

CELEBRATING 10 YEARS

A reflection on the history, science, and partnerships at the
Franklin Research and Demonstration Farm



SPECIAL THANKS

The Nature Conservancy would like to thank the Franklin family for their 10+ years of partnership at the Franklin Research and Demonstration Farm. The Farm has been a source of innovation for wetland research, progressive agriculture, habitat conservation, and public education. We greatly appreciate the Franklin family for their support of science, conservation and biodiversity.

We would also like to thank Tim Lindenbaum, tenant for the Franklin family and photographer extraordinaire. Thank you for your years of support and assistance in all of our Mackinaw River projects. All photos in this report are credited to Tim.

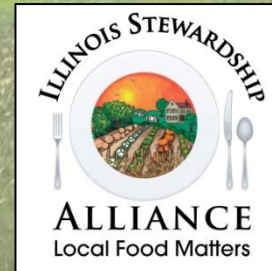




PARTNERS AND FUNDING SOURCES



THE MOSAIC COMPANY
FOUNDATION



United States
Department of
Agriculture

Natural Resources Conservation Service



The Franklin Research and Demonstration Farm project is a collaborative effort between the Franklin family, The Nature Conservancy, University of Illinois Urbana-Champaign, Illinois State University, McLean County Soil and Water Conservation District, and McLean County Natural Resources Conservation Service. The goals of the project are to (1) study practices designed to reduce nutrient loading in tile drained agricultural systems of Illinois, (2) demonstrate a wide variety of on-the-ground conservation practices in the context of a modern farm to local landowners, agency personnel, policy makers and the general public, and (3) restore woodland, savanna, prairie and wetland habitats to increase the biodiversity of plants and animals coexisting within an agricultural landscape.



The Franklin Research and Demonstration Farm is a model of sustainable agriculture. It demonstrates first-hand how nature and agriculture can coexist to produce benefits for crop production, water quality, and habitat preservation.

HISTORY OF THE FRANKLIN FAMILY FARM

The Franklin family farm has been a mainstay in Lexington, IL for over 160 years. Coming from Owen County, Indiana in 1851, John Franklin drove 300 head of cattle to the farm he had purchased in Lexington, Illinois, through land grants from the government at \$1.25 per acre. Like others who discovered the land they had purchased was in the prairie, he traded it for land near timber and started to accumulate acreage.

For the first 100 years, the Farm was primarily a cattle operation, managed by Noah Franklin (son of John Franklin). Noah (photo on right) is credited for building up the property, raising Shorthorn and then Angus beef cattle, and was represented at the Chicago stockyards for 78 consecutive years.



Photo (left): Noah Franklin (second row, seated in black suit) on his 100th birthday in 1932 surrounded by third and fourth generation family. Seated with Noah are his children Bert, Noah Elmo Sr., and Ida (left to right). The young boy standing is Noah Elmo Jr., and the young girl sitting on the right is Barbara Allsup.

TRANSITION: CATTLE TO ROW CROPS

During the 1960s, the Franklin family farm went through a transition, converting several acres of the property to row crop agriculture. Noah Elmo Jr. also built a family cabin and several barns on the property during this time.

For the past 50 years, the majority of the Farm has been in a corn/soybean rotation, although timber remnants remain in the savanna and along the Mackinaw River.



Above left: Aerial photo of the Franklin farm in the 1940s during cattle production. Above right: Aerial photo of the Franklin Farm in 2015, showing cropland, constructed wetlands, and remnant timber.



Twins Mike and John Franklin on a horse led by sister Liz in 1960.



Liz and Ann Franklin, along with "Mo" the family dog in 1960.



The Franklin family cabin in 2012.

FRANKLIN FAMILY: 2003- PRESENT

In 2003, the Franklin family entered into an agreement with The Nature Conservancy to construct wetlands for research and educational purposes using USDA Farm Bill programs. Over the past 10+ years, the Farm has served as a model for sustainable agriculture, innovative research, and successful partnerships. Today, the Franklin Research and Demonstration Farm has been toured by hundreds of visitors and has been utilized by several agencies and universities for educational purposes, including work published in scientific journals.



Franklin family members in 2012 Open House event



Fourth and fifth generation owners of the Franklin farm



Barb Allsup and Liz Stakenborg

WETLAND CONSTRUCTION

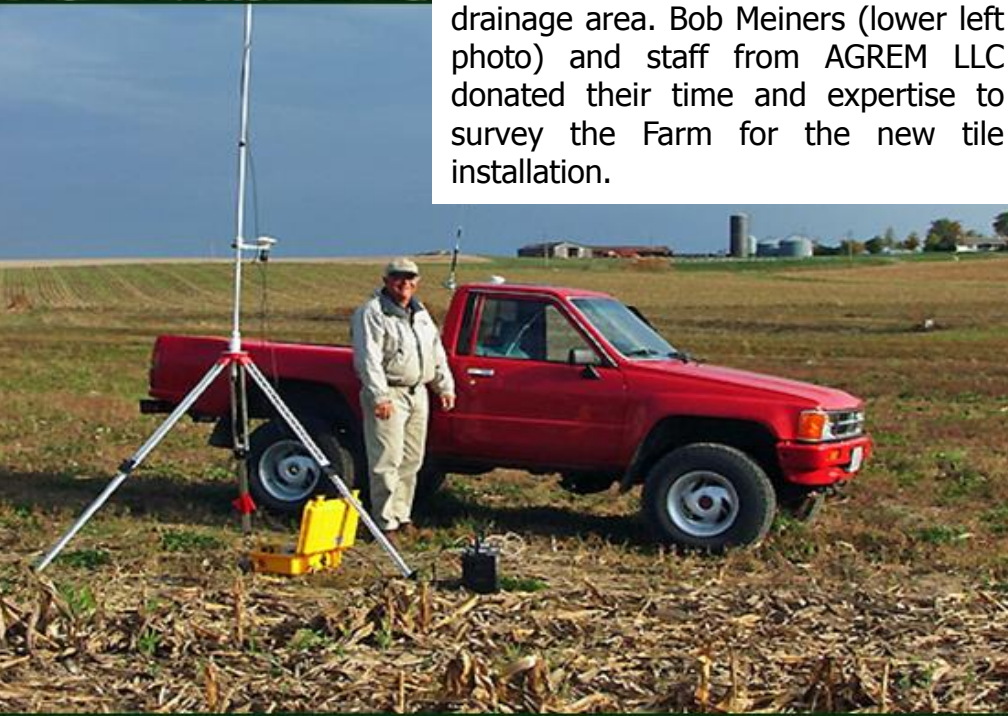
In 2004, the Franklin family began working with The Nature Conservancy and others to determine the effectiveness of constructed wetlands at removing nutrients from field tiles. In the summer of 2005, construction began with the installation of three experimental wetland systems. Funding for the initial project was provided through a Conservation 2000 grant to the Conservancy from the Illinois Department of Natural Resources. Each system contains 3 subunits, each of which represent 3% of the drainage area, that are designed to determine the effectiveness of alternatively sized wetlands at reducing agricultural nutrient runoff, specifically nitrogen and phosphorus.



These wetlands were constructed in the cropland area of the Farm, along with seven acres of floodplain and upland wetland habitat near Turkey Creek totaling 13.3 acres. The construction of the experimental and floodplain wetlands was funded in part through the Conservation Reserve Program, Environmental Quality Incentives Program, and McLean County Soil and Water Conservation District. Areas surrounding the wetlands were seeded with a mixture of native grasses and forbs to provide a natural buffer and habitat for wildlife in 2009.

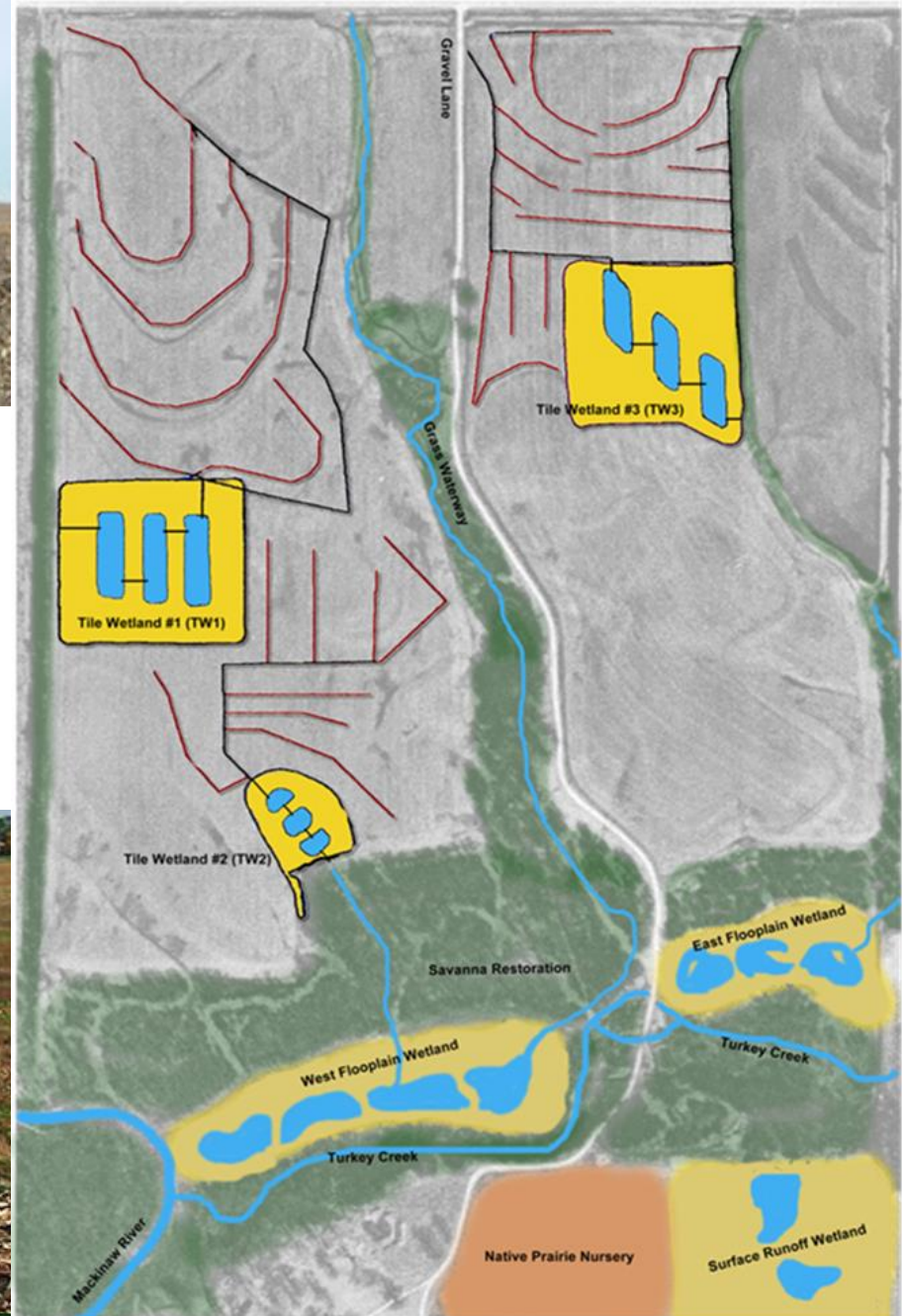


New drainage tile (shown in red on map, right) was installed at the Farm using laser survey points to accurately construct experimental wetlands, representing 3%, 6%, and 9% of the drainage area. Bob Meiners (lower left photo) and staff from AGREM LLC donated their time and expertise to survey the Farm for the new tile installation.



Franklin Farm Project

— 6 Inch Main Tile Line
— 3 Inch Lateral Tile Line



Aerial View of the Research Wetlands at the Franklin Research and Demonstration Farm





In 2006, control gates and automatic water samplers were installed at the inlet and outlet of each wetland. The water control structures allowed tile flow to be controlled entering and exiting the wetlands. The automatic water samplers collected tile water samples according to timed-event programming, and designated samples were sent to the University of Illinois Urbana-Champaign for analysis. Housings for the equipment were built using 36-inch diameter, dual-walled tile.

In 2007, monitoring of tile flow, level, and nutrient runoff began with the goal of determining wetland to watershed ratios needed to see reductions in nitrogen and phosphorus. Water samples are collected weekly, or more frequently during periods of high tile flow, from the 12 automated ISCO™ water quality samplers. These data are used to determine nutrient quantities and concentrations as water drains from the agricultural drainage areas through each of the wetland units.



*Photo above:
ISCO 6712C
automated water
samplers*



*Photo left (L to
R): Julie
Bowling, Maria
Lemke, Krista
Kirkham, and Tim
Lindenbaum*



*Tim Lindenbaum and Maria Lemke collect water
samples from ISCO units*

WETLAND EFFECTIVENESS

All wetlands lose and/or gain water from interactions with groundwater sources. These interactions can complicate experimental measures of nutrient loss, in that nutrients can be lost or gained in a wetland cell through groundwater (e.g., ORP in the Gully wetland) as well as from denitrification processes in the wetland cell itself.

Therefore, total nutrient removal (kg) from these experimental wetlands can be calculated in two ways: straight mass balance approach using measures from inlets and outlets, or mass balance that includes seepage adjustments. The more conservative approach is to include seepage adjustments, since this represents reductions that occur only in the wetland cell itself, and not losses due to seepage of water out of the wetland into groundwater.

Calculations of $\text{NO}_3\text{-N}$ cumulative 8-year loading reductions that account for seepage ranged from 13-29% (3% cell), 33-38% (6% cell) and 42-46% (9% cell) (Fig. 1).

Estimated cumulative 8-year loading reductions for ORP that take into account seepage ranged from 45-78% (3% cell), 47-88% (6% cell) and 16-91% (9% cell) (Fig. 1).

Whether the effectiveness of these experimental wetlands at reducing nutrients are estimated in terms of the whole system (wetland + groundwater interactions) or only as the wetland cell alone, they have proven to be very effective at reducing nitrate export from agricultural fields that would otherwise be entering directly into the Mackinaw River.

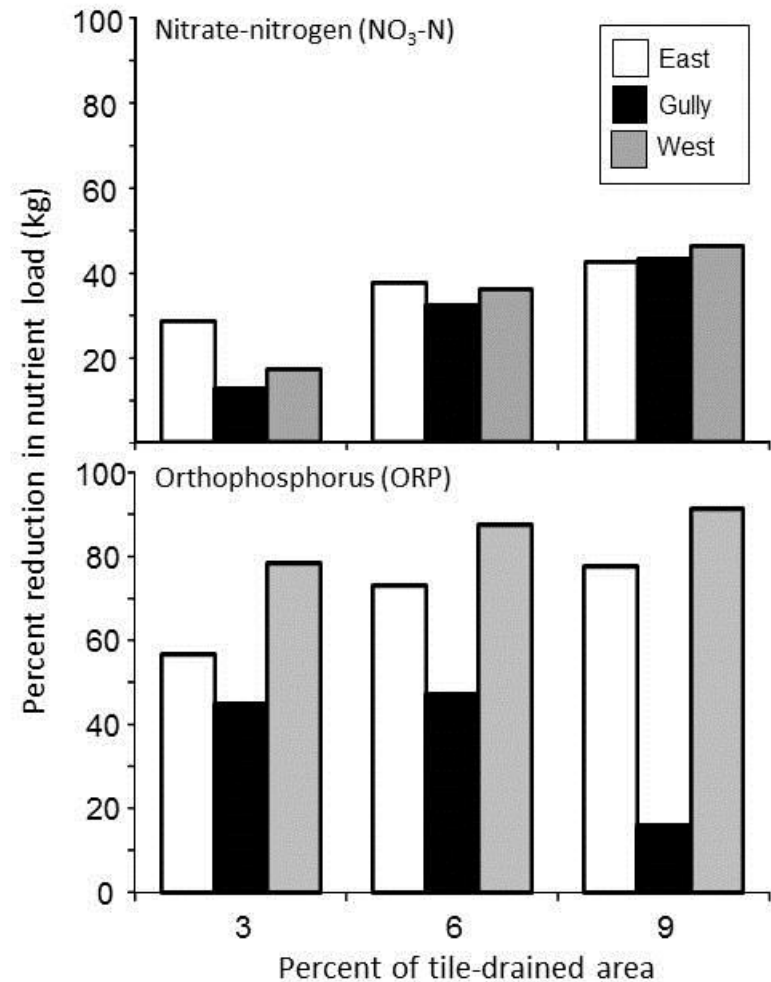


Figure 1. Eight-year (2007-2014) cumulative percent load reductions (kg) for nitrate-nitrogen and dissolved phosphorus (orthophosphate) from individual cells of the East, Gully, and West wetland complexes, each cell representing 3%, 6%, and 9% of the surrounding tile-drained farmland.

These results show that wetlands, as a conservation practice, could move the scale forward in our attempts to reduce nutrients from agricultural tile water in a way that minimizes impacts on downstream drinking water quality, biotic diversity and Gulf hypoxia.



Since 2005, many wetland plants have emerged voluntarily including blue lobelia (bottom left), broadleaf arrowhead (top right), smartweed, and water plantain (bottom right).



SUCCESSFUL CONSERVATION CROPPING



The Franklin Research and Demonstration Farm is a model for the integration of conventional agricultural and conservation. Since 2003, Tim Lindenbaum has served as the tenant farmer on the Franklin Farm, farming a no-till corn and soybean rotation system on ~150 acres surrounding the experimental wetland units.



COVER CROPS: 2011-2014

Cover crop research began at the Farm in 2011 funded in part by an Illinois NRCS Conservation Innovation Grant to monitor the effectiveness of cover crops in sequestering nutrients and reducing tile nutrient runoff.

Since 2011, various winter cover crops and seeding methods have been tried on 15 acres at the Farm (east side). Cereal rye and radish (upper right photo) were planted in 2011 and 2013, and annual ryegrass in 2012 and 2014. The first crop in 2011 was planted with a modified Ro-Gator (lower right photo) during an Open House hosted by the Conservancy and the McLean County Soil and Water Conservation District. The

2012 annual ryegrass was crop was planted with a no-till drill. In September 2013, cover crops were planted via aerial seeding to 15 additional acres draining the south end of the Franklin Farm. The 2014 annual ryegrass crop was also seeded aurally.

Cover (i.e., growth) estimates were conducted every year in the fall and spring by Conservancy staff, along with soil temperatures in the spring. This research will increase our understanding of the effectiveness of cover crops for sequestering nutrients as a single practice, as well as how effectiveness might be increased by bundling cover crops with wetlands.





SAVANNA RESTORATION

The Farm is home to approximately 20 acres of remnant oak-hickory savanna that hosts a wide variety of plants and animals; however, this habitat type is easily invaded by weedy, exotic species such as bush honeysuckle and multiflora rose.

Restoration efforts of the savanna began in 2005 with the manual removal of small invasive shrubs and trees in the understory using a rented Geo-Boy made possible through funds from a USDA Forest Service grant. A prescribed burn program was initially implemented to maintain an open understory and promote oak and hickory regeneration.

Invasive species have returned to the understory of the savanna over the past few years dominated by honeysuckle and requiring the development of a new management plan. On Earth Day 2012, a small group of volunteers (primarily graduate students from Illinois State University) began the removal of honeysuckle, honey locust seedlings, and multiflora rose in a small section of the savanna. Management options were discussed during the summer and fall of 2012 to include mowing, burning, and cutting of the understory with the appropriate application of herbicide to prevent future growth of the invasive species. These management plans were initiated during the winter and spring of 2013 and will be continued over the next several years to promote healthy, open canopy habitat in the savanna.

2005



February 2014



Eastern spring beauty
Claytonia virginica



Pearl crescent butterfly
Phyciodes tharos



Common Yellowthroat
Geothlypis trichas



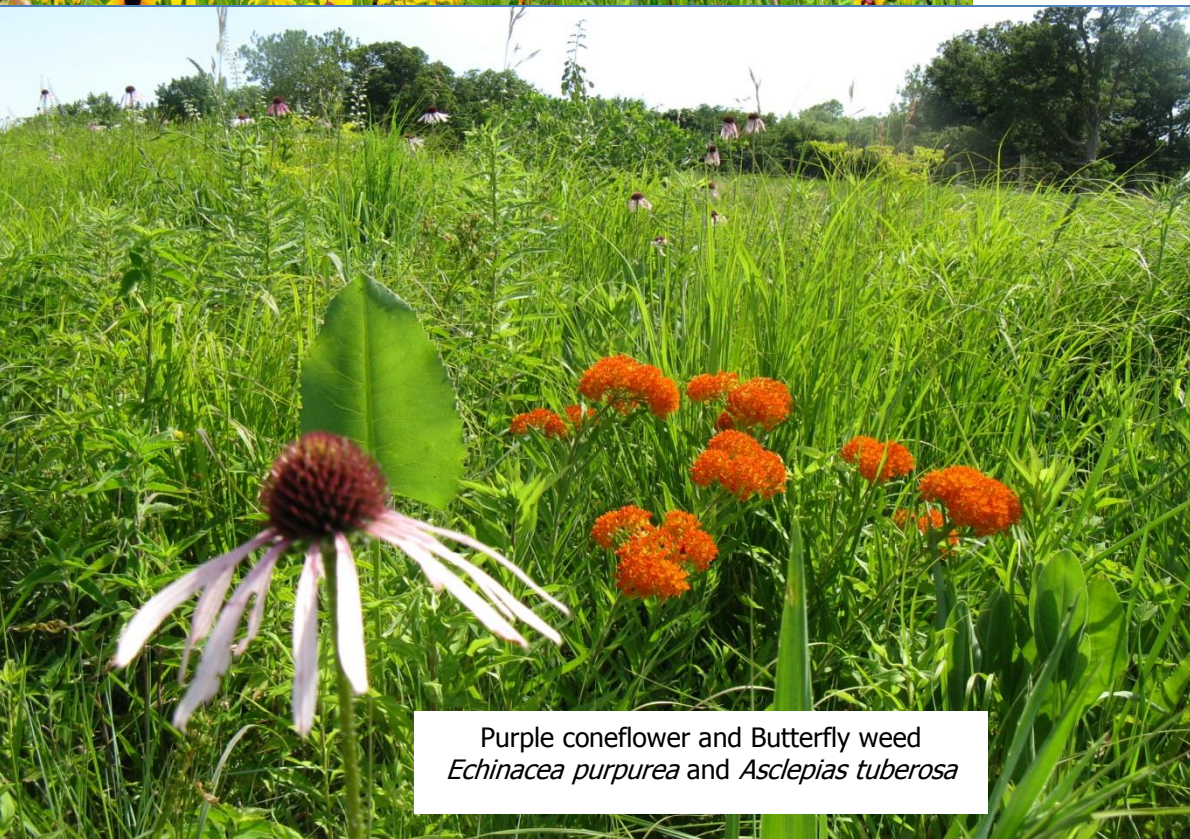
Sugar maple
Acer saccharum



Blackeyed susan
Rudbeckia hirta

PRAIRIE RESTORATION

The 14-acre prairie on the Farm was first planted by Tim Lindenbaum in the spring of 2005 with a mixture of nine native grasses and 61 forbs species collected from local prairie remnants. The prairie has been successfully burned every spring since 2010 to control the establishment of invasive plants, remove old growth, return valuable nutrients back to the soil, and promote new growth of prairie plants. To date, 57 forbs and seven species of grass have been identified growing from the original seeding. White wild indigo, purple coneflower, and butterfly weed are some of the common forbs that can be observed in the prairie.



Purple coneflower and Butterfly weed
Echinacea purpurea and *Asclepias tuberosa*



Red admiral
Vanessa atalanta

Fire is an important component to prairie restoration and management. Tractors with tillage equipment are often used to create fire breaks during controlled burns. Fire inhibits the establishment of invasive species and promotes new growth for the native prairie species.



Baltimore oriole
Icterus galbula



Cedar waxwing
Bombycilla cedrorum



Red fox kits
Vulpes vulpes



Widow skimmer
Libellula luctuosa

Several animals call the Farm home, including a wide variety of mammals, insects, birds, reptiles, and amphibians

American bittern
Botaurus lentiginosus



Mallard, northern pintail, wood duck, and hooded mergansers
Anas platyrhynchos, *Anas acuta*, *Aix sponsa*, *Lophodytes cucullatus*



Spiny softshell turtle
Apalone spinifera



Least sandpiper
Calidris minutilla



American coot
Fulica americana



Sora
Porzana carolina



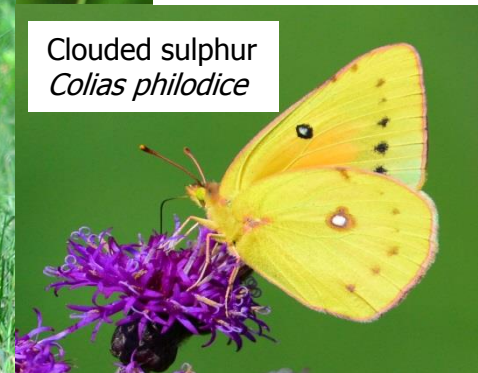
Common snapping turtle
Chelydra serpentina



White-tailed deer fawn
Odocoileus virginianus



Sweetflag spreadingwing
Lestes forcipatus



Clouded sulphur
Colias philodice

OUTREACH AND MEDIA

A key objective at the Franklin Research and Demonstration Farm is to conduct tours that demonstrate on-the-ground conservation practices and economics to local farmers, the public, agency personnel and policy makers. Since 2005, close to 100 tours have been conducted at the Farm for landowners, producers, university students, scientists, partners, staff, and elected officials.



OPEN HOUSE EVENTS: 2009, 2011 AND 2012



MEDIA FEATURES AND PRESENTATION AUDIENCES FOR FRANKLIN FARM RESEARCH AND OUTREACH

Media

Illinois AgriNews
Prairie Farmer
Pantagraph
WGLT
WJBC AM 1230; FM93.7
USDA-NRCS News Release
McLean County Chamber of Commerce
TNC National Magazine
WEEK News 25
Peoria Journal Star
Farm Journal
The State Journal Register
Illinois Farm Bureau
Conservation Technology Information Center
Purdue University
Illinois Issues
Outdoor Illinois
NPR WCBU
Conservation Science
Cass County Star Gazette
Successful Farming Magazine
PBS

Presentations

North American Benthological Society
Soil and Water Conservation Society
Illinois Department of Natural Resources
USEPA Nutrient and Point Sources Workshop
Illinois River Coordinating Council
Emiquon Symposium
Bradley University
Illinois State University
University of Illinois
Biodiversity Metrics Meeting of the Field to Market Sustainable
Agricultural Alliance
Notre Dame University
Geological Society of America
Appalachian State University
Midwest-Great Lakes Chapter of the Society for Ecological Restoration
Indiana Water Resources Association Conference
Midwest Natural Resources Group
Illinois River Governor's Conference
Vital Lands Summit
Auburn University
Loyola University
University of Maringa, Brazil
Joint Meeting of the Canadian Council of Ministers of the Environment
Society for Freshwater Science



SPECIAL REPORT ON 2013 AND 2014

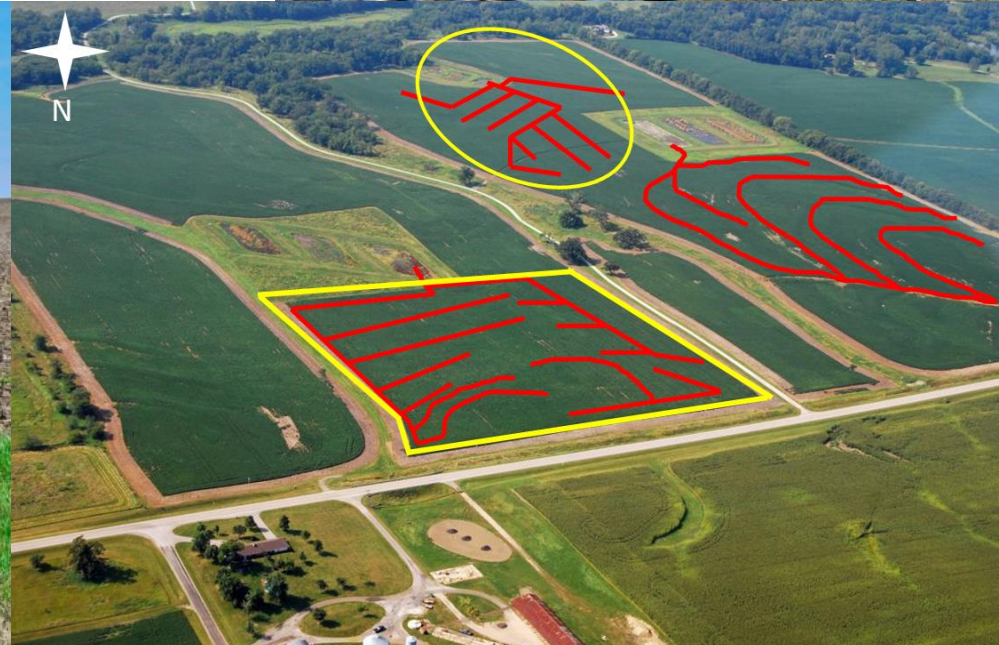
2013

2013 was a year of “firsts” at the Franklin Research and Demonstration Farm. Here are some of the highlights:

- Installation of sign at the main gate
- First photographic documentation of bald eagles on the property
- First Earth Day roadside cleaning (photo, below left)
- Expansion of cover crops to 15 additional acres in the Gully drainage area (cereal rye and radish)
- Tim Lindenbaum was interviewed and highlighted in *Farm Progress* magazine (June addition)

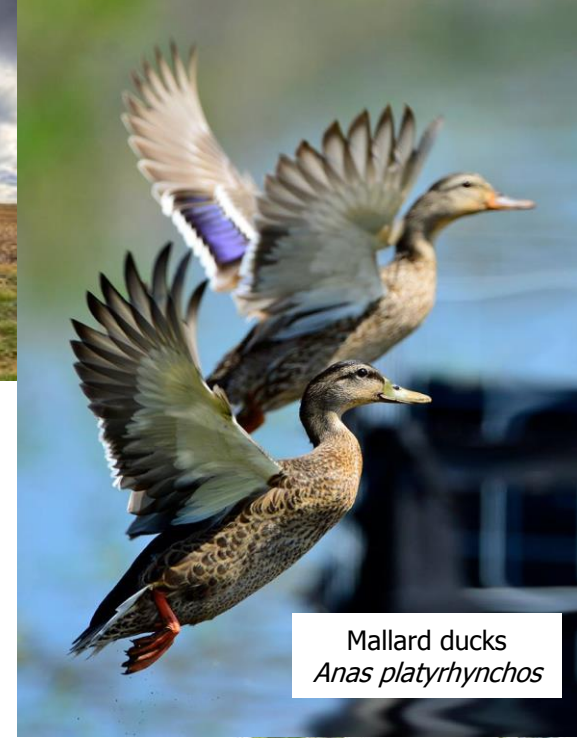


Bald Eagle
Haliaeetus leucocephalus



2013 Continued

Eastern meadowlark (at right)
Sturnella magna



Mallard ducks
Anas platyrhynchos



- The Farm experienced very wet conditions in April and May, followed by a dry summer and fall, leading into one of the coldest winters on record.
- In 2013, commodity prices were at a record high, with corn peaking over \$7.00/bu.
- 15 tours were conducted on the Farm in 2013, including a cover crop tour sponsored by McLean County Soil and Water Districts (28 attendees) that was covered by *AgriNews*.
- A crew of Illinois State University students and volunteers began work in the winter to remove invasive species in the savanna
- Many animal and plant species continue to visit, or make home of the many diverse habitats found on the Farm.



White-tailed deer and fawn
Odocoileus virginianus



Eastern pondhawk
Erythemis simplicicollis



Eastern bluebird
Sialia sialis

2014

2014 started as one of the coldest and driest winters on record, causing a deep freeze in many parts of the country. The dry weather continued into the spring and summer, with March, April, and May yielding 2-3" below normal rainfall. The rains began in June and July, often in large quantities, providing the soybeans at the Farm with a much needed drink. Wet conditions continued in September and October, leading to some difficulties during harvest (see lower right photo).

Wetland water quality sampling continued at the Farm in 2014, totaling eight years of research. The wetlands are still showing strong reductions in nitrate and phosphorus loadings (up to 45% and 90%, respectively). These results have been shared at numerous meetings and conferences and will be submitted for publication in a scientific journal in the near future. 2014 also produced a very strong population of the aquatic plant water plantain (below) in the West wetland series.



American water plantain
Alisma subcordatum



Left: Greater yellowlegs
Tringa melanoleuca



Eastern tiger swallowtail
Papilio glaucus



Twelve-spotted skimmer
Libellula pulchella



Angus cattle
Bos taurus



Dickcissel
Spiza americana

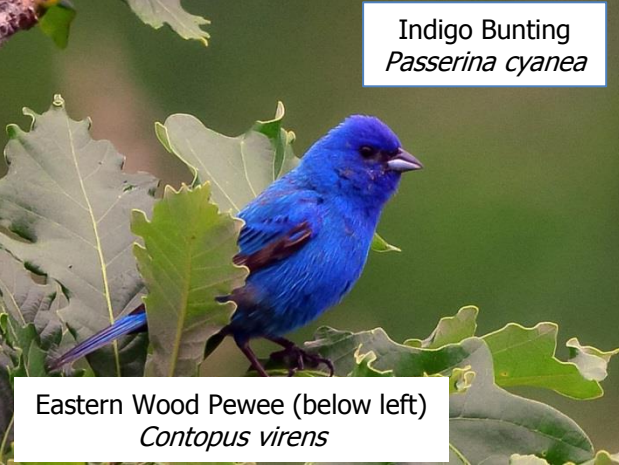


2014 Continued

Dickcissel
Spiza americana



Indigo Bunting
Passerina cyanea



Eastern Wood Pewee (below left)
Contopus virens



Great egret
Ardea alba



- Cover crop research continued at the Farm with the aerial seeding (center, below) of annual ryegrass (18 lbs./acre) in the East and Gully drainage areas.
- The Farm also hosted 12 tours in 2014, including a visit by the Fishers and Farmers Partnership members (lower right) and staff from U.S. Representative Adam Kinzinger's office.
- John Franklin was interviewed and highlighted in the March issue of *Illinois Farmer Today*, featuring the Franklin Research and Demonstration Farm.
- Tim Lindenbaum completed another successful spring burn on the 14-acre prairie (upper right).



Cardinal flower
Lobelia cardinalis



THANK YOU!

