

CASE STUDY REPORT #41  
SAND BAR DIVERSION  
MIDDLE FORK STANISLAUS RIVER

I. Project Description

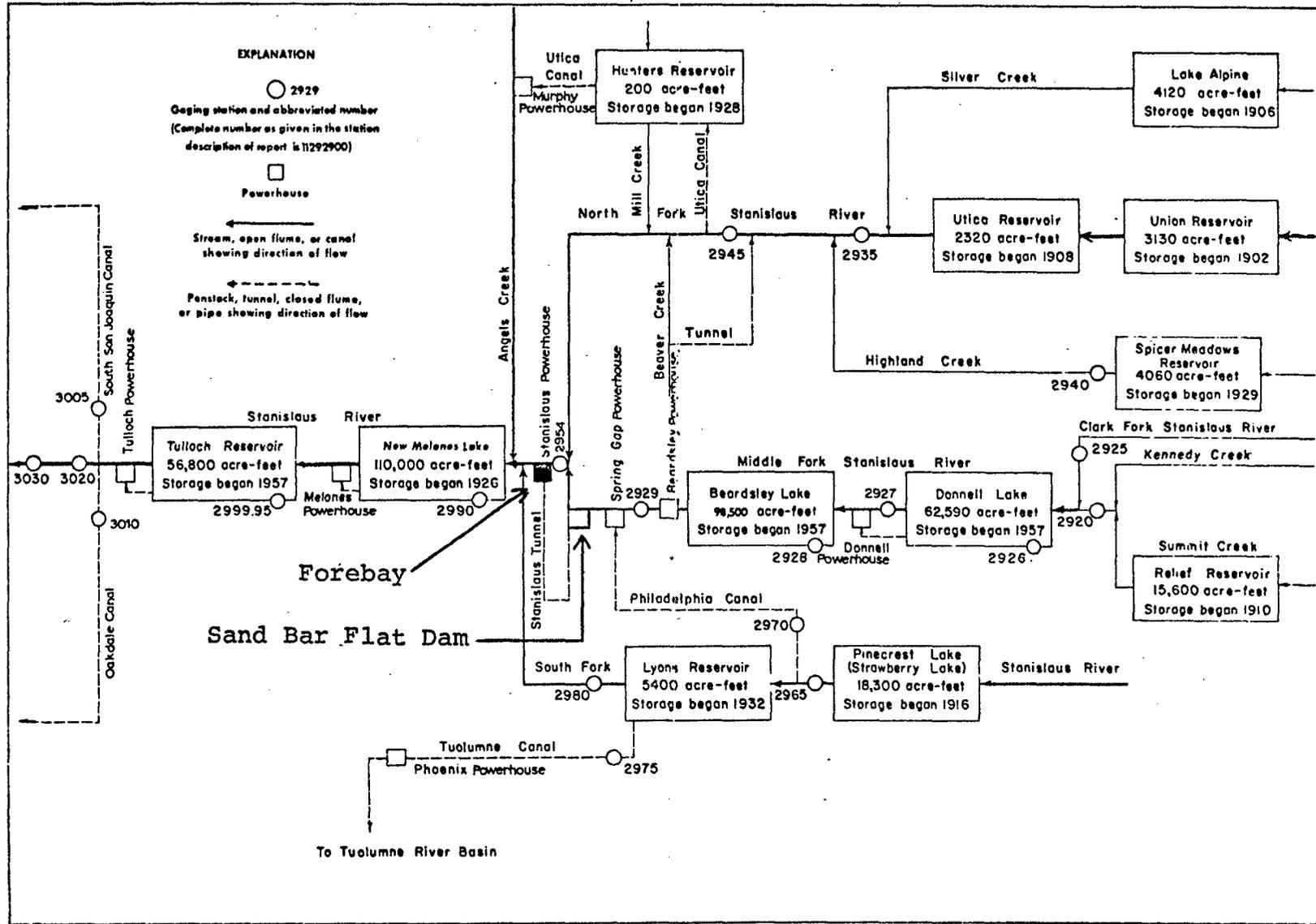
Sand Bar Diversion Dam was constructed on the Middle Fork of the Stanislaus River by the Pacific Gas and Electric Company (PG&E) in 1939. The Sand Bar Dam diverts up to 475 cfs of the Middle Fork Stanislaus River through a tunnel to the Stanislaus Powerhouse, which is located below the confluence of the North and Middle Forks of the Stanislaus River (Figures 1 and 2).

Prior to the construction of Sand Bar Diversion Dam, the Middle Fork Stanislaus River Basin had only one major water development -- Relief Reservoir on Summit Creek.

II. Pre-Project Conditions

The Middle Fork Stanislaus River originates in the glacial basins north of Yosemite National Park along the Sierra Divide (Figure 2). It flows through a deep canyon with a steep gradient that in some segments averages 124 feet per mile.

The natural flow represents a seasonal pattern similar to that of other major Sierra streams. The pre-1937 hydrograph (Figure 3) indicates that approximately 70 percent of the mean annual flow occurred during the months of March through June



--Schematic diagram showing diversions and storage in Stanislaus River basin.

Figure 1

SOURCE: U.S. GEOLOGICAL SURVEY, 1973, WATER RESOURCES DATA FOR CALIFORNIA.

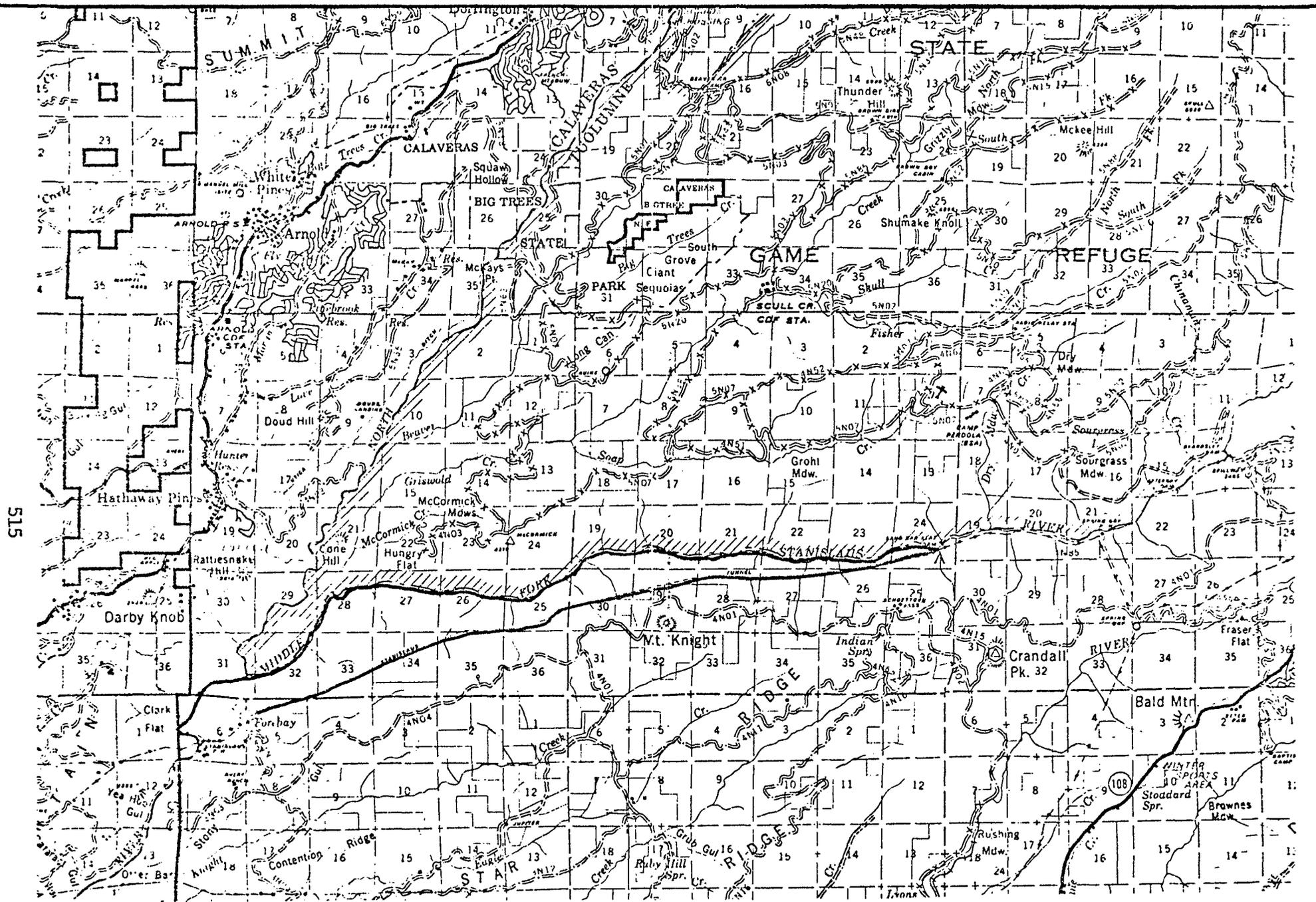
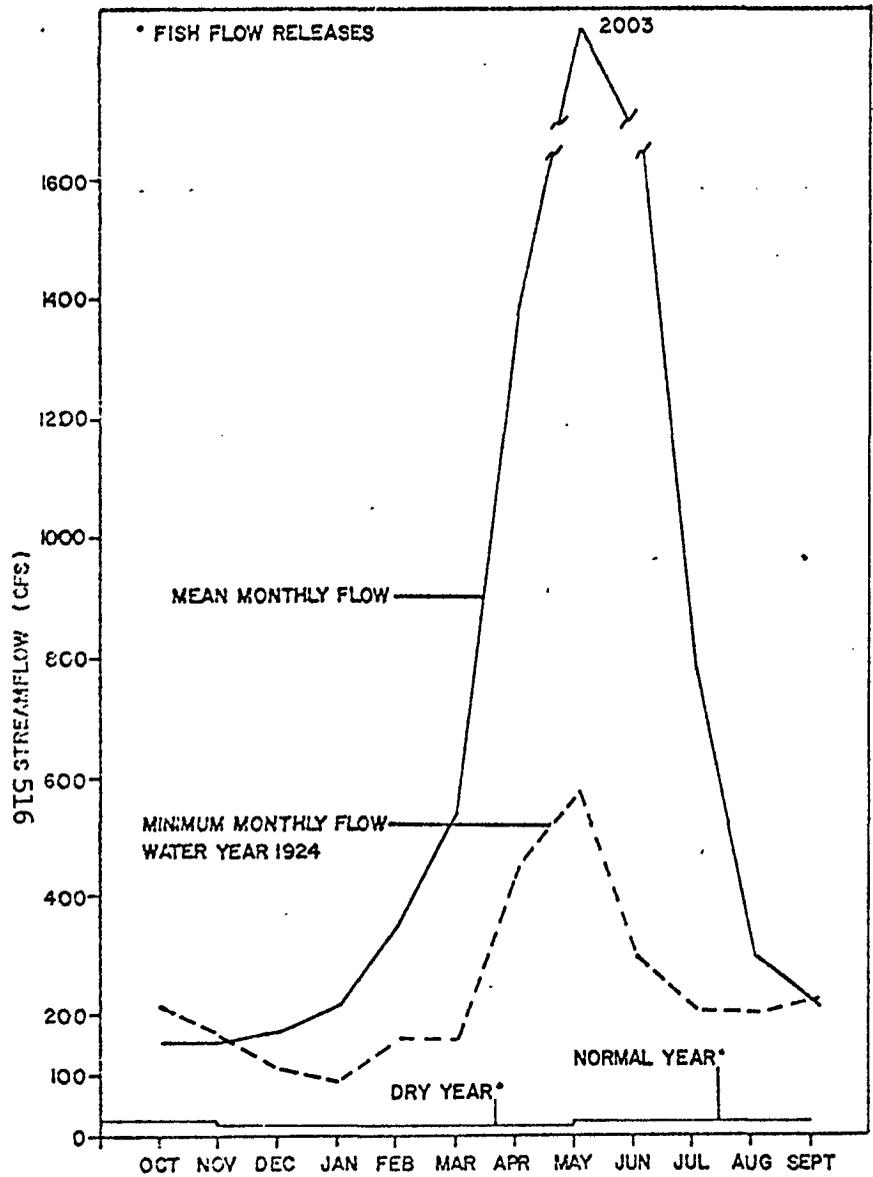


Figure 2  
 LOCATION MAP  
 MIDDLE FORK STANISLAUS RIVER

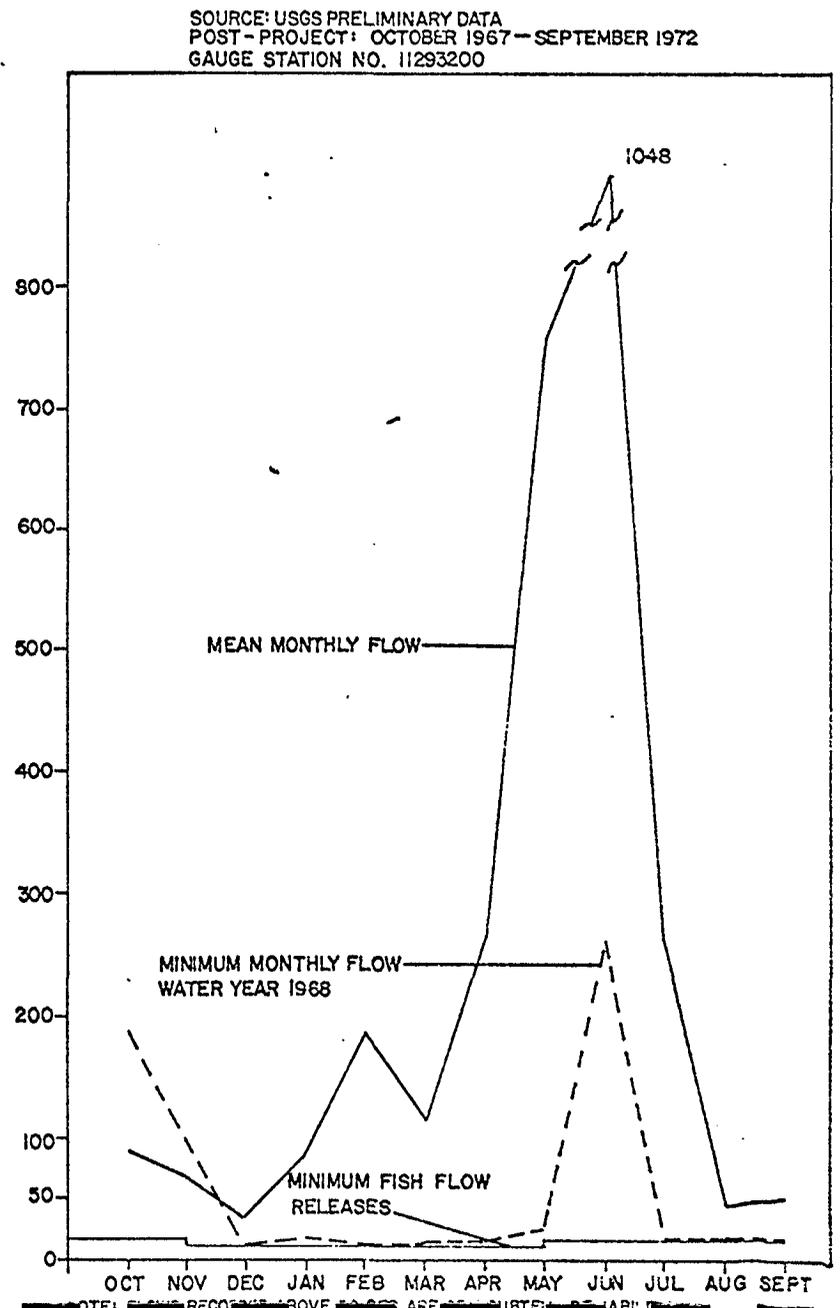
SOURCE: U.S. FOREST SERVICE - STANISLAUS NATIONAL FOREST, CALIFORNIA, 1973.

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PRE-PROJECT: OCTOBER 1905 - SEPTEMBER 1937  
 GAUGE STATION NO. 164  
 SOURCE: USGS WATER SUPPLY PAPER 1315-A

FIGURE 3  
 STREAMFLOW CONDITIONS, SAND BAR  
 DIVERSION DAM



NOTE: FISH FLOW RECORDS ABOVE 100 CFS ARE NOT SUBJECT TO LIABILITY

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which is the period of snowmelt. In 1916 the instream flow at Sand Bar Flat was augmented by water diverted from the South Fork Stanislaus through the Philadelphia Canal which enters the Middle Fork at Spring Gap Powerhouse approximately three miles upstream from Sand Bar Flat.

There is a paucity of information about fish populations in the Middle Fork prior to the completion of Sand Bar Dam in 1939. No descriptions were discovered in the data reviewed; however, it is assumed that before diversions were made the river supported rainbow trout, steelhead trout, king salmon and an assortment of nongame species including minnows, suckers and sculpins.

### III. Project Development

The Stanislaus Powerhouse was placed in operation in 1908. The facilities consisted of a powerhouse and a water flume. A description of these PG&E facilities was not available. As the need for hydroelectric power increased, PG&E enlarged the Stanislaus Powerhouse. Sand Bar Diversion Dam and the Stanislaus tunnel were constructed in 1939 to connect the Middle Fork Stanislaus River with the Stanislaus Powerhouse located below the confluence on the North and Middle Forks of the Stanislaus River (Figure 1).

The tunnel has a designed capacity of 475 cfs which is 160 cfs larger than the claimed maximum capacity of the old Stanislaus flume. In order to initiate an appropriative right to the additional 160 cfs, PG&E filed water rights Application No. 10122.

In 1955 the Federal Power Commission (FPC) issued an FPC license to the Sand Bar Diversion project. This license, FPC No. 2130, is not subject to revision until 1985.

Within the FPC license is a stipulation for the protection of fish and wildlife. The terms of this stipulation follow: "during a normal year, minimum instream flows are May 1 to October 31, 15 cfs, and November 1 to April 30, 10 cfs; during dry years, a minimum release of 10 cfs is required year-round." It was agreed that the above flows would not be subject to revision short of 10 years.

The establishment of minimum streamflow requirements for fish and wildlife was based on a Department of Fish and Game regional biologist's evaluation of the streamflow requirements to maintain fish life. Information describing the methodology employed was not discovered in the data reviewed.

#### IV. Post-Project

The operation of the Sand Bar Diversion Dam has reduced the instream flow between Sand Bar Dam and the Stanislaus Powerhouse to less than one half the pre-project condition

see Figure 3). Since the construction of Sand Bar Dam in 1939, several water developments have been constructed above the dam (see Figure 1). These impoundments have influenced the maximum and minimum extremes of the instream flow, both above and below Sand Bar. The post-project hydrograph shows the maximum flow of 1,048 cfs occurring in May and the minimum flow of 50 cfs occurring in the months of December through April. Historically, the minimum flows did not go below 100 cfs (see Figure 3) whereas during dry periods they may now be reduced to 10 cfs.

No record of technical fishery investigations in the Middle Fork below Sand Bar Dam was found within the records searched.

#### V. Conclusion

Sand Bar Diversion Dam reduced the peak seasonal flows in the Middle Fork of the Stanislaus River. The Sand Bar Dam and tunnel can divert up to 475 cfs of the Middle Fork Stanislaus River to the Stanislaus Powerhouse. This water is diverted to a point below the confluence of North and Middle Forks of the Stanislaus River (Figure 2), which bypasses approximately 12 miles of the natural stream channel. During minimum flow periods, instream flows below the diversion have been above the minimum flows allocated for fish and wildlife (see Figure 3).

The establishment of minimum instream flow requirements for fish and wildlife was based upon a Department of Fish and Game regional biologist's evaluation of the streamflow requirements to maintain fishlife. Information regarding methodology used to determine instream flow requirements was not discovered in the data reviewed.

Since the construction of Sand Bar Dam in 1939, several water developments have been constructed above the dam (see Figure 1).

Each one of these developments has resulted in some alteration of streamflows. The combined effect accounts for the large reduction of streamflows.

No evidence was found of instream flow evaluations after the construction of Sand Bar Dam.

#### BIBLIOGRAPHY

##### Personal Communications

Meyer, Fred. 1975. California Department of Fish and Game.  
Waters, Brian. 1975. Pacific Gas & Electric Company.

##### References

U. S. Federal Power Commission. 1939. Federal Power Commission project no. 2130, license issued to Pacific Gas & Electric Company no 2130-40.