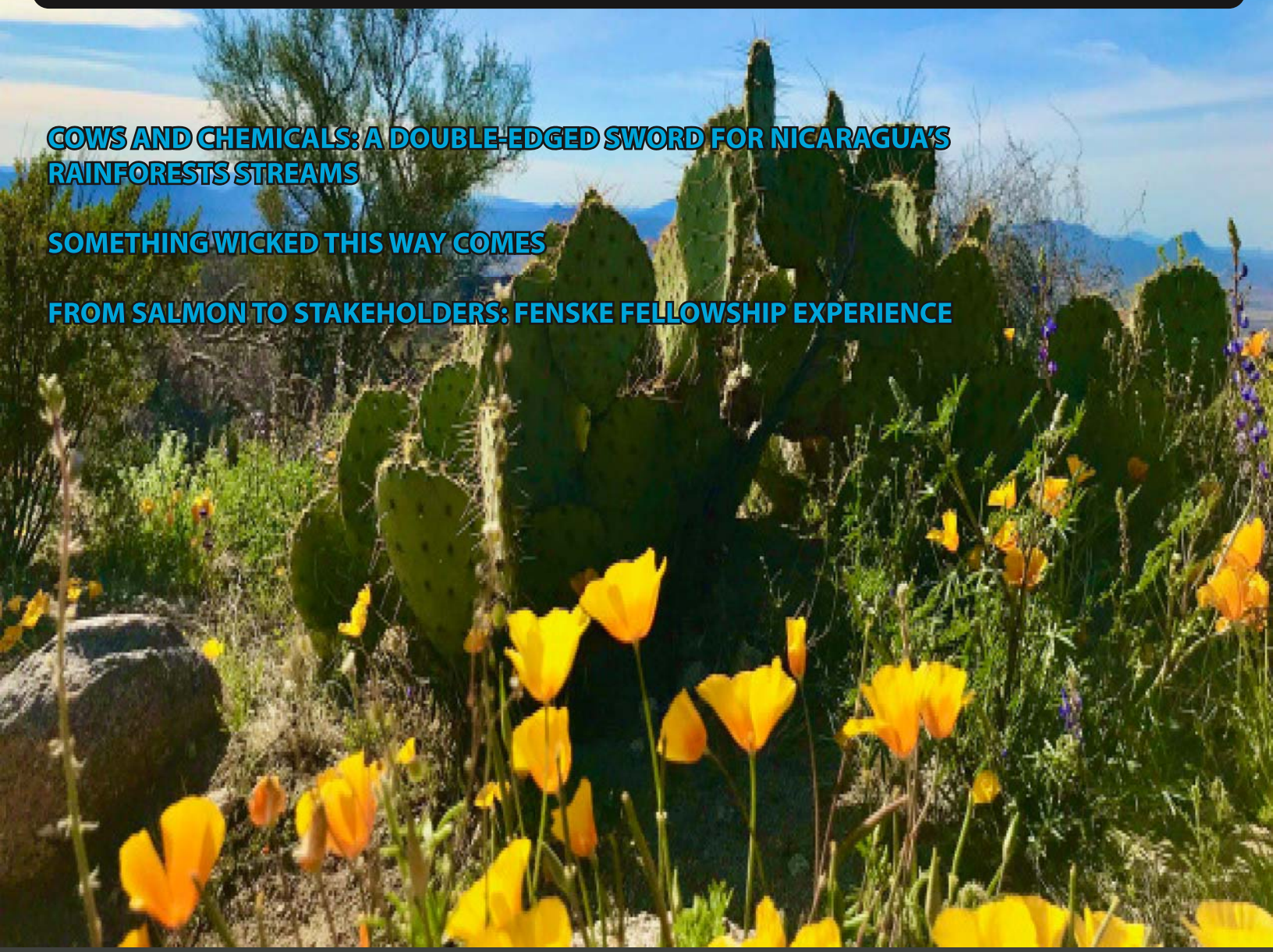
MSU Fisheries & Wildlife

SPOTLIGHT

Spring 2020

Produced by Graduate Students in the Department of Fisheries & Wildlife at Michigan State University



COWS AND CHEMICALS: A DOUBLE-EDGED SWORD FOR NICARAGUA'S RAINFORESTS STREAMS

SOMETHING WICKED THIS WAY COMES

FROM SALMON TO STAKEHOLDERS: FENSKE FELLOWSHIP EXPERIENCE

ALSO INSIDE: Alumni Corner, Jianguo (Jack) Liu Lab Profile, USFWS fellowship experience and more!

SPOTLIGHT

Spring 2020
Issue 16

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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Cover photo:
Parker Banas
Overlook in Saguaro
National Park

From the Chair

Letter from Dr. Scott Loveridge

Welcome to this year's issue of MSU Fisheries and Wildlife Spotlight! The following pages provide you with just a sample of the amazing and vital contributions our students, faculty and alumni are making to understand and conserve our natural heritage. The challenges in maintaining and restoring wild places continue to grow. Fortunately, the department continues to attract ever brighter, talented, and engaged students and faculty who are able to apply their tremendous energy to overcome the hurdles. In the following pages, you'll learn about:

1. A student's experience with the US Fish and Wildlife Service as an intern helping to save an endangered bird.

2. The experience a Fenske Fellowship has allowed two students to gain in working with the Michigan Department of Natural Resources on fisheries management decisions.

3. An alumni using his skills to protect indigenous people and animals in 13 Andean countries.

4. A student experience surviving the California wilderness while studying flying squirrels and woodrats.

5. A student studying how deforestation is facilitating use of pesticides for fishing in Nicaragua.

6. How a close encounter with a bear caused a student to reflect on her efforts to help Alaska adjust to the warming trend affecting all its ecosystems.

The wide array of projects show how we grow our students. The department also continues to grow. This year, we hired two new faculty. Christopher Vandergoot is an Associate Professor who is working with the Great Lakes Fisheries Commission to sustain and grow the Great Lakes Acoustic Telemetry Observation System (GLATOS), which draws researchers from around the Great Lakes basin as partners in tracking movement of economically and ecologically important fish species. Alexa Warwick is a specialist working with the Michigan Department of Natural Resources Wildlife Division and MSU Extension's Community, Food, and Environment Institute to develop better approaches to engaging the public in dialog on natural resources issues.

The department is providing leadership in combating Chronic Wasting Disease in deer. Michigan is one of a handful of unfortunate states that is afflicted with this currently incurable, terminal, and poorly understood disease. So were most willing to work with the Michigan Department of Natural Resources in implementing a state-sponsored wildlife disease initiative. The initiative enabled the working group to bring researchers from around the country together to prioritize issues and strategies for mitigating this devastating development.

This year is also one of self-reflection, as the department works to complete the strategic plan that will help inform the search for a new chair and its direction over the next years. We welcome your support and input as we move forward.

-Scott Loveridge

An Interview with

Chris Jordan

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

Chris: While at MSU I worked with Drs. Gerald Urquhart and Dan Kramer on an NSF funded project looking at the ecological impacts that globalization has had on remote communities along Nicaragua's Caribbean Coast. My work in particular looked at the impacts of development and colonization on terrestrial mammals and on the loss/retention of traditional environmental knowledge.

Spotlight: Where are you now and what do you do?

Chris: I currently work as Global Wildlife Conservation's Central America and Tropical Andes Coordinator. Global Wildlife Conservation's mission is to conserve the diversity of life, and we do this using a partnership based strategy. My role is to develop partnerships, projects and programs and be the organization's liaison for them across much of Latin America.

Photo credit: Chris Jordan
Fisheries & Wildlife, Ph.D. 2015

Spotlight: What motivated you to apply for your current position?

Chris: While still at MSU, I transitioned from research to conservation and began partnering with international conservation partners; one of those partners was close to Global Wildlife Conservation. I was jointly hired by GWC and Panthera to continue the work I began once I finished my PhD.

Spotlight: What's your favorite thing about your current position?

Chris: GWC's partnership based model keeps us from getting too top-heavy and makes us to be a nimble organization that is able to respond quickly to emerging conservation threats or seize opportunities to have big impact through our local partners. The work that we do is dynamic, varied, and focused on saving the planet by getting things done on the ground with local partners. Our partnership-based approach means that everything we do is focused on empowering and promoting local partners and local solutions, which results in a much less colonial model. My current position is very demanding both physically and mentally, but varied, motivating, meaningful, and never boring. In the past year I have been involved with many projects in 13 different countries ranging from directly supporting indigenous peoples to defend their ancestral lands in Nicaragua, Honduras, Panama, Brazil, and Ecuador to helping to develop a captive breeding program with a Natural History Museum for a critically endangered species of water frog in Cochabamba, Bolivia.

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

Chris: My PhD supervisors recognized that I was the type of student who didn't respond well to highly structured programs and they gave me a long leash and sufficient autonomy to develop my own projects within their larger efforts. This allowed me to try new things in a challenging environment, which gave me the opportunity to make mistakes and adapt to them. Ultimately my experiences during my time at MSU helped me to develop the resilience needed for my current position.

Spotlight: Do you have any advice to share with current fisheries and wildlife students?

Chris: Many of the solutions to the planet's current conservation crises are fairly straightforward; we know what needs to be done. However, the struggle of conservation is scaling those solutions at a pace that matches the urgency of the context we are facing on our planet; things have a tendency to take longer than we want. The need to be patient and to remain determined and resilient year after year after year can be exhausting. While we absolutely need to design methods to rapidly scale up conservation efforts, we also need to be in this for the long haul. Many factors go into being able to do this, but one factor is taking the time to identify a niche within the field that will keep you engaged and inspired even in the most challenging moments within a challenging field.

Something Wicked This Way Comes

By Tracy Melvin

"Oh! *There* is the bear!" The woman from Long Island cheerily pointed towards me.

I was a solid 40 feet behind everyone, fixing my hip waders - doing the one thing you weren't supposed to: leave the group. With much hubris I figured, "Whatever, it's the end of the tour, I have no expectations. Plus, I've lived here every summer for the past 4 years and all these people don't know Alaska like I do."

Then I turned around.

And there he was, about 30 feet away: a big, beautiful, coastal brown bear.

He had easily maneuvered around us in the tiny patch of forest between the beach and meadow, as if stalking a big dumb animal. He knew I was. He knew where my eyes were, and he looked right into them. He didn't take his eyes away from mine as he walked towards me, with what seemed very much to be purpose. For the briefest moment, I felt attached to an older world: one in which you live and die by a natural order - where the outcome of your life is stewarded much more by awareness and connection to other beings. The whole universe aligned. It was me and bear. We both knew: I was completely his.

Any other time in history, I would have been mauled, bluff-charged, or bear scat. But this was 2019, I had a guide armed with a pair of noisy rain pants who was next to me in seconds, and a group of chatty New Yorkers who soon assembled around us. The bear slowed. Only when the whole group was together did he break off to the right, albeit hesitantly, and meander into the sedges and towards the mountains. The whole ordeal probably lasted 5 seconds.

"I was not giving, but rather, taking."

The group chatted excitedly back to the floatplane parked on the beach. Having learned nothing, I again strayed. Not in shock, but rather, shame. I saw the reality of what my role in nature was in 2019 – an ignorant, rule-breaking tourist in a vestige of wilderness, privileged enough to afford a float plane tour, and, like everyone today, desperate for a picture to solidify the experience and prove that I was "really living". I was not giving, but rather, taking. The bear is probably still out there right

now, and I took its time, its energy. I influenced its movement into the meadow and away from the beach. I was part of the tourist groups that day getting in the way of bear clamming. I got my picture.

I noticed other roles played by modern humans in this place: masses of tourists walking everywhere and ATVs from a local inn trampling the sands of a beach covered in an invasive sweet clover. I stopped and took in a 360-degree view, imagining the passage of time from the seat of the soul of this place, down the line of bear ancestors to present-day bear and present-day spectacle. What incredible change.

"Both beasts are valid, both are inherently valuable, and both are navigating a world full of windows and window-gawkers."

I have envisioned Alaska like many do – as that great wild northern place – a last, "untrammeled" wilderness. However, now I take discomfort in this ideology, seeing two major flaws to it. The first is that it is trammeled. Even if tourism isn't affecting wild places here, climate change is. Alaska has already experienced unprecedented warming at more than twice the rate of the contiguous United States. Alaska has already experienced unprecedented warming. The second flaw lies within the danger of labeling something as "last". What happens when the last thing goes away? We cannot discount wildness and beauty right here, right now, everywhere, even the birds in your backyard and the lichen growing on city buildings.

A tufted titmouse, *Baeolophus bicolor*

As I was writing this, I was jolted up by a tufted titmouse slamming into my office window. I spent a good ten minutes watching it clutch the rhododendron in my front garden, mouth agape, tucked under leaves, breathing heavily, eyes distant. To my relief, it appeared to recover, seemingly agitated that it had temporarily lost its flock. *This* is wildness. The tense uncertainty over the possible last moments of this tiny creature was inherently the same connection I had when I was thinking I might get mauled by a bear. Both beasts are valid, both are inherently valuable, and both are navigating a world full of windows and window-gawkers.

All of this makes me pause as a researcher, and more so as a human. Manipulating Mary Oliver's famous poem; "What is it, we plan to do, with this one wild and precious place?" I study climate change ecology in Alaska, and the truth is my work has not directly helped any Alaskan beasts, plants, or fungi. Five years of planning meetings and collaborations on papers has not moved any soil or conserved any land. However, it has made me realize that perhaps the best collaboration is of wisdom-sharing through time. By this I mean, knowing the rate of change for a place, and what we could do in present time to steward the future trajectory. If our first experience is our only experience – how do we measure conservation success and failure? Fast changes are the ones to be soberly recognized, whether they be climate, a shifting-baseline of public perception, or what parts of nature should be valued.

Take this bear clamming beach forward in your mind 2 years, 10 years, 50 years. What does it look like? Will groups still be just as excited to see bears? Perhaps fewer, or smaller bears? How many folks will be on the beach? Will there be clams?

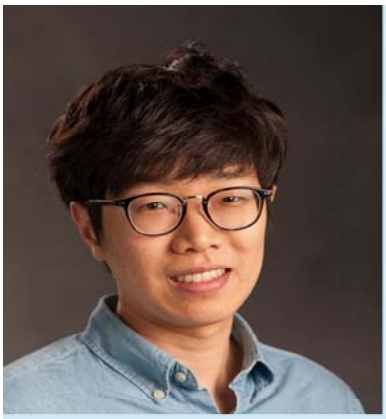
We can become impassioned towards action when we sit with a place and internalize it as ourselves. There is truth in the notion that all places are already in us, and already of us, already changed and changing, and already in need of stewardship. The most profound lesson I have learned during my Ph.D. is that sometimes it's best not to be with the group, but to stay far behind, to look, listen, and fully feel those places – even if there might be a bear about.

Tracy Melvin is a Ph.D. candidate with Dr. Roloff. She is broadly interested in climate change ecology, ecological transformation, and global biodiversity. She can be reached at swemtrac@msu.edu.

TheJianguo (Jack) Liu Lab

Center for Systems Integration and Sustainability (CSIS) joins forces with the best minds in sustainability sciences across the nation and the world to tackle some of the world's greatest challenges. Addressing complex issues related to sustainability requires innovative integration of multiple disciplines --both social and natural sciences. As the world embraces the United Nations' Sustainable Development Goals the realization dawns that achieving those goals in one place may offset or enhance efforts to achieve goals in other places.

This group is led by **Dr. Jianguo "Jack" Liu,** the Rachel Carson Chair in Sustainability and a University Distinguished Professor. Telecoupling was introduced by Liu in 2008 and the telecoupling framework has since been applied to more than 500 scientific papers. The telecoupling framework is an integrative way to study coupled human and natural systems that are linked over long distances. The framework keeps both the humans and nature in focus, and shows how changes can reverberate far beyond, and then even double back.

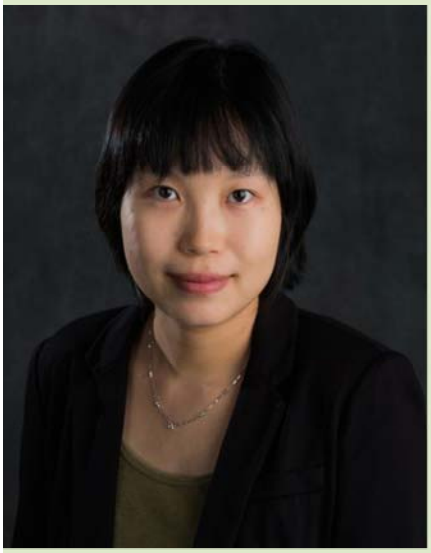


Min Gon Chung works on interdisciplinary studies between ecology, statistics, socioeconomics, and geography to integrate multiple disciplines and techniques. He is particularly intrigued by studying the interactions between ecosystem services, human well-being, and their linkages in coupled human and natural systems (CHANS) and telecoupling.

In addition, he is especially interested in in assessing ecosystem services with a modern spatial analysis method, and in bridging together socioeconomic data with ecological data by using statistical models. He would like to suggest scientific guidelines for conservation andsustainable use of biodiversity and ecosystem services.

Veronica Frans is from New Jersey. She specializes in ecology, geographic information systems, programing, ecological modeling, and community outreach and engagement. She has lived, studied and worked in many different places around the world, mainly focusing on marine environments and emphasizing the importance of local knowledge and working with stakeholders and decision-makers to accomplish mutual goals for conservation. She has conducted research on commercial fishing vessels in Alaska, assisted in dolphin population monitoring in Hong Kong, and worked with local communities in the Falkland Islands to study whales. As a result of her travels, she can also speak 6 languages (English, French, Spanish, Portuguese, Japanese and German).

Currently, Veronica is a second-year PhD student in Fisheries and Wildlife and Ecology, Evolutionary Biology and Behavior. She is also in MSU's Community Engaged Scholarship, Spatial Ecology and Modeling Environmental and Social Systems certification programs. She is an NSF GRFP Fellow and University Enrichment Fellow and works at the Center for Systems Integration and Sustainability (CSIS) with Dr. Jianguo (Jack) Liu. She studies human influence on species distributions.



Mimi Gong joined Jianguo Liu's lab in the Department of Fisheries and Wildlife and the Center for Systems Integration and Sustainability in 2018. Before that, she has worked for three years as a GIS analyst for Global Forest Watch in World Resources Institute and an ORISE (Oak Ridge Institute for Science and Education) fellow for US Army Corps of Engineers (USACE). These working experiences provided her opportunities to see real human-nature conflicts related to deforestation and resource exploitation around the world, and unexpectedly, aroused her interests in research to investigate more on human-nature systems. Her broad interests lie in the interdisciplinary studies on complex relationships among human behaviors, biodiversity and land use change.

Gong holds a bachelor's degree from Sun-yat Sen University, China, in Environmental Ecology, minor in Economics; and dual master's degrees in Forestry and Environmental Management with a focus on Environmental Economics and Policy from Duke University.

Anna Herzberger has her dissertation research combines telecoupling, network analysis, and agent based modeling with microbial ecology to study the impact of international soybean trade, specifically how soybeans imported from Brazil and the USA are influencing domestic soybean production in China.

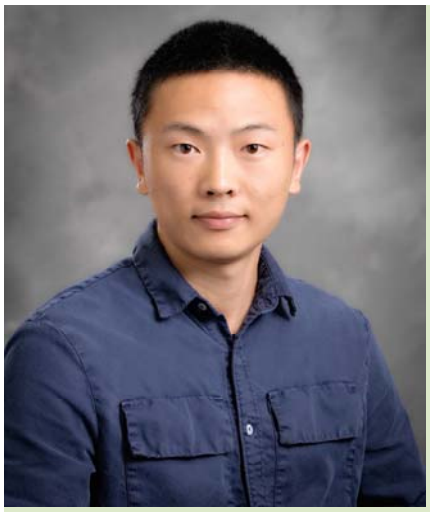
Imported soybeans are cheaper than domestically produced soybeans, which disincentives Chinese farmers from planting soybeans (a legume). Areas that were originally planted with soybeans are being converted to rice and corn (grasses), as they are more profitable crops. In order to quantify the impact of these changes on the soil-microbial community, our research team traveled around Heilongjiang, the far northeastern province, surveying farmers and sampling their soil.

Ciara Hovis grew up surrounded by science and the natural world since the day I was born. Both of my parents (a biology teacher and a wildlife biologist) raised me to always be curious and to appreciate nature. By the time I reached middle school, I could identify most animal and plant species. This propensity for studying nature continued to my college years. I graduated from Penn State University in the spring of 2016. While I was there, I worked on an independent field experiment studying the multiple aspects that effect species establishment using an invasive plant as a study species. During the three years I worked on this project, I learned how complex interactions, despite their initial obscurity, can have profound and tangible effects; and the understanding these types of systems is, in fact, worthwhile. In graduate school, I wanted to scale up my investigations of the natural world. I study the global soy trade using the telecoupling framework between the United States, Brazil, and China.

My research in particular focuses on the environmental effects in the importing country, China. The first goal of my research is to quantify the environmental benefits that China may or may not be receiving via this trade network. The second goal is to investigate the effect global trade is having on the biodiversity by recording bird diversity there to uncover hidden consequences the soy trade could be having on the ecosystem in regions of NE China.

Kelly Kapsar is aim is to better understand the relationship between humans and their environment, with a particular focus on the conservation of wildlife as her research goal. In 2014, she graduated with a B.A. in biology from Carleton College and after two years working as a science educator, she is eager to continue her education at Michigan State University.

Through interdisciplinary graduate research under Dr. Jianguo Liu at the Center for Systems Integration and Sustainability, she hopes to better understand the dynamic relationships between culture, ecosystems, science, and conservation policy in the Arctic.



Yingjie Li is a PhD student in the Center for Systems Integration and Sustainability(CSIS) at MSU. He is pursuing his research interest in ecosystem services and telecoupled human and natural systems. Before he joined MSU, he received a master degree in geography, and worked on environmental/ landscape changes, trade-offs, and synergies among ecosystem services programs that supported by the Natural Science Foundation of China (NSFC) and the National Social Science Foundation of China. He has broad interests in ecosystem services assessment, environmental policies, land use/cover change modelling, virtual resources flows and the impacts on global sustainability.

Yingjie received a B.S. in land resource management and an M.S. in geography from China.

Yuqian Zhang is a doctoral student at the Center for Systems Integration and Sustainability under the Department of Fisheries and Wildlife, and the Environmental Science and Policy Program. He is also a scholar with the Sustainable Michigan Endowed Project. Prior to studying in the United States, Yuqian worked in a Chinese nature reserve for an NGO and local government, where his work has focused on giant panda research, protected area community development, and public participation in nature conservation.

He received a Master of Science in Environmental Science and a Master of Public Affairs in Environmental Policy Analysis at Indiana University Bloomington, where he furthered his interdisciplinary research interest in ecosystem conservation and community sustainable development. His current research focuses on the interaction between human and nature systems, and multiple systems integration, by using GIS, remote sensing and statistical modeling.

Photo credit: Nick Yeager

FROM SALMON TO STAKEHOLDERS: My Fenske Fellowship Experience

By Katie Kierczynski

Over the past year I have had the opportunity to participate in an amazing mentorship experience as a Janice Lee Fenske Excellence in Fisheries Management Fellow. The goal of this fellowship is to honor Jan Fenske, the first female fisheries biologist in the Michigan Department of Natural Resources (MDNR) Fisheries Division. The Fenske Fellowship provides graduate students from underserved communities with funding and mentoring opportunities to assist them in developing successful careers in fisheries management. Each fellow, with guidance and assistance from their fellowship mentors, also works on a project that is of high priority to their mentoring agency. As a part of my mentoring experience, I worked closely with MDNR Fisheries biologist, Dr. Dave Fielder, and my MSU advisor, Dr. Brian Roth, to document past methodologies of predator stocking equivalents used by the MDNR to assist with stocking decisions in the Great Lakes.

"The stocking experiment was a huge success, and the salmon fishery grew to be highly valued by anglers"

Lake Michigan is a complex system managed for a variety of stakeholders including recreational, commercial, and tribal fishers. Recreational fisheries have high economic value to the state of Michigan, and historically the complexities of this ecosystem have made it difficult to manage. Two top priority management goals by MDNR are to reduce the impact of invasive species and to provide angling opportunities for stakeholders. One high-impact invasive species is the Alewife, first documented in the 1930s. By the 1950s, Alewife reached a nuisance-level population Partly due to lack of predators in Lakes Michigan and Huron. In 1966 and 1967, Coho Salmon and Chinook Salmon, respectively, were introduced to provide a sportfish for recreational anglers and to consume Alewife, simultaneously accomplishing both MDNR management goals. The