

## TIMBER HARVEST AND LOGGING PLAN FOR THE SOUTH FORK OF THE CASPAR CREEK WATERSHED

### Management Policy

The State Forests under law (Sections 4631-4658 Public Resources Code) have a specific purpose. This is to investigate and demonstrate how commercial forest land can be managed and harvested economically and efficiently to sustain and enhance timber productivity, yet to do it compatibly with recreation, fish, wildlife, and other values. Under these guidelines, timber management policies on Jackson State Forest provide for progressive logging practices. A continual effort is made to improve the timber harvesting techniques so that the results are a healthy, vigorous timber stand and ground conditions that are conducive to natural regeneration while minimizing soil erosion.

### Caspar Creek Watershed Study

The Caspar Creek Watershed Study was initiated in 1960 to study large differences between conditions of stream flow and sedimentation, fish life and fish habitat between paired watersheds, one of which will be carefully logged while the other is left undisturbed as a control. This study will not compare differences in types of logging practices.

Two matched watersheds were selected in Caspar Creek and a concrete weir was constructed in each watershed in fall of 1962. The north fork weir measures the water runoff from 1255 acres while the south fork weir measures flows from 1047 acres. The average age of the timber stand in the south fork watershed is about 20 years older than that in the north fork drainage. Based on the age of the timber, it was decided to make the south fork the treatment watershed and to leave the north fork watershed undisturbed and use it as the control.

The Caspar Creek Watershed Study is planned in three phases which are as follows: 1) calibration of the undisturbed watershed for comparative purposes (1962 through 1966); 2) main logging road construction and its evaluation on the

water regime (1967 through 1970); and 3) the logging of the timber from the drainage and its evaluations (1971 to about 1977).

The purpose of this plan (Timber Harvest and Logging Plan for the South Fork of Caspar Creek Watershed) is to establish the intent and methods to be used in the third phase of the Caspar Creek Watershed Study. This plan will show the forest management methods which will be applied in timber sale administration to meet the objectives of the watershed study.

### Objectives

It is the intent of this logging plan to provide an exemplary type of logging operation using standard equipment and the current standard of logging being used on Jackson State Forest.

The watershed timber sales are scheduled to provide information for evaluation of the effects of logging activities on:

1. Flood peak characteristics during and following storms.
2. Water temperature and quantity changes.
3. Stream sedimentation rates, both suspended and bedload.
4. Stream channel changes and their effect upon fish life and fish habitat.

### Sale Areas and Scheduling

The timber in the South Fork watershed will be harvested in three consecutive annual sales, starting in 1971. Starting at the weir and progressing upstream, each sale will be completed in one logging season. This is consistent with present harvesting plans on the State Forest. Each sale will be between 10 and 12 million board feet of timber. Estimated cut and leave volumes are listed by year in Table 1. The 1967 road right-of-way timber volume is included to present a total accounting.

Table 1. Timber sale volumes in the South Fork of Caspar Creek

| Sale                           | Year | Acres      | Million Board Feet |            |
|--------------------------------|------|------------|--------------------|------------|
|                                |      |            | Harvest            | Leave      |
| Caspar Creek #10 <sup>1/</sup> | 1967 | 47         | 4.0                | -          |
| Watershed #1                   | 1971 | 240        | 10.6               | 7.1        |
| Watershed #2                   | 1972 | 370        | 11.5               | 7.2        |
| Watershed #3                   | 1973 | <u>390</u> | <u>12.0</u>        | <u>7.9</u> |
| Total                          |      | 1,047      | 38.1               | 22.2       |

1/ 4.3 miles of road right-of-way clearing.

There are several considerations which led to the choice of sale areas and scheduling sequence. (see attached map):

1. The volume involved in each of the three sales is consistent with the present timber sale policies. The planned volumes can be removed in one logging season with two logging sides using available equipment.
2. Ridge-to-ridge sale areas provide the most orderly plan for the systematic timber harvest.
3. Starting with the first timber sale near the weir and subsequent sales upstream should allow for better evaluation of sediment source areas without having an accumulative effect as would happen if the sequence of logging were reversed.

#### Silvicultural System

Selection systems will be used in marking timber throughout the sale areas. The 90 to 95 year old stand consists of mixed young growth redwood, Douglas-fir, grand fir, hemlock and some scattered old growth timber.

To develop the desired leave stand, certain principles will be followed in marking the area. They are as follows:

1. Encourage Douglas-fir reproduction by opening areas using group selection to create small openings which favor establishment of Douglas-fir and the release of other advanced regeneration.
2. Maintain vigorous growth in redwood by thinning of existing clones of redwood to favor the better-shaped and higher quality trees.
- 3, Maintain vigorous growth in grand fir by harvesting large or defective trees.
4. Remove hemlock and bishop pine to reduce these seed sources as much as possible:
5. Harvest all large defective trees while favoring smaller vigorous leave trees.

The marking will be done with consideration of a 20-year cutting cycle. Almost all old growth redwood will be removed; however, some exceptions may be made adjacent to the State Park and county roads. Virtually all of the residual old growth Douglas-fir will be harvested. About half of the young growth Douglas fir will be harvested.- About 60 percent of the grand fir will be removed. Hem lock and bishop pine will be marked very heavily to remove their seed source while favoring other species regeneration. In the area near the county roads and adjacent State Park boundaries, marking will be done with special consideration for aesthetic values. This treatment will "feather in" to the standard marking at 50 to 200 feet, depending on local conditions. This "feathering" should also produce a windbreak along the southern perimeter of the area which is underlain with the sandy soil of the Caspar series. The trees on this soil are susceptible to windthrow problems.

### Logging Methods

As stated in the Cooperative Agreement for the watershed study, the study will not compare different types of logging practices, but will use standard logging equipment and practices. To insure a standard of logging which will be consistent with State Forest practices and not deviate between the three proposed sales, the following conditions will be controlled in the timber sales:

#### Logging Equipment

To insure that the job is consistent between sales and that the leave stand and ground conditions are similar, the following equipment complement will be used:

1. Two loading machines operating concurrently.
2. At least one rubber-tired skidding machine for each loading machine.
3. Restricted use of tractors comparable in size to a Caterpillar D-7 or larger for constructing roads, skid trails and landings. Any use of this size equipment, with or without blade, for log skidding must have prior approval of the Forest Officer.
4. Limit crawler type tractors to yarding of turns between the stump and the major skid trails.
5. Encourage use of rubber-tired skidders to transport logs on major skid trails to the log landing.
6. Encourage use of winch lines to minimize soil movement caused by log removal.
7. Restrict activity to designated logging areas and require an orderly progression of work.

### Erosion Control Practices

The intent of all practices will be to hold soil in place through minimizing overland flows. As each sale progresses, installation of erosion control measures will be provided in a logging area subunit prior to moving to another area.

#### Streamside Protection

Logging equipment will not be allowed in streams except to cross. Care will be taken to minimize soil disturbance adjacent to intermittent and perennial streams. If a road or skid road must cross a stream, the road will cross at right angles to the stream. A dip or reverse grade will be constructed in the road where it approaches the intersection of the stream crossing. This technique will help minimize road surface erosion and disturbance to the stream channel.

After logging is completed, all drainage channels will be re-established at stream crossings. Road and skid roads will be seeded and fertilized with urea for a distance of one chain on each side of the stream crossing.

Streamside timber will be felled away from the stream.

#### Waterbreaks

Waterbreaks will be constructed along road and skid road systems as local conditions dictate and to the following minimum specifications:

- (1) At intervals of not more than 200 feet on grades of 10% or less.
- (2) At intervals of not more than 150 feet on grades of 11% - 25%.
- (3) At intervals of not more than 100 feet on grades of 26% - 49%.
- (4) At intervals of not more than 75 feet on grades of 50% or more.

All distances shall be measured along the slope of the ground.

### Roads, Skid Trails and Landings

#### Roads

The roads constructed in addition to the existing system will be temporary spurs. As shown on the attached map, the new construction

will take place primarily in the upper elevations of the sale to reduce skidding distance. These roads may be constructed in areas of scenic values and care will be taken in road location along Mendocino County Roads 408 and 409 to minimize unsightly vistas. In road design and construction every effort will be made to control surface drainage and minimize sediment movement.

The temporary roads shall be constructed to a width of 12 feet, with sustained grades not less than 2 percent nor generally more than 10 percent and with occasional short pitches of up to 12 percent. The sustained road grades will be broken with rolling undulations and cross-drained following, logging to prevent water buildup on the road surface. The temporary roads will be located on grades and alignments that minimize the amount of road cuts. The roads will be outsloped and the berm will be removed and water breaks installed to facilitate drainage and reduce surface erosion and gullying.

### Skid Trails

#### 1. Major Skid Trails

All major skid trails will be laid out, mapped, and marked on the sale areas prior to construction. Landings have been so located that skidding distance will not ordinarily exceed 1,000 feet. The grades on major skid trails will be as moderate as reasonable. Skid trail width will be limited to the width of the tractor used in construction and cuts will be kept to a minimum. A more detailed map will be made of the major skid trails when they are located on the ground.

The major skid trails will be located primarily on ridges. All skid trails dropping off ridges~into landings will be outsloped and constructed in an "S" shape to provide for the side-casting of water into the duff before it has a chance to build up on the skid trails.

## 2. Minor Skid Trails

The minor skid trails will be constructed as laterals in a "herring-bone" design from the major skid trail system. They will be built into the gulches on a contour and will end at least 50 feet from the stream edge. Along streamside areas the logs will be "lined" out and special care will be taken to minimize the disturbance to these areas. This approach will be used on most intermittent and all permanent streams. All minor skid trails shall be approved by the local Forest Officer before construction.

## Landings

All the existing landings within the watershed boundary will be used again and the existing landings on Road 640 will also be used when ever practical. The new landings will be constructed in conjunction with the temporary road system. Most of the proposed landings will be located on the flats off Mendocino County Road 408 and 409 or on ridges. Landing size will be limited to 1/4 acre unless unusual conditions warrant a larger size. All landings will be located and marked in conjunction with the skid trail system. No additional landings will be constructed by the contractor without prior approval of the local Forest Officer. Landings will be drained and seeded to grass after logging is completed.

Special Considerations, Soils and Geology

A soil survey by E. N. Gladish, made in 1964, showed that the majority of the soil in the South Fork watershed is of the Hugo series. Almost 5 percent of the area is flat area adjacent to the county road and is classified as Caspar Series. Both of these soil series are rated as having "moderate erosion hazard." In summary, Gladish states "It is suspected that increased sediment from logging operations may be closely related to micro-relief, particularly the very steep areas."

In 1964 Eugene Rojan presented a portion of a Preliminary Draft in Engineering Geology of Caspar Creek Watersheds in which he discusses north-south trending fold axes and northwest trending zones of intense shearing in both watersheds. He cautioned that a minimum of disturbance should be made of slopes by road cuts, landings and skid trails in certain areas as designated in a map. These areas are shown on the working map attached to this plan.

It will be the intent of planning and timber sale administration to give due regard to any areas of unstable soil or steep terrain which present possible problems and the areas as delineated in Rojan's report.

Timber Sale, "Watershed #1"

The timber sale in 1971 will be designated as Watershed #1. The road and skid road locations and timber marking should be completed by May 1, 1970, and the cruise data completed by June 1, 1970. A final consultation of the planned timber sale appraisal and agreement will be made around the first of October 1970. This meeting should establish all details which pertain to the contractual considerations involved in this timber sale.

The appraisal data and timber sale agreement should be completed by November 15. The calculations involved in timber sale appraisal are delayed until this date to insure that costs and values are as timely as possible. The bid date will be in early January 1971.

The timber sale agreement will contain provisions which will determine the scheduling of logging activities. As is standard practice, it will be possible for the contractor to begin preliminary work after March 1, 1971. These activities will include felling timber and construction of roads and landings. It is estimated that transportation of logs on a production basis would not begin until April. The timing of the logging operation will be controlled by the timber management officer, based on weather and ground conditions and decisions documented.

Based on rainfall records, logging in the spring can be intermittent in April and generally no problem in May. At the end of the season, logging activity may be intermittent and will usually be halted in November. Storms prior to April may be so spaced that the water storage capacity of the soil in April will tolerate logging with a few storms in April. Also after a dry season, the early storms in October do not materially affect stream flow and, as in 1969, logging activity may be continued well into November without creating undue soil disturbance. Based on these considerations, it is planned that the period of the timber sale agreement will be from March 1 to November 15, with on-the-ground control of logging activity.

#### Acreage Volume

The 1971 timber sale area is 240 acres and the timber volume to be removed is approximately 10.6 MM board feet.

#### Roads, Landings and Skid Trails

All roads, landings and skid trails will be located and marked prior to crusing the timber for sale. Timber will be felled and yarded from these areas prior to logging. All roads, landings and skid trails will be constructed using the principles previously stated.

Manpower Requirements

It is estimated that about 40 percent of the total man months spent on the three annual timber sales in 1971 on the Forest will be spent on this Watershed #1 sale.

It is realistic to assume that even though the logging job will represent a good standard, comparable to other sales, extra time will be required in planning, administration, documenting and analyzing on this sale.

The estimated man months of time required are shown in Table 2.

Table 2. Manpower requirements in man months for the Watershed #1 Timber Sale (estimated).

|                             | Forester I | Forester II |
|-----------------------------|------------|-------------|
| Preparation:                |            |             |
| Planning                    | 1.0        | .5          |
| Boundary and Roads          | 1.0        | .2          |
| Marking                     | 2.0        | .2          |
| Cruising                    | 1.0        | .1          |
| Agreements                  | 1.0        | .5          |
| Supervision:                |            |             |
| Administration and Analysis | 3.0        | 2.2         |
| Scaling                     | .8         | 3.0         |
| Total                       | 9.8        | 6.7         |

Experimental Considerations

In attempting to document the effects of the 1967 road building, permanent photo stations were established on the road and in the stream. Reference points to these photo stations will need to be protected during the logging activity.

Other permanent photo stations will be established to evaluate the effects of logging and pictures will be taken before, during, and after logging.

A study of deposition within sediment catchment basins adjacent to Road 600 will be conducted. Photos and profile measurements will be made as soon after logging as possible. Road 600 has been stationed for estimating soil movement. These stations will be protected for further analysis.

The inclinometer tube installations established at two locations in the watershed drainage are adequately marked and will be protected from logging damage. These were installed in 1964 by Eugene Kojan as part of a broader survey of soil creep in the north coast area.

It is planned to document and map any problem areas with regard to soil and micro-relief. The result of logging in these areas can be shown by photography and before and after pictures will be taken. Every effort will be made to take advantage of expert knowledge in the fields of watershed management and soil science to add to evaluation efforts for this project.

Aerial photos should be budgeted for and taken to show the area before and after logging. It would also be desirable to have a strip of controlled vertical aerial photos of the same scale as the 1968 administrative photos for the Forest flown soon after logging in the project area for direct comparison.

#### Timber Sale, Watershed #2

The field work for the Watershed #2 Timber Sale will be started while the Watershed #1 Timber Sale is in operation. It is hoped that it can be completed early in 1971. By the first of October 1971, administrative agreement on conditions of the sale should be reached. The timber sale report and sale agreement are scheduled for completion in mid-November 1971 and the bid is to be in by mid-December 1971. The sale period should be March 1 to November 15, 1972.

Manpower requirements will be about the same as those shown in Table 2.

#### Acreage and Volume

The area for the Watershed #2 Timber Sale will be approximately 370 acres. The volume will be approximately 11.5 million board feet net. This sale is the second logging unit in the watershed. The volumes are estimated from the 1967 cruise and probably will change somewhat when the exact area is marked and cruised. When this information is known the boundary and acreage may be changed to make the sale more compatible with the Management Plan.

#### Other Administrative Considerations

Timber sale administration will be consistent with the Watershed #1 Timber Sale. The only exception might be in the event that better methods of accomplishing the job will be incorporated into the timber sale activity.

#### Timber Sale Watershed #3

The field work for this sale should be done by late 1971. The administrative agreement should be reached by October 1, 1972, and the timber sale report and sale agreement by November 15, 1972. The bid date will be mid-December 1972, and the sale period from March 1 to November 15, 1973. Manpower requirements will be approximately the same as the other Watershed sales.

#### Acreage and Volume

The area of the sale will be about 390 acres or the remainder of the watershed area. The net volume should be about 12 million board feet.

#### Other Administrative Considerations

Again, the sale conditions will be consistent with the previous South Fork of Caspar Creek Watershed timber sales. Generally, there is more flat ground in this sale than the previous sales and a large portion of the volume will

be moved over County Roads 408 and 409. The scales will probably be moved for this year's sale as the Woodlands #1 sale is also to be hauled on County Road 409.

Conclusion

The purpose of this plan is to provide a record of intent for the timber harvesting and logging in the South Fork of Caspar Creek Watershed Study area. There will doubtless be some changes made as more knowledge of specifics is acquired.

As this is a preliminary plan; it may serve to provide information for consideration to improve or add to the operations of the timber sales, or the experimental possibilities. We would appreciate any constructive comments from cooperators in the study, or experts who see an opportunity for plan improvement or reasonable additions to experimental efforts.

May 7, 1970