

THE STANISLAUS RIVER:
A FRESH PERSPECTIVE

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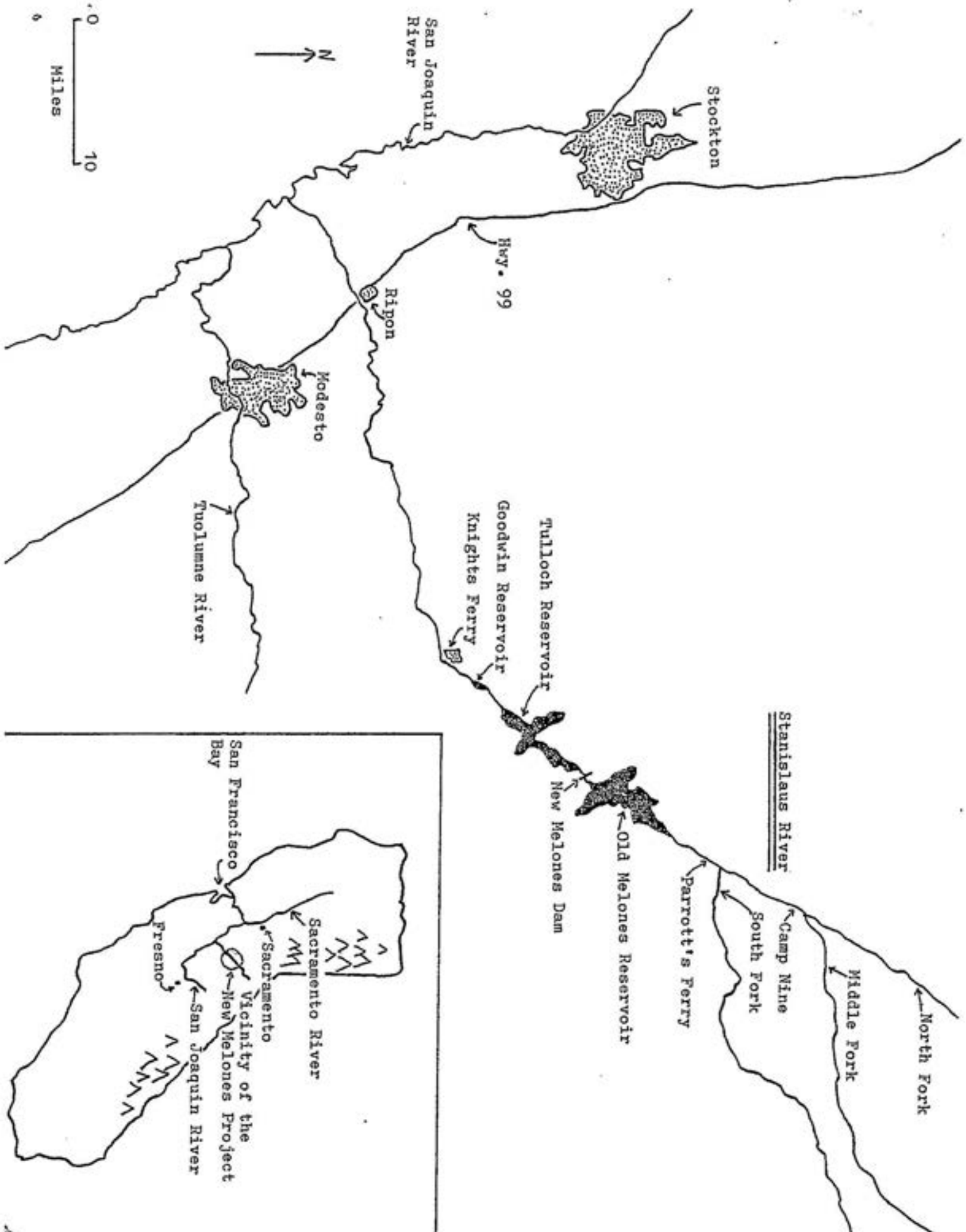
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Stockton

San Joaquin River

Hyw. 99

Ripon

Modesto

Tuolumne River

Tulloch Reservoir

Goodwin Reservoir

Knights Ferry

Stanislaus River

New Melones Dam

Old Melones Reservoir

Parrott's Ferry

Camp Nine
South Fork

Middle Fork

North Fork

San Francisco Bay

San Francisco

Presno

San Joaquin River

Vicinity of the
New Melones Project

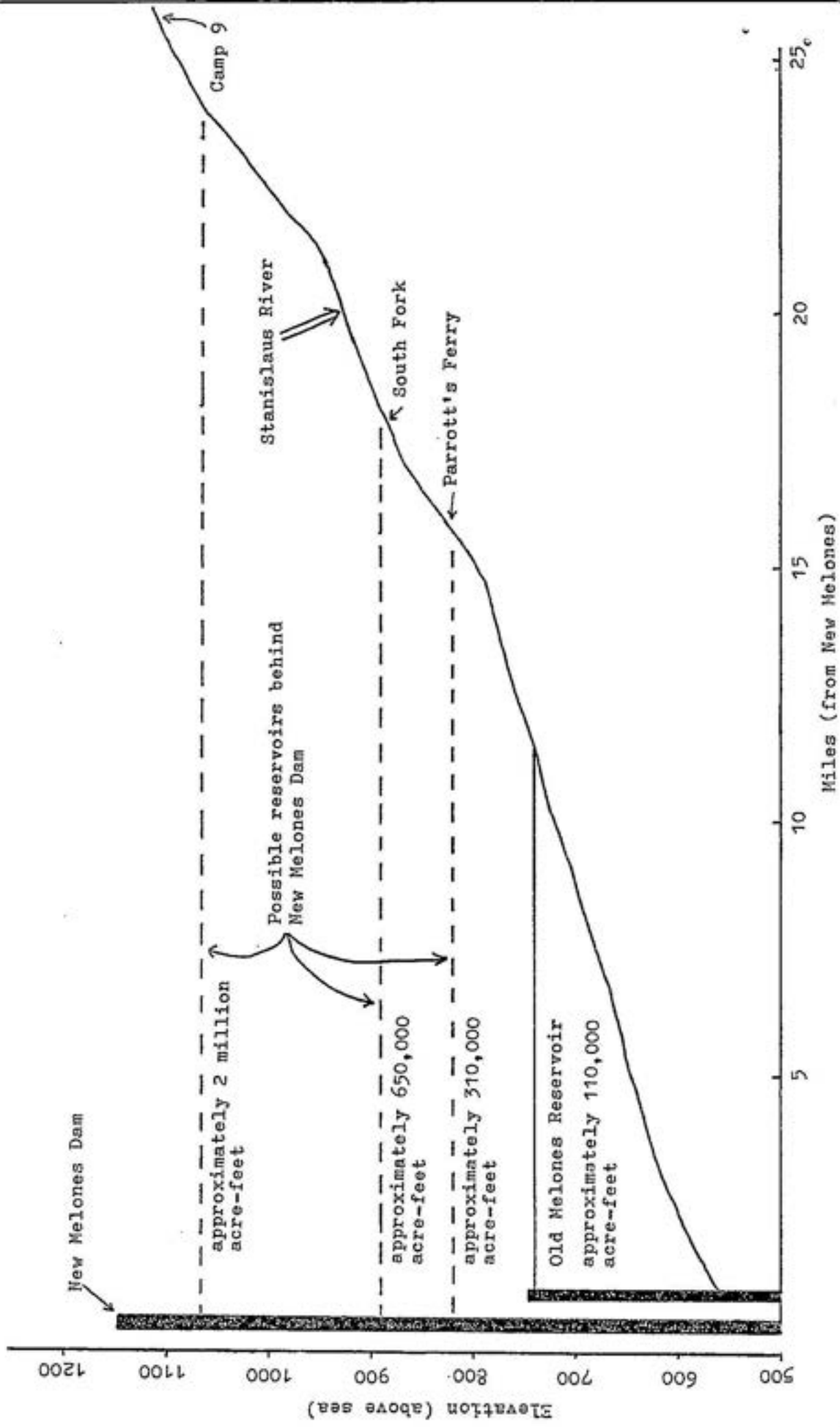
Sacramento River

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I. INTRODUCTION

Water is necessary for human life. Nearly all Californians live and work away from rivers and streams; most buy drinking water from a supplier. Nearly all Californians obtain food from an agricultural system which requires irrigation. Nearly all Californians rely, to some extent, on electricity to produce heat or light. A complex of 1200 dams and hundreds of canals has been built in California, to provide water and electricity where needed.

20% of the electricity generated in California is hydroelectric.⁽¹⁾ 50% of the water used for irrigation,⁽²⁾ and 60% of the water used for residential consumption,⁽³⁾ is taken from rivers and streams.

Yet provision of water for consumption or hydroelectric generation are only two worthy uses of rivers and streams, which are also necessary for the growth of plants and animals, and which are desirable as a means of human recreation. Since precious, rivers and streams in California are often the focus of political controversy: what are the most worthy, and the least worthy, uses of a given river or stream?

Any real controversy involves insufficient facts. Both sides claim to hold nearly all of the facts; neither does, and successful resolution of the controversy ultimately involves assumptions or conclusions about values.

Generally, a controversy about the desirable uses of a river or stream involves both facts and values, sometimes mixed in a confusing fashion. The Army Corps of Engineers and the Bureau of Reclamation, in the business of building dams, often hide assumptions about values behind cost/benefit ratios, which are intended to appear to be based simply on facts. For example, New Melones Dam, the focus of a decade of strident controversy, was evaluated by the Army Corps as providing benefits 70% greater than costs; yet the Army Corps assigned a cost of 0¢ to the inundation of a stretch of the river which is the second most popular white water in the entire country.⁽⁴⁾

Too, Friends of the River sometimes confuses facts and values. But this booklet hopefully allows you to distinguish facts and Friends of the River's values.

Friends of the River is convinced that the balance of facts favors the impoundment of a small reservoir behind New Melones Dam, rather than the huge, planned reservoir. As importantly, Friends of the River is convinced that a careful examination of the social values enhanced by full impoundment, and those enhanced by partial impoundment, favors partial impoundment. For by building or using new dams or canals to temporarily solve an apparent shortage in the supplies of water and electricity for consumption, the Federal Government is destroying wild lands and rivers, and only delaying the day of reckoning, when such shortages (if real) will be generally solved by careful management of existing supplies.

Born in the glacial basins north of Yosemite National Park, along the main Sierra Divide, the Stanislaus River precipitously flows through tall canyons until it reaches Knights Ferry, where it leaves the mountains and meanders through the fertile San Joaquin Valley; it finally joins the San Joaquin River, near Modesto. The river flows approximately 120 miles from its source to this confluence. Along the way, it drains nearly 1000 miles of land. Along the way, it is impounded by twelve operating dams; its average annual flow equals 1,100,000 acre-feet of water,* yet 45 to 50% of that flow is presently diverted through canals, principally for irrigation.⁽⁵⁾

In 1944 Congress authorized another dam on the Stanislaus -- the New Melones Dam -- to control floods; then in 1962, Congress increased the size, and diversified the purposes, of the proposed dam. Construction of the access roads, the facilities for workers, and the public overlook began in July 1966; construction of the dam began in June 1974 and was completed in October 1978. Excluding interest after construction, New Melones Dam cost \$376,158,000.⁽⁶⁾

New Melones Dam stands 625 feet high, spans 1,560 feet between the walls of the canyon, and is capable of impounding 2,400,000 acre-feet of water in a reservoir which would inundate Old Melones Dam, only three-quarters of a mile upstream, and which would extend twenty-five miles, to Camp 9. (See the preceding maps.)

Part of the Central Valley Project, which is the largest reclamation project authorized under the Federal Reclamation Acts, New Melones Dam was designed to control floods; to provide water for irrigation, and municipal and industrial consumption; to generate electricity; to provide releases for maintenance of downstream fish and wildlife, and for improvement of the water quality downstream and in the lower San Joaquin River; and to provide flatwater recreation.

In October 1978, the dam began to impound water. Due to a long-standing legal and political controversy about the desirable level of impoundment, the permanent plan for operating the dam remains unsettled.

III. DECISION 1422

Under the California Water Code, any person or agency who wishes to divert water from a river or stream must apply for a permit from the State Water Resources Control Board (SWRCB), which can "issue a permit only if it determines that unappropriated water is available and that the proposed use is both 'reasonable' and 'beneficial'."⁽⁷⁾ Holding responsibility for all

*Or 360 billion gallons. An acre-foot equals 325,000 gallons.

aspects of the operation of New Melones Dam, except flood control, the Bureau of Reclamation duly applied to the SWRCB, but on April 15, 1973, received only partial approval of its applications to impound and divert water at the dam.

Calling the Stanislaus a "unique asset to the State and Nation,"⁽⁸⁾ the SWRCB approved impoundment only to control floods; to satisfy "prior rights" -- to replace Old Melones Reservoir, which provided water for consumption by the Oakdale and South San Joaquin Irrigation Districts; to provide releases for the maintenance of downstream fish and wildlife, and for improvement of the water quality downstream and in the lower San Joaquin. The SWRCB disapproved impoundment to provide new water for irrigation or other consumption, and disapproved impoundment specifically to generate electricity. Altogether, the SWRCB estimated that maximum normal impoundment of 650,000 acre-feet would satisfy the purposes which it approved, and that impoundment of an extra 450,000 acre-feet, during the worst possible flood, would control that flood.* However, the SWRCB cautioned that "all rights and privileges under this permit... are subject to the continuing authority of the...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";⁽⁹⁾ the SWRCB reserved the right, in the future, to decrease or increase the approved level of impoundment.

In October 1974, the Bureau of Reclamation brought suit against the SWRCB, in order to challenge the authority of the SWRCB over any aspect of the operation of the dam. The suit finally landed in the U.S. Supreme Court. On July 3, 1978, the Supreme Court ruled, on narrow grounds, in favor of the State: "The legislative history of the Reclamation Act [of 1902] makes it abundantly clear that Congress intended to defer to the substance, as well as the form, of state water law.... While later Congresses have indeed issued new directives to the Secretary [of the Interior], they have consistently reaffirmed that the Secretary should follow state law in all respects not directly inconsistent with these directives."⁽¹⁰⁾

*"There remains some uncertainty as to the reservoir storage needed to satisfy conditions in Decision 1422. It is not possible to determine the maximum storage amount and the resulting probable maximum nonflood elevation until the State has seen and evaluated the operating plan for the reservoir."⁽¹¹⁾ The Bureau of Reclamation submitted its operating plan in February 1979; the SWRCB is likely to approve or disapprove that plan by the end of March 1979.

Impoundment of 650,000 acre-feet would inundate the Stanislaus up to the South Fork; impoundment of 1,100,000 acre-feet would inundate the Stanislaus up to Rose Creek. Although the SWRCB approved maximum regular impoundment of approximately 650,000 acre-feet, the SWRCB did not require even that much impoundment. State Resources Secretary Huey Johnson (see p. 4) and Friends of the River have concluded that impoundment of only 310,000 acre-feet, inundation of the Stanislaus only to Parrott's Ferry, might be the wisest compromise between full use, and almost no use, of the dam.

The suit was then remanded to a Federal District Court, for determination of whether the twenty-five conditions of Decision 1422, and specifically partial impoundment, are "consistent" with "congressional directives" for New Melones Dam.

On December 8, 1978, despite his belief that "several of the conditions in Decision 1422" are "inconsistent with congressional directives," Secretary of the Interior Andrus announced that the Bureau of Reclamation would "voluntarily comply with the State conditions until a final court decision is made on the remand or other agreement is reached with the State of California."⁽¹²⁾ On December 12, 1978, State Resources Secretary Huey Johnson requested the "cooperation" of the Federal Government "in preserving existing natural and recreational values of the Stanislaus River to the maximum extent feasible," and specifically requested the Federal Government "to act voluntarily to provide maximum, long-term protection to the Stanislaus from Parrott's Ferry upstream."⁽¹³⁾

By the end of 1980, the suit about the authority of Decision 1422 will probably be settled. Then the Federal Government, probably in conjunction with the State, will determine the permanent operating plan for New Melones Dam, and thus will determine whether the reservoir will normally extend to Parrott's Ferry, or to the South Fork, or to Camp 9. Until then, the reservoir almost definitely will not exceed the confluence with the South Fork, and possibly will not exceed Parrott's Ferry.

IV. FRIENDS OF THE RIVER

Since the late 1960's, some environmentalists and other interested citizens have complained that the Corps of Engineers' and the Bureau of Reclamation's favorable cost/benefit ratios for New Melones Dam* rely on obviously faulty assumptions -- on figures which exaggerate the benefits, and minimize the costs -- and also that the actual costs of the dam outweigh the actual benefits. In late 1973, an informal coalition, Friends of the River, was formed to prevent the construction of the planned dam, and more importantly, to advocate the values of the river and canyon in a relatively natural state.

By June 1974, 30,000 Friends of the River had gathered 500,000 signatures on a petition and qualified the River Initiative, Proposition 17, for the state-wide ballot in November. Passage of the proposition would have designated the Stanislaus River, from Camp 9 to Parrott's Ferry, and from Goodwin Dam to the confluence with the San Joaquin River, as components of the State's Wild and Scenic Rivers' System; it would have permitted the construction of a small dam to control floods.

*In House Document #453, mentioned in Public Law 87-874, which reauthorized New Melones Dam; and in the Environmental Impact Statement of May 1972

Although Proposition 17 was defeated, 47% to 53%, a subsequent survey of voters found that 59% intended to vote against the planned, larger dam, and that 78% felt the wording of the proposition was confusing.⁽¹⁴⁾ Apparently many voters were confused by misleading advertisements by the opponents of Proposition 17 -- for example, by advertisements claiming that defeat of the proposition would "Save The River"; many voters believed that voting against the proposition meant voting against the planned dam. Nonetheless, the planned dam was built.

Since November 1974, Friends of the River has incorporated, and has conducted grassroots campaigns to preserve many other Californian rivers, and more importantly, to reform Federal and State policies concerning the supply and use of water. But the campaign to preserve the Stanislaus, from Parrott's Ferry to Camp 9, remains a principal focus. Whether or not the suit concerning the right of the State to require partial impoundment is eventually decided in favor of the State, the Federal Government is legally allowed a large degree of flexibility in the operation of Federal dams, and could independently determine that partial impoundment is a "reasonable use" of New Melones Dam.

Consequently, Friends of the River hopes that, in the near future, the majority of Californians show interest in the river, and in the significant precedents inherent in the resolution of the controversy about the operation of New Melones Dam. Friends of the River hopes that the majority of California's Congressional Representatives,* Secretary of the Interior Andrus, and President Carter agree that partial impoundment -- specifically, impoundment of 310,000 acre-feet, and inundation of the Stanislaus only to Parrott's Ferry -- makes better sense, economically and environmentally, than full impoundment, and enjoys the support of the majority of Californians, too. No longer particularly concerned about the costs and benefits of the dam itself, Friends of the River is convinced that the more relevant comparison of the advantages and disadvantages of full impoundment, and the advantages and disadvantages of partial impoundment, results in favor of partial impoundment. This booklet summarizes that conviction.

V. ADVANTAGES AND DISADVANTAGES OF FULL IMPOUNDMENT AND OF PARTIAL IMPOUNDMENT

1. Flood Control

New Melones Dam will provide protection to approximately 35,000 acres of the floodplain of the Stanislaus, most of which is prime agricultural land, some of which is suburban development, and (to a very small degree) to lands along the lower San Joaquin River and within the Sacramento-San Joaquin Delta.⁽¹⁵⁾

*In the fall of 1978, thirteen of California's forty-three Congressional Representatives signed a letter urging impoundment only to Parrott's Ferry.

A maximum of 450,000 acre-feet of potential storage behind New Melones Dam is required for flood control.⁽¹⁶⁾

Flood control is an advantage neither of full nor of partial impoundment. Flood control is a consequence and an advantage of the very existence of the dam. For example, if as planned in 1962, the reservoir averages 1,600,000 acre-feet, and if the melting of an extraordinarily heavy snowpack resulted in the worst possible flood, then the consequent reservoir would total 2,050,000 acre-feet, until the flood can be safely released. On the other hand, if the reservoir averages 310,000 acre-feet, then after the flood the reservoir would briefly total 760,000 acre-feet.

2. Hydroelectric Generation

If the reservoir extends nearly to Camp 9, New Melones Dam would yield between 200,000 and 250,000 acre-feet of water per year for consumption, and would generate an average of 430,000,000 kilowatt-hours per year. Since the Bureau of Reclamation must compensate the owners of Old Melones Dam for the loss of the 114,300,000 kilowatt-hours previously generated there per year, New Melones Dam would yield 315,700,000 kilowatt-hours per year.

By law, the first priority for this electricity would be the pumping of water for consumption. And the amount of electricity needed for pumping is directly determined by the distances and differences in elevation between the pumps and the places of use, and by the amount of water pumped to each place of use.

Probably little, if any, of the electricity from New Melones Dam would be used to light, heat, or cool homes, or run factories. For "the entire [agricultural] service area" which the Bureau has tentatively designated as the recipient of water from New Melones includes "over 11,000,000 acres of land"⁽¹⁷⁾ -- namely, the Stanislaus River Basin (consisting of parts of Stanislaus, Tuolumne, Calaveras, and San Joaquin Counties); the remainder of those counties outside the basin; Contra Costa County; and the remainders of the Central Valley Project's service areas in the San Joaquin and Santa Clara Valleys.⁽¹⁸⁾ If much of the water yielded for consumption is pumped outside the Stanislaus River Basin, then New Melones Dam might yield less electricity than would be used for pumping its water.⁽¹⁹⁾ If little water is pumped outside the basin, or if relatively little or no water is pumped anywhere, then New Melones Dam would yield more electricity than would be used for pumping its water.

By contrast, if the reservoir extends only to Parrott's Ferry, no water

⁽²⁰⁾ *Nine million acres are presently irrigated in California. The Bureau's designation of eleven million acres as the possible recipient of water from New Melones is evidence that the Bureau has no "specific plan" (see p. 7) for the consumption of that water.

(beyond the water needed to satisfy "prior rights") would be pumped for consumption; no electricity would be used for new pumping. But if the present generators and intake pipes at New Melones Dam are not modified, impoundment of that reservoir might not allow generation of any electricity at the dam, or might allow somewhat irregular generation of a significant amount of electricity. The specific effects of partial impoundment on electrical generation have not been carefully studied, and therefore cannot yet be characterized either as slightly negative or as very negative.

Still, it is certain that, over the one-hundred-year life of the dam, partial impoundment would allow an average generation of less than 430,000,000 kilowatt-hours per year. But how significant is any loss in the average yearly generation at the dam? For comparison, a 25% reduction in the agricultural demand for the Central Valley Project's water would cause a reduction of between 200 and 300 million kilowatt-hours per year in the demand for the Central Valley Project's electricity:⁽²¹⁾ the less water demanded, the less pumped. A 25% reduction in the agricultural demand for water in the Central Valley would cause a reduction of over 1 billion kilowatt-hours per year in the demand for electricity.⁽²²⁾ State-wide, a moderate program of residential and industrial conservation of water would reduce demand for electricity by more than 6 billion kilowatt-hours per year: the less water demanded, the less pumped or heated.⁽²³⁾

Upon full impoundment, most or all of the hydroelectric yield of New Melones Dam would be used to pump water for what Friends of the River considers unnecessary consumption. (See the next section.) State-wide conservation of water could easily produce twenty-five times the full hydroelectric yield of New Melones, and would entail no environmental loss. Hydroelectric generation at New Melones does not by itself justify any impoundment, and should therefore be maximized at the level of impoundment sufficient to supply water for other beneficial uses.

3. Consumption of Water

If the reservoir behind New Melones Dam extends only to Parrott's Ferry, no water (beyond that water needed to satisfy "prior rights") could be provided for consumption. If the reservoir extends nearly to Camp 9, between 200,000 and 250,000 acre-feet per year could be provided for new consumption.

However, in the opinion of the SWRCB, "the Bureau of Reclamation has presented no specific plan for applying project water to beneficial use for consumptive purposes at any particular location."⁽²⁴⁾ By habit, the Bureau first builds a dam, and only then seeks commitments or contracts from potential consumers of water from the dam; in this case, the Environmental Impact Statement specifying

the "service area" will not be finished until November 1980.

Furthermore, the SWRCB argued that "the record shows that the CVP has substantial quantities of water that are not being used and are not under contract."⁽²⁴⁾ "The record...shows that, without using the yield of New Melones Reservoir, the CVP can meet the estimated buildup of present contract demands for 50 years."⁽²⁵⁾ In an average year, the Central Valley Project supplies 7,280,000 acre-feet, yet has available another 640,000 acre-feet.⁽²⁶⁾ Thus, "because of the lack of evidence that New Melones Project water will be needed for consumptive use outside the four basin counties for many years to come, if ever, or that it will be used within those counties at any definite time in the future,"⁽²⁷⁾ the SWRCB, in Decision 1422, refused to permit any impoundment for provision of water for new consumption.

Moreover, in reaching this conclusion, the SWRCB did not even consider conservation of water by present customers of the Central Valley Project, and specifically by potential customers of New Melones' water, as a means to insure that present and future demands for water are satisfied at the least environmental cost.* Even moderate conservation of water presently supplied by the Central Valley Project would produce many times the full yield of New Melones.

Obviously, within a region, the extent of feasible conservation is determined by the types of customers, and by the demands and practises of each type. The Central Valley Project supplies twenty-five times more water for irrigation than to municipal and industrial customers⁽²⁸⁾; state-wide, 85% of the water supplied for consumption is used for irrigation.⁽²⁹⁾ In the Central Valley,** agricultural conservation of water is the most telling kind of conservation of water.

Farmers served by the Central Valley Project, and by most of the Bureau of Reclamation's projects, waste approximately 56% of the water presently used for irrigation.⁽³⁰⁾ For example, 90% of the water supplied for irrigation in the San Joaquin Basin is applied through relatively inefficient "gravity methods," like ditches; only 10% is applied through relatively efficient sprinklers; and almost 0% is applied through highly efficient (although somewhat experimental) "drippers."⁽³¹⁾

* For example, the SWRCB found that the "record contains substantial evidence" -- although no proof -- "that the full conservation yield of New Melones Project, and more, will eventually be needed in Tuolumne, San Joaquin, and Stanislaus counties."⁽³²⁾ The ultimate demand for water by those counties is estimated as 913,000 acre-feet per year⁽³³⁾; the ultimate yield of New Melones for consumption is 205,000 acre-feet per year.⁽³⁴⁾ Yet if the estimate of ultimate demand by those counties exceeds actual demand by 21% (205,000 acre-feet), whether because of inaccurate assumptions behind that estimate, or because of conservation, then those counties would not, even eventually, need water from New Melones for consumption, beyond the water held by "prior rights."

**The Central Valley consists of the San Joaquin and the Sacramento Valleys.

The cheapness of water supplied by the Bureau of Reclamation, and "inaccurate estimates by farmers of irrigation frequency and amounts of water to apply relative to soil moisture conditions," consistute "the two major causes" of the "irrigation efficiency" of only 44% on farms supplied by the Bureau.⁽³⁵⁾ The cheaper a product, the less precious.

The average price for an acre-foot of water supplied for irrigation by the Central Valley Project is presently \$7.50 in new contracts, less than \$7.50 in old contracts⁽³⁶⁾ -- altogether, approximately \$4.25.⁽³⁷⁾ In a study by the Bureau of Reclamation in 1973, a price of \$7.50 per acre-foot was correlated to an "irrigation efficiency" of approximately 50%; and a price of \$4.25, to an "irrigation efficiency" of just over 40%.⁽³⁸⁾

A farmer's ignorance or confusion about the techniques and benefits of conservation also helps cause waste in irrigation. "...techniques for improving on-farm management have been developed through the Agricultural Research Service, Soil Conservation Service; and Bureau of Reclamation research....They range in cost and efficiency from expensive, sophisticated drip and trickle irrigation systems, which can double irrigation efficiency, to simple improvements in irrigation scheduling (a systematic determination of when to irrigate and how much water to apply) which, although inexpensive, have the potential of increasing irrigation efficiency.... But Federal efforts to promote more efficient on-farm irrigation have not been adequately coordinated at policymaking levels of the Departments of the Interior and Agriculture....The Bureau of Reclamation does not seek cooperation and assistance on a systematic basis for other Federal agencies, such as...the Soil Conservation Service, except at the lowest field levels."* Even at those levels, "Federal efforts" to promote conservation are generally minimal, or confused. The General Accounting Office has reported that "Bureau technicians demonstrating the Irrigation Management Service Program attempted to obtain the cooperation of field personnel of other agencies, but we found no instances in which such efforts were successful...." Altogether, "irrigation practises have not changed appreciably during the past three decades even though irrigation science and technology made substantial advances."⁽³⁹⁾

This "comedy of errors" -- the Bureau of Reclamation's and the Department of Agriculture's disappointing inability to provide adequate advice to farmers about conservation of soil and water -- and the Bureau's unnecessarily low price per acre-foot of water for irrigation, actively discourage conservation of soil and

*"...historically, on-farm water management systems have been the responsibility of the Soil Conservation Service while system management was handled by the Bureau of Reclamation."⁽⁴⁰⁾ "...Soil Conservation Services are available to nearly 3000 soil and water conservation districts which include about 98% of the farms in the U.S."⁽⁴¹⁾

particularly of water. The Bureau actively encourages Congress to appropriate money for dams and canals, but does not bother to insure that farmers efficiently use the heavily subsidized water thus provided,* or even that it efficiently transports water to farmers: between dams and the places of consumption, the Bureau typically loses 25% of the water diverted.⁽⁴²⁾

Good advice, patiently given to farmers, and a substantial increase in the average price per acre-foot provided for irrigation.** would actively encourage conservation by farmers of their soil and particularly of water. The Bureau's lining its own canals with concrete, and automation of the gates on these canals, would significantly increase the supply of water available for consumption.

President Carter's Task Force on Water Resource Policy estimated that, with moderate ease and cost, improvements in the scheduling of irrigation could reduce demand by 3 to 5%; improvements in irrigation systems could reduce demand by 5 to 10%; improvements in canals could reduce losses by 5 to 10% of demand.⁽⁴³⁾

The consequences of moderate improvements in the efficiency of irrigation in the Central Valley Project are startling. A 10% reduction in the agricultural demand for the Central Valley Project's water would equal more than 400,000 acre-feet in an average year; a 25% reduction in agricultural demand would equal 1,000,000 acre-feet in an average year.⁽⁴⁴⁾ If the reservoir behind New Melones Dam extends nearly to Camp 9, the full yield of water for consumption -- "205,000 acre-feet per year" in the "future"⁽⁴⁵⁾ -- is a fraction of the amount of water saved by a moderate program of conservation in the Central Valley Project, and thus available for potential customers of New Melones' water or for other uses. The relatively obvious worth of the Stanislaus from Parrott's Ferry to Camp 9 (see sections 6 and 7) vividly contrasts with the relatively questionable worth of water provided for consumption.

4. Improvement of Water Quality

The natural flow of the Stanislaus River is seasonally distributed, like the flows of other major rivers passing from the Sierra into the San Joaquin Valley. The wet season, beginning with the first major rains, usually in November, continues through June; 90% of the natural flow of the Stanislaus, as measured at New Melones Dam, occurs during this season. In turn, from July through September, diversions reduce the natural flow by 83 to 98%, as measured at Knights Ferry; from April

*Irrigation with the Central Valley Project's water is subsidized at a rate of \$1,100 per acre, stated in 1976 dollars.⁽⁴⁶⁾ Irrigators pay only 20% of the cost of water supplied by Federal projects.⁽⁴⁷⁾

**"Studies in California suggest that, on the average, a 10 percent increase in irrigation water price will result in a 6 to 7 percent reduction in water used for irrigation."⁽⁴⁸⁾

through June, by 60%; from October through March, by 21%.⁽⁴⁹⁾

Inadequately treated sewage, upstream diversions of water, and somewhat salty "return flows" from irrigation, cause a periodic depletion of oxygen, a periodically excessive concentration of dissolved solids, in the lower Stanislaus and San Joaquin Rivers, particularly in the summer and fall. In fact, because of upstream diversions, the volume of "return flows" (which contain natural salts, and salts from fertilizers, pesticides, and herbicides) often exceeds the volume of otherwise clean water, in the lower stretches of both rivers.*

The Bureau of Reclamation has agreed to release up to 70,000 acre-feet of water per year, from a reservoir extending to the South Fork or higher, in order to maintain the dissolved solids at 500 parts-per-million, a mean monthly concentration, in the lower San Joaquin,** and to maintain dissolved oxygen at 5 parts-per-million in the lower Stanislaus. Full impoundment would allow timely releases to dilute the pollutants in the lower Stanislaus and San Joaquin Rivers. Given the need for sizable releases to satisfy "prior rights" and to maintain downstream fish and wildlife, impoundment of a reservoir extending only to Parrott's Ferry might not allow timely releases of an additional 70,000 acre-feet, in a dry year, for dilution of the pollutants, and thus, in the short run, might not allow significant improvement in downstream water qualities.

However, releases from New Melones Dam should not be considered a substitute for the implementation of comprehensive plans and programs to control pollutants at the various sources along the lower Stanislaus and San Joaquin Rivers, as required by the Federal Pollution Control Act. The Soil Conservation Service, other Federal agencies legally responsible for helping farmers conserve water, and the local Soil Conservation Districts, should actively encourage conservation of water diverted from both rivers, so that the volume of initially clean water in the rivers is significantly increased. For example, a 12% reduction in the annual demand for water from the Stanislaus would allow an extra 70,000 acre-feet of initially clean water to remain in the river; and the less the water diverted, the less the "return flows." Likewise, the sewage which spills into the Stanislaus from Oakdale, Riverbank, Salida, Escalon, and Ripon, after receiving only primary treatment, should receive secondary treatment.

Pollution in the lower Stanislaus and San Joaquin Rivers should be controlled directly, not at the expense of the upper Stanislaus. In fact, under the Federal Pollution Control Act, through direct control of pollutants, the "chemical,

*The majority of the total waste load in waters of the lower San Joaquin River Basin is contributed by the agricultural industry, which is the principal land use...."(50)

**The Stanislaus River contributes approximately 25% of the annual flow of the San Joaquin at Vernalis...."(51)

physical, and biological integrity of the Nation's waters," of the Stanislaus and the San Joaquin -- the water quality sufficient for "protection of fish, shellfish, and wildlife and...for recreation" -- will be legally required by 1985.

5. Maintenance of Fish and Wildlife

The populations of trout living both upstream and downstream of New Melones Dam, and the populations of striped bass, shad, sturgeon, catfish, crappies and other warmwater species living principally downstream of the dam, would probably not be significantly increased or decreased as a result of full impoundment.⁽⁵²⁾ On the other hand, the average population of 8,600 king salmon spawned entirely downstream of Goodwin Dam would be reduced by 90% as a result of full impoundment.⁽⁵³⁾

According to the State Department of Fish and Game, the Bureau of Reclamation's proposed releases from New Melones of 98,000 acre-feet in a normal year, and 69,000 acre-feet in a dry year, specifically for maintenance of downstream fish, would not in fact provide the food or the "push" needed by young salmon to migrate, from April through June, down the Stanislaus, down the San Joaquin, and to the ocean. If the reservoir extends nearly to Camp 9, most of the releases from New Melones would occur in the summer, when water is provided for consumption; the flow of the Stanislaus at Ripon presently averages 1814 cubic feet per second, from April through June, but, as a result of full impoundment, would average only 414 cubic feet per second during that season.⁽⁵⁴⁾

So the salmon fishery in the lower Stanislaus, presently producing a commercial harvest of 350,000 pounds per year,⁽⁵⁵⁾ worth \$300,000 per year,⁽⁵⁶⁾ would in effect be destroyed a few years after water from New Melones is provided for consumption. Impoundment only to Parrott's Ferry would allow the preservation of the salmon fishery.

Full impoundment would also inundate 10,700 acres of wild land (including 1000 acres of riparian land); construction of recreational facilities and related roads would destroy an additional 5,200 acres.⁽⁵⁷⁾ Altogether, full impoundment would cause the destruction of 15,900 acres of wild land, presently inhabited by a species of spider found nowhere else, and by mule deer, California quail, brush and cottonwood rabbits, the ruddy, ring-necked, mallard, and wood ducks, and by animals from 179 other species.* Yet "it is an accepted principle of wildlife management that the same number of animals that are forced to move will soon perish, because the adjacent habitat will already be fully occupied by the number of animals that it is capable of supporting on an annual basis."⁽⁵⁸⁾

*"Most of the 187 wildlife species...inhabit riparian habitat...and many are entirely dependent on...this habitat type for survival."⁽⁵⁹⁾

The Army Corps of Engineers and the Bureau of Reclamation have agreed to "mitigate" the loss -- to "abate the harshness" of the loss -- of wildlife habitat in the Stanislaus Canyon. And "the single, most important wildlife mitigation measure"⁽⁶⁰⁾ is the proposed purchasing of some, and the obtaining of easements for most, of the remaining 4,000 acres of riparian land along the lower Stanislaus.

Relatively cool and wet, thus unusually lush and supportive of wildlife, riparian or stream-side land is "one of the most important and critical" kinds of land "in California today"; also, "one of the most endangered."⁽⁶¹⁾ Along the Stanislaus River below Knights Ferry, for example, farming and the production of gravel significantly reduced the natural acreage of riparian land before 1958, reduced the remaining acreage by approximately 20% between 1958 and 1965, and reduced the then-remaining acreage by approximately 50% between 1965 and the present. The "same alarming loss" of riparian land "is occurring throughout California...."⁽⁶²⁾

The Army Corps' and the Bureau's proposal for the "preservation" of the riparian land along the lower Stanislaus is unlikely to succeed. "Uncontrolled flooding in the past has, to a degree, retarded encroachment" by certain kinds of vegetation (like willows), and by farming and the production of gravel, all of which are "incompatible" with the maintenance of most wildlife. Regardless of the level of impoundment, because of New Melones Dam's control of floods, the acreage of downstream riparian land will probably be reduced in the near future. Although the number of species living on downstream riparian land will probably not be reduced in the near future, the populations of most of these species will be "drastically reduced."⁽⁶³⁾ Fortunately, impoundment only to Parrott's Ferry would at least allow the preservation of the 1000 acres of riparian land between Parrott's Ferry and Camp 9.

6. Recreation

The Stanislaus Canyon, from Camp 9 down to Parrott's Ferry, registers 90,000 visitor-days per year -- 90,000 visits by anglers, hikers, picnickers, spelunkers, swimmers, kayakers, and rafters. The 40,000 boater-days registered on this stretch qualify it as the second most popular white water in the country, the most popular west of the Mississippi.⁽⁶⁴⁾ In turn, the existing Old Melones Reservoir registers 45,000 visitor-days per year,⁽⁶⁵⁾ 33,000 of which are angler-days.⁽⁶⁶⁾

New Melones Dam was designed to create a reservoir twenty square miles in area, with one hundred miles of shoreline; the Army Corps of Engineers has estimated that a full New Melones Reservoir would be capable of accomodating 4,000,000 visitor-days

per year, ultimately, and 320,000 visitor-days, initially.⁽⁶⁷⁾

That estimate of the ultimate use of a reservoir extending to Camp 9 is highly impressive and equally inaccurate. According to the U.S. Water Resources Council, the eleven existing public reservoirs located within thirty miles of New Melones Dam could accommodate any increased demand for flatwater recreation, near New Melones Dam, during the next fifty years.⁽⁶⁸⁾ For example, Don Pedro Reservoir, seven miles away, registered 350,000 visitor-days in 1978, yet has a capacity of at least 500,000 visitor-days per year; Lake McClure, twenty-nine miles away, registered 372,000 visitor-days in 1978, yet has a capacity of 1 million visitor-days per year. If demand for flatwater recreation increases at a rate unanticipated by the Water Resources Council, then access to these eleven reservoirs, and their facilities, could be improved. Likewise, if the reservoir behind New Melones Dam extends only to Parrott's Ferry, and if its access is better than the access to Old Melones Reservoir, then it could ultimately accommodate 500,000 visitor days per year,⁽⁶⁹⁾ and the rare and precious stretch of white water between Parrott's Ferry and Camp 9 could be preserved.

"To look to other rivers as alternatives to the Stanislaus is fruitless. There are none that even approximate the values of the Stanislaus in meeting a broad range of public interest in wild river recreation....Rivers like the Tuolumne, the Eel, and North Fork of the American...are limited by short and unpredictable boating seasons,...and are suitable only for the most highly skilled boatmen...."⁽⁷⁰⁾ Boating the Stanislaus between Camp 9 and Parrott's Ferry offers all kinds of people -- young and old, even blind or quadriplegic -- a relatively rare opportunity to vigorously enjoy white water. Boating this stretch demands and rewards responsiveness, excites but infrequently endangers the boater.

The vegetations, the rocks, the colors of this stretch reflect its bordering two "biological zones," that of the valley, and that of the Sierra. Unlike nearly every river passing through the foothills, the Stanislaus is still sufficiently undammed, and accessible, that swimmers, hikers, picnickers can readily enjoy the harsh yet fertile nature of life characteristic of the foothills, and, at first hand, can enjoy abundant and concentrated evidence of the lives of previous residents of the foothills. (See section 7.)

This stretch is close to Sacramento, Modesto, Stockton, and only three hours by car from the San Francisco Bay. According to the Folsom Office of the Bureau of Land Management, full impoundment behind New Melones "would eliminate recreational values which cannot be duplicated anywhere, especially within easy access to major urban populations at affordable costs." The Folsom Office recommends permanent protection of this stretch.⁽⁷¹⁾ That recommendation is wholeheartedly endorsed by Friends

*By comparison, Yosemite National Park registered 2.5 million visitor-days in 1978.

of the River.

7. Protection of Archeological Resources

Miwok Indians lived beside the Stanislaus, year-round -- fishing, and picking fruits, vegetables, herbs, and nuts, when and where ripe -- near the headwaters, in the summer; at lower elevations, in other seasons. Their mortar holes, in which they principally ground acorns, dot the banks of the stretch between Camp 9 and Old Melones Reservoir. Their burial grounds and caves, and petroglyphs, more precious, are more hidden.

Their literally cyclical migration, from the west to the east, then west again, was interrupted by the Forty-niners, following the north-to-south band of gold, the Mother Lode. The miners used the water of the Stanislaus, and its tributaries, to wash dirt from the gold; tunnels, pits, ditches, pipes, shacks, and stamping mills seem almost as common along this stretch as street signs in a city.

Nearly 630 significant, undisturbed, archeological sites have been identified between Camp 9 and Old Melones Reservoir. Many of the undisturbed sites have been determined as eligible for inclusion in the National Register of Historic Places. However, under the provisions of the Historic Preservation Act of May 24, 1974, the Army Corps of Engineers, which will operate New Melones Dam until the generators are tested, signed a Memorandum of Agreement to "mitigate" the proposed inundation of the 630 sites by prior study and recovery of artifacts.

Approximately one-third of the sites are located downstream of Parrott's Ferry. By the summer of 1979, Parrott's Ferry (and all sites downstream) might be inundated. Archeological mitigation in the lower canyon began in October 1978. In February 1979, Dr. Knox Mellon, California Historic Preservation Officer, concluded that archeological mitigation in the lower canyon is being implemented without a "competent research strategy," without supervisors sufficiently versed in Sierran archeology, without sufficient time or money. Altogether, "mitigation" in the lower canyon "will result in irreparable losses and distortions to knowledge of the cultural heritage of the region."⁽⁷²⁾ Dr. Mellon proposed that the reservoir behind New Melones not be allowed to extend to Parrott's Ferry, until true mitigation in the lower canyon has been completed. That recommendation is wholeheartedly endorsed by Friends of the River.

Under the Bureau of Reclamation's apparent plan for the impoundment of a reservoir extending nearly to Camp 9, the remainder of the sites will be inundated no more than eight years from now, and probably sooner. By comparison, impoundment of a reservoir extending only to Parrott's Ferry would leave a living museum between Camp 9 and Parrott's Ferry: a mortar hole, in place, overhung by oaks,

informs the observer about the Miwoks' lives more comprehensively than a mortar hole, behind glass, separated from the acorns; a ditch and flecks of gold in the river inform the observer about the miners' lives far more dramatically than a shovel or pan, separated from the canyon.

VI. THE ECONOMICS OF FULL IMPOUNDMENT AND OF PARTIAL IMPOUNDMENT

Given the incontrovertible principle that public investment should be put to good use, an apparently impressive argument for full impoundment is the cost of New Melones. But in fact, a reasonable application of this principle favors partial impoundment: a bad public investment, an unneeded dam, does not by its very existence then justify damaging a good river and good farming land. The economic consequences of full impoundment are four-fold: the consequences for local employment and taxes; for commercial fishing; for farming in the "service area"; and for the Central Valley Project's balance of payments.

First, full impoundment would not eradicate the local pattern of high unemployment in the winter: motorboaters, like rafters, mostly enjoy their sport during the summer.⁽⁷³⁾ Moreover, because "37,000 acres of land have already been purchased primarily for speculative 'ranch style' development" near New Melones Dam; because full impoundment would spur this development, which in turn would require the provision of public services, such as schools; because patrol of a full reservoir, possibly used by several hundred thousand up to a million visitors per year, would be the responsibility of the local fire and police departments,⁽⁷⁴⁾ full impoundment might cause taxes in the local counties to increase as quickly as the demand for private goods and services. By contrast, partial impoundment might discourage "speculative development," would require a relatively small patrol, which could remain the responsibility of the Bureau of Land Management; partial impoundment would probably cause a modest increase in the demand for private goods and services, and an insignificant increase in local taxes.

Second, full impoundment behind New Melones would destroy the lower Stanislaus' commercial salmon fishery, presently worth \$300,000 per year, and would forego "the last opportunity" in the "near future"⁽⁷⁵⁾ for actual improvement of the lower San Joaquin's salmon fishery. Partial impoundment would allow at least a maintenance, and possibly an improvement, of the lower Stanislaus' salmon fishery.

The lower Stanislaus' salmon fishery historically totalled 20,000 to 40,000, and now averages 8,600.⁽⁷⁶⁾ The San Joaquin's salmon fishery historically totalled over 200,000,⁽⁷⁷⁾ and now totals only 8,000 to 20,000.⁽⁷⁸⁾ The recent

reductions in the fisheries of these rivers is directly caused by diversion of water for consumption, by related destruction of spawning grounds, and by suction of fish into the Delta's pumps. Partial impoundment behind New Melones might be accompanied by an active program to encourage conservation of water throughout the Central Valley Project, and consequently might signal the renewal of the salmon fishery in the Stanislaus and even the San Joaquin.

Third, although full impoundment behind New Melones would provide water for consumption (in excess of the water held by "prior rights"), the effect of this consumption on farming in the Central Valley Project would be marginally positive, at best, and more probably, would be negative. The specific economic effect of this consumption cannot be determined until the "service area" is determined.

"Although actual quantities and areas in which this water will be used cannot be determined until service contracts are executed, it is estimated that about 10% would be used to meet municipal and industrial demands. About 75% or more would be used as a supplemental supply to areas now under irrigation to alleviate present ground water overdraft or provide a full irrigation supply. Any remaining supply would be used to irrigate new lands not now under irrigation....a maximum of only 7,500 acres of new land would be put under irrigation."⁽⁷⁹⁾ Benefits, generously estimated as \$3,610,000 per year, include "increased income resulting from reduced ground water pumping costs and increased ground water supply, as well as the increased income from surface application of the new water supply."⁽⁸⁰⁾

On the other hand, new irrigation of that maximum of 7,500 acres might also be accomplished by a reduction of .5% in the demand by present customers of the Central Valley Project, and by a consequent diversion of that saving to the lands in question. The supposed economic benefit of consumption of water from New Melones would principally accrue on already irrigated lands.

Actually, the principal consequence of irrigation with water from New Melones would probably be a declining or at least not increasing productivity on the lands thus irrigated. Over-irrigation, already common throughout the Central Valley Project, would not be corrected and might worsen on the lands irrigated partly with water from New Melones.

"Overirrigation damages cropland by washing away valuable nutrients and topsoils....Overirrigation can also damage crops by raising the water table (the upper level of an underground water body)....The water can then fill in the air spaces between soil particles and drown the plants. The water can also carry natural, soluble salts toward the surface, reducing the plant's ability

to use water and contaminating the soil so that it will not support plant life.... life...." (81)

Already, "irrigation practises" cause the levels of groundwater near the Stanislaus River to be "generally higher than adjacent river levels, even in flood stage."⁽⁸²⁾ For the same reason, "the San Joaquin Valley has been functioning as a...trap"⁽⁸³⁾ of salts from the soil, fertilizers, pesticides, and herbicides. "Intensive agricultural practises in the San Joaquin Valley, presently one of the richest farming regions in the world, are creating conditions that resemble the formative stages of a desert....If corrective measures are not taken soon..., growing any crops will be difficult in severely hit areas";⁽⁸⁴⁾ presently, in the San Joaquin Valley, almost 400,000 acres are affected, and ultimately, 1.1 million acres might be affected, by excessive salinity of groundwater, or at the roots of crops.⁽⁸⁵⁾

Full impoundment behind New Melones would allow and encourage a continuation of the Bureau's habit of building a dam, then locating and supplying customers, almost regardless of the true cost to the taxpayer, almost regardless of the actual consequences for the farmlands. Typically, less than half of the water used in irrigation by a customer of the Bureau is actually needed by the crops; so full impoundment would provide water which would probably be applied significantly in excess of the needs of crops, and which thus might cause a decline in the productivity of the land involved. Full impoundment behind New Melones Dam would thus provide one more supposedly good reason for the construction of a system of drains proposed by the Bureau and the State Department of Water Resources as a "Master Drain" for the San Joaquin Valley, and estimated to cost \$750 million, thus likely to cost more than \$1 billion.

An ounce of prevention is worth a pound of cure, particularly when the prevention is relatively cheap and easy. A sensible "corrective measure" for the declining productivity of parts of the Central Valley would be the establishment of a serious, creative, Valley-wide program to produce the maximum yield of crops with the minimum application of water, fertilizers, pesticides, and herbicides.* Partial impoundment would represent or help cause the Bureau's novel insistence that water available for consumption should be applied when and where needed, only, and that the consequence of irrigation in the Central Valley Project should be the production of crops, but not also the eventual destruction of farmlands.

*For example, "in Texas an integrated system of cotton production based on new, early maturing varieties has demonstrated that cotton can be produced with 50-75 percent less insecticide, 80 percent less fertilizer, and 50 percent less irrigation water than conventional varieties of cotton grown with high energy agriculture. In fact, yields have risen, with an increase in profits to farmers of more than \$100 per acre."⁽⁸⁶⁾

Fourth, partial impoundment behind New Melones, as a precedent and thus a possible cause of a serious and creative program to conserve soil and water throughout the Central Valley Project, might materially contribute to a lessening in the Project's estimated deficit of \$8.8 billion in 2028.⁽⁸⁷⁾ Although sale of the full yield of water and electricity from New Melones might raise \$9.2 million per year,⁽⁸⁸⁾ paradoxically full impoundment might contribute less materially than partial impoundment to the lessening of the Central Valley Project's deficit.

Since farmers have become accustomed to buying cheap water from the Central Valley Project, since the Bureau has built New Melones without previously establishing firm commitments from potential customers, and since the yield from New Melones might increase the Central Valley Project's surplus of water, the price for New Melones' water would be set -- just as the prices of water presently available from the Central Valley Project are set -- in a "buyer's market," not a "seller's market." The average price paid by farmers for the Central Valley Project's water has become a small fraction -- and the price likely to be paid for New Melones' water would also represent a fraction -- of the actual cost of the water. By increasing or maintaining the Central Valley Project's surplus, full impoundment behind New Melones would help cause the Bureau to raise the average price for its water at a rate less than inflation.

Alternatively, impoundment only to Parrott's Ferry might help bring the Bureau to a "day of reckoning." Partial impoundment would probably be preceded by the Bureau's admission or agreement that developing new supplies of water is not the necessary answer to shortages during a drought, or overdraft of groundwater; partial impoundment would probably be followed by a dramatic increase in the price of water and electricity, as an inducement to conservation, so that new customers can be supplied, or new crops grown, with presently available water.

In short, Friends of the River proposes: that the reservoir behind New Melones extend only to Parrott's Ferry; that, in the near future, a kilowatt-hour of the Central Valley Project's electricity cost at least \$.0125, in 1979 dollars, rather than the present \$.0043;** that an acre-foot of water supplied by the Central Valley Project for irrigation cost at least \$15, in 1979 dollars, rather than the present \$4.25; that part of the increased revenue be used for

*For example, "the local areas were informed in 1975 and 1976, that if water were available from the [New Melones] reservoir, the rates at the reservoir and downstream in the river would be \$3.50 per acre-foot for agricultural water...."(89)

**As recommended in the Department of the Interior's recent audit of the Central Valley Project. (89)

construction and advice sufficient to increase to 80% the average "irrigation efficiency" in the Central Valley Project; that the proposed drain for the San Joaquin Valley, and the various canals and dams proposed by the Bureau for the Central Valley Project, be built only as needed to complement this serious program of conservation of soil and water.

The Bureau's minimizing large-scale construction, and emphasizing careful management of existing facilities and supplies, would directly cause a minimizing of the Bureau's deficit. Although improvement of the average "irrigation efficiency" in the Central Valley Project, from 45% to 80%, might cost between \$50 and \$100 per acre, in 1979 dollars,⁽⁹⁰⁾ or between \$100 and \$200 million for all the land irrigated by the Central Valley Project, nonetheless the proposed reforms in the rates for the Central Valley Project's water and electricity would raise over \$50 million per year, in 1979 dollars. Not constructing canals from New Melones would save the Central Valley Project, or irrigation districts, between \$10 and \$50 million. Finally, if conservation of soil and water in the San Joaquin Valley would reduce by only 10% the acreage needing drainage, then the cost of the "Master Drain" would decrease by \$25 to \$100 million.

VII. CONCLUSION

The Stanislaus is already a social workhorse. More than a half-million acre-feet of water per year are diverted for consumption. Nearly a billion kilowatt-hours are generated per year in the Stanislaus Basin.⁽⁹¹⁾ Full impoundment behind New Melones would further harness the river, but without sufficient benefit, and would cause significant harm to an important biological community, to a dense record of American history, and to a sizable and growing community of people who avidly enjoy the river. Impoundment only to Parrott's Ferry would make little use of an expensive and grandiose public investment, New Melones Dam, but would make the best possible use of a public treasure, the Stanislaus from Parrott's Ferry to Camp 9, "a unique asset to the State and Nation."

FOOTNOTES

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