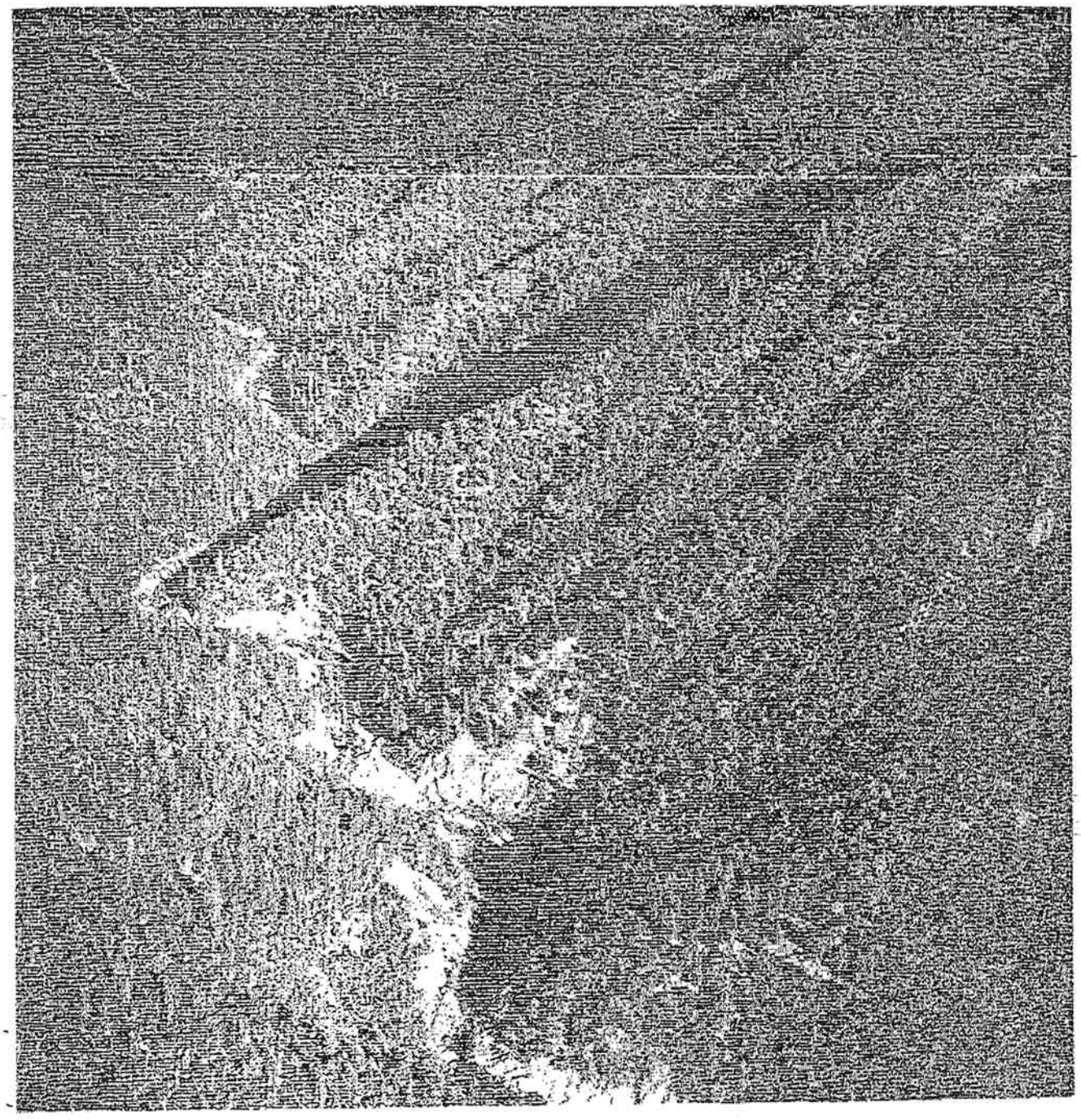
State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

RUBICON RIVER WILD TROUT MANAGEMENT PLAN1/

Inland Fisheries Branch

July 1979

1/ This work was performed as part of Dingell-Johnson Project California F-10-R, "Salmonid Stream Study", supported by Federal Aid to Fish Restoration funds.



RUBICON RIVER GORGE

D.F.G. Photo by John Hummel - September 1976

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PREFACE

In 1966, the Department of Fish and Game in the California Fish and Wildlife Plan recommended expansion of trout management activities to "protect and enhance wild trout fisheries." In response to this recommendation and to concerns expressed by the public, the California Wild Trout Program was established by the California Fish and Game Commission in 1971. The primary purpose of the program is to preserve attractive stream trout fisheries which are naturally sustained by wild strains of trout rather than sustained by domesticated, catchable-sized trout stocked on a put-and-take basis. Emphasis is placed on protecting the aquatic environment to perpetuate natural production and on preserving the natural character of the streamside environment to provide a quality angling experience.

Since 1971, the Fish and Game Commission has designated eight backcountry[2/] and nine roadside streams as wild trout streams. Each wild trout stream is to have its own management plan and regulations which will emphasize individuality and diversity.

Specific management objectives for each stream will use the general objectives of the wild trout program as guidelines. The guidelines are:

1. To maintain wild trout populations at levels necessary to provide satisfactory recreational angling opportunities for wild trout.
2. To maintain and enhance where possible the habitat required for optimum wild trout production.
3. To preserve the natural character of the streamside environment.

[2/] Remote with access largely provided by trails.

Management of backcountry streams such as Nelson Creek will also emphasize maintenance of the remote secluded quality of the angling experience, which generally involves minimizing angler encounter with man-made alterations or activity.

The Rubicon River was included in the wild trout program following the recommendations of the late Irwin Bosworth, Forest Supervisor of the El Dorado National Forest. He suggested the Rubicon River downstream from Hell Hole Reservoir be considered for the program pointing out that, "the Rubicon River has stable flows during the summer from controlled releases upstream, it flows through a steep canyon with few easy access points, and that the area surrounding the Rubicon River can accommodate additional people without experiencing resource damage."

This plan is an in-house document written to identify the Department of Fish and Game's activities in the Nelson Creek drainage including the management direction to be taken in coordinating with agencies responsible for environmental protection. All land use planning is the ultimate responsibility of the U. S. Forest Service. As per the Memorandum of Understanding between the Department and the Forest Service, the Department will identify management direction which is intended to preserve and protect wildlife resources in natural forests and the Forest Service will recognize the Department's responsibilities and concerns along with hope of the other users of the forest in their multiple use planning.

RESOURCE STATUS

General Setting

The Rubicon River is a major tributary of the American River, located in the northern Sierra Nevada 40 miles east of Sacramento (Figure 1). The river originates in Clyde Lake, 8,700 ft above sea level, and terminates 57

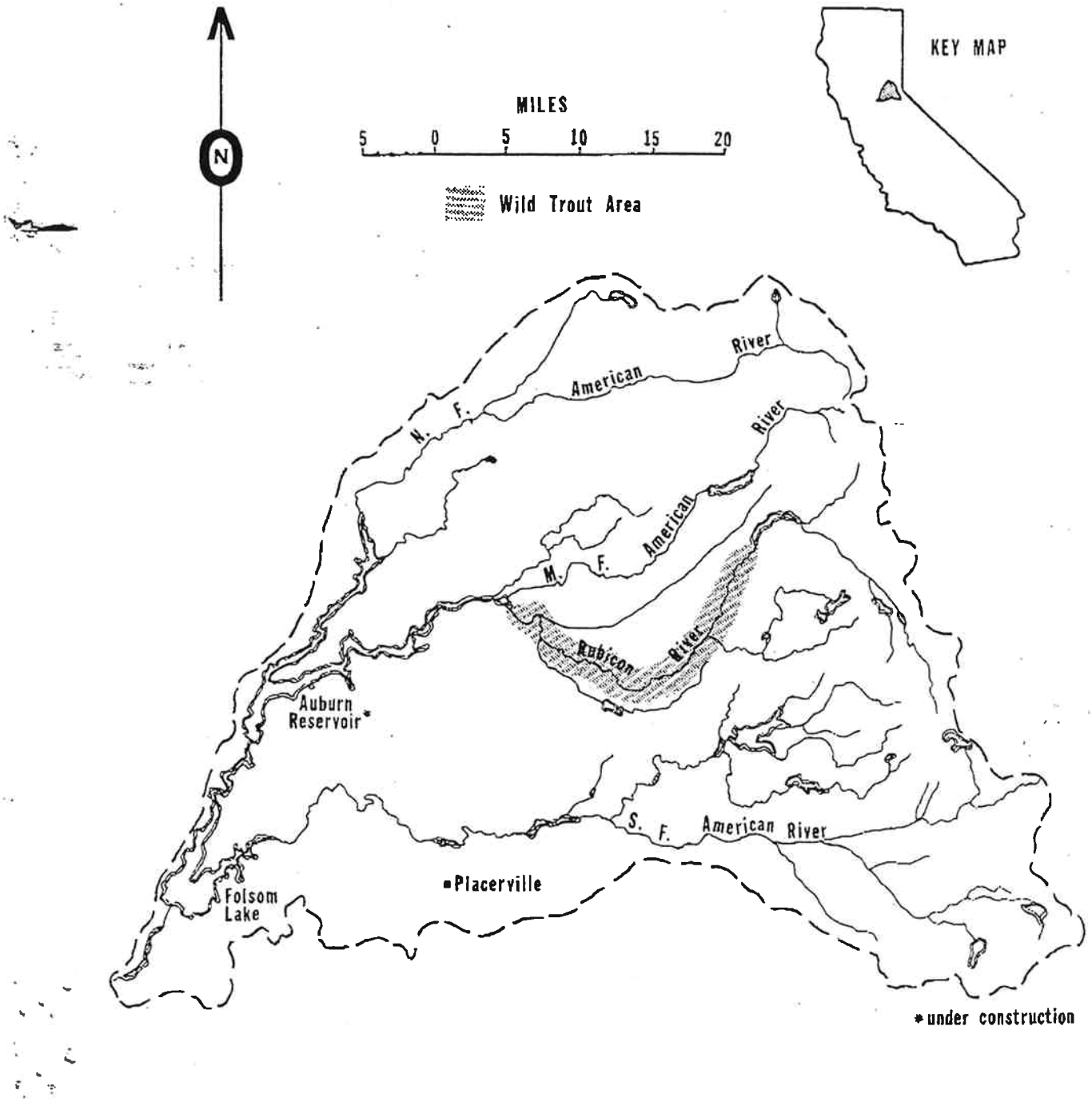


FIGURE 1 GENERAL LOCATION OF RUBICON RIVER.

miles downstream at its confluence with the Middle Fork American River. It drains a 315 mile^2 watershed situated entirely with the boundaries of El Dorado National Forest.

The designated wild trout section of the river is 30 miles long extending from Hell Hole Dam downstream to the Middle Fork American River (Figure 2). The uppermost 6 miles of the section, between Hell Hole Dam and Hales Crossing, lie within a granitic, glaciated canyon, characterized by a boulder strewn stream channel and gently sloping canyon walls. The average gradient is 86 ft/mile.

Downstream from Hales Crossing in the vicinity of the confluence of the South Fork, the river bisects a large metasedimentary rock formation of slate, schist, and sandstone. The result is the Rubicon River gorge; an impressive steep walled, V-shaped incision, nearly 23 miles long and as much as 2,400 ft deep. Canyon slopes in excess of 90% are common throughout the gorge. Exposed bedrock and numerous small cascades generated by the average 110 ft/mile gradient characterize the stream.

The wild trout area is situated largely within the Upper Sonoran and Transition life zones. Sunbaked, southwest-facing slopes are sparsely vegetated as soils are rocky and undeveloped. Scrub oaks and chaparral species, including manzanita, chamise, ceonothus, coffee berry, toyon, and chinquapin dominate the vegetative community with conifers and hardwood concentrated in the upstream area.

The less exposed, northeast-facing slopes are covered with a thick mantle of vegetation consisting primarily of black oak, canyon live oak, big leaf maple, tanoak, dogwood, and laurel, with some Douglas fir, ponderosa pine, incense cedar, and sugar pine. The density of the coniferous forest

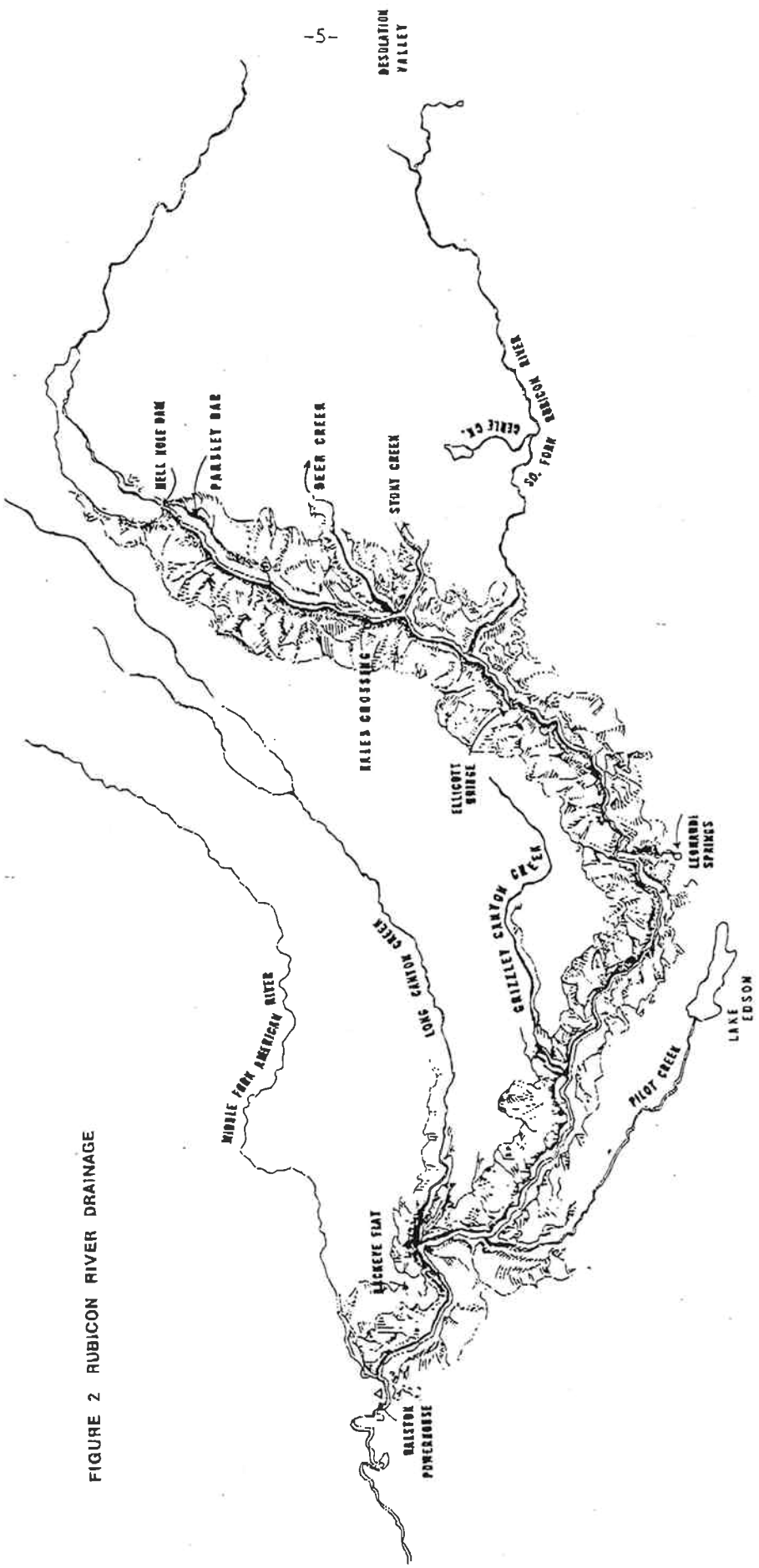


FIGURE 2 RUBICON RIVER DRAINAGE

increases above Ellicott Bridge with the heaviest concentrations occurring between Hales Crossing and Parsley Bar. Moderate to heavy growths of white alder and willow border the stream throughout most of the wild trout area.

Annual precipitation within the wild trout area ranges from an average of 50 inches at Ralston Powerhouse to 60 inches at Hell Hole Dam. Snowfall above the Canyon rim ranges from 50 inches near Ralston Powerhouse to 200 inches east of Hell Hole Reservoir. Heavy snow pack within the headwater area often lasts until mid-July.

Before construction of impoundments and diversions, flows in the Rubicon River drainage were torrential during the spring snow melt period, often exceeding 1,000 cfs. Runoff would decline sharply during July, and then gradually drop through the summer months to a low in October. Unimpaired midsummer flows ranged from 50 cfs near the present location of Hell Hole Dam, to 100 cfs near Ralston Powerhouse. October flows at these same points varied from 6 to 40 cfs, respectively. Late fall and winter flows in the upper portion of the wild trout area are only slightly greater than October flows, since precipitation in the watershed tributary to this section falls as snow and does not usually run off until spring. The condition down river is different, however, as precipitation runoff generally increases the flow to levels in excess of 200 cfs during the winter.

Impoundments and diversions on the mainstem of the river and its tributaries have greatly reduced winter, spring, and early summer flows. Flow modifications are discussed in greater detail in the section describing water development.

Impact of the 1964 Flood Surge

In December 1964, the failure of the then partially completed Hell Hole Dam resulted in an unprecedented flood, which peaked at an estimated

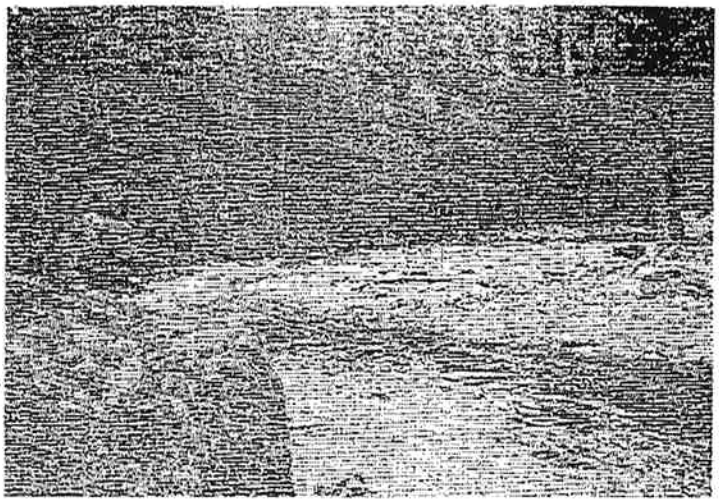
260,000 cfs, and severely damaged the natural resources of the Rubicon River.[3/] Extremely high surge velocities caused severe erosion damage to the stream channel and streamside environments. Six miles of channel between the South Fork and the dam were changed from a V-shaped channel to a broader, U-shaped channel.

Materials eroded from stream banks and an estimated 700,000 yds^3 of rockfill from the dam moved downstream as far as Parsley Bar, substantially aggrading this reach of the streambed. So much rock fill was deposited within this 0.5 mile long section of the river that during low water periods the entire flow disappears beneath the porous streambed. Immediately downstream, pools were filled with rock leaving very little trout habitat. The flood surge also triggered more than thirty discrete landslides within the gorge, disposing an additional 800,000 yds^3 of material into the river.

Although many pools in the river were filled with rock during the flood, many new pools were created. A noticeable net change in the riffle-pool ratio, therefore did not occur except in the Parsley Bar area.

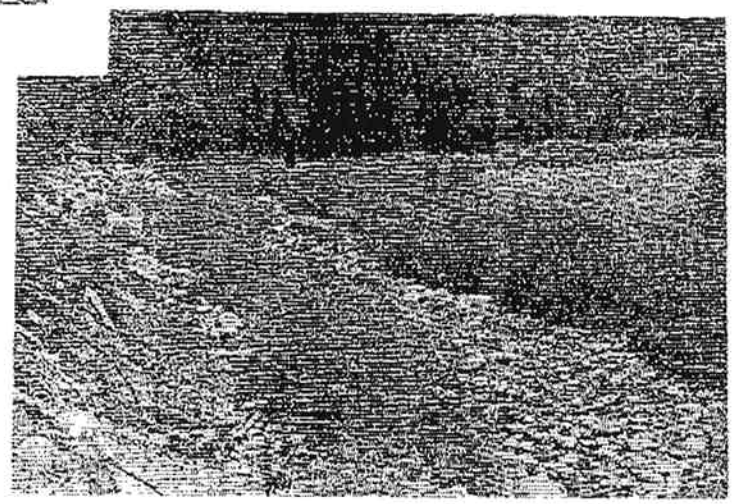
Fortunately, natural succession is restoring the riparian landscape. In many places heavy thickets of alder and willow, some already 15- to 30-ft tall, have become established. Conifers, shrubs, and grasses are becoming established in those areas within the flood zone which still possess soil. The trout population has apparently recovered naturally throughout most of the river.

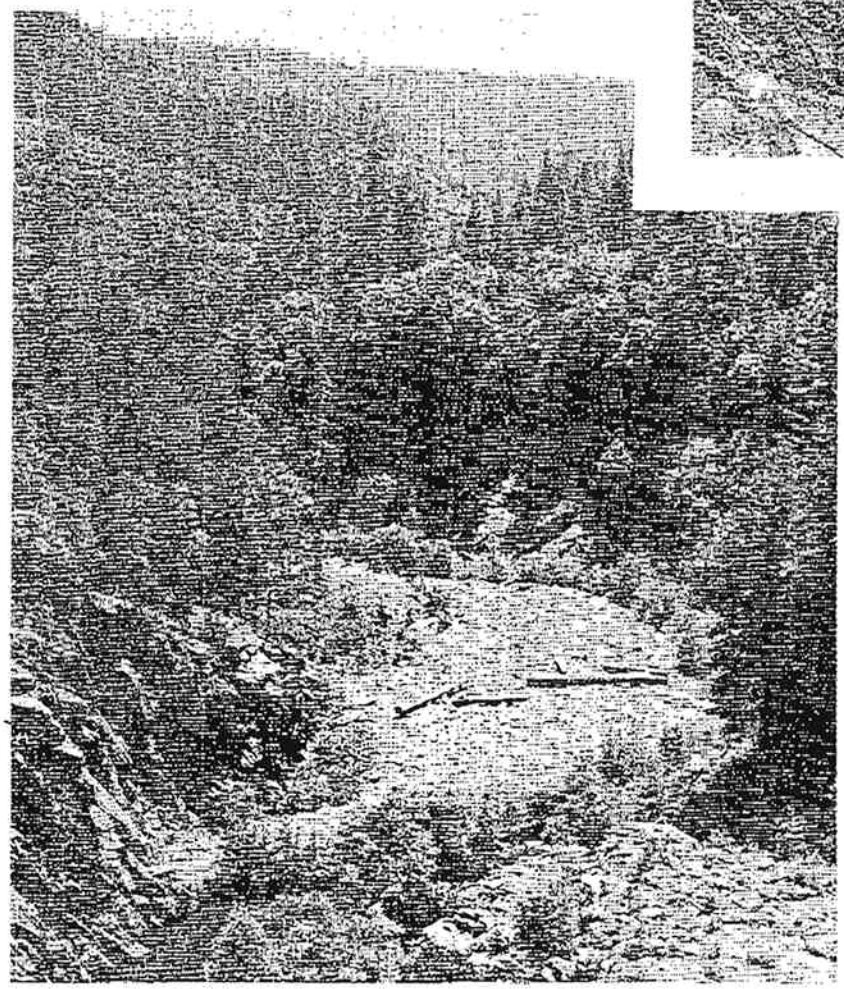
[3/] Scott, Kevin M., and George C. Gravlee, Jr. 1968. Flood Surge on the Rubicon River, California—Hydrology Hydraulics and Boulder Transport. U. S. Geo. Surv. Prof. Paper 422-M



Upper left - Hales Crossing area as it appeared before the flood surge of 1964.

D.F.G. Photo by T. Wooster 1961





Upper right and lower left - Hales Crossing area as it appears today. Willows are starting to frame the low flow channel and some vegetation is taking hold along the 100 foot tall scar along each wall of the canyon.

D.F.G. Photo by B. Snider

Land Ownership

The Rubicon River is located entirely within the bounds of El Dorado National Forest. However, much of the stream frontage and canyon slopes upstream from Parsley Bar and downstream from Grizzly Canyon, are in private ownership (Figure 3). About 30% of the right bank and 25% of the left bank stream frontage is privately owned. Bohemia Lumber Company, which acquired most of the Pacific Gas and Electric Company lands within the canyon, American Forest Products, Southern Pacific, Michigan California Lumber Company, and Cordilleron Resources combined own about 5,800 acres within the canyon.

Description of the Fishery

Fish Species

Rainbow trout are the only resident game fish native to the Rubicon River drainage. Anadromous spring-run king salmon and steelhead rainbow trout utilized the lower reaches of the Rubicon River (below Pilot Creek) for spawning before construction of dams on the lower American River.

Brown, golden, and brook trout have all been introduced to the Rubicon River system. Brown trout occur throughout the Rubicon River and in the larger tributaries and lakes upstream from Hell Hole Reservoir. Golden and brook trout have been planted in several headwater lakes; however, neither have been observed within the wild trout area.

Four species of native nongame fish occur in the wild trout section of the Rubicon River: Sacramento sucker along the entire length of the river, with heaviest concentrations in the lower river; speckled dace and riffle sculpin throughout the river; and Sacramento squawfish as far upstream as the Leonardi Spring area. Three other species of native nongame fishes

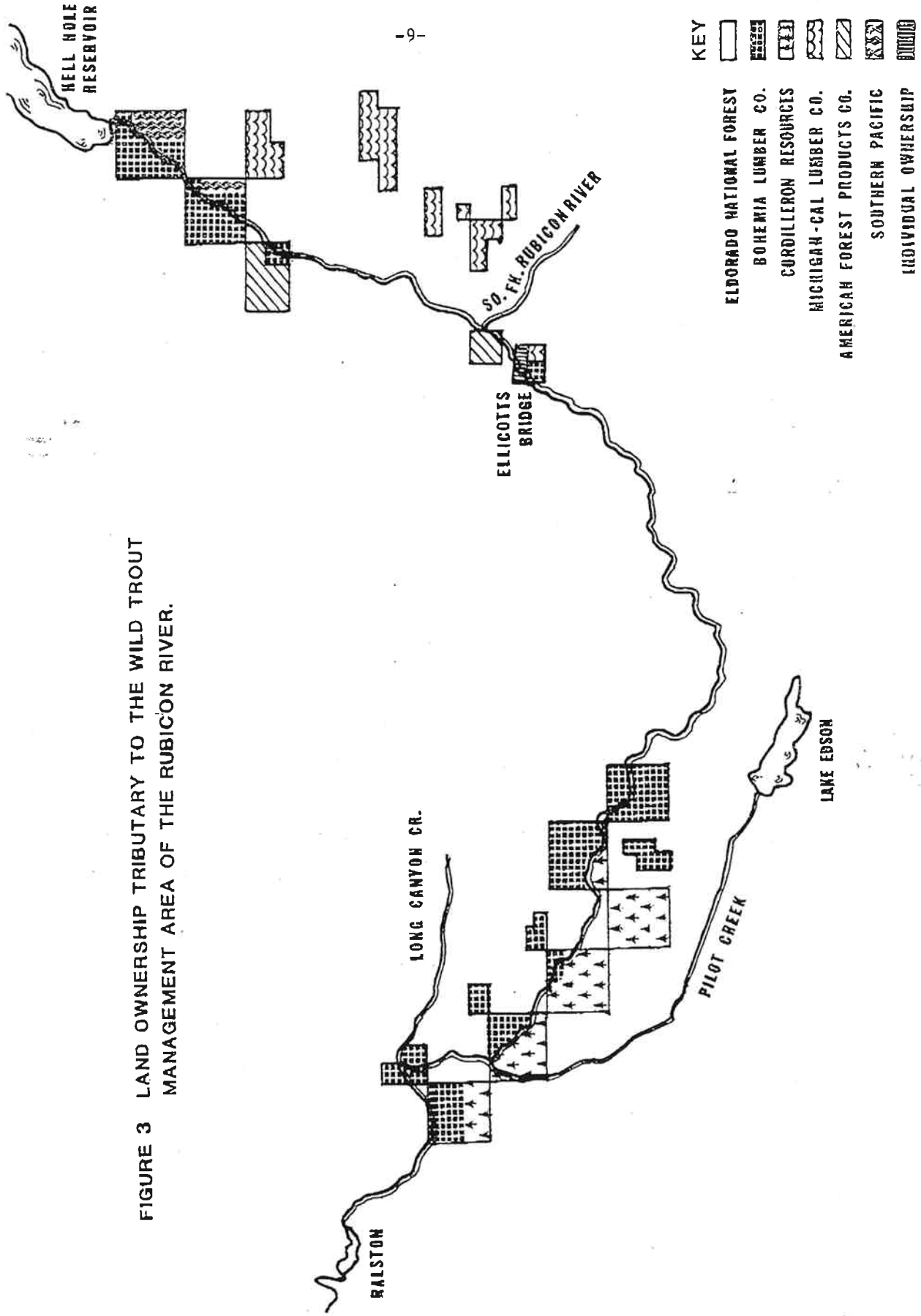


FIGURE 3 LAND OWNERSHIP TRIBUTARY TO THE WILD TROUT MANAGEMENT AREA OF THE RUBICON RIVER.

potentially exist in the wild trout section of the river. Sacramento hardhead and Sacramento blackfish have been observed in the Middle Fork American River and may possibly occur in the lower Rubicon River. Tui chub have been illegally introduced into the Rubicon River system and are abundant in Hell Hole Reservoir. However, chub have not been observed in the Rubicon River downstream from Hell Hole Reservoir.

Trout Habitat

Maximum summer water temperatures range from 48°F at the upper end of the wild trout area to 84°F near the lower end. Water temperatures during the summer are generally less than 65°F upstream from Ellicott Bridge and less than 75°F within the gorge.

Pool development in the Rubicon River is good, particularly within the river bends and narrows. Cover consists primarily of deep pools, shelving rocks, and surface turbulence which become scarce during low flow periods. Spawning gravel in the river is restricted to a few scattered patches. However, the abundance of yearling trout observed in 1975 suggest that spawning gravel availability is not limiting trout production.

Tributary streams other than South Fork Rubicon River are not accessible to spawners migrating from the main stream Rubicon. Cascades and excessive gradient create barriers at or near the confluence of most tributaries. These tributaries do provide some "drift-down" recruitment to the Rubicon River fishery.

Fish Populations

Trout population data for the Rubicon River are limited to those obtained from underwater observations and electrofishing made upstream of Ellicott Bridge. Trout population estimates are summarized in Appendix 1.

Population estimates of trout 6 inches or greater range from 200 per mile in the Ellicott Bridge area to 500 per mile at Hales Crossing. Observations of trout abundance made while angling in the gorge indicate that trout 6 inches or greater may be as numerous as 1,000 per mile.

Trout Growth

The growth rate of rainbow trout in the Rubicon River is slow relative to growth rates observed in more fertile, nongranitic basin streams such as Hat Creek and the Pit River. It is comparable to those observed in other streams of the west slope of the Sierra Nevada (Appendix 2).

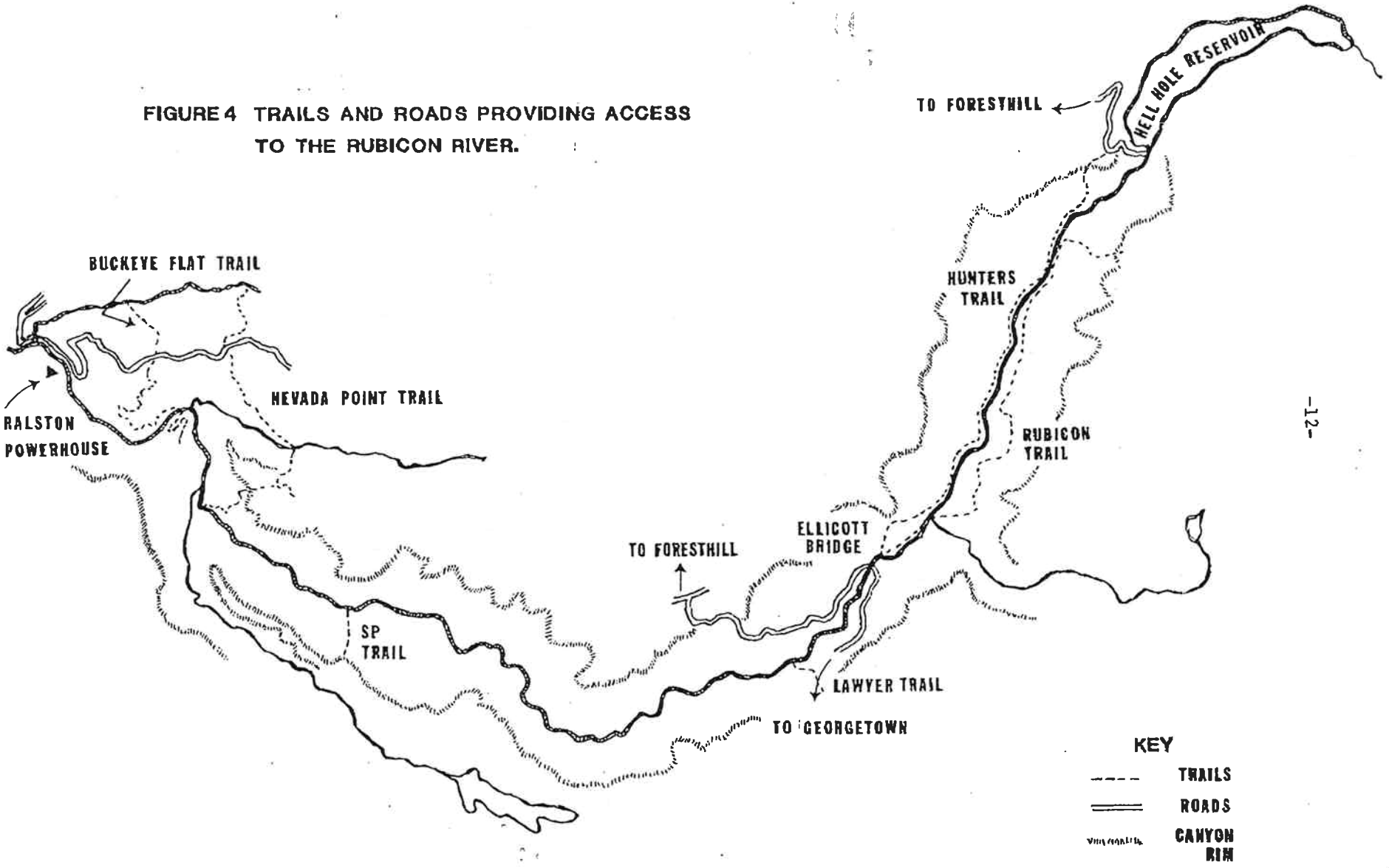
Rainbow trout in the Rubicon River require at least six growing seasons (Age V+) to attain 12 inches in length. However, because rainbow trout are relatively shortlived, with very few fish living more than four seasons, the proportion of large rainbow trout in the river is small. The majority of rainbow trout observed in the accessible portions of the river were Age II or younger, or less than 6 inches long.

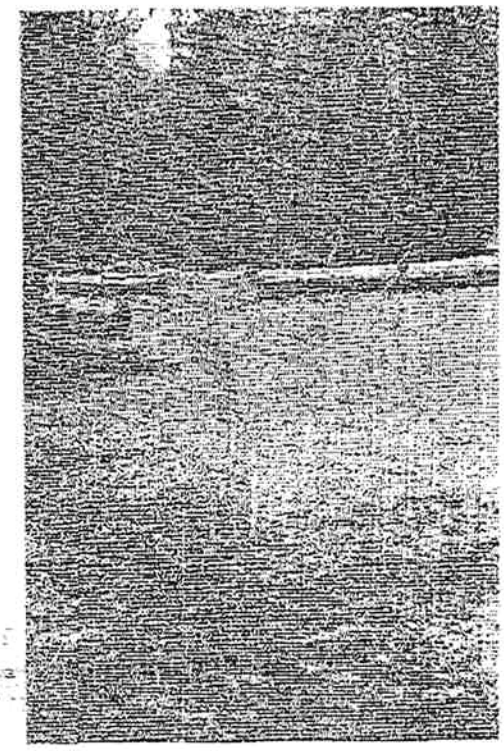
In contrast, brown trout in the Rubicon River are often of good size. Although they do not appear to grow any faster than the rainbow trout, they frequently live 6 to 8 years and thus reach a much larger size (16- to 20-inch fish are not uncommon). Also, brown trout are characteristically more wary than rainbow trout and, hence, less vulnerable to removal by angling.

Angling Access and Use

Roads provide access to the Rubicon River at several locations (Figure 4): at Ralston Powerhouse just upstream from the confluence with the Middle Fork American River; at Ellicott Bridge, 20 miles above the powerhouse; and at Hell Hole Dam. A road also penetrates to within 1/2 mile of the river in the vicinity of Buckeye Flat, 2 miles above the powerhouse.

FIGURE 4 TRAILS AND ROADS PROVIDING ACCESS TO THE RUBICON RIVER.



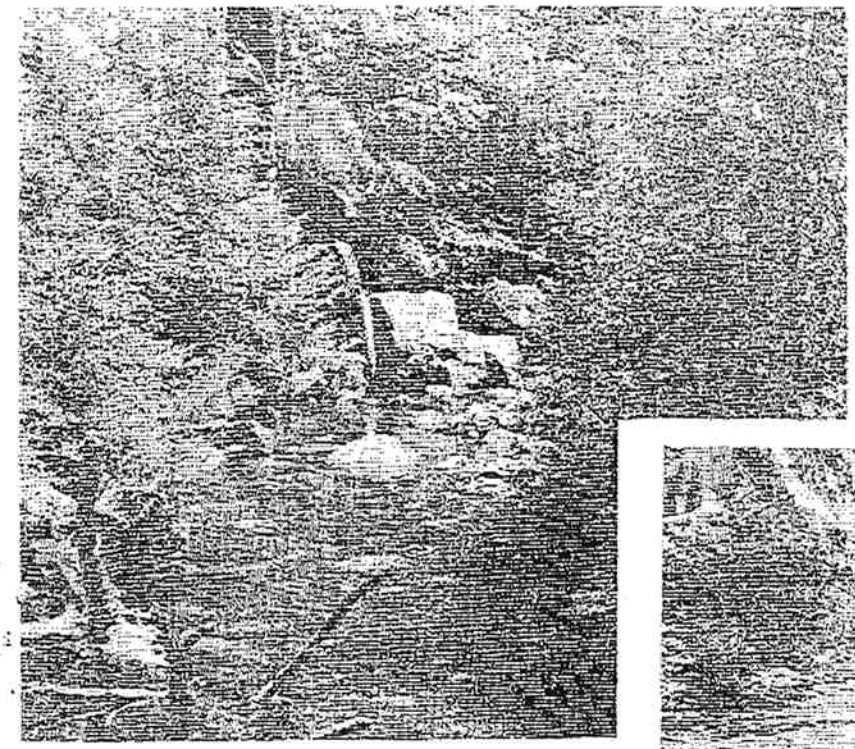


Hunters Trail

D.F.G. Photo by B. Snider 1977

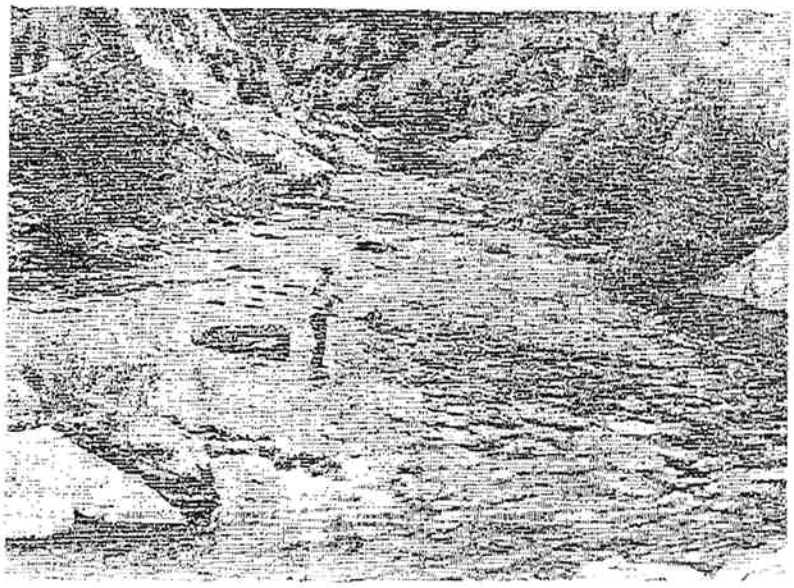
Deep, clear pools near the South For

D.F.G. Photo by B. Snider 1978



Angling within the gorge

D.F.G. photo by G. Smith 1973



At the mouth of the South Fork

D.F.G. photo by B. Snider 1978

Rainbow trout caught in the Ellicott Bridge area average less than 8 inches long. Within the gorge, however, an angler may anticipate catching a few 10- to 14-inch and an occasional 14- to 18-inch rainbow along with numerous 6- to 9-inch trout (Appendix 3).

MANAGEMENT PROGRAM

Management Goals

The goals of wild trout management on the Rubicon River are:

1. To protect the aquatic environment of the Rubicon and its tributaries.
2. To perpetuate a naturally sustained, balanced[4/] population of rainbow trout.
3. To provide a quality backcountry angling experience characterized by a naturally scenic streamside environment.

Rubicon River wild trout management goals are based on the following assumptions:

1. The demand for wild trout angling opportunities in California will continue and perhaps increase.
2. Wild trout anglers will continue to be more interested in the pleasure of fishing and in the challenge of catching larger "hard-to-catch" trout in attractive surroundings than in either angling convenience or the potential for creeling many trout.
3. The Department of Fish and Game will continue to manage the Rubicon River for wild trout, and hatchery trout will not be planted.

[4/] Including optimum numbers of adult-age three trout (8 inches and greater) to maintain an adequate spawning stock and to provide quality angling in terms of catch per hour and average size of trout caught. (Specific numbers to be identified with the implementation of this plan.)

Management Direction

1. Determine the status of the Rubicon River trout fishery and propose angling regulation changes, if needed, to achieve the goals of this plan (page 20).
2. Monitor fishery as described on page 20 of this plan.
3. Work with the U. S. Forest Service in the development of their forthcoming Tahoe Forest Land Management Plan (presently in early planning stage). Specific areas of concern include:
   a. Maintenance of the integrity of the roadless area of the Rubicon River Gorge (Figure 5 and page 37).
   b. Maintenance of a water influence zone[5/] within the wild trout area above Ellicott Bridge (page 28).
   c. Acquisition of private lands within the wild trout area (Figure 5 and page 33.
   d. Mineral withdrawal in the wild trout area (page 35).
   e. Restriction of vehicular use within the wild trout area to Hunters and Buckeye Flat trails (page 37); and
   f. Limitation of recreational development in the wild trout area to provide sanitary and waste disposal facilities at Buckeye Flat, Ellicott Bridge and Hales Crossing (page 36).
4. Work with the Regional Water Quality Control Board, Central Valley Region and the Forest Service to regulate mining activities to prohibit water quality or aquatic habitat degradation, preserve the natural character

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5/ A special management zone established by the Forest Service in which water quality protection and streamside habitat preservation is the primary management goal.

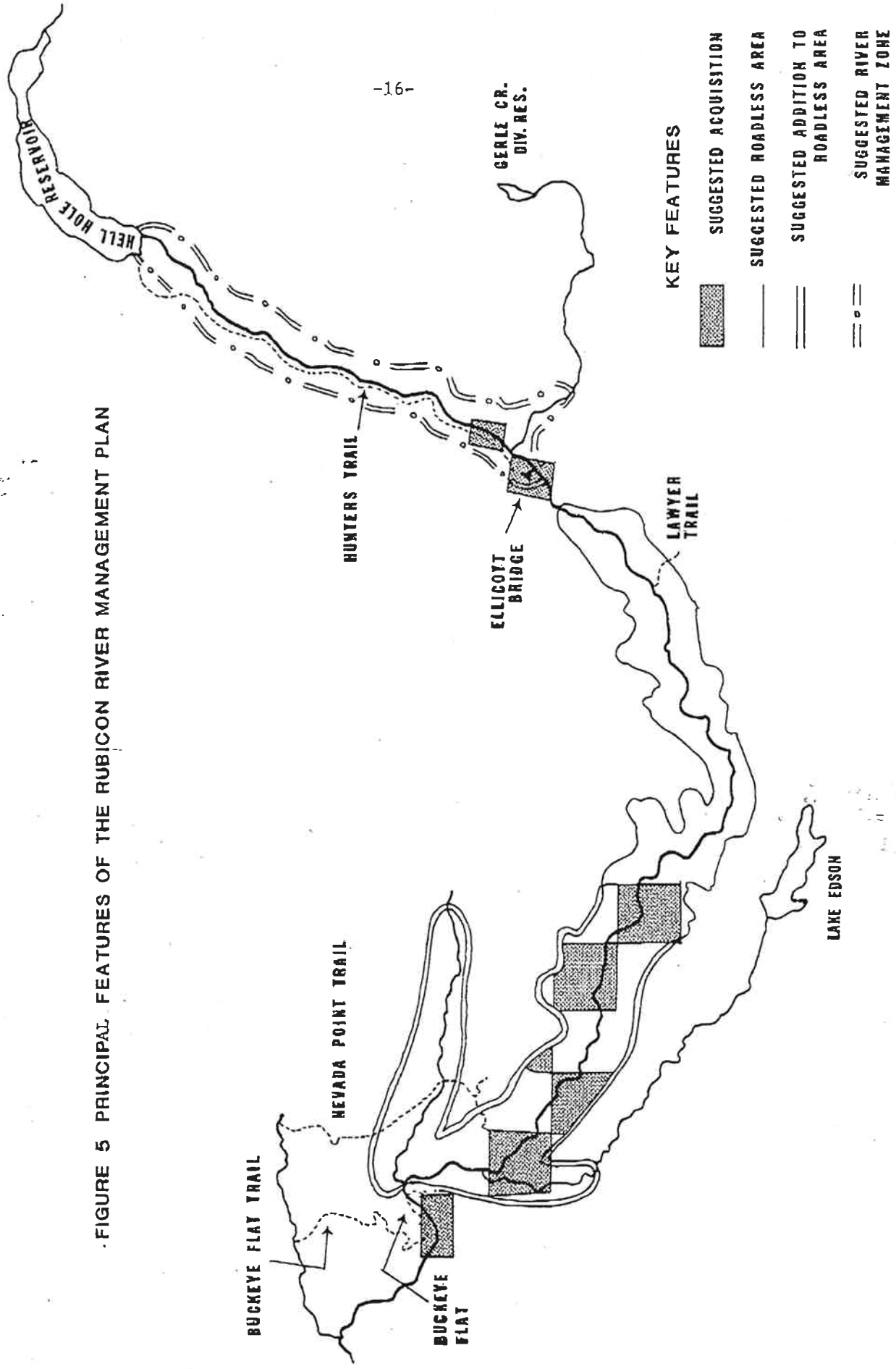

FIGURE 5 PRINCIPAL FEATURES OF THE RUBICON RIVER MANAGEMENT PLAN

of the area within the view zone of the river and minimize conflicts associated with the wild trout angling experience of the roadless areas of the canyon (page 28).

5. Limit suction dredge operations to within 1/4 mile of the roadside areas of the canyon and to existing placer claims within the roadless areas. Dredges larger than 4 inches in diameter should continue to be prohibited (page 35).

6. Assure that all agreements entered into pursuant to Sections 1601-1603 of the Fish and Game Code are consistent with the implementation of this plan, and closely monitor the agreements entered into to assure that the provisions are being met.

7. Annually conduct an aerial surveillance of the entire Rubicon River drainage to determine if the management objectives proposed in this plan are being achieved.

8. Request El Dorado County to consider increasing the minimum parcel requirement in the Rubicon River Canyon to at least 160 acres to discourage incompatible development on private lands[6/] not acquired by the Forest Service or the State. Until such a restriction is in effect, review all subdivision and parcel splitting activities proposed to El Dorado County and make recommendations as needed to prevent development within the Rubicon River Canyon which is incompatible with this plan (page 33).

9. Thoroughly review private logging activities within the canyon which are regulated by the timber harvest plan review procedure of the State Forest

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6/ The zoning change is recommended solely to protect the canyon environment of the Rubicon River. It is not intended to lower property values in order to facilitate public acquisition. If the zoning were implemented, public acquisition would not be required to protect the canyon environment.

Practices Act to preclude degradation of aquatic habitat and of the back-country angling experience. Oppose road construction and yarding in existing roadless areas of Rubicon Canyon (page 30).

10. Work with Placer County Water Agency to evaluate the effect of altering the flow release schedule for Hell Hole Reservoir to increase flow during the traditional low flow period by sampling the Ellicott Bridge Hell Hole Dam area (Table 1) at existing flows than during the proposed flow regime (page 21). If the results indicate that the proposed schedule increases trout production, request Placer County Water Agency to join renegotiation of the terms of Article 37 of the Federal Power Commission license for project 2079 prescribing flow releases from Hell Hole Reservoir (page 21).

11. Establish routine monitoring of flow releases from all diversions tributary to the wild trout area (i.e., review USGS flow records) to assure compliance (page 21).

12. Oppose construction of the Rubicon River pump storage project, a potential hydroelectric power project (page 27).

13. Request Georgetown Public Utility District to emphasize soil stabilization and erosion control programs along their Pilot Creek flume (page 29).

14. Request Sacramento Municipal Utility District to develop an alternative method of sediment removal in Robbs Peak Forebay which would not harm the fishery. The bypassing of inflowing water around the excavation through a temporary conduit appears to be the most promising solution (page 29).

15. Work with Placer County Water Agency to prevent sedimentation of the stream environment from occurring with any sediment removal operations

TABLE 1. Fishery Management Activities for the Rubicon River.

I. Define dynamics of fishery between Ellicott Bridge and Hell Hole Dam.

A. Transect sampling - Two consecutive years (1978, 1979).

1. Establish three 100-yard long transects which are representative of entire area as to habitat, use, etc.

2. Sample using electrofishing equipment to obtain:

a. population estimate (mark and recapture, or diminishing return)

i. per surface area

ii. per mile

b. length/weight relationship

c. age/growth relationship

d. size distribution

e. age classes distribution

f. total species composition (both game and nongame)

B. Tagging - Two consecutive years in vicinity of transects (beginning in 1979).

II. Monitor fishery between Ellicott Bridge and Hell Hole Dam.

A. Tagging and transect evaluation to be repeated once every 5 years (starting in 1983).

III. Define and monitor fishery status in gorge.

A. Establish questionnaires to be placed on windshields of vehicles parked at access points to gorge to determine:

1. Use

2. Harvest

3. Size

4. Catch

5. Angling experience attributes

they might undertake by providing flow bypass around any excavation areas. Tunnel cleaning operation should not result in sedimentation of Long Canyon Creek. The operations should be closely monitored (page 29).

Fishery Management

General trout regulations currently apply to the Rubicon River trout fishery. The angling season extends from the last Saturday in April through November 15, the bag limit is ten trout but not more than 10 pounds and one fish.

Cursory surveys of the Rubicon's trout fishery indicate that the general regulations may be providing the objective fishery in the remote sections of the river, but may not be providing the objective fishery in the accessible areas; the Ellicott Bridge area and the lower river near Ralston Powerhouse.

Recommendations

Two management directions are initially recommended; determine the status and dynamics of the fishery in the accessible areas through electroshocking, and determine the quality of the fishery in the remote, gorge section of the wild trout area through angler questionnaires. A monitoring program is also recommended.

Ellicott Bridge to Hell Hole Dam

The status and dynamics of the fishery above Ellicott Bridge will be determined by performing the activities outlined in Table 1. Once the data are collected, the results will be compared with the objective quality. Appropriate changes in angling regulations will be proposed, if necessary. A monitoring program is also outlined in Table 1.

Gorge

Available information indicates that the gorge presently provides an excellent quality wild trout fishery. An abundance of 6- to 9-inch long rainbow trout (Age 3+) and occasional 10- to 18-inch long trout sustain high catch rates of good-sized trout.

Management activities in the gorge should be directed toward maintaining the existing quality fishery: the primitive nature and remoteness of the area, the low harvest rate and resultant abundance of relatively large trout. Angler questionnaires should be developed and placed on windshields of vehicles parked at gorge access points to monitor the status of the fishery (Table 1). This should be done intermittently throughout the season for at least the next 3 years (1978-81) to develop baseline data, then repeated every other year to monitor for needed changes in angling regulations.

Environmental Problems and Land Use Management

Existing Water Development

Six reservoirs and three diversion facilities annually divert about 286,000 acre-feet of water from the Rubicon to the middle and south forks of the American River (Figure 6). Flow into the wild trout area is normally restricted to flow release from Hell Hole Reservoir, as required by Federal Power Commission License No. 2079 (Table 2) and flow accretion from tributary streams situated downstream from the dam. Spills over the dam occasionally occur during the spring and early summer runoff. The result has been a significant change in the flow regime of the wild trout area (Figure 7).

The magnitude and frequency of high flow during the spring and early summer runoff have been reduced along with the flushing capacity associated with higher flows. Prior to the construction of Hell Hole Dam flow in the

TABLE 2. Existing and Proposed Flow Requirements for Hell Hole Reservoir.

EXISTING		PROPOSED	
Normal runoff year			
Period	Flow (cfs)	Period	Flow (cfs)
June 1 - July 25	20	July 1 - November 15	20
July 26 - August 5	15		
August 6 - October 31	10		
November 1 - January 14		November 16 - June 30	10
February 1 - May 31	20		
Subnormal runoff year[1/]			
Period	Flow (cfs)	Period	Flow (cfs)
June 1 - December 31	8	July 1 - November 15	10
January 1 - March 25	6	November 16 - June 30	5
March 26 - May 31	8		

1/ Subnormal-forecast runoff to Folsom Reservoir less than 1 million acre-feet.

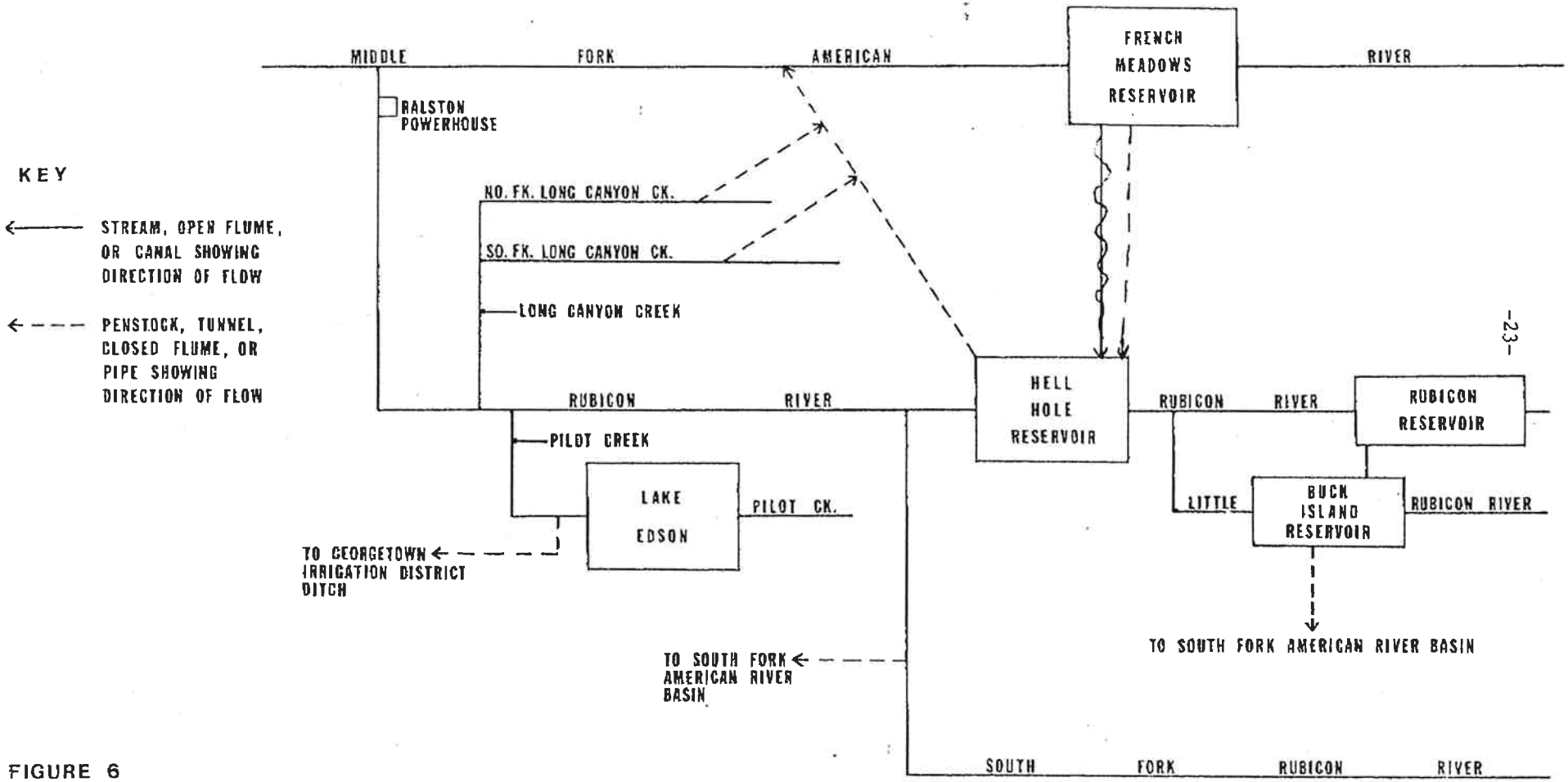

FIGURE 6
SCHEMATIC DIAGRAM SHOWING DIVERSIONS AND STORAGE IN RUBICON RIVER BASIN

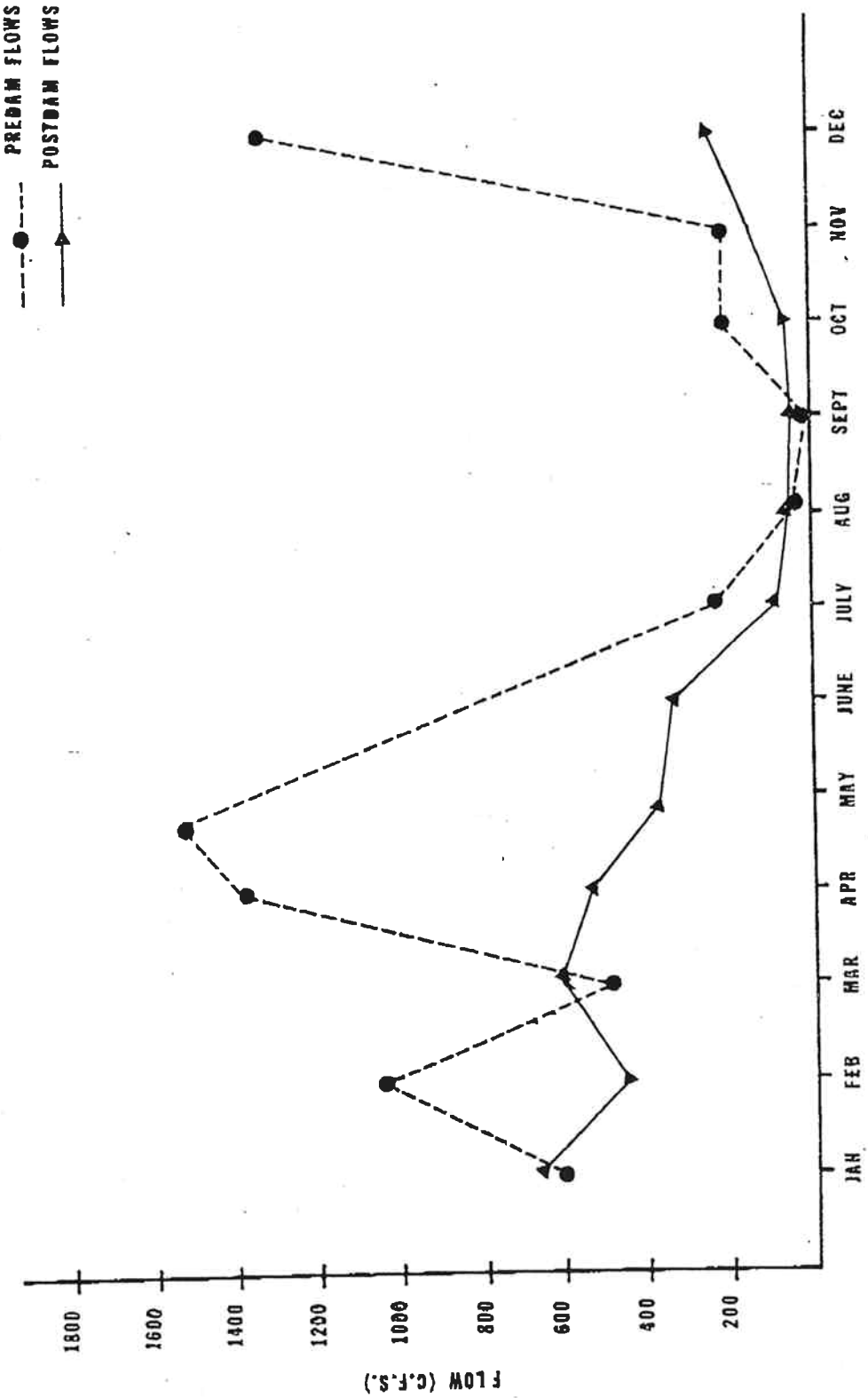

FIGURE 7 COMPARISON OF MEAN MONTHLY FLOWS IN THE RUBICON RIVER BEFORE AND AFTER CONSTRUCTION OF HELL HOLE DAM. MEASURED AT FORESTHILL GAGEING STATION.

vicinity of the dam annually exceeded 1,000 cfs. Since the dam has been in operation, flow in excess of 1,000 cfs has passed the dam only twice: 1,900 cfs in 1967 and 1,500 cfs in 1970. In the lower river, occurrence of flow greater than 2,000 cfs has been reduced 50%. Critically associated with reductions in high flow has been the increase in sediment and debris in the river and land slides along the river, all resulting from the dam failure in 1964. Both quantity and quality of trout habitat have been reduced as a result.

Temperatures in the river have also been altered by water developments. Release of cold water from the lower depths of Hell Hole Reservoir have decreased peak summer water temperatures in the Rubicon River below Hell Hole from 75°F to 48°F. Peak water temperatures at Ellicott Bridge have been reduced from 75°F to 65°F; however, peak water temperatures in the lower river may still reach 80°F.

Construction of Ralston Afterbay Reservoir below Ralston Powerhouse may also have had an adverse affect on the lower Rubicon River fishery. The 45-acre afterbay appears to serve as a nongame fish nursery area allowing undesirable proliferation of nongame species in the lower river. Suckers, in particular, seem to be more abundant in the lower river now than they were before project construction.

The critical flow period of the year is late summer and fall when flow release from Hell Hole and accretion flow from tributary streams are at a minimum. Trout living space is at a minimum during this period, which apparently limits overall trout production.

When the release schedule for Hell Hole Reservoir was negotiated it was assumed that spring flow would be critical and that reduced spawning habitat would limit trout production. Therefore, the largest flow release is required

during the spring. However, observations of young-of-the-year trout made in 1975 indicate that natural recruitment is adequate and that the amount of accretion flow during the runoff period may be high enough to allow a 10 cfs reduction in the release from Hell Hole without jeopardizing recruitment. This would allow a commensurate 10 cfs increase in flow release during the late summer and fall potentially yielding an increase in trout living space and an overall increase in trout production. The revised release schedule suggested in Table 2, for example, could increase summer flows at Ellicott Bridge from 20 cfs to 32 cfs, during normal years, and from 15 cfs to 20 cfs during dry years.

Recommendations. The flow release schedule changes proposed in Table 2 should be implemented and evaluated by Region 2 personnel using the transect evaluations listed in the Fishery Management Section. The Department should work with Placer County Water Agency and all other interested agencies to initiate the evaluation. If it is determined that a change in the flow release schedule would benefit the fishery, new flow release terms should be negotiated pursuant to Article 37 of the Federal Power Commission License for Project 2079 (the Placer County Water Agency Middle Fork Project). A provision of the article allows for renegotiation of the release schedule provided that the total amount does not change.

For flow release agreements to be effective in maintaining a quality fishery, they must be upheld. Water release requirements below Gerle Diversion, Robbs Tunnel Diversion, South and North Long Canyon Diversions, and Pilot Creek Diversion, as well as below Hell Hole Dam must be routinely monitored by Region 2. Monthly printout sheets of current flow should be routinely obtained

from the U. S. Geological Survey. Inasmuch as flow releases below Hell Hole Dam have been less than those stipulated in the agreement[7/], it is imperative that a monitoring program be established immediately.

Future Water Development

In a report issued by Pacific Gas and Electric Company presenting alternatives to the Helms Creek Project, one site on the lower Rubicon River was identified which could become feasible if the value of hydroelectric power continues to increase. The project would involve a dam on the Rubicon River 1.7 miles downstream from the confluence of Big Grizzly Canyon Creek. The impoundment, Rubicon Reservoir, would inundate about 3 miles of the Rubicon River encompassing 230 acres. A second reservoir, Pilot Creek Reservoir, would be constructed on Pilot Creek about 3.5 miles upstream from the Rubicon River. This impoundment would inundate about 1.5 miles of stream with a 150-acre reservoir.

A tunnel would connect the two reservoirs and a powerhouse would be located at the down slope terminous of the conduit. During peak power demand periods, stored water would be released from Pilot Creek Reservoir into Rubicon Reservoir. During off peak demand periods, water in Rubicon Reservoir would be pumped back into Pilot Creek Reservoir.

Rubicon Reservoir would destroy the fishery for about 7.5 miles below the reservoir if adequate water releases were not made for downstream fishery maintenance. Pilot Creek Reservoir would destroy a good brown trout fishery for 3.5 miles below the reservoir if adequate stream flow releases were not

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[7/] U.S.G.S. records indicate that periods of violation occurred each year between 1966 and 1976.

made. Construction and associated access roads into the steep canyon could trigger additional landslides with consequent reservoir turbidity and downstream siltation problems. The pump-back of warmer Rubicon River water into cold Pilot Creek (cold water is presently released from the depths of Lake Edson) will probably increase temperatures in Pilot Creek. Nongame fish proliferation cuased by these projects are additional threats.

Recommendations. The projects as described above, should be opposed by the Department.

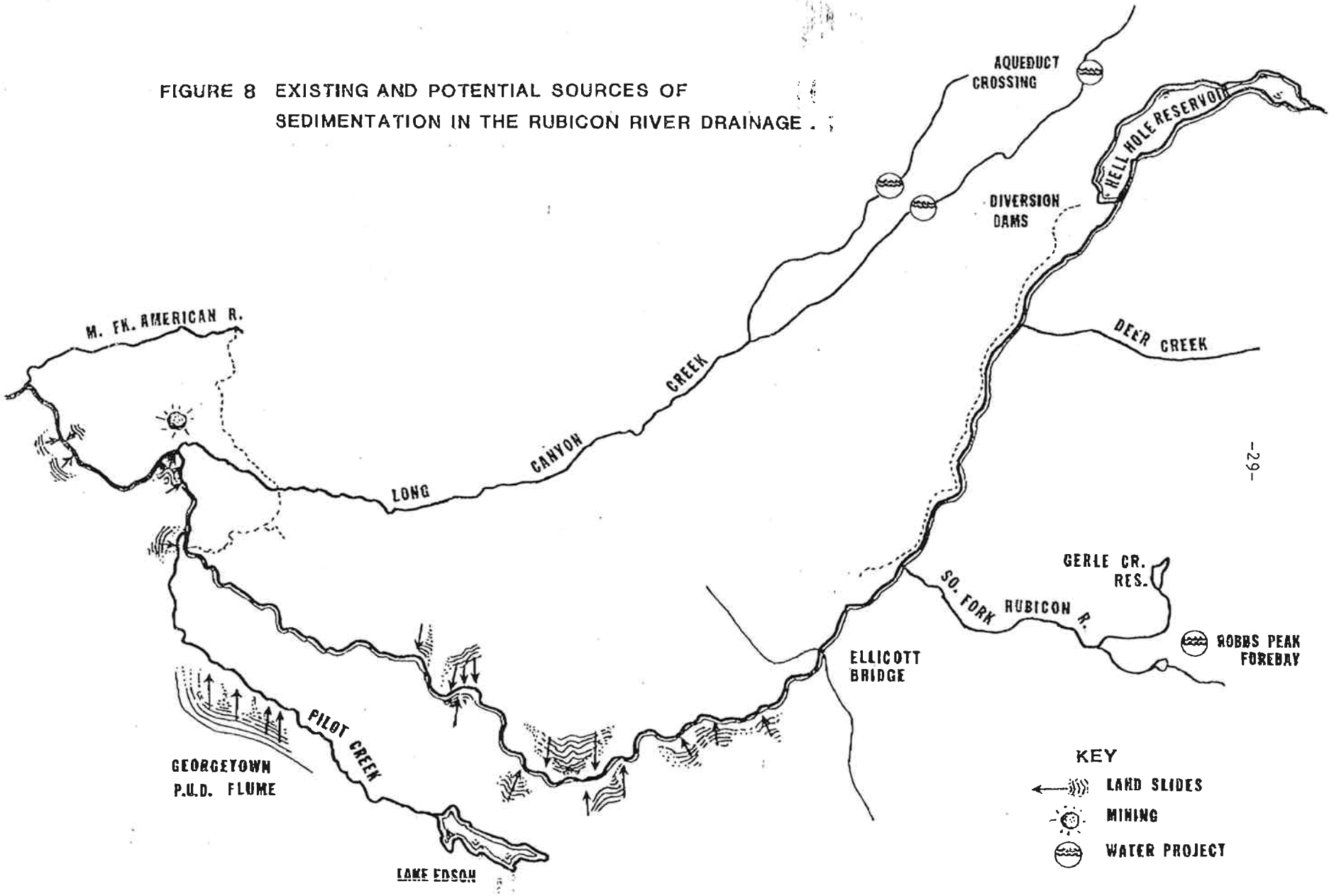
Sedimentation from Water Development Operations

Operation of the various water development facilities within the Rubicon River drainage chronically adds to sedimentation of the river and its tributaries (Figure 8). Slides and washouts along the Georgetown Public Utility District's flume have deposited thousands of cubic feet of sediment into Pilot Creek Canyon. High flows have moved much material downstream into the Rubicon River. The district is gradually replacing sections of open ditch with pipe or Gunite lining, and is also terracing and grass seeding in an attempt to stablize fills and slipouts. Sediment removal each fall from the Robbs Peak Diversion, operated by SMUD on the South Fork Rubicon River results in turbid water and silt deposition in the South Fork.

Removal of the sediment from PLACWA diversion dams on both South and North Long Canyon creeks, could be damaging if the flow were not bypassed around the excavation operations. Periodic flushing of debris from the tunnel which carries water from Hell Hole Reservoir to the Middle Fork American River could result in sedimentation of Long Canyon Creek.

Recommendations. Georgetown Public Utility District should emphasize soil stabilization and erosion control along their Pilot Creek flume. SMUD

FIGURE 8 EXISTING AND POTENTIAL SOURCES OF SEDIMENTATION IN THE RUBICON RIVER DRAINAGE .



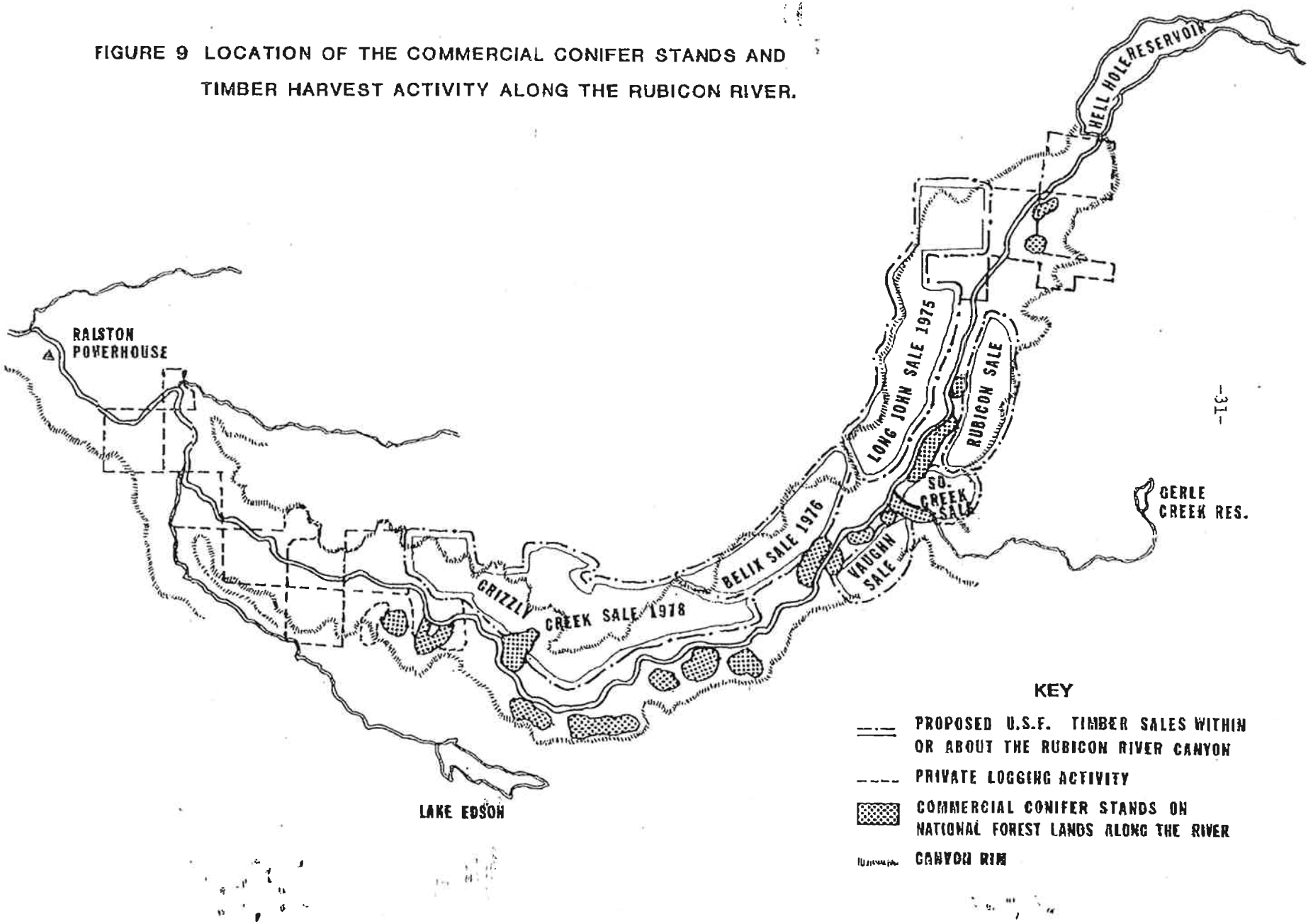
should develop means of eliminating sedimentation of downstream areas during sediment removal operations in Robbs Peak Forebay. Diverting flow around the areas of excavation may be a solution. PLACWA also should develop means of preventing sedimentation areas downstream from their Long Canyon diversions. Again, diverting the flow around excavation areas may be the answer. Also, PLACWA tunnel cleaning operations should be closely monitored by the Department in an attempt to prevent deposition of material into Long Canyon Creek.

Timber Management

Timber harvesting activity has been extensive in the Rubicon River watershed, downstream from Hell Hole Reservoir. Sedimentation has been relatively minor except in the Pilot Creek drainage where substantial turbidity and sedimentation has occurred. Most logged areas have been on gentle sloping terrain within tributary drainages, which may account for the relative lack of sedimentation. Now that much of the merchantable timber has been removed from the more operable sites, increased logging of steeper terrain may be expected with probable increases in sedimentation.

In the current El Dorado National Forest 5-year plan (1975-1980), six timber sales are proposed along the Rubicon River Canyon (Figure 9). The Rubicon sale could have the severest impact of the six sales since much of this sale area possesses a mantle of highly erodible decomposed granite soils. No sales in the 5-year plan have been proposed within the Rubicon Gorge, nor within the half-mile wide water influence zone between Ellicott Bridge and Hell Hole Dam. However, a salvage operation in this corridor which will involve helicopter yarding, is being advertised for sale (1978).

FIGURE 9 LOCATION OF THE COMMERCIAL CONIFER STANDS AND TIMBER HARVEST ACTIVITY ALONG THE RUBICON RIVER.



In 1971 the Georgetown Ranger District of the El Dorado National Forest prepared an interim management plan for the Rubicon River canyon downstream from Ellicott Bridge. The plan recommended that no additional roads nor vehicular trails be permitted in the canyon and that the roadless area be placed in the "unregulated cut" (no planned commercial timber harvest) component of the timber management plan. The management plan pointed out:

> "Coniferous timber is confined mainly to occasional benches and draws. This timber is generally young saw timber with some old growth very widely scattered throughout the unit. Logging in this unit would be impractical under current logging methods because of high road costs per unit of timber volume and high erosion potential."

Timber operations on private land below Ellicott Bridge will not be governed by the Forest Service's management plan but by the California Forest Practices Act. Inasmuch as the problems associated with logging on private land would be the same as on Forest Service land, logging of private lands should follow the same basic management recommendations made for Forest Service areas.

Recommendations. Timber management direction in the canyon area[8/] should follow the recommendations outlined in the Georgetown Ranger District's Plan (1971): maintain the area in the unregulated cut component, only to allow harvest of dead or dying trees and then only allow yarding by helicopter (or some other means of flying the logs free of the ground to yarding areas outside the canyon). Logging of private lands within this area should also follow the latter direction.

8/ From Oxbow Reservoir to Ellicott Bridge, extending approximately 3/8 mile on each side of the river, which corresponds roughly with the first break in the steep, precipitous side slopes.

Above Ellicott, logging within the water influence zone should also be restricted as described above. Logging above the zone should be conducted in such a manner which maintains the natural aesthetics of the canyon as viewed from the river and from both Hunters and South Fork trails.

Private Land Development

The El Dorado County General Plan recommends that the Rubicon River Canyon be used for purposes compatible with open space preservation. Current zoning, however, allows parcels as small as 10 acres within the canyon. Considerable parcel splitting has already occurred above the canyon rim but the El Dorado County Planning Department staff has informally indicated that approval of building permits within the canyon would be doubtful due to a lack of building sites and the difficulty in disposing of sewage. Nevertheless, there is nothing in the present zoning to prevent anyone from selling 10-acre parcels in the canyon to uncritical purchasers looking for inexpensive land. If private lands within the Rubicon River Canyon were sold as 10-acre parcels, there undoubtedly would be some buyers who would want road access to their parcel or to the river causing damage to canyon slopes.

Not all private lands within the Rubicon River canyon are steep and inaccessible. Private parcels located at Ellicott Bridge are readily accessible and possess gentle slopes. Future summer cabin development is a distinct possibility.

Recommendations. The Georgetown Ranger District preliminary management plan for the Rubicon Canyon recommends acquisition of private lands along the river. The U.S. Forest Service should pursue acquisition, if possible, following suggestions listed in Figure 10.

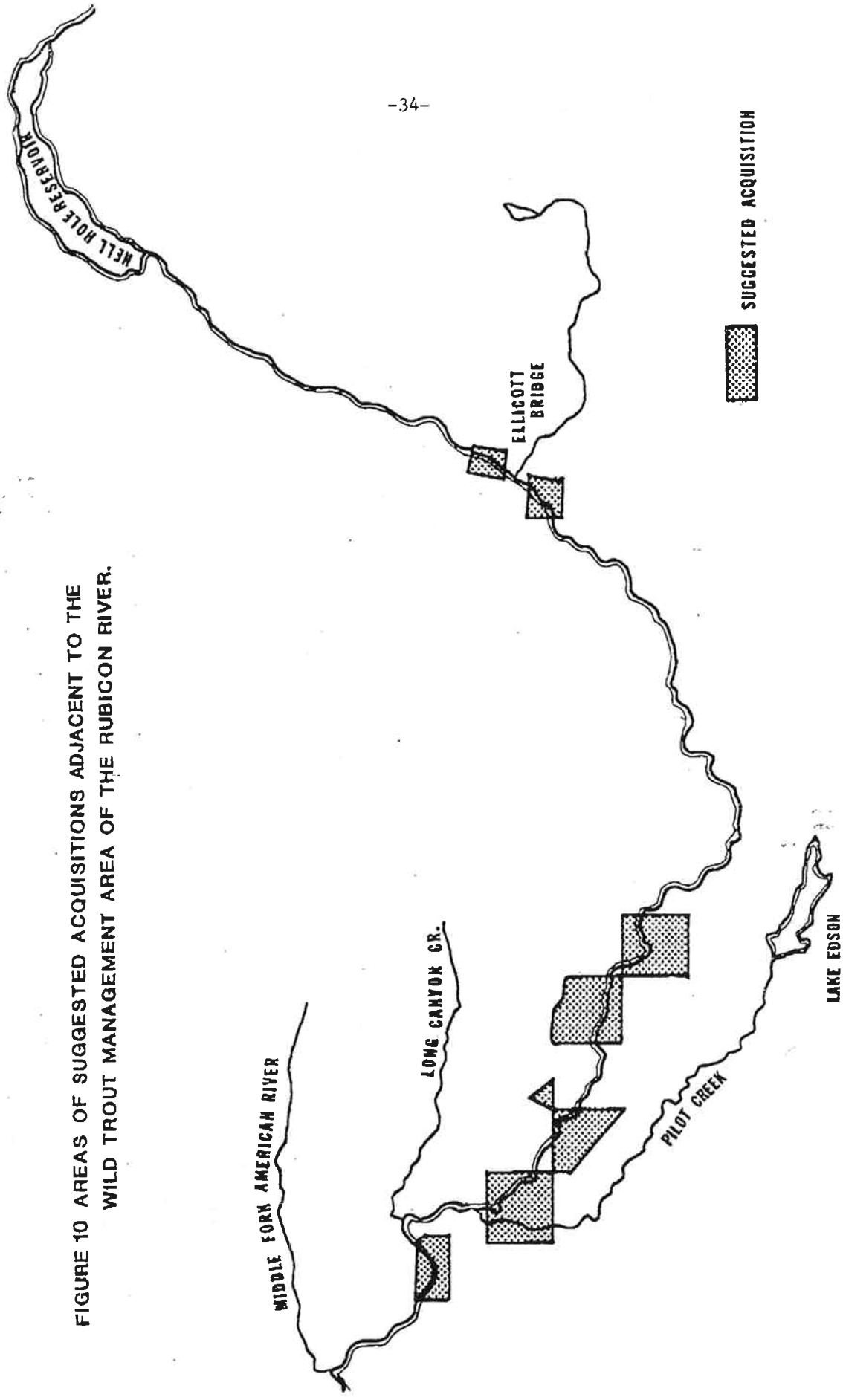


FIGURE 10 AREAS OF SUGGESTED ACQUISITIONS ADJACENT TO THE WILD TROUT MANAGEMENT AREA OF THE RUBICON RIVER.

The Department should request El Dorado County to increase the minimum parcel requirement in the Rubicon River Canyon to at least 160 acres in order to reduce the potential for additional roads and development.

Mining

Mining has been confined to the lower end of the gorge downstream from Pilot Creek where gold-bearing gravels exist. Five active unpatented placer claims exist between Pilot Creek and Buckeye Flat. The most active claim is a short distance downstream from Long Canyon Creek. Its operation has produced some turbidity and has resulted in the alteration of several hundred yards of river bank. A plywood shack situated on the river bank amidst piles of scrap detracts from the natural character of the river canyon.

Other placer claims on the river are operated by panning and suction dredges. Potential impact will depend on the type and size of equipment used to work the claims. Larger dredges often muddy the water, while all dredges represent, to some, a noisy mechanical intrusion into an otherwise quiet wilderness canyon. A 4-inch maximum size limit for suction dredges has been established by the Department on the Rubicon River.

Several lode claims have been filed on the canyon slopes, including a tungsten operation proposed for the Buckeye Flat Area. Several of the claims will involve mills. Mill wastes can be a serious source of pollution if not properly ponded. Roads built in conjunction with these mining operations could damage the steep canyon slopes. The appearance of the operation if not properly disguised could detract from the aesthetics of the area.

Discharge of milling wastes and silted water from mining operations can be controlled through waste discharge permits issued by the Regional Water Quality Control Board, Central Valley Region.

The Georgetown Ranger District Management Plan recommends that every effort be made to withdraw the canyon from mineral entry and that steps be taken to clear existing claims. There is no guarantee that the Bureau of Land Management, the agency responsible for adminstration of mineral entry, will withdraw these lands. Furthermore, withdrawal of the area will only preclude filing of mining claims but may or may not exclude recreational mining depending upon the language of the law and court interpretation. Also, existing claims would predate withdrawal thereby allowing continued operation of existing valid claims.

Recommendations. Mineral entry withdrawal in Rubicon Canyon should be pursued by the Forest Service. The Department should assist the Forest Service in this endeavor. Also, the Department should change suction dredge regulations to limit suction dredge operations to an area within 1/4 mile of existing road access and to existing valid claims. The 4-inch maximum size dredge limit should be retained. To assist the Regional Water Quality Control Board in protecting water quality, the Department should keep the Board staff informed of new mining activity.

Recreational Development

Recreation use on the Rubicon River consists primarily of fishing, camping, hiking, gold panning, and hunting. Judging from the fire rings scattered along the river, camping occurs throughout the canyon with the heaviest use at Buckeye Flat, Ellicott Bridge, and Hales Crossing. There are no sanitary or waste disposal facilities at any of these locations, thus human wastes and litter accumulations are becoming a problem. The U.S. Forest Service proposes to develop a minimum facility campground at Ellicott Bridge to control sanitary and litter problems there. No other facilities within the canyon are recommended except a primitive toilet at Hales Crossing.

Recommendations. Recreational development in the Rubicon River wild trout area should be limited to that proposed, above, by the Forest Service.

Road Development

That portion of the Rubicon gorge between Big Grizzly Canyon and Ellicott Bridge is now being informally managed as a roadless area. The downstream portion of the gorge has been excluded from consideration for roadless designation because of private inholdings. Permanent roadless area designation in the land use plan is recommended for the portion of the gorge identified in the roadless inventory. Acquisition of private inholdings in the canyon would allow the boundaries of the formal roadless area to be extended downstream to Buckeye Flat, thus providing additional protection for some of the best trout habitat and most sensitive canyon slopes within the wild trout area.

Recommendations. The integrity of the existing roadless area within Rubicon Canyon should be preserved. Establishment of a special management zone in which road construction is prohibited below the canyon rim, would satisfy this recommendation.

Vehicle Use

Only the Hunters and Buckeye Flat trails are designated for trail bike use in the El Dorado National Forest Off-road Vehicle Plan. Little impact on soils or vegetation has been observed along these trails; however, the noise generated by two-cycled machines is objectionable to some.

Recommendations. The Forest Service should continue to restrict vehicle travel to Hunters and Buckeye Flat trails.

MONITORING PROGRAM

A monitoring program should include periodic assessment of key qualities of the stream and its environment, and the monitoring of actions which can potentially affect the planning area. Monitoring of these two elements will allow the Department to remain informed of planning, regulating and permitting activities, and to the condition of the stream's environment and fishery.

The Department of Fish and Game should review, on an informational basis, relative plans and permits of local, federal, and other state agencies. This could be accomplished by informal understandings with each agency within already established frameworks. These review and contact arrangements will provide constant and immediate feedback to the agencies who have regulatory authority within the planning area. By working closely and repeatedly with the various agencies, the Department should be able to directly help these agencies interpret and apply the intent of the management plan through careful use of their planning and approval authorities. If initiated at the earliest stage of planning, allowing the Department time to comment prior to a decision being reached, the process will have its maximum beneficial effect. This process will also allow a continuing evaluation of the Management Plan and the extent to which it anticipates and recommends solutions for potential conflicts.

By providing for a flight surveillance, it would be possible for the Department to make general assessments of development activity, including mining, forestry, and road construction. Aerial photography can provide a historical record of those changes, constituting an irrefutable visual image of the past.

Monitoring of the fishery can be achieved following the program proposed in the Fishery Management Section of this plan.

Recommendations

Personnel of the Department of Fish and Game (Region 2) should remain in frequent communication with the USFS; Regional Water Quality Control Board, Central Valley Region; and other agencies that may be actively involved in the planning area.

Aerial surveillance of the drainage should be conducted on an annual basis and black and white aerial photographs be taken of the entire basin every 5 years, at a scale of about 1:15,000.

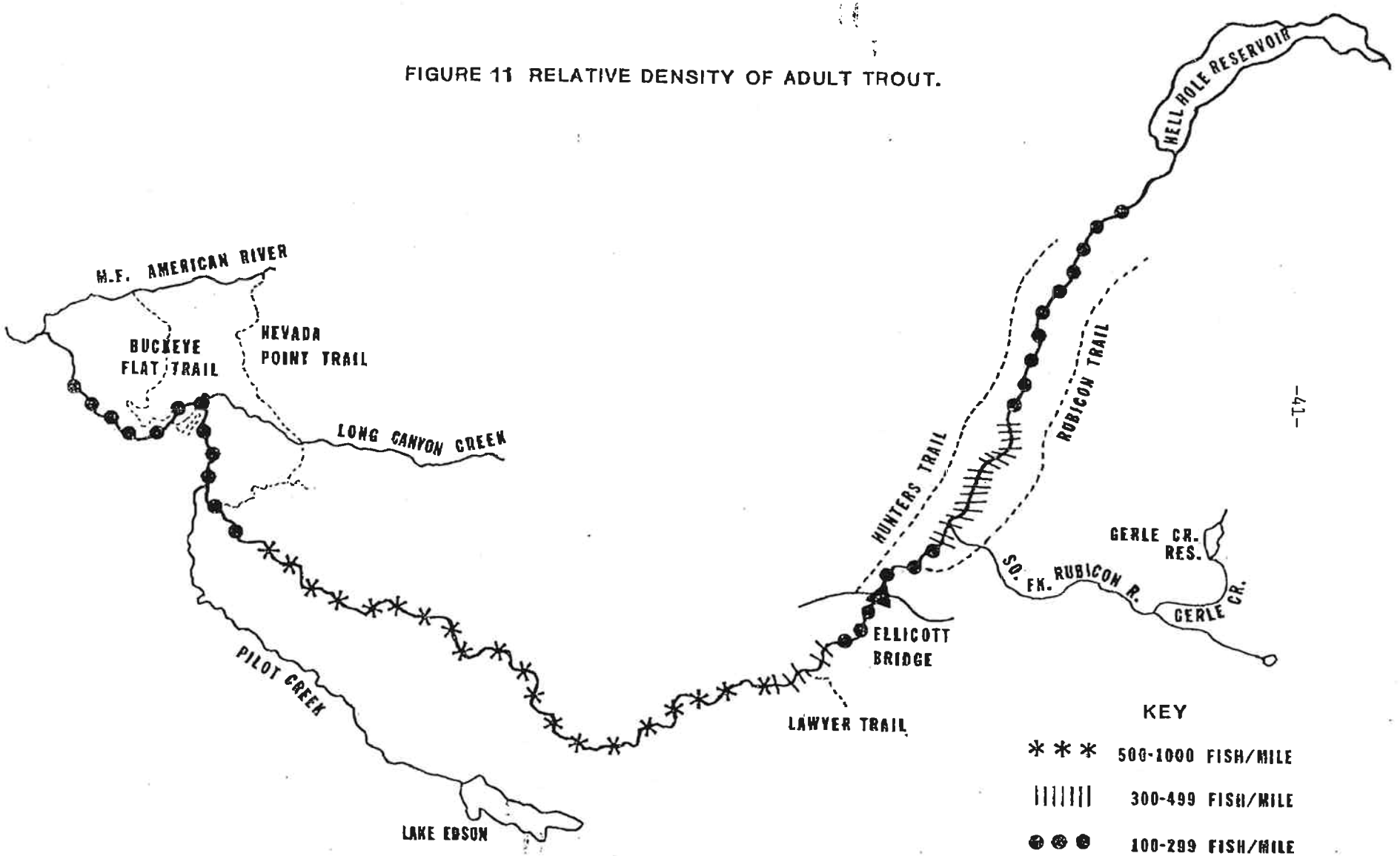
The fishery monitoring program discussed above be initiated in 1984 and repeated every 5 years thereafter.

PROGRAM IMPLEMENTATION SCHEDULE

Task	Department section responsible	Implementation date
A. Fishery Management		
1. Conduct fishery investigation.	Region 2	Initiate in 1978
2. Monitor fishery.	Region 2	Start in 1983, repeat every 5 years.
B. Mining		
1. Recommend change in suction dredge regulations to limit operation to areas within 1/4 mile of roadside reaches of the wild trout area.	Region 2	1979
C. Water Development		
1. Evaluate flow release schedule change proposal.	Region 2	Initiate 1979
D. Timber Management		
1. Work with Forest Service to establish special management unit on Forest Service lands within Rubicon Canyon.	Region 2	Immediately

Task	Department section responsible	Implementation date
E. Private Land Development		
1. Work with Placer County officials to change the zoning in the Rubicon Canyon.	Region 2	Immediately
F. Monitoring		
1. Aerial surveillance.	Region 2	Annually
2. Aerial photographs.	Region 2	Every 5 years beginning in 1979
3. Review all activities in the drainage and make recommendations, as needed, to satisfy the objectives of this plan.	Region 2	Continually

FIGURE 11 RELATIVE DENSITY OF ADULT TROUT.



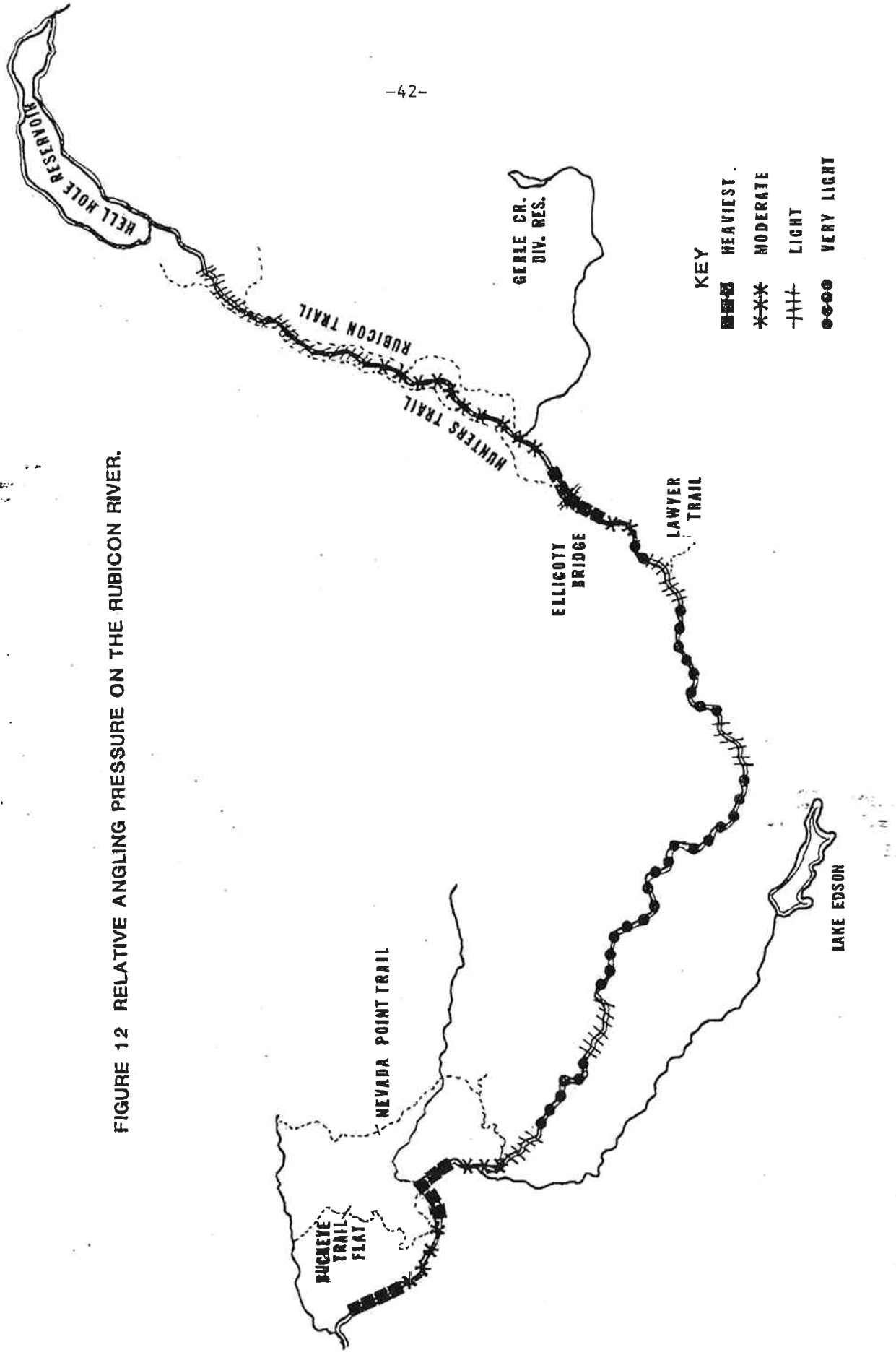


FIGURE 12 RELATIVE ANGLING PRESSURE ON THE RUBICON RIVER.

Table 6. Summary - 1978 Electrofishing Survey; Rubicon River - Hales Crossing

Section	Trout species	Sample				Estimate population				Est. Wt (lbs.)	
		Total		≥6"		300' Section		Per mile		300' Section	Per acre
		No.	%	No.	%	Total	≥6"	Total	>6"		
Hales Crossing (Upper)	RT	24	89	6	22	27±	8±	475	141	3.7	30
	BN	3	11	1	4	4±	1±	70	18	0.37	3
	Combined	27	100	7	26	31±	9±	545	159	4.1	33
Hales Crossing (Lower)	RT	132	95	15	11	183±	25±	3221	440	7.7	41
	BN	7	5	1	1	(10)	(3)	(176)	(53)	1.3	7
	Combined	139	100	16	12	193±	28±	3397	493	9.0	48

APPENDIX 1. Population Estimates for Trout Greater Than 6 Inches Long.

Stream section	Stream miles	Estimated trout/mile	Estimated trout pop.
Hell Hole Dam to Parsley Bar	1.0	50	50
Parsley Bar to Hales Crossing	6.0	200	1,200
Hales Crossing to Ellicott Bridge area	3.5	500	2,000
Ellicott Bridge area	1.0	300	300
Ellicott Bridge area to Pilot Creek	15.5	900	13,950
Pilot Creek to Ralston Powerhouse	3.0	200	600
Total	30.0		18,100

APPENDIX 2. Comparison of Rainbow Trout Growth in the Rubicon River and Other California Rainbow Trout Streams.

Stream	Age groups[1/] 0	I+	II+	III	IV+
Hat Creek	5.3	10.2	13.2	17.0	19.3
Pilot Creek		7.4	11.8	14.3	15.9
McCloud River		6.5	8.5	12.0	13.0
M. F. Feather River	2.5	7.0	9.0	11.0	
N. F. San Joaquin River	3.6	6.8	8.9		
N. F. Yuba River			8.0	9.0	
Clavey River		5.5	7.5	9.0	9.5
S. F. Kings River		6.8	8.0	9.0	
Yellow Creek	2.5	5.7	7.0	9.0	
Rubicon River	2.5	5.5	7.5	8.5	11.0
East Carson River	4.5	6.0	7.0	8.5	9.0
N. F. American River	2.5	5.5	7.0	8.0	9.0
Nelson Creek	2.2	5.5	6.5	8.0	
Sagehen Creek	1.8	4.4	6.2	7.8	9.3
N. Shirttail Creek	3.8	4.7	5.7	7.3	8.4
S. F. Mokelumne River	2.7	4.4	5.7	7.0	
N. Stanislaus River (above Little Rattlesnake Creek)	2.5	3.8	5.8	7.0	
Tiger Creek	2.5	3.8	5.8	7.0	

[1/] Trout measured to fork length in inches.

APPENDIX 3. Length Frequency of Rubicon River Trout Collected 1974-1975.

		Collected by electrofishing at Ellicott Bridge		Rainbow trout collected by angling		
Age	Inches fork length	No. of rainbows	No. of browns	Ellicott Bridge	Hunters trail[1]	Gorge
0	1.0 - 1.9	3	0	0	0	0
	2.0 - 2.9	27	7	0	0	0
I	3.0 - 3.9	38	15	0	0	0
	4.0 - 4.9	21	7	5	0	3
II	5.0 - 5.9	28	0	9	0	9
	6.0 - 6.9	6	2	8	25	5
III	7.0 - 7.9	3	0	5	38	2
	8.0 - 8.9	1	1	10	25	10
IV	9.0 - 9.9	1	1	1	15	3
	10.0 - 10.9	0	0	2	3	3
V	11.0 - 11.9	0	1	0	2	3
	12.0 - 12.9	0	1	0	1	1
VI	13.0 - 13.9	0	0	0	0	0
	14.0 - 14.9	0	0	0	0	0
	15.0 - 15.9	0	0	0	0	1
	16.0 - 16.9	0	1	0	1	0
Totals		128	36	40	110	40

[1] Trout tagged with reward tags.