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Parlin Creek Large Woody Debris Placement Project

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In August 1996 the Jackson Demonstration State Forest (JSDF) completed a fish habitat rehabilitation project in a 2.5 mile reach of Parlin Creek, a tributary to the Noyo River in Mendocino County, California. The purpose of the project was to introduce large woody material to the stream channel to determine if higher quality habitat could be produced for anadromous salmonids. The project goals were to: 1) increase depth and complexity of pools, 2) create new pools, and 3) break up long riffles and reduce winter flow velocity.

The project consisted of adding large pieces of wood to the stream to provide pool scouring elements which would help increase habitat complexity, increase rearing areas, and provide escape and overwinter cover for anadromous fish. Wood pieces were introduced into the stream channel either by falling trees directly into the active channel or by dragging downed trees and logs adjacent to the stream into the active channel. Wood pieces were not anchored to the bank or to each other, which is a departure from normally recommended practices. In cooperation with the JSDF's large woody debris placement project, the California Department of Fish and Game's (CDFG) Salmonid Habitat Restoration Program agreed to conduct long term project monitoring and evaluation to determine if fish habitat improvements were achieved over time, and monitor any movement of unanchored wood pieces within the project reach. The study design called for an initial survey the year the project (1996) was completed to determine baseline or "as built conditions". This was to be followed by a survey of treatment conditions after first winter (1997), which is assumed to be after the first bankfull stream flow events. Subsequent surveys are to be conducted after third winter (1999) and then at three year intervals (e.g., 2002, 2005, etc.). Additional surveys could

main buildings of the Parlin Fork Conservation Camp, and permanent station markers were established every 500 feet upstream, measured from this reference point. Each log, tree, or root wad was marked with a unique identifier consisting of metal tags secured with aluminum nails. Only logs with a d.b.h. greater than 12 inches were considered as project wood. Existing logs or other large woody debris (LWD) in the stream were not noted in this survey; however, locations of large debris accumulations (log jams) of more than two logs were noted in comments. The survey included 11,500 feet of Parlin Creek upstream from the reference point. The first log was observed at 1,095 feet and the last log noted at 11,486 feet. The project continued upstream for another 1,000+ feet but was not observed in this survey. A total of 162 pieces of wood were observed within the reach surveyed. This averages out to one piece every 64 feet.

During the 1996 survey, recently felled trees with either their limbs removed (NEW) or their limbs still on (NEW_B) accounted for 42% of the project wood placed in the channel, while existing down logs with either their root mass attached (LOGROOT) or lacking a root mass (OLDLOG) made up 37% the project wood surveyed. The remaining project wood surveyed consisted of log remnants less than 20 feet in length or stump pieces without root-like appendages (CHUNK) (19%), and root masses with root appendages (ROOTWAD) (2%). The recently felled trees measured in the 1996 survey averaged 49 feet in length (range: 10 to 100 ft) and 21 inches in diameter (range: 11 to 36 in.). Existing down logs averaged 37 feet in length (range: 10 to 75 ft) and 22 inches in diameter (range: 12 to 46 inches). The current guidelines for the use of unanchored LWD in stream restoration work given in the third edition of the CDFG's California Salmonid Stream Habitat Restoration Manual (February 1998) calls for logs with a minimum diameter of 12 inches d.b.h. and a minimum length of 1.5 times the mean bankfull width. One of the objectives of CDFG's monitoring and evaluation of this project is to test the adequacy of these criteria. The average

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The second CDFG survey was conducted in September 1997 to determine the location of the project wood after experiencing their first winter bankfull stream flow events. The 1997 survey was conducted in the same stream reach as the 1996 survey, except the reach below the reference point was also surveyed for any displaced project wood. Each piece of project wood found was again marked with a unique identifying metal tag. In addition trees or wood piles meeting the minimum size requirements which fell into or entered the stream since the 1996 survey were also sampled and tagged.

During the 1997 survey 147 of the 162 pieces of project wood tagged in 1996 were located (91%). Their average length was 39 feet

(range: 6 to 100 ft) with an average diameter was 25 inches (range: 12 to 90 in.). The 1996 project wood not found in 1997 had a significantly smaller averaged length (22 feet; range: 6 to 55 ft), although their average diameter (28 inches; range: 11 to 84 in.) was not significantly different. However, it is possible that some of the missing 1996 project wood may have either lost their tags or had rolled on top of them obscuring the tags from view. Therefore, not all of these pieces were necessarily lost from the project area. Out of the 147 pieces of the 1996 project wood which were observed during the 1997 survey, 33 (22%) were found to have moved downstream an average distance of 388 (range: 34 to 1842 ft) feet from their 1996 location. The average length of those pieces displaced downstream (31 feet; range: 7 to 100 ft) was also significantly smaller than those pieces of wood found in their original positions (40 ft; range: 6 to 100 ft). Again, no significant difference was observed between the average diameters of the project wood which moved downstream and those which didn't.

During the 1997 survey, 76 additional pieces of wood meeting project criteria were found to have fallen or moved into the project area. Together with the 147 pieces of the 1996 project wood, a total of 223 pieces of wood were observed within the reach surveyed. The first piece of LWD was found 747 feet below the reference point and the last 11,538 feet above it. This averages out to one piece every 55 feet. Average bankfull width of the stream during the 1997 survey was about 21 ft, putting the recommended 1.5 times bankfull length for LWD at 31.5 feet. The results of these first two surveys, therefore, appears to support CDFG's unanchored LWD length criteria. Future monitoring efforts will continue to track the stability of project wood in Parlin Creek, measure new LWD recruitment, assess fish habitat quality produced from the project treatment, and determine how of juvenile coho salmon and steelhead utilize this habitat.