Science to Solutions

Marking High-Risk Fences Saves Sage Grouse

In Brief: Marking fences for visibility can dramatically reduce sage grouse collisions. A new mapping tool can help managers and landowners target those fences that pose the highest risk for grouse strikes: fences close to leks and in flat or rolling terrain.

Photo: Jeremy Roberts, Conservation Media

A new mapping tool helps identify the best spots to reduce sage grouse fence collisions

Skimming low over the tops of sagebrush, sage grouse can easily collide with livestock fences. When grouse fly into their breeding grounds, or "leks", the dim pre-dawn light makes it difficult for the birds to see and quickly avoid fence wires. Striking fences in flight can kill or fatally injure grouse, as well as raptors and other birds.

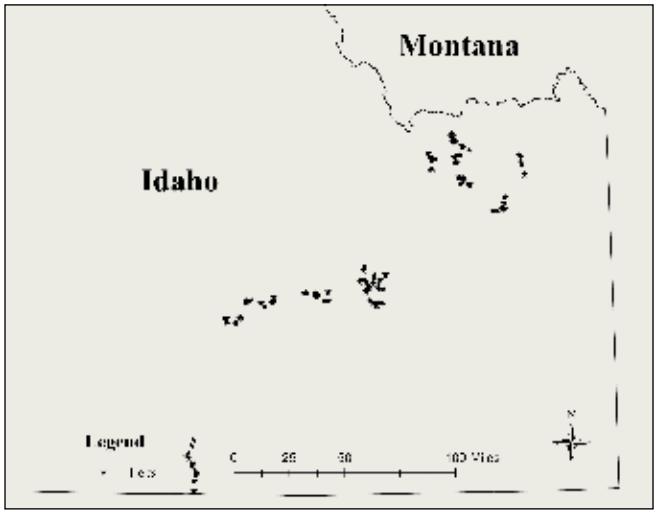
Fence collisions take their toll: a recent study in Idaho that investigated sage grouse fence strikes near leks reported average collision rates as high as 1.2 strikes per mile of fence each breeding season (Stevens 2011). This estimate could be conservative, however, because strikes are difficult to detect and bird carcasses are quickly scavenged. Tallied across the breadth of sage grouse country, fence strikes may pose a considerable hazard for grouse.

Yet a simple practice can make an enormous difference without disrupting fences needed for livestock: marking fence wires with flagging or durable vinyl markers makes them more visible, and recent science has found that fence markers can reduce grouse collisions by up to *83 percent* (Stevens et al. 2012). Fence marking projects are now being widely adopted by ranchers and land managers to reduce sage grouse collisions.

But does every mile of fence in sage grouse country pose a risk? Can we target our efforts to save costs and resources?

Photo: Jeremy Roberts, Conservation Media

From Science to Solutions: The Fence Collision Risk Tool



Lek sites (stars) across eastern Idaho were studied to determine high-risk areas for grouse fence collisions. Map courtesy of B. Stevens.

Research in Idaho found that grouse are most at risk of striking fences close to leks: 73% of strikes were within 0.3 miles of a lek, and 93% were within 0.93 miles. Further, most collisions occurred where the terrain was flat or gently rolling. The researchers speculate that in steeper and more broken terrain grouse tend to fly higher, but will skim low over the ground in flatter terrain.

With this new information in hand, SGI developed a mapping tool to help land managers prioritize sites where sage grouse are most at risk of colliding with fences. The Fence Collision Risk Tool resulted from a GIS (Geographic Information Systems)-based model of strike risk around 4,684 known leks. The tool maps the best sites for fence marking or other modifications to increase visibility for low-flying grouse. It's also playing an important role in identifying fences for removal if no longer needed. When planning new fence projects, the tool helps managers avoid building fences in high-risk areas.

NRCS has now mapped high risk areas for grouse strikes (where there is likely to be more than one strike over the lekking season) across 10 states in sage grouse range. The mapping reveals that only a tiny fraction of sage grouse range (6 to 14 percent) potentially poses a high risk for collisions and would need markers or other modification if fences are present (NRCS 2012; Stevens et al. 2013). Using this tool, public land managers and private landowners can now focus their limited resources on those fences that are most likely to reduce grouse strikes.

By understanding the risk of grouse collision with fences in flat and rolling terrain, managers can also apply these insights to other seasonal habitats where grouse are known to concentrate and where they could collide with fences, such as brood-rearing habitat and wintering sites.

"My fieldwork showed that areas with the highest risk of fence collisions for sage grouse were large sagebrush flats or benches near lek sites. We developed a model that explained these "hotspots", then created a user-friendly tool to identify areas with higher and lower risk across landscapes." ~Bryan Stevens

How Do I Access the Tool?

Photo: Rick McEwan

The Fence Collision Risk Tool is a GIS map layer that has been provided to state wildlife agencies and NRCS field offices range-wide. These offices can use the tool within their GIS systems to map out high-risk areas and plan fence marking and mitigation projects locally or across landscapes. The resulting maps are not directly available to the public because of the sensitivity of lek location data. However, whether you are a private landowner or public land manager, you can work with the NRCS to identify high-risk areas for your landscapes.

Private Landowners

An NRCS conservation planner can provide technical assistance with the Fence Collision Risk Tool. The planner can combine the Fence Collision Risk Tool with the most current known lek locations, aerial imagery and other geographic and resource information for your property. Working together, you can include existing or planned fence locations and other management activities.

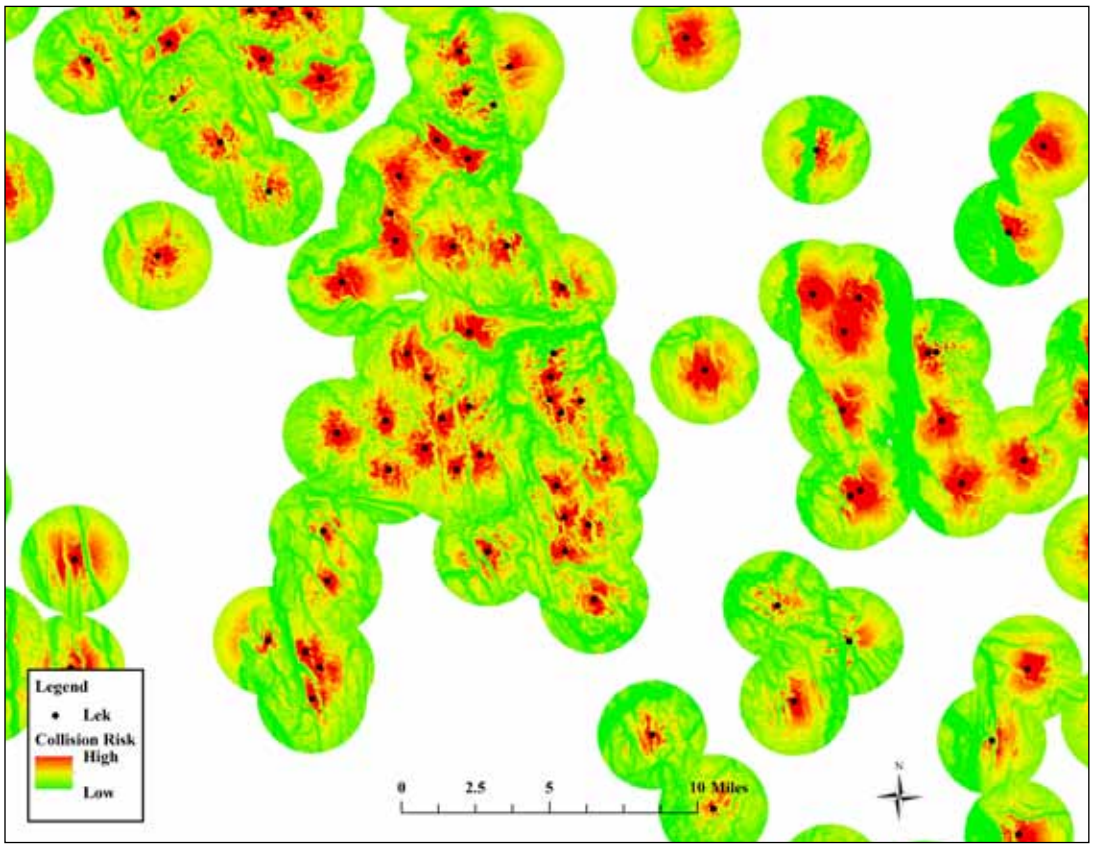
If you wish, the fence risk tool can be one step in an overall conservation planning process to address sage grouse and other resource concerns, which can be followed up with a field visit. To find your local NRCS office and contact a conservation planner, visit the USDA Service Center locator: **http://offices.sc.egov.usda.gov/locator/app.**

In addition, the SGI website features a special section for landowners on how to enroll in SGI conservation programs and how to mark fences for visibility: **http://www.sagegrouseinitiative.com/our-work/for-landowners/.**

Natural Resource Professionals

Agency resource professionals that have access to GIS capabilities may be able to use the Fence Collision Risk Tool directly or work with an NRCS conservationist or state wildlife manager to apply the tool. Contact the NRCS State Office or the sage grouse biologist with your state wildlife agency. For full details on the tool, see "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes" in the sources below (NRCS 2012).

To apply the tool to areas of management concern, use a GIS system to combine the Fence Collision Risk Tool with the most current state-level lek location data and aerial imagery. Incorporate any existing or planned fence location data, if available (sometimes existing fences can be identified on aerial images). Then identify potentially high-risk areas: contiguous areas of red that represent flat or rolling terrain near leks. At a local scale, managers may wish to include other areas of seasonal habitat and grouse concentrations if they are known, such as brood-rearing habitat or wintering sites (NRCS 2012).



An example of the Fence Collision Risk Tool – a GIS layer that can be overlaid onto other map features, such as satellite imagery or land ownership. The tool identifies areas with highest risk of fence collisions (red) within 1.8-mile radius circles around leks (black dots). Map courtesy of B. Stevens.

In the Field

Ground-truth these hotspots in the field. Add any sites of concern missed by GIS mapping, and dismiss spots that would not be problematic, such as fences running through very tall brush or through habitats that don't support sage grouse (NRCS 2012). Use the resulting map to plan the placement of new fences, remove obsolete fences that are high risk but no longer needed, and plan fence marking projects.

For more detail on making and installing durable fence markers yourself, see the NRCS publication "How to Make and Install Fence Markers for Sage-Grouse" in the sources below (NRCS 2013). Markers are also commercially available from several small businesses.

For more information on the Sage Grouse Initiative and sage grouse conservation planning, visit **http://www.sagegrouseinitiative.com/.**

While a graduate student at the University of Idaho, Bryan Stevens identified areas where sage grouse are most at risk of colliding with fences on their breeding grounds, and then turned that information into an effective tool for land managers and landowners. Photo courtesy of B. Stevens.

Suggested Citation

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Photo: Jeremy Roberts, Conservation Media

Durable fence markers are typically cut from vinyl "undersill" trim siding that has a lip that snaps securely onto fence wires. The vinyl strips are cut into 3" pieces, and reflective tape is added to both sides of the markers to increase visibility in low light. An alternative is to use both white and black markers for visibility against vegetation and snow. Usually, markers are placed at 3-foot intervals on the top wire. Fences that are well-covered by tall sagebrush, or run through other tall vegetation such as willows or trees, may not need to be marked.

Sources

NRCS. 2012. Applying the sage grouse fence collision risk tool to reduce bird strikes. CEAP Conservation Insight. Natural Resources Conservation Service, Washington, D.C. Nov. 2012; 5 pp. **http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1049415.pdf.**

NRCS. 2013. How to make and install fence markers for sage grouse. Natural Resources Conservation Service. **http://www.sagegrouseinitiative.com/wp-content/uploads/2013/07/NRCD-SGI_FenceMarker_Instructions.pdf.**

Stevens, B. S. 2011. Impacts of fences on greater Sage grouse in Idaho: collision, mitigation and spatial ecology. Master's Thesis, University of Idaho, Moscow.

Stevens, B.S., K.P. Reese, J.W. Connelly, D.D. Musil. 2012. Greater sage-grouse and fences: does marking reduce collisions? Wildlife Soc. Bull. 36:297-303; doi:10.1002/wsb.142

Stevens, B.S., D.E. Naugle, B. Dennis, J.W. Connelly, T. Griffiths, and K.P. Reese. 2013. Mapping sage grouse collision risk: spatially explicit models for targeting conservation implementation. Wildlife Soc. Bull. 37(2) 409-415; doi: 10.1002/wsb.273.