

CASE STUDY REPORT #52
NEW DON PEDRO
TUOLUMNE RIVER

I. Project Description

New Don Pedro Dam was constructed on the Tuolumne River by the Turlock and Modesto Irrigation Districts in 1971 (Figure 1). The reservoir has a maximum storage capacity of 2,030,000 acre-feet and covers a maximum surface area of 12,960 acres. The dam was built to store and regulate waters for irrigation and hydro-electric power generation. The City of San Francisco pays the Turlock-Modesto irrigation districts for storage as part of their Hetch Hetchy operation (see Case Study #47).

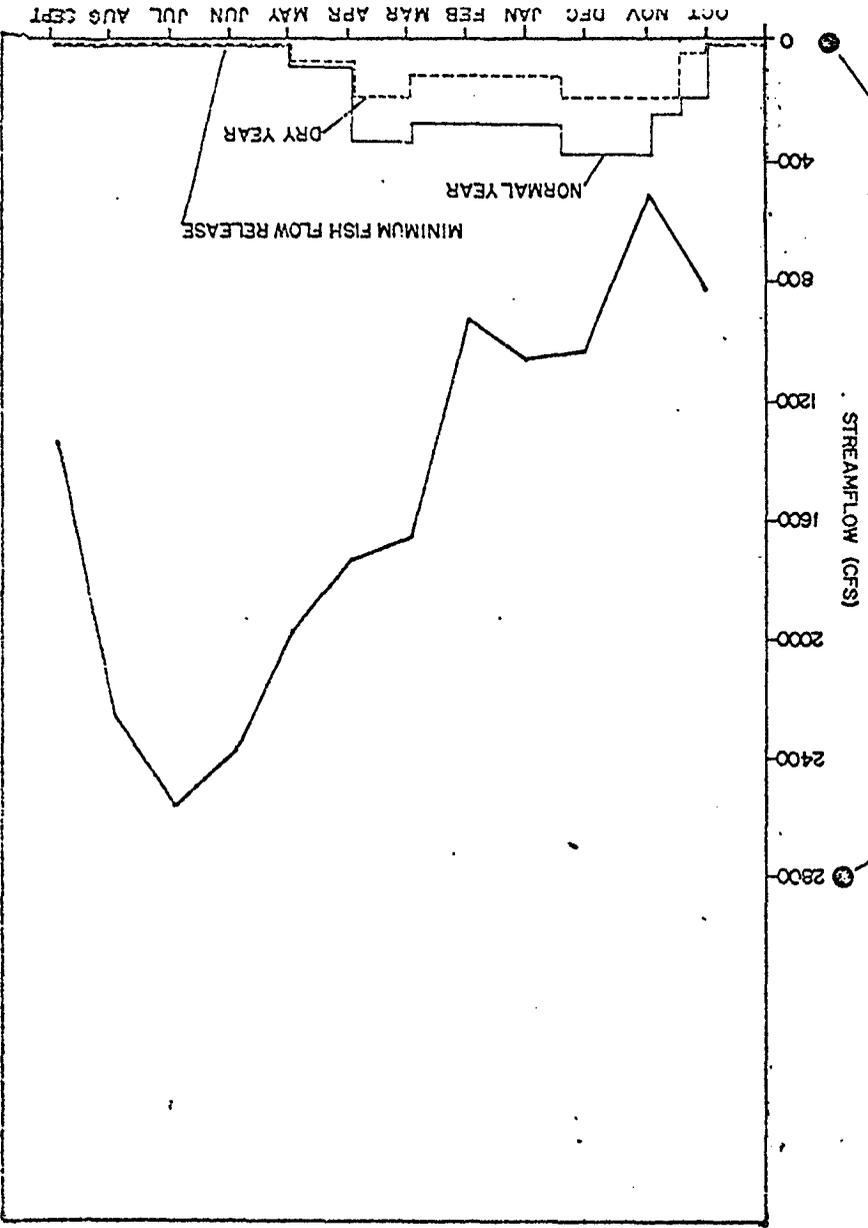
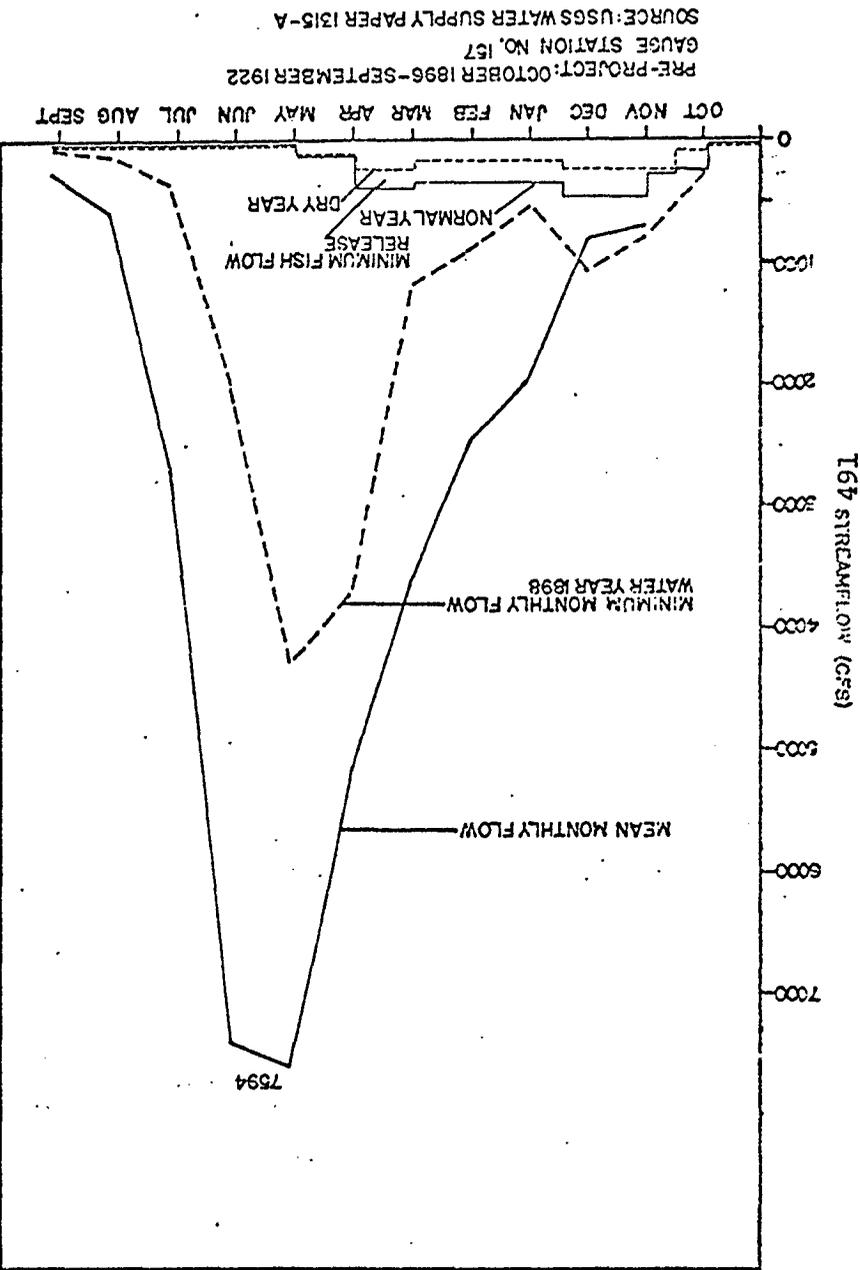
II. Pre-Project Condition

The Tuolumne River originates at the base of a glacier on the western slope of 13,000 foot high Mt. Lyell in Yosemite National Park. The Tuolumne River flows westward for a distance of 158 miles to join the San Joaquin River near the city of Modesto, draining an area of about 2,000 square miles. It was impounded above Don Pedro in 1923 in Yosemite National Park (see Hetch Hetchy Case Study #47).

Instream flows near the site of New Don Pedro Dam in 1971 were influenced by the Hetch Hetchy project but reacted primarily to annual spring run-off from snowmelt.

Pre-project instream flow conditions (Figure 2) indicate a maximum flow of 7,594 cfs occurring in May and the flow generally remained above 250 cfs for 11 months of the year.

FIGURE 2
 STREAMFLOW CONDITIONS, DON PEDRO DAM
 TUOLUMNE RIVER ABOVE LA GRANGE DAM NEAR
 LA GRANGE



POST-PROJECT: OCTOBER 1970 - SEPTEMBER 1973
 GAUGE STATION NO. 11289500, 11289500, 11289000
 SOURCE: SURFACE WATER RECORDS VOL. 2

C-064473

C-064473

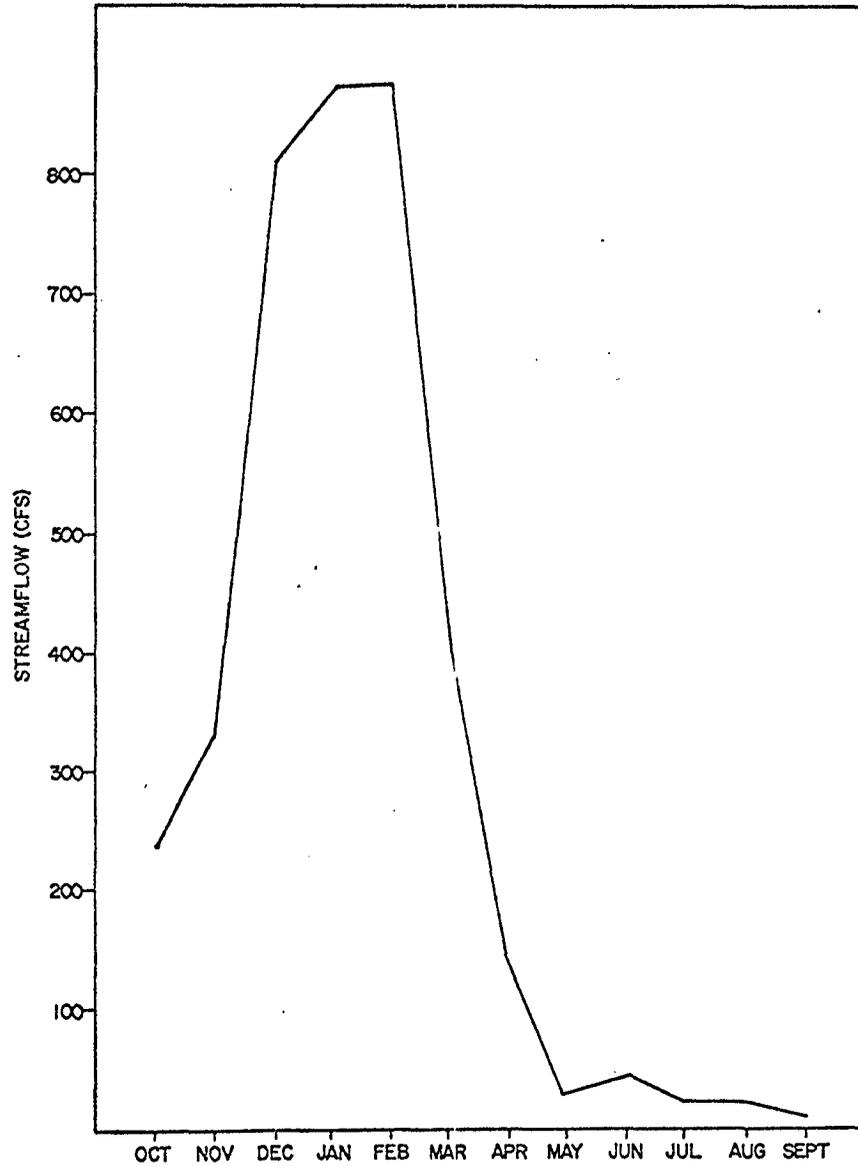
The Tuolumne River supports a significant fishery especially in the upper, coldwater reaches of the river. Rainbow, brown, brook and golden trout inhabited the upper reaches. Rainbow trout ranged as far downstream as the present location of New Don Pedro Reservoir. Largemouth and smallmouth bass, bluegill, white catfish, and other warmwater fish were common in the lower foothill and valley reaches of the river.

California Department of Fish and Game records indicate that the original salmon run up the Tuolumne River prior to the construction of New Don Pedro Dam in 1971 averaged 75,000 to 80,000 fish with a recorded maximum run of 130,000 in 1940.

III. Project Development

In 1963 the Turlock and Modesto Irrigation districts applied to the Federal Power Commission (FPC) for a FPC license for the New Don Pedro project. In 1964 the Federal Power Commission granted license No. 2299 which contained conditions for the protection of fish and wildlife. The minimum instream flow requirements in Article 28 are:

"Article 28. For the first 20 years of project operation, the Licensees shall maintain minimum stream flows in the Tuolumne River at La Grange bridge (river mile 50.5) (Figure 3) for fish purposes in accordance with the schedules set forth below or with such monthly schedules as may, with the approval of the Licensees, be prescribed by the California Department of Fish and Game; Provided, that the total



POST-PROJECT: OCTOBER 1970--SEPTEMBER 1973
GAUGE STATION NO. 11289650
SOURCE: USGS SURFACE WATER RECORDS VOL.2

FIGURE 3
STREAMFLOW CONDITIONS, TUOLMNE RIVER
BELOW LA GRANGE DAM (3 MILES DOWNSTREAM
FROM NEW DON PEDRO)

volume under Schedule A shall not exceed 123,210 acre-feet per water year and the total volume under Schedule B shall not exceed 64,040 acre-feet per water year.

Period	Schedule A (Normal Year)		Schedule B (Dry Year)	
	cfs	acre feet*	cfs	acre feet*
Pre-season flushing flow	2,500	4,950	-	-
October 1-15	200	5,950	50	1,490
October 16-31	250	7,930	200	6,350
November	385	22,900	200	11,900
December 1-15	385	11,450	200	5,950
December 16-31	280	8,830	135	4,280
January	280	17,210	135	8,300
February	280	15,550	135	7,500
March	350	21,520	200	12,300
April	100	5,950	85	5,060
May-September	3	91.0	3	91.0
Total acre feet		123,210		64,040

* cfs day equals 1.903 acre feet.

"The schedule to apply shall be governed by the water year immediately preceding October 1 of each year. Flows under Schedule A shall apply when the inflow into New Don Pedro reservoir equals or exceeds 1,000,000 acre feet. Schedule B shall apply in like manner if the inflow is less than 1,000,000 acre feet; Provided, that in a water year when the inflow is less than 750,000 acre feet, the amount of water provided under Schedule B shall be reduced by a percentage of the total acre feet equivalent to the percentage reduction in the gravity diversion at La Grange by the Licensees. For this purpose, the diversion shall be defined as 900,000 acre feet to Licensees.

"After the first 20 years of project operation, the Licensees shall maintain minimum stream flows in the Tuolumne River at La Grange bridge as may be prescribed hereafter by the Federal Power Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the California Department of Fish and Game, after notice and opportunity for hearing and upon a finding based on substantial evidence that such minimum flows are available and are necessary and desirable and consistent with the provisions of the Act."

Article 30 of the license 2299 prescribed a 20-year study to be conducted by the California Department of Fish and Game and the U. S. Fish and Wildlife Service to assure the continuation and maintenance of the fishery in the Tuolumne River. The results of these studies will be used to evaluate the instream flows in Article 28 and perhaps to establish new minimum instream flows.

On May 24, 1967 Turlock Irrigation District and Modesto Irrigation District submitted a proposed fish study program prepared in cooperation with the California DFG and USFWS pursuant to Article 30 of the FPC license for Project No. 2299 (New Don Pedro project).

The program proposed a 20-year fishery study to investigate physical factors in the Tuolumne River below the project which contribute to salmon production, e.g. flow conditions, water temperatures, river fluctuations, turbidity, stream bed composition and weather conditions. The study employs fish

counts, spawning nest counts, evaluation of downstream migrations and stream productivity to measure the effects different flow conditions will impose on the salmonid (primarily salmon) populations.

IV. Post-Project

The natural flow regime was drastically reduced in 1971 following the construction of New Don Pedro Dam. A comparison of pre- and post-project hydrographs (Figure 2) indicates that minimum post-project flows are near zero cfs whereas pre-project minimum flows were never below 14 cfs.

The Tuolumne River once supported king salmon spawning runs in excess of 100,000 fish annually. In 1971 the year the New Don Pedro project was completed the run was approximately 19,000 fish. In 1972 it dropped to 5,000. "This reduction is partially due to the lack of adequate conditions for spawning. The stream is reduced to deep narrow channels by reason of the topography of the bed, the growth of willows and their subsequent entrapment of sediment, and the low flows released from the dam in the summer." (State Lands Commission, 1973)

In 1973 the Modesto and Turlock Irrigation Districts proposed an improvement of salmon spawning conditions in the Tuolumne River between La Grange and Waterford (downstream from Don Pedro). The objective of the improvement project is to increase spawning runs to their former and much higher levels. Approximately 2,500,000 square feet of gravel will be restored. This will be

accomplished by grading the stream bottom and channelization of the bifurcated stream sediments.

Prior to the initiation of the project the Modesto Irrigation District was required to obtain a waste discharge permit from the State of California Regional Water Quality Control Board. The requirements stipulated the restoration project should not cause the turbidity five miles downstream to exceed 5 Jackson turbidity units. At the same point the concentration of settleable solids shall not exceed 0.2 milligrams per liter. The discharge specification also stipulated that the restoration project shall only be conducted between August 15 and October 1 each year.

Each season Modesto Irrigation District restored 625,000 square feet. At the end of the 1975 season the Modesto Irrigation District had restored 1,500,000 square feet. At that time the Department of Fish and Game evaluated the project and it was their conclusion that the salmon were not using the restored salmon beds to the extent originally predicted. Subsequently the Department recommended the restoration project should be suspended until a reevaluation of the methodology could be conducted. The Modesto Irrigation District disagrees with the Department's recommendations and presently is planning to continue with the project as originally planned.

V. Conclusions

The natural flow regime of the Tuolumne River has been reduced considerably by the operation of New Don Pedro. A comparison of pre- and post-project hydrographs (Figure 2) indicates that minimum post-project flows are near zero cfs whereas pre-project flows were never below 14 cfs.

The post-project salmon runs have declined in numbers since the completion of the dam. The State Lands Commission examined the situation and determined the reduction in migrating salmon was partially due to the lack of adequate conditions for spawning caused by low flows released from the dam during the spring and summer months.

The initial instream flow release schedule was developed by the California DFG from their general knowledge of the Tuolumne River. A stipulation of the fish and wildlife protection feature is a 20-year study to evaluate the ability of these releases to maintain the fish and wildlife resources. This program is to evaluate flow conditions, water temperatures, river fluctuations, turbidity, stream bed composition and weather conditions. The study also employs fish counts, spawning nest counts, evaluation of downstream migrations and stream productivity to measure the effects different flow conditions will impose on the fish and wildlife resources.

The effectiveness of the initial minimum instream flow release schedule has not been evaluated because the fall releases from New Don Pedro have been well above the minimum flow requirements.

BIBLIOGRAPHY

Personal Communications

Fjelstad, Maurice. 1975. California Department of Fish and Game.

Toffoli, Eugene. 1976. California Department of Fish and Game.

References

California. Regional Water Quality Control Board, Central Valley Region. 1973. Waste discharge requirements for Modesto Irrigation District streambed restoration project, Tuolumne River, Stanislaus County. Order no. 73-70.

California. State Lands Commission. 1973. Environmental impact report - New Don Pedro project W20161 - Salmon gravel reclamation project Tuolumne River.

U. S. Fish and Wildlife Service. 1975. Tuolumne River flow study, canyon power project - draft.