

Forest Management Tech Tips

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Temporary Stream Crossings to Minimize Instream Sediment

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This Tech Tip shares information with Forest Service, U.S. Department of Agriculture, field personnel on innovative temporary stream crossings used on timber sales throughout the United States. In 2004, this information appeared on San Dimas Technology and Development Center's (SDTDC) internal Web site. Now the information has been updated for publishing on the Internet. SDTDC did not have the opportunity to evaluate these temporary structures in the field. The structures we describe worked for the people providing the information. Local conditions should be carefully evaluated to determine if one of these structures will work in other areas.

EASTERN REGION (R-9) STRUCTURE

Information on the Forest Service Eastern Region (R-9) structure was provided by Charlotte Bofinger from the Ottawa National Forest. The situation was a summer drainage crossing for a forwarder. After installation, the crossing withstood heavy use for a month or more and then was removed. The stream course was running water to a depth of 12 inches and up to 3 feet wide. The crossing was created using separator material, corrugated plastic pipe, and pulpwood. The separator material keeps the logs from being pushed into the soil and results in cleaner logs being hauled out of the woods. A pervious, nonwoven geotextile is recommended. After the crossing was no longer needed, the pulpwood was removed and hauled. The separator material and pipe were removed for reuse.



Figures 1 and 2—The temporary crossing in place and after its removal.



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Figure 3—A closeup of the channel with separator material, pipe, and pulpwood.



Figure 4—A closeup of the channel after removal of the temporary crossing. Note the indentations of the logs.



Figure 5—Ground cover of organic material is still in place after the logs are removed.

Consider the following before installing a temporary crossing. These factors may vary by location, slope, local weather conditions, season of use, etc.

1. Expected stream flows within the period of use. This will influence the pipe size.
2. Wildlife/fishery habitat disturbance. Are threatened, endangered, or sensitive species or their habitat present? Does the stream provide habitat for aquatic or semiaquatic species? These questions should have been considered during the environmental analysis phase of the project and documented in the environmental assessment.
3. Structural integrity of the crossing. Consultation with a transportation planner or engineer is recommended to ensure that materials used will meet the needs of the structure and equipment crossing it.
4. Soils/hydrological concerns. Subsurface flows, likelihood of slumping, erosion potential, etc., should be considered. This is particularly important on steeper slopes or with an incised channel. These concerns may also have been addressed during the environmental analysis phase but may not be site specific enough to cover an area this small. If not documented in the environmental assessment, additional analysis is necessary before implementation.
5. To prevent the pipe from being crushed and blocking flow, have enough logs over the pipe to disperse the weight. This depends on the size of logs being used. The logs also need to be placed carefully (tightly) to prevent shifting, which could cause the pipe to be crushed.

6. Ensure that a documented agreement is in place from the timber purchaser as to standards for installation, recovery of the logs used, and timely removal (seasonal or weather related) of the crossing. It is possible to get substantial channel scour if storm flows move the logs. Agreements should include provisions to remove the logs if heavy storms are predicted where flows may exceed the maximum expected.

OTHER DESIGNS

An example of a crossing in the Pacific Southwest Region (R-5) was shared by Tony Rodarte from the Tahoe National Forest. The crossing had already been removed, therefore, only “after” pictures are available.

The situation was an ephemeral drainage used during August, when the chance of measurable precipitation is minimal. The crossing was removed by September 15. The need for a temporary crossing was recognized during the National Environmental Policy Act process and was included in the analysis. There was no pipe or separator material used. The harvest was a whole-tree thinning from below. Whole trees (10- to 24-inch diameter breast height) were used in the drainage. The material used was included under the contract. After the crossing was no longer needed, the material was removed with a heel-boom loader and processed at the landing. Standard erosion control measures were required. The material was required to be removed after use and before the first rain (a date was specified). Straw was required to be placed at the crossing above the apparent high water mark on both sides of the channel. Some breakage of limbs and tops was experienced, but all slash was removed from the drainage. The end result can be seen in figures 6 through 9. The water evident in the pictures is from a November rain 2 or 3 days before the pictures were taken. The rain event was almost 3 inches.

Figures 6 through 9. Crossing already removed; Tahoe National Forest.



Figure 6



Figure 7



Figure 8



Figure 6

Another innovative approach was shared by Ken Heffner from the Intermountain Region (R-4). This has been used in the past, but no pictures are available. This approach involves laying chain link over the stream course with a chain attached to one end. The chain link is covered with logging slash/limbs. Mineral soil can be placed on top of the logging slash to create a running surface or snow can be used in the winter. The crossing is removed by using the chain on the opposite streambank and pulling with a skidder or other equipment and rolling the whole thing back towards the near side of the stream. The chain link, slash, and earth/snow all come out like a “chain-link burrito,” and the original channel is not disturbed at all.

SDTDC’s national publications are available on the Internet at <http://www.fs.fed.us/eng/pubs/>.

Forest Service and U.S. Department of the Interior, Bureau of Land Management employees also can view videos, CDs, and SDTDC’s individual project pages on their internal computer network at <http://fsweb.sdtdc.wo.fs.fed.us/>.

For additional information on the forest management program, contact Bob Simonson, program leader, at SDTDC. Phone: 909–599–1267. E-mail: bsimonson@fs.fed.us.