



STATE FOREST NOTES

Office of the State Forester
Sacramento

No. 61

April, 1976

"MINI-YARDER" CLEARS STREAMS ON JACKSON STATE FOREST

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For several years a large amount of wood fiber on Jackson State Forest and other properties has gone unused because it was uneconomical to salvage. This waste material consisted of debris



Fig. 1. Slide debris in Berry Gulch.

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resulting from land slides, blowdown or trees which had been undercut by high waters. The concentration of material along gulch and canyon bottoms compounded the problem by changing stream flows and creating blockages which restricted fish passage.

In recent years with the return to popularity of cable logging systems, it has become apparent the best way to do stream clearance and salvage work is with a mobile yarder or short span skyline system. However, most of these "modern" yarders are so costly that low volume jobs such as stream clearance are not economically practical.

Recognizing the need for such stream clearance and salvage work, and the need for suitable equipment to do the job, two Willits, California, businessmen formed Salmon Cat Systems, Inc. They examined the feasibility of a small mobile yarder called a "mini-yarder." Their first idea was to build one on a military tank chassis, but they soon discovered this would be almost as costly as buying a small track-mounted machine such as the Skagit SJ-4.

Searching the western states, they found a used machine which seemed to meet their needs. This machine had been manufactured by Schneider Machine Co. of Eugene, Oregon. Schneider produced several, most of which were shipped to the Philippines. Two were put into operation in Canada and one was utilized in Oregon.



Fig. 2. Mini-yarder rigged and ready for work.



Fig. 3. Mini-yarder ready for transport.

The machine consists of a Timberjack 360 rubber-tired skidder equipped with a 25-foot Schneider tower and a Skagit double drum winching system. The drums have a capacity of 800 feet of 3/4 inch mainline and 900 feet of 5/8 inch haulback. The tower can be raised or lowered by means of a hydraulic ram. Stabilization is provided through four guy lines operated by hand crank reels near the base of the tower and a steel plate at the base of the tower. With the tower in its operational position, the rear tires of the skidder rest on this plate.

The total weight of skidder, tower and line is 26,000 pounds. It has a width of 10 feet 4 inches. A transportation permit is required for over-highway movement. However, it is not always necessary to use a lowbed as the skidder is self propelled and capable of road speeds of 30 miles per hour. Set-up time runs about an hour and a half to two hours. Take-down time is less.

The first job this mini-yarder worked on was a slide along the North Fork of Big River on Jackson State Forest. Salmon Cat yarded some thirty thousand board feet, net scale, in a three-week period, as well as removing debris from the streambed. This first job prompted some ideas for modification.

The main idea was to change to a standing skyline and add a carriage to the system. This allowed lateral yarding with minimum side pull on the skyline. A simple mechanical carriage was found in Idaho. This Macki gravity carriage weighs only 450 pounds and makes selective harvesting or thinning possible.

The next job tackled by Salmon Cat was a logging operation in the Point Arena area. With further experience, a four-man crew, and the Macki carriage, production reached fifteen thousand board feet per day.

In December, 1975, five stream clearance jobs on Jackson State Forest were let for bid. Salmon Cat was low bidder on three of these jobs. The mini-yarder equipped with the carriage proved to be well suited for this type of work. Production figures are difficult to define as only 1/3 of the time was spent in yarding of salvage material. The remaining 2/3 of the time was composed of hand work and reduction of large stumps and chunks to a size which could be handled by the equipment. Cost of stream clearance of the type illustrated in Fig. 1 was approximately \$30. per lineal foot of streambed.

The limiting factors of the mini-yarder are mainly related to safe working loads of approximately 14,000 pounds for the mainline and 20,000 pounds for the skyline. In addition, there must be sufficient elevation for the carriage to work properly. Estimated lift capacity for logs is about 1,500 - 2,000 board feet. Average yarding distance is 300 feet. In stream clearance work, it is often necessary to saw or split into pieces large stumps or root wads as they are water soaked or have quantities of dirt held by the roots which make them heavier than logs.

Specifications for the stream clearance work on Jackson State Forest required the contractor to remove all loose logs, stumps and other woody debris from the stream channel. Any buried material was to be cut off flush with only the exposed portion removed. No equipment was allowed closer than fifty feet slope distance from the high water line of the stream. All large material was to be cable yarded or long lined out of the channel; smaller material was removed by hand. Because the project was on a slide area, no consideration for standing trees was necessary.

Merchantable debris removed was decked at roadside. The remainder was piled out of the streambed where it would not re-enter the channel or was burned where the ash would not adversely affect water quality.

Permits for stream alterations were obtained from the California Department of Fish and Game for all of these projects. At one point while the mini-yarder was working in the James Creek area, biologists from the Department of Fish and Game as well as a staff specialist from the California Regional Water Quality Control Board, North Coast Region, observed the operation. Their comments were favorable as to this type of operation.

Cost of these stream clearance jobs for the yarder and a four-man crew was approximately \$600 per day or \$30 per lineal foot of streambed. Additional equipment such as a cat or loader as well as move-in and move-out costs are extra.



Fig. 4. Berry Gulch after most of debris had been removed.

This mini-yarder and other equipment like it will probably be utilized more in the future for stream clearance and small logging jobs.

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