

# DRIFTLESS ODYSSEY

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## SUSTAINING A DIVERSITY OF WILDLIFE IN A SPECIAL PLACE

As Yogi Berra said, “You can observe a lot by watching.” A timber rattlesnake sunning on a rock ledge outside its bluff-top den; the caterpillar of a regal fritillary butterfly feeding on a prairie birds-foot violet; a peregrine falcon dropping from a cliff face to snag a songbird mid-air; a Blanding’s turtle making its June cross-country trek from a wetland to upland dunes to lay her eggs—in each of these, we see the culmination of a kaleidoscope of past events. Even species co-existing in the same landscape, in some respects having a shared history, arrive at the present moment via distinctly different routes.

Accordingly, wildlife ecologists study landscapes as much as they do wildlife, seeking to understand the conditions, processes and relationships that allow a given species to persist in its historic range. The aim is to preserve these essential elements where possible and to restore them where they are marginal or lacking. The MN DNR Nongame Wildlife Program has a special focus on species that are rare, declining or vulnerable to decline, as



Queen's Bluff along the Mississippi River in King's and Queen's Bluffs Scientific and Natural Area, Winona County  
Photo by Jay Rendall, MN DNR

prioritized under the state’s Wildlife Action Plan. But the eye is always on the prize: healthy, functioning natural systems that support the state’s diversity of wildlife as a whole.

The stakes are especially high in the southeastern corner of Minnesota. Described in the state’s ecological classification system as the Blufflands Subsection, this string of counties along the Mississippi River (Goodhue, Wabasha, Winona, Houston), along with much of adjacent Filmore County, is home to 151 Species in Greatest Conservation Need. These include 103 species that are federal or state listed as endangered, threatened or of Special Concern. They represent the highest totals for any of the state’s 28 Ecological Subsections. Put another way, nearly half of all state listed rare animal species are found in the Blufflands: a truly remarkable concentration.

Why such species richness?

Depending on your perspective, you could say it has to do with how history unfolded here. Or, rather, how it didn’t.

From roughly 23,000 years ago until 12,500 years ago, when glacial ice last worked its way across the land that would later become Minnesota, it missed this region. It is widely known as the Driftless Area—a name suggesting that it lacks sediment deposited directly by glaciers.

“But, the short story is that Minnesota’s Driftless Area is not truly driftless,” says Tony Runkel, lead geologist with the Minnesota Geological Survey. “It did escape the most recent glaciations that muted the landscape in much of the rest of the state, but one or more much older glaciations (somewhere between 500,000 and 2.6 million years ago) did cross southeastern Minnesota and leave behind thin and patchy sediments.” See figure 1, which depicts the area in southwestern Wisconsin and northwestern Illinois that is more accurately described as the “true” Driftless Area: that is, never glaciated.

**Figure 1.** Age and distribution of glacial deposits surrounding the Driftless Area, showing general direction of ice flow for glaciers that bounded the Driftless Area

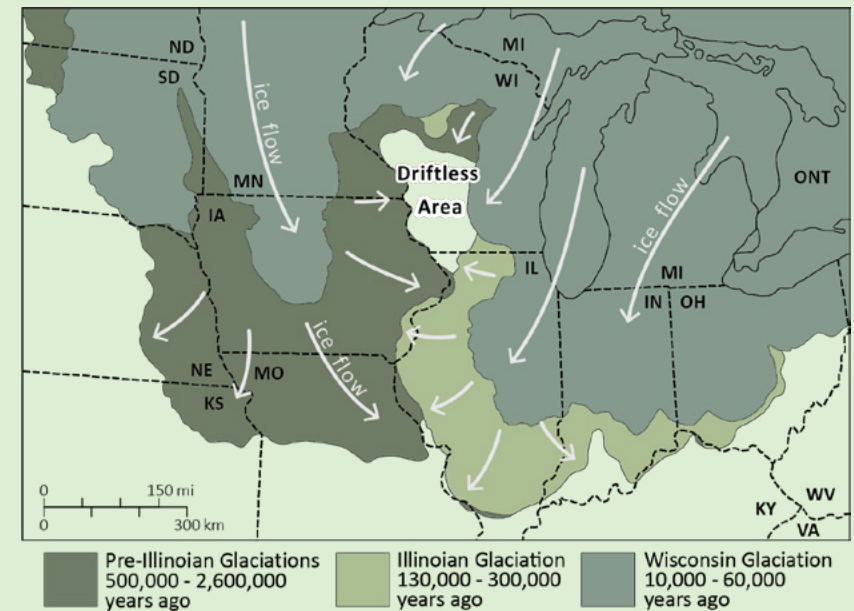


Image courtesy Wisconsin Geological and Natural History Survey (University of Wisconsin, Madison).



Small waterfall in Minnesota's Driftless Area  
Photo by ColdSnap

Still, for Minnesotans, “The Driftless Area” is likely to stick. It evokes a distinct landscape with its own cultural identity and associations, and has taken on new meanings over time. Says Runkel, “More and more, it’s become associated with the recognition that the area is relatively fragile environmentally.”

There is no question that missing out on that last steamrolling by glaciers (and the associated burial in sediment) has had profound implications for life in this region. Since the earlier glaciations were so long ago, there has been abundant time for other natural forces to sculpt the land. The result has been a place of great contrasts. The classic topography is dramatic, featuring steep terrain and rocky bluffs rising as much as 600 feet in local elevation, where patterns of life correspond to the angles of slopes and the direction they face. Watersheds of rivers like the Root and Whitewater are finely dissected: eroded and down-cut over time to incise meandering, shade-filled valleys where spring-fed streams can run through winter.

Bedrock here is predominantly limestone, dolomite and sandstone largely formed beneath ancient seas between 500 and 350 million years ago, when this part of the continent was located at latitudes near and even below the equator. The character of this bedrock defines the landscape both above and below ground. Above, it offers outcroppings that provide

specialized niche habitats for plants and animals, as well as a foundation for native plant communities ranging from dry (sometimes called goat) prairie and oak savannas, to mesic hardwood forests, to globally-rare algific talus slopes. Below ground, these sedimentary rocks are readily dissolved by the weak acid in rainwater, creating networks of porous spaces, passageways and even yawning sinkholes where precipitation can race from the surface to groundwater with little filtering. This short transit time means that there are few secrets kept among land use, groundwater quality and the quality of emerging springs: a key reason for the area's environmental sensitivity.



Add to these the powerful influence of the Mississippi River. The Upper Mississippi River National Wildlife and Fish Refuge reaches from Wabasha, Minnesota to Rock Island, Illinois: all told, over 240,000 acres of floodplain habitat and 261 river miles. Should we need a reminder, the river's valley makes clear that, while recent glaciers missed this region, they still made their mark from the wings. The valley was deepened and its cliff faces scoured by great volumes of glacial meltwater, and fine windblown silt (loess) was carried here from surrounding lands in the period during and after glaciation. In Minnesota, one is never far removed from the handiwork of ice.

The wartyback mussel is a state listed endangered species. This Mississippi River species is now rare and found only sporadically as the river flows through the Driftless Area.

Ross Hier



A view of the Mississippi River floodplain from Minnesota's Driftless Area  
Photo by ColdSnap

*“By restoring these habitats, we could both benefit the snakes’ reproductive success and reduce encounters, since the snakes are by nature secretive and typically not aggressive unless threatened.”*

**JAIME EDWARDS, MN DNR Wildlife Biologist**



MN DNR Wildlife Biologist Jaime Edwards (right) with a bullsnake and crew member with an eastern hog-nosed snake. Both snakes are residents of the Driftless Area. Photo by MN DNR

## Hard-Earned Magic

The Driftless Area is celebrated in arts and literature as a magical place, and so it is. But it’s not an easy magic. It’s earned through conscious decisions and actions. For the Nongame Wildlife Program and its many partners working to conserve the natural heritage of the Blufflands region, it calls for insights rooted in research, persistence and first-hand knowledge of the land. It helps to have an intrepid nature and a decent pair of boots.

“Terrain is the biggest difference,” says Jaime Edwards, who spent 18 years in the Driftless Area for the Nongame Wildlife Program and continues to partner with the program on projects in her current role as manager of the Whitewater Wildlife Management Area (WMA). “The habitat types may occur elsewhere, but the steep terrain here sets it apart. It means that road access to many sites is limited. If you’re doing restoration work, such as clearing invasive cedars from a bluff, it’s often done on foot and by hand.” The landscape is also fragmented into smaller parcels than in many parts of the state, the vast majority in private

ownership. “So, even a relatively small project here may involve a working relationship with three or four landowners,” she notes.

Much of Edwards’ work in the Blufflands has focused on the timber rattlesnake, a state listed threatened species in decline due to habitat loss, illegal collecting and outright efforts to eliminate them. Over the years, these threats have been mitigated to a degree by restoring the bedrock bluff prairies and rocky outcrops that serve as den sites on both public and private lands. Says Edwards, “We’d get calls that they were showing up in yards, and people didn’t want them around their pets or kids. We realized that the reason the snakes were moving down into these areas is because the bluff prairies they would normally stay on for a large part of the year were overgrown with trees or other woody vegetation. By restoring these habitats, we could both benefit the snakes’ reproductive success and reduce encounters, since the snakes are by nature secretive and typically not aggressive unless threatened.”

Initially, there was some concern that snakes—in particular, gravid (pregnant) females—might move off sites as a result of work in the area, bolting when they emerged after winter hibernation to find their surroundings altered. But post-restoration studies documenting numbers of snakes and their age-classes at den sites indicated that they remained in the vicinity and successfully gave birth to young.

Projects have evolved over time as other wildlife species have been found to occupy these same spaces. In addition to timber rattlesnakes, management now takes into account the interests of splendid tiger beetles, Leonard’s skippers, six-lined racerunners, five-lined skinks and a host of other Species in Greatest Conservation Need.

A relationship with a landowner often begins with a knock on the door. If an area looks promising for priority species based on information in the Natural Heritage Database or aerial photos, Nongame Wildlife Program staff ask permission to walk the property and evaluate habitat. “Afterward, if we’ve been invited on the land, we’ll give them a copy of the survey sheet documenting native plants and wildlife we’ve observed, along with our overall assessment of existing or potential habitat,” says Edwards. “Their response is often, ‘Wow, I didn’t know I had all

*this stuff!*’ There are situations where it’s appropriate to keep locations of rare species under wraps for their protection. But we’ve tended to be very upfront with landowners. In my experience, when they learn they have something special on their property, they have more of a protective attitude.”

The landowner is informed if their land meets criteria for assistance with restoration work. This might include management plans, removal of invasive cedars, use of grazing goats to knock back brush, prescribed burns, inter-seeding of native species and other measures—all subject to their agreement. “It’s a conversation,” says Edwards. “We’ll ask, ‘How about this, is this acceptable? This would meet our goals. Would it meet your goals?’ We’ve had so much landowner cooperation that we’ve been able to expand and build on it, make it more of a landscape effort, mapping polygons that enable us to view sites as part of a complex with connectivity.”

For practical purposes, not every site is considered redeemable through restoration. For example, if a look back on historic aerial photos shows that a bluff prairie has been closed in since the 1950s, the transition to forest may be irreversible. “But if it was open in the 50s and closed in the 90s, there’s still a chance of getting it back,” notes Edwards.



As their name suggests, timber rattlesnakes do use forested areas. But den sites on rocky outcrops in bluff prairies are recognized as critical habitat and are a key focus of restoration.

Photo by Jeff LeClere

## Diverse Region, Diverse Strategies: A Selected Sampling

High, rocky bluffs are an iconic landscape feature in the Driftless Area, but they represent only one facet of the Nongame Wildlife Program's efforts in the area. At any given time, initiatives in various stages and diverse ecological settings are underway as program staff collaborate with in-state partners as well as agencies in neighboring states.

While nature operates on its own time frame, work plans must be designed to follow grant and budget cycles, gearing up (or down) according to funding. State Wildlife Grants, Competitive State Wildlife Grants and the Lessard-Sams Outdoor Heritage Fund (created by the Clean Water, Land and Legacy Amendment) have been key funding sources making this work possible.

In fragmented landscapes, careful planning is needed to conduct

prescribed burns without causing undue mortality to invertebrate populations that may be present as adults and larvae. Strategies to minimize potential harm include careful timing of burns, and burning on a rotational basis, leaving some areas unburned to serve as refugia.

“Whitewater WMA is my favorite place on earth,” says invertebrate ecologist Jessica Petersen with the MN DNR Minnesota Biological Survey. “There is **insect diversity** that exists there that no longer exists elsewhere in the state. It's outstanding.” Petersen has been among those conducting **targeted surveys** for Lepidoptera (butterflies and moths) at multiple locations, documenting Leonard's skipper and regal fritillary—both state listed Special Concern species—at the Weaver Dunes Complex and Whitewater WMA.



MN DNR Minnesota Biological Survey Entomologist  
Jessica Petersen conducting surveys in the Driftless Area  
Photo by Mike Worland, MN DNR



Leonard's skipper  
Photo by Jessica Petersen, MN DNR

Better represented in neighboring Wisconsin, the Persius duskywing is a state listed endangered species at the edge of its range in Minnesota, where it has likely always been rare. In contrast, the Leonard's skipper (a state listed species of Special Concern) and the dusted skipper (a state Species in Greatest Conservation Need) were once more widely distributed in the state but have grown increasingly rare with loss of habitat. All are specialists of oak savanna and sandy barrens, communities in the Driftless Area that benefit from fire.



Persius duskywing  
Photo by Kyle Johnson, MN DNR



Dusted skipper  
Photo by Jessica Petersen, MN DNR



*“Among native bee species in North America and Hawaii with sufficient data to assess, more than half are declining, and nearly one in four is imperiled and at increasing risk of extinction.”*

**POLLINATORS IN PERIL,**  
the Center for Biological Diversity



Rusty patched bumble bee  
Photo by Heather Holm

**Pollinators** continue to command attention in the state and country, due to widespread population declines. In addition to securing data on the **federally listed rusty patched bumble bee**, Nongame Wildlife Program surveys provide a window into the status of pollinators generally. For example, nine species of bumble bees were documented at Whitewater and McCarthy Lake WMAs, while a survey at the Weaver Dunes Complex revealed a diversity of native bee species from a range of morphological groups, including but not limited to **chap leg bees, striped sweat bees, hairy belly bees** and **cuckoo bees**. While lesser known, these species perform critical functions in Minnesota’s natural landscapes, gardens and agriculture-based economy. Survey results inform management and planning. In one project, over 500 acres of sand prairie, oak barrens, savanna and oak woodland have been restored to **improve pollinator habitat** on public land in the Whitewater WMA. Post-restoration monitoring documented increases in populations of pollinators as well as their nectar and host plants, both indicators of success. A joint

effort with Wisconsin’s DNR has also worked to benefit pollinators through development and promotion of **Best Management Practices** shared with the public in workshops and one-on-one contacts.

The region’s wetlands and dry sand prairie have also been recognized as important habitat for the **Blanding’s turtle**, a state listed threatened species. Recent work here has focused on efforts to inventory current adult and hatchling populations and compile historic data from multiple sources to better determine trends. This work is urgent, given that experienced observers have estimated a decline of as much as 70% in the past 10-15 years.

“Habitat is not always the primary limiting factor,” says MN DNR nongame wildlife researcher Krista Larson. Poaching is a known problem, and efforts are being made to step up enforcement of this federal crime, which is subject to prison time. Recent prosecutions will hopefully send a message. “It’s a source of frustration, since loss of even a few reproductive-aged females can have a dramatic impact,” says Larson.



MN DNR Nongame Wildlife Researcher Krista Larson with a Blanding's turtle hatchling  
Photo by MN DNR

While the species can be long-lived (70 years or more), Blanding's turtles don't reach sexual maturity until about 12 years of age, and studies indicate that predation can impact more than 90% of nests. Hatchlings and adults also experience tremendous mortality on roads when traveling between wetlands and nesting sites. Over the course of **roadside surveys** in fall of 2020, Larson and fellow biologist Mike Worland reported over 30% of total hatchlings observed as dead on the road, presumably hit by cars. Turtle crossing signs help to alert drivers, but "turtle tunnels" used successfully elsewhere are not practical in settings here, where activity is dispersed over larger areas. "The hatchlings are so tiny; they look like a piece of gravel. So, I understand it can be unintentional," says Larson. "I've actually been very encouraged by people in Driftless Area communities that I've met over the last couple of years, seeing how far things have come, in terms of the ways of thinking."

She recounts, in particular, a gentleman who was grading a gravel road using his own equipment, a pick-up with a rake loaded down

with rocks. "Unfortunately, it happened to be one of those days when reptiles were really on the move. There were hatchling Blanding's, western hognose snakes, painted and snapping turtles. I'm running all over trying to get them off the road, thinking of how many were about to be killed. He stopped to talk and was so receptive. He knew about the turtles. He said they were not out that day, that he'd been keeping an eye out. My hands were holding turtles I had just pulled out from in front of his vehicle. He'd never seen a hatchling and had no idea they were so small. He asked to hold one and was clearly moved. He said, 'You know what, this road doesn't need to be graded today. I'll come back. Tell me when it will be a better time.' That meant a lot."

On the near horizon, the Nongame Wildlife Program is looking to partner with the Minnesota Zoo using telemetry and GPS data loggers to track Blanding's turtle movements and answer questions about how they utilize the landscape, similar to work elsewhere with wood turtles.

*"I've actually been very encouraged by people in Driftless Area communities that I've met over the last couple of years, seeing how far things have come, in terms of the ways of thinking."*

**KRISTA LARSON, MN DNR Nongame Wildlife Researcher**



Prescribed goat grazing is a tool to introduce disturbance.  
Photo by Mike Worland, MN DNR

**Disturbance** is key to fire-dependent communities such as oak savanna and bluff prairie, which offer critical habitat for many Species in Greatest Conservation Need. Fortunately, there are willing recruits available to assist. The strategy for Mound Prairie State Natural Area and the Hammel, Kronseder and Wetbark State Forest Units calls for repeated seasons of **prescribed goat grazing followed by prescribed burning**. Paddocks are used to both contain the goats in sites targeted for grazing and, equally important, **to exclude their access to more sensitive areas** within those sites. Sandy rock outcroppings are off limits: they are attractive to goats but prone to erosion. Private contractors from the local community play an important role in renting out goat herds for this purpose.

A four person **strike team** led by Autumn Jensen can be called upon when time is of the essence, thanks to a **partnership with The Nature Conservancy** on a competitive federal grant for wildlife. The team is

equipped to take on a wide range of tasks on short notice: bolstering staffing levels for a prescribed burn or acting on early detection of invasive species with a rapid response before they get established.

The Nature Conservancy (TNC) has identified the Driftless area as part of its “**Resiliency Connected Network**,” based on a national analysis identifying areas likely to be more resilient in the face of climate change. TNC Projects Manager David Ruff is based in the area and is working to establish connectivity of habitat complexes in places like the South Fork of the Root River and Rushford/Rush Creek. “The idea is to do the best work we can in the right places to maximize resiliency of natural systems for the future,” says Ruff. There is abundant opportunity for collaboration with the Nongame Wildlife Program where such efforts dovetail with the aims of Minnesota’s Wildlife Action Plan, which recognizes **climate change as a stressor of wildlife** and aims to increase connectivity to build resilience.



Prescribed burning is another disturbance tool to promote ecological balance.  
Photo by Jaime Edwards, MN DNR

*“The idea is to do the best work we can in the right places to maximize resiliency of natural systems for the future.”*

**DAVID RUFF, TNC Projects Manager**



Nongame Wildlife Program Technician Barb Perry, now retired, remains passionate about protecting rare species of the Driftless Area after many years of hard work in the field.  
Photo by MN DNR

## Continuity Matters: for landscapes and for people

Like Jaime Edwards, Barb Perry has focused on southeastern Minnesota for many years, starting in 2001 as a technician with the Nongame Wildlife Program, devoting half her time in the Driftless Area, then full time after 2016. Retired in spring of 2022, Perry leaves with memories as rare as the species she's worked to help. She recounts an experience scaling a bluff with an antenna in one hand, a receiver on a strap worn over the shoulder beeping stronger as she grew ever closer to an unseen rattlesnake, finally spotting it a foot away, nearly invisible in leaf litter with its cryptic coloring.

"It wasn't moving. It felt very safe," she laughs. She's grateful to the landowners she's come to know, whose land she's walked and helped to restore. She knows that whoever comes next will need to tackle some of the same sites. "It's great when our work opens up that habitat and gives the native forbs and grasses a chance again, to bloom, to occupy that space. There can be such diversity there. But you also find out what else has been waiting in the soil to express itself, to fill in that opening that we've created. If you cut a cedar, it won't come back, but you may get invasive buckthorn, honeysuckle, bittersweet. Preserving these places is going to require ongoing investment."

Among the greatest imperatives for the program here is building the capacity to sustain these existing relationships while responding to new requests. "This is the most bio-diverse region of the state," says Perry. "The good news is that there is all this interest from landowners, including landowners who would love to do more work on their property and others who meet the criteria and want to participate."

Generations of families have already lent their own sweat and elbow grease to this work. Jaime Edwards says, "People get their kids and grandkids involved. It's been so many years, we'll see them now, all grown up, and they'll tell us, 'I remember when I came out and helped with that prairie.' It's been a privilege to share these experiences with people, and rewarding to see the progress they've had with their management goals."

To hear Perry and Edwards talk, it's clear that this is not about people just doing a job. It's their passion, their life's work. The relationships they've built with landowners are grounded in mutual respect and shared appreciation for the conservation values they've worked together to preserve.

It's some of the best magic in the Driftless Area. 🦋

**KEN VISGER, landowner**

*“I’ve been tromping around these hills a long time. We moved here in 1974, and it’s been an evolving process. I was a part-time farmer, worked in town, had cattle. I wasn’t really focused on conservation and habitat; it was all about growing crops. I was first introduced to the MN DNR Nongame Wildlife Program efforts when I met Jaime Edwards. She’d heard we were having issues with rattlesnakes in the yard and suggested that we create better habitat for them up in the hillsides behind the house, which was covered in Eastern red cedar. It seemed counter-intuitive, to restore habitat for snakes when you wanted to see fewer snakes. But we went for it. She hired a local forester, Johnny Micheel of Chimney Rock Forestry, who spent all winter long clearing and burning cedar off of 80 acres. It worked. In the 12-15 years since then, we’ve seen two snakes, and we had been getting three or four every summer. Since then, with Barb Perry as well, the program has helped with prescribed burns, hired goats, a lot of buckthorn*

*and invasive treatments. For me as a landowner, having that resource available has been just wonderful.*

*“Soon after that first winter when Johnny did his clearing work, I quit farming, got rid of the cattle. Now, I’m spending all my energy trying to restore my property back to what it should have been from the beginning. It’s become more important to me to restore the prairie where I can, and to manage my forest land.*

*“When I was younger, I had an interest in the outdoors, but I thought of it more as a playground. It took me until I was in my 50s to understand the tremendous value of the Upper Mississippi Refuge and the Driftless Area. It’s a unique landscape and resource, and a real asset to the state of Minnesota. I think nongame work should be better appreciated and better funded than it is. I’m a hunter and fisherman—that’s how I learned to love the outdoors. But without nongame species, the game species wouldn’t be there either, you’ve got to have the whole package.”*

Ken Visger and his wife, Terry, have 184 acres near Hokah. The Nongame Wildlife Program first surveyed the property in 2008, and began removing cedars in 2009. Over the years, there have been multiple contracts for restoration work on the property, and the Visgers decided to enroll the land in two different programs: a MN DNR Prairie Bank Easement for the bluff and woods/savanna as one drives into the home site, and a conservation easement with the Minnesota Land Trust for the remaining acreage.



## LUCILLE CROW, landowner

*“I’m the fourth generation to own the farm. It has been in my lineage for 168 years. After I inherited the land in 2005, I was thinking of things I might like to do. I decided to lease part of the land to a cousin who farms, which helps pay the taxes. A neighbor said, you know, maybe I might want to get in touch with Prairie Moon Nursery. Prairie Moon was overjoyed to lease 15 acres, where they plant wildflowers that need sandy soil. So now, in spring, we get to see this beautiful swath of sky-blue lupine. It was an arborist with Houston County who encouraged me to get in touch with Jaime Edwards and the Nongame Wildlife Program, since there were 20 acres or so of pasture that had never been cropped. She and Barb Perry came out and discovered many prairie plants in the pasture, and then up on the bluff there were pasque flower and tons of native plants that none of us had seen before: goat prairie, they called it. It’s been a wonderful learning curve for me and my family.*”

*“The habitat management work has largely focused on getting rid of invasive species. I had thought at first that it might look like a park afterwards, but I can’t say it matches what I had imagined. It’s better. It’s better because it’s teeming with wildlife. We’re seeing more butterflies, more birds. The whippoorwills have come back. My sons and I now pay attention to the new growth in the areas where work has been done.*”

*“In communities like this, it tends to be word of mouth. Jaime and Barb are authentic. They have the ability to meet a farmer, discuss what they do, open the door to possible solutions they could offer. I so appreciate them, and the Nongame Wildlife Program, for providing the means to restore the prairie and savanna on our farm. No, it’s not a park. It’s nesting habitat. It’s a place where things live.”*

(Photo, right) Lucille Crow’s 260-acre farm is near Rushford. The Nongame Wildlife Program has restored oak savanna on 22 acres through brush mowing, and removed cedar/invasives on 10.5 acres to restore bluff prairie. Prescribed burning and grazing goats have been used in both locations.

Photo by Richard Hamilton Smith

# SELECTED RESOURCES

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