

III - HISTORY OF PROJECT

3-01. Authorization

Brea Dam, one of the units of the flood-control project for the San Gabriel River Basin and Orange County, California, was constructed under authorization of the Flood Control Act of 22 June 1936 (as amended). The Corps of Engineers is responsible for the operation and maintenance of the project. Section 5 of the aforementioned act authorizes construction of Brea Dam under the following paragraphs:

LOS ANGELES AND SAN GABRIEL RIVERS, CALIFORNIA

Construction of reservoirs and principal flood channels in accordance with plans to be approved by the Chief of Engineers on recommendation of the Board of Engineers for Rivers and Harbors at an estimated construction cost not to exceed \$70,000,000; estimated costs of lands and damages, \$5,000,000.

SANTA ANA RIVER, CALIFORNIA

Construction of reservoirs and related flood-control works for protection of metropolitan area in Orange County, California, in accordance with plans to be approved by the Chief of Engineers on recommendation of the Board of Engineers for River and Harbors, at an estimated construction cost not to exceed \$13,000,000; estimated costs of lands and damages, \$3,500,000.

3-02. Planning and Design

The flood of 1916 and the agricultural growth of Orange County in the 1920's gave rise to the need for improved flood protection on the County's coastal plain, and for development of a system to replenish the groundwater that was being used at an ever increasing rate. The Orange County Flood Control District envisioned a plan that would address both of these issues, and outlined it in their 1929 report, "The Control of Floods and Conservation of Water".

The original plan for the Brea Creek watershed was to construct a storage dam on each of the two forks of Brea Creek. A dam on each of the forks was necessary because a single dam on Brea Creek below the confluence of the forks would have inundated nearby oil fields. Stored water was to have been released downstream and diverted, below the confluence, into the Fullerton Creek watershed and stored behind Fullerton Dam. Releases from Fullerton Dam would then be transmitted to Carbon Canyon Creek via a conduit and subsequently released into the Santa Ana River with the intent of recharging the groundwater aquifer.

It appears that Orange County originally submitted a report on the overall Santa Ana River Basin and

Orange County project and applied for a grant under the Federal Emergency Relief Appropriation Act of 1935. The project was later authorized under the Flood Control Act of 22 June 1936 (as amended).

The Flood Control Act did not authorize any storage for water conservation; therefore Brea Dam was constructed for flood control only. The present dam site was chosen because a greater amount of flood water could be impounded than at the sites proposed by the county. A hydrologic study for Brea Creek was performed in November 1939, and the analysis of design for Brea Dam was accomplished based on the derived hydrologic information in February 1940 (Ref. 1939 Hydrology in the Brea Creek Drainage Area, and 1940 Analysis of Design listed on pl. 1-01). The Dam was named Brea because of its location.

3-03. Construction

Construction of Brea Dam was started in July 1940 and completed in March 1942. The cost of the project, which was financed by Federal funds, was \$1,417,815.

3-04. Related Projects

The other components of the flood control system related to Brea Dam are Fullerton Dam and Carbon Canyon Dam. These facilities are discussed in section 4-11 of this manual. All three facilities are operated independently of each other. Their operation only influences flow conditions in their immediate downstream areas.

3-05. Modification To Regulations

At the time of construction of Brea Dam in 1942, a capacity of 1,330 cfs for the downstream channel of Brea Creek was adopted as the regulated outflow from the dam. Modifications to the operating schedule since then have been minor. The original design water control plan for Brea Flood Control Basin is presented in the report, "Brea Creek Improvement, Brea Dam, Analysis of Design," dated February 1940. The plan established a debris pool by keeping both gates closed until the sill; of the ungated outlets was reached at water surface elevation 251.0 feet. Above this elevation, the gates were operated to maintain outflow equal to inflow to a maximum discharge of 1,330 cfs. With increasing flow, the gates were operated to maintain a constant outflow of 1,330 cfs, including discharge through the ungated openings. During falling stages, the maximum outflow of 1,330 cfs was maintained until the water surface receded to elevation 251.0 feet. Below this elevation, water was released at a non-damaging rate. This plan was in effect until 1970.

A water control plan, adopted in 1970, had both gates initially open one foot to pass small flows. The gates were operated to increase the outflow to approximately 1,330 cfs at water surface elevation 232.0 feet, and to maintain this outflow to spillway crest (elev. 279.0 ft.). Above spillway crest, the gates were gradually closed, transferring flow to the spillway. During falling stages, the reverse schedule was followed. In 1970, a maximum discharge of 1,400 cfs was adopted to regulate the outflows, and in 1982, the gate opening for the initial stage

was changed from 1.0 to 3.5 feet. This plan will be referred to as the "Previous Plan" in the remainder of this manual.

The current water control plan adopts 1,500 cfs as the limiting release for reservoir elevations up to the spillway crest. This limiting release is consistent with the downstream channel capacities which vary from 1,500 cfs (for the unlined channel near Hillcrest Park) to 11,000 cfs.

3-06. Principal Regulating Problems

There have been no major problems in the regulation of Brea Dam since construction was completed in 1942. The dam has never spilled; there have never been any structural deficiencies or major hydraulic malfunctions.

The trash rack at the entrance to the intake structure occasionally becomes clogged from excess debris accumulation (Photo No. 3-01); periodic maintenance is necessary to remove the accumulated trash and debris. As much as 8 feet of sediment has been deposited at the intake structure as a result of storm runoff. The sediment accumulation occasionally causes the digital recorder float to become stuck. The float eventually becomes dislodged when the buoyant force caused by increasing reservoir head becomes great enough to do so. The result, however, is an erroneous jump in the digital reading.

Photograph 3-02 shows sediment deposition at Basque Avenue in the channel downstream from Brea Dam. Debris and sediment accumulation occurred at Basque Avenue in 1980. Although the accumulation was significant, peak flows were contained within the channel. During the flood of 1983, flows briefly overtopped the channel just upstream of Basque Avenue. Reduced channel capacity due to sediment accumulation was the probable cause of the breakout. Removal of such accumulation is the responsibility of OCEMA.

An oil spill occurred within the Brea Creek basin several miles upstream of the dam in January, 1983. A constant reservoir water surface was maintained to aid in the clean up of the oil from reservoir lands. A minimal amount of oil passed the dam and ultimately reached the ocean. The spill, which was cleaned up shortly thereafter, was considered insignificant by the Regional Water Quality Control Board and the Environmental Protection Agency.

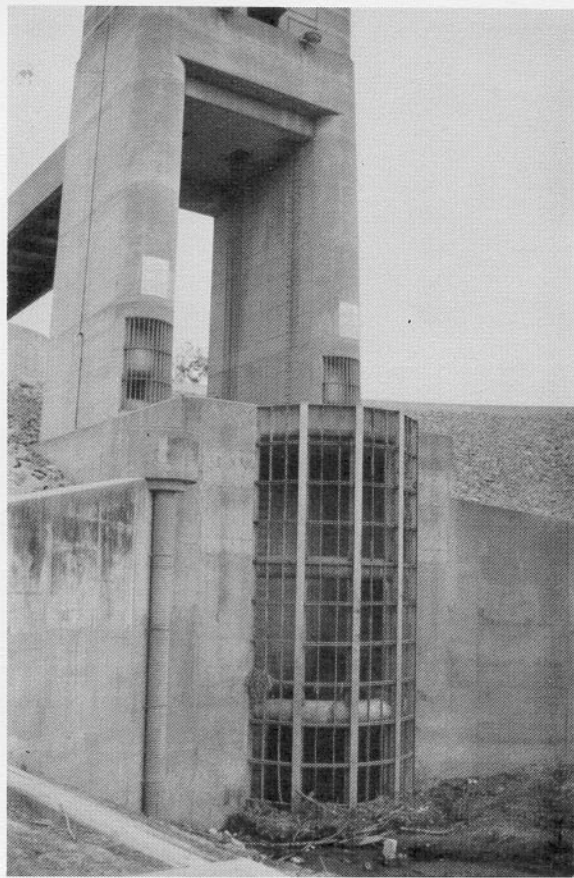


Photo 3-01. Debris intake structure trash rack. Note debris accumulation at base and hanging from structure.



Photo 3-02. Sediment deposition at Basque Avenue (view toward upstream).