

GLOBAL WARMING & SONGBIRDS

Wyoming



Evening Grosbeak
-U.S. Fish and Wildlife Service

WHY CARE ABOUT BIRDS?

Birds are sources of enjoyment and public pride. Birds play an important role in communities by their aesthetic values and as sources of public pride. They provide a value to people through their very existence. Even non-birdwatchers may be thrilled to see Bald Eagles soaring overhead, and many people feel they would be deprived in some way if the birds disappeared.

Birds are important for Wyoming's ecosystems. Birds play an important role in

ecosystems by pollinating plants, dispersing seeds and eating insects. A number of bird species are predators of douglas-fir tussock moths, gypsy moths, codling moths, tent caterpillars, western spruce budworms, ponderosa pine budworms and mountain pine beetles, which can cause major damage to Wyoming's forests.

Birdwatching makes a significant contribution to Wyoming's economy. People watching and feeding wildlife (primarily birds) in Wyoming spent approximately \$235 million in 1996.

HOW MIGHT GLOBAL WARMING AND ASSOCIATED CLIMATE CHANGE AFFECT THE SUMMER DISTRIBUTION OF SONGBIRD SPECIES IN WYOMING?

Human activity – particularly the burning of fossil fuels such as coal, oil, and natural gas – is sending tremendous additional quantities of carbon dioxide (CO₂) and other heat-trapping gases into the atmosphere. The buildup of these gases is causing the planet to heat up and is altering the basic climate systems to which nature is adapted. There is growing scientific evidence that some birds and other wildlife are already responding to the changing climate.

Models have been developed that examine how summer bird distributions (climatic ranges) in Wyoming might respond to a changing climate. Over the coming decades, there could be changes in the number of species of birds that Wyoming residents know and love. These changes encompass both birds colonizing as well as those that may disappear from the state. Many of the species projected to disappear from the state or whose ranges might shrink are those species that feed on insect pests.

Wyoming actually fares better than many states in maintaining its avian species richness. This is due in large part to the abundance of high elevation areas available as refuges for the birds. The ranges of many

bird species will likely shift upwards in elevation as well as northward in latitude. If proper habitat is available then species from lower elevations may be able to move upslope. In particular, the model projects that the area surrounding Grand Teton and Yellowstone National Parks will be an important refuge for many of Wyoming's bird species, even those whose summer distributions in Wyoming are currently more widespread.

How quickly these distributional changes might occur is unknown. The rate of change depends on whether the limits to a given species' distribution are more closely linked with climate, vegetation, or some other factor. The rate of change will also likely be tied to the rate of climate change itself. However, changes could occur relatively quickly. For example, one pilot study of 35 North American warbler species found that the range of occurrence of 20 percent of the species has shifted significantly north in the past 24 years, by an average of more than 65 miles. This is consistent with what we would expect as birds seek climates to which they are adapted.

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SOME SPECIFIC CHANGES:

The following is a list of how the climatic summer ranges of some of Wyoming's birds might change. These changes are specific to the climate conditions projected by one of the climate change models, that of the Canadian Climate Center. This bird list is not all inclusive, and different models will produce somewhat different results. While the models cannot be used to say exactly how a given species' distribution might change, they can be used to give an idea as to the direction and potential magnitude of change in the suitable climatic range for the species. The following list of possible changes to Wyoming's avifauna was prepared by comparing the maps of projected summer bird ranges with the maps and information found in *Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming* (Wyoming Game and Fish Department 1997).

Species whose future climatic range may exclude¹ Wyoming in summer: Least Flycatcher, Bank Swallow, Marsh Wren, Eastern Bluebird, Red-eyed Vireo, Orange-crowned Warbler, American Redstart, Ovenbird, Northern Waterthrush, Wilson's Warbler, Rose-breasted Grosbeak, Indigo Bunting, Green-tailed Towhee, Clay-colored Sparrow, Sage Sparrow, Fox Sparrow, Lincoln's Sparrow, White-crowned Sparrow, McCown's Longspur, Orchard Oriole, Pine Grosbeak, Cassin's Finch, Red Crossbill and Evening Grosbeak.

Species whose climatic summer ranges² in Wyoming might contract: Olive-sided Flycatcher, Willow Flycatcher, Hammond's Flycatcher, Dusky Flycatcher, Tree Swallow, Black-capped Chickadee, Mountain Chickadee, Red-breasted Nuthatch, House Wren, Gray Catbird, Sage Thrasher, Brown Thrasher, Plumbeous Vireo, Warbling Vireo, Yellow Warbler, MacGillivray's Warbler, Common Yellowthroat, Chipping Sparrow, Brewer's Sparrow, Vesper Sparrow, Savannah Sparrow, Song Sparrow, Dark-eyed Junco, Chestnut-collared Longspur, Bobolink, Yellow-headed Blackbird, Brewer's Blackbird, Common Grackle, Pine Siskin and American Goldfinch.

Species whose climatic summer ranges in Wyoming might undergo little change: Western Wood-Pewee, Say's Phoebe, Western Kingbird, Eastern Kingbird, Horned Lark, Violet-

green Swallow, Northern Rough-winged Swallow, Cliff Swallow, Barn Swallow, Blue Jay, Rock Wren, Loggerhead Shrike, Yellow-rumped Warbler, Yellow-breasted Chat, Western Tanager, Lazuli Bunting, Spotted Towhee, Lark Bunting, Red-winged Blackbird, Western Meadowlark, Brown-headed Cowbird, Bullock's Oriole, House Finch and House Sparrow.

Species whose climatic summer ranges in Wyoming might expand: Ash-throated Flycatcher, Bewick's Wren, Northern Mockingbird, Black-headed Grosbeak, Blue Grosbeak, Dickcissel, Lark Sparrow and Grasshopper Sparrow.

Species whose future climatic summer ranges might include Wyoming: Vermilion Flycatcher, Scissor-tailed Flycatcher, Chihuahuan Raven, Chestnut-backed Chickadee, Cactus Wren, Curve-billed Thrasher, Bell's Vireo, Painted Bunting, Cassin's Sparrow, Black-throated Sparrow and Great-tailed Grackle.

In summary, a high probability exists that global warming could cause changes in the climatic summer ranges of some of Wyoming's birds. These changes could occur (and probably are occurring) relatively quickly and may have widespread ecological effects and possible economic effects. While some birds that are lost to Wyoming may be found for the first time in another state, key vegetation and other habitat needs may not always be able to change fast enough or may be affected in other ways that will undermine the birds' long-term survival. Although we cannot say for certain what the exact magnitude of these effects will be, it is possible that bird communities may look quite different in the future if we do not begin to take meaningful action to reduce the greenhouse gas emissions responsible for global warming.

Global warming is of particular concern when viewed in concert with other already well established population stresses (e.g., habitat conversion, pollution, invasive species). It is the combination of these stresses that will likely prove to be the greatest challenge to wildlife conservation in the 21st century. It is important to understand as much as possible about the responses of animals to a changing climate in order to more effectively manage and protect species and habitats.

¹ The scale of the models make them unable to take into account some topographic changes (e.g., moving up in elevation) and the possible existence of suitable microclimates (e.g., along rivers). Therefore, some of the species whose climatic ranges are projected to exclude an area (i.e., be extirpated) may be able to persist if a suitable microclimate is available, especially in higher montane areas.

² The climatic summer range of a species refers to that area that models project as having a suitable climate for a species during the summer. The model results referred to here discuss how the climatic range may change. A species actual distribution is usually tied to a multitude of factors. These include direct climatic effects (e.g., physiology) as well as indirect climatic effects (food, habitat). The rates of change of each of these is different. While the climate can change quickly, the ranges of some plants making up a species' habitat may take decades to centuries to move. Whether a species will be able to track these changes in its climatic ranges will depend on its physiological tolerances as well as on its dependence on these other factors.