Effects of Burning and Thinning on Forest Hydrology

Anthony Madrid and Dr. Sam Fernald (advisor)
Department of Animal and Range Sciences, New Mexico State University

PURPOSE OF STUDY

This research will determine how different types of forest treatments affect runoff and sediment yield in the Mora River Watershed in northern New Mexico. Runoff and sediment yield will be monitored in two vegetation communities: ponderosa pine and mixed conifer forests. Monitoring plots will be placed on gentle and steep slopes for each vegetation type. Four different treatments will be evaluated: (1) untreated control, (2) cool burn simulating prescribed burns, (3) hot burn simulating wildfires, and (4) tree thinning plus cool burn. In 2004, rainfall will be simulated for measurement of runoff, infiltration, and sediment yield. An additional 64 plots with the same treatments will be used to monitor vegetation response to natural rainfall. Results will be evaluated to provide recommendations for treatments that meet management objectives regarding vegetation, runoff, and sediment yield.

NMSU graduate student Anthony Madrid is studying the relationship between forest thinning and watersheds at research sites in Cloudcroft and Mora. Madrid grew up on a cattle ranch near Cuba, New Mexico. (Photo by J. Victor Espinoza)

STUDY UNDERWAY

• Of particular interest in this study is after thinning, how much erosion will take place from runoff across sparsely vegetated areas on the forest floor, and whether any of the runoff will percolate into subsurface flows.

• The research will be conducted on four research sites in Mora and three in Cloudcroft. The Mora site has not yet been thinned. In Cloudcroft, where trees less than 9 inches in diameter already have been thinned, Madrid is researching sites where logs are piled up as well as areas that have scattered slash and comparing them to untreated areas.

BENEFITS

• The negative effect of dense forests is clear, but the impact of various forest thinning treatment techniques can be murky. This study will bring a greater understanding of thinning options in the Mora and Cloudcroft areas, thus potentially improving forest and watershed health.

• Anthony Madrid, a 2003 graduate in natural resources management from New Mexico Highlands University and currently a graduate student at NMSU, will lead a Cloudcroft High School FFA team on a tour of his research plots. Hopefully, he will inspire other students to learn more about their environment and possibly pursue degrees in water-related disciplines.