



The Nature of Illinois

FALL 2021

Innovations at Emiquon

At The Nature Conservancy's Emiquon Preserve near Havana, a fish ladder and facial recognition software are among the latest technologies being tested in the battle against invasive carp and other aquatic invasive species.

In 2020, the team at Emiquon launched a partnership with the Illinois Department of Natural Resources, the Illinois Natural History Survey and Whooshh Innovations to construct a steepass at Emiquon to attract the invasive carp. A steepass is a type of fish ladder that has a chute with vanes along the sides and bottom that create turbulence, which lowers water velocity.

This summer, TNC and partners began testing the next part of the system, the FishL Recognition scanner, which scans images and takes data from the fish passing through.

Whooshh developed the smart technology that allows researchers to identify which species are trying to enter Emiquon's waters.

"What we have seen is that the zooplankton-rich water that's passed from the Emiquon Preserve via the levee and back into the Illinois River through the managed connection has attracted invasive carp to the location," explains Doug Blodgett, Emiquon's director of river conservation. "The steepass and related technology capitalize on that attraction and will hopefully help us sort out good native species from invasive species like carp."

Here's how it could work: if invasive carp ascend the steepass in search of the rich waters of TNC's adjacent floodplain wetland, they can be identified by the FishL Recognition scanner and directed to a containment area

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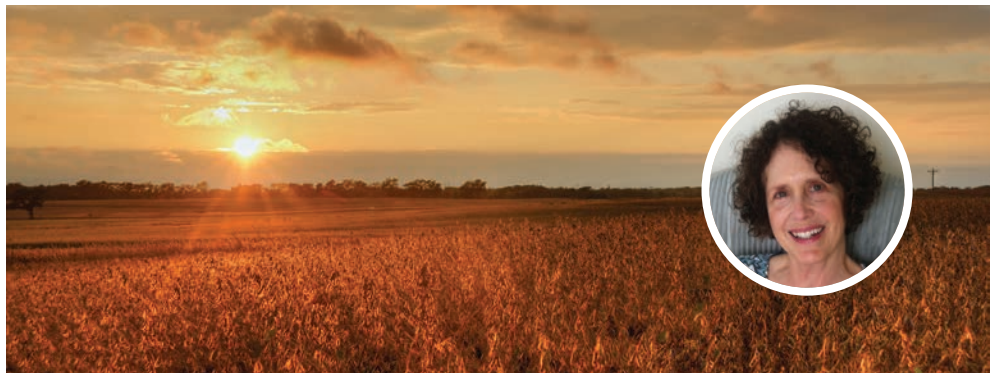
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From the Family Farm to Climate Science

By Lynne Weinberg, a TNC member and special contributing writer

In the 1950s, 60s and 70s, when professional weather forecasts were largely limited to radio and television, three boys—Jim Angel, Ken Kunkel and Don Wuebbles, now members of TNC's Science Advisory Committee in Illinois—learned early the profound effect of the weather on their families' Illinois farms. Ultimately, those farms produced not only crops and livestock, but three prominent atmospheric scientists, proud of their deep roots in the Illinois soil.

Jim Angel recalls conversations at his grandparents' livestock farms: "The number one topic of every farmer was the weather."

As Illinois state climatologist (1997-2018), Angel expanded outreach to farmers and city officials to help them understand and adapt to climate change and build resilience to extreme weather events. He also led writing of TNC's Illinois Climate Assessment with Don Wuebbles.

Ken Kunkel's family farmed corn, soybeans and wheat near Carlyle.

"We always struggled financially at the whims of the weather," he said. "Growing up on a farm was THE reason I pursued degrees in meteorology."

Kunkel's research focuses on how climate change and global warming cause extreme precipitation. He is lead scientist for the National Climate Assessment Technical Support Unit. In 2010, he became a senior scientist and lead scientist for assessments at North Carolina Institute for Climate Studies.

Don Wuebbles grew up about a mile from Kunkel and still refers to himself as a farm boy. He served as President Obama's climate science advisor and is the Harry E. Preble professor of atmospheric science at the University of Illinois Urbana-Champaign. He did early research on stratospheric ozone and developed one of the first air-quality models. Wuebbles has been a leader in many of the major national and international assessments of climate change science.

He cautions, "Climate change is one of the most important issues that humanity faces."

Angel, Kunkel and Wuebbles cherish their childhood experiences on their families' farms and have dedicated their careers to researching how the climate that farmers depend on is changing in Illinois and beyond. As we prepare to live on a planet with a changing climate and more frequent, and extreme, weather events, their scientific contributions are more critical than ever.

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COVER: Our Emiquon Preserve is the site of many innovative upgrades for fish and fresh water. © Todd Winters
THIS PAGE: Sunset across an Illinois farm field. © T. Lindenbaum; Writer Lynne Weinberg is a long-time TNC supporter.
© David Weinberg



Murals Celebrate Nature, Importance of Clean Air



Art can help us understand the crucial role nature plays in our lives, from the air we breathe to the parks and green spaces we visit. This spring, Open Center for the Arts (OPEN), Latinos Progresando (LP) and TNC partnered on a special art installation on Chicago's West Side that did just that.

In May, OPEN revealed four new murals created by local artists as part of the StepOut People, Health and Nature partnership between the three organizations. The murals were installed on OPEN's building exterior for public viewing.

"We are excited to be part of the StepOut project, which uses art to ignite conversations about the importance of clean air and green spaces in our communities," said Omar Magaña, executive director of OPEN. "The murals created by the artists to begin these conversations are breathtaking!"

Four North and South Lawndale-based artists were selected as recipients of \$1,500 grants for their murals. The artists chosen were: Alma Domínguez, Jay Simon, Miguel Del Real and Holiday Gerry.

"The StepOut initiative represents an opportunity for our community to reflect and heal," said Luis Gutierrez, CEO of Latinos Progresando. "StepOut makes such an important statement, focusing on art, nature and what's positive about our communities."

Later in the summer, the murals moved from OPEN to new locations in community gardens within the North and South Lawndale communities, as voted on by community members.

In addition to this art installation, TNC, OPEN and LP collaborated on a related series of workshops focused on air quality and health, as well as green space and health. The family-oriented workshops were conducted in both Spanish and English and included learning and discussion up-front, followed by artmaking and storytelling to dive deeper into these important topics that help identify community-based solutions.

The StepOut initiative was intentionally created to pair with an air quality monitoring pilot led by Latinos Progresando, the Environmental Law and Policy Center and TNC to engage community residents and partners in collecting data about local air pollution trends in order to inform advocacy and green infrastructure interventions.





where they would be harvested and removed from the river system. Native fish could be allowed to pass through the structure and on into the preserve where they can spawn, feed or spend the winter.

This is just the latest in a long history of scientific innovations at Emiquon, which celebrated its 20th anniversary last year. Purchased by TNC in 2000, the pumps that drained the fields were stilled in 2007 and water levels rose with each rain, partners began to stock native fish and researchers began to monitor the return of wildlife. Regular assessments of the ongoing restoration work identify innovative new projects that improve this wetland wonderland, including:

- Research into the unseen micro- and macro-invertebrate worlds by Dr. Maria Lemke, director of science for TNC in Illinois. Over the years, Dr. Lemke has overseen the collection of the littlest creatures from across Emiquon. In one study, research revealed

that after flooding from levee overflowing occurred, the richness, diversity and composition of zooplankton species increased. That finding can help water managers assess damage—and potential benefits—from natural flooding events.

- Another recent project nabbed high-resolution color, infrared and thermal aerial imagery of Spunky Bottoms and Emiquon Preserves to reveal how plant communities change over time in response to management actions, serving as a model influencing management at the sites.
- In 2016, TNC installed Ahsapa, an award-winning water control structure that provides a managed reconnection between the floodplain wetland at Emiquon and the Illinois River. Now seasonal water exchanges re-create more natural water levels, provide passage for aquatic organisms and help make the river healthier.

- TNC scientists and partners use computer models to evaluate different management scenarios—change one decision on the front end of a planned project and the modeling predicts the effects of that change further down the line.

The restoration and management of Emiquon is guided by planning completed with the help of the Emiquon Science Advisory Council, comprised of more than 40 renowned experts from a variety of fields, including plant ecology and restoration science. Additionally, partners and the TNC Illinois chapter's Science Advisory Committee provide a constant flow of innovative ideas for how to keep this natural crown jewel of Illinois vibrant.

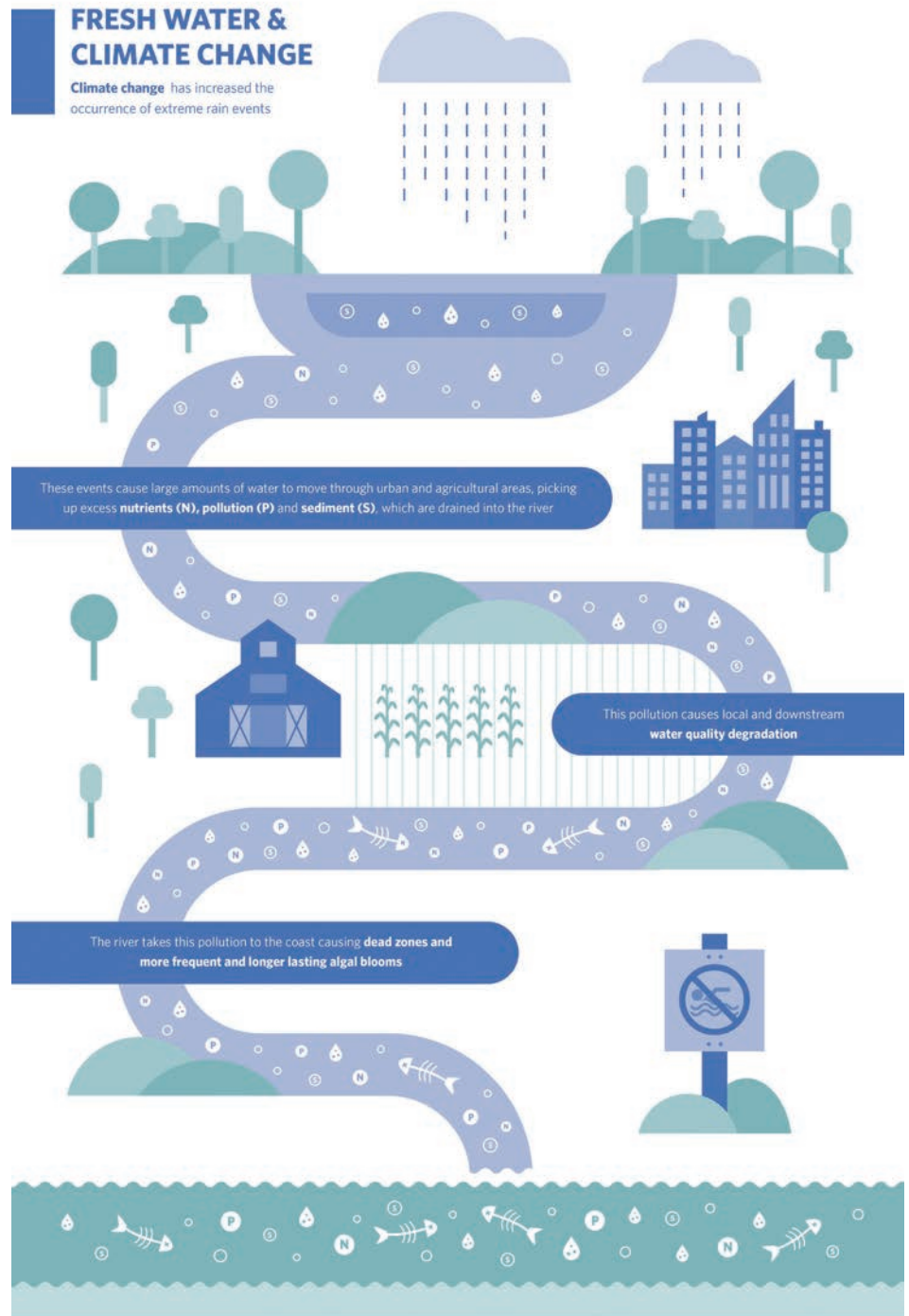
The remarkable wildlife world of Emiquon thrives because real-world conservation care is fused with targeted scientific research. To plan a visit or to explore the preserve virtually, go to nature.org/emiquon.

On Thin Ice: Midwest Fresh Water



The United States is home to some of the world's greatest freshwater resources—and Illinois is in the center of it all. To the north, the towering forests of Minnesota and Wisconsin are home to the Mississippi's headwaters and filter tributary streams and creeks that flow into the Great Lakes. To the east and west, the rich soils of the Mississippi River Valley give rise to Illinois, Iowa and Indiana's fertile farmlands. To the south, the river meets with its distributary to the Gulf of Mexico, where water collected from 31 states meets the ocean.

The Great Lakes and the Mississippi River grow the crops that feed the world, transport thousands of tons of cargo and



create vital habitat that is home to plants and wildlife found nowhere else. They also provide the element that all life on Earth needs to thrive—water. Proximity to this essential resource has allowed local communities to grow, thrive and develop rich cultures and economies. But too

much demand and a changing climate has pushed these rivers and lakes to the brink.

Explore the graphic above to learn more, and then visit [nature.org/midwestwater](https://www.nature.org/midwestwater) to dive into the stories of those who are leading the charge for change.

Conservation News in Brief

Celebrating the Magic of Nature

The Chicago Park District (the Parks), in partnership with TNC, celebrated the 20th year of the Parks' Natural Areas and the Community Stewardship Program with a display of enchanting fairy houses installed at select Park District Natural Areas. These mystical wooden structures charmed adventurous visitors throughout the summer months.

The Parks invited 20 volunteer community partners to create 20 fairy houses that were installed at 20 natural areas. Each whimsical house dazzled with creativity, combining natural items such as branches, plants, feathers, rocks and more with unique special touches.

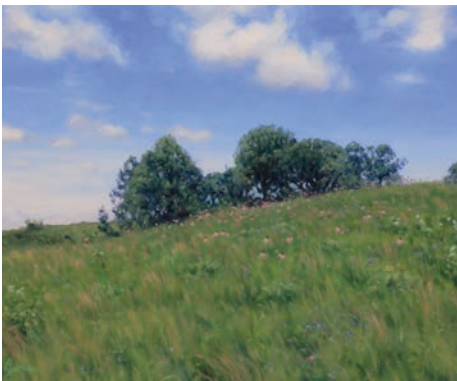


The Chicago Park District manages more than 75 natural areas throughout the city, totaling 1,890 acres of wetlands filled with frogs and turtles, prairies buzzing with birds, savannas surrounded with butterflies and wildflowers... and maybe a fairy in a nearby forest.

The natural areas' mission is "to develop and maintain habitats that are dedicated to the cultivation and enrichment of ecological diversity, nature exploration, learning and the enlivening of the human spirit," and they reveal the richness and beauty of nature in the city to residents and visitors alike. Through the Community Stewardship Program, dedicated volunteers work with the Parks staff and contractors to protect and care for these natural oases, while also connecting people to nature.

TNC supports these efforts through a joint staffing partnership with the Chicago Park District that focuses on community stewardship. To find a Chicago Park District Natural Area near you, visit chicagoparkdistrict.com/natural-areas.

The Art of Conservation



Artist Philip Juras captured the beauty of Midwestern prairies, including TNC's Nachusa Grasslands and Indian Boundary Prairies' Gensburg Markham Prairie, in his series of paintings, *Picturing the Prairie*. The exhibit was on display at the Chicago Botanic Garden (the Garden) through September 12.

According to the Garden, Juras explored the Chicago area and beyond to discover—and rediscover—a vision of an ecosystem that has virtually vanished in North America. Traveling from his home in Athens, Georgia, he spent five years on the project, guided by some of the foremost prairie conservationists in Illinois and by his own research.

"In my search as an artist to understand the original Illinois tallgrass ecosystem, Nachusa offered what most preserves couldn't: the combination of high-quality prairie environments and the sight of them stretching nearly to the horizon—not to mention the presence of characteristic megafauna and the fantastic aesthetics of prescribed fire," Juras explains.

"In its groves and prairies, I could investigate a full complement of the visual aspects that once defined the Prairie State," he said. "But while I came looking for a historic landscape, Nachusa showed me a prairie reawakened by a system that fosters the efforts of volunteer stewards and research scientists—and even artists—to contribute to a vision of what tallgrass prairie can become. I literally couldn't picture the prairie otherwise."

The *Picturing the Prairie* exhibit included an online feature that educated readers about prairie plants. It was made possible by a partnership between the Chicago Botanic Garden, the Field Museum, the Forest Preserves of Cook County, TNC and Openlands. Learn more at chicagobotanic.org.



Analyzing Biodiversity in Chicago

Across the Chicagoland region, nature abounds—but researchers have always wanted to know more about the species that call the Windy City home and where they can be found. To gain a better understanding, TNC Science Fellow Nina Hill has spent the past year as the primary researcher for the Chicago Biodiversity Assessment. Through this project, Nina has been investigating patterns of plant and animal biodiversity across Cook County.

Tell us a little about the Chicago Biodiversity Assessment. What are the main goals for this project?

The Chicago Biodiversity Assessment aims to measure biodiversity across Chicagoland. While it can be measured in different ways, we are starting with the basic definition of biodiversity as the number of plant and animal species that occur within Cook County. As we count species, we are also looking for patterns and assessing how geographic and environmental characteristics influence biodiversity. Thousands of people have contributed observations of plants and animals within their neighborhoods, giving us more than 100,000 research-grade records through the website and app iNaturalist. This powerful dataset provides observations in land and properties where scientists cannot access.

How did you get people across Cook County involved?

The first phase of the assessment is being developed with input from many great

conservation partners across the region, including the Field Museum, Chicago Park District, Forest Preserve District of Cook County, Morton Arboretum and others. Our partnership with the Chicago Botanic Garden is especially exciting as we will work together to dig deeper into analyses and expand a more strategic program to engage communities in exploring local nature. We are getting out to schools and giving online talks to invite others to join us in the assessment and to share the value of community science tools like iNaturalist—every person using the app can be part of the science!

What was the most surprising piece of data recorded?

Monarch (*Danaus plexippus*) has more than 1,000 observations and is the most-observed species in the dataset; common milkweed (*Asclepias syriaca*) is in the top 10 with nearly 600 observations! I'm excited to discover areas outside of parks and preserves that support high or unique biodiversity. For example, a vacant



lot can be a haven for biodiversity, and 15 of observations come from people exploring nature near their homes.




What's next? How will these learnings be used to protect nature in Chicago going forward?

The map of biodiversity will be available as geospatial data layers and will be a great supplement to other tools like the Multifunctional Urban Green Stormwater Infrastructure app and the Chicago Greenprint map. I hope that the biodiversity assessment will lift up the value of nature in all the places it occurs and encourage everyone to get out and explore their local biodiversity.

The Nature of Illinois

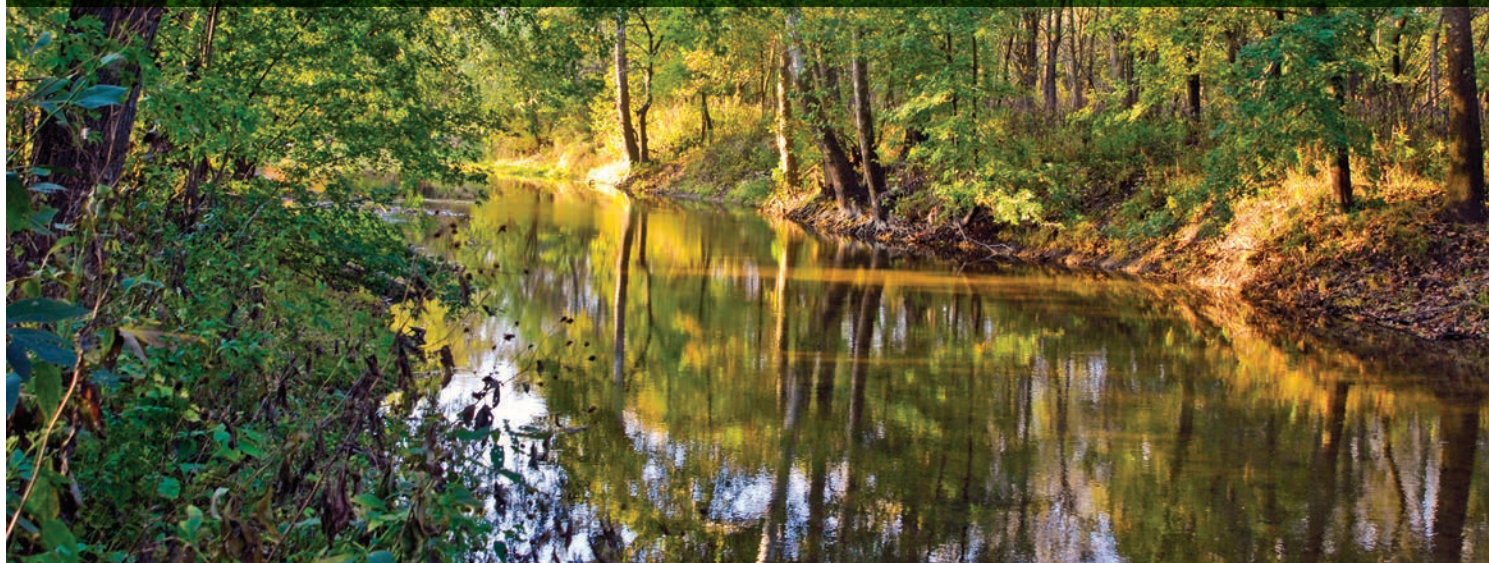
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Mackinaw River at the Franklin demonstration farm in the Mackinaw River watershed, Lexington, Illinois. © Timothy T. Lindenbaum/TNC