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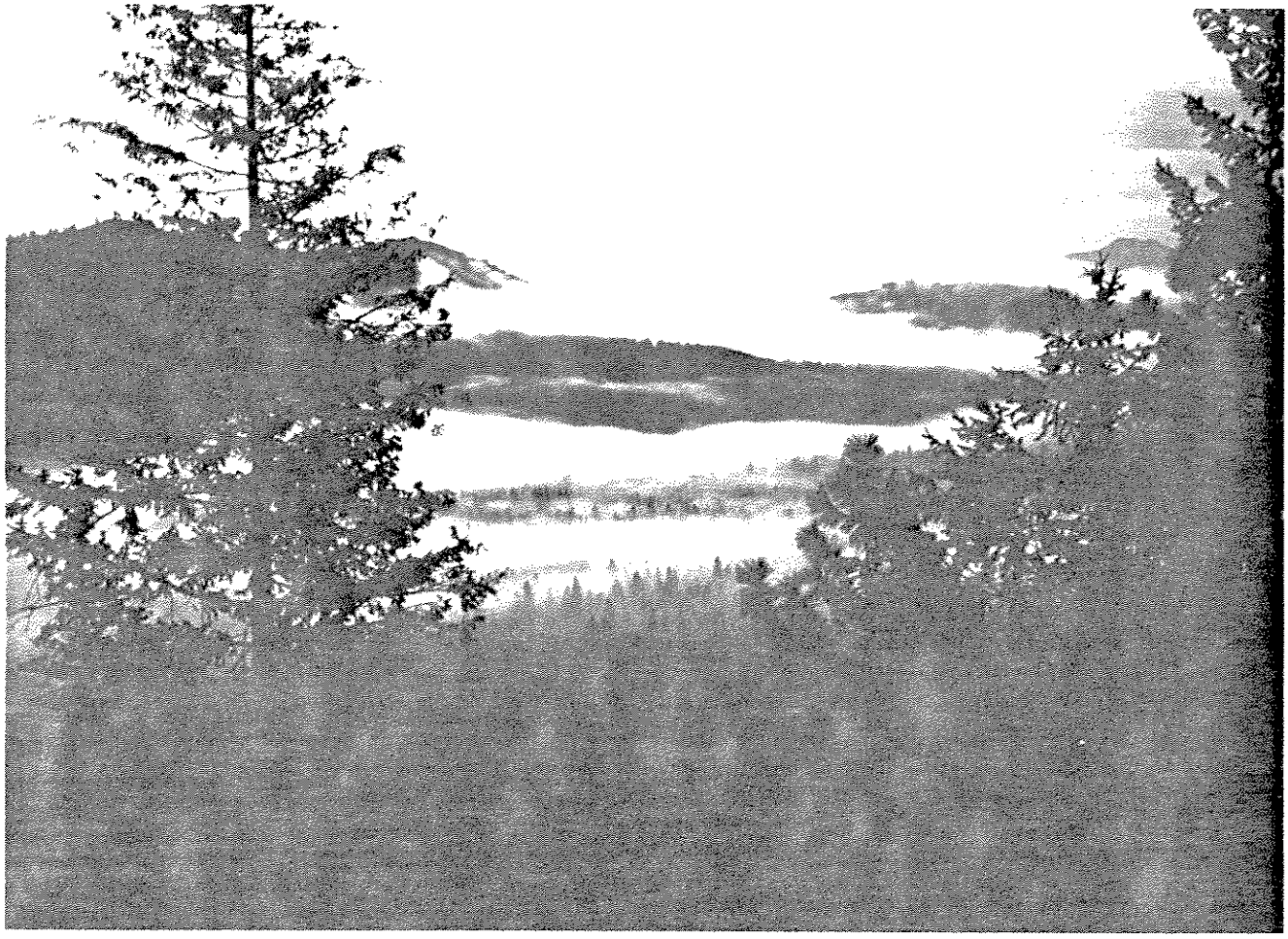
State of California
The Resources Agency
Department of Water Resources
Northern District

SCOTT RIVER FLOW AUGMENTATION STUDY



Douglas P. Wheeler	Pete Wilson	David N. Kennedy
Secretary for Resources	Governor	Director
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October 1991

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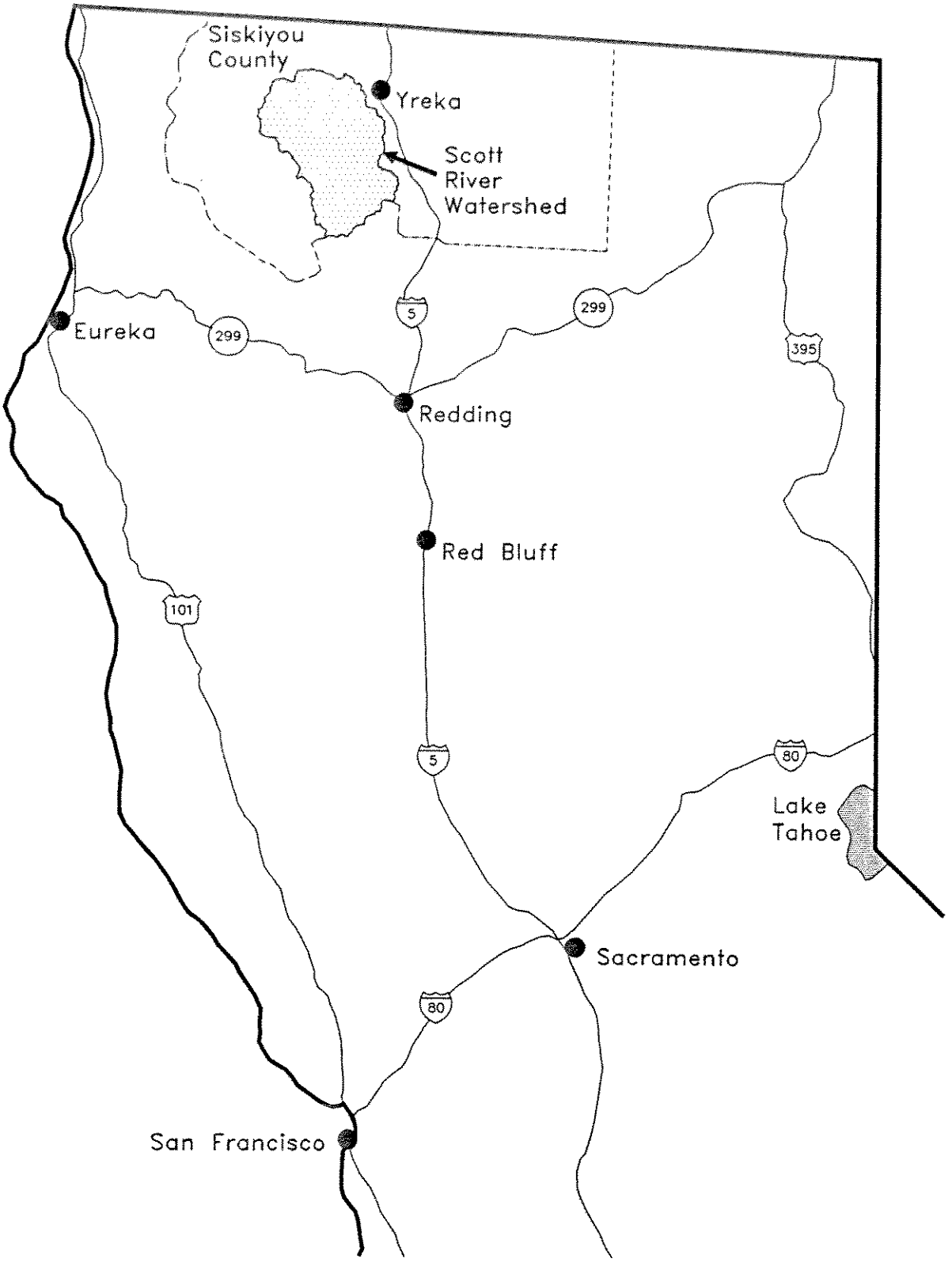
Regional Map



FOREWORD

The Scott River watershed is beautiful and diverse. Expansive green fields, timber-covered mountains, and the rugged majesty of the wilderness combine to make this area truly one of the State's most beautiful areas. Fish runs in the Scott River represent a significant portion of the Klamath River's anadromous fish resources. Regrettably, these resources have declined dramatically over the last half century due to many factors, some of which are correctable.

This study was cooperatively funded under the authority of the Klamath River Basin Fishery Resources Restoration Act. Funds were made available through the U. S. Department of Interior, U. S. Fish and Wildlife Service, Klamath River Basin Fisheries Task Force (KRBFTF) and the State of California, Department of Water Resources (DWR). KRBFTF requested that DWR investigate the potential for augmenting streamflows in the upper Scott River. The cooperative agreement is included in Appendix F.

This study is a cursory level investigation of various potential methods for augmenting fishery flows in the Scott River. It addresses several flow augmentation measures and presents an action plan for augmenting flows. We feel this plan contains the elements necessary to improve the Scott River's capability of supporting a larger fishery. Findings and recommendations are presented for task force consideration.

The goal is that this investigation will provide the initial information needed to undertake the restoration of the Scott River anadromous fishery. Based on the findings, there is a promising potential to restore the fishery of this great river.

Dennis Letl, Chief
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ABSTRACT

The anadromous fish resources of the Scott River have declined dramatically over the years. The major factors in this decline have been the degradation of habitat due to the diversion of water from the river and the influx of sediment into the stream channels. The main focus of this study is to assess alternatives for increasing streamflows for the fishery. The Scott River adjudication does not allot water for streamflows to maintain the fish habitat in the valley portion of the river. Consequently, during July through October, there is very little streamflow available for the fishery. Each year hundreds of thousands of salmonid fry are rescued from receding flows in streams in the Scott Valley.

There are several potential methods for increasing fishery flows in the Scott River, however all are expensive or difficult to implement. These methods are grouped into three categories: water conservation, water transfers, and water development. Water conservation is possible by lining irrigation ditches and increasing irrigation system efficiency. Because of the terrain and soil conditions, concrete is the most appropriate lining material for the Scott Valley. There are three major ditches that divert water from the Scott River. Lining these ditches would cost millions of dollars, and not provide a substantial amount of water to the river. Within the Scott Valley there are approximately 10,000 acres of flood irrigated land. Theoretically, if farming operations could be converted to sprinkler irrigation, water demands for the valley could be reduced by approximately 60 cfs. However, this reduction doesn't necessarily convert to streamflow. During the time when additional streamflow is needed, irrigation demands exceed the surface flow sources. Ground water extraction will likely show a reduction, but surface flow diversion will not.

Water transfers could provide additional streamflows for the Scott River. Purchasing water rights and pumping ground water

are methods that could work in the Scott Valley. At present, there is limited interest in the valley for selling water rights, as only one owner has expressed an interest. If this water was left in the river it would substantially increase the surface flow of the upper Scott River during critical periods.

Pumping ground water to augment the streamflows of the Scott River could work if the instream flow needs are not too great. Additional study is required to determine the impacts on the surrounding ground water levels, but this may be a viable alternative.

The development of water storage projects has good potential for augmenting the streamflows of the Scott River. Constructing reservoirs on the tributaries and enlarging the high-altitude lakes in the watershed are methods that we investigated. There are two potential reservoir sites in the upper Scott Valley, each of which could provide as much as 20,000 acre-feet of water annually for streamflow augmentation. Initial observations indicate that two of these sites would have minor adverse impacts on the existing fishery, but could provide augmented flows to the downstream fishery. Each of these reservoirs would cost between $20,000,000 and $30,000,000.

Enlarging the high-altitude lakes of the watershed could produce an additional 3,500 acre-feet of water annually for the Scott River. However, two-thirds of these lakes lie in wilderness areas, which would make further development very difficult. Enlarging these lakes may also disturb their natural aesthetic value.

Several issues could impact the feasibility of the various streamflow augmentation methods. The interaction between ground water and surface flows needs to be investigated thoroughly as a part of any feasibility level study. In addition, the feasibility of water transfers, conservation, or development will have to consider the impacts on the surrounding ground water.

Preliminary data indicate that streamflow losses in the Scott River due to seepage are not a major concern.

Current water temperatures are too warm in portions of the Scott River during the summer. Resultant water temperatures from augmented flows should be investigated to determine if they would be acceptable.

The instream flow needs of the Scott River should be more accurately defined. The feasibility of all the flow augmenting methods discussed in this report are dependent in part on how much water is needed and when it is needed. An instream flow needs study should also include a temperature model to evaluate the temperature needs of the fishery. Such a study would cost approximately $420,000 and take two years to complete.

Watermaster service is not presently provided for most of the Scott Valley. Some parties have voiced support for watermaster service. However, the Scott River adjudication did not provide for minimum streamflows for the fishery in the valley portion of the Scott River. Therefore, a watermaster's ability to help the fishery is limited.

The U. S. Forest Service (USFS) has water rights for instream use for fish and wildlife within the Klamath National Forest. Typically, it does not receive the full allotment, because the terms of the Scott River adjudication give most of the entire Scott Valley priority over the USFS land. Consequently, the USFS may not receive what it needs, but most of the time it receives what it's entitled to.

DWR was also asked to investigate the possibility of rearing fish in some of the larger irrigation ditches in the Scott Valley. With one exception, it is not possible to operate a rearing program in these ditches. The Farmers Ditch could be used to rear fish, but it would take a considerable amount of effort and coordination.

Some additional measures will be needed to restore the habitat of the Scott River. Stream channel alterations would bring immediate and lasting improvement to the quality of habitat in portions of the Scott River. The upper Scott River above Fay Lane could especially benefit from some channel alterations. Here, the river is free from the sediment problems that plague most of the rest of the river. Erosion and sediment control measures would also bring improved conditions to the river. Watershed restoration by re-establishing and protecting ground cover on bare areas is the long term answer to controlling erosion. In the meantime, some sediment control measures would help. Construction of sediment collection pools at the mouth of tributaries and in the river can trap much of this sediment.

A watershed restoration plan addressing all of the issues that impact the fishery would facilitate the recovery of the Scott River anadromous fishery.

A flow augmentation plan should be developed to facilitate the acquisition of streamflows for the fishery. This plan would give structure and continuity to the efforts put forth. There is data that should be collected and information produced to define the needs of the whole watershed as well as the fishery.

Augmenting the flow of the Scott River is quite possible; however, there are no inexpensive or simple solutions. It will require commitment and leadership by a number of interests in order to bring about the successful restoration of the Scott River andromous fish resources.

CHAPTER I. FINDINGS AND RECOMMENDATIONS

The following findings and recommendations are presented for the information and consideration of those concerned with planning and implementing the restoration of the Scott River anadromous fishery.

1. Opportunities are available to augment streamflows in the Scott River during periods of inadequate fishery flows. The methods identified in this report should help in developing an action plan to meet the needs of the fishery.

2. The water right owned by Art Butts should be purchased or leased. Mr. Butts is agreeable to this. He is the only water right holder we found at this time that is willing to sell his water right. This would provide an additional 3.7 cfs, now being lost as seepage, to the surface flow of the river above Fay Lane.

3. It is possible to increase flows in the Scott River by lining a portion of the Scott Valley Irrigation District (SVID) ditch, but it would not be cost effective. Because of the limited water supply, lining other large ditches on the Scott River would not produce a significant amount of additional water.

4. Increasing irrigation efficiency in the Scott Valley would have only a limited impact on the summer flows of the Scott River. Therefore, it should not be considered as a sole alternative.

5. Pumping ground water to augment streamflows has potential, provided that it would not result in an unacceptable lowering of the ground water table or result in injury to present water right holders. Further investigation of the relationship between ground water and surface water is required before pursuing this as an alternative.

6. At the present time, the combination of water conservation and water transfers will not likely produce enough water to meet the needs of the Scott River fishery during the late summer and fall months. Water conservation, while being a logical and responsible endeavor, will fail to produce a concentrated source of water for the fishery. Until water transfers can be proven successful and more interest is developed among the water right holders, this alternative has limited capability.

7. There are two potential reservoir sites in the East Fork Scott River watershed. A sufficient water supply is available during normal winter months to fill a reservoir of 20,000 acre-feet. These would be costly alternatives. Cursory estimates indicate the cost to be in the $20 - $30 million range.

8. An instream flow needs study should be conducted to determine the flow needs of the Scott River fishery and to determine the practicality of the various flow augmentation methods. Such a study would cost $420,000 and should include a water temperature evaluation.

9. It is not feasible to rear salmonids in either the Butts or SVID ditches. The Farmers ditch could be used for rearing salmonids, if fishery experts conclude that potential production is worth the effort and an agreement can be reached with the owners.

10. Preliminary observations indicate that streamflow losses in the Scott River due to seepage are not of major concern. However, the relationship between ground water and surface water flows within the Scott Valley should be further investigated as part of a feasibility level study for any of the alternative flow augmentation methods.

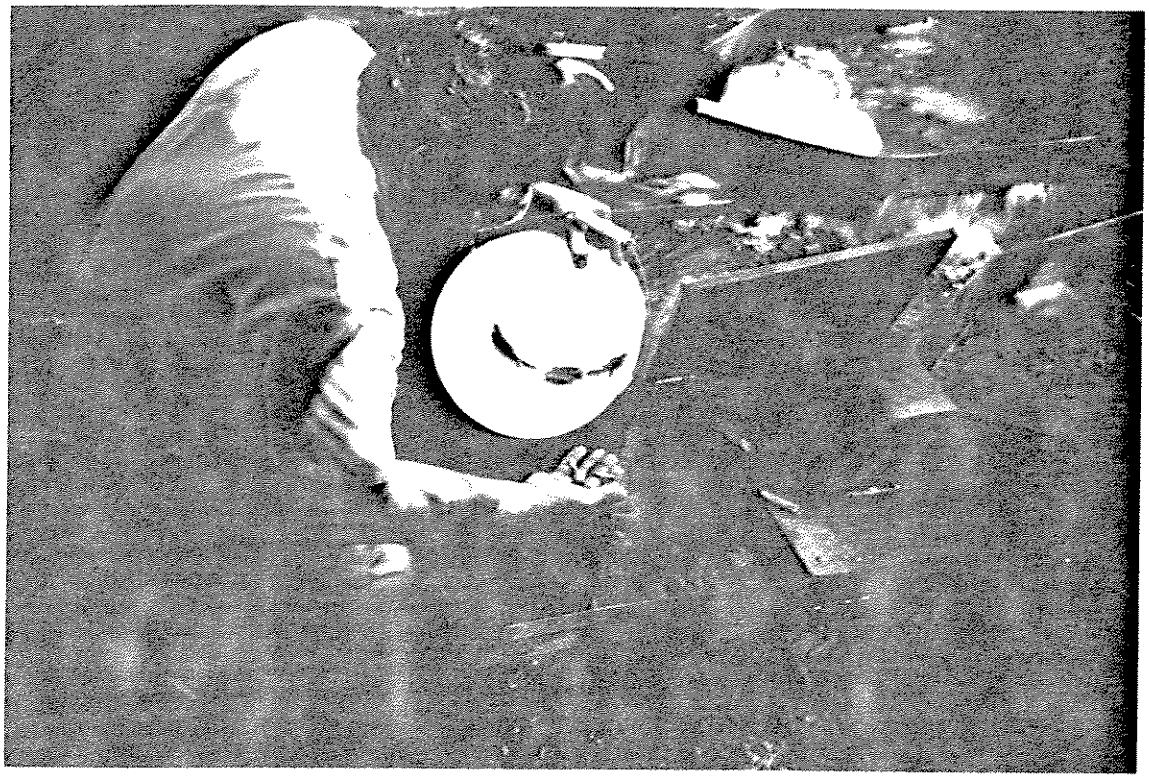
11. Additional surface water gaging stations need to be established on the East Fork, the South Fork, and the main stem of the Scott River. These are required to document existing conditions, to correlate fish populations, and to assist in defining the instream flow needs.

12. Implementing the Action Plan presented in this report will help achieve restoration of the fishery of the Scott River. The items listed in the Action Plan will lead to a logical and progressive approach to the restoration of the fishery.

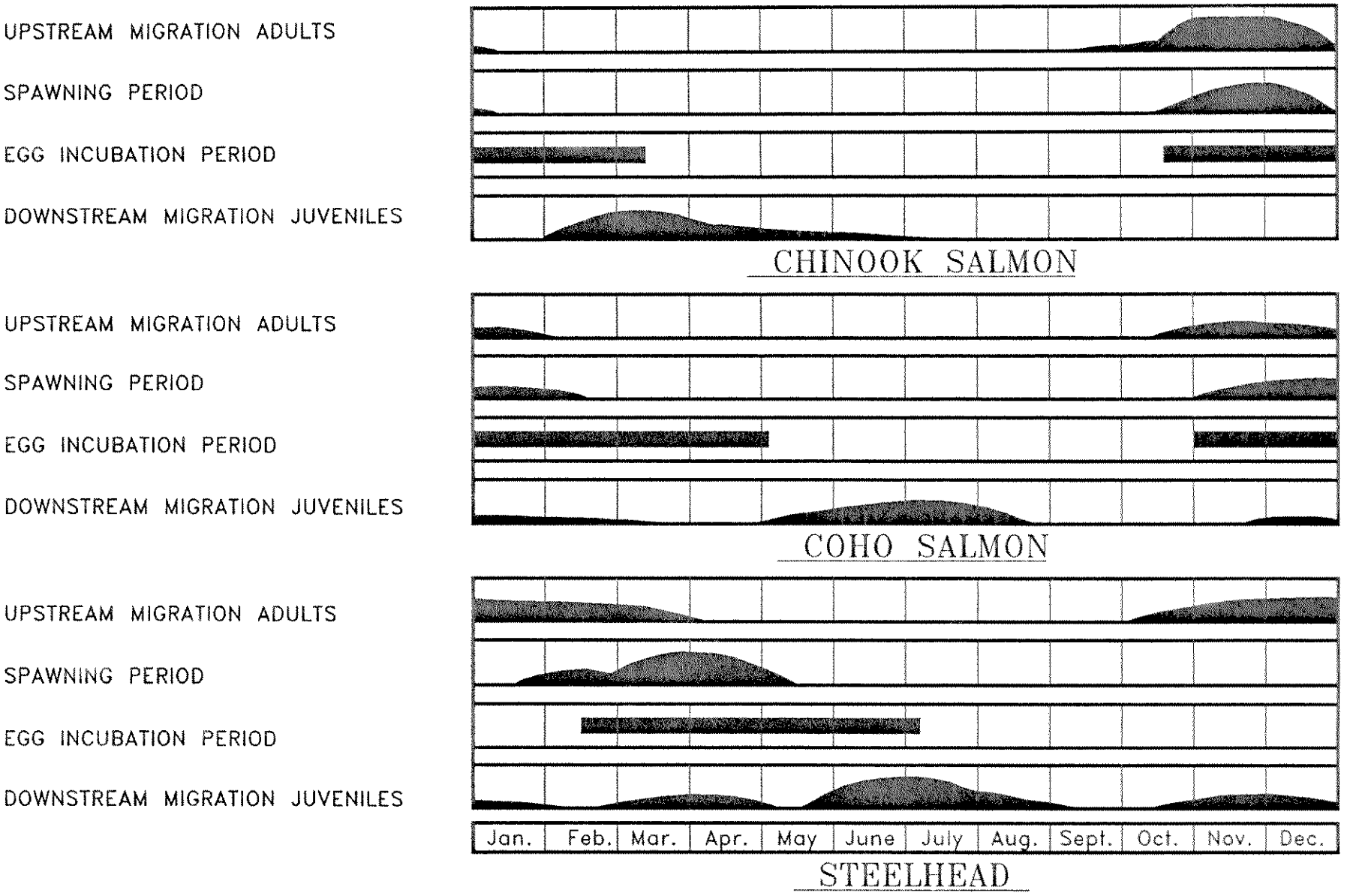
13. The Department of Fish and Game (DFG) should request the State Water Resources Control Board (SWRCB) to review the conditions and stipulations of the Scott River adjudication with individual water right holders in the Scott Valley. This would help eliminate inadvertent or deliberate violations of the terms of the adjudication.

CHAPTER II. INTRODUCTION

The Scott River contains a significant portion of the Klamath River anadromous fishery habitat. Fall-run and spring-run chinook salmon use the Scott River as spawning grounds in the Fall and early Winter. Coho salmon spawn in the upper Scott River and a few of its larger tributaries in the Fall and Winter. Coho juveniles also rear in these tributaries and the river for a year prior to migrating to the ocean. Steelhead rainbow trout spawn in Fall, Winter, and Spring. They rear in the Scott River and many tributaries throughout the year (DFG March 1974, June 1980). See Figure 1 for additional salmonid life history for the Scott River.

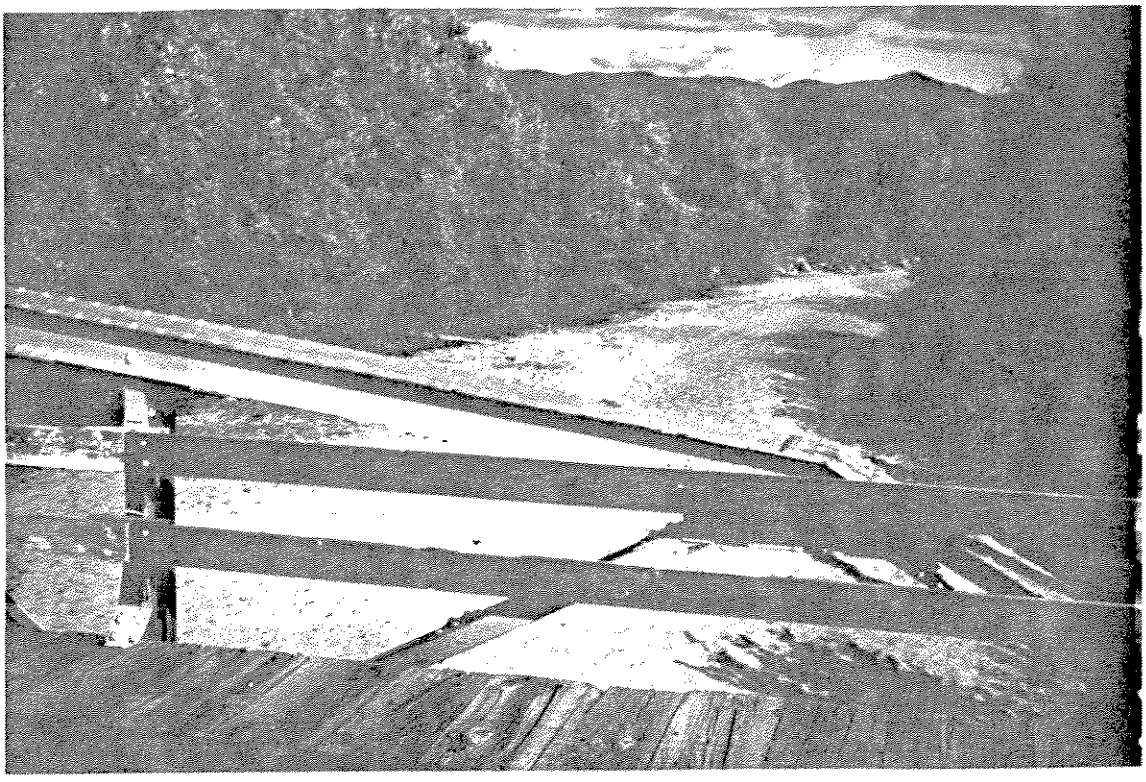


Hundreds of thousands of salmonid fry are rescued each year from streams in the Scott Valley.



SPAWNING, EGG INCUBATION, AND MIGRATION PERIODS
OF ANADROMOUS FISH FOR THE SCOTT RIVER

Figure 1



Low flows and sediment are major problems for the Scott River in the Scott Valley.

The anadromous fish resources of the Scott River have declined dramatically over the years due to the effects of human activities on the fishery and habitat. Because of this decline, in 1986 the Klamath River Basin Fishery Resources Restoration Act (16 U.S.C. 460 ss-ss6) was enacted. A copy of the act is included in Appendix E. This Act created the Klamath River Basin Conservation Area Restoration Program, a 20-year program to restore the anadromous fish populations of the Conservation Area. The KRBFTF was established to manage the restoration efforts of the program.

One factor in the decline of the fishery resources has been the degradation of habitat due to the diversion of water from the stream channels. Late summer and early fall streamflows in the valley are essentially all diverted under water rights defined by court decrees and adjudications. DFG rescues hundreds of thousands of salmonid fry from receding streams during periods of diversion. Portions of the main stem of the Scott River become dry and instream water temperatures become excessively high in flowing sections. Inadequate flows normally occur during the months of July through October. Another factor has been influx of sediment from upslope erosion. This sediment covers the normal productive substrate in the stream channel.

Cattle ranching, agriculture, and timber production comprise most of the economic base of the Scott Valley. These activities have accelerated erosion in the watershed and changed the natural runoff patterns of the river.

The objectives of this investigation were to identify possible methods for increasing flows in the Scott Valley portion of the Scott River and to determine if an instream flow needs study is justified. Seven specific tasks were identified to be completed.

First, develop a hydrology base for the Scott Valley reach of the river to identify the location, magnitude, and frequency of low-flow conditions.

Second, review past work on tributary stream water storage projects to determine if a reservoir is a feasible means of augmenting instream fishery flows.

Third, investigate the potential for purchasing private water rights from willing sellers to augment flows.

Fourth, determine the potential for implementing agricultural water conservation measures in Scott Valley to make more water available for instream uses.

Fifth, study the potential for lining irrigation ditches to reduce the demand for diversions from the river.

Sixth, investigate the possibility of using some reaches of larger irrigation ditches for rearing the fish rescued from low water conditions in the river.

Seventh, evaluate the cumulative potential of the above methods for augmenting flow in the river to determine if an instream flow needs study is justified. Such a study would have little value unless there is some assurance that instream flows could be increased.

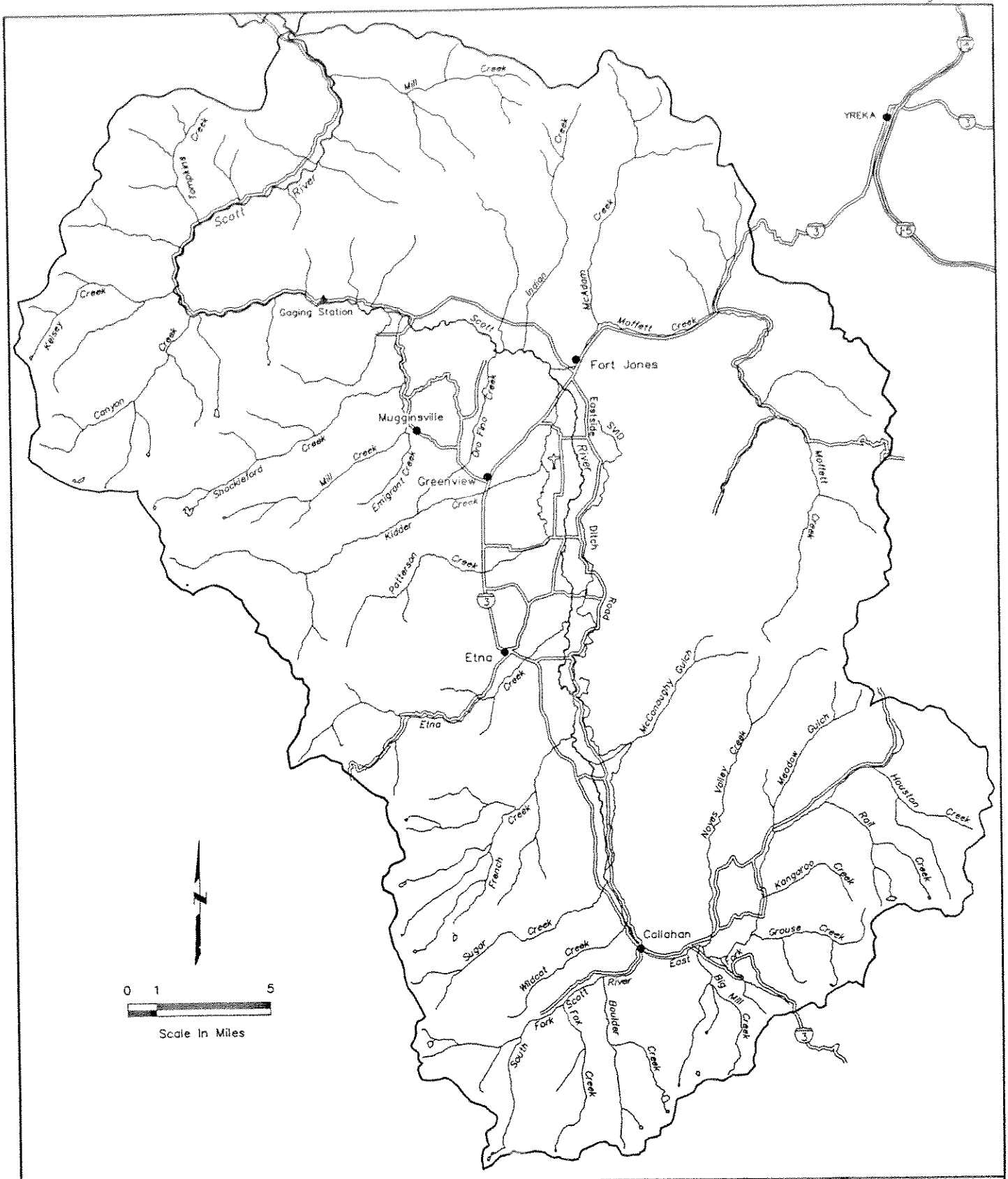
CHAPTER III. DESCRIPTION OF STUDY AREA

The Scott River watershed is located approximately twenty miles southwest of Yreka in Siskiyou County, California. The cities of Fort Jones and Etna as well as the rural communities of Greenview, Mugginsville and Callahan are located within the valley. Figure 2 shows general locations of towns, roads, and streams.

The principal stream in the valley is the Scott River, which is a major tributary to the Klamath River. The headwaters of the East Fork Scott River rise on China Mountain approximately seven miles east of Callahan. The headwaters of the South Fork Scott River are the mountain lakes five miles southwest of Callahan. These two forks merge at Callahan to form the Scott River. From this point, the Scott River flows northward along the east side of Scott Valley to Fort Jones. There it turns westward and flows about ten miles to the end of the valley. The Scott River streamgage is located at the end of the valley and measures runoff from approximately 650 square miles of the Scott River drainage. Major tributaries to the Scott River are Shackleford, Moffett, McAdam, Kidder, Etna, and French Creeks, and the South Fork and the East Fork of the Scott River.

The Scott Valley has a north-south length of about twenty miles. It is narrow at its southern section near Callahan, and widens to about seven miles near Greenview. The area of the valley floor

Figure 2



Scott River Watershed

Siskiyou County, California

Department of Water Resources

Northern District

is about 100 square miles. The elevation ranges from 2,500 feet at the valley floor up to 8,500 feet at the mountain peaks. Scott Valley is surrounded by mountains. Southeast of the valley are the Scott Mountains and to the west and south are the Salmon Mountains. To the north and northwest are the Scott Bar and Marble Mountains. To the east are Scarface Ridge, Antelope Mountain and Soap Creek Ridge.

The climate of this watershed is characterized by warm dry summers and moderately wet winters. In the Scott River watershed average annual precipitation ranges from 70 inches in the western mountains to 20 inches over the valley floor and the eastern mountains. About 75 to 80 percent of the precipitation occurs

Snowpack in the Scott, Salmon, and Marble Mountains provides runoff to the Scott River.

from October through March, with occasional thundershowers during summer months. Streamflow in the Scott River is extended into the summer dry period by the melting snowpack of the Scott, Salmon, and Marble Mountains. Many of the tributaries of the Scott River originate from high-altitude lakes located near the summits of the mountain ranges.

The west side of the valley is irrigated mainly by tributaries originating from the Salmon and Marble Mountains. The east side of the valley is irrigated mainly by stream diversions from the Scott River. Ground water is also used extensively in the valley.

Jackson Lake is one of the few privately owned lakes in the Scott River watershed.

CHAPTER IV. METHODS FOR INCREASING STREAMFLOWS

This investigation concentrated on three areas that could increase streamflows: water conservation, water transfers, and water development. We have identified specific methods and assessed their potential for increasing streamflows. Our analysis also took into account the times for which increased streamflows would be the most important. Therefore, we tried to find ways to increase streamflow in the main stem of the Scott River during July through October.

Water Conservation

We considered two possible methods of water conservation. First, we investigated ditch losses in three unlined irrigation ditches and evaluated the feasibility of reducing these losses. Second, we evaluated the potential for increasing the efficiency of surface water irrigation systems.

Lining Irrigation Ditches

Ditch loss is the reduction of surface flow, due to evaporation, seepage and evapotranspiration of the vegetation along the ditch. In the Scott Valley the major component is seepage.

Concrete lining is the most cost-effective means of reducing ditch losses in the Scott Valley. It is much more affordable than pipe. Geomembrane materials are not suitable for the rocky soil conditions and can be destroyed by the domestic animal usage in the ditches. Gunite and shotcrete are two processes widely used for lining ditches with concrete. Both processes apply the concrete lining to the ditch by means of pressurized hose and nozzle.

Three major irrigation ditches divert water from the Scott River below Callahan. They are the Butts ditch, the Farmers ditch, and the SVID ditch. These ditches provide irrigation water during the spring and summer and stockwater throughout the year.

Stockwater provided by these ditches is important to the ranchers, because water lines and troughs generally freeze, leaving the ditches as the only stockwater source.

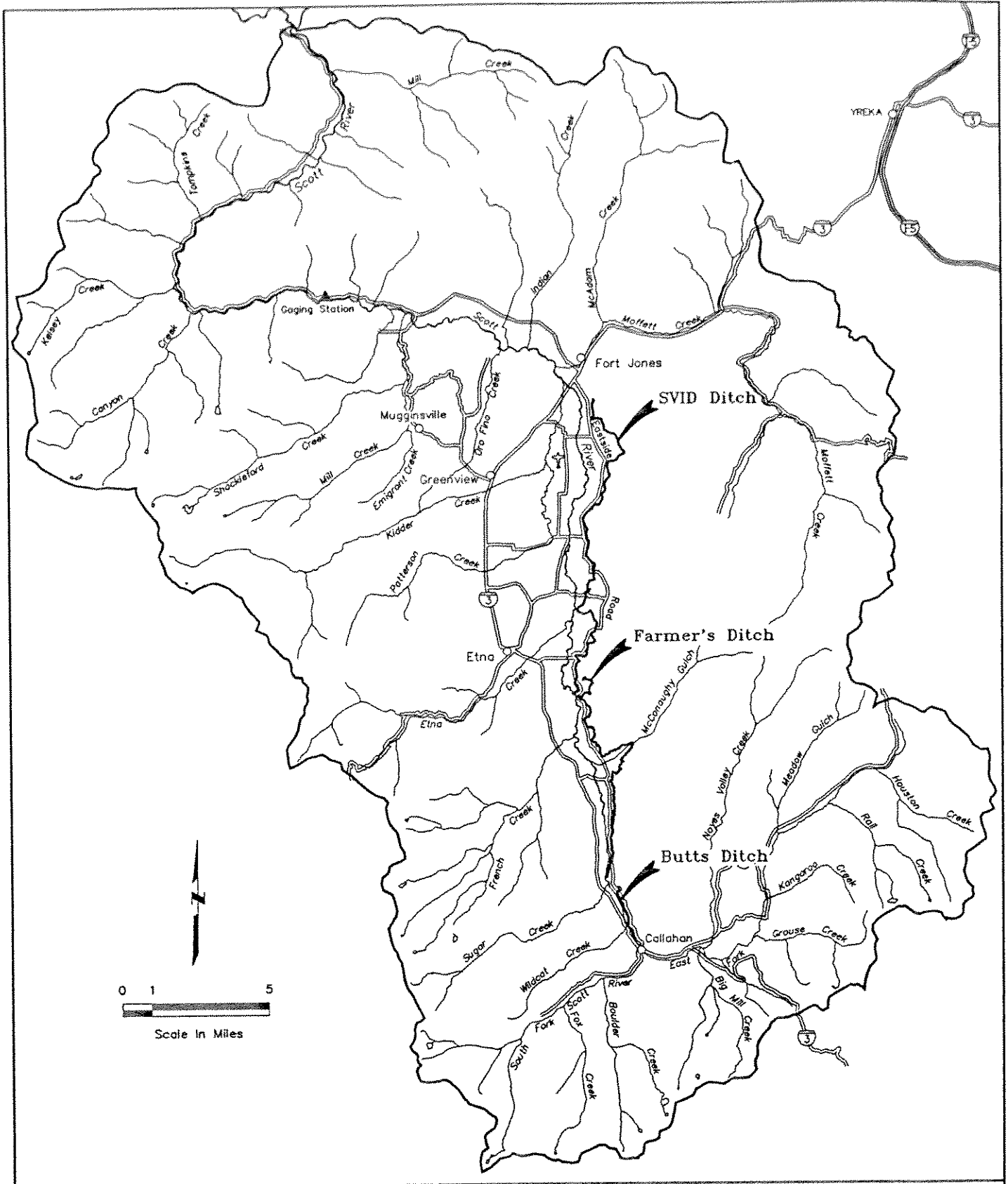
These ditches run along the side hills bordering the east side of the valley and are elevated above most of the irrigated lands. Figure 3 shows the location of these ditches. Other smaller ditches divert water from the Scott River, but do not have a high potential for ditch losses.

The Butts ditch is the first diversion on the Scott River below Callahan. (The Art Butts water right is discussed later in this chapter.) Flow measurements taken in July of 1990 show that when 8.2 cfs is diverted into the Butts ditch, only 0.2 cfs reaches his place of use. 4.2 cfs returns to the surface flow of the river within a few thousand feet, while 3.7 cfs is lost to the surface flow of the river due to the ditch losses. As these data indicate, the Butt's ditch is very inefficient.

Lining the Butts ditch would cost approximately $300,000. The ditch is located on extremely steep terrain, and continual maintenance is needed to remove material falling from the county road above it. A more economical solution would be to install a pump to lift water from the river near the point of use. The ditch could then be abandoned. This alternative would cost approximately $40,000. It would leave his entire water right of 6.2 cfs in the river for an additional two miles and would result in only a 1.2 cfs loss to meet his full irrigation needs.

The Farmers ditch is the next surface diversion downstream from the Butts diversion. The Farmers Ditch Company owns and operates the ditch to supply 10 users. Most of the water is applied on irrigated pasture. The Scott River adjudication allocates 36.0 cfs to the Farmers ditch, 22.3 cfs for consumptive use and 13.7 cfs for ditch losses. Lining the Farmers ditch would be very expensive, costing approximately $1,900,000.

Figure 3



Ditch Locations

Siskiyou County, California

Scott River Watershed

Department of Water Resources

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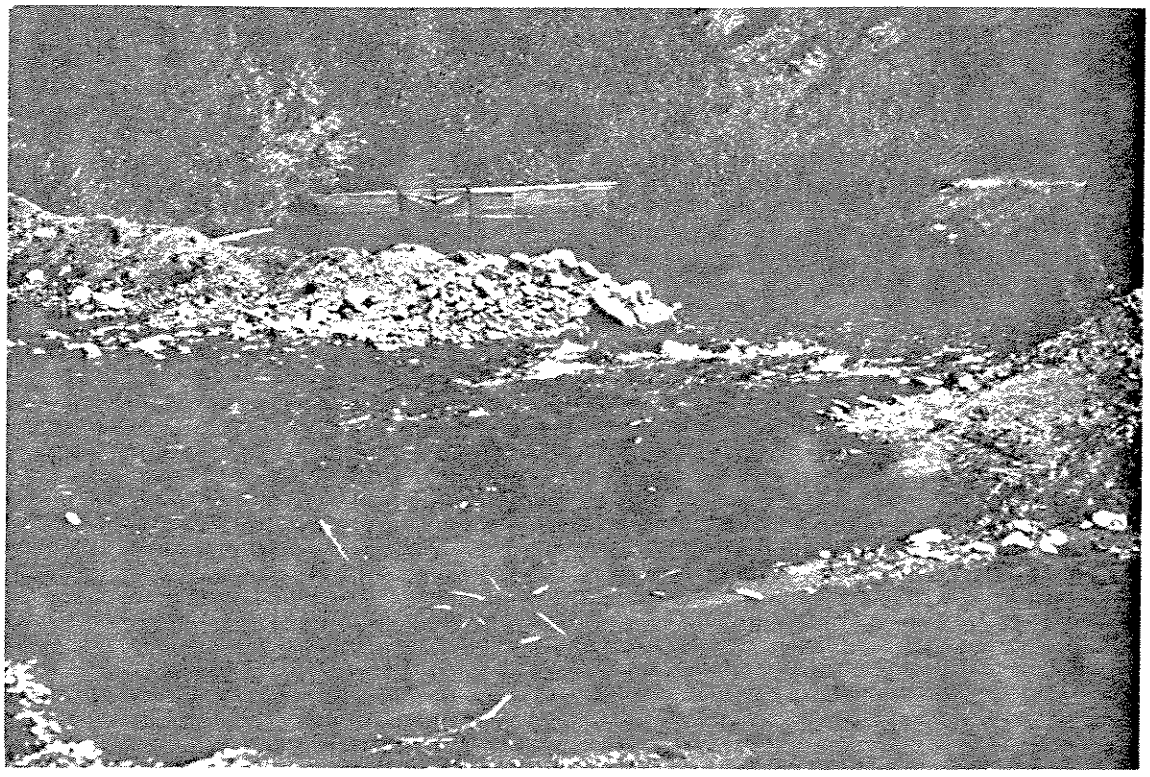
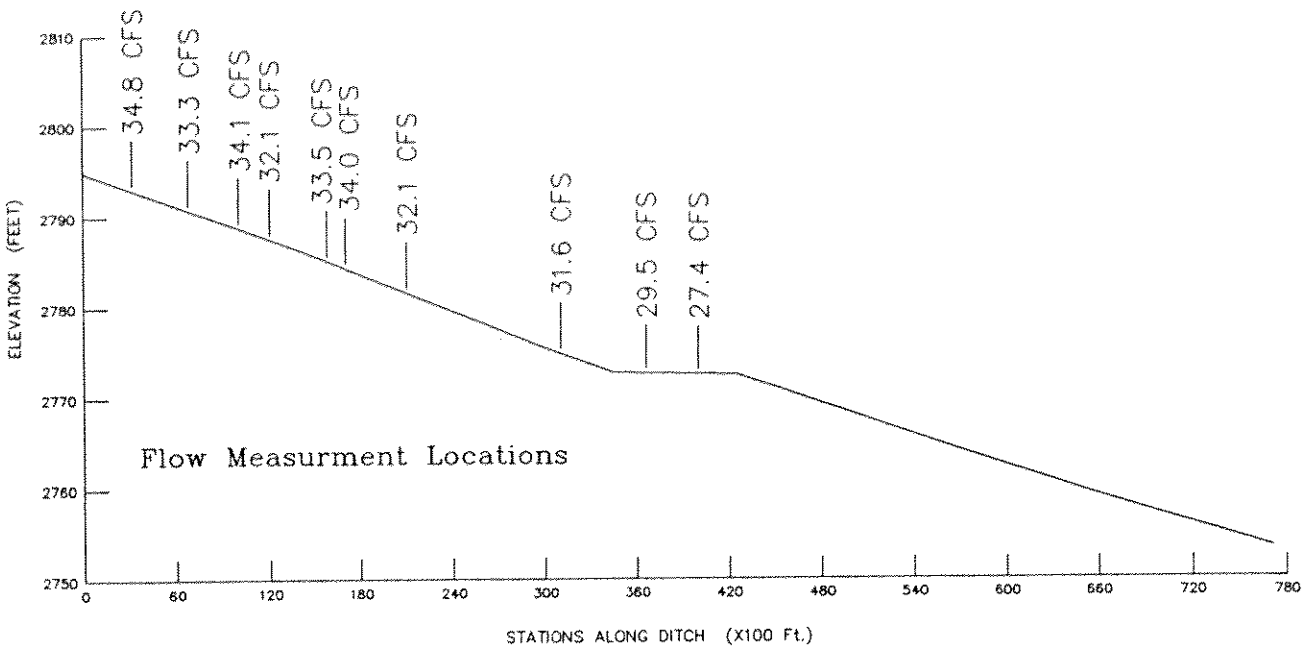
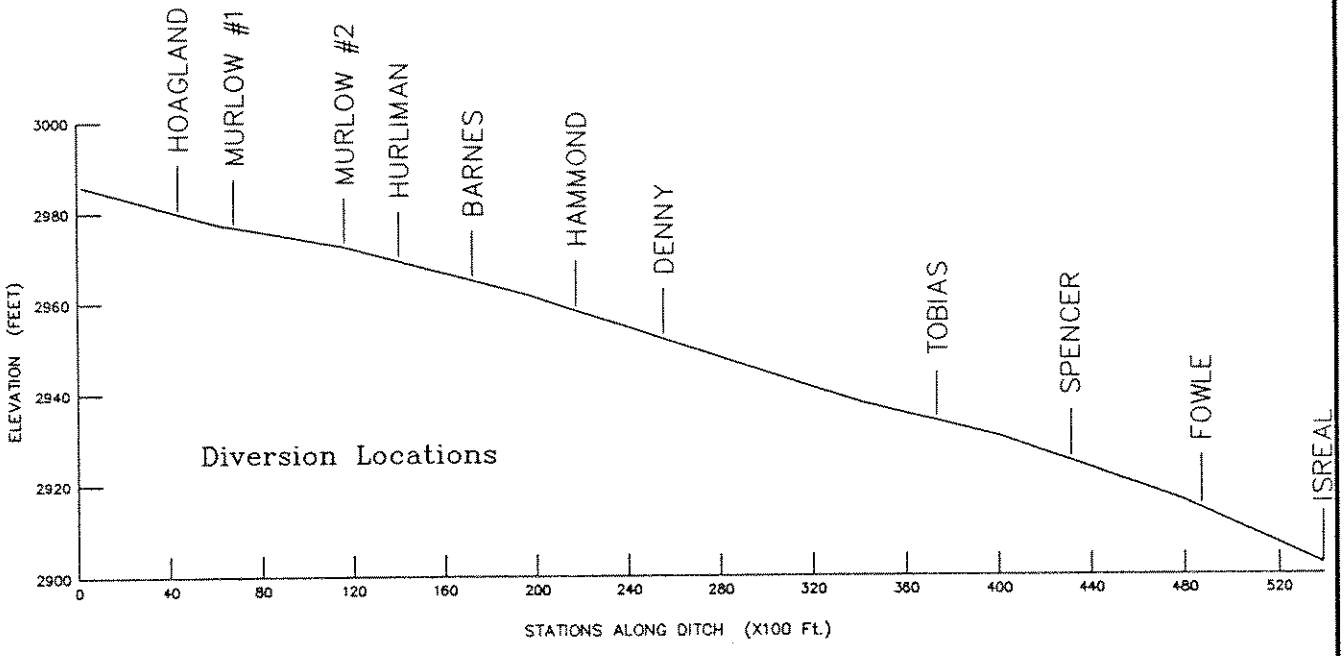
As part of this study, we recorded instantaneous flow for Farmers and SVID ditches. During 1990, we did not observe the Farmers ditch diversion taking more than 36.0 cfs. The average flow diverted during June and July was approximately 26 cfs. By mid-July the Farmers ditch water right exceeded the entire flow of the Scott River. By mid-August, the total flow of the river had receded to approximately 14 cfs. Diversions and streamflows were similar in 1989. These data indicate that the Farmers ditch presently is not diverting the maximum amount allowable under the adjudication. Typically, in August and September the ditch has the right to divert the entire natural flow of the river. During June 1990, DWR conducted a series of flow measurements in the ditch to quantify losses. We made these measurements with the ditch diverting 28 cfs. The losses were so small that we were unable to quantify them. Figure 4 shows the location of the diversions and the names of the users on the Farmers ditch, where flow measurement were taken.



The Farmers ditch greatly impacts the summer flows of the Scott River.



SVID DITCH

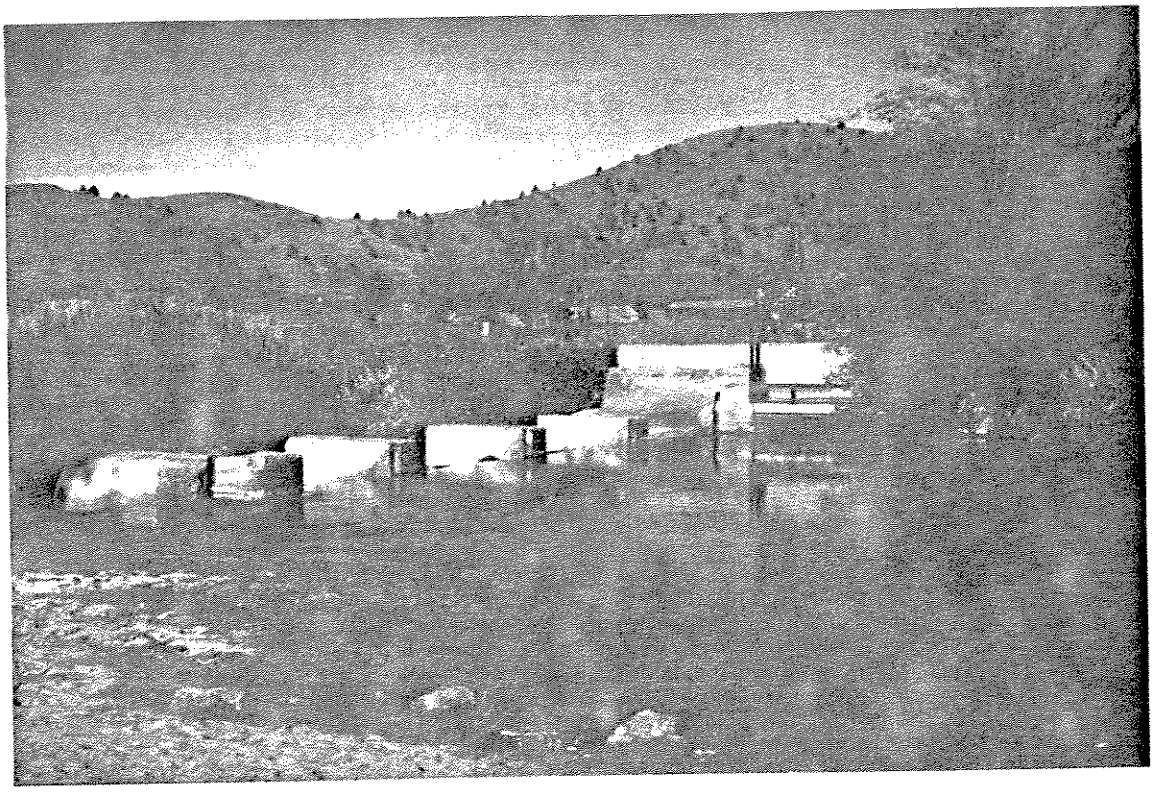


FARMERS DITCH

Ditch Profiles	Department of Water Resources
Siskiyou County, California	Northern District
Scott River Watershed	

Under present conditions, lining the Farmers ditch would produce very little water savings. Therefore, this should not be considered as a method for augmenting streamflow in the Scott River.

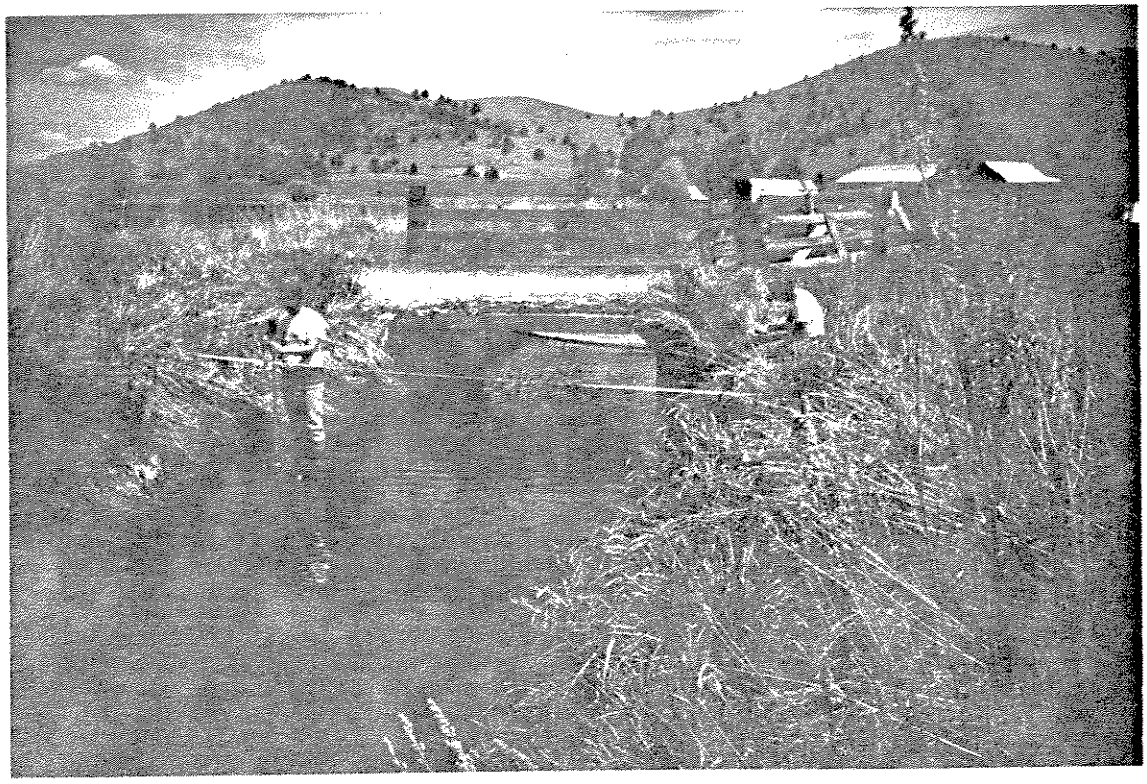
The third diversion is the SVID ditch which diverts flows from the river at Young's Point about 7,000 feet upstream from Horn Lane. The adjudication allotted 62.50 cfs to the SVID at this diversion. However, this was later reduced by SWRCB to 43.00 cfs. Historically and at present, there are significant losses along this ditch. At its full allotment, these losses are substantial. The ditch passes through several rocky points where water runs down the hillside below the ditch. Because of complaints by owners of land receiving excessive seepage, SVID



The SVID diversion is the largest on the Scott River.

does not divert its full allotment. During June 1990, the average flow diverted by SVID was 38 cfs. By mid-July approximately 80 percent of the flow of the river was being diverted. During the week of June 25 to June 29, 1990, DWR made a series of flow measurements in the SVID ditch. Figure 4 shows a profile of the ditch with the location of the measurements. These data indicate that with a diversion of 35 cfs there is a 7.4 cfs loss in the first 40,000 feet of the ditch.

Due to the timing of the irrigation rotation and the available flows, we were not able to take measurements in the lower half of the ditch during the 1990 summer. However, data provided by the Soil Conservation Service (SCS) show losses of approximately 7 cfs in the lower 36,000 feet of the ditch with approximately 42 cfs diverted. Combining the two sets of data suggests that there is approximately 15 cfs to be conserved by eliminating the losses for the entire ditch.



DWR has made numerous streamflow measurements in the Scott River and in irrigation ditches.

Lining the SVID ditch with shotcrete or gunite is the most feasible solution to reduce the losses and still operate the ditch. It would cost approximately $2,000,000 to line the first 40,000 feet and $3,600,000 to line the entire 77,100 feet. This makes the average cost approximately $370,000 per cfs.

The available flow in the Scott River at the head of the SVID ditch during July 1990 was approximately 40 cfs. Typically, SVID doesn't divert the entire flow. The fish screen mechanism requires some bypass flow to function properly. In some years, the river is dry at the diversion during August and September. It is speculative to say how much water would be returned to the river by lining the SVID ditch. However, in August and September, little or none would be returned.

It may be possible to negotiate an agreement with the SVID to line a portion of the ditch in return for some favorable changes in their diversion practices. This may increase streamflows in the river below the SVID diversion for a 2-4 week period in June or July.

Increasing Irrigation Efficiency

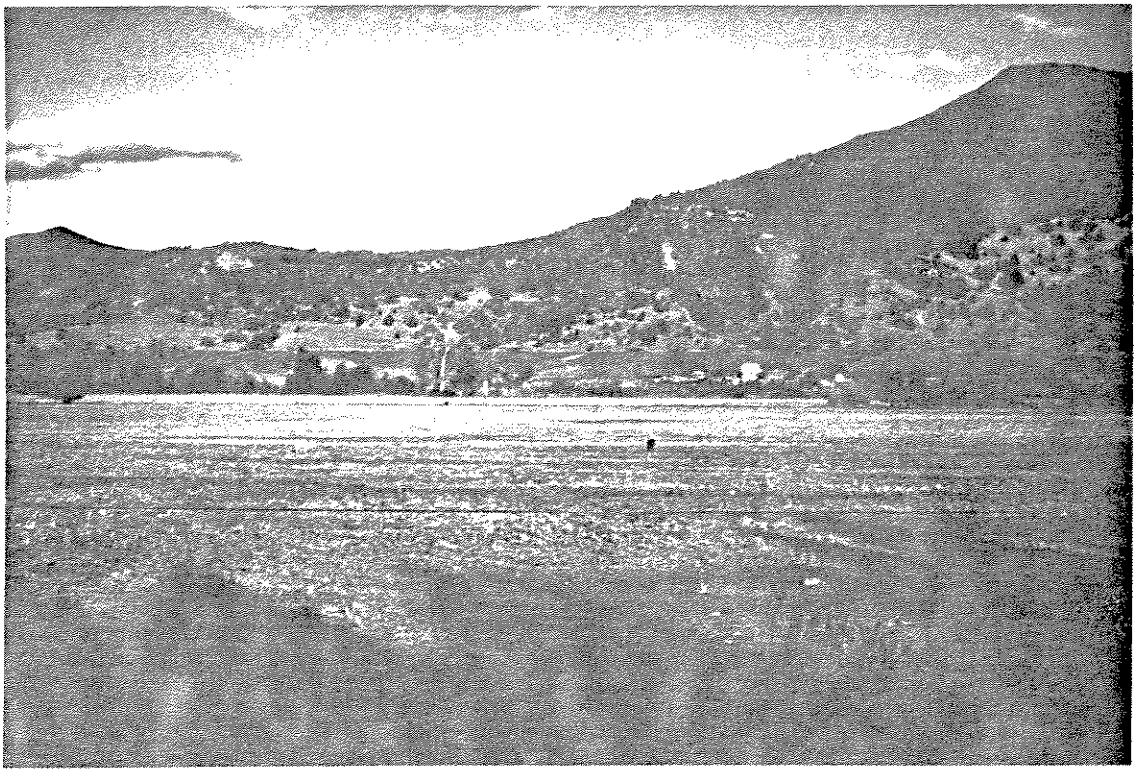
The most recent data available on water supply and use are included in the SWRCB Report, entitled Report on Water Supply and Use of Water: Scott River Stream System, dated December 1974, which was prepared for the Scott River adjudication. This report states that within the Scott Valley 19,000 acres of land are flood irrigated. Appendix A, Table A-1 of the above report indicates that 9,277 acres of flood irrigated land are supplied from pumped water or reservoir releases.

Assuming that these 9,277 acres are not irrigated from surface flow, this leaves 9,723 acres of flood irrigated land from surface flow sources. According to the SWRCB report, the average duty of water for flood irrigation is 1 cfs to 50 acres. For sprinkler irrigated land, it is 1 cfs to 70 acres. Applying this potential water saving to the 9,723 acres, it is theoretically possible to reduce irrigation demands by 56 cfs.

This represents a significant amount of water conservation. However, this 56 cfs doesn't necessarily convert to streamflow for the fishery. First, the critical time of the year is July though October when surface flow is the lowest. In many cases,

Thousands of acres of land are sprinkler irrigated in the Scott Valley.

ground water is pumped to supplement the decreasing surface flow during this period. Thus, conserved water would be applied to land, which is usually supplied by ground water. Second, this conserved water would be distributed throughout the Scott Valley. Thus, it would be very speculative to quantify what the cumulative impact would be on the Scott River. However, it is unlikely water conservation would result in 56 cfs of additional streamflow in the Scott River during July through October. Third, even though no data are presently available, some individuals in the Scott Valley believe that the amount of land irrigated by sprinkler systems has increased since the mid-1970s. Thus, there may be less water savings than indicated in this report.



The Farmers ditch irrigates much of the hillsides on the east side of the Scott Valley.

For some lands in the Scott Valley, such as the pasture lands on the hillsides along the Farmers ditch, flood irrigation is the only reasonable method of irrigation.

Some other water conservation measures that could be implemented are:

1. Improved land grading using laser technology.
2. Installing irrigation return flow systems.
3. Use of soil moisture data to schedule irrigations.

All of these have potential for water conservation, but their ability to increase streamflow is uncertain. Therefore, increasing irrigation efficiency should not be pursued as the only method of augmenting flows of the Scott River.

Water Transfers

Recent California legislation makes the transfer of water a potential source of increasing streamflow, although complex legal issues are frequently involved. Most situations seem to be unique, and call for their own solutions. Transfer of water on the Scott River would present challenging issues. There is no history of water transfers on the River, and there are only two organized irrigation groups. Additionally, because the existing adjudication is a recent one, it may be difficult to modify. These factors may limit the options for water transfers.

We investigated two methods of water transfer that may work to improve the present streamflow conditions in the Scott River. These are purchasing water rights and purchasing ground water. The KRBFTF should seek qualified legal counsel before moving on either of these ideas.

Purchasing Water Rights

Purchasing of water rights in the Scott Valley is one method of securing streamflows for the fishery. The Scott River adjudication does not allot water within the Scott Valley for fishery enhancement or instream flow maintenance. At present, the water must be used for adjudicated purposes. In theory, KRBFTF or another party could purchase a water right, then sell the use of that water to another user. To maximize the fishery benefits, the original water right should be located as far upstream as possible and the buyer's place of use should be located as far downstream as possible. This would provide streamflow through a long reach of the river. In this situation, KRBFTF would function as a water marketer. Another option may be a long-term lease of the water right.

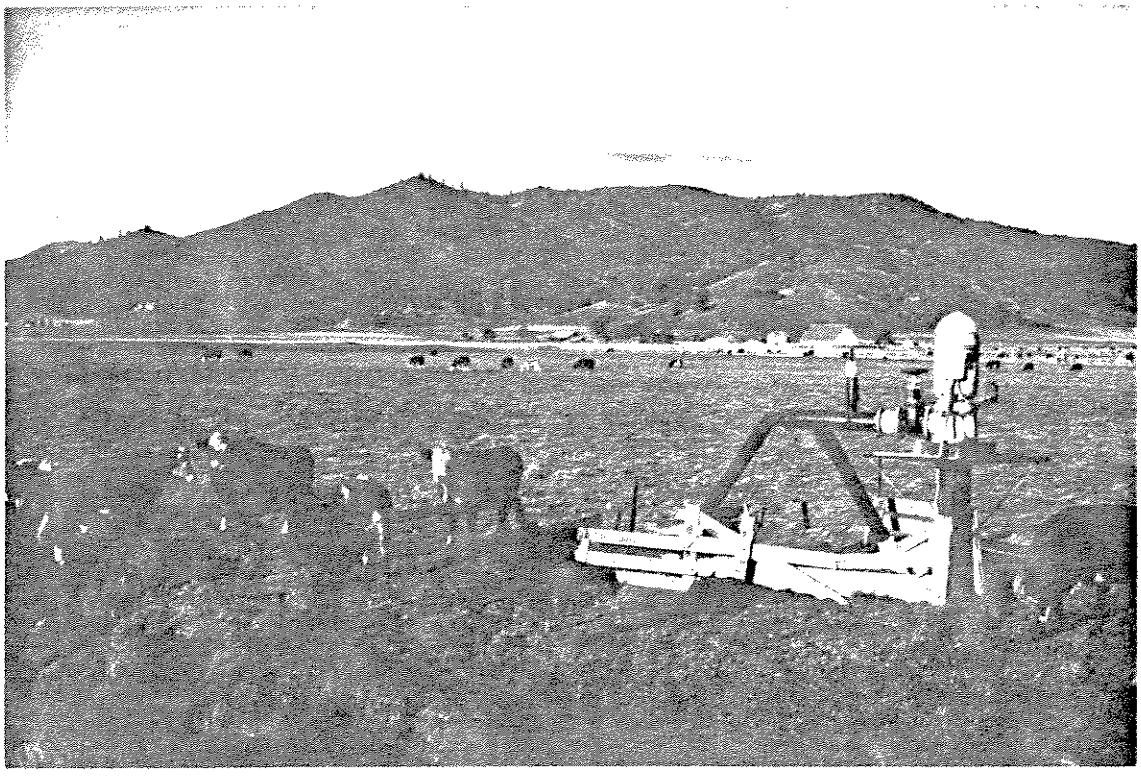
We informally contacted several water right holders in the upper Scott Valley to determine interest in sale of water rights. Only one expressed an interest in selling his water right. This was Art Butts, who diverts water from the river just downstream of the confluence of the east and south forks of the Scott River. His water right is for 6.16 cfs. The other water right holders we interviewed were not receptive to the idea of selling their right. Most of these water right holders are ranchers, and without water they are out of business.

The Butts Ditch is in very poor condition, and he receives only a small portion of this flow. Our observations show that when he is diverting his entire water right, approximately 0.2 cfs reaches his place of use. The remainder is lost along the ditch. In order to determine how much of this ditch loss returned to the river, we took a series of flow measurements during July 1990 on both the Butts ditch and the Scott River. These data indicate that the Butts diversion resulted in a 3.7 cfs decrease to the surface flow of the river.

It would be desirable for KRBFTF to have control of the Butts water right. It is the first water right below Callahan and it is a significant amount of water. The flow is 12 acre-feet per day, totaling 1,300 acre-feet for the period of July through October 15. Therefore, an agreement should be negotiated with Mr. Butts to either replace the use of his ditch with a pump station or purchase his water right.

Pumping Ground Water

Pumping ground water into the river is a potential method of increasing the summer surface flow of the Scott River. Eight to ten wells could produce approximately 30 cfs for surface flow.



Ground water wells close to the Scott River are considered to be surface diversions.

Ground water pumping could cause several problems. First, the Scott River adjudication defines a zone of interconnected ground water. Figure 5 shows the boundaries of this zone. Within this zone, water pumped from the ground is considered to be part of the adjudicated water supply. It will be difficult to find water right holders that are willing to give up continuous use of water from this zone. Second, if ground water from outside this zone is used, pipelines or ditches may have to be extended hundreds of feet to deliver the water to the river. Third, the area south of Young's Point (location of the SVID diversion) has no such defined zone. Pumping large quantities of ground water from this area may directly impact the flow of the river. The water table appears to be feeding the flow of the river in this section. If this water table is significantly lowered, the streamflow that normally increases through this reach may decrease. Thus, the increase in flow through adding ground water may be offset by the decrease in flow through infiltration. Fourth, there will certainly be property owners who feel their water use is going to be adversely impacted by this extensive ground water extraction.

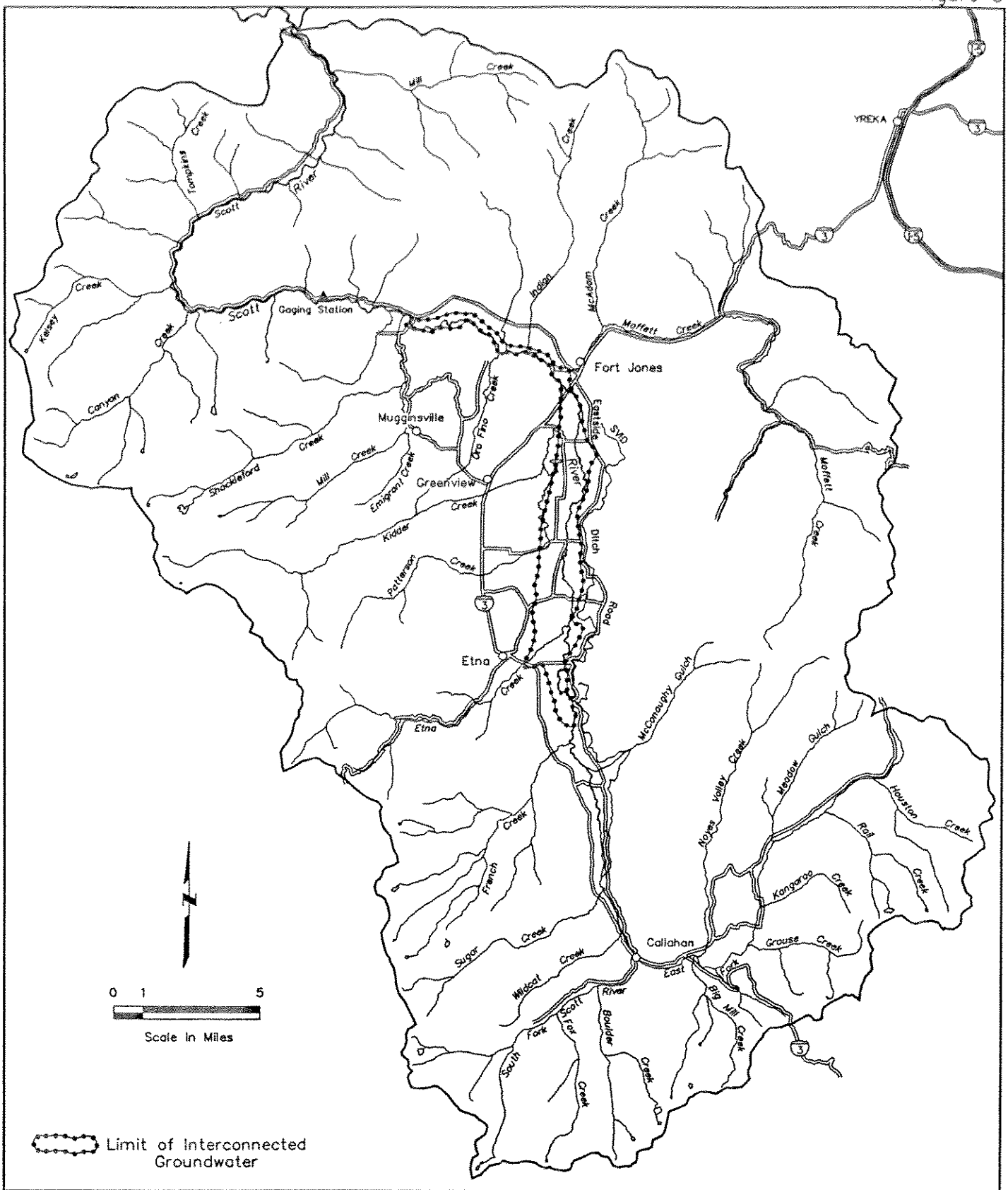
The inter-relationship between ground water and surface water needs to be investigated further in conjunction with any of the flow augmentation methods.

Water Development

Several water storage reservoirs in the Scott Valley have been previously investigated. DWR Bulletin No. 83, published in 1964, identified damsites within the valley and estimated their size and cost. In 1972, SCS published a report entitled Inventory and Evaluation of the Natural Resources Scott River Watershed. This report reviewed the work of Bulletin No. 83 and evaluated some additional reservoir sites.

These investigations assessed several potential reservoir sites with agricultural water supply and flood protection as the major objectives. Damsites were selected to provide the most economic

Figure 5



Interconnected Ground Water	Department of Water Resources
Siskiyou County, California	Northern District
Scott River Watershed	

storage, not to accommodate the needs of the fishery. Most of these reservoirs would not improve fishery habitat on the main stem of the Scott River without reducing other valuable fishery resources.

Considering these factors, we found only one previously studied reservoir to be worth reinvestigating. This was a reservoir on French Creek approximately one-half mile above Highway 3. This reservoir site is referred to as Etna Reservoir in Bulletin No. 83 and as French Creek Reservoir in the SCS publication. It is referred to by the latter name in this report.

A reservoir in the upper third of the watershed would have the most value to the main stem of the Scott River. The Scott River between Callahan and French Creek has a particularly high potential for habitat improvement. The substrate of the river channel in this reach is generally free from sand and decomposed granite. A water storage project that provided additional streamflows to this portion of the river would be highly beneficial to the fishery.

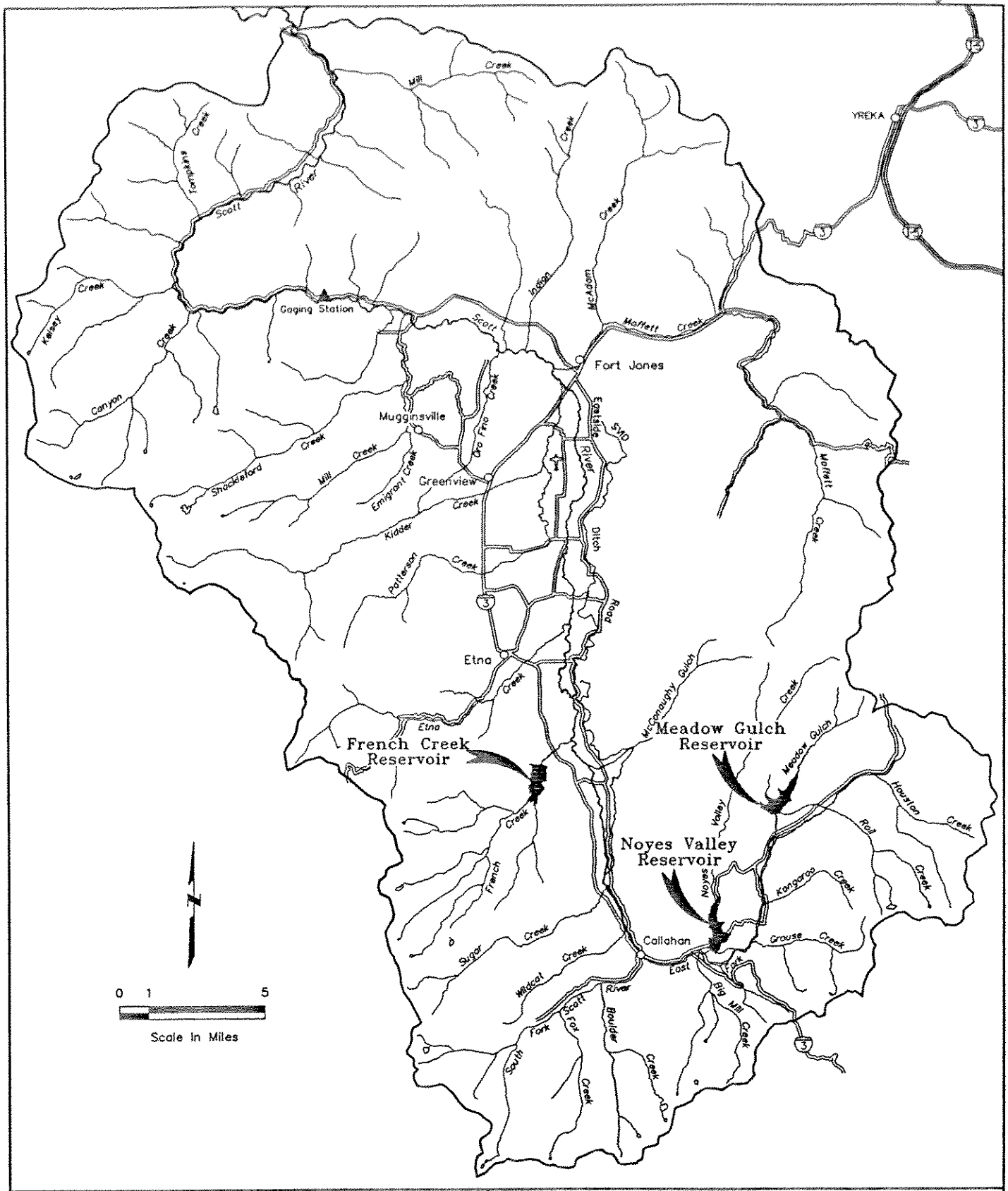
Because review of previous work did not identify a reservoir site that ideally fit the criteria, we undertook locating additional sites. We found two sites that:

1. Provided adequate storage capacity,
2. Did not block passage into a viable anadromous fish habitat,
3. Had adequate water source to fill the reservoir during the nonirrigation season.

These sites are named the Noyes Valley Reservoir and the Meadow Gulch Reservoir. Figure 6 shows the location of these two reservoirs and the French Creek site.

To date the instream flow needs for the Scott River have not been defined. Without knowing this information, the desired storage for a water development project cannot be determined. However, in order to move forward with the investigation, we reviewed the

Figure 6



Potential Reservoir Sites	Department of Water Resources
Siskiyou County, California	Northern District
Scott River Watershed	

historic flow records and synthetic flow records and determined that the mean runoff at Callahan for July through October was approximately 8,000 acre-feet. This corresponds to a mean daily flow of 33 cfs for this time period. From our field observations, we concluded that under present conditions, 33 cfs probably would not be adequate. This was not a biological assessment, only a judgement whether more than 8,000 acre-feet of storage would be necessary. We chose 20,000 acre-feet to be the preliminary storage size for this study. This amount should be able to:

1. Meet the flow needs of the fishery,

2. Provide extra storage to help with possible water temperature problems,

3. Provide flexibility in release schedules.

A water storage project could result in a variety of benefits to the Scott Valley. Our focus is on the benefits to the fishery. Other than augmenting streamflow for the Scott River, a reservoir could:

1. Improve water temperatures in the river,

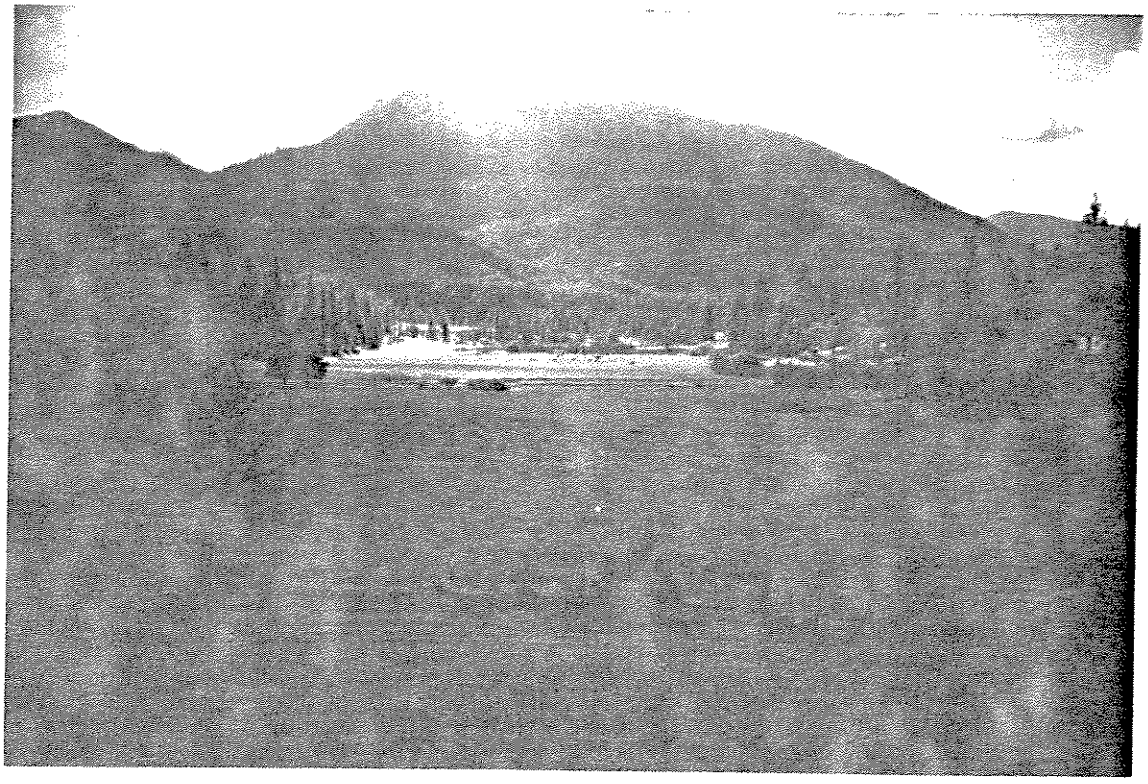
2. Provide a firm water source for a rearing facility for the many salmonoid fry that are rescued from the Scott River and tributaries each year,

3. Provide additional or improved habitat on the tributary below the dam as well as the Scott River,

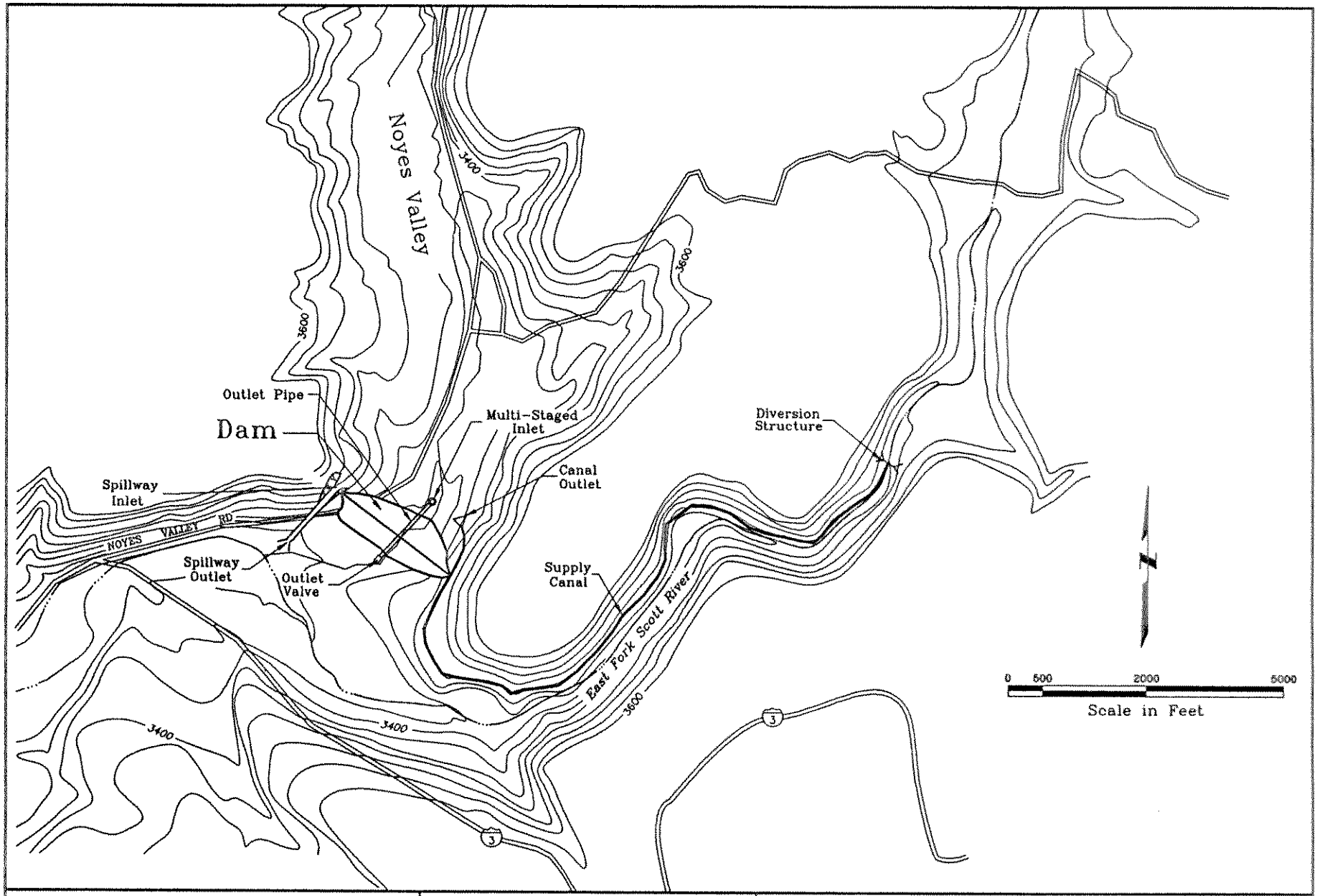
4. Provide an opportunity, especially in drought times, for meeting the specific needs of target fish species.

Noyes Valley Reservoir

This potential reservoir site is located on Noyes Valley Creek approximately 2.5 miles east of Callahan and approximately 2,000 feet upstream from the confluence with the East Fork Scott River. Our cursory investigation considered an earthfill dam with a concrete-lined spillway and a multi-stage outlet structure. The main source of water for the project would come from the East Fork Scott River. A diversion structure on the East Fork Scott River would deliver surplus winter water via a canal to Noyes Valley Reservoir and would provide a safe yield of 20,000 acre-feet. Figure 7 and Table 1 give some of the project details. The cursory estimated capital cost for the Noyes Valley Reservoir is $23,000,000.



Looking downstream at the Noyes Valley Damsite.



Potential Damsite Siskiyou County, California Scott River Watershed	Noyes Valley	Department of Water Resources Northern District

Figure 7

Table 1

General Features of Noyes Valley Dam
and Reservoir

Dam

Type	Earthfill
Crest elevation, in feet	3440
Crest length, in feet	1950
Crest width, in feet	15
Spillway elevation	3430
Side slopes, upstream	3:1
" " , downstream	2:1
Stream bed elevation	3293
Volume of fill, in cubic yards	2,190,000

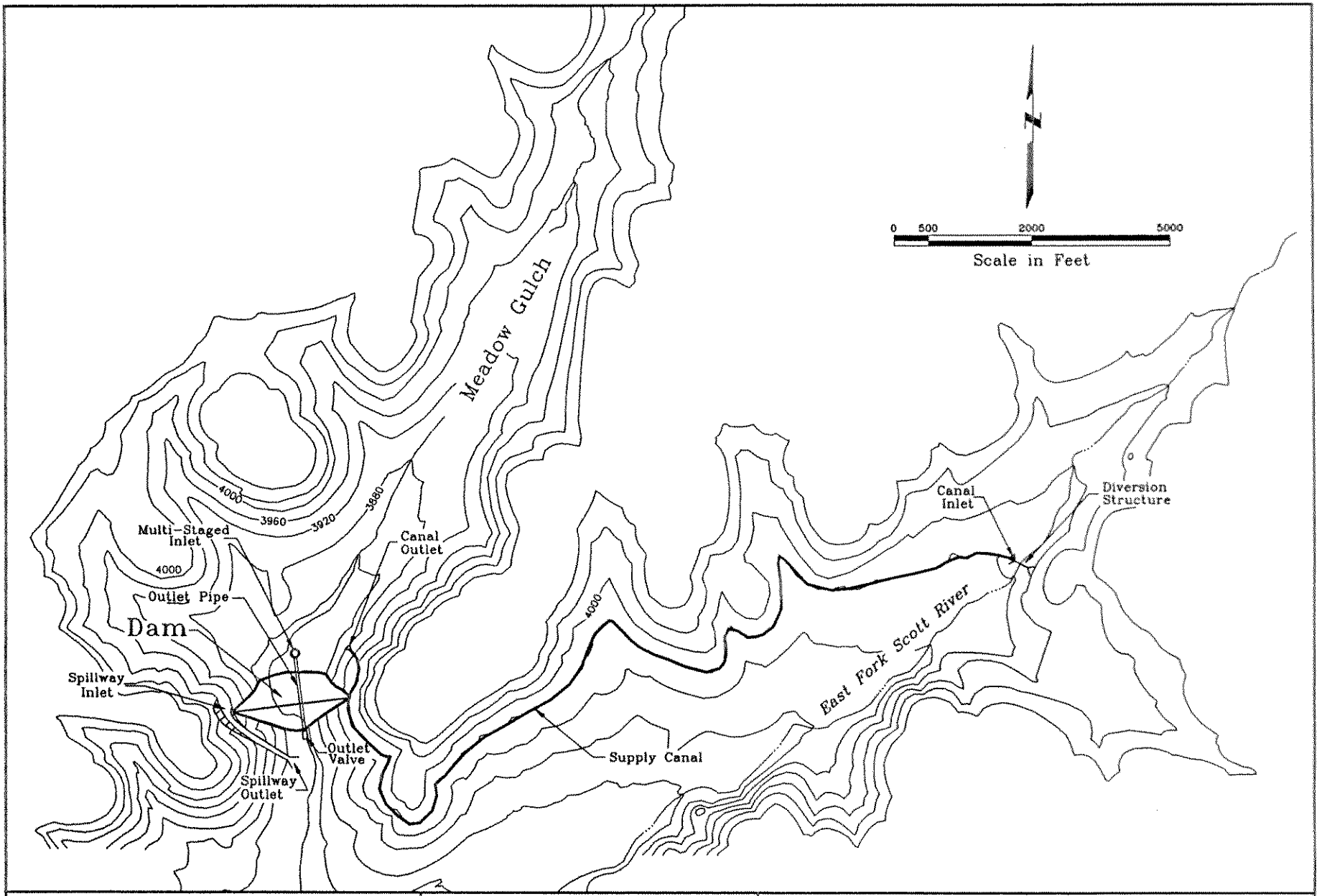
Reservoir

Surface area at spillway lip, in acres	350
Storage capacity at spillway lip, in acre-feet	20,000
Drainage Area, Noyes Creek, in square miles	26.0
" " , E.F. Scott River, in square miles	68.7
Outlet type	Multi-staged

Meadow Gulch Reservoir

This potential reservoir site is located in Meadow Gulch near Gazelle Mountain. It is approximately 8.9 miles northeast of Callahan. Our investigation considered an earthfill dam with a concrete-lined spillway and a multi-stage outlet structure. The main source of water for the project would come from the East Fork Scott River. A diversion structure on the East Fork Scott River would deliver surplus winter water via a canal to Meadow Gulch Reservoir. Figure 8 and Table 2 give some of the project details. The cursory estimated capital cost for the Meadow Gulch Reservoir is $20,000,000.

Additional hydrologic data needs to be collected and analyzed to be certain that there is adequate runoff at this site to fill a 20,000 acre-foot reservoir.



Potential Damsite Siskiyou County, California Scott River Watershed	Meadow Gulch	Department of Water Resources Northern District

Figure 8

Table 2

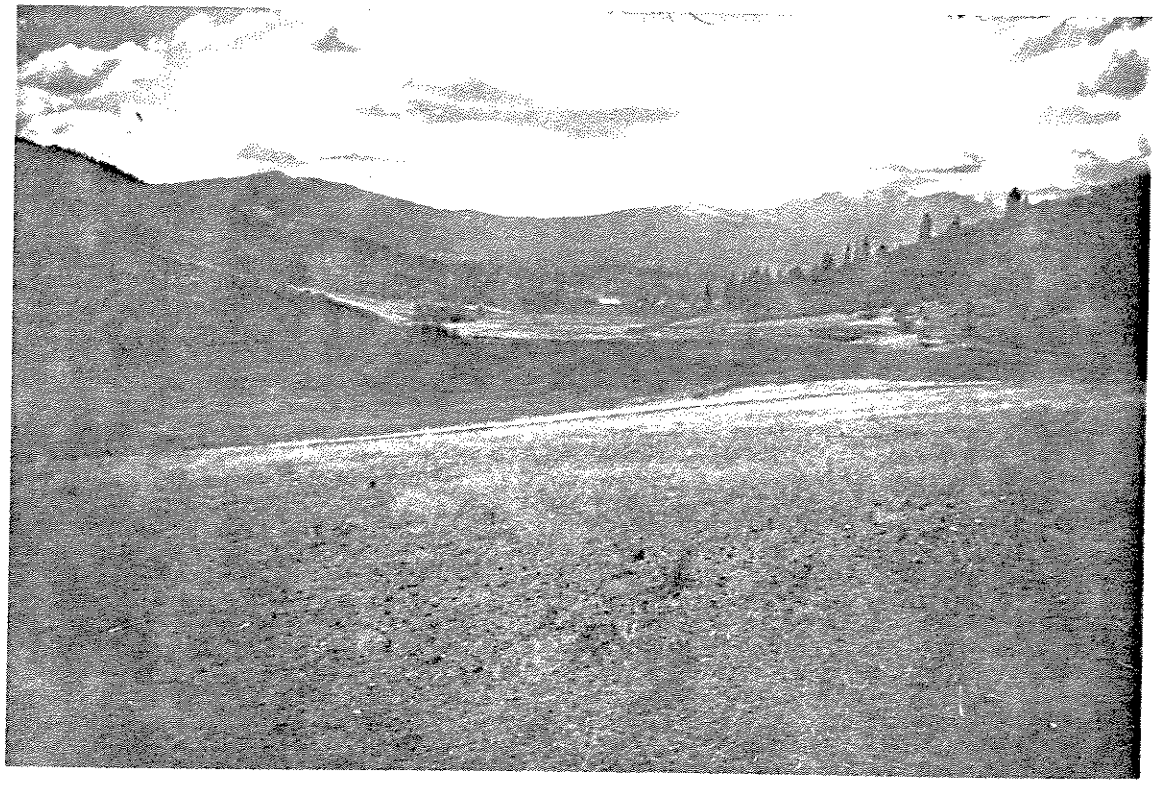
General Features of Meadow Gulch Dam
and Reservoir

Dam

Type	Earthfill
Crest elevation, in feet	3962
Crest length, in feet	1737
Crest width, in feet	15
Spillway elevation	3952
Side slopes, upstream	3:1
" " , downstream	2:1
Stream bed elevation	3801
Volume of fill, in cubic yards	1,929,100

Reservoir

Surface area at spillway lip, in acres	387
Storage capacity at spillway lip, in acre-feet	20,000
Drainage Area, Meadow Gulch in square miles	8.8
" " , E.F. Scott River, in square miles	24.2
Outlet type	Multi-staged



Looking downstream at the Meadow Gulch Damsite.

French Creek Reservoir

This potential reservoir site is located on French Creek approximately 0.5 miles west of Highway 3. Previous studies proposed an earth dam with a concrete-lined spillway. In addition, our investigation considered a multi-stage outlet structure. Table 3 and Figure 9 give some of the project details. The cursory estimated capital cost for the French Creek Reservoir is $20,000,000. The Bulletin 83 investigation estimated the average annual runoff of the creek to be 38,600 acre-feet. Therefore, this reservoir should be able to yield 20,000 acre-feet.

Table 3

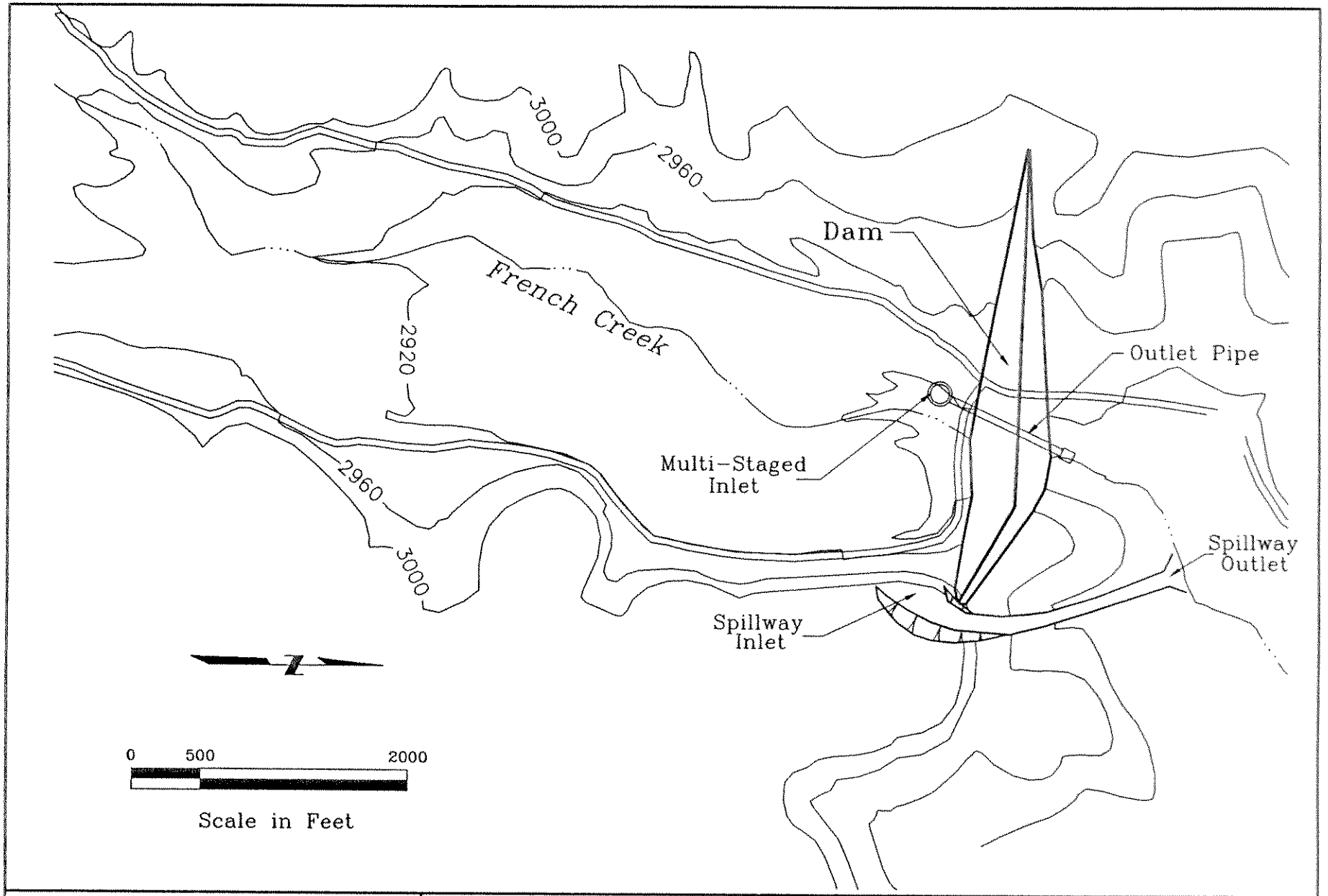
General Features of French Creek Dam and Reservoir

Dam

Type	Earthfill
Crest elevation, in feet	2982
Crest length, in feet	2900
Crest width, in feet	15
Spillway elevation	2972
Side slopes, upstream	3:1
" " , downstream	2:2
Stream bed elevation	2866
Volume of fill, in cubic yards	1,507,000

Reservoir

Surface area at spillway lip, in acres	413
Storage capacity at spillway lip, in acre-feet	20,000
Drainage Area, French Creek in square miles	29
Outlet type	Multi-staged

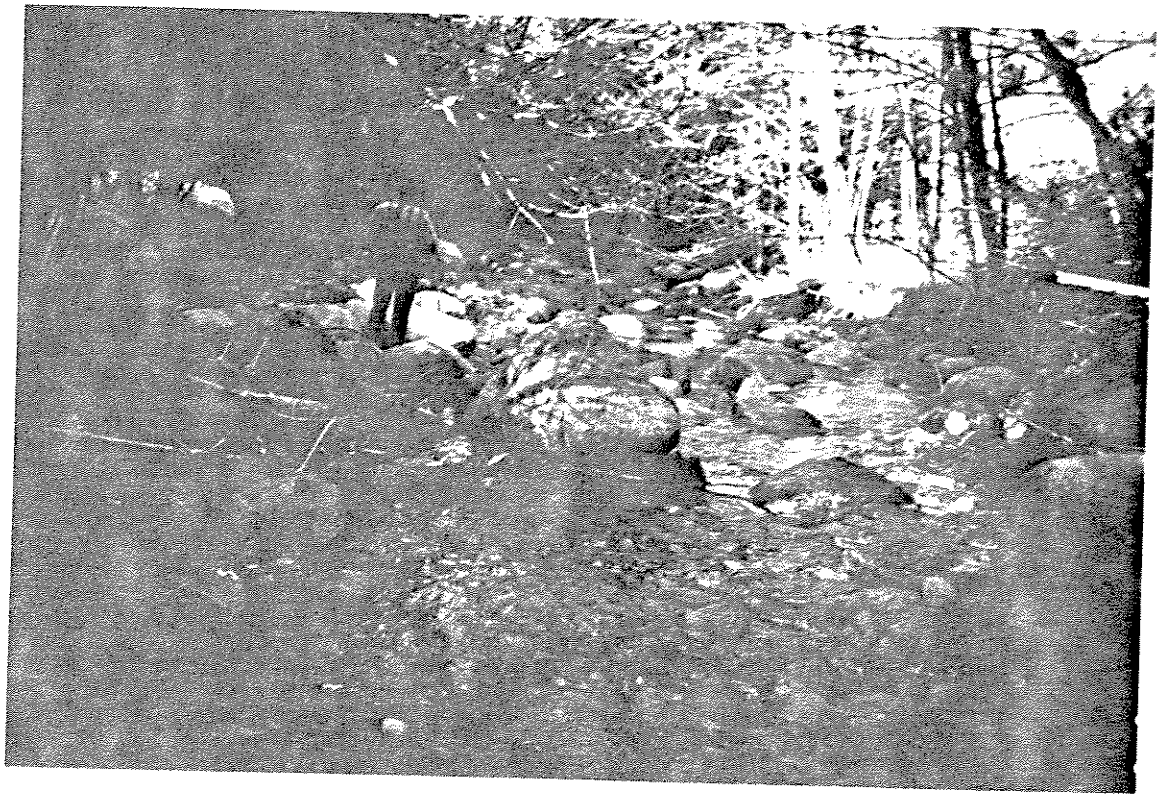


Potential Damsite Siskiyou County, California Scott River Watershed	French Creek	Department of Water Resources Northern District

Figure 9

Because of its location, the French Creek Reservoir would not have the flexibility in water exchanges that the other two large reservoirs have. This reservoir is too low in elevation to deliver water to the Farmers ditch by gravity. Also, it would not increase streamflows in the Scott River above the confluence of French Creek. The reach of the river above French Creek has great potential due to the quality of the substrate in the river.

The French Creek watershed produces a significant amount of sediment. This would be a major factor in considering a reservoir project at this site. Because of this sediment, some suggest, French Creek no longer produces significant numbers of salmonids. This would be an important factor in considering the reservoir. However, electrofishing done by DFG Contract Services



French Creek is a highly productive stream for steelhead rainbow trout.

shows this not to be the case. In fact, data collected in October 1990 show French Creek to be highly productive. Appendix B contains the complete DFG report.

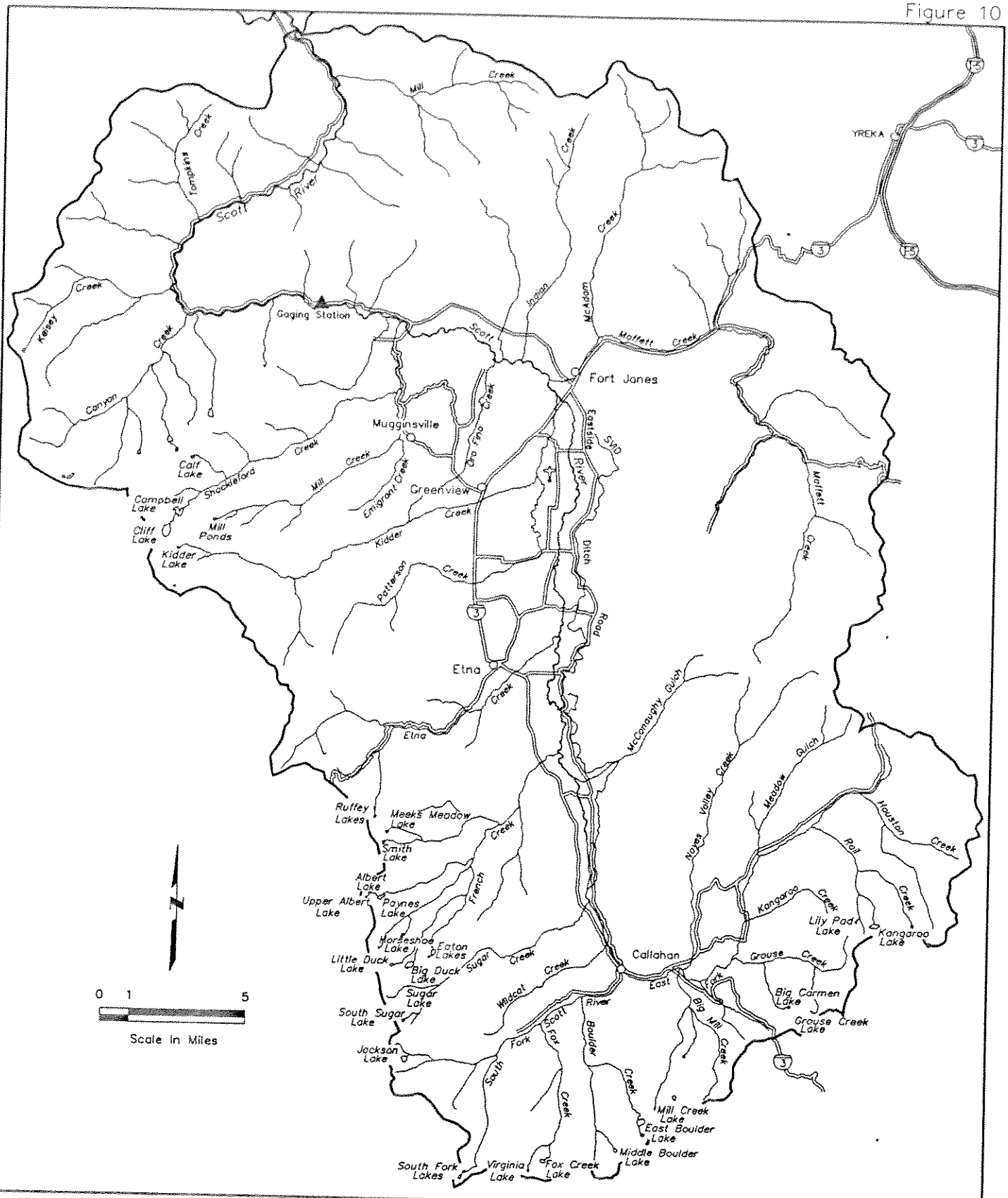
High-Altitude Lakes

During our investigation, members of the community suggested that we consider enlargement of some of the area's high-altitude lakes as a possible water source. There are more than 30 high-altitude lakes within the Scott River Basin. Some of these lakes have been used in the past to increase summer streamflows for irrigation. This was usually accomplished by building a small rock and earth dam with an outlet at the natural outflow point. These lakes could be enlarged, and the stored water released later in the summer to supplement the flow in the Scott River. Figure 10 shows the locations of the lakes and Table 4 provides some cursory data on the potential enlargements.

The potential increased storage data should be used cautiously. None of the lakes were field inspected to determine feasibility or accessibility. Gross assumptions about typical topography were made in calculating these volumes. This information does, however, help define this alternative's potential. As Table 4 indicates, over 3,500 acre-feet of additional water could be made available by enlarging all of the lakes.

Several problems would have to be solved in order to enlarge the lakes. First, over two-thirds of the lakes lie in wilderness areas. This accounts for 78 percent of the potential storage. Under present law no development inside a wilderness area is permitted. Special legislation may be required to implement this alternative. Second, access and construction methods may make many of these enlargements impractical. Third, while these enlargements may benefit the individual creeks, their cumulative impact on the Scott River is difficult to judge. Water would enter the river from seven different tributaries distributed over the entire Scott Valley. It would not be a concentrated water

Figure 10



High-Altitude Lakes

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District

Table 4

Potential Enlargement of

High-Altitude Lakes

Lake Name	Quadrangle	Tributary	Wilderness		Present Surface Area(acres)	Potential Increased Storage (AF)
Albert	Eaton Peak	French Cr.	Yes		1.0	19.0
Upper Albert	Eaton Peak	French Cr.	Yes		1.0	19.0
Big Carman	China Mt. SW	E.Fork Scott R.		No	7.0	81.0
Big Duck	Eaton Peak	French Cr.	Yes		23.0	245.0
Calif.	Boulder Peak	Shackelford Cr.	Yes		4.0	50.0
Cambell	Boulder Peak	Shackelford Cr.	Yes		38.0	406.0
Cliff	Boulder Peak	Shackelford Cr.	Yes		57.0	596.0
East Boulder	Billys Peak	S.Fork Scott R.	Yes		31.0	333.0
Eaton	Eaton Peak	French Cr.	Yes		12.0	136.0
Fox Creek	Billys Peak	S.Fork Scott R.	Yes		11.0	126.0
Gouse Creek	China Mt. SW	E.Fork Scott R.		No	4.0	50.0
Horseshoe	Eaton Peak	French Cr.	Yes		7.0	81.0
Jackson	Eaton Peak	S.Fork Scott R.		No	27.0	289.0
Kangaroo	China Mt.	E.Fork Scott R.		No	20.0	215.0
Kidder	Boulder Peak	Kidder Cr.	Yes		3.0	35.0
Lily Pad	China Mt. SW	E.Fork Scott R.		No	1.0	19.0
Little Duck	Eaton Peak	French Cr.	Yes		9.0	96.0
Meeks Meadow	Etna	French Cr.		No	3.0	35.0
Middle Boulder	Billys Peak	S.Fork Scott R.	Yes		7.0	81.0
Mill Creek	Billys Peak	E.Fork Scott R.	Yes		1.0	19.0
Mill Ponds	Boulder Peak	Shackelford Cr.	Yes		4.0	50.0
Paynes	Eaton Peak	French Cr.	Yes		14.0	156.0
Ruffey	Etna	Etna Cr.		No	3.0	35.0
Smith	Eaton Peak	French Cr.		No	4.0	50.0
South Sugar	Eaton Peak	Sugar Cr.	Yes		6.0	66.0
Sugar	Eaton Peak	Sugar Cr.	Yes		3.0	35.0
Virginia	Billys Peak	S.Fork Scott R.	Yes		6.0	66.0
South Fork	Deadman Peak	S.Fork Scott R.	Yes		4.0	50.0
South Fork	Deadman Peak	S.Fork Scott R.	Yes		7.0	81.0
		Totals	21	8	318	3520.0

source. Fourth, it would be difficult, or impossible, to coordinate releases from the 29 lakes to maximize the benefit to the Scott River fishery. Fifth, enlarging the lakes may disturb their natural aesthetic value.

DWR does not recommend developing these lakes for water sources to augment the streamflow of the Scott River. There are not enough benefits to offset all the negative aspects of this alternative.

Kangaroo Lake is one of the many beautiful high-altitude lakes in the Scott River watershed.

CHAPTER V. ISSUES CONCERNING POTENTIAL WATER SOURCES

This chapter addresses some issues of concern that influence the potential of water sources for the Scott River fishery. First, what is the relationship between the ground water and surface flow of the river? Is the river recharging the ground water or is the ground water supplying water to the river? These questions are significant in that they will influence the methods identified to meet the flow needs of the fishery. Second, water temperatures in the river during the summer presently exceed the acceptable range. Third, the instream flow needs for the entire river should be accurately defined and accepted. Forth, should watermaster service be requested for the Scott River? Fifth, is rearing fish in the larger irrigation ditches in the Scott Valley a practical undertaking?

Ground Water

Ground water was first studied in the Scott Valley by the U. S. Geological Survey (USGS) and reported in the Water Supply Paper 1462. A ground water contour map was constructed from data collected from 104 wells in the Scott Valley. These data were collected in April 1954, a time when the ground water table should be at its maximum recharged condition. The report states that from the margins of the Scott Valley, movement of the ground water is toward the river and ground water discharge supplements the flow of the Scott River. This would be a typical situation during spring.

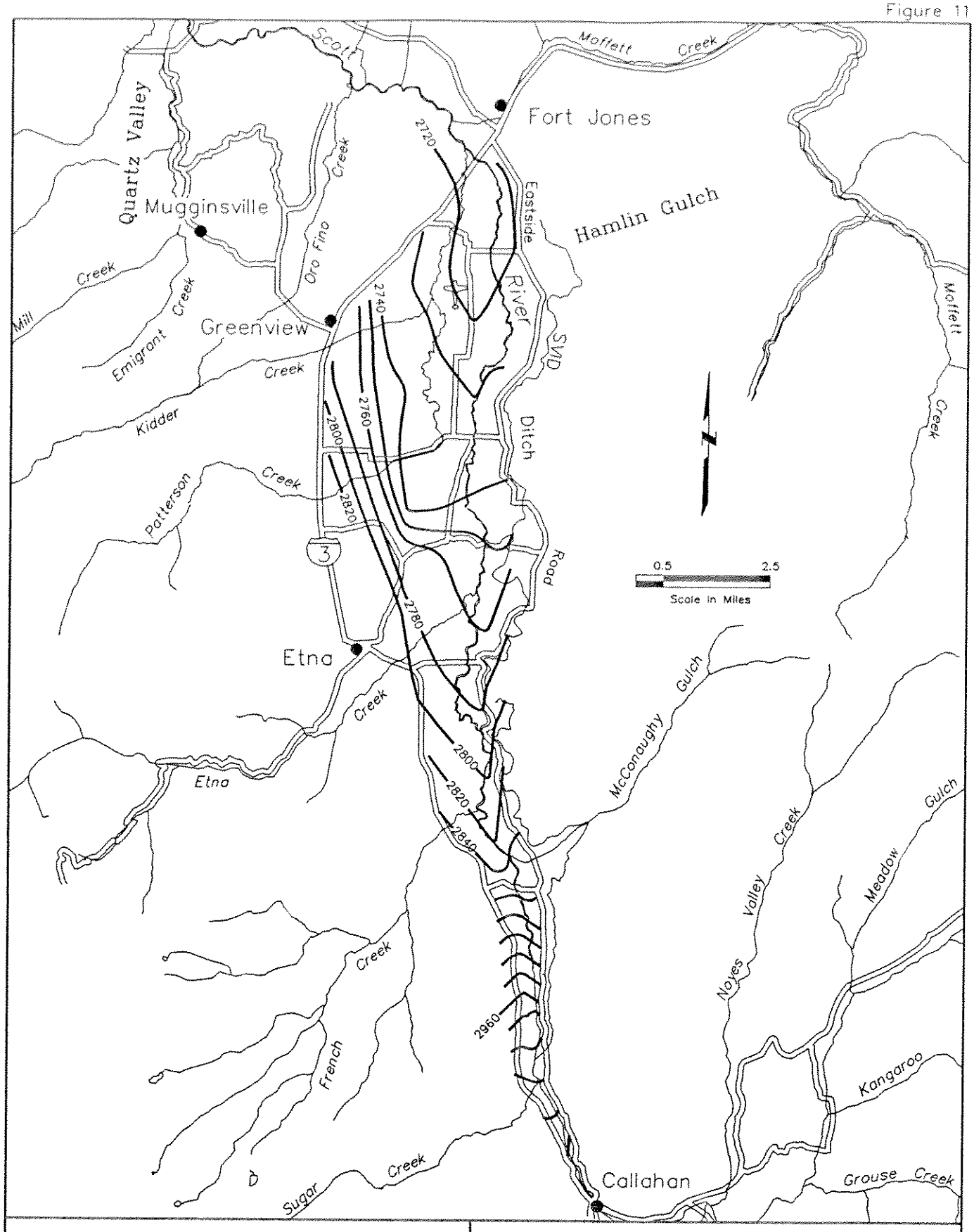
The time of greatest concern for the fishery is July through October. Because of the recent extended period of below-normal precipitation in the Scott River watershed, DWR decided to produce another ground water contour map for the Scott Valley.

Figure 11 is the map DWR created from data collected in August 1990. This map should represent the most extreme conditions since 1954. We focused on the actual Scott Valley and did not monitor the Quartz Valley, the Oro Fino Creek area, or the Moffett Creek area. We measured thirty-eight wells, which is approximately the same density in the Scott Valley as the 1954 survey.

Both maps exhibit the same general relationships; the gradient of the ground water table is toward the river. This is obvious on the westside of the valley and in the southern end of the valley.

Water levels were measured in 38 wells during the summer of 1990.

Figure 11



Ground Water Contour Map	Department of Water Resources
Siskiyou County, California	Northern District
Scott River Watershed	

However, the eastern side of the valley between Island Road and Eller Lane has a fairly flat ground water table. Large irrigation wells in the Hamlin Gulch area run continuously during most of the summer. These wells may impact the movement of ground water toward the river. This impact would not be evident on our twenty-foot contour interval map. The data from our survey is not conclusive in this area.

Our ground water well survey was an attempt to remeasure the wells from the 1954 survey. Unfortunately, many of these wells have been destroyed. New wells, close to the destroyed ones, were measured where it was possible.

While this ground water data is not totally conclusive, it does suggest that even in August of a dry year, ground water still moves toward the river in most of the Scott Valley. During the 1989 and 1990 summers, there was continuous surface flow at all the major bridges on the Scott River. Although surface flows stopped at some points along the river, ground water apparently continued to recharge the river.

This surface flow-ground water relationship should receive further study as part of a water transfers, conservation, or development feasibility study.

We established elevations on most of the 1990 wells from USGS bench marks. Well elevations for the 1954 survey were estimated from quadrangle maps. Consequently, we found errors in many of the original well elevations. These errors did not significantly change the general shape of the 1954 ground water contours.

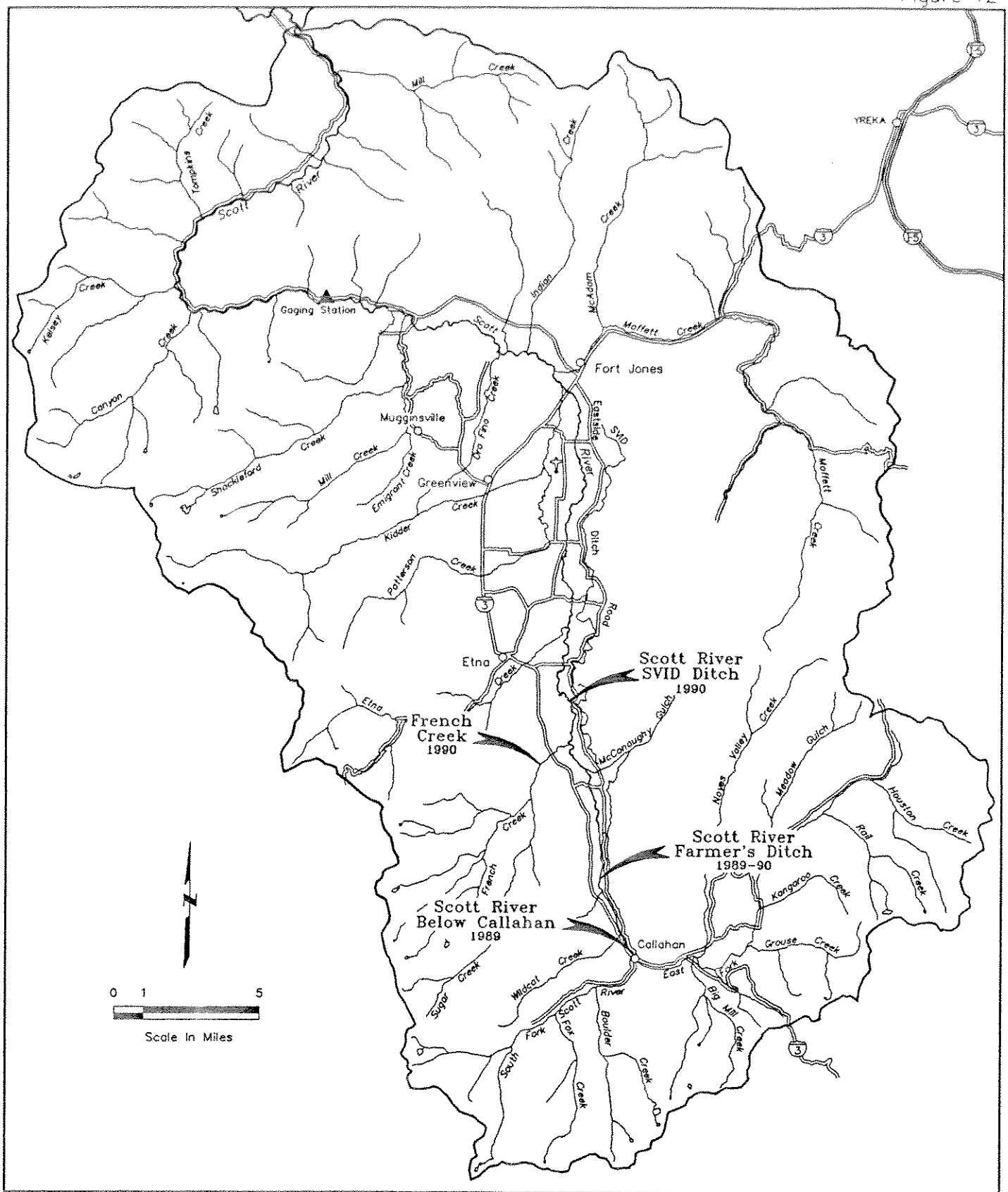
Water Temperatures

Instream water temperature is a major factor in the quality of fish habitat in the Scott River. Under present conditions, even if water is secured for instream uses, during July through September, water temperatures may exceed lethal limits for salmonids. Because of the lack of tree cover to shade the river, water temperatures increase due to solar radiation heating the substrate. Figure 12 shows the locations of thermograph recorders operated during our investigation. Appendix C presents the temperature data collected.

Water temperatures from a storage project may also be too warm. All of the reservoirs studied in this investigation are located below 4,000 feet. Additional temperature data should be collected and a temperature model used to predict temperatures of water released from reservoirs. This would be part of a feasibility-level study.

Thermographs were installed to record surface water temperatures during 1989 and 1990.

Figure 12



Thermograph Locations

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District

Fishery Instream Flow Needs

This study was initiated to identify possible methods for increasing flows in the Scott Valley portion of the Scott River and to determine if an instream flow needs study is justified. The feasibility of the identified methods for augmenting flow depends, in part, on the quantity and timing of water needed to meet the fishery needs. Water conservation and transfer methods look promising, but may not provide the needed flows at the proper time. Also, the flow needs of the fishery would determine the required size of a water storage project. And, if KRBFTF desires to have water rights established for the fishery, these fishery needs must be defined. An instream flow needs study, including temperature modeling, would cost $420,000 and take two years to complete, provided that adequate flow conditions occur during the study period.

A previous report published by the DFG in 1974 provides minimum streamflow requirements for anadromous salmonids in the Scott River Basin. This study was cursory at that time, but provided an initial estimate of minimum streamflow requirements. However, better methodologies now exist that are widely accepted. If the SWRCB became involved again, then a new study would certainly be desirable.

Watermaster Service

Five tributaries to the Scott River are currently under watermaster service. These are Shackleford, Sniktaw, Oro Fino, French, and Wildcat Creeks. The entire Scott River could be placed under State watermaster service to insure that the terms of the adjudication are enforced. However, those proposing the watermaster service may have some misconceptions about what a watermaster could do for the area. The watermaster would distribute the available water supply strictly according to the terms of the adjudication. The Scott River adjudication provides for ditch losses and flood irrigation.

The watermaster would have no authority to force any reduction in these recognized losses or practices. During our two-year study, we have not observed any blatant violations of parties diverting more than their adjudicated amounts. In fact, our data indicate that average diverted flows for the Farmers and the SVID ditches are consistently less than the maximum allowed by the adjudication. However, we are aware of users continuing to divert amounts of water in excess of their stock-watering needs after October 15. DFG has also observed that several gravel diversion dams are not removed from the stream channel after the irrigation season has ended. These are situations that DFG and DWR can work towards solving.

Should KRBFTF be successful in securing streamflows for the fishery, watermaster service would be a logical tool to ensure that these streamflows are maintained.

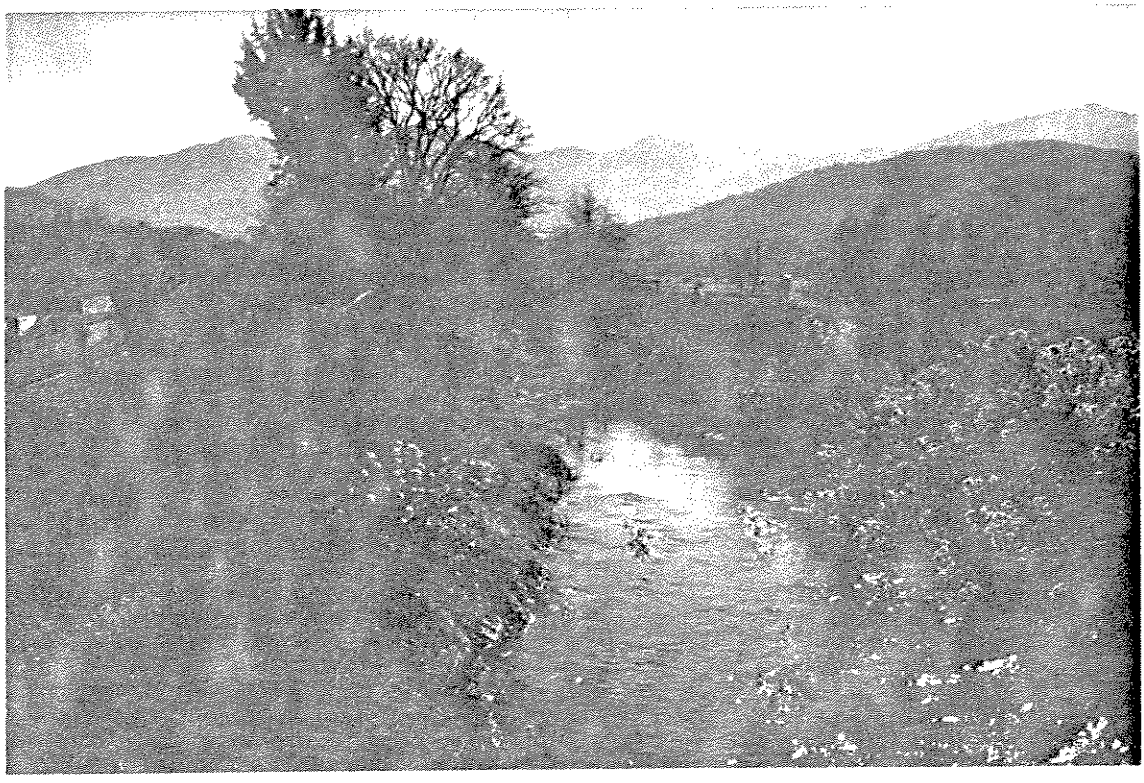
U. S. Forest Service Water Rights

The Scott River Decree (No. 30662 superior court for Siskiyou County) allots water to the USFS for instream use for fish and wildlife within the Klamath National Forest. These water rights are equal in priority to rights allotted to other water users from diversion no. 576 to the USGS gaging station. However, the USFS water rights are inferior to all rights granted above diversion no. 576, which is most of the Scott Valley and its tributaries. Streamflow records show that in most years USFS does not receive its full allotment of water during the summer and fall months.

The Scott River and most of its tributaries are not water-mastered. Consequently, there is no way to know absolutely if there are water users diverting in excess of their allotment during this period. If they are not, the only claim the USFS has is that the other users below diversion no. 576 share proportionately. If the USFS believes it could benefit from watermaster service, it could petition the court. Another avenue is to bring together 15 percent of the water users who want watermaster service and request it from DWR.

Rearing Fish in Irrigation Ditches

One of the specific tasks assigned to this study was to investigate the possibility of using some reaches of larger irrigation ditches for rearing fish. We investigated the three ditches previously discussed in this report. The Butts ditch has steelhead living in it already. These fish somehow passed the screen and are surviving in the ditch. However, the small size of the ditch and frequent maintenance required make it a poor



The SVID ditch is the largest irrigation ditch in the Scott Valley.

candidate for fish rearing. Also, the topography of the terrain through which the ditch travels would not allow the construction of pool habitat necessary for the escapement and resting of the fish. We recommend that the Butts' water right be purchased and the ditch be abandoned.

The Farmers ditch is large enough and has an ample water supply for steelhead rearing. Many steelhead have been observed in the ditch behind the screen. The screen facility would have to be moved down the ditch. This would be a major undertaking. Additionally, the Farmers Ditch Company, as a normal maintenance practice, uses herbicide for weed and moss control in the ditch. This would have to be discontinued for a portion of the ditch if a fish rearing program were undertaken.

The SVID ditch is large and has reaches that could be made into pools. The problem with using this ditch for salmonid rearing is that water temperatures get too high, and water quality is inadequate in late summer to sustain young salmonids. Many times during the last decade SVID has stopped diverting, because streamflow in the river was insufficient to meet the minimum needs of the district. Appendix B contains results from DFG electrofishing in October 1989. The fact that only non-game fish were captured supports this.

Our conclusion from this cursory investigation is that the Butts and the SVID ditches do not lend themselves to a fish rearing operation. Farmers ditch could be used to rear steelhead, but a considerable amount of effort and coordination would be needed.

CHAPTER VI. ADDITIONAL MEASURES

We have addressed two additional needed measures: First, sediment and erosion control and second, the need for stream channel alterations. Some of the sediment control practices currently used on the Trinity River might also be applied to the Scott River and its tributaries to reduce the amount of sediment reaching the river. There are some locations on the Scott River where stream channel work will bring immediate and lasting improvement to the fish habitat. These locations are where sediment is not a problem and the existing substrate is good.

Erosion and Sediment Control

The Scott River, in the 19 miles from the mouth of French Creek to the end of the valley, contains large quantities of sand-size sediment. This sediment comes from the granitic and dioritic soil formations of the Marble and Salmon Mountains. French and Sugar Creeks are major producers of this sandy sediment. It collects in the flatter reaches of the river and destroys fish spawning and rearing areas by filling pools and covering riffles. The shallow water conditions created by this pervasive sediment encourages rapid heating of streamflows and greatly reduces the quantity and quality of fish habitat.

This sediment problem on the Scott River has existed for several decades. Its total elimination may not be feasible, but some actions could be taken to reduce the total quantity of sediment present in the stream channel. A detailed analysis of this problem was not conducted during this study, because a separate, ongoing investigation concentrates on this issue. However, experience gained on the Trinity River in dealing with a similar sediment problem is cited here to indicate the types of actions that could be applied on the Scott River.

The methods of sediment control used on Grass Valley creek, a tributary of the Trinity River below Lewiston, consist of:

1. Catchment dam construction in the upper watershed,

2. Watershed restoration by re-establishing groundcover on bare areas,

3. Construction of sediment collection pools at the mouth of the creek.

Dam construction was by far the most expensive action with a cost of around $20,000,000. This alternative is probably not applicable to the Scott River because of the high expense and lack of suitable dam sites that would not block quality fishery

Sediment pools at the mouth of Grass Valley Creek stop the sediment from reaching the Trinity River.

habitat. The other two methods, watershed restoration and pool construction, may have some application to the Scott River.

Vegetative restoration is needed in the French Creek watershed and probably in the Sugar Creek and Etna Creek watersheds. Many scars from logging and road construction exist in these watersheds which produce significant quantities of sediment. SCS has contracted with a private consultant to determine the sources, type, and quantity of sediment production in the Scott River watershed. A plan should be developed to correct the problems producing the sediment.

Construction of sediment collection pools near the mouths of sediment producing tributaries is an alternative used on the Trinity River. It may also have application on the Scott River.

Additional site specific analysis is required to establish the feasibility of constructing and maintaining such pools. Since 1984, three pools have been constructed at the mouth of Grass Valley Creek in the Trinity River watershed. The lower pool was re-excavated once after the 1986 high water, and the upper pool was partially re-excavated in 1989. Sediment removed from these pools is deposited on nearby adjacent land and covered with topsoil and revegetated with grass and trees. The unit cost of constructing these pools and disposing of the removed material averages about 8 dollars per cubic yard. A reduction in this cost is expected during the maintenance phase.

Opportunities for applying this sediment control method to the Scott River may exist near the mouths of French and Sugar Creeks. One or more sediment control pools could be constructed on French Creek between Highway 3 and the river. The sediment from these pools could be spread on adjacent land which could be revegetated. Another possibility is to haul the sediment to the dredger tailings area three miles upstream. This material could be used to cover existing tailings so that vegetation would grow

where none exists presently. This disposal material could also be used to fill pits created by ongoing gravel mining.

The mouth of Sugar Creek could be diverted into pools created by future gravel mining, thus eliminating the need for periodic excavation and disposal of this material at another location. This would substantially reduce the operating cost, and the original pools might be constructed by a gravel operation without incurring additional cost. The existing fish habitat of Sugar Creek should be evaluated before such a plan is recommended.

These potential sediment control opportunities must receive considerably more analysis before their applicability to the Scott River can be determined. Specifically, the relative quantities of sediment production from various tributaries must be known before sediment control sites are selected. Also, this work must be consistent with the Klamath River Fishery Management Plan, and adequate funding to support the work must be obtained.

Stream Channel Alteration

Along with looking for additional water sources for flow augmentation, we briefly examined the river's fishery habitat from Callahan to the canyon in an attempt to find ways to better use the existing water supply. The river's geomorphology in the 28 miles below Callahan has been severely altered due to the mining in the upper valley, agricultural practices, and timber production in the upper watershed.

The river channel from Callahan to Fay Lane is stable and free from fine granitic sands. This is due to the higher channel gradient and the confinement by the mountains, which increase stream velocities and transports the sediment. Sediment deposition is not a problem in this reach. Reconstruction would benefit this reach, because the substrate indicates that spawning size materials are stable for the flow regime. If stream velocities were too great, substrate material of this size would not be present in abundance.

Below Fay Lane the channel gradient flattens, and the stream is unconfined. This allows deposition, as evident from the channel substrate being dominated by sand. With the existing conditions in the watershed, reconstruction in this reach would have limited benefits.

Below the Scott Valley, the river gradient increases through the canyon and deposition is not a problem. However, the substrate is mainly bedrock. Reconstruction in this reach would also have limited benefits, because the channel shape and meander patterns are defined by the bedrock.

The Upper Scott Valley floor from Callahan to just above Fay Lane has been heavily mined using floating dredges that could dredge 55 feet below the water surface. This process removed almost all of the fines, destroyed the river's riparian habitat, altered the river's natural cross-sectional configuration, and did major damage to the river's capacity to maintain surface flow. The mining process removed the fines, leaving behind the coarser gravel and cobbles that are more pervious than the original ground. This coarser substrate allows the surface water in the river to infiltrate rapidly. Typically during late June or early July, streamflow in the river below the Farmer's Ditch Company diversion drops to around 30 cfs. At this point, the infiltration rate is higher than the ability of the river to sustain a surface flow, causing the river to go dry. Surface flow begins to rise approximately 8,000 feet downstream, and at Fay Lane the river has continuous flow again. In this reach that goes dry, a small pool retains water throughout the summer. The existence of this pool suggests that subsurface water flows into the pool and sustains it, and that the water table is not far below the surface of the stream channel. DFG electrofished this pool and found steelhead rainbow trout survived the summer. Additional information on this electrofishing is available in Appendix B.

The river channel between Farmer's ditch and Fay Lane is characterized by a flat bottom, 100 to 300 feet wide, and very steep banks. There is very little vegetation on the banks to provide a healthy riverine habitat. This desert-like section of river could be modified by creating low water, active, and bankfull channels with a floodplain, and re-establishing vegetation (Trinity Fisheries Consulting, February 1990). If this were done, it could keep the water from going subsurface. This would result in additional productive fishery and wildlife habitat.

Another section of the Upper Scott River that needs reconstruction work is just above the old iron bridge on Wildcat Creek Road. There is a 1,000-foot reach of river channel that is too wide and braided. This reach is a fish passage barrier at low flows. The section could be rebuilt by decreasing the channel gradient and reconstructing the channel as previously

A pool on the Scott River below Fay Lane. Juvenile steelhead survive the summer in this pool.

described. This would improve the fish habitat, allow migration, and could be realigned to relieve the flood pressure on the bridge. There are additional reaches in the river between Callahan and the Farmer's ditch that would benefit from channel modification.

CHAPTER VII. FLOW AUGMENTATION ACTION PLAN

This chapter presents an action plan for augmenting streamflows in the Scott River. The action items listed and discussed below were formulated after informal discussions with staff members of SWRCB. The completion of these items will provide the additional information required for solving the fishery flow needs of the Scott River. Whether KRBFTF chooses to take action to develop streamflows, ask the court to reconsider the adjudication, or seek for the public trust doctorine to be applied, these action items will address many key issues.

Item 1 - Perform an Instream Flow Needs Study

As discussed previously in this report, there are potential methods for increasing streamflows in the Scott River. The feasibility of these methods will depend, in part, on the amount of water needed to meet the specific needs of the fishery. The KRBFTF needs to know how much water is needed to plan actions to achieve this. Additionally, the public and the court will demand a scientifically quantified amount. An instream flow needs study should receive high priority from KRBFTF in order to move forward with solving the fishery flow needs.

Item 2 - Investigate Alternative Water Sources

This report provides cursory-level planning information on the potential for increasing streamflows in the Scott River. If KRBFTF decides to pursue one or a combination of the identified methods, a feasibility investigation will be necessary. Depending upon the identified flow needs, water development may be the only way to provide the quantity of water required. The burden to have this work done would rest with KRBFTF. Even if their intention is to ask the court to reconsider the allocation of water, KRBFTF would be required to show alternatives for meeting the needs of the agricultural water users.

Item 3 - Monitor Surface Water Flow

Surface water flow should be monitored at more locations along the Scott River. The only active stream gaging station on the Scott River is located approximately 10 miles west-northwest of Fort Jones. This single gage is not adequate for the investigations and documentation that need to be done. Historically, gages were located on the East Fork and South Fork of the Scott River. As a minimum, these gages should be reestablished and a gage installed on the Scott River in the middle of the valley. These stream gages are necessary to document the existing conditions and assist in water development studies. In the future, the gages would be used to manage and monitor the augmented streamflows.

Item 4 - Monitor Ground Water

Ground water monitoring in the Scott Valley should be expanded to fully cover the valley. DWR presently measures ground water levels at five wells in the valley on a semi-annual basis. Overall, ground water capacity and annual ground water fluctuations could be essential information in selecting alternatives for augmenting streamflows.

Item 5 - Fish Population and Use Data

Fish population data under current conditions, should be documented to provide a basis for setting restoration goals.

Item 6 - Develop a Fishery Restoration Plan

A comprehensive restoration plan for the Scott River should be developed and implemented. All components of the physical habitat should be addressed. The need for instream flows may be reduced somewhat by improving substrate and cover conditions in the stream channel. KRBFTF should demonstrate a commitment

toward addressing all the actions needed to improve the fishery habitat, not just to increasing flows.

A restoration plan should include both long-term objectives and more immediate tasks. Some logical components of this plan follow.

1. Riparian Zone
   A program to re-establish the riparian zone along the river should be planned and developed.

2. Sedimentation
   A long-range plan should be developed to reduce the influx of sediment to the river. This should include watershed restoration as well as direct sediment removal from the river.

3. Reconstruction
   A riffle and meander reconstruction plan should be developed for the Scott River. Where possible, a more natural geomorphic form should be restored to the river and thereby help the river convert back to its once highly productivity state. At the present time only the reach of the river from Callahan to approximately Fay Lane is suitable for reconstruction.

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APPENDIX A

DFG WILDLIFE FIELD INSPECTION RESULTS

State of California

Memorandum

To : Glyn Echols
DWR - Northern District
2440 Main Street,
Red Bluff, CA

Date : January 7, 1991

From : Department of Fish and Game

Subject : Reconnaissance Level Review of Wildlife Resources at Proposed Reservoir Sites in the Scott River Watershed

Attached is a copy of the subject draft report. A copy of this report is concurrently being sent to DFG Region 1 for a routine internal review. Any forthcoming comments from the regional office will be incorporated into a final report which will be mailed mid-January. If you have any immediate questions regarding this report please contact Frank Wernette or myself at ATSS 8-423-7675.

Laurie Briden

Laurie Briden
Wildlife Biologist
Bay-Delta Project

cc: Charlie Brown
Tom Stone - DFG Reg. 1

Enclosure

State of California
The Resources Agency
Department of Fish and Game

Reconnaissance Level Review of Wildlife Resources at Proposed Reservoir Sites in the Scott River Watershed

Draft Report

January, 1991

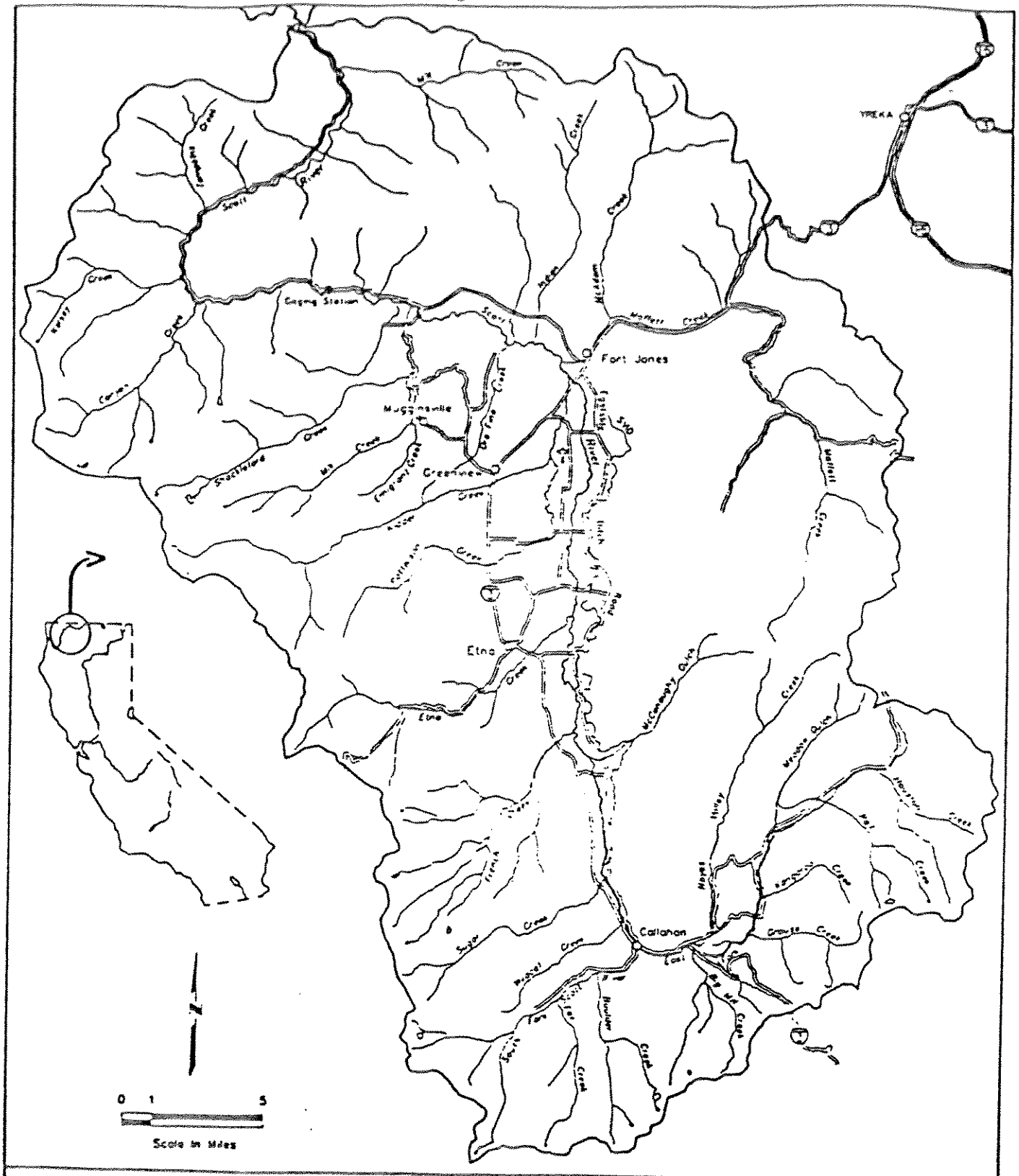
INTRODUCTION

The Scott River watershed is located southwest of Yreka, California in Siskiyou County (Figure 1). Potential water storage reservoirs in this area have been investigated in the past. DWR Bulletin No. 83, published in 1964, presents work conducted during the early to mid-1950's. The Soil Conservation Service published a report in 1972, "Inventory and Evaluation of the Natural Resources Scott River watershed". This report reviewed the work covered in Bulletin No. 83 and presented additional reservoir sites. These investigations looked at potential reservoir sites with agricultural water supply and flood protection as the major objectives. Consequently, most of these potential sites would not provide benefits to the fishery.

DWR has stated that there would be benefits to the Scott River Valley from a water storage project and has reasoned that a reservoir in the upper third of the watershed would have the most value to the main stem of the Scott River. In DWR's view, a reservoir could improve the fishery in the following ways:

1. Improve water temperatures.
2. Provide a firm water source for a rearing facility for the millions of salmonid fry that are rescued from the Scott River and tributaries each year.
3. Provide additional or improve existing habitat on the tributary below the dam.
4. Provide an opportunity, especially in drought times, for fishery exports to meet the needs of fish.

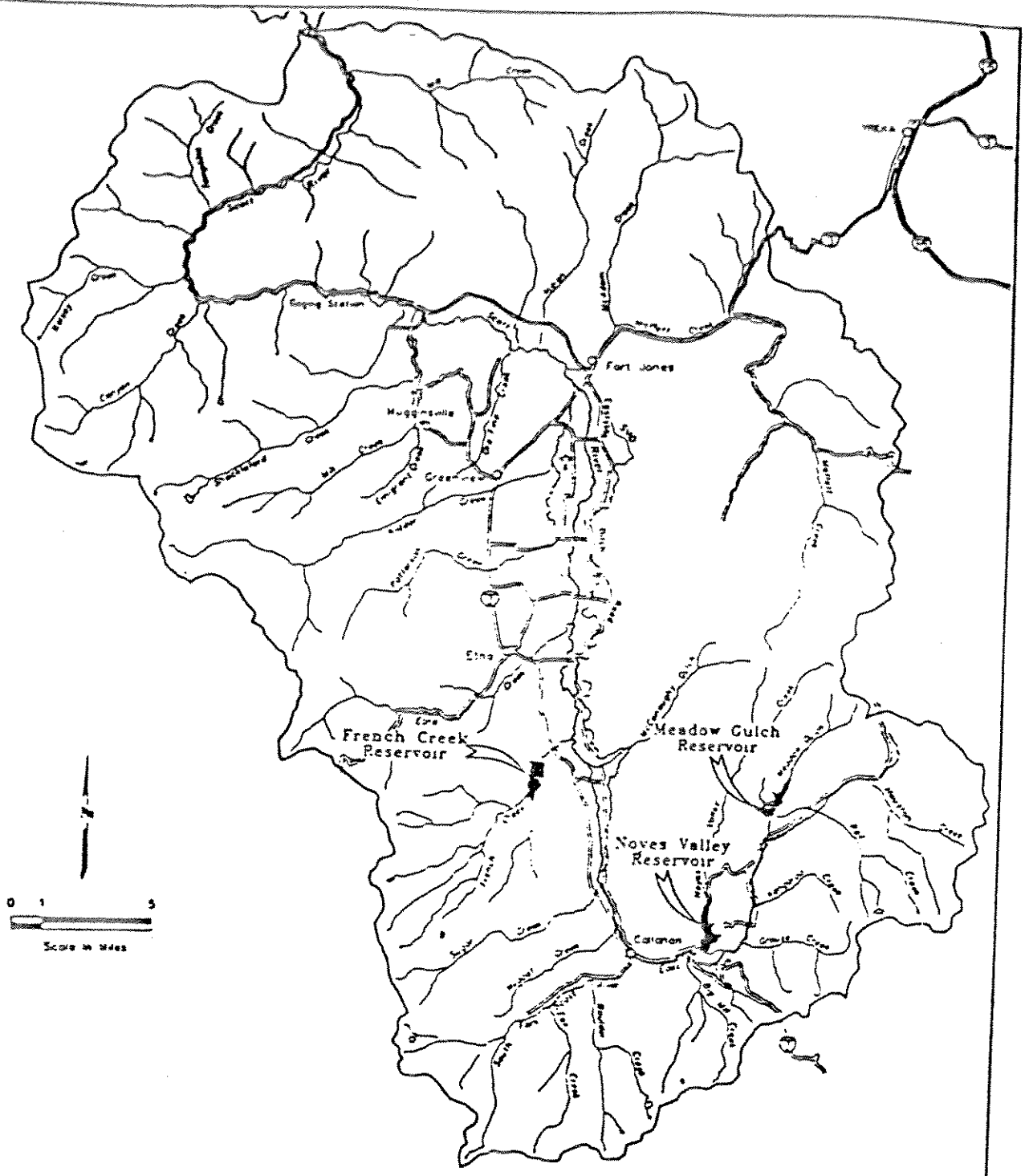
Considering the above, DWR is investigating one previously studied reservoir, the French Creek Reservoir. The proposed French Creek Reservoir site is located approximately one-half mile above Highway 3 (Figure 2). Two previously unstudied sites have been located which also fit the criteria of improving the fishery. These two sites are the Noyes Valley Reservoir and the Meadow Gulch Reservoir (Figure 2). The Noyes Valley Reservoir site is located on Noyes Valley Creek approximately 2.5 miles east of Callahan and approximately 2,000 feet upstream from the confluence with the East Fork Scott River; the Meadow Gulch Reservoir is located in Meadow Gulch near Gazelle Mountain and is approximately 8.9 miles northeast of Callahan.



Department of Water Resources
Northern District

Scott River Watershed
Siskiyou County, California

Figure 1



Department of Water Resources
Northern District

Scott River Watershed
Siskiyou County, California
Proposed Reservoir Sites
Figure 2

METHODS

A search of records from Department of Fish and Game's (DFG) Natural Diversity Data Base and review of information received from the Wildlife Habitat Relationship System for Siskiyou County was conducted.

Doug Blankenship, Department of Water Resources, Assistant Engineering Technician, met with a DFG Contract Services biologist and drove to the three sites, and inspected the approximate location of the dams and areas that would be inundated with water. DFG personnel in the district office familiar with the project area were interviewed.

Field work consisted of a one day reconnaissance level effort. Photos of each of the three areas were taken. Effort were concentrated on the site's mammalian resources.

RESULTS AND DISCUSSION

No record of listed species were found in the Natural Diversity Data Base for the proposed reservoir sites. Table 1 lists the endangered, threatened species and candidate species that may occur in the Scott River Watershed according to the Wildlife Habitat Relationship System. Table 2 lists the birds incidentially observed during the brief field inspection.

Local records show that blacktail deer and mountain quail are the primary game species with black bear and mountain lions also common. The area is heavily used by wintering raptors such as the red-tailed hawk.

The deer in this protion of Siskiyou County are part of the Klamath deer herd. The Scott River Valley is critical winter range for this herd with winter densities estimated to be 50 deer per square mile. All three proposed reservoir sites fall within this winter range.

To date, rural residential development in Scott Valley has reduced the extent of the deer winter range and there is the possibility of additional land use changes for rural subdivision development and the establishment of small "ranches".

French Creek Reservoir

The proposed French Creek Reservoir has a planned storage capacity of 20,000 acre-feet and a surface area at spillway lip of 413 acres.

Records indicate this site falls on the western edge of the deer herd's wintering range and contains slightly lower densities.

DFG did not have access to this proposed reservoir site during this evaluation. Further studies will be necessary to assess the impact to deer wintering in this area.

Noyes Valley and Meadow Gulch Reservoirs

The proposed Noyes Valley and Meadow Gulch reservoirs have planned storage capacities of 20,000 acre-feet. Surface area at the spillway lip of Noyes Valley would be 350 acres and 387 acres for the Meadow Gulch Reservoir.

A Conservation Easement affecting land in Noyes Valley was deeded to DFG. The possibility of this conflicting with the placement of the proposed Noyes Valley Reservoir was investigated. The proposed reservoir is in Township 41 North and the Conservation Easements are to the north in Township 42 North.

The proposed areas to be inundated are pastures currently being used for cattle grazing and related livestock operations. Pasture habitats are used by a variety of wildlife depending upon geographical area and types of adjacent habitats. Ground-nesting birds nest in pastures if adequate residual vegetation is present at the onset of the nesting season. Deer also graze pastures particularly when adjacent escape cover is available. The primary vegetation adjacent to both areas of inundation is buck brush (Ceanothus cuneatus), Oregon oak (Quercus oregona), Yellow pine (Pinus ponderosa) and Birch-leaf mahogany (Cercocarpus betuloides).

RECOMMENDATIONS

Due to the value of the Scott River Valley as deer wintering range further studies will be necessary to assess the impact to deer. Impacts from the construction of one of the proposed reservoirs will include inundation, loss of habitat from facility construction, and possible interference with daily and seasonal movements of deer with conveyance facilities. Deer pellet group counts and composition counts will be needed to estimate usage of the area. Surveys should be completed in adjacent areas to provide information necessary to mitigate for project impacts. Telemetry studies could be used to evaluate conveyance facility impacts.

In addition, surveys will be necessary to determine if any listed plant or animal species occur in the area. It will be necessary to time botanical surveys to take place during the time of the year when flowering occurs of any species likely to occur. Animal surveys should include small mammal live-trapping, variable circular plots, riparian transects and raptor routes.

A comprehensive study of all potential impacts to fish and wildlife is needed before a determination can be made regarding the value of the proposed reservoirs.

Table 1. Listed Endangered and Threatened Species and Candidate Species That May Occur in the Scott River Watershed, Proposed Reservoir Sites.

Species	Definition
Siskiyou Mountain Salamander	CT, FS
Common Loon	CSC
Double-Crested Cormorant	CSC
Osprey	FS, CSC
Bald Eagle	FE, CE, CP
Northern Harrier	CSC
Northern Goshawk	FS
Swainson's Hawk	CSC
Golden Eagle	CP, FS
Merlin	CSC
Peregrine Falcon	FE, CE, CP
Prairie Falcon	FS
Blue Grouse	FS
Sandhill Crane	CP
Burrowing Owl	CSC
Spotted Owl	FS, CSC
Long-eared Owl	CSC
Short-eared Owl	CSC
Purple Martin	CSC
Bank Swallow	CT
Yellow Warbler	CSC
Yellow-breasted Chat	CSC
Ringtail	CP
Wolverine	CT, CP, FS

Status Definitions:

FE: Federally Endangered
CSC: California Special Concern
CE: California Endangered
CT: California Threatened
FS: Forest Service Sensitive

TABLE 2. LIST OF BIRDS OBSERVED IN THE SCOTT RIVER WATERSHED PROPOSED RESERVOIR SITES

Order Ciconiiformes (Herons, Storks, Ibises, and Relative)
- Family Ardeidae (Herons and Bitterns)
  - Ardea herodias - Great Blue Heron

Order Falconiformes (Vulotures, Hawks, and Falcons)
- Family Accipitridae (Hawks, Old World Vultures, and Harriers)
  - Circus cyaneus - Northern Harrier[1/]
  - Buteo jamaicensis - Red-tailed Hawk
- Family Falconidae (Caracaras and Falcons)
  - Falco sparveius - American Kestrel

Order Passeriformes (Perching Birds)
- Family Corvidae
  - Corvus corax - Common Raven
- Family Emberizidae
  - Sturnella neglecta - Western Meadowlark
  - unidentified sparrow

1/ Species of Concern - DFG Wildlife Management Branch Administrative Report No. 78-1 (June 1978)

APPENDIX B

DFG ELECTROFISHING RESULTS

State of California The Resources Agency

Memorandum

To : Files Date: November 21, 1989

From : Department of Fish and Game

Subject: Results of sampling fish in Scott River, October, 1989

A team of Department of Fish and Game (DFG) biologists and a Department of Water Resources (DWR) engineer travelled to Scott River, Siskiyou County, to sample fish in the river and in ditches that divert water from the river. DFG employees Charlie Brown, Dawn Bumpass, and Julie Brown were responsible for fish sampling equipment and Glen Eckols from DWR located areas to be sampled. Fish were sampled to determine their relative abundance in the Scott River between Callahan and Etna and in the Scott Valley Irrigation Ditch (Figure 1).

Fish were sampled on October 17 and 18, 1989. Scott River was sampled near Callahan (UTM No. 152781) and 300 feet downstream from the bridge on Fay Lane (UTM No. 143823). Scott Valley Irrigation Ditch was sampled at its point of diversion from Scott River (UTM No. 130869) and near Etna (UTM No. 144985) (Figure 1). Fish were stunned by electricty generated by a Smith-Root Model VII electrofisher. They were captured in dip nets and placed in buckets. A representative number of fish from each sample were measured and the amount of water each displaced in a glass graduated cylinder was recorded as weight.

We caught Pacific lamprey, steelhead rainbow trout, speckled dace, Klamath smallscale sucker, and coastrange sucker (Table 1). The most common fish we saw was steelhead rainbow trout. We captured one steelhead rainbow trout in Scott Valley Irrigation Ditch and 115 in Scott River. The trout we caught in the ditch was 168 mm fork length. The trout we shocked in Scott River ranged from an adult 560 mm fork length to a juvenile 53 mm fork length. We netted

Table 1. Fishes caught in Scott River, California, 1989

Common Name	Scientific Name
Pacific lamprey	Lampetra tridentata
Steelhead rainbow trout	Oncorhynchus mykiss
Speckled dace	Rhinichthys osculus
Klamath smallscale sucker	Catostomus rimiculus
Coastrange sculpin	Cottus aleuticus

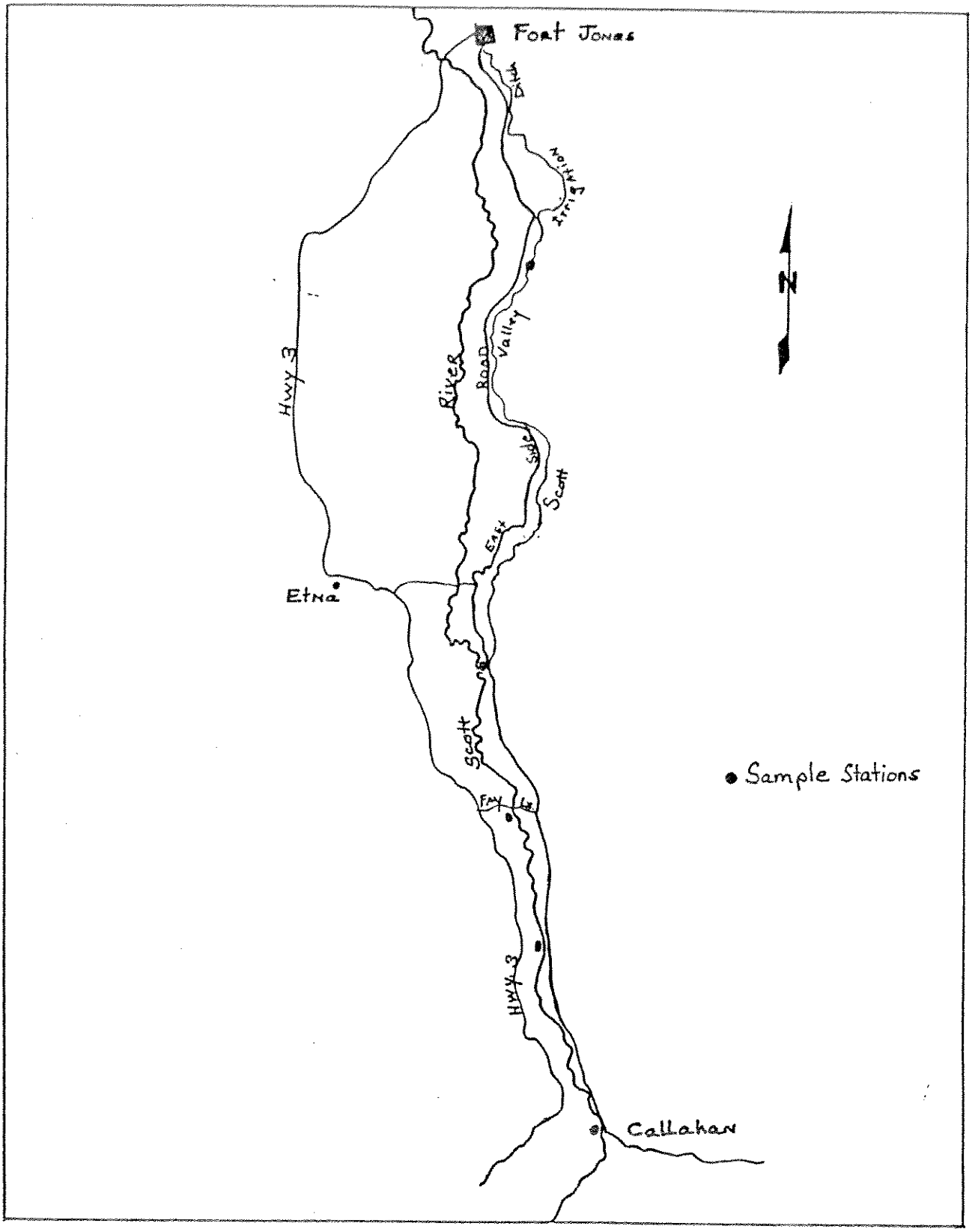


Figure 1. Locations where fish were sampled in the Scott River and the Scott Valley Irrigation Ditch, October 17-18, 1989.

18 Klamath smallscale suckers. They ranged from 65 to 80 mm fork length. We saw most suckers in the ditch. Speckled dace were common in the river but uncommon in the ditch. We shocked two in the ditch and 39 in the river. Dace in the ditch were 45 and 58 mm fork length. Dace in the river varied from 40 to 75 mm fork length. We only caught sculpin and lamprey in the river. We saw nine sculpin and three lamprey in the river. Sculpin ranged from 47 to 94 mm fork length and lamprey measured 70, 95, and 135 mm fork length (Table 2).

TABLE 2. Length and weight of fishes caught in the Scott River, California, 1989.

DATE	LOCATION	UTM NO	STEELHEAD FORK LENGTH MM	STEELHEAD WEIGHT ML	KLAMATH SMALLSCALE SUCKER FORK LENGTH MM	SPECKLED DACE LENGTH MM	COASTRANGE SCULPIN FORK LENGTH MM	PACIFIC LAMPREY FORK LENGTH MM
10-17-89	SCOTT VALLEY DITCH NEAR ETNA	144985				53		
10-17-89	POINT OF DIVERSION SCOTT VALLEY DITCH	130869	168	50	65	45		
					65			
					68			
					70			
					70			
					70			
					72			
					73			
					74			
					75			
					75			
					75			
					76			
					77			
					78			
					78			
					80			
10-17-89	POOL IN SCOTT RIVER NEAR CALLAHAN	152781	53	2	66		68	70
			59	3			74	95
			66	2.5			85	135
			66	3				
			66	3				
			74	4.5				
			76	5				
			76	5				
			99	10				
			137	30				
			PLUS 76 SH-RT					
10-18-89	SCOTT RIVER 300 FT BELOW FAY LN	143823	60	2		40	66	
			65	3		50	47	
			67	4		55	87	
			70	3.5		55	94	
			82	6		57	85	
			85	7		60	50	
			90	9		62		
			95	9		64		
			102	12		70		
			102	11		75		
			265	-		PLUS 29 DACE		
			560	-				
			PLUS 17 SH-RT					

State of California

The Resources Agency

Memorandum

To : Bill Mendenhall
Department of Water Resources

Date November 8, 1990

From : Department of Fish and Game

Subject: Results of 1990 Electrofishing in Scott River and Tributaries

Department of Water Resources, Northern District funded biologists with the Contract Services Section (CSS) of the Department of Fish and Game to sample juvenile steelhead in the Scott River and selected tributaries. CSS biologists sampled two pools in the Scott River and sections of an irrigation ditch last year. The objectives of this year's work were to determine presence and relative abundance of juvenile steelhead in two pools in Scott River and in sections of French Creek, Noyes Valley Creek, and Meadow Gulch (Figure 1).

Fish were captured in net-enclosed sections by biologists operating a battery-powered backpack electroshocker. Captured fish were removed from the net-enclosed section after each pass. The length, average depth, and average width of each station was measured. Standing stock estimates were developed using MICROFISH 3.0, a computer program.

The weights of steelhead were determined by displacement. Weights were measured for steelhead, but not for nongame fishes. Fork length of each fish caught was measured to the nearest millimeter.

Scale samples were taken from steelhead over 100 mm in length. Scales were mounted dry between microscope slides, and their images were projected on a NCR microfiche reader at a magnification of 42x. Scale measurements were recorded to the nearest millimeter along the anterior radius of the anterior-posterior axis of the scale.

Scott River

CSS biologists sampled fish in two pools in the Scott River. Pool 1 was located in the floodplain of the river, but it was not connected to the river by surface flow. It had a surface area of 432.6m^2. Pool 2 was in the river. It had surface water flowing into and from it. Pool 2 had a surface area of 1092.5m^2 (Figure 1).

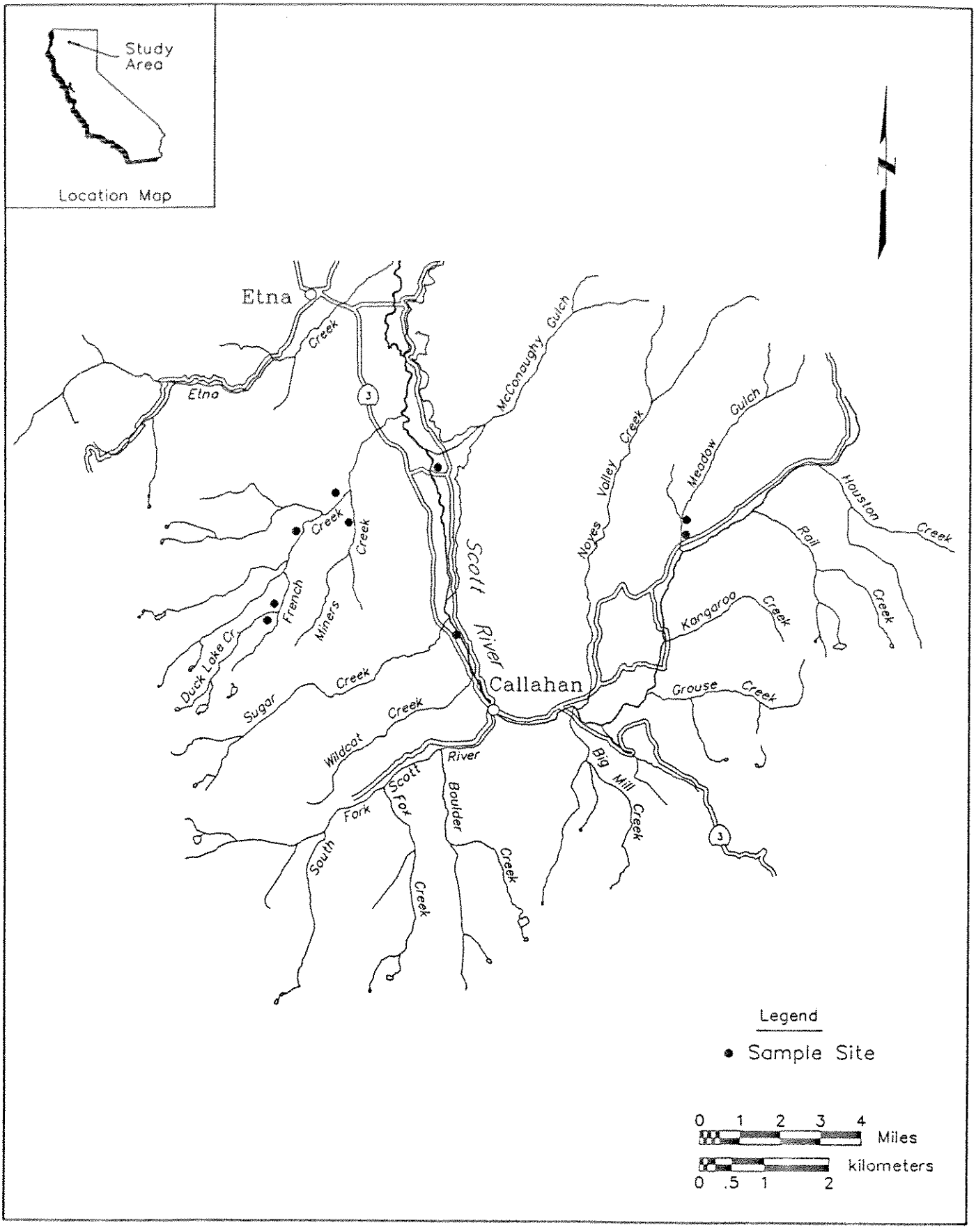


Figure 1. Area sampled for juvenile steelhead, Scott River, California 1990.

We estimated that Pool 1 held 75 juvenile steelhead. Biomass was 0.2 g/m^2. All but two steelhead were age 0+ (young of the year). Two were age 1+ (Appendix 1). Pool 2 held fewer fish. We calculated a steelhead population of 40. Biomass was 0.5 g/m^2 (Table 1). Age composition in Pool 2 was more diverse than Pool 1. We caught four age 1+ fish, two age 2+ and one adult steelhead. The remainder of our catch was age 0+ (Appendix 2).

TABLE 1. Population Estimates, Density, and Biomass of Steelhead Caught in the Scott River and Tributaries, 1990.

Location Scott River	UTM Number	Population Estimate	95% Confidence Interval	Steelhead Density (fish/m^2)	Biomass (g/m^2)
Pool 1	149787	75	39-168	0.2	0.2
Pool 2	140826	40	31-60	0.1	0.5
French Creek					
FC-2	089801	128	108-151	0.6	3.8
FC-5B	081768	50	46-57	0.2	2.5
FC-5	083781	35	33-41	0.2	3.4
Duck Lake Creek	079767	21	21-23	0.2	6.7
Miner's Creek	110809	233	198-268	1.7	7.4

Other fish caught in the Scott River include tui chub, Klamath smallscale sucker, marbled sculpin, green sunfish, Pacific lamprey, and speckled dace (Table 2).

TABLE 2. Common and Scientific Names of Fishes Caught in the Scott River, 1990

Common Name	Scientific Name
Pacific lamprey	Lampetra tridentata
Steelhead	Oncorhynchus mykiss
Speckled dace	Rhinichythys osculus
Tui chub	Gila bicolor
Klamath smallscale sucker	Catostomus rimiculus
Green sunfish	Lepomis cyanellus
Marbled sculpin	Cottus klamathensis

French Creek

We sampled fish in three locations in French Creek. The lowest site, FC-2, is located 14.0 km miles upstream from the mouth of French Creek at Universal

Transverse Mercator (UTM) 089801. It had a surface area of 213.3m^2. The Middle site FC-5 is 19.0 km above the mouth at UTM 083781. It had a surface area of 156.1m^2. The upper site, FC-5B, is 21.7 km upstream from the mouth at UTM 081768. This site had a surface area of 204.9m^2.

The sites we sampled indicated that French Creek is a very productive waterway for steelhead. Site FC-2 held an estimated 128 steelhead fry. Seven juvenile steelhead were age 1+ and one was age 2+ (Appendix 3). These fish may smolt this winter and spring and migrate in the spring. Biomass of steelhead at this station was 3.8 g/m^2. Station FC-5 contained an estimated 35 steelhead. Eleven were age 1+ and two were age 2+ (Appendix 4). Steelhead biomass at this station was 2.5 g/m^2. The estimated population of steelhead in station FC-5B was 50. Five steelhead were age 1+ and two were age 2+. Biomass of steelhead was 3.4 g/m^2 (Table 1) (Appendix 5).

Miner's Creek

Miner's Creek is a tributary to French Creek. The station we sampled, MC-1, is located 2.4 km above the confluence of French Creek and Miner's Creek at UTM 110809. The surface area of this site was 137.3m^2.

Miner's Creek was the most productive area we sampled. We caught 198 and estimated this section held 233 steelhead. Twelve fish were age 1+. All others were age 0+ (Appendix 6). Biomass of steelhead at this station was 7.4 g/m^2 (Table 1).

Duck Lake Creek

Duck Lake Creek is a tributary to French Creek. It is located 21.9 km above the mouth of French Creek. The station we sampled was 0.1 miles above the mouth of Duck Lake Creek. The surface area of the station was 115.9m^2. We estimated that the section of Duck Lake Creek we sampled held 21 steelhead. Five of these fish were age 1+, while 16 were age 0+ (Appendix 7). We calculated biomass at 6.7 g/m^2 (Table 1).

Meadow Gulch

Meadow Gulch is a tributary to the East Fork of Scott River. It joins the East Fork 40.2 km above Callahan. It is dry during summer above a diversion of water that flows into it from the East Fork. We sampled one station, MG-1, immediately above the culvert that carries Meadow Gulch under the road that connects Callahan to Gazelle. The second station MG-2, we sampled was located 4.2 km above the culvert. Station MG-1 was a pool formed by water flowing through a pipe and dropping into the stream. Station MG-2 was a narrow channel running through a cow pasture. The area of station MG-1 was 20m^2 and the area of station MG-2 was 148.6m^2.

We made one pass at each station because we made the stream turbid as we sampled fish. The stream did not clear while we were at the site. We caught 17 steelhead at MG-1. One was age 0+, 10 were age 1+, and 6 were age 2+. We caught 7 steelhead at station MG-2. Two were age 0+, 4 were age 1+, and 1 was age 2+.

Noyes Valley Creek

Noyes Valley Creek (Figure 1) was dry. We inspected it at various sites along the Callahan-Gazelle road. Substrate and cover would be suitable for steelhead spawning and rearing when cool water is present. Adult steelhead could spawn here if winter rain and snow keep water in the creek long enough.

Frank Wernette

Frank Wernette
Contract Services Section Supervisor

APPENDIX 1

Catch of Steelhead in an Offstream Pool (UTM 149 787) in the Scott River, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
43	1	45	1
43	1	45	1
45	1.5	46	1.5
48	1	47	1
48	1	48	1.5
48	1.5	48	1.5
50	2	48	1.5
50	2	49	1.5
52	1.5	49	1.5
52	1.5	51	2
52	1.5	52	1
53	2	53	2
54	1.5	55	2
57	2	59	2.5
58	2	59	2.5
59	2	60	2.5
59	2.5	111	15
60	2		
60	2.5		
61	2		
63	2		
73	3		

APPENDIX 2

Catch of Steelhead in a Pool (UTM 140 826)
in the Scott River, 1990

FORK LENGTH (mm)	FORK WEIGHT (g)	LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
63	4	60	1.5
66	3	61	3
74	5	63	2
75	5	64	3
81	5	66	3
83	6	69	4
83	7	72	4
84	5	74	3.5
85	7	76	4.5
86	7	83	6
88	8	84	7
90	8		
92	9		
97	10		
103	13		
135	29		
143	30		
198	180		
210	160		

APPENDIX 3

Catch of Steelhead at Station FC-2 (UTM 089 801)
in French Creek, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
54	2	56	2
55	2	56	2
57	2.5	56	2
57	2	57	2
57	2	58	2
58	3	58	2
58	2	59	2
59	2	60	3
59	3	61	2
59	2	61	3
59	2	61	2.5
59	2	64	2.5
59	2	64	3
60	2	65	3.5
60	2	67	3.5
61	2	67	3
63	3	67	3
64	3	68	3
64	3	69	4
64	2	69	3.5
65	3	69	4
65	3.5	70	4
65	3	71	4
65	3	71	4.5
65	2	72	5
66	3	75	5
66	4	77	6
66	2.5	79	5
66	3	83	7
67	4	105	13
68	4	124	21
68	3.5	130	23
68	3		
69	4		
69	3.5		
69	4.5		
70	4		
70	4		
70	4.5		
70	4		
70	4.5		
70	3		
71	4		

FORK LENGTH (mm)	WEIGHT (g)
71	4
72	5
72	4.5
73	5
73	4
73	4.5
74	5
75	4.5
75	4
76	5
77	5
77	5
77	5
78	5
79	5.5
79	6
81	6
81	6
90	9
105	14
109	15
115	18
116	21
117	16
120	18
120	17
122	20
125	19
140	30
142	32
167	50
169	110

APPENDIX 4

Catch of Steelhead at Station FC-5
(UTM 081 768) in French Creek, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
61	2.5	68	4
62	2.5	69	4
65	3	70	4
69	3.5	74	5
70	5	80	6
79	6	81	7
90	8	91	9
91	7.5	118	9
92	10		
93	9		
93	9		
95	10		
96	10		
98	10		
100	11		
102	18		
105	12		
107	15		
113	15		
119	20		
125	21		
140	28		
152	40		
190	80		
219	120		

APPENDIX 5

Catch of Steelhead at Station 56 (UTM 081 768) in French Creek, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
47	1.5	45	1
49	1	48	1.8
51	2	49	1
53	2	51	2
53	2	54	2
54	2	74	5
54	2	81	6
54	2	82	6
55	2	82	7
55	2	84	7
58	2	121	18
60	2		
74	5		
75	4		
80	8		
83	7		
92	10		
105	14		
121	20		
147	37		
178	60		
212	110		
215	120		
PASS 3		PASS 4	
		50	1.5
47	1.5	51	1.5
49	1	55	2
50	2	76	5
52	1.5		
55	2		
85	7		
91	10		
128	19		

APPENDIX 6

Catch of Steelhead at Station MC-1 (UTM 110 809)
in Miner's Creek, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
42	1	43	1
51	1.5	48	1
52	1.5	52	1.5
54	2	56	2
54	2	56	2.5
56	2	57	2
56	2	58	2
58	2.5	58	2
59	2	59	2
59	2.5	59	2
59	3	59	2
59	2	61	2
59	3	62	2
59	3	63	2
59	2	63	2
59	2	63	2.5
60	3	63	2.5
60	2	64	2.5
60	3	64	3
60	2	65	3
60	2	65	3
61	2	65	3.5
61	3	66	3
61	2.5	66	3
61	2.5	66	3.5
61	2.5	66	3
61	3	67	3
61	3	67	3
62	2.5	68	3
62	2.5	68	3
62	2.5	68	4
62	3	68	3.5
62	2	70	3
62	2.5	70	3
63	3	70	4
63	3	71	4.5
63	3	71	4
63	3	72	4
63	2.5	73	4
63	2.5	74	5
64	2	74	4
64	3.5	74	5

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
65	3	75	6
65	4	76	5
65	4	76	5
65	3	78	6
65	3	78	6
65	4	81	6
65	4	82	7
65	3.5	82	6
65	3	83	6
65	3	85	7
66	4	85	6
66	3	87	8
66	3	95	10
66	4	145	33
67	3	160	46
67	4	162	48
67	3		
67	3		
67	4		
67	3		
68	3		
68	3		
68	4.5		
68	3.5		
68	4		
68	4		
68	3		
69	4		
69	4		
69	4		
69	4		
70	4		
70	4		
70	4		
70	4		
70	4		
70	4		
70	4		
71	4		
72	4		
72	4		
73	4.5		
73	5		
73	6		
74	5		
74	5		
74	5		
75	4.5		
75	6		
75	5		

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
76	6		
76	5		
76	6		
76	5		
76	5		
76	5		
77	6		
77	5		
78	6		
79	4		
79	4		
79	6		
80	5.5		
80	6		
81	5.5		
81	6		
81	6		
81	6		
81	6		
81	6		
81	6		
82	7		
82	7		
84	8		
85	7		
87	7		
89	10		
89	8		
89	9		
90	10		
91	9		
92	9		
100	14		
100	11		
101	12		
110	15		
112	15		
115	22		
120	22		
123	22		
124	20		
149	38		

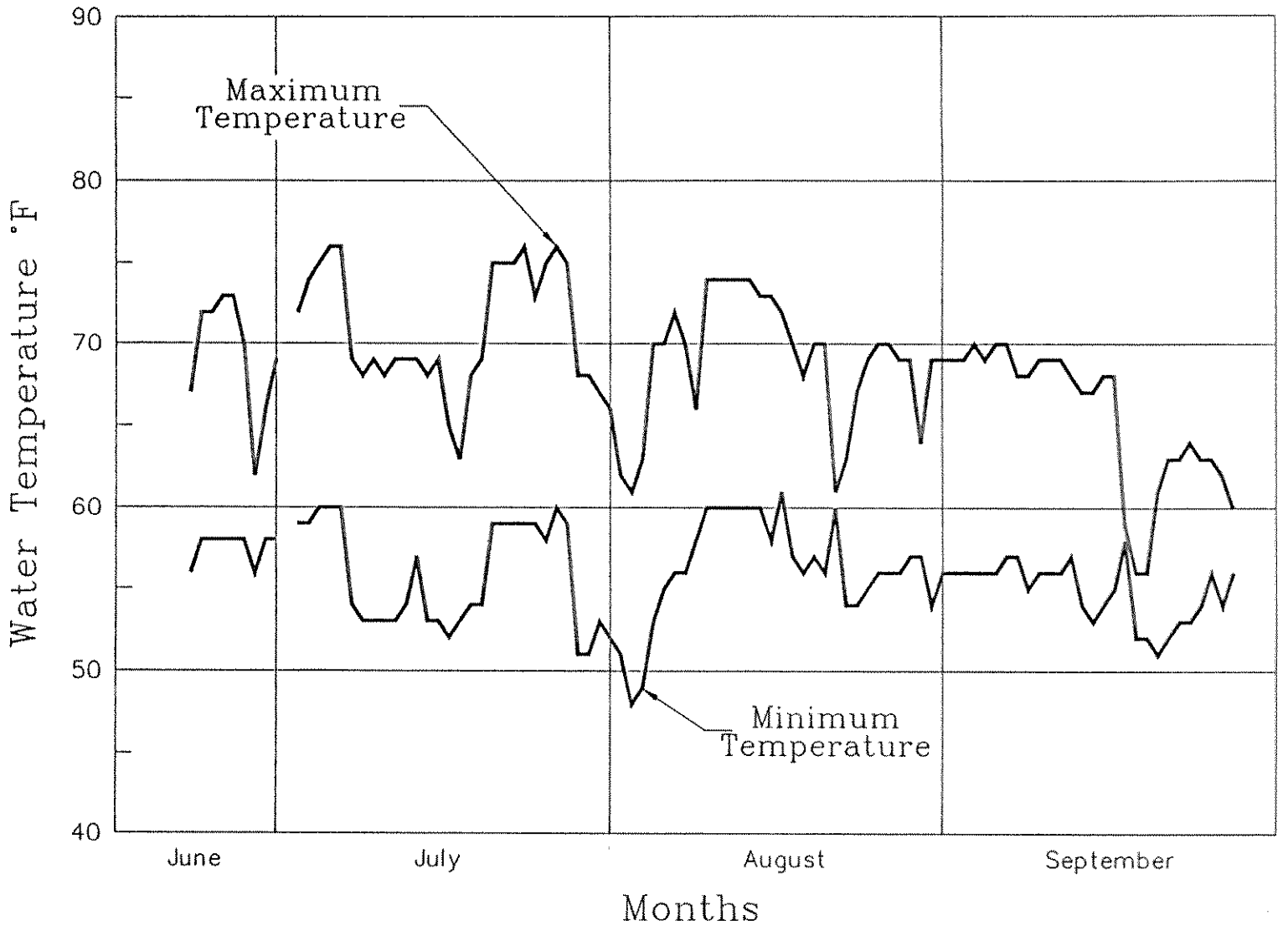
APPENDIX 7

Catch of Steelhead at Station DL-1 (UTM 079767)
in Duck Lake Creek, 1990

FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
PASS 1		PASS 2	
57	2	64	3
61	2	89	9
65	2.5	94	10
80	5	114	15
80	6	178	74
84	7		
84	7	PASS 3	
87	7		
96	10	60	2
121	22	87	7
130	25	91	9
		98	10
		103	12
		PASS 4	
		NO FISH	

APPENDIX C

SCOTT VALLEY WATER TEMPERATURE DATA



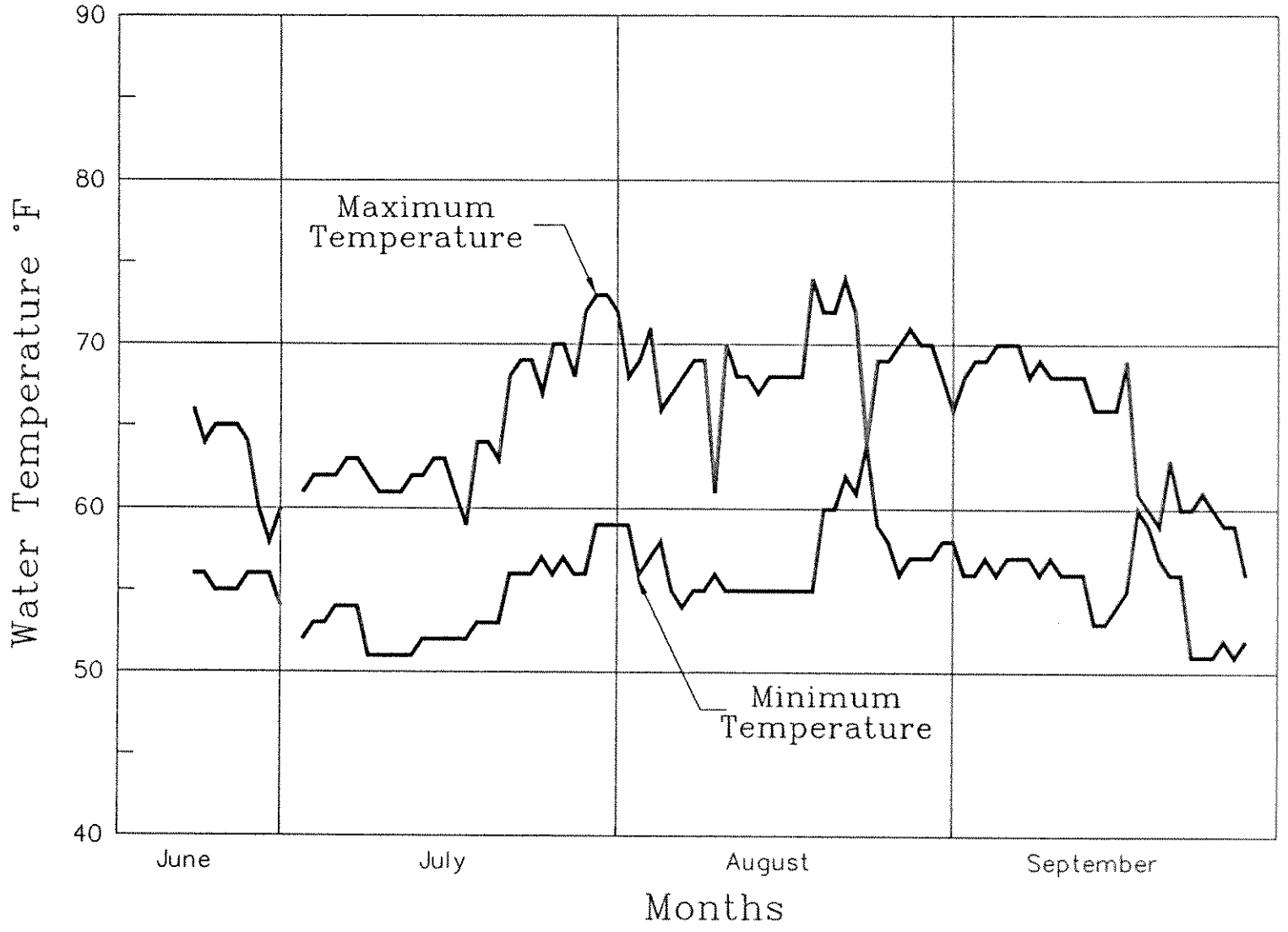
Temperature in Scott River Below Callahan 1989

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District



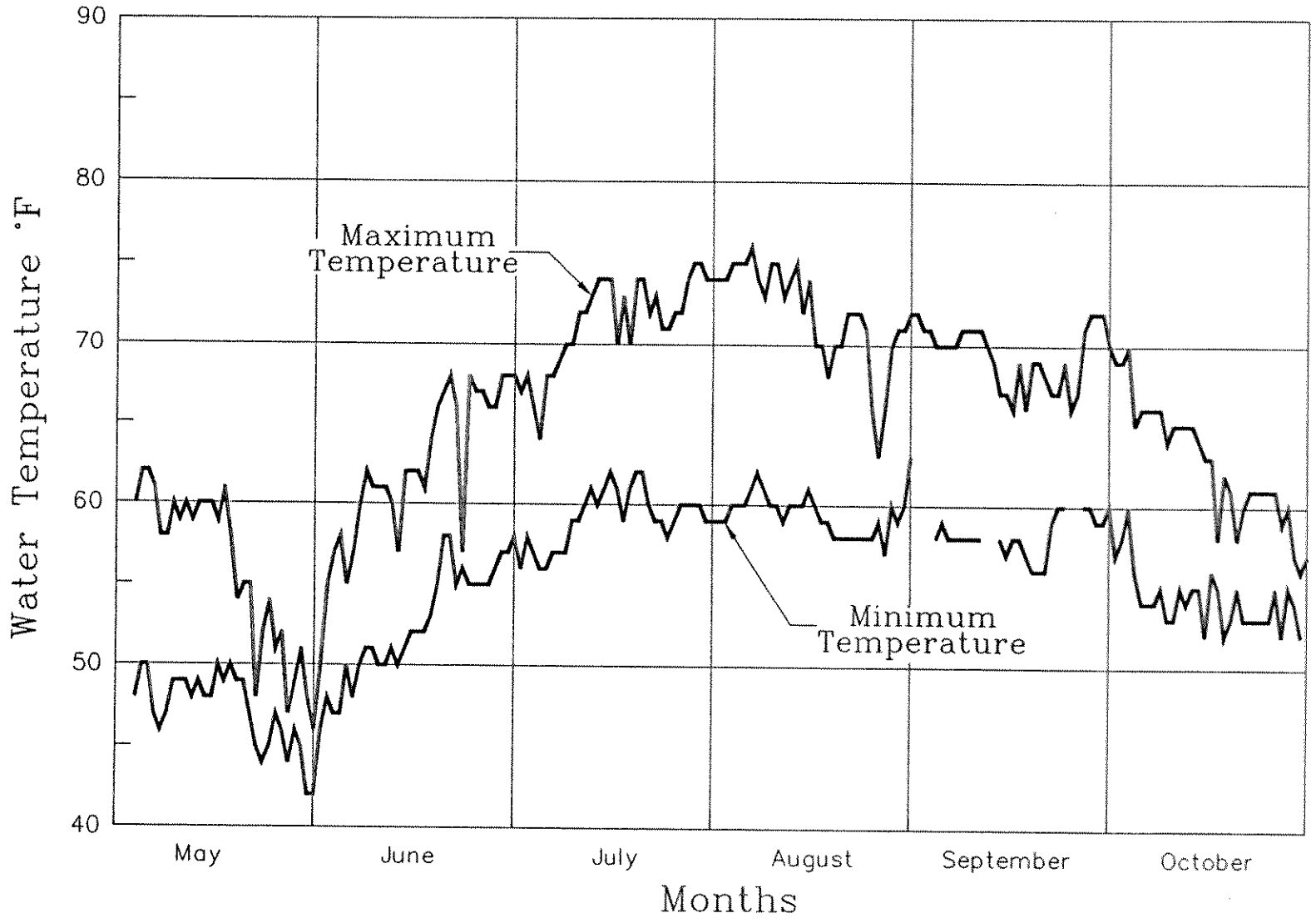
Temperature in Scott River Farmer's Ditch 1989

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District



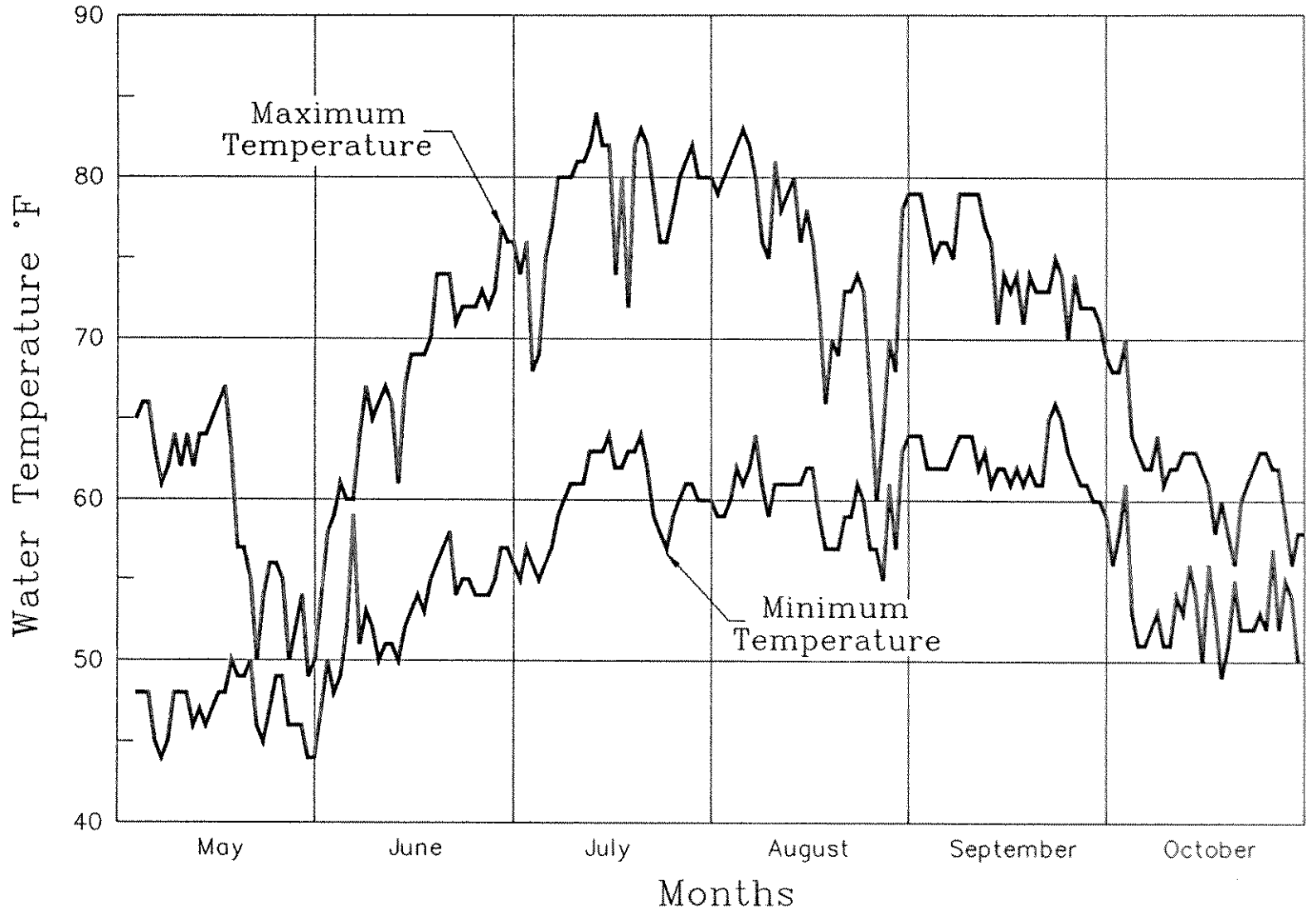
Temperature in Scott River Farmer's Ditch 1990

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District



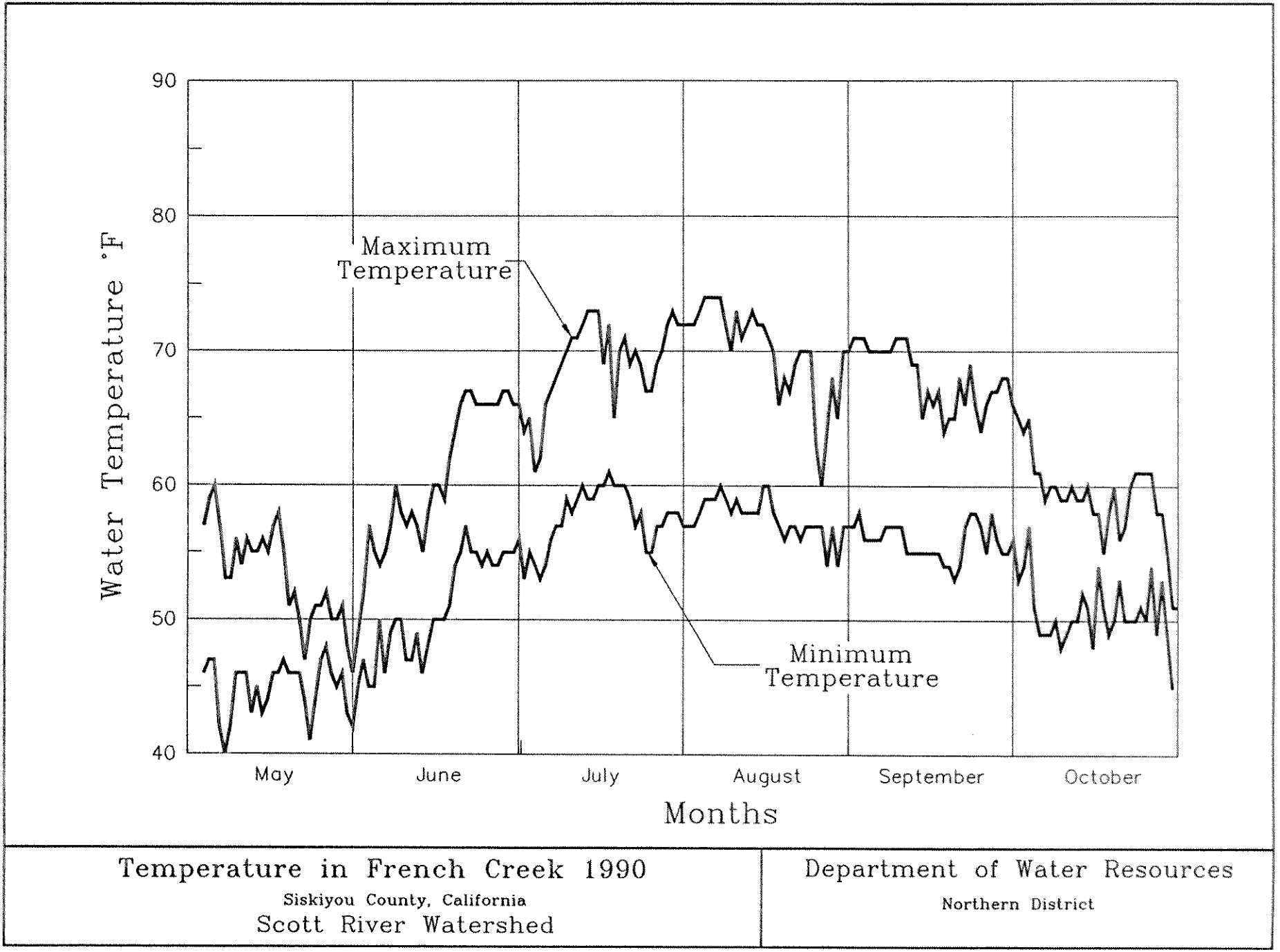
Temperature in Scott River SVID Ditch 1990

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District



Temperature in French Creek 1990

Siskiyou County, California

Scott River Watershed

Department of Water Resources

Northern District

APPENDIX D

STUDY EXPENDITURES

Proprietorial information provided to the

United States Department of the Interior

Fish and Wildlife Service

APPENDIX E

FEDERAL LEGISLATION

Public Law 99-552
99th Congress

An Act

Oct. 27, 1986
[H.R. 4712]

To provide for the restoration of the fishery resources in the Klamath River Basin, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

16 USC 460ss.

SECTION 1. FINDINGS.

The Congress finds that—

(1) the Klamath and Trinity Rivers have been placed under the California and National Wild and Scenic Rivers Systems to protect their outstanding anadromous fishery values;

(2) the Klamath and Trinity Rivers provide fishery resources necessary for Indian subsistence and ceremonial purposes, ocean commercial harvest, recreational fishing, and the economic health of many local communities;

(3) floods, the construction and operation of dams, diversions and hydroelectric projects, past mining, timber harvest practices, and roadbuilding have all contributed to sedimentation, reduced flows, and degraded water quality which has significantly reduced the anadromous fish habitat in the Klamath-Trinity River System;

(4) overlapping Federal, State, and local jurisdictions, inadequate enforcement of fishery harvest regulations, and ineffective fishery management have historically hampered fishery conservation efforts and prevented the Federal Government and the State of California from fulfilling their responsibilities to protect the rivers' anadromous fishery values;

(5) the Klamath-Trinity fall chinook salmon populations have declined by 80 percent from historic levels and steelhead trout have also undergone significant reductions;

(6) Klamath River Basin Fisheries Resource Plan has been developed by the Secretary acting through the Bureau of Indian Affairs;

(7) the Klamath Salmon Management Group, a group of agencies with fishery management responsibility, has established, in cooperation with the users of the Klamath-Trinity River Basin fishery resources, a sound framework for the future coordination of fishery harvest management;

(8) a new Klamath-Trinity River Basin Management authority, composed of the Klamath Salmon Management Group and representatives of users of the fishery resources of the Klamath-Trinity River Basin, is needed to ensure more effective long-term coordination of the Klamath-Trinity River fisheries under sound conservation and management principles that ensure adequate spawning escapement; and

(9) the Secretary has the authority to implement a restoration program only in the Trinity River Basin and needs additional authority to implement a restoration program in cooperation with State and local governments to restore anadromous fish

populations to optimum levels in both the Klamath and Trinity River Basins;

SEC. 2. KLAMATH RIVER BASIN CONSERVATION AREA; FISHERY RESOURCES RESTORATION PROGRAM. 16 USC 460ss-1.

(a) ESTABLISHMENT OF KLAMATH RIVER BASIN CONSERVATION AREA.—The Secretary shall designate the anadromous fish habitats and resources of the Klamath River basin as the Klamath River Basin Conservation Area (hereafter in this Act referred to as the "Area").

(b) KLAMATH RIVER BASIN CONSERVATION AREA RESTORATION PROGRAM.—

(1) ESTABLISHMENT.—The Secretary shall, in consultation with the task force established under section 4, formulate, establish, and implement a 20-year program to restore the anadromous fish populations of the Area to optimum levels and to maintain such levels. The program shall be based on the Klamath River Basin Fisheries Resource Plan referred to in section 1(6) and shall be known as the Klamath River Basin Conservation Area Restoration Program.

(2) PROGRAM ACTIVITIES.—In carrying out the objectives of the program, the Secretary, in cooperation with the task force established under section 4, shall—

(A) monitor and coordinate research evaluating the Area anadromous fish populations and administer and evaluate the success of activities described in subparagraph (B); and Research and development.

(B) take such actions as are necessary to—

(i) improve and restore Area habitats, and to promote access to blocked Area habitats, to support increased run sizes;

(ii) rehabilitate problem watersheds in the Area to reduce negative impacts on fish and fish habitats;

(iii) improve existing Area hatcheries and rearing ponds to assist in rebuilding the natural populations;

(iv) implement an intensive, short-term stocking program to rebuild run sizes while maintaining the genetic integrity and diversity of Area subbasin stocks; and

(v) improve upstream and downstream migration by removal of obstacles to fish passage and the provision of facilities for avoiding obstacles.

(3) RESTORATION WORK.—To the extent practicable, any restoration work performed under paragraph (2)(B) shall be performed by unemployed— Indians.

(A) commercial fishermen;

(B) Indians; and

(C) other persons whose livelihood depends upon Area fishery resources.

(4) MEMORANDUM OF AGREEMENT.—In order to facilitate the implementation of any activity described in paragraph (2) over which the Secretary does not have jurisdiction, the Secretary shall enter into a memorandum of agreement with the Federal, State, and local agencies having jurisdiction over such activities, and the Area Indian tribes. The memorandum of agreement shall specify the program activities for which the respective signatories to the agreement are responsible and shall contain such provisions as are necessary to ensure the coordinated implementation of the program. Contracts. State and local governments. Indians.

16 USC 460ss-2.

SEC. 3. KLAMATH FISHERY MANAGEMENT COUNCIL.

(a) ESTABLISHMENT.—There is established a Klamath Fishery Management Council (hereafter in this Act referred to as the "Council").

(b) FUNCTIONS.—

(1) The Council shall—

(A) establish a comprehensive long-term plan and policy, that must be consistent with the goals of the program, for the management of the in-river and ocean harvesting that affects or may affect Klamath and Trinity River basin anadromous fish populations;

(B) make recommendations, that must be consistent with the plan and policy established under subparagraph (A) and with the standards in paragraph (2)—

(i) to the California Fish and Game Commission regarding in-river and offshore recreational harvesting regulations,

(ii) to the Oregon Department of Fish and Wildlife regarding offshore recreational harvesting regulations,

(iii) to the Pacific Fishery Management Council regarding ocean harvesting regulations,

(iv) to the Bureau of Indian Affairs regarding regulations for harvesting in the Area by non-Hoopa Indians, and

(v) to the Hoopa Valley Business Council regarding regulations for harvesting in the Area by members of the Hoopa Indian Tribe; and

(C) conduct public hearings on any regulation referred to in subparagraph (B) (i) through (v).

(2) Any recommendation made by the Council under paragraph (1)(B) regarding harvesting regulations shall—

(A) be based upon the best scientific information available;

(B) minimize costs where practicable, and avoid unnecessary duplication of regulations;

(C) take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches; and

(D) be designed to achieve an escapement that preserves and strengthens the viability of the Area's natural anadromous fish populations.

(c) MEMBERSHIP AND APPOINTMENT.—The Council is composed of 11 members as follows:

(1) A representative, who shall be appointed by the Governor of California, of each of the following:

(A) The commercial salmon fishing industry.

(B) The in-river sportfishing community.

(C) The offshore recreational fishing industry.

(D) The California Department of Fish and Game.

(2) A representative of the Hoopa Indian Tribe who shall be appointed by Hoopa Valley Business Council.

(3) A representative, who shall be appointed by the Secretary, of each of the following:

(A) The non-Hoopa Indians residing in the Area.

(B) The Department of the Interior.

(4) A representative, who shall be appointed by the Secretary of Commerce, of each of the following—

(A) The National Marine Fisheries Service.

(B) The Pacific Fishery Management Council.

(5) A representative, who shall be appointed by the Governor of Oregon, of each of the following:

(A) The commercial salmon fishing industry.

(B) The Oregon Department of Fish and Wildlife.

(d) CONSULTATION REQUIREMENT.—The appointments required under subsection (c) shall be made in consultation with the appropriate users of Area anadromous fish resources.

(e) QUALIFICATIONS.—Council members shall be individuals who are knowledgable and experienced in the management and conservation, or the recreational or commercial harvest, of the anadromous fish resources in Northern California.

(f) TERMS.—

(1) IN GENERAL.—The term of a member is 4 years.

(2) SERVICE.—Members of the Council serve at the pleasure of the appointing authority.

(3) VACANCIES.—Any vacancy on the Council shall be filled in the manner in which the original appointment was made. Any member appointed to fill a vacancy occurring before the expiration of the term for which his predecessor was appointed shall be appointed only for the remainder of such term. A member may serve after the expiration of his term until his successor has taken office.

(g) TRANSACTION OF BUSINESS.—

(1) DECISIONS OF COUNCIL.—All decisions of the Council must be by unanimous vote of all of the members.

(2) CHAIRMAN.—The Council shall elect a Chairman from among its members.

(3) MEETINGS.—The Council shall meet at the call of the Chairman or upon the request of a majority of its members.

(h) STAFF AND ADMINISTRATION.—

(1) ADMINISTRATIVE SUPPORT.—The Secretary and the Director of the California Department of Fish and Game shall provide the Council with such administrative and technical support services as are necessary for the effective functioning of the Council.

(2) INFORMATION.—The Secretary and the Director of the California Department of Fish and Game shall furnish the Council with relevant information concerning the Area.

(3) ORGANIZATION.—The Council shall determine its organization, and prescribe the practices and procedures for carrying out its functions under subsection (b).

(i) FEDERAL OR STATE EMPLOYEES.—Any Council member who is an officer or employee of the United States or the State of California at the time of appointment to the Council shall cease to be a Council member within 14 days after the date on which he ceases to be so employed.

(j) EXPENSES.—

(1) TRAVEL EXPENSES.—While away from their homes or regular places of business in the performance of services for the Council, Council members shall be allowed travel expenses, including a per diem allowance in lieu of subsistence, in the same manner as persons employed intermittently in the

Government service are allowed travel expenses under section 5703 of title 5 of the United States Code.

(2) LIMITATION ON SPENDING AUTHORITY.—No money authorized to be appropriated under section 6 may be used to reimburse any agency or governmental unit (whose employees are Council members) for time spent by any such employee performing Council duties.

16 USC 460ss-3.

SEC. 4. KLAMATH RIVER BASIN FISHERIES TASK FORCE.

(a) ESTABLISHMENT.—There is established a Klamath River Basin Fisheries Task Force (hereafter in this Act referred to as the "Task Force").

(b) FUNCTIONS.—The Task Force—

(1) shall assist the Secretary in the formulation, coordination, and implementation of the program;

(2) shall assist, and coordinate its activities with, Federal, State, and local governmental or private anadromous fish restoration projects within the Area;

(3) shall conduct any other activity that is necessary to accomplish the objectives of the program; and

(4) may act as an advisor to the Council.

(c) MEMBERSHIP AND APPOINTMENT.—The Task Force is composed of 12 members as follows:

(1) A representative, who shall be appointed by the Governor of California, of each of the following:

(A) The commercial salmon fishing industry.

(B) The in-river sport fishing community.

(C) The California Department of Fish and Game.

(2) A representative of the Hoopa Indian Tribe who shall be appointed by the Hoopa Valley Business Council.

(3) A representative of the Department of the Interior who shall be appointed by the Secretary.

(4) A representative of the National Marine Fisheries Service who shall be appointed by the Secretary of Commerce.

(5) A representative of the Department of Agriculture who shall be appointed by the Secretary of Agriculture.

(6) A representative of the Oregon Department of Fish and Wildlife who shall be appointed by the Governor of Oregon.

(7) One individual who shall be appointed by the Board of Supervisors of Del Norte County, California.

(8) One individual who shall be appointed by the Board of Supervisors of Siskiyou County, California.

(9) One individual who shall be appointed by the Board of Supervisors of Humboldt County, California.

(10) One individual who shall be appointed by the Board of Supervisors of Trinity County, California.

(d) COUNCIL MEMBERSHIP NOT A BAR TO TASK FORCE APPOINTMENT.—An individual who is a member of the Council is not ineligible for appointment as a member of the Task Force.

(e) TERMS.—

(1) IN GENERAL.—The term of a member of the Task Force is 4 years.

(2) SERVICE.—Members of the Task Force serve at the pleasure of the appointing authorities.

(3) VACANCIES.—Any vacancy on the Task Force shall be filled in the manner in which the original appointment was made. Any member appointed to fill a vacancy occurring before the

expiration of the term for which his predecessor was appointed shall be appointed only for the remainder of such term. A member may serve after the expiration of his term until his successor has taken office.

(f) TRANSACTION OF BUSINESS.—

(1) DECISIONS OF TASK FORCE.—All decisions of the Task Force must be by unanimous vote of all the members.

(2) CHAIRMAN.—The members of the Task Force shall select a Chairman from among its members.

(3) MEETINGS.—The Task Force shall meet at the call of the Chairman or upon the request of a majority of its members.

(g) STAFF AND ADMINISTRATION.—

(1) ADMINISTRATIVE SUPPORT.—The Secretary and the Director of the California Department of Fish and Game shall provide the Task Force with the administrative and technical support services necessary for the effective functioning of the Task Force.

(2) INFORMATION.—The Secretary and the Director of the California Department of Fish and Game shall furnish the members of the Task Force with relevant information concerning the Area.

(3) ORGANIZATION.—The Task Force shall determine its organization, and prescribe the practices and procedures for carrying out its functions under subsection (b).

(h) MEMBERS WHO ARE FEDERAL OR STATE EMPLOYEES.—Any Task Force member who is an officer or employee of the United States or the State of California at the time of appointment to the Task Force shall cease to be a member of the Task Force within 14 days of the date on which he ceases to be so employed.

(i) LIMITATION ON SPENDING AUTHORITY.—No money authorized to be appropriated under section 6 may be used to reimburse any Task Force member or agency or governmental unit (whose employees are Task Force members) for time spent by any such employee preforming Task Force duties.

SEC. 5. ENFORCEMENT.

Contracts.
California.
State and local governments.
16 USC 460ss-4.

(a) MEMORANDUM OF AGREEMENT.—In order to strengthen and facilitate the enforcement of Area fishery harvesting regulations, the Secretary shall enter into a memorandum of agreement with the California Department of Fish and Game. Such agreement shall specify the enforcement activities within the Area for which the respective agencies of the Department of Interior and the California Department of Fish and Game are responsible and shall contain such provisions as are necessary to ensure the coordinated implementation of Federal and State enforcement activities.

SEC. 6. APPROPRIATIONS.

16 USC 460ss-5.

(a) AUTHORIZATION.—There are authorized to be appropriated to the Department of the Interior during the period beginning October 1, 1986, and ending on September 30, 2006, $21,000,000 for the design, construction, operation, and maintenance of the program. Monies appropriated under this subsection shall remain available until expended or October 1, 2006, whichever first occurs.

(b) COST-SHARING.—

(1) 50 percent of the cost of the development and implementation of the program must be provided by one or more non-Federal sources on a basis considered by the Secretary to be

timely and appropriate. For purposes of this subsection, the term "non-Federal source" includes a State or local government, any private entity, and any individual.

Gifts and property.
Real property.

(2) In addition to cash outlays, the Secretary shall consider as financial contributions by a non-Federal source the value of in kind contributions and real and personal property provided by the source for purposes of implementing the program. Valuations made by the Secretary under this paragraph are final and not subject to judicial review.

Voluntarism.

(3) For purposes of paragraph (2), in kind contributions may be in the form of, but are not limited to, personal services rendered by volunteers in carrying out surveys, censuses, and other scientific studies.

Regulations.

(4) The Secretary shall by regulation establish—

(A) the training, experience, and other qualifications which such volunteers must have in order for their services to be considered as in kind contributions; and

(B) the standards under which the Secretary will determine the value of in kind contributions and real and personal property for purposes of paragraph (2).

State and local governments.

(5) The Secretary may not consider the expenditure, either directly or indirectly, with respect to the program of Federal moneys received by a State or local government to be a financial contribution by a non-Federal source to carry out the program.

16 USC 460ss-6.

SEC. 7. DEFINITIONS.

As used in this Act—

(1) The term "program" means the Klamath River Basin Conservation Area Restoration Program established under section 2(b).

(2) The term "Secretary" means the Secretary of the Interior.

Approved October 27, 1986.

LEGISLATIVE HISTORY—H.R. 4712:

HOUSE REPORTS: No. 99-894, Pt. 1 (Comm. on Merchant Marine and Fisheries).
CONGRESSIONAL RECORD, Vol. 132 (1986):
Sept. 30, considered and passed House.
Oct. 3, considered and passed Senate.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 22 (1986):
Oct. 27, Presidential statement.

○

APPENDIX F

COOPERATIVE AGREEMENT 14-16-0001-89521

COOPERATIVE AGREEMENT

between

U.S. Fish and Wildlife Service

and

The California Department of Water Resources

THIS COOPERATIVE AGREEMENT is made and entered into between the U. S. Fish and Wildlife Service, an executive agency of the United States Department of the Interior, hereinafter referred to as the "Service" and The California Department of Water Resources, an executive agency of the State of California, hereinafter referred to as the "Cooperator", pursuant to 31 U.S.C. 6301-6308(1982).

The Service and the Cooperator enter this Cooperative Agreement pursuant to the authority provided by the Klamath River Basin Fishery Resources Restoration Act (16 U.S.C. 460ss-ss6), hereinafter referred to as the Klamath Act.

PURPOSES AND OBJECTIVES

This Cooperative Agreement is made for the purpose and objective of carrying out the objectives and implementing the activities of the Klamath River Basin Conservation Area Restoration Program, a 20-year program established by law (16 U.S.C. 460ss-1) to restore the anadromous fish populations of the Conservation Area, and hereinafter referred to as the Restoration Program.

Specifically, the objectives of this agreement are to identify possible methods for increasing flows in the Scott Valley portion of the Scott River from May to October, and to determine if an instream flow needs study is justified for Scott River.

RECITALS

WHEREAS, the Service has been delegated authority by the Secretary of the Interior to administer the Restoration Program, and,

WHEREAS, The Cooperator is responsible for managing the water resources of the State of California, and

WHEREAS, A Work Plan and budget have been approved by the Klamath River Basin Fisheries Task Force and by the Designated Federal Officer acting for the Secretary of the Interior, identifying elements of the Restoration Program to be accomplished with Federal funds in Federal Fiscal Year 1989 (October 1, 1988 - September 30, 1989) and with non-Federal funds in State fiscal year 1988-1989 (July 1, 1988 - June 30, 1989), and

WHEREAS, having a written agreement which provides the extent of each party's obligations will facilitate their cooperation to accomplish the purposes and objectives of this agreement, Now, Therefore, in consideration of the benefits to be derived by each party:

Dwr 164214

IT IS HEREBY AGREED as follows:

I. COOPERATIVE PROGRAM

The cooperative program to be accomplished under this agreement is project (2.61) of the Federally-funded Work Plan.

II. TERM OF AGREEMENT - COMPLETION OF COOPERATIVE PROGRAM

This Cooperative Agreement shall become effective upon being executed by both parties. It shall remain in force and effect until September 30, 1990.

III. MUTUAL COOPERATION

To accomplish the purposes and objectives of this Cooperative Agreement, each party agrees to cooperate with the other in fulfilling its obligations as herein provided.

IV. SPECIFIC OBLIGATIONS OF THE PARTIES

A. Service's Obligation

The Service shall furnish the Cooperator with the following assistance to accomplish the cooperative program:

1. Federal Funds in the amount of $36,000 will be provided to the Cooperator in Fiscal Year 1989 for the work identified in Attachment 1 of this Agreement.

2. Coordination. The Service will administer the Restoration Program through its Klamath Field Office. The Klamath Field Office will provide coordination, information storage and transfer, and related services to the Cooperator.

3. Publication The Service will maintain a publication series to disseminate information collected under auspices of the Restoration Program.

B. Cooperator's Obligations

The Cooperator shall furnish the following to accomplish the cooperative program.

1. Equipment, Facilities, and Supplies required to conduct those elements of the Work Plan displayed in Attachment 1 will be provided by the Cooperator.

2. Services - Personnel. The Cooperator will provide staff necessary to accomplish those elements of the Work Plan displayed in Attachment 1.

3. Other The Cooperator will provide products identified in Attachment 2 in accordance with the schedule established for each product. Significant changes in content or schedule of products will be made only with

concurrence of both parties and will be recorded as amendments to this agreement.

V. PROJECT OFFICERS.

Project officer for the Service will be:

Ronald A. Iverson
Project Leader, Klamath Field Office
U.S. Fish and Wildlife Service
1312 Fairlane Road Yreka, CA 96097
Telephone 916-842-5763

Project officer for the Cooperator will be:

Douglas N. Denton
Chief, ~~Environmental Branch~~ Fishery Engineering Section, Northern ~~Region~~ District
California Department of Water Resources
P.O. Box 607
Red Bluff, CA 96080
Telephone 916-527-6530

VI. METHOD OF PAYMENT

A. Transfer of Funds

The Cooperator shall present monthly/quarterly bills to the Service in a format mutually agreeable to the parties.

1. Payments shall be made on the basis of invoices presented for work completed during the life of this agreement. The invoices shall be presented in original and one copy and shall be supported by such evidence of costs incurred as may be required by the Service.

2. The Cooperator shall keep accounting records of all expenditures and costs incurred in carrying out the provisions of this agreement, in a manner satisfactory to the Service, and shall, insofar as practicable, keep those records separate from its other work and itemized to support the itemization shown on the invoices.

3. Final payment for each work item identified in Attachment 1 will be made on receipt of acceptable final products, as identified in the project proposal for that work item. Determination of acceptability will be made by the project officer for the Service.

B. Payment:

The Cooperator will submit monthly/quarterly invoices for reimbursement for work performed, noting the Agreement number, to:

U.S. Fish and Wildlife Service
Klamath Field Office
1312 Fairlane Road
Yreka, California 96097

The Cooperator will supply an itemized listing of expenditures for each budgetary line item set forth in the approved budget, showing as a minimum:

1. Salaries (including personnel and benefits)
2. Travel and transportation (including per diem)
3. Nonexpendable equipment and material (greater than $300 per item)
4. Expendable equipment and material (sensitive in nature)
5. Operations and maintenance (including computer services and publications)
6. Overhead
7. The currently approved budget
8. Current budget period
9. Cumulative expenditures to date

Nonitemized and/or incomplete billings will be detained for payment processing until correct information has been supplied by the contracting agency. Invoices will be reviewed, certified, and forwarded to the Service's Finance Center for payment processing.

C. Budget

Salaries and staff benefits		$20,000
Indirect (overhead) costs		13,000
Travel		3,000
	TOTAL	$36,000

VII. AVAILABILITY OF FUNDS FOR THE NEXT FISCAL YEAR

Funds are not presently available for performance under this contract beyond September 30, 1989. The Government's obligation for performance of this contract beyond that date is contingent upon the availability of appropriated funds from which payment for agreement purposes can be made. No legal liability on the part of the Government for any payment may arise for performance under this agreement beyond September 30, 1989, until funds are made available to the Contracting Officer for performance and until the Cooperator receives notice of availability, to be confirmed in writing by the Contracting Officer. If funds are made available for succeeding fiscal years the date listed in this section will be revised.

VIII. SPECIAL TERMS AND CONDITIONS

A. Preference in Employment

In accordance with Section 2(b)(3) of the Klamath Act (16 U.S.C. 460ss-1(b)(3)), the Cooperator shall, to the extent practicable, insure that fishery restoration work identified in Attachment 1 shall be performed by unemployed members of the following groups: commercial fishermen, Indians, and other persons whose livelihood depends upon Area fishery resources.

B. Limitation of Cost

1. The parties estimate that performance of this agreement will not cost the Service more than the estimated cost specified in the budget. The Cooperator agrees to use its best efforts to perform the work specified in the Statement of Work (Appendix 1 to this Agreement) and all obligations under this agreement within the estimated cost.

2. The Cooperator shall notify the Project Officer in writing whenever it has reason to believe that:

a. The costs the Cooperator expects to incur under this agreement in the next 60 days, when added to all costs previously incurred, will exceed 75 percent of the estimated cost specified in the agreement; or

b. The total cost for the performance of this agreement will be either greater or substantially less than had been previously estimated.

3. As part of the notification, The Cooperator shall provide the Project Officer a revised estimate of the total cost of performing this agreement.

4. Except as required by other provisions of this Agreement specifically citing and stated to be an exception to this clause:

a. The Service is not obligated to reimburse the Cooperator for costs incurred in excess of the estimated cost specified in the Agreement.

b. The Cooperator is not obligated to continue performance under this agreement or otherwise incur costs in excess of the estimated cost specified in the budget, until the Project Officer (1) notifies the Cooperator in writing that the estimated cost has been increased; and (2) provides a revised estimated total cost of performing this Agreement.

5. No notice, communication, or representation in any form other than that specified in subparagraph (4)(b) above, or from any person other than the Contracting Officer, shall affect this agreement's estimated cost to the Service. In the absence of the specified notice, the Service is not obligated to reimburse the Cooperator for any costs in excess of the estimated cost.

6. If the estimated cost specified in the budget is increased, any costs the Cooperator incurs before the increase that are in excess of the previously estimated cost shall be allowable to the same extent as if incurred afterward, unless the Contracting Officer issues a termination or other notice directing that the increase is solely to cover termination or other specified expenses.

7. Modifications shall not be considered an authorization to exceed the estimated cost to the Service, unless they contain a statement increasing the estimated cost.

8. If this Agreement is terminated or the estimated cost is not increased, the Service and the Cooperator shall negotiate an equitable distribution of all property produced or purchased under the Agreement.

C. Annual Formal Project Review/Presentation:

At the option of the Service, a presentation of the project status shall be given to the Klamath River Basin Fisheries Task Force. The following guidelines shall apply:

1. The date of the Annual Review/Presentation shall be on a mutually agreed-upon date of a regularly scheduled meeting of the Task Force.

The Annual Review will be made an agenda item of the Task Force meeting, with concurrence of the chairperson of the Task Force.

2. The Project Manager/Principal Investigator shall make a concise presentation.

3. The presentation shall utilize appropriate visual aids, be well organized and not exceed 30 minutes:

a. Describe the problem being addressed, and the objectives of the Project leading to the solution of the problem.

b. Briefly describe relevant methods and the experimental design.

c. Summarize Project results, activities, and conclusions.

d. Describe the future work schedule, methods to be used, and anticipated results that are intended to provide improved procedures for protection, mitigation, and enhancement of the fishery or wildlife resources.

e. Provide a written budget justification for follow-on Fiscal Year work, if appropriate.

D. Specifications for Nonexpendable Equipment and Materials:

Cooperator Liability: The Cooperator, or representative, shall be liable for any loss of or damage to Government property, or for expenses incidental to such loss or damage, which results from willful misconduct or lack of good faith on the part of the Cooperator or which results form a failure on the part of the Cooperator to maintain said property in accordance with sound business practices.

The Cooperator shall not be reimbursed for, and shall not include as an item of overhead, the cost of insurance, or any provisions for reserve, covering the risk of loss of or damage to Government property, except to the extent that the Government may have required the Cooperator to carry such insurance under any other provision of this Agreement.

Nonexpendable Property: Equipment which must be controlled in accordance with prescribed procedures from time of acceptance until released. Property which has a continuing use, is a self-contained unit, is not consumed in use, does not lose its identity when put to use and normally is not a component of other equipment. Nonexpendable property is further classed as:

1. Capitalized Property: Any piece of personal property, equipment, or furniture with a useful service life of 1 year or more and is acquired at a unit cost of $300 or more. This property will be assigned a Service Property Control number.

2. Noncapitalized Property: Any piece of personal property, equipment, or furniture that normally costs less than $300. These items are expensed and Service property control numbers are assigned to those items which are classified as sensitive.

Sensitive Items: Those items of personal property which are considered to be susceptible to being appropriated for personal use or which can readily be converted to cash and selected items of a durable nature which do not meet the capitalization criteria, for which physical control is required. This category includes cameras, calculators, binoculars, recorders, power tools, radios, televisions, typewriters, audio equipment, projectors, and similar items.

Requirements: Send to the Klamath Field Office the original acquisition document, including complete description, make, model, and serial number (if applicable) for each piece of nonexpendable or sensitive property.

Action: After receipt of acquisition document, the Service will forward property control tags to be affixed to the equipment by the Cooperator. Inventory of all Service-owned equipment will be required annually. Loss or theft must be immediately reported to the Klamath Field Office. Proper and routine maintenance of all equipment by the Cooperator is required. The location and condition status of nonexpendable and sensitive items will be reported to the Klamath Field Office on completion of the project. The Service will retain ownership of all equipment. The Cooperator may retain possession of equipment subject to 50-days' notice of recall by the Service.

E. Changes: Any changes in the project objectives, scope, or key personnel, including any proposed transfer of expenditures of more than ten percent of the total amount of payment between approved budget line items, must be submitted in writing to the Service's Contracting Officer for approval prior to initiating the change.

F. Project Continuation This Project may continue to be funded on an annual basis subject to the Service's favorable determination of the following:

1. Availability of adequate funds to the Restoration Program.

2. Required reports were submitted on time, in the designated format, and well edited.

3. Results demonstrate progress towards project goals was equal to or greater than proposed by the Project Manager.

4. The next year's work statement has been approved by the Service.

5. The annual formal presentation of the project status, to the Task Force, has been completed on a timely basis and the Service desires to renew the project.

G. Publication: The Service strongly endorses the publication of research results in scientific journals to facilitate public access and to preserve scientific data. When appropriate, the Project Manager shall prepare manuscripts for submission to journal editors, giving due credit for the Service's financial support. The Service reserves the right to publish all or part of the reports submitted pursuant to the terms of this Agreement.

H. Public Presentations: All news releases, presentations, or publications shall acknowledge Service support for research and/or development activities. Copies of news articles shall be forwarded to the Service's Project Officer.

IX. TERMINATION

This Cooperative Agreement may be terminated under the following conditions.

A. Termination for Cause.

The Service may terminate the Agreement in full, or in part, at any time before the date of completion, whenever it is determined that the Cooperator has failed to comply with the conditions of the Agreement. The Service shall promptly notify the Cooperator in writing of the determination and the reasons for the termination, together with the effective date. Payments made to a Cooperator or recoveries by the Service under Agreements terminated for cause shall be in accord with the legal rights and liabilities of the parties.

B. Termination for Convenience.

The Service or the Cooperator may terminate the Agreement in whole, or in part, when both parties agree that the continuation of the project would not produce beneficial results commensurate with the further expenditure of funds. The two parties shall agree upon the termination conditions, including the effective date and, in the case of partial terminations, the portion to be terminated. The cooperator shall not incur new obligations after the effective date, and shall cancel as many outstanding obligations as possible. The Service shall allow full credit to the Cooperator for the Federal share of the noncancellable obligations, properly incurred by the Cooperator prior to termination.

X. GENERAL PROVISIONS

General provisions attached, derived from Federal statutes, are made a part of this agreement (Attachment 4).

XI. AMENDMENTS

Amendments to the agreement may be proposed by either party and shall become effective upon being reduced to a written instrument executed by both parties. The agreement will be amended annually to provide for implementation of the Federally- and non_Federally-funded portions of the work plan for the upcoming fiscal year.

DWR 164214

IN WITNESS WHEREOF, each party hereto has caused this Cooperative Agreement to be executed by an authorized official on the day and year set forth opposite their signature.

SERVICE

By: Robert W. Babb Date: 5/23/89

Contracting Officer
500 N.E. Multnomah St.
Portland, OR 97232

COOPERATOR

Barbara A Polson Date: 3/31/89

Barbara A. Polson
Administrative Officer

Director,
California Department of Water Resources

Contract Sufficiency Review

By: Robert W Babb

Title: Contracting Officer

Date: 3/9/89

Approved as to legal form and sufficiency:

Asst. Chief Counsel, DWR

Dvr 164214

ATTACHMENT 1

STATEMENT OF WORK
FOR
COOPERATIVE AGREEMENT
TO
IDENTIFY POSSIBLE METHODS FOR
FLOW AUGMENTATION OF THE SCOTT RIVER
BETWEEN CALLAHAN AND SHACKLEFORD CREEK
FOR FISHERY RESTORATION

I. Program Information

A. Restoration Program Task: (2) Get Information

B. Restoration Program Subtask: (2.6) Get Information on Instream Flows

C. Project Title: (2.61) - Potential for Augmenting Flow in the Scott River

II. Background

Agricultural diversions in the middle section of the Scott River between Callahan and Shackleford Creek dry up much of this 32-mile reach from May through October 1/. This results in the loss of fishery habitat and necessitates the annual rescue of salmonids during the spring. The small amount of water remaining in this stream reach is normally inadequate (too hot) to support significant salmonid populations. Augmentation of flow in this reach would greatly increase fish habitat and survival of young fish.

III. Project Objectives:

✓ A. Identify possible methods for increasing flows in the Scott Valley portion of the Scott River from May through October.

✓ B. Determine if a Scott River instream flow needs study is justified.

IV. Tasks

✓ Task 1. -- Develop a hydrology base for the Scott Valley reach of river to identify the location, magnitude, and frequency of low-flow conditions.

✓ Task 2. -- Review past work on tributary stream water storage projects to determine if a reservoir is a feasible means of augmenting instream fishery flows.

✓ Task 3. -- Investigate the potential for purchasing private water rights from willing sellers to augment flows.

1/ Rights to these diversions were established by a statutory adjudication in (1980).

Task 4. -- Determine the potential for implementing agricultural water conservation measures in Scott Valley to make more water available for instream uses.

Task 5. -- Study the potential for lining irrigation ditches to reduce the demand for diversions from the river.

Task 6. -- Investigate the possibility of using some reaches of larger irrigation ditches for rearing the fish rescued from low water conditions in the river.

Task 7. -- Evaluate the cumulative potential of the above methods for augmenting flow in the river to determine if an instream flow needs study is justified. Such a study would have little value unless there is some assurance that instream flows could be increased.

ATTACHMENT 2

DELIVERABLES AND REPORT FORMAT

I. Specific Work Products

A report will be prepared recommending a course of action based on the study findings. A recommendation will be made on whether or not an instream flow needs study should be made. Opportunities for augmenting instream fishery flows will be identified and analyzed. Those opportunities that appear feasible will be recommended for additional investigation and implementation.

II. Quarterly Reports

The Cooperator shall submit quarterly reports throughout the period of this agreement. Each report shall include:

A. A summary of significant activities and results for the period.

B. A brief discussion of any major problems encountered, desired changes in the work plan and justification therefore, or desired changes in the schedule and justification therefore.

C. A description of the activities planned for the following quarter.

D. An itemized list of all non-expendable items obtained under this agreement with a value in excess of $300.00.

E. An itemized list of all sensitive items (as defined in Section VIII of this agreement) obtained under this agreement.

III. Final Report

The Cooperator shall submit a final report for this project. With the concurrence of the California Department of Fish and Game, this report may be combined with an annual report on several projects involving routing and removal of sediment which are proposed as state-funded projects for the state's fiscal year 1988-1989. This final report shall be prepared in accordance with the format contained herein.

IV. Report Format

The final report shall include:

A. Abstract (limit of 600 words)
B. Introduction
C. Description of study area
D. Methods and materials
E. Results and discussion of results obtained from the year's (or completed project's) work.
F. Summary and conclusions
G. Summary of expenditures, including a list of major property purchased during the year (or complete project period).

H. Supplemental volumes of appendices which contain detailed summaries of all data collected.

V. Submittal of Reports

A. Numbers of reports to be submitted.

1. Quarterly reports - three copies
2. Final Report - five copies

B. All reports shall be submitted to the following address:

Ronald A. Iverson
U.S. Fish and Wildlife Service
Klamath Field Office
1312 Fairlane Road
Yreka, California 96097

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ATTACHMENT 3

PROJECT SCHEDULE

Initiation of Project	~~March 1, 1989~~ Date contract is signed by DWR & FW.
Literature search completed	June 1, 1989
Field work begun	June 1, 1989
Field work completed	November 1, 1989
Quarterly report submitted	15 days after end of quarter
Draft final report	~~March~~ 1, 1990
Final report	Sept. 30, 1990