

Northwest Alaska bird, mammal species could experience habitat change from warming climate

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Of the 201 bird and mammal species that call northwest Alaska's arctic and subarctic region their home, 195 of them could experience some form of habitat loss or gain stemming from climate change, according to a study led by the US Forest Service's Pacific Northwest Research Station. The study projected the availability of future wildlife habitat based on recent and anticipated vegetation changes. Here, a glimpse of the bird and mammal species projected to gain or lose the most. (Bold denotes a subsistence species.) Credit: US Forest Service, Pacific Northwest Research Station. Bruce Marcot, USFS.

Of the 201 bird and mammal species that call northwest Alaska's arctic and subarctic region their home, 195 of them—or, roughly, 97 percent—could experience some form of habitat loss or gain stemming from climate change, a new U.S. Forest Service-led study has found.

The study, which projected the effects of climate-related changes on habitats of 162 species of birds and 39 species of mammals within 403,000 acres of the arctic, is among the first to explore what a warming climate might mean for a wide array of bird and mammal species across a vast geographic area. The findings are published in the journal *Climatic Change*.

"Climate is changing in the arctic far faster—by some estimates, twice as fast—than in lower-latitude temperate regions," said Bruce Marcot, a research wildlife biologist with the Pacific Northwest Research Station who led the analysis. "This makes the arctic, in a way, an 'early warning system' for the rest of the continent, making projections of changes in the region a very important scientific tool."

In their study, Marcot and his colleagues used three approaches to project changes in vegetation and land cover through the 21st century along with wildlife-[habitat](#) relationship models that, together, summarize what scientists know about how ecosystems and wildlife habitats can be affected by rising temperature and associated drivers such as the expansion of tall shrubs and trees, increase in fire, and melting of permafrost. The researchers then projected the availability of [wildlife habitat](#) by relating recent and projected vegetation changes to the habitats of the region's birds and mammals.

The study revealed that up to 52 percent of the 201 bird and mammal species currently occurring in the area would experience habitat

expansion under the models, 45 percent would see habitat contractions, and 3 percent would experience no habitat change. Species whose habitats are projected to expand include those occupying forest and tall-shrub habitats, such as grouse and black bear, while species whose habitats are projected to decline include those occupying meadow and low-shrub habitats, like ptarmigan and caribou as well as most of the small mammals that form the prey base for larger carnivores and raptors.

Marcot and his colleagues also found that a greater proportion of mammal species would experience habitat declines than would bird species. In addition, half of the 50 bird and [mammal species](#) used for subsistence hunting, including greater white-fronted goose, tundra swan, caribou, mink, and muskrat would experience habitat decline.

"I view our work as producing testable working hypotheses that can be validated and refined over time through further studies and monitoring," Marcot said. "It is a first approximation and not a definitive prediction of changes in wildlife population sizes to come, so continued studies will help refine our predictions and likely provide some surprises as the region continues to change."

More information: *Climatic Change*, link.springer.com/article/10.1007/s10584-015-1354-x

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