STATE OF CALIFORNIA

STATE WATER RIGHTS BOARD

In the Matter of Applications 13681, 13682, 14919, 14920, 15551, and 15552 Held by Richvale Irrigation District on Behalf of Joint Water Districts

Decision D 1224

Source: Middle Fork Feather River

Counties: Plumas and Butte

Adopted June 30, 1965

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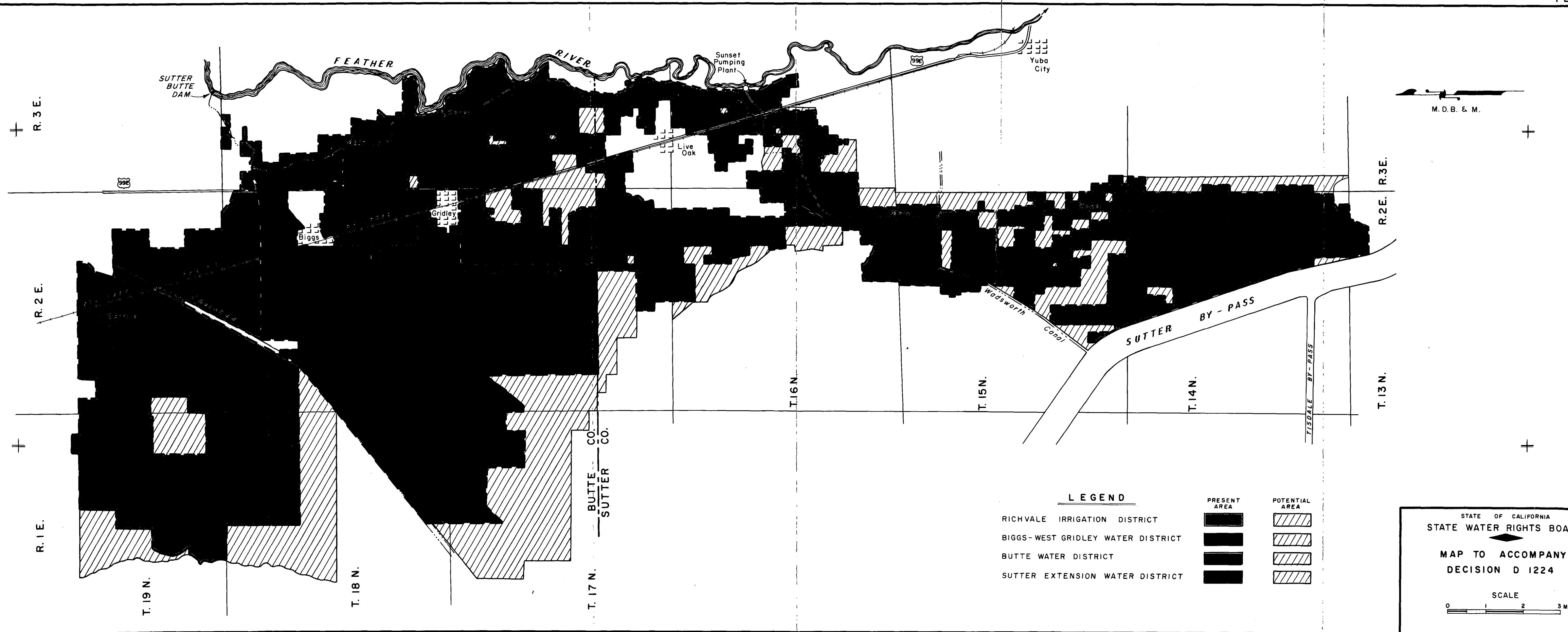
FEATHER RIVER
SUTTER BUTTE DAM
Sunset Pumping Plant
Yuba City
Live Oak
Gridley
Biggs
Wadsworth Canal
SUTTER BY-PASS
TISDALE BY-PASS
M.D.B. & M.
R. 3 E.
R. 2 E.
R. 1 E.
R. 2 E.
R. 3 E.
T. 19 N.
T. 18 N.
T. 17 N.
T. 16 N.
T. 15 N.
T. 14 N.
T. 13 N.
BUTTE CO.
SUTTER CO.
LEGEND
PRESENT AREA
POTENTIAL AREA
RICHVALE IRRIGATION DISTRICT
BIGGS-WEST GRIDLEY WATER DISTRICT
BUTTE WATER DISTRICT
SUTTER EXTENSION WATER DISTRICT
STATE OF CALIFORNIA
STATE WATER RIGHTS BOA
MAP TO ACCOMPANY
DECISION D 1224
SCALE
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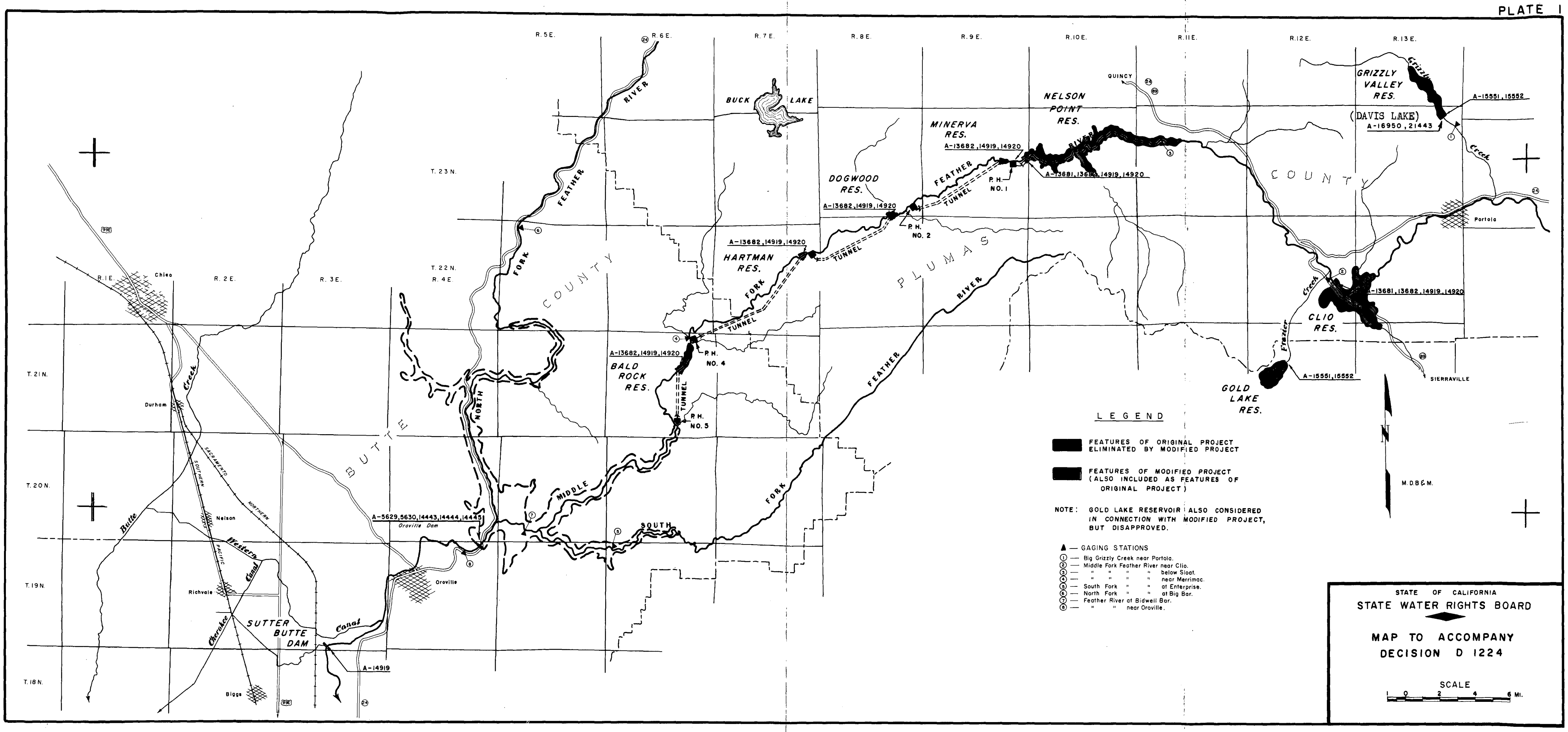
PLATE 1


R. 5E.
R. 6E.
R. 7E.
R. 8E.
R. 9E.
R. 10E.
R. 11E.
R. 12E.
R. 13E.
R. 1E.
R. 2E.
R. 3E.
R. 4E.
T. 23 N.
T. 22 N.
T. 21 N.
T. 20 N.
T. 19 N.
T. 18 N.
BUCK LAKE
FEATHER RIVER
FORK
NORTH
MIDDLE
SOUTH
BUTTE COUNTY
PLUMAS COUNTY
DOGWOOD RES.
MINERVA RES.
NELSON POINT RES.
HARTMAN RES.
BALD ROCK RES.
GRIZZLY VALLEY RES.
(DAVIS LAKE)
CLIO RES.
GOLD LAKE RES.
TUNNEL
P.H. NO. 1
P.H. NO. 2
P.H. NO. 4
P.H. NO. 5
A-13682, 14919, 14920
A-13681, 13682, 14919, 14920
A-15551, 15552
A-16950, 21443
A-5629, 5630, 14443, 14444, 14445
Oroville Dam
A-14919
QUINCY
Portola
SIERRAVILLE
Chico
Durham
Nelson
Richvale
Oroville
Biggs
Butte Creek
Western Canal
Cherokee Canal
SUTTER BUTTE DAM
SACRAMENTO SOUTHERN PACIFIC
SACRAMENTO NORTHERN
Grizzly Creek
Frazier Creek
LEGEND
FEATURES OF ORIGINAL PROJECT ELIMINATED BY MODIFIED PROJECT
FEATURES OF MODIFIED PROJECT (ALSO INCLUDED AS FEATURES OF ORIGINAL PROJECT)
NOTE: GOLD LAKE RESERVOIR ALSO CONSIDERED IN CONNECTION WITH MODIFIED PROJECT, BUT DISAPPROVED.
▲ — GAGING STATIONS
(1) — Big Grizzly Creek near Portola.
(2) — Middle Fork Feather River near Clio.
(3) — " " " " below Sloat.
(4) — " " " " near Merrimac.
(5) — South Fork " " at Enterprise.
(6) — North Fork " " at Big Bar.
(7) — Feather River at Bidwell Bar.
(8) — " " near Oroville.
N
M.D.B.&M.
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STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

In the Matter of Applications 13681, 13682, 14919, 14920, 15551, and 15552 Held by Richvale Irrigation District on Behalf of Joint Water Districts to Appropriate Water from Middle Fork Feather River in Plumas and Butte Counties

Decision D 1224

DECISION CANCELING APPLICATION 13681, APPROVING IN PART APPLICATIONS 13682, 14919, and 14920, AND DENYING APPLICATIONS 15551 and 15552

The Joint Water Districts

The six applications which are the subject of this decision are for permits to appropriate water for multiple purposes from the Middle Fork Feather River. Water stored in the proposed upstream reservoirs would be available for recreational use, then used for power purposes, and ultimately diverted for irrigation use. All six applications are now held by Richvale Irrigation District on behalf of itself and three other districts, namely, Butte Water District, Biggs-West Gridley Water District, and Sutter Extension Water District.

In their unified water operation, the four districts are known as the Joint Water Districts, and will be referred to sometimes as the "Districts." Richvale Irrigation District will be referred to as "Richvale", or "the applicant." The other districts will be referred to sometimes as "Butte," "Biggs-West Gridley," and "Sutter Extension," respectively.

Release from Priority of State Filings

Applications 5629, 5630, 14443, 14444, and 14445 are State filings which seek permits to appropriate water from Feather River at Oroville Dam and from the Sacramento-San Joaquin Delta. They relate to the State project known as the Feather River project. When the California Water Commission assigned these applications to the California Department of Water Resources in 1961, the Commission reserved the power to execute a release from their priority in favor of Richvale. The effect of such a release of priority would be to subordinate the earlier State filings in favor of the later Richvale applications.

After holding a series of full Commission hearings supplemented by hearings before a subcommittee, the Commission on April 6, 1962, executed a release from priority of the named State filings in favor of Richvale Applications 13681, 13682, 14919, and 14920, and the portions of Applications 15551 and 15552 not pertaining to Grizzly Valley

Reservoir. The Commission found that the Richvale applications are "for the purpose of development not in conflict with a general or coordinated plan looking toward the development, utilization, or conservation of the water resources of the State...." (Appl. Exh. 44.)

The release was made subject to certain reservations or conditions, three of which are as follows:

> "The prior rights of any county in which the water covered by the applications originates to the use of such water as may be necessary for the development of the county, as provided in Section 10505 of the Water Code;"
>
> "That the Richvale Irrigation District shall provide full public access, consistent with safety and project operation, to the reservoirs of the Richvale Middle Fork Project for recreational purposes;"
>
> "That the Richvale Irrigation District shall make such provision for the maintenance and protection of the fishery resources affected by the project as may be agreed to between Richvale Irrigation District and the State Department of Fish and Game or, in the event no such agreement can be reached, as may be prescribed by the State Water Rights Board."

The California Department of Water Resources holds Applications 16950 and 21443 (assigned by the California Water Commission on April 3, 1964) for permits to appropriate a total of 83,000 acre-feet per annum in the proposed Grizzly Valley Reservoir on Big Grizzly Creek. The proposed reservoir site is at substantially the same location as that proposed by Richvale Applications 15551 and 15552.

Proposed Amendments and Changes Already Approved by California Water Commission

When originally filed, Applications 13681, 14919, and 15551 specified that the place of use for irrigation purposes was to be a net of 24,500 acres within a gross area of 25,650 acres of Richvale Irrigation District. On December 17, 1959, petitions were filed with the Board requesting permission to enlarge the place of use to that described in Table 1, which includes the Butte, Biggs-West Gridley, and Sutter Extension Water Districts.

Because of the releases from priority of State filings in favor of the Richvale applications, the Board cannot approve this or any other proposed amendment or project change without the prior approval of the California Water Commission. (See Water Code Section 10504.5.)

The California Water Commission's subcommittee report dated March 16, 1962, to the full Commission, recommending the release of priority (Appl. Exh. 43), refers specifically to the crop patterns of and return flow from the Joint Water Districts area. Therefore, the Commission's release from priority in favor of Richvale Irrigation District by necessary implication appears to approve a place of use serving the Joint Water Districts, as is proposed by this amendment. Likewise, the opening

brief of the protestants, at page 75, accepts the enlarged service area as one which the Joint Water Districts can legitimately seek to supply with water.

Additional amendments and changes to the project were proposed by letter dated July 12, 1962, and petitions were filed October 9, 1962, with amended supplements to each application marked "corrected 7-10-62." These proposed amendments cover technical changes in the description of facilities at points of diversion and rediversion and in capacities of reservoirs. Among other changes, Clio Reservoir would be increased to a capacity of 156,400 acre-feet, and both Hartman and Bald Rock Diversion Dams would be relocated downstream a fraction of a mile.

The California Water Commission on August 17, 1962, approved the proposed amendments as not constituting a major change from the project for which a release from priority had been granted.

The Board finds that the changes proposed by the petitions filed December 17, 1959, and October 9, 1962, will not operate to the injury of any legal user of the water involved. (See Water Code Section 1702.) These petitions will be approved.

The main features of the applications as proposed to be amended by the petitions filed December 17, 1959, and October 9, 1962, are summarized in Table 1, and are shown on Plate 1 of this decision.

TABLE I

SUMMARY OF RICHVALE APPLICATIONS HELD FOR JOINT WATER DISTRICTS
TO APPROPRIATE FROM FEATHER RIVER AND TRIBUTARIES
AS PROPOSED TO BE AMENDED JULY 12, 1962[1]

Application Number	Source of Appropriation	Diversion Dam or Storage Reservoir	Storage Capacity (acre-feet)	Quantity Requested		Season Requested	Purpose[4]	Place of Use
				cfs[2]	afa[3]			
13681	M.F. Feather River	Clio	156,400		72,000	11/1-6/30	I,D.	A net irrigable area of 101,900 acres in a gross area of 106,316 acres
		Nelson Point	116,000		60,000	"		
13682	M.F. Feather River	Same as A-14920, excluding Clio		300		year-round	P.	Powerplants 1,2,3,4, and 5
14919	Feather River	Sutter Butte		1,300		5/1-10/31	I.	Same as A-13681
	M.F. Feather River	Clio	156,400		131,000	10/1-7/1		
	"	Nelson Point	116,000		116,000	"		
	"	Minerva	577		500	"		
	"	Dogwood	2,021		1,250	"		
	"	Hartman	2,860		250	"		
	"	Baldrock	5,420		5,000	"		
				Plus 50% refill	127,000			
					381,000			
14920	M.F. Feather River	Clio	156,400		131,000	year-round	P.	Power plants 1,2,3, 4 and 5
	"	Nelson Point	116,000	800	116,000	"		
	"	Minerva	577	800	500	"		
	"	Dogwood	2,021	900	1,250	"		
	"	Hartman	2,860	1,000	250	"		
	"	Bald Rock	5,420	1,300	5,000	"		
				Plus 50% refill	127,000			
					381,000			
15551	Big Grizzly Creek	Grizzly Valley	40,500		40,000	10/1-5/31	I.	Same as A-13681
	Frazier Creek	Gold Lake	15,910		16,000	"		
15552	Big Grizzly Creek	Grizzly Valley	40,500		40,000	10/1-5/31	P.	Same as A-13682
	Frazier Creek	Gold Lake	15,910		16,000	"		

[1] Proposed amendments approved by California Water Commission on August 17, 1962.

[2] cfs = cubic feet per second

[3] afa = acre-feet per annum

[4] I = irrigation; D = domestic; P = power.

Proposed Amendments and Changes Still Pending Before Water Commission and Water Rights Board

Petitions were also filed with the California Water Commission and this Board on December 19, 1964, and March 9, 1965, covering certain technical changes in the description of facilities and water storage at points of diversion and rediversion. Applications 14919 and 14920 would be amended to redescribe annual storage in Clio as 156,400 acre-feet (the reservoir capacity), and Hartman Bar storage would be increased to 3,700 acre-feet per annum (afa). The 50 per cent refill storage now proposed would be reduced from 127,000 afa to 98,150 afa, a reduction which would correspond to the increased storage at Clio and Hartman Bar. Total appropriation to storage would remain unchanged. By the same petition, the applicant also requested the Board to cancel Application 13681, and to limit Application 13682 to direct diversion at Bald Rock Dam only, for the season of November 1 to June 30. The applicant, on March 9, 1965, proposed to substitute the Thermalito Diversion Dam for Haselbusch Dam as a point of rediversion.

The Board can take no action on these proposed amendments until and unless they are approved by the Commission.

Protests, Hearing, and Issues

Protests having been received, public hearings were held before the State Water Rights Board in Oroville, California, conducted by Board Members Kent Silverthorne (Chairman), Ralph J. McGill, and W. A. Alexander. Testimony was received by the Board during a total of 56 days of hearing between August 28, 1962, and September 23, 1964. Intermissions were allowed from time to time, primarily for the purpose of allowing an opportunity for the parties to prepare studies relating to the operation of the project or the water requirements of trout. The issues raised by all protestants are well summarized in the joint opening and joint reply briefs filed by the State Department of Fish and Game, County of Plumas, and State Department of Water Resources. Hereinafter the Department of Water Resources will be referred to as "DWR," and the Department of Fish and Game as "Fish and Game."

The main issue is whether the broad public interest would best be served by the construction of proposed reservoirs on the Middle Fork Feather River to be used for recreation, power and irrigation purposes, or by denying the applications to preserve intact the wilderness status of the rugged and relatively inaccessible Middle Fork Canyon with its outstanding wild trout fishery. Important related issues are whether the ultimate water requirements of the

applicant Districts are substantial enough to require or justify approval of the applications, and whether there are other sources of supplementary supplies which are adequate and should be used to the exclusion of the proposed project. If any project is to be approved, a preliminary issue is whether it should be the original Richvale project or a modified project which would eliminate three powerhouses in the Middle Fork Canyon and revise the proposed project operation.

Other issues include the extent of future rice production by the Joint Districts, the extent of availability of unappropriated water, the anticipated effect on the project of future stream depletion in Sierra Valley, the effects of the project on the California Water Plan and the extent of water conservation by the project in excess of that to be provided by Oroville Dam, recreation benefits and plans for recreation, and the need for a reservation of jurisdiction by the Board.

Ultimate Water Requirements of The Joint Water Districts

The Joint Water Districts are located in the Sacramento Valley downstream from Oroville and westerly of the Feather River within an area that is about 35 miles from north to south and ranges in width from 12 miles at its center to about 2 miles at the north end of Sutter Extension

District. The gross area of the Districts is 107,153 acres which are held in about 1,200 separate ownerships. Each district contains about 25,000 irrigable acres, with Biggs-West Gridley being a little larger and Sutter Extension a bit smaller. As is indicated on Plate 2, Richvale is the most northerly district, with Biggs-West Gridley bordering it on the south. Easterly and southerly of Biggs-West Gridley lies the elongated Butte District and further south lies the equally elongated Sutter Extension District.

Joint Districts lands receive most of their present water supply from natural flow of the Feather River diverted at Haselbusch Dam through the Sutter Butte Canal, which the Joint Districts purchased from the Sutter Butte Canal Company. Just upstream from Haselbusch lies the Western Canal which is now owned by Pacific Gas and Electric Company, hereinafter referred to as "PG&E," and serves irrigation water on a public utility basis to an area just north of Richvale.

Sutter Butte Canal and Western Canal diversions of natural flow of the Feather River both rely on "pre-1914 appropriative rights," adjudicated by a stipulated court decree entered in 1924 (Appl. Exh. 25). The decree on its face divides the first 3,700 cfs of natural flow of the Feather River between these two parties, but the Sutter Butte Canal was built to a capacity of only 2,000 cfs, and the Western Canal to a capacity of only 700 cfs. The evidence indicates that the Sutter Butte Company and its

successor, the Joint Districts, have consistently diverted natural flow of the Feather River to the extent that it has been available during the irrigation season, but limited by the capacity of the Sutter Butte Canal (Plumas Exhs. 14A-14R).

With the exception of about half a section in Richvale and about two sections in Biggs-West Gridley, the land in both districts is exclusively of the tight-clay type, or flat-basin type of land with clay hardpan. The same tight soils cover at least three-fourths of Sutter Extension and about one-third of Butte (DWR Exhs. 31, 32, 60B and 60C).

An expert for DWR testified that of the irrigable acreage in the Districts, 75,000 acres are of the tight adobe-type soil with clay hardpan suitable only for rice, pasture, and other crops adaptable to a soil of this nature, and only 24,000 acres located almost entirely in the Butte District are of the lighter-type soil (RT 4220*-22). At present, rice is the only crop being raised on the 75,000 acres that produces a profit (RT 1209-10, 6136-38, 6174-76, 6315-25). Another expert for DWR agrees that at present the highest and best use of the land is for rice (RT 4142). He would plant his own land to rice if a rice allotment were available (RT 3901).

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* RT 4220 designates page 4220 of reporter's transcript of hearing.

An acre of rice needs about 2½ times as much irrigation water as is required by an acre of general crops. A reasonable prediction of future water requirements, therefore, requires a reasonable basis for projecting future rice acreage. This problem is made more difficult as the result of federal rice allotments which have sharply cut back rice acreage since 1954.

Rice allotments have not operated on a fixed, but on a slowly changing, basis. Rice allotments are to a certain extent transferable, and some Districts increase in rice production in recent years has resulted from such transfers into the Districts. Furthermore, a flat ten per cent increase in rice acreage was authorized in 1962, and rice acreage was promptly increased (Appl. Exh. 98B).

The DWR expert predicted a decline in the proportion of acreage in rice production based on a decline in the rate of per capita rice consumption. However, a recent federal analysis shows the per capita consumption of rice to be holding about steady, but rising slightly (Appl. Exh. 57). In support of their position, the DWR offered in evidence a newspaper article (DWR Exh. 53) which reported the future rice predictions of an agricultural expert of the University of California. The Districts refuted the emphasis of this prediction by producing the expert in person. His qualifications and testimony were equally impressive. He

predicted an increase in rice production that would keep pace with the increase in population. It would come in part from increased production per acre, but also would demand increased acreage. He also expected federal controls in the future as in the past to respond to increased demands for domestic use or foreign export (RT 5758-60). The Board takes official notice of the subsequent appointment of this expert to one of the top positions in the United States Department of Agriculture.

Increased future rice acreage is also indicated by a recent change in planting practices. Formerly an acre planted to rice was kept out of rice production for the following two years. As the result of modern fertilizers and techniques, it is now possible and common for acreage to be in rice production at least two out of three years.

The Board finds it reasonable for the Districts to anticipate their future requirements by projecting their current crop patterns, of which the year 1962 is a representative example.

The applicant's estimated future water requirement for the Districts, assuming 85 per cent development within the irrigable acreage and a projection of the 1962 crop pattern, is 719,054 afa at the river (Appl. Exh. 98E). The acreage irrigated, assuming 85 per cent development, was computed at 82,112 acres. This acreage was computed after deducting the acreage now served by wells within the

Districts and adding that area served by drains outside the Districts but within the Districts exterior boundaries. The duty of water per acre for diversion from the river was computed to be 8.34 acre-feet plus 5 per cent for operational spill, or 8.76 acre-feet (RT 7564).

DWR estimates the future water requirements of the Districts to be 534,000 afa at the river, assuming irrigation of 80,000 acres (RT 4118-20; DWR Exh. 65A). This overall requirement was arrived at by predicting the crop pattern to be irrigated by the Districts in the future (including a decline in the percentage of rice acreage), and taking a corresponding value for consumptive use from Bulletin 2 of the State Water Resources Board (DWR Exh. 5). DWR then assumed a 60 per cent irrigation efficiency, which is the alleged efficiency being experienced in the Western Canal service area, and divided the consumptive use figure by 60 per cent to obtain the quantity per acre for farm delivery. Then a 30 per cent loss for transport of the water from the river to the farm headgate was assumed, and, dividing the farm delivery quantity of 373,600 acre-feet by 70 per cent, the total water requirement of 534,000 afa was computed (RT 4223-24).

Diversion of water by the Districts at the Haselbusch diversion dam and the Sunset pumping plant has averaged about 522,600 afa for the period 1957 through 1961.

Of this quantity, an average of approximately 32,900 acre-feet was regulatory spill. The total diversion included water purchased from PG&E. During the same period the Districts irrigated an average of 50,250 acres per year. Of this quantity, over 50 per cent was rice acreage (Appl. Exhs. 4A and 98B).

DWR contends that use of water by the Districts is excessive and wasteful. It alleges that better irrigation practices could reduce the quantity of water required. These practices would include lining of canals and laterals, more careful regulation of water use, and expanding facilities for capture of drain water. In order to determine whether or not use of water by the Joint Districts is excessive, use of water by other districts and areas with similar planting ratios of rice to general crops was studied. The best information obtained for this comparison was that found in Table 176 of DWR Bulletin 23-59 (Staff Exh. 13). The Colusa Basin Drain area has a similar ratio of rice acreage to general crops as that found in the Districts. In this area the gross duty in acre-feet per acre was found to range from 9 afa to 12.1 afa, with an average of 10.5 afa. In the Feather River area from the mouth to Oroville, which includes the area served by the Districts, use of water was found to be somewhat less in duty per acre than that found in the Colusa Basin Drain area. The average acreage irrigated in the Feather River area for the period 1950 through 1959 was

83,360 acres, of which the Districts comprise about 60 per cent. The gross duty of water per acre as computed in Staff Exhibit 13 ranged from a low of 8.1 afa to a maximum of 9.2 afa and averaged 8.6 afa. The figures for these two areas are to be compared with the Joint Districts gross duty of water for diversion at the river of 8.76 afa.

While the quantity of water used by the Districts may be high, it apparently is in line with the type of irrigation experienced in other rice growing areas in the Feather River and Sacramento River Basins. Moreover, testimony by witness for DWR indicated that surface water leaving the Districts general area and getting back into the Feather and Sacramento Rivers during July and August amounted to approximately 10 per cent and 15 per cent, respectively, of the total water supplied to the area. This was stated to be a reasonable and efficient quantity for a large area. During earlier and later months there are greater quantities of return flows, but there is no particular shortage of water from the river at those times. In any event, the return flows get back into the Feather and Sacramento Rivers and are available for other users (RT 4018-19; DWR Exhs. 57A-57C). There was no evidence that Districts practices resulted in unnecessary consumptive losses by evaporation or otherwise.

In computing future water requirements, the Districts and DWR used comparable figures for the quantity of

water needed to irrigate an acre of rice or other crops. The substantial difference in their estimates of total Districts requirements is caused primarily by their different estimates of future rice acreages. We believe it reasonable for the Districts to anticipate about 47,500 acres ultimately to be in rice out of 82,000 acres to be supplied directly by the Districts. DWR predicted only 36,000 acres would be in rice and downgraded the water requirements accordingly (DWR Exh. 49).

The Districts requirements would also be substantially increased if full consideration were given to the requirements of the entire net irrigable acreage of anticipated future inclusions. (See Plate 2 and Appl. Exhs. 24 and 98E.) In a previous decision the Board has given consideration to the requirements of proposed inclusions to lands of a district. (See Decision D 979, p.6.)

It is difficult to give a precise estimate of the supplementary requirements of the Joint Districts. According to testimony and exhibits of the Districts, it appears to be 200,000 afa or more, excluding water purchased from PG&E and not relied upon for future availability (Appl. Exhs. 98A-98E). According to DWR the Districts additional water requirements will range from zero to about 200,000 afa and will average 53,800 afa, assuming a repetition of conditions of the 33-year period, 1924 to 1956 (DWR Exh. 67C). In this

instance, and for the reasons previously stated, we believe the Districts have more reasonably and accurately set forth estimates of their future requirements.

Possible Supplementary Water Sources for the Joint Water Districts

Protestants to the proposed project contend that there are feasible sources of water available to the applicant other than the Middle Fork project. Protestants contend that if these other sources of water were utilized and developed, there would be no need to implement the proposed Middle Fork project and thereby cause great harm to the fishery and wildlife resources and recreational potential of the Middle Fork Canyon area.

One of the alternate sources of water for the applicant originally proposed by DWR was the State project at Oroville Reservoir. The initial cost of the Oroville water was $3.50 per acre-foot, with a $2.00 per acre-foot surcharge for acreage in excess of 160 acres. The charge for the water would be escalated as various other sources of water are added to the State project facilities. The Joint Districts considered these prices too high and too indefinite. In the competitive Western Canal area supplied by PG&E, the cost of water for rice is only $1.65 per acre-foot (Plumas Exh. 15). In any event, questions concerning this source have apparently become moot, since the Districts

did not sign a contract with DWR before expiration of the contract deadline date. Joint briefs of the protestants no longer urge this as an alternate source of supplementary supply for the applicant.

Another source of water available to the applicant is drain water. There is apparently a considerable quantity of drain water within the Districts boundaries. DWR contends that an average of 23,200 acre-feet of drain water could be recovered by the Districts during July and August at a cost of about $3.67 per acre-foot (DWR Exhs. 76A and 76B). This is the period when a shortage of water normally occurs. About 20 per cent of the drainage water originates from the Western Canal service area to the north and might be reused by the Western Canal Company itself in the future.

At present the Districts are making what they feel is a reasonable capture of drainage water through existing facilities. In Richvale there are three pumping stations on drains having a total pumping capacity of 95 cfs. In Biggs-West Gridley there are six pumping stations with a total capacity of 132 cfs. The Butte Water District does not have any recovery pumps. In Sutter Extension there are six pumping plants located on drains with a total pumping capacity of 244 cfs. The engineering witness for the Districts testified that he believed they were recovering as much of the drain water as feasible at the present time considering the erratic pattern of flow (RT 1097-1104). For the

expenditure proposed by DWR, the Districts could undoubtedly recapture and reuse some additional drain water.

A possible supplemental supply of water that could be developed for the Districts service area is ground water. According to DWR, there is available for pumping in the three northerly districts and the northerly part of Sutter Extension a ground water supply of about 41,500 afa. (Future potential pumpage shown in DWR Exh. 62A minus existing pumpage shown in DWR Exh. 61A). DWR did not make an allowance for the existence of extensive municipal pumping (App. Exh. 98D), which would reduce its estimates to about 37,000 afa. The applicant's estimates of this potential supplementary supply are substantially smaller (Appl. Exhs. 23, 98D, 98E).

To provide the quantity of supplemental water estimated to be necessary by DWR would require a large investment for many pumping plants. Further, the DWR estimate of availability of ground water was predicated on a lowering of the water table in the Districts area so that a greater recharge would be induced from the Feather River. In fact, DWR shows that 32,000 acre-feet of this supplementary supply of 37,000 acre-feet would come from the Feather River (DWR Exh. 62B). This type of operation might involve legal complications by reducing the flow of the Feather River.

For a number of years the Districts have been obtaining a supplemental supply of surplus water from PG&E. In dry years more water has been purchased than in average

or above-normal years. This can be classed as an undependable supply, however, inasmuch as the availability of this water is governed by the operation of PG&E's hydroelectric power system and its public utility obligation to the Western Canal Company service area. According to testimony given during the hearing it is anticipated that the Western Canal will be enlarged in the future from 700 cfs capacity to approximately 1,200 cfs capacity and that its water deliveries will increase from 140,000 to 280,000 acre-feet in a maximum year. This is expected to reduce drastically the quantity of water available for sale to the Districts. DWR evaluates future surplus PG&E water available to the Districts for the critical summer months to average only 2,500 afa (DWR Exh. 67C). Consequently, surplus PG&E water cannot be depended upon as a firm source of supply for future Districts operations (RT 1671-74, 3632-44; Appl. Exh. 7; Plumas Exhs. 16A-16Q; DWR Exhs. 66A-66D).

Even if the Districts should find available and be able to pump or buy drain water, well water, and excess PG&E water in the total quantity of 53,800 afa (DWR's estimate of average additional water requirement), the Board finds that the Districts would be far short of meeting their ultimate requirements. The Districts should reach their full potential growth with the aid of the 100,000 afa, more or less, developed by the Middle Fork project plus more intensive use of drain water and use of well water within Districts boundaries to

the extent required. Without the Middle Fork project and without obtaining comparable quantities of water from another source, the Districts would survive but would not reach their full potential economic growth.

We proceed to consider the proposed Middle Fork project in the light of the broad public interest in multiple uses of our water resources for recreation and in conservation of water, of power, and of the wildlife, particularly the wild trout.

Middle Fork Feather River and Unappropriated Water

General Description of Watershed

The waters of Middle Fork Feather River originate in the Sierra Nevada in Plumas, Sierra, and Butte Counties. Several small streams which drain 155 square miles of Sierra Valley join near the eastern end of the valley to create the river. It flows out of Sierra Valley through the town of Portola and continues in a southwesterly direction for about 10 miles to the small community of Clio in Mohawk Valley. At this point it turns abruptly northwest through Mohawk Valley, gaining water from the many streams draining into this area from the surrounding mountains and lakes. It then turns west and southwest to enter the Middle Fork Canyon. It emerges from the canyon about 60 miles downstream and joins the South and North Forks of the Feather River a few

miles upstream from Oroville Dam and from the City of Oroville in Butte County. From Oroville the main stem of the Feather River flows south on the easterly side of the service area of the Joint Water Districts and joins the Sacramento River about 25 miles north of Sacramento.

The total drainage area of the Middle Fork is about 1,240 square miles. Most of this area lies in Plumas County and consists largely of mountain slopes covered with coniferous forest. The valleys of the drainage area are covered either with sagebrush or grass. Watershed elevations range from about 300 feet at the confluence of the North Fork and Middle Fork to a maximum of about 8,500 feet.

Precipitation in the upper watershed of the Middle Fork is very low, since this area is east of the crest of the Sierras. In the vicinity of Sierra Valley the precipitation averages about 10 inches per year. Going westward from Sierra Valley precipitation increases greatly to a maximum of about 90 inches per year in the mid and lower reaches of the watershed (Staff Exh. 6, Plate 3).

Water Supply and Prior Vested Rights

The applicant proposes a multipurpose project for storage and diversion of water throughout the year. The only storage project of any magnitude below the applicant's proposed storage reservoirs is Oroville Dam on the Feather River being constructed by DWR. However, the release from

priority granted by the California Water Commission of the filings at Oroville in favor of Richvale appears to remove any possible objection by DWR on the ground of lack of unappropriated water. Downstream users appropriate water by direct diversion and would not be injured by storage during periods of high flow.

The USGS Water Supply Papers show that hydrologic continuity of Feather River with the Sacramento River exists throughout the year (Staff Exh. 7). Certain exhibits were introduced into evidence relative to the availability of unappropriated water in the reach of the Sacramento River to which the Feather River is tributary (Staff Exhs. 9-10, "Central Valley Project Operation Study, Shasta Reservoir Operation for Hydrologic Period 1921-22 to 1953-54," with sources of data and column explanation, and Staff Exh. 11, "Report on 1956 Cooperative Study Program," Volumes 1 and 2, together with supplements on assumptions as to water rights, hydrology, and methods of analysis). A study of these exhibits indicates that no unappropriated water is available during the months of July and August of each year and that the applications for appropriation by storage or by direct diversion for irrigation use during those months should be denied to protect existing downstream rights.

Insofar as the applications pertain to direct diversion for nonconsumptive power use, the above reasoning would not apply to prevent use during any portion of the year.

Future Stream Depletion in Sierra Valley

Sierra Valley is a rather arid, mountain valley in the upper reaches of the Middle Fork. It contains approximately 100,000 acres of irrigable land, less than half of which is irrigated at the present time. Frenchman Reservoir on Little Last Chance Creek has been constructed by DWR. Planned for construction within the next several years is Grizzly Valley Reservoir on Big Grizzly Creek. Both of these reservoirs are to be used for recreation and will be available to supply irrigation water to the Sierra Valley area.

Long-range plans include construction of Sheep Camp Reservoir on Carmen Creek toward the southwesterly portion of Sierra Valley. This reservoir is not economically justified at the present time, but DWR believes it can be justified within a period of 20 to 25 years. All of these factors will have an effect on the availability of water for the Middle Fork project proposed by the applicant.

In addition to the development of surface water, DWR estimates that the ground water basin underlying Sierra Valley will be gradually developed at the rate of 1,000 afa to a maximum quantity of approximately 50,000 afa.

DWR predicts in its Exhibit 71C that the average depletion of surface flow from Sierra Valley for the initial 15-year period of operation of the applicant's project, assuming a repetition of the hydrologic period of 1928 through

1942, will be about 44,500 afa (RT 5130-41). Two-thirds of this total would result from the operation of Frenchman and Grizzly Valley Reservoirs; one-third would result from DWR's predicted expansion of ground water use in Sierra Valley.

There has been little ground water development in Sierra Valley to date. In fact, the witness for DWR knew of only 7 irrigation wells drilled in Sierra Valley since 1958, and the 7 were all drilled by one operator whose main occupation is not ranching (RT 5158-59). We believe that for most ranchers the same factors will hold back development of Sierra Valley ground water in the future that have discouraged its development in the past. These factors include a very short growing season (Appl. Exh. 49, p. 6), the relatively high cost of developing a supplementary supply to be used only near the end of the short irrigation season, and the poor quality of the water in some parts of Sierra Valley (Staff Exh. 4, p. 106 and Table 25). Table 25 of Staff Exhibit 4 also indicates a question as to the extent of possible annual recharge of ground water. No evidence indicates that the limiting factors of today will not continue to be limiting factors in the future use of Sierra Valley ground water.

The 29,000 acre-foot average annual depletion which is anticipated by the Districts for the initial period is equivalent to about 15 per cent of the streamflow which historically reached Clio between 1928 and 1942. The Districts

increase this figure to an average of about 61,600 afa to represent anticipated upstream depletion during the remainder of the payout period of operation. (This represents 35 per cent of the historic inflow to Clio. See RT 8031). This increased depletion could result in part from the building of Sheep Camp Reservoir or from some increased use of ground water, or both. We find these to be reasonable estimates of anticipated upstream depletion.

The release from priority of the applications covering the State Feather River project in favor of the applicant's proposed project was conditioned upon a general reservation of water required to meet the full needs of the counties of origin (Appl. Exh. 44). This condition removes the only ground of protest asserted by several upstream protestants. Protests asserted in the public interest remain for consideration.

Applicant's Proposed Project

Original Project

The applicant originally proposed the construction of a dam and reservoir on Frazier Creek at Gold Lake, a dam and reservoir on Big Grizzly Creek at Grizzly Valley, two dams and storage reservoirs on the Middle Fork at Clio and Nelson Point, and four diversion dams in the Canyon of the Middle Fork with power drops to five powerplants. The powerplants would have a dependable capacity of 215,000

kilowatts and would be operated at a 41 per cent load factor during the first 15 years of operation of the project and at 34 per cent load factor during the remainder of the payout period (Appl. Exh. 14).

This plan proposed basic releases of 10 cfs below Clio Dam, 50 cfs below Nelson Point and the other diversion dams in the canyon during the period May 1 to October 31, and 30 cfs during the period November 1 through April 30, to maintain minimal streamflows for fish in the natural channel. A release from Gold Lake of 10 cfs from June 30 through September 30 and 2 cfs from October 1 through June 29 was proposed for Frazier Creek. The flows below Nelson Point and other diversion dams in the canyon would be modified downward during dry years (Appl. Exh. 15).

According to applicant's Exhibit 14, the irrigation yield of the proposed project with the five powerplants and Gold Lake would be 94,000 afa during the initial period. During the ultimate period, under the 34 per cent load factor operation, 76,000 acre-feet of water would be yielded from storage during the irrigation season.

Applicant plans to finance construction of the storage reservoirs and power features of the project by sale of revenue bonds secured by a long-term contract for the sale of project power to PG&E. Engineering witnesses for the applicant testified that the project is financially feasible if the revenue bonds can be sold at 4 per cent interest or less (RT 455, 552, and 742).

The Grizzly Valley Reservoir portion of the project was not pressed at the hearing. In fact, the applicant stated that it wished action deferred on this application pending negotiation of a suitable agreement with DWR for either joint use or purchase of water from this site. An agreement was effected on July 6, 1964, whereby the applicant agreed to withdraw the Grizzly Valley Reservoir from its Federal Power Commission application (Appl. Exh. 113). The Grizzly Valley Reservoir is an authorized feature of the California Water Plan. In view of these circumstances, this portion of Applications 15551 and 15552 will be denied.

Modified Project

During the course of the hearing it developed that the project as originally proposed by the applicant would probably cause extensive damage to the fishery resource and inadequately protect the recreation potential of the Middle Fork. At the suggestion of the Board, the applicant studied the possibility of an alternate project which would eliminate certain features and change the proposed operation of the upper reservoirs to make the project more compatible with fishery and recreational requirements. The modified project would eliminate Powerplants 1, 2 and 3 in the canyon below Nelson Point and the forebay dams at Minerva Bar and Dogwood. Also, the Gold Lake storage reservoir might be eliminated. No further application amendments would be required, as the

changes would involve approval of a portion of the applications now pending before the Board and denial of the remainder in the public interest. Hereinafter, this suggested alternative project will be referred to sometimes as the "modified project."

In order to evaluate this proposed modified project, the applicant and Board requested the protestants to supply criteria most desirable from their standpoint for operation of Clio and Nelson Point Reservoirs and for minimum releases at the reservoirs. Protestants Fish and Game and County of Plumas submitted criteria for operation of the reservoirs and releases, although not in any way approving the modified project. The Board then compiled the information and submitted it to the applicant in the form of a letter. Proposed criteria included operating Clio Reservoir at highest possible levels with a minimum release of 10 cfs below Clio Dam, maintaining minimum releases below Nelson Point, Hartman Bar, and Bald Rock Dams of 75 cfs, 30 cfs, and 30 cfs, respectively. In addition, it was suggested that an alternative study be made eliminating Gold Lake Reservoir from applicant's project, and that the annual drawdown at Clio Reservoir be limited to a maximum of 15 feet except during critically dry years when greater withdrawal would be needed to meet minimum power and irrigation requirements. It was also suggested that the summer drawdown at Clio Reservoir be limited to 5 feet by September 1 of each year (Staff Exh. 1; RT 8018 and 8030).

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Accordingly, the applicant prepared operation studies to include the suggested criteria (Appl. Exhs. 102, 103, 104 and 105). The studies include operation of the modified project with and without Gold Lake, using 41 and 34 per cent load factors. Streamflow depletion for the studies has already been discussed in connection with Sierra Valley.

The engineering witness for the applicant concluded that the modified project, with or without Gold Lake, is economically feasible. The modified project would be financed by sale of revenue bonds, and feasibility would be based upon sale of bonds at 4 per cent interest or less. The estimated cost of the modified project is $74,000,000 (RT 8045, 8058-61).

The dependable power capacity of the modified project at 41 per cent load factor with Gold Lake would be 114,500 kilowatts and without Gold Lake, 114,000 kilowatts. At 34 per cent load factor the dependable power capacity with Gold Lake would be 116,500 kilowatts and without Gold Lake, 116,000 kilowatts (Appl. Exhs. 102, 103, 104 and 105). The irrigation yield of the modified project would be approximately 108,000 afa during the irrigation season with 41 per cent load factor conditions during the 15-year initial period. With 34 per cent load factor operation, the modified project would yield approximately 111,000 afa during the irrigation season (RT 8051).

The protestants correctly point out that the modified project would have greater financial feasibility than the

original project and would produce more irrigation water available for use by the Districts (Joint Opening Brief, p. 47). Other considerations also favor the modified project over the original project. Clio Reservoir held to a high level in the summer would increase the overall recreation opportunities of the area. Most important, trout would be better protected below Nelson Point Dam.

Appropriation by storage in Gold Lake should not be approved for either project. It is an important natural trout fishery, and its proposed reservoir would damage the fishery and recreation resources of the lake more than would be gained by increased summer flows for trout in Frazier Creek.

Operation of Gold Lake to meet Fish and Game requirements would contribute less than one-half of one per cent of total modified project kilowatts. The capital and operating costs would make doubtful its financial feasibility.

If either project is to be built on the Middle Fork, the modified project minus both Grizzly Valley and Gold Lake Reservoirs should be selected.

Evaluation of Benefits and Detriments Resulting From the Modified Middle Fork Project

Wildlife

Witnesses for Fish and Game testified that the principal game species found in the project area are mountain quail, deer, bear, rabbits, doves, and waterfowl. These would not be greatly affected by the project between Nelson Point

Dam and the proposed Oroville Reservoir. However, the population of the fur-bearing animals, quail, and doves from Nelson Point Dam upstream through Clio Reservoir would be decreased in proportion to the amount of habitat destroyed by the project. Fish and Game estimates that the project would have no effect upon waterfowl (RT 4449-59; Fish and Game Exh. 10).

The area from the proposed Nelson Point Dam to and including lands to be covered by the proposed Clio Reservoir constitutes winter range for deer. The summer range influenced by this winter range comprises approximately 411 square miles. This winter range is estimated to cover 59 square miles during a mild winter and 28 square miles during a severe winter. The deer population supported by this area is estimated to be not less than 10,000. According to testimony by witnesses for Fish and Game, approximately 6 square miles of the winter range would be lost due to flooding by the proposed Nelson Point and Clio Reservoirs (Fish and Game Exh. 10).

Deer do not migrate out of the area in which they normally reside. Consequently, if a portion of the winter range were to be removed, a heavier burden would be placed upon the remaining range, which is already at carrying capacity. Witnesses for Fish and Game estimate that this would result in a loss of 3,000 animals from the deer herd (RT 4486; Fish and Game Exh. 10). This figure may be high, as local residents testified they had never seen more than a small fraction of this number of deer in the proposed reservoir areas, even

under severe winter conditions. However, there is no question that winter range for deer would be impaired.

No evidence was offered with respect to the expected loss of winter range for deer if Meadow Valley and Turntable or other Middle Fork reservoirs were built instead of Clio and Nelson Point. See DWR Bulletins 3, 59, 59-2, and Appendix A to 59-2.

Recreation Potential

The effect of the modified project on recreation is of prime importance, partly because of the high recreation potential of the Upper Feather River area and partly because of the economic needs of the County of Plumas.

DWR evaluated the effect of the original Richvale project on recreation by attaching estimated monetary values to anticipated recreation use both with and without the project. Most of this information is contained in studies made by Pacific Planning and Research, Incorporated, as set forth in DWR's Bulletin 59-2, Appendix A (Staff Exh. 6). The same expert who prepared these studies for DWR appeared in these proceedings as an expert for the County of Plumas and submitted revised recreation visitor days for Clio Reservoir, Nelson Point Reservoir, and for the Middle Fork Canyon. The revised estimates of recreation visitor days were predicated on revised assumptions of reservoir operations and releases.

Table 2 on page 36 of this decision selects or combines those evaluations of the recreation expert which most

nearly correspond to the modified project operation. It selects the higher recreation visitor day evaluation for Clio and the lower evaluation for Nelson Point Reservoir. The recreation evaluation of the Middle Fork Canyon is made on a combination basis. Originally the expert had assumed high streamflow releases throughout the entire Middle Fork Canyon. His resulting recreation evaluations were high. His revised low evaluation assumed few trout would survive below Nelson Point. Under the modified project there should be an outstanding trout fishery in at least one-half of the canyon. In Table 2 we have added the expert's two estimates for this area and divided by two. This should be a conservative evaluation of the impact of the modified project on recreation visitor days in the Middle Fork Canyon.

It is estimated that each recreation visitor would spend between $8 and $9 for each day in the Upper Feather River (Staff Exh. 6). Ultimately, the modified project should cause increased annual expenditures of over $10,000,000. The increased annual expenditures in the County of Plumas from the modified project are estimated as $2,000,000 in 1980, rising to $5,000,000 in 2010. See Tables 2 and 3.

The expert for the County of Plumas no longer looks upon Clio as a desirable reservoir site. His map with the proposed County of Plumas recreation plan (Plumas Exh. 1) shows with approval a proposed future Meadow Valley Reservoir and Turntable Reservoir. No application has been filed by

TABLE 2

Probable Ultimate Annual Recreation Expenditures

in Plumas County Resulting from Modified Middle Fork Project

Area	Annual Visitor Days Without Project	Annual Visitor Days With Project	Reference
Clio Reservoir	164,063		Table 14[1]/
		601,690	Table 29[1]/
Nelson Point Reservoir	181,582		Table 14[1]/
		738,500	Plumas Exh. 32B
Middle Fork Canyon--Sloat to Oroville Reservoir	675,348		Plumas Exh. 34A
		1,025,412	(Plumas Exh. 34B (Table 26[1]/
	1,020,993	2,365,602	
Increased Visitor Days		1,344,609	
Est. Expenditure per day		$8.00	Page 141[1]/
Est. Ultimate Annual Expenditures		$10,756,872	

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TABLE 3

Approximate Additional Annual Recreational Expenditures

in Plumas County Resulting from Modified Middle Fork Project

Year	Additional Plumas Expenditures	Derivation
1980	$2,000,000	Graph 4, p. 42[1]/
1990	3,000,000	
2000	4,000,000	
2010	5,000,000	
2050 (ultimate)	10,756,872	

1/ DWR Bull. 59-2, App. A

the State or anyone else for these reservoirs. Their lack of financial feasibility, as shown by DWR Bulletin 59-2, indicates that they probably will not be built. Turntable is largely identical with Nelson Point Reservoir.

The modified project will reverse the summer operation of Nelson Point and Clio Reservoirs, with Clio instead of Nelson Point held at the highest level possible. This change in operation should substantially improve the total recreation benefits of the project.

Clio Reservoir has a unique recreation potential in the entire Upper Feather River Basin; it would be held at a high level during the entire summer recreation season; it would have surface water warm enough for swimming and water skiing; and it would be deep enough near its dam so that summer releases of water for trout would be cold and could be used to enhance trout fishing in the area between Clio and Nelson Point Reservoir.

Hartman and Bald Rock regulating forebay reservoirs would be built large enough to impound steady flows of project water over the weekend at a time when power requirements might be nonexistent. They would provide daily as well as weekend regulation to accommodate peak requirements. These fluctuations would not be desirable from a recreation point of view, but could not be avoided.

Fishery

One of the most valuable assets of Middle Fork Feather River is its wild trout fishery. Preliminary study

of the effects of the proposed Richvale project on the Middle Fork were started by Fish and Game in 1955. A full-scale biological investigation of the effects of the project was not made until 1959 and 1960. Fish and Game Exhibit 14 covers its evaluation of the original Richvale project. Project features and affected areas evaluated by Fish and Game include a dam and reservoir at Clio, a dam and reservoir at Nelson Point, four forebays and five powerplants in the Middle Fork Canyon below Nelson Point, and the reaches of Middle Fork Feather River between these facilities.

Clio Reservoir will inundate and destroy about four miles of relatively poor trout habitat in the Middle Fork, according to Fish and Game. It will also inundate and destroy three miles of Sulphur Creek which contains an excellent trout fishery but is located on privately owned lands with limited public access.

Fish and Game anticipates that Clio Reservoir will have an abundance of rough fish and will not provide a satisfactory sport fishery. This contrasts with the opinion of the expert for the applicant that the trout fishery in Clio would be an improvement over that now existing in the part of the stream that would be inundated. His reason: a thermocline would form in Clio with the result that the water below 40 or 50 feet would remain cold enough for trout. Present summer water temperatures in this reach of the Middle Fork attain 80 degrees (RT 4736) and are too warm for trout. He also testified that a sport fishery of bass would be possible in the warm upper waters of Clio (RT 5618-19).

Fish and Game testified that control of rough fish and encouragement of trout and bass in Clio would be a continuous problem. Clio would nevertheless appear to provide more sport fishing than is presently available in the portion of the river to be inundated.

The reach of the Middle Fork between Clio and Sloat (the upper end of Nelson Point Reservoir) is 16 miles long. The upper half of this reach is now a relatively poor trout habitat because of low summer flows and resulting high temperatures. The lower half is now classed as a fair trout fishery which becomes good just above Sloat. This reach of the river is easily accessible and is fairly heavily fished (Fish and Game Exh. 14). Therefore, a real enhancement of the trout fishery in this portion of the Middle Fork should be a valuable asset to the County of Plumas.

Fish and Game evidence indicated that trout enhancement below Clio would result from spring spawning flows of 150 cfs or more from April 1 to June 30, followed by minimum flows of 50 cfs during the rest of the year (Fish and Game Exh. 14). Frazier Creek enters the Middle Fork less than a mile below Clio, and we assume that enhancement downstream from Frazier Creek could result from combining natural Frazier Creek flows (available since Gold Lake storage is to be denied) with regulated releases from Clio. An analysis of operation studies for the modified project (Appl. Exh. 102, 103) indicates that releases from Clio could be so regulated as to result

in the specified trout enhancement flows, and that this can be accomplished in nearly all years without lowering the surface of Clio Reservoir more than 5 feet during the summer. It is the desire of the County of Plumas that Clio's summer water surface be held at a high level for recreation purposes.

The natural flows of Frazier Creek that reach the Middle Fork a mile below Clio are calculated in Fish and Game Exhibits 23, 24, and 25 as an average of the flows for the period 1926-1958. Frazier Creek accretions to the Middle Fork for the trout spawning months of April, May, and June averaged 130, 120, and 60 cfs, respectively. Supplementary releases from Clio to total a combined 150 cfs would average only 20, 30, and 90 cfs in April, May, and June, respectively, and Clio storage could be building up in these heavy runoff months.

The summer trout enhancement flows of 50 cfs would have to come almost entirely from Clio, since a riparian landowner on Frazier Creek diverts most of its flows from early July to the end of the irrigation season. Releases of 50 cfs from Clio from July 1 to September 1 would total 6,000 acre-feet and would lower Clio's surface about 2½ or 3 feet. A full Clio would have a surface area of nearly 2,500 acres, and it would be full or nearly full most years on July 1. In most summers Clio's evaporation would exceed inflow enough to lower the surface by one or two feet. Sometimes inflow would exceed evaporation, and future summer inflows may be larger as the result of the operation of Frenchman and Grizzly Reservoirs.

Accordingly, a release of 50 cfs from Clio from July 1 to September 1 would not result in the lowering of Clio's surface by as much as 5 feet in most years. Such a minor fluctuation of Clio should not impair its summer recreation value.

Although operation studies indicate that Clio releases and Frazier Creek natural flows could combine to meet Fish and Game's trout enhancement flows in most months of most years, in critical dry years the Districts would be required to maintain only small minimum releases. Operating criteria suggested to the applicant and used by it in its operating studies for the modified plan include a mandatory minimum release of 10 cfs from Clio, regardless of project requirements. However, a mandatory minimum release from Clio of 5 cfs plus such additional quantity, if any, which, when combined with Frazier Creek would result in a flow of 25 cfs at the junction of Frazier Creek with Middle Fork Feather River, would be preferable. The substitute mandatory releases would have no more adverse effect on the project than the previously suggested mandatory releases. The 25 cfs combined minimum flow would be more desirable for trout, would be a substantial improvement over existing low flow conditions, and would better protect the same part of the river that would receive trout enhancement flows.

The summer trout enhancement flows below Clio of 50 cfs are unusual in that they would not consist of minimum flows, but of constant flows. As much as 50 cfs is needed for the trout. More than 50 cfs released from Clio might unduly lower its surface elevation to the detriment of recreationists.

Nelson Point Reservoir would inundate about 10 miles which is classified as excellent trout river. Because Nelson

Point Reservoir would be located in a steep and narrow canyon, Fish and Game believes it would not provide good trout fishing. It expects rough fish to dominate the fish population. Nelson Point Reservoir would also inundate about 2½ miles of Nelson Creek, which is a very popular trout stream and an important spawning area for trout. Nelson Point Reservoir would have its plus values from the point of view of recreation, but from the point of view of the trout fishery, it would result in a substantial, although unavoidable, detriment.

Rapid changes in releases from Nelson Point might be harmful to aquatic life and dangerous to human life in the river channel below the dam. The Board agrees with the Fish and Game recommendation that its criteria for rate of change of flow should be required if permits are granted to the applicant. The applicant agreed to meet these criteria.

Below Nelson Point the river works its way deeper and deeper into the rugged and relatively inaccessible parts of the Middle Fork Canyon. Natural conditions and inaccessibility to the fisherman have combined to preserve the wild trout in this area.

There are 17 miles of stream below Nelson Point and above the proposed Hartman Dam. The original project would have reduced summer flows in this reach to 50 cfs in normal summers and 30 cfs in 6 winter months. By eliminating Powerplants 1, 2, and 3, no water would be diverted from this reach of the river. A minimum of 75 cfs would be released

from Nelson Point at all times. Summer flows would be about 400 to 800 cfs, far larger than natural flows late in the summer but a little lower than present flows at the beginning of the trout season. On the whole, Fish and Game believes that the excellent trout fishery which now exists in this reach would continue under the modified project.

There are about 14 miles of the Middle Fork below Hartman Dam. Under the modified project Hartman and Bald Rock would be the diversion dams to Powerplants 4 and 5. Tentative stream releases below these dams are 30 cfs. Fish and Game's expert had no hope for a future trout fishery in this reach with flows of this size.

We believe that releases below Hartman and Bald Rock Dams should be increased to the amounts originally proposed by the applicant, which its expert testified would support a reduced trout fishery. These flows would be 50 cfs in the six summer months of normal years but subject to reduction in dry years to 40 or 30 cfs. Winter releases would be 30 cfs. An analysis of Applicant's Exhibit 15, Table 2, shows that the suggested releases were evaluated by the applicant as equivalent to a continuous flow of 35 cfs and that the power revenue loss resulting from each cfs for five powerplants was considered to be about $12,500. For two powerplants, the cost per second foot should be less than $10,000, and the suggested modification would presumably decrease power revenue to the Districts less than $50,000 a

year. This would still leave the modified project financially more feasible than the original project and capable of being financed at 4 per cent, with some extra capital left over, according to the Districts' analysis (RT 8107-08). More important, summer flows of 50 cfs would be much more desirable both for fish and from the standpoint of campers.

Fish and Game's preliminary Middle Fork predictions are contained in Bulletin No. 59-2. In Appendix D it predicted that constant flows of only 75 cfs below Nelson Point would cause a considerable reduction in fish population and that the trout fishery eventually would be destroyed with a flow of 23 second-feet (Staff Exh. 6, p. D-32). Fishing pressure is indicated as being one of the most important factors in reducing a trout fishery. However, Figure 2 next to page D-32 indicates that within the limits of angling pressure there might be at least a minimal trout fishery with flows of more than 23 cfs, although less than 75 cfs. This reinforces our view of the importance of increasing Hartman and Bald Rock releases to the extent indicated.

At the end of the project payout period of about 50 years, angling pressure will require that streamflow releases at Hartman and Bald Rock Dams be increased for the restoration of the trout fishery. Present flows in this reach of the Middle Fork Canyon approach 200 cfs at the end of the summer. A supplementary streamflow release of 150 cfs would result in

flows a little larger than natural low flows (Fish and Game Exh. 27). Power revenues would be decreased but would still amount to several million dollars a year.

Conservation of Power and Water

The dependable power capacity of the modified project would be only a little more than 50 per cent of the dependable power capacity of the original project, but would nevertheless be a valuable contribution to California's total power supply.

Important as it is, power is not at present in critically short supply in California. Water is. DWR estimated that for a critical dry period the original project would conserve about 25,400 afa (RT 2246; DWR Exhs. 9 and 10). Using the operation studies for the modified project, the average net drawdown of Clio and Nelson Point Reservoirs during the same critical dry period used by DWR would be a little over 28,000 afa. This figure represents the critical dry period water conservation of the modified project over and above that conserved at Oroville Reservoir.

Total water conserved by the modified project would be substantially larger than that conserved in a critical dry period. It would consist of Oroville Reservoir flood storage space releases as well as spill and would apparently average more than 50,000 afa. DWR Exhibit 8 contains Operation Study B-B Summary, of which columns 7, 8, and 9 are entitled

"Mandatory Release Acre-feet," "Total Release Acre-Feet," and "Spill Acre-Feet," respectively. Spill would be expected to occur in only 10 years out of 31. The spill in 1928 was used for the purpose of calculating water conservation by the Middle Fork project. However, in an additional 10 years out of the 31 there would have been flood space releases of water that would be available for Middle Fork project storage.

With diversion of 100,000 acre-feet and efficiency of 60 per cent, 40,000 acre-feet a year of project water would return to the ground water table or to the Feather or Sacramento Rivers.

Opposition by County of Plumas, Conservationists, and United States Forest Service

The original Richvale project was opposed by the County of Plumas, some of the local residents, the United States Forest Service, and certain groups of conservationists. The modified project would meet some but not all of their objections.

The County of Plumas opposed the project planned by the applicant because it would conflict with the development of the county as planned and projected by officials of the county and planning consultants. The county desires to maintain the Middle Fork Canyon in a relatively natural, inaccessible state. The county anticipates that the major

reservoirs planned by the applicant will be fluctuated greatly, with unsightly mud flats on the perimeter of the reservoirs during the recreation season. The county also contends that the land to be taken by the project will reduce its tax base and pose an additional burden on the taxpayers of the county (RT 5333-38).

The county has adopted a general plan for future development (Plumas Exh. 1), prepared by Pacific Planning and Research, and the county apparently relies heavily upon the reservoirs to be constructed by DWR in the upper watershed. Five such reservoirs have been authorized, two of which have been constructed at the present time.

The county's expert had previously prepared recreation studies used by DWR in Bulletin 59-2, Appendix A. We believe that the county's expert was right the first time when he anticipated in Appendix A to Bulletin 59-2 that Clio and Nelson Point Reservoirs would bring substantial recreation benefits to the County of Plumas. His reasons for modifying his views largely disappear with the substitution of the modified project for the original project. So far as taxes and a tax base are concerned, the county expert would have the Clio area devoted to agriculture, with only a few homes predicted for the future. This would bring little tax revenue to the county--far less than would be produced by Clio under the modified project.

The applicant offered to share net power revenues with the County of Plumas, in which this water originates after the end of the 50-year payout period. This offer was repeated in the Joint Districts reply brief. We believe it is fair and should be made a permit condition. Most land in the County of Plumas is federally owned and tax exempt. Years ago, comparable projects were built and added to the tax rolls by tax-paying public utilities. Most of this applicant's property would be tax exempt. Furthermore, the applicant would not have to build this project out of its own pocket. By use of a long-term contract and revenue bonds, it would receive a free water supply from unappropriated water which now constitutes an asset of the State.

Numerous letters and resolutions from individuals, sportsmen's organizations, and various other groups have been received by the Board. Many of these statements and resolutions were offered in evidence by the County of Plumas. Much of the opposition to the Middle Fork project was generated by an organization called "Save the Middle Fork League," which wrote to many sportsmen and conservation organizations throughout the State to solicit their support in opposition to the proposed Middle Fork project (Plumas Exh. 4A-11). This opposition was directed against the original Richvale project.

The U. S. Forest Service indicated a basic position of opposition to any Middle Fork Canyon reservoirs to be built pursuant to this project. It expects to oppose the

project before the Federal Power Commission, and refers to the possibility, which has been under federal study for several years, of having Middle Fork Feather River declared a wilderness reserve.

The elimination of diversion dams for Powerhouses 1, 2, and 3 would presumably remove the Forest Service's grounds for opposition to the project in the upper reaches of Middle Fork Canyon. Its objections presumably would remain with respect to diversions at Hartman and Bald Rock Dams and resulting low streamflows.

Conclusions

There is unappropriated water available for the Districts project except for diversion to storage or to consumptive irrigation use during the critical summer months of July and August. The proposed uses are beneficial.

If all the lands now included in the Joint Water Districts, plus other lands within their exterior boundaries that may reasonably be expected to be included, are developed to their full economic potential, all the water conserved by this project in addition to water reasonably available from all other sources, will be needed.

In determining public interest under Water Code Sections 1253 and 1255, the Board has given consideration as directed by Water Code Section 1256, to the evaluations of the Richvale project contained in Bulletin 3 and subsequent

bulletins of the Department of Water Resources. There is no evidence to indicate that the State or anyone else will build any of the other proposed Middle Fork projects which are considered as alternatives to the Richvale project. The California Water Commission has determined that the Richvale project is not in conflict with the coordinated water plan of the State of California. The Board agrees. A release of priority has been made of State filings in favor of the applicant's filings based on this premise. The Districts project would conserve a substantial quantity of water above that which will be conserved by the State facility at Oroville.

Evidence introduced during the hearing indicated that the fishery and wildlife resources of the Middle Fork Feather River are substantial and it would be in the public interest to preserve and enhance as much of this resource as is reasonably possible. The Board, realizing the importance of the fishery and wildlife resources and the recreation potential of the Middle Fork, suggested that the proposed project facilities and operation be modified.

Under the modified plan, which the applicant says is feasible and would actually provide additional yield for irrigation, three of the five proposed powerhouses would be eliminated from the project. The storage facilities at Gold Lake would be eliminated, the reservoir facilities on Big Grizzly Creek would be left to the State for construction and development, and 17 miles of the Middle Fork Canyon would

not only be preserved in a relatively natural state but would possibly be enhanced. At the end of the payout period, additional releases of water could and should help to restore the wild trout fishery below Hartman and Bald Rock Dams.

The recreation potential of the applicant's reservoirs, especially Clio Reservoir, appears to be quite substantial. Frazier Creek and Gold Lake, which have outstanding fisheries, would be preserved in their natural states. An enhanced trout fishery would exist between Frazier Creek and Nelson Point Reservoir. An analysis of all available evidence shows that the modified project preserves a significant portion of the fishery resource and also allows development of the water resources for other purposes.

The probable economic benefit to the area would be considerably greater with the modified project. Also, a significantly greater number of people would utilize the river's fishery and recreational resources with the modified project.

Section 1257 of the California Water Code provides that the Board in considering and acting upon applications to appropriate water "shall consider the relative benefit to be derived from all beneficial uses of the water concerned including, but not limited to, use for domestic, irrigation, municipal, industrial, preservation of fish and wildlife,

recreational, mining and power purposes, and may subject such appropriations to such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest, the water sought to be appropriated."

In analyzing the evidence submitted during the hearing, consideration has been given to the relative benefits to be derived from all of the beneficial uses of the water involved. The evidence shows that with the modified project, significantly greater benefits from the resources involved would be realized than without any water development. Accordingly, the Board finds that the modified project should be approved and permits issued subject to appropriate limitations and conditions.

It is of paramount importance that project reservoirs have adequate recreation facilities. The Federal Power Commission's Order No. 260-A, issued in 1963, requires its applicants for a power license to submit recreation plans for full public utilization of project waters and adjacent project lands for recreational purposes. It applies to project reservoirs to be located on non-federal as well as federal lands. "The plan shall show the location of the project lands and waters proposed by the applicant for camping, picnicking, bathing, boating, fishing, hunting and similar recreational activities. It shall include provisions for sanitary facilities, boat-launching ramps, and access roads and trails. The applicant shall indicate the facilities

it proposes to provide at its own cost...." As applied to the proposed project, it is not clear what recreation facilities would be proposed by the applicant to be built at its own expense or would be required by the Commission.

The applicant agreed, if so requested by the County of Plumas, to apply for a Davis-Grunsky recreational grant to be used for the construction and operation of recreational facilities at project reservoirs. A Davis-Grunsky grant could result in the construction and operation of recreational facilities broader in scope or area than those covered by any FPC order (although not in conflict with any such order). A permit condition will require the applicant, if so requested by the County of Plumas, to cooperate with it in the preparation of a recreation plan for Clio Reservoir and to seek a Davis-Grunsky grant to help finance the construction and operation of such facilities. A similar condition will apply with respect to reservoirs to be located on U. S. Forest Service lands.

It may become desirable to make minor adjustments in reservoir releases from Clio. A period of actual operation would demonstrate the effect on Clio's surface of summer releases of 50 cfs. A variable to be considered is the future operation of Frenchman and Grizzly Reservoirs, which may temporarily or permanently augment the summer inflow to Clio. It therefore is necessary for the Board to reserve jurisdiction to approve or order adjustments in future Clio

releases that will be consistent with project requirements but may be needed or desirable to meet recreation or fishery requirements.

At the end of the project payout period, future net power revenues should be divided between the Joint Water Districts and the County of Plumas.

Two matters of public interest should be mentioned which are based on testimony in these proceedings but beyond the scope of any order by the Board:

1. The U. S. Forest Service has a potentially excellent recreation area at Gold Lake, but at present it lacks any lake frontage. PG&E holds the entire lake frontage in private ownership because of its potential power storage development at Gold Lake. If the time comes when PG&E finds it has no further utility need for Gold Lake, it is hoped that in disposing of that property it will consider the great public recreational benefit that would result from the Forest Service acquiring a substantial frontage on Gold Lake.

2. There is a future hope for trout, even in reaches of trout streams detrimentally affected by water conservation or power projects. In this case the Board has provided that at the end of the project payout period, the streamflow releases in the adversely affected portions of the river shall be increased for the purpose of improving and restoring the wild trout fishery. Where the Federal Power Commission reviews projects under its jurisdiction

for possible renewal (after the end of the project payout period), that Commission could be urged to review streamflow requirements for trout. (In this connection, see RT 984).

Applications 15551 and 15552, which relate to Gold Lake and to Grizzly Reservoir will be denied. Application 13681, for which a request for cancellation has been received, will be canceled. No unappropriated water is available during July and August, except for power use by direct diversion. Applications 14919 and 14920 will be modified accordingly.

Since the proposed new diversion structures at Thermalito Afterbay will have a combined capacity of 2,800 cfs, direct diversion and rediversion of stored water for irrigation use under Application 14919, plus diversion for irrigation use under existing rights to the natural flow of the Feather River, should not exceed an instantaneous rate of 2,800 cfs. Applications 14919 and 14920 each request appropriation by storage of 381,000 afa, including refill, but will be approved for only 378,375 afa because of the denial of the portions of the applications which request storage at Minerva and Dogwood Dams.

ORDER

IT IS HEREBY ORDERED that Application 13681 be, and it is, canceled, and that Applications 15551 and 15552 be, and they are, denied.

IT IS FURTHER ORDERED that the proposed amendments to Applications 13682, 14919 and 14920 which have been approved by the California Water Commission (see Table 1 hereof), be, and they are, approved.

IT IS FURTHER ORDERED that Applications 13682, 14919 and 14920 be, and they are, approved in part, and that permits be issued to the applicant subject to vested rights and to the following limitations and conditions:

1a. The water appropriated under the permit issued pursuant to Application 13682 shall be limited to the quantity which can be beneficially used and shall not exceed 300 cubic feet per second by direct diversion, year-round.

1b. The water appropriated under the permit issued pursuant to Application 14919 shall be limited to the quantity which can be beneficially used and shall not exceed 1,300 cubic feet per second by direct diversion from about May 1 to about June 30 and about September 1 to about October 31 of each year and 378,375 acre-feet per annum by storage in Clio, Nelson Point, Hartman, and Bald Rock Reservoirs, to be collected between about October 1 of each year and about June 30 of the succeeding year, all as more

explicitly set forth in Paragraph 2 of this approved application, as amended. Direct diversion and rediversion of stored water for irrigation use under Application 14919 plus diversion for irrigation use under existing rights to the natural flow of the Feather River shall not exceed an instantaneous rate of 2,800 cubic feet per second.

1c. The water appropriated under the permit issued pursuant to Application 14920 shall be limited to the quantity which can be beneficially used and shall not exceed 1,000 cubic feet per second by direct diversion at Hartman Dam and 1,300 cubic feet per second by direct diversion at Bald Rock Dam, year-round, and 378,375 acre-feet per annum by storage in Clio, Nelson Point, Hartman, and Bald Rock Reservoirs, to be collected between about September 1 of each year and about June 30 of the succeeding year, all as more explicitly set forth in Paragraph 2 of this approved application, as amended.

2. The maximum quantity herein stated may be reduced in the license if investigation warrants.

3. Actual construction work shall begin on or before July 1, 1969, and shall thereafter be prosecuted with reasonable diligence and if not so commenced and prosecuted this permit may be revoked.

4. Construction work shall be completed on or before December 1, 1974.

5. Complete application of the water to the proposed use shall be made on or before December 1, 1990.

6. Progress reports shall be filed promptly by permittee on forms which will be provided annually by the State Water Rights Board until license is issued.

7. All rights and privileges under this permit including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

8. Permittee shall allow representatives of the State Water Rights Board and other parties as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit.

9. This permit is subject to the prior rights of any county in which the water covered by the application originates to the use of such water as may be necessary for the development of the county.

10. Before making any change in the project determined by the California Water Commission to be substantial, permittee shall submit such change to the Commission for its approval in compliance with Water Code Section 10504.5(a).

11. Permittee shall allow full public access to project reservoirs, consistent with safety and project operation, for recreation and fishing.

12a. If the County of Plumas requests it to do so, the permittee shall apply for a grant of Davis-Grunsky funds for the development of recreation facilities at Clio Reservoir, and the permittee shall fully cooperate with the county in the preparation of necessary recreation plans and in implementing them.

12b. If the United States, acting through the Forest Service or other authorized agency, requests it to do so, the permittee shall apply for a grant of Davis-Grunsky funds for the development of recreation facilities at reservoirs located in federal areas, and the permittee shall fully cooperate with the federal agency in the preparation of necessary recreation plans and in implementing them.

13. Construction of the dams shall not be commenced until the Department of Water Resources has approved plans and specifications.

14. In accordance with the requirements of Water Code Section 1393, permittee shall clear the site of the proposed reservoirs of all structures, trees and other vegetation which would interfere with the use of the reservoir for water storage and recreational purposes.

15a. To the extent reasonably possible consistent with project operations, releases shall be made from Clio

Reservoir which, when combined with the flow of Frazier Creek, will result in the following flows below the junction of Frazier Creek with Middle Fork Feather River:

(1) A constant flow of at least 150 cubic feet per second between April 1 and June 30.

(2) A constant flow of 50 cubic feet per second between July 1 and September 1.

(3) At least 50 cubic feet per second between September 1 and April 1.

15b. At all times, regardless of project operations, a minimum flow shall be maintained below Clio Dam of 5 cubic feet per second plus such additional quantity, if any, which, when combined with the flow of Frazier Creek, will result in a flow of 25 cubic feet per second at the junction of Frazier Creek with Middle Fork Feather River, to maintain the fishery below that point.

16. A minimum release of 75 cubic feet per second shall be made at all times from Nelson Point Reservoir to maintain the fishery below that point. To the extent reasonably possible consistent with project requirements, the releases from Nelson Point Reservoir during the period April 1 through June 30 shall be at least 300 cubic feet per second.

17. Minimum flows shall be maintained in the Middle Fork Feather River below Hartman and Bald Rock Dams of 50 cubic feet per second between May 1 and October 31 and

30 cubic feet per second between November 1 and the succeeding April 30, provided, that when the streamflow forecast for the Feather River Basin above Oroville, as given in the annual April bulletin of the California Department of Water Resources, estimates water runoff for the water-year of less than 1,500,000 acre-feet, the flow may be reduced throughout the seven-month period beginning May 1 to a minimum of 30 cubic feet per second, and when such forecast estimates runoff for the water-year of less than 3,000,000 acre-feet but more than 1,500,000 acre-feet, such flow may be modified through the seven-month period beginning May 1 to a minimum of 40 cubic feet per second.

18. The following minimum conservation pools shall be maintained:

Clio Reservoir: Not less than 30,000 acre-feet as of September 30 of each year and not less than 8,000 acre-feet at any time.

Nelson Point Reservoir: Not less than 12,000 acre-feet at any time.

19. The drawdown at Clio Reservoir in any one year shall be limited to a maximum of 15 feet except when operational criteria demand greater withdrawal to meet minimum power and irrigation requirements. To the extent reasonably possible, the drawdown of Clio Reservoir shall be limited to 5 feet by September 1 of each year.

20a. The rate of change of controlled reservoir releases at Nelson Point Dam shall not exceed 15 per cent of the maximum release of the previous day in any 24-hour period.

20b. Transitions from one mean monthly flow to the next shall occur during a period of not less than 7 days, except that a minimum daily change that would be less than 25 cubic feet per second may be increased to that rate.

20c. These rates of change will not apply when the reservoir has water flowing over the spillway.

21. To prevent rough fish (not game species) from migrating upstream into the Middle Fork Feather River from Hartman Bar Reservoir a fish barrier shall be constructed and maintained by the permittee across said river immediately upstream from the maximum water surface elevation of Hartman Bar Reservoir. This barrier shall be approved in specifications and design by the California Department of Fish and Game prior to its construction.

22. Permittee shall install and maintain suitable measuring devices upstream from the high-water elevation of the reservoirs, immediately below the storage dams, and immediately below the junction of Frazier Creek and Middle Fork Feather River, in order that accurate measurements can be made of the quantity of water flowing into and out of said reservoirs and of the combined flows of Middle Fork Feather River and Frazier Creek.

23. Water entering the reservoirs or collected in the reservoirs during and after the current storage season shall be released into the downstream channel to the extent necessary to satisfy downstream prior rights and to the extent that appropriation of water is not authorized under this permit.

24. Permittee shall install and maintain outlet pipes of adequate capacity in the dams as near to the bottom of the natural stream channel as may be approved by the State Department of Water Resources, in order to assure that streamflow releases for trout shall be of cold water.

25. The Board reserves jurisdiction to approve or order adjustments in streamflow releases from Clio Reservoir, consistent with project requirements, when such adjustments are needed to meet recreation and fishery requirements.

26. At the end of the project payout period (of about 50 years) the streamflow releases made at Hartman and Bald Rock Dams shall be increased for the purpose of improving and restoring the trout fishery by adding to the minimum releases required herein an additional flow of 150 cubic feet per second or such lesser amount, if any, as may be determined by the California Department of Fish and Game to be adequate for such purpose.

27. After the end of the project payout period, the permittee shall share net power revenues on an equal basis with the County of Plumas.

Adopted as the decision and order of the State Water Rights Board at a meeting duly called and held at Sacramento, California, the 30th day of June 1965.

/s/ Kent Silverthorne
Kent Silverthorne, Chairman

/s/ Ralph J. McGill
Ralph J. McGill, Member

/s/ W. A. Alexander
W. A. Alexander, Member