

# The Rectrix

A seasonal newsletter of the Missouri River Bird Observatory

Volume 7 No. 2. Summer 2017



rectrix [rek-triks] noun. (pl. -trices) any of the larger feathers in a bird's tail, used for steering in flight.





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**Our Mission**  
To contribute to the conservation of Missouri's birds and their habitats through research, monitoring, education and outreach.

# Letter from the Director

Dear MRBO Members and Friends,

I write this in early July as our field season is drawing to a close. Once again this year, MRBO engaged in all-species bird surveys on prairies, wetlands and forests across the state. We ended up surveying 32 private wetlands during spring migration and again in the breeding season, 30 public and private grassland sites, five new bottomland forest sites in the Bootheel and one eastern Missouri State Park. Right now, we still have two staff members working on a nest-monitoring project at Wah'Kon-Tah Prairie to investigate the effects of patch-burn grazing management on bird productivity. Additionally, MRBO has delivered 38 education events since April 1<sup>st</sup>.

Ethan and I are often asked how such a small organization is able to accomplish so much. I am writing today to address this question: it is because of our staff, which this year consists of Veronica Mecko, Erik Ost, Paige Witek and Philipp Maleko. It has been their exceptional dedication and incredibly hard work over the past three months that has kept our projects running.

Unlike previous years, we had a very difficult time staffing all of the projects. We should have had two wetlands technicians, but were only able to find one – Philipp. He came to MRBO from southern California with wetlands experience and extreme motivation. He took one day off during the entire field season and traveled all over Missouri alone, camping, meeting with landowners, surveying and writing site reports. On the grasslands project, we really needed four technicians but found three, one of whom quit in mid-May just as surveys were beginning. Most fortunately for MRBO, that left Veronica and Erik on the grasslands projects. As most of our readers know, Veronica has been with MRBO for five years and is not only an excellent field biologist, she is also a skilled project coordinator. Erik was with us for his second season and brought the same dedication, flexibility, and rock-solid work ethic to the grasslands project that he displayed on the wetlands project in 2016. Also fortunately, we were blessed to find an excellent educator, Paige, who took the helm of MRBO's education program and has worked wonders in developing and implementing events. You can read more about what Paige has done so far in the following pages.

This "Letter from the Director" is essentially a public THANK YOU to Veronica, Erik, Paige and Philipp. Without their extraordinary work this season, MRBO would have suffered. Instead it excelled in every project and within the education program. Each one of these people is an incredible asset to the field of bird conservation.

Sincerely,

Dana

Left: Dana, Paige & Ethan at Indian Foothills Park. Center: Philipp & Ethan at Pershing State Park. Right: Paige, Erik & Veronica at the Missouri Prairie Foundation's Bio-blitz at Stilwell Prairie (photo from Carol Davit).



# Answering the Question, “Who Cares?”

by MRBO Educator Paige Witek



Talking amphibians at the Young Explorers Club in Arrow Rock.

As an environmental educator, my job is to constantly answer the question, “Who cares?”. It is an important question to answer and it lies behind every program I give. I started my job as the educator for the Missouri River Bird Observatory at the end of March, and since then I have given many different programs with the same goal: to inspire curiosity about the natural world. I started by assisting the Friends of Arrow Rock with the Natural History portion of their Arrow Rock School Programs in the spring. For most of these programs I would lead kids on nature hikes and discuss ecosystems, aspects of human settlement, and the history of Arrow Rock’s natural resources along the way. Some of the time, I was allotted only 20-30 minutes for each program and this involved a lot of walking backwards up a hill shouting to the whole group about the Missouri River multiple times! Therefore, it was sometimes quite tiring, but, of course, worthwhile. Another set of programs I give is two one-hour programs every Friday to the Marshall Foothills Day Camp. Each week I teach the kids about birds and lead a variety of activities with them. So far, I have given multiple programs on bird adaptations, nest building and rearing young. The kids got to create their own bird, pretend to be bird parents, build nests and try out different “beaks”. Every week has been a lot of fun and I have become known as “the bird lady”. I have also done a lot of “one time only” type of programs at a variety of events and locations. I have taught bird migration at Great Circle: Tom Butterfield Campus, water bird adaptations at George Owens Watershed Festival,

led bird hikes at Knob Noster State Park, banded birds and hiked with 1<sup>st</sup> graders at Indian Foothills Park, attended the March for Science in Springfield and the Missouri Prairie Foundation’s Bio-Blitz in Vernon County. I have partnered up with Missouri River Relief several times and gave a program on river birds and their unique adaptations for the Missouri River All Stars program. For this program, I created a “Birds of the River” poster. I gave each student a different type of bird that lives on the river and asked them to look at its adaptations and features and think about what type of habitat along the river (shown on the poster) their bird might prefer. The poster was a success and worth the many hours I put into making it. All of those programs were a lot of fun and I could write much more about each of them, but the program I want to write about the most is the one that has taken up most of my time this summer.

The Missouri River Bird Observatory, for the first time this summer, has started a summer day camp for kids! The camp is called the Young Explorers’ Club and it has been (and still is) quite the experience. We split the camp up into two sessions. The first one started at the end of May and continued through the middle of June for children ages 7-9 yrs. The second session started June 27<sup>th</sup> and will continue into the end of July for children ages 10-12 yrs. I believe our first session was a great success, especially for our first summer running it. We decided to start the camp this year by



Playing a bird silhouette game at the March for Science, Springfield.



Examining scat with 1st graders from St. Peter School.

running two days a week (Tuesday and Wednesday) in the morning for three hours. Each day has a different theme or topic attached to it. Our first session topics included: birds (of course), connecting with nature, amphibians, reptiles, mammals, and the Missouri River! Each day consists of a warm-up/ice breaker, many fun activities related to the topic of the day, snack and a related craft. We banded birds, went on a birding hike, played the Great Migration Challenge and Food for the Brood, performed nature yoga, created nature stories, discussed natural resources, meditated outside, made a food web, explored the Big Spring while taking field notes, explored amphibian vocalizations, held live snakes and a turtle, compared species x-rays, examined mammal pelts and skulls, and hiked the Missouri River Landing Trail all the way to the Missouri River. And that’s not even all of it. We also made bird houses, bird feeders, snakes out of plates, foxes out of paper bags and watercolor paintings of the river. Added into all of this were also a lot of fun physical activities that got the kids moving. For example, a relay race to “help the turtles cross the road.” This all occurred within our first session of camp. We had many wonderful volunteers and presenters



# Education: “Who Cares?”



An Arrow Rock Natural History field trip.

come out to help and I could not have done it without them. It was a lot of fun for both the children and me. Our second session is still to come and, although we are having some trouble with sign-ups for the 10-12 year old category, I am hopeful. Starting this camp was a great deal of work to organize, advertise, and perform; but it has been a great learning experience and I am looking forward to the chance to improve it for next summer.

Speaking of the future, there are still many things I want to accomplish with MRBO. I would like to work with more school groups and establish an after-school program with local schools. I would like to create and collect more educational tools for me and future educators to use. I am looking forward to Northern Saw-whet Owl banding in the fall, the Arrow Rock Heritage Festival and bird banding at the Columbia Audubon Nature Sanctuary. I am also looking forward to the opportunities not yet scheduled and the adventures yet to come.

Now that I have looked into the future, I want to talk about the past. Many people have asked me

how I got into this line of work. Similar to most people in this field, it started with a love of the outdoors and wildlife at a young age. I was born and raised in Green Bay, Wisconsin. For most of my childhood I dreamed of becoming a veterinarian. I was very serious about wanting to help animals and heal them. So, after I graduated high school, I decided to attend the University of Wisconsin- Madison and start on the pre-vet track. As many of you may know, vet school is quite difficult to get into and I began working on my plan B in case I didn't get in. It was this journey, in search of my plan B, that plan B became plan A. It wasn't any one job or internship that directly led to this career change, but a mixture of a variety of experiences and self-examination. I began to see the need for environmental



Studying nests with Marshall Foothills Park day campers.

education and even sometimes how the public desired it. My environmental based classes always reviewed different ways to solve the many environmental issues in the world and providing education to the public was ALWAYS mentioned. However, it was usually listed last and kind of thrown in at the end, even though it seemed important. It wasn't until last year that I began to make the connection between my love for teaching people about animals and the strong need for it. I wanted a job in a field I was passionate about and I could leave at the end of the day knowing I did something to make a difference. In May of 2016 I graduated with a Bachelor of Science degree in Zoology and Environmental Studies from the University of Wisconsin. After I graduated (and even before I graduated) I took internships and jobs with an environmental education aspect. First, it was making the public, “Bear Aware” in northern Minnesota. Second, it was teaching mixed audiences about raptors and avian rehabilitation in Antigo, Wisconsin. Now, I am educating people from all over Missouri about wildlife, their habitats and

conservation with MRBO. It has been a great experience so far and I believe it will continue to be great into the future. I do this work because I want to help others feel the way I do when I walk outside...serene with the knowledge that “I care” and I am doing something about it.



Discussing watersheds at George Owens Nature Park in Independence.



Hiking in Arrow Rock with the Young Explorers Club.





# FlyingWILD Certification Workshop

**Arrow Rock, MO  
August 26th, 2017  
10 a.m. - 3 p.m.**

- **Receive FlyingWILD Educator Guide and materials**
- **In-depth overview of FlyingWILD program and guide**
- **Hands-on demonstrations and ideas of how to incorporate FlyingWILD into your programs**
- **Tips to ID our Missouri birds**
- **FlyingWILD Training Certification**

**Please register by August 12th!  
Call 660-837-3888 or email  
[paige.witek@mrbo.org](mailto:paige.witek@mrbo.org)**

**Who:** Elementary & Middle School teachers, “non-formal” environmental educators and interpreters.

**What:** Receive training in the Council for Environmental Education’s FlyingWILD program - you will come away with 100’s of fun, inquiry-based activities that meet national education standards. The program and its activities are based around birds - some of the most well-loved of Missouri’s wildlife and the easiest to engage your students!

**Where:** Held at the Missouri River Bird Observatory’s office in Arrow Rock.

**How much:** \$15, which covers your Flying WILD activity guide and light refreshments.

**Bring with you:**

Sack lunch  
Indoor/outdoor clothing  
Binoculars if you have them

*Check with your school - you may be able to receive continuing ed credit.*

**Learn more at:** [www.flyingwild.org](http://www.flyingwild.org)

Brought to you by



Missouri River Bird Observatory

*Flying WILD facilitators since 2012*



# Getting Personal with Missouri's Swans

by wildlife photographer & MRBO member Mark Ramsey

*It all started with this picture of a Trumpeter Swan with a neck band reading 4M7, taken in February 2012.*

I had heard there was a banded swan on a local wetland south of town. Being familiar with the place, I took off immediately to see if the swan was still around. It was, but it was not located in a good place for taking pictures! I had to crawl about 100 yards to get close enough to set up. I laid there for almost an hour and just watched and photographed several swans, including the banded 4M7.

*I was hooked.*

Not knowing how to find information about banded birds, I reached out to the US Fish and Wildlife Service. I sent a couple of emails and didn't receive a answer. I felt like I had done my duty in trying to report 4M7, so didn't worry about it anymore. 2013 came and went and while there were a few swans around I didn't see 4M7 that year. *In 2014 there were almost 50 swans on the same wetland and to my amazement 4M7 was with them.*



The first sighting of 4M7, in 2012.



4M7 and friends in 2014.

This time I called my local Conservation Agent and friend with the Missouri Department of Conservation (MDC). He did some checking and found out the red color of the neck band meant the bird had been banded in Iowa. I then called the Iowa Department of Natural Resources (DNR). The man I spoke with knew 4M7 very well! I was talking to the man that helped raise this swan from a cygnet! It turned out that 4M7 is a male hatched in 2006 and donated to Iowa by the Northwest Trek Wildlife Park in Washington State. He was hand raised by Dave Hoffman of the Iowa DNR and another man from Clinton, Iowa. *4M7 was released in May 2007 at Clear Lake near Mason City, Iowa.* He and his family have been seen during spring and summer in Wisconsin and Minnesota.

I have now observed, photographed and reported 4M7 in 2012, 2014, 2015, 2016 and 2017. I find him in Chariton County near Forest Green on Highway 5 just north of Glasgow. *He is now 11 years old.* I got super-excited when I found him this year. Even though Trumpeter Swans can live into their 20's according to banding records, there are any number of mishaps that can happen during their migratory trips or on the breeding and wintering grounds. One of the biggest threats is collisions with power lines.



4M7 in 2015....



...and in 2016.

I have been able to get photos of two other swans with neck bands. One of these was from Iowa - red band 9M9. 9M9 is a male hatched in 2014. He came to Iowa after being cared for at the Wildlife Rehabilitation Center of Minnesota. He was released in 2015 near Stanton, Iowa and I captured shots of him in March of 2016 in Chariton County. The other - yellow band 1T6 - turned out to be from Wisconsin. 1T6 hatched in the wild in June 2012 in Burnett County, northwest Wisconsin. It was banded in September 2012 and I got pictures of it in January 2017, just two miles from my house - 530 miles from where it was banded in Wisconsin! 1T6 was with a group of over 150 Swans.



# Swans



4M7 with his mate and four young in 2017.

I continue to look for banded Trumpeter Swans during my regular photography outings to local wetlands and I have also learned some of the species' biology. At up to 25 pounds, the Trumpeter Swan is the heaviest bird native to North America; it is also the largest species of waterfowl with a wingspan of 7 to 8 feet. The adult Trumpeter has all white plumage while the cygnets have light grey plumage and pinkish legs. They gain their fully white plumage after about a year. They have a large, wedge-shaped black bill. Trumpeter Swans often mate for life and both parents participate in raising their young, though primarily the female incubates the eggs. Most pair bonds are

formed when swans are 3 to 6 years old. I have seen some serious fights when swans are competing for mates!

In 1933 there were only 70 Trumpeter Swans remaining in the lower 48 States. What a great success story - efforts by numerous Wildlife Agencies and the Trumpeter Swan Society have helped change what used to be a rare sight to be almost common today. I applaud their efforts. *Only 70 birds back in the 1930s to an estimated 46,000 in 2010!*

The behavior and actions of Trumpeter Swans are fun to watch. It is said that they need almost 100 yards to take off from the water - that's a pretty big runway! They will usually start exchanging vocalizations with others in the group that are going to leave, the head and neck will bob up and down and then they start flapping their wings and use their webbed feet to start running on the water. It makes a lot of splash! While landing is graceful most of the time, I have witnessed a swans landing on other swans on a few occasions. This usually leads to a skirmish.

If you happen to drive by a group of Trumpeter Swans, roll down the window, shut off the motor, and you will hear why they are called Trumpeters. In mid-Missouri swans can be seen on wetlands that other waterfowl species frequent. They can also be seen in harvested corn fields.



Cleared for take-off!

If you would like to see more swans and other wildlife photos please check out my Facebook page Mark Ramsey Photography. Here are some links to more information on Trumpeter Swans: <http://www.trumpeterswansociety.org/>  
<http://www.iowadnr.gov/Conservation/Wildlife-Stewardship/Non-Game-Wildlife/Diversity-Projects/Trumpeter-Swan-Restoration>



We at MRBO got acquainted with Mark Ramsey during our Images of Hope photography competition. Since then he has submitted many pictures of birds, native plants and pollinators to MRBO's social media.

Mark writes:

I am a life-long resident of Chariton County. and have hunted and fished my entire life. My grandfather was a great outdoorsman; I would go with him every chance I could. I learned a lot from him, mainly how to read wildlife and stay still! Grandfather was also a great photographer. He took thousands of pictures, put them into slides, and we would have what we called the "picture show" - all of us crammed into my grandparents' tiny house watching. Of course, this was all back in the film days - he would have liked digital I think! When I was younger I couldn't afford to develop the pictures so I didn't get fully into outdoor photography until about nine years ago. I am self-taught and still learning! I use the skills I developed from hunting to get a lot of my shots.

We live on 120 acres and manage our land for wildlife, including deer, turkey, quail, numerous songbirds and furbearers. On occasion we have Wood Ducks that nest on the creek that runs through our farm. I have a blind set up in the field 200 yards from the house, and it is a dream come true to be able to walk from the house to see and photograph wildlife. My wife and I have three beautiful daughters and five grandchildren.



# Missouri Public Land Spotlight: Washington State Park

by Pat Leuders of the St. Louis Audubon Society/Audubon Society of Missouri



How far would you be willing to travel to enjoy a natural park with American Indian petroglyphs dating from 1 AD, a native hardwood forest, limestone glades and savannas, towering dolomite bluffs overlooking a river, native wild flowers, camping, fishing, and hiking trails? Washington State Park in central Missouri, a reasonable drive from anywhere in the Midwest, features all of these natural wonders and admission is free, as it is at all of our State Parks!

## HISTORY & PETROGLYPHS

Covering 2.8 miles, the land for Washington State Park was donated to the state of Missouri in 1932, and the buildings were constructed by the African American Company 1743 of stonemasons with the Civilian Conservation Corps. The park is known as the best location of prehistoric ceremonies associated with the American Indian culture, referred by archaeologists as

the Mississippian. Petroglyphs, or rock carvings, remain as evidence of their beliefs and give clues to understanding their lives in this area around 1000 AD. The park protects this largest group of petroglyphs discovered in Missouri, recognized in 1970 in the National Register of Historic Places.

Inspired by the petroglyphs, Company 1743 named their barracks “Camp Thunderbird”, building the lodge, lookout shelter, and picnic shelters from native rocks found on the property.

## NATURAL FEATURES & BIRDING WASHINGTON STATE PARK

The park, covering almost 1,800 acres, features a wide variety of habitats which attract a large number of bird species as permanent residents, summer breeders, and spring and fall migrants.

The **Washington Park Hardwood Natural Area** is a native forest with tall Kentucky coffee, sugar maple, and slippery elms providing the canopy, and ferns and wildflowers cover the rocky understory. Native woodpeckers including Pileated, Red-bellied, and Downy nest in the large number of cavities provided in this heavily treed area. Kentucky Warblers and Ovenbird vocalize loudly in the summer as they nest. Worm-eating Warblers, Acadian Flycatchers, Yellow-billed Cuckoo, Northern Parula, Carolina Wren, and Blue-gray Gnatcatchers are plentiful as they spend the summer in this beautiful forest. Red-eyed Vireo are so numerous there seems to be one vocalizing in each tree, and occasionally a Yellow-throated Vireo joins the chorus. Tropical-looking Scarlet and Summer Tanagers show their beautiful colors as they search for insects in the canopy.

## TRAILS AND AMENITIES

Washington State Park has three well-marked and maintained trails that provide access to the many varied habitats available in the park.

### **Opossum Trail**

The Opossum Trail meanders through a hardwood forest along a creek formed by a natural spring. Louisiana Waterthrush announce the boundaries of their territory along the water’s edge and as do Kentucky Warblers, Acadian Flycatchers, American Redstart, and Eastern Phoebe. Barred Owl make their year-around home along the creek, often bothered by Blue Jay and Northern Cardinal trying to warn the rest of nature about their threat!

### **Rockywood Trail**

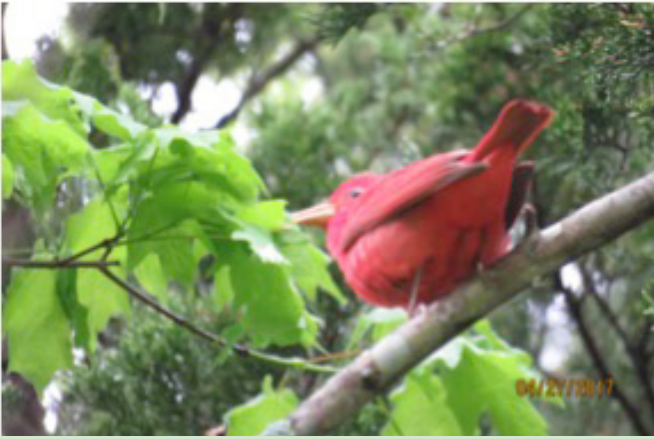
The Rockywood Trail is the longest in the park winding for six miles around the perimeter of the main park area. You can enter and leave the trail at various points where it crosses the main park road providing access to some of the hardwood forest areas. It also provides access to some of the glades and savannas.

Many acres of the park contain limestone glades and savanna featuring a large variety of wildflowers including the Fremont’s leather flower and the blue-violet nemastylis found in few other parks. The glades attract the colorful Indigo Bunting, Yellow-breasted





# Washington State Park



Chat, Blue-gray Gnatcatchers, Ruby-throated Hummingbird, Great-crested Flycatcher, and White-eyed Vireo. The lovely song of the Prairie Warbler can be heard at the glade surrounding the petroglyphs as can that of the colorful Blue Grosbeak, American Goldfinch, and Indigo Bunting. The native Red Cedar is popular with these species as are the native wildflowers found in the glade. Red-headed Woodpecker are seen moving around in this area flashing their white wing patches.

## 1000 Steps Trail

Towering dolomite bluffs overlook the Big River providing breathtaking views of the expansive valley below. The 1000 Steps trail is a 1.5 mile loop that leads to a lookout shelter and puts the hiker high in the forest canopy for close, treetop looks at many bird species. The haunting melody of the Wood

Thrush contrasts with the loud call of the Ovenbird as the birder climbs the dolomite steps. Eastern Wood-Pewees call their name as many Red-eyed Vireo move quickly through the leaves finding food for their young. Summer Tanager (above) and Yellow-billed Cuckoo spend the summer in this beautiful forest.

## Big River Valley

Easy access to the shores of the Big River allows the visitor to watch low flying Northern Rough-winged and Cliff Swallows over the water and Barn Swallows over the bordering fields. Northern Parula, Prothonotary, Yellow, and Yellow-throated Warblers nest together in the towering Sycamores along the bank. The Belted Kingfisher parades the shores protecting his territory. Warbling Vireos sing their repeated song hidden deep in the leaves. Great Blue and Green Heron wade in the river while fishing the shallow waters, and above them Orchard Orioles are feeding young. Chipping Sparrows are found along the edge of the road. Common Yellowthroat enjoy the fields as do the Eastern Bluebird, Indigo Bunting, and Field Sparrow. By mid-morning, Turkey Vultures are circling above, and the occasional Red-shouldered and Red-tailed Hawk joins the kettle. House Finch and American Goldfinch visit the flower heads looking for seeds. Visitors have access to the clear river water and a gravel beach, and a children's playground and picnic shelter attracts families at the end of the river access road.



## YEAR AROUND BIRDING

Neotropical migrants traveling the middle of the United States in the Spring and Fall visit Washington State Park to rest and feed before continuing their journey. Some of the spring migrants recorded using the native hardwood forests include Blackpoll, Black-throated Green, Nashville, Tennessee, and Chestnut-sided Warblers. Gray-cheeked and Swainson's Thrush feel at home on the leaf covered forest floor. Most Rose-breasted Grosbeak continue

north in the spring, and White-throated Sparrows spend the winter but will leave for Canada by late May.

The ability to see and hear such a large number of migrants, year-around residents and summer breeders makes birding Washington State Park in the spring and summer a rewarding destination. In addition, the beauty of the natural and man-made wonders of this park make it a destination that Missouri residents and out-of-state visitors won't want to miss!



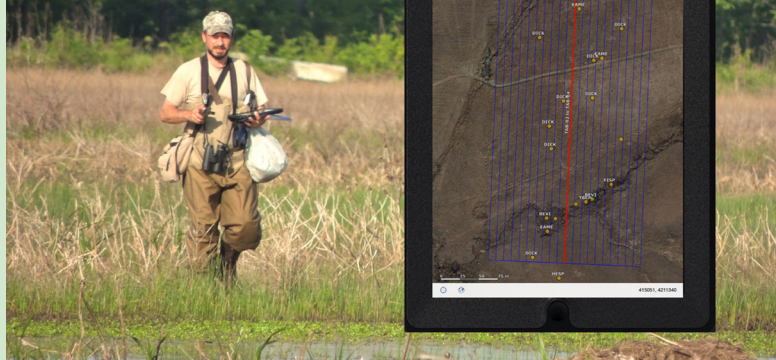
Pat Lueders worked for MRBO this year to conduct spring and summer bird censuses at Washington State Park. This work was part of a contract with the Missouri Department of Natural Resources to assess the diversity of birds in the various natural communities of the Park.

Pat has been leading birding trips in the St. Louis area and Midwest for over 15 years. A love of traveling has taken her to many countries of the world and most of the US. Pat is currently employed as a tour and birding guide with the Naturalist Journeys/Caligo Ventures tour company and leads trips to many countries including Belize, Panama, Trinidad & Tobago, Colombia, Cuba, and the US. When not out birding, she is the coordinator of volunteers for a number of Citizen Science projects partnering with many agencies including Missouri Department of Natural Resources, U.S. Fish & Wildlife, U.S. Army Corps of Engineers, National Audubon, National Trumpeter Swan Society, Forest Park Forever, Great Rivers Greenway, and the Missouri Department of Conservation. Pat serves on the boards of St. Louis Audubon & Audubon Society of Missouri and is on a bird banding team at the World Bird Sanctuary.



# The Art and Science of Bird Surveys in the Modern Age: A New Twist to Distance Sampling

By: Ethan Duke



Since 2012, the Missouri River Bird Observatory has been working on improving bird survey methodologies and the presentation of results by developing data collection technology through ArcGIS Collector.

We've blogged about it [before](#) at and [presented on the topic in Sweden](#) at the International Bird Observatory Conference and yet, within the bird monitoring community use of modern technology to facilitate the data collection process is relatively rare.

It takes time to understand the countless, well-developed methods for conducting bird surveys and data analysis. Each approach is often tailored by region, habitat, and taxa, and information needs.

[Distance.org](#) provides a simple description of Distance Sampling, one of the most commonly-used survey methodologies.

Even though Distance sampling can provide incredibly robust statistics, we at MRBO have sought for and developed a way to improve data collection and provide supplemental outputs. In short, we not only keep lists of birds detected and respective distances, we also map them. To be clear, traditional Distance sampling results in estimates of density (birds per/acre) and abundance. Our data collection method provides these results with the added advantage of recording exactly where the birds are seen in the landscape.

We have been using iPads on surveys for four years to collect data. Specifically, we use ESRI's software and applications, Collector for ArcGIS and ArcGIS Desktop ArcMap to conduct line-transect and point-count and prepare data for Distance sampling. Our GPS-enabled iPads are prepared with aerial imagery basemaps, elements of study design (transects and survey points), as well as feature collection services (i.e. bird and habitat) that work offline in remote settings. As surveyors walk a transect line they see where they are on the aerial imagery basemap and mark all birds where they are seen or heard.

Since 2013, we have collected locations of hundreds of thousands of birds using Missouri's most imperiled habitats. Resulting density and abundance estimates as well as mapped bird locations are provided to landowners and land managers.

In addition to the statistical analysis results, mapped results can be overlaid with management and habitat information, providing compelling illustrations.

Mapped individual bird points or heatmaps provide a compelling visualization of factors effecting shifts in occupancy from year to year. Maps can be made available via ArcGIS online in the form of webmaps or webapps. Some of our data are available in various formats at [mrbo.maps.arcgis.com](http://mrbo.maps.arcgis.com).

In addition to more flexible outputs, the process has considerable advantages over traditional sampling methodologies. We save an extraordinary amount of time and resources. In any given year, we cover about 950 line transects and about 50 point counts. Traditionally, this would have required the design and printing of 1,000 datasheets. Also, distance sampling requires estimating the distance from subjects of study to the transect line or point count point location. People are notoriously bad at estimating distances precisely. With our method each bird is placed with a much greater degree of precision. Survey crews can navigate and plan logistics much more efficiently without previously being oriented in an area.

Additionally, it would have entailed hours of daily data entry with countless chances of errors in transcribing the data. Data entry now takes place in seconds without human error with the click of a button on an iPad. Fieldwork just got a lot more fun.

Data are saved on secure servers in the cloud and on multiple hard drive backups. It can seamlessly be pulled into the desktop environment and synced back to the cloud. There is tremendous flexibility in sharing data.

So, where do we go from here? Since this methodology is so new, the many outputs and further uses of the data haven't been fully realized. One hope is that we will be able to capture distances from observer to birds rather than distance from distances of birds

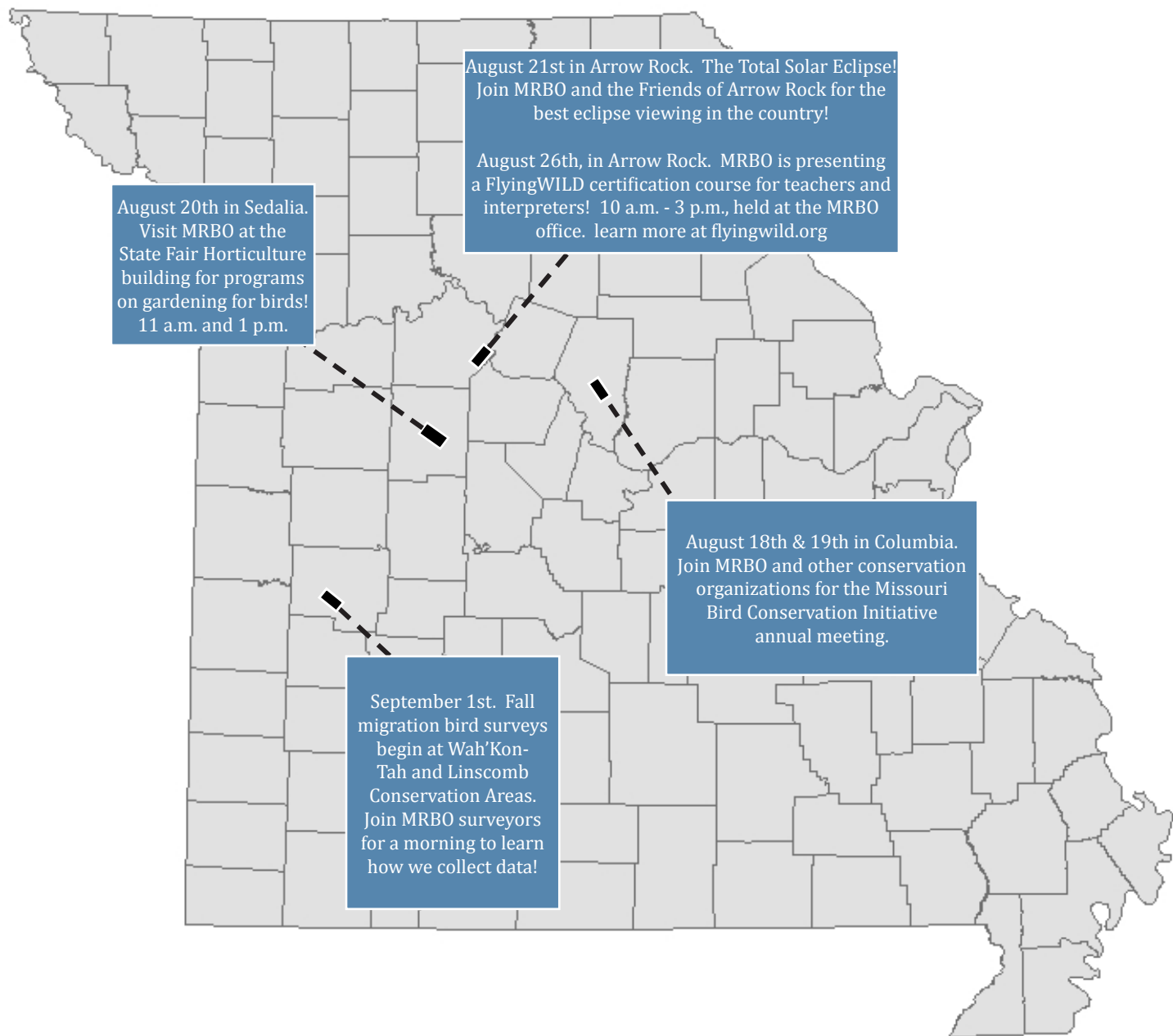
to transect line. This would lead to more accurate detection functions in Distance analysis. Also, when more researchers are using these methods, datasets could be easily combined. Furthermore, there are piles of data on paper, floppy disks, CD ROMs, Zip Drives, and hard drives in unusable legacy formats. This data could be digitized in varying degrees of spatial accuracy to become more useful and relevant. Perhaps, some the money saved by organizations using these methods could be spent on the task of digitizing data.

All of these ideas of where to go from here are just ideas... but isn't that how we got here to begin with?

The original post on this topic can be found on MRBO's blog at <http://mrbo.org/technology>



# Upcoming Events



## New & Renewing Members

*Mary Wight-Carter, Midlothian TX*  
*Sherry Pilkington, Lebanon MO*  
*Tom Tucker & Tina Yochum-Magaz,*  
*Kansas City MO*





