

MSU Fisheries and Wildlife

SPOTLIGHT

Spring 2022

Featuring

Predatory Fish Diets for Kids

Cultural Identity and Grad School

Self-help and Resilience for PhDs

Finding Deeper Meaning in Science

Celebrating Our Administration Staff

and More!

Written and Produced by Graduate Students



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Coordinator

Tricia Brockman

Assistant Coordinator

Jillian Sterman

Emma Rice

Editors

Kyle Brumm

Emma Rice

Elizabeth Stebbins

Michelle Volk

Design

Trish Brockman

Cover Photo

Evan Griffis

Contact Spotlight

fwspot@msu.edu

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Letter from Dr. Gary J. Roloff





I am again delighted to be part of the MSU Fisheries and Wildlife Spotlight magazine. This magazine is coordinated and produced annually by our graduate students and offers a sampling of the work we conduct in the department. The global pandemic continues to affect our work and personal lives, but our department remains strong and relevant because we have resilient, committed, and caring people. I hope you enjoy this issue of the Spotlight, and never hesitate to stop by the department and say hello (or take a picture with our renovated polar bear in the Natural Resources lobby).

The 2022 issue of Spotlight offers a new feature that highlights our department-level staff. These individuals oftentimes work behind the scenes to keep our department functioning smoothly and efficiently and their positive contributions to our mission cannot be overstated. The Spotlight also offers four feature articles:

 Alexandra Benitez, an MS student being co-advised by Dr. Abigail (Abby) Bennett and Mark Rey, shares her journey from Puerto Rico (her home) to the Fisheries and Wildlife department at MSU.

 Clara Graucob, a PhD student advised by Dr. Dan Kramer, translates research on social-ecological resilience into a self-help guide to understand her PhD student experience.

 Jake Sawecki, a PhD student advised by Dr. Brian Roth, talks about the importance of outreach and engagement in accomplishing our fisheries and wildlife objectives using his work on fish stomachs as a case study.

 Elizabeth Stebbins, an MS student working in the Quantitative Fisheries Center, offers a philosophical perspective on the science we conduct.

This issue of Spotlight also features Dr. Abby Bennett's research lab, and a check in on a couple of our Fisheries and Wildlife alumni.

Thank you for being interested in our department and the magnificent work that our graduate students are conducting. Enjoy this issue of Spotlight.

- Gary J. Roloff



SPOTLIGHT ON FELLOWSHIPS

DEPARTMENT OF FISHERIES & WILDLIFE FELLOWSHIP AWARDS

Robert C. Ball and Betty A. Ball Fisheries and Wildlife Fellowship

The Robert C. Ball and Betty A. Ball Fisheries and Wildlife Fellowship provides graduate students with the opportunity to study fisheries, limnology, or water research.



Danielle Matsuzak

Graduate Program: M.A., FW: Data Intensive Landscape Limnology Lab & Ecology, Evolution, and Behavior

Advisor: Dr. Kendra Cheruvellil

Graduate Research: My research focuses on understanding the biogeography of the invasive zebra mussel (*Dreissena Polymorpha*). I am examining the role of surface water (streams) and human (public access sites) connectivity, as well as the importance of whether a lake is “natural” or “human-made” (aka reservoir) for mussel presence and spread. In addition to mussels, I include water quality measures and microcystin toxin levels in my research of northeastern and midwestern U.S. lakes.

Motivation to Apply: The Annual Robert C. Ball and Betty A. Ball Fisheries and Wildlife Fellowship was a perfect fit for me because of its goal to support students researching fisheries, limnology or water quality.

Benefits of the Fellowship: The Ball Fellowship supplements my teaching assistantship, facilitating my research and my engagement with stakeholders about the impact of connectivity, lake origin, and water quality on the spread of invasive freshwater mussels. It will also provide funding for me to present at the Joint Aquatic Sciences Meeting in May 2022.

Dr. Howard A. Tanner Fisheries Excellence Fellowship

The Dr. Howard A. Tanner Fisheries Excellence Fellowship recognizes students who are committed to fisheries research related to the Great Lakes or connecting waterways.



Tyler Firkus

Graduate Program: Ph.D., FW & Environmental Toxicology

Advisor: Dr. Cheryl Murphy

Graduate Research: The sublethal effects of sea lamprey parasitism on lake charr energy budgets, reproduction, growth, and wound healing.

Motivation to Apply: It was a great opportunity to further my Great Lakes focused research.

Benefits of the Fellowship: It helped fund the work and publication of 2 manuscripts and was critical to my funding for the final year of my Ph.D.

Janice Lee Fenske Excellence in Fisheries Management Fellowship

The Janice Lee Fenske Excellence in Fisheries Management Fellowship honors the first female fisheries biologist with the Michigan DNR, Jan Fenske. It is designed to facilitate interactions of a graduate student with professionals from an agency through the implementation of a fisheries project.



Amber Johnston

Graduate Program: M.S., FW: Aquatic Animal Health Laboratory

Advisor: Dr. Thomas Loch | **Fenske Mentors:** Dr. Thomas Loch and Gary Whelan (MDNR)

Motivation to Apply: There were two driving factors behind my application for the Fenske Fellowship. First, through the MSU-AAHL, I collaborate with the Michigan Department of Natural Resources (MDNR) Fisheries Division to enhance fish health in wild and hatchery-reared fishes, and this collaboration fostered an interest in the intersection between fisheries management and fish health. Second, I felt inspired to apply by Janice Fenske's legacy as not only the first female fisheries biologist with MDNR, but also as a leader in the field.

Fenske Project: My project is titled "Closing the gap on whirling disease in Michigan: a synthesis of historical and contemporary knowledge to support and guide fish health management decisions". Guided by my mentors, I am developing a contemporary summary of whirling disease, caused by the problematic fish parasite *Myxobolus cerebralis*, in Michigan.

Lessons Learned: While the project is ongoing, one thing I've learned so far is that fish health issues are complex, interdisciplinary problems that require creative solutions developed with the needs and goals of anglers, management agencies, and researchers in mind.

Applications Beyond Fellowship: Upon completion of my project, MDNR will be armed with a compendium of knowledge surrounding *M. cerebralis*'s history in the state, a critical tool to have when developing efficacious management strategies. Beyond the fellowship project, I'll have had opportunities to network with a diversity of fisheries managers not only in Michigan, but nationwide.



Nicole Watson

Graduate Program: Ph.D., FW: Fisheries Ecology and Management & Ecology, Evolution, and Behavior

Advisor: Dr. Daniel Hayes | **Fenske Mentor:** Neal Godby, MDNR Fisheries Biologist

Motivation to Apply: The Fellowship honors the career of Janice Lee Fenske, the first female biologist in MDNR Fisheries Division and aims to provide a rich, working mentor experience and insight with a chosen agency, MDNR in my case.

Fenske Project: My study addresses two critical concerns, changes in water temperature and discharge, with three key goals and objectives: 1) analyze existing temperature data for sites throughout the North Branch Au Sable River (NBAS) system; 2) determine if water temperature exceeds thermal optimal growth range and lethal limits for Brook and Brown trout, and if so, quantify the frequency and duration; 3) examine discharge patterns, including seasonal timing and duration of peak and low flows in relation to critical times in the salmonid

life cycle.

Lessons Learned: My fellowship is ongoing and I am learning much about the intricacies of the agency.

Applications Beyond Fellowship: The collaborations and professional relationships that are built will last into the future as will the study itself. These data will provide guidance in understanding impacts of water temperature and discharge changes to the growth and survival of local populations of Brook and Brown trout in the NBAS system with application to other watersheds. The study results may help explain recent changes in salmonid populations observed in the system and has potential to guide conservation and management goals.

SPOTLIGHT ON FELLOWSHIPS

Hal and Jean Glassen Conservation Medicine Fellowship & The Vera M. Wallach Graduate Fellowship

The Hal and Jean Glassen Conservation Medicine Fellowship recognizes a student committed to the study of fish and wildlife disease ecology and conservation medicine.

The Vera M. Wallach Fellowship is awarded to students studying wildlife management, ecology, or natural resource management or conducting Arctic and Antarctic research with emphasis on the protection and



Noelle Thompson

Graduate Program: Ph.D., FW: Boone and Crockett Quantitative Wildlife Center

Advisor: Dr. David Williams

Graduate Research: My research investigates the management of chronic wasting disease (CWD) in white-tailed deer in Michigan. I have developed an agent-based model that projects direct and indirect transmission of CWD within free-ranging deer herds. Using this model, I am assessing integrated management actions that reduce transmission of CWD, are cost effective, and are socially acceptable.

Motivation to Apply: I applied for the Glassen Conservation Medicine Fellowship because of my research and career interests in wildlife disease ecology and conservation medicine. I came to MSU knowing that I wanted to obtain a graduate specialization in fish and wildlife disease ecology and conservation medicine. Furthermore, my dissertation research focuses on improving scientific-based management of wildlife, a topic on which the Glassens were keen. I applied for the Vera M. Wallach fellowship because my dissertation focuses on the ecology and management of wildlife affected by CWD.

Benefits of the Fellowship: These fellowships have allowed me to present my research to various audiences at the state, regional, and national levels, such as at annual Wildlife Disease Association and The Wildlife Society meetings.

Ambrose Pattullo Fund for Environmental Issues Graduate Fellowship for Literary Work

The Ambrose Pattullo Fund for Environmental Issues Graduate Fellowship for Literary Work recognizes students who are interested in current environmental issues and who have written about these issues for possible publication in a literary outlet.



Kelly Kapsar

Graduate Program: Ph.D., FW: Center for Systems Integration and Sustainability

Advisor: Dr. Jianguo (Jack) Liu

Graduate Research: My current research focuses on understanding the spatial and temporal scales of human-environment interactions. Specifically, I evaluate patterns of marine vessel traffic in the North Pacific as they relate to the distribution of marine mammals and sea ice.

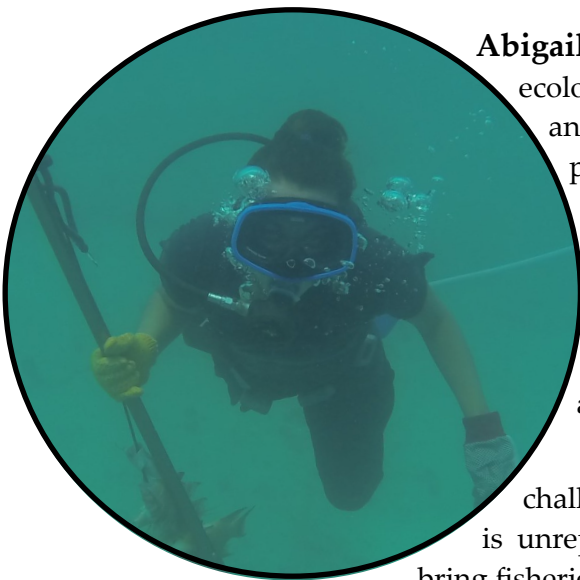
Motivation to Apply: As a freshman in college, I got involved in an organization called Kids for Conservation where we had the opportunity to teach elementary age students about the natural environment and sustainability. This experience spurred a passion for environmental education and science communication that has stayed with me ever since. After spending an extraordinary three weeks on an ice breaker in the North Pacific helping researchers to collect oceanographic and biological data, I wanted to share my experience with others. The Patullo Fellowship was a great opportunity to put my thoughts to paper.

Name of Literary Piece: Breaking the Ice: Connecting data and reality on an Arctic research cruise

Lab Spotlight: Dr. Abigail Bennett



The Bennet Lab: Abigail Bennett, Edith Gondwe, Emma Rice and Alexandra Benitez.



Abigail Bennett is an assistant professor of global inland fisheries ecology and governance. She studies the role of fisheries in livelihoods and food security around the world. Her research examines how processes such as governance and trade shape the connections between fisheries and human well-being. For example, what kinds of governance arrangements can mitigate negative social and ecological impacts of global trade pressures? How important are fisheries for addressing hunger and malnutrition globally? And, how can we enhance fish value chains to increase access and benefits to women and the rural poor?

Empirically, she employs innovative approaches to confront the challenges of inadequate data, given that substantial global fish catch is unreported and post-harvest activities are often undocumented. To bring fisheries to the forefront in policy dialogues on sustainable development goals such as reducing poverty and addressing global hunger, she works closely with organizations such as the United Nations Food and Agriculture Organization and other international organizations in the design, implementation, and dissemination of research.

Dr. Bennett loves learning from her students and the projects and activities they are involved in. Lab meetings with students are the highlight of her week - it is great to have time reserved each week to have conversations about the stuff that really matters, laugh, and decompress, and eat Jimmy Johns with spicy peppers.

Edith Gondwe is a 3rd year Ph.D. student from Malawi, Southern Africa pursuing a degree in Fisheries and Wildlife, with a specialization in Gender, Justice, and Environmental Change. She holds a bachelor's and Master's degree in Agribusiness Management (BSc and MSc) obtained from the Lilongwe University of Agriculture and Natural Resources (LUANAR) in Malawi. Her research interests include livelihoods and well-being, gender and women's empowerment, household economy and decision-making, food and nutrition security, value chains, and profitability of food systems. Her dissertation focuses on the intersections of livelihood strategies, intrahousehold decision making, social norms and institutions, and how they interplay to produce food security outcomes in households engaged in small-scale fish trade in Malawi. Beyond her Ph.D., Edith hopes to have a career where she can teach and work with organizations that implement research-based development programs.



Working with Dr. Bennett, whom she met and danced with on the shores of the beautiful African Great Lake Malawi in 2018, has been a wonderful experience. Dr. Bennett is a supportive mentor and continually challenges us to think deeply and widely about our research interests. Furthermore, Dr. Bennett facilitates the participation of students in projects, such as the Food and Agricultural Organization (FAO) Illuminating Hidden Harvest Project that Edith was a part of. My favorite moments in the lab are the deep waves of laughter we share during our check-in meetings and, of course, the Jimmy Johns meals. Edith enjoys running, dancing, long phone calls with friends, and cooking when not participating in conversations about fish food systems.



Emma Rice is a second-year master's student in the Department of Fisheries & Wildlife with a specialization in Gender, Justice, and Environmental Change through the Center for Gender in Global Context (GenCen) at MSU. Emma, a native Michigander, received her bachelor's degree from the Department of Agriculture, Food and Resource Economics (AFRE) at Michigan State in 2020. She is an interdisciplinary scholar drawing primarily from economics, geography, and gender studies. Her thesis research will be investigating the drivers of variation in profit margins for fish traders in Malawi. Using a mixed methods approach, she hopes to understand the role of gender, space, and place in determining livelihood outcomes for fish traders. Emma has also had the opportunity to work with FAO and Duke University on the *Illuminating Hidden Harvests* report, a global study of small-scale fisheries, as well as collaborate with researchers at Lilongwe

University of Agriculture and Natural Resources (LUANAR) on developing a market information system to provide fish traders with real time price information. She plans to continue social science research in fisheries and pursue a PhD after completing her master's degree.

Emma enjoys the global focus of the Bennett lab and has learned so much from research partners in Malawi as well as from the varied lived experiences of her fellow lab mates. She appreciates the smaller lab atmosphere and looks forward to great discussion (& Jimmy John's) at lab meetings every week. Dr. Bennett is a great mentor who challenges everyone in the lab to continually think of unique questions, ideas, and approaches.

Alexandra Benitez received her bachelor's degree from the Department of Environmental Science in University of Puerto Rico (Rio Piedras). She is currently pursuing a master's degree in the Department of Fisheries & Wildlife with a specialization in Gender, Justice, and Environmental Change, and a certification in Community Outreach and Engagement. She is currently working with Michigan Sea Grant (MSU), Bowling Green State University, and the Great Lakes Center for Fresh Waters and Human Health on a collaborative health project regarding Harmful Algal Blooms (HABs). Alex is interested in environmental justice, science communication, and risk perception. Her thesis focuses on understanding how to effectively communicate public health risks from HABs with vulnerable populations. The research project aims to evaluate how existing information about HABs provided by government agencies are influencing vulnerable populations' intentional behavior and risk perception.



In Dr. Bennett's lab, Alex has acquired a better understanding of qualitative data and analysis, fieldwork, and fisheries governance research by contributing to projects on topics ranging from the socioeconomic effects of HABs in Lake Erie to conservation crime science and Sea Cucumber trafficking in Mexico. Alex's favorite memories with the lab are "tea time", and eating veggie sandwiches from Jimmy Johns on the picnic table outside the office. Dr. Bennett's integration between social science and fisheries livelihoods and food security, and tremendous leadership in academia has inspired Alex to continue pursuing research on a higher level in academia. Her future plans include pursuing a PhD in the Department of Communications at MSU to continue researching how cognitive factors influence risk communication and perception.



Tools of the Trade: Blue Light Filtering Glasses

My name is **Emily Liljestrand** and I am a PhD candidate taking decades of commercial fisheries data to feed into computer models. The end result is an estimation of abundance, or number of fish, for each year.

Brand: EyeBuyDirect

Model: Decadence

Price: \$32 for frames, \$19 for blue light treatment

Why you love it: I asked my eye doctor about these recently and he said blue light filtering glasses can reduce eye stress and help with regulating sleep cycles. As a quantitative fisheries scientist, I'm at my desk all day, programming, reading papers, or writing. It might be the placebo effect, but when I remember to wear them, I feel like I'm looking after my long term eye health!

Why you hate it: I don't!

Additional advice: If I had to order them again, I might pick a more stylish or brand name frame. These can sometimes bend or smudge easily!

Outreach and Engagement

A New Opportunity, Experience, and Discovery

By Jake Sawecki

It's no secret that outreach and engagement are at the forefront of what we do as graduate students within the Fisheries and Wildlife Department. From learning about outreach and engagement strategies in Dr. Erin Dreelin's course to sharing our research on social media, at conferences and with family and friends, engaging with scientists and non-scientists alike has become an enjoyable component of my work as a graduate student. As the lead PhD student on the Huron-Michigan Predator Diet study within Dr. Brian Roth's lab, my job involves much more than sorting through the contents of fish stomachs to study the feeding behavior of Great Lakes salmonines.

Over the past two years I have engaged with the public about the diets of trout and salmon within Lakes Huron and Michigan in ways that I never would have imagined. Beyond typical conferences, I've been invited to give talks to anglers, charter captains and other interested stakeholders regarding the status of the project at Lake Huron and Michigan fisheries workshops each spring. Throughout the summer months, while collecting stomach samples at salmon fishing tournaments, anglers were often eager to ask about the diet study and communicating with them about the research we've been doing on campus became my favorite facet of the field season. In addition, I run the Huron-Michigan Predator Diet Study page on Facebook, and responding to comments of folks that are amazed to see some of the data we've collected or an interesting diet item we've found has become a pleasant routine of mine at the end of a long work week.

However, it wasn't until this past summer that I was offered the opportunity to talk with a group of people that weren't all anglers, charter captains, or individuals that are directly interested in the Great Lakes salmon fishery. In July, I met 7th grade teacher, Gregory Durham and discovered that his coworker was awarded a grant from the Michigan Department of Natural Resources "Salmon in the Classroom" initiative. I shared the research that I was conducting on salmon and trout diets with Mr. Durham and he invited me to talk to his 7th grade class about salmon in the Great Lakes. Although I was hesitant at first, I happily accepted the invitation! I had always considered a career in education and teaching 7th – 12th grade Biology was an interest of mine, but I had trouble committing to a career in teaching. This was an excellent opportunity to see what being a 7th grade teacher was all about.

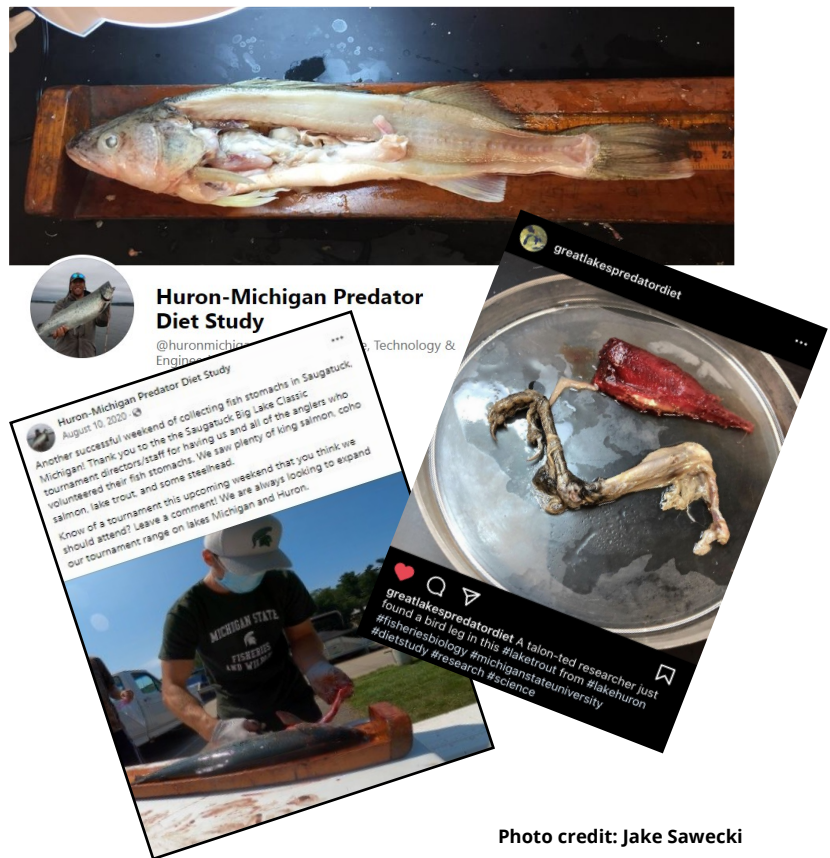


Photo credit: Jake Sawecki

So, on Tuesday, November 23rd I packed my laptop and some fish stomachs, put on a fish tie and some dress shoes, and drove to Berkshire Middle School in Beverly Hills, Michigan to play 7th grade teacher for the day! Needless to say, I was nervous. I was used to presenting data to other researchers and adults, not 11- and 12-year-old students. How was I supposed to make sure they understood everything I was saying? How would I keep their attention?

Thankfully, the answers to my questions became apparent while presenting to the first group of students. I intentionally presented in a fashion that would engage the students and I was blown away by the level of interest they showed in my research and their engagement with the presentation. Instead of showing them what a salmon was, I had them identify it for me in a group of various species. Together, we created a list of diet items that they thought would be found in



Photo credit: Jake Sawecki

the stomach of a salmon and to really garner their attention, I even brought in some fish stomachs, prey fish, crayfish, and fish bones. This approach helped to keep the students engaged and facilitate discussion and questions about how salmon forage in the Great Lakes and why studying them for management is important to the Great Lakes Region.

Outreach and engagement come in many forms, and although this form was new for me, I could

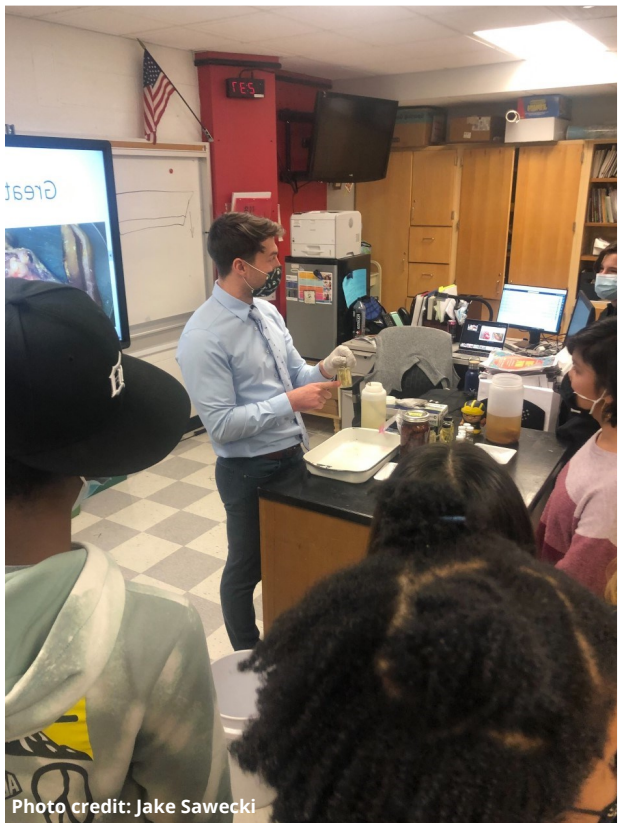


Photo credit: Jake Sawecki

not have asked for a better group of students or for a better experience than the one I had at Berkshire Middle School. Constructing a presentation that was both informative and engaging for children was a challenge, and one that took several iterations. However, I had no issue filling an hour with interesting discussion about fish, and we even got to check out the salmon eggs! This has been my favorite outreach event of the past two years, and I cannot wait to do it again next year!



Jake Sawecki is a Ph.D. student studying foraging ecology of Great Lakes Salmonines and enjoys fishing, playing sports, and breeding aquarium fish in his free time.

A person is seen from behind, standing on a grassy hillside and holding a large Puerto Rican flag that is spread out behind them. The background features rolling green hills under a cloudy sky, with a small village visible in the distance. The overall scene is peaceful and scenic.

From the Atlantic Ocean to the Great Lakes: My journey as a FW Graduate Student

My voice has a song from generations of indigenous tribes – *Taino* and African ancestors. My tongue is my fortress, and my identity is a combination of revolution, the Caribbean, and North American. I am a born and raised Latina, Hispanic, and Puerto Rican woman. I grew up in the metro area of San Juan, Puerto Rico but all my family resides on the west side of the Island, *Isabela and Arecibo*. I had the blessing to experience both the cities and mountains, suburbs, rural villages, the fast-paced city life, and the hard-working one. If I had to describe home, it consists of a warm feeling filled with harmonious rhythms like the waves on the beach or how the branches of the trees dance as the breeze and the sun sustains them.

Home is a feeling I can only describe once I set foot on my island and listen. There is never silence on my island; there is always music. At night we hear el *coquí* - our native frogs that sings every night "Co-kee." Some say the *coquí* should represent us as our national symbol: a small island, a tiny frog, but a big and powerful voice. There is never silence when traveling on a plane with native Puerto Rican passengers. Traditionally, after the plane lands in Puerto Rico, as the airplane wheels touch the runway, clapping and cheering are highly encouraged to honor our pilot and staff for our landing. There is never silence in my home- my island and noise are part of our culture. I come from a place where *sazón* ("spices") is needed in every single dish we eat, where *salsa and merengue* music are as familiar as hearing birds chirp in the mornings, and where dancing is our way of healing. Screaming for justice throughout protests and strikes for our land is as necessary as breathing air.

They call Puerto Rico *Isla Del Encanto* ("Island of Enchantment") because that is exactly what it is: an island filled with beauty, hope, and resilience, even after facing one of the most disastrous and catastrophic events during 2017 *Huracán María* ("Hurricane Maria"). There were over 3,000 deaths, and more than 80% of the transmission and power distribution was destroyed. A collapse of communication, electricity, radio, and internet connection challenged us to seek other ways to communicate with others. Inadequate disaster response caused greater effects post-catastrophe. The death toll continued to climb

several years, challenges such as corruption, political turmoil, massive strikes, and protests emerged across the island demanding for our former governor, Ricardo Rosselló, to resign after discovering evidence of corrupted negotiations conducted during the aftermath of Hurricane Maria. The public education system in Puerto Rico was among one of the institutions that faced several challenges given the destruction of infrastructures on campus due to the hurricane, financial threats, and budget cuts. The challenges that made my island faced, only made me continue to pursue a higher academic degree, and explore new opportunities.



due to lack of cellphone reception, unclear roads, floods, and other aftermath that the hurricane brought upon us, uncovering death, fear, and destruction. After living through the effects of Hurricane Maria I was able to view life from a different perspective. To borrow the words of Franklin D. Roosevelt, "we have nothing to fear but fear itself" ... Over the next

Before enrolling at MSU, I worked as a high school teacher in my former high school I graduated in San Juan. Becoming a teacher made me aware the importance of the role, allowed me to learn more about our future generations, and made me aware the honor and integrity one must uphold by being a teacher. During this time, I learned that being a teacher made me a better scientist. Having the opportunity to translate knowledge and learn how to engage with my students creatively allowed me to realize how communication is an essential component of education. Although I loved teaching, I wanted to continue pursuing my academic goals.

An opportunity of a lifetime was offered when meeting Dr. Bill Taylor, Dr. Abigail Bennett, and Dr. Mark Rey at the University of Puerto Rico, Rio Piedras campus, in search for potential graduate students to study in the Department of Fisheries and Wildlife at Michigan State University. To invest in my growth academically and personally, I left my high school teaching position and decided to pursue my master's degree for an exceptional opportunity to work with Dr. Triezenberg for the Michigan Sea Grant on improving risk communication within coastal and Great Lakes aquatic ecosystems. This decision changed my life and allowed me to become the researcher, educator, and scholar I am today.

Leaving my family was one of the hardest yet most courageous decisions I have made. Moving to Michigan, living alone, and relying on the bus as my primary source of transportation made me a stronger and more independent individual. My passion for qualitative research and learning about risk and science communication emerged while conducting my fieldwork in small communities residing near inland lakes and Lake Erie. My research consists of understanding how to effectively communicate risk to vulnerable populations and learn what potential factors influence risk perceptions.

The vulnerable populations consist of residents that live near inland lakes that have continuously reported harmful algal bloom (HAB) events which can cause potential health concerns. Developing my research project allowed me to explore communities' attitudes, personal lake experiences, and the public's current knowledge about HABs. Because information about HABs is mainly communicated by government agencies, our study also explores how trust toward government agencies may influence a vulnerable population's risk perception.

My interests for risk communication continue to strengthen while working towards my master's degree in the Fisheries and Wildlife Department. Within the Department of Fisheries and Wildlife, there are multidisciplinary aspects that have allowed me to learn new disciplines and knowledge within the field. Having the opportunity to work with



Photo credit: Alex Benitez

Michigan Sea Grant while doing my masters' degree in the FW Department has allowed me to integrate risk communication with outreach, engagement, and human dimensions. This summer conducting semi-structured interviews and fieldwork, I learned about the importance of community engagement by exploring several communities' attitudes, personal lake experiences, and current knowledge about HABs, as well as other concerns they might have with the lakes they frequent.

In my fieldwork, attending local and state parks and boat launches near the selected lakes allowed me to learn more about the community, the current warning signs of HABs, and other risk messages displayed by the Michigan DNR. This experience working with Michigan Sea Grant, developing my research project, and being part of this department has been a life-changing decision that allowed me to become the researcher, scientist, and scholar I am today. Although I'm not a professional fisher or hunter, being part of this department offers more than just valuable skills. The Fisheries and Wildlife Department has allowed me to gain further understanding of the professional I want to become and learn the integration between environmental disciplines and social science. As a Hispanic and Latina graduate research assistant, it has been a privilege to have been part of the Fisheries and Wildlife Department.

Alexandra Benitez



Photo credit: Alex Benitez



Alexandra Benitez is a M.A. student with a specialization in Gender, Justice, and Environmental Change, and a certification in Community Outreach and Engagement. You can read more about her research on **page 9.**

Dr. Remington Moll Ph.D., 2018



How it started...

What did you work on while you were a student at MSU?

I worked on carnivore ecology in Bob Montgomery's research lab with an emphasis on interspecific competition, the ecology of fear, and human-carnivore interactions.

Where are you now and what do you do?

I am an Assistant Professor of Wildlife Ecology and Management at the University of New Hampshire (UNH), where I lead the Wildlife Modeling and Management research lab.

Is it what you thought you'd be doing when you began your time at MSU?

My path to this position took twists and turns, but I feel very blessed to have this job. The chance to conduct research, teach, and contribute to the UNH community is really wonderful.

What motivated you to apply for your current position?

I always wanted to continue in research and to teach at the university level. Securing a tenure-track position is difficult, so I applied very

widely. I was drawn to the UNH position because it is a beautiful part of the country and a great department. The program is very strong in research but also highly values teaching - a great combination!

What's your favorite thing about your current position?

Collaborating with students to explore novel research questions that are relevant to management decision-making. For me, it doesn't get better than that.

What experiences at MSU best prepared you for your current position?

My advisor, Bob Montgomery, was (and remains) a tremendous mentor. The collaborative atmosphere and quantitative training I received at MSU also positioned me for success in developing exciting research ideas with colleagues.

Do you have any advice for current FW students?

My advice is to focus relentlessly on the journey rather than the destination. Learn from other people but don't focus on comparing yourself to others. We all have goals and aspirations, but the real value is how you change, mature, and grow over time. And find good mentors!



...How it's going

Dr. Nathan Snow

Ph.D., 2014



How it started...

What did you work on while you were a student at MSU?

Spatial and quantitative modeling of wildlife vehicle collisions.

Where are you now and what do you do?

I work for USDA/APHIS/Wildlife Services/ National Wildlife Research Center in Fort Collins, Colorado. I lead field, pen, and modeling research studies aimed toward managing invasive wild pigs in the US. I focus on learning about wild pig ecology and finding new tools for controlling their populations, reducing damage to agriculture and property, and reducing the spread of disease

Is it what you thought you'd be doing when you began your time at MSU?

Sort of. I knew I wanted a Research Biologist position at the NWRC, but I would have never guessed it was focused on wild pigs.

What motivated you to apply for your current position?

This was the position that motivated me to get a PhD. So, when a position opened, it was a job I had been wanting for a long time. I wanted to conduct applied research and solve human-wildlife conflicts.

What's your favorite thing about your current position?

I get to learn, solve problems, and invent things. I get a nice balance of field and office, so it never gets boring. I am using my skills to help people and our natural ecosystem.

What experiences at MSU best prepared you for your current position?

Becoming comfortable with statistics and modeling. Knowing these tools, their strengths and weaknesses, helps me design studies that can answer questions with minimal uncertainty. Plus, learning how to be a professional (legacy of Dr. Porter).

Do you have any advice for current FW students?

Take your time to define your research questions. This will make the analysis and writing processes much smoother.



...How it's going

Translating Research on Social-ecological Resilience into a Self-help Guide For Understanding the Ph.D. Experience

By Clara Graucob

Burnout by Emily and Amelia Nagoski and *The Craving Mind* by Judson Brewer are just two examples of ‘self-help books’ I’ve read since starting my PhD. However, they aren’t the kind that Bridget Jones would read in her pajamas with crazy hair when trying to lose weight to find a new man. Instead, these books help you take recent scientific developments and apply them to your own life. As it turns out, my PhD research could be used in a similar way. But wait, I’m not a psychology student. Nor a neuroscientist. I study social-ecological resilience. Social what? And what does that have to do with me (you) personally? Let me explain...

Resilience is commonly understood as the ability to deal with bad stuff and coming out the other side still standing or functioning successfully. This applies to individuals (e.g., mourning the loss of a loved one) and communities (e.g., after a natural disaster). It includes persisting, i.e., enduring the bad without undergoing any changes until things are better and then continuing as usual, and adapting, i.e., making changes to deal with the bad, and then either reverting to business as usual or carrying those changes forward into the future with you.



Social-ecological resilience research analyses social-ecological systems, reflecting an awareness that it is not just humans managing their natural environment but rather that both sub-systems are so intrinsically interconnected that they cannot easily be separated. Social-ecological resilience considers how such systems react to a range of internal and external processes to remain functioning. There are generally 3 understandings of resilience.

The first is resilience as a rate of recovery. This is partly rooted in engineering (rate of return to the original state of a material) and partly in disaster recovery. It assumes that given enough time a system will always return to the same state as it was before a disturbance, even without targeted management actions. The second is resilience as a process and often as a normative concept, i.e., resilience is a good thing for all and we should strive to build more of it. This aligns with the common language understanding of wanting to be able to deal with bad situations and continue to function. However, as the literature on poverty traps makes apparent, there are also systems in which a break-down of resilience would be more desirable. Consider a dictatorship without freedom of speech and with a suffering economy. This is a system that can be highly resilient to both internal and external forces of change.

Here, resilience isn't normative but rather the dynamic something that keeps the system in its current state. This is the third understanding (and my use) of resilience, as an emergent property of a system, i.e., it describes how a system behaves and moves (or does not move) between different stable states and in response to 'disturbances' (Allen et al., 2019).

While my dissertation mostly considers impacts of climate change, this discussion is also applicable to me (you) personally. Attention: here comes my twist of a 'self-help book'. I have found that I am resilient in both desirable and undesirable system states. How do I know this? By using one operationalization of social-ecological resilience, namely the 7 Principles (Biggs et al., 2012). I will use them to give you some personal examples of how they apply to life as a PhD candidate.¹



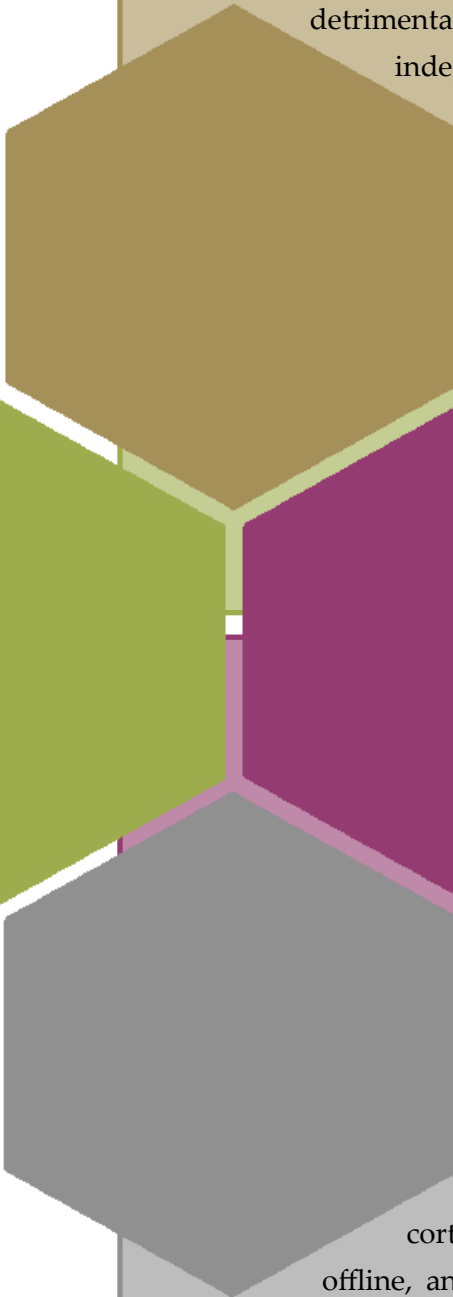
Photo credit: Trish Brockman

¹Note: These principles were developed as system properties, and while one could argue that as an individual, I am not a system, I believe we can still learn from these for personal experiences. Also note that psychology may have another operationalization and metrics for 'resiliency'.

Maintain Diversity and Redundancy: Diversity and redundancy help buffer shocks. A diversity of work projects is important for me to counteract boredom and mental blocks, but also to continue to make progress if a project gets stuck because of external factors, e.g., a pandemic delaying data collection. Diversity and in a sense, redundancy of relaxation strategies is also essential. Some hobbies have different relaxation potential in summer versus winter, are not possible/more effective during lockdowns, or might just not be the thing you feel like doing at a given point in time. Having a potpourri of relaxation strategies to choose from is therefore an important counterweight to my work.

Manage slow variables and feedbacks: A PhD is a marathon. Over time, motivation ebbs and flows. You're finally ready to start working on a chapter after mulling over the methodology for months and you get the feedback that it needs substantial revisions. Cue "why am I even doing this?" thinking. Interests change over time – unexpectedly being open to staying in this country reveals different job opportunities, like the dream job announcement your friend shared. All these seemingly unrelated things feed back into how you view your dissertation. Such feedbacks require awareness, critical thought and managing. It might mean changing half your dissertation even after your Comps. Foster certain positive feedbacks to get you going or negative feedbacks to break through lulls or bad moods. And don't neglect to consider feedbacks between different parts of your life (impacts of physical and mental health on work and vice versa).

Broaden participation: In social-ecological systems, this usually refers to including a diversity of stakeholders. For work, it can be as easy as asking different people for input on your research. But it could also be viewed as asking yourself to give input on different aspects of your life. For example, look at different parts of your life to see whether you are operating in a desirable system state. If work is going well but you don't have time for loved ones or hobbies, is this desirable? Is taking time off and relaxing but being stuck on work desirable? We could view different aspects of our personality and life as different stakeholders in creating a desirable system state for the whole person. Once we know what is desirable and what isn't, we know whether we need to build or erode resilience to stay/get there.



Manage Connectivity: Ensure you have an appropriate level of connections – friends, family, colleagues, and other community networks for information sharing and as a support system. This does not automatically mean the tighter and more numerous the connections, the better. Being too dependent on others can be detrimental when they are busy or unavailable. Some degree of self-sufficiency and independence is a must in my opinion. However, friendships and work connections contribute enormously to work progress and help navigate the mental and emotional rollercoaster that is life.

Foster complex adaptive systems thinking: Work and personal life are not separated but intrinsically linked and influence each other in complex ways – as do other people and circumstances. The exact consequences are not always known. For example, throw in a thyroid problem messing with your mood and energy and it becomes impossible to predict what is going to happen in terms of your productivity on a given day. Be gentle with yourself when something isn't going to plan – we are complex adaptive systems and can't always see every feedback that's occurring.

Encourage learning: Learn to broaden your work horizon and get inspiration for dissertation topics. Learn about what you are good at and what you are interested in. Learn about what worked as a self-care strategy in the past, what can get you out of a demotivation phase, and how to 'complete your stress cycle'. Get to know yourself, your triggers, your communication style and what is good for you. It's the only way to grow and adapt.

Promote polycentric governance systems: In social-ecological systems, different governance centers allow a faster response to disturbances, and they minimize risks of getting stuck in one way of doing things. For an individual, this might refer to our different brain regions, the "planning/rational brain" (prefrontal cortex) and the "habits/automatic brain". Under stress, the prefrontal cortex goes offline, and we don't really have access to planning and rational thinking anymore.² Make sure you have a diversity of strategies in place that help you achieve your goals – be it writing groups to hold you accountable or having some lasagne in the freezer for the days when you just don't have the willpower to cook and would otherwise just eat a block of cheese.

² Paraphrased from *The Craving Mind* by Dr. Judson Brewer

Understanding and assessing resilience is difficult. But by using it to understand social-ecological systems under climate change, I see many aspects mirrored in my own personal and professional journey. Social-ecological systems are complex – individual lives are complex. Both can use resilience thinking to understand their current capacity to respond to change and to achieve and maintain a more desirable state. Self-reflection, learning, and change are hard but worth it – for societal problems, and personal ones.

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Clara Graucob is a 4th-year Ph.D. candidate studying social-ecological resilience to climate change. When she isn't outside enjoying every sunny (and many rainy) moment, you can find her exploring local coffee shops or experimenting in her kitchen.

Tools of the Trade: Bug Shirt

My name is **Trish Brockman** and I am a master's student studying the effects of private forest management on the North American wood turtle (*Glyptemys insculpta*) in the Western Upper Peninsula of Michigan.

Brand: The Original Bug Shirt Company

Model: Elite Edition Bug Shirt

Price: \$77 - \$91

Why you love it: This shirt keeps me from going insane during field work in the UP where literal swarms of biting insects descend on you as soon as you step out of the truck. The tight weave keeps even the most determined bug out, and it's light weight and very breathable for those long hot summer days. I also like the big pocket in front for carrying my equipment!

Why you hate it: The hood can restrict your view and you CANNOT wash it in a machine.

Additional advice: I wear the hood down and put on a head net instead and zip up the hood neck to make a tight seal. I also buy a size up so that it's a little roomier. If you take care of it, it can last up to two seasons of hard use!



Grieving for Lone Geese

By Elizabeth Stebbins



"It was found by mathematical analysis that flocks of six [geese] or multiples of six were far more frequent than chance alone would dictate. In other words, goose flocks are families, or aggregations of families, and lone geese in spring are probably just what our fond imaginings had first suggested. They are bereaved survivors of the winter's shooting, searching in vain for their kin. Now I am free to grieve with and for the lone honkers."


"It is not often that cold-potato mathematics thus confirms the sentimental promptings of the bird-lover."

- Aldo Leopold, *A Sand County Almanac*

Science as a discipline relies on the assumption that, for a while, we can suspend our participation in the natural and physical processes around us and analyze them as a third-party observer. Questions like *Are the geese lonely?* would not carry much weight in a scientific journal, and yet, the scientific method can answer it in some way. Research—even quantitative fishery science research—is an ongoing negotiation between objectivity and subjectivity, personal biases, and a search for truth.

This is not to say that all research is biased, that the pursuit of objectivity is futile, or that you can't use scientific results as a proxy for truth. As a mode of inquiry, science is one of the best formats we have to answer what are often intensely complex problems, especially

ecological ones. However, in the steps we as scientists take to ensure our research is robust, reproducible, and peer-reviewed, we can often lose sight of the deeper questions that underlie the research in general. In the words of Helen Macdonald: "We tend to think of science as unalloyed, objective truth, but of course the questions it has asked of the world have quietly and often invisibly been inflected by history, culture and society" (*Vesper Flights*, vi). These facets of life interact at all stages of research, and in denying or excluding personal narratives, we as scientists lose one of our most powerful tools for making our work matter. Most research questions are specific, but I think that underlying most projects is the ever-present thrum of: *We think something is going on here. It feels like there is. Can we prove it?*



What follows questions like these are hypotheses, citations of previous works and theories, statistical tests, and discussion. A good scientific study needs to be transparent, reproducible, and justifiable. What are these qualities if not a collective expression of what humans deem the best way to approach objectivity in an inquiry about the world and our place in it? The very concept of the scientific method shows an awareness of the fact that humans are organisms, with unreliable or unknowable characteristics that can be partially curtailed by a procedure. Science and sentimentality are not mutually exclusive, and in fact, they depend on one another.

For example: Watching the coordinated rotation of a schooling column of fish raises goosebumps on my arms. There are patterns there, rules guiding those movements, and they mean something to me – but those rules are a mystery. Why, then, do I react? Even if I can't define them, as an observer I'm aware there is something going on. They make themselves known to me. I perceive significance.

The study of the mathematical underpinnings of ecological systems, particularly fisheries, can be alienating, abstract, or obtuse to an unfamiliar reader. At first, it was foreign to me, too: A native of New Mexico with a background in politics, my passion for marine conservation didn't quite seem to fit.

What does a fish growth model have to do with me? How is partitioning variability relevant to my life – my concrete, physical, emotional, inner life? How can I make it matter to you? Fishery science and its quantitative aspects at first seemed to me to only further the imaginary distance between humans and nature; instead of celebrating the indefinable connections we have as part of ecological systems, building statistical models only abstracted these processes. Predation becomes a parameter; years of our lives become a line of code. Yet the more I learn about these models, the more

I think they are undeniably connected with our innate desire to understand the mysteries of the ecological world around us.

“Cold-potato mathematics,” as Leopold calls it, can help to explain that significance. Building models requires us to state our assumptions, our inspirations, our suspicions. And then we challenge them. It is a search for proof that our suspicions were right, that our intuition is indeed connected with the ecological processes around us, perhaps subconsciously. What we’re looking for, I think, is not only proof that the universe has an order, but that we are a part of it.

“The scientist is another who prepares, who makes ready, working day and night, sleeping and awake, for inspiration. As Pythagoras knew, the god may speak in the forms of geometry as well as in the shapes of dreams; in the harmony of pure thought as well as in the harmony of sounds; in numbers as well as in words.”

- Ursula K. Leguin, *Left Hand of Darkness*



Liz Stebbins is a M.A. student studying individual variability in growth with the Quantitative Fisheries Center at MSU.

SPOTLIGHT ON ADMIN

Navigating grad school would be impossible without our amazing FW administration staff! Whether it be connecting students with resources, troubleshooting various university systems, making sure graduation requirements are met, or just having a great conversation in the hall.

Our admins are the backbone of the Fisheries & Wildlife Department at MSU.



**Brian
Livingston**

Tell us about yourself!

I have been working with the department of Fisheries and Wildlife for almost five years. Prior to MSU I had worked as a touring musician, a private chef, and real estate developer. In my personal life I am currently revitalizing a 20 acre farm while trying to raise a young family. I also own and operate a local Real Estate Brokerage that specializes in investments, home renovations, energy efficiencies, and helping first time home buyers get into homes.

What is your role in the department?

My role is "Financial Business Officer". A part of what I do is help to obtain and manage the money that is used to fund things like student tuition, health care coverage, stipends, and the research projects that students and faculty work on.

What do you enjoy most about working with FW graduate students?

I appreciate how grateful our students are for my help and the passion everyone seems to have for what they do. I enjoy seeing how my work has a direct impact on the lives, education, and future of the students I am helping.



Jamie Lake

Tell us about yourself!

After 15 years in the banking industry, I started my career with MSU in 2012 working for RHS in the payroll dept. I later moved to Mechanical Engineering where I worked for almost six years prior to joining FW. I reside in Charlotte with my husband of 26 years and have two boys: Cameron's a FW alum and Gary who's a future MSU Spring graduate with a degree in his Kinesiology. I love animals of all kinds; I have two German shorthair pointers, a cat that chose us, and two rabbits. My current interests are camping, fishing, hunting, crafting, and spending time with my niece and nephew.

What is your role in the department?

Department Secretary; providing a variety of administrative support to faculty, staff, students, and visitors.

What do you enjoy most about working with FW graduate students?

My favorite thing about working with the Grad students is building new relationships and learning about the different research happenings each one brings to our department.



Jill Cruth

Tell us about yourself!

Married for 39 years, Mark and I are blessed with two great kids and five awesome grandkids. Home is thirty miles south of MSU on fifteen acres. I love country living and with the help of all the kids we recently added over 250 trees and developed a peaceful walking trail on our property. When not spending time with family, I enjoy road trips and rock-hunting around the Great Lakes. I also enjoy volunteering at my church where I serve as Moderator of our governing board. I'm also a Stephen Ministry Leader, training others in the care giving ministry. I have a bachelor's degree in Management and Organizational Development and a master's degree in Counseling.

What is your role in the department?

I've been in the Department for 20 years, most of the time as the Graduate Secretary. I process new graduate student admissions, track student's progress and assist as I can through the end of their program including degree conferral. I hire undergraduate student employees and process graduate assistantships and fellowships. I also assist the undergraduate Advisor as needed.

What do you enjoy most about working with FW graduate students?

I enjoy listening to their story, what brought them to the Department, their research, goals, and just getting to know them. I enjoy helping students understand their program and funding requirements and making sure they are on track to graduate.



Josh Towslee

Tell us about yourself!

I'm a lifelong Michigander who joined FW in the fall of 2021, previously working for the Michigan Public Service Commission. I live in Okemos with my family and love spending time in the woods and water of our awesome state.

What is your role in the Department?

Communications Manager (split appointment with MSU Institute of Water Research)

What do you enjoy most about working with FW graduate students?

I enjoy hearing about so many fascinating projects underway and having a chance to help tell stories highlighting how Spartans are making a difference and improving our relationships with our natural world.



**Dr. Mary
Tate Bremigan**

Tell us about yourself!

I 'grew up' in Chicago's south suburbs, and only experienced nature on family vacations. The natural world felt so rare to me, I wanted to do something about that. Fast forward, as an undergraduate biology major I enrolled in a summer field course. I fell in love with aquatic ecology, decided to pursue a MS degree, became inspired by research, continued on, and earned my PhD. I sought a position doing applied ecological lake research and teaching. Fortunately, my FW position was a great fit. (Beyond science, I particularly love hiking, kayaking, travelling, gardening, and hanging out with friends, my nephew, stepson, and pup.)

What is your role in the Department?

My role has evolved over time, and I'm grateful for that opportunity. Life happens; circumstances change. Nowadays, I focus on department administration and teaching. As Associate Chair for Academic Programs I work with the FW Curriculum, Graduate, and Advisory committees and the Department Leadership Team. Our major initiatives include: reviewing our undergraduate curriculum; updating graduate program processes to improve transparency, inclusion, and advisor-student relationships; and implementing our FW Strategic Plan. I work closely with Jill Cruth on technical aspects of administering the graduate program and facilitating student success.

What do you enjoy most about working with FW graduate students?

I love the mix of getting to know individual FW graduate students, while working on collaborative efforts to improve our academic programs, the graduate student experience, and our department culture. I like helping students and contributing to the future of our department. I really welcome the opportunity to get to know students. So, stop by and say hi!



Mary Witchell

Tell us about yourself!

I'm a lifelong resident of the Lansing area. I began working at MSU while still in high school, and also earned a Bachelor of Arts degree from MSU's College of Communication Arts and Sciences.

What is your role in the Department?

I'm currently an Office Assistant IV in the Department of Fisheries and Wildlife. My main responsibilities include managing and maintaining the department's bookkeeping and accounting systems. I work closely with Brian Livingston (the department's Financial Business Officer), as well as the Chairperson and Associate Chairs, faculty, and students in processing transactions, reconciling accounts, developing budgets, and maintaining compliance with MSU's fiscal guidelines.

Since joining the FW support staff team in 1999, I've also previously served as undergraduate and graduate secretary, and administrative assistant to the Chair.

What do you enjoy most about working with FW graduate students?

My favorite part of working with FW graduate students is being exposed to the wonderful breadth of diversity they represent – not just culturally, but also in terms of their academic background and work and life experience. We have students who come to our program from science disciplines and right out of their undergraduate programs; but we also have students who seek advanced degrees after working for years in related – and unrelated – fields. Seeing the dedication and enthusiasm they all have for making our world a better place to live, by sharing their love of our natural environment and showing respect for all living things, is a privilege and a pleasure!

SPOTLIGHT ON ADMIN



Rose Stewart

Tell us about yourself!

I grew up in Frederick, MD, nestled in the Blue Ridge Mountains yet close to the DC metro area. As a child, our family camped and adventured across the east coast from Maine to Florida. After completing my B.A. in biology at St. Mary's College of Maryland, I worked as a Research Assistant at World Wildlife Fund. From there, I entered a graduate program at the University of Maryland and completed my doctoral research at the Smithsonian Conservation Biology Institute. Before joining the Department of Fisheries and Wildlife at MSU, I served as Director of the Center for the Integrative Study of Animal Behavior's core research facility at Indiana University. I live in Okemos with my husband and our 2 kids, aged 9 and 13.

What is your role in the Department?

I am a Research Administrator and Associate Director of Boone & Crockett Programs at MSU. In this role, I provide general support to the MSU B&C program and work with the national network of B&C University Programs, where I am responsible for planning special events, preparing reports, and developing professional development opportunities. I also provide direct support to FW, including coordinating the Glassen Undergraduate Experience.

What do you enjoy most about working with FW graduate students?

Working with graduate students is one of my favorite things about my job! It is really rewarding to watch the progression of each student as they move through their program. I cheer for them and their successes, and I'm here for them when things get tough. I continue to be impressed by FW's graduate students and how intelligent, creative, and enthusiastic they are!



Sharon Reasoner

Tell us about yourself!

I started working with MSU in November of 2000. My first job was with Judicial Affairs in the Student Services Building, moving to RCPD, the Counseling Center and then to where I am today with Fisheries and Wildlife in April of 2008. One of the positive outcomes of COVID, was the opportunity to work remotely in Arizona. Part of my family lives in Tucson and I enjoy spending more time out west during the cold Michigan months. The golf season is year around in Tucson, though the grass is not as green as in Michigan. I have one daughter and two granddaughters who live in Tucson, along with a couple of brothers and their families. So, you see the draw!

What is your role in the Department?

My role in the department is to support the Chair's office, in addition to the faculty, students and staff. Primarily, I process all the academic and support staff HR documents, but there are a host of other duties/roles I play that keep me busy. This is my second year on the DEI committee, and I am learning a lot.

What do you enjoy most about working with FW graduate students?

Our FW graduate students are so enjoyable to work with, they have lots of energy and bring many new and fresh ideas to the department. Each fall there is a new group that arrives, and it is fun getting to know them as they navigate through their education and watching them succeed in their careers.

Thank you for everything you do!

2022 FW GSO Research Symposium



The 2022 FW GSO Research Symposium was a great success! This hybrid event featured 21 presenters and reached over 75 attendees from East Lansing to Nepal. The FW GSO Symposium provides students with the opportunity to present their research in a professional setting and gives partners and stakeholders the chance to connect with students for future collaborations and partnerships.



2022 FW GSO Research Symposium

Congratulations to our 2022 Award Winners!



Best Retrospective Oral Presentation
Amber Johnston & Sean M.G. Lennox



Best Prospective Oral Presentation
Steven Gurney

The FW GSO Symposium is organized and run by grad students in the FW Department. This years symposium was made possible by the hard work of:

Co-Chairs

Kyle Brumm & Olivia Rupert

Committee Members

Sydney Waloven
Alex Benitez
Marcella Domka
Emma Rice
Nick Manning
Carly Andrews

Nick Alioto
Emily Mensch
Carrie Meier
Trish Brockman
Emily Liljestrand

To learn more about the FW GSO Symposium, visit: www.msufwgo.wixsite.com/fwgo

2022 FW Graduate Student Photo Contest

Second Place



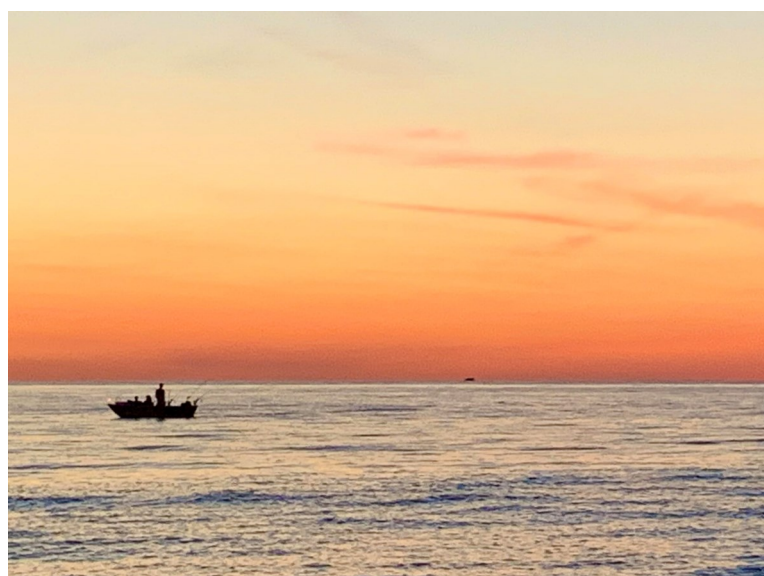
Fauna: Nicole Watson



Flora: Nick Manning



Fieldwork: Emily Liljestrand



Landscape: Carrie Hirsch

2022 FW Graduate Student Photo Contest First Place

Flora: Evan Griffis - Front Cover



Fauna: Evan Griffis



Fieldwork: Nicole Watson



Landscape: Trish Brockman