CALCULATING WILDFIRE RISK SCORE

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Wildfire risk includes (1) the intrinsic characteristics (e.g., fuel load, fuel continuity, and topographic variables) of a landscape that make the landscape more or less susceptible to a wildfire along with (2) the likelihood that a fire may begin (i.e., an ignition source) and (3) those factors that describe risk to people and property. To identify wildfire risk areas in Bannock County Idaho a wildland urban interface (WUI) zone was first developed. The WUI zone was created by first identifying wildland areas in Bannock County. These areas are lands managed by the USDA Forest Service, USDOI Bureau of Land Management, Tribal lands, and/or state of Idaho managed lands. The land cover type within these areas was determined using the Landfire Existing Vegetation Type layer. The perimeter (line) for these wildland areas was buffered by 1km to create the WUI zone used in this study.

Identifying the Wildland Urban Interface Zone

The WUI zone polygon layer was subset using Bannock County emergency management fire response zones resulting in 11 regions within the WUI zone. This layer was then enriched in ArcGIS Pro with demographic data describing the number of households having (1) no personal vehicles/private transportation, (2) persons aged 85 years or older, and (3) persons with disabilities.

Structures Data

A comprehensive point structures layer was developed by updating the existing structures layer using USDA National Agriculture Imagery Program (NAIP) data collected in 2023. The finished structures layer contains one point for every visible structure in the imagery and is not attributed with the type of structure or other description. The structures layer is correct as of June 2023.

Identifying At-Risk Populations

The data used for at-risk population factors were extracted from the Census Tract data layer using the structures layer and only included those structures within the WUI zone. The specific attributes chosen were households with individual aged 85+, households with people that have disabilities, and households with 0 vehicles.

Wildfire Susceptibility

Two data layers were used to describe fire hazard in the model (1) the Idaho Department of Lands Fire hazard model¹ and (2) an experimental ladder fuels model derived from LIDAR data.

<u>Spatial Analysis</u> The Getis-Ord Gi* geoprocessing tool in ArcGIS Pro was used to identify hot spot and cold spots in Bannock County. That is, places where a specific risk factor was found to be statistically very high, neutral, or statistically very low.

Each of five risk factor layers (no personal transportation, people aged 85 year or more, people with disabilities, fire hazard, and ladder fuels) were analyzed using Hot Spot Analysis (Getis-Ord Gi*) tool, resulting in five new layers with risk attributes ranging from -3 to 3. All Hot Spot layers were converted to raster files using the GI-bin value and stored in TIF format with 30-meter pixel spatial resolution.

¹ https://www.idl.idaho.gov/fire-management/

All five raster layers were then used as inputs to the Weighted Sum tool in ArcGIS Pro. This geoprocessing tool sums all pixel values where layers overlap. The weighting value was set to one for all layers except the fire hazard layer which was given a weight of two. This produced the final Wildfire Risk Score layer, with values ranging from -18 to +18 (the sum of all possible values from the weighted sum tool).