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Managing Wildfire Risks: Effects on Water Resources With and Without Fuel Treatment

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ABSTRACT

Wildfire poses policy, management, scientific, and technical challenges for water resource systems. The challenges of wildland fire management are increasing for a variety of reasons. Most terrestrial ecosystems in the western states were born of and maintained by fire. Wildfire suppression over many decades has led to fuel accumulations posing high or moderate ecological risks on 141 million acres of federal lands. Under droughty conditions such fuel loads can produce uncharacteristically intense wildfires and increase the severity of adverse effects on, among other things, water bodies and riparian areas. The resource manager's working hypothesis is that fire behavior can be modified by reducing fuels on the landscape, thereby reducing risks to valuable resources. The federal wildfire policy states that risk management undergirds all wildland fire management activities. Risk cannot be managed until it has been assessed. Risk assessment techniques can be used to test the working hypothesis. We work down through various scales to provide an overview of risk assessment tools that use landscape characteristics, fire behavior, and values at risk that help identify fuel treatment priority areas. In collaborative settings map-based tools can demonstrate to stakeholders that strategic placement of treatments can reduce wildfire extent. At the project-level scale (< 20,000 acres), decisions to implement fuels treatment on federal lands generally must be supported by environmental impact assessments demonstrating that the project will reduce wildfire risks without adversely affecting the water quality parameters associated with fish habitat. Short- and long-term effects must be considered. Sediment is used to demonstrate adaptation of the Environmental Protection Agency's ecological risk assessment framework, which is driven by stakeholder involvement, for the fire/fish risk assessment tradeoff problem. The key is including the long term benefits of fuel treatment on sediment regimes into a decision model framework. An application using Water Erosion Prediction Project (WEPP) Internet-based tools is presented.

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