The Tablelands at Uihlein Farm: Grassland Habitat Enhancement and Future Recommendations

Prepared for the Henry Uihlein II & Mildred A. Uihlein Foundation
by the Paul Smith's College Adirondack Watershed Institute

2021

The Tablelands at Uihlein Farm: Grassland Habitat Enhancement and Future Recommendations 2021

Report to the Uihlein Foundation

Michale Glennon[*], Hyla Howe, Stephane Tyski, and Raymond Curran[a]

Paul Smith's College Adirondack Watershed Institute. PO Box 265, Paul Smith's NY 12970. www.adkwatershed.org

[a] Senior advisor to the Henry Uihlein II and Mildred A. Uihlein Foundation and ecologist with Adirondack Information Group, LLC; Saranac Lake, NY

[*]Corresponding report author: mglennon@paulsmiths.edu (518) 327-6475

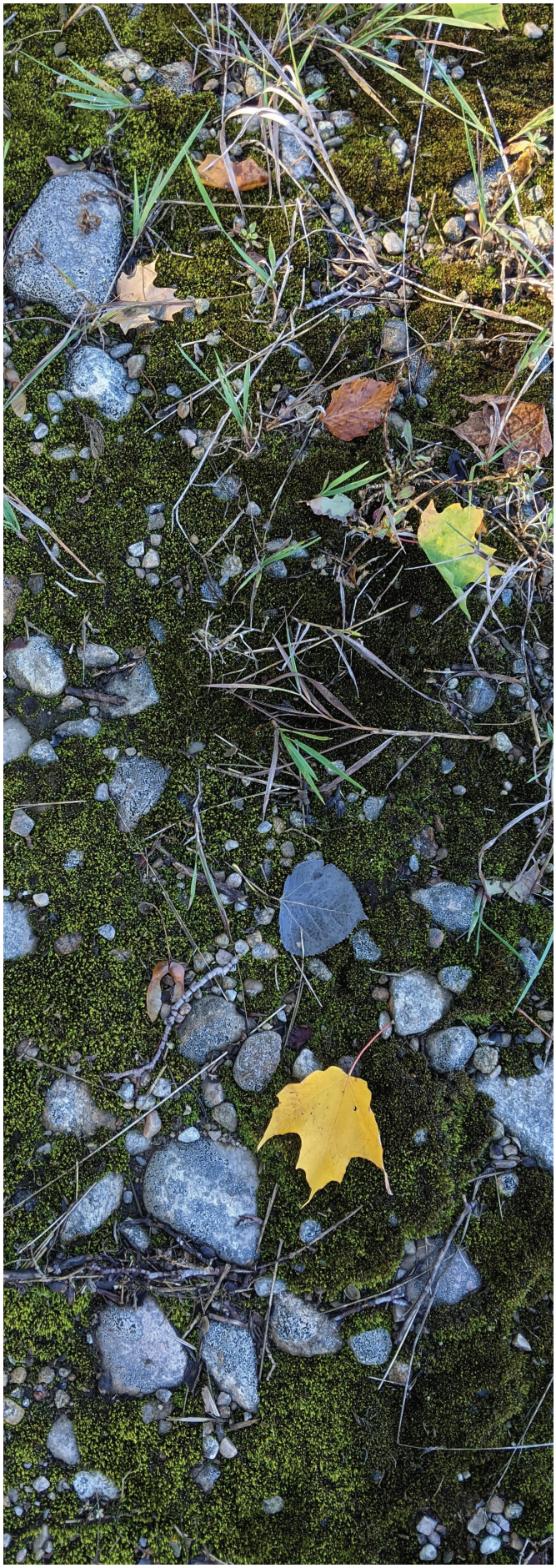
PAUL SMITH'S COLLEGE
Adirondack Watershed Institute

Recommended Citation
Glennon, M., H. Howe, S. Tyski, and R. Curran. 2021. The Tablelands at Uihlein Farm: Grassland Habitat Enhancement and Future Recommendations. Report to the Uihlein Foundation. Paul Smith's College Adirondack Watershed Institute. Report # 2021-02.

Acknowledgments

We are indebted to the numerous local and regional experts with whom we have continued to correspond with regard to questions about grassland and hay management, ecological restoration, fire as a management tool, and potential visions and future uses of Uihlein Farm. Among them, we include Carly Summers, Joann McKenna, Derek Rogers, Holli Edgely, Chris Neill, Chris DiCintio, and Jim Gerard. As always, we thank Larry Master for permission to use his wonderful bird photos. We thank Jim McKenna for facilitating our time on the site and responding quickly to all of our questions and requests. We thank the Adirondack Garden Club and the Ellen Lea Paine Memorial Nature Fund for contributing to this project and for helping to support grassland bird habitat enhancement. Last, we deeply appreciate the support of the Henry Uihlein II & Mildred A. Uihlein Foundation, the willingness of the Foundation to consider and undertake management actions that help conserve grassland birds, and the opportunity to again partner with you on this project.

CONTENTS



Introduction

In 2020, the Henry Uihlein II and Mildred A. Uihlein Foundation Trust (Uihlein Foundation) acquired a parcel of land totaling approximately 428 acres, previously donated to Cornell University and used for potato production and research until its transfer back to the Uihlein Foundation. Summer of 2021 marked the 3rd year of collaboration between the Uihlein Foundation and the Paul Smith's College Adirondack Watershed Institute to examine how bobolinks and other bird species respond to management practices in hay fields on Heaven Hill and Uihlein Farm. These efforts are focused primarily on grassland specialist bird species including the bobolink (*Dolichonyx oryzivorus*) and savannah sparrow (*Passerculus sandwichensis*). These species depend on grassland habitat for successful breeding and are often found in hay meadows and pastures in the Northeast US in part due to the dearth of natural grassland habitat. As a group, grassland birds are one of the most imperiled on the continent, primarily as a result of long-term habitat loss and fragmentation combined with intensifying agricultural production on remaining farmlands.

No longer under cultivation, the former potato fields at Uihlein Farm provide an opportunity for future grassland bird conservation as well as a variety of education and interpretation activities. Uihlein Farm is in the process of a strategic planning effort for this parcel, which is likely to include a component of habitat management and enhancement of the site for grassland birds. We have the fortunate opportunity to build on our initial work at Heaven Hill and to expand our partnership with the Uihlein Foundation through efforts to document wildlife and ecological characteristics at Uihlein Farm to provide a basis for future restoration and management of those lands for grassland birds and other species. This report documents our activities at Uihlein Farm during the 2021 field season; activities at Heaven Hill are described in a companion report.

Methods and Findings

Birds

Our biological surveys at Uihlein Farm this year were limited to birds. We made visits to the site throughout the summer of 2021 from early June through late August and conducted walking surveys during each visit and noted all species of birds we detected on site each time. To do so, we made use of a Survey123 smartphone application and our BOBO SAVS survey, described in the companion 2021 report for Heaven Hill. This survey is programmed to allow for data collection at both locations and was shared with a small handful of additional potential observers, though the majority of observations were made by AWI staff.

Northern harrier, L. Master

At Uihlein Farm in 2021, we made 133 detections of 25 bird species, primarily passerines. Most bird detections were by ear, and therefore most were songbirds though birds that do not vocalize as regularly were also often detected on site. Most common species by numbers of detections were savannah sparrow, American crow, song sparrow, ovenbird, and red-eyed vireo and some of the more infrequently detected species included scarlet tanager, common yellowthroat, and Nashville warbler. We spent the majority of our time in the open field portions of the property. As such, although we detected numerous forest birds from the nearby woodlands, most detections were of species associated with more open habitat types (Table 1). Savannah sparrow remains very widespread and abundant throughout all areas of Uihlein Farm. Bobolink, by contrast, was

Male bobolink, L. Master

Table 1. Number of occasions on which each bird species was detected at Uihlein Farm, 2020 and 2021.

Common name	Scientific name	AOU** code	2020	2021
American crow	*Corvus brachyrhynchos*	AMCR	8	16
American goldfinch	*Spinus tristis*	AMGO	3	6
American kestrel	*Falco sparverius*	AMKE	3	0
American robin	*Turdus migratorius*	AMRO	1	6
Black-and-white warbler	*Mniotilta varia*	BAWW	1	0
Black-capped chickadee	*Poecile atricapillus*	BCCH	2	6
Black-throated blue warbler*	*Setophaga caerulescens*	BTBW	1	0
Black-throated green warbler	*Setophaga virens*	BTNW	2	0
Blue jay	*Cyanocitta cristata*	BLJA	7	8
Blue-headed vireo	*Vireo solitarius*	BHVI	6	5
Bobolink*	*Dolichonyx oryzivorus*	BOBO	5	2
Canada goose	*Branta canadensis*	CAGO	3	0
Cedar waxwing	*Bombycilla cedrorum*	CEDW	4	5
Chestnut-sided warbler	*Setophaga pensylvanica*	CSWA	6	3
Chipping sparrow	*Spizella passerina*	CHSP	1	6
Common yellowthroat	*Geothlypis trichas*	COYE	1	1
Dark-eyed junco	*Junco hyemalis*	DEJU	1	0
Eastern bluebird	*Sialia sialis*	EABL	6	3
Eastern kingbird	*Tyrannus tyrannus*	EAKI	1	0
Eastern phoebe	*Sayornis phoebe*	EAPH	2	0
Hermit thrush	*Catharus guttatus*	HETH	6	2
Indigo bunting	*Passerina cyanea*	INBU	5	8
Least flycatcher	*Empidonax minimus*	LEFL	1	0
Mourning warbler	*Geothlypis Philadelphia*	MOWA	2	0
Nashville warbler	*Leiothlypis ruficapilla*	NAWA	1	1
Northern flicker	*Colaptes auratus*	NOFL	4	0
Northern harrier*	*Circus hudsonius*	NOHA	6	2
Northern parula	*Setophaga americana*	NOPA	2	0
Ovenbird	*Seiurus aurocapilla*	OVEN	4	9
Red-breasted nuthatch	*Sitta Canadensis*	RBNU	2	2
Red-eyed vireo	*Vireo olivaceus*	REVI	7	9
Savannah sparrow	*Passerculus sandwichensis*	SAVS	9	16
Song sparrow	*Melospiza melodia*	SOSP	9	9
Tree swallow	*Tachycineta bicolor*	TRSW	1	0
Turkey vulture	*Cathartes aura*	TUVU	1	0
Wild turkey	*Meleagris gallopavo*	WITU	3	4
Yellow-rumped warbler	*Setophaga coronata*	YRWA	2	0

* Considered Species of Greatest Conservation Need in New York State by NYS Department of Environmental Conservation. ** American Ornithological Union 4 letter codes.

detected only infrequently and primarily by ear. We remain uncertain whether there are any bobolink consistently using Uihlein Farm at present. It is more likely that occasional observations of them there are temporary individuals moving around in the landscape or responding to mowing activity at Heaven Hill rather than breeding. We do, however, strongly believe that habitat improvement of the site will result in use by bobolink in the future.

Soils

Because pH is an important determinant of habitat suitability for plant species, we conducted soil sampling in order to inform grassland habitat improvement plans. Five composite samples were collected from the plateau area adjacent to the forest island on Uihlein Farm. This site is presumed to have high affinity for bobolink because they prefer the visual advantage conferred by the height of land in a given field. Composite samples were taken at the location of 4 of the 12 newly installed bluebird boxes, and one additional sample to the west of the others. Each composite sample consisted of 5 subsamples collected from the center and in each of the 4 cardinal directions of an unmarked plot. These samples were each combined into a composite sample for the location. We collected samples with an AMS 21"L soil probe sampler and combined the 5 samples from each location into a composite, stored in a plastic bag and labeled for plots 1 – 5. These samples were transported to the Environmental Research Laboratory at AWI and transferred to metal tins for drying. After approximately 10 days drying time in our lab, samples were sieved to remove rocks and plant material and subsequently combined with type 1 water in 45 ml test tubes and allowed to settle for 30 minutes. At the conclusion of the 30-minute period, each sample was tested for pH with a Mettler Toledo pH/conductivity sensor. Resulting soil pH values were within the range of tolerance for grass species under consideration for habitat improvement (Table 2).

Figure 1. Locations of 5 composite soil samples taken at Uihlein Farm, 2021.

Grassland Enhancement

The topic of grassland habitat enhancement for bobolinks at Uihlein Farm has been a point of discussion since 2020 and was the primary focus for Hyla Howe during the 2021 season. She performed an extensive literature review of diet, foraging, habitat preferences, territory size, breeding behavior, and management considerations for bobolink. Text in this section is taken directly from her literature review, with limited edits for length and cohesion with the broader document.

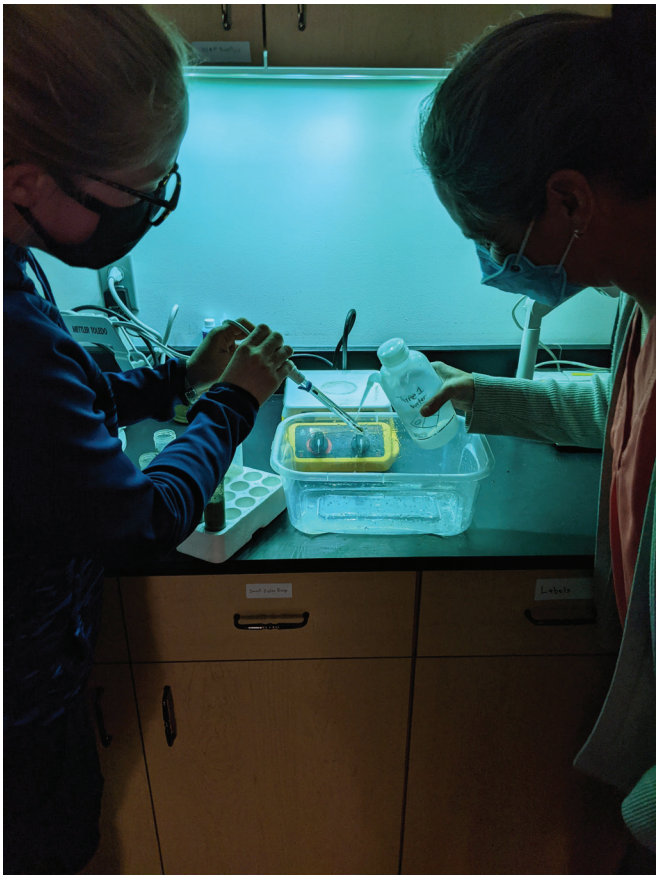
Bobolinks are grassland specialist songbirds that overwinter in the Pampas of Brazil and Argentina and migrate to North America to breed in hayfields,

Table 2. Measured soil pH from 5 composite samples at Uihlein Farm, 2021.

Sample	Latitude	Longitude	pH
1	44.24306	-73.97856	5.81
2	44.24324	-73.97860	5.62
3	44.24418	-73.97982	5.63
4	44.24459	-73.98018	5.94
5	44.24416	-73.98076	5.89

pastures, and remnants of native prairie. Bobolinks originally nested in tall-grass or mixed-grass prairies in the midwestern US and south-central Canada. Plowing of fields, removal of native vegetation by grazers, loss of wetlands, implementation of plantation forestry practices, and invasion of woody vegetation resulting from fire suppression have all contributed to losses of native grassland habitats. The expansive western and midwestern prairie fell to intensive agriculture around the same time that eastern forests were cleared, creating hay fields and meadows that became habitat refugia for grassland species. Historical evidence also suggests the existence of grassland ecosystems in the eastern US before the arrival of European colonizers. These grasslands were managed by indigenous Americans, who periodically set fire to small areas to hunt game animals who were driven out. These open areas occurred in oak forests in Erie, Genesee, and Livingston counties, and between Cayuga and Owasco Lakes. Periodically burned areas are also found within the Adirondacks in Groveland, near Masonville in Delaware County, the Moose River Plains, and the Oswegatchie River Plains.

Bobolinks eat weed seeds, larval and adult insects, spiders, and snails in the summer. When foraging, they typically glean insects and spiders from mid-growth and bases of forbs, grasses, and sedges. The preferred



foraging height is 6-15 cm above ground. They also occasionally forage in trees and shrubs adjacent to or within the nesting area. This is supported by observations we have made in the field, where bobolinks and savannah sparrows were seen foraging and perching in the shrubs in the set aside area at Heaven Hill. Bobolink territories include both foraging and nesting areas. The average territory size is 0.49 ha in tame hayfields in New York State, but changes drastically based on their mating structure and the habitat quality.

While the habitat requirements vary significantly for different grassland species, bobolinks thrive in older, grass-dominated fields. It is frequently reported that bobolinks prefer medium-height grasses and avoid woody vegetation, which contrasts somewhat with the increased activity around isolated trees and shrubs that has been recorded at Heaven Hill. Bobolinks use and prefer fields in the U.S. that have a mixture of grasses and broad-leaved forbs, although their usage of habitat decreases when forbs equal or outnumber grasses. In particular, they prefer hayfields with high grass-to-forb ratios and avoid those with high legume-to-grass ratios. The forb component is beneficial for nesting cover, while the grasses offer protection and foraging opportunities. Optimal characteristics occur in hayfields that are more than 8 years old, and bobolink

densities are greatest in monocultures of warm-season grasses. New York hayfields have shown a steady increase in bobolink abundance as hayfields age. The correlation of bobolink density with field age has been observed in several studies.

Bobolink abundance increases along with percent grass cover, litter depth, density of low-growing shrubs, and vegetation density, and declines with increases in clubmoss, bare ground, and plant communities dominated solely by native grass. It is notable that many of the grass species found in Northeastern hayfields were brought with the colonizers from Europe, and are non-native but naturalized. While walking through the fields at Uihlein Farm, it is easy to notice that there is far too much bare ground, and there is a high forb-to-grass ratio. In order to improve the habitat quality, it is essential to increase stem density and encourage the establishment of more grasses. Measured soil pH levels are of a suitable acidity for the warm and cool season grasses that we want to sow. Grass species that are commonly linked to bobolink nesting habitat include big bluestem, little bluestem, switchgrass, indiangrass, green needlegrass, western wheatgrass, side-oats grama, and Kentucky bluegrass, among others (Table 3).

Territory size for bobolinks varies with habitat quality, which is determined by vegetation structure, food abundance, and field size. While many studies have found positive correlations between bobolink abundance and environmental factors such as food abundance, hayfield age, and vegetation density, information regarding the ideal territory size remains sparse. Bobolinks are semi-colonial breeders, meaning that they nest close to others and are sometimes polygynous. The territory size has less to do with competition between individuals and more to do with resource availability. Higher quality habitat allows for more territories in a smaller space. Researchers have described a 'neighborhood model' where older males held smaller territories clustered in regions of higher habitat quality and younger males with less breeding experience aggregated around the periphery in larger, lower quality territories.

Smaller territories have more abundant important prey species, taller and denser vegetation, deep litter, and less bare soil. Examples of important prey species for adult bobolinks include Coleoptera (beetles), Lepidoptera (butterflies and moths), Hymenoptera (bees, wasps, ants), and Orthoptera (grasshoppers). Young are fed Lepidopteran and Hymenopteran larvae, as well as occasional Orthoptera, Homoptera (true bugs), Ephemeroptera (aquatic insects), Aranea (spiders), and adult Lepidoptera. Hemiptera and Diptera are more abundant in large territories, while Lepidoptera and Hymenoptera larvae, Hymenoptera and Orthoptera were more abundant in small territories. Bobolink density generally increases with field or patch size, and decreases along woodland edges.

Table 3. Suitable grasses for Zone 4 bobolink habitat enhancement.

Species	Height (ft)	Site Condition	Warm/Cool	Other	Price/Company
Little bluestem	1.5-4	Tolerates sandy and clay soils	Warm	Drought tolerant, deer resistant	$9.45 per ¼ lb American Meadows
Big bluestem	3-8	Very adaptable	Warm	Aggressive at high seeding rates	
Switch grass	2-7		Warm		$284.95 per 25 lbs American Meadows
Indian grass	2-9	Fire-adapted	Warm	Aggressive at high seeding rates	
Side oats grama	1-3	Well-drained	Warm	Drought tolerant	
Green needlegrass					
Kentucky bluegrass			Cool		
Red fescue			Cool		
Canada wild rye	4	Coarse or rocky soils	Cool		
Quackgrass			Cool		
Redtop					$349 per 50 lbs

Determining the optimal territory size is important for the planning process at Uihlein Farm, because we need to determine the appropriate size to set aside for habitat enhancement. Most sources that mention a minimum field size put it between 20-25 acres, but it is unclear whether that number is taking into account the total open area or the total area of contiguous high quality habitat. At Uihlein Farm, we have an expansive open area but have discussed only burning and reseeding a small portion of it initially in order to test several treatments and while strategic planning for the parcel as a whole takes place.

Bobolinks have a very low dispersal rate, meaning that individuals frequently return to the territory that they occupied in the past, and offspring typically do not disperse more than a few kilometers from where they fledged. This makes hayfield management all the more important in the Northeast, where the habitat is limited. Given their tendency to stay in a small area, combined with a lack of options, if one field is hayed year after year during the peak of their nesting season, it will significantly hamper that population's success. According to one study, 44% of males and 25% of females returned to breeding sites in subsequent years. Overall, 30% of bobolinks and 45% of savannah sparrows return to the same field in the following year, and another 30% and 25% respectively return to the next field over. Generational studies have closely examined dispersal patterns in the Champlain Valley and found "great-great grandchildren" returning to the same field as the original banded bird. This is likely another reason that bobolinks take some time to establish themselves in a newly planted hayfield.

While it is important to limit disturbance during the nesting season as we have previously discussed, grassland ecosystems do benefit greatly from frequent disturbance that limits the encroachment of woody vegetation. Rotational mowing and grazing can be used to maintain grassland communities in various stages of growth and vegetation diversity. Prescribed burning is a useful form of disturbance that returns valuable nutrients to the soil, removes thatch, and keeps the land open. If habitat is not maintained, bobolink numbers decrease significantly due to the accumulation of litter and the encroachment of woody vegetation. Mowing and grazing should be conducted yearly, while prescribed burns can occur on a 3 to 5-year basis (or should follow the natural burn regime of the ecosystem). Burning and grazing are advantageous disturbance methods because they naturally return nutrients to the soil and encourage plants to send more energy into their roots, which increases carbon sequestration and improves soil structure. Both of these factors are important when

Figure 2. Potential layout design of test plots on plateau area of Uihlein Farm. Each block is an acre in size; costs, permitting, and available personnel and equipment may influence achievable plot size. Subset depicts 4 potential treatment types. Dependent on fine-scale field conditions, each larger plot could be subdivided to additionally test seed mix types as well as soil conditions and existing vegetation structure.

considering that the soil structure was impaired by years of intensive agricultural research conducted on this land in the past.

In summary, the ecological potential of the Tablelands is immense, and we are excited to explore a grassland habitat enhancement project on the site. Literature is limited on the conversion of former crop fields (specifically potato) to grassland bird habitat, so we recommend the establishment of test plots to compare the effectiveness of various restoration strategies including burning, mowing, and potentially a buckwheat smother (Figure 2).

It is essential that a sustainable grass community is established, which will be more successful if weed pressure from the current forbs is reduced. Because of this, we recommend that a burn is conducted in the spring of 2022. We are anticipating that it will take several years for grasses to establish and reach the densities that will attract bobolinks, but the area will undoubtedly be used during that time by other grassland birds including savannah sparrow, Northern harrier, and wild turkey. It is our estimation that bobolinks could be observed in the fields 5 years after our initial planting, and the population will increase after 8 years. A long-term management plan will need to be set, which would include either yearly mowing, rotational grazing, or burns every 3-5 years.

Recommendations

We made several recommendations in our 2020 report and detailed specific actions for consideration within the general topics of long-term ecological monitoring, bird-specific habitat management and interpretation, experiential restoration and climate refugia, fire as a management tool, potential model sites, Tablelands as a demonstration site, collaboration, grants and other considerations. The majority of these recommendations are long-term and broad and we urge their continued consideration. We are, however, thrilled to note that some of these recommendations have already been implemented including the installation of bird boxes, the anticipated establishment of test plots for grassland restoration alternatives, the continued work with students, and the consideration of the Tablelands as a demonstration site for grassland management.

In acknowledgement of the context that Uihlein Farm is at an early and exciting phase of planning for its long-term future and the current strategic planning efforts will help refine our recommendations and those of others, we suggest the following short-term considerations for the upcoming field season in 2022:

- Establishment and monitoring of grassland enhancement test plots as described above

- Establishment of a network of permanent sampling locations throughout the extent of the open habitat, to be used initially for avian point counts with possible addition of additional methods and taxa in the future

- Continued monitoring of bird occurrence at Uihlein Farm, targeted toward high profile grassland species including bobolink, savannah sparrow, Northern harrier, short-eared owl, and American kestrel

- Monitoring of bird use of newly installed nest boxes (12) at Uihlein Farm

- Hosting a public bioblitz, and continuing to promote additional data collection via iNaturalist

We are appreciative of the opportunity to work on the site and remain enthusiastic about its future. We again congratulate the Uihlein Foundation on the protection of this special and valuable parcel and look forward to helping implement your future goals in any way we can.

Literature Cited

Bollinger, E. K., Successional changes and habitat selection in hayfield bird communities (1995). Faculty Research & Creative Activity. 84. Eastern Illinois University.

Dickerson, J., Wark, B., Vegetating with native grasses in Northeastern North America. U.S. Department of Agriculture, Natural Resource Conservation Service Plant Materials Program.

Diemer, K. M., Nocera, J. J., 2014. Associations of bobolink territory size with habitat quality. Ann. Zool. Fennici 51: 515-425

Hopwood, J., et al. 2016. Habitat planning for beneficial insects: guidelines for conservation biological control. The Xerces Society for Invertebrate Conservation. Portland, OR.

Kress, S.W. 2006. The Audubon Society guide to attracting birds: creating natural habitats for properties large and small, Second Edition. Cornell University Press. Ithaca, NY.

Kurosawa, R. and R. A. Askins. 1999. Differences in bird communities on the forest edge and in the forest interior: Are there forest interior specialists in Japan? Journal of the Yamashina Institute for Ornithology 31:63-7

Ochterski, J. 2006. Transforming fields into grassland bird habitat. Cornell University Cooperative Extension. Schuyler County, NY.

Perlut, N. (2020). Perspectives on farming with nature: Noah Perlut, University of New England. [Video recording]. Hudson Valley Farm Hub. Olivebridge, NY

Troy, A., Strong, A., et al. 2005. Attitudes of Vermont dairy farmers regarding adoption of management practices for grassland songbirds. Wildlife Society Bulletin 200, 33(2):528-538

U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. Management Considerations for Grassland Birds in Northeastern Haylands and Pasturelands. Wildlife Insight. Washington, DC

Weidman, T., Litvaitis, J. A. 2011. Are small habitat patches useful for grassland bird conservation? Eagle Hill Institute. Northeastern Naturalist, 18(2) : 207-216.