

SPRING 2010

MSU FISHERIES & WILDLIFE

# SPOTLIGHT



Produced by Graduate Students in the Department of Fisheries & Wildlife at MSU



the future  
of FW:  
Getting  
Kids  
Outdoors

**SPARTANS**  
as **Leaders** in  
*Global Wildlife*  
**Conservation**

ALSO INSIDE: Saginaw Bay's Mysterious Muck, Opening Roads in Nicaragua & More!

## FROM THE COORDINATOR



### BRET MUTER

Welcome! On behalf of the magazine committee, I am excited to present the sixth issue of FW SPOTLIGHT. This magazine is a product of the Graduate Student Organization (GSO) — it is written, edited and designed by graduate students in the Department of Fisheries and Wildlife at Michigan State University.

This issue of FW SPOTLIGHT demonstrates the diversity of research and outreach efforts being conducted by graduate students in the Department. Features in this issue cover topics ranging from West Nile Virus to youth education and outreach and take place in locales as close as East Lansing and as far as Nicaragua.

**Bret Muter** is a first-year doctoral student under the direction of Dr. Meredith Gore and Dr. Shawn Riley. He is researching human dimension issues surrounding bovine tuberculosis in Michigan and Minnesota. Contact Bret at [muterbre@msu.edu](mailto:muterbre@msu.edu).

### CONTACT US!

FW SPOTLIGHT is continually improving and we always appreciate feedback from our readers. Send us an e-mail at [fwspotlight@gmail.com](mailto:fwspotlight@gmail.com) to let us know what you think!

## FEATURES



### 7 SAGINAW BAY'S MUCK

BY MARC VERHOUGESTRAETE

Identifying the potential sources of fecal pollution entering Saginaw Bay and hiding in that mysterious muck



### 10 OPENING ROADS IN NICARAGUA

BY KRISTEN SCHMITT

A look at how road access and changing market dynamics influence environmental change on Nicaragua's Atlantic coast



### 14 EMERGING WILDLIFE LEADERS

BY JESSICA KAHLER

Perspectives from participating in the 2009-2010 Emerging Wildlife Conservation Leaders program



### 16 CULPRITS OF WEST NILE VIRUS

BY GABE HAMER

Understanding the ecology of West Nile Virus and the mosquito and bird species responsible for its transmission



### 20 CONNECTING YOUTH & NATURE

BY JARED MYERS, BRET MUTER, MICHELLE LARKINS JACQUES & EDI SONNTAG

FW students spotlight some of their outreach efforts aiming to get youth outdoors and excited about our fish and wildlife resources

FW SPOTLIGHT is a magazine written, edited and designed by graduate students in the Department of Fisheries and Wildlife at Michigan State University.

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For an electronic copy of current and past issues, please visit [www.fw.msu.edu/magazines/spotlight](http://www.fw.msu.edu/magazines/spotlight)



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A *Culex pipiens* mosquito collects a blood meal from the photographer's hand. This insect is one of the culprits involved in the transmission cycle of West Nile Virus. See **page 16** for the full story. *Photo by Gabe Hamer*

**DEPARTMENTS**

**4 FW NEWS**

Departmental news briefs and FW students making headlines

**4 FROM THE CHAIR**

Perspectives on the future of FW from Dr. Mike Jones

**6 ON CAMPUS**

Demmer Shooting Sports Center is open to the public

**13 FW LABS**

FW's Avian Health & Disease Ecology Research Group

**19 FELLOWSHIPS**

Heidi Ziegenmeyer reflects on her 2009 Fenske Fellowship

**24 FW IN THE FIELD**

Winners from the 2009 GSO Photo Contest

**COVER PHOTO CREDITS**



Giraffe at the White Oak Conservation Center in Yulee, Fla.

Photograph by Jessica Kahler



Admiring a red-backed salamander in Paradise, Mich.

Photograph by Dawn Reinhold

5th Annual  
GRADUATE STUDENT  
RESEARCH SYMPOSIUM

- Friday, February 17, 2010 -

Learn about the diverse research being conducted by graduate students in the Department of Fisheries & Wildlife.

**MSU Union, 2nd Floor: Parlor C**  
All are welcome!

Student Talks:  
9 a.m. to 5 p.m.



Keynote Address: **5:00 p.m.**  
Dr. Robin Kimmerer, SUNY-ESF

For more information please contact Trevor Meckley at [meckleyt@msu.edu](mailto:meckleyt@msu.edu)

STUDENTS MAKING  
HEADLINES

**Timothy O'Brien** and **Aaron Berger** received scholarships from the Saginaw Bay Walleye Club in December 2009.

**Timothy O'Brien** authored an article titled "Fall Diet and Bathymetric Distribution of Deepwater Sculpin in Lake Huron" that appeared in the September 2009 issue of *Journal of Great Lakes Research*.

**Clint Otto** received the Michigan Herpetological Conservation Grant from the Michigan Society of Herpetologists in June 2009.

**Yen Duong** received the James E. Wright Graduate Travel Award from the Genetics Section of the American Fisheries Society in September 2009.

**Katrina Mueller** and **Geoff Horst** received Dissertation Completion Fellowships for fall 2009.

**Carolyn Schulz** coauthored an article titled "Detection of Viral Hemorrhagic Septicemia virus (VHSV) from the leech *Myzobdella lugubris* Leidy, 1851" that appeared in the September 2009 issue of *Parasites & Vectors*.

**Sherry Martin** and **Geoff Horst** coauthored an article titled "Catching the new wave of teaching" that appeared in the October 2009 issue of *Frontiers in Ecology and the Environment*.



**Jared Myers** coauthored an article titled "Reassessment of the Predatory Effects of Rainbow Smelt on Ciscoes in Lake Superior" that appeared in the November 2009 issue of the *Transactions of the American Fisheries Society*.

**Marty Williams** was advised that he will receive continuing scholarship support from the B.A.S.S. and Costa Del Mar conservation scholarship program for an additional two years.

**Laura Claus** recently received a travel grant award from the GSO to attend a conference on environmental toxicology.

FROM THE  
DEPARTMENT CHAIR



**DR. MIKE JONES**

A year ago in this space I wrote my first column as leader of the Department of Fisheries and Wildlife. At the time I spoke of the changes we would be facing in the coming year, as we selected a new leader and adjusted to the challenges arising from global and local economic pressures. Well, it's a year later, and the saying "May you live in interesting times" seems like an apt slogan for my 2009.

As you probably know if you're reading this, the "new leader" turned out to be me, and the challenges we have faced and continue to face are, to say the least, interesting. Fisheries and Wildlife, together with the rest of MSU, faces unprecedented challenges to preserve and build our strengths in

the face of substantial reductions in funding from the State of Michigan. Now, more than ever before, we will rely on the exceptional strength of our department to, as the slogan on our web page says, "Preserve our Past and Create our Future." I am proud to have been selected to lead our department through this period and look forward to working with all of you to build an even better future.

Despite the many challenges we face in Michigan and at MSU, our department continues to be very successful and productive. In the pages of this magazine you will read about a sample of research and outreach experiences of our fine group of graduate students, from locations as far away as Nicaragua

**Bob Montgomery** received the 2009 Best Student Presentation Award at The Wildlife Society Annual Meeting in Monterey, Calif.

**Bret Muter** received an Academic Achievement Graduate Assistantship from MSU. He also coauthored an article titled "From victim to perpetrator: Evolution of risk frames related to human-cormorant conflict in the Great Lakes" that appeared in the October 2009 issue of *Human Dimensions of Wildlife*.

**Andrea Miehl** coauthored two articles titled "Invasive species impacts on ecosystem structure and function: A comparison of Oneida Lake, New York, USA, before and after zebra mussel invasion" and "Invasive species impacts on ecosystem structure and function: A comparison of the Bay of Quinte, Canada, and Oneida Lake, USA, before and after zebra mussel invasion" that appeared in the November 2009 issue *Ecological Modeling*.

**Tiffany Hamilton** received the 2009 Rachana Rajendra Fellowship and an Academic Achievement Graduate Assistantship from MSU. She also coauthored a NOAA Technical Memorandum titled "Atlas of cetacean sightings from Southwest Fisheries Science Center cetacean ecosystem surveys: 1986-2005."

## our guiding philosophy fw spotlight

As part of a pioneer land-grant institution, the Michigan State University Department of Fisheries and Wildlife strives to embrace a land-grant philosophy by applying its research to real issues, empowering citizens to become natural resource stewards and providing them with access to university resources. We take great pride in this philosophy, as well as the quality of research we conduct and diversity of activities and initiatives in which we participate. In the spring of 2005, FW graduate students founded this magazine in the spirit of our land grant heritage to communicate Department goings-on with Michigan citizens and also to gain non-technical writing skills that would prepare them to be better communicators once they entered the work force. However, with over 40 faculty, more than 100 graduate students and 150 undergraduates, there are simply too many exciting and innovate research projects, activities and initiatives occurring at any given time within the FW Department to showcase all of them at once — this magazine serves to regularly "spotlight" our students and their respective work at MSU.

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and as close to home as Saginaw Bay, and spanning topics from wildlife diseases to leadership in natural resource management. With over forty faculty and nearly one hundred graduate students, this sample barely scratches the surface of the variety of things we are up to. I'd like to use this opportunity to highlight a few other important achievements during 2009.

Early in 2009 we learned that Dr. Joan Rose would receive an MSU Distinguished Faculty Award, one of the top honors that an MSU professor can receive. Later in the spring Kendra Cheruvilil was awarded a Lilly Fellowship, joining a long line of

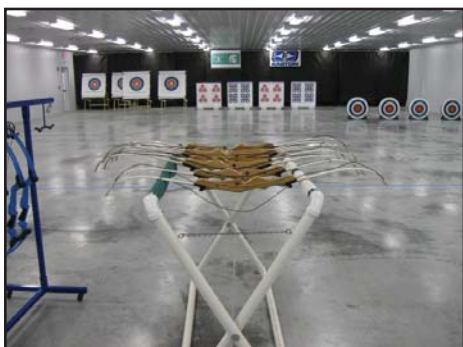


Fisheries and Wildlife professors who have participated in this MSU program to foster excellence in teaching. Kendra is the tenth Lilly Fellow from our Department; no other unit on campus comes close to this number of Lilly Fellows.

Three of our new graduate students in 2009 were awarded University Distinguished Fellowships, another distinction for which our Department is among the top units in the University. The fall saw the opening of the John and Marnie Demmer Shooting Sports Education and Training Center ([www.demmercenter.msu.edu](http://www.demmercenter.msu.edu)) and interviews for the Boone and

Crockett Endowed Professorship in Wildlife Policy and Conservation.

All things considered, 2009 was another outstanding year for Fisheries and Wildlife at MSU. We will continue to face important challenges in 2010 as we adjust to new economic realities in Michigan, but I can't help but remain optimistic about our future. As I have frequently said to the faculty, staff and students in our Department, "good work and accomplishments will be rewarded, no matter what the circumstances." I have no doubt we will continue to do great things, and will therefore remain in the "SPOTLIGHT," in the best possible sense of the word.



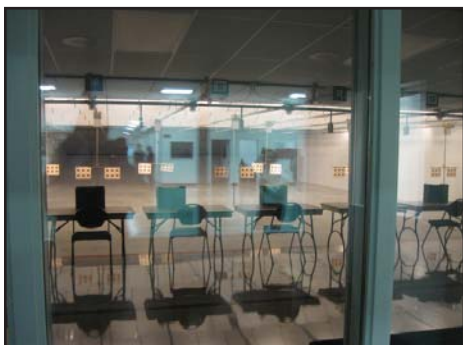
The Center contains a 12-lane, indoor archery range which allows archers to shoot at distances up to 25 yards.



The outdoor field range gives archers the opportunity to shoot at 3-D targets of moose, white-tailed deer, black bear, wolverines and more.



The outdoor beginner range gives young archers the chance to shoot at 3-D dinosaurs and other fun targets from distances up to 20 yards.



The indoor ballistics range offers 16 lanes for shooting .22 caliber pistols and rifles, as well as .177 caliber air pistols and rifles.



The John and Marnie Demmer Shooting Sports Education and Training Center is located at 3365 East Jolly Road in Lansing.

*Photos by Clint Otto*

## DEMMEER SHOOTING SPORTS EDUCATION & TRAINING CENTER OPEN TO PUBLIC

The John and Marnie Demmer Shooting Sports Education and Training Center is a brand new, 24,000-square foot facility south of campus designed to encourage MSU students, faculty and the local community to learn about and enjoy shooting sports in a safe setting. The Center supports NCAA shooting events, the National Archery in the Schools Program, 4-H youth programs and hunter safety courses.

It boasts four archery ranges (three outdoors, one indoors) and an indoor ballistics range for small bore and air rifles and pistols - providing opportunities for shooters at all skill levels.

Instructors are available to assist non-experienced shooters.

In addition to introductory courses on archery, pistol and rifle shooting, the Center offers a variety of activities, clinics and programs.

The Center offers a variety of individual and family memberships, as well as the option for non-members to walk in and pay for individual sessions. Equipment can be rented for a small fee and safety gear is provided free of charge.

For more information, visit the Demmer Center online at [www.demmercenter.msu.edu](http://www.demmercenter.msu.edu) or call the center at 517.884.0550.

**517.884.0550**

**[www.demmercenter.msu.edu](http://www.demmercenter.msu.edu)**

### WEEKLY SCHEDULE

**Mondays**  
Closed.

**Tuesdays & Thursdays**  
Classes, leagues and organized activities.

**Wednesdays & Fridays**  
Public shooting hours  
11:30 a.m. - 8:00 p.m.

**Saturdays**  
Public shooting hours  
11:00 a.m. - 6:00 p.m.

**Sundays**  
Public shooting hours  
12:00 p.m. - 5:00 p.m.

# MUCKY MYSTERIES:

## Identifying Sources of Pollution in Saginaw Bay

To peer across one of the world's largest freshwater systems can be a breathtaking experience. The blue water reflects a brilliant sunrise while the sounds of gulls and children in the background create a peaceful soundtrack. A deep breath in, however, reminds us that something is amiss. The malodorous scent of decaying algae, organic material, aquatic insects and partially treated sewage overwhelm any sense of peace provided by the natural beauty.

Like many waterbodies, development along the shores of the Saginaw Bay has led to degradation in water quality and natural beauty. Once pristine beaches are now covered with large algal mats that detach from growing points in the water and wash ashore while beach closures in response to elevated bacteria levels are on the rise. Surface waters collect excess waste from combined sewer overflow systems and failing infrastructure leaks nutrients, chemicals and bacteria into surrounding soils.

These problems stem from the needs of the people inhabiting the area, but the impacts to Saginaw Bay can be minimized through better land use management and improved water conservation education. Although the scene at Saginaw Bay is disappointing, my role

as a student involved in both research and policy of water quality places me in a unique position to integrate science with the needs of diverse groups of stakeholders to help restore the Saginaw Bay to the safe and enjoyable natural resource that it once was.

The objectives of my study in are to apply microbial and genetic methods, which use source-specific microorganisms, and then apply these genetic methods to the algal mats and surrounding waters at each beach. The goals of my investigation were to identify the potential sources of fecal pollution entering Saginaw Bay and contained in the stranded algal mats. This knowledge is vital to inform remediation efforts.

The various stakeholders concerned with the health of the Saginaw Bay watershed include residents, scientists, governmental officials, tourists and

businesses. Bay residents are upset by decreased property values and spoiled recreational activities, and they want immediate action from state and local government agencies to improve the water quality. However, many residents are also reluctant to help fund remediation projects because of inconclusive

The beaches and coastline lining the Saginaw Bay have experienced a significant increase in nuisance algal mats in recent years. These mats diminish opportunities for recreational activity.

STORY AND PHOTOS BY:

Marc Verhougstraete



The algal mats have been termed “muck” by members of the surrounding community. The muck is composed of dead and decaying algae, aquatic insects and organic material.

evidence identifying the source(s) of pollution.

Local governments are charged with protecting and improving human health within their communities but are often limited by personnel, funds and legal statutes. Michigan’s Department of Environmental Quality (MDEQ) is charged with protecting Michigan’s environment, including waters and wetlands. Unfortunately, the MDEQ lacks sufficient data necessary to improve the health of Saginaw Bay and has limited resources that they need to distribute across the state. (The MDEQ and the Michigan Department of Natural Resources merged in January 2010 to become the Michigan Department of Natural Resources and Environment.)

In addition to the regulatory challenges associated with water pollution, there are agricultural concerns, as well. Farmers in the Saginaw Bay area help feed America, but because best management practices for minimizing water pollution are not clearly defined for agriculture, they are not consistently applied. This is a challenging issue with emotional and practical concerns from many stakeholders; however, in order to make progress, we will all need to come together over our shared love of Michigan’s natural resources.

With the cooperation and attention of the MDEQ, local health departments and Saginaw Bay residents, I performed water quality tests using bacteria to pinpoint the sources of fecal pollution entering Saginaw Bay at four beaches: Whites Beach in Arenac County, Bay City State Recreation Area’s beach in Bay County, Caseville County Park’s beach and Port Crescent State Park’s day-use beach in Huron County [see map].

I selected these beaches based on prior water quality data and a lack of information about the potential pollution sources impacting each site. Since 2003, these four beaches were closed 19 times because bacteria

levels exceeded established thresholds of state standards for safe swimming. Prior to this study none of the closures at each beach had an identified source of pollution. The closures lasted for a total of 133 days resulting in an estimated \$6.65 million loss in tourist revenue. To better understand the pollution impacting each beach, I performed bacterial analyses on samples from ankle-deep water, waist-deep water, shallow-water sediment and within the algal mats.

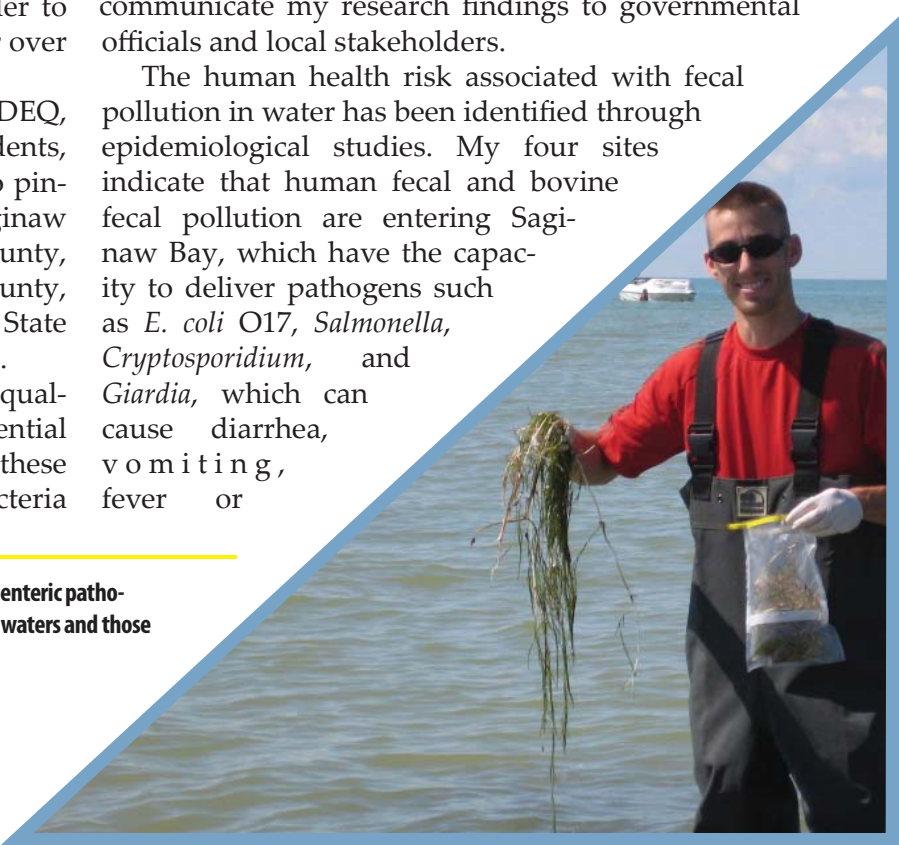
Results from samples collected during the summer of 2008 indicate that primarily human fecal pollution was present on two Saginaw Bay beaches (Caseville County Park beach and Bay City State Recreation Area beach). Prior to 2008, human-specific microorganisms were detected on five Saginaw Bay beaches (83% of tested beaches) and bovine-specific microorganisms were detected on one beach (17% of tested beaches).

High concentrations of fecal-indicating bacteria were detected in the algal mats awash on the shoreline and, to a lesser extent, the surrounding shallow waters. Analysis of the data identified that bacteria associated with algal mats and sediments remained in those areas until disturbances (such as wind or waves) released bacteria to the surrounding waters. My results also indicate that although bacteria levels may satisfy state safety standards in one area of a beach, another area of the same beach may exceed the established thresholds. Since I work on both the research and policy sides of Saginaw Bay pollution issues my next objective is to communicate my research findings to governmental officials and local stakeholders.

The human health risk associated with fecal pollution in water has been identified through epidemiological studies. My four sites indicate that human fecal and bovine fecal pollution are entering Saginaw Bay, which have the capacity to deliver pathogens such as *E. coli* O17, *Salmonella*, *Cryptosporidium*, and *Giardia*, which can cause diarrhea, vomiting, fever or

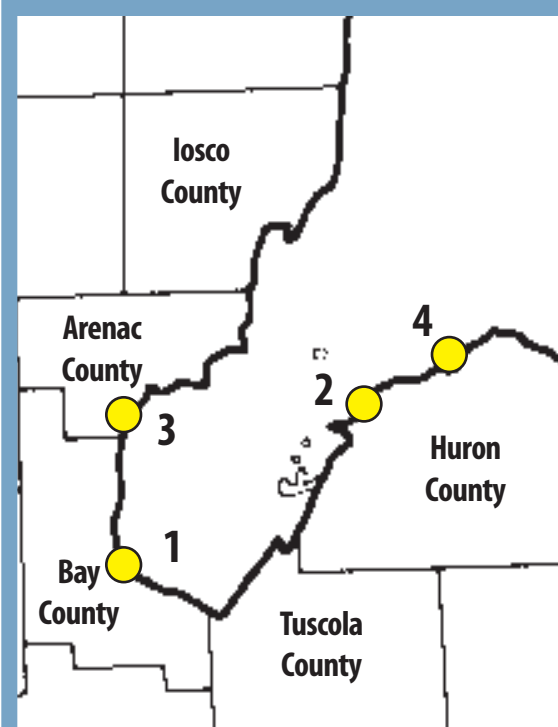
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The muck has been shown to harbor fecal-indicating bacteria and human enteric pathogens. The pathogens pose a risk to humans swimming in the surrounding waters and those that come into direct contact with the muck.





# 2008 Beach Closures & Human Fecal Indicator Detected



#	Beach	# Beach Closure Days	Human Fecal Pollution
1	Bay City State Recreation Area	1	Yes
2	Caseville County Park	17	Yes
3	Whites Beach	0	No
4	Port Crescent State Park	0	No

Map of Saginaw Bay (LEFT) showing the four study site beaches selected for Marc's source tracking investigation. The table to the right displays beach closure days and human fecal indicators detected at each of the four beaches.

death in humans. These results are of primary concern for children, pregnant women and elderly citizens, because these populations often recreate in the shallow waters that accumulate the highest levels of fecal-indicating bacteria and algal mats. However, the source tracking tools (bacteria and DNA-specific to humans or cows) used for this project were not identified during each sampling event, which leads me to suspect a diffuse source of pollution. Additional research will be necessary to determine specific bacterial loading points.

Bridging the science, policy and remediation barrier requires disseminating results to every stakeholder group involved in the research area. I was invited by multiple Saginaw Bay, Michigan, and international organizations to present results from my research. I spoke for the Saginaw Bay Coastal Initiative, a MDEQ directive, which included state officials and concerned citizens from around the Saginaw Bay. I also described my research and results for the Huron County Saginaw Bay summit which included citizens and Huron County governmental officials.

I was able to address the human health aspect of my results at the Health Related Water Microbiology annual conference and at the Michigan Environmental

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**Marc Verhoughstraete** (left) is a third-year doctoral working under the direction of Dr. Joan Rose. He is interested in the interactions between land use and climate change on recreational beach water quality in the Great Lakes. His research is focused on developing a multifaceted plan aimed at improving water quality through microbial testing, source tracking, policy, model development, and site remediation. Contact Marc at [verhough3@msu.edu](mailto:verhough3@msu.edu).

Health Association's annual meeting. A large portion of land use in the Saginaw Bay watershed is devoted to agriculture and I was able to address the farm community at the Michigan Farm Bureau policy meeting. As water quality research and source-tracking methods continue to be developed and refined, I will communicate the results to officials capable of informing the community of risks, improving beach monitoring methods and eliminating pollution sources.

There is a considerable amount of interest in Saginaw Bay both in research and policy development. The water quality research I performed in Saginaw Bay has demonstrated how complex the Bay is and how widespread the pollution issues stretch. Sweeping changes are required for drains, wetlands, farming practices, wastewater infrastructures and shoreline management. Some of these requirements can already be seen around Saginaw Bay, such as county-wide bans on phosphorus fertilizers, the Water Watch website for illness outbreaks associated with recreational water, the MDEQ implemented Saginaw Bay Coastal Initiative and waste-water treatment system improvements.

I hope to continue to document how these changes help restore Saginaw Bay as I integrate policy, research, public health protection and public directive aspects of water quality together in my Ph.D. research. We are at a crucial point where we have an opportunity to merge the science on water and human health in order to make real changes and improve one of the world's greatest natural resources: the Great Lakes.



# Opening Roads in Nicaragua

After 12 hours of travel along 235 miles of bumpy roads, four different vehicle changes, two rainstorms that soak me and my fellow truck passengers, and a final trek on foot, I finally arrive in the town of Pearl Lagoon, Nicaragua. It is hard to believe that just one year before, Pearl Lagoon was considered even more remote, accessible only by air or boat travel. Access to this community changed dramatically in 2007 with the construction of the new unpaved road that I have just traveled, connecting the western and eastern coasts of Nicaragua. Without hesitation, the majority of Pearl Lagoon residents tell me that the journey I completed from the capital city of Managua is now cheaper, faster and easier than it was before. But the benefits of road travel come with potential drawbacks for the local community, including the encroachment of settlers from the west, outside competition with local businesses, and of particular interest to myself, changing use and extraction of natural resources. In many ways, the changes that are taking place in Pearl Lagoon and other Atlantic coastal communities represent a process that is happening worldwide, as globalization removes barriers between isolated communities and the rest of the world...

Story & Photos By:  
**Kristen Schmitt**



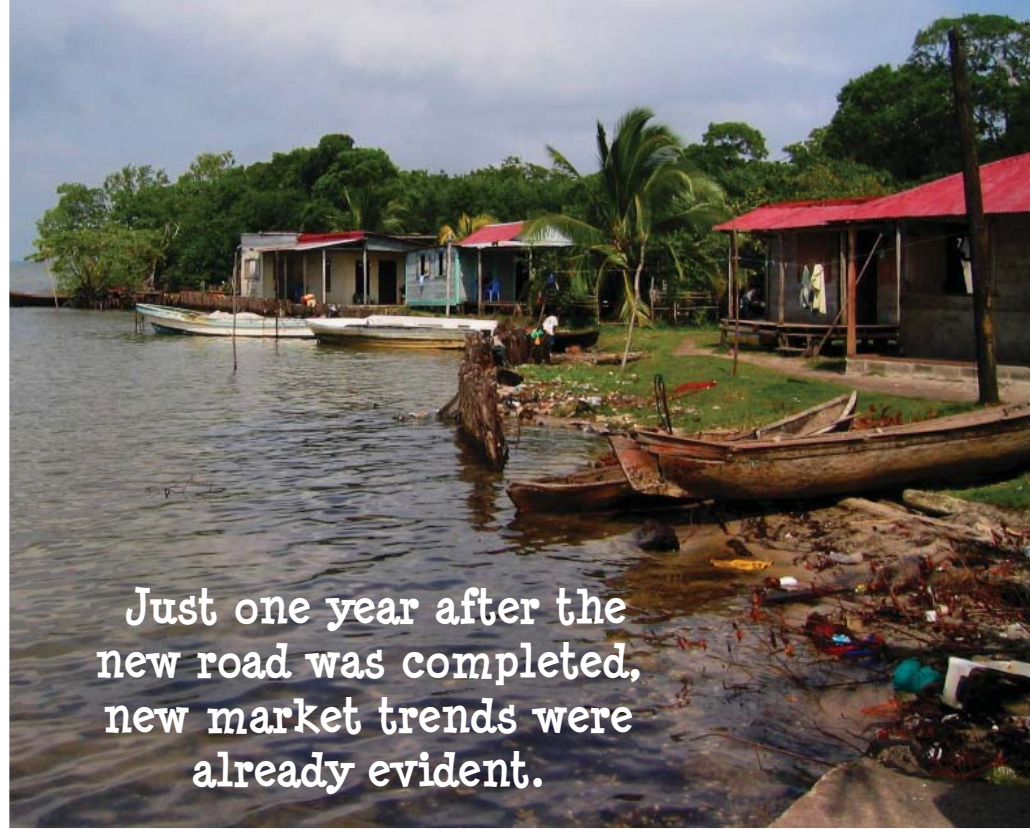
The days of exploring uncharted territory on earth, while perhaps not over, are severely limited. According to a recent study by the European Commission, only 10% of the planet's land mass can be classified as remote, meaning it takes at least two days of travel by road or boat to reach a city of 50,000 people. Those who are mindful of environmental issues may see this as a problem. Many of these remote locations are also pockets of high biodiversity, and road-building has repeatedly been associated with negative environmental outcomes such as deforestation and damage to wildlife populations.

On the other hand, development professionals, governments and rural communities want more roads which are essential in providing rural communities with access to markets for locally produced goods, emergency medical care, education and other services. So how can we provide road access, which may contribute to improving economies and livelihoods, while at the same time prevent harmful environmental outcomes?

My master's research was driven by the goal of providing information necessary for answering this critical question. My work aims to understand how road access and changing market dynamics influence environmental change on the Atlantic coast of Nicaragua. Although road development is frequently associated with environmental degradation, there is often confusion about why and how this happens. Clarifying the indirect processes by which roads cause environmental damage are important in designing 'pre-road' policies that could mitigate negative outcomes such as deforestation or collapse of local fisheries.

### *Community Surveys*

To study changes in natural resource use after road development, I conducted my research in six small towns located along the shore of Pearl Lagoon, the largest lagoon on the Atlantic coast. Several of these



Just one year after the new road was completed, new market trends were already evident.

Changing market dynamics may mean changes in local fishing practices and commonly used gear, such as the wooden boats pictured here.

towns were newly connected to Managua during my study, allowing me to collect data both before and after the road was completed. Some more distant communities served as controls, because they remained isolated and accessible only by boat throughout my study; one of these communities was reachable from Pearl Lagoon only after a three-hour, high-speed boat ride and a three-hour canoe paddle.

I conducted household interviews to determine how fisheries and agricultural markets changed as a result of increased market access and to see if these changes influenced local fishing and farming practices. I visited the same set of households both "pre-road" and "post-road," collecting information on household characteristics, employment, farm size, crops grown, agricultural inputs, fisheries utilized, fishing gear, time spent fishing, prices for farmed and fished goods and other factors.

Many coastal residents were

not only willing to be interviewed, but were eager to talk about the positive and negative changes they had seen in their communities. Much of the information offered by study participants highlighted the complexity surrounding interactions between humans and the environment on the Atlantic coast.

### *The Effects of Nicaragua's Cross-Country Road*

In beginning of this study, I was uncertain if I would be able to see any meaningful change within the time frame of a master's thesis. However, speaking to fishers just one year after the new road was completed, new market trends were already evident, particularly in the fisheries sector. Fishing has traditionally been a mainstay of the Pearl Lagoon economy.

Lobster, shrimp and gill fish are all commonly fished in the area and prior to road travel were either eaten, sold locally or sold to local fisheries middlemen known as *acopiadores* for shipment to western

**OPPOSITE LEFT:** New market connections allow fishers to fetch a higher price for species such as blue crab; **OPPOSITE RIGHT:** The author talks to a fisherman/farmer in the coastal community of Awas.

A local seafood-buying middleman (acopiador) sorts and weighs a catch of Snook and other fin fish.

Nicaragua or abroad. In addition to providing households with cash, seafood is a mainstay of local diets. With direct access to Managua, the towns located near the new road are seeing an influx of seafood vendors from the Pacific who have impacted the market dynamics.

In 2007, only 30% of fishers reported selling their product to Pacific vendors; by 2008 (after road construction was complete), 60% were using this outlet. As one might expect, this has resulted in conflicts of interest between local *acopiadores* and incoming vendors and has forced local governments to scramble for solutions and new regulations.

On the other hand, having Pacific vendors in town can be advantageous for local fishermen. More buyers mean more competition for product. Since the Pacific vendors entered the area, shrimp prices have stabilized toward approximately 30 córdobas/lb (US \$1.50), which means that fishers can be more certain of how much they will receive for their catch. Pacific vendors supply their own ice and buy product at all hours of the day and night, so fishers returning from late-night fishing trips can sell their catch immediately without worrying about keeping it unspoiled until the next day.

Fishers who sell primarily to Pacific vendors also report receiving more money for their catches; fishers are paid 4.31 córdobas/lb (approx. \$0.22 USD) more for their shrimp if they sell to outside vendors for transport along the road than if they sell through the traditional middlemen. Although this may not seem like a significant price advantage, annual salaries in the area are often less than \$400.00 (USD), so seemingly small price changes can be important. These trends in fisher preferences and available sales outlets all have implications as to how fishers allocate their time, effort and gear investments, and can ultimately impact the resource by increasing yields of desirable species.

Some of the road's effects on lo-



Fishers can be more certain of how much they will receive for their catch.

cal fisheries are very direct. There is evidence of emerging markets for fisheries products that have previously been used only for small scale home consumption. Local fishers are now able to sell species such as blue crab and stingray for a greater profit, which are increasingly exported via roadway according to both surveys and locally collected sales receipts.

Shrimp exports along the road during the month of April (peak shrimp season) increased from 15,000 lbs during 2007 to over 35,000 lbs in 2008. Reports abound of smaller-than-legal-sized shrimp and lobster being smuggled by truck out of the community. This trend raises concerns about overfishing. Moreover, the road has led to direct imports of cheap agricultural goods from outside of the communities; this has an immediate effect on diets, local farmer livelihoods and area markets.

#### *Future Research*

A recent National Science Foundation (NSF) grant supporting this research will allow for continued observation of the market changes described here as well as for the future monitoring of biological populations as road

access becomes more established in Pearl Lagoon. Although previous research has shown that roads are associated with deforestation, providing meaningful solutions to the suggested conflict between the environment and access requires a deeper look into causes and potential mitigating factors.

Given early results from this study, helpful questions to address before continued road construction in Atlantic coastal Nicaragua may include: How can we ensure that local businesses can compete with new entrepreneurs in fisheries and agricultural sales? How can communities begin a fisheries monitoring program prior to road construction to assist in developing sustainable yield guidelines? How can markets for fisheries goods be anticipated to avoid unregulated exploitation when market access improves?

Although these indirect mechanisms of environmental change have been largely ignored in the pre-planning process for roads in the past, more comprehensive future planning could accompany infrastructure projects on Nicaragua's Atlantic coast in order to address environmental concerns before they become threats to local biodiversity and livelihoods.

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**Kristen Schmitt** recently completed her master's degree in the Department of Fisheries and Wildlife, where she worked with Dr. Daniel Kramer to study access improvements and environmental change on Nicaragua's Atlantic coast. Kristen's research was supported in part by the Tinker Foundation and the Surfrider Foundation. She currently lives in Houghton, Mich. and works with public land managers on climate change outreach issues. Contact Kristen at [kmschmit@mtu.edu](mailto:kmschmit@mtu.edu).

# AVIAN HEALTH & DISEASE ECOLOGY RESEARCH GROUP



## DR. JEN OWEN

My students and I focus on the role of wild birds in the maintenance and spread of diseases, with a particular emphasis on zoonoses, animal diseases transmissible to humans. We investigate how environmental and physiological stressors impact a bird's ability to mount effective immune responses and how that impacts both their susceptibility to disease and their ability to serve as competent reservoirs. By understanding the behavior and physiology of the infected host animal we can better assess and potentially minimize risk to wild and domestic animals as well as humans. We have an active lab with three graduate students, one veterinary student, and numerous undergraduate students. Contact me at [owenj@msu.edu](mailto:owenj@msu.edu).



Our lab will have undergraduate research opportunities in spring and summer 2010. If you are interested please see our website: [www.fw.msu.edu/~owenj/](http://www.fw.msu.edu/~owenj/).



## EMILY JOHNSTON

**Emily Johnston** is a Ph.D. student interested in the role of the avian host immune response in disease ecology. Birds are reservoirs and dispersal agents for many zoonotic pathogens. Upon infection, a bird may eliminate the pathogen (resistant), allow amplification and transmission without experiencing disease (tolerant) or succumb to disease (susceptible). Currently, little is known about the mechanisms underlying these responses. Emily will compare the resistant and tolerant abilities of the American robin, gray catbird and northern cardinal using two zoonotic pathogens: *Borrelia burgdorferi* and West Nile virus. This research will improve our ability to characterize resistance and tolerance of hosts, identify animal reservoirs and aid our ability to reduce the risk of infection with zoonotic pathogens. Contact Emily at [john2973@msu.edu](mailto:john2973@msu.edu).

## TIFFANIE HAMILTON

**Tiffanie Hamilton** is a master's student investigating the disease and movement ecology of double-crested cormorants (*Phalacrocorax auritus*) in the North Channel of Lake Huron. Tiffanie is sampling cormorants for active infections and/or for previous exposure to avian influenza and Newcastle Disease virus. These pathogens are the two most economically important diseases of domestic poultry. Furthermore, Newcastle Disease virus causes high mortality in juvenile cormorants. Tiffanie's thesis research focuses on tracking the daily movements of adult breeding cormorants to gain insight on how diseases may be spread among cormorant populations as well as to other avian species, including domestic poultry. Contact Tiffanie at [hamil322@msu.edu](mailto:hamil322@msu.edu).




## DUSTY ARSNOE

**Dusty Arsnoe** is a master's student investigating the influence of body condition on the ability of waterfowl to spread low pathogenic avian influenza (LPAI). Prevalence of avian influenza typically peaks in the fall when juvenile waterfowl congregate before migration. During migration, birds are energetically challenged which may impact their ability to disperse and maintain avian influenza. Dusty is currently manipulating the body condition of juvenile mallards (*Anas platyrhynchos*) and experimentally infecting them with LPAI. His research objective is to determine how natural variation in body condition affects a mallard's immune status, susceptibility and viral shedding patterns. Contact Dusty at [arsnoedu@msu.edu](mailto:arsnoedu@msu.edu).

# EMERGING WILDLIFE CONSERVATION LEADERS

Recently, a Spartan was selected to develop crucial leadership skills through participation in a conservation campaign to save a critically endangered animal found halfway around the world...



Wildlife is facing threats around the globe. From over-exploitation of wildlife and the resources they depend on to global climate change, it has become increasingly important for wildlife conservationists to collaborate internationally to meet global challenges by sharing knowledge, resources and skills. Inspiring and cultivating leadership in this global wildlife conservation network is essential to coordinate efforts to meet common goals and save endangered species. I am currently participating in a program that helps young professionals gain these essential skills: the 2009-2010 Emerging Wildlife Conservation Leaders (EWCL) program.

EWCL is a two-year intensive training program sponsored by various conservation minded groups including the U.S. Fish & Wildlife Service, Howard Gilman Foundation, Defenders of Wildlife, Wildlife Conservation Network and the International Fund for Animal Welfare. I am one of 21 early-career and upcoming international conservation leaders selected for the 2009-2010 EWCL class. Our class represents 18 different organizations from five countries (Argentina, Brazil, Costa Rica, Kenya and U.S.), as well as an impressive array of international conservation experience, passion and enthusiasm. As one of only two participants currently engaged in graduate studies, it is an honor to participate in this prestigious leadership-training program and represent MSU's Department of Fisheries & Wildlife.

Once selected for the EWCL program – a process that involved completing an application, providing references and authoring essays – we are flown twice over two years to the White Oak Conservation Center in Yulee, Fla. Throughout the next two years we will receive training in running successful wildlife conservation programs and developing leadership skills. In addition, each of us are mentored and given career guidance by a volunteer board of directors made up of seasoned wildlife professionals. The first

PHOTOS & STORY BY:

## JESSICA KAHLER

**Jessica Kahler** is a second-year master's student working with Dr. Meredith Gore on a project that explores local perceptions of wildlife conflicts in Namibia, southern Africa. Her interests in finding conservation solutions that benefit both wildlife and livelihoods was enhanced by her three year experience as a U.S. Peace Corps volunteer in the Republic of Vanuatu. She is a recipient of an Academic Achievement Graduate Assistantship at MSU and is a participant in the 2009-2010 Emerging Wildlife Conservation Leaders program. Contact Jessica at [kahlerj1@msu.edu](mailto:kahlerj1@msu.edu).

session, which was held in March 2009, focused on topics ranging from crucial conversation skills, team building, cultural sensitivity, fundraising and development to media readiness training and dealing with personal conflict in a professional setting. These skills are invaluable for leadership in international conservation efforts as they provide for effective conservation campaigns. In addition, many of the lessons focused on strategies for bettering communication and professional relationships with colleagues both with similar and dissimilar cultural backgrounds to improve organizational effectiveness and, ultimately, efforts to conserve wildlife around the globe.

Sessions were designed to be instructive, interactive and engaging. Often working in groups or pairs, we were able to practice, discuss and reflect on lessons covering a variety of topics including leadership, communication, management and planning skills. By using team building challenges, interactive scenarios and the simulation of difficult conversations, the program stimulated a lot of conversation and created an environment where one can identify personal leadership weaknesses and build leadership skills. A training highlight was when Julie Scardina, Busch Gardens and Discovery Cove Animal Ambassador and EWCL board member, set up a functioning professional television studio and put participants in the spotlight as part of the media readiness training.

In addition to group training and lessons, I greatly benefited from one-on-one sessions with EWCL mentors with whom I discussed my professional and personal goals. The EWCL program provided other participants and myself an opportunity to gain knowledge and skills not found in college wildlife textbooks, benefiting from the hard lessons learned, such as professional conflict resolution and effective public communication, over the course of the careers of the wildlife professionals associated with the EWCL program.

In addition to the professional and personal growth opportunities that EWCL provides, another objective of their two-fold mission also requires participants to develop, implement and evaluate a concrete international conservation project aimed to benefit an endangered species. We are learning by doing with the hopes that the experience not only benefits our professional development, but also benefits current conservation efforts as well. Using skills taught in communication, team building and leadership my fellow EWCL colleagues and I will develop, implement and evaluate conservation campaigns aimed at conserving endangered species.

For the next two years the 2009-2010 EWCL participants will be involved in four campaigns aimed at aiding conservation efforts to diverse endangered species worldwide. I am participating in one of these campaigns – the EWCL Saola conservation group – which has worked since March 2009 to develop a conservation plan for the saola (see sidebar at top-right). Our group is raising funds for the development of a community-based “Spared from the Snare” program that will support and enhance current efforts to remove one of the most eminent threats to the saola, hunter’s snares, and build the capacity of community rangers to engage in conservation and monitoring efforts. Other EWCL conservation campaigns will focus on the cotton-top tamarin of Columbia, endangered macaws of South America and tapir species from South America and Southeast Asia. Hopefully, these campaigns put forth by EWCL participants will contribute to international conservation in a significant way and help spare species, like the saola, from the ultimate tragedy: extinction.



## SAVING THE SAOLA


*Photo courtesy of Toon Fey, World Wildlife Fund.*

The saola (pronounced SOWu-la) is an elusive, antelope-like bovid species found in the rain-soaked Truong Son mountain range, a rugged region between Lao Peoples’ Democratic Republic and Vietnam. Scientists first described the saola in 1992, making it the most recent large mammal discovery worldwide. With an estimated population as small as 200 individuals, this “wild cow” is also one of the most critically endangered animals on the planet. Efforts to keep this species in captivity have been unsuccessful. The clearing of forests for agriculture, combined with snare hunting and dog-tracking efforts by locals supplying a large wild meat trade, threatens this high altitude species, which is found only in forested areas with minimal disturbance and limited human presence. Saving the saola will not only entail protecting its fragile habitat, but also drastically reducing snare-trapping and poaching across the remaining forests where this amazing animal is found. To find out more about the saola and efforts to save it visit the World Wildlife Fund’s (WWF) website at [www.worldwildlife.org](http://www.worldwildlife.org).



## WHITE OAK CONSERVATION CENTER

The White Oak Conservation Center (WOCC) is a 7,400-acre facility managed by the Gilman Foundation. Established in 1982, the WOCC specializes in breeding rare and endangered animals from North America and around the world. The center uses controlled breeding to maintain a healthy population of nearly 35 species of wildlife, including cheetah, four species of rhinos and the Florida panther. Some of these animals have been successfully released back into the wild. The WOCC also funds and provides advice to conservation projects in several countries, as well as boasts excellent training programs for students with interest in veterinary medicine and animal behavior. To find out more about the White Oak Conservation Center, visit their website at [www.wocenter.org](http://www.wocenter.org).

 <p><b>EWCL SAOLA TEAM</b></p>	<p><b>OUR CAMPAIGN IS ON FACEBOOK!</b></p> <p>Join our “Save the Saola” group on Facebook to show your support and to receive news and other information on the saola!</p>
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# WEST NILE VIRUS:

Story & Photos By:  
**GABE HAMER**



## CONSIDERING THE CULPRITS

The rapid invasion of West Nile virus (WNV) after 1999 westward across the United States has resulted in over 1,000 human deaths and 20,000 non-fatal human cases, as well as countless cases of wild and domestic animal disease. As the virus expands in geographic range, it leaves behind a complex ecological puzzle involving the virus, blood-feeding insects and birds which must interact for human disease to occur.

My dissertation research combined molecular and ecological techniques to incriminate the mosquitoes and birds responsible for maintaining and transmitting WNV. I used trace quantities of blood in the mosquitoes' abdomen to identify the bird or mammal species the mosquito fed on. I was also able to detect WNV-positive mosquitoes that have human-derived blood meals, thus demonstrating direct evidence of virus exposure to humans.

Diseases shared among wildlife, domestic animals and humans are becoming increasingly common; molecular tools allow researchers to understand these complex disease ecology systems. Knowledge about the transmission cycle in na-

ture allows for the development of management strategies that reduce human health risk to wildlife and mosquito-borne disease. WNV is an example of an emerging disease that recently appeared in the United States and rapidly swept through North and South America (Figure 1).

My dissertation research was part of a larger project studying the epidemiology of WNV transmission in suburban Chicago, Ill., with collaborators from the University of Illinois and the University of Wisconsin-Madison. Part of my research focused on the ecology of WNV transmission and the incrimination of the mosquito and bird species responsible for transmission.

Once infected, not all birds and mosquito species respond the same. Laboratory researchers can infect birds with WNV to observe disease development and determine the ability of a bird species to be a good WNV host. The same is true for mosquito species, which vary in their ability to become infected and then re-infect a subsequent host during feeding.

Additionally, mosquito species vary in their host choice. They tend

to take blood meals from some host species more so than others; thus, the 'preferred' bird species are exposed to WNV more frequently than 'avoided' species.

Although a number of birds have been implicated as important amplification hosts based on laboratory studies, few studies have combined all the important information necessary to critically judge which birds are actually responsible for increasing the virus to high levels in the field.

Learning more about host choice will improve our understanding of which mosquito species are transmitting the pathogen among birds



The author uses a backpack aspirator to collect blood fed mosquitoes in suburban Chicago, Ill.



and which mosquito species are passing the virus to humans. This information is critical for effective management of WNV, where mosquito control of larval habitat is the most effective technique. Different species of mosquitoes breed in different types of habitat, such as temporary flood water or small containers. Instead of public health agencies attempting to treat all mosquito larval habitat, the results of this research can direct management efforts to target the primary species responsible for WNV transmission.

### MOLECULAR TOOLS TO STUDY WNV TRANSMISSION

The advent of a molecular tool called the polymerase chain reaction (PCR) in the 1980s generated a suite of applications to the study of wildlife and mosquito and tick-borne diseases. This technique can

amplify a region of DNA from a few copies to millions, which allows for the detection of pathogens at very low levels. Researchers can use PCR-based approaches to identify pathogens and species by detecting unique regions of DNA.

One such PCR-based molecular tool is the mosquito blood meal analysis (Figure 2). The goal of the blood meal analysis is to identify the unknown host by analyzing the blood meal in the mosquito's abdomen. This tool allowed us to investigate the roles of different birds, mammals and mosquitoes in WNV transmission and offers an improved understanding of how diseases are maintained in nature. We used this molecular tool in our WNV research based in suburban Chicago.

Our research team collected blood-fed mosquitoes from 2005 to 2007 in residential and semi-nat-



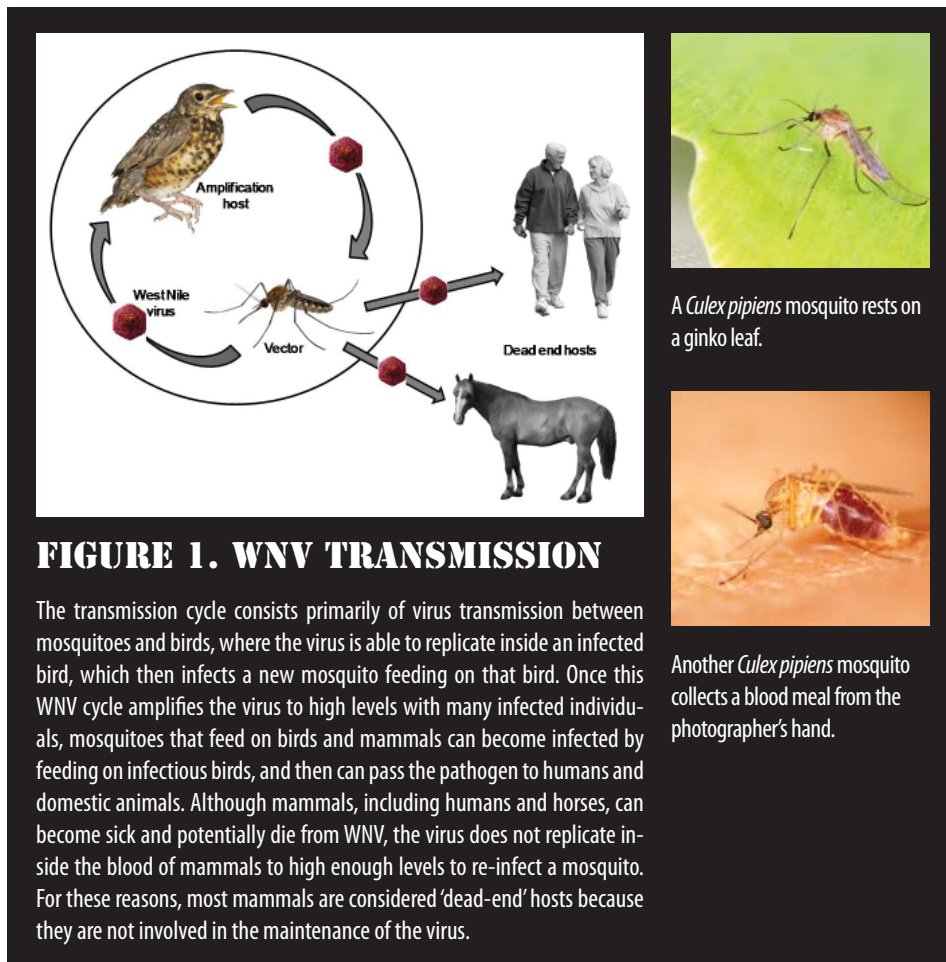
The author holds a juvenile American robin captured while mist-netting in suburban Chicago, Ill.

ural areas using several mosquito traps and collection techniques. The blood-fed mosquitoes were brought to MSU for the molecular analyses, which began with the removal of the blood fed abdomen and the subsequent isolation of DNA. We then performed PCR to amplify a region of DNA called the cytochrome b gene, after which we used DNA sequencing to determine the unique genetic identity that could lead us to the identification of the species.

### COMBINING MOLECULAR & ECOLOGICAL FACTORS

Once we identified the species of vertebrate hosts that mosquitoes fed upon, we were able to learn more about transmission ecology. However, as feeding patterns are influenced by host availability, we first needed to measure bird abundances in order to identify which bird species are preferred, avoided or used in proportion to availability. Therefore, while collecting mosquitoes, we also performed bird surveys to estimate relative densities.

We used several calculations to determine mosquito preference for a bird host and the contribution of a particular species of bird to the transmission of WNV. Using these molecular and ecological approaches, we identified the top three bird species responsible for WNV transmission and amplification as the



**FIGURE 1. WNV TRANSMISSION**

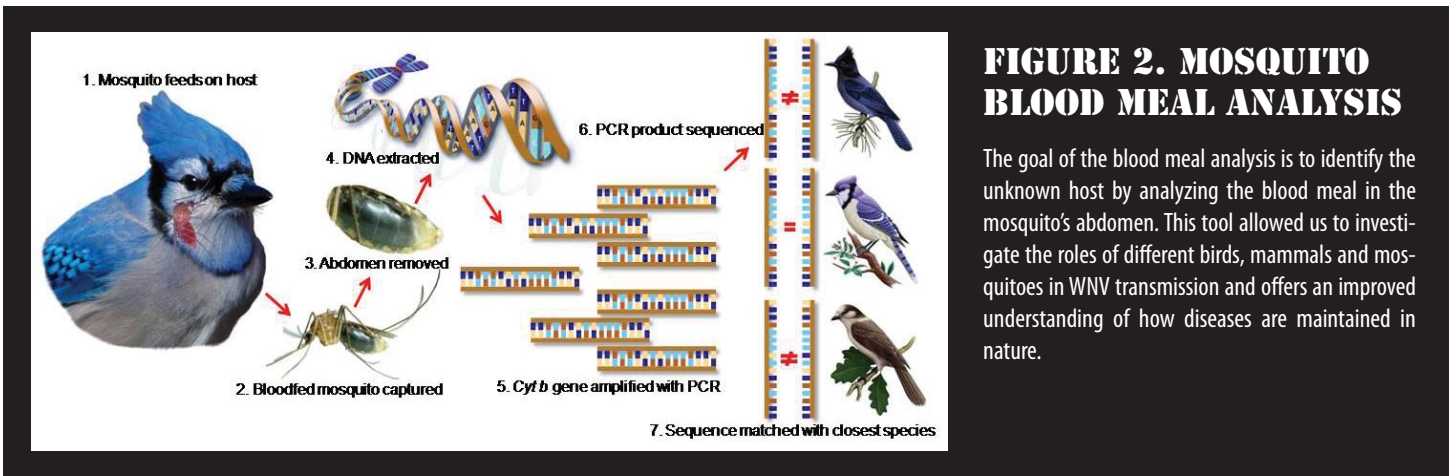
The transmission cycle consists primarily of virus transmission between mosquitoes and birds, where the virus is able to replicate inside an infected bird, which then infects a new mosquito feeding on that bird. Once this WNV cycle amplifies the virus to high levels with many infected individuals, mosquitoes that feed on birds and mammals can become infected by feeding on infectious birds, and then can pass the pathogen to humans and domestic animals. Although mammals, including humans and horses, can become sick and potentially die from WNV, the virus does not replicate inside the blood of mammals to high enough levels to re-infect a mosquito. For these reasons, most mammals are considered 'dead-end' hosts because they are not involved in the maintenance of the virus.



A *Culex pipiens* mosquito rests on a ginkgo leaf.



Another *Culex pipiens* mosquito collects a blood meal from the photographer's hand.



American robin, blue jay and house finch. Combined, these three species were responsible for 66% of the amplification of WNV in our study region. We are also able to identify the roles of different mosquito species in the transmission system. Of the 661 *Culex pipiens* mosquitoes from which we identified blood meals, 83% were avian; this confirms their role as the primary host amplifying the virus to high levels. However, we noted significantly more mammal-feeding by *Cx. pipiens* than is expected of this species, including one individual that tested WNV-positive and contained a human-derived blood meal. This finding is the first direct evidence that *Cx. pipiens* is capable of being the amplification mosquito species and the species responsible for human exposure, probably acquiring WNV from an infectious bird and subsequently transmitting WNV to a human during the next blood meal.

We provided our collaborators at the Connecticut Agricultural Experiment Station with the DNA from our *Cx. pipiens* specimens. They investigated a potential genetic basis for the patterns of avian and mammal feeding that we observed. Through a molecular approach, our collaborators determined that individual *Cx. pipiens* with mammal-derived blood meals were more likely to share ancestry with a type

of mosquito that is known to have higher inclination for feeding on mammals. This is one of the first reports of this type of *Cx. pipiens* in the Midwest and increases our understanding about mechanisms of WNV spillover into humans.

**CONCLUSION**

Molecular tools are an important asset to ecologists studying disease at the wildlife, domestic animal and human interface. This multi-disciplinary approach requires collaboration among experts in different fields and is necessary in the attempt to fully understand complex disease ecology systems. For example, my dissertation research combined the traditional fields of wildlife ecology, medical entomology and microbiology to address questions related to the transmission of a pathogen among birds, mosquitoes and humans. My findings incriminate a particular spe-

cies of mosquito that is possibly responsible for both increasing WNV to high levels as well as passing the virus to humans.

With this knowledge, public health agencies can allocate effort appropriately and target specific breeding habitat that will prevent *Cx. pipiens* from reaching high abundances. The primary breeding locations for this container-breeding mosquito are catch basins, which are designed to receive and send rain water to the nearest stream through underground pipes. Other types of urban breeding habitats for *Cx. pipiens* mosquitoes include bird baths, flower pots, buckets and any container capable of holding a small amount of water. You can do your part in controlling mosquito-borne diseases in your own backyard by removing these containers or ensuring they are treated with mosquito larvicide.



**Gabe Hamer** recently completed his Ph.D. in the Department of Fisheries and Wildlife under the direction of Dr. Edward Walker. He is currently a Post-doctoral Research Associate at the University of Wisconsin-Madison and has an Adjunct Assistant Professor position in the Department of Fisheries and Wildlife at MSU. His research interests include studying wildlife and vector-borne disease ecology. For more information about this collaborative WNV research project funded by the National Science Foundation and National Institute of Health's dual program in the Ecology of Infectious Disease, please visit the project website at [www.vetmed.wisc.edu/WNV/](http://www.vetmed.wisc.edu/WNV/).

Contact Gabe at [gghamer@msu.edu](mailto:gghamer@msu.edu).

# Excellence in Fisheries Management

## Made possible by the Janice Lee Fenske Fellowship

By Heidi Ziegenmeyer

**Heidi Ziegenmeyer** (pictured snorkelling below) is a second year master's student in the Department of Fisheries and Wildlife. Her research focuses on the effects of spring angling on black bass nesting success in inland Michigan lakes. Her work is supported by the Janice Lee Fenske Excellence in Fisheries Management Fellowship, a grant from the MDNR and an MSU Teaching Assistantship. Contact Heidi at [ziegenme@msu.edu](mailto:ziegenme@msu.edu).

When I heard about the Fenske Fellowship opportunity, I jumped at the chance to apply. That's because the Janice Lee Fenske Excellence in Fisheries Management Fellowship is not your average funding opportunity.

The fellowship was created to honor the commitment, integrity and memory of Michigan's first female fisheries biologist, Jan Fenske, and provides Fisheries and Wildlife graduate students from the underserved community with a year-long experience interacting with fisheries professionals, working on a project to inform management and learning from great mentors.

As a Fenske Fellow I worked closely with mentors within the Michigan Department of Natural Resources (DNR): Gary Towns (Fisheries Supervisor, Lake Erie Management Unit) and Dr. Jim Breck (Research Biology Specialist, Institute for Fisheries Research) as well as my major professor at MSU, Dr. Mary Bremigan.

I attended Fisheries Division Management Team meetings witnessing first-hand, interagency decision making among representatives from Fisheries management units, the Fisheries Division Research Section and Fisheries Division administrators. I also participated in meetings between the Fisheries Division representatives

and other agencies by attending the Huron-Erie Corridor Initiative Meeting held at the U.S. Environmental Protection Agency offices in Detroit. There, fisheries professionals from other states and Canada interacted to work toward the common goal of managing a shared body of water.

My mentors also provided me with input on my graduate research project; an assessment of a change in DNR fishing regulations that allows angling for black bass during the spring nesting season.

As a Fenske Fellow I gained a better sense of how to plan and manage a large collaborative project, but equally invaluable was the example set by my mentors in communicating and seeking input on the project from managers, biologists and technicians—not just other researchers.

The fellowship provided me with the opportunity to create meaningful connections with members of the Fisheries Division and with lessons and experiences valuable in preparing me for a career in fisheries management.

I was truly inspired by Jan Fenske's story and am grateful for the opportunity that the Fenske Fellowship has provided for me. I encourage anyone with an interest in fisheries management to apply for this opportunity; you won't regret it!

Janice Lee Fenske was the first female fisheries biologist for the Fisheries Division of the Michigan Department of Natural Resources. During her 27 years of service, Jan's love of the environment compelled her to work untiringly for the long-term protection and sustainable use of Michigan's aquatic resources. The intent of the Excellence in Fisheries Management Fellowship is to honor Jan's commitment, integrity and memory by providing graduate students from the underserved community of the Department of Fisheries and Wildlife at MSU, with a financial award and mentoring experience that will aid them in developing successful careers in fisheries management. For more information about the Fenske Fellowship, please visit: [www.fw.msu.edu/fellowships.htm](http://www.fw.msu.edu/fellowships.htm).

Janice Lee Fenske



1954 - 2005



Jared Myers Bret Muter Michelle Larkins Jacques Edi Sonntag

## inspiring the next generation of **Fisheries + Wildlife professionals**

Ask any FW student why they chose to be in this field and many will tell you that their passion for the outdoors stemmed from their early childhood experiences – catching tadpoles or fireflies in their backyards, exploring forests and fields near their homes, or going on their first fishing or camping trip with friends or family.

Most of us grew up in a generation where free time was spent outside rather than in front of a television or a computer. Today's youth, however, are bombarded with many distractions that keep kids indoors, inactive and uninspired. Not surprisingly, this has resulted in an increasing disconnect between children and nature.

Getting kids outdoors has become the topic of much attention in recent years. Evidence of significant declines of participation in outdoor activities throughout the United States is alarming. (Read Robert Louv's *Last Child in the Woods*, for a good overview.) The unfortunate truth is that kids who spend less time outdoors are more likely to

experience youth obesity, attention deficit disorders, depression, other physical and emotional illnesses, as well as a diminished sense of place and curiosity of nature.

Further, the economic and environmental future of Michigan depends on a citizenry that is strongly committed to the sustainable use of our state's natural resources. As was highlighted in Michigan's "No Child Left Inside" proclamation, the children of today will be integral to the preservation and protection of our environment in the future.

It is in MSU's land grant spirit that many graduate students in the Department of Fisheries and Wildlife have volunteered their time, skills and enthusiasm for all things wild (or wet) to help kids jump – sometimes face-first – into nature. Here, we showcase a few of the initiatives led by, or involving, FW students that aim to introduce kids to the outdoors, foster an appreciation for our state's natural resources, and inspire a new generation of fisheries and wildlife professionals.



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Jared Myers (above) shows the participants in the 4H Great Lakes & Natural Resources Camp how to clean their day's catch.

## 4-H Great Lakes + Natural Resources Camp

Working with kids at the annual 4-H Great Lakes and Natural Resources Camp in Presque Isle, Mich. was one of the more enjoyable experiences I have had as a graduate student. Consistent with the missions of each partnering sponsor, the goal of this camp is to provide Michigan teens (ages 13 to 15) with a better understanding of natural resource ecology and management while also fostering an appreciation for environmental stewardship and outdoor activities.

Given my research interests pertain to Great Lakes fisheries, I was charged with helping kids learn about the Lake Huron ecosystem. Teaming with local charter captains Ed Retherford and Dick Rang, we were able to introduce campers to the science and management of Great Lakes fisheries while targeting salmon and lake trout.

Many of the kids were reluctant to participate in the early morning; however, seeing a fellow camper struggle to stay in the boat while fighting the first fish of the day tended to brighten the mood. Smiles became contagious and our discussion of issues relating to the Great Lakes became more engaging. There was never a shortage of topics to talk about while on the water. Before heading back to shore, it was evident these young anglers recognized the complexity of ecosystems and the challenges associated with multi-use management.

After returning to camp, the tradition was to show off the day's catch to other campers. The persuasive chanting from 80 of their peers screaming "kiss your fish" left the young anglers with no option. I

would never have guessed the same kids that were hesitant to grab a rod would be as excited as they were to pucker-up for a Chinook salmon, lake trout or walleye.

After an initial demonstration each student was given a knife and shown how to safely and efficiently fillet their fish. Throughout the exercise we talked about anatomy, physiology and the responsibility of sportsmen and women, which provoked more thoughtful questions and discussions. It was at this time that their progression was most obvious. They had a greater appreciation of their harvest, but more importantly they recognized the intrinsic value of our natural resources.

Campers were exposed to a breadth of educational and recreational activities throughout the week. Whether it was fishing on Lake Huron, snorkeling in Lake Esau, learning about wetlands and wildlife, or sticking their head in the mud, students seemed to glow with excitement and curiosity. The growth of these students reaffirmed the need to expose youth, as well as adults, to nature. In their eyes the outdoors were no longer dirty or disgusting, but rather interesting, inspiring and worthy of protection.

### Jared Myers

Jared Myers is a second-year doctoral student working under the direction of Dr. Mike Jones. He is researching factors that affect early life history of cisco (aka lake herring) in Lake Superior. Contact Jared at [myersjar@msu.edu](mailto:myersjar@msu.edu).

### FW Field Shots...

1. Looking at red-backed salamanders while hiking at Tahquamenon Falls State Park.
2. A youngster investigates a tortoise during a reptile outreach program.
3. Learning about radio telemetry at the 4-H Great Lakes & Natural Resources Camp.
4. Watching trumpeter swans at Seney National Wildlife Refuge.
5. Practicing seining skills at the 4-H Great Lakes & Natural Resources Camp.

Photo 1 by Dawn Reinhold  
Photo 2 by Edi Sonntag  
Photos 3, 4 & 5 by Bret Muter



**Bret A. Muter** (above) leads a lesson on landscape photography with participants in the 2008 Parks in Focus Michigan program.

## Capturing Nature with a Camera

Since 2007 I have teamed up with the NCCS Boys & Girls Club of Newaygo County (in Fremont) and the Muskegon River Valley Chapter of Big Brothers Big Sisters (in Big Rapids) to take groups of teens on photographic expeditions of some of the Upper Peninsula's most scenic public lands. The trips are part of a program called the Stewart L. Udall Parks in Focus program, which aims to connect underserved youth to nature through digital photography.

Parks in Focus (PIF) is a program of the Udall Foundation, an independent federal agency based out of Tucson, Ariz. PIF began in Arizona in 1999 with the Boys & Girls Clubs of Tucson; however, the Foundation has since expanded the program and now supports trips with Boys & Girls Clubs in New Jersey, Michigan, Maine, Washington, Montana, California and Georgia. Since the program's inception, hundreds of youth have participated in PIF.

In its three year tenure, 30 youth have participated in PIF Michigan. This year, I'll take another group of 12 teens on the annual adventure. Participants spend the week camping at Tahquamenon Falls State Park, where we search for salaman-

ders, bounce on bogs and crawl into bear dens. Other trip highlights include fishing and bird watching at Seney National Wildlife Refuge and taking a boat cruise of Pictured Rocks National Lakeshore.

Participants learn about the natural history of each site we visit while learning about the fundamentals of digital nature photography. Each participant documents his or her adventures, taking hundreds (and sometimes thousands) of photos of the people, places, plants and animals they encounter along the way. Photo highlights from our trips have been featured in various media outlets and have been displayed in several exhibits around the country, including the Department of Interior Museum in Washington, D.C.

For more information about PIF, or to view photo highlights from all of the PIF trips around the country, visit <http://pif.udall.gov>.

### Bret Muter

**Bret Muter** is a first-year doctoral student under the direction of Dr. Meredith Gore and Dr. Shawn Riley. He is currently researching human dimension issues surrounding bovine tuberculosis in Michigan and Minnesota. Contact Bret at [muterbre@msu.edu](mailto:muterbre@msu.edu).

## Fun at Fenner Nature Center!

Ask Greater Lansing residents to recall their favorite science lesson in grade school and many will tell you of their field trip to Fenner Nature Center—where they viewed insects in the pond, made clay imprints of red fox tracks or caught a glimpse of deer in the meadow.

The 135-acre park in southeast Lansing contains several ponds, an American Chestnut grove, grass and forested landscapes, a butterfly garden and an orchard. It also offers a unique opportunity for K-12 classrooms to learn about and experience the natural environment without venturing far from home.

In March 2007 I was elected to the Board of Directors of Friends of Fenner Nature Center, the administrative body which funds and directs all programming and activities.

Anxious to begin working on Fenner's central mission—to cultivate an appreciation of the environment through education and experience, especially in youth—I volunteered to co-chair the Norris Ingells Nature Education Fund for Youth. This legacy fund awards scholarships to enhance environmental awareness of K-12 students through nature and science-based learning experiences.

The importance of this work became especially clear when the financial constraints of the Lansing School District resulted in a moratorium of field trips. Suddenly, the countless hours spent



on fundraising, making calls to potential sponsors and promoting upcoming events took on a purpose much more specific than the admirable cause of nature education.

These dollars are now one of few existing opportunities for children in urban schools to discover the natural world and learn about their relationship within it. As a graduate of Lansing Schools, I feel a strong personal connection and commitment to the students in this district.

I am proud to say that after three years of co-chairing this Fund, we have raised well over \$10,000. Through our field trip transportation grants, 75 classrooms or approximately 2,600 students will now be able to visit Fenner!

This past summer, we also provided scholarships to Lansing students to attend our nature camps where they learned about forest ecology, as well as Michigan birds, reptiles, amphibians and insects.

With the success of our 2009 annual fund-



**Michelle Jacques** (in cardinal costume) volunteers at a community event at Fenner Nature Center.

raiser, the feverish season of submitting sponsorship proposals, assisting in t-shirt designs and coming up with eye-catching posters and pledge sheets is over. With a little over \$4,000 raised in sponsorships and donations, we have the potential to bring 27 more classrooms to Fenner in 2010 – each with 35 young minds who I can help to teach about the local environment.

### Michelle Larkins Jacques

**Michelle Jacques** is a second-year master's student working under the direction of Dr. Tracy Dobson. She is researching public and environmental health literacy among community groups in Allegan and Ottawa counties. Contact Michelle at [larkins4@msu.edu](mailto:larkins4@msu.edu).



**Edi Sonntag** (above) shares her enthusiasm for amphibians and reptiles with several youth during an outreach program.

## Sharing One's Love for Herps

Many adults consider amphibians and reptiles (called “herps” for short) to be slimy, useless creatures that are just plain old “icky.” The chances that a person holding these misconceptions will be concerned about the conservation of amphibian and reptile species are very slim. In fact, public misconceptions and negative perceptions about herps have been some of the biggest challenges to ensuring their survival worldwide.

Fortunately, children tend to view herps in a much better light. Kids see frogs, toads, salamanders, snakes, lizards and turtles as “cool,” “neat,” and “awesome.” They are especially ecstatic to see these species up close, have the opportunity to touch them and find out that they are anything but slimy. They want to know everything they can about herps, ask hundreds of great questions and are continually amazed by the things they learn. Youth are truly the future of global amphibian and reptile conservation. It is for these reasons that I volunteer my time to talk to kids about conservation.

As a graduate student in the De-

partment of Fisheries & Wildlife who is interested in amphibian biology and conservation, I conduct a wide variety of educational programs on my own and as part of the MSU Herp Club using live animals. I have taken these animals to schools, churches, science nights, campus-based events, zoo programs, nature centers and more. I present customized programs that focus on students' present area of study and use the animals as a way to demonstrate connections between a variety of scientific concepts, conservation practices and humans. I have discussed development, water quality issues, adaptation and evolution, and biomes using the animals as visual aides.

It is my hope that by creating and providing these opportunities for youth to interact with amphibians and reptiles I will inspire young people to take an interest in, and help change negative perceptions held about herps, while also ensuring their survival.

### Edi Sonntag

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## FW IN THE FIELD | GSO Photo Contest Winners

The FW Graduate Student Organization (GSO) sponsored its second annual photography contest in the fall of 2009. Submissions for the contest helped raise over \$200 for the GSO! Check out the winning entries below:



**1st Place [Wildlife] - Casey Koleski**  
Male dall sheep on Mt. Healy in Denali National Park



**2nd Place [Wildlife] - Taelor Haase**  
Green frog hiding in duckweed in southeast Michigan



**1st Place [Scenery] - Dan Wieferrich**  
A nice way to end a long day of fishing at Big Lake in Michigan



**2nd Place [Scenery] - Phil Ganz**  
Resurrection Bay from the top of Mt. Marathon in Alaska



**1st Place [Fieldwork] - Emily Norton & Tammy Otto**  
Female northern map turtle being marked for research



**2nd Place [Fieldwork] - Casey Koleski**  
Flying squirrel on a student's shoulder during FW field course