The Ventura River Project

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Southern California's Pacific Coast has always been home to the sun, sandy beaches, and surfers, but beginning in 1948, when Santa Barbara County water developers teamed up with the Bureau of Reclamation to have the Cachuma Project built, the region also became the site of three large-scale Federal water projects. These "seacoast projects," as they came to be called, attempted to capture the seasonal floodwaters that would otherwise "waste to the sea."

The Ventura River Project was the third and last of these projects. Further south and east down the coast from the prior-constructed Cachuma and Santa Maria Projects, Ventura, too, supplied water to a citrus-dominated agricultural industry and an exploding municipal-industrial population. Although the Ventura River Project has been bothered by fewer problems than have beset its neighboring Reclamation projects - floods, droughts, population pressures, sedimentation, earthquakes, to name just a few - it, too, possesses some of the characteristics that make Southern California's seacoast projects so colorful.

Project Location

The Ventura River Project is located in the south coastal section of California in Ventura County, sixty miles northwest of metropolitan Los Angeles. The 90,000-acre project area is fan-shaped in that the main Ventura River Valley runs north-south from the Topatopa Mountains down to the Pacific and several side valleys drained by tributaries of the Ventura River funnel into the main basin from the east and west. There is also an additional strip of project land (Rincon) contiguous with but lying outside of the basin along the Pacific coast to the northwest of the city of Ventura.

Within the rugged and mountainous project area (the Ventura River watershed drains elevations up to 6,000 feet), only about thirty percent is considered developable (either by irrigation or habitation), consequently these areas are densely worked.[1] The district is highly urbanized along the coast and includes the cities of Ventura and Ojai (located in a somewhat

1. Bureau of Reclamation, *Ventura River Project - A Report on the Feasibility of Water Supply Development, 1954*, Record Group 115, 12.

broad, northern valley), the unincorporated communities of Oak View and Meiners Oaks, and surrounding suburban and agricultural areas comprising the Ventura River, Santa Ana, Ojai, and Upper Ojai Valleys.

The Ventura River bisects the lower, southern portion of this area, flowing for about sixteen miles from its formation at the confluence of Matilija Creek and the North Fork of Matilija Creek to the Pacific Ocean. The river's coastal inlet lies at the western edge of the city of Ventura, the largest town in the project area. Its two principal tributaries are San Antonio Creek, which enters from the east, draining the agriculturally productive Ojai Valleys, and Coyote Creek, which enters from the west and upon which the project's dam is constructed.

The annual average flow of the Ventura River, the supply of which is transferred by pipeline to Coyote Creek, is 13,600 acre-feet (ac-ft). It drains an area of 228 square miles and, like most in Southern California, is a highly fluctuating, intermittent stream, running usually only in the winter month's "wet season." The area averages fourteen inches of precipitation per year, but has exhibited ranges varying from a low of five inches to a high of forty.[2]

The main features of the Ventura River Project are Casitas Dam and Reservoir, which is located on Coyote Creek about two miles above its junction with the Ventura River; the Robles Diversion Dam, which lies on the Ventura River about 1.5 miles downstream from the river's formation, diverting much of its flow to Coyote Creek; the 5.4-mile Robles-Casitas Canal, which conveys the diverted flow of the Ventura River into Coyote Creek and then Lake Casitas; and the main conveyance system, which includes 34 miles of pipeline, five pumping stations, and six balancing reservoirs located throughout the project area - all of which contribute to the eventual delivery of project water to area subscribers.

Historic Setting

Prehistoric Setting

California's south coastal region, now comprised of Ventura County, Santa Barbara County, and the Channel Islands, was once home to numerous Chumash Indians. The Chumash

2. Bureau of Reclamation, *Annual Project History, Ventura River Project, 1956*, Record Group 115, 3.

subsisted on fish and shellfish from the sea (Ventura River was the site of a sizeable Steelhead Salmon run until the construction of Matilija Dam by Ventura County in 1948; a few dozen now annually visit the river) and game from the backcountry.

When Juan Rodriguez Cabrillo first came to California in 1542 and landed in the Ventura area he observed the Chumash traveling in their large, finely-constructed canoes which could fit up to twenty people.[3] Their mild-mannered docility and disease led to their eventual demise once the Spanish settled the area.

Historic Setting

While the Cabrillo and Juan Bautista de Anza expeditions visited the Ventura area in 1542 and 1774 respectively, it was not until Father Junipero Serra founded the ninth and last mission, San Buenaventura, in 1782, that the coastline region lying between Santa Barbara and Los Angeles was settled (the name, Ventura, is an American corruption of the Mission name; San Buenaventura is still used in some traditional circles). During the mission days, the padres raised livestock and grew grains, first diverting the waters of the Ventura River at Canada Larga for their use. Remnants of the old stone aqueduct, demolished by a flood in 1866-67, can still be seen near the confluence of the streams a few miles north of Ventura. An old, massive-walled settling tank, or receiving reservoir, which distributed river water to the mission also stands intact today and is owned by the city of Ventura.[4]

Mexican rule in the early-mid nineteenth century brought with it the doling out of large land grants that typically became ranches. After these lands came under American dominion in 1850, the large parcels were subdivided. The new settlers raised mostly grains. By 1900, new water developments allowed for more intensive agriculture to be practiced in the area, with citrus fruits, apples, apricots, and peaches being grown.

Pre-project agricultural water use consisted primarily of drawing from groundwater basins, with a smaller amount taken directly from streamflow. The fast-growing City of Ventura

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3. Mildred Hoover, *Historic Spots in California* (3rd Ed.), (Stanford, California: Stanford University Press, 1966), 578.
4. *Ibid*., 579.

received its supply from the Ventura River by gravity as well as by pumping from river gravels. Overall, the river supplied the city with eighty percent of its supply.[5] It also had three wells along the ocean beach that served as back-ups in the event of a dry year. Unfortunately, the city believed the wells would be unusable in the near future due to salt water encroachment. Consequently, the city's situation grew especially critical during dry years when the Ventura River could not be counted on for its supply.

Many agricultural wells in the productive Ojai Valley began going dry in the 1930's and '40's, forcing Ventura County to build 7,000 ac-ft Matilija Dam in 1949. The purpose of the dam was to replenish groundwater basins used for farming in Ojai and by the City of Ventura for its municipal supply.

Post-war Ventura, then, was faced with a familiar Southern California dilemma - the need for water to support its growing economy. Its population was exploding, agriculture was expanding, and the burgeoning local oil industry also had huge water needs. Because rainfall patterns were so erratic and unreliable and few surface storage works existed to capture what precipitation did fall, the area continued to suffer a chronic water shortage through the 1950's. It was during these post-war years that Ventura County looked on with especially keen interest as neighboring communities such as Santa Barbara, Santa Maria, and Los Angeles embarked upon major Federal reclamation projects which impounded water for their own use, water that would ensure the future of the cities, industries, and farms within each water district.

Authorization

Official investigations concerning potential solutions to the Ventura area's water supply problem began in 1925 when Ojai Valley hired J. B. Lippincott to look into water development plans. The Los Angeles-based water engineering firm did the same for Ventura in 1934 but nothing came of either investigation.[6]

Having witnessed the construction of reclamation projects by its neighbors, Ventura knew how to mobilize quickly when it realized how critical its need had become. In March,

5. Reclamation, *Ventura River Project, A Report on Feasibility, 1954,* 5.
6. Reclamation, *Ventura River Project, A Report on Feasibility, 1954,* 18.

1953, the Ventura River Municipal Water District (VRMWD) was formed so that a local legal body could seek arrangements with the Bureau of Reclamation to initiate water resource feasibility studies for the District on a match-fund basis. Once the cooperative investigation partnership between VRMVD and Reclamation was underway in 1953-54 the process progressed quickly.

Speed was possible for this project for several reasons. First, the area's need for water grew more critical with each passing year. This assured that there would be little objection to the building of the expensive project. In fact, when a $720,000 preconstruction contract between VRMWD and Reclamation required voter approval at a special election in November, 1955, it passed by a 30 to 1 margin.[7] Also, as was the case with the preconstruction contract, many steps of the process were carried out concurrently rather than consecutively, saving much time. So, while processing the Ventura River Project feasibility report through time-consuming Federal and State of California channels, the District was able to ready plans and specifications for immediate issuance upon the expected final authorization by Interior and Congress. It was also understood that, due to the area's propensity to experience drought, it could take several years for the proposed reservoir to store an adequate supply. Consequently, all parties involved attempted to expedite the typically lengthy Federal project process.[8]

Everything worked as planned, so when the planned $27.5 million Ventura River project was officially authorized on March 1, 1956, construction began immediately. The entire process, from the formation of the VRMWD to initial water deliveries to project beneficiaries in 1959, took six years, causing *The Reclamation Era* to report, "It is believed that this is a record with respect to elapsed time for conception, design, and construction of a Federal reclamation project"[9] Reclamation's Leland G. Bennett was to manage the project.

Construction History

The Ventura River Project works include some unique features. Because of extended

7. Leland G. Bennett, "Ventura River Project," *The Reclamation Era*, February, 1961, 5.
8. *Ibid*., 5.
9. *Ibid*., 4.

periods of drought often experienced in the area, the storage reservoir was originally planned to have a capacity of 250,000 a-ft, nine times the safe annual yield for the project (a safe yield figure that was later revised, making the new safe yield measurement of 21,900 ac-ft over eleven times the safe annual yield; in comparison, the neighboring Cachuma Project was built to endure seven years of drought).[10] Furthermore, the storage reservoir is located not on the Ventura River, but up a tributary, Coyote Creek, because it was the only suitable site in the area that could not only feasibly fit a reservoir of the proposed size, but that could also be used without extensive right-of-way and pollution problems. The Foster Park area, which is below the confluence where all of the streams in the Ventura River Basin collect - thus having the largest potential yield - was the only alternative area that was seriously considered. This sole advantage that Foster Park held over the Casitas site was also a disadvantage, however, in that a higher yield also meant more sewage would probably collect in the alternative Foster Park site. It was also evident that a Foster Park dam would inundate several more settlements than would Casitas, resulting in much more expensive right-of-way acquisitions and, furthermore, that a higher elevation site such as Casitas would make for cheaper pumping costs. What was referred to as the "Middle Casitas" location became the clear choice for the Ventura River Project damsite.[11]

The reservoir, a 2,700-acre body of water with a 31-mile shoreline named Lake Casitas, was formed by Casitas Dam and lies about eight miles from the city of Ventura. The $8.5 million contract to build the dam was awarded to Winston Brothers Company, which commenced construction on the planned 285-foot high, 2000-foot long, zoned earthfill structure in August, 1956. Winston would eventually move 9.5 million cubic yards of earth in constructing the dam, which is located about 2 miles above Coyote Creek's confluence with the Ventura River.[12]

Also built by Winston was a spillway located on the left abutment consisting of a concrete-lined inlet channel, an uncontrolled overflow concrete crest, and a concrete spillway

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10. The term "safe annual yield" refers to the amount of water that could safely be counted on each year; also, Reclamation, *Ventura River Project, A Report on Feasibility, 1954*, 190.
11. Reclamation, *Ventura River Project, A Report on Feasibility, 1954*, 192-3.
12. Bureau of Reclamation, *Annual Project History, Ventura River Project, 1956*, 14.

chute and stilling basin.

Casitas' outlet works which distribute water to District subareas through over 34 miles of pressure pipeline was, at the time of construction, described as "unique in Bureau experience."[13] It is a reinforced-concrete structure which rests on the sloping upstream face of the dam and encases a 48-inch steel outlet pipe which is fitted with nine hydraulically operated slide gates at uniform intervals between minimum and maximum reservoir water levels.

The works' outlet pipe connects to a 1,800-foot long outlet tunnel bored through the left abutment of the dam. The outlet tunnel is a 7-foot-diameter circular section for about one-half its length, the circular section terminating at a main valve chamber. From this point, the tunnel is an 8-foot horseshoe section and the water flows through a 51-inch steel pipe. A catwalk was also constructed alongside the pipe to permit access to the main valve chamber. Each outlet gate is fitted with a semi-cylindrical screen which can be removed and taken to a washrack above high water through the operation of a system of tracks, cables, and pickup carriage. The hydraulic slide gates are operated by means of a control house located at the top of the dam.[14]

With Casitas Dam located on Coyote Creek and the principal source for project water supply being the Ventura River, water for storage, other than the natural flow of Coyote Creek, was planned to reach Lake Casitas through the 5-mile long Robles-Casitas Canal. Construction of the $1.5 million canal and attendant Robles Diversion Dam works was awarded to a joint venture between M. H. Hasler Construction Company and F. W. Case Corporation. The diversion dam was located on the Ventura River 1.5 miles below its formation at the junction of Matilija Creek and that creek's north fork. The diversion dam is a low rockfill structure with a wooden sheet-piling cut-off wall and rolled earth core rising but 24 feet above the river yet having a crest length of 598 feet. The dam's sluiceway has a capacity of 10,000 cubic feet per second (cfs) and is controlled by four radial gates, with the water entering the diversion canal headworks at the dam being controlled by three radial gates.[15]

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13. Bennett, 6.
14. Bennett, 26.
15. Reclamation, *Annual Project History - Ventura River Project, 1960*, 15.

The Robles-Casitas Canal constructed by the Hasler-Case joint venture has a capacity of 500 cu-ft-sec and conveys water 5.4 miles from the Robles Diversion Dam on the Ventura River to Casitas Reservoir. It includes 4.25 miles of concrete-lined canal, one mile of 78-inch diameter reinforced concrete pipe, and 1/4 mile of rectangular drop chutes. The open canal has a width at the top of 27 feet, sloping to a bottom width of 7 feet.[16]

The Ventura River Project's conveyance system includes miles of pressure pipeline, five pumping plants, since much of the service area lies at a higher elevation than Casitas Reservoir, six steel tank balancing reservoirs for peak and emergency storage, and chlorination stations to disinfect the water.

The thirty-four miles of pipeline was constructed by the E. A. Irish Company for $5.4 million. The main conduit consists of reinforced concrete pipe and mortar-lined steel pipe ranging in diameter size from 54 to 12 inches. The system was interconnected with an existing pipeline from Matilija Reservoir to integrate the operation of the two systems. One 23.3-mile section of the main conduit extends from Casitas Dam to the Upper Ojai Valley and has an initial capacity of 135 cu-ft-sec. After crossing the Ventura River, it branches to serve the lower portions of the service area, including the City of Ventura and the higher elevation areas to the east and north of Casitas Reservoir. The 9.6 cu-ft-sec capacity Rincon pipeline (ranging in size from 21 inches to 16 inches in diameter) serves the west coastal area of the project. It starts at the dam where a pumping plant lifts the water 900 feet over Casitas Pass to the Rincon Balancing Reservoir near the coast, a distance of 9.7 miles.[17]

Other features of the Ventura River Project include: five pumping plants constructed by Robert E. Ziebarth and Sylvester B. Appler for $546,000; six balancing reservoirs built by Chicago Bridge & Iron for storing water during periods of peak demand and emergencies, ranging in total capacity from 250,000 gallons to 6.5 million; four chlorination stations done by Young & Anderson Company; and an automatic control and telemetering system installed by Santa Paula Electric Company which operates over leased telephone lines and automatically

16. *Ibid.*
17. *Ibid.*

stops and starts the motor units for each pumping plant on the line when either a certain water level is reached in the balancing reservoirs or there is a system failure.[18]

The overall cost of the Ventura River Project when all features were finished in 1959 was $29.6 million, with 57.33% of this figure being accounted to irrigation and the balance (42.67%) to municipal and industrial use. Operation and maintenance of all facets of the project were handed over to the VRMWD in 1959.[19]

Post-Construction History

It ultimately took a scant six years from the time of the Ventura River Project's germination in 1953 (when the VRMWD was created) to the first delivery of project water in Summer, 1959. Such proficiency and expedience is indicative of the project's operational history, for it escaped many of the problems that its neighboring Reclamation projects in Southern California experienced over the years. Due in part to luck but also to foresight, the project's objective of storing the Ventura River's floodwaters for the agricultural, municipal, and industrial use of an area that had long suffered chronic water shortages, has not been as subject to the mostly population-based pressures as has besieged such water projects as Cachuma and Santa Maria, whose managing districts have been forced to look at such options as the State Water Project and desalination plants in order to sufficiently supply their customers.[20] Over the past decade, Casitas Municipal Water District managers (CMWD - the new name for the VRMWD as of the late 1970's) have reduced the safe annual yield expected of the project by over 20%, from 27,900 a-ft to 21,900. This change was due primarily to the major drought that occurred in the late 1980's and early '90's, which forced managers to base their precipitation assumptions and, hence, their yield forecasts, on much drier periods in the Ventura area's climatic history, thus making more realistic demands on the project as a whole.[21]

This is not to say that the project has been wholly problem-free, however, for the

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18. *Ibid*., 18-9.
19. *Ibid*., 22.
20. Norris Hundley. *The Great Thirst: Californians and Water, 1770's-1990's*. (Berkeley: University of California Press, 1992), 400-1.
21. Telephone Interview with Dick Barnett, Chief Engineer, Casitas Metropolitan Water District (CMWD), July 18, 1995.

requisite Southern California floods and wildfires have certainly visited the Ventura River Basin from time to time. In 1969, two heavy winter rainstorms dropped up to thirty inches of precipitation over four days, causing a runoff of 30,000 cfs at Robles that would have filled Lake Casitas that winter, nine years earlier than it actually did, had the Robles Diversion dam not been breached. As it was, the violent storms washed out much of the diversion dam's embankment downstream of the redwood cut-off wall and destroyed 100 feet of the wood wall itself in the process.[22] Consequently, most of the prodigious runoff drained down the Ventura River, unclaimed, to the Pacific Ocean. Floods in 1978-79 that damaged the same cut-off wall but failed to breach the diversion dam did, in fact, both fill Lake Casitas and utilize the dam's spillway for the first time since the project was finished in 1959.

The largest wildfire of 1985 in the state of California also occurred high in the Ventura River watershed on mostly Los Padres National Forest lands. The 90,000-acre fire would have threatened Lake Casitas' stored resources with the inundation of turbid water if district officials had not treated much of the tainted incoming element with special purifying polymers. Afterward, the huge expanses of burned chapparal were reseeded to prevent the potential of future landslides.[23]

Sedimentation and seismicity have not caused the headaches for district officials at Ventura that they have caused other water project managers in Southern California. Sedimentation, an infamous villain at most regional reclamation developments, has robbed some reservoirs of over ten percent of their capacity (as is the case at Cachuma and Twitchell), but has not been particularly problematic at Casitas because of the project's make-up. Matilija Reservoir and Robles Diversion Dam, both upstream of Casitas, perennially hold most of the dropped silt in the river basin, leaving little to settle in and present problems at Casitas.[24]

Potential problems such as sedimentation were further mitigated in the late 1970's and early 1980's by an inter-agency (Forest Service, BLM, CMWD, and Reclamation) coordinated

22. Bureau of Reclamation, *Biennial Project History, Ventura River Project, 1969-70*, 2.
23. Telephone interview with Dick Barnett, Chief Engineer, Casitas Metropolitan Water District, July 18, 1995.
24. Telephone Interview with Dick Barnett.

effort to protect the "Casitas Watershed" and preserve its open space by withdrawing 69,000 acres of Los Padres National Forest lands from any potential development. The arrangement manages the area as open space under watershed protection guidelines expressly for the purpose of ensuring Casitas water quality.[25] As recently as 1994, the California State Health Department's sanitary survey of watersheds and water quality graded Casitas and its surroundings highly, demonstrating that such interagency conservation measures were very successful.[26]

The ever-present problem of earthquakes was addressed in the early 1980's when a SEED Report (Safety and Evaluation of Existing Dams) on Casitas Dam classified it with a "Poor" grade because of the potential for liquefaction of the dam's foundation during a high magnitude earthquake which could cause damage to the slope intake structure. The problem was mitigated when computerized piezometers placed in the dam embankment recorded satisfactorily-low levels of seepage. Consequently, Casitas Dam's safety classification was upgraded to safe status.[27]

Recreation has long been a prime activity at Lake Casitas. The area is highly populated and the reservoir has served as a popular activity spot for the many residents in the area. In 1980, over 1.5 million people visited Casitas.[28] Activities include boating, fishing, and camping. In 1984, Lake Casitas had the distinction of hosting rowing events for the Los Angeles Olympics.

Settlement of the Project

Upon conception of the Ventura River Project in 1953-54, it was hoped that a total of 13,200 acres of agricultural lands could ultimately be irrigated within project boundaries. Due to urban expansion, much of the potential farm lands were developed for other uses. As a result, the project has never supplied water to more than 7,000 acres of agricultural lands, with even

25. Reclamation, *Biennial Project History, Ventura River Project, 1979-80,* 13.
26. Telephone interview with Dick Barnett.
27. Bureau of Reclamation, Division of Dams and Structural Safety, *SEED Report on Casitas Dam, 1983,* Denver, Colorado, 2-4.
28. Reclamation, *Biennial Project History, Ventura River Project, 1979-80,* 2.

that number being frozen as of 1995 by CMWD for conservation purposes.[29] The Rincon area of the project, located near the coast to Ventura's west, has increased its agricultural acreage over the years, growing mostly avocados.

Although the population of the area has exploded since the project's inception, with the city of Ventura increasing from 25,000 to 92,000 residents from 1955 to 1990 (surpassing project planners forecasts which saw Ventura having a population of approximately 75,000 in 1990), the project's capacity allows it to serve no more than approximately 60,000 municipal customers.[30]

Uses of Project Water

The distribution of project water over the years shows that sixty to seventy percent of the supply has gone to irrigation and the balance (typically from 10,000-12,000 a-ft) to municipal-industrial uses.[31] Irrigated agriculture in the Ventura River Basin consists primarily of citrus, avocados, and berries. Project water is also used for recreation on Lake Casitas, where boating, fishing, and camping are very popular.

Conclusion

The Ventura River Project was Reclamation's third and last California seacoast project. These versatile projects helped sustain agricultural in a region which annually averages roughly fifteen inches of rain, sending to market such products as lemons, strawberries, avocados, walnuts, and grapes. They also attempted to quench the thirst of an exploding urban population which surpassed all water planners' long-range forecasts. These factors combined put immense pressures on these projects, asking them to do things of which they were not always capable. And the vagaries of the Southern California climate did not help matters, for it seemed it either rained in epic proportions or not at all - and these seacoast works were entirely dependent on it.

All in all, seacoast projects such as Ventura River allowed for economic growth in a landscape that had many constraints placed upon it, the foremost being a lack of water. While

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29. Telephone Interview with Dick Barnett, July 18, 1995; Reclamation, *Annual Project History - Ventura River Project, 1960*, 10; Reclamation, *Summary Statistics - Water, Land, and Related Data*. (Denver, 1990), 175.
30. Reclamation, *Ventura River Project, A Report on Feasibility, 1954*, 8.
31. Reclamation, *Summary Statistics - Water, Land, and Related Data*, (Denver, 1990), 78.

the project helped supply enough of the liquid resource to prop up the area during the post-war boom years, its future, like that of much of Southern California, remains in question. Ironically, it is precisely such grand water developments as Ventura River, Cachuma, and Santa Maria that are to blame, for their presence opened the region to more people than could otherwise live there. But there exists only so much rainfall to capture. And as the region's population continues to escalate, additional water must be located to meet their needs. This is evident in nearby Santa Barbara, among other places, where the local water district has been forced by growth pressures and a lack of water to build a desalination plant and tap into the huge and expensive State Water project. This, in turn, will once again allow for additional growth. Unchecked, the process appears to go on and on, pushing the limits of nature, exhausting the land and its resources.

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