

Fire exclusion, fire suppression, and climate change have altered wildfire regimes in the Western Cascades during past decades. Fire season is becoming longer and burned area in the Western Cascades are projected to increase 200-400% above contemporary levels by the end of the century. Such fire-regime changes can have cascading consequences for human and natural systems, including degradation of downstream water quality. Understanding the potential consequences of an altered fire regime will be necessary for managing forested watersheds to protect highly valued resources, especially high-quality drinking water. In this study, we apply the ecohydrologic model RHESSys, coupled with the fire spread model WMFire, to investigate how climate change and forest management techniques, such as stand thinning, can affect wildfire regimes in the Cedar River Watershed in western Washington, which provides drinking water for 1.4 million people in greater Seattle area. We run multiple simulations considering different climate change and forest management scenarios to assess the vulnerability of wildfire activity in this watershed and the efficacy of management practices to reduce fire impacts. Preliminary results suggest that both forest management and climate change alter the fire regime in the Cedar River watershed. By using processes-based model with factor-controlled simulation experiments, we can better inform the water management authorities, such as Seattle Public Utilities, on how to best mitigate the risk of wildfire-induced harm to drinking water.