



Hydrologic Responses to Western Juniper Removal: The Camp Creek Paired Watershed Study

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Since 1934, western juniper has increased its hold on eastern Oregon rangelands. U.S. Forest Service reports that juniper acreage has increased from 1.5 million acres to over 6 million acres in 1999. Previous studies have shown that water use by juniper can exceed 30 gallons per day when adequate soil moisture is present. Increased juniper dominance has been implicated in the desertification of Oregon's rangelands. Ground water mitigation, reintroduction of steelhead into the upper Deschutes River basin and changes in laws affecting surface water right allocations have driven public policy to look at how water is currently being used and how changes in water use (water law) could affect water availability. Vegetative modeling has shown that 9 to 35 trees per acre are enough to utilize all the precipitation delivered to a site in a 13 inch precipitation zone. Earlier studies suggest that a minimum of 17 inches of annual precipitation is required to measure a water yield response associated with vegetative manipulation. In 1994, the Camp Creek Watershed study area was established to monitor the effects of juniper removal on hydrologic processes. In 2005, following 12 years of pretreatment monitoring in the 2 watersheds (Mays and Jensen) all post-European aged juniper (juniper < 140 years of age) were cut from the treatment watershed (Mays). Analysis indicated that juniper reduction significantly increased late season spring flow by 225 percent ($\alpha > .05$), increased days of recorded ground water by an average of 41 days ($\alpha > .05$) and increased the relative availability of late season soil moisture at soil depths of .76 m (27 inches) ($\alpha > 0.1$). Ephemeral channel flow did not show a predictable trend following 2 years of post treatment measurements. The Camp Creek project illustrated that for this system, managing vegetation for water yield may be obtainable at a much lower precipitation threshold than what was previously understood.

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