Isaak, D.J., M.K. Young, D.L. Horan, D. Nagel, M.K. Schwartz, and K.S. McKelvey. Do metapopulations and management matter for relict headwater bull trout populations in a warming climate? Ecological Applications

Appendix S6, Table S1. Descriptions of scenarios used to assess the effects of climate change and management restoration strategies on bull trout populations in the Northern Rocky Mountains.

Scenario	Description	Comments
1	Baseline climate[1,2] with current habitat conditions	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values.
2	Baseline climate with complete road network removal	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that road density values were set to 0 km/km^2 of patch watershed area.
3	Baseline climate with extensive road network development	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that road density values were set to the maximum observed value of 5.6 km/km^2 of patch watershed area.
4	Baseline climate with complete brook trout removal	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that brook trout prevalence values were set to 0%.
5	Baseline climate with ubiquitous brook trout invasion	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that brook trout prevalence values were set to 100%.
6	Baseline climate with connectivity fully restored	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that nearest neighbor connectivity distance values were set to unaltered states regardless of dam locations that impair fish movement.
7	Baseline climate with full severance of connectivity	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that nearest neighbor connectivity distance values were set to 50 km to simulate the disconnection of all patches.
8	Baseline climate with full set of restoration actions	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values, except that road density values were set to 0 km/km^2, brook trout prevalence values were set to 0%, and connectivity distance values were set to unaltered states regardless of dam locations. Scenario 8 represents the combined benefits of restoration actions described in scenarios 2, 4, and 6.
9	Moderate climate change[3] with current alterations of patch habitats	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented moderate climate change conditions.
10	Moderate climate change with partial restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented moderate climate change conditions. In addition, connectivity values were set to an unaltered state, road density values were reduced by 10% in patch watersheds, and brook trout were eliminated from 25% of randomly selected patches that had prevalence levels exceeding 50% and patch lengths less than 10 km.

Appendix S6, Table S1 (continued)

Scenario	Description	Comments
11	Moderate climate change with partial targeted restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented moderate climate change conditions. In addition, connectivity values were set to an unaltered state, brook trout were eliminated from 25% of randomly selected patches that had prevalence levels exceeding 50% and patch patch lengths less than 10 km, and road density values were reduced by 25% in the patch watersheds where brook trout were eliminated.
12	Moderate climate change with full restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented moderate climate change conditions. In addition, connectivity values were set to an unaltered state, road density values were set to 0 km/km^2, and brook trout prevalence was set to 0% in patch watersheds.
13	Extreme climate change[4] with current alterations of patch habitats	Bull trout patch occurrence probabilities were predicted from the final model using observed covariate values with smaller and warmer patches that represented an extreme climate change scenario.
14	Extreme climate change with partial restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented extreme climate change conditions. In addition, connectivity values were set to an unaltered state, road density values were reduced by 10% in patch watersheds, and brook trout were eliminated from 25% of randomly selected patches that had prevalence levels exceeding 50% and patch lengths less than 10 km.
15	Extreme climate change with partial targeted restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented extreme climate change conditions. In addition, connectivity values were set to an unaltered state, brook trout were eliminated from 25% of randomly selected patches that had prevalence levels exceeding 50% and patch lengths less than 10 km, and road density values were reduced by 25% in the patch watersheds where brook trout were eliminated.
16	Extreme climate change with full restoration	Bull trout patch occurrence probabilities were predicted by applying the final model to a set of smaller and warmer patches that represented extreme climate change conditions. In addition, connectivity values were set to an unaltered state, road density values were set to 0 km/km^2, and brook trout prevalence was set to 0% in patch watersheds.

[1]Stream temperature and flow scenarios for baseline and future climatic conditions were downloaded from the NorWeST Regional Database and Modeled Stream Temperatures website: https://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html and the Western U.S. Stream Flow Metrics website: https://www.fs.fed.us/rm/boise/AWAE/projects/modeled_stream_flow_metrics.shtml.

[2]Stream temperature and flow characteristics were based on averages that represented conditions at the beginning of the 21st century.

[3]The moderate climate change conditions were based on stream temperature and flow values that differed from the baseline conditions by an increase of 1°C mean August stream temperature, a decrease in summer stream discharge of 25%, and an increase in the average number of high winter flow days from 3 days to 6 days.

[4]The extreme climate change conditions were based on stream temperature and flow values that differed from the baseline conditions by an increase of 2°C mean August stream temperature, a decrease in summer stream discharge of 50%, and an increase in the average number of high winter flow days from 3 days to 9 days.