Abstract:

Climate warming is a threat to the survival of fishes adapted to cold water. Brook Trout Salvelinus fontinalis and Brown Trout Salmo trutta are two coldwater species occurring in streams in Wisconsin, where climate change may make these species particularly vulnerable. Vulnerable trout populations need to be identified to aid in the development of adaptation strategies. We used web-based stream temperature and fish-distribution models in FishVis to predict current (late twentieth century) and project future (mid twenty-first century) distributions of Brook Trout and Brown Trout. The models predict the suitability of habitat for trout in individual reaches using environmental variables in a geographic information system, including adjacent and upstream channel characteristics, surficial geology, landcover, and climate. Future projections of air temperature and precipitation were obtained from 13 general circulation models downscaled for Wisconsin. Currently, 34,251 km of streams are suitable for Brook Trout and 20,011 km for Brown Trout. The models project a decline of 68% (10,995 km) in stream habitat for Brook Trout and a decline of 32% (13,668 km) for Brown Trout. These projected declines, while substantial, are lower than earlier estimates because our models account for projected increased precipitation that may enhance groundwater inputs and partially offset higher air temperatures.

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