



ARTICLE

Harpers Ferry Grassland Bird Survey

Harpers Ferry National Historical Park (<https://www.nps.gov/hafe/>)

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A [2022 study in Harpers Ferry National Historical Park \(https://irma.nps.gov/DataStore/Reference/Profile/2304340\)](https://irma.nps.gov/DataStore/Reference/Profile/2304340) (NHP) revealed that park grasslands support a surprising diversity of birds during both migration and the breeding season. In most cases, bird species preferred to stopover or breed in large open grasslands with clear sightlines and diverse vegetation. This study indicates the importance of preserving the existing grasslands in the park (through strategic mowing, invasive plant removal, and other methods). It also indicates that larger and more contiguous grasslands would benefit grassland birds.

Battlefields as Sanctuaries for Declining Bird Populations

Over 95% of North America's original grasslands have been lost to development or forest growth and the grassland bird populations that depend on them have declined steeply in recent decades. Places like Harpers Ferry NHP that preserve open battlefield landscapes are home to some of the few grasslands that remain in the eastern US. These areas have become crucial for the continued survival of grassland birds.

Harpers Ferry (HAFE) supports 165 hectares of grassland fields situated in a mosaic of forest patches, tree lines, trails, and roads. In 2022, researchers at the University of Delaware completed a study of grassland birds in the park to help determine how best to manage and conserve their grassland habitats in support of these birds. The "[Grassland Bird and Raptor Inventory of Harpers Ferry National Historical Park \(https://irma.nps.gov/DataStore/Reference/Profile/2304340\)](https://irma.nps.gov/DataStore/Reference/Profile/2304340)" aimed to provide a comprehensive inventory of both migrating and breeding birds that rely on park grasslands. It also looked at how distance to forest edges effects grassland bird nest site selection and their daily nest survival.

This study complements the annual grassland breeding bird monitoring done by the National Capital Region Inventory & Monitoring Network at Harpers Ferry since 2016.

Survey Reveals Remarkable Diversity of Migrating Birds

Over the course of the study, 111 different bird species were observed in HAFE grasslands. The grasslands supported a greater number of species and abundance of birds overall during the migration periods than during the breeding season, with 87 and 96 species observed during spring and fall migrations, respectively. This emphasizes the importance of these grasslands as "stopover points" to many birds during their annual migration.

These stopover points are especially important for long-distance migrants like the Bobolink (*Dolichonyx oryzivorus*), which travels 20,000 km between breeding and overwintering grounds. Grasslands provide migrating birds the opportunity to refuel on a diverse

array of insects, seeds, and other foods. Grasslands also provide areas for birds to safely rest and wait for favorable weather conditions in a place where they can easily detect predators. The loss of rest and refueling stops along migration routes is a cause of mortality for many long-distance migrating species.

Migrating birds also showed a strong preference for more open grasslands and were observed in greater numbers in larger HAFE grassland sites like Schoolhouse Ridge North and South.



Above: Eastern meadowlark (*Sturnella magna*). Below: grasshopper sparrow (*Ammodramus savannarum*)
J. Lefever



Bobolink (*Dolichonyx oryzivorus*)
NPS

Breeding Birds Prefer Disturbed Grasslands

Harpers Ferry also provides crucial habitat for several species that depend on grasslands for breeding and survival. The grassland obligate species eastern meadowlark (*Sturnella magna*) and grasshopper sparrow (*Ammodramus savannarum*) were the most abundant birds park-wide, with both species found in almost all sites in HAFE during migration and breeding periods. Researchers chose to focus on these two species because they rely on grasslands for breeding more than any other species.

Researchers found that, like many migrating species, both eastern meadowlark and grasshopper sparrow prefer larger grassland areas that contain diverse vegetation with mixed-grass areas. These conditions closely resemble native grasslands, which are usually large areas composed of a diverse assortment of warm and cold season grasses, non-woody plants, and other vegetation.

Both species also preferred areas with moderate disturbance (such as mowing) that provide intermediate grass heights, and eastern meadowlarks showed an aversion to areas with higher densities of invasive species such as vetch (*Vicia* spp). Therefore invasive plant removal, strategically-timed mowing, controlled burns, and other disturbance tactics done after the breeding season may help to maintain grasslands with suitable conditions for these priority species. Harpers Ferry currently restricts mowing in grasslands between May 15 and July 15 to allow breeding birds to nest and fledge their young.

Grasshopper sparrow and eastern meadowlark also showed similar nesting preferences. **Both preferred to nest further from tree lines that make up the grassland's edge. For the eastern meadowlark specifically, there was a significant relationship between nest success and the distance from the nest to the forest edge** (Figure 1). Nests success increased when the distance from the forest edge increased, indicating that providing larger grassland patches and increasing grassland openness will improve

habitat suitability and breeding success for this species. A nest was deemed successful if at least one nestling fledged, and nest success was most likely when distance to the forest edge neared 100 meters.

Researchers hypothesize that larger grasslands with more open sightlines allow nesting birds to better spot potential predators and greater land area enables grasslands to support a greater density of grassland species.

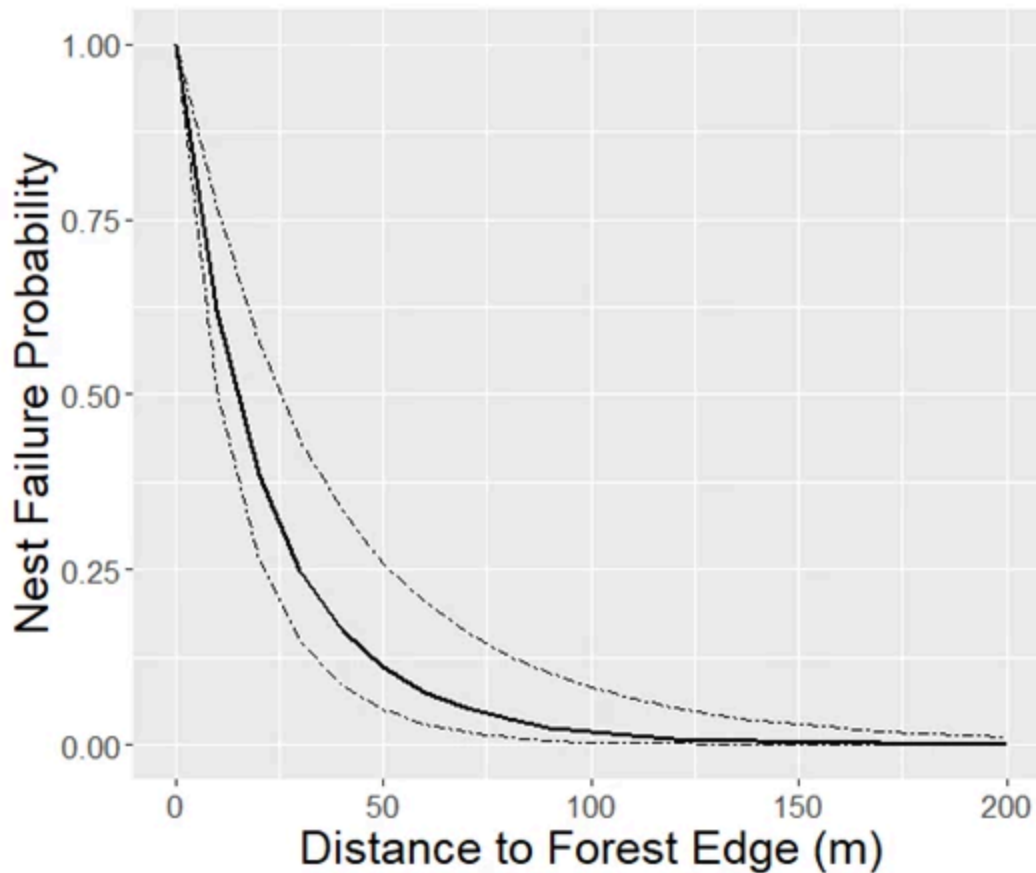


Figure 1. Model showing the relationship between the probability of nest failure and the distance from the nest to the forest edge for the eastern meadowlark. Solid line = model estimate of nest failure; dashed line = 95% confidence interval of the modeled estimate. A nest failed if no nestlings fledged.

Greg Shriver and Leah Rudge

Managing Grasslands to Protect Grassland Birds and Preserve History

Supporting previous I&M grassland work, this study made it clear that an overall increase in grassland size is beneficial to grassland bird species. For both migrating and breeding species, there was a greater number of individuals observed in larger grassland areas than in smaller grassland patches.

Harpers Ferry's grassland areas are composed of multiple small patches broken up by thin tree lines, fencing, and roads that reduce clear sightlines for birds. Some of these tree lines are the last remnants of historic field boundaries and contribute to cultural landscapes in the park. Because of their significance to both grassland birds and to preserving historic landscapes, the park is planning a study of all interior tree lines and small forest pockets that will determine their historic significance and look at how they are used by other species. This process will allow the park to find the best balance for both cultural and natural resources—like grassland birds—together.

When it comes to preserving and maintaining existing grasslands, Harpers Ferry uses strategically timed mowing and other methods of continued disturbance to keep grasslands from growing into shrublands or forests or being overrun by invasive plants. Invasive

plants are a common problem across the eastern US that reduce grassland openness, so continued removal of invasive plants like vetch and autumn olive (*Elaeagnus umbellata*) in the park will help improve grassland habitat. Harpers Ferry is also in the planning process for using prescribed fire to help promote biodiversity and desired grassland composition.

Continuing current grassland management practices at Harpers Ferry, as well as considering how grasslands might be enlarged, are part of how NPS can protect these vital ecosystems for the future.

Further Reading

- Borowy, Dorothy. 2022. [Re-Growing Southeastern Grasslands \(https://www.nps.gov/articles/000/re-growing-southeastern-grasslands.htm\)](https://www.nps.gov/articles/000/re-growing-southeastern-grasslands.htm).
- Massa M., Matthews E.R., Shriver W.G., Cohen E.B. 2023. [Response of grassland birds to management in national battlefield parks \(https://wildlife.onlinelibrary.wiley.com/doi/10.1002/jwmg.22519\)](https://wildlife.onlinelibrary.wiley.com/doi/10.1002/jwmg.22519). Wildlife Management.
- Tait, Nicholas. 2023. [Battling to Save Battlefield Birds \(https://www.nps.gov/articles/000/battling-to-save-battlefield-birds.htm\)](https://www.nps.gov/articles/000/battling-to-save-battlefield-birds.htm).

Learn More about the National Park Service's Inventory & Monitoring Efforts

To help protect natural resources ranging from bird populations to forest health to water quality, National Park Service scientists perform ecological Inventory & Monitoring (I&M) work in parks across the country. The [National Capital Region Network, Inventory & Monitoring program \(https://www.nps.gov/im/ncrn/index.htm\)](https://www.nps.gov/im/ncrn/index.htm) (NCRN I&M) serves national parks in the greater Washington, DC area.

To learn more about NCRN I&M bird monitoring, you can visit the [NCRN bird monitoring webpage \(https://www.nps.gov/im/ncrn/birds.htm\)](https://www.nps.gov/im/ncrn/birds.htm).



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battlefield birds

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eastern meadowlark

grasshopper sparrow

bobolink

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species inventory

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