

**Woodside, Greg**

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**From:** Miller, Craig  
**Sent:** Sunday, December 04, 2005 11:04 PM  
**To:** Woodside, Greg; Deshmukh, Shivaji; Hutchinson, Adam; Garey, Kirsten; Chris McNevin (E-mail); Kuperberg, Joel  
**Subject:** FW: Prado Dam water conservation operations  
**Attachments:** State Board-Olson-letter.doc

FYI

-----Original Message-----

**From:** Weintraub, Mark M SPL [mailto:Mark.M.Weintraub@spl01.usace.army.mil]

**Sent:** Thursday, December 01, 2005 11:43 AM

**To:** solson@swrcb.ca.gov; solson@waterboards.ca.gov; Miller, Craig

**Cc:** Minch, Lawrence N SPL; Self, Heather M SPL; Kuz, Annette B SPD; Curtis, Kerry S SPD; Hostyk, Aaron H HQ02; Morris, Kenneth R SPL; Moore, Brian M SPL; Sigur, Patricia C HQ02; Tracy, Brian G SPL; Evelyn, Joseph B SPL; Langlois, Henri A SPD; Watt, Alexander C SPL; Krhoun, Frank W SPD; Tong, Lester SPD; Lamb, Deborah L SPL

**Subject:** Prado Dam water conservation operations

<<State Board-Olson-letter.doc>>

Mark M. Weintraub  
Principal Assistant District Counsel  
(213) 452-3930

December 1, 2005

Office of the  
District Counsel

Samantha K. Olson, Esq.  
Division of Water Rights  
State Water Resources Control Board  
1001 I Street, 14<sup>th</sup> Floor  
Sacramento, California 95814

Dear Ms. Olson:

This letter is provided as a response to the State Water Resources Control Board's (the "Board") letters of October 25, 2004 and July 21, 2005 to the U.S. Army Corps of Engineers ("Corps"). It is also intended to confirm the phone conversation on November 23, 2005 with you, Heather Self representing the Corps of Engineers, and me regarding water conservation operations and water rights at Prado Dam, Riverside County, California.

Prado Dam was authorized by the Flood Control Act of 1936 (PL 74-738), which, under the heading "Santa Ana River, California," provided for:

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 Rivers and Harbors, at an estimated construction cost not to exceed \$13,000,000; estimated cost of lands and damages, \$3,500,000.

Although water conservation is not expressly mentioned in the authorizing legislation, the Corps of Engineers reports developed in conjunction with the authorizing legislation clearly demonstrate that water conservation was recognized as an incidental purpose of this project.

The District Engineer submitted his plan for Prado Dam in a letter report entitled, "Definite Project for the Construction of Reservoirs and Related Flood Control Works in Orange County, California, Authorized by the Flood Control Act of 1936." The reported, dated December 21, 1936, states:

General: The Prado Retarding Basin is located on the Santa Ana River in Riverside County, California, about two miles north of the Orange County line. Its primary purpose is flood protection for those residents of Orange County whose lands have previously been subject to the destructive action of uncontrolled flood waters. There is also a water conservation feature to be utilized in connection with the automatic release of flood waters. Due to the high absorptive qualities of the material underlying the river bed below the dam, and the large natural underground storage characteristic [sic] of the valley, it will be possible

through automatic regulation to conserve a large portion of the flood flows heretofore wasted to the ocean.

The storage capacity of the retarding basin below spillway crest elevation is 180,000 acre-feet. The Orange County Flood Control District has estimated that the practical capacity of the Santa Ana River below Prado Retarding Basin is approximately 6,000 cfs. In order to limit the outflow to this quantity it is necessary to provide the storage capacity of 180,000 acre-feet with the retarding basin operated for flood control and conservation as described below. The Orange County Flood Control District has assumed that the channel downstream from the proposed Prado Dam site will absorb by percolation from flows of 1,000 to 2,000 cfs. It was further assumed that the retarding basin could safely be operated for conservation to elevation 507.5 (capacity of 54,000 acre-feet). The remaining net storage capacity of 126,000 acre-feet is to be reserved for flood control. It is proposed to secure the conservation operation by omitting the gate on one of the 4 ft. by 8 ft. conduits.

The District Engineer's report was reviewed by the Division Engineer who recommended tentative approval with further study of flood flows and soil tests. The Board of Engineers for Rivers and Harbors concurred on March 8, 1937. The Chief of Engineers approved the Division Engineer's recommendations on March 12, 1937. Subsequent documents contain similar language recognizing water conservation as a proper purpose of Prado Dam.<sup>1</sup> A report dated April 15, 1937 contains the following

The primary purpose of the proposed Prado retarding basin is for the protection of that part of the metropolitan area of Orange County which is subject to overflow from the Santa Ana River. Incidental to this primary purpose, the flood waters are to be released at such rates as will permit a maximum conservation of water by storage underground. Also, by automatic release of the normal low water flow, the existing low water flow conditions are to be maintained.

When Prado Dam was completed in 1941, it was constructed with six gated outlets and two ungated outlets. The ungated outlets discharged about 1,900 cubic feet per second (cfs) at water elevation 507. This flow was the estimated absorption capacity of the downstream river bed and spreading grounds. After construction, it was discovered that the absorption capacity was smaller and water was being wasted to the ocean. The Orange County Water District

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<sup>1</sup> See also *The Analysis of Design*, May 14, 1938 (stating "Further, the adopted operation would conserve a large portion of the flood flows, heretofore wasted into the ocean. This is possible due to the high absorption qualities of the materials underlying the river bed below the Dam, and the large, natural underground storage characteristics of the valley. Local interests estimate these spreading grounds to have an absorption capacity of 2,000 cfs."); Report of July 1939 ("The general plan of the district engineer recommends the construction of eight flood control basins [one of which is Prado], the Loftus Diversion Channel, and channel improvements in the lower Santa Ana River, or as many items thereof as can be built for the \$13,000,000 authorized by Congress. The flood control basins will serve the triple purpose of reducing peak run-off, storing debris carried by the streams, and retarding flood flow so that it will be released at a rate which is within the capacity of the channels below. The retardation of flow will permit increased percolation into the stream bed, thereby conserving a part of the run-off which would otherwise waste into the ocean. ... Plans and specifications for the construction of Prado Dam and appurtenant works, the largest of the eight structures proposed under the existing authorities, have been approved by the Chief of Engineers, and construction is being prosecuted under private contract.").

("OCWD") in conjunction with the Orange County Flood Control District ("OCFCD") requested that the two ungated outlets be sealed so that water conservation operations downstream of Prado Dam could be optimized. With Office of the Chief of Engineers approval, the west ungated outlet was sealed in 1946, and the east ungated outlet was sealed on May 29, 1969.

The revised reservoir regulation schedule, after the 1946 closure of the west ungated outlet, provided for unregulated flow through the remaining ungated outlet, with the six flood control gates remaining closed, up to water elevation 514.00 feet. The schedule uniformly increased the flow in small increments from 1,240 cfs at water elevation 514.00 feet to 9,170 cfs at water elevation 518.5 feet. Thereafter, the six flood control gates would be operated to maintain an average outflow of about 9,200 cfs up to the spillway crest elevation of 543.00 feet. At spillway crest elevation the gates were to remain open during uncontrolled spillway flows.

In February of 1969, the Corps revised its design flood criteria for Prado Dam, resulting in the Standard Project Flood that was much larger than the original reservoir design flood. The Standard Project Flood could not be controlled without large spillway outflow. In an effort to achieve a greater level of flood control protection, the reservoir regulation schedule was modified to begin gated flood control releases at water elevation 490.00 feet. Before initiating larger gated flood control releases, it is necessary to build a pool of water (debris pool) to submerge the gates to prevent vortices from sucking floating or partially submerged debris into the outlet works. A debris pool elevation of 490.00 feet was established. The revised regulation schedule called for unregulated flow through the remaining ungated outlet, with the six flood control gates closed up to water elevation 490.00 feet. At water elevation 490.00 feet the unregulated release of 890 cfs would be uniformly increased to 9,120 cfs at water elevation 491.4 feet. From water elevation 491.4 feet to spillway crest 543.00 feet an average outflow of 9,250 cfs would be maintained.

The reservoir regulation schedule was revised again in August of 1969 to account for limitations in the downstream channel conveyance capacity, and the closing of the remaining ungated outlet. Operational experience gained during the January and February 1969 flood events revealed that the lower Santa Ana River was not capable of safely conveying the 9,250 cfs releases called for in the reservoir regulation schedule. Releases of up to 5,000 cfs during the 1969 flood events caused severe damage to the downstream channel. Also, the joint request of OCWD and OCFCD in 1963 to seal the last remaining ungated outlet was approved by the Office of the Chief of Engineers.<sup>2</sup> Both of these factors necessitated the formulation of a revised regulation schedule. The revised schedule called for the formation of a debris pool to water elevation 490.00 feet from which water conservation releases would be made in coordination with OCWD. Above water elevation 490.00 feet releases would be uniformly increased to 4,870 cfs at water elevation 490.8 feet. From 490.8 feet to spillway crest elevation 543.00 feet the gates would be operated to maintain an average outflow of 5,000 cfs.

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<sup>2</sup> Part of the delay in processing the 1963 joint application of OCWD and OCFCD for closure of the remaining ungated outlet was a water rights controversy. This controversy was eventually resolved by Judgment No. 117628 of the Superior Court for the State of California for the County of Orange (Orange County Water District v. City of Chino et al.), in which it was held that the "Lower Area water users [OCWD] and other entities may make full conservation use of Prado Dam and reservoir, subject only to flood control use."

Downstream channel deficiencies necessitated further revision to the regulation schedule in 1990. The water control plan introduced a buffer pool from water elevation 490.00 feet to water elevation 494.00 feet with which the water control manager can limit release from Prado Dam to less than 2,500 cfs. The reservoir regulation schedule calls for the formation of a debris pool to water elevation 490.00 feet from which releases are coordinated with OCWD in order to minimize the wasting of flood waters to the ocean. Releases are gradually increased to a maximum of 2,500 cfs from water elevation 490.00 feet to 494.00 feet, should runoff and weather forecasts indicate that the reservoir pool will rise higher than water elevation 494.00 feet. Under favorable hydrologic and reservoir conditions, releases from the buffer pool (i.e., water elevation 490.00 to 494.00 feet) are made at rates that facilitate OCWD's groundwater recharge activities. Above water elevation 494.00 feet releases are made at increased rates determined by the water control manager based upon runoff and weather information.

The 1990 reservoir regulation schedule is essentially the plan that Prado Dam operates under today, with some minor revisions and changes to accommodate the ongoing construction within the basin to raise Prado Dam, modify the outlet works, and construct downstream channel improvements. These modifications are reflected in the existing 1994 Interim Water Control Manual for Prado Dam.<sup>3</sup> The water conservation operations remain as described in the 1990 schedule.

Beginning in 1991, the Corps and OCWD began to formalize the water conservation operations at Prado Dam through the use of Memorandums of Agreement. The current agreement for water conservation operations at Prado Dam is the 1993 Memorandum of Agreement ("1993 MOA") signed by the Assistant Secretary of the Army. The 1993 MOA calls for water conservation releases of 250 to 600 cfs to be made from Prado Dam between water elevations 490.00 and 494.00 feet from October 1 to February 28 /29 each year. From March 1 to August 31 of each year, water conservation releases of 250 to 600 cfs are to be made between water elevations 490.00 and 505.00 feet. These water conservation release rate obligations are subordinate to releases necessitated by flood control operations of the dam and the Corps' environmental obligations.

The Corps prepared the "Prado Basin Water Conservation Reconnaissance Report" in July 1996 under the authority of HR 101-96, June 20, 1989. This report recommended that a feasibility study be conducted to complete the plan formulation and evaluation process of increasing water conservation operations at Prado Dam. During the preparation of this feasibility study and its associated environmental documentation, the Board submitted two comment letters to the Corps inquiring as to the authority under which the Corps operates Prado Dam for water conservation. The history set forth above responds to the Board's query.

The February 2005 Prado Basin Water Conservation Feasibility Study's recommended alternative is to increase water conservation operations at Prado Dam to water elevation 498.00 feet from October 1 to February 28 /29. Water conservation operations from March 1 to August 31 will remain at water elevations up to 505.00 feet. In response to the feasibility study,

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<sup>3</sup> This manual is available at <http://www.spl.usace.army.mil/resreg/htdocs/Publications.html>

Congress directed the Corps to enter into a new agreement with OCWD for seasonal water conservation up to elevation 498.00 during the flood season at Prado Dam.<sup>4</sup>

The Corps and OCWD are putting together a new Memorandum of Agreement that will extend the top of the buffer pool at Prado Dam from elevation 494 to 498 feet National Geodetic Vertical Datum (“NGVD”) between October 1 and February 28/29. When the space within the buffer pool is not needed for flood control water may be temporarily held there to provide for water conservation releases that are consistent with OCWD’s ability to recharge the release to groundwater. This modification would be incorporated into a revised Water Control Manual.

During the non-flood period from March 1 to August 31, the top of the buffer pool is extended to elevation 505 feet NGVD. Water may be stored up to this elevation for water conservation, if the space is not needed for flood control, with the provision that when the pool is between elevations 494 and 505 feet NGVD, average releases must equal or exceed 500 cfs. This minimum required release is made to comply with the Corps’ and OCWD’s obligations for preservation of the endangered Santa Ana sucker and least Bells vireo. This non-flood period operation schedule would remain unchanged in the revised Water Control Manual.

Although pools may be held behind Prado Dam for water conservation for several months, at no point in the water conservation operation does the average detention time exceed 30 days. The duration of a pool behind the dam depends on how much inflow is received. The average detention time of water within the pool depends on the rate at which water is released.

In the worst case scenario for average detention time during the non-flood period, water conservation occurs when the pool is at elevation 505. At this point there would be a maximum of 25,760 acre-feet of water stored in the reservoir. As stated above, there is a minimum required release of 500 cfs when the pool is this full. This release rate is approximately equal to 1000 acre-feet per day. The average detention time of water in the reservoir would therefore not exceed 26 days. Smaller pools will have shorter average detention times.

The worst case scenario for average detention time during the flood season would occur when the pool is at elevation 498. At this point there would be a maximum of 13,460 acre-feet of water stored in the reservoir. It is theoretically possible, but unlikely, that OCWD could request sustained releases as small as 250 cfs when the pool is at this elevation. This release rate is approximately equal to 500 acre-feet per day. The average detention time under this scenario would therefore not exceed 27 days.

All the storage space at Prado Dam remains allocated to flood control. No storage space is allocated to water supply. Seasonally variable use of a portion of the flood control storage space for water conservation is made only to the extent that it does not adversely affect downstream flood protection or adversely impact endangered species. None of the water conservation operations currently ongoing or planned for the future at Prado Dam result in average detention times of water being “stored” behind Prado Dam exceeding 30 days. Accordingly, and as we discussed on the telephone, the Corps’ water conservation operations at Prado Dam on behalf of OCWD do not require a storage permit under California state water law.

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<sup>4</sup> Section 110 of the Consolidated Appropriations Act of 2005 (PL 108-447).

This information explains the nature of water conservation operations occurring at Prado Dam. As we discussed, this information should enable the Board to send a letter to the Corps concurring with our conclusion that neither OCWD nor the Corps is required to secure a water storage permit, and that the Corps is free to continue its operations of Prado Dam for water conservation without infringing on the jurisdiction of the Board. As is made clear from the information laid out above, the Corps has Congressional authority to operate Prado Dam for the purpose of water conservation.

Your continued understanding and cooperation as we work toward resolving this issue is greatly appreciated. Should you have any questions please contact me at (213) 452-3930 or Heather Self at (213) 452-3152 or [Heather.M.Self@usace.army.mil](mailto:Heather.M.Self@usace.army.mil).

Sincerely,

Mark M. Weintraub  
Principal Assistant District Counsel

Cf: Craig Miller, Orange County Water District, via e-mail  
U.S. Army Corps of Engineers South Pacific Division, via e-mail  
U.S. Army Corps of Engineers Headquarters, via e-mail