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Blurring the lines between working and conservation lands: Bird use of prairie strips on farmers' fields

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Blurring the lines between working and conservation lands: Bird use of prairie strips on farmers' fields

Abstract

As part of a larger prairie strips project, this project began monitoring how farmland birds are affected by the addition of these strips to cropland. The hypothesis is that bird species presence and abundance can be positively impacted by the potential habitat provided by prairie strips.

Keywords

cover crops, nutrient management, conservation, wildlife, soil, water

Disciplines

Environmental Monitoring | Environmental Sciences | Natural Resources and Conservation | Natural Resources Management and Policy



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As part of a larger prairie strips project, this project began monitoring how farmland birds are affected by the addition of these strips to cropland. The hypothesis is that bird species presence and abundance can be positively impacted by the potential habitat provided by prairie strips.

Principal Investigator:

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Budget:
\$9,990 for year one

Q What bird species are using fields with prairie strips? What is the seasonality of bird use of fields with prairie strips? How do the species and seasonality of bird use of fields with prairie strips compare to bird use of nearby agricultural habitat types?

A The project increased the scientific understanding of how prairie strips are impacting bird communities and also provided adopting farmers and farmland owners with some data on wildlife use of their farms and whether beneficial habitat is being offered for desirable wildlife through prairie strip establishment.



ECOLOGY

Background

The central hypothesis of the Science-based Trials of Row-crops Integrated with Prairie Strips (STRIPS) project is that the conversion of small amounts of row-crops to prairie within agricultural landscapes will provide disproportionately greater environmental benefits (i.e., soil stability, water purification and attenuation, carbon sequestration, insect pest suppression, and wildlife habitat provision) than expected based on the amount of land converted. This approach maximizes environmental benefits while minimizing the land taken out of agricultural production, thereby maintaining farm profitability.

The key to this conservation practice is strategic integration of a perennial land cover that is biologically diverse and native to this landscape. This feature allows persistent soil conservation and water quality issues to be directly and efficiently addressed. The STRIPS project also has the potential to address the habitat needs of grassland-dependent species in the Midwest by establishing diverse native prairie vegetation.

The objective of this project is to quantify how grassland birds respond to the novel and economically practical prairie strips conservation practice. Understanding bird response to prairie strips located in farmers' fields is critical from ecological, social, and economic perspectives. Increasing the amount of available, diverse, native prairie habitat provides an opportunity to positively impact some grassland birds. As a group, grassland birds have experienced the steepest population declines among all bird taxa in the United States, mostly as a result of habitat loss.

The investigator proposed to test the following hypotheses in relation to bird habitat provision:

- Native bird species richness is higher in row-cropped fields with a greater area of prairie habitat, and
- Native bird species richness varies with landscape context surrounding the row-cropped field with prairie strips.



Sharing information at research plot sites. (Photo courtesy Lisa Schulte)

Approach and methods

This work is part of Phase 2 of the STRIPS project and is located on 24 farmers' fields throughout Iowa and at one site in northern Missouri where prairie strips have been sown. Funds from this project were used to purchase 15 Autonomous Recording Units (ARUs) for placement on cooperating landowners' farms to record wildlife activity. A total of 44 ARUs have been placed on 44 farm fields at 15 properties to monitor bird presence/absence. ARUs record for one hour each morning, starting 15 minutes before sunrise (referenced to Ames, Iowa) and ending 45 minutes after sunrise. Research using these ARUs is ongoing and will inform further development of the prairie strips conservation practice.

Research sites contain prairie strips of two types: those that have been planned and installed according to the criteria suggested by the larger STRIPS project, and those that fulfill most of these criteria, but were not designed or implemented in consultation with the STRIPS team. The former consist of farms owned and operated by individual farmers, nonprofit trusts, or Iowa State University and associated organizations and contain prairie strips designed and implemented by or in close consultation with members of the STRIPS team. The latter consist of farms operated by individuals or organizations that independently installed contour buffer strips with perennial vegetation.

Results and discussion

STRIPS research team members are analyzing the data collected from the ARUs. Each research site contains between one and four treatment levels. These include:

- prairie strips, in which some amount of infield land is converted to native prairie or other perennial vegetation along or as close to the contour as farming practices readily permit (15 fields);
- terrace, in which the field contains some number of raised, fixed terraces along the contour for the purpose of halting or slowing surface runoff (8 fields);
- CRP, in which at least 10 contiguous acres of land have been converted a block of perennial cover (7 fields); and
- control, in which either no conservation practices are implemented or only those which are considered standard and necessary, such as grassed waterways to aid in gully control (14 fields).

A two-step sampling procedure was employed. In step one, two recordings per property per week will be visually reviewed by a trained observer who will mark as observed or not observed each bird from a predetermined list of birds common to agricultural areas in Iowa. Selected birds include red-winged blackbird, American robin, killdeer, dickcissel, brown-headed cowbird, American crow, American goldfinch, Western meadowlark, Eastern meadowlark, mourning dove, Northern cardinal, ring-necked pheasant, song sparrow, vesper sparrow, upland sandpiper, Canada goose, common yellowthroat, and chipping sparrow.

In step two, a trained observer will listen to randomly selected 10-minute sections of a randomly determined subset of recordings and note each species heard. Both steps will



Graduate student checking ARU. (Photo courtesy Lisa Schulte)

discard a recording and move to another randomly determined one within the same week if excessive rain, wind, or anthropogenic noises prevent the observer from hearing or seeing clearly more than 30 percent of the birdsong. The use of ARUs has proven helpful by allowing for the collection and analysis of many hours of data without the need for human observers.

Bird detections from both ARUs and Bird Point Counts will be combined to gather overall avian species diversity data. These data can be broken down by bird type, guild, or breeding strategy in order to determine which types of birds are affected the most and the least by certain characteristics of prairie strips.

Such aspects include percentage of total area of field which can be described as a grassy feature as well as width, plant species diversity and structural heterogeneity of said grassy features.

Impact of results

This research is ongoing and will inform the development of the new prairie strips conservation practice that keeps living roots in the ground. It will help improve the health and functioning of landscapes dominated by row-crops, as is found throughout much of Iowa and adjacent states. The long-term goal of this project is to provide robust measurement and analysis of improved agricultural biodiversity through bird habitat provision benefits associated with the prairie strips conservation practice. As such, the work substantially contributes to the value of the overall STRIPS project and expands its relevance to the continental scale by providing habitat for breeding, migrating, and wintering birds, which link Iowa to places such as the Arctic and South America. It also expands project relevance beyond producers and land managers to include nature enthusiasts, who value habitat for its wildlife-viewing opportunities.

Education and outreach

Outreach to STRIPS cooperators has occurred through dialog when deploying and checking ARUs, and to the broader STRIPS stakeholders at the summer 2015 Stakeholder meeting. A one-page outreach brochure was created for interacting with participating landowners. Papers documenting the results will be submitted for publication in a peer-reviewed scientific journal and results will be integrated into STRIPS outreach materials.

Efforts at Iowa State University include the education of one master's student and the training of three undergraduate research assistants. A poster on this research was presented at the NREM departmental poster session on December 4, 2015. A poster was presented at the Midwest Fish and Wildlife Conference in Grand Rapids, MI, January 24-27, 2016. Methods and initial results were presented at the Iowa Chapter of the Wildlife Society meeting on February 17, 2016.

The overall STRIPS project was made possible through the cooperation of several departments, organizations, and agencies, including the following Iowa State University departments: Agricultural and Biosystems Engineering, Agricultural Education and Studies, Agronomy, Entomology, Natural Resource Ecology and Management, and Sociology. Other partners include the Leopold Center for Sustainable Agriculture, Neal Smith National Wildlife Refuge, and the U.S. Fish

and Wildlife Service, the USDA-ARS National Laboratory for Agriculture and the Environment, the USDA Forest Service Northern Research Station, the U.S. Geological Survey, and more than 20 private and institutional landowners. Pheasants Forever has donated seed for planting at sites and published an article on prairie strips in their magazine during 2015. The Iowa Ornithologists Union awarded a small grant to a graduate student working on the STRIPS project.

Leveraged funds

This grant helped leverage an additional \$106,176 from the USDA Farm Service Agency, \$134,485 from Iowa State University College of Agriculture and Life Sciences and Natural Resource Ecology and Management department.

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