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Impact of simulated changes in climate on fire regimes, vegetation, and wildlife habitat on landscapes of Glacier National Park, USA.

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Future changes in climates will precipitate major changes in vegetation, disturbance, and wildlife that could cascade throughout landscapes and cause significant vital ecosystem shifts and modifications. We used the mechanistic, spatially explicit, ecosystem process model Fire-BGCv2 (a Fire BioGeoChemical succession model version 2) is used to investigate long-term trends in fire regimes, vegetation composition, and wildlife habitat under future, present and historical climates for a complex landscape in Glacier National Park, Montana, USA. Fire-BGCv2 simulates stand-level processes such as tree dynamics, organic matter accumulation, and decomposition whereas landscape processes of fire and seed dispersal are simulated using mechanistic spread algorithms. We used FireBGCv2 to simulate two Glacier National Park landscapes for 500 years under the following fire management scenarios: 1) complete fire exclusion, 2) historical wildfire occurrence, and climate scenarios 1) historical climate and 2) future climate warming. We present wildfire, vegetation composition, and wildlife habitat statistics over the simulation to illustrate the impact of climate change on this popular National Park. Wildfire statistics include size, severity, and frequency of fire, vegetation measures include landscape composition and structure, and wildlife habitat is measured in terms of suitability for grizzly bear, lynx, and elk.