

Can forest watershed management mitigate climate change effects on water resources?

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Abstract Long-term hydrology and climate data from United States Forest Service Experimental Forests and Ranges (EFR) provide critical information on the interactions among climate, streamflow, and forest management practices. We examined the relationships among streamflow responses to climate variation and forest management using long-term data. Analysis of climate data from a subset of EFRs suggested an increase in air temperature over the past 20–30 years. Streamflow increased initially after cutting for all sites and cutting treatments, but the longer term responses vary considerably across sites and treatments. Streamflow response following cutting without vegetation conversion depends on variation in treatment, soils, vegetation, and climatic regimes among sites. Statistical models indicate that many of the management treatments result in forest stand structure and species composition interact with climate differently than the unmanaged reference stand, indicating that forest management may exacerbate or mitigate the effects of future climatic conditions.

Key words United States Forest Service paired watersheds; climate change; streamflow; forest management; interactions