Science to Solutions

# Grazed Rangelands Produce Sage Grouse Chicks' Preferred Food

***In Brief:***

- Terrestrial arthropods (like insects) provide the protein-rich foods necessary for the survival of young shrub and grassland birds.
- A new study comparing arthropod communities in grazed, deferred, and idled pastures found that arthropods consumed by sage grouse chicks were 13% more prevalent in grazed versus idled rangelands.
- Long-term absence of grazing may alter the structure of arthropod communities, resulting in reduced food availability for growing young birds during late summer.

## Background

Arthropods are a component of many wildlife species' diets, and include beetles, grasshoppers, crickets, spiders, ants, and the larvae of butterfly and moths. These arthropods provide energetic resources for grassland and shrubland birds in North America, including imperiled species like McCown's longspur, sagebrush thrasher, Brewer's sparrow, and many others.

Arthropods are also a key food source for greater sage-grouse and lesser prairie-chickens. Re-search shows that virtually 100% of the diet of one- to four-week-old sage grouse chicks is composed of arthropods. However, studies also indicate that only a few types of ground-dwelling arthropods (beetles, ants, and caterpillars) make up the bulk of the food important for sage grouse survival.

Land use such as livestock grazing—the most common use of rangelands—influence the abundance and composition of arthropods, which may have far-reaching effects on rangeland ecosystems. Grazing impacts arthropods through direct habitat disturbance as well as by changing the composition and physical structure of plant communities they rely upon.

*Sage grouse chicks are virtually 100% dependent on protein-rich arthropods during their first month of life, especially beetles, ants, and caterpillars. Predatory spiders tend to eat the insects birds prefer to eat.*

Studies have shown that grazing strategies that incorporate temporal variation in grazing intensity, such as rest-rotation grazing, may be an effective tool for maintaining arthropod biodiversity on managed rangelands.

## Methods

Researchers from Montana State University investigated relative abundance and diversity of ground-dwelling arthropods in sagebrush habitats in central Montana from 2012–2015. The percentage of bare ground and the height of grass and sagebrush were also averaged for each location. Samples were collected weekly in three types of pastures:

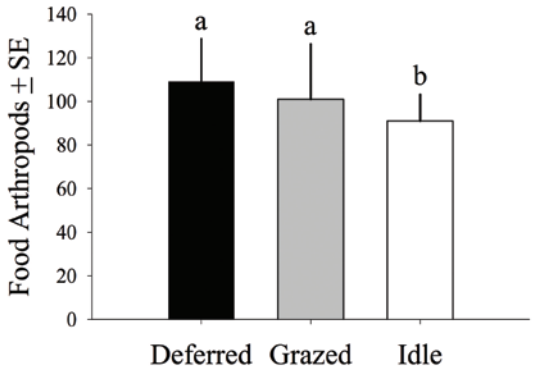
**1) Deferred:** Pastures in the "rest" phase of a rest-rotation grazing system implemented by the USDA Natural Resources Conservation Service-led Sage Grouse Initiative. Rest-rotation involves moving livestock herds through multiple pastures during the season while leaving at least one pasture ungrazed for ~15 months to allow for plant growth and reproduction.

**2) Grazed:** Pastures where livestock were present.

**3) Idle:** Pastures on the Lake Mason National Wildlife Refuge where livestock grazing was absent for over a decade.

*"Grazed rangelands produced more sage grouse food compared to idled pastures where predatory spiders were most abundant."*

~ Hayes Goosey, lead researcher, Montana State University




*Activity-density of bird-food arthropods from samples collected in grazed, rested, and idled pastures during the 2012-2015 field season north of Lavina, Montana. Bars represent weekly catch least squared means, and error bars represent the standard error of the mean.*

## Results

Total arthropod catches were twice as high on idle pastures compared to managed pastures, and the totals trapped in grazed and deferred pastures did not differ. This corresponds to the reduced percentage of bare ground documented in sample areas on idled rangeland—increased grass and shrub cover likely support a higher abundance of arthropods.

However, researchers discovered that the **specific classes of arthropods preferred by sage grouse were 13% more prevalent on managed pastures.** Plus, managed rangeland supported a more diverse assemblage of ground-dwelling arthropods, which may be particularly beneficial for birds that rely on this critical food resource.

In the American West's grazing-adapted ecosystem, long-term absence of grazing or other disturbance dramatically alters the structure of arthropod communities, ultimately resulting in reduced availability of important food resources for shrubland and grassland birds. Livestock grazing that incorporates rest-rotation or other conservation practices may provide a valuable ecosystem service.

## Science In Action

Well-managed livestock grazing of native plants is one of the best ways to benefit wildlife and working lands. Rangelands with lush native grasses, wildflowers, sagebrush and wet meadows are the best habitat for arthropods, as well as sage grouse and hundreds of other species. Plus, managing for diverse, healthy plants puts more pounds on livestock, too.

As part of Working Lands For Wildlife, the Sage Grouse Initiative and Lesser Prairie Chicken Initiative work with ranchers on customized grazing plans that improve rangelands for wildlife while also boosting the bottom line of agricultural operations. To date, these initiatives have partnered with over 2,000 ranchers to conserve 7.5 million acres of rangelands.

**Source:** *Publication Pending.* Goosey, Hayes B., et. al. 2018. Ground-Dwelling Arthropod Community Response to Livestock Grazing: Implications for Avian Conservation. Environmental Entomology.

The **Sage Grouse Initiative** is part of **Working Lands for Wildlife,** led by USDA's Natural Resources Conservation Service, which is a partnership-based, science-driven effort to proactively conserve America's working agricultural lands and wildlife.