

New maps document big-game migrations across the western United States

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For the first time, state and federal wildlife biologists have come together to map the migrations of ungulates—hooved mammals such as mule deer, elk, pronghorn, moose and bison—across America's West.

The maps will help land managers and conservationists pinpoint actions necessary to keep migration routes open and functional to sustain healthy big-game populations.

"This new detailed assessment of [migration](#) routes, timing and interaction of individual animals and herds has given us an insightful view of the critical factors necessary for protecting wildlife and our citizens," said USGS Director Jim Reilly.

The new study, *Ungulate Migrations of the Western United States: Volume 1*, includes maps of more than 40 big-game [migration routes](#) in Arizona, Idaho, Nevada, Utah and Wyoming.

"I'm really proud of the team that worked across multiple agencies to transform millions of GPS locations into standardized migration maps," said Matt Kauffman, lead author of the report and director of the USGS Wyoming Cooperative Fish and Wildlife Research Unit. "Many ungulate herds have been following the same paths across western landscapes since before the United States existed, so these maps are long overdue."

The migration mapping effort was facilitated by Department of the Interior Secretary's Order 3362, which has brought greater focus to the need to manage and conserve big-game migrations in the West. It builds on more than two decades of wildlife research enhanced by a technological revolution in GPS tracking collars. The research shows ungulates need to migrate in order to access the best food, which in the warmer months is in the mountains. They then need to retreat seasonally to lower elevations to escape the deep winter snow.

Big-game migrations have grown more difficult as expanding human populations alter habitats and constrain the ability of migrating animals to find the best forage. The herds must now contend with the increasing footprint of fences, roads, subdivisions, energy production and mineral

development. Additionally, an increased frequency of droughts due to climate change has reduced the duration of the typical springtime foraging bonanza.

Fortunately, maps of migration habitat, seasonal ranges and stopovers are leading to better conservation of big-game herds in the face of all these changes. Detailed maps can help identify key infrastructure that affect migration patterns and allow conservation officials to work with private landowners to protect vital habitats and maintain the functionality of corridors.

The migration maps also help researchers monitor and limit the spread of contagious diseases, such as chronic wasting disease, which are becoming more prevalent in wild North American cervid populations such as deer, elk and moose.

"Arizona is excited to be part of this effort," said Jim deVos, assistant director for wildlife management with the Arizona Game and Fish Department. "This collaboration has allowed us to apply cutting-edge mapping techniques to decades of Arizona's GPS tracking data and to make those maps available to guide conservation of elk, mule deer and pronghorn habitat."

Many of these mapping and conservation techniques were pioneered in Wyoming. Faced with rapidly expanding oil and gas development, for more than a decade the Wyoming Game and Fish Department and the USGS Cooperative Research Unit at the University of Wyoming have worked together to map corridors to assure the continued movements of migratory herds on federal lands.

Migration studies have also reached the Wind River Indian Reservation, where researchers are collaborating with the Eastern Shoshone and Northern Arapaho Fish and Game to track mule deer and elk migrations

and doing outreach to tribal youth. Director Reilly emphasized that the interactions with state agencies and the tribes, especially with the Wind River students, have been a hallmark of this effort and have been remarkably successful.

For example, the mapping and official designation of Wyoming's 150-mile Red Desert as part of the Hoback mule deer migration corridor enabled science-based conservation and management decisions. Detailed maps also allowed managers to enhance stewardship by private landowners, whose large ranches are integral to the corridor. Partners funded fence modifications and treatments of cheatgrass and other invasive plants across a mix of public and private segments within the corridor.

"Just like Wyoming, Nevada has long valued our mule deer migrations," said Tony Wasley, director of the Nevada Department of Wildlife. "This effort has provided us with a new level of technical expertise to get these corridors mapped in a robust way. We look forward to using these maps to guide our stewardship of Nevada's [mule deer](#) migrations."

In 2018, the USGS and several western states jointly created a Corridor Mapping Team for USGS scientists to work side-by-side with state wildlife managers and provide technical assistance through all levels of government. With coordination from the Western Association of Fish and Wildlife Agencies and the information-sharing and technical support of the team, agency biologists from Arizona, Idaho, Nevada, Utah and Wyoming collaborated to produce migration maps for the five big-game species. In 2019, the Corridor Mapping Team expanded to include mapping work across all states west of the Rocky Mountains.

In addition to managers from the respective state wildlife agencies, the report was coauthored by collaborating biologists from the USDA Forest Service, the National Park Service, and the Bureau of Land

Management, among others. The maps themselves were produced by cartographers from the USGS and the InfoGraphics Lab at the University of Oregon.

More information: Matthew Kauffman et al, Ungulate migrations of the western United States, Volume 1, (2020). [DOI: 10.3133/sir20205101](https://doi.org/10.3133/sir20205101)

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