Research and Community Science: Menomonee Valley

2018
Annual Review

URBAN ECOLOGY CENTER®

A MESSAGE FROM THE TEAM

Welcome to the Urban Ecology Center's 2018 Menomonee Valley Research and Community Science Annual Review! Our team of community researchers has been studying wildlife in the Valley since 2011, two years before Three Bridges Park opened and a year before the Center refurbished a historic tavern to open their third branch.

Many of you have helped this community become a national leader in the field of Community Science. Together we (professional and community scientists) collaborate in the study of ecological connections in busy urban green spaces in a truly unique manner. Our long-term presence in the community allows for strong social ties connecting people to the environment and to each other. Long-term data sets allow us to assess ecological trends with confidence such as the effects of climate change on bird migration. Over the years our collective presence in and intentional management of reclaimed industrial green spaces such as Three Bridges Park have led to a substantial increase in biotic diversity over time. This is something in which we all can take pride. If you are currently part of the team, we express our immense gratitude for your efforts. If you're curious about what we do, come join us for a wildlife survey and see first-hand how magical this community is. You could be the next person to discover a species new to the park, to Milwaukee, to Wisconsin or the world!

The Research and Community Science team in 2018 (left to right): Research Fellow Tony Garcia, GIS & Field Data Coordinator, Jessica Orlando, Research and Community Science Coordinator, Jennifer Callaghan, and Manager of Research, Tim Vargo.

—Ethan, Maggie, Jennifer, Jessica, Tony and Tim

A Brief History

The Menomonee River Valley formed as a result of glacial processes over 10,000 years ago. It became a thriving wild rice marsh that many people called home (see Land Acknowledgment at right). The name "Menomonee" originates from the Algonquian word "meno," meaning good, and "min," which is a term for grain or fruit that is now known as wild rice. In the early 1800's, the area became colonized by European settlers who forced indigenous people from their traditional homelands.

We conduct numerous wildlife surveys year-round, but primarily during the busy summer months. We owe a huge debt of gratitude to our summer interns who are often the first people out in the parks before sunrise checking mammal traps or closing the building after an evening bat survey. Thank you!

Over time these vast marshes were drained and filled to create dry land for economic development, including machine shops, packing plants, and the shops of the Milwaukee Road Railway. The River was channelized for shipping, changing the lazily meandering river and surrounding floodplain into an industrial river fraught with pollution and waste. Funneled water moving with greater velocity further eroded the river banks. This anthropogenic change to the landscape had lasting impacts on the ecology and health of the river.

Land Acknowledgement

Before one can continue, it is important to remember the history of the land and of its people. A land acknowledgement is a formal statement recognizing the unique and enduring relationship between indigenous people and their traditional territories. Its purpose is to remind us of, honor, and respect those before us.

The Urban Ecology Center wishes to acknowledge and honor the indigenous communities native to this region, and recognize that Three Bridges Park and the Urban Ecology Center was built on indigenous homelands and resources. The Urban Ecology Center recognizes the Peoria, Oneida, Mohican, Brothertown, Potowatomi, Ojibwe, Ho-Chunk, and Menominee people as past, present, and future caretakers of this land.

Cover photos (clockwise from left): Bumble bees and honey bees hard at work (photo by community scientist Bruce Halmo), Community scientists monitoring bats at the Urban Ecology Center-Menomonee Valley during a spring migration acoustic bat monitoring survey in April (Photo by Chicago-area documentary filmmaker Marianna Milhorat), and community scientists netting Monarchs to tag during a record-breaking 2018 Monarch season (photo by community scientist John Chaplock).

A STAR VOLUNTEER

Story of a Young Scientist

The next generation of environmental scientists is growing up. Out the door at 6 a.m., Analiese is ready to dive into the latest Community Science research project at the Urban Ecology Center. It's not how you'd expect an 11-year-old might start her day but for Analiese, walking a few doors down to the UEC at daybreak was a weekly routine during the summer of 2018.

Ana's involvement with the Center began when her grandma first brought her to the Menomonee Valley branch for the Young Scientist Club.

"I really felt this good vibe. It was a place where I could be myself, and I felt safe. I just kinda clicked with it," she explains. "After going to the Urban Ecology Center, I realized how powerful nature can be and all the great things it can provide us."

"I feel happy because I am able to help kids respect nature. Before I didn't look at nature in the way I currently look at it. I love insects, bees, I love being outside and I love biking with my grandma".

A Day in the Life of a Young Scientist

Ana decided to stay, and her adventures with the Young Scientist Club led to a deeper fascination with Community Science. Jennifer Callaghan, former Research & Community Science Coordinator, was totally impressed. "Ana's curiosity, commitment, and intelligence have led her to contribute meaningfully to many of the Center's research and community science projects. Whether it's helping collect data for a bat survey at 10:00 p.m. or entering information into a tricky database after a 6:00 a.m. small mammal survey, Ana's helpfulness and sense of adventure lend well to field ecology. Her joyful spirit is infectious and every time I have an interaction with her, I leave feeling a little happier."

Photo (top to bottom): Ana being photographed as a star volunteer at the Urban Ecology Center; Ana helping record data with the Research and Community Science Department.

Looking Toward the Future

Today, Ana helps share all she has learned with those around her. "Now I teach my family: that's Switch Grass, that's a yellow finch, that's a House Sparrow. My parents are actually very proud of it and so surprised at how much I've grown." And she loves helping other kids learn about Monarch butterflies, migration, hibernation, and how plants grow. In her opinion, "the UEC is a place you can see that TV is not the best thing. Maybe it's nature!"

It's no surprise that Glenna Holstein, Menomonee Valley Urban Ecology Center Branch Manager, says, "Ana is definitely an honorary member of the Menomonee Valley team, and none of us will be surprised if she's running this place someday!"

Green Career Pipeline

Ana became passionate about ecology and now cares deeply for our green spaces. The Urban Ecology Center hopes to foster this intense curiosity for other young aspiring scientists through the "green career pipeline."

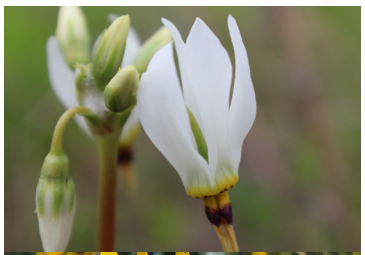
This process aims to introduce youth to the possibilities of careers in the environmental field. It can begin when kids come to the Center through a school program, summer camp, public program or just by chance.

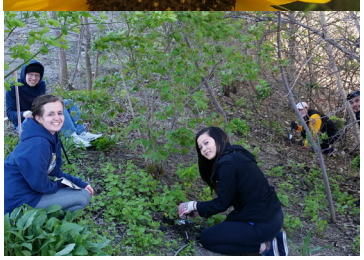
Later, as high school sophomores or juniors, they can apply for the Outdoor Leadership program. This two-year program provides job training in paid positions throughout the Center, such as community programs, visitor services, land stewardship, volunteer engagement, marketing and, of course, research.

In college, students can continue along the path with internships for credit and paid summer intern programs. This pathway prepares them for future employment at organizations with an environmental focus, or hopefully the Urban Ecology Center!

Photo (top to bottom): Ana helping feed the animals in the Animal Room at the Menomonee Valley Urban Ecology Center; Ana helping the summer interns collect data on snakes; the 2018 Urban Ecology Center Outdoor Leaders.

STEWARDSHIP, RESTORATION, AND ADAPTIVE MANAGEMENT





The Urban Ecology Center's Land Stewardship and Community Science teams collaborate to implement an iterative land management process called Adaptive Management. Regular wildlife monitoring can inform the efficiency and efficacy of restoration strategies. In other words, the critters themselves tell us how well we're doing. An increase in a particular species of beetle, for example, might indicate habitat improvement or that we're closer towards our goal of a functional Oak Savannah. Regular monitoring and adaptive management helps us track our goals to heal the land.

The hard work of volunteers and of land stewards helps ensure that Three Bridges Park will continue to become a healthier green space over time by providing food for Monarchs and by creating a home for a Shooting Star Flower (pictured right).

Community members work together in all aspects of restoration

86% of the species in the park are native

2,623 land stewardship volunteer hours in 2018

9 invasive species removed or treated over **24 acres**

The Value of Prescribed Burns

In early spring of 2018, we conducted a prescribed burn on the east side of the park for the first time. Prescribed fire is a useful management tool that knocks back encroaching woody species, removes duff layer, warms the ground, returns nutrients to the soil and invigorates fire-adapted native species. Fire has been a natural process throughout history and has been a management tool used by indigenous communities prior to European settlement. When these primary caretakers were driven from the land in the 1800's, thousands of years of indigenous knowledge was lost about the importance of living in coexistence with wildfire, which is a key process in long-term ecosystem health. The Urban Ecology Center hopes to continue this vital practice in the future.

A prescribed burn in Three Bridges Park in 2018.

Adaptive Management—How it All Connects

It's hard to protect what we don't understand and Adaptive Management is a key tool in understanding ecosystem connections. For example, Canada Thistle is an invasive species that can dominate prairies, crowding out native species and reducing diversity so we are trying to remove it from the landscape. However, the American Goldfinch, also known as the Wild Canary, relies on this plant for everything from food to nesting material to habitat cover. The two species have co-evolved over millenia such that goldfinches nest late in the year when thistle are in bloom. Thus it is important that when we remove non-native thistle we make sure we are also planting a variety of native thistles, along with other seed producing species they rely on like Cup Plant and Yellow Coneflower, to ensure the goldfinch population continues to thrive. If community scientists detect a change in the goldfinch population they can inform the land stewardship team who then may want to adjust their goals accordingly.

A male (left) and female (right) American Goldfinch feeding on small seeds in Three Bridges Park.

REPTILES, AMPHIBIANS, & FISH

Snakes

Snake populations are monitored using a simple and reliable method of strategically placing plywood cover boards throughout Three Bridges and Stormwater Parks. Snakes, which are ectothermic, are often attracted to the heat that radiates from the boards. The most commonly occurring species is the Butler's Gartersnake, a State Species of Special Concern native to Southeastern Wisconsin. They prefer open to semi-open habitats in wetlands and adjacent uplands, including our restored savannahs and prairies. Community scientists have also documented DeKay's Brownsnake, which is common throughout Wisconsin. We've noticed a slight local decrease in snake populations, so it's important to continue monitoring these important species to see if the trend continues or if populations rebound. Stay tuned!

Community scientist and Research intern Maggie Steinhauer handle snakes on snake surveys in 2018.

Community scientists mark a Butler's Gartersnake found under a Menomonee Valley cover board in July with Research and Community Science Intern Maggie Steinhauer. Mark-recapture allows us to identify individual snakes and assess population trends. Snakes are captured immediately after the board is lifted (which requires quick reflexes), processed, marked and released. Photo by community scientist Vesile Yilmaz.

Frogs & Toads

Frogs and toads are a vital cog in natural communities, and one of the best ways to monitor them is through acoustic surveys. Listening for breeding frogs and toads near aquatic habitats (and sometimes holding them like this American Toad found on an evening Menomonee survey), provides another important connection for people with urban-dwelling wildlife.

A Toad in the Hand photo by community scientist Adam Carr.

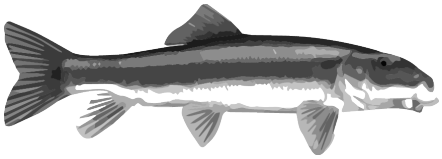
Turtles

For the second consecutive year, we documented breeding Snapping Turtles by the rain gardens built into Three Bridges Park. Ephemeral ponds and rain gardens are of vital importance to many herptile (reptile & amphibian) species because fluctuating water levels deter predatory fish and bullfrogs. Snapping Turtles are one of the most iconic critters around, having changed little since the time of dinosaurs. They also play an important role as scavengers and provide food for many other species of wildlife. That is, however, until they grow up and become a top predator in the food chain with a lightning-fast, bone-crushing bite!

Turtle photos by UEC staff and community scientist, Carlos Manriquez.

Fish

The Urban Ecology Center is partnering with the Shedd Aquarium on a new cutting-edge research project that looks at migration patterns in White and Longnose Suckers (fish) throughout the Great Lakes region. Migratory fish carry important nutrients that annually fertilize upstream natural communities. Suckers are being used as the focal species because they migrate into virtually every stream in large numbers and are large enough to be easily seen by community scientists. Because suckers are sensitive to temperature changes in the water, this research can help determine how climate change might impact their migration patterns as well as predict how other migratory fish might be affected. The project also looks at which environmental cues trigger migration. This project started in 2017 and will continue into 2019. In its inaugural year, 79 suckers were spotted while in 2018, 47 suckers were recorded. The Urban Ecology Center is excited to be a partner in this important research!



BATS
(AND OTHER CREATURES OF THE NIGHT)

Land or Water: There will be Bats

Walking, paddling, and driving: three methods community scientists at the Urban Ecology Center use to collect acoustic bat monitoring data. Community-based partnerships are at the heart of Wisconsin's bat research program where natural resources managers, professional scientists, students, and community scientists work together on a truly collaborative research and monitoring project.

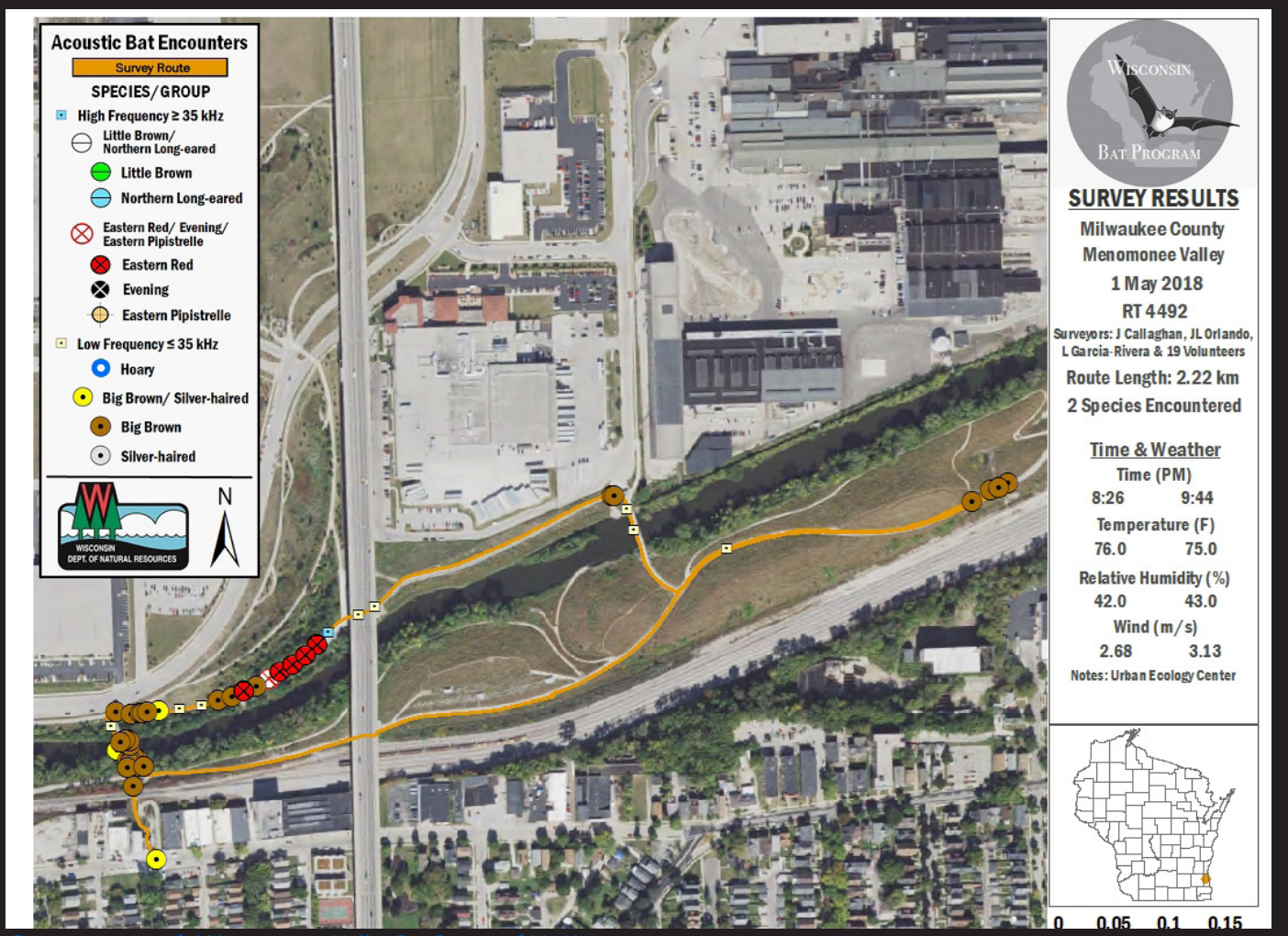
It is Community Science at its Best!

During three walking surveys in Three Bridges Park in 2018, we recorded 2 species of bats. The Eastern Red Bat is a tree bat and is a species of special concern in Wisconsin. The Big Brown Bat is a cave bat that is threatened in Wisconsin. Threatened species receive special protections in the face of white-nose syndrome, a deadly fungal disease.

What is the difference between Cave bats and Tree bats?

Cave bats hibernate in caves and mines during the winter when their food source (insects) disappear from the landscape. They are most susceptible to white-nose syndrome because they congregate in large numbers at close quarters during hibernation, which allows the fungus to easily spread from one bat to another. White-nose syndrome is rapidly spreading throughout the state of WI and in some hibernacula leads to a 99% mortality rate.

Tree bats migrate to warmer climates but also have the ability to go into torpor during cold spells. Hoary Bats can migrate all the way to Mexico to escape our Wisconsin winters while some tree bats like Eastern Red Bats migrate shorter distances and hibernate in crevices in trees and even underneath leaves.



Our most successful Menomonee Valley Bat Survey of 2018!

BATS
(AND OTHER CREATURES OF THE NIGHT)

Community scientists monitor bats at the Urban Ecology Center-Menomonee Valley during a spring migration acoustic bat monitoring survey in April. Photos by Chicago-area documentary filmmaker Marianna Milhorat. Read more about the importance of these community efforts on our blog!

In 2018, UW-Stevens Point researcher Dr. Chris Yahnke was co-hosted by the Urban Ecology Center for a semester-long sabbatical. Together with community scientists, Milwaukee area classroom partners, and natural resources managers, we published and presented original bat research to the American Society of Mammalogists and at the Wisconsin Bat Festival.

A bat detector is used to record the high frequency calls of bats as they feed on insects in Three Bridges Park.

Bats Need Rest Areas Too

Three Bridges Park is an important migratory stopover habitat for not only birds, but bats as well. As they migrate south or to their hibernaculum, they need places that provide plentiful insects to fuel them on their journey as well as to fatten up for a long winter's sleep.

Native plants attract a larger number and greater diversity of insects, which is exactly what bats, birds and other groups need. As native plants increase according to our land management goals, this should benefit all levels of the ecosystem including bats.

Evening bat surveys occur at a time that is also great to listen for breeding frogs and other creatures that are active at night.

Summer evenings are ideal for listening for various species of singing insects such as Snowy Tree Crickets and katydids. We also monitor different species of fireflies, recording data on flash patterns (which helps identify species) and abundance.

During the spring and early summer months, we also listen for nighttime calls of singing frogs and toads. Northern Leopard Frogs and American Toads are commonly heard in the Valley as they broadcast their calls in hopes of attracting females for breeding. By the late summer of 2018, young Leopard Frogs were so abundant in Dragonfly Pond, care had to be taken not to step on any while walking the perimeter of the pond.

A firefly and a Northern Leopard Frog are documented during surveys in 2018.

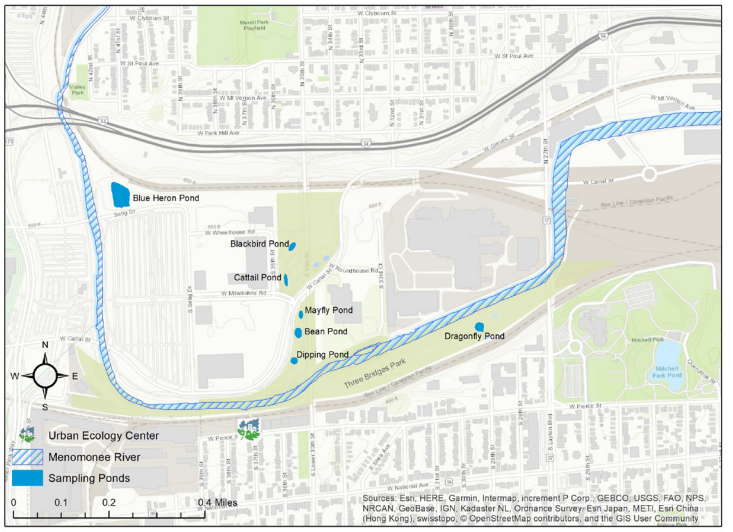
After sunset, Urban Ecology Center green spaces take on an entirely different feel as nocturnal animals take the stage

A bat walk through Three Bridges Park with the Research and Community Science Department and a community scientist on a beautiful summer evening in 2018.

WATER QUALITY

Water Quality Monitoring of Menomonee Valley Ponds

In 2018 Research interns Richard Imp and Maggie Steinhauer designed a protocol to collect water quality data from the ponds in Three Bridges and Stormwater Parks.



A map of 7 ponds throughout the Menomonee Valley to be surveyed as part of the water quality monitoring protocol. The map was designed and created by summer intern Maggie Steinhauer.

The project focuses on a series of 5 ponds in Stormwater Park, a retention pond near Miller Park, and Dragonfly Pond, a larger pond in Three Bridges Park. The 5 ponds in Stormwater Park ("Blackbird," "Cattail," "Mayfly," "Bean," and "Dipping"), are examples of ephemeral wetlands, the pond near Miller Park ("Blue Heron") is a traditional retention pond and Dragonfly Pond is an engineered stormwater pond designed to retain and filter runoff. The water intake to Dragonfly Pond is managed through the use of pumps and cisterns, and the vegetation around the pond is fully managed by the Urban Ecology Center. The vegetation around Blue Heron is unmanaged, overrun with thistle, and the vegetation around the ephemeral wetlands is partly managed. We hope to better understand the efficacy of these different types of ponds and management systems toward improving water quality by filtering rainwater runoff before it enters the river.

Reflections along the Menomonee River

Collecting water quality samples often means getting into the thick of things as Richard is seen here!

"Being able to create a project that aims to get community scientists involved in the study and betterment of water quality in the river is meaningful in more ways than one. Not to mention, wading in a pond filled with dragonflies and turtles is an added bonus." — Maggie Steinhauer 2018 Research & Community Science Intern

"I've been an Outdoor Leader and Intern since Three Bridges Park's opening, so this project is very near and dear to my heart" —Richard Imp, 2018 Research & Community Science Intern

– How do the built ponds of Stormwater Park differ from the more traditional retention ponds (e.g., Miller Park)?

– Is the Menomonee Valley functioning as it originally did as a wetland of biological filtration before water reaches Lake Michigan?

— by 2018 Menomonee Valley Research and Community Science Interns Richard Imp and Maggie Steinhauer

ODONATES (DRAGONFLIES AND DAMSELFLIES)

Because most Odonates spend much of their early lives in water as eggs and larva, dragonflies and damselflies are excellent indicators of water quality. Some larger species spend up to 4 years in streams, ponds, and rivers before they undergo metamorphosis and emerge as beautiful flying adults! As water conditions in the Menomonee Valley improve and the diversity of microhabitats in Three Bridges and Stormwater Parks increase, we should see an increase in Odonate numbers and diversity. This is an excellent example of how we can use certain groups of insects to adaptively manage our green spaces.

odonate: Any of the numerous predatory insects in the order odonata, which includes both dragonflies and damselflies

exuvia: The cast-off outer skin of an arthropod after a molt

metamorphosis: The changes in form that occur as an insect approaches adulthood

The variability in habitat types and structure in the Menomonee Valley allows for diverse groups of Odonates to exist. Riparian areas with emergent vegetation support charismatic damselflies such as the Ebony Jewelwing and American Rubyspot, while Dragonfly Pond attracts everything from robust darners to the more delicate bluets. Witnessing the dynamic choreography of swarms above a pond is incredible. Hearing the rustling of wing on wing contact by males wrestling to protect their territory is truly unique. Watching a hungry dragon zone in on its flying lunch is like watching a dogfight between propeller planes in a 20th century war picture – a very quiet one by human standards.

Photos clockwise from left: A Shadow Darner, a dragonfly exuvia, an Ebony Jewelwing, and community scientists referencing a field guide.

A Citrine Forktail—one of the smallest and rarest odonate species in the United States—photographed September 20, 2018 at Menomonee Valley. This is a "Most Wanted" species in Wisconsin, as more information on its habitat preferences and range is needed to better understand the species.

A Rare Gem

On September 20, community scientists documented a rare damselfly species in Three Bridges Park - the Citrine Forktail, which is considered a rare species in the state and only found once or twice a year in Wisconsin. Menomonee Valley holds the only two observations in the Wisconsin Odonata Survey since 2015!

Unlike most Odonates, Citrine Forktail females mate just once and store the sperm for future egg fertilization. Because it is so rare, mating behavior is rarely seen and poorly studied. We still have so much to learn about this beautiful creature!

The Citrine Forktail presents another case for Adaptive Management. If this rare species is attracted to the Valley, we will want to understand why and also how we can introduce management techniques to support a stable population. Without community scientists, we might never have found this species!

Additional first-time observations for the Valley in 2018 were a Southern Spreadwing (June 6th), a Rainbow Bluet (July 5th) and an Azure Bluet (July 4th).

Photos clockwise from top: Ebony Jewelwing, Rainbow Bluet, and Widow Skimmer.

WEEKLY BIRD WALKS

Community scientists kickstart their mornings with fresh air and bird song every Tuesday at 8:00am throughout the year! Weekly Bird Walks help us document bird diversity and long-term population trends. These walks are free and open to the public. Community scientists volunteered almost 600 hours of birding to the Menomonee Valley in 2018 and added new species to the UEC's cumulative checklist, as well as documenting unusual migration timing for Nashville warblers and Red-winged Blackbirds.

Photos clockwise from top left by community scientist Bruce Halmo and Liz Dalton: American Kestrel, Ovenbird, Snowy Owl

Additions to Menomonee Valley's cumulative list of 150 species:

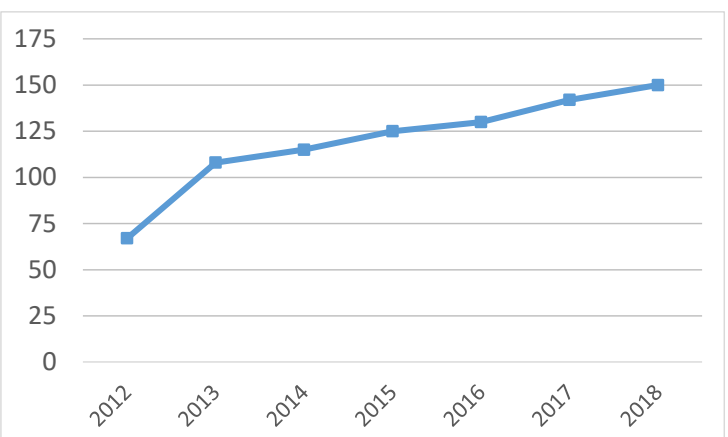
- Blue-winged Warbler*
- Gray-cheeked Thrush
- Ovenbird
- Osprey
- Sharp-shinned Hawk
- Snowy Owl
- Marsh Wren
- Wild Turkey

*Species of Special Concern:

Species where a problem of abundance or distribution is suspected but not yet proven. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

Cumulative bird species richness

Total number of species documented over time based on almost 200 checklists (weekly walks and casual observations) in Menomonee Valley.



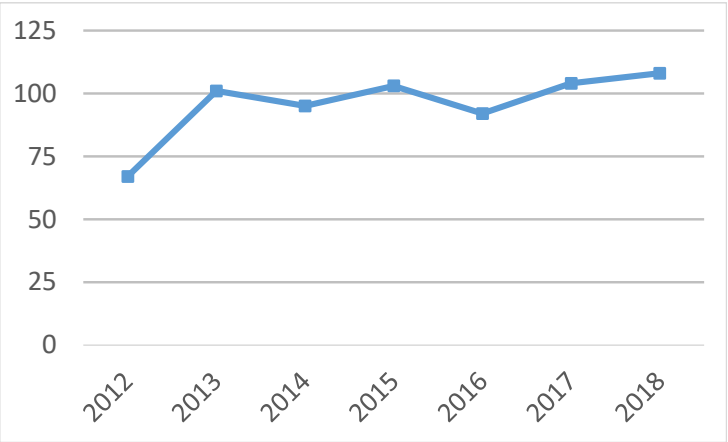
In May, the Urban Ecology Center hosted the 2nd annual Brew City Birding Festival. Participants from around the city came together to support their passion for birds and their community in eco-friendly ways. Several teams in the Green Birding Challenge, the BCBF finale, birded in Menomonee Valley as it is known as a birding hotspot. The festival highlighted the importance of urban greenspaces during migration.

Species Spotted in Three Bridges Park during the 8th Annual Green Birding Challenge

Photos clockwise from top left by community scientist Bruce Halmo: Spotted Sandpiper, Belted Kingfisher, Swainson's Thrush, and a Ruby-Crowned Kinglet.

Yearly bird species richness

Total number of species documented per year based on almost 200 checklists (weekly walks and casual observations) in Menomonee Valley.



BIRD BANDING

The Urban Ecology Center bird banding team monitors birds during spring and fall migration. We are a team of trained banders (both staff and community scientists) and professional partners that also support educational opportunities for school groups and community members. Visitors to the station observe the processes that allow for a better understanding of bird migration and dispersal, behavior and social structure, toxicology and disease, lifespan, population dynamics, and survival and productivity. And the best part is that any visitor to the station can also help us release birds from their own hands. Learn more from community scientists in this video.

A Ruby-Crowned Kinglet is held securely and safely by a qualified bander at Three Bridges Park. They attach a lightweight band with a unique code to one of the legs. Should it be recaptured at this or another banding station, we can better understand migratory habitats, habitat requirements, and longevity of a species. Caption community scientist Charlotte R. Catalano.

Recaptures provide valuable insights on migration patterns, local habitat health, and better species-specific field observations

A recapture is any bird captured already wearing a band. This includes:

- Birds banded here and recaptured elsewhere
- Birds banded here in the past that return to breed
- Birds banded here that are resident year-round
- Birds banded here that annually migrate through
- Resident birds aging in place

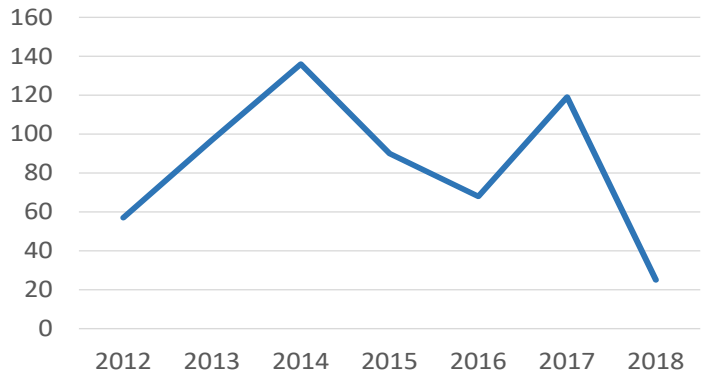
Photos from left to right of birds that are most commonly recaptured at Menomonee Valley: American Robin, American Goldfinch, Song Sparrow.

By the Numbers

In 2018, community scientists analyzed the longitudinal banding data set, integrating a historical context. They found marked variability. Twice as many birds for example were banded in 2014 than 2016, and 2018 represented a seven-year low point. The question is, "Why?".

One factor may have to do with banding effort (number of banding sessions and time nets are open), so future analyses can normalize for this variable.

Total Birds Banded



Another likely factor is that Three Bridges Park has a healthy population of American Goldfinches. In the fall they flock together in large numbers, and every once in a while an entire flock can be captured in one net. This doesn't happen every year so when it does happen it boosts our capture numbers to a great extent. A similar phenomenon can be seen in House Finches and wood warblers. These variable data provide a unique opportunity for community scientists to determine the variables that most influence capture rates. Weather conditions undoubtedly influence capture rates as well for example.

This page was adapted from a presentation by GIS and Field Data Coordinator Jessica Orlando and community scientist Diane Weaver. *Bird Banding at the Urban Ecology Center: What a Sliver of our Data Tells Us* was presented at Milwaukee's Brew City Birding Festival in May 2018. Featured in May's Volunteer Spotlight, Diane (right) volunteered a grand total of 222 hours at all three UEC branches in 2017 alone! She's involved in numerous community science projects, notably Odonate monitoring and her many leadership roles within our bird banding project. This includes representing the Center at meetings with partners, entering and quality assurance of all bird banding data, translating raw data into the format needed for the USGS Bird Banding Lab database, analyzing data and presenting results. Diane's attention to detail is incredibly valuable to stewarding the bird banding data set—one of the longest running research projects at the Center (since 2002!).

INTERESTING INVERTEBRATES:

Monarch Migration

Each fall, Monarchs born here fly an incredible 2,000 miles to Mexico to roost for the winter. Known as the "super" generation, they migrate north in spring, but only make it to Texas. Out of reserves and exhausted they lay eggs and die. Incredibly, their offspring continue the journey north. The cycle repeats itself and the returning spring migrants are the grand- or great-grandchildren of the super generation!

Monarch populations continue to plummet due to climate change, loss of milkweed plants and loss of habitat. This species plays a valuable ecosystem role as a pollinator and as food for insects, birds and other small animals (despite their toxicity). Many other important species share similar habitat requirements as Monarchs, so everything we do to help Monarchs also helps hundreds of other species!

5 Stages as a Caterpillar

When a Monarch hatches from the egg, it starts its new life as a tiny caterpillar. An eating machine, it soon outgrows its skin, sheds it and molts into a new "instar." This cycle repeats 5 times with each instar slightly bigger and more toxic than the previous as they eat more milkweed.

Record Setting Season

2018 was a productive year for Monarchs at the Menomonee Valley. In mid-August, community scientists observed 19 larvae on 105 milkweed plants. A week later, 51 eggs were recorded on 104 milkweed plants. These represent historic high-points for Monarch density. Hopefully these trends will continue in the coming years in conjunction with local and international conservation efforts.

From top to bottom: Monarch eggs on milkweed; a 5th level instar munching on milkweed; several level instars along with Monarch eggs on one milkweed plant.

Monarch Tagging

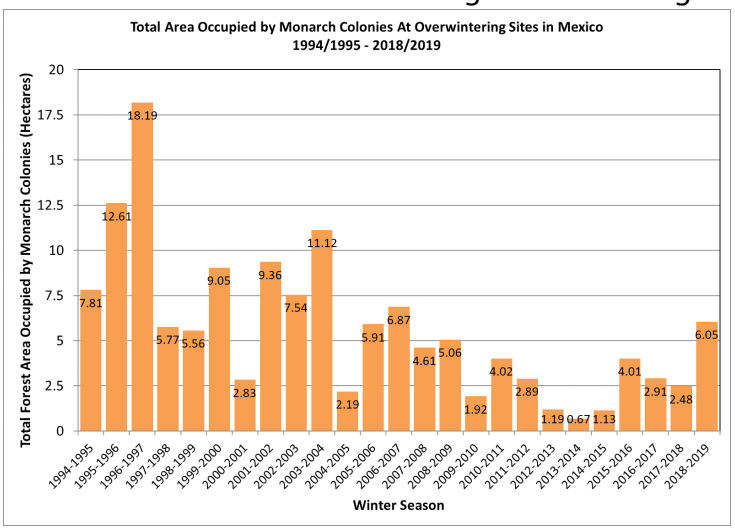
In addition to monitoring eggs and larvae, community scientists tag adult Monarchs from the super generation in August. They catch and place a small sticker with a unique code on the hind wing of butterflies. If someone finds a Monarch with a tag either during migration or at the wintering grounds, they can submit that finding online. This is part of an international program called Monarch Watch which seeks to better understand the time and pace of migration, mortality during migration, and changes in geographic distribution.

Larval Monarch caterpillars feed solely on native milkweed. It provides them with sustenance, of course, but also with a defense mechanism against predators. Milkweeds contain a toxin that is harmless to Monarchs but harmful to their predators, who quickly learn to avoid them.

Small stickers are placed on Monarchs to track their migration during a successful Monarch tagging day at Three Bridges Park.

Local Efforts have International Impact

Local efforts to increase diverse native plants are paying off. The 2018 – 2019 season is the first time since 2006 – 2007 that the population area is higher than six hectares—the target for a sustained population that can recover from climate events and large-scale challenges.



Graph by Monarch Joint Venture showing the total area of forest area with overwintering monarchs over 25 years.

BUTTERFLIES, BEETLES, & BEES

Bees in Distress

Many bumble bee species are in decline in Wisconsin and throughout the world. Of Wisconsin's twenty species, one is federally endangered species (The Rusty Patched Bumble Bee), seven are Species of Greatest Conservation need, and three have been designated as Species with Information Needs.

There is still very little known about the distribution and biology of the bumble bees in Wisconsin. Additional data are needed on species distribution, habitat needs, phenology, and population status to fully plan for the conservation and management of these beautiful pollinators.

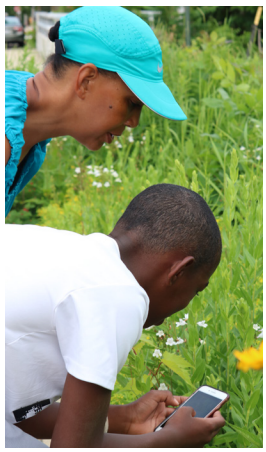
A pollinator survey being conducted at Menomonee Valley with the help of community scientist John Chaplock's photography.

Importance of Native Plants

Historically, agriculture in Wisconsin consisted of small family farms with diverse plantings that supported diverse insect populations. Most farms today consist of massive mono crop fields that support only a few insects. With this shift, it is increasingly important to manage other areas like Three Bridges Park, converted farms and even backyards with native plants to support a diverse insect community, which in turn supports birds and other wildlife.

Photo by community scientist Bruce Halmo.

A Modern (and easy) Method of Data Collection



Bumble bees are quite sensitive and don't often respond well to traditional survey methods of capture and release with insect nets (plus they sting!). With this in mind, the essential equipment for bumble bee surveys is usually a smart phone or other camera and that's it! Photos can be used later to identify species and location which is non-intrusive to the bees hard at work pollinating our crops and keeping our gardens looking beautiful.

Community scientists help take pictures of bumble bees for a pollinator survey.

Beetles

An incredible 25% of all animal species in the world belong to the order Coleoptera, also known as the Beetles, making it the largest group of animals on the planet! With less than 10% of all species identified, new discoveries are constantly being made by taxonomists and amateur entomologists. In 2018 community scientists identified more than 30 species new to the Menomonee Valley and some were new to Wisconsin!

Beetles live in almost every environment on earth and play crucial ecosystem roles. They are efficient decomposers that break down vegetation, rotting wood, and fungi, which makes vital nutrients accessible to a host of other plants and animals.

Not all beetles are created equally, however. One beetle, the Emerald Ash Borer, is causing catastrophic numbers of ash trees to die throughout Wisconsin, including Three Bridges Park. Dead, standing ash trees throughout the park are a grim reminder of the impacts that invasive species can have right here in the Menomonee Valley.

Please do your part and be sure to not transport firewood from one place to another as that will only aid in the beetle's dispersal. Obtain your firewood locally or from certified wood dealers and also inform your friends.

Jon Bales and Heidi Meier co-led 3 surveys with volunteers from April to October 2018. Collected beetles are brought back to the Center for identification. Jon and Heidi found beetles that haven't been recorded in the region before and are contributing valuable knowledge to science about the diversity of life inhabiting restored urban greenspaces.

WHY COMMUNITY SCIENCE IS IMPORTANT

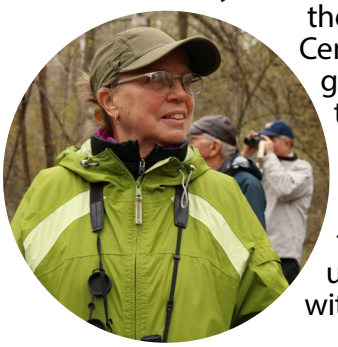
The Idea

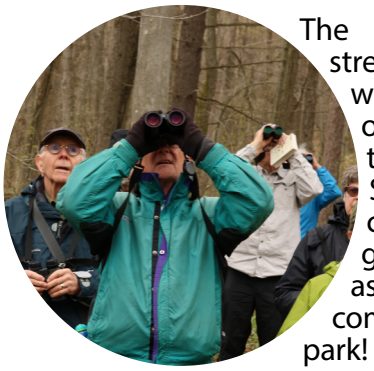
Community science is a process in which professional and community scientists work together to conduct scientific research and monitoring. The Urban Ecology Center supports this collaboration that improves ecological understanding, deepens a sense of environmental ethics and connects people in cities to nature and to each other. We hope to create safe spaces for people of all walks of life and backgrounds, so everyone can experience the transformative power of nature. This process inspires personal respect, commitment, and stewardship of the earth.

Photo of a Tiger Swallowtail by Educator Matt Flower

Value of Your Work

Data collected by community scientists like you are shared with local, state, national, and international research partners. These data have helped better understand the effects of climate change and habitat loss on bird populations, the timing of Monarch butterfly generations and their annual migration, and the impact of white-nose syndrome on bats. These data also tell the story of the Urban Ecology Center's restoration of urban green spaces. They illustrate the presence of diverse wildlife species, particularly indicators, new species, or the return of species that were extirpated for decades. The data also help us adaptively manage the land with posterity in mind.





The knowledge you bring strengthens the work we do while also strengthening our community through the talents you contribute. Stronger people, stronger communities, and stronger green spaces are formed as a result of engaging in community science in the park!

Your Work Pays OFF!

The historical data you've helped collect through the years are contributing to both local and national active research projects. For example, Jana Viel, a PhD Candidate in the Geography department at the University of Wisconsin – Milwaukee, is analyzing our bird banding data in order to to study passerine (song bird) breeding phenology. She is analyzing the physical characteristics we collect during the banding process to determine the timing of breeding of different species and whether or not this has changed over the years in response to climate change. We are grateful that our Urban Ecology data set could be of importance to Jana and we're excited see the results of her dissertation!

Eco-Travel

The Research and Community Science team goes beyond Milwaukee a few times per year to connect the community with new places. These include destinations close to home such as the other side of our own Lake Michigan watershed as well as international destinations that highlight unique ecology, geology, or sustainability issues. Regardless of the destination, Eco-travel exemplifies the same focus on nature, education, community, and fun that informs everything we do. In 2017 & 2018 the Research and Community Science team led trips to explore tropical biology in Costa Rica, sand dunes on the sunset side of Lake Michigan, the Prairie Pothole Region of North Dakota, and the glaciers and volcanoes of Iceland!

2018 COMMUNITY SCIENTISTS

Thank you to the 73 individuals and organizations who volunteered over 697 hours of their time and talents to Research and Community Science at the Urban Ecology Center - Menomonee Valley 2018!

Our volunteers are the heart of our organization. You help keep the daily workings of the Center going, not to mention the fun you create while you're at it. Here are 4 awards that we feel you all deserve:

1) The Workhorse Award: Our volunteers help our department run 365 programs per year! This doesn't even take into account the events, field trips, and programs our department runs that you also often attend. These programs are only able to run when we have volunteer assistance. That's a lot of help from some dedicated volunteers!

2) The Long Hours Award: Ok, we admit it. The volunteer hours required to help with Community Science programs can be brutal. Whether it is bird banding at 5:00 am or recording bat calls at 10:00 pm, we can rely on you to be there. That feels pretty good.

3) The Light at the End of the Tunnel Award: Research days often start early and end late, and come with challenging work conditions for staff. Volunteers bring laughter and smiles, giving us energy and a figurative "light at the end of the tunnel" on those long days. We appreciate you more than you know. Our work would not be as fun or engaging without you. Thank you for your endless enthusiasm and your ability to remind us of how exciting this work is for our community.

4) Nothing Fazes You Award: Get bird poop flung on your face? Walk through clouds of biting mosquitoes? Help with a program on a 95 degree day? Bird walk when it's -15 degrees? Get your new boots caked with mud while counting Monarchs? Wake up at 3:30 am to make sandwiches for banding? Carry 25 pounds of field equipment while swatting at mosquitoes while it's 95 degrees? Meh. Ain't no thang. You act as if these everyday requests truly don't faze you. We notice those exceptional things you do and hope you know it means the world to us.

Anonymous
Aaron Griffing
Adrienne Muller-Goldstein
Alexa Hollywood
Alexis Pederson
Analiese Rosales-Garcia
Andrea Thiltgen
Ann Graf
Antonio Garcia
Barb Kellermann
Bob Heil
Brittany Peters
Callia Johnson
Carrie Kaliebe
Cecilia Vargo
Charlotte Catalano
Chris Yahnke
Chris Young
Dan Jibson
Daniel Gleason
Dean Muller
Define Yilmaz
Dennis Casper
Diane Weaver
Elizabeth Dalton
Ellie Jerow
Emiliano Gutierez
Emily Widen
Eric Koepp
Erica Henderson
Gaia White
Heidi Meier
Ipak Yilmaz
Jaclyn Schmitz
Jake Buege
Jake Radke
Jane Cliff
Jane Gellman
Jean Casper
Jean Zachariasen
Jeffrey Taylor
Jenna Buege
Jonathon Bales
Judi Kistler
Katherine Stefanik
Kathy Beaver
Kent Heberling
Lisa Mowery
Margaret Ver Hage
Maria Terres-Sandgren
Marianna Milhurat
Martin Pfeiffer
Matthew Hughes
Michelle Hawkins
Nancy Groethe
Nathaniel Wojcicki
Pam Dibble
Riley Young
Rita Dragotta
Rose Mary Muller
Samantha Flores
Sharon Champeau
Sonia Ost
Stephen Baldwin
Steven Edwards
Suzy Holstein
Terrence Pavletic
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Todd Herman
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This research was made possible by the generous support of the Menomonee Valley Partners, Inc.

MENOMONEE VALLEY
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GROUND UP
A COLLABORATION OF
MENOMONEE VALLEY PARTNERS, INC. & URBAN ECOLOGY CENTER