MAPPING BURN SEVERITY AND FOREST STRUCTURE WITH REMOTELY SENSED DATA

COLTON MILLER
GENERAL EXAM

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Over the last several decades, the western U.S. has experienced increasing trends in the number of large fires and total large fire area burned per year. Climate change projections for the Pacific Northwest include longer, hotter, and drier fire seasons and reductions in summer precipitation. In Washington State, the area burned could double or triple by the 2080s. Remotely sensed data provides a consistent source of data for mapping land surface change over large spatial and temporal extents, and spectral indices such as dNBR and RdNBR have become standard data for mapping burn severity. Burn severity is used for site-level recovery projects, understanding landscape patterns and processes, planning future treatments, and projecting the impacts of climate change on future disturbances. However, spectral indices are not specifically tied to components of ecosystem change and must be linked to field-measured attributes to understand site-level responses to fire. LiDAR provides the technology to measure three-dimensional forest structure although repeated sampling over burned areas are rare due to the high cost of acquiring data.

The research objectives of this work are to 1) conduct a systematic review of the use of spectral indices and LiDAR for modeling burn severity using Composite Burn Index (CBI) plots; 2) investigate how the King Fire impacted forest structure in LiDAR space as well as whether including bi-temporal estimates of forest structure change derived from LiDAR may improve models of burn severity based on spectral indices; and 3) map land cover change due to wildfire across the boundary of the Colville Indian Reservation and adjacent Colville and Okanogan-Wenatchee National Forests.

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