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Assessing Farmer Attitudes and Capacity to Adopt Bobolink-Friendly Haying Timelines in the Eastern Adirondacks

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ABSTRACT

Grasslands represent an important and declining habitat for a suite of wildlife species, and in the Northeastern US, most of this habitat is on private land. Consequently, understanding the attitudes of farmers toward the management of this habitat is critical for bird species like the Bobolink (*Dolichonyx oryzivorus*), whose population has declined due to habitat loss and hay cropping during the nesting period. We developed a typology of farmers to help understand their patterns of decision making and to identify opportunities, limitations, and barriers that enable or prevent farmers from following recommended haying timelines. Almost half of the participants follow one of the two recommended haying timelines. Financial incentives were the most impactful form of support to promote the adoption of bird-friendly haying timelines. These findings provide a framework to cross reference ability to delay haying with factors such as farm type, connection to the natural world, and value orientation. Our findings suggest that landowners and farmers who sell meat and dairy products are more willing than hay producers to delay haying, and that organizations with a strong local presence are best positioned to deliver technical assistance.

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Introduction

Approximately 60% of the United States is privately owned, with farms and ranches making up 60% of that privately owned land area. With over half of forested and open lands in private ownership, the role of private landowners in the conservation of biodiversity cannot be understated. Conservation actions that individual landowners can take range from conservation easements which restrict development rights to more hands-on management actions, such as removing invasive species, reducing runoff to improve water quality, installing nest boxes, or planting native species (Breetz et al. 2005; Drescher et al. 2019; Knoot and Rickenbach 2011) Many conservation actions

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come with tradeoffs, such as leaving snags that may threaten infrastructure, or investing in costly invasive species management (Drescher et al. 2019). Importantly, landowners need to balance conservation goals for their properties with economic interests, which can at times be in conflict. This is especially true for grassland birds. A recent analysis showed that 82% of the remaining grassland bird population in the US resides on privately owned land (Drum et al. 2015), highlighting the fact that engaging private landowners in the implementation of conservation strategies is essential to the resilience of these species' populations.

Farm income data for the Adirondacks (NY, USA) suggest that farms in this region are not managed as intensively as in other parts of the Northeast (USDA NASS Addison County, VT, Essex County, NY). Smaller farms are more likely to delay haying for grassland birds (Troy et al. 2005), which suggests that while less intensive and more isolated, the farms in the Adirondack region could serve as a refuge for grassland species. To fully understand the social, ecological, and economic landscape affecting farms in the Adirondacks, it is critical to understand the motivations and constraints of landowners. Consequently, the objectives of this study were to: (1) Examine the types of farmers that could support grassland bird conservation; (2) assess whether farmers in the Adirondacks can follow bird-friendly haying timelines; (3) identify key opportunities, limitations, and perceived barriers that allow or prevent farmers in the Adirondacks from following recommended haying timelines; (4) identify the types of support most needed to implement delayed haying; and (5) measure the level of trust that farmers and landowners have in organizations that provide information and technical support.

Conservation in Agricultural Landscapes

For decades, scientists, policy makers and farmers have been debating the potential for agricultural landscapes to support, rather than undermine, environmental conservation efforts (Foley et al. 2011; Perfecto, Vandermeer, and Wright 2009; Scherr and McNeely 2008). More recently, this debate has focused on the challenges and opportunities of land sharing or wildlife friendly farming (integrating conservation into agricultural landscapes) versus land sparing (separating agriculture from land for conservation; Fischer et al. 2014). Our research is centered on the land sharing approach, which proposes a strategy where farms are part of an "agricultural matrix" that integrates conservation practices to support wildlife conservation (Perfecto and Vandermeer 2010). Importantly, land sharing conservation programs require the active participation of farmers.

There is a substantial body of work analyzing the barriers and opportunities for farmers to support wildlife conservation in the United States (Ranjan et al. 2019). Quantitative and qualitative studies have documented a variety of factors including farmers' individual connections to wildlife, trust partner organizations, and community and livelihood conditions (Barnes et al. 2020). Farmer adoption of conservation practices is affected by social and ecological factors that are specific to a given location (Sweikert and Gigliotti 2019). In this study, we drew on this literature to analyze the perceived barriers and opportunities that farmers face when incorporating conservation practices for Bobolinks (*Dolichonyx oryzivorus*) in northern New York. More specifically,

we used the value-belief-norm theory as a framework to categorize participants by the beliefs and values underlying their connection to the natural world. The value-belief-norm theory asserts that there is a causal chain from a person's basic belief structure (values), to beliefs about the interactions between humans and the natural world (beliefs), to a feeling of obligation or responsibility, which activates a moral obligation and predisposition to act (personal norms) in support of an environmental cause (Stern, et al. 1999). Multiple studies have examined the beliefs and values at the beginning of the chain and used the theory to successfully explain a variety of pro-environmental behaviors (Gruntorad et al. 2021; Oreg and Katz-Gerro 2006; Wynveen et al. 2015).

Trends in Grassland Bird Conservation in the United States

A recent analysis showed that 82% of grassland bird populations in the US reside on privately owned land (Drum et al. 2015), meaning that engaging private landowners in the implementation of conservation strategies is essential to the resilience of these species' populations. However, significant, long-term declines in grassland bird populations have been recorded continent-wide (Rosenberg et al. 2019) due to the intensification of farming practices and the abandonment and development of agricultural lands (Shustack, Strong, and Donovan 2010; Vickery, Hunter, and Melvin 1994). Conversion of most of the midwestern prairie to agriculture (Samson and Knopf 1994: Vickery and Dinwiddie 1997) has caused obligate grassland birds to experience the greatest declines of birds in any biome (Rosenberg et al. 2019) with an overall population loss of 53% in the last 50 years (Rosenberg et al. 2019). Bobolinks are now listed as an Orange Alert Tipping Point Species by Road 2 Recovery, meaning that they have shown long-term population losses with accelerated recent declines (r2rbirds.org).

Natural communities in the Northeastern U.S. that supported Bobolinks (coastal prairie and interior river valleys) were the first to be developed after European colonization (Vickery, Hunter, and Melvin 1994). Now, Bobolinks rely on hayfields and pasturelands in the Northeast for breeding habitat; however, hay harvests are occurring earlier and more frequently due to climate change (McGowan, Perlut, and Strong 2021) and intensifying management patterns (Troy et al. 2005). The complexity surrounding Bobolink conservation in the Northeast stems from the fact that the timing of haying is the greatest determinant of habitat quality and nesting success for Bobolinks in the Northeast (Dechant, et al. 1999; Diemer and Nocera 2014; Perlut et al. 2006). Studies conducted in New York and Vermont (Fajardo et al. 2009; Perlut et al. 2006; 2008) documented that birth and survival rates were lowest in fields that were cut before 11 June, and highest in fields cut after 1 August. The nutritional content of hay declines each day that harvest is delayed after it reaches a peak in early June (Brown and Nocera 2017), which results in a measurable financial tradeoff for farmers considering managing their fields for Bobolinks (Smith, et al. 2022).

Incentives for Landowners to Adopt Bobolink-Friendly Haying Timelines

Financial compensation provides an important incentive to enable farmers and landowners to adopt bird-friendly haying timelines (Gruntorad et al. 2021; Troy et al.

2005) and several incentive programs have been developed and tested in Vermont with varying success (Chakrabarti et al. 2019; Perlut, Strong, and Alexander 2011; Strong 2015). The Bobolink Project (Chakrabarti et al. 2019) utilized a payment for ecosystem services model to compensate farmers for following one of two recommended haying timelines: (1) Completing a first cut before late May and delaying the second cut for 65 days, and (2) delaying the first cut until mid-July (updated from August 1 in 2025). Both timelines have shown roughly the same rate of reproductive success (Perlut et al. 2006; Perlut, Strong, and Alexander 2011).

Studies have found that landowners are willing to engage in conservation activities for grassland birds (Gruntorad et al. 2021; Troy et al. 2005), which can be further encouraged through extension and education efforts that connect farmers with information, support, and funding (Gruntorad et al. 2021). Since land managers are heterogeneous even within small geographic areas, grouping similar farmers into categories allows for a more nuanced understanding of farmers' perspectives on a range of issues (Bartkowski, Schüßler, and Müller 2022). Categories, or "typologies" separate farmers into groups based on a range of factors, which are often unique to the study, but can include value orientations, occupation status, and demographics like age, education level, and farming experience (Bartkowski, Schüßler, and Müller 2022). A regional understanding of landowner perspectives, perceived barriers, and their variation across landowner types is necessary to inform programming that is targeted (Upadhaya, Arbuckle, and Schulte 2021), provides sufficient support (Troy et al. 2005), and ensures that there is alignment between farmers' values and those that are being articulated by conservation and management programs (Chapman, Satterfield, and Chan 2019).

Methods

The study area encompassed 786,908 hectares of New York's Champlain Valley and Eastern High Peaks regions, which includes portions of Essex, Franklin, and Clinton counties and is largely forested, with a range of habitats that include alpine summits, boreal bogs, ruderal shrubland and grassland, and coniferous and mixed deciduous forests. Located entirely within the boundaries of the Adirondack Park, the area contains several fragmented and low-intensity farming regions. Separated by Lake Champlain, the Vermont side of the Valley differs geographically and socioeconomically from that of New York. The 2017 Census of Agriculture (USDA NASS Addison County, VT, Essex County, NY) showed striking economic differences between the agricultural communities in Essex County, NY and Addison County, VT. The average farm size was similar but mean net annual farm income was $1,950 in Essex County, compared to $199,557 in Addison County.

We conducted twenty semi-structured interviews (SSI) between July 2023 and January 2024. Landowners and farmers who manage hayfields and pastures (referenced hereafter as "participants") were invited to participate using a snowball sampling method (Parker, Scott, and Geddes 2019). We began with existing contacts who connected us with their contacts, which continued until a sample size of 20 was reached, which aligned with available time and resources. Although this is a relatively small sample size, it was generally representative of the farmers in the region, as the average age and median farm size aligned with county-level data (Census of Agriculture 2022). Interview

participants engaged with this research voluntarily, consented to being recorded, and were compensated $50 for their participation, which increased willingness to participate (Kelly et al. 2017), and acknowledged the value of their time and knowledge (Cheff 2018). To protect the privacy of participants, we did not record any identifying information. We assigned a number (1–20) to each interview based on the order in which they were conducted, which served as the identifier throughout the coding process. Interviewees provided demographic data including town, age, tenure on the property, ownership of land, and percentage of household income derived from farming. Informal conversations with staff from local agricultural organizations in the summer of 2022 steered the development of interview questions that were relevant to technical service providers.

We recorded interviews using the Voice Memos app on an iPad (Apple iPad 9th generation) and a research assistant transcribed the recordings using Otter.ai. Following transcription, we created a codebook that included 31 inductive and deductive codes (DeCuir-Gunby, Marshall, and McCulloch 2011; Reyes et al. 2021), which were organized by research question. The first author and the research assistant coded two interviews (10%) in a practice round in which 100% agreement was reached. This was an effort to standardize coding and gain agreement between researchers. Five additional interviews (25%) were then coded to test inter-coder reliability (ICR). These interviews scored 100% ICR, and the first author coded the remaining 13 interviews using the agreed-upon codebook.

We developed a qualitative typology using land ownership, active engagement in land management, and main marketable products as the criteria for categorization (Table 1) to better understand and compare the different types of participants present in the sample. The landowner types focused on their relationship with hay production and included hay producers who hayed multiple properties and sold the hay, self-suppliers who produced the hay they needed to feed their own livestock, hay consumers who pastured livestock and bought hay from hay producers, and landowners who leased their land to self-suppliers and hay producers. We also created codes that described a participant's relationship with the natural world (Table 2), which were later compared to similar categories developed under the value-belief-norm theory (Stern, et al. 1999). The three categories we initially identified were Intrinsic, Pragmatic, and Concerned, which directly mirrored the Intrinsic/Altruistic, Instrumental/Egotistic, and Relational/

Table 1. Typologies with defining attributes used to categorize interview participants in a study of farmers Champlain Valley of New York in 2023.

Category	Sample size	Attributes
Landowner	5	• Hay is the main marketable product. • Land is owned but managed by someone else.
Hay Producer	5	• Hay is their main marketable product. • Land may be owned, rented, or a combination of both, but is managed by the individual.
Hay Consumer	2	• Diversified animal products are the main marketable products • Land is owned and/or rented and managed by the individual. • Hay is purchased.
Self-supplier	8	• Diversified animal products are the main marketable products. • Land is owned and/or rented and managed by the individual. • Hay is produced on property.

Biospheric categories of the value-belief norm theory. After assessing the similarity between our "connection to the natural world" typology to Stern, et al. (1999) value-belief-norm categories, we adopted their terminology. Intrinsic participants often have a deep connection to the natural world which is foundational to their life, instrumental participants typically view the natural world through a production lens, and relational participants tend to look at the natural world with expressions of care and concern, or grief and complexity.

Participants were informed about the two recommended haying timelines that Perlut, Strong, and Alexander (2011) identified. The first recommendation is to wait until 1 August (which we modified slightly to the middle of July, to reflect the current timelines of the Bobolink Project) for the first cut (hereafter referred to as delayed first cut), and the second is to perform the first cut before the end of May and delay the second cut for 65 days (hereafter referred to as the delayed second cut). Next, they were asked if they had ever harvested on either timeline and the challenges or opportunities that both would pose for their operation. For each question, answers were grouped into one of three categories: weather-dependent, positive, and negative. Multiple codes were possible and common for the same question. A "positive" response represents participants who have delayed haying or would be willing to on some or all of their fields, "negative" represents participants who are not willing or able to intentionally delay haying for Bobolinks on any of their fields, and "weather-dependent" represented participants that referenced weather as the main reason that they could or could not follow either timeline. We also asked participants to explain their main considerations when weighing changes in their management practices and coded their responses into four categories: Financial, Stewardship, Production, and No Interest in Change (Table 3).

We asked participants about the types of support that would be most helpful to them and sought to understand the organizations that are best positioned to provide it by asking about their level of trust in various organizations. We created a list of government agencies and NGO's that provide support to farmers or work locally to protect avian diversity. Organizations were identified through a literature review and informal conversations with farmers and conservation professionals in the Adirondacks. While not an exhaustive list, it covers a range of organizational structures and areas of focus. Participants were asked to rank their level of trust on a scale of 1 (low) to 10 (high) with each organization. If the participant hadn't heard of an organization, their score was omitted from the average. Organizations included the National Audubon

Table 2. Comparison of the codebook definitions with respect to connection to the natural world and the analogous value-based-norm theory orientation of participants in a study of farmers Champlain Valley of New York in 2023. Respondents could be placed in more than one category.

Our Study	Value-based-norm theory
Intrinsic: Connection to the natural world is a fundamental part of life, why they decided to farm; they view themselves as a part of nature. N = 6	*Intrinsic or altruistic:* Value nature for what it is, not what it provides.
Pragmatic: Connection to the natural world is rooted in production, farming, or hunting. N = 10	*Instrumental or egotistic:* The environment is valued for a particular end (product).
Concerned: Expressions of grief and complexity. N = 7	*Relational or biospheric:* Focused on the person's relationship with nature. Centered around expressions of care and concern.

Table 3. Codebook definitions for the four management consideration categories of participants in a study of farmers Champlain Valley of New York in 2023. Respondents could be placed in more than one category.

Financial	Direct reference to financial constraints, concerns, or profits. Can include needing to secure additional markets or customers for their products. N = 7
Stewardship	Farmer or landowner mentions improving the health of the land, soil, water, pasture, and managing for overall ecological function and biodiversity for the long term. N = 10
Production	Farmer or landowner references capacity limitations like time, labor, or machinery, and the growth and health of the grass for livestock health. N = 8
No Interest in Change	Interviewee states that they have no interest or no need for change. N = 2

Table 4. Mean, median, and range for key landowner demographics from a sample of 20 landowners, farmers, and haymakers in the Champlain Valley of New York in 2023.

Category	Mean	Standard Deviation	Median	Range
Age	57	15	61	30–78
Land Tenure	26	27	15	1–100
Acreage in Hayfield and Pasture	199	244	107	13–1000

Society, local land trusts, the state agricultural extension unit, soil and water conservation districts, and the natural resource conservation service (NRCS).

Results

Demographics and the North Country Hay Economy

Interviews lasted between 16 and 76 minutes with an average duration of 35 minutes. The twenty participants ranged from 30 to 78 years old (Table 4). While one participant had been on their property for only one year, another could trace their family's occupancy of the land to when they settled as sheep farmers during the Civil War. The details of their farming operations and the community relationships upon which they depend varied substantially. Most participants owned their land, with less than half partially or fully renting the land that they farm. The economic breakdown among participants showed that 70% made less than a quarter of their income from farming and only 20% relied on farming for all their income.

While there were some participants in their thirties, the mean and median ages were 57 and 61, respectively. The duration of land tenure varied widely but was skewed toward more recent entries into farming, with eight farmers stewarding their land for 10 years or less. The average tenure was 26 years, and the mean was 15. While 14 of the participants had childhood or family connections to farming, nine returned to farming or relocated to the Adirondacks after working in other careers, which may explain the disconnect between age and amount of time farming, as well as the low reliance on farming for overall household income (USDA NASS Addison County, VT, Essex County, NY).

Landowner Typology

Landowners

Landowners (N = 5) were participants who own land that is managed by someone else. They may list hay as their property's main marketable product, but they are not cutting

or selling it, nor do they maintain the machinery. They have a relationship with a nearby farmer, which allows the farmer to harvest hay from the property. The arrangement could be an informal handshake agreement or an agricultural lease. Landowners derived the lowest proportion of their income from farming and had the oldest average age. Every landowner wanted their land to be managed for wildlife in some way, and they had the highest levels of concern for the environment and appreciation for the Adirondacks.

Hay Consumers

Only 2 of 20 participants were categorized as hay consumers, meaning that they purchase hay from other farms while they pasture animals on their fields, which could be owned or leased. Hay consumers listed meat, dairy, and fiber products as their main marketable products. This group had the youngest average age, derived the highest proportion of their income from farming, had the lowest land tenure, and the lowest amount of open acreage. One of the two hay consumers indicated that they manage their land in some way for wildlife, and both had a formal education in the natural sciences. One hay consumer made all their income from their dairy and creamery operation, and the other made less than a quarter of their income from selling diversified products, including meat and breeding stock.

Hay Producers

Hay producers (N = 5) harvest and sell hay as their main marketable product. The land that they manage may be owned, leased, or a combination of the two. Hay producers derived the second highest proportion of their income from farming, managed the most acreage, and had the longest tenure managing their land. They had the lowest willingness to manage fields for wildlife, and the lowest concern for the environment. Every hay producer had a childhood or family connection to farming, and they showed consistent concern about farmland preservation. Hay producers most frequently mentioned the difficulty in making a living from farming.

Self-Suppliers

Self-suppliers (N = 8) listed meat, dairy, and fiber products as their main marketable products, but they produce sufficient hay on the land they own or lease to support their livestock. Self-suppliers may buy or sell small quantities of hay depending on fluctuations in weather and the size of their herd, but it is not a focus of their business. While six out of the eight self-suppliers made a quarter of their income or less from farming, one made all their income from their agricultural products. The six self-suppliers who made a small proportion of their income from farming had a childhood or family connection to farming. Self-suppliers were the most diverse group showing intermediate values for average age, land tenure, open acreage, and proportion of income from farming. Half of the self-suppliers were willing to manage their lands for wildlife, and half expressed concern for the environment. Two described the difficulty of making a living from farming. Six had a childhood connection to farming, and one had a formal education in natural sciences.

Willingness to Delay Haying for Bobolinks

Participants who considered stewardship as a main management consideration were the most likely (70%) to delay haying using the delayed first cut timeline but were equally as likely as those who prioritize production to implement a delayed second cut. People who prioritized finances were significantly less likely to delay haying for Bobolinks, with an average of 30% willingness. Approximately half of participants who prioritized production delay haying for Bobolinks using either timeline. Finally, the two participants who had no interest in change were not open to either of the two timelines and were not able to delay haying for Bobolinks.

Approximately 60% of landowners and self-suppliers responded that they could hay on either timeline on some or all their fields. Conversely, 60% of hay producers said that they could not follow either timeline. One landowner could not give a definitive answer because they deferred to the farmer who hays their land, and the two hay consumers could only speak to their grazing timelines. Nine of the remaining participants indicated that they follow one or both haying timelines on all or part of their land. Seven said that they do not follow either timeline and would not change their management timelines to accommodate Bobolinks. Weather was a common reason that haying some or all fields was unintentionally delayed, and it was also listed as a main source of uncertainty that made them unwilling to accommodate one or both timelines during drier years. One participant was frustrated by the issue, saying:

> I put five to $10,000 worth of fertilizer on those properties every year. And I'm not going to delay my harvest of hay for the sake of some birds.

Four of the participants intentionally delay their haying and set aside certain fields until they observe that birds have fledged from their nests. Three out of four of these were landowners who had long-standing relationships with the farmers who hay their land, and they give permission to hay each year when they feel comfortable.

> The fields do not get mowed until we have fledged most of the birds… there is an emphasis on the Bobolinks but I try to take into account the meadowlarks and the little guys that I see but can't identify… I know where they are and so I know (they) can mow around them if (they) need to.

Delayed First Cut Timeline

Sixty percent of landowners and self-suppliers made positive statements about the delayed first cut timeline. Hay producers were evenly split, with two agreeing that it was feasible, two saying it would not be possible, and one not answering the question directly. In addition to the four participants who delay their first cut for Bobolinks, six others regularly get to only a portion of their fields before the middle of July. These delays were due to logistics and weather. Hay producers prioritize their most valuable fields, which means that they don't complete the first cut on as much as 25-40% of their acreage until July. One self-supplier said that they would have to designate one field as the "Bobolink Field" each year, which is a strategy that is used by two of the four landowners who give permission to hay when they see fledglings. Farmers who manage pasture in addition to making hay account for a significant portion of the participants

that find success with this timeline, because many do not rotate through all their fields before the middle of July. Participants who pasture livestock also aren't as limited by weather as hay producers, who need stretches of dry weather to produce dry bales.

Delayed Second Cut Timeline

When asked about completing the first cut in May and delaying a second cut for 65 days, weather became a more prominent concern, with eight participants naming it as a primary consideration. Five participants indicated they could hay in May and wait 65 days on some of their fields or in some years, but three of the five attributed those delays to weather. Of the nine participants that cannot follow this timeline, five also had concerns about weather, which included not being able to get into their fields in May. Two participants described logistical challenges on both ends, because fields could be too wet for machinery in May and nutritional content is too low later in the season.

> Trying to mow before May 31, it's gonna be wet… that could be an issue, becausehe's gotten stuck down there before trying to mow early.

Another expressed concern that they don't have a market for the hay that could be produced early in the season, saying:

> that would be a difficult thing for me… you have the ability to make high moisture, silage hay, which I could do at the end of May… and it hasn't worked out too well. Here in this location, I have limited demand for that product.

Self-suppliers had the most negative response to the delayed second cut timeline, with 60% saying that they could not follow it. Hay producers gave mixed responses, frequently citing variations in weather patterns. "Windows to make dry hay within that growing season are few and far between. You know, I am still working on some first cut hay right now (August), that should have been cut six weeks ago."

Those who were unable to harvest on either of the two suggested timelines cited logistical challenges, inadequate nutritional content, concerns about missing weather windows, and perceived social pressure to keep fields well maintained.

Connection to the Natural World

Connection to the natural world varied by typology. Hay producers and self-suppliers both aligned most closely with the instrumental connection to the natural world and rarely spoke of intrinsic connections. Landowners, however, frequently shared sentiments reflecting an intrinsic connection to the natural world. Approximately half of the landowners also shared relational sentiments, while only one landowner had an instrumental connection to the natural world. Both hay consumers shared relational sentiments, with one also showing instrumental connections and the other showing intrinsic connections. Correlations between connection to the natural world and willingness to delay haying were largely inconclusive but showed a slight trend toward those with an intrinsic connection being less likely or able to delay haying on their properties.

Participants with instrumental connections to the natural world considered finances to be the most important management consideration, which was followed closely by production. People with an intrinsic connection to the natural world considered stewardship to be the most important management consideration. Those who had a relational connection with the natural world valued production first, with stewardship and finances tied but trailing significantly behind.

Support Needed to Implement Bird-Friendly Strategies

An overwhelming majority of participants (80%) voiced a need for financial support to help them improve management for Bobolinks. They cited compensation for added complexity, supplementing the cost of taxes, offsetting lost income, and added costs as primary reasons. One participant summed up their need for payments by saying:

> if you're going to take on that level of complexity, you should be getting compensated for it", and then later said that they "dream for a day when… you're out there looking for those things, because there's some sort of mechanism to reward you for stewarding the land in a way that attracts (birds).

A quarter of the participants noted the influence of interpersonal relationships and voiced their need for financial incentive to purchase supplemental hay for their customers or make up the lost income for the farmer who hays their land. Of these five participants, three were landowners and two were hay producers. Landowners typically wished to speak with the farmer who hays their land, stating:

> I guess I need to clarify my agreements with the farmer, and figure out how that would affect the financial arrangements that I already have

The need for information and technical support were mentioned by 35% of the participants. Requests for information and technical support included identifying the timing and location of breeding populations and technical support when applying for grants and federal programs. A self-supplier stated:

> If you don't support (a program) with a facilitator who actually sits down with the primary potential lendee or grantee, you're going to get nowhere. I can't tell you how many times I've hung up the phone and just ripped up the paper and not even gone to look at that program again, because there's no support.

The same person mentioned the importance of feeling acknowledged and supported through grant programs:

> it's about the cooperation, and it's about community effort, it's about the prioritization of the many demands we have on our time, and resources, all of us, including the sources of these funds.

Two landowners said that no form of support would make any difference. For one, the lack of need was because they manage fields for Bobolinks and plan to continue regardless, and the other was because they had no interest in altering their practices. All five hay producers voiced a need for financial support, and two self-suppliers were

the only ones to ask for information and technical support alone, wishing for information that could confirm the impact of their choices. As one of them expressed:

> Guidance and knowledge… everything from best practices… tips, and knowledge. I think the more we know about them, the more we can be attentive to the impact of what we're doing.

Trust in Conservation Organizations

Cornell Cooperative Extension (CCE) had the highest average trust score (8.4/10). Next were local Soil and Water Conservation Districts (SWCD) (7.2) and Land Trusts (6.3). The lowest scoring organizations were New York State Department of Environmental Conservation (DEC) (5.7), Audubon (5.2), and the Natural Resource Conservation Service (NRCS) (4.9). NRCS and Audubon both had a high number of participants who had never heard of them (4 and 5, respectively).

Landowners had the most trust in CCE, and the least amount of trust in the NRCS. Hay consumers had high levels of trust for CCE, SWCD, NRCS, and Audubon. Hay producers highly regarded CCE, NRCS, and SWCD, because they received technical support from them. They had the lowest levels of trust in Land Trusts, Audubon, and the DEC. Self-suppliers had moderate levels of trust in all the organizations. They expressed concerns about NRCS because of a perceived lack of capacity, and in Audubon because they felt that their values didn't align with the organization.

Not surprisingly, participants had the most trust in organizations that they typically worked with, or organizations that they felt aligned with their values. Landowners and hay consumers, who did not rely on their properties for hay production, had the most favorable views of the Audubon Society. Hay producers highly regarded the organizations that provide technical support to farmers. Self-suppliers varied widely in their views on many of the organizations, but they expressed similar sentiments about wishing for better support and having higher trust in organizations that are represented by trusted members of the community.

Discussion

Our conversations illuminated four main barriers that exist for participants to implement bird-friendly haying timelines: 1) lost income from delayed haying, 2) uncertainty and delays attributed to weather, 3) lack of information and technical support, and 4) perceived community barriers. The typology we developed enabled us to better understand the opportunities and constraints facing farmers when considering managing their property for Bobolinks. Almost half of the participants were willing to delay haying for Bobolinks and can utilize one of the two recommended timelines on some or all their land. However, as argued by Upadhaya, Arbuckle, and Schulte (2021) incorporating farmer typologies can lead to a more nuanced understanding of the challenges and opportunities associated with managing for wildlife. Landowners and hay consumers tend to be the most willing to delay haying, but arguably have the least ability to do so, depending on their relationship with the person that rents their land or supplies them with hay. Hay producers, who have a greater effect on the quality of nesting habitat, are the least likely to delay haying on their fields and have the greatest concern about production and logistics.

With almost half of the participants already following Bobolink-friendly haying timelines, the Adirondacks show potential as a place where outreach, technical assistance, and financial incentive programs can maintain and improve breeding habitat quality on privately owned land. Troy et al. (2005) had similar findings when they surveyed 131 dairy farmers in Vermont's Champlain Valley and found that 49% alter their haying timelines on at least a portion of their land. Another study found a positive correlation between livestock production and willingness to delay haying for grassland species (Gruntorad et al. 2021), which aligns with our findings that hay consumers and self-suppliers were much more likely to delay haying than hay producers. While there is a connection between raising livestock and willingness to delay haying for grassland birds (Gruntorad et al. 2021), farmers with smaller herds are more likely to delay haying than those with more livestock to manage (Troy et al. 2005). This could pose a challenge for grassland bird conservation efforts, because in aggregate, the amount of land owned or managed by farmers with smaller herds is relatively small. While the participants in Troy's (2005) study said that they could delay haying on an average of 29% of their land, that only accounted for 9% of the total acreage in the study. Large-lot landholders who are not involved in agricultural practices could play a crucial role in conservation efforts, and property owners who are adjacent to Bobolink-friendly fields could be targeted for outreach opportunities. Several studies have proposed methods for identifying High-Value Nature farmland (Bernués et al. 2016) and identifying priority parcels (Sutti, Strong, and Perlut 2017), which could be adapted for programs in the Northeast, such as the Bobolink Project (Chakrabarti et al. 2019).

Out of the two suggested haying timelines, the delayed first cut was the more favorable option due to the short growing season and variable summer weather patterns. The 2023 season was unusually wet, which made it difficult for participants to follow their typical haying patterns. The strain weather posed in that year may have led to an exaggeration of its effect, but while some made direct references to the 2023 season being abnormal ("I should have been haying 6 weeks ago"), others made generalized comments that apply in most years (e.g. "I would get stuck"). Most landowners and self-suppliers were open to delaying cuts in some fields and avoiding areas with the highest level of activity, but they can make small changes to accommodate breeding birds, they must produce sufficient hay to meet their livestock's nutritional requirements.

The "connection to natural world" categories that were derived through inductive and deductive coding mirror the three orientations of value-belief-norm theory, which has been used to explain patterns of pro-environmental behavior among diverse stakeholder groups. Gruntorad et al. (2021) found positive associations between wildlife knowledge, livestock ownership, and willingness to delay hay harvests for grassland birds, and a negative relationship between hunting and delaying hay harvest. Floress et al. (2017) also detected a positive correlation between stewardship attitudes and the willingness of farmers to take action to address water quality issues. However, our findings showed that participants who had an intrinsic connection to the natural world were more likely to prioritize stewardship on their land but are not significantly more likely (even potentially less likely) to delay haying. This may be explained by the fact that the landowner typology was most closely aligned with an intrinsic orientation, but hay producers often control decisions about production, because their rental agreements

give them authority to make management decisions (Daloglu, et al. 2014, Barnett et al. 2020). By contrast, those with an instrumental connection to the natural world cared more about production and finance and accounted for all participants who had no interest in change. Finally, participants with a relational connection to the natural world most frequently considered production, with stewardship and finances trailing behind. These findings largely align with other studies that investigated similar value correlations (Bartkowski, Schüßler, and Müller 2022; Daloglu, et al. 2014; Upadhaya et al. 2019). Further examination of our typology with a larger sample size would provide a more robust comparison to studies in other locations, which have used typologies to target outreach and incentive programs (Upadhaya, Arbuckle, and Schulte 2021).

The importance of trust in conservation organizations centered around a few themes: perceived capacity, relevance of work to the landowner, past interactions with staff, and familiarity. Our interviews showed that personal relationships with agency staff greatly improve the level of trust that a landowner has with an organization. Personal relationships with agency staff or a trusted third party (Breetz et al. 2005) make information more accessible in a rural landscape dominated by small farms that rely more on traditional local knowledge and experience channels (Lv and Li 2023). Cornell Cooperative Extension is very active in this region and was the most trusted organization. Cornell Cooperative Extension provides research-based support and outreach to farmers with an emphasis on production and farm viability. Other findings suggest the importance of informal and casual outreach that biological technicians can provide while monitoring properties (Lutter et al. 2018). Additionally, organizations that provide technical support to farmers are the best positioned to approach hay producers and hay consumers, while conservation nonprofits are positioned to provide technical support to landowners.

The importance of community creates additional barriers and opportunities. While outreach that encourages farmers to learn from each other is a powerful tool (Chapman, Satterfield, and Chan 2019; Green, Dayer, and Johnson 2022), community relationships can have an adverse effect on willingness to delay haying in two distinct ways. The first example was the frequent occurrence of participants who declined to answer questions without consulting another party or stated a need for financial compensation to benefit someone else. With statements such as "I would need to check with the farmer, they may need supplemental income to offset the losses" (landowner), or "I would need to find somewhere else to buy hay for my customers" (hay producer), they showed that they heavily consider the needs of others as they make decisions. A more subtle example of community influence was the importance of the appearance of fields that they manage. "I just don't like it, it looks overgrown", said one hay producer. This highlighted an important and easily overlooked consideration, which is that "what is good may not look good, and what looks good may not be good… the appearance of many indigenous ecosystems and wildlife habitats violates cultural norms for the neat appearance of landscapes" (Nassauer 1995). In the essay *'Messy Ecosystems, Orderly Frames'*, Nassauer (1995) explains the importance of embedding cultural "cues to care" such as mowed paths along fencelines into management guidelines, so that conserved and protected landscapes are not perceived as neglected or abandoned by some community members.

The low proportion of participants who rely on farming for their household income aligns with the findings of Green, Dayer, and Johnson (2022), who conducted 124

semi-structured interviews in the Virginia Working Lands and had only three participants who relied on farming for all their income. With an average net income from farming of $1,950 per year in Essex County, farming made up 100% of the household income for only four of the twenty participants in our study. Troy et al. (2005) noted that the number of large-lot landholders who do not farm has increased in the Champlain Valley, suggesting that all the farmland that has been retired from agriculture does not necessarily equate to lost grassland. Large-lot landholders may have fewer economic constraints than farmers, but they often rely on neighboring farms to hay their properties, which maintains the open nature of the land and makes them eligible for agricultural tax credits (Howe, pers. obs,).

The resulting need for financial support aligns with the findings of similar studies (Smith, et al. 2022; Troy et al. 2005), which documented the financial strain that delayed haying imposes on farmers. Ideally, successful programs would minimize financial barriers to adopting bird-friendly haying timelines and provide education through conservation science programs (Green, Dayer, and Johnson 2022; Lutter et al. 2018). In addition to financial support, information and technical support were also frequently referenced. Information and technical support include activities such as farm visits, educational programming, and assistance with applications for funding. This type of support can increase knowledge of the conservation impacts that result from altered management plans and lower perceived barriers to financial compensation. Place-based information relevant to their communities increases the likelihood that farmers and landowners will engage in stewardship activities on their property (Green, Dayer, and Johnson 2022). Gruntorad et al. (2021) found that willingness to delay haying increased with the landholders' knowledge of grassland birds, confirming that outreach efforts will have impacts beyond the ones that are immediately measured. Informal and casual outreach styles, such as conversations with researchers and on-farm demonstrations increase landowners' interest in habitat management and give them opportunities to learn from other land managers in their community (Green, Dayer, and Johnson 2022).

One of the limitations of our study was the small sample size of farmers we were able to interview. The sample was generally representative of farm and farmer characteristics in the Census of Agriculture (2017) for Essex County (135 vs. 199 acres in hay and pasture, 53 vs. 57 years old, and 35% vs. 40% new farmers; Census of Agriculture data and our sample, respectively). The sample allowed us to gain meaningful insights, given the richness of information we were able to capture through the interviews. The relationship web that we sampled from brought us a diversity of important perspectives from a small and closely knit community, but expanding the sample size and collecting data over multiple years would enable us to explore deeper connections to the value-belief-norm theory and decrease the potential for bias from a year of erratic weather.

Conclusions and Directions for Future Research

With almost half of the participants already following Bobolink-friendly management timelines, the Adirondacks show potential as a place where outreach and financial incentive programs can maintain and improve breeding habitat quality for Bobolinks. Out of the two suggested haying timelines, delaying the first cut into mid-July is the

most favorable option among hay producers due to the short growing season and variable summer weather patterns. Weather presents a challenge for participants in the Adirondacks, which restricts their ability to hay early in the season. However, almost half of the participants already delay haying on some fields due to logistics, weather, and concern for breeding birds.

Most landowners and self-suppliers are open to the idea of delaying cuts on some fields and avoiding the areas with the highest level of Bobolink activity. While they can make small changes to accommodate Bobolinks, they must produce hay that will meet their livestock's nutritional requirements. Financial compensation was the most desired form of support to compensate for this added complexity and offset lost income.

The Adirondacks present a unique opportunity for grassland bird conservation efforts, due to lower-intensity farming and high levels of community connection. Effective outreach strategies would utilize partnerships between technical service providers and conservation nonprofits to appeal to a wider range of land managers. Management recommendations should take esthetics and production into account to appeal to more land managers holding instrumental beliefs. Finally, incentive programs should include technical support so farmers can make well-informed and nuanced decisions for their properties and should offer different levels of financial support to account for varying levels of reliance on farm income.

Future studies should examine supply and demand for hay in the Adirondacks to understand how hay can be produced and distributed locally while adhering to recommended haying timelines on high-quality habitat. Our study showed that farmers and landowners are open to adopting best management practices for Bobolinks, but significant financial, logistical, and social barriers are present. Understanding the flow of hay through the community and identifying net surpluses or deficits in the system could determine acreage limitations for incentive programs and opportunities to streamline the production and distribution of hay. Additionally, subsequent studies could examine the household finances of farmers. Since most participants in our study generate less than a quarter of their income from farming, understanding how many hours per week are dedicated to other sources of income would add important context. If their other sources of income are passive, it may allow for more flexibility and a greater willingness to take risks. On the other hand, if the other sources of income are from part-time or full-time employment, it could significantly reduce their capacity to adopt altered management timelines. Examining alternative sources of income at the household level will give conservation professionals crucial context about farmers' capacity limitations or ability to take additional risk. To add further context to our understanding of the economics of haying in the Adirondacks, we also need to expand our documentation of Bobolinks populations in the Adirondacks. Combining spatial population data with an understanding of landowner values, capacities, and constraints would allow efficient resource allocation for improving Bobolink populations.

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Author contributions

CRediT: **Hyla E. Howe**: Data curation, Funding acquisition, Investigation, Methodology, Writing – original draft, Writing – review & editing; **Allan M. Strong**: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing – review & editing; **V. Ernesto Mendez**: Conceptualization, Data curation, Methodology, Writing – review & editing.

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References

Barnes, J. C., M. Sketch, A. R. Gramza, M. G. Sorice, R. Iovanna, and A. A. Dayer. 2020. "Land Use Decisions after the Conservation Reserve Program: Re-Enrollment, Reversion, and Persistence in the Southern Great Plains." *Conservation Science and Practice* 2 (9). https://doi.org/10.1111/csp2.254.

Barnett, Matthew J., Kaitlyn Spangler, Peggy Petrzelka, and Jennifer Filipiak.,. 2020. "Power Dynamics of the Non-Operating Landowner-Renter Relationship and Conservation Decision-Making in the Midwestern United States." *Journal of Rural Studies* 78: 107–114. https://doi.org/10.1016/j.jrurstud.2020.06.026.

Bartkowski, Bartosz, Charlotte Schüßler, and Birgit Müller. 2022. "Typologies of European Farmers: approaches, Methods, and Research Gaps." *Regional Environmental Change* 22 (2): 43. https://doi.org/10.1007/s10113-022-01899-y.

Bernués, Alberto, Elena Tello-García, Tamara Rodríguez-Ortega, Raimon Ripoll-Bosch, and Isabel Casasús. 2016. "Agricultural Practices, Ecosystem Services and Sustainability in High Nature Value Farmland: Unraveling the Perceptions of Farmers and Nonfarmers." *Land Use Policy* 59: 130–142. https://doi.org/10.1016/j.landusepol.2016.08.033.

Bollinger, E. K., and T. A. Gavin. 2004. "Responses of Nesting Bobolinks (*Dolichonyx Oryzivorus*) to Habitat Edges." *The Auk* 121 (3): 767–776. https://doi.org/10.1642/0004-8038(2004)121[0767:RONBDO]2.0.CO;2.

Breetz, H. L., K. Fisher-Vanden, H. Jacobs, and C. Schary.,. 2005. "Trust and Communication: Mechanisms for Increasing Farmers' Participation in Water Quality Trading." *Land Economics* 81 (2): 170–190. https://doi.org/10.3368/le.81.2.170.

Brown, L. J., and J. J. Nocera. 2017. "Conservation of Breeding Grassland Birds Requires Local Management Strategies When Hay Maturation and Nutritional Quality Differ among Regions." *Agriculture, Ecosystems and Environment* 237: 242–249. https://doi.org/10.1016/j.agee.2016.11.004.

Chakrabarti, Anwesha, Lisa Chase, Allan M. Strong, and Stephen K. Swallow.,. 2019. "Making Markets for Private Provision of Ecosystem Services: The Bobolink Project." *Ecosystem Services* 37 (2019): 100936. https://doi.org/10.1016/j.ecoser.2019.100936.

Chapman, M., T. Satterfield, and K. M. A. Chan. 2019. "When Value Conflicts Are Barriers: Can Relational Values Help Explain Farmer Participation in Conservation Incentive Programs?" *Land Use Policy* 82: 464–475. https://doi.org/10.1016/j.landusepol.2018.11.017.

Cheff, R. 2018. *Compensating Research Participants: A Survey of Current Practices in Toronto*. Wellesley Institute.

Q9 Daloglu, I, et al. 2014. "Development of a Farmer Typology of Agricultural Conservation Behavior in the American Corn Belt." *Agricultural Systems* 129: 93–102.

Dechant, J. A., et al. 1999. "Effects of Management Practices on Grassland Birds: Bobolink." *Northern Prairie Wildlife Research Center, USGS*. Jamestown, ND.

Q10 DeCuir-Gunby, Jessica T., Patricia L. Marshall, and Allison W. McCulloch. 2011. "Developing and Using a Codebook for the Analysis of Interview Data: An Example from a Professional Development Research Project." *Field Methods* 23 (2): 136–155. https://doi.org/10.1177/1525822X10388468.

Diemer, K. M., and J. J. Nocera. 2014. "Associations of Bobolink Territory Size with Habitat Quality." *Annales Zoologici Fennici* 51 (6): 515–525. https://doi.org/10.5735/086.051.0607.

Drescher, Michael, Graham B. Epstein, G. Keith Warriner, and Rebecca C. Rooney. 2019. "An Investigation of the Effects of Conservation Incentive Programs on Management of Invasive Species by Private Landowners." *Conservation Science and Practice* 1 (7). https://doi.org/10.1111/csp2.56.

Q11 Drum, Ryan G., Christine A. Ribic, Katie Koch, Eric Lonsdorf, Evan Grant, Marissa Ahlering, Laurel Barnhill, et al. 2015. "Strategic Grassland Bird Conservation throughout the Annual Cycle: linking Policy Alternatives, Landowner Decisions, and Biological Population Outcomes." *PloS One* 10 (11): e0142525. https://doi.org/10.1371/journal.pone.0142525.

Durand, L. 1967. "The Historical and Economic Geography of Dairying in the North Country of New York State." *Geographical Review* 57 (1): 24–47. https://doi.org/10.2307/212758.

Fajardo, N., A. M. Strong, N. G. Perlut, and N. J. Buckley. 2009. "Natal and Breeding Dispersal of Bobolinks (*Dolichonyx Oryzivorus*) and Savannah Sparrows (*Passerculus Sandwichensis*) in an Agricultural Landscape." *The American Ornithologists' Union, The Auk* 126 (2): 310–318. https://doi.org/10.1525/auk.2009.07097.

Fischer, J., D. J. Abson, V. Butsic, M. J. Chappell, J. Ekroos, J. Hanspach, T. Kuemmerle, H. G. Smith, and H. von Wehrden. 2014. "Land Sparing Versus Land Sharing: Moving Forward." *Conservation Letters* 7 (3): 149–157. https://doi.org/10.1111/conl.12084.

Floress, Kristin, Silvestre García de Jalón, Sarah P. Church, Nicholas Babin, Jessica D. Ulrich-Schad, and Linda S. Prokopy. 2017. "Toward a Theory of Farmer Conservation Attitudes: Dual Interests and Willingness to Take Action to Protect Water Quality." *Journal of Environmental Psychology* 53: 73–80. https://doi.org/10.1016/j.jenvp.2017.06.009.

Foley, J. A., N. Ramankutty, K. A. Brauman, E. S. Cassidy, J. S. Gerber, M. Johnston, N. D. Mueller, et al. 2011. "Solutions for a Cultivated Planet." *Nature* 478 (7369): 337–342. https://doi.org/10.1038/nature10452.

Glennon, M., and R. Curran. 2013. "How Much Is Enough? Distribution and Protection Status of Habitats in the Adirondacks." *Adirondack Journal of Environmental Studies* 19: 36–46.

Green, R. E., A. A. Dayer, and A. E. M. Johnson. 2022. "Private Landowners Perceive Positive Impacts on Their Land Stewardship following Involvement in a Conservation Research Program." *Conservation Science and Practice* 4 (12): 12. https://doi.org/10.1111/csp2.12846.

Gruntorad, M. P., K. A. Graham, N. Arcilla, and C. J. Chizinski. 2021. "Is Hay for the Birds Investigating Landowner Willingness to Time Hay Harvests for Grassland Bird Conservation." *Animals* 11 (4): 1030. https://doi.org/10.3390/ani11041030.

Harris, G. 2002. "The Hidden History of Agriculture in the Adirondack Park, 1825-1875." *New York History* 83 (2): 165–202.

Kelly, Bridget, Marjorie Margolis, Lauren McCormack, Patricia A. LeBaron, and Dhuly Chowdhury.,. 2017. "What Affects People's Willingness to Participate in Qualitative Research? An Experimental Comparison of Five Incentives." *Field Methods* 29 (4): 333–350. https://doi.org/10.1177/1525822X17698958.

Knoot, T. G., and M. Rickenbach. 2011. "Best Management Practices and Timber Harvesting: The Role of Social Networks in Shaping Landowner Decisions." *Scandinavian Journal of Forest Research* 26 (2): 171–182. https://doi.org/10.1080/02827581.2010.545827.

Lutter, Seth H., Ashley A. Dayer, Emily Heggenstaller, and Jeffery L. Larkin.,. 2018. "Effects of Biological Monitoring and Results Outreach on Private Landowner Conservation Management." *PloS One* 13 (4): e0194740. https://doi.org/10.1371/journal.pone.0194740.

Lv, X., and J. Li. 2023. "A Benchmark Model for Exploring the Differentiation of Trust in Information Sources in Heterogenous Farmers' Green Behavior." *Environmental Science and Pollution Research International* 30 (27): 69941–69954. https://doi.org/10.1007/s11356-023-27340-3.

McGowan, M. M., N. G. Perlut, and A. M. Strong. 2021. "Agriculture is Adapting to Phenological Shifts Caused by Climate Change, but Grassland Songbirds Are Not." *Ecology and Evolution* 11 (11): 6993–7002. https://doi.org/10.1002/ece3.7548.

Nassauer, J. I. 1995. "Messy Ecosystems, Orderly Frames." *Landscape Journal* 14 (2): 161–170. https://doi.org/10.3368/lj.14.2.161.

Oreg, S., and T. Katz-Gerro. 2006. "Predicting Proenvironmental Behavior Cross-Nationally: Values, the Theory of Planned Behavior." *Environment and Behavior* 38 (4): 462–483. https://doi.org/10.1177/0013916505286012.

Parker, C., S. Scott, and A. Geddes. 2019. *Snowball Sampling*. SAGE Research Methods Foundations. 10.4135.

Perfecto, I., J. Vandermeer, and A. Wright. 2009. *Nature's Matrix: linking Agriculture, Conservation and Food Sovereignty*. London, UK: Earthscan.

Perfecto, I., and J. Vandermeer. 2010. "The Agroecological Matrix as Alternative to the Land-Sparing/Agriculture Intensification Model." *Proceedings of the National Academy of Sciences of the United States of America* 107 (13): 5786–5791. https://doi.org/10.1073/pnas.0905455107.

Perkins, David G., Noah G. Perlut, and Allan M. Strong. 2013. "Minor Fitness Benefits for Edge Avoidance in Nesting Grassland Birds in the Northeastern United States." *The Auk* 130 (3): 512–519. https://doi.org/10.1525/auk.2013.12163.

Perlut, Noah G., Allan M. Strong, Therese M. Donovan, and Neil J. Buckley.,. 2006. "Grassland Songbirds in a Dynamic Management Landscape: behavioral Responses and Management Strategies." *Ecological Applications* 16 (6): 2235–2247. https://doi.org/10.1890/1051-0761(2006)016[2235:GSIADM]2.0.CO;2.

Perlut, N. G., A. M. Strong, T. M. Donovan, and N. J. Buckley. 2008. "Regional Population Viability of Grassland Songbirds: Effects of Agricultural Management." *Biological Conservation* 141 (12): 3139–3151. https://doi.org/10.1016/j.biocon.2008.09.011.

Perlut, N. G., A. M. Strong, and T. J. Alexander. 2011. "A Model for Integrating Wildlife Science and Agri-Environmental Policy in the Conservation of Declining Species." *The Journal of Wildlife Management* 75 (7): 1657–1663. https://doi.org/10.1002/jwmg.199.

Ranjan, P., S. P. Church, K. Floress, and L. S. Prokopy. 2019. "Synthesizing Conservation Motivations and Barriers: What Have We Learned from Qualitative Studies of Farmers' Behaviors in the United States?" *Society & Natural Resources* 32 (11): 1171–1199. https://doi.org/10.1080/08941920.2019.1648710.

Renfrew, R., et al. 2020. "Bobolink (*Dolichonyx Oryzivorus*), Version 1.0." In *Birds of the World*, edited by P. G. Rodewald. Ithaca, NY: Cornell Lab of Ornithology.

Reyes, Victoria, Elizabeth Bogumil, and Levin Elias Welch. 2024. "The Living Codebook: Documenting the Process of Qualitative Data Analysis." *Sociological Methods & Research* 53 (1): 89–120. https://doi.org/10.1177/0049124120986185.

Rosenberg, Kenneth V., Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Stanton, et al. 2019. "Decline of the North American Avifauna." *Science (New York, N.Y.)* 366 (6461): 120–124. https://doi.org/10.1126/science.aaw1313.

Samson, F., and F. Knopf. 1994. "Prairie Conservation in North America." *BioScience* 44 (6): 418–421. https://doi.org/10.2307/1312365.

Scherr, S. J., and J. A. McNeely. 2008. "Biodiversity Conservation and Agricultural Sustainability: Towards a New Paradigm of 'Ecoagriculture' Landscapes." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 363 (1491): 477–494. https://doi.org/10.1098/rstb.2007.2165.

Shustack, D. P., A. M. Strong, and T. M. Donovan. 2010. "Habitat Use Patterns of Bobolinks and Savannah Sparrows in the Northeastern United States." *Avian Conservation and Ecology* 5 (2): 11. https://doi.org/10.5751/ACE-00423-050211.

Smith, et al. 2022. "Hay Nutritional Quality and Grassland Bird Nesting: Impact of Delaying First Hay Cut on Dairy and Beef Production in Ontario." *Sustainable Agriculture Research* 11 (2).

Stern, P. C, et al. 1999. "A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism." *Human Ecology Review. Soc. Hum. Ecol* 6 (2): 81–89.

Strong, A. M. 2015. "How Much is a Bobolink Worth?" *Bird Observer* 43 (1): 15–20.

Sutti, S., A. Strong, and N. Perlut. 2017. "A Multicriteria Decision Analysis for Identifying Priority Conservation Areas for Grassland Birds." *Northeastern Naturalist* 24 (sp8): 99–118. https://doi.org/10.1656/045.024.0sp801.

Sweikert, L. A., and L. M. Gigliotti. 2019. "Understanding Conservation Decisions of Agriculture Producers." *The Journal of Wildlife Management* 83 (4): 993–1004. https://doi.org/10.1002/jwmg.21643.

Troy, Austin R., Allan M. Strong, Sidney C. Bosworth, Therese M. Donovan, Neil J. Buckley, and Megan L. Wilson.,. 2005. "Attitudes of Vermont Dairy Farmers regarding Adoption of Management Practices for Grassland Songbirds." *Wildlife Society Bulletin* 33 (2): 528–538. https://doi.org/10.2193/0091-7648(2005)33[528:AOVDFR]2.0.CO;2.

United States Department of Agriculture, National Agricultural Statistics Service. 2017. "Addison County, VT County Profile. 2017 Census of Agriculture."

United States Department of Agriculture, National Agricultural Statistics Service. 2017. "Essex County, NY County Profile. 2017 Census of Agriculture."

Upadhaya, S., J. G. Arbuckle, and L. A. Schulte. 2021. "Developing Farmer Typologies to Inform Conservation Outreach in Agricultural Landscapes." *Land Use Policy* 101: 105157. https://doi.org/10.1016/j.landusepol.2020.105157.

Vickery, P. D., and P. W. Dinwiddie. 1997. *Grassland of Northeastern North America: Ecology and Conservation of Native and Agricultural Landscapes*. Massachusetts Audubon Society. Lincoln, MA.

Vickery, P. D., M. L. Hunter, and S. M. Melvin. 1994. "Effects of Habitat Area on the Distribution of Grassland Birds in Maine." *Conservation Biology* 8 (4): 1087– 1097. https://doi.org/10.1046/j.1523-1739.1994.08041087.x.

Winten, J. R, et al. 2010. "Trends in the Northeast Dairy Industry: Large-Scale Modern Confinement Feeding and Management-Intensive Grazing."

Wynveen, Christopher J., Brooklynn J. Wynveen, and Stephen G. Sutton. 2015. "Applying the Value-Belief-Norm Theory to Marine Contexts: implications for Encouraging Pro-Environmental Behavior." *Coastal Management* 43 (1): 84–103. https://doi.org/10.1080/08920753.2014.989149.