the rotary dump and 400-foot trailing conveyor. The tunneling would be done by a "mole," Mark 11 Series, twelve-feet in diameter, four horsepower electric motors, made by Jarva, Inc., of Solon, Ohio. The first day the mole advanced a mere fifteen feet with considerable difficulty, but its efficiency would soon improve in the coming months. It set a record on April 13, 1969 by drilling though 293 feet of rock.[22]

The contractor completed the work on the tunnel over a month before the deadline, despite some minor delays. For instance, the machine broke down on several occasions—three times in November—once delaying operations for over two weeks. More frustrating was when the mole penetrated into "soft" rock—"an unstable vitric agglomerate cooling zone of a rhyolite

21. "Project History, Southern Nevada Water Project," Vol 1, pp. 14, 15, 16, 17; Vol. 2, pp. 11-3, RG 115, NARA.
22. "Project History, Southern Nevada Water Project," Vol 1, 1968, pp. 41, 46-7; Vol. 2, 1969, p. ii, RG 115, NARA.

flow"—which slowed progress until the mole hit harder rock. But after nine months of drilling on three 24-four-hour shift rotations, the mole broke through the other side of the four mile mountain pass. In 1970, when the cement lining and work on the project feature neared completion, the slip form of the outlet portal tank had to be rebuilt and operating engineer staged a brief labor strike in June. All work on the tunnel was done in August 1970.[23]

Two companies received the bid to construct the lateral distribution system. Hood Corporation of Whittier, California, set to work on the laterals extending to Boulder City, using pipe delivered by United Concrete Pipe Corporation and Hydro Conduit Corporation. Excavation, pipe laying, and compaction was done with a backhoe and Cat tractor. Water delivered through the Boulder lateral would pass through pumping plants nos. 4, 5, and 7, constructed by R. E. Ziebarth and S. B. Alper of Torrance, California.[24] The other laterals—Las Vegas Valley, Henderson, Whitney, North Las Vegas, and Sahara—were opened for bidding in February 1970, with the award going to A&K Construction Co., from Montebello, California. After establishing a base of operations, the company began excavating and drilling wells "for the dewatering necessary to the construction of the Whitney Lateral." Pipe laying on all the laterals began in 1970 and was completed either before year's end or in 1971. With pipelines laid and flow control and electrical systems installed, the project made the first deliveries of water to the Las Vegas Valley Water District in mid-1971. Pumping plant nos. 3 and 6, furnished by Hitachi New York, Ltd., were located on the Henderson and North Las Vegas laterals, respectively.[25]

Second Stage (1977–83)

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23. "Project History, Southern Nevada Water Project," Vol 1, 1968, pp. 12-3; Vol. 2, 1969, pp. 8-9; Vol. 3, 1970, pp. 6, RG 115, NARA.
24. "Project History, Southern Nevada Water Project," Vol 1, 1968, p. 16; Vol. 2, 1969, pp. 13-4, 18, RG 115, NARA.
25. "Project History, Southern Nevada Water Project," Vol 2, 1969, pp. 16-7; Vol. 3, 1970, pp. 12-3; Vol. 4, 1971, pp. 9.

Several years after the first stage of construction was completed, advanced planning began on the second stage. In 1975, the Division of Colorado River Resources (previously the Colorado River Commission) released the report, "Socioeconomic Impact of the Second Stage of the SNWP.. and Its Alternatives." That year Manuel Lopez, Jr., of Reclamation announced the intention to conduct a public involvement program to coordinate and communicate with the public on the planning of the second stage of SNWP. A planning conference was held on July 31, 1975, for this purpose, sponsored by Reclamation and the DCRR and attended by local citizens, government personnel, private industry and environmental groups. Participants voiced their opinions that "water conservation should be considered together with plans for additional water supplies, that greater flexibility should be included to meet future changes in growth patterns, and that plans should be closely coordinated with regional land use planning." Reclamation planned additional meetings and public hearings through the year and into the next.[26]

The year 1976 marked the completion of the final report and the environmental impact statement on the second stage, and Don D. Fillis's appointment as project construction engineer.[27] Pre-construction work included surveys and topographical studies on the treatment plant, pumping plants, laterals, and aqueducts, and testing for seismic activity in the area. Concrete was to be produced at a deposit of concrete aggregate near Henderson, the same deposit used during construction of the Hoover powerplant.[28]

Reclamation made the notice for the bid on the Main Aqueduct "B" Line on June 6,

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26. R. A. Olson to Donald L. Paff, William J. Briggle, and David Henry, August [?], 1975; "Public Involvement Program: Second Stage of the Southern Nevada Water Project," July 1, 1975, box 166, 115-94-0132, Federal Records Center, Denver, Colorado.
27. "Project History, Southern Nevada Water Project," Vol. 5, 1977, p. 23, PH 1911-91, RG 115, NARA.
28. "Project History, Southern Nevada Water Project," Vol. 5, 1977, pp. 56, 60, 62, PH 1911-91, RG 115, NARA.

1977, and opened bidding in late July. Kordick and Rados, Inc., won the bid at $3,216,238 and signed the contract to complete the work in 400 days; the pipe was to be supplied by Ameron Pipe Products based in Etiwanda, California. The line was essentially completed by the first of the year—the only work remaining was to clean up the work site and repair "defective concrete."[29]

The major feature of the second stage of construction, the Pittman Lateral, was to extend from the River Mountain Tunnel west and northwest into Paradise Valley, then turn sharply north near I-15 to North Las Vegas. The Perini Corporation won the bid for schedule 1 of the lateral. In 1977, it began excavating trenches and laying pipe through the Boulder Highway Crossing—the latter with considerable difficulty due to adverse sand and gravel conditions. On occasion crews encountered groundwater as they dug the pipe trenches, but this was rarely cause for great concern. After laying the pipes, crews filled in the space between the line pipe and the liner plate with pea gravel. The contractor had no problems keeping the backfill operations up to speed with the pipe laying.[30]

The Morrison-Knudsen Co., Inc., undertook schedule No. 2 of the Pittman Lateral, which entailed similar work of excavation, pipe laying, and filling in. They had the tricky task of laying pipe right down the center of Hacienda Avenue. Though the company took great pains to avoid gas, water, and telephone lines, this was not always possible. In February 1980, workers damaged a 10-inch LVVWD water main, flooding the lateral with water which had to be pumped out. To make matters worse, that same month a storm drain flooded the Sahara Tunnel; according to project reports, "water entered the pipe trench to such a depth the 84-inch line pipe,

29. "Project History, Southern Nevada Water Project," Vol. 5, 1977, pp. 75-6; Vol. 7, 1979, p. 55, PH 1911-91, RG 115, NARA.
30. "Project History, Southern Nevada Water Project," Vol. 7, 1979, pp. 58, 60, 66, 72, PH 1911-91, RG 115, NARA.

both within the tunnel and outside the tunnel, experienced movement." Contractors also completed two pumping plants placed at different points along the lateral, one at the intersection of Annie Oakley Drive and Hacienda Avenue and the other at Twin Lakes. One feature of the plants was that they were fitted with modern automated controls—"mini-computers at the valve locations, ultrasonic water level devices in the surge tanks, pressure transducers in the forebay and regulating tanks, and controls on the pumps." In addition to the Pittman Lateral and the pumping plants, the second stage of construction featured several shorter laterals. These included the Fayle, Twin Lakes, Foothill, North, Mesa, Charleston Heights, Robinson, and Colorado Street laterals.[31]

Labor conditions outside the project area sometimes had an impact on the progress of the construction. In 1980, a strike of the Shopmen Ironworkers shut down the plant in Gardena, California, that was to supply the steel for the Hacienda pumping plant. The strike began in June and continued into July; steel shipments did not resume until mid-August.[32]

During construction, Reclamation personnel actively kept abreast of progress. In March 1980, for instance, James E. Morrisette traveled to the project site where he inspected all project activities. He found satisfactory the progress on the pumping plants and the Pittman Lateral. In 1985, an inspector found that O&M did not follow a previous recommendation to prevent further undercutting on the Las Vegas Wash Channel, but it had evaluated the possibility of fencing the control station at Radwick and Carrey Avenues to protect the facility from vandals. The inspector noted "excellent housekeeping," with only minor problems with erosion to the

31. "Project History, Southern Nevada Water Project," Vol. 7, 1979, p. 77; Vol. 8, 1980, pp. 31-41, PH 1911-91, RG 115, NARA. U.S. Department of the Interior, Bureau of Reclamation, "Development of Pump Characteristics from Field Tests," June 1979.
32. "Project History, Southern Nevada Water Project," Vol. 8, 1980, p. 4, PH 1911-91, RG 115, NARA.

construction facilities and operation of the computer control system.[33]

Construction of the SNWA was unique in that it required the coordination and cooperation of multiple interests, public and private. Most Reclamation projects grappled with agricultural and land-owning interests, but in the case of SNWP it had to deal with all the interests of a thriving metropolis. Reclamation officials spent much time holding private and public meetings and visiting the varied interest groups to make the project work. The task would not have been an easy one.

Project Improvements and Operations

The completion of the second stage of construction came not a moment too soon. By the 1980s, southern Nevada needed the water and in the years to come would find that even more developments would be needed to keep up with the population growth. Patricia Mulroy, general manager of the Las Vegas Valley Water District, played a particularly important role in the debates over water in Nevada. In 1989, determined to locate a new water supply for the city, she immediately set her sights on the deserts north of Las Vegas by filing for the rights to 800,000 acre-feet of water in White Pine, Nye, and Lincoln Counties. Rural Nevadans responded with vehement outrage and stalled the plan in its tracks. Later, in the 1990s, Mulroy proposed buying Colorado River water from the other basin states, but to no avail.[34]

If these earlier efforts did not win the day, Mulroy was successful laying claim to the water from the Virgin River, a tributary of the Colorado River, and convincing the voters of Nevada to support a sales tax to pay for it. Instead of building a dam on the Virgin, it was

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33. James E. Morrisette to Acting Chief Construction Engineer, March 31, 1980; Chief of Water O&M Branch to Chief of Division of Water and Land Services, June 7, 1985, box 166, 115-94-0132, Federal Records Center, Denver, Colorado.

34. Mike Davis, "Las Vegas versus Nature," *Reopening the American West*, Hal K. Rothman, ed. (Tucson: University of Arizona Press, 1998), 56; Matt Jenkins, "Squeezing Water from a Stone," *High Country News*, September 19, 2005 (accessed online).

decided the let the water flow into Lake Mead where it would be diverted to the Las Vegas area. Parsons was hired to head the $2 billion Capital Improvements System, as it was called, to be completed in stages as the features were needed to accommodate growth in southern Nevada. Major features in the present plan include 105 miles of pipeline; twelve pumping stations; sixteen reservoirs and forebays; a large new intake in Lake Mead; three large hard rock tunnels; a new ozone/direct filtration plant; the addition of ozone treatment to the existing water treatment plant; and turnouts, or distribution points, to the various water retailers. All of this is being supported by a greatly enlarged power system, including thirteen substations. It was estimated that at completion the improvements would double the system's capacity from 450 million gallons per day to 900 million gallons per day. On January 22, 2000, state and water officials participated in a ceremony for the opening of the second intake structure in Lake Mead.[35] The next year, on July 3, 2001, the Southern Nevada Water Authority bought the right and title to the original project for $121.2 million—a move that saved Nevadans millions of dollars and gave more freedom to SNWA to operate the project features.[36]

The search for water to supply Las Vegas' insatiable appetite for growth has become particularly urgent since 1999, the first year of a major drought. The drought forced the water authority to return to the idea of tapping into the groundwater of the basin and range province. The most recent proposal is to draw water from seven valleys in eastern Nevada and channel it down a 235-mile long pipeline to the Las Vegas Valley. The idea is to pump considerably more than 800,000 acre-feet of water—as much as 180,000 acre-feet—at a cost of $2 billion. That is a lot of money to pay for a project that has no guarantee for success. For instance, it is unclear

35. "Parsons," http://www.parsons.com/about/press_rm/potm/10-2001/index.htmlaccessed July 27, 2006; Michael Weissenstein, "The Water Empress of Vegas," *High Country News*, April 9, 2001 (accessed online);Hal Rothman, *Neon Metropolis: How Las Vegas Started the Twenty-First Century* (New York: Routledge, 2002), 214-6.
36. "Southern Nevada Water Authority," http://www.snwa.com/html/about_snws.html, (accessed July 27, 2006).

what the impact will be on existing aquifer wells and on the ecosystems of the desert region, and how long the water supply will last. Rural Nevadans continue to oppose any pumping plan that benefits Las Vegas at the expense of the rest of the state, just as opposed like proposals in the late 1980s.[37]

Population growth has already exacerbated environmental and health problems in the Las Vegas area. According to the Environmental Protection Agency, Las Vegas ranks among the highest in the country in air pollution, which has an impact not only locally but in the surrounding desert country as well.[38] Population growth also adversely affects water quality. Lake Mead had long been the sinkhole of the Colorado, carrying the waste of upstream and lake users, but it became even more so as return flows deposited human waste and toxic chemicals back into the lake. Nevada pumps 420,000 acre-feet of water from the river but returns 120,000 acre-feet to reach a net balance of 300,000 acre-feet. Return flows from Las Vegas concern users downstream but the water quality also affects the residents in the Las Vegas area. Thirty-seven people died in 1997 as a result of the presence of the protozoan *Cryptosporidium parvum* believed to have been present in municipal tap water.[39]

Cheap land and subsidized water continue to lure people into the dry, arid desert of southern Nevada. How long will water continue to flow, where will it come from, and what happens if a prolonged drought drys up available reserves? People are living precariously, many hardly aware that any number of factors could shut down their water supply and force an evacuation. According to one critic, the SNWP contributes to an imbalance in the "structural asymmetry in power between the gaming corporations and local government." It accommodates

37. Jenkins.
38. Davis, 58-9.
39. Davis, 57.

the needs of the casinos and other developments by guaranteeing the bonds of the water system by sales taxes.[40]

Conclusion

The SNWP breathed new life into Las Vegas, shifting the power base of Nevada from Reno and providing the means to make casino gambling the staple of Nevada's economy. The Las Vegas region is still a desert, but the 300,000 acre-feet diverted from the Colorado River has made it a desert in contrast. At the heart of the city are lavish hotels and casinos, adorned with man-made lakes and water cascading from fountains. Las Vegas is built on water, without which little but sagebrush and small mammals would survive.

All this means that Nevada is in a precarious position as it faces relentless demand to increase its water base in order to make room for continued development in its arid deserts. The Las Vegas region nearly consumes Nevada's full allocation of water from the Colorado River, but it is still not enough. Las Vegas officials have considered many alternative water sources—buy Colorado River from other basin states, tap groundwater from rural Nevada basins, construct a 1000-mile long aqueduct from the Columbia, or even to provide money to desalinize water from the Pacific Ocean[41]—but all alternative options are expensive and will surely raise hell-fire among many groups. When construction began on stage one, no one could have estimated just how much southern Nevada would grow by the Twenty-First Century. Now that Nevada's share of the Colorado River has been put to beneficial use, the state must look elsewhere for water to support a population that continues to increase by the thousands weekly.

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40. Davis, 62.
41. Laxalt, 122.

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Bibliography

Manuscript and Archival Sources

Federal Records Center. Denver, Colorado. 115-94-0132, Box 166.

Record Group 115. Records of the Bureau of Reclamation. National Archives and Records Administration, Denver, Colorado.

"Project History, Southern Nevada Water Project," Vols. 1-4, 1968-71. 8NN-115-92-130.

"Project History, Southern Nevada Water Project," Vols. 5-8, 1977-80. 8NS-115-93-213.

Government Documents

U.S. Department of the Interior, Bureau of Reclamation. "Development of Pump Characteristics from Field Tests," June 1979.

U.S. Department of the Interior, Water Resources. *Project Data*. Washington, D.C.: Government Printing Office, 1981.

Secondary Sources

Beck, Warren A., and Ynez D. Haase. *Historical Atlas of the American West*. Norman: University of Oklahoma Press, 1989.

Billington, David P., Donald C. Jackson, and Martin V. Melosi. *The History of Large Federal Dams: Planning, Design, and Construction*. U.S. Department of the Interior, 2005.

Davis, Mike. "Las Vegas versus Nature." In *Reopening the American West*. Hal K. Rothman, ed. Tucson: University of Arizona Press, 1998.

Elliott, Gary E. *Senator Alan Bible and the Politics of the New West*. Reno: University of Nevada Press, 1994.

Jenkins, Matt. "Squeezing Water from a Stone." *High Country News*, September 19, 2005.

Lamar, Howard R., ed. *The New Encyclopedia of the American West*. New Haven, Conn.: Yale University Press, 1998.

Laxalt, Robert. *Nevada: A Bicentennial History*. New York: Norton, 1977.

Nash, Gerald D. *The American West Transformed: The Impact of the Second World War*. Lincoln: University of Nebraska Press, 1985.

Rothman, Hal. *Neon Metropolis: How Las Vegas Started the Twenty-First Century*. New York: Routledge, 2002.

Weissenstein, Michael. "The Water Empress of Vegas." *High Country News*, April 9, 2001.

Miscellaneous Sources

"Colorado River Aqueduct." http://en.wikipedia.org/wiki/Colorado_River_Aqueduct.

"Parsons." http://www.parsons.com/about/press_rm/potm/10-2001/index.htm.

Simonds, William Joe. "The Boulder Canyon Project." Bureau of Reclamation History Program, Denver, Colorado.

"Southern Nevada Water Authority." http://www.snwa.com/html/about_snws.html.

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