

Mixed Conifer Working Group Meeting
April 15, 2011
Water and Soil Resource Management Considerations

It is difficult to tie watershed health directly to mixed-conifer forests. Watersheds encompass a variety of vegetation types. Today's discussion will cover watershed health in forested watersheds of the San Juans (particularly on the Pagosa Ranger District) and will generally not be specific to mixed conifer forests.

Municipal watersheds

- PAWSD's main intakes on Fourmile Creek and West Fork of the San Juan

Sensitive watersheds

- No streams on or immediately downstream of the Pagosa Ranger District are on the State of Colorado's Section 303(d) list of impaired waters
- Two streams are on the State of Colorado's monitoring and evaluation list: Stollsteimer Creek above the Southern Ute boundary for sediment; and the Little Navajo River downstream of the San Juan-Chama diversion for E. coli.
- Many drainages with steep slopes in volcanic geology are naturally very unstable
- Many watersheds on Mancos and Lewis shale have very erodible soils
- Anthropogenic effects such as past and present livestock grazing, past and present timber harvest, past and present road construction and maintenance

Benefits to watershed health are generally

- Vegetation
- Ground cover
- Functioning watershed processes

The largest disruptor of the above is probably wildfire and post-fire soil and watershed effects

- Loss of ground cover, including vegetation, litter, duff, and organic material in soil
- Loss of roots in soil
- Decrease in infiltration
- Dramatic increase in peak flows
- Dramatic increase in erosion, channel scouring, and sediment deposition

Vegetation treatments that reduce the risk of high severity wildfires will benefit watershed health. Low severity fires have little effect on watershed health.

Soil Compaction Study – Dr. Julie Korb, Fort Lewis College

- Comparison of treatment and control units with similar soil type and vegetation (ponderosa pine and Gambel oak)
- Comparison of pre- and post-treatment conditions
- Pre-treatment monitoring conducted in 2009 and 2010
- Soil resistance to penetration was measured using a soil penetrometer as a way to quantify soil compaction
- Soil resistance to penetration (soil compaction) in all pre-treatment units was greater deeper within the soil profile than at the soil surface as expected
- Soil resistance to penetration (soil compaction) was not significantly different between pre-treatment control and treatment units. Soil resistance to penetration was higher, but not significantly different, in landing areas that had been used in past timber harvests.
- Post-treatment monitoring will be conducted in 2011

Typical water and soil design criteria for mechanical vegetation management projects

SOILS

- a) When soils are saturated, equipment operation will cease until the ground dries out or freezes. Soils are considered saturated when ruts 4 inches deep or deeper are created by equipment or vehicles on native surface roads or off road. This condition will be widespread in the active treatment units and access roads and not just in isolated depressions. Ruts deeper than 4 inches would be rehabilitated.
- b) Soil disturbance will be kept to less than 15% of the treatment area. Soil disturbance includes bare soil exposed at the completion of the treatment and soil that is disturbed and then covered with mulch, chips, or slash.

The next two have been recently added for biomass projects. They are not yet fully tested.

- c) At least 5% of treatment generated slash will be left on site, distributed throughout the treatment units.
- d) Chip piles will not be stored on the Forest for more than 60 days during spring, summer or through mid-fall. Storage longer than 60 days can occur, with Forest Service approval, during late fall and into spring. Chip piles stored over 30 days when daytime temperatures exceed 70 degrees F will be checked to monitor for internal temperatures.

WATERSHED

- a) Mechanical treatment will be restricted to sustained slopes less than 35%.
- b) Streamcourse protection provisions are applied to identified streams.
 - i. Vegetation management operations shall be conducted to prevent debris from entering streamcourses. In the event that debris enters streamcourses in amounts that may adversely affect the natural flow of the stream, water quality, or fishery resource, the

operator shall removed such debris as soon as practicable, but not to exceed 2 days, and in an agreed manner that will cause the least disturbance to streamcourses.

- ii. Culverts or bridges shall be required on temporary roads at all points where it is necessary to cross streamcourses. Such facilities shall be of sufficient size and design and installed in a manner to provide unobstructed flow of water and to minimize damage to streamcourses. Trees or forest products shall not be otherwise hauled or yarded across streamcourses unless fully suspended.
 - iii. Wheeled or track-laying equipment shall not be operated in streamcourses, except at designated crossings or as essential to construction or removal of culverts or bridges.
- c) Reasonable care shall be taken to avoid damage to the cover, soil, and water in identified meadows. Vehicular or skidding equipment shall not be used on meadows, except where roads, landings, and tractor roads are approved. Unless otherwise agreed, trees felled into meadows shall be removed by endlining. Resulting logging slash shall be removed where necessary to protect cover, soil and water.
 - d) Trees and other vegetation growing within or on the banks of stream channels will not be cut.
 - e) Mechanical treatment of riparian or wetland vegetation will be prohibited. Equipment operation within stream courses or wetlands will be prohibited except to cross at designated stream crossings. Limit stream crossings to the minimum number necessary and cross perpendicular to the direction of flow. Do not cross streams if banks exceed 30%.
 - f) Skid trails will be located perpendicular to slope angles (along the contour) as much as possible. Avoid creating a dendritic runoff pattern. Avoid skidding up and down drainage bottoms. As needed, install waterbars or outslope and spread slash on skid trails upon completion of use.
 - g) Proper drainage will be constructed or reconstructed on existing and temporary roads that will be used. All drainage structures on roads will be inspected at the completion of the project to make sure they are in good condition and functioning properly. Blading roads that are currently well vegetated with grass will be minimized as much as possible.
 - h) Temporary roads will be decommissioned within 5 years of sale closure. These measures will include removing culverts, eliminating ditches, outslowing roadbeds, removing ruts and berms, effectively blocking the road to normal vehicular traffic, building cross ditches and water bars as needed, and seeding. When culverts are removed, associated fills will also be removed to the extent necessary to permit normal maximum flow of water.
 - i) Slash piles will not be burned within 25 feet of any drainage or wetland.

Applicable design criteria from the Region 2 Watershed Conservation Practices Handbook (FSH 2509.25):

- a) Keep heavy equipment and ground vehicles out of streams, swales, lakes, and wetlands except to cross at designated points, build crossings, or do restoration work, or if protected

by at least 1 foot of packed snow or 2 inches of frozen soil. Keep heavy equipment out of streams during fish spawning, incubation, and emergence periods. Do not disrupt water supply or drainage patterns into wetlands.

- b) Ensure at least one-end log suspension in the water influence zone (WIZ). The WIZ includes the geomorphic floodplain (valley bottom), riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is the greater of 100 feet or the mean height of mature dominant late-seral vegetation. Fell trees in a way that protects vegetation in the WIZ from damage. Keep log landings and skid trails out of the WIZ, including swales.
- c) Avoid new roads or heavy equipment use on unstable or highly erodible soils.
- d) Locate and construct log landings in such a way to minimize the amount of excavation needed and to reduce the potential for soil erosion. Design landings to have proper drainage. After use, treat landings to disperse runoff and prevent surface erosion and encourage revegetation.
- e) Use filter strips, and sediment traps if needed, to keep all sand-sized sediment on the land and disconnect disturbed soil from streams, lakes, and wetlands. Disperse runoff into filter strips.
- f) Key sediment traps into the ground. Clean them out when 50% full. Remove sediment to a stable, gentle, upland site and revegetate.
- g) Keep heavy equipment out of filter strips except to do restoration work or build armored stream or lake approaches. Yard logs up out of each filter strip with minimum disturbance of ground cover.
- h) Do not encroach fills or introduce soil into streams, swales, lakes, or wetlands.
- i) Restrict roads, landings, skid trails, and similar soil disturbances to designated sites.

Missionary Ridge Fire, 2002



Florida River



Shearer Creek

Other Fires

