SYNERGIES BETWEEN BIRD SURVEYS AND STEWARDSHIP AT SUNRISE FARM IN CENTRAL ALBERTA

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Introduction

Bird populations in grassland ecosystems have declined by 67 per cent since 1970, more than any other group of birds.[1] Many grassland birds are at risk of extirpation or extinction, largely due to the loss or fragmentation of grassland habitat through cropland expansion.[2] Other reasons include increases in human development, agricultural activities, tree and shrub encroachment, fire suppression, climate change, urban areas, roads, oil and gas extraction, climate change, and pesticides.[1,2]

We can take action to reverse these trends. Most importantly, through environmental stewardship, we can work to protect the remaining grasslands and to restore grasslands wherever possible.[2] There are many ways to engage in local environmental stewardship, which can be defined as: "the actions taken by individuals, groups or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts."[3] Achieving environmental stewardship in grassland ecosystems could involve setting specific targets for grassland protection, restoration, or sustainable management, and then supported by appropriate policy measures, such as monetary payment programs (e.g., incentives, compensation programs, payment for ecosystem service provision), non-monetary programs (e.g., providing information about grassland-friendly management practices to producers, recognition for such actions), and regulation (e.g. based on improved legislation, monitoring, and enforcement).[4] Furthermore, we can use market-based approaches that support agricultural products that come from sustainably used grasslands (e.g., ecolabel programs such as Habitat-Friendly Winter Wheat through Ducks Unlimited Canada and providing information about management practices required for certain agricultural products). We need many of these actions and research results at the ecosystem scale, but we also need information and actions at the local or farm scale.[5,6]

Only 25-30 per cent of original grassland habitats in Canada remain in their original condition.[7] Furthermore, of the remaining prairie grasslands about 32 per cent is owned privately, and additional grassland is leased to individuals.[8] Therefore, we should support the conservation actions of local wildlife stewards on these important lands. One type of support comes from synergies that develop between wildlife-based researchers who monitor local wildlife and the landowners who may undertake stewardship activities for bird conservation.[9] Conservation benefits can result in several ways. Whether landowners actively participate in data collection or not, the interactions between researchers and landowners can improve landowner knowledge, attitudes, and behaviors related to conservation.[10,11,12] Moreover, interactions between the landowners and others in their networks can trigger additional conservation benefits, through advocacy and stewardship by others.[13] Last, conservation benefits might result from changes to the researcher through the sharing of research results, ideas for future research, and engagement and advocacy for bird conservation with other landowners and stakeholders.

The purpose of this article is to describe how a partnership between a bird researcher and a wildlife-loving landowner in east-central Alberta produced valuable conservation benefits for the researcher and landowner.

Sunrise Farm

Sunrise Farm is located in the Parkland Natural Region in east-central Alberta near Killam, about 160 kilometres southeast of Edmonton. Don and Marie Ruzicka owned the farm from 1983 to 2020. The farm consisted of 600 acres of mixed grasses and legumes and 200 acres of native prairie, aspen (*Populus tremuloides*) forest, riparian areas, and wetlands. Until 1995, they used traditional, industrial farming techniques, growing grains and beef for the commodities market. After taking a holistic management (https://holisticmanagement.ca/) course in 1996, they changed their approach. Their philosophy was simple: "decide what you want in life, link it to your production model and open your mind to a new way of thinking." What they wanted in life was found in their new vision: "Enduring stewardship contributing to maintaining and promoting a healthy landscape with abundant biodiversity resulting in resilient ecosystems."[14] The Ruzickas wanted to tie the sustainability of the land (e.g., clean water, healthy soil, fresh air, and abundant wildlife) to the sustainability of farming economics (e.g., financially viable and satisfying farming lifestyle). They believed that if they managed the land well, it would reflect on the health of the plant communities and in the food production with nutritious and great tasting beef, pork and poultry. The Ruzickas believed that birds can be effective indicators of the overall health of the land.[15] Moreover, they subscribed to claims by E.O. Wilson (biologist, naturalist, ecologist, and entomologist) that "when it comes to the diversity of species that exists in an ecosystem, the flexibility of that ecosystem is what keeps the system healthy, growing and resilient to change."[16]

As a result, the Ruzickas "changed from a conventional way of farming to a grass-based, certified organic, niche way of farming."[17] Even before becoming certified organic in 2000, they began raising and selling products from a small herd of cows, along with pigs, chickens, turkeys, and laying hens. The Ruzickas slowly developed a committed group of consumers that wanted to support sustainable and wildlife-friendly agriculture. They also offered custom cattle grazing on their pastures. By monitoring available grass, the Ruzickas rotationally grazed small herds of cattle with temporary electric fences. They delayed grazing around their 15-acre wetland until mid-July to allow breeding birds a chance to nest and fledge in the native pasture. They rotationally grazed their pigs, chickens, and turkeys by pulling relocating self-contained outdoor pens to new pastures each day.

In 1992, Ducks Unlimited Canada re-established an 11-acre wetland along Iron Creek. Between 1997 and 1999, the Ruzickas fenced off 10 dugouts and natural riparian areas to keep cattle out, and used a solar-powered pump to provide water to cattle away from the water bodies. There are about 60 acres of wetlands across the five quarters of land. In 2003, the Ruzickas began planting trees and shrubs in the riparian area along the creek and wetland. The riparian health assessments by Cows and Fish indicated that scores rose from 77 per cent in 2001 (i.e., healthy but with problems) to 84 per cent in 2006 and to 87 per cent in 2017 (i.e., both meaning healthy).

Over the years, the Ruzickas engaged with the community in many ways. Students from the University of Alberta's Augustana Campus completed many community service-learning projects on wildlife, farming, and sustainability projects. Service groups, researchers, interested citizens, and consumers visited the farm for workshops, projects, or private tours. Most left with a greater appreciation and support for the possibility of sustainable agriculture.

Bird monitoring

In 2004, Don and Glen met at a prairie conservation conference in Calgary where Glen gave a talk about birds in remnant aspen patches around Camrose. We quickly shared our passions for birds, wildlife, and sustainability. Soon after, Don invited Glen to conduct a bird survey on the Ruzicka's farm. As a result, every year from 2004 to 2020, Glen conducted 10-minute unlimited radius point counts[18] at Sunrise Farm, from 05:30 h to 09:30 h, on one morning in June (Figure 1). Don and Glen visited nine sites around the farm that were representative of the various habitats and management strategies. Glen counted birds only in conditions with low wind speeds and no precipitation. He included all birds seen and heard, and took steps to avoid double counting.

Over 17 years, we recorded an average of 46.6 species per year (range = 40-56), with little variation each year (SD = 3.1). We recorded new species almost every year, but at a declining rate over time. The resulting species accumulation curve (Figure 2) indicates that we were close to seeing most of the species present. On our very last count, we celebrated by reaching 100 species recorded over 17 years. The number of species recorded each year did not vary by which date in June the survey occurred. On average, we recorded 272 individual birds each year (SD = 44.9, range = 215-390), with no clear trends over the 17 years. For comparison, Glen conducts an annual

FIGURE 1. Glen conducting 10-minute bird counts at Sunrise Farm.

Breeding Bird Survey route near Halkirk, Alberta (about 70 km southeast of Sunrise Farm), involving three minutes of counting birds in a similar manner at each of 50 sites. With more sites, but a shorter time at each site than at Sunrise Farm, he recorded 117 species since 1995, with an average species count per year of 63.2 (range = 47-74), and an average abundance per year of 1,134.6 (range = 837-2,068; https://www.pwrc.usgs.gov/BBS/).

We recorded many common species every year, including the Canada Goose (*Branta canadensis*), Least Flycatcher (*Empidonax minimus*), Warbling and Red-eyed Vireo (*Vireo gilvus* and *V. olivaceus*), Black-billed Magpie (*Pica hudsonia*), American Crow (*Corvus brachyrhynchos*), Tree Swallow (*Tachycineta bicolor*), Northern House Wren (*Troglodytes aedon*), American Robin (*Turdus migratorius*), Yellow Warbler (*Setophaga petechia*), three sparrows (Chipping, Clay-colored, and Savannah; *Spizella passerine, S. pallida, Passerculus sandwichensis*), Red-winged Blackbird (*Agelaius phoeniceus*), and Baltimore Oriole (*Icterus galbula*). We recorded some species on only one year, including Great Blue Heron (*Ardea herodias*), Black-crowned Night Heron (*Nycticorax nycticorax*), Common Goldeneye (*Bucephala clangula*), Northern Goshawk (*Astur atricapillus*), Northern Harrier (*Circus hudsonius*), Greater Yellowlegs (*Tringa melanoleuca*), Ring-billed Gull (*Larus delawarensis*), Downy Woodpecker (*Dryobates pubescens*), Horned Lark (*Eremophila alpestris*), Grasshopper Sparrow (*Ammodramus savannarum*), Common Grackle (*Quiscalus quiscula*), and White-winged Crossbill (*Loxia leucoptera*). Among Canada's species at risk in 2025, we recorded Sprague's Pipit (*Anthus spragueii*, Threatened, recorded on nine years), Barn Swallow (*Hirundo rustica*, Threatened, 15 years), and Horned Grebe (*Podiceps auritus*, Special Concern, five years).[19]

After classifying each sampling site according to habitat, the average number of species was highest for wetland habitats (38.6), followed by native pastures (27.3), tame pastures (27.1), aspen forests (23.6), and the homestead (12.7).

Stewardship benefits the birds

Meeting up each year, we quickly caught up on family and work news as we travelled to the survey points. As we conducted the bird surveys, we anticipated bird sightings at each stop. Will we see Sprague's Pipits? Will the new Purple Martin (*Progne subis*) house have nestlings? What new species will we record this year? After counting birds and eating breakfast together, Glen shared insights about conserving birds, educating students, the power of research, and connecting with local conservationists. As well, Don shared his passion for sustainable farming, wildlife, and healthy living. We developed a common bond, which deepened each year.

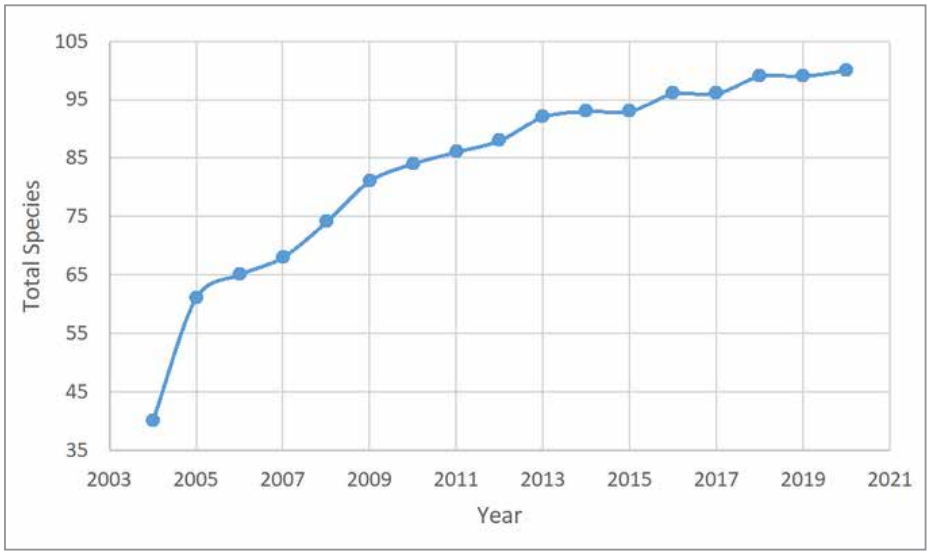

FIGURE 2. Species accumulation curve from bird surveys at Sunrise Farm, 2004-2020.

Among the many birds on their farm, a few species seemed to have extra meaning. In 1994, the Ruzickas cleared 20 acres of native prairie and brush where Sharp-tailed Grouse (*Tympanuchus phasianellus*) had a dancing ground. No longer finding grouse since that time was a loss for the Ruzickas. Similarly, many years earlier, Don's father had cleared another area of mixed aspen forest and native prairie for grain farming. It became apparent that the productivity of this land would not provide adequate returns. Therefore, Don planted alfalfa (*Medicago sativa*) and four different grasses in 1997, to restore some grazing potential. However, the bird diversity that returned to the area never matched its original bird diversity (compared to an adjacent parcel of land with intact native vegetation).

Nevertheless, many conservation efforts produced positive results for birds, even before bird monitoring began. After changing his grazing regime, a key turning point for Don was hearing a Western Meadowlark (*Sturnella neglecta*) sing in May 2000, the first he had heard in 11 years, when it was once prolific. Don always thought that the presence of meadowlarks indicated whether the pasture was overgrazed. Meadowlarks provided a good indicator of healthy natural grassland ecosystems, and helped to show how long to graze cattle in one area. As Don later wrote:[20]

> Their spirited song became a catalyst for working at becoming more intimate with nature.... The western meadowlark requires abundant litter from native forages for nesting. The rest periods had enabled those forages to grow and thrive, providing a home for the meadowlark and also abundant grazing for our cattle. This lesson suggested that nature would become a barometer and a major player in helping us to make decisions on how to manage the ecosystem.... The western meadowlark became the face of our farm as their return was the first visible sign that it was possible to repair and restore habitat.

Indeed, the meadowlark became the welcoming bird on the farm's entrance sign.

With information from the bird

surveys in hand, we can make some links between stewardship activities and bird sightings on the farm. We break down these links by habitat. First, riparian health played a major role in providing quality habitat for wetland birds. With an 11-acre wetland established in 1992 to water cattle, our surveys confirmed that wetland birds benefited. In addition to the common duck species, we recorded new riparian species on our surveys, such as Double-crested Cormorant (*Nannopterum auritum*) in 2016, Great Blue Heron (2018), and Common Yellowthroat (*Geothlypis trichas*, 2018).

In 2009, Don finished fencing all of the sloughs to keep cattle out and to avoid disrupting nesting birds (Figure 3). This fencing improved the wetland habitat, allowing us to record waterfowl and shorebirds regularly (e.g., Sora [*Porzana carolina*], American Avocet [*Recurvirostra americana*], Spotted Sandpiper [*Actitis macularius*], Lesser Yellowlegs [*Tringa flavipes*], Marbled Godwit [*Limosa fedoa*], and Willet [*Tringa semipalmata*]), and wetland-associated sparrows (e.g., LeConte's and Nelson's, *Ammospiza leconteii, A. nelsoni*) sporadically. Don placed floating nesting boxes for Canada Geese on four of the dugouts in 2004, round flax straw bales on four more dugouts in 2006, and two bales in the eleven-acre wetland in 2007, all with successful goose nests (Figure 4).

The Ruzickas also carefully managed their small patches of aspen forest with fencing and managed grazing. Such activities contributed to birds first recorded on our surveys, such as Northern Goshawk (2016), American Kestrel (*Falco sparverius*, 2011), Pileated Woodpecker (*Dryocopus pileatus*, 2012, Figure 5), Western Wood-peewee (*Contopus sordidulus*, 2011), White-winged Crossbill (2013), and Red-breasted Nuthatch (*Sitta Canadensis*, 2017). Of course, we regularly recorded Baltimore Orioles and Least Flycatchers throughout their forests. Don and Marie especially appreciated the ability of Red-tailed Hawks (*Buteo jamaicensis*), which nest in the aspen trees, to control rodent pests, such as Richardson's Ground Squirrels (*Urocitellus richardsonii*). Don had unfinished plans to erect a nesting platforms in the native prairie to entice more Red-tailed Hawks to nest.

FIGURE 3. The fenced dugouts keep out cattle and the solar-powered system provides water away from the dugout.

FIGURE 4. Floating platforms provided nesting locations for various waterfowl species, such as Canada Geese.

The native prairie on the farm received special management attention. Don rotationally grazed cattle in a way that maintained grass cover patterns desired by target species. We were especially delighted to record Sprague's Pipits, another favourite for Don and Marie, on nine of 17 years. The pipits were always in a patch of native pasture singing high above the moderately grazed grass. Don often wondered what the most effective grazing strategies were to attract pipits. As Don wrote later:[20]

FIGURE 5. The Pileated Woodpecker found sufficient habitat in an aspen stand with minimal grazing.

Well managed native pastures of a diversity of grasses and legumes entice them to nest. Their diet is made up of small seeds from various grasses as well as terrestrial insects, with grasshoppers being a favourite. They seldom make their nests in pastures but if there is enough litter, they show up. Their young are fed mainly insects.

It was a highlight day when Marie discovered and photographed a pipit nest along the route of her regular walks. While we did not record Loggerhead Shrikes on our surveys, Don and others did see these birds on their land, making use of thorny buffaloberry (*Shepherdia argentea*) shrubs within patches of prairie.

Don had an extensive system of cavity nest boxes along fence lines, and was rewarded with a 97 per cent occupancy by cavity-nesting birds (Figure 6). Don targeted Mountain Bluebirds (*Sialia currucoides*), but Tree Swallows and Northern House Wrens were the primary beneficiaries. However, we recorded Mountain Bluebirds on 13 of 17 years. These insectivorous birds helped keep insect populations in check, which aided the Ruzickas in their decision to avoid using insecticides. Moreover, swallows used the chicken feathers left behind each morning to build nests when the chicken pens were moved. Had they stayed on the farm, Don planned to mow some areas so that bluebirds could access more terrestrial insects.

A nearby friend of the Ruzickas banded Mountain Bluebirds at Sunrise Farm from 2002 until 2019. In the early years, he suggested that Don enlarge the entrance holes of the nest boxes from 1½" to 19/16". This change allowed larger males to gain easier access to the nest boxes, resulting in a noticeable increase in bluebirds on the farm. The bird bander kept meticulous notes (including nestling age, GPS location, time, and date) which he sent to the North American Bluebird Society for further continent-wide analyses. Knowing that Hantavirus is a disease carried by deer mice (*Peromyscus maniculatus*) through contact with their droppings or urine, Don discouraged mice from entering the nest boxes, by placing an aluminum sleeve around the fence post a few inches below the entrance to the box. As a result, Don never found signs of mice were in the nest boxes.

Upon hearing from neighbours about their success in attracting Purple Martins, the Ruzickas erected a martin nest box in 2008, which enticed martins from 2010 onward. These delightful birds return in the spring to locations near where they were hatched and fledged. Their cheerful chirps and rattles were a pleasure to anticipate, experience, and remember.

Around their home, the Ruzickas provided Niger seed at bird feeders, attracting a variety of species, including American Goldfinches (*Spinus tristis*) regularly and Pine Siskins (*S. pinus*) starting in 2013. In the winter, the Ruzickas stocked feeders with sunflower seeds for the Black-capped Chickadees (*Poecile atricapillus*) and other winter residents.

In 1984, learning that they could order trees and shrubs at no cost from the Prairie Farm Rehabilitation Administration Shelterbelt Program, the Ruzickas placed their first order for seedlings for two- and four-row shelterbelts throughout the farm. These trees provided a range of ecosystem services, including windbreaks, retained snow, nesting habitat, sequestered carbon, and wildlife travel corridors. Flagstaff County supplied the tree planter and two summer students did the planting. Later on, they became more intentional by establishing wildlife habitat plantings, which consisted of one acre of 10 rows of trees, including deciduous trees, conifers, and berry bushes (Figure 7). Last, they planted what they call eco-buffers, consisting of three sections: 1) two rows of chokecherries (*Prunus virginiana*, flowering for three weeks); 2) three rows of 10 varieties of flowering trees (flowering for five weeks); and 3) seven rows of 21 different tree species and 20 native flowers (flowering from April to October). Thus, pollinators had access to flowering plants throughout the growing season. We recorded Ruby-throated Hummingbirds (*Archilochus colubris*) occasionally since 2008, largely attracted to the flowering shrubs now available. In the last few years, we started monitoring birds in the areas planted to trees and shrubs, but did have enough years elapsed to detect any changes. We recognize that bird diversity is increased through the provision and management of a variety of habitats.[21]

The Ruzickas have received many awards for their innovative stewardship efforts. While they hesitate to brag about their awards, these awards were able to raise awareness and gave the Ruzickas opportunities to share their passion and expertise. Some of these awards included:

FIGURE 6. While the nest boxes targeted Mountain Bluebirds, other species were common users, such as the Tree Swallow.

FIGURE 7. Wildlife habitat plantings provided cover, food, and travel corridors for many species of wildlife.

- 2019 Outstanding in Stewardship Award, Battle River Watershed Alliance
- 2012 Farmer-Rancher Pollinator Advocate Award for Canada, North American Pollinator Partnership
- 2011 Alberta Emerald Award for Individual Commitment, Alberta Emerald Foundation
- 2008 L.B. Thomson Award from the Prairie Farm Rehabilitation Administration and Environment
- 2007 Growing Alberta Leadership Award for Environmental Stewardship, Alberta Agriculture
- 2007 National Stewardship Award, Countryside Canada
- 2003 Excellence in Grazing Management Award, International Mountain Section of The Society for Range Management.

In 2020, the Ruzickas sold their land to new owners, who naturally will take the farm in new directions. Normally, when land changes hands in this area, new owners drain wetlands and sloughs, and clear trees to make every acre of land pay. However, the Ruzickas decided that the best way to honour all of those people who helped paint the canvas of their farm was to place some of the land into a conservation easement.[14] With the County of Flagstaff acting as a land trust, a conservation easement ensures that the new owners will maintain fencing, restrict grazing, and maintain trees on 45 acres of the land (i.e., wetlands, sloughs, shelterbelts, wildlife plantings, and eco-buffer plantings). In addition, the new owners shared the Ruzicka values and respect for the land that has provided them all with a great deal of satisfaction.

Conclusion

Of course, our efforts faced many limitations of time and information. Glen could make himself available for one day a year, but surveys that are more thorough would have taken several days. It would have been helpful to have more years to survey birds in the wildlife plantings and eco-buffer areas. Given the size of Sunrise Farm, we focused surveys on just nine sites; expanding the breadth of coverage would have resulted in more bird records over time and a deeper understanding of bird relationships with habitat. Our discussions occasionally continued when we met in other venues or through email, but most of our insights arose from those yearly visits. Moreover, the Ruzickas' stewardship activities were influenced by many other people and organizations. Last, since many stewardship activities began before, or happened tangentially to, the bird surveys, we can only make indirect connections between them. These stewardship activities also benefited species from other taxonomic groups, such as common Garter Snakes (*Thamnophis sirtalis*), Thirteen-lined Ground Squirrels (*Ictidomys tridecimlineatus*), and native bees.

Nevertheless, these bird surveys, annual visits to Sunrise Farm, and the genuine connection over environmental stewardship helped develop a positive reciprocal relationship, with benefits to Glen and to the Ruzickas. First, Glen found that watching the Ruzickas engage in many kinds of stewardship activities was a wonder to behold. They were passionate about sharing their insights with anybody who visited their farm: students, consumers, neighbors, government officials, researchers, and family. Their style of interaction was engaging and positive, and helped Glen and the Ruzickas make greater connections to the land. The Ruzickas were willing to try new techniques, often raising eyebrows in an otherwise conservative farming community. In turn, these interactions increased Glen's desire to monitor bird populations at their farm and elsewhere. Some opportunities arose through Don's involvement with the Iron Creek Watershed Improvement Society, and some developed as Glen expanded his networks. These bird surveys triggered other connections between his university and Sunrise Farm, through student field trips, volunteering, community service-learning students, and guest speaking engagements. Professionally, Glen expanded these initial bird surveys to a larger research project that he shared with others (through conference presentations, publications, community talks, and conservation efforts).

Second, the Ruzickas gained some benefits as well. They expressed appreciation regularly for the long-term dataset about birds on their property. After each survey, we talked about how that information helped drive their desire for more stewardship. Of course, awareness of the species present, and their unique requirements, helped the Ruzickas make land use decisions to support a healthy landscape. Visitors to the farm gained insights from the Ruzickas as they made connections between their farming decisions and bird populations. As Don says, "in observing people who have visited our farm …, I have noticed that some have a yearning that is aching to be filled. When they come in contact with nature being cared for, it seems to give them some hope."[22] In effect, Sunrise Farm became a positive demonstration and outreach site that illustrated, among many other topics, how to manage for both wildlife and sustainability. Don often said, "We can make a difference, despite the rapid changes elsewhere." Moreover, he enthusiastically invoked E.O. Wilson (1986) by saying that "we can infect people with biophilia."[23]

We realize that most farms in the Canadian Prairies operate an industrial model that intensively uses carbon and pesticides, converts habitat, and drains wetlands.[24] However, the Sunrise Farm made an important transition towards a sustainable-food-system. Many factors can trigger and support a transition toward wildlife stewardship activities by landowners, including connections to the land, personal norms, information, mentors, capacity, and emotional attachment.[25,26] The interactions that we have described illustrate these triggering factors, and helped Glen and the Ruzickas pursue environmental stewardship at Sunrise Farm and beyond. We hope that some of these examples resonate with readers with a connection to wildlife and the ability to contribute to stewardship activities. Scaling up local solutions to large-scale adoption of sustainable agriculture will not be easy, but will require a careful attention to collaborations, integrated systems, economic viability, suitable policies, and new and emerging technologies.[27]

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