**Application of empirical land-cover changes to construct climate change scenarios in federally-managed lands

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 **Abstract:**To better understand how climatic factors contribute to sagebrush-dominant ecosystems in the Great Basin, USGS researchers applied NLCD Back in Time fractional vegetation component data to measure the rate of cover change over three decades and quantified the relationship between historical climate and vegetation. Historical rates and causes of land cover change were used to create climate-land change scenarios to project how shrub, herbaceous, and bare cover may be located in the future. Historical data were used to project future rangeland cover in three different federal management areas (Beaty Butte Herd Management Area, Hart Mountain National Antelope Refuge, and Sheldon National Refuge) using a business-as-usual (BAU) scenario and RCP 8.5 climate change scenario spanning 32 years (2018-2050). Summaries of historical changes and gridded spatially-explicit map projections suggest that climate influences may make the landscape more homogeneous in the near future. Across the entire study area, 30m pixels with current high percent bare ground cover are projected to become less bare ground dominant; pixels with current moderate percent herbaceous cover are projected to contain less herbaceous cover, and pixels with current low percent shrub cover are projected to contain more shrub cover by 2050. Although change rates vary between scenarios, general patterns and composition do not differ much between scenarios by the end of the projected period. This is surprising given that RCP 8.5 climate projections suggest that minimum temperatures will be 17% higher and total precipitation will be 3% higher in the study area by 2050. Different patterns and trends are more apparent by comparing projections between management units. Hart Mountain National Antelope Refuge is projected to undergo the most change over the projected period. BAU and RCP 8.5 models project a larger decline in bare ground, as well as larger upticks in average herbaceous and shrub cover in Hart Mountain compared to the other management areas included in the study. These scenarios present alternate future outcomes that could help guide federal land managers to identify changes in cover that may affect certain species.