On-Site Large Woody Residue and Soil Litter Retention, BMP 14.24

Objectives

1) To maintain long-term soil productivity by retaining enough large woody residue and organic litter on the soil surface.

Site Description

This site is located ½ to ¾ of a mile from the Cottonwood Lakes Road on Road 602. The site is in Unit 10 of the Cave Helo Timber Sale, on the Seeley Lake Ranger District of the Lolo NF, in Section 22, Township 16N, Range 13W. LSI classification is 64QG.

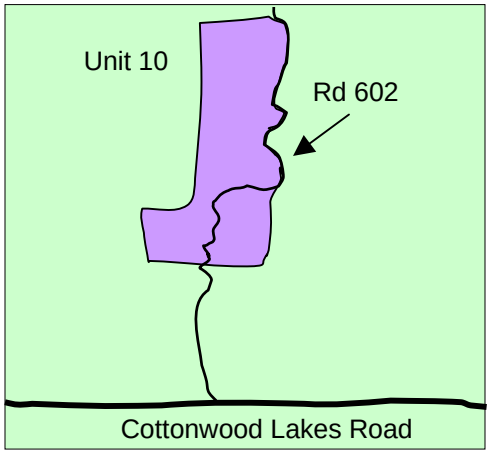


Figure 1

Narrative

It is important to leave an adequate amount of woody debris and small diameter slash on harvest units to decrease erosion and increase infiltration and soil productivity. The debris benefits the soil productivity through nutrient cycling and moisture retention. It protects the soil and creates micro-sites offering shade and cover for new seedlings. In addition it provides habitat and cover for wildlife.

BMP standards require an even distribution of large woody debris at least 3 inches in diameter, with 75 percent of litter retained overall. The large woody debris on Unit 10 was retained at the time of sawing and skidding, and will be used onsite.

Observations and Measurements

The majority of logs left onsite are 3 to 8 inches in diameter, with a few 12 inch diameter logs. Smaller slash was scattered between the larger logs. Surface litter is approximately 3 to 3½ inches deep. Nearly 70 percent of the slash are log tops and smaller limbs, with the remainder logs greater than 3 inches. Signs of erosion or soil displacement are nonexistent onsite. Tree and shrub re-growth is productive (photos 1 & 2).

Photo 1


Photo 2

Effectiveness

The amount of large woody debris retained is effective. Soil erosion and displacement have been prevented. Larger logs have created wildlife habitat that will decompose and provide enhancement to soil productivity in the future. Surface litter retained onsite is 3 to 3½ inches deep, over 75 percent of the unit.

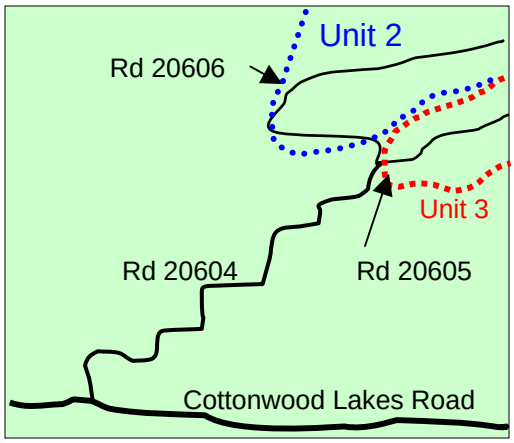
General Guidelines for the Location and Design of Roads and Trails, BMP 15.02

Objectives

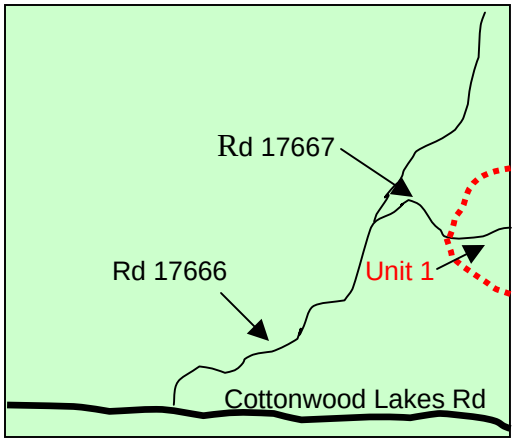
1) To locate and design roads and trails with minimal impacts to soil and water while considering all design criteria.

Site Description

The four road examples, Roads 20604, 20605, 20606, and 17667 are all located on the Cave Helo Timber Sale. They are on the Seeley Lake Ranger District, Lolo NF, in Sections 22 & 23 of Township 16N, Range 13W (figures 1 & 2). LSI classification is 64QG.



Figures 1 & 2



Narrative

Temporary access roads were constructed for Units 1, 2, and 3 on the Cave Helo Timber Sale (figures 1 & 2).

After identifying soil types and characteristics, roads were located to fit the topography using natural contours and slopes. Unstable areas, steep slopes and areas that could contribute to sloughing and erosion were avoided to ensure effective drainage. Five closure keys were identified as methods to be used after the harvest. They include:

1) The purchaser shall remove the evidence of a road through recontouring and distributing slash.
2) Scarify, seed, and fertilize the travelway.
3) Install waterbars in the road surface.
4) Scatter slash along the travelway.
5) Remove gates, culverts, and timber cross drains.

Roads were not built near stream courses. In addition, a temporary drainage system was established to prevent erosion and sediment production during use. Water bars and dips were installed to divert water off of the road surface to a vegetated filter strip.

Four new road segments were built to access timber. Road lengths were restricted to the minimum needed:

1) Road 17667 was 0.46 mile.
2) The beginning 0.2-mile of Road 20604 was rebuilt to avoid wet areas and potential erosion along the original location.
3) Road 20605, 0.54 mile, and Road 20606, 0.53 mile, were built to access tractor Unit 2 and helicopter Unit 3.

After the timber harvest terminated, access to the units was no longer needed. Therefore the temporary road segments were re-contoured and re-vegetated. The road prisms were eliminated, and the areas were slashed and seeded.

Effectiveness

This practice has proven to be highly effective. Erosion was greatly reduced due to proper planning. Drainage systems were installed during use, minimizing the potential for erosion. Constructing temporary roads and obliterating them after use has proven to be successful and has met the desired objectives.

Mitigating Surface Erosion and Stabilizing Slopes, BMP 15.06

Objectives

1) To minimize soil erosion from cutslopes, fillslopes and travelways.

Site Description

The monitoring site is located approximately ½ mile from the junction of Henry Creek Road and Highway 200, on the westside of Henry Creek Road. It is on the Plains Ranger District of the Lolo NF, in Section 1, Township 19N, Range 26W. There is no LSI classification for this site, the land is privately owned, with the Lolo NF having maintenance responsibility for it.

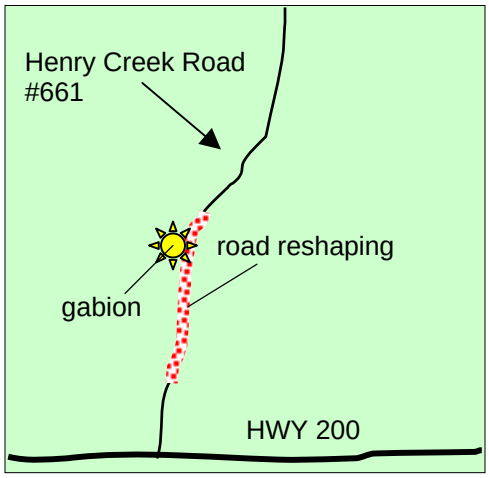


Figure 1

Narrative

After a section of road was re-shaped, gabions were built to provide stabilization and support, and to prevent sloughing. Because of the tremendous weight of the rock, the gabions were self-secured. The bare slopes above and below the gabion walls were seeded.

Observations and Measurements

The gabion wall prevents the fill from sloughing. The wall is 95 feet long by 3 feet tall by 2.8 feet wide (photo 1). Roughly 90 percent of the rocks used to build the gabion have similar shapes, averaging 1 foot by 2 to 3 inches. The holes in the wire mesh are hexagonal, 3 inches by 4 inches (photo 3).

Grass has not established on top of the gabion, the soil in this area is fine and rooting will be difficult. However, the vegetative buffer below the gabion is substantial and will filter sediment that travels over the wall (photo 2). The gabion provides a firm foundation for the fill; potential for failure is minimal.

Photo 1

Effectiveness

Building a gabion wall to prevent fill-slope failure has been effective. Stabilizing the slope has minimized the amount of sediment entering the stream. Since the fillslope is stable, the road prism is structurally sound, decreasing the amount of road maintenance required. The gabions will provide a long-term solution in stabilizing the road.

Photo 2

Photo 3

Control of Permanent Road Drainage, BMP 15.07

Objectives

1) To minimize water erosion and improve water quality by improving road drainage.

Site Description

This site is ¾ mile from the junction of Highway 200 and Henry Creek Road 661, adjacent to the first cattle guard. Henry Creek Road is on the Plains Ranger District of the Lolo NF, in Section 1, Township19N, Range 26W. LSI classification is 13UA.

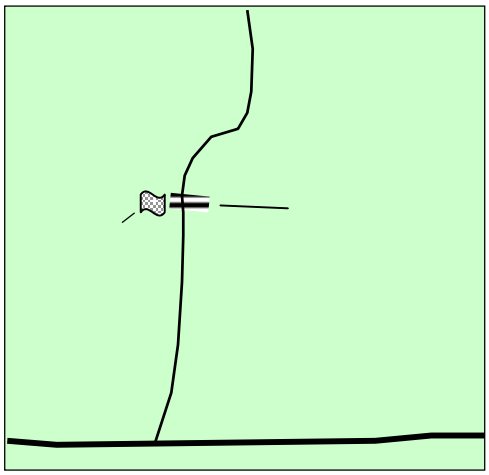


Figure 1

Narrative

Soils at this site are highly erosive. Because of the erosive nature of the soil and due to the location of the road, 100 feet from the stream, an 18-inch culvert was installed to divert water from the road ditch into a catch basin with a silt fence. The silt fence and catch basin were installed to prevent sediment from reaching the stream. The ditch leading to the relief culvert was lined with rock to slow the water's velocity into the culvert (photo 1).

Photo 1 - Rocked ditch to inlet

The inlet and outlet were adequately armored with rock. The rock will add stability and reduce erosion potential (photos 2 & 3).

Beyond the silt fence a well-established riparian area acts as an additional filter.

Photo 2 - Culvert inlet has collected sediment

Photo 3 - Culvert outlet

Observations and Measurements

The silt fence is shaped in a half-circle 28 feet long x 2½ feet tall. The bottom is securely fastened and buried beneath the soil (photo 4).

Photo 4

A substantial amount of sediment from the road moves through the culvert, with accumulations of fine soil and rock from 1½ to 2 inches thick (photo 5).

Photo 5

About 30 feet separate the silt fence from the stream. Vegetation is well established throughout the riparian area. Sediment that travels beyond the silt fence is filtered by the riparian vegetation.

Effectiveness

The relief culvert and catch basin effectively combine to minimize sediment delivery and maintain water quality. Reconstructing the relief ditch and adding the rock lining minimizes erosion by protecting the soil, slowing down the water, and collecting sediment before it enters the culvert. The catch basin prevents sediment from entering the stream. To maintain its effectiveness, the catch basin will need to be cleaned out periodically.

Control of Permanent Road Drainage, BMP 15.07

Objectives

1) To minimize water erosion and improve water quality by improving road drainage.

Site Description

The two monitoring sites are located at 3 and 3.7 mile-markers on Henry Creek Road #661, from the junction of Highway 200. Henry Creek Road is on the Plains Ranger District of the Lolo NF, in Section 33, Township 19N, Range 26W. LSI classification is 10UA.

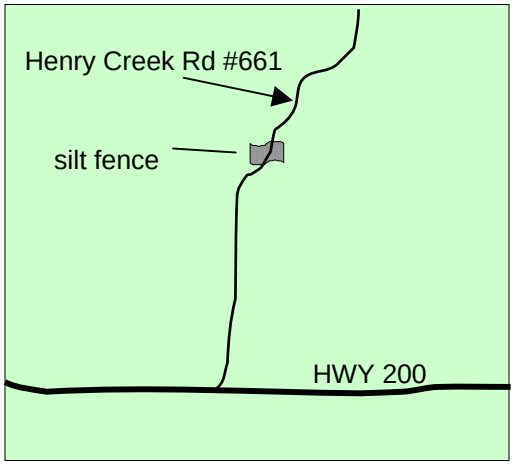


Figure 1

Narrative

A straw-bale silt fence was constructed on the fillslope end of each drain dip to filter road-surface water and sediment before they enter the stream. Materials required for the silt fence included four straw bales, silt-fence material and eight pieces of rebar.

To build the silt fence, first the straw bales were placed on the side of the road. Next, the straws bales were covered with filter cloth and secured with rebar. Two pieces of rebar were hammered through each bale (photos 1 & 2) to secure them in place. Finally, a catch basin was constructed directly in front of the silt fences.

Catch basins are built by removing soil in front of the silt fence to form an elongated hole. The catch basin then collects sediment from the road that will in turn be removed later during road maintenance. Monitoring Site 1, at 3 mile-mark, has a deposition area of roughly 60 feet^2. Monitoring Site 2, at 3.7 mile-mark, has a deposition area of approximately 72 feet^2.

The straw bales act as a buffer by slowing down water and sediment from the road. The sediment is then trapped at the silt fence and deposits directly into the catch basin.

Photo 1 - Monitoring Site 1 at 3 miles

Photo 2 - Monitoring Site 2 at 3.7 miles

Observations and Measurements

Ten months after installation, the silt fence remains intact. The straw bales to date are still 3 feet long by 2½ feet wide, forming a silt fence 12 feet long by 2 feet tall. Sediment has successfully been trapped in the catch basin (photo 1).

At this time, 13 $feet^3$ of sediment have been trapped at Site 1, and 21 $feet^3$ of sediment at Site 2. There are only trace amounts of sediment behind the silt fences (photos 3 & 4). Thick riparian buffers behind the silt fences provide additional filtration. After nearly one year without maintenance, both silt fences are in good condition.

Photo 3 - Monitoring Site 1 at 3 miles

Photo 4 - Monitoring Site 2 at 3.7 miles

Effectiveness

The straw-bale silt fences trap sediment that otherwise would reach the stream. They are large enough to handle the sediment volumes from Henry Creek Road. Overall, the silt fences have met the desired objectives of the Best Management Practice.

Control of Permanent Road Drainage, BMP 15.07

Objectives

1) To minimize water erosion and improve water quality by improving road drainage.

Site Description

The monitored water belt is situated between mileposts 8 and 9 on Road 887, on the Plains Ranger District of the Lolo NF. Road 887 is in Section 12, Township 21N, Range 27W. LSI classification is 10UA.

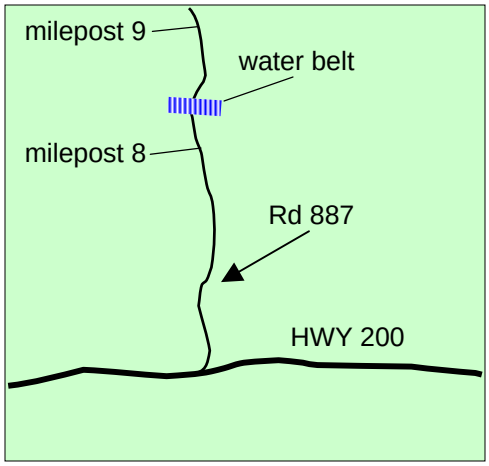


Figure 1

Narrative

Rubber water belts are one of the simplest, most practical methods of controlling drainage. Water belts are used for both temporary and permanent roads. They are easy to install and cost-effective. Made of rubber that's both flexible and stiff, the belts are layered between two 2-inch x 6-inch pieces of wood, and excavated into the road surface. They are sturdy enough to handle heavy water flows, but flexible enough that vehicles pass over them easily.

This water belt was installed as a mitigation measure under the Wee Teepee Timber Sale. Road 887 needed to meet BMP's before harvest could begin. This water belt was one of many installed on Road 887.

The water belt was installed at an angle redirecting water off the road surface and into a riparian buffer area (photo 1). The redirected water then enters the fillslope rock armor, which was placed for stability and to reduce erosion. Next the sediment is filtered through a slash filter windrow and finally is filtered into a well-established riparian vegetative buffer.

Photo 1

Observations and Measurements

The 22-foot long rubber belt was installed at the proper angle to the road. The rock armoring is 2½ feet x 1½ foot, consisting of rock 3 to 8 inches thick (photo 2). The slash-filter windrow is 5 feet x 3½ feet, built of Douglas fir and ponderosa pine branches (photo 2). Water drains along the belt, over the rocks, through the windrow and into the riparian buffer. There is no sign of rilling above or below the water belt.


Photo 2

Effectiveness

This BMP met all of the required objectives. It was effective in minimizing the impacts of concentrated water on the road by diverting water off the road, through a slash-filter windrow and into the riparian buffer before reaching the stream.