

leviate inbreeding, have recovered to a 20-year population high. Hopefully, this success can be duplicated elsewhere.

We spend much of our time conducting surveys of singing males as well as locating and monitoring grassland bird nests. We characterize each nest site by gathering data on nest concealment and height, vegetation type, structure, and location relative to potential predator travel corridors such as trails, streams, fences, and field edges. We also record management work done at the site.

We trap Eastern Meadowlarks and Dickcissels in mist nets, band them, and radio-tag them to allow us to track them throughout the breeding season and document their response to nest successes or failures. We also radio-tag juvenile Eastern Meadowlarks to monitor their movement and survival after fledging.

We also have created small satellite grasslands nearby, and monitor nesting within them. As a management practice, these satellites would be periodically destroyed and reproduced elsewhere; perhaps birds colonize these areas faster than predators, thereby enjoying higher breeding success.

Since 1996, we have conducted thousands of surveys and monitored about 1,400 nests at Prairie Ridge. Some portions of our research are complete; others are still in progress.

The following are some of our preliminary conclusions:

- \* Grassland reserves need to be fairly large for at least two reasons: first, to attract "area-sensitive" species, and second, to contain a variety of vegetation types necessary to attract different species. Grasslands of 160 acres or larger attract significantly more species, particularly rarer species including Upland Sandpipers, Henslow's Sparrows, and Northern Harriers, than smaller grasslands.

- \* Locating scattered grasslands within 1 km (0.6 mile) of each other helps maintain more species.

- \* Complicating matters, endangered species such as Upland Sandpipers, Short-eared Owls, Greater Prairie-Chickens, and Northern Harriers appear restricted to areas farther than 400 m (0.25 mile) from wooded areas, whereas grassland-dependent species such as Loggerhead Shrikes and Bell's Vireos require shrub patches or small trees for nesting. Size permitting, a mosaic of vegetation types should be provided within grasslands to attract different species.

- \* Dickcissels, Northern Harriers, Sedge Wrens, and Henslow's Sparrows prefer taller, denser grass.

- \* Eastern Meadowlarks, Grasshopper Sparrows, Upland Sandpipers, and Short-eared Owls prefer shorter vegetation. Low-intensity grazing has been found to be useful for creating diverse vegetation structure.

- \* Dickcissels, Field Sparrows, Henslow's Sparrows, and Eastern Meadowlarks were more abundant in grazed prairie grass than all other vegetation types. Grasshopper Sparrows, the other species surveyed, were somewhat more common in grazed introduced grasses.

- \* Nest success is variable among years, but seems to typically be high enough to maintain or enlarge local populations. Individual birds persistently re-nest, sometimes averaging 3 to 4 times per season!

- \* Nest predation is greater on smaller grasslands, reinforcing the need for larger areas.

- \* The satellite grasslands show lower predation rates than older grasslands of similar sizes. However, some species needing serious management attention (e.g., Henslow's Sparrows) are not attracted to such young vegetation nor small areas.

Our research has already begun to affect specific grassland wildlife management challenges at Prairie Ridge. As our work concludes over the next two years, hopefully these results will be helpful tools for conserving grassland birds throughout the Midwest.

### Acknowledgments.

Funding for our research is provided by the Illinois Council on Food and Agricultural Research (C-FAR), The Illinois Wildlife Preservation Fund, and the University of Illinois. Thanks to our advisor, Dr. Richard E. Warner, the Illinois Department of Natural Resources site staff, Scott A. Simpson and Terry L. Esker, and to our field assistants, who endured tall, wet grass, dangerous heat, copious ticks, and primitive living conditions for very little pay.

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