ENVIRONMENTAL ASSESSMENT

SOUTH FORK LONG CANYON CREEK

GEORGETOWN RANGER DISTRICT

ELDORADO NATIONAL FOREST

1979

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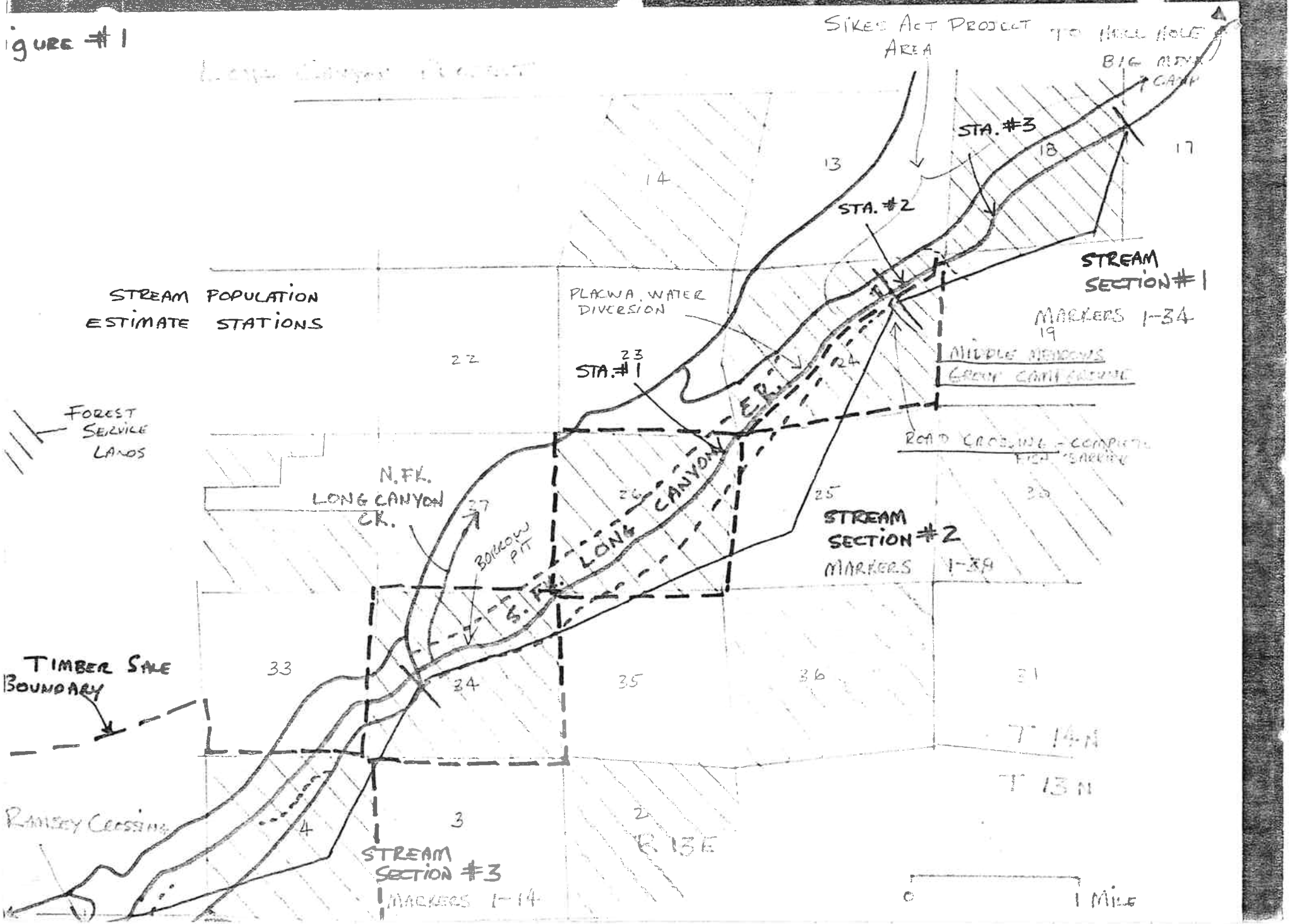
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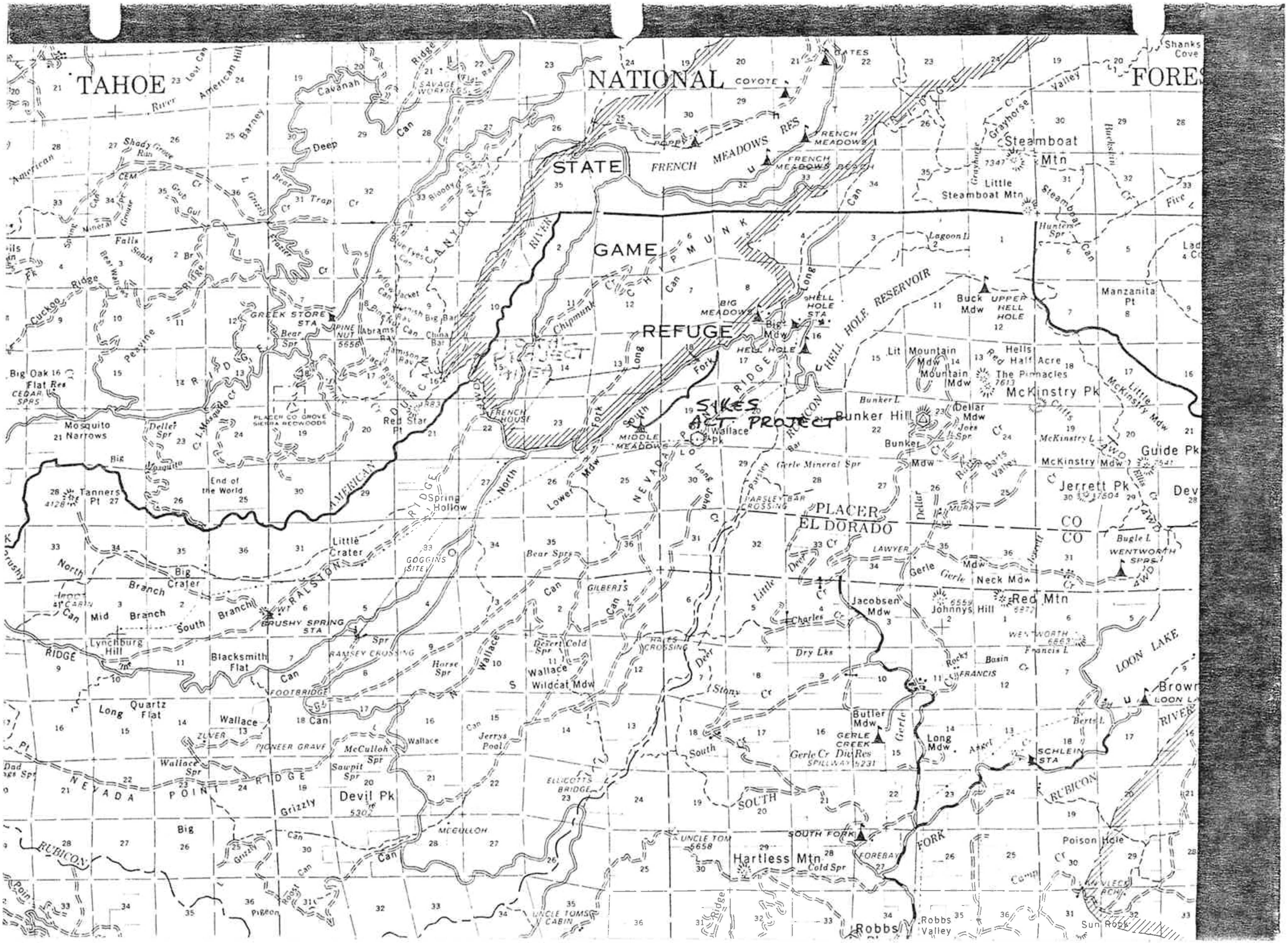
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I Introduction

The South Fork Long Canyon Creek was first recognized as a habitat rehabilitation project in 1972. A 1 1/2 mile stream section from the east section line of Section 18, T14N, R14E to approximately the center of Section 24, T14N, R13E contains many log jams, some of which are causing erosion problems with stream sedimentation.

The present condition has been caused by past logging operations, natural blowdown of trees, construction of a 30 acre barrow pit, and road construction adjacent to the creek.

The Sikes Act provides for an increased emphasis on development and protection of National Forest fish and wildlife habitats. The goals are to increase and maintain fish and wildlife on public lands for use by the general public.

The primary purpose of this project is to help maintain a fish population which will meet the needs and desires of the people which use the National Forest lands in California.

The Sikes Act plan outlines a five-year program of fish and wildlife improvement and attendant costs.

II Affected Environment

A. Environmental Setting

1. Outdoor Recreation

Fishing, swimming and hiking are the most important recreational uses of this area although the intensity of use would be classed as "light" by comparison with such streams as the Rubicon or American rivers. Fishing presure is estimated at approximately 200 fisherman days/year over the project area. Swimming and wading is concentrated near Middle Meadows campground and Goggins. Evidence of hiking can be seen occasionally along the stream although no improved trail exists.

2. Fish and Wildlife

This streamside zone is typical of many Sierran riparian habitats. Approximately 70% of the animals found on the Eldorado use the riparian/deciduous habitat at some point in their life cycle and it is very important to the survival of numerous amphibians.*

During the field analysis period (early August) many

* Wildlife/Habitat Relationships - Western Sierra, 1978 (Draft).

hummingbirds (unidentified species) were found in the project area.

Fish species in this section of the stream are rainbow trout, however, further downstream the Rubicon contains Brown trout.

No threatened or endangered species are known to exist in the project area.

3. Range

The project is in the Long Canyon allotment. Cattle tend to use the riparian zone more heavily than the general forest areas, especially the small meadow areas near the streams.

4. Water, Soil, and Geology

The Long Canyon creek watershed covers 22.3 square miles above Ramsey crossing. The geology is generally Mesozoic granitic with some Mesozoic basic intrusive rocks in the canyon bottom. The ridges slopes and headwaters areas are characterized by Mocene and Pliocene volcanic pyroclastic rocks at mudflow origin. Water quality in the watershed appears very good and is characteristic of the geology. The water is moderately low in nutrients, and dissolved solids as indicated by an average specific conductance of 44 umhos. The temperature was moderately cool for a summer low flow period, as indicated by an average noon reading of 12°C.

Since 1966 the winter and spring high flows from both the North and South Forks of Long Canyon creek have been diverted into a tunnel from Hell Hole Reservoir to Middle Fork powerplant on the Middle Fork American River under authority of Federal Energy Regulation Commission License #2079 to Placer County Water Agency. The average diversion (1966-76) from the North Fork is 2310 acre-ft (3.19cf from the South Fork is 6750 acre-ft (9.31 cfs). The North Fork diversion is located 3.2 miles above the confluence. The South Fork diversions is located 3.3 miles upstream from the diversion for this same time period the gage located on Long Canyon creek 75 feet below the confluence of the North and South Forks has recorded an average flow of 29.5 cfs. (21,400 acre-ft). The max flow at this sta. was 4,690 cfs on December 23, 1964 and the min was 0.08 on September 27 and 28 at 1968.

5. Air

Air quality in this area is generally very good. However, the main road to Hell Hole reservoir parallels the upper section of the project stream which results in occasional dust reaching the stream. Normally this is minimal and air quality is high.

6. Vegetation

The project area is dominated by mid to high elevation riparian species. Alder and Willow are the dominant shrubs. Adjacent tree species are typical Sierran mixed conifers consisting of red fir, ponderosa pine, incense cedar, white fir, Douglas fir and sugar pine.

7. Scenic Quality

The general landscape character of the area is dominated by broad ridges and moderately inused drainages. The area is of average variety (Variety Class B). Several sections of Long Canyon Creek, however, exhibit outstanding variety, particularly the water-worn granite pools and waterfalls. These areas should be protected.

Long Canyon creek is classed as Sensitivity Level 2. The main Ramsey Crossing-Hell Hole Road is classed as Sensitive Level 1 as are the Middle Meadows and Big Meadows Campgrounds.

Areas seen from the main road in sections 33, 34, 4 and those sections above Middle Meadows Campground which are seen from either the campgrounds or the road have a Visual Quality Objective of Rentention. Those areas seen only in the foreground from the creek itself have a Visual Quality Objective of Partial Retention. (see map)

8. Archaeology

No archaeological survey of the project has been performed. However, several bedrocks mortar sites and possible sites were identified during the stream reconnaissance. (some of the sites may have been "potholes" created by water). Undoubtedly additional sites exist within the project area.

9. Private Lands

Figure # 1 shows the checkerboard arrangement of private and Forest Service lands which surround the South Fork Long Canyon creek.

The majority of the stream is within the boundaries of the Eldorado National Forest. Consultation with the California Department of Fish and Game biologists will be needed if improvement sites are found in the short sections of private lands.

B. Present Stream Conditions

1. Sedimentation

Sedimentation is the major problem within the project area. Many logs are located within the stream channel which are diverting stream flows during periods of high water flows. The flow diversions are eroding stream banks which cause more trees to fall within the channel compounding the problem.

Stream sedimentation is a prime cause in degrading stream trout productivity. Some of the problems associated with sedimentation found in Long Canyon creek are:

a. Limiting Food Production

Sediments interfer with the respiration of larval aquatic insects which trout feed on. Sedimentation is also responsible for filling the living spaces between rocks and gravel where these insects live.

b. Decreases Egg Survival

Survival of fish eggs may be decreased as sediments decrease gravel permeability. This condition limits the amount of Oxygen which reaches the eggs and slows down the removal of metabolic wastes.

c. Reduces Trout Habitat

Sediments can fill in pools which are an important trout habitat requirement.

All of the factors associated with a reduction in stream sedimentation will increase the fisheries productivity in this and adjacent sections of Long Canyon creek.

2. Stream Barriers

The migratory patterns of the resident trout populations are blocked by some of the log barriers. These obstructions reduce the available spawning grounds for the fish populations within this section of the creek. Removal of a portion of these barriers would reduce competition for good spawning sites in areas of high fish densities.

C. Recreation

1. Angler Use

Angler use data for this section of Long Canyon Creek is not available.

Rainbow trout was the only species found in the project area. It is the most sought after fish by freshwater anglers. In 1970 an estimated 10 million angler days were spent trout fishing, 3.9 million occurred in the Northern California Planning Area. (RPA, 1975)

Demand for angling in many areas exceeds the ability of trout waters to produce enough fish to provide a satisfactory experience for an angler. The California Department of Fish and Game has made projections of fish and wildlife use demands through the year 2000. These projections show a 36 percent increase in user days between 1970 and 2000. (RPA, 1975)

2. Camping Near Project Area

Two existing recreational facilities are located near the project area. Big Meadow Campground and Middle Meadows Group Campground are located adjacent to some of the most disturbed sections of the creek. There are also campsites near the confluence of the north and south forks of Long Canyon Creek.

The project area has the potential of offering these campground users a better resident trout fishery.

D. Economics of Angler Usage

A 1977 publication lists the net economic value of an angler day for resident trout fishing at $10.60 (Fish Mgt., 1977). This value reduces to $4.24 per fish caught. The angler day is considered a more realistic measure of the worth of a recreational fishery.

The R-5 Preliminary Economic Value Guide for the forest services California Region (1972) lists the economic value of a visitor day of trout fishing between $5.25 and 8.65 with values increasing with the quality of the fishery.

III Evaluation Criteria

A. Considerations in Formulating Alternatives

1. Increase Fishery Productivity

A study of the present fishery was conducted within the

project area to evaluate the current habitat. Improvements which would increase the productivity were considered beneficial.

2. Minimize Adverse Effects of Implementation

The environmental effects of removing much of the stream debris could be quite serious. The positive effects of the removal had to be weighed against the negative effects of heavy equipment operating in the stream channel and near the stream banks.

3. Enhance Visual Quality

Some of the log jams are large and greatly effect the aesthetic values of the stream.

4. Reduce Future Problems to a Minimum

The possibility of the existing debris naturally moving to new locations where more serious problems could occur was considered. Some alternatives have short range beneficial effects which were considered.

5. Enhance Downstream Habitat

Whenever work is done in a stream the area which lies downstream will be effected. The entire stream course is effected after stream alterations are completed. The method of treatment should be designed to improve both treatment area and downstream habitat.

6. Improve Recreation of Project Area

The effects of increased use of the stream and the Forest Service's recreational plans were examined. Whether the general public would benefit from this project was considered.

IV Alternatives Considered

A. Fishery Study of Project Area

Fish population estimates were collected using a D. C. pack-pack electro fishing device. Stream sampling sections were measured to obtain results which could be extrapolated to give numbers and weight of fish per acre surface area.

A representative sample of fish were measured (fork length) and weighed (water displacement method) to give the raw data which could later be used to calculate the average fish condition factors.

'Fulton's coefficient of condition', or simply the 'condition factor' (K), calculated from the formula of the type:

$$K = \frac{w}{l^b}$$

has often been used to investigate seasonal and habitat differences in 'fatness' or general 'well being'. (Riker, 1971)

If b is close to 3, as in some salmonoid (salmon and trout) stocks, comparison using this formula will reflect individual variability almost entirely.

The average condition factor of the fish sampled in Long Canyon Creek was 1.017. A k value greater than 1.0 indicates a fish is plump and in terms of length-weight relationship is in good condition.

In the study area the weight of the fish varies with the cube of the length. This condition will vary with season, sex, sexual maturity, age, and various other factors. (Carlander, 1977)

Table #1 shows the results of the three fish sampling stations. Figure # 1 is a map of the sampling station locations.

Biomass data from 278 north Sierra stream sections from 102 coldwater streams produce a pattern with a mean of 41 lbs/acre. (Gerstung, 1973). Two-thirds of these stream sections contained trout standing crops smaller than the mean. About a quarter of the sections contained populations greater than 60 lbs/acre.

Table #2 is a table from the Gerstung report which shows that approximately three-fourths of the stream stations from his study contained fewer adult trout populations than the South Fork Long Canyon Creek.

Figure #2 is a chart which can be used to grade study streams relative to other streams. South Fork Long Canyon Creek is well within the upper 20th percentile in terms of biomass.

The electro fishing study of this stream compared with other stream sections in this portion of California indicate the high productive level of the stream. It is believed that the additional cover which is provided by much of the debris is one of the factors atributable for these values.

A study on the micorhabitat of trout was done by Wickham (1967. Observations of trout under natural conditions in a small, high altitude stream suggested the operation of a scheme of fish habitation, the focal point concept. This concept is

Table #1 Summary of Fishery Study of South Fork Long Canyon Creek

	Station I	Station II	Station III	Average
Fish Biomass lb/acre	41.72	141.98	54.58	79.43
Population Estimate #fish/acre	87.36±5.16	73.78±3.8	53.89±7.73	71.68
Average Condition Factor K	1.018	1.038	.994	1.017
Adult Fish/Mile of Stream	105.6	766.0	276.8	379.8

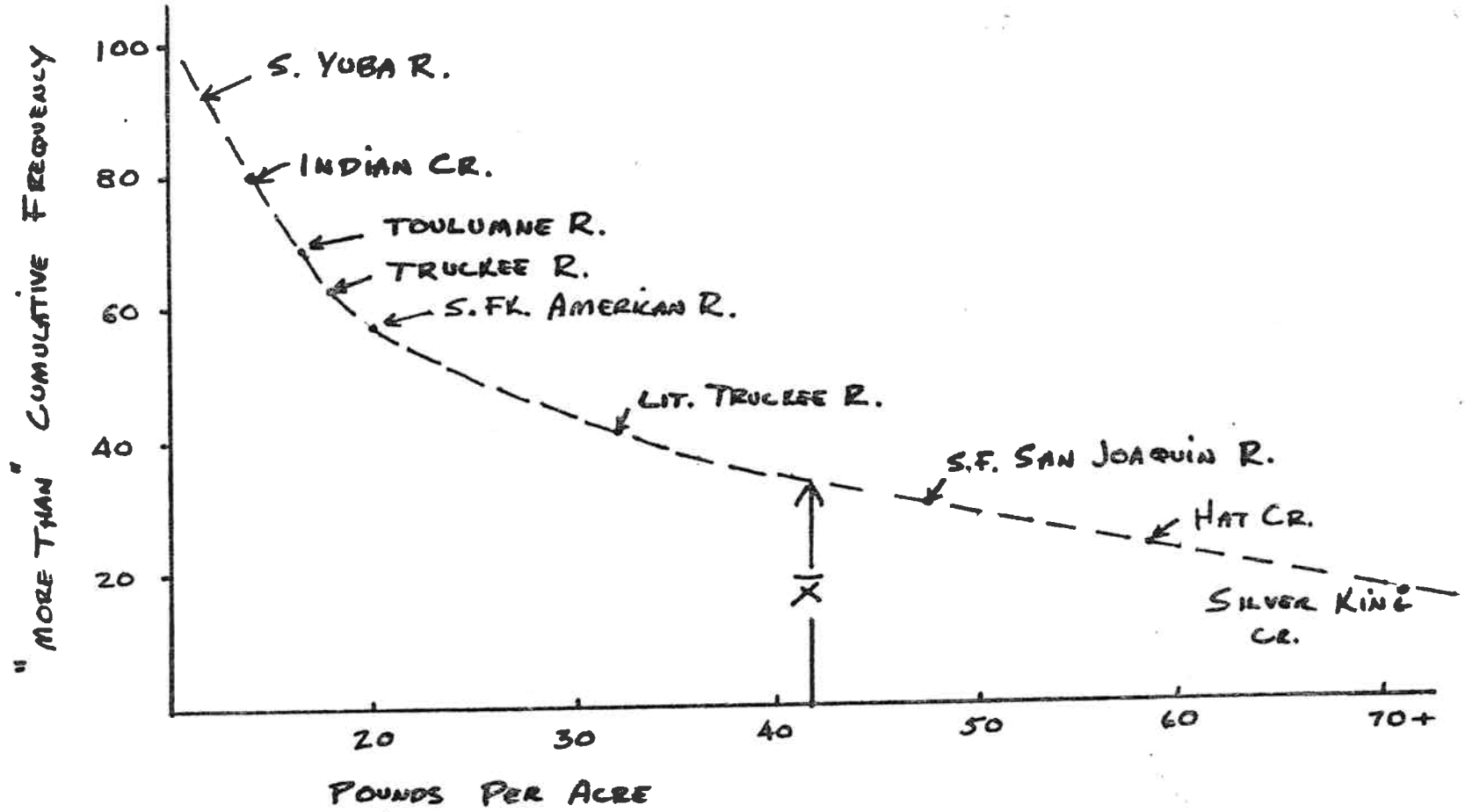
Table #2 Frequency Distribution of Adult Trout* Population Estimates

Adult Trout per mile	No. study sections per class	Percent frequency
1-99	91	32
100-199	61	22
200-399	82	29
400-799	42	15
800+	4	2

South Fork Long Canyon Creek - 379.8 adult trout/mile

* Adult Fish at 6" or greater in length.

Fig. 2 Stream Classification Relative to Frequency Distribution of Biomass Estimates From Stream Sections



South Fork Long

expressed in focal point residency and in movements away from the focal point. The purpose of Wickham's study was to gather information on the physical micorhabitat occupied by trout. Some fish used as many as four focal points concurrently, but only a limited area in each section of stream was used for focal points. The use of more than one focal point was due to a reduction in competition for space in the stream section because of lower population densities.

The most striking feature of the focal point is the great amount of time the fish spends in a small area. Percentages of time spent at focal points averaged at 94% of the time.

Cover was found to be an important feature associated with focal points. Large rocks, turbulent surface waters, and submerged logs were associated with focal points. Studies by Vincent (1969) show similar results. (Hooper, 1973).

The California Department of Fish and Game does not usually consider log jams a serious problem in streams having non-migratory trout. They are sometimes an asset there, providing shelter or creating pools. (California, State of 1966)

It was concluded from these habitat studies that the maximum amount of usable microhabitat in terms of depth, velocity, and cover will support more fish if other factors are not limiting populations.

To help ensure that other factors will not limit productivity the reduction of sedimentation is felt to be of primary importance.

B. Description of Alternatives

1. Partial Removal Alternative

To achieve the goals of optimum fish productivity in this section of stream will require the following improvements:

a. Remove debris within the stream channel which is diverting stream flows and causing erosion within the stream cahnnel and along the stream banks.

b. Install gabions along the bank areas where erosion problems are severe. Rock gabions located along damaged streambanks will reduce soils from entering the stream.

c. Cut and remove trees which represent future problems. Leaning live and dead trees were marked at the time of inventory of the study area.

d. Remove only the log jams which represent fish barriers and can be removed without causing stream channel and stream bank erosion.

2. No Change Alternative

The alternative of no change is a reasonable alternative due to the productive quality of the existing fishery.

The existing fishery has approximately twice the late summer standing crop compared with 102 other coldwater streams within the northern Sierra Nevada. (79.43 lb/acre vs 41.0 lb/acre). The number of adult trout/mile is at approximately the 75th percentile of the 102 other streams.

The electro fishing study and the observed stream habitat indicates that much of the existing debris is offering excellent cover for this fishery. Removal of some of the logs could result in less cover for the present fishery and a reduction in both biomass and the numbers of fish this section of stream can support.

The economic savings associated with implementing this alternative is obvious. The long term economic gain resulting from enhancement of the fishery could possibly be greater than the improvement costs.

The forest service landscape architect feels that in general, people enjoy a variety in visual settings, which is offered by some of the existing debris. Some of the larger log jams are unsightly and should be removed for aesthetic purposes.

3. Complete Removal

The original recommendation in the Multiple Use Plan of this project was to remove all of the existing debris within the stream channel and return the environment to its predisturbed condition.

This alternative has the following positive and negative effects:

a. Positive Effects of Alternative

(1) Enhances fish migration

Removal of all fish barriers would enable fish to migrate through the entire study area.

(2) Removal of potential future barriers

Some logs , in the stream channel, are presently doing little damage. These same logs have the potential of causing more serious problems if other debris becomes piled up behind them. This situation could cause future erosion problems and interrupt fish migrations. Removal of all the debris would reduce the possibility of future projects in this section.

(3) Improve access

Fishing access would be improved within the stream channel by removing all of the debris. In some areas the full width of the channel is jammed with logs making access within the channel difficult. Fishing this type of stream requires moving up and down the stream to fish the pool areas.

b. Negative Effects of this Alternative

(1) Heavy equipment damage

The heavy equipment needed to remove all of the debris would cause serious damage to the stream channel and banks. The primary objective is to reduce erosion and sedimentation. Some areas could possibly have more damage done in removal compared with the impact of leaving the debris.

(2) Reduction in fish cover

Removing all of the debris would reduce the present amount of cover available to the fishery. This would result in a reduced fish productivity level.

V Effects of Implementation

A. Methods of Implementation

Several methods are being considered for removing and disposing of stream channel debris:

1. Hand clearing using chainsaws and protable winches.

This is a labor-intensive method which could be used on approximately half of the debris sites. Some major log

jams are so compacted with silt and gravel that hand crews would not be effective. This is a very selective method that would have minimum impact on the stream environment. Emphasixing handcrews will result in greater human wxposure to accidents.

2. Small tractor with winch.

This method would use a medium size (D-6 or D-7) tractor to remove compacted jams and winch out large logs to disposal sites. Immediate environmental impacts would be greater than in No. 1, above but acceptable if carefully done. In some cases the tractor would be working in the stream bed which will result in silt deposited downstream until spring runoff flushed the stream gravels. Because of steep terrain the tractor will not be able to reach approximately 1/4 of the debris sites and these areas will be treated by hand crews as described above. Use of the tractor in place of hand crews would result in less human injury.

3. Disposal by burning.

Many debris jams are close to open streamside areas where logs could be piled and burned. Studies have shown* that water quality can be affected with increased levels of nitrates, nitrogen and potassium present for periods up to six years after burning for large burn areas. However, none of these chemicals approached toxic levels in the study and no adverse effects to the aquatic system were noted.

Logs would be end-lined and/or cut into rounds and rolled to the burn sites at least 100 feet from the stream. Burning would take place in the fall when safe burning conditions occur. There will be temporary reductions in air quality (smoke) but no other significant environmental problems are expected. There will be a short term impact on visual quality in these areas and use of some of these sites for dispersed camping reduced for a few years.

4. Disposal by Chipping

This would involve using a large chipper to dispose of logs and debris. Chips would either be scattered on the site or blown into a trailer and removed. The problems associated with this method are access limitations and corresponding longer end lining distances to get logs to the chipper. However, most of the high-volume debris sites are located near access points and it is estimated

* See discussion under V, B, 1b "Implementation effects of each alternative".

that approximately half the total debris volume could be disposed of by chipper. The environmental effects of using a chipper would be positive if chips are removed from the site and negligible to positive if chips are scattered at the site. Scattering chips could be beneficial at the borrow-pit site below Middle Meadow Campground. This area is close to the road and visible to dispersed recreationists in the area. It may be possible to establish plantings in this area with use of a chip mulch for rehabilitation.

B. Implementation Effects of Each Alternative

1. Alternative A - Partial Removal Alternative

a. Sedimentation

This alternative is most directed toward the reduction of stream sedimentation. Removing the debris which is causing erosion will stop the addition of sediments into the stream channel.

Installing gabions will help to reduce erosion of damaged stream banks. In some locations the natural healing process within the stream channel will take a long time. During this time period excessive amounts of sediment would enter the creek if the banks were not protected.

b. Environmental Effects of Implementation

In order to have positive effects from this project the end product must have more positive effects than the negative effects which will occur during the implementation.

Some of the log jams which will be removed in this alternative are the logs which are causing erosion problems. Other debris which can be removed without serious damage to the stream should also be removed.

If it appears that removing certain logs will cause stream bank damage, then these logs should be looked at twice. If the logs are diverting water into the banks they should be removed even if there will be damage done during the process. It is felt that the long term erosion problems associated with leaving these logs would be greater than the short term damage done while removing them.

After the logs have been removed they can be stacked

for burning purposes in approved open areas located adjacent to the stream.

Studies on the effects of burning slash near streams indicate there are associated changes in water quality (Brown, et al, 1973). An area which was completely clear-cut and burned was compared to a similar area, one which was 25 percent clear-cut and one which was a control area. The burned sections yielded maximum nitrate nitrogen and potassium concentrations in the water. These levels returned to prelogged levels within six years and two months respectively.

Phosphorus concentrations were unchanged and all of the changes posed no threat to aquatic or terrestrial productivity. At no time during this study did the nitrate nitrogen concentrations approach levels considered toxic to fish or man.

c. Visual Effects

Some of the larger, more unsightly, log jams will be left by using this alternative. Many of the larger log jams require the use of large equipment for removal. Use of this type of equipment would cause excessive damage within the stream channel.

d. Future Problems Associated with Alternative

The possibility of the remaining debris causing future problems exists using this alternative.

Future monitoring of the streams condition after flood conditions would be required.

The majority of the logs are deeply embedded and appear to be of a stable nature.

e. Downstream Habitat

The downstream habitat, at the present time, is adversely effected by the sediments which are being added to the stream from this section.

The repairing of any sediment producing situation would enhance the habitat found downstream.

If some logs were to be relocated due to high water conditions, it is felt that the meandering character of the stream will prevent these logs from traveling long distances.

f. Fisheries Productivity and Recreation

Leaving many of the logs will leave the important cover which is being provided by these logs.

Recreation along the creek will be improved with an increase in the fishing quality.

Summary:

This alternative realizes the importance of the debris as offering fish cover. At the same time it identifies the problems of some of the cause of the sediment problems.

2. Alternative B - No Change Alternative

a. Sedimentation

The continuing process of sedimentation will occur without removing the causes.

b. Environmental Effects of Implementation

The added sediments due to removal of the logs will not be a factor with this alternative.

c. Visual Effects

Some of the debris has neither positive or negative visual effects. Other areas of the stream have had only negative effects because of the larger log jams. There appear to be some logs which offer a pleasing riffle to pool ratio.

In general the diversity of the various types of log jams makes the visual impacts difficult to deal with as a whole.

d. Future Problems Associated with the Alternative

The condition of the stream will probably get worse before it becomes better.

It is not practical to think in terms of the natural decaying period of wood for the improvement of biological habitats.

The breakdown of wood fiber is an aerobic process. Many of the logs are completely to partially sub-

merged. This situation will prolong the decaying process. It is estimated that these logs will remain for 75 to 100 years. (Harrell, R.D., 1978) personal communication. The possibility of improving this area exists now.

e. Downstream Habitat

The downstream habitat at the present time is su: ing from the sedimentation being produced in the study area.

Some positive effects may be in the number of fish which are produced in this section and migrate downstream.

It is felt that the negative effects of this alternative outweigh the positive effects.

f. Fisheries Productivity and Recreation

The fishery study conducted in the study area indicates a high productive level compared to an average level found in 102 coldwater streams in the northern Sierra Nevada.

This fact may be the most positive attribute of this alternative. It has also been responsible for changes in initial judgements of the study area.

Summary:

This alternative recognizes the fisheries productivity associated with the present habitat.

It does not deal with the negative impacts of the sedimentation problems.

3. Alternative C - Removal of All Debris

a. Sedimentation and Effects of Implementation

The removal of all the debris would reduce the sediment yield where there used to be diversion of streamflows into stream banks. There would also be large amounts of soil stirred up by large equipment during the removal process.

Whenever equipment is needed to remove logs there would be damage done to the stream channel which would add to the sediment load.

b. Visual Effects

The damage of the stream by the use of large equipment would be a negative impact. Removal of all of the debris will result in fewer pool areas and longer riffle and run areas.

There will be both positive and negative impacts associated with this alternative.

c. Future Problems Associated with Alternative

Removing all the debris would result in eliminating the sites where sedimentation is being produced.

Gabions could be installed where excessive stream bank damage has occurred. Potential areas of erosion could also have gabions placed around them.

d. Downstream Habitat

Initially the downstream habitat would suffer from this alternative. All of the excess soil disturbance would be spread downstream.

It is felt that the effects of this disturbance would only last a few years. Most of the soils would be carried during high flow periods when the sediments would remain in suspension.

Ultimately the reduction in erosion producing areas will result in less sediment being added to the downstream substratum.

e. Fisheries Productivity and Recreation

Access within the stream channel would be improved after the debris had been removed.

Studies of the importance of cover for small cold water streams show that the available living spaces used by salmonoids would be reduced using this alternative. This would decrease the fishery which is presently found in this section.

Summary:

This alternative would return the stream to its predisturbed condition.

It would result in a long term reduction of sediments,

but an increase in the short term sedimentation. The extent of this short term period would depend on factors related to the damage done within the stream channel and the amount of yearly run-off following the implementation.

The data collected in this section of the creek indicates there would be a reduction of the present fishery if all of the fish cover was removed.

VI Evaluation of Alternatives

To evaluate the three alternatives a qualitative study of the evaluation criteria was made. Table #3 is an analysis of the three alternatives.

The following is an explanation of the qualitative ratings associated with each evaluation criteria:

A. Fisheries Productivity

Fisheries productivity is related to the quality of the habitat. The major effect of the debris found in this section of Long Canyon Creek is the sedimentation associated with erosion problems.

The following ratings are future estimates relative to the present productivity found in this section of the creek.

Rating:

1 - Productivity will be less.

2 - Present productive level.

3 - Productivity will increase.

B. Sedimentation and Fish Habitat

1 - Increase in sedimentation and loss of pools and cover area.

2 - Little or no change in the present sedimentation problem or usable habitat.

3 - Reduction in sedimentation with no loss of available fish habitat.

C. Environmental Effects of Implementation

1 - The effects of implementation would do more harm to the habitat than good.

2 - The effects of this alternative, while doing no additional damage to the present habitat, will result in added sedimentation.

3 - The effects of implementation will be minimal and the effects will reduce sedimentation.

D. Visual Effects

1 - Aesthetic value will be lower than the present condition.

2 - Aesthetic values will remain approximately the same. There may be some trade offs made with this rating. Some increases in aesthetics could be balanced by some decreases in aesthetic values.

3 - In general a more pleasing visual environment.

E. Future Problems Associated with the Alternative

1 - Future problems will be the same as they are at the present time.

2 - After completion of this alternative the possibility of future problems have been decreased, but not eliminated.

3 - Future problems due to stream debris will be eliminated.

F. Downstream Habitat

1 - Downstream habitat will be in degraded condition compared to the pre-implementation condition.

2 - Downstream habitat will remain approximately the same.

3 - Sedimentation will be less causing an improvement in the fishery habitat.

G. Recreational Use of the Stream

1 - Number of angler days is expected to be less due to the expected yield per angler hour of effort.

2 - Amount of recreational use is expected to remain approximately the same.

3 - Recreational use will increase due to higher fish productivity. Anglers are expected to catch more fish.

VII Identification of the Forest Service Preferred Alternative

Using the values outlined in section VI, the partial removal alternative (A) has the highest score. This alternative is considered the best in terms of the Multiple Use Plan.

VIII Management Requirements and Constraints

A. Evaluation of Each Stream Debris Area

An inventory of the rehabilitation needs was conducted in August, 1978. Each possible problem site was numbered and corrective measures were given.

Before taking any corrective measures, each numbered site must be evaluated to determine if there is a need to remove it. The criteria given in section V, B, 1a should be used in this evaluation process.

B. Monitoring the Future Stream Conditions

Section V, B, 1d discusses the future management requirements which will be necessary after the completion of this project.

C. The project will be completed primarily by hand methods so to mitigate adverse effects.

D. Burning of the debris will be in areas located in openings at least 100 feet distant from the stream.

Table #3 Evaluation of Alternatives

	Fisheries Productivity	Sedimentation and Fish Habitat	Environmental Effects of Implementation	Visual Effects	Future Problems Associated with Alternative	Downstream Habitat	Recreational Use of Stream	Total Rating
ALT. 1 Partial Removal	3	3	3	3	2	3	3	20
ALT. 2 No Change	2	2	2	2	1	2	2	13
ALT. 3 Complete Removal	1		1	2	3	3	1	11

IX Finding of No Significant Effect

This project will not have a significant effect on the human environment. The effects on the environment are of a permanent nature, but are not considered to be of a serious consequence.

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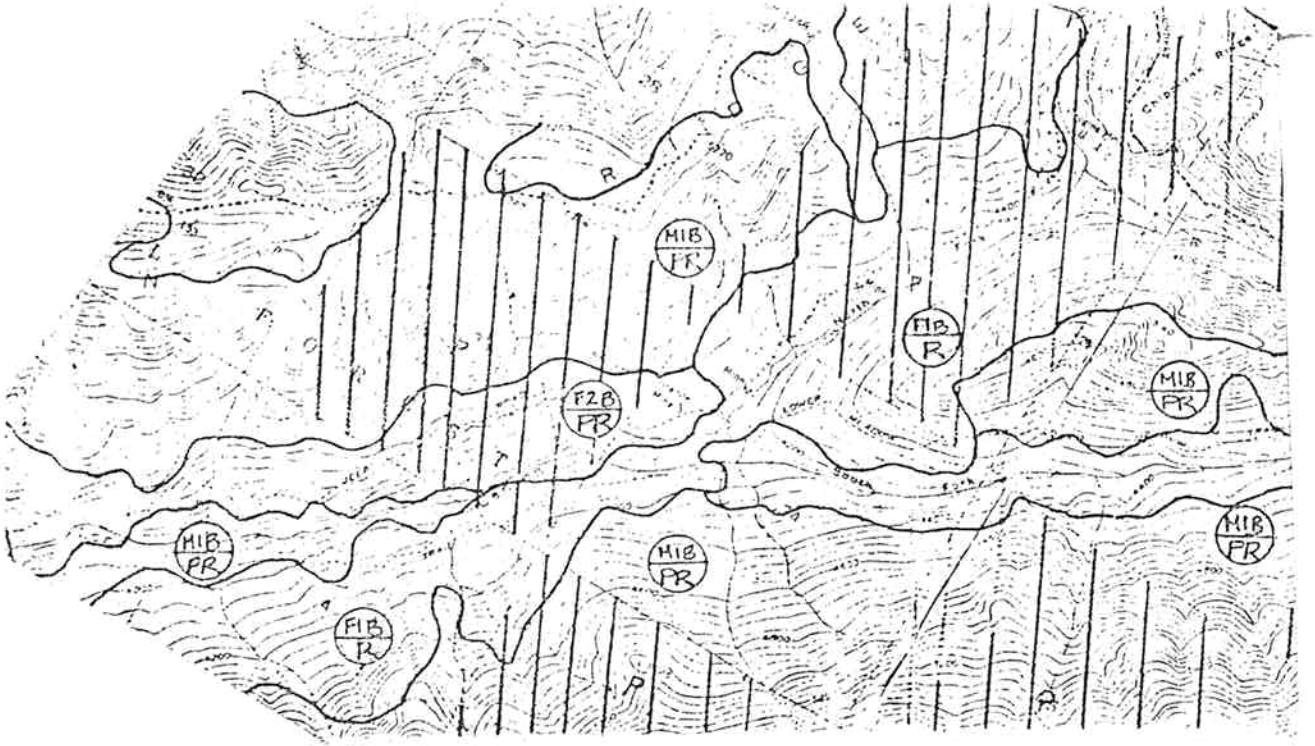
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