

San Diego Project

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San Diego Project

During Reclamation's first forty years, the bureau's engineers forged a reputation for manipulating rock and water in places that will never see a streetlamp. Much of their work is conducted far away from population centers, and occasionally, their efforts stimulated the growth of western metropolises like Los Angeles, Phoenix, and Las Vegas. Until the 1940s, Reclamation had never been called upon to directly assist a city in search of water. However in 1944, a struggle on a crucial World War II home front pulled Reclamation into an alliance with other federal agencies and branches of the military to divert an urban disaster.

The epicenter of this crisis was the heretofore slow-paced community of San Diego, California. On the eve of United States entry into the war, an unprecedented influx of military personnel and civilian workers threatened to consume all of metropolitan San Diego's water supply in a matter of a few months. A military-industrial dilemma had to be resolved with a federally devised solution. The force of executive action and the spirit of wartime efficiency caused Reclamation to design a pipeline to carry Colorado River water to a thirsty San Diego.

Project Location

The San Diego Aqueduct runs 71 miles from the San Jacinto Tunnel at the Colorado River Aqueduct south to the terminal of the San Vicente Reservoir, located 15 miles northeast of the city of San Diego. The tunnel and reservoir provide the San Diego Aqueduct with its official name, the San Jacinto-San Vicente Project.

Oblivious to topography, the pipeline, or “barrel”, in engineering parlance, makes its way across the variances of Southern California. From the San Jacinto tunnel, the barrel extends southwest over rolling countryside along the first third of its trip until it reaches the Temecula River. Two miles south of the river, the Aqueduct crosses the summit of Rainbow Pass and runs

alongside U.S. Highway 395. Across the next thirteen miles, the pipeline passes through four tunnels and over rocky ground. Fifty-eight miles into its journey, the aqueduct travels east of the town of Escondido, passing vineyards, citrus and avocado groves on to the San Dieguito River. Across the river, the pipeline runs southeast from Poway Valley into the inlet portal of the Poway Tunnel. In the final four miles, the barrel enters two tunnels before delivery at the San Vicente Reservoir.

San Diego County provides almost everything nature offers, except enough water to serve a population of millions. Proceeding inland from the Pacific Coast, the county rises from coastal plain to inland valleys to the Laguna Mountain range and back down to desert valleys. The climate is mild to semi-arid with an average temperature of 63 degrees. San Diego County covers some 4,200 square miles with two-thirds of the county's 2.3 million people living west of the mountains.

Since weather records were first kept in 1851, climatologists tracked dry periods lasting from six to 21 years and wet cycles averaging 11 years. In rainy years, precipitation falls from December to April. Annual precipitation averages about 10 inches along the coast, but is four to five times greater over the Lagunas. Run-off from the mountains has always been erratic, and San Diegans realized early that they not could depend on it as a sole source of water.¹

Historic Setting

From the arrival of the Spanish padres up to the present, San Diego's struggle to keep and hold water has progressively intensified. In 1769, a contingent led by Father Junipero Serra trekked 1,800 miles northward from Mexico to establish California's first European settlement,

1. U.S., Department of Navy, *San Diego Aqueduct Project: Report on Need, Pre-Construction Planning Administration, Construction History and Financing*, (San Diego: Eleventh Naval District, 1948), 23-4; J. P. Jones, "The San Diego Aqueduct," in *Reclamation Era*, May, 1955, 31; U.S., Department of Interior, Bureau of Reclamation, *Report on San Diego Project, Metropolitan Connection Enlargement*, (Boulder City, Nevada: 1951), 3-6.

San Diego de Alcalá. Four years later, work started on the first irrigation and domestic water supply system in the American West. Under the watchful Serra and other Franciscan brothers, Indian work gangs dug canals to irrigate mission vineyards and vegetable plots. The next step was construction of a dam. Preserved as a historical landmark, the Old Mission Dam, is made of jagged rock and brick held together with mortar. In 1810, San Diego River water held by the dam was flowing in tile lined conduits from the upper end of Mission Gorge to the valley lands in the vicinity of the San Diego Mission six miles away. Soon, Mexican ranchers replaced the missionaries and were then in their turn superseded by stragglers from the San Francisco gold rush.

In the mid-19th Century, San Diego's water supply came from the annual output of 60,000 acre-feet of underground water or water diverted from foothills streams. The arrival of the California Southern Railway brought the next generation of settlers. The enterprising newcomers quickly dammed the coastal streams surrounding San Diego to provide domestic water to the city and an irrigation supply to nearby agricultural areas, and many of these privately funded dams are still in use today.

The county's streams from north to south are: Santa Margarita, San Luis Rey, San Dieguito, San Diego, Otay, and Tia Juana. In 1888, the city's first diversion project brought water from the headwaters of the San Diego River 35 miles down to the city. A trestle flume carried the water over gullies and ravines, but it often leaked or had sections blown over by the wind. Despite its primitive technology, parts of the flume were sturdy enough to remain in service until 1957.²

Droughts in the late 1880s, and from 1897 to 1904, thinned San Diego's population from

2. State of California, Department of Public Works, *San Diego County Investigation*, (California State Printing Office: 1935), 64-5; Erwin Cooper, *Aqueduct Empire: A Guide to Water in California Its Turbulent History and Its Management Today*, (Glendale, California: The Arthur H. Clark Company, 1968), 101-3.

40,000 people down to 17,700 by 1900. The city's climate and tranquility still attracted outsiders, and by 1920, the population was back up to 74,361. During this period, the necessity of obtaining water from outside the county dawned on San Diego's civic leaders, and they looked toward the unpredictable flow of the Colorado River to provide the foundation of the city's future stability.

In 1926, the California Division of Water Resources agreed to give the city the right to appropriate 155 cubic feet per second (cfs) of water from the river. On June 25, 1929, President Herbert Hoover approved the Boulder Canyon Project Act, and two years later, the City and County of San Diego completed a deal with six other Southern California water regulatory bodies dividing California's share of the river.³

In the 1930s, the City and County of San Diego filed petitions with the Secretary of the Interior to receive 250,000 acre-feet of storage capacity from Lake Mead and the delivery of 112,000 acre-feet of water annually through the All-American Canal system. In 1936, the city launched a study to determine the feasibility of constructing a branch aqueduct to serve San Diego. The final report of February 1937 recommended economy. San Diego should develop its local resources, and when additional water was needed, build its own aqueduct and import water from the All-American Canal. San Diego could take its share of Colorado River water from the canal 176 miles to the east, lifted by pumps over the mountains, and dispersed to the city's reservoirs.

The other option suggested by the report would bring river water captured at Lake Havasu 215 miles away and transferred to the Metropolitan Water District (MWD) of Southern California. The primary purpose of the MWD was to provide Colorado River water to

3. U.S., Department of Interior, Bureau of Reclamation, *Investigation, Design and Construction of the San Diego Aqueduct*, (Boulder City, Nevada: 1948), vii; State of California, Department of Public Works., 81.*San Diego County Investigation*

metropolitan Los Angeles. As Los Angeles grew, so did the MWD, and its influence was felt from Pasadena to the Mexican border. Delivery of water through MWD to San Diego would come by a separate gravity-flow pipeline. Included in project costs were fees to join the MWD plus other expenses. The All-American Canal route was favored among many San Diegans, because it allowed the city autonomy from sharing Colorado River water with Los Angeles and the rest of Southern California. Engineers and city officials felt there was no reason why the city would not continue to steadily grow and eventually develop a water system to solely serve San Diego.⁴

The war in Europe blew San Diego's vision of measured growth sky-high. As the military and industry invaded the city, local legislators panicked. On May 28 and 29, 1943, in order to determine the most feasible means of obtaining Colorado River water, the City and County signed contracts with Reclamation to survey routes. The first survey would be the MWD Colorado River Aqueduct at the San Jacinto tunnel. A separate investigation would examine the favorite choice of San Diego's landowners, merchants, and developers, the All-American Canal.⁵

Concurrent with the surveys, the San Diego County Water Authority (SDCWA) organized on June 9, 1944, for the purpose of delivering Colorado River water to San Diego County. The original nine members of the SDCWA comprised five cities (San Diego, Chula Vista, Coronado, National City, and Oceanside), three irrigation districts (Lakeside, Helix and Ramona), and one public utility district (Fallbrook). Looming over the surveys and participants was a dry 1944 which broke a five-year string of above average annual precipitation. In September, Reclamation's report on the MWD-San Jacinto connection revealed additional

4. City of San Diego, California, *Report on Program of Water Development, the City of San Diego and the San Diego Metropolitan Area*, (1937), 4-10. The report was written by Lester S. Ready, construction engineer, San Francisco; Louis C. Hill, construction engineer, Los Angeles and J. P. Buwalda, construction geologist, Pasadena.

5. *Report on San Diego Project, Metropolitan Connection Enlargement*, 37-40.

troubling news. Engineer R. B. Ward emphasized the city was teetering toward drought, “In June 1944, it was thought that the City of San Diego had sufficient water in storage to supply its users through the year 1947. During the subsequent three months, however, the volume of use increased to such an extent the supply maybe depleted by July 1947.” In Ward's opinion, “plans for importing a supplemental supply must be formulated much sooner than was formerly anticipated.”⁶

In the months before December 1941, San Diego was on the cutting edge of war production as government contracts, military build-up and factory jobs made the city hum. A reporter for a national magazine wrote pre-war San Diego was a “quiet, slow moving town,” whose principal industry was “tourists.” Another publication said the city of a little over 200,000 was “indolent,” and local business subsisted on “expenditures made by the United States Navy and by the residents who were retired from middle-class families.”

Because of war contracts, San Diego became the quintessential boom town of the twentieth century. In the nineteenth century, other California cities like San Francisco and Los Angeles were founded on gold and oil rushes. San Diego's boom was fueled with federal and corporate dollars. In 1943, City Manager Walter Cooper said war “revolutionized” San Diego, and its effect “is not fixed or static, but it is a constantly changing factor in the life of the city.” In 1940, the city's population was 202,000. Four years later, it ballooned to 510,000 with 380,000 civilians and 130,000 military people. War brides, servicemen, pilots and factory workers intermingled in the few downtown blocks holding the city's restaurants, tattoo parlors, burlesque houses, and saloons. Movie theaters were open all hours, dance halls swung until late. In the summer of 1944, San Diego's role as ship and aircraft builder was a vital element in the

6. *Investigation, Design and Construction of the San Diego Aqueduct*, viii; U.S., Department of Interior, Bureau of Reclamation, *Report on Proposed Metropolitan Water District Connection, San Jacinto-San Vicente Aqueduct, San Diego Project*, (Boulder City, Nevada: 1944), 4; *Metropolitan Connection Enlargement*, 2, 40.

America's arsenal, but the city was under attack. Not from enemy artillery or bombs, but from nature's caprice and humanity's excess.⁷

Project Authorization

Only a few times in Reclamation's history has there been as much urgency expended from the highest levels of government to begin a project as there was in San Diego. Normally obsessed with the Central Valley Project, California Senator Sheridan Downey finished reading Reclamation's San Diego report with much anxiety. In a letter dated September 25, 1944, Downey begged President Franklin D. Roosevelt to authorize the federal government to step into the San Diego situation, "In the event history repeats itself, as is most probable, and years of little or no runoff occur in the San Diego watershed, this city and all the important naval and military establishments in the locality will be without water early in 1947."⁸

In eight days time, Roosevelt appointed a committee to study San Diego's water problems. William E. Warne, acting commissioner of Reclamation, served as chair of an interdepartmental committee comprising representatives from the Departments of Navy and War, the Federal Works Agency, and the San Diego County Water Authority. On Oct. 3, Roosevelt wrote back to Downey, agreeing it was imperative the aqueduct be built, "Because of the importance of the San Diego area from a naval and military standpoint and the need for protection of its civilian population, this situation is of national concern."⁹

In the course of their research, the committee determined the city of San Diego could

7. "Boom Town: San Diego," in *Life*, vol. 11, (July 24, 1941), 64-9; Carey McWilliams, "The Boom Nobody Wanted," in *New Republic*, (June 30, 1941), 882-4; Gerald D. Nash, *The American West Transformed: The Impact of the Second World War*, (Bloomington, Indiana: Indiana University Press, 1985), 59-62.

8. U.S., Department of Interior, Bureau of Reclamation, *Correspondence and Other Data Relating to Authorization by the President for Emergency Construction*, (Boulder City, Nevada: 1944). A Democrat, Downey served in the United States Senate from 1938 to 1950.

9. *Correspondence and Other Data Relating to Authorization by the President for Emergency Construction*, Box 749. Other members of the presidential committee included, Vice Admiral Ben Moreell, Chief of Bureau Yards and Docks representing the Navy; Major Gen. Eugene Reybold, Chief of Engineers, War Department; Baird Snyder, Assistant Administrator, Federal Works Agency, and Phil D. Swing, Attorney, San Diego County Water Authority.

safely use 30,000 acre-feet annually. If the population continued to grow, the city would have to supply 52,000 acre-feet in a year. A breakdown of total water use proved the Navy consumed 21.6 percent of city water, followed by the Army, federal housing, and war industries. Military and military-related organizations may have occupied only 10 percent of San Diego's land area, but they used 40.3 percent of municipal water. Civilians had to make due on the remaining 59.7 percent.

Two months later, following Reclamation's suggestion, the committee recommended immediate construction of a connection at San Jacinto with the Colorado River Aqueduct. The committee rejected the All-American Canal route, because construction required extra equipment to lift the water and would take three years – a year longer – to build than the San Jacinto-San Vicente proposal. The War and Navy Department along with the Federal Works Agency would bear the entire cost. On November 29, 1944, Roosevelt approved the report and instructed Reclamation to complete the designs and the Navy Bureau of Yards and Docks to begin construction.¹⁰

Construction History

In January and February 1945, 42 Reclamation employees from regional offices in Arizona, California, Colorado, New Mexico, and Utah were loaned to the San Diego Project. They stayed an average of two months in San Diego as they performed survey and other kinds of fieldwork. All of Reclamation's drawings, specifications, and surveys were complete by early June of 1945.

On March 3, the Director of the War Mobilization and Reconversion Board wrote to the Secretary of the Navy recommending the aqueduct project be delayed for a year due to material

10. *Ibid.*; *Investigation, Design and Construction of the San Diego Aqueduct*, viii. Information on San Diego's acre-feet capacity came from an October 16, 1944 letter from Army Chief Engineer Reybold to Acting Commissioner Warne.

and manpower shortages. The chairman of the Authority, Fred A. Heilbron, flew to Washington to remind officials, in a series of conferences of the importance of San Diego's military-industrial muscle in the war effort. He also pointed out the city was mired in another drought cycle. Heilbron's arguments swayed the bureaucracy and the project was back on track. Later in the autumn of 1945, the Navy and the city of San Diego agreed to continue construction of the aqueduct by the Navy and lease of the pipeline to the city.¹¹

Six contractors – five from California and one from New York State – were charged with building the pipeline which was divided into seven schedules for purposes of construction. The contract ran from September 1945 to May 1946. The contractor's work schedules were divided between one contract for building diversion works and a regulating reservoir with connecting pipe lines, two for tunnels, three for the concrete pipe line and one schedule for the steel pipe siphons. The schedules were numbered in sequence to conform with the completion of field surveys and the drafting of drawings and specifications. Ground breaking began on September 12, less than two weeks after the Japanese signed surrender terms on the deck of the battleship *Missouri*.¹²

Reclamation's original designs provided for the use of precast concrete pipe with an ultimate capacity of 165 cfs. Seven tunnels and the first two miles of the barrel and certain limited access sections were built to full design capacity. The remaining 61 miles were built to carry 85 cfs, in case San Diego needed the extra water in the future. Except for one and three-quarters miles of steel 48-inch pipe, the aqueduct used reinforced concrete pipe varying from 48 to 96 inches in diameter.¹³

11. *San Diego Aqueduct Project*, 51; *Investigation, Design and Construction of the San Diego Aqueduct*, 22; Cooper, *Aqueduct Empire*, 104-5.

12. *Report on the Need, Pre-Construction Planning Administration, Construction History and Financing*, 47; *Investigation, Design and Construction of the San Diego Aqueduct*, 22.

13. *Project History, San Diego Project, Vol. 1*, vi.

In November 1945, contractors had difficulty in finding qualified tunnel workers, despite the return home of the first wave of servicemen back from the war. Recruits went as far north as Fresno to find unskilled laborers to work for 87.5 cents an hour and equipment operators to work for \$1.75 an hour. Six months later, in the summer of 1946, as many as 850 men were involved in all aspects of construction.

Much of the construction landscape was either rural or rugged. In the central and southern construction sites there were no telephone lines connected with each contractor's field office. Workmen used two-way radios so that repair crews, assistance, and spare parts arrived on the scene faster, and contractors were able to dispatch trucks and bulldozers to required locations. Major external delays included the 1946 strikes by the coal and steel industries holding up allocations and shipments of steel which delayed construction for three months. Originally the project was scheduled to last 15 months, but stoppages pushed completion time to 25 months.¹⁴

The mountains provided the stage for the project's most demanding work as drillers bored seven tunnels allowing the pipeline to pass. The names of the tunnels in order from San Jacinto Tunnel are: Rainbow, Lilac, Red Mountain, Oat Hills, Poway, Fire Hill and San Vicente. Excavations range from 500 feet in the Lilac Tunnel to 5,700 feet in the Fire Hill Tunnel. The diameter of each tunnel is six feet. The 4.4 miles of concrete-lined tunnels comprise 14 percent of the total length of the aqueduct.¹⁵

As construction continued, San Diego's dream of private access to the Colorado had to be relinquished. The city surrendered its Colorado River water filing to the SDCWA which in turn

14. U.S., Department of Navy, *San Diego Aqueduct Project: Report on the Need, Pre-Construction Planning Administration, Construction History and Financing*, 20, 49-53.

15. *Report on the Need, Pre-Construction Planning Administration, Construction History and Financing*, 105; M. W. Loving, "San Jacinto-San Vicente Aqueduct: San Diego Project, California, Second Pipeline," (Glenville, Illinois: 1953), 3-18.

transferred these rights to the powerful Metropolitan Water District of Southern California. On December 17, 1946, the SDCWA was annexed to the MWD. The shotgun marriage of the with the Los Angeles-based MWD is a key element in the creation of modern San Diego. The once sleepy seaport joined the reality of urban Southern California sprawl.¹⁶

At 2 o'clock on the morning of November 26, 1947, the first Colorado River water reached the San Vicente aqueduct. The final cost of \$14.1 million dollars was a small price to pay in comparison to what might have happened if the city had gone dry. An estimated of the first year's flow out of the barrel was 66,700 acre-feet. The Authority said without Colorado River water, all City of San Diego reservoirs would have been empty by September of 1949.¹⁷

The December 11, 1947, aqueduct dedication caused a brief celebration in the city. A Reclamation Engineer later congratulated all the parties involved, "The job is an outstanding example of the ability of Federal and State agencies to work together to accomplish a mutual objective." Ewart W. Goodwin, chairman of the San Diego-Colorado River Association, publicly thanked Reclamation, the Navy and the federal government for "saving" San Diego. Reclamation's survey work and engineering experience brought the project in very close to the original projected cost. If the aqueduct had not been completed in time, San Diegans faced rationing. Now with the barrel completed, engineers estimated, and locals hoped, the aqueduct would keep San Diego in water for the next 20 to 30 years.¹⁸

Post Construction History

In January 1948, an exasperated SDCWA engineer best described the futility of servicing

16. *Aqueduct Empire*, 105; *Report on San Diego Project, Metropolitan Connection Enlargement*, 7-10.

17. *Investigation, Design and Construction of the San Diego Aqueduct*, 84; *Aqueduct Empire*, 106; *Report on San Diego Project, Metropolitan Connection Enlargement*, 10.

18. Jones, "The San Diego Aqueduct," 49; San Diego County Water Authority, *The Need and Feasibility of Increasing the Capacity of the San Diego Aqueduct*, (San Diego: 1948), 3; Richard F. Pourade, *The History of San Diego: City of the Dream*, (San Diego: Copley Books, 1977), 73.

a thirsty metropolis, “After the one-half capacity aqueduct has been under operation for a period of only seven months. . . local water supplies in surface and underground reservoirs are still slowly dwindling.” The report also echoed a familiar warning, “The plain fact is that the Water Authority areas may again be facing a critical water shortage by 1951.”¹⁹

Since 1945, 40,000 people a year were making San Diego their new home. By June of 1950, and in the middle of a drought cycle, the United States was again at war, this time with North Korea. In the same five year period, annual rainfall was two-and-a-half inches below normal. In April of 1951, local water demand for deliveries from the aqueduct exceeded its capacity and neighborhoods formed water conservation committees. The necessity of an additional aqueduct was borne out when the Colorado River provided about 60 percent of the water consumed by all member agencies of the San Diego County Water Authority between July 1948 and June 1954.²⁰

In September 1951, Reclamation began a survey to build a second barrel. The second pipeline would parallel the route of the first aqueduct and pass through the same tunnels. The 82nd Congress authorized the construction of the second barrel by the Secretary of the Navy under Public Law 171 on October 11, 1951. The authorization permitted the Navy to use other federal agencies to carry out the work. Navy and the Interior Department agreed to put Reclamation in charge of designing and building the second barrel. Like the situation surrounding the completion of the first barrel, time was of the essence. Unlike the first barrel, the Navy could not spend money on construction while negotiation of the repayment contract was in progress. On May 28, 1952, a contract between Reclamation and the San Diego County Water Authority allowed the Authority to advance funds not exceeding \$100,000 to cover the

19. San Diego Water Authority, *The Need and Feasibility of Increasing the Capacity of the San Diego Aqueduct*, 3.

20. John D. McCoy, “San Diego's Second Barrel,” in *The Reclamation Era*, (August 1955), 63, 76.

costs of surveys, designs, and construction. Under a separate contract between the Navy and the Authority, the Authority agreed to repay the United States at the true cost of the second barrel over 40 years. Worked started on March 23, 1953, as Reclamation oversaw construction by five different contractors working on seven different construction schedules. The Bureau sent 50 to 68 employees to the project in 1952-53.²¹

Similar to the first barrel, water flows through the barrel by gravity from the intake at San Jacinto 1,500 feet down to the San Vicente Reservoir at 760 feet. Diversions were constructed at turnout structures located along the aqueduct. The distance between the two barrels varies from 15 to 75 feet. To adapt to the varying landscape, contractors used precast concrete pipe ranging from 48 inches to 75 inches in diameter. A total of 694,000 man hours were spent on the job. About three-fourths of the cost of the second barrel went toward supply and delivering pipe to the job site. The relief the affected agencies felt at the October 1954 dedication of the second barrel overshadowed the final cost of \$16 million.²²

The city's addiction to imported water has continued since that dedication. In 1960, the MWD completed a third barrel on the second San Diego Aqueduct. Funded and built by the state and the MWD, the pipeline was capable of carrying 180,000 additional acre-feet annually. The Authority added a fourth pipeline in 1973. The 94-mile-long second San Diego Aqueduct flows from the Colorado River Aqueduct to the Otay Reservoir south of the city. San Diego's search for water reflects increased growth and demand, but also is a reminder of how tenuous San Diego's future is.

Settlement of Project

21. U.S., Department of Interior, Bureau of Reclamation, *San Diego Project Histories, Vol.1*, (Boulder City, Nevada: 1952), viii-ix; McCoy, "San Diego's Second Barrel," 64, 76.

22. U.S., Department of Interior, Bureau of Reclamation, *Project History, San Diego Project, Vol. 2*, (Escondido, California: 1953), 1.

From Spanish soldiers to “Aviation Oakies,” San Diego's location and climate has been an intense lure for three centuries. Water did not become a source of civic anxiety until the military and industry took control of the city's direction. In most places after Reclamation finished a job, settlement soon followed. In San Diego, the people were there, and kept coming. The San Diego Aqueduct did not invent a lifestyle, but helped sustain one.

A true portrait of changes mass migration can bring, is reflected in the amount of water used in San Diego before and after the start of World War II. According to a city water study, in 1938, San Diegans used 22,508 acre-feet of water. Four years later, in the first full year of the war, 40,597 acre-feet were consumed. In this period, San Diego's civilian population alone grew by 75 percent.²³

Impending drought was only one of San Diego's many worries. When defense workers arrived in droves, the city resisted establishing a local housing authority under the domain of the United States Housing Authority (USHA), because in the words of one commentator, “almost everyone in San Diego is engaged in the real-estate business.” The Federal Works Administration finally stepped in and built the Kearney Mesa Housing Project, six miles north of the city. Three-thousand units of family housing were built to accommodate 10,000 to 12,000 people. Kearney Mesa was depicted as a “horrible example of what happens when the local community, its present and future needs, are not considered.” The units were serviced by one ten-inch pipe for water, a primitive sewage system, and accessible only by a sole two-lane road. Others living in San Diego's unplanned new suburbs complained of driving fourteen miles for a loaf of bread.

The *New Republic* magazine described the plight of the newcomers in search of work.

23. City of San Diego, California, California Water Department, Division of Development and Conservation, *Water Storage and Use, Anticipated Runoff, Storage and Use, July 1, 1943 to December 31, 1947*, (San Diego: 1943), 2. The water department report was composed by hydraulic engineer Fred D. Pyle.

Many were “Aviation Oakies,” workers employed by the aircraft industry riding the last wave of the Great Depression exodus from the south-central United States to California. One man's case that symbolized thousands belonged to Otis M. Porter of Pawnee, Oklahoma. Employed at San Diego's largest aircraft contractor, Consolidated Aircraft Corporation, Porter was paid 64 cents an hour, living in a one-room cabin in an auto court with seven members of his family. The cabin's \$72 a month rent took a large bite out of his monthly take home pay of \$135. These new San Diegans, refugees from the dust bowl, were unaware that a situation similar to the one they had escaped from in Oklahoma was in danger of repeating itself in sight of the Pacific Ocean.²⁴

For those in control of production, wartime San Diego was in an industrial golden age. In 1939, the value of products manufactured in San Diego County totaled \$43 million, and in 1948, it exploded to \$1.7 billion. In the same year, 445 manufacturing plants built aircraft, ships, or canned food. The Navy's \$150 million annual payroll and the tourist trade also made major contributions to the local economy. At the close of the 1940s, San Diego's 164,013 civilian workers received \$3.4 billion in annual salaries.

This wave of khaki, serge and denim aggravated municipal housing, transportation, and education issues, but the area's mild climate and room to expand helped to defuse any potential tension. The military's presence also stabilized the population. A brief post-war downturn found 9.9 percent of the city's civilian population without work compared to the national average of 4.4 percent. Regardless, business liked San Diego, and growth picked up in the 1950s and took off in the 1960s.²⁵

In 1970, metropolitan San Diego's population stood at 1,198,323. In a decade's time, it had passed San Francisco as California's second largest city. At the close of the century, over

24. McWilliams, “The Boom Nobody Wanted,” 882-4. In 1943, Consolidated merged with the Vultee Corporation and subsequently renamed Convair. In 1956, Convair became General Dynamics.

25. *Report on San Diego Project, Metropolitan Connection Enlargement*, 14-7.

2.3 million people resided in metropolitan San Diego, with 46.5 percent of that number native born. During the same period, the number of people working in the city's traditional manufacturing and fishing bases slipped behind new industries. In 1990, local business employed 363,997 people in technical, sales, and administrative positions, while the number of blue collar workers totaled 108,243. Total wage income was a little over \$26.6 billion.²⁶

Uses of Project Water

By the 1990s, more than 90 percent of San Diego's water supply is imported from the Colorado River. Over 98 percent of the county's population lives within the Authority's service area. Out of 4,200 square miles of San Diego County, 1,417 square miles is now part of the Authority. In a location as urbanized as San Diego, there remain a few growers raising citrus fruit and avocados. In spite of the high cost of water, taxes and continual residential development, avocado growing continues to turn a profit. At the completion of the second barrel in 1954, the crop was worth \$7 million. In 1992, avocado trees covered 12,968 acres of San Diego County and the crop value leaped to \$106.3 million.²⁷

Historian Erwin Cooper wrote in his 1968 study of California's water dependent lifestyle, *Aqueduct Empire*, "The first century of San Diego history was written with dams. The second century is being written with aqueduct dedications." The history has added a new chapter illustrating the lengths San Diego will go to survive. The past was in the process of repeating itself in the 1980s as the Authority sought to circumvent the MWD. In the mid-1980s, San Diego was filled with talk of building a dam on the north end of the county and of a deal with a private firm to lease nearly 300,000 acre-feet from a reservoir on the Yampa River in Colorado.

26. U.S., Department of Commerce, Bureau of Census, *1990 Census of Population and Housing Summary, California, Tape File 3A*, (Washington, D.C.: 1991).

27. McCoy, "San Diego's Second Barrel," 77; San Diego County Department of Weights and Measures, *1992 Annual Crop Report*, 4.

Attacked by environmentalists and other members of the MWD, San Diego backed away from both projects. Undaunted, San Diego's quest for water is increasingly becoming more independent from the rest of Southern California. The desire that drove the city to seek Reclamation's help to build the aqueduct in the 1940s has only escalated.²⁸

Conclusion

Responding to a wartime emergency, Reclamation may have inadvertently encouraged San Diego's import-dependent, growth-conscious culture. Originally hailed as an example of inter-departmental technique and teamwork, the aqueduct's legacy is that it inspired San Diego to build more aqueducts. Since the late 1940s, water and survival are more closely tied together in San Diego than in any other city in the West. Unfortunately, the average San Diegan is unaware the City and the County is increasingly unable to support the number of people who live on it. Now, and in the future, San Diego's day-to-day existence is a triumph outrunning tragedy.

About the Author

Robert Autobee holds a Masters degree in History from the University of Northern Colorado. The Colorado Historical Society published his thesis, *If You Stick With Barnum: A History of a Denver Neighborhood*, as part of their *Essays and Monographs in Colorado History* series in 1993. He has worked as a reporter for several different Colorado newspapers, and for a national environmental newsletter, *Western Resources Wrap-Up*, based in Washington, D.C.

28. Cooper, *Aqueduct Empire*, 107; Robert Gottlieb and Margaret FitzSimmons, *Thirst for Growth: Water Agencies as Hidden Government in California*, (Tucson: The University of Arizona Press, 1991), 36-9.

Bibliography

Manuscript and Archival Collections

Record Group 115. Records of Bureau of Reclamation.

Project Histories, 1952-4.
Project Reports, 1937-55.

Government Documents

City of San Diego, California, California Water Department, Division of Development and Conservation. *Water Storage and Use, Anticipated Runoff, Storage and Use, July 1, 1943 to December 31, 1947*. San Diego: 1943.

City of San Diego, California. *Report on Program of Water Development, the City of San Diego and the San Diego Metropolitan Area*. 1937.

County of San Diego, Department of Weights and Measures. *1992 Annual Crop Report*. San Diego: 1993.

San Diego County Water Authority. *The Need and Feasibility of Increasing the San Diego Aqueduct*. San Diego: 1948.

State of California, Department of Public Works. *San Diego County Investigation*. 1935.

United States Department of Interior, Bureau of Reclamation. *Correspondence and Other Data Relating to Authorization by the President for Emergency Construction*. Boulder City, Nevada: 1944.

United States Department of Interior, Bureau of Reclamation. *Investigation, Design and Construction of the San Diego Aqueduct*. Boulder City, Nevada: 1948.

United States Department of Interior, Bureau of Reclamation. *Report on Proposed Metropolitan Water District Connection, San Jacinto-San Vicente Aqueduct, San Diego Project*. Boulder City, Nevada: 1944.

United States Department of Interior, Bureau of Reclamation. *Report on San Diego Project, Metropolitan Connection Enlargement*. Boulder City, Nevada: 1951.

United States Department of Navy. *San Diego Aqueduct Project: Report on Need, Pre-Construction Planning Administration, Construction History and Financing*. San Diego: Eleventh Naval District, 1948.

Articles

“Boom Town: San Diego.” *Life*, vol. 11 (July 24, 1941): 64-9.

Jones, J. P. “The San Diego Aqueduct.” *The Reclamation Era*. (May 1955): 31-2, 49.

McCoy, John D. “San Diego's Second Barrel.” *The Reclamation Era*. (August 1955): 63-4, 76-7.

McWilliams, Carey. “The Boom Nobody Wanted.” *New Republic*, vol 104 (June 30, 1941): 882-4.

Books

Cooper, Erwin. *Aqueduct Empire: A Guide to Water in California Its Turbulent History and Its Management Today*. Glendale, California: The Arthur H. Clark Company, 1968.

Gottlieb, Robert, and FitzSimmons, Margaret. *Thirst for Growth: Water Agencies as Hidden Government in California*. Tucson: The University of Arizona Press, 1991.

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

Pourade, Richard F. *The History of San Diego: City of the Dream*. San Diego: Copley Books, 1977.

Other Sources

Loving, M. W. “San Jacinto-San Vicente Aqueduct: San Diego Project, California, Second Pipeline,” Glenville, Illinois: 1953.

U.S., Department of Commerce, Bureau of Census, *1990 Census of Population and Housing Summary, California, Tape File 3A*, Washington, D.C.: 1991.

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