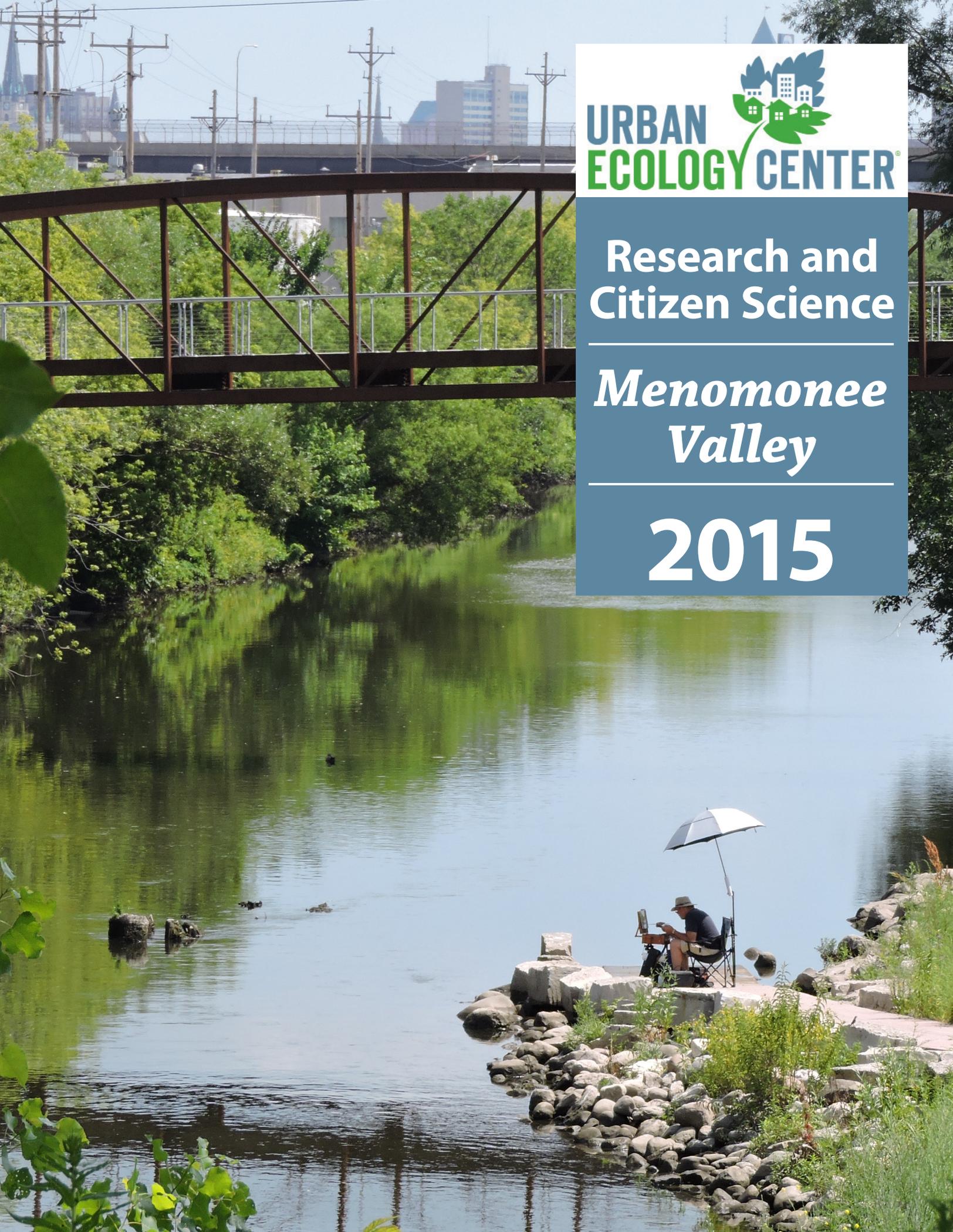




Research and
Citizen Science

*Menomonee
Valley*

2015



A MESSAGE FROM THE TEAM



We are excited to sing the praises of the amazing work that has been done by hundreds of volunteers from the Urban Ecology Center and our community partners in the Menomonee Valley. It was once hard to imagine that the areas along the Hank Aaron State Trail and in Menomonee Valley's Three Bridges Park and Stormwater Park were part of a huge, thriving wetland with bountiful wild rice, waterfowl, and fish. After over 150 years of human development turned the land into a barren, industrial brownfield, the Menomonee Valley Partners Inc. and other partners are breathing new life into this area. Today, humans and wildlife together are rediscovering and healing the land and citizen scientists are helping to understand and celebrate this rebirth.

We have plenty of great stories to share as native plants, insects, birds, mammals and other critters are coming back to the ecosystems. We invite you to see for yourself what's happening by coming down to the Menomonee Valley and volunteering your time as a land steward or citizen scientist, taking a walk through the park on newly created trails, or enjoying a great view of Milwaukee. We'll be there along with hundreds of our volunteers, school groups, and community partners!

—Jennifer, Jessica, and Tim



ABOUT US

The Urban Ecology Center's Citizen Science Program serves as a meaningful bridge between academic research and the community-at-large...



...enabling collaboration, and creating a more engaged, knowledgeable, and ecologically literate citizenry.

OVERVIEW



We sincerely appreciate the support of the Menomonee Valley Partners Inc. which helps enrich the Urban Ecology Center's mission to foster ecological understanding as inspiration for change. Collaboration between academic research and the community-at-large through citizen science in the newly restored ecosystems of Three Bridges Park and Stormwater Park puts the partnering organizations at the leading edge of urban greenspace restoration.

We are excited to report progress from our community-led research and monitoring activities during ecosystem restoration and land management of the Menomonee Valley during 2015. Highlights include:

- Expanding our network of collaborating Community Scientists. They support all aspects of research—from planning methodology and advising as part of the Community Citizen Science Advisory Board to collecting data in the field and presenting results at research symposia and conferences.
- Collaborating with numerous local, state, national, and international research programs that leads to better understanding and conservation of our urban ecosystems and the communities that depend on them.
- Conducting monitoring that leads to an ongoing inventory of wildlife species present in the Menomonee Valley, including documenting some species that haven't been recorded in Milwaukee County in over 100 years!
- Mentoring community scientists of all ages, including the Urban Ecology Center's Young Scientists Club, high school students participating in the Outdoor Leadership Program, interns preparing for a career in natural resources management, and opportunities for lifelong learning through adult education and community programs.



BATS

Our team of community scientists researches bats in the Menomonee Valley by monitoring bats' echolocations. Each bat species produces a unique sound wave during echolocation which can be used to identify bats during migration (April – May & September – October) and summer breeding and residency (June – August). The acoustic monitoring equipment we carry during surveys translates frequencies higher than the human ear can process into visual sonograms of the sound waves.

In 2015, ten community scientists plus staff conducted four acoustic bat surveys in Three Bridges Park, detecting three of Wisconsin's eight bat species—Big Brown, Hoary, and Eastern Red.

Big Brown bats were our most frequently encountered bat species during 2015 Menomonee Valley surveys (75% of identified bat detections). These bats are known to reside in urban areas, roosting in abandoned buildings and attics, but they are currently State-threatened due to the threat of White Nose Syndrome, a deadly non-native fungal disease affecting cave-hibernating bats across the country.



Community scientists researching bats in the Menomonee Valley. GIS and Field Data Coordinator Anne Reis is measuring bat acoustics produced during echolocation as citizen scientists spot bats overhead! Photographed by Milwaukee Journal Sentinel's Michael McLoone.

Bats are important for the Menomonee Valley, keeping insect pests in balance and protecting our native landscapes, gardens, and human health by reducing the need for chemical pesticides.

As a community liaison with the Wisconsin Department of Natural Resources, The Urban Ecology Center also lends out our acoustic bat monitoring equipment. In 2015, 19 additional surveys were conducted throughout Southeastern Wisconsin by Havenwoods State Forest, Wehr Nature Center, Mackenzie Environmental Center, and numerous community members concerned about bat conservation. Together, our surveys are part of an important network tracking the presence of bats throughout the region and documenting their populations during the spread of White Nose Syndrome. We are hopeful that a committed team of researchers and community members can work together to better understand these important mammals and work towards ways to conserve them.



Results of May 21, 2015 acoustic monitoring. Bat species confirmed included Big Brown, Hoary, and Eastern Red. This survey coincided with bat migration season and this evening we encountered the most bat species and individual bat detections of our 2015 monitoring season.

WEEKLY BIRD WALKS

Weekly Bird Walks were conducted for the fourth year in Menomonee Valley and included 52 surveys in 2015 (48 surveys in 2014). These encompassed 50 weeks of the year plus two additional weekend surveys, including the Christmas Bird Count—the longest-running citizen science birding event in the country! Volunteers identified and counted birds in the Menomonee Valley and then hiked to Washington Park continuing the count. Survey effort was an accumulation of 650 hours of birding (number of observers × survey hours), over twice that of 2014 (302 hours). The mean number of birders increased from four to six per Weekly Bird Walk, occurring Tuesday mornings from 8:00 a.m. – 10:00 a.m. We are excited to see such a big increase in community engagement in this project. The 1.25 mile walking routes alternate east through Three Bridges Park and west through the Menomonee Valley Passage—we hope you can join us!

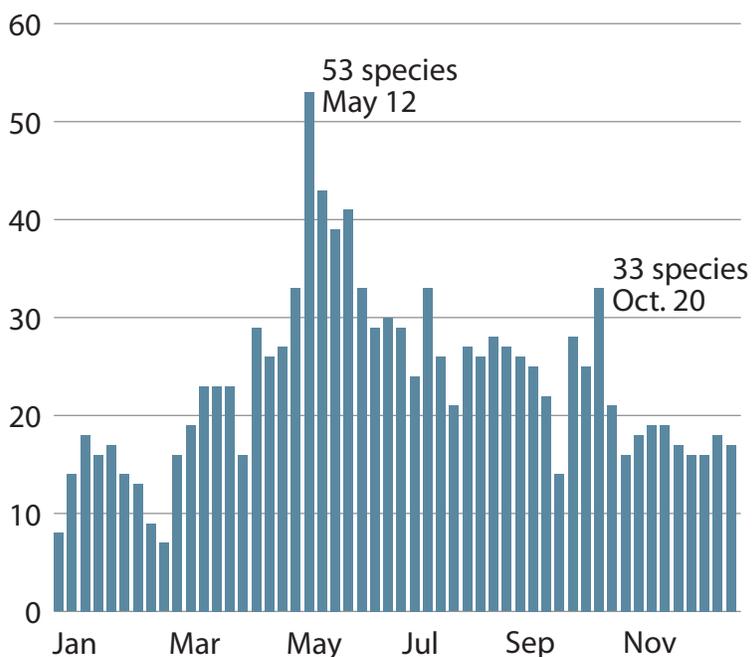
In 2015, ten species were recorded for the first time ever in the Menomonee Valley, increasing our cumulative bird list (ongoing since 2012) to 126 species! These species included:

- Bald Eagle
- American Woodcock*
- Cape May Warbler
- Alder Flycatcher
- Olive-sided Flycatcher*
- Great Crested Flycatcher
- Orchard Oriole
- Eastern Towhee
- American Wigeon
- Rusty Blackbird

*State Special Concern species

Number of bird species throughout the year

Bird species peaked during spring and fall migrations



Menomonee Valley citizen scientists recorded 101 bird species during 2015 weekly bird walks. While our species lists peak during spring and fall migrations, we're out all year long!



Green Heron observed along the Menomonee River in July 2015 by Urban Ecology Center educator and phenology enthusiast Matt Flower.

BIRD BANDING

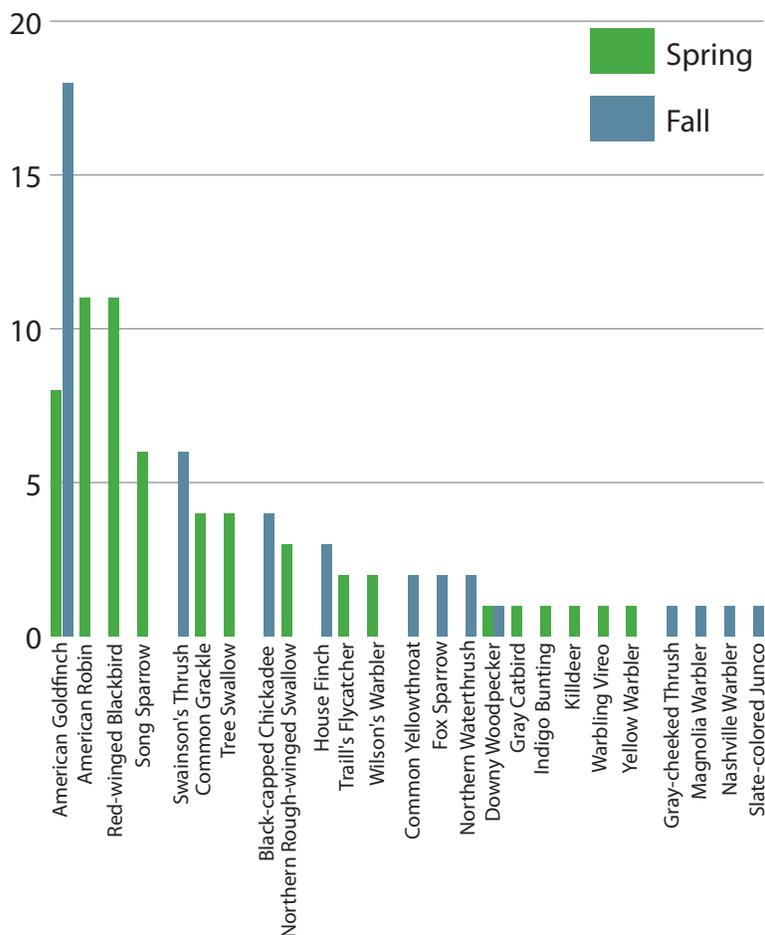
For this research, each bird is given a unique identification leg band and we record metrics such as age, weight, molting status, wing length and the amount of fat. If a bird is encountered again in the future (anywhere along its migration route) this helps us understand migration patterns which is important information for conservation. Banding also helps determine how effective our green spaces are in providing stopover sites to refuel during the long, demanding migration process and can help identify more elusive species. To date, we've identified six unique bird species through banding efforts that were undetected during bird walks, including Fox Sparrow, Gray-cheeked Thrush, Mourning Warbler, Philadelphia Vireo, Traill's Flycatcher, and Western Palm Warbler.



Banding a Swainson's Thrush. Photo by GIS and Field Data Coordinator Anne Reis.

Number of birds banded seasonally by species

Recorded from two banding sessions each season in 2015



The two seasons had markedly different species compositions, with only American Goldfinch and Downy Woodpecker occurring in both.

We banded five species that hadn't been banded in this area previously: Downy Woodpecker, Killdeer, Gray-cheeked Thrush, Fox Sparrow, and Slate-colored Junco, increasing the Menomonee Valley list to 44 species.

We banded 99 birds in 2015, encompassing 25 different species (57 individuals/15 species in spring, 42 individuals/12 species in fall). In spring, 40% of the birds we banded were male and 44% were female (16% unidentified). Of these, 78% of male birds and 68% of female birds banded showed signs of breeding (a cloacal protuberance or brood patch for males and a brood patch for females). In fall, 31% of the birds were male and 12% were female (57% unidentified). Sex is easier to determine during the breeding season when both plumage and anatomical differences tend to be more pronounced. As expected, birds we caught in spring were older than birds caught in fall after the nesting season produced a new class of fledglings. Fat reserves are assessed on a scale from zero to seven and across species median fat was class zero in spring and class one in fall, indicating increased fat reserves before fall migration. For American Goldfinch (one of the few species with large numbers of individuals banded in both seasons), fat reserves were class two (average weight 13.1 g) in spring and class four (average weight 13.6 g) in fall.

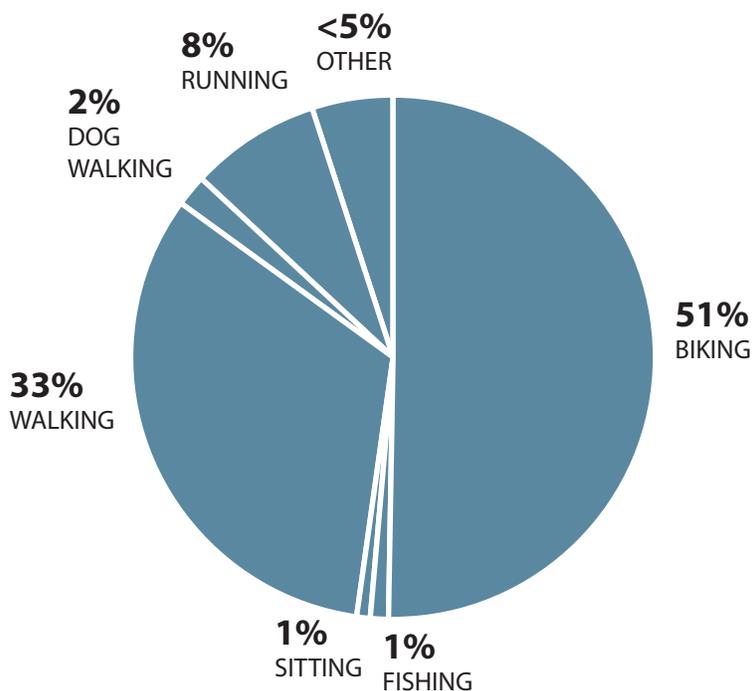
PARK USE MONITORING

Annual park use is estimated from year-round surveys conducted largely by volunteer community scientists. Surveys last approximately one hour and consist of four fixed points where visitor use is recorded for ten minutes. Additional observations are made when moving between survey points. The route encompasses Three Bridges Park, Stormwater Park, and part of the Hank Aaron State Trail. We record how people are using the park (biking, running, walking, fishing, nature viewing, other categories) and then extrapolate from these observations to estimate park use for the entire year using an adjustment factor specific to each branch, season, and year.

In 2015, we estimated there were 27,739 recreational park visits!

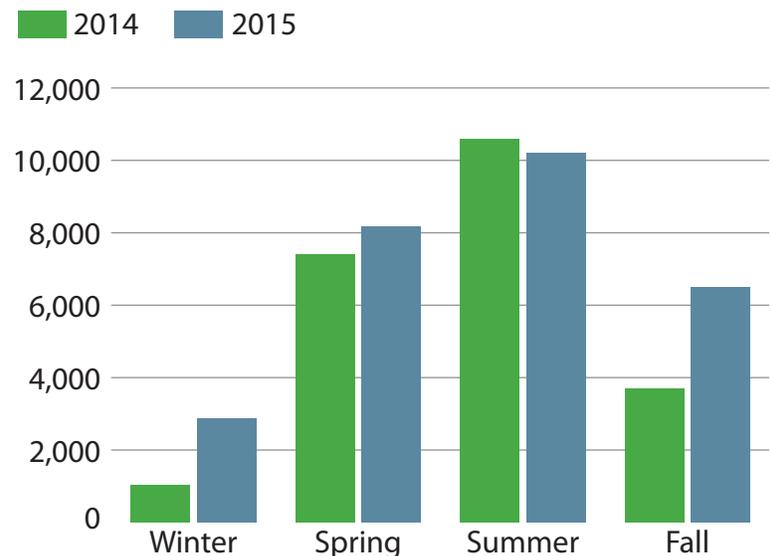
Surveys are scheduled randomly throughout the year and conducted during three different times of the day: morning (7:30 a.m. – 11:30 a.m.), afternoon (11:30 a.m. – 3:30 p.m.), and evening (3:30 p.m. – 7:30 p.m.). Four-hour windows allow volunteers more flexibility in their own schedules to ensure a sustained community contribution. In 2015, returning volunteers were joined by 6 new volunteers to conduct 65% of 81 park use surveys, contributing 53 volunteer hours to the project.

Summary of 2015 park use by activity



Total number of park users increased by 22.1%

Estimated from 84 surveys in 2014 & 81 surveys in 2015



- 84% of park users were adults
- Biking was the most popular observed activity for adults (54%) while youth were most often walking (49%)
- 76% of dogs were on leash



Photo taken during 2015 Walk 100 Miles with the Mayor by Urban Ecology Center supporter Adam Carr.

INVERTEBRATES

The Urban Ecology Center has been busy monitoring invertebrates—the largest group of animals on earth! This is no small undertaking, as it includes a great diversity of butterflies, beetles, moths, grasshoppers, fireflies, centipedes, and spiders (not to mention the mollusks, crustaceans, and worms we haven't started studying...yet). Despite their small size, these are primary consumers of the many plants we have added to the park and together they have a lot to tell us about the quality of the environment.

We are examining the restoration progress of our urban ecosystems from a bug's (and spider's) point of view.



Surveys led by local expert Joey Kilmer and 12 community scientists identified spiders from 5 different families.

The CRIKT team—Citizens Researching Invertebrate Kritters Together—is a community group engaging in professional-level research. Members monitor invertebrates using various techniques including net, visual, trap, and even acoustic surveys to obtain a better representation of the invertebrate community. These animals are critical for pollination, soil nutrient cycling, and supporting the food-web. These often overlooked “kритters” will aid the Urban Ecology Center in determining if we are on the right track towards restoring a functioning, native ecosystem. CRIKT is embracing the complexity of studying an urban environment undergoing ecological restoration through adaptive management. Instead of a laboratory or remote field station, Menomonee Valley invertebrates are being researched right where they occur.



Spider survey at Menomonee Valley. Photo by GIS and Field Data Coordinator Anne Reis.

One critical question that this group is exploring is: “Can insects be an effective indicator of the resilience and sustainability of the restoration work we do in our urban parks?” —“CRIKT and You” by Beth Heller, Urban Ecology Center Senior Director of Education and Strategic Planning.

We have started answering this question by compiling an inventory of what we have right now, only a few years after the transformation of Menomonee Valley into a restored, early-successional plant community. As land stewardship further transforms this ecosystem into more complex native prairies and river woodlands, we are excited to look for invertebrates that indicate successes of new habitats!



Invertebrate survey at Menomonee Valley. Photo by Research and Citizen Science Coordinator Jennifer Callaghan.

ODONATES

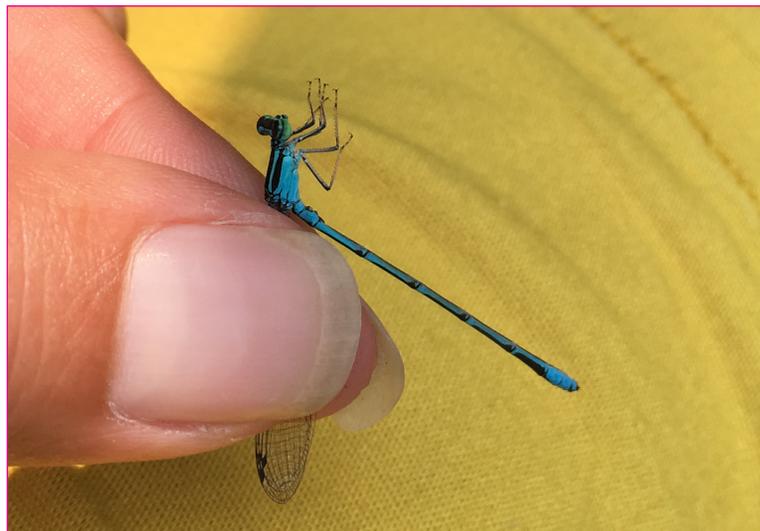
Ten community scientists contributed 44 hours of sampling effort during June – September 2015 to survey odonates—dragonflies and damselflies. In total, we recorded 16 species with the Eastern Forktail and Twelve-Spotted Skimmer being the most common. The cumulative list after two years of surveying includes 19 species of odonates in the Menomonee Valley.

Six of these species were first-time records for the Menomonee Valley:

- Ebony Jewelwing
- Lance-tipped Darner
- Cherry-faced Meadowhawk
- Widow Skimmer
- Common Whitetail
- Familiar Bluet



Lance-tipped Darner, one of the six new species for Menomonee Valley's ongoing checklist of species. Photographed July 25 by community scientist Jym Mooney.



A Stream Bluet—the first record of this species in Milwaukee County since 1907! Photo by Research and Citizen Science Coordinator Jennifer Callaghan.

Through these community efforts to study the effect of restoration efforts in the Menomonee Valley, we have observed several dragonfly and damselfly species that have not been documented in the county in over 100 years. One of these species, the Stream Bluet (*Enallagma exsulans*) was officially documented (observed and photographed) for the Wisconsin Odonata Survey as the first Milwaukee County record of this species since 1907!

"There's surely more to find here, especially as the habitat improves, but until [The Urban Ecology Center] started we haven't been looking in a long time."

—Wisconsin Dragonfly Society



BUTTERFLIES



Butterfly survey at Menomonee Valley. Photo by GIS and Field Data Coordinator Anne Reis.

Butterfly Census

Butterfly monitoring led by community scientist Jym Mooney continued in 2015, adding two new species to the Menomonee Valley inventory: Eastern Tailed-blue and Common Wood-nymph. Now totaling ten species, we expect this number to increase as native plant communities mature.

Monarch Larval Surveys

Citizen scientists counted Monarch eggs, instars (larval caterpillar molting stages), and pupae as part of University of Minnesota's Monarch Larvae Monitoring Project.



Urban Ecology Center intern Lauren Snell inspecting a Common Milkweed. Lauren spent her 2016 summer working at the University of Minnesota Monarch Lab, which coordinates the Monarch Larval Monitoring Project across the country!

Monarch butterflies lay eggs on milkweed plants, which larvae eat after they hatch. Larval caterpillars absorb unpalatable alkaloid and cardenolide compounds from the plant into their body, protecting them from predators even after they metamorphose into an adult butterfly. We found eggs or larvae on 9% of milkweeds surveyed, up from 3% in 2014, indicating that restoration efforts in the Menomonee Valley continue to increase densities of milkweed plants that support monarch breeding.

Monarch Tagging



Monarchs are tagged by placing a sticker with a unique code on the discal cell on the underside of the hindwing.

Fourteen Monarch butterflies were tagged during three September surveys. Of these, 29% were female and 64% were male (7% unknown). Tagged butterflies were either born in Milwaukee or were encountered during migration south and were members of the "super generation" that fly all the way to the mountains of central Mexico during fall, survive winter, and fly north in spring to begin the next generation in northern Mexico and the southern U.S. These offspring (and their offspring) slowly continue north during spring and summer, whereby Monarchs born here will make the same multigenerational migration as their great-grandparents did the year before. Tags recovered during migration, winter hibernation, or return spring flight increase understanding of population dynamics, improve habitat along migration routes, and help conserve this unique species.

INTERNS & YOUNG SCIENTISTS

Our Citizen Science program in Menomonee Valley is enriched through mentorship of grade school Young Scientists, high school Outdoor Leaders, and college interns. From afterschool programs to summer internships, our research efforts are supported by the enthusiasm and inquisitiveness of the next generation of ecologists. Furthermore, we are able to support these future leaders through opportunities in our green-career pipeline such as our Outdoor Leadership program.



Research and Citizen Science Coordinator Jennifer Callaghan mentoring summer interns Lauren Snell and Elise Myers on a Menomonee River turtle basking survey.



Long-term wildlife monitoring, including small mammal and snake mark-recapture research, is often led by summer interns and requires a daily commitment to check live traps and coverboards. The recapture of individuals allows us to assess age and growth patterns and estimate population size to adapt habitat management strategies in our urban ecosystems.



Menomonee Valley's Young Scientists Club presented their own original research to professional scientists at University of Minnesota's Ecology Fair in December 2015 as part of the Driven to Discover program.

The Urban Ecology Center's Young Scientists Club meets after school on weekdays and on Saturdays to explore our restored ecosystems and learn how to conduct their own research. As our youngest community scientists, this group designed a bird study in Stormwater Park during fall migration. They presented (and defended) this research to professional scientists at the University of Minnesota's Ecology Fair in December 2015 as part of the Driven to Discover program. We are excited to continue working with the Young Scientists Club to better understand the changes happening in the restored ecosystems of the Menomonee Valley!

LAND STEWARDSHIP

The Land Stewardship team spent a large portion of the year doing invasive species management. Over the course of the growing season, we removed Garlic Mustard, Spotted Knapweed, Purple Crown Vetch, Sweet Clover, and Buckthorn from about 8 acres in Three Bridges Park and along the Menomonee River and Hank Aaron State Trail. Because we were able to focus our time for the better part of the growing season, we were able to get a step ahead of the spread of some of these non-native, invasive plants.

Two new trails were created in Three Bridges Park during 2015!

With the help of summer interns Yue Pheng Lee and Callia Johnson we blazed a new trail to the top of the westernmost hill in Three Bridges Park. Before this path was installed, there was erosion from walking to the top of the hill. Now this established route allows people to view the restored ecosystems of the Menomonee Valley while reducing soil erosion to encourage native plant communities. We also created a wood-chipped path along the Menomonee River in the wooded area of the park. This gives our education programs and other visitors access to habitat that previously was difficult to explore because of overgrown vegetation and uneven terrain. Interns are also vital for monitoring restoration progress in the park. In 2015, summer intern Haley Carter developed a vegetative monitoring survey that measures plant species composition over time. From her research we are able to create adaptive strategies to manage the changing landscape.



This newly blazed trail now allows people climb the westernmost hill and reduces erosion in Three Bridges Park. Photo taken during 2016 Walk 100 Miles with the Mayor by Urban Ecology Center Marketing Communications Coordinator Anna Aragon.



Outdoor Detectives summer campers enjoying the newly created trail along the Menomonee River in Three Bridges Park. Photo by Urban Ecology Center Intern Maddie Bird.

All of this land stewardship, ecosystem restoration, and more is made possible by our amazing volunteers. We are so grateful for their time spent volunteering with us, whether it was once, or once a week. Thank you!

In 2015, over 680 individual volunteers spent nearly 1,600 hours restoring the native ecosystems of the Menomonee Valley and stewarding the parks for wildlife and our community.

COMMUNITY SCIENTISTS

Thank you to all of the community scientists who have conducted research during 2015! You made every bat survey, bird walk, bird banding, invertebrate survey, mammal monitoring, odonate survey, park use survey, and snake survey possible and enjoyable.

Adam Yellen	Lauren Snell
Ann Graf	Lea K. Cutsforth
Anonymous	Lincoln Rice
Billie Harrison	Lora Loke
Carol A. Hayes	Maggie Madden
Charlotte Catalano	Martin Pfeiffer
Chris Young	Mary Mirasola
Courtney J. Allen	Michelle Hawkins
Craig Berg	Michelle E. Les
Daniel Jibson	Neil J. Houtler
Danny Lynn	Nicholas Hightdudis
David A. Snell	Norm Gunder
David Axtell	Owen Jaglowski
Dennis Casper	Randy T. Cerfus
Diane Weaver	Rebecca Burton
Eva Johnston	Richard Ruppel
Ilya Slootsky	Richard Toth
Jamie B. Bruchman	Robbie Johnston
Janet L. Carr	Robin Squier
Jean Zachariasen	Rose Mary Muller
Jean Casper	Sarah Fischer
Jeanette Zevallos-Zelazoski	Sarah R. Geise
Jeff Taylor	Siena B. Muehlfeld
Jennifer Lautz	Sonia Ost
Jessica Jaglowski	Sophia Otap
Jessica Orlofsky	Stephen A. Gaza
Joey Kilmer	Stephen E. Baldwin
Jon Bales	Sue Lewis
Joanna Rotter	Suzu C. Holstein
Julia Robson	Tenzin Jaglowski
Judi Kistler	Terry Parletic
Kate Hightdudis	Thomas M. Moore
Kathleen M. Beaver	Vicki Piaskowski
Kelsey Crank	William C. Vuyk
Laura Pope	



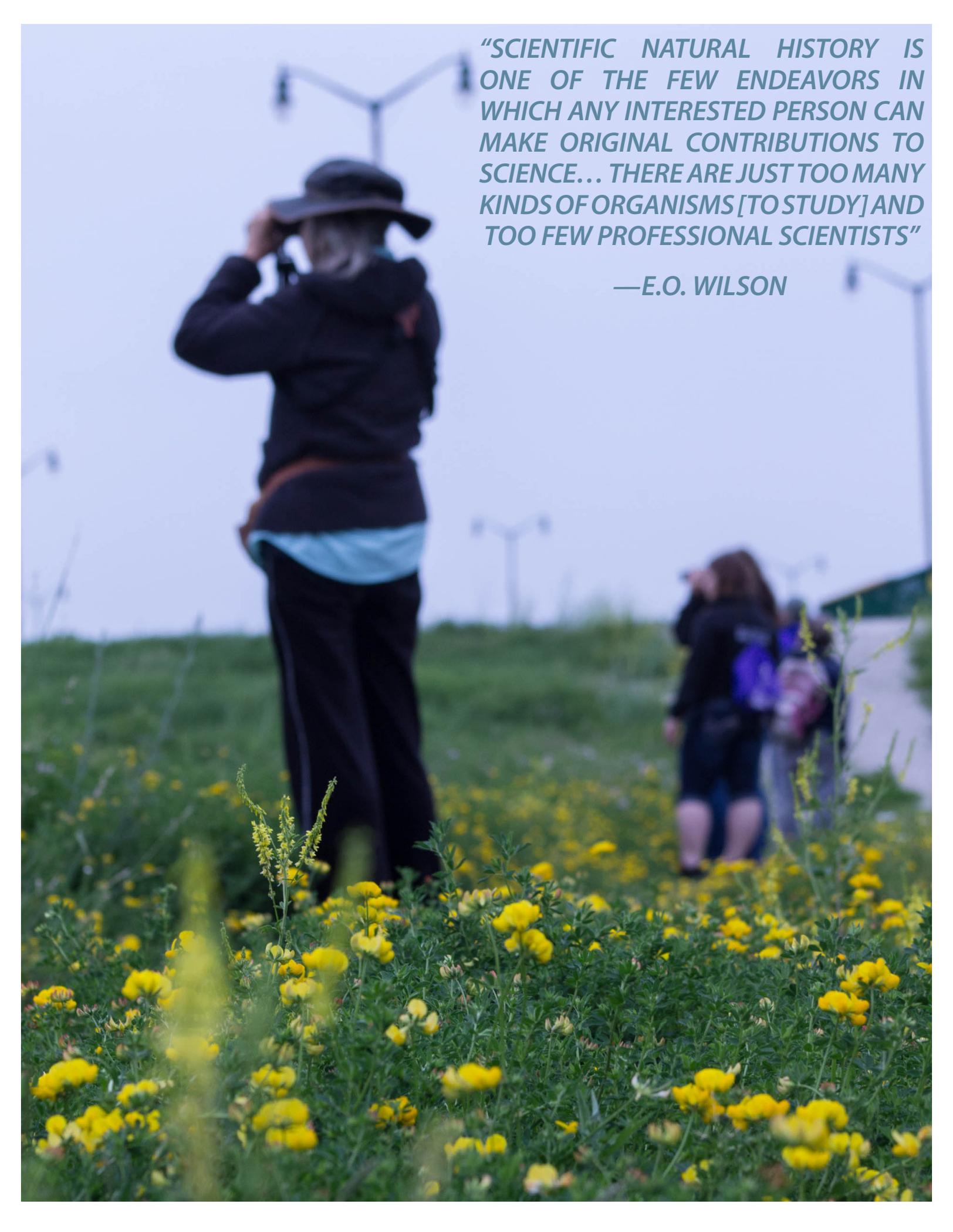
Invertebrate BioBlitz at Menomonee Valley. Photo by GIS and Field Data Coordinator Anne Reis.



Spider survey at Menomonee Valley. Photo by GIS and Field Data Coordinator Anne Reis.



Volunteers returning from invertebrate monitoring. Photo by Research and Citizen Science volunteer Ann Graf.



"SCIENTIFIC NATURAL HISTORY IS ONE OF THE FEW ENDEAVORS IN WHICH ANY INTERESTED PERSON CAN MAKE ORIGINAL CONTRIBUTIONS TO SCIENCE... THERE ARE JUST TOO MANY KINDS OF ORGANISMS [TO STUDY] AND TOO FEW PROFESSIONAL SCIENTISTS"

—E.O. WILSON



Riverside Park

1500 E. Park Place
Milwaukee, WI 53211
P (414) 964-8505
F (414) 964-1084
jferschinger@urbanecologycenter.org

Hours:
Mon – Thurs | 9am – 7pm
Fri & Sat | 9am – 5pm
Sun | Noon – 5pm

Washington Park

1859 N. 40th Street
Milwaukee, WI 53208
P (414) 344-5460
F (414) 344-5462
tevans@urbanecologycenter.org

Hours:
Tues – Fri | Noon – 6pm
Sat | 9am – 5pm

Menomonee Valley

3700 W. Pierce Street
Milwaukee, WI 53215
P (414) 431-2040
F (414) 308-1858
gholstein@urbanecologycenter.org

Hours:
Tues – Thurs | Noon – 7 pm
Fri | Noon – 6 pm
Sat | 9 am – 5 pm

The Urban Ecology Center is a proud member of
Community Shares of Greater Milwaukee

