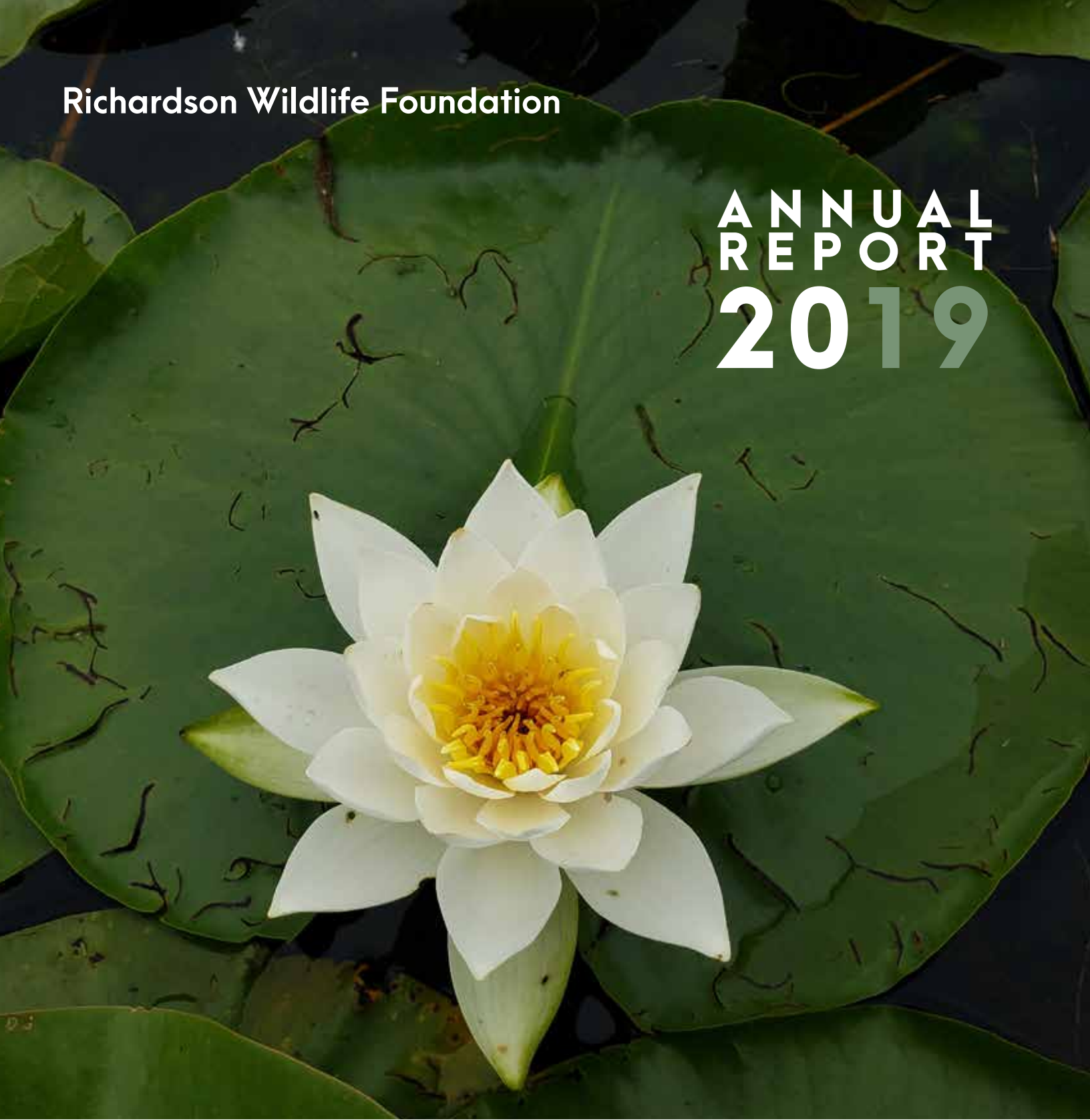


Richardson Wildlife Foundation

ANNUAL REPORT 2019





Richardson Wildlife Foundation (RWF), located in Lee County in north central Illinois, is a not-for-profit corporation dedicated to the long-term restoration of habitats and the judicious use of our natural resources. The Foundation was established in 1989 by Edward J. Richardson with an initial land donation of 250 acres and three primary goals of Habitat Restoration, Conservation Education, and Research. This area is recognized as part of the Grand Prairie Division of Illinois and was part of the historic, 30,000-acre Inlet Swamp and adjacent bluff lands. The Richardson family has been the sole source of funding as the Foundation has expanded to 1,976 acres through land donations from the Richardsons and the purchase of adjacent farms.

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OFFICERS

| | |
|---------------------------|---------------------|
| Edward J. Richardson..... | President |
| J. Brian Towey..... | Vice President |
| Cody Considine... .. | Secretary/Treasurer |

STAFF

| | |
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| J. Brian Towey..... | General Manager |
| Justin Pitzer..... | Ecologist |
| Brad Kleckner..... | Site Maintenance |
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FRONT COVER PHOTOS

Background:
White Water Lily, *Nymphaea Tuberosa*

- From left to right:
- Planting bare root trees
 - Augustana College's Field Research Class visits RWF
 - Conducting Blanding's Turtle surveys using Radio Telemetry



Sedge meadow habitat near a wetland on the Erbes tract

THIRTY YEARS

This year marked the Foundation's 30th since its establishment as a non-profit organization in 1989. Prior to our inception Mr. Richardson had owned the Original tract for years and while he had already begun restoring wetland and prairie before creating RWF, anniversaries are always a good point at which to look back and take stock. Here let's take the opportunity to review and celebrate some of the things we've been enabled to accomplish over these three decades.

Since 1989 the Foundation has grown in area by 790% from 250 to 1,976 acres through periodic land acquisitions and donation by Mr. Richardson. In every year during that span we have converted land from row crops or pasture cover to native habitats of prairie, wetlands, and woodlands. To date we have restored 828 acres of prairie and grassland, 157 acres of over 40 different wetlands, and 360 acres of woodland to add to and complement the existing habitat on site. While we continue to restore new habitat, the volume of habitat we have put in place over time has enabled us to shift our focus from generating quantity of new habitat in the early years toward focusing more on the quality of habitat in more recent years. We measure quality in terms of diversity and richness of native species, establishment of viable populations of rare or uncommon species of flora and fauna, meeting specific wildlife requirements, and generally facilitating the natural relationships in native communities of species. Of course, as we establish habitat in greater amount the stewardship requirements have grown. The process of restoring habitat does not end with the initial planting. We have continued to introduce plant and animal species to our restorations as sources become available to us. Today, combatting invasive species to safeguard the habitat work we've done from being degraded requires more of our time and resources than the restoration of new habitat acres.

Nearly 50 employees and many volunteers over the past 30 years have helped to shape the present and future of this landscape and have played a role in providing for the needs of generations of hundreds of wildlife species. Many of our former employees have gone on to successful careers in the conservation biology field around the country and continue to carry their early experiences at RWF with them in their current endeavors. There are now adults who visited the site as children with scouting or school groups, hopefully leaving with as many new questions as answers to their curiosities about the outdoors. Some of them may have or may yet return as one of the numerous researchers who have conducted field experiments and surveys on site, leading to a greater scientific understanding of the natural world.

There is no way to know how many of the species of plants or animals currently using the habitat at RWF would have declined to the point of local extirpation if it had not been for the restoration efforts conducted here. Still other species which were never recorded here in the early years have found and continue to find the site. Most years we record species using the site either year-round or for their breeding seasons or migratory stopovers that we haven't documented here before. The frequency of these finds is testament to the need for such places and the utility that RWF provides to native wildlife.

There are few organizations like Richardson Wildlife Foundation. We are fortunate to have been enabled by the Richardson family to make the strides that we have over the decades in fulfilling our missions of habitat restoration, conservation education, and research, and we hope to match or even exceed our accomplishments over the next 30 years and beyond.



Collecting seed of Meadowsweet, *Spiraea alba*

SEED COLLECTION

Achieving diverse restorations on a large scale in our habitat development projects is significantly more efficient and cost effective using seed than by other methods. For that reason, collection of prairie, wetland, and woodland forb and grass seed is critical to our ability to restore and improve the habitat offered on site. To maximize the diversity of our plantings for the benefit of wildlife and habitat functionality, we try to collect as many desirable native species as possible.

Forb seed collection requires considerable time due to variation in seed maturation dates, the labor-intensive method of hand-harvesting, and the number of species and amounts we target. Many species are difficult to collect in quantity due to the spotty distribution of plants or because seed production from individual plants is low. Hand collecting and cleaning forb seed, although time-consuming, is considerably less expensive than purchasing an equivalent amount of seed from a commercial source. An additional benefit to collecting seed on site is that using seed of our local ecotype helps to maintain the genetic integrity in our plantings and increases the conservation value of our restorations.

By hand collection, we gathered 821 pounds of seed of 230 species of native prairie, wetland, and woodland plants this year. We have been particularly focused on woodland habitat development lately, and our collection of woodland wildflower seed continues to increase in amount and diversity. This is in part due to willing landowners from whom we have gratefully obtained permission to collect and/or transplant desirable native woodland species from several nearby, off-site, wooded locations, as well as from the excellent oak savanna on the Richardson property in LaFox. Additionally, we were granted permission to collect certain prairie and wetland species that we do not have on our site at the Nature Conservancy's Nachusa Grasslands site.

Using a modified combine, we harvested 739 pounds of Big Bluestem and Indiangrass seed as well as 91 pounds of Side-oats Grama and 172 pounds of Little Bluestem grass seed which we were able to glean from collection patches we planted just last year. To supplement our collection, we will trade seed of some of our hand-collected forb species to native plant nurseries and other restoration agencies in exchange for species that are native to this area but are currently rare or absent from this site.





Wild Hyacinth, *Camassia scilloides*

PRAIRIES

Prairie habitat represents a higher proportion of the Foundation property than any other habitat type, most of it having been restored on former agricultural ground. We conduct prescribed and controlled burns, generally on a 3-year rotation for established prairies and more frequently for new plantings and those with invading, undesirable woody species. This rotational approach leaves some areas unburned, protecting fire-sensitive species, providing additional early nesting cover for wildlife, and allowing for the greatest potential for species diversity. We had a successful 2019 burn season during which we burned 56 units totaling about 391 acres from March 11th through April 2nd. All units were burned safely using a 4- or 5-person crew equipped with water sprayers, drip torches, Nomex clothing, and two-way radios. As a safety precaution for burning, and to allow for access to the property, 47.3 miles of firebreaks and trails were maintained via mowing during the growing season.

This year we dedicated most of our prairie forb seed collection to the improvement of some of our older prairie restorations—areas that had been originally planted with fewer species than we are able to collect today. In January, using a gravity-flow seeder loaned to us by our friends and colleagues at Nachusa Grasslands, we interseeded about 150 acres of tallgrass-dominated prairie on the Bernardin, Burkardt, Martin, and Montavon tracts with 130 species of hand-collected forb seed at approximately 3.3 pounds to the acre as well as a diverse, mechanically harvested grass and forb seed mix. For specific locations of this year's interseeding efforts, see the orange cross hatching in our habitat map (Appendix 1) in the back of this report.

In addition to using seed to improve our plantings, we planted several hundred plugs of native plants in areas that should meet their specific sun, soil, and moisture requirements in accessible locations in recent plantings, established prairies, open woodlands, and wetlands. Some of these were sown and grown in-house by RWF staff, but most (Shooting Star and Royal Catchfly this year) were received in trade. We hope to be able to draw on these plants for seed in the coming years to further diversify future restoration efforts.

In preparation for restorations planned for future years, we have been eliminating cool-season grasses and invasive weeds on a large number of areas through multiple means. We are preparing a significant area on the Wysneinski South tract by farming row crops in areas that had previously been cool season grasses and weeds. On over 20 patchy acres dominated by Reed Canarygrass—split between the Original, Montavon, Wysneinski South, and Bernardin tracts—we mowed in spring or early summer and treated twice during the growing season with the herbicide Glyphosate. These areas will need to be treated in the same manner in 2020 to fully kill existing Reed Canarygrass and begin to diminish the seedbank of that species before planting for more native and healthy restorations.



Prairie Gentian, *Gentiana puberlenta*



Toad Pond, in its first spring following construction

WETLANDS

Wetlands are among the most biologically productive and diverse habitat types found in nature. They provide immense value to human well-being through their natural functions of water purification, flood control, and groundwater replenishment even before factoring in the direct and intrinsic values of wetland flora and fauna. They are also among the most imperiled habitat types. Approximately half the world's natural wetlands had been drained by the mid-1990s. On our site, any efforts to accomplish successful restoration of native habitat and provide for the needs of local populations of wildlife need to be informed by the wetland history of the property. RWF exists at the southern edge of the historic Inlet Swamp, drained over one hundred years ago, and many of our soils are "hydric" or wetland formed. Soil types, coupled with hydrology and sunlight, are what determine which native species can thrive. Replacing the 30,000-acre wetland complex that once existed here is neither feasible nor culturally possible at this point so our approach has been to restore what are known as prairie pothole wetlands dotting our landscape and providing similar function on a smaller scale.

We record water level readings at each wetland on a monthly basis to assess fluctuations occurring throughout the year as well as across multiple years. On the heels of a series of four wet years, 2019 set records with its abundance of rainfall. Despite our efforts to bring water levels down to potentially drain several wetlands in late summer, only our two most ephemeral wetlands (Terrace and Hilltop) ever dried completely without our intervention. After a September that brought almost four times the average precipitation and an October that was also wetter than normal—including a 4" snowfall on Halloween—most wetlands on site entered the winter months full to overflowing.

The ongoing trend of exceptionally wet years has led to a proliferation of both fish and Muskrats. We would prefer to manage most of our wetlands as fish-free for the benefit of species that thrive without fish as top predators. Muskrats in such high numbers can do significant damage to dikes and shorelines. In many cases, natural fluctuations of hydro-period can be counted on to keep these species in check, but the duration of this high-water period justified an effort to artificially lower water levels at certain ponds in order to achieve our management goals. During the summer months (and for a second consecutive year in most cases) we lowered tilt tubes or lifted control boards which hold water back in an attempt to drain Arrowhead, Crane, Teal, Sandfield, Spring, Pintail, Bobcat, Beaver and Muskrat wetlands, all of which had been invaded by Green Sunfish and some of which had also been invaded by Black Bullhead Catfish or Common Carp. We were successful in drying Spring and Mallard wetlands. The rest were reduced but not drained enough to eliminate fish. The upshot was a mixed-to-poor result on our immediate goal but a notably positive effect on wetland flora, which responded vigorously even in the wetlands that never fully dried. History suggests that we will eventually see a more typical weather pattern which will enable us to accomplish the goal of removing unwanted fish from most of these wetlands. To that end, we retrofitted the overland spillway system at Pintail with a culvert and catch box which we designed to make future invasions by fish less likely. This wetland, like most others on site, was designed with an overland "emergency" spillway at one end of the dike, where excess water can escape in periods of high water when the tilt tube regulating water level cannot take 100% of the flow. This is also the route that invading fish have repeatedly taken to infiltrate Pintail. The culvert, which we installed in late summer this year, will now vent that excess water, which will then fall several inches into a catch box full of large rocks and drainage tile before making its way through a recontoured ditch to the waterway flowing north. With this system in place, invading fish would have to perform some impressive feats of acrobatics in order to access Pintail in the future.



Installing a PVC water control structure

WETLANDS (cont'd)

We do manage several of our more permanent wetlands with native fish species that are of conservation concern as well as some more common species as part of the community we try to promote. We continued our native fish–stocking program at Mink and Goose ponds with introductions of more common native gamefish species. We transplanted adult Bluegill and Largemouth Bass from Main Lake to both ponds in the spring and fall respectively. We intend to continue this effort next spring and with additional species as opportunity allows.

We mowed wetland dikes in June as part of an ongoing maintenance program. Visual searches were made for Muskrat damage, and repairs were made where needed. As expected we found more Muskrat damage than we typically would. We made the needed dike repairs at Bauer, Muskrat, and Arrowhead. We also improved the interior tilt tube water control structures at Lily and Willow ponds by adding Hickenbottom Risers to reduce vegetation plugging. Also at Lily and Willow, we replaced wooden frames meant to prevent damage to tilt tubes from ice flow with frames constructed using metal posts and synthetic boards after the existing frames were nearly destroyed by heavy ice flow this year.

In the narrow window of time this summer when conditions were dry enough to access low ground with equipment, we constructed two small wetlands on the border of Original and Erbes tracts that we are calling Buck and Doe ponds. The two ponds are not far apart, with Buck to the north and Doe to the south. After conducting a stadia survey and analysis of each site, we used a bulldozer to search out and destroy any underlying drainage tile then simply removed soil from the basin. Neither of these ponds required a dike structure to retain water. Rather they were already situated in low areas prone to spring flooding and were dominated by near monocultures of Reed Canarygrass. Our goal for each was simply to lower the bottom in order to foster a longer hydroperiod with the added benefit of removing the invasive grass for an opportunity to restore a proper native wetland plant community. The challenge on a dugout-style wetland such as this is dealing with the soil removed. At Buck pond we used the excavated soil to raise a berm to connect trails from the Original tract to the east to the Erbes tract on the west. This will be a very useful pathway, as connectivity between those tracts has always been limited. At Doe pond we raised a low spot on the trail to the east and stockpiled the rest of the excavated soil with the intent to use it where needed for other projects and later spread it over lower ground in the row crop fields to the west. Doe pond was outfitted with an 8" tilt-tube control structure with two anti-seep, latex diaphragms. Outflow will vent into the exiting waterway leading to Beaver pond as it did before construction. Currently we do not foresee a need for a control structure at Buck pond. If outflow proves to be greater than anticipated, we will address it in a future year. Following completion, we seeded the dikes with Timothy grass to prevent erosion. The basins, shorelines, dikes, and surrounding areas will be planted with native wetland plants, prairie grasses, shrubs, and forbs before spring 2020. Heavy rains in September filled both ponds to overfull within about two weeks of completion.



Outflow designed to prevent fish invasion at Pintail wetland

WETLANDS (cont'd)

Last year we repaired two undermined “log dams” used as a part of a rehabilitation of a stream that flows north through the property from Martin wetland down to Beaver pond, crossing under Shaw Road east of our office building. These dams are intended to step the water level of the stream down gradually, holding it back in a pool and riffle system that would be more favorable to stream-dwelling flora and fauna as well as preventing continuous erosion. Last year we cut the eroded banks with backhoe and bulldozer to a more gradual slope and used that soil to fill and repair the log dams. This summer, after allowing nearly a year’s worth of water flow to deposit silt at each dam, we added rock and gravel above and below the dams to finish out the pool and riffle development. We intend to continue treatment of the banks and surrounding area to remove Reed Canarygrass before seeding the area with moist soil plant species.

Over the winter we seeded diverse mixes of native wetland plants, prairie grasses, shrubs, and forbs (143 total pounds of 97 plant species collected on site) into and around the Toad and Sand Ridge wetlands, which we constructed in summer of 2018, as well as two others constructed in recent years (Mink and Snake).



Larval Tiger Salamander,
Ambystoma tigrinum



Oak savanna restoration, leafing out following its first spring burn

WOODLANDS

In the habitat category of “woodlands,” we refer to three types of timber stands: mixed timber stands which pre-date the inception of the Foundation, hardwoods planted by RWF (majority Black and Bur Oak), and oaks planted with Red and White Pines by RWF. For each type of timber stand, our intent is to develop healthy oak savanna and woodland communities with a diverse, native understory. This is by its nature a slow process, but one in which results are becoming more evident and rewarding each year as trees mature and interseeded native herbaceous plants become established.

Most of our existing mixed timber stands are the result of natural succession following the abandonment of agricultural crop fields or pastures decades ago. Some were planted with various pines 50+ years ago. Our management strategies for these woodlands are based upon individual assessments of the quality and species composition of each stand. Many contain a majority of non-native or undesired tree species. Our goal for most of the existing woodlands is to increase the proportion of oaks and other beneficial native deciduous trees to shift these areas into healthy, self-sustaining woodlands and savannas. Implementing this goal includes the removal of non-native and detrimental species; protecting existing, desirable saplings from deer damage; and improving understory communities of shrubs, small trees, woodland wildflowers, savanna forbs, sedges, and grasses.

Two of our oak savanna restorations reached a milestone this spring when they were burned for the first time. Fire is an essential aspect of savanna ecology and these trees had finally attained enough size to withstand the prescribed burn without significant damage. The burns went well and seemed to have the desired impacts: a decrease in undesired brushy vegetation and invading Boxelder and Cherry trees, reinvigoration of forbs and grasses native to the habitat type which we had interseeded in previous years, and an increased growth rate of the oaks due to increased nutrient availability. These savannas will be burned periodically on a 3- to 6-year rotation in the future.

We concentrate the bulk of the mechanical aspect of our forestry management in the winter, when frozen ground can support heavy equipment without damaging roots or significantly disturbing the soil. The long, cold winter of early 2019 provided those conditions in spades and enabled us to do quite a bit of needed forestry work. We thinned dense pine plantings on the Wysneinski North, Wysneinski South, and Montavon tracts for oak release and to prepare for supplementation of more desirable tree and shrub species. Once each thinning was completed, we interseeded a diverse mix of woodland and savanna plant species. This seeding will help foster a healthy understory in areas that had been barren due to the dense, year-round shade cast by the pine canopy. The project continued with the planting of bare root trees and shrubs in the spring and potted tree and shrub species in the fall (both described below). Additional thinning as needed on a smaller scale in future years will foster the continued development of these young, diverse savannas by allowing the oaks to grow more quickly and healthily, allowing for greater light penetration for forb growth and oak regeneration, and providing better cover and browsing within the timber for wildlife.



Digging holes for bare root tree planting using an auger

WOODLANDS (cont'd)

We removed invasive Black Locusts from a 10-acre section of the woodland on the Jeanblanc North tract. These trees had been girdled and treated in prior years to kill them standing and had finally dried enough to dispose of with fire. Locusts had comprised a significant portion of the canopy of this woodland but there were some oaks, Black Cherries, and other trees scattered in the area. Several of the Black Cherries happened to blow down in spring storms when the soil was oversaturated due to record rainfall. While we had decided to leave these trees in place, the woodland will not suffer for their absence in the long run. In the fall we laid the foundation of the new structure of the woods by planting many potted oaks, hickories, and shrubs. We interseeded the woods with native grasses immediately following timber removal and will supplement the seeding with a very diverse and robust seed mix this winter.

Prior to planting potted trees in the fall, we strategically opened small areas of forest canopy on two existing woodlands on the Original and Montavon tracts by selectively treating undesired Boxelders, Mulberries, and Silver Maples with herbicide, and immediately supplemented the areas with potted oaks, hickories, and shrubs. These areas will be interseeded with native understory plants in the coming year.

In the summer and fall we released oak trees from intense competition from crowding pines in plantings on the Martin, Burkardt, Wysneinski North, Mellot, and Bernardin tracts. Too much competition for light and resources not only slows or prevents growth of the oaks we are trying to promote, it also causes them to abort lower limbs, grow in a tall, narrow shape detrimental to their future prospects, and makes them more prone to damage and disease. The selected pines were girdled by chainsaw and treated with a 50% Glyphosate solution, and a few were selectively dropped and left in place to provide immediate ground-level cover for wildlife. These areas will be next in line for winter timber improvement projects, interseeding, and rootstock introduction where needed. We've made excellent advances in the health of our tree plantings in recent years and look forward to continued progress in these areas.

In March and April, we used bare root trees and shrubs to supplement existing tree plantings and woodlands on the Wysneinski North, Wysneinski South, Bauer, Original, Bernardin, Burkardt, and Montavon tracts. Species included Black Oak (200), Bur Oak (200), Pin Oak (200), Swamp White Oak (200), Red Oak (100), Pecan (100), Persimmon (25), Bald Cypress (100), Serviceberry (150), Ninebark (100), Smooth Sumac (200), Aromatic Sumac (300), Eastern Wahoo (300), Paw Paw (250), Smooth Arrowwood (200), Blackhaw Viburnum (200), Nannyberry (200), Red Osier Dogwood (200), Silky Dogwood (200), Buttonbush (200), Witchhazel (200), Hazelnut (300), and Black Chokeberry (200). Because we were planting into existing timber habitat, most of these plantings were done by hand and shovel or using a motorized auger, though in two plantings we were able to save significant time by using the pull-behind tree planter for seedlings without extensive roots. Although the process is rigorous, at this stage in the game supplemental planting is the most effective way to improve our woodlands and increase their diversity and value to wildlife.



Shagbark Hickory, *Carya ovata*, basketed to protect from deer browse

WOODLANDS (cont'd)

In late October, we planted 242 potted RPM™ trees and equipped them with Earthmats to reduce desiccation and competition, as well as wire baskets with rebar stakes to protect them from browse and rubbing by deer. Potted trees were planted in areas and numbers indicated in the table below.

POTTED TREE AND SHRUB ALLOCATIONS:

| | Jeanblanc | Montavon North | Montavon South | Original | Wysneinski North | Wysneinski South |
|------------------|-----------|----------------|----------------|----------|------------------|------------------|
| Acres | 10 | 1.4 | 2.5 | N/A | 3 | 3 |
| Black Oak | 22 | 10 | 5 | 10 | 10 | 8 |
| Bur Oak | 19 | 5 | - | 9 | 10 | 8 |
| White Oak | 10 | - | - | 4 | 5 | 5 |
| Red Oak | 10 | - | - | - | - | 2 |
| Shagbark Hickory | 13 | - | - | 5 | 5 | 7 |
| Aromatic Sumac | 15 | 5 | - | 5 | - | - |
| Serviceberry | 5 | - | - | - | - | - |
| Nannyberry | 10 | - | - | - | - | - |



Sharp-lobed Hepatica, *Hepatica nobilis acuta*



Bloodroot, *Sanguinaria canadensis*



Garlic Mustard, *Alliaria petiolata*

INVASIVE SPECIES MANAGEMENT

Suppression of invasive species continues to be a major portion of our habitat work and is an ongoing challenge on this site, as it is on the regional, state, and worldwide landscape. Even as we continue to make great progress in reducing invasive plants, we find that it requires an immense amount of effort to hold ground against re-invasion.

Reed Canarygrass poses a greater threat to the vegetative integrity of our wetlands than any other current factor. Many of our wetlands and waterways require vigilant care to prevent Reed Canarygrass takeover. We continued the ongoing program of treating this invasive species at several wetlands as well as several areas on more upland locations, and mowed to prevent seeding in other areas. Several areas on the Bernardin, Original, Wysneinski Central, and Martin tracts were treated twice with Glyphosate during the growing season to continue a multi-year treatment strategy designed to restore native species in areas dominated by Reed Canarygrass.

Garlic Mustard is an invasive, herbaceous, biennial plant that can dominate at ground level in woodlands, edging out native woodland wildflowers and the fauna which depend on them. Our efforts are focused on minimizing its spread and eliminating it from known areas over time. Control efforts this year included applications of 3% solutions of Glyphosate and hand-pulling of plants before they seeded. As we target Garlic Mustard in woodlands, we also spray many invasive Bush Honeysuckle shrubs as we encounter them. We strategically targeted known patches of Garlic Mustard in woodlots on the Erbes, Jeanblanc, Original, Wysneinski Central, and Mellot tracts. To avoid damage to valuable native, spring wildflowers on the Bauer tract we hand-pulled Garlic Mustard in the timber west of Meridian Road. Treatment of the original colonization sites seems to be depleting the seed bank, but it is a long, slow battle since plants produce copious amounts of seed, and research suggests that at least five years of complete suppression are required to significantly deplete the seed bank. Seed is also known to be dispersed long distances on the hooves, feet, and fur of animals. Despite our efforts to kill plants before seed production occurs, complete coverage and surveillance of the property is not possible, and we are subject to constant invasions from off-site seed sources. The only attainable goal for Garlic Mustard on this site is to control and limit the population rather than aim for complete eradication.

Invasions of prairie plantings, other grasslands, and tree plantings by Canada, Bull, and Musk Thistles and White and Yellow Sweetclover are a periodic problem. Canada Thistle is an aggressive perennial invasive which tends to thrive in disturbed habitat or the early stages of habitat restoration. In many cases we target invasions in our prairies on foot with backpack sprayers to prevent damage to non-target plants or mow Canada Thistles during the growing season prior to the flowering stage to prevent seed development. We have found our best results in recent years have come from controlling seed production of Canada Thistles and chemically treating the most severe invasions in the spring while mitigating sources of disturbance and interseeding native species to outcompete the thistle over time. Bull and Musk Thistles and White and Yellow Sweetclover are all biennial species (live two years, produce seed in year two, then die). For this reason, it can be possible to prevent seed production through repeated mowing, allowing time and competition to diminish the population. This has been a focus of our strategy for several years and has been working well.

Recent research has shown that in addition to displacing and outcompeting native plants that have value to wildlife, the invasive shrubs Bush Honeysuckle and Common Buckthorn introduce novel chemicals into the environment that can have deleterious effects on the survival of native vertebrates, from amphibians to birds and mammals. Over recent years we have made excellent progress clearing our woodlands of the adult, seed-producing individuals of these species as well as those of another invasive shrub,



Treating invasive shrubs

INVASIVE SPECIES MANAGEMENT (cont'd)

Autumn Olive. During the growing season and into the fall, we treated adult plants and seedlings of invasive shrubs with Glyphosate or Triclopyr 4 using backpack sprayers. Treatments varied from foliar spraying while the plants were actively growing to cut stump or basal bark treatments later in the fall. Keeping up with ongoing re-growth of seedlings and new invasions in these many acres is time-consuming and will be required annually for a number of years and periodically thereafter as we work through the invasive seed banks. The treatments require significant time and material, but they are critical to maintaining the progress we've made and will help prevent spread of invasives to new areas.

In the very short period of time this summer when it was dry enough to do so, we mowed clonal stands of Sandbar Willow in areas of wet remnant and restored prairie on the Montavon, Original, Martin, and Wysneinski North tracts. While the Sandbar Willow is a native species in our area, it is an invader of any moist habitat, particularly capable of diminishing the diversity and quality of wet prairie and sedge meadow. Periodic mowing of the many suckering stems of this plant can stop or reverse its outward spread.

We continue to become more effective and efficient at combatting invasive species as we refine our techniques. We monitor the scientific literature and maintain dialogue with colleagues and other professionals to learn methods and treatment options that could help us in our efforts at RWF. We've made outstanding progress controlling or suppressing many of these invasive species, and our habitat on site is much the better for it. There is no viable alternative to dedicating resources to invasive species control if we are to maintain quality habitat for a wide variety of native wildlife species.



Pruning fruit trees

DISEASE AND PEST CONTROL MANAGEMENT

Sphaeropsis, or Tip Blight, remains a problem affecting many Red Pines on this site. A number of trees needed to be removed this year, though fewer than in other recent years. In an attempt to control the spread of this blight in Red Pines, we treat trees of high aesthetic value with a foliar spray of the fungicide Topsin in May and June. We cut, removed, and burned Jack, Red, and Scotch Pines killed by Tip Blight, weather extremes, or Pinewood Nematode.

We maintained fruit trees with annual pruning and by following a recommended pest control program from Stark Brothers Nursery. We controlled insect pests, blight, and Cedar Apple Rust with one application of a dormant-oil spray and periodic applications of Home Orchard Spray and Ferbam. With the cool, late spring Apple trees bloomed late and produced fruit in overabundance this year. Fruit was numerous but very small and most dropped from the trees before they ripened. Pear trees bloomed at their usual time but cold weather likely prevented pollinators from fulfilling their role. Few pears were produced. Pest control measures were generally effective where applicable.

The emerald ash borer, which has spread across this part of the state in recent years, reached RWF (to our knowledge) in 2015. While we do still have some live, mature Green Ash trees that are apparently unaffected as yet, many have died and most others will follow. Ash did not comprise a large portion of our woodland tree community but nonetheless it is a shame to watch a native species fade away due to an introduced insect pest. On a landscape level, there is essentially nothing we can do but watch the process and remove affected trees that threaten buildings.



Winter wheat cool season food plot for wildlife

FOOD PLOTS / AGRICULTURE PLANTINGS

We maintain wildlife food plots of corn, winter wheat, sunflowers, soybeans, oats, Imperial Whitetail Clover, and Brassica to complement our native habitat in meeting the food requirements of wildlife. We planted 7 new Imperial Whitetail Clover patches (~2.7 ac). We planted Liberty herbicide-tolerant corn and soybeans and treated with that to help combat Glyphosate-resistant Water Hemp in soybeans. This was the most challenging year in memory for farming row crops in our area. A late, cold spring; record amounts of rainfall; generally cool, wet summer and fall conditions; and early frost conspired to delay planting, slow growth, and prevent the full maturation and drying of crops. We shelved our plan to plant sunflowers, which require the longest maturation period, because by the time planting was possible there would not have been enough time left in the growing season for them to mature. Many farmers in our immediate area were prevented by the weather from planting all or portions of their fields this year. We managed to plant all of our row crop acres but yields were significantly reduced. There will, however, be plenty of crop remaining for winter use by wildlife.

Final acreage figures for all wildlife food plots included twenty-five fields of corn totaling 63.2 acres, twenty-two fields of soybeans totaling 71.9 acres, twenty-six fields of Imperial Whitetail Clover totaling 15.8 acres, two fields of winter wheat totaling 2.2 acres, and thirty-six fields of Brassica totaling ~4 acres. Acreages are measured using GPS and mapping software and reported to the Farm Service Agency for crop certification.

We used Verdict, Glyphosate, and Sotrion for weed control on all corn acreage and Verdict, Liberty, and Secure on soybeans. We regularly mowed Imperial Whitetail Clover and Chicory for weed control and sprayed Clethodim for control of grasses.

Over the last several years agricultural fields across northern Illinois (our site included) have been invaded by a Glyphosate-resistant Water Hemp weed which is extremely difficult to control. To adapt, many commercial farms have begun to use Dicamba, which is effective against Water Hemp but has a volatile chemistry that will often drift to non-target areas. Our relatively small agricultural fields and their proximity to the habitat we work so hard to restore makes currently available forms of Dicamba a poor fit for our site. This year's addition of Liberty to the herbicide program on soybean fields was designed to combat Water Hemp and other Glyphosate-resistant weeds without Dicamba. The resulting control of Water Hemp and other weeds in soybean fields was very good, however some stunting of soybeans in fields on sandy ground was observed. As with any program at RWF, we continue to research potential methods to determine if there is a more effective way to manage row crops for production and wildlife use.

Acclimating Channel Catfish during spring stocking



MAIN LAKE

Our management goals for Main Lake include promoting healthy populations of game fish for recreational fishing opportunities. This year we stocked five hundred 6–8" Channel Catfish to supplement the decreasing existing population, which is generally comprised of larger, older individuals. In order to minimize encumbrances to fishing we selectively treat the pond with a number of products to reduce algae and aquatic plant growth. To suppress growth of both plants and algae by reducing the available light in their required photo-spectrum, we applied a total of 37.5 gallons of Aquashade blue pond dye in periodic treatments from February to August. For control of rooted aquatic vegetation, we treated the lake with 5 gallons of Aquathol K in one treatment, 2.75 gallons of Aquastrike in two treatments, and 6.25 gallons of Reward in a single treatment. To control algae, we spread copper sulfate crystals across the bottom of the lake in two treatments totaling 800 pounds in April and October, and we made 14 treatments of Cutrine and/or Clearigate between May and October. We used a total of 180 pounds of Cutrine Plus, 66.75 gallons of Cutrine Ultra, 14.3 gallons of Clearigate, 11.25 gallons of Aquaprep, and 5 gallons of Amp. Planktonic algae was less of a challenge than most years. It was present most of the late summer but was very manageable. Filamentous algae has become more challenging in the last 2 seasons, especially in the latter half of this growing season when the more difficult to treat *Pithophera* algae emerged and maintained a presence into the fall of the year. *Pithophera* algae is known to have thicker cell walls than other forms of filamentous algae and requires greater doses of copper products to penetrate and effectively control it.

We performed annual maintenance on the aeration system to help balance the diffusers and keep them operating efficiently. We retrieved all diffusers from the lake bottom, cleaned them in a muriatic acid bath, reassembled them to the plastic tubing, and repositioned them on the lake bottom. We changed filters and graphite vanes on the compressors and adjusted control valves to balance the system. We shut the system down for winter in November following turn-over of the water column and will restart it in early spring—or earlier if snowpack over ice becomes too severe during the winter.

Extreme amounts of rain led to a fifth straight year during which we had to keep the control valve open more often than not to release excess water, even during the summer, fall, and early winter, which had been historically unusual for this pond. Though the lake required frequent algae treatments, management goals were achieved or exceeded for aesthetics and the health of the fishery. Both Bluegill and Largemouth Bass spawns were productive, and fall observations suggested a good food base of this year's fry remained for larger fish. The fishery would benefit from cover provided by emergent vegetation becoming established along a greater percentage of the lakeshore. Our seeding and transplant efforts to that effect along the south shoreline last year have not yet shown much sign of progress but still may lead to the desired outcome. We will continue to try to spare that shoreline from herbicide treatments next year.



Performing maintenance on aerator diffusers



Mated pair of Wood Ducks, *Aix sponsa*, at their nest box

WOOD DUCK NEST SURVEY

We maintained a total of 84 nest box structures for Wood Ducks on or near wetlands and waterways across the property. Maintenance of duck boxes includes repairing structural damage, cleaning out any remains in the boxes, and putting in fresh wood shavings for nesting material. Five boxes were damaged between the February repairs and the nest survey and were unusable for nesting. Two additional boxes were flooded during the nesting season due to record precipitation. We have three types of nesting boxes available for Wood Ducks: Ducks Unlimited plastic boxes, cedar wood boxes, and galvanized round metal cone boxes.

Wood Ducks nested in 20 of the Ducks Unlimited boxes (95%). Nine of these nests produced chicks (43%). The cedar boxes showed 88% Wood Duck use (45 of 51) of which 37% produced chicks. There were two successful nests this year from the 5 metal cone boxes (40%). Overall use of boxes by Wood Ducks (91%) was greater than last year (87%) but nesting success rates were lower. Thirty-nine percent of available boxes produced a successful nest (19% less than last year). The numbers of eggs hatched was 9.5% less than last year at 245 (271 last year) while the total number of eggs recorded was 43% higher at 1148 (802 last year). The proportion of eggs that hatched was 21% (34% last year). There were ten more “dump nests” this year, ending a run of 2 consecutive decreases in that category. The total number of eggs laid in “dump nests” increased by 62% from a year ago. “Dump nest” refers to nests in which female Wood Ducks (frequently more than one) will lay eggs but not incubate or care for them. This occurs both in artificial nest boxes and natural nesting cavities. The behavior is a form of nest parasitism in which females attempt to sneak their eggs into an active nest to have another female raise the resulting chicks with her own brood.

After conducting this year’s nest box inspections, we found several boxes that were usable but in need of replacement or repairs. We will carry out the necessary maintenance on these boxes prior to the upcoming nesting season. We will also install boxes on the newly constructed Buck and Doe wetlands on the Erbes and Original tracts.

Juvenile Eastern Bluebird, *Sialia sialis*



EASTERN BLUEBIRD NEST SURVEY

We inspected the fifty Eastern Bluebird nest boxes on site for use during the nesting season on July 17th. One nest box was unusable for birds during breeding time due to damage. Eastern Bluebird nests were observed in 28% of the remaining boxes, higher by 9% compared to last year. House Wrens nested in 2 fewer of our boxes than last year but displaced more bluebirds from their nests. We found that wrens constructed 7 nests over an existing Bluebird nest compared to just 1 last year. We estimated that there were about 11 fledglings from our boxes this year, a second consecutive decrease. It is likely that the cool, wet springs we've experienced lately have not favored Bluebirds, both due to incubation difficulties and because Bluebirds prefer to forage for their insect prey in more sparse grass and forb cover. Our approximation of the number of fledglings remains a rough estimate based on egg fragments observed and other subjective factors. We are likely to continue to see significant fluctuation in Bluebird recruitment dependent upon local or regional habitat, weather patterns, competition for nesting sites (with species such as House Wrens), fluctuations in food availability, or other factors. As the oak trees and savannas restored on the property mature, we expect conditions to become more and more favorable for Eastern Bluebirds.

Other species that used Eastern Bluebird nest boxes in 2019 included House Wren (44%), Tree Swallow (8%), and European Starling (2%), and two boxes (4%) showed some level of use with indeterminate nesting materials. Nest boxes were found to be empty on 6 inspections (12%). In addition to replacing and repairing aging boxes, we continue to adjust nest box placement to try to favor Bluebirds, especially over their chief competitors, Wrens. Even so, intense competition for nesting sites may be an unavoidable effect of our woodlands reaching a stage of maturity preferred by wrens.





Adult doe and bucks

WHITETAIL DEER SURVEYS

Following a protocol we established years ago, we conducted three ground censuses for Whitetail Deer early in the evenings of January 28th, February 13th, and February 25th of 2019. They were conducted from a vehicle traveling a predetermined route along gravel roads on site. Two observers recorded deer seen from the vehicle. The census route and schedule of dates are kept similar from year to year. The total numbers of deer seen for each census were 84, 184, and 172 respectively, for an average of 147 deer sighted per survey. One of the reasons we monitor ongoing trends in deer numbers is because when deer populations become excessively high, the herd, individual deer, and the quality of local habitat will suffer. This year's surveys were the highest in four years and slightly above our 26-year average. In recent years we had observed that the deer herd had been reduced to below a maximum carrying capacity and that the risk of habitat damage due to excessive deer browse was low. We therefore decreased our hunting pressure and harvest goals to allow for greater recruitment into the population. While this year's survey results indicate some regression to the mean through population growth, we continue to believe the herd could be allowed to expand somewhat further without causing significant damage to the available habitat. Based on this information it would be recommendable to maintain a modest harvest of does while continuing to monitor for population changes and habitat affects. It is worth noting that these road survey numbers are a "noisy" dataset as they are simple observations of deer made over three days in the winter from a limited vantage point. There are a number of variables that can skew results one way or the other despite our efforts for consistency. They are only one index of the size of the deer herd and are one of many metrics taken into consideration for devising our deer management strategy.

We use trail cameras to survey wildlife use of the property and they are especially effective when deployed to monitor deer. A total of fourteen cameras were strategically placed across the property to gather information on the movement patterns, reproductive parameters, concentrations, and general presence of deer and other wildlife. Information collected with these cameras can be used to estimate deer recruitment rates, buck-to-doe ratios, numbers of mature bucks, and movements and patterns of deer and other wildlife with more nocturnal or secretive behavior.

On February 22nd we surveyed all corn food plots planted in 2018 to determine utilization by deer and other wildlife. It is important to note that these numbers refer to the food crop that was available over the winter of 2018–2019 and is not referencing the crop we planted in 2019. Our surveys reflected that despite wet growing conditions in 2018, corn production was quite good, partially due to a continuing reduction in early season browsing by deer. Many lower-lying soybean fields were negatively affected by excessive rainfall, resulting in shorter, less productive plants. All corn fields produced ears this year (which has not always been the case). Taken as a whole, in food plots property-wide, 84% of corn stalks still had cobs attached (a 13% decrease over the previous survey and more in line with previous results), and on those, ~19.5% of kernels remained on the cobs. The previous two surveys had shown record amounts of corn remaining at the time of our survey. This result indicates increased utilization by deer and wildlife and tracks with our increased deer observations during our road surveys. The results of this crop survey show far more than adequate corn standing available to wildlife into the spring. In addition to corn, we left about 15% of our soybeans standing for wildlife use. Improved shatter-resistance of modern soybean varieties has made this crop an even more valuable food source in winter in recent years. We've found that they continue to hold beans in pods deep into winter and even into spring, above any typical depth of snow cover and readily available for wildlife browse. In recent corn surveys, we've made it a point to record information on soybeans as well. This year's survey showed that there were standing beans left in pods in most fields in late February, but several fields showed heavy utilization by wildlife. Five fields had nearly no beans left while 10 fields were recorded as having some or many beans



Feeding fawns and watchful mothers

WHITETAIL DEER SURVEYS (cont'd)

remaining in pods. It has now been several years since we last observed evidence of deer foraging in the winter on “hunger foods” such as Red Cedar, Arbor Vitae, or Yew shrubs in landscaping during the late winter months.

We monitor many aspects of our deer population through cooperative efforts with hunters, who fill out a log sheet upon completion of each deer hunt. They record numerous factors and observations on deer and other wildlife, which are entered into a database by Foundation staff for analysis. This dataset helps us identify trends in population demographics that influence subsequent population numbers and give us invaluable information which strongly informs our deer management strategy. Our hunters also provide us access to sample material from harvested animals which we collect and deliver to the Illinois Department of Natural Resources to be tested for Chronic Wasting Disease. RWF has provided the Department with the majority of samples taken from Lee County over the years. Thankfully, no positive cases have been found in our samples or in Lee County to date.

Foundation employees captured five Whitetail Deer fawns on the property incidental to other work: two females and three males. We equipped the fawns with individual ear tags containing I.D. numbers, the acronym “RWF,” and our office phone number. To date, we have tagged 87 deer (43 male, 44 female, and one unknown). Of these, 20 have yielded valuable post-capture information regarding local population demographics, mortality factors, and movement patterns. We have recovered eight females on site: six harvested by hunters, and two killed by vehicle collision. We have recovered five males on site: two killed by vehicle collision (both < 1 year old), one evidently predated in its first month, and two harvested (both at 4.5 yrs. old). Three males (one 1.5 yrs. and two 2.5 yrs. old) and two females (1.5 yrs. and 4.5 yrs. old) have been phoned in after being harvested off site by hunters. These deer were from < 1 mile to 25 miles from the Foundation when harvested. The data collected from this tagging program provides useful information that we use when developing our deer management strategies.





Gray treefrog, *Hyla versicolor*, expressing green color phase

HERPETOLOGICAL SURVEY

Foundation staff surveyed reptiles and amphibians using cover boards, aquatic hoop traps, and visual and audio searches. Amphibians observed on site this year included Tiger Salamander, Western Chorus Frog, Blanchard's Cricket Frog, Grey Tree Frog, Northern Leopard Frog, Green Frog, American Bullfrog, and American Toad. Reptiles observed this year included Six-Lined Racerunner, Fox Snake, Eastern Garter Snake, Smooth Green Snake, Eastern Hognose Snake, Brown Snake, Painted Turtle, Common Snapping Turtle, Blanding's Turtle, and Ornate Box Turtle. No Spring Peepers, Plains Garter Snakes, or Spiny Softshell Turtles were recorded this year.

As we have for several years now, we put specific effort in April and May into surveying our wetlands for Blanding's Turtles with the goals of furthering our understanding of their use of the site, identifying nesting areas, and protecting nests from egg-predators. Read more about our efforts to study and assist Blanding's and Ornate Box Turtles in the "Research and Study Projects" section of this report. While trapping for Blanding's Turtles, we also caught 30 Painted Turtles from eight different wetlands. All new turtle captures are assigned and marked with a code so that they can be identified if they are caught in the future. This provides us with valuable information on growth rates and population demography. To date, we have marked and released about 299 adult turtles of four species.

The last few years have arguably been too wet to provide ideal conditions for some pond-breeding species of amphibians. Perhaps that should be stated "too consistently wet": the vast majority of our wetlands have maintained pooled water, without drying, for more than four years. Ephemeral ponds—those that dry completely each summer or periodically—are ideal breeding sites for most of the amphibian species native to this site. Periodic drying prevents the buildup of populations of upper-level predators of amphibian larvae such as fish and egg predators such as leeches. Successive wet years have allowed for invasion and persistence of Green Sunfish and Bullhead Catfish in many of our wetlands. Additionally, ponds that don't dry down for very long do not get the nutrient boost provided by the summer growth of annual plants on exposed mudflats. Anecdotal observations would suggest that Tiger Salamanders in particular have seen a decline in recruitment in recent years, most likely due to these factors. We did, as explained in more detail in the "Wetlands" section of this report, draw water levels down this summer but saturated soils and continued regular rain events prevented timely drying of most of these. Next year we will hope for a return to more historically normal weather patterns and plan to take advantage of any natural summer dry periods we may experience.



Brown Mantidfly, *Climaciella brunnia*

WILDLIFE OBSERVATIONS

The Foundation maintains annual records of on-site wildlife observations as well as reproductive parameters of several species. The following are notes of selected observations. Ring-Necked Pheasant recruitment rates appeared to be relatively high yet again this year. Wild Turkey recruitment looked similar to recent years. This species, like so many other ground nesting bird species, would benefit from a year without the excessive spring rains and cool temperatures we have experienced lately. It has been several (wet) years since we've seen particularly strong brood numbers of turkeys in the spring and summer months though the population apparently remains stable. Bobwhite Quail were seen and heard frequently for a fifth year in a row. Quail were seen and heard from one end of the property to the other which is a positive sign. This species has seemed on the brink of a true population climb at various points in the last decade or so; here's hoping that this time the Bobwhites can gain some real traction. Sandhill Cranes continue to breed on site, though fewer juveniles were seen this year than in some years. Migratory waterfowl—ducks and geese—used the site in great numbers during the spring migration but the fall migration was again minimal this year on our site, presumably due to the abundance of flooded agricultural fields around the region. Observations suggest that Coyote and Raccoon populations remain high, though both may have declined from recent highs to a degree.

We conducted a quick, opportunistic fish survey of ephemeral pools in and around Beaver wetland and the associated drainage ditch when late summer conditions concentrated fish in several small pools. With a minimal amount of seining and dip netting we identified eleven fish species: Black Bullhead Catfish, Common Carp, Bluegill Sunfish, Green Sunfish, Largemouth Bass, Starhead Topminnow, Bullhead Minnow, Golden Shiner, White Sucker, Johnny Darter, and Western Blacknose Dace. Sightings of Endangered or Threatened species included Starhead Topminnow, Black-Crowned Night Heron, Osprey, Northern Harrier, American Bittern, Blanding's Turtle, and Ornate Box Turtle. Other species of interest included Virginia Rail, Scarlet Tanager, Rose-Breasted Grosbeak, Pied-Billed Grebe, Greater White-Fronted Goose, Trumpeter Swan, Woodcock, Eastern Whip-Poor-Will, Hooded Merganser, Bald Eagle, Eastern Screech Owl, Blanchard's Cricket Frog, Tiger Salamander, Six-Lined Racerunner, Eastern Hognose Snake, Smooth Green Snake, American Badger, American Beaver, White Sucker, and Western Blacknose Dace.

OTHER SURVEYS AND DATABASE RECORDS

Several projects are of an ongoing nature and require field investigations, monitoring, and updating of records annually. Some of these include Wild Turkey brood surveys, fish surveys, habitat type database records, wetland management regimes, native plant seed collection lists, seed cleaning techniques, native plant seed harvest chronologies, prairie burn schedules, and prairie and wetland restoration management notes, techniques, and reports.



Wild Turkey hens and poults, *Melagris gallopavo*



Smooth Green Snake, *Opheodrys vernalis*

REPTILE STATUS AND HEALTH IN THE GREEN RIVER CONSERVATION OPPORTUNITY AREA

Researchers from Dr. Richard King's laboratory at Northern Illinois University have been conducting herpetological surveys and research at RWF and other local, protected, natural areas for the last several field seasons. During their summer research periods RWF has tried to help facilitate these studies by providing lodging during their field season. The crew has already reported significant finds of rare species that had not been documented from local sites in many years. The following paragraphs are Dr. King's summary of some of their snake survey and turtle health findings at RWF.

Researchers from Northern Illinois University included Richardson Wildlife Foundation in their assessment of amphibian and reptile status and health within the Green River Conservation Opportunity Area. Snakes were surveyed by establishing arrays of artificial cover objects (ACOs) consisting of two rows of 8 plywood sheets measuring 24" x 32" x 5/8" each (Figure 1). ACOs were checked every week or two and snakes found beneath them were identified and measured. Common Gartersnakes were encountered most frequently, but Plains Gartersnakes, Dekay's Brownsnakes, Eastern Foxsnakes, and Smooth Greensnakes, an Illinois species of greatest conservation need, were also encountered regularly (Table 1). ACOs yielded just one Eastern Hognose Snake but two others were encountered incidentally. Overall, snake encounter rates were higher at Richardson Wildlife Foundation than at Green River State Wildlife Area (Table 2). Common Gartersnakes, Dekay's Brownsnakes, and Eastern Foxsnakes were especially common at RWF; Plains Gartersnakes, Smooth Greensnakes, and Eastern Hognose Snakes were encountered at similar rates at the two sites. Plains Hognose Snakes, an Illinois species of greatest conservation need, were encountered infrequently at GRSWA and not at all at RWF. Length-mass relationships were similar between sites (e.g., Eastern Foxsnakes, Fig. 2), suggesting growth and body condition is comparable.

Health assessments of Ornate Box Turtles and Blanding's Turtles, both Illinois species of greatest conservation need, within the Green River Conservation Opportunity Area were carried out on swab samples submitted to the University of Illinois Wildlife Epidemiology Laboratory. Of 14 viral and bacterial pathogens screened in Blanding's Turtles, only one, *Emydoidea Herpevirus 1*, was detected in 3 of 15 samples assayed. Of 12 viral and bacterial pathogens screened in Ornate Box Turtles, only one, *Terrapene adenovirus*, was detected in 2 of 21 samples assayed. The three RWF Blanding's Turtles and two RWF Ornate Box Turtles included were all negative for all pathogens tested.



Locations of artificial cover object (ACO) arrays (dark blue rectangles labeled S, T, U, W, X, Y and AD) at Richardson Wildlife Foundation.

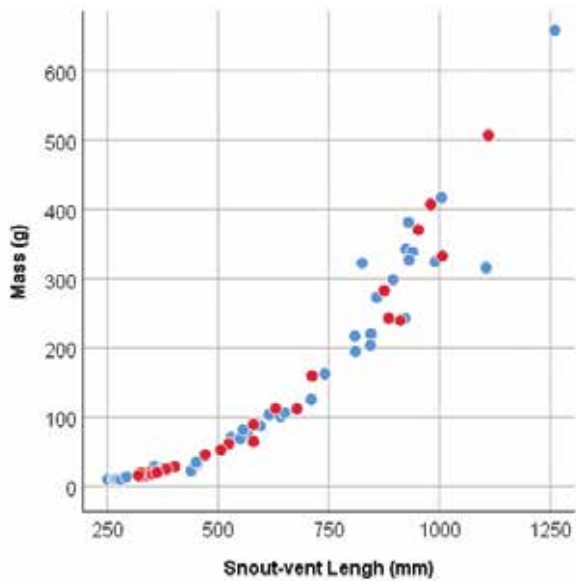


Fig. 2.

Comparison of length-mass relationship in Eastern Foxsnakes at Richardson Wildlife Foundation (red) and Green River State Wildlife Area (blue).

Table 1.

Total snake captures at ACO arrays at Richardson Wildlife Foundation in 2018 and 2019
(See Fig. 1 for array locations)

| Species | S | T ¹ | U | W | X | Y | AD ² | Total |
|-----------------------|----|----------------|-----|-----|-----|-----|-----------------|-------|
| Common Gartersnake | 26 | 2 | 84 | 101 | 159 | 217 | 22 | 611 |
| Plains Gartersnake | 9 | | 1 | | 7 | 7 | 1 | 25 |
| Dekay's Brownsnake | 31 | 2 | 7 | 33 | 19 | 13 | 7 | 112 |
| Eastern Foxsnake | 5 | | 15 | | 4 | 4 | 2 | 30 |
| Smooth Greensnake | | | 2 | 1 | 11 | 1 | | 15 |
| Eastern Hognose Snake | | | | 1 | | | | 1 |
| All Snakes | 71 | 4 | 109 | 136 | 200 | 242 | 32 | 794 |

Notes:

1 - 2018 only

2 - 2019 only

Table 2. Snake capture rates (captures per 100 ACO checks) at Richardson Wildlife Foundation (RWF) and Green River State Wildlife Area (GRSWA) during 2018 and 2019

Rates are based on 1,872 ACO checks at RWF and 11,104 ACO checks at GRSWA which yielded 794 snake captures at RWF and 1,781 snake captures at GRSWA.

| Species | RWF | GRSWA |
|-----------------------|-------|-------|
| Common Gartersnake | 32.64 | 11.43 |
| Plains Gartersnake | 1.34 | 1.04 |
| Dekay's Brownsnake | 5.98 | 1.91 |
| Eastern Foxsnake | 1.60 | 0.18 |
| Smooth Greensnake | 0.80 | 1.39 |
| Eastern Hognose Snake | 0.05 | 0.05 |
| Plains Hognose Snake | 0.00 | 0.05 |
| All Snakes | 42.41 | 16.04 |



Tallgrass prairie restoration

REGIONAL GRADIENTS IN PLANT-SOIL FEEDBACKS

Dr. Scott Meiners of Eastern Illinois University has used the Foundation several times in the recent past as a field site and source of materials for his research, frequently focused on the interactions and relationships between plants and soil microorganisms. He is currently collaborating with Dr. Helen Alexander, Dr. Jim Bever, and Dr. Peggy Schultz of the University of Kansas on a related project described below. RWF was pleased this spring to assist with identification of source locations and collection of materials for this project.

Plant-microbe interactions are critical in determining the diversity and composition of grassland habitats. However, eastern prairies are consistently more diverse than drier western prairies, potentially due to the changing strength of plant-microbial interactions along this precipitation gradient. Researchers from the University of Kansas (Dr. Helen Alexander, Dr. Jim Bever and Dr. Peggy Schultz) have pulled together a network of six sites spanning this gradient to experimentally test the role of rainfall in determining plant-soil feedbacks. Eastern Illinois University (Dr. Scott Meiners) is the easternmost of these research sites.

Using soil microbes collected from RWF, we have now completed the first season of this work. We have inoculated seedlings of three prairie species (*Andropogon gerardii*, *Lespedeza capitata*, and *Silphium integrifolium*) with live prairie soil and grown them for one season in Casey, IL. This phase of the experiment is often referred to as the training phase of the project as it generates soil microbial communities cultured by each of the plant species. In the spring of 2020, we will be completing the second phase of the project, growing a second round of seedlings in this soil to assess how the impacts of soil microbes have changed. This project has trained one undergraduate (Isabella Lopez) who will be passing the second phase of the project off to a second student, Kenzie Funk. By comparing the results of the project across the gradient, we will be able to assess whether plant-soil feedback become stronger with more rainfall.



Rosinweed, *Silphium integrifolium*



Blanding's Turtle, *Emydoidea blandingii*, eggs recovered for head start program

RARE TURTLES RECOVERY PROJECT

Blanding's and Ornate Box Turtles are Endangered and Threatened in Illinois respectively and have drastically declined in number in the state and in many places across their native ranges. They are among the most imperiled full-time resident species on our site; both are primarily prairie species. Blanding's Turtles are a species evolved to exist in a prairie pothole wetland ecosystem. Ornate Box Turtles are a terrestrial species and don't have the same wetland requirements as Blanding's Turtles.

The loss of historical prairie habitat—and especially of large, unbroken blocks of prairie—has been a leading factor in the decline of both species. At RWF we have been actively restoring prairie and wetlands, which has certainly benefitted the small remaining populations of these two turtle species. The most limiting factor for turtles in this region today other than habitat loss is nest and hatchling predation by mesopredators, primarily Raccoons. Raccoons are a species that benefits from and exists in larger numbers on today's agricultural landscape than they did in days before the plow. The quality of historic nesting sites for Blanding's and Ornate Box Turtles at RWF may have diminished over the years as trees planted on sandy ground have matured and closed the canopy or briars and shrubs have increased underneath, both factors potentially making conditions more appealing to Raccoons and other mesopredators. Relatively open sandy soils are preferred nesting sites for female turtles to use for egg deposition.

For several years we have taken actions meant to foster a recovery of these populations on our site. In initial phases we were able to identify some of the nesting areas being used by these species to allow us to conduct informed habitat management practices. Last year we leapfrogged that accomplishment when we were finally able to follow two female Blanding's Turtles during their nesting forays, protect their eggs from predation with wire baskets around the nest site, and release 22 healthy hatchlings directly to shallow, vegetated wetland habitat after they emerged in late summer. This year, our recovery program took another, even more significant leap forward through cooperative partnership with The Nature Conservancy, researchers from Northern Illinois University and the University of Illinois, the Forest Preserve districts of DuPage and Lake Counties, the Illinois Department of Natural Resources, and others.

Beginning in May, we ran aquatic hoop traps and conducted visual searches. Trapping efforts for Blanding's Turtles were especially difficult this year. All of our wetlands had been full since at least the previous fall so there were few locations to specifically target over other areas, thus spreading us out. Wet spring and summer weather meant we had to be especially careful with trap placement to avoid having traps inundated under fluctuating water levels and potentially harming the turtles we seek to help. Often the result was choosing the safer option over the option with a greater likelihood of success. While we caught a good number of Painted Turtles and a few juvenile Snapping Turtles (described in the Herpetological Surveys section of this report) we did not capture any additional Blanding's Turtles prior to nesting season. We did happen to find one female moving over land following nesting season and equipped her with a transmitter in the hope that we will be able to protect any eggs she may have next year. We began this spring with radio transmitters already on four females that we had tracked the previous year. Prior to nesting season, we used telemetry to relocate and recapture these females to determine if they were gravid (pregnant with eggs). The battery of one of the transmitters had apparently failed over the winter so we were unable to locate that female. We palpated each of the remaining 3 turtles and found that all were gravid. This was a very welcome outcome as Blanding's Turtles do not typically nest every year of their adulthood.



Egg incubator

Hatchlings before move to head starting facility

RARE TURTLES RECOVERY PROJECT (cont'd)

Typical nesting season for both Blanding's and Ornate Box Turtles is late May into June. Beginning in mid-May we regularly located the female turtles, triangulating their radio signal to determine where they were and if they remained in a wetland. It is common for Blanding's Turtles to move from one pond to another and two of these turtles did so prior to their nesting foray. One female left the relative protection of the RWF boundary and was located with permission in a flooded area in a neighbor's row-crop field. For her safety we returned this turtle to the RWF wetland she had previously occupied, as vehicles and farm equipment are the most significant source of unnatural mortality in adult turtles in our region. Nesting occurred later than in previous years of our project, probably due to unusually cool, cloudy spring weather. In mid-June the turtles began leaving their wetlands in search of nesting sites. This process often takes days, and is particularly challenging to researchers trying to be present for the actual nesting event because eggs are most often laid at night (but not always). Having learned the hard way in previous efforts that these turtles cannot be relied upon to nest at a "typical" time, we located each turtle approximately every 3 hours around the clock while they were on nesting forays until they eventually selected a site, dug a circular depression in sandy soils, and deposited their eggs.

Two females nested on the night of June 13th and the third (the youngest female) nested on the night of June 22nd. None of the females gave us the slip this year and we were able to locate each while she deposited her eggs. Whereas last year we protected the nest site from predation using wire baskets, this year we allowed each female to finish deposition and then removed the eggs from the nest. With clutch sizes of 14, 12, and 13, we recovered a total of 39 eggs. Having formed partnerships with several other conservation agencies and having been granted legal permitting from the Illinois Department of Resources to do so, we took our recovery efforts to the next level. We placed the excavated eggs into containers with sand from the nest site and drove them to a facility in DuPage County where professionals have been successfully incubating and head-starting Blanding's Turtles for over a decade. There, Ecologist Dan Thompson incubated our eggs.

Like certain other turtles, Blanding's Turtles exhibit Temperature Dependent Sex Determination (TSD) rather than a genetic, chromosomal determination of sex. In this species cooler incubation temperatures lead eggs to develop into male hatchlings while warmer temperatures result in female hatchlings. This interesting aspect of their development affords us a level of control over the sexual outcome of incubation. Because Blanding's Turtles exhibit delayed sexual maturity (>14 years for Females, ~12 years for males) and because reproductive females are so desperately needed to foster a recovery we chose to ask Dan to incubate each clutch at temperatures to generate a 2:1 ratio of female to male hatchlings following methods he has used in his own DuPage County recovery program.

Thirty-eight of the thirty-nine eggs hatched in August. The hatchlings were given time to acclimate to life outside the egg, were individually marked, and we moved them to a facility in Lake County, where Gary Glowacki operates that county's Blanding's Turtle recovery effort. Under Gary's care, the RWF hatchlings will remain active over winter in controlled, aquatic enclosures with heat lamps and a highly nutritious turtle diet. Under these conditions they will be able to grow far more rapidly than is possible in the wild as well as to grow over winter, a time at which they would otherwise be dormant and not grow at all. Once the hatchlings achieve a target size and weight, which should happen in early summer of next year, we will bring them back to the Foundation to release them into wetlands having achieved in a matter of months growth that would have taken about 4 years in the wild. At this



Head starting quarters

RARE TURTLES RECOVERY PROJECT (cont'd)

size they will be far less vulnerable to predation from fish, birds, small mammals, and bullfrogs and therefore more likely to survive to reproductive age. Another potential advantage is that head starts may achieve reproductive maturity at an earlier age than their wild counterparts.

We have not yet made the same strides in our efforts with Ornate Box Turtles as we have recently with Blanding's Turtles. We are currently aware of only 2 females on site and a male that has not been seen in several years. Both females are equipped with radio transmitters. We checked their location and status through the spring and summer months. In the two years we have monitored them they have rarely strayed more than a few dozen meters, occupying a very small home range. Neither has been gravid or laid eggs in that time to our knowledge. It is difficult to definitively conclude whether a Box Turtle is gravid or not because of the challenges of palpating them due to their small size and ability to close their plastron on probing fingers. They have much smaller clutch sizes than Blanding's when they do produce eggs (1–3). We were grateful to have the opportunity to send our 2 females to a local animal hospital for radiography along with several other females being monitored in a research project at Nachusa Grasslands by graduate student Devin Edmonds. The X-rays of the RWF turtles did not reveal the eggs we had hoped to see but we're quite grateful to Devin for including our individuals nonetheless.

We can not expect to capture all females of either of these turtle species every year nor protect all nests from predators. Moreover, hatchlings and juveniles are at significant risk of predation by mesopredators such as Raccoons, Opossums, Mink, and Coyotes. To address this threat to our imperiled turtle populations, we applied for a special permit from the Illinois Department of Natural Resources to trap mesopredators outside of the typical, legal trapping season. The permit was granted and we received it just before turtle nesting season. We deployed 36 traps for about a month and a half, targeting Raccoons in areas in which Blanding's or Ornate Box Turtles have nested or are suspected to have nested in the past. Over 1,385 trap nights (1 trap deployed over 1 night = 1 trap night), we removed 103 Raccoons. With an earlier anticipated start to our trapping efforts next year we hope to provide greater protection to these turtle populations.

The road to recovery for either of these turtle species will be long and difficult. The strides we made this year were due primarily to collaboration and partnerships as will be any future success. Discussions, planning sessions, cooperation, and mutual support from colleagues have been critical to scaling up our efforts efficiently. Across northern Illinois these turtles face many of the same threats and require the same types of interventions in order to remain part of the animal community on our local landscape. We are very fortunate and are very grateful to have found the partnerships we have formed over the last few years and we look forward to working together on this important effort.



Blanding's Turtle demonstrating basking trap

EFFICACY OF TURTLE BASKING TRAPS

Over the years we have offered our summer interns or seasonal employees the opportunity to conduct a research project of interest to them that would address questions beneficial to the Foundation. Taylor Steinfeldt and Brandon Jahn, our summer seasonal employees, took on such a project this summer in an effort to find a more efficient way for us to sample aquatic turtles, especially Blanding's Turtles. Below is a synopsis of Taylor and Brandon's report on their findings.

Blanding's Turtle (*Emydoidea blandingii*) habitat has been greatly decreased over the decades as they grow ever closer towards extinction in many parts of their historical distribution. In attempts to prevent this from happening, *E. blandingii* is being studied and conservation measures are being implemented across its range. Locating adult *E. blandingii* can prove to be quite difficult due to many factors including their rarity and the vegetated aquatic habitat they favor. In an attempt to capture more Blanding's Turtles, basking traps were created to take advantage of the turtle's inclination to bask in the sun during cool weather or while incubating eggs. Blanding's Turtles have been observed at RWF and elsewhere to bask on logs, Muskrat huts, vegetation, and other structures in aquatic habitat. Homemade basking traps constructed of salvaged materials were set in various ponds at RWF. During this period many Painted Turtles were caught but, unfortunately, no Blanding's Turtles. Hypotheses were formed about how to improve the design of these traps to make them more attractive or effective for Blanding's Turtles.

To answer these questions, we put multiple trap features under scrutiny, evaluated traps for turtle escape potential, and revised design and deployment techniques such as the following: baited vs. non-baited traps, floatation and/or anchoring methods, and ramp and basking platform styles.

To test how the presence of bait affects turtle attraction and the use of the trap, two ponds had each type of trap set in them (one baited and one non-baited), both installed in a very similar fashion. Our findings appeared to show that the presence of the bait had little effect on capture rates. However, this study was conducted during mid-summer, when food in the pond was readily available. We hypothesize that it could have a greater influence in the spring, while turtles have to more actively search for food. This factor is something that could be tested in future trapping seasons.

We tested various deployment methods, with a preference towards implementing a floating method that would automatically adjust to the ever-changing water level of the wetlands. Testing showed that a time- and cost-efficient method of a dedicated floatation system was not feasible. However, the plastic rings that the traps were made of were almost buoyant enough to fully lift themselves. As an alternative method for setting the traps, holes were drilled into the air chambers of the rings on the trap so that rebar stakes could be fed through. These rebar stakes were then held in place using spring clamps made from high-tension electric fencing wire. They could then be easily adjusted to the desired water level whenever the traps were checked.

The third test was to prototype various ramp and basking platform styles. The original version had the ramps rest on top of the basking platform. Video surveillance of turtles using the trap showed that they sought out the highest point and would rest there, which happened to be right on the edge of the trap. This means that when the turtle wanted to drop back in the water, there was a high likelihood that they would simply miss the trap and return to the pond. To remedy this issue, the ramps were attached in-line with the basking platform, and the basking platform was given an arch shape, making the center of it the highest point. In theory, this should coerce the turtles to climb further over the trap during basking.



Basking trap deployed

EFFICACY OF TURTLE BASKING TRAPS (cont'd)

Finally, escape tests were conducted, both with Painted Turtles and later with a Blanding's Turtle. Initial findings suggested that the top edge of the trap was smooth enough that the turtles were unable to climb over it, even when assisted. In principle, the turtle must be able to get half of its body mass over the edge in order to escape the trap. Painted Turtles never demonstrated an ability to do so. The Blanding's Turtle, on the other hand, was able to use its long neck and larger claws to pull itself over the threshold of the trap and escape. Trap height seemed to have little effect on escape potential. To address this issue the top lip of the trap was rounded to prevent the turtle from latching onto it. This alteration worked quite effectively in preventing escape; the turtle was now unable to grip the top edge to pull itself over the trap.



Blanding's Turtle, *Emydoidea blandingii*



Augustana College's Field Research Class visits RWF

EDUCATION

Whenever possible, the Wildlife Foundation hosts educational and community groups of all ages and backgrounds, fosters interest with the public in our mission and methods, and supports local education and research efforts however we can. As in any given year we oriented guests, students, and researchers to RWF, presented our museum specimens to interested groups, and provided some history and context to the Foundation: our mission and methods, successes and challenges, and how we fit into the regional conservation picture. Through our participation in the Illinois Recreational Access Program (IRAP), we provided state-administered spring and summer access to nature lovers for hiking, bird watching, and photography, as well as youth turkey hunting to help young people learn safe and responsible hunting techniques and gain experience with and appreciation for wildlife and the natural world.

During the field season we provided temporary living quarters for various researchers, including summer-long quarters for university students studying reptiles and amphibians in the Green River Basin area (of which we are a part).

In May we welcomed Dr. Steve Hager's Field Research class from Augustana College for a day at RWF. While touring our site, we gave the class some background on the Foundation, how we compare to other conservation organizations, how we conduct our habitat restoration and maintenance work, the challenges wildlife face in the modern landscape, and what we do to address those challenges. We took the class to several of our restored wetlands and through prairie and oak savanna restorations to show and tell them about various methods and techniques we employ to achieve our habitat objectives. We demonstrated the radio telemetry equipment we are using to track turtles on site and let the students search out hidden transmitters using the gear. They found the transmitters (eventually). The group was enthusiastic and interested. They asked thoughtful questions and it was a pleasure to host and talk to them about work that means so much to us.

Since laying the groundwork for an organized, regional turtle conservation effort with colleagues in 2017, we have continued to engage and help to build and implement a 2–3 county plan to bring the Endangered Blanding's and Threatened Ornate Box Turtles back from the edge of extinction in this part of the state. We held a third formal "turtle summit" meeting in May, hosted by our friends at the Nature Conservancy's Nachusa Grasslands, during which an excellent turnout of professionals representing various agencies (state, federal, university, NGO, etc.) came together to share their knowledge, resources, and interest in a cooperative effort to implement a recovery strategy for these species. As described in the section of this report on our Rare Turtle Recovery Efforts, RWF is fully behind this objective. We, and of course the remaining Blanding's Turtle population on our site, benefitted immensely this year from the cooperative efforts of this group and we hope to continue to help expand this project.

Continuing education for staff personnel was also provided via participation in Pesticide Applicator Training Clinics, meetings with Illinois Department of Natural Resources Wildlife Biologists on the status and management of Chronic Wasting Disease in Whitetail Deer, and meetings with researchers from the Illinois Natural History Survey.



Interns Brandon Jahn (Left) and Taylor Steinfeldt (Right) locate a gravid Blanding's Turtle

INTERNSHIP / SEASONAL EMPLOYEE PROGRAM

Most years we offer one or more internships during the summer and/or fall months. This year we were fortunate to have three such positions to offer. During the summer months we welcomed to the team Taylor Steinfeldt, a recent Wildlife and Fisheries Science graduate of South Dakota State University, and Brandon Jahn, a Conservation Biology student at Illinois State University. Taylor and Brandon's responsibilities included invasive species control, collecting native plant seed, Wood Duck and Eastern Bluebird nest box inspections, herpetological surveys and conservation measures, equipment and shop maintenance, removal of downed trees, and wildlife surveys. During the late summer and fall we were happy to have the help of Courtney Diddell, who assisted with collection and processing of the native seed we will use in our 2020 habitat restoration projects. All three of these individuals worked hard to move us toward our goals and brought new eyes and perspectives to our projects. We wish them each a bright future and hope that they enjoyed their time working and learning at RWF.

VOLUNTEERS

The Foundation has benefitted over the years from the help of volunteers who donate their time in large or small amounts to assist with our conservation projects. At times, volunteers have come to us as individuals who introduce themselves simply to offer their help. Other times, they have come in group form as entire scouting troops, classes, or student groups. This year we received help collecting wetland plant seed from Randy Rutledge and Kaylie, Carter, and Preston Hamm. Tess Wilson edited and proofread copy such as this report and assisted with turtle tracking. Amanda Contreras assisted with winter-seeding woodland species into thinned tree plantings. We greatly appreciate the work that each put forth on the projects in which they were involved. We continue to seek and encourage other potential volunteers of various skill, knowledge, and experience levels, as there is no shortage of valuable habitat work to be done throughout the year.



Preston, Kaylie, and Carter Hamm survey insects after collecting wetland seed

MUSEUM COLLECTIONS AND STUDY SPECIMENS

The Foundation maintains museum collections of plants, insects, fish, herps, and mammals for educational and research purposes. Our herbarium collection consists of 979 plant specimens representing 78 families, 261 genera, and 455 species matted on acid-free paper. Our seed collection includes seed of 82 native prairie and wetland species displayed in glass vials. The insect collection exhibits several thousand pinned and labeled specimens in glass-topped drawers. Our fish collection is comprised of 185 specimens of 13 genera and 21 species preserved in jars of alcohol. The herp collection includes 35 specimens representing 15 genera and 17 species in the form of preserved turtle shells and specimens preserved in jars with alcohol. The mammal collection represents 30 species in the forms of hides stretched on wire frames and skulls displayed in a glass-topped case.

The majority of the specimens in our museum cases were collected on site by RWF personnel, researchers from the Illinois Natural History Survey, or educational institutions. Databases are maintained on each of these collections, and informational brochures illustrating species lists for the Foundation property are available for educational and research purposes.





Combining corn

EQUIPMENT, PROPERTY, AND BUILDING IMPROVEMENTS

Equipment maintenance and repairs account for a significant percentage of total employee hours each year. The following list details repairs or improvements made to implements, tractors, and trucks this year:

S770 Bobcat

- Repl. 1 foam-filled tire
- Repl. hyd. port assembly
- Repl. forestry boots

Bobcat Grapple Bucket

- Replaced 2 cylinders
- Replaced hydraulic hose

Bobcat Forestry Head

- Replaced hydraulic hose

Woods 7' Mower

- Replaced blades

Woods Batwing 180 Mower

- Replaced blades

John Deere 4020

- Repl. 3-pt control cable
- Repl. Batteries

John Deere 4040

- Replaced front tires
- Replaced 2 tie rods
- Replaced radiator hose
- Replaced A.C. belt
- Replaced alternator belt

John Deere 1435

- Replaced gauge wheel

John Deere 722 Soil finisher

- Replaced worn sweeps
- Repl. blades & bearings

John Deere 335 Disk

- Repl. wheel bearings
- Replaced 1 tire

John Deere Gator

- Repl. drive belt
- Replaced plugs
- Replaced passenger seat

McFarlane Drag

- Replaced drag chains

Gravity Wagons

- Replaced 3 tires

EZ Dump Trailer

- Replaced 1 tire
- Replaced bed floor

30' Boom Sprayer

- Repl. nozzles, diaphragms

Chevrolet Pickups

- Repl. rt wind. motor ('00)
- Repl. water pump ('02)
- Replaced trans. lines ('02)
- Replace radiator ('02)
- Repl. rear tires ('02)
- Repl. alternator ('07)
- Repl. fuel pump ('07)
- Repl. tailgate latch ('07)
- Repl. battery ('11)

In addition to the specific list above, we changed filters, fluids, and grease for all tractors and trucks; sharpened mower blades; made numerous repairs to small equipment including the chainsaws, backpack sprayers, snow blower, and leaf blower; and patched or otherwise repaired tires of implements, tractors, and trucks as needed.



Staining and finishing shiplap

EQUIPMENT, PROPERTY, AND BUILDING IMPROVEMENTS

This year we pressure washed and painted the Erbes cabin, as well as the small Morton outbuilding and large pole barn north of our office building.

At the lodge we pressure washed, caulked, and stained the siding on the western façade; rolled and treated the lawn for crabgrass; cleaned windows and gutters; repaired appliances; replaced a microwave; and repaired bathroom plumbing. In September plumbing burst in the basement and caused extensive flooding which we were fortunate to identify quickly. We removed all furniture and ran commercial fans and dehumidifiers for over a week to dry the carpet and baseboards. Once thoroughly dried we replaced all of the basement carpet and put new vinyl flooring and wood trim in one of the bathrooms.

At the Sanctuary we added two electric in-duct heaters to act as boosters for the existing geothermal upstairs units; removed and re-caulked windows; cleaned gutters; washed windows; pressure washed the building, decks, and stone walkways; touched up the paint on the decks in worn spots; added a handrail on the stairway; and made repairs to the dock.

We re-roofed the Bauer house with steel shingles and removed and closed a leaking skylight rather than replace it. At the Erbes cabin we replaced the motor on the well pump. At the Montavon house we made repairs to a sink and replaced a sump pump and wiring in the well house. At the Martin house we made electrical repairs and replaced the water softener. At our office building we replaced a rotted storm door and purged and replaced water in the boiler. Other repair and maintenance jobs included winterizing buildings, pressure washing barn roofs, cleaning gutters, and splitting firewood.

As in any year we spent significant time removing trees that were dead or dying from disease or brought down by storms and pruning trees near buildings and along lanes and trails to maintain accessibility on the property.

Property maintenance included many of the jobs listed above as well as overseeing pest control contractors at the Lodge and Sanctuary; mowing and rolling lawns; maintaining landscaping; grading, spreading gravel, and patching potholes on lanes; clearing snow; repairing and maintaining cable gates and posts; posting property boundary signs; repairing field tile; and removing Beaver dams where needed for proper drainage.

PRAIRIE AND SAVANNA MANAGEMENT



Maintaining the fire line in the savanna

On March 28th and 29th we conducted successful controlled burns on approximately 46 acres of prairie, savanna, and creek banks. With a crew of 5 people, 2 John Deere Gators and a John Deere tractor, each machine with 50 gallon pumper units, and 2 drip torches, we established a blackened safety zone around the perimeter of each unit prior to head firing. A total of seven units were safely and successfully burned. After burns were completed in the spring, our crew returned to cut and treat unwanted Boxelder trees invading the bottomland hardwood tree planting using chainsaws, loppers, hand saws, and herbicide. On another occasion, a single staff member treated invasive Honeysuckle and Multiflora Rose shrubs in the Savanna with a basal bark formulation of Triclopyr 4.

POND MANAGEMENT



Algae before and
after treatment
(left to right respectively)

We controlled aquatic vegetation and algal blooms using various chemical applications over the course of the growing season. For control of rooted aquatic vegetation, we applied Nautique once in May and Reward in 4 different applications: once each in May, June, July, and August. We made eleven treatments with Cutrine Ultra and/or Clearigate and Aquaprep to control algae from May to October. In all, we used a total of 2 gallons of Nautique, 7.7 gallons of Reward, 10.5 gallons of Cutrine Ultra, 5.8 gallons of Clearigate, and 5 gallons of Aquaprep. The continued use of Aquashade, a pond dye which helps limit the amount of light available in the water column, has helped us reduce the severity of blooms and therefore the amount of herbicide and algaecide needed to manage the pond. We applied a total of 10 gallons of Aquashade dye in 2 treatments in May and June.

We performed regular maintenance on the aeration system to help balance the diffusers and keep them operating efficiently. In August, we retrieved all diffusers from the pond bottom, cleaned them in a muriatic acid bath, reassembled them to the plastic tubing, lowered them to the pond bottom, and balanced the pressure to diffusers from the pump.



Beaver, *Castor canadensis*, dam on Brooklyn Creek

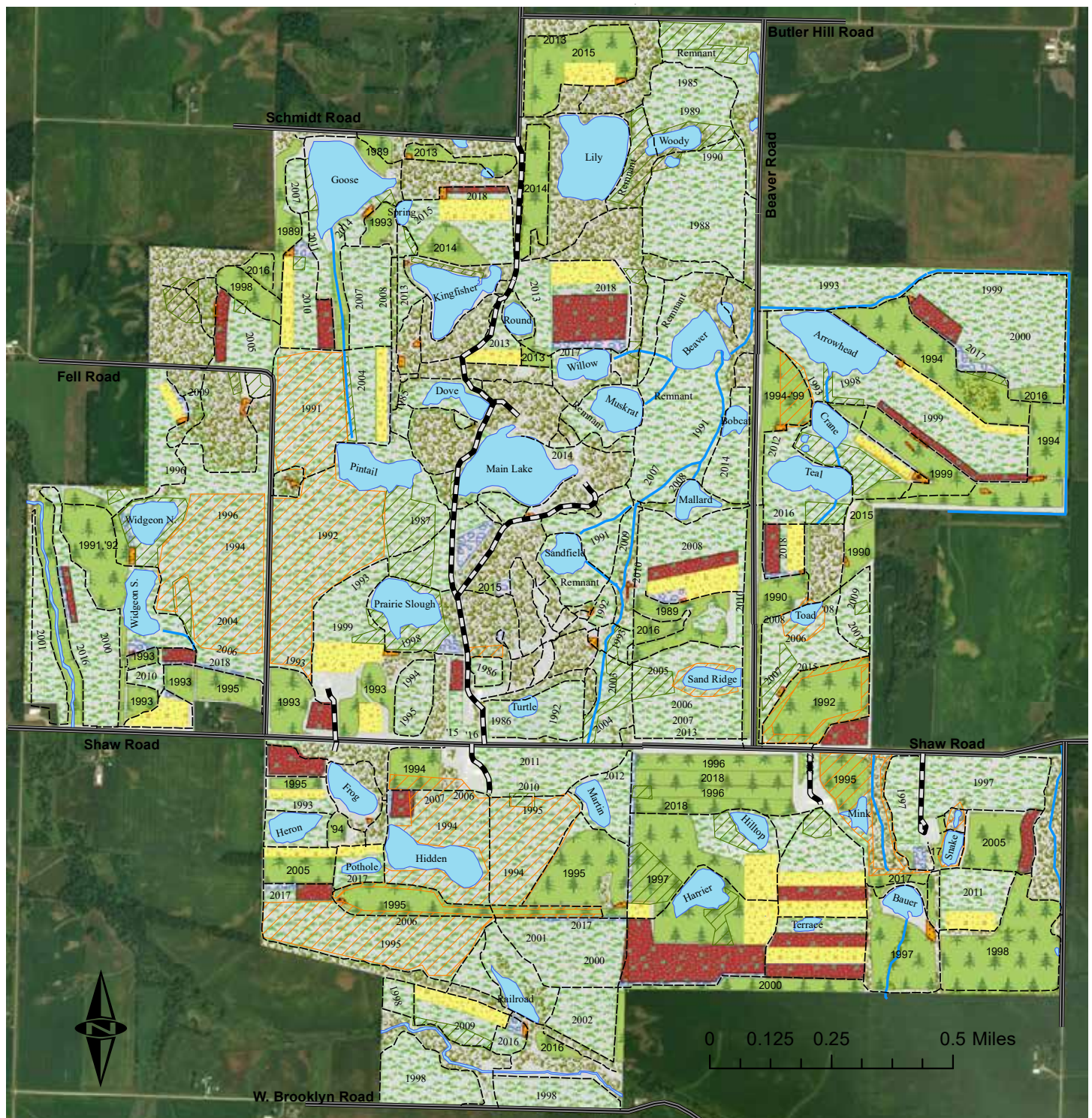
The following is a brief list of administrative support services involved with the daily operation of the Wildlife Foundation.

- Habitat planning, layout, mapping, and evaluation of annual land management practices
- Budgeting, payroll, task code, and programmatic accounting
- Preparation of an annual report of Wildlife Foundation accomplishments
- Maintenance of a website representing the Wildlife Foundation
- Representing RWF at meetings and conferences for the advancement of the Foundation
- Coordination of investigations, surveys, and research projects
- Literature review & research regarding management practices and conservation issues
- Completion of required state and federal reports for continued operation
- Applying for miscellaneous permits and licenses needed for continued operation
- Complying with reporting requirements for federal crop programs
- Ordering and purchasing supplies needed for operation and project implementation
- Conducting staff meetings and training sessions
- Devising work plans, project lists, and scheduling
- Conducting annual employee evaluations and reviews
- Technical support services
- Seeking and interview of potential employees or internship applicants
- Maintaining professional and business contacts
- Legal searches and review of operations
- Program evaluation and review
- Correspondence and miscellaneous office duties

PHOTO CREDITS

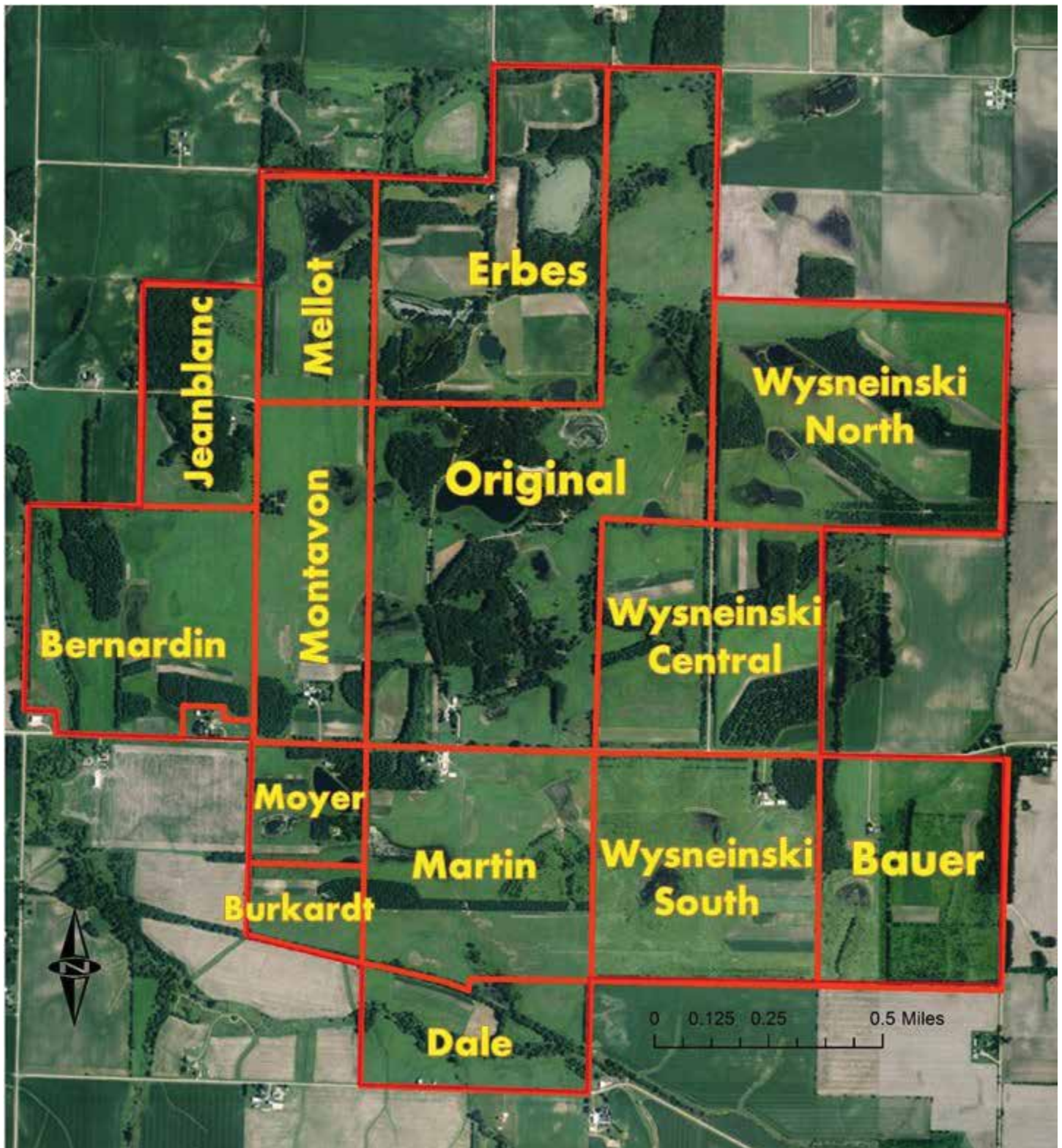
The following is a list of people who contributed photographs for this year's annual report: Brian Towey, Jay Vecchiet, Tristan Schramer, Taylor Steinfeldt, and Lee Walston. We thank them for the use of their photos.

MAP OF HABITAT MANAGEMENT PRACTICES



Legend

| | | | | | | | | | |
|--|-------------|--|-----------------|--|---------------------|--|----------|--|------------------|
| | Gravel Lane | | Existing Timber | | Prairies, 2019 | | Corn | | Sunflowers |
| | Trails | | Tree Plantings | | interseed, 2019 | | Soybeans | | Clover Foodplots |
| | Water | | Prairies | | Habitat Preparation | | Oats | | Mixed Foodplots |



2019 ACREAGE FIGURES

RICHARDSON WILDLIFE FOUNDATION

| Prairie Restoration | Acres | % of Total |
|---|--------------|--------------|
| 1985 | 21.2 | |
| 1986 | 13.3 | |
| 1987 | 12.3 | |
| 1988 | 19.3 | |
| 1989 | 6.9 | |
| 1990 | 15.5 | |
| 1991 | 38.8 | |
| 1992 | 39 | |
| 1993 | 45.9 | |
| 1994 | 41.3 | |
| 1995 | 52.2 | |
| 1996 | 28.1 | |
| 1997 | 25.4 | |
| 1998 | 33.1 | |
| 1999 | 38.2 | |
| 2000 | 51.2 | |
| 2001 | 25.2 | |
| 2002 | 10.9 | |
| 2003 | 7.1 | |
| 2004 | 15.3 | |
| 2005 | 17.1 | |
| 2006 | 26.5 | |
| 2007 | 28.68 | |
| 2008 | 20.2 | |
| 2009 | 12.6 | |
| 2010 | 18.52 | |
| 2011 | 23.85 | |
| 2012 | 16.1 | |
| 2013 | 30.5 | |
| 2014 | 19.2 | |
| 2015 | 9.2 | |
| 2016 | 12.13 | |
| 2017 | 20.28 | |
| 2018 | 2.05 | |
| 2019 | 0.25 | |
| TOTAL ACRES- | 797.4 | 40.4% |
| Remnant Prairie - | 40.4 | 2.0% |
| Tree Plantings | | |
| 1989 | 13.8 | |
| 1990 | 7.4 | |
| 1991 | 16.7 | |
| 1992 | 23.8 | |
| 1993 | 16.2 | |
| 1994 | 51 | |
| 1995 | 39.7 | |
| 1996 | 15.1 | |
| 1997 | 46.4 | |
| 1998 | 23.7 | |
| 1999 | 23.8 | |
| 2000 | 2.2 | |
| 2001 | 1.7 | |
| 2002 - (625*) | | |
| 2003 - (300*) | | |
| 2004 - (452*) | | |
| 2005 | 15.2 | |
| 2013 | 9.2 | |
| 2014 | 11 | |
| 2015 - (28*) | 14.2 | |
| 2016 - (37*) | 8.9 | |
| 2017 - (108*) | 8.65 | |
| 2018 - (81*) | 12 | |
| 2019 - (242*) | | |
| TOTAL ACRES- | 360.7 | 18.3% |
| <i>* Potted trees planted within existing woodland plantings.</i> | | |
| Pre-existing Timber | 291.2 | 14.7% |

| Wetlands | Acres | % Of Total |
|----------------------------------|--------------|-------------------|
| Beaver | 5.5 | |
| Main Lake | 14.2 | |
| Woody | 2.4 | |
| Dove | 3.2 | |
| Muskrat | 5.1 | |
| Sandfield | 3.8 | |
| Goose | 13 | |
| Teal | 6.5 | |
| Mallard | 2.6 | |
| Pintail | 7.1 | |
| Wigeon North | 2.4 | |
| Wigeon South | 5.4 | |
| Prairie | 8.2 | |
| Hidden | 7.6 | |
| Pothole | 1.3 | |
| Hilltop | 2.7 | |
| Bauer | 2.5 | |
| Martin | 3.5 | |
| Railroad | 2.2 | |
| Terrace | 0.75 | |
| Harrier | 5.2 | |
| Turtle | 1.5 | |
| Crane | 2.8 | |
| Arrowhead | 6.8 | |
| Bobcat | 1.5 | |
| Lily | 13.4 | |
| Willow East | 2.3 | |
| Willow West | 1.8 | |
| Round | 1.6 | |
| Kingfisher | 8 | |
| Spring | 1.3 | |
| Mink | 1.1 | |
| Snake | 1.9 | |
| Sand Ridge | 2.1 | |
| Toad | 2 | |
| Buck | 1.65 | |
| Doe | 0.5 | |
| Dugouts (4) | 0.75 | |
| TOTAL ACRES- | 154.0 | 7.8% |
| Cool Season Grasses | | |
| TOTAL ACRES- | 31.1 | 1.6% |
| Foodplots | Acres | % Of Total |
| Corn | 63.2 | |
| Soybeans | 71.9 | |
| Oats | 0 | |
| Sunflowers | 0 | |
| Winter Wheat | 2.2 | |
| Clover / Chicory | 15.8 | |
| Brassica | 6.0 | |
| TOTAL ACRES- | 159.1 | 8.1% |
| Drainages | | |
| Bauer | 1.2 | |
| Bernardin | 1.1 | |
| Dale | 1.3 | |
| Sandfield | 0.5 | |
| Wysneinski | 1.6 | |
| TOTAL ACRES - | 5.7 | 0.3% |
| Trail \ Firebreaks - | | |
| Total Length - 47.3 miles | 69.5 | 3.5% |
| Road \ Ditch Easements | 45.9 | 2.3% |
| Total Length - 6.6 miles | | |
| Building and Home Sites - | 18.9 | 1.0% |
| TOTAL ACREAGE - | 1,976 | |



HUNTER HARVEST

The following table represents hunting activity for the past calendar year. One hunter trip is defined as a hunter going afield for one specific hunting activity. For example, a hunter may have hunted deer in the morning and hunted pheasants in the afternoon, or hunted deer in the morning and again in the afternoon. Both of these examples would count as two hunter trips for the same day.

| <u>SPECIES</u> | <u>HUNTER TRIPS</u> | <u>HARVEST</u> |
|-----------------------|---------------------|----------------|
| Dove | 2 | 0 |
| Waterfowl | 12 | 8* |
| Pheasant | 9 | 5 |
| Deer (Archery) | 161 | 14** |
| Deer (Firearm) | 9 | 1** |
| Coyote | **** | 1 |
| Turkey (Spring) | 8 | 5*** |
| Turkey (Fall Archery) | **** | 1 |

* The waterfowl harvest included 5 Wood Ducks, and 3 Canada Geese.

** The deer harvest included 9 does and 6 bucks with the following breakdown:
8 adult females, 1 juvenile female, 6 adult males, and no juvenile males.

*** The turkey harvest included 5 Toms harvested in the spring season and 1 Jake harvested in the fall season.

**** Hunter trips were incidental to archery deer hunting.

TRAPPING HARVEST

| <u>SPECIES</u> | <u>HARVEST</u> |
|----------------|----------------|
| Raccoon | 103 |
| Muskrat | 3 |
| Opossum | 7 |
| Mink | 0 |
| Fox Squirrel | 3 |
| Striped Skunk | 0 |
| Beaver | 3 |
| Badger | 0 |
| Coyote | 0 |





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