Colorado River Aqueduct

for *Water Politics and The Environment in The United States: An Encyclopedia*
Mesa Verde Publishing/CQ Press — 750 words

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August 5, 2009

The Colorado River Aqueduct (CRA) conveys water from the Colorado River (at Lake Havasu/Parker Dam on the California/Arizona border) to Lake Mathews, which is near Riverside, California. Starting at an elevation of about 450 feet, water is pumped through five plants (total lift of 1,617 feet) over 242 miles of dry uneven terrain to a final elevation of about 1,350 feet. The CRA has 92 miles of tunnels, 63 miles of lined canals, 55 miles of covered canals and 29 miles of inverted siphons. The CRA has a rated capacity of 1,800 cfs or 1.3 maf/year (SDCWA, 1946). After entering service in 1941, the CRA played a critical role in Southern California's post-WWII growth. Today, the CRA supplies 20–25 percent of the 4 mafy used in urban Southern California.

The CRA was built by the Metropolitan Water District of Southern California (MWD) between 1933–1941. MWD was formed in 1928 to build and operate a CRA that would bring water to a "parched" Southern California. Although MWD promised that the CRA would relieve "imminent" water shortages, increase property taxes only slightly, create jobs, and "perfect" MWD's rights on the Colorado River, three of these claims were false. There was no shortage in the *region*, property taxes rose far higher, and MWD's water rights were cut from 1,212 taf to 550 taf in the 1963 *Arizona vs. California* decision. The CRA *did* employ 10,000 workers — about 1.2 percent of all workers in the region (Zetland, 2009, Chapter 3). Nonetheless, voters believed Met and approved the $220 million bond — the largest in the region's history — in September 1931. The CRA actually cost $190 million.

CRA pumps use hydroelectric power that travels over 237 miles of transmission lines from Hoover Dam. The Department of the Interior awarded 36 percent of the 50-year contracts for Hoover power to MWD in April 1930 — before MWD had the money to build the project that would use the power. Today, MWD has contracts for 28.5 percent of Hoover Dam's 2,080 MW capacity. These contracts are sufficient to pump 800 taf of water; MWD needs to buy power on the "open market" to cover the next 500 taf. Depending on volume and energy prices, it costs MWD $70-100/af to move water through the CRA (Zetland, 2009, Chapter 2). In comparison, MWD pays $135–294/af for water it buys from the State Water Project.

The CRA is significant in several ways. Like the 1913 Los Angeles Aqueduct (LAA, 485 cfs capacity) or 1934 Hetch Hetchy Aqueduct (HHA, 465 cfs capacity), it brings water to urban areas. Unlike these gravity-flow aqueducts, it uses pumps to move water. Further, the

CRA was put into operation without any firm customers. The LAA was built for existing municipal and industrial users; HHA was built for M&I users in San Francisco and south.

The CRA's "supply without demand" character emerged from conflicting needs. Although Los Angeles had plenty of water from the LAA, it ran the LAA at full capacity to generate power. LA used its "surplus" water as a reward to neighboring areas that agreed to annex to the City. Between 1910 and 1932, LA grew from 90 to 450 square miles. (The "shortage," speculation and corruption portrayed in Robert Townsend's 1974 film *Chinatown* draws events around *both* the LAA and CRA.) LA wanted the CRA and put up the money to study the idea and form MWD — only because the CRA made Hoover Dam — and its generating capacity — more likely. Neighboring cities (Pasadena, Burbank, etc.) wanted a water supply that was not controlled by LA. They made a deal: LA would provide money; the other 12 founding members of MWD would provide political support in Sacramento and Washington DC. LA got 19 percent of the contracts for Hoover power in 1930 and gets 15.4 percent today.

The trouble began when the per unit cost of water turned out to be roughly three to five times the cost of local water. At "break-even" prices, demand was weak: MWD projected sales of 400 cfs, but only sold 20 cfs in 1942. MWD's solution — subsidized prices and expansion — eventually created demand but also established a precedent of cheap water and sprawling urbanization that continued into the 1980s.

(On a positive note, nobody claims that the CRA harms the environment — unlike the LAA or HHA. That's because everyone assumes that the Colorado River will be diverted. Colorado over-allocation originates with a badly-designed Colorado River Compact.)

For current residents of southern California, the CRA is a valuable source of water to their increasingly drought-prone region. Unfortunately, they may not understand how the CRA probably increased demand more than supply. Put differently, the CRA's development made today's shortages *more* likely.

References

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