Point Blue Publication Brief

Predictive habitat suitability models for nesting woodpeckers following forest fires

Brent R. Campos, Ryan D. Burnett
bcampos@pointblue.org, rbburnett@pointblue.org

Snags are standing dead trees generated by forest fires that provide crucial nesting and foraging resources for woodpeckers. Nest cavities excavated by woodpeckers in snags are later used as shelters and nests by many wildlife species. For these reasons, woodpeckers are species of conservation concern for forest managers in recently burned forests. Logging fire-killed trees, a.k.a. "salvage logging," to recoup the economic value of timber resources after a forest fire is a common practice that can negatively impact woodpecker populations. Because fire-killed trees rapidly deteriorate and lose value, forest managers make decisions on where and how to salvage soon after a fire occurs. Thus, they need ways to quickly identify important areas of habitat for woodpeckers in the burned forest to inform their decisions.

In this study, we developed models to predict the locations of woodpecker nests in future burned forests to inform post-fire planning and salvage logging decisions. From 2009 to 2016, we monitored 313 nests of Black-backed, Hairy, and White-headed Woodpeckers, and Northern Flickers at three wildfires in the Northern Sierra Nevada and Southern Cascades 1–5 years after fire. Using these data, Point Blue teamed up with scientists at the US Forest Service Rocky Mountain Research Station to develop habitat suitability models that compared data collected at nest snags to data collected at snags without nests.

We found that woodpeckers preferentially used mid-sized snags and snags with broken tops, with high tree mortality within 50 m but lower tree mortality within 1 km. Models for all four species predicted well across the wildfire locations despite considerable variation in forest conditions among the three wildfires. This suggests they are broadly applicable to guide post-fire management after future fires in the Sierra Nevada region. Our models can be used to map how likely all areas of a burned forest are to be used by woodpeckers for nesting. Our models can also be used by managers to inform logging guidelines, such as how many and what sizes of snags need to be retained in a fire-killed forest stand to best conserve woodpecker habitat.

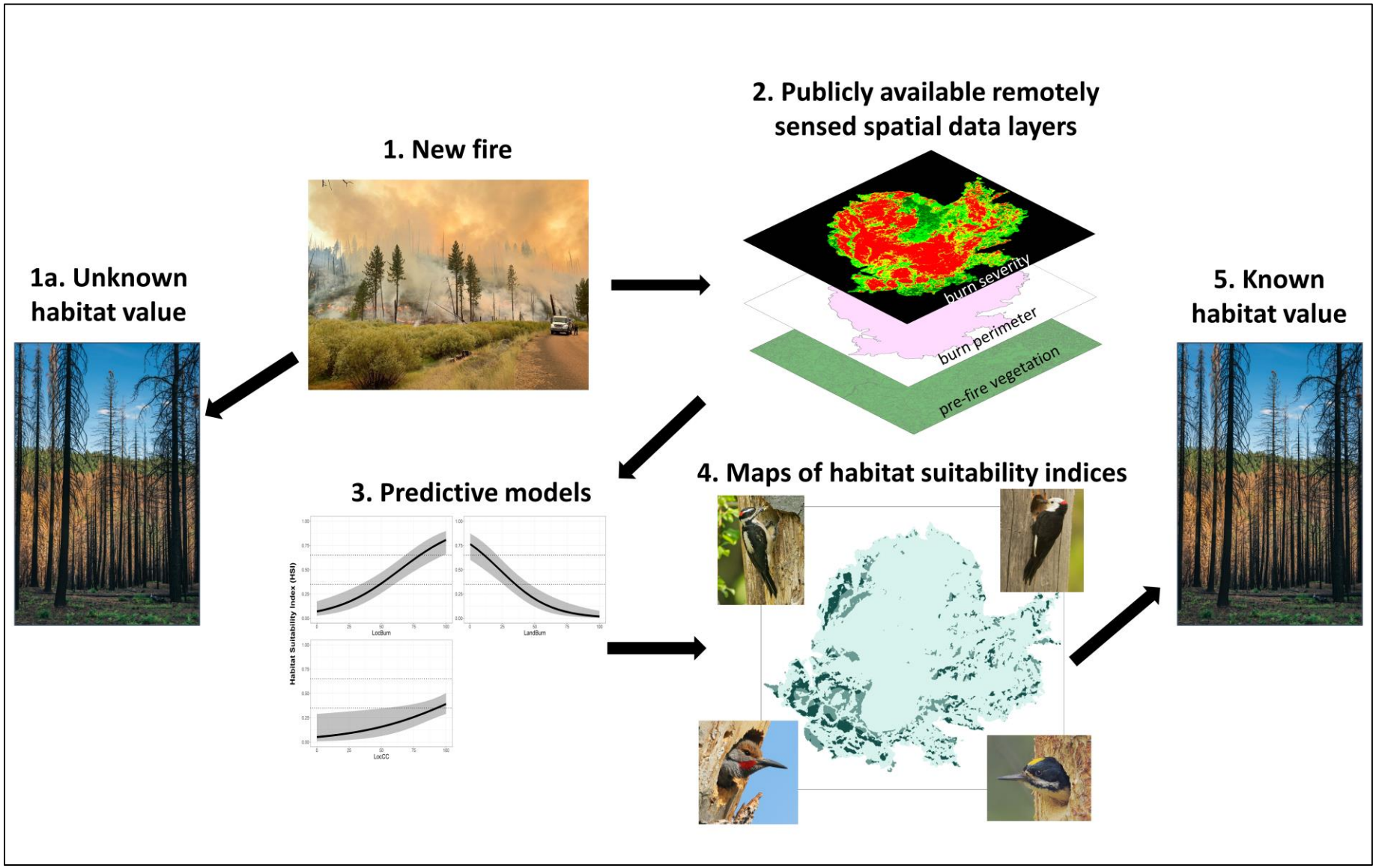
Main Points

We created models that greatly increase land managers' ability to identify high quality habitat for nesting woodpeckers following wildfire in the Sierra Nevada

Areas of high tree mortality, intermixed with lower tree mortality, provide important habitat for woodpeckers

Snags with broken tops, often those dead before the fire, are frequently used for nesting

B.R. Campos, Q.S. Latif, R.D. Burnett, V.A. Saab. 2020. Predictive habitat suitability models for nesting woodpeckers following wildfire in the Sierra Nevada and Southern Cascades of California. The Condor. 122: duz062.



We developed models for four species of woodpecker that predict habitat suitability for nest sites in future burned forests to inform post-fire planning and salvage logging decisions. We provide models with strong predictive performance requiring only remotely sensed data inputs for mapping habitat suitability within entire fire areas, as well as models based on remotely sensed and field-collected data for informing forest management at stand scales.