USGS Western Ecological Research Center

Research Spotlight

Greater Sage-grouse Frequently Select Poor Quality Nesting Sites Following Wildfire

New research from the USGS and partners concluded that greater sage-grouse in the Great Basin often select nest sites that result in poor nest survival after wildfire. The poor quality nest sites are strongly associated with spread of invasive grasses and loss of shrub canopy cover.

The greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse) is an iconic western species, a symbol of remote landscapes. Sage-grouse populations in the Great Basin have been in decline over the past 30 years. While the decline has been linked to an accelerated cycle of wildfire and invasion of cheatgrass (annual grass), exactly how these landscape changes drive sage-grouse losses has been uncertain. Results of a new study, published in Global Change Biology, indicate that changes in land cover as a result of wildfire is influencing nesting success, which may be driving population declines.

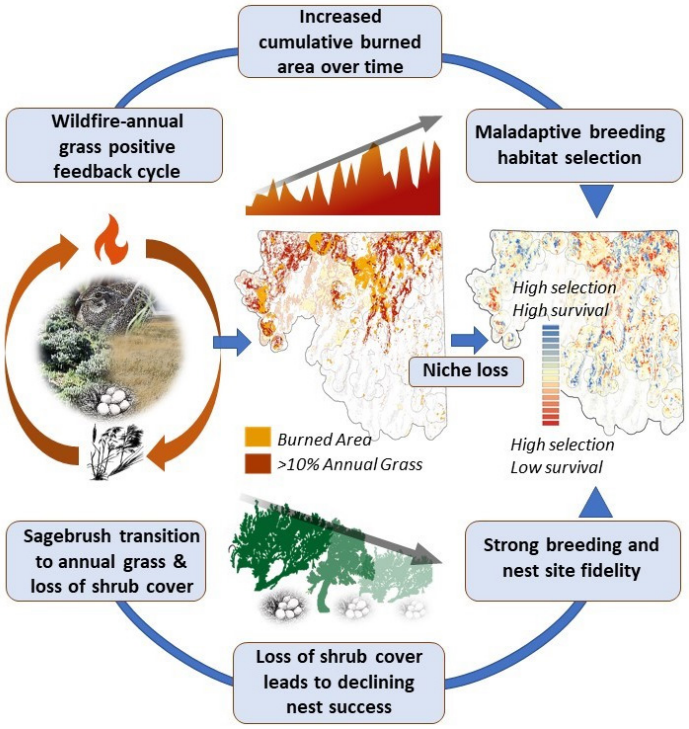
Using the locations of 786 sage-grouse nests monitored from 2009 to 2018, USGS researchers and partners identified which environmental factors influenced where sage-grouse selected a nest site and used this information to create maps of preferred sage-grouse nesting habitat across the region.

Most of the environmental factors that were associated with nest site selection by sage-grouse were those that seem to reflect a healthy environment for eggs and chicks. Overall, the birds preferred rugged, high-elevation sites with plenty of sagebrush, sites that provide cover from nest predators like ravens. But a surprisingly large portion of nests were in areas that did not seem well-suited for hatching chicks: 23 percent of selected nests were in areas that had burned in recent wildfires and were often dominated by invasive cheatgrass.

When the nest selection data were combined with information on nest survival, the results revealed a striking mismatch: many sage grouse were selecting nest sites where their eggs and chicks were likely to have poor rates of survival. Sixteen percent of the area was classified as "maladaptive", and below-average survival was predicted for 58% of habitat within 17 kilometers of active leks (breeding areas).

The study did not explore exactly why sage-grouse chose such poor quality nesting sites, but the researchers believe that it is related to site fidelity. Sage-grouse tend to choose the same nesting sites they chose in years past, and where previous generations of sage-grouse have nested. In recent years, the Great Basin has undergone rapid transformation from invasive cheatgrass and wildfire. About half (51%) of the area classified as high-selection, low-survival was associated with recent burns or more than 10% annual grass cover.

The new publication suggests that greater sage-grouse may not be adapting quickly enough to the changes driven by the grass-fire cycle and other types of disturbance in the Great Basin, leading to population declines. By articulating how landscape change leads to species decline, USGS scientists and partners inform management and conservation of Great Basin sagebrush ecosystems.



MANAGEMENT IMPLICATIONS

- Greater sage-grouse prefer nest sites with high sagebrush and native grass cover but often choose maladaptive sites that result in poor nest survival. About half of the area classified as high-selection, low survival nesting habitat is associated with recent wildfire and >10% annual grass cover.
- Maps produced in this study can identify high-quality nesting habitat, with both high levels of site selection and nest survival, as well as areas that have been degraded and where sage grouse may be in jeopardy.
- Locations on the map with high rates of selection and low nest survival are still areas that sage grouse are using for nesting and may represent opportunities to improve habitat through restoration. Further disturbance to these areas could exacerbate sage grouse decline.

RESEARCH CONTACTS

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This Spotlight Refers To:
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