



DESERTIFICATION AND OTHER ECOLOGICAL IMPACTS PRODUCED BY THE HISTORIC RODEO-CHEDISKI WILDFIRE OF 2002, ARIZONA, USA



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RODEO-CHEDISKI MEGA FIRE

ABSTRACT: The Rodeo-Chediski Wildfire - the largest in Arizona's history - damaged or destroyed ecosystem resources and disrupted ecosystem functioning in a mosaic pattern throughout the ponderosa pine (*Pinus ponderosa*) forests exposed to the burn 189,015 ha. Impacts of this wildfire on trees were studied on two watersheds in the area burned; one watershed burned by a high severity (stand-replacing) fire, while the other watershed burned by a low severity (stand-modifying) fire. Chaparral scrub communities and pinyon-juniper woodlands at lower elevations and ponderosa pine forests at high elevations were located within the burned area. Monitoring of soil erosion and other hydrologic and ecological parameters is continuing to obtain a longer, more comprehensive picture of the impacts of this catastrophic wildfire event.

A. INTRODUCTION

The Rodeo-Chediski fire burned for 3 weeks in late June, 2002 in east central Arizona, USA. Suppression and ecosystem damage costs were \$171 million. Ecosystem impacts were studied on two watersheds in the Little Colorado River basin, one had a high severity burn and the other a low to moderate severity burn. A mosaic of areas burned at varying fire severities within intermingling unburned areas. Post-fire rehabilitation efforts included water bars, straw wattles, straw mulch, and aerial seeding of native herbaceous plant species to mitigate anticipated accelerated post-fire soil erosion.

B. MEASUREMENTS: Hydrology, erosion, water repellency, trees, herbaceous plants, ungulates, small mammals, birds

C. FIRE EFFECTS:

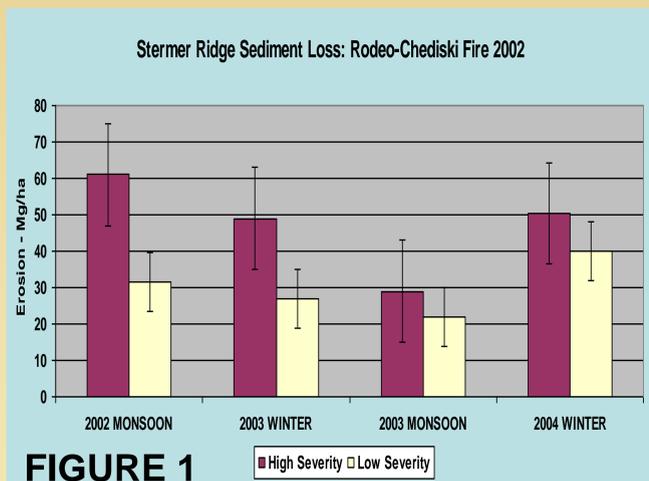


FIGURE 1 High Severity Low Severity

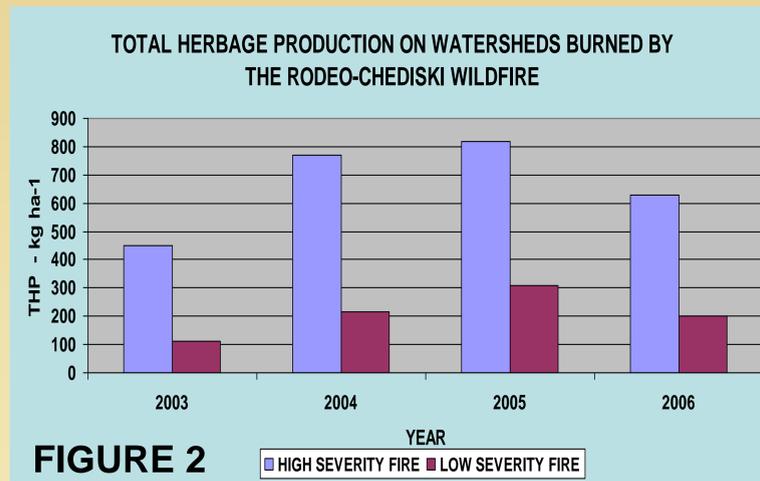


FIGURE 2 HIGH SEVERITY FIRE LOW SEVERITY FIRE

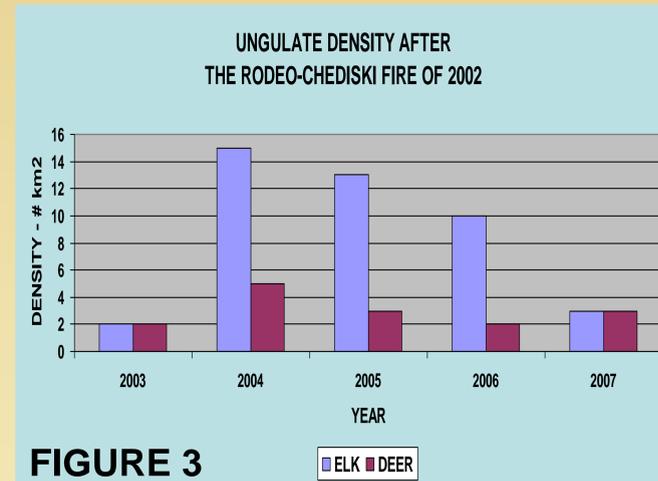
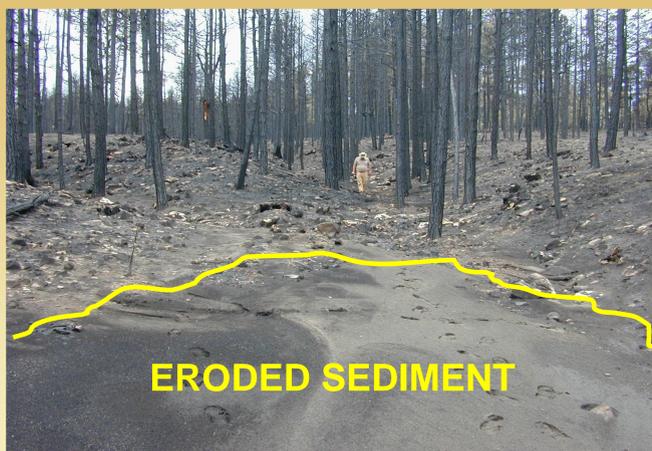


FIGURE 3 ELK DEER

RODEO-CHEDISKI WILDFIRE 2002



ERODED SEDIMENT

D. ECOSYSTEM RECOVERY: Erosion rates (Fig. 1) have declined since 2002 but the rates for the high severity fire are still twice that of the low severity watershed. The total herbage production peaked 3 years after the fire and the high severity area is likely to remain 3 times that of the low severity area due to the lack of an overstory (Fig. 2). Elk density (Fig. 3) increased by a significant amount 2 years after the fire, but declined to the same level as low severity fire, probably due to plant species changes.

RODEO-CHEDISKI WILDFIRE 2002



HIGH SEVERITY WILDFIRE

E. CONCLUSIONS

The timing of when these watersheds will return to pre-fire conditions is variable, depending on ecosystem parameter. A much longer time will obviously be required for most functions in high severity burned areas to recover than low burn severity areas. Most of the latter have already returned to pre-fire conditions.

F: REFERENCES

Neary, D. G., K.C. Ryan, and L.F. DeBano (Eds) 2005. Fire effects on soil and water. USDA For. Serv. Rocky Mtn. Res. Stn., Gen. Tech. Rep. RMRS-GTR-42, Vol. 4. 250 p.
 Ffolliott, P.F.; Stropki, C.L.; Neary, D.G. 2008. Impacts of a historical wildfire on tree overstories: An Arizona case study. USDA For. Serv. Rocky Mtn. Res. Stn. Res. Paper RMRS-RP-75. 25 p.

