# FIELD NOTES

IOWA STATE UNIVERSITY NATURAL RESOURCE ECOLOGY AND MANAGEMENT

GRADUATE STUDENT MAGAZINE

VOLUME 12 2022

# IN THIS ISSUE

OF FIELD NOTES



NREM GRADUATE STUDENT PROGRAM

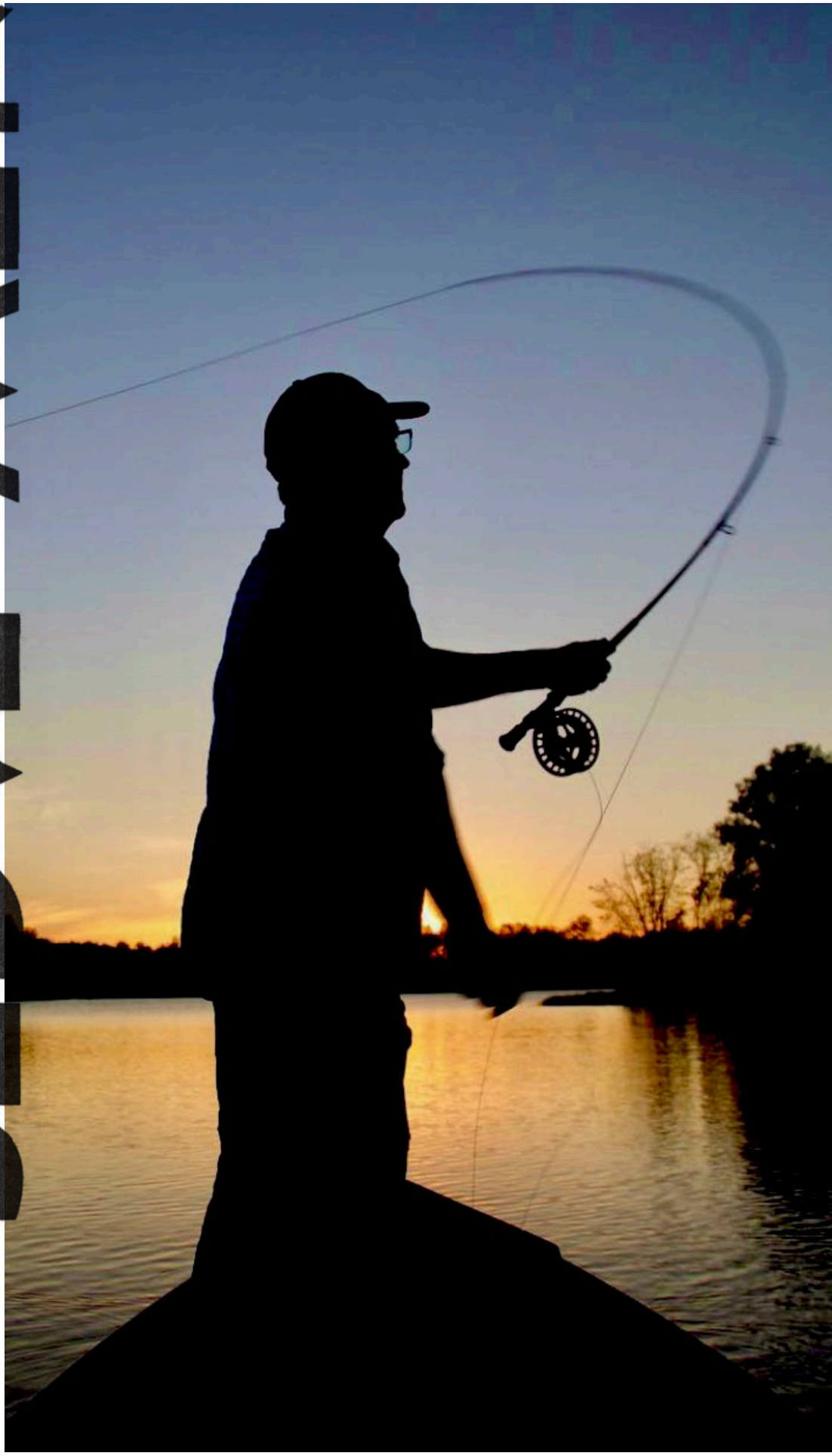
Natural Resource Ecology and Management

*Cover photo by Sarah Hoepfner*

*Photo by Erik Griffin*

# NEW FACES TO NREM

FACULTY



# ANNA TUCKER


Anna Tucker is the new Assistant Unit Leader, Wildlife in the U.S. Geological Survey Iowa Cooperative Fish and Wildlife Research Unit. As a Coop Unit scientist, she conducts applied wildlife research in collaboration with state, federal, and regional partners; mentors graduate students; teaches graduate-level courses; and provides technical assistance. She is broadly interested in understanding wildlife population dynamics to support conservation and management. Her research combines population ecology, quantitative methods, and applied science to assist managers with decision making in the face of uncertainty. She uses a variety of quantitative methods for both understanding past and current drivers of population change and predicting future status, including hierarchical Bayesian models and population viability analysis. Most of her research has focused on migratory birds, but she is excited to expand to working in other taxa. Anna is also trained in decision analysis and uses the tenets of structured decision making to guide her work with managers and decision makers.

Anna was born in New Jersey and earned a B.S. in Biology from Loyola University Maryland in 2010. After graduation, she worked a variety of field technician (and unrelated) jobs before enrolling in a M.S. program at Virginia Commonwealth University. Her M.S. thesis investigated population genetics and rates of conspecific brood parasitism in prothonotary warblers nesting outside of Richmond, VA. She then moved to Auburn, AL for her PhD at Auburn University, where she analyzed a long-term monitoring dataset from Delaware Bay to understand stopover ecology and population dynamics of migratory shorebirds. She has also worked with the U.S. Fish and Wildlife Service on developing population viability analyses for Species Status Assessments of threatened and endangered species. Before moving to Ames in April 2021, she was living in Austin, TX and working remotely as a postdoc with the USGS Patuxent Wildlife Research Center. After 6 years of living in the south, she is excited (and a little apprehensive) to experience real winter this year.

Anna is excited to join the NREM department and develop graduate courses on decision analysis and decision-support modeling as well as hierarchical Bayesian estimation methods. She is looking forward to working with cooperators at ISU, IA DNR, and other partners to conduct applied wildlife research in Iowa.

*Photo by Morgan Kaardal*

# NEW FACES TO NREM

RESEARCH SCIENTISTS

# EMMA BRAVARD

Emma Bravard joined the Natural Resource Ecology and Management Department in August of 2021 as a Research Scientist. Broadly, Emma's research is focused on understanding the relationship among conservation practices, environmental outcomes, and the financial analysis of multifunctional landscapes.

Emma received her Master's in Sustainable Agriculture with the GIS Graduate Certificate in August 2021 from Iowa State University. Working closely with Dr. John Tyndall and Dr. Emily Zimmerman, Bravard's thesis research examined opportunities to improve the efficiency of best management practices (BMP) placement using geospatial modeling, specifically the Agricultural Conservation Planning Framework (ACPF).

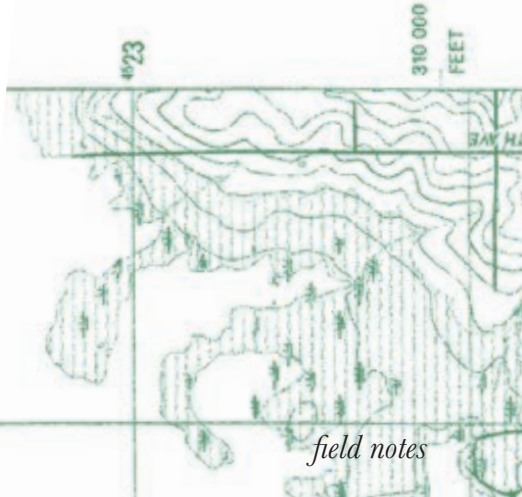
A major outcome from this research was the creation of the ACPF Financial and Nutrient Reduction Tool (ACPF FiNRT; "fine art"). This tool incorporated financial cost data and nitrate reduction data into the ACPF for use when analyzing different BMP scenarios. The toolbox can be used to calculate total long-term cost and cost effectiveness of various conservation plans.

The combination of these data will support watershed management and assist water quality stakeholders in determining where BMPs should be placed on the landscape to yield the most effective and lowest cost nitrate reduction at a watershed scale. Prior to completing her Master's, Bravard received her B.S. in Environmental Science with minors in Sustainability and Industrial Technology from Iowa State University in 2018. As an undergraduate, Emma was fortunate enough to study abroad in St. John, U.S. Virgin Islands with the EARTH program (Education and Resiliency Through Horticulture) in the fall of 2017. During the program, she was able to expand her knowledge of food systems, agricultural practices, and assist with hurricane recovery after Hurricanes Irma and Maria. She fell in love with St. John's culture, food, and people and goes back to visit the island as often as she can.

*"She fell in love with St. John's culture, food, and people"*

In her new role, Emma is excited to continue some of the work she began in her Master's research and improve the efficacy of conservation planning. Emma looks forward to working closely with Dr. Emily Zimmerman and several of her graduate students. She is eager to improve the ACPF FiNRT and integrate other topics into her research, including policy and decision making.

Emma grew up near Granger, IA where she enjoyed exploring Jester Park and fell in love with the outdoors. She is an avid runner and has completed two half marathons and countless other road races. She also enjoys biking, practicing yoga, kayaking, and hiking. Emma is very passionate about traveling, exploring new places & foods, and all things Disney. Additionally, spending time with family and friends, cooking, and reading are some of her favorite pastimes. Both of her parents attended Iowa State, as well as her older sister and younger brother; Ames has always felt like home to her.



# DAVID NAVARRO

David Navarro joined the NREM department in the Spring of 2021 as a Research Scientist working in the lab of Dr. Julie Blanchong. Originally from Washington State, he graduated with a Bachelor's degree in Wildlife Ecology and Conservation Sciences from Washington State University (WSU) in 2017. He then moved to Southern Texas where he completed a master's degree in Range and Wildlife Management from Texas A&M University-Kingsville in 2020.

David's interest in wildlife research began as a volunteer in animal husbandry for research animals in the Small Mammal Research Center at WSU. Under guidance of Dr. Erin Gomez, he worked as a technician surveying amphibian diversity in the Pacific Northwest. In 2016, as a Ronald E. McNair research assistant at WSU, David worked with Dr. Lisa Shipley conducting an assessment of field techniques using accelerometers to measure captive white-tailed deer behavior. Also in 2016, he worked with Dr. Kimberly Rosvall at the Center for Integrative Study of Animal Behavior at Indiana University studying the relationship between sex hormones and parental investment in male Tree Swallows.

Having gained an interest how underlying genetic expressions influence animal behavior and development, his interests shifted to genomic studies, ultimately resulting in his pursuit of a master's degree. He began his master's project with the Cesar Kleberg Wildlife Research Institute (CKWRI) in South Texas in 2017 under the mentorship of Dr. Randy DeYoung. His work was focused on the effects of selective harvest on adaptive genetic variation in white-tailed deer. Specifically, his work examined the relationship between genetic variation of the Major Histocompatibility Complex (MHC) and phenotypic antler development. Upon graduation, he became a Research Associate with the Caesar Kleberg Wildlife Research Institute CKWRI, assisting with ongoing surveillance research on the cattle fever tick and nilgai.

Currently, David is working on the development of two genomic panels to advance white-tailed deer and chronic wasting disease research and management. These panels are being designed to be an easy to use, cost-effective genomic resource that allows for collaboration efforts across multiple laboratories and state agencies. Consisting of many tens of thousands of genetic markers (SNPs – sites of variation among individuals), David will test the capabilities of these panels using data generated from samples collected from 12 states across the eastern range of the white-tailed deer in the US. He is very excited to work on a project that has the potential to remove some of the barriers that obtaining and using genomic data can pose for wildlife managers.

# DAVID YFF

David Yff is a new research scientist in Dr. Weber's lab, focusing on larval Bigheaded carp research on the Upper Mississippi River. He is originally from Illinois and received his B.S. in Fisheries and Water Resources from the University of Wisconsin – Stevens Point. This led him to pursue a master's degree in Biological Sciences, which he is currently wrapping up at Eastern Illinois University, where he researched larval bigheaded carp on tributaries of the Illinois and Wabash Rivers. His research passion resides in large river fisheries, in part due to the importance of studying large rivers that have undergone significant anthropogenic changes, along with their dynamic fish communities.

Invasive species interest him due to their potential to disrupt native food webs and species compositions. This larval fish research provides a unique opportunity to study Bigheaded carp reproduction along their invasion front, which gives important information on their spread along with providing information on the fish community as a whole. Much like others in natural resource fields, his passion for the work comes from his love of the outdoors.

In his free time, David is an avid musky fisherman and waterfowl hunter and he is looking forward to exploring the angling and hunting opportunities that Iowa has to offer.

*Photo by Jade Allen*

# NEW FACES TO NREM

GRAD STUDENTS

# BRANDT BOEKHOUT


Brandt is a new master's student in Dr. Weber's lab majoring in Fisheries Biology. He grew up in Rock Rapids, Iowa, and always enjoyed the outdoors and attending events such as the Iowa Whitetail Classic and Pheasant Forever Banquets. He also really enjoyed waterfowl hunting and that is part of what led him to South Dakota State University, where he originally wanted to become a waterfowl biologist.

After his freshman year at SDSU, he decided to switch his path from waterfowl to fisheries and was able to spend three summers gaining experience as a fisheries intern for South Dakota Game Fish & Parks in Rapid City. He spent his first summer as a creel clerk, the following an AIS intern, and lastly a fisheries management intern. These internships allowed him to see many aspects of the fisheries world. Brandt started at Iowa State in August and will be studying Asian carp and their movement and survival within the Iowa, Cedar, and Des Moines Rivers. He will be using acoustic telemetry to help identify movement patterns and survival rates within those three Mississippi River Tributaries. Upon completion of his master's project, Brandt would like to start a career as a fisheries biologist.

# NICOLE BOSCO

Nicole is a first year master's student working with Dr. Dinsmore, majoring in Wildlife Ecology. Her research involves monitoring waterbird use and vegetation responses to controlled water level management on Red Rock Reservoir here in central Iowa. Nicole was born and raised in New York, where she grew up on the south shore of Long Island.

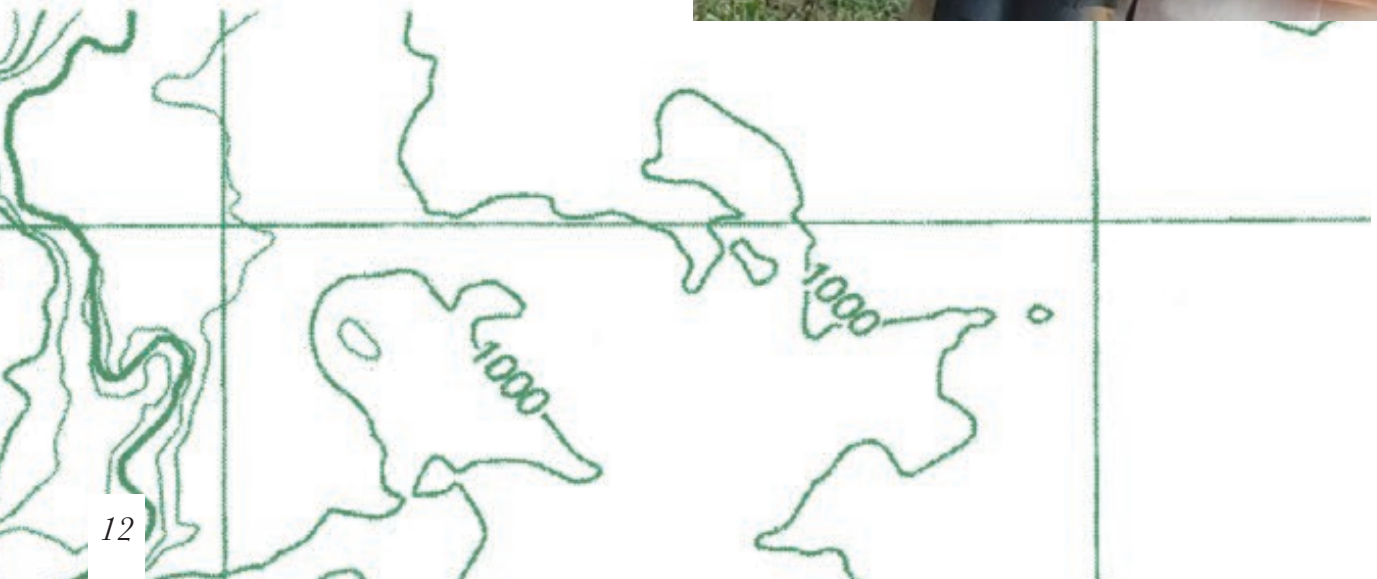
*"She became a first-generation higher education graduate"*

She became a first-generation higher education graduate after receiving her B.T. in Wildlife Management from SUNY Cobleskill in 2018. Since graduating, she has worked seasonal technician positions for research projects with Virginia Tech on nesting piping plovers in the Northeast and LSU on cavity-nesting waterfowl down in Louisiana. During her free time she enjoys traveling, hunting, hiking and wildlife photography. Nicole is excited for this new journey away from the coastal scene and seeing what the midwest has to offer.


# LINDSEY GAPINSKI

Lindsey is a new master's student pursuing a degree in Wildlife Ecology. Originally from southern Wisconsin, she graduated from the University of Minnesota- Twin Cities in 2017 with a B.S. in Fisheries, Wildlife, and Conservation Biology. Since then, most of her background has been in avian research in Minnesota and Wisconsin. During her time as a field technician, Lindsey had the opportunity to work in a variety of unique habitats surveying birds: northern peat bogs, old-growth pine forest, northern lowland brush, and tallgrass prairie.

While working in the Prairie Pothole Region, Lindsey developed an appreciation for the unique plant and animal species found in prairies; this interest led her to a project at Iowa State University. Working with Dr. Anna Tucker, her current research lies in studying how non-game breeding birds use restored wetlands in Iowa's Prairie Pothole Region. Lindsey is excited to be contributing to science at ISU and is looking forward to seeing all that Iowa has to offer.



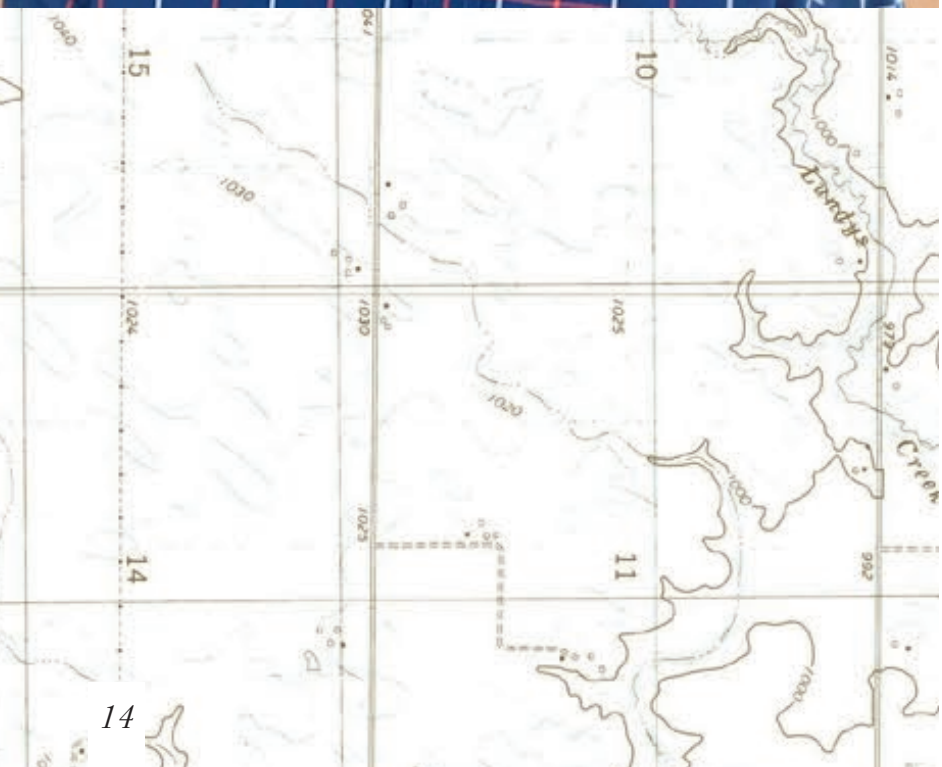
# ERIK GRIFFEN

Erik is a new Master's student majoring in Fisheries Biology with Dr. Weber. Erik is from Ashland, Missouri and grew up in a childhood full of outdoor opportunities. His passion for fish led him to pursue a Bachelor's degree in Natural Resources from the University of Missouri and graduated in 2021. As an undergrad, he worked as a summer technician with a PhD candidate conducting electrofishing and habitat surveys to assess fish community composition in central Missouri. He also worked as a technician for the Missouri Department of Conservation conducting pallid sturgeon research to monitor their populations and habitat use in the Missouri River.

At Iowa State, Erik's research involves assessing the effects of experimental releases on fish reproduction below Red Rock Dam on the Des Moines River. His field season began in summer 2021 with extensive larval fish sampling, larval fish ID, and juvenile fish sampling to collect individuals that hatched earlier in the spring. The end goal is this research will formulate water flow management to benefit the fish communities below dams in rivers like the Des Moines and across the country.

In his free time, he enjoys flyfishing for muskies, smallmouth bass, and brown trout. He also enjoys fly tying and deer hunting. Erik hopes to become a fisheries biologist in the future with the new skills learned through his research.

# GABE JOHNSON




Gabe is a first-year PhD student studying Sustainable Agriculture and Agricultural Engineering. He is working with Dr. Tom Isenhart studying the design and performance of saturated buffers for removing nitrate from agricultural subsurface drainage water. This research will contribute to a multistate database across the Midwest tracking the effectiveness of edge-of-field practices with the goal of increasing adoption of saturated buffers and denitrifying bioreactors to improve water quality.

Gabe is an Iowa native hailing from Bettendorf and completed his B.S. in Agricultural Engineering (Land and Water Resources focus) at Iowa State in 2019. He completed his master's degree in Agricultural Engineering at the University of Illinois Urbana-Champaign in August 2021 where he researched the physical properties of woodchips for denitrifying bioreactors. While his research has focused primarily on agricultural water quality, Gabe is also interested in soil health, urban stormwater management, and sustainable agriculture. He developed a passion for agriculture and environmental protection as a kid gardening vegetables, visiting his grandparent's farm, and spending time outside in nature. His ultimate career goals are to combine these passions to improve the environmental sustainability of agriculture so future generations can continue to feed themselves and have clean water and air, healthy natural areas, and resilient agroecosystems.

In his free time Gabe enjoys Cyclone sports, outdoor recreation, and spending time with his girlfriend and dog. He is excited to be back in Ames and a part of the Cyclone community again.

# MORGAN KAARDAL

Morgan is a first year master's student in the NREM department working with Dr. John Tyndall and majoring in Sustainable Agriculture. Her research focuses on positive externalities of prairie strips for farmers and potential funding to offset costs.

Morgan was raised in Minnesota and received her undergraduate degree in Economics and International Studies at the University of St. Thomas in Saint Paul. Through various internships at Senator Klobuchar's office and the Minnesota Department of Agriculture, Morgan discovered her passion for rural and agriculture sustainability. After her undergraduate, Morgan went on to work in economic development and through that work focused on innovative agriculture companies, but noticed there often was a road block when it came to implementation. This inspired her to pursue a master's in Sustainable Agriculture and work to make sustainable practices more feasible and attractive to farmers.

In her free time, Morgan loves reading and hiking. She takes every opportunity to return to her favorite place, the North Shore, and upon completion of her graduate degree plans to hike the Superior Hiking Trail.

# MADELNE LEWIS

Madeline Lewis is a PhD student in the Weber Lab. Madeline graduated from Montana State University in June 2021 with a Master of Science in Fish and Wildlife Management. Her Master's research focused on evaluating outmigration dynamics of juvenile Bull Trout to better inform management of a downstream trap and haul program.

Madeline received a Bachelor of Science in Wildlife Biology (Aquatic Focus) from the University of Montana in May 2018, where she completed an undergraduate research project evaluating life history variation in non-native Brook Trout. While pursuing her undergraduate degree, she spent a field season on a Forest Service crew, monitoring Bull Trout populations in Idaho, and two seasons on an anadromous fish snorkel crew with Idaho Fish and Game. Madeline's research at Iowa State will focus on evaluating population dynamics of Walleye and Muskellunge in reservoirs.

# ÁMBAR MELENDEZ-PEREZ

Ámbar is a first-year Forestry Ph.D. student in Dr. Jan Thompson's UNREAL lab. She is interested in working on urban green spaces and the correlation of these spaces with wellbeing and environmental justice. She hopes that this research will help establish priority urban areas for restoration in the Midwest and contribute significantly to the understanding of urban green space quality.


*"Her affinity to nature and healing led her to slowly fall in love with ecosystems and their impact on the communities around them."*

Growing up in San Juan and Mayagüez, Puerto Rico, Ámbar was surrounded by tropical vegetation and a nature-centric household. Her affinity to nature and healing led her to slowly fall in love with ecosystems and their impact on the communities around them. In 2015 she started her B.S. in Microbiology at the University of Puerto Rico, Mayagüez campus, adding two minors (Gender Studies and Project Management) along the way. She had undergraduate research opportunities in restoration ecology, soil microbiota restoration, and environmental mycology during this time. These experiences led her to look at paths to connect her two passions, Public Health and Natural Resource Restoration.

In 2020 she began her Master's in Public Health at the University of Puerto Rico, Medical Sciences Campus, where she was able to work as a research assistant in epidemiological COVID-19 research. Ámbar considers herself a bit of a wild card with her academic background but hopes she can bring new perspectives to the NREM department.

Ámbar is passionate about cooking good food, especially for other people, and talking about pretty much anything from hot takes on colonialism to what makes a perfect brownie (which might be the more sizzling take). During her undergrad, she also began making stained glass projects and is setting up a small workshop area in her apartment to keep up this hobby. She feels excited to work in this new cultural and environmental area and is definitely trying to convince people to go with her to Puerto Rico on vacation.

# THOMAS MILES

Tom Miles is a first-year Master's student in Dr. Weber's lab. He is originally from a small suburb of Philadelphia, PA called Chadds Ford. It was there that he found a passion for all things outdoors and, as he got older, he learned that there were real careers that focused on wildlife and fisheries. Without a specific area of focus in mind, Tom decided to pursue a college degree in Wildlife, Fisheries, and Aquaculture Science at Mississippi State University.

In an effort to find an area of focus, Tom got involved in research almost immediately at Mississippi State, working with a host of graduate students and professors on projects ranging from camera trap analysis of wildlife movement to parasitology to paddlefish tagging. After dipping his toes in each pool, Tom decided to dive headfirst into the world of fisheries.

During his sophomore summer at Mississippi State, he worked with the United States Department of Agriculture National Wildlife Research Center on a disease/parasite transmission study on channel catfish. The next summer, he worked with Dr. Peter Allen at the Mississippi State South Farm Aquaculture Facility, again primarily with channel catfish but also with alligator gar, koi, largemouth bass, bluegill, and other species housed at the facility. Beginning his junior year, Tom built a relationship with Dr. Wes Neal and the two began an undergraduate research project under the university's Undergraduate Research Scholars Program which provides grants to undergraduate students for research.

Their project, which studied Mississippi's white bass population in multiple water bodies, was recently accepted for publication in this years Journal of SEAFWA (Southeastern Association of Fish and Wildlife Agencies). Tom hopes to complete his M.S. and continue his education with a PhD with the eventual goal of becoming a professor, which will allow him to continually foster his love of fisheries research while mentoring graduate and undergraduate students.

# CLAIRE RUDE

Claire is a first-year master's student studying fisheries biology in Dr. Michael Weber's lab. Claire grew up in the Twin Cities metro area of Minnesota, where she cultivated an early interest in lakes and aquatic organisms by spending lots of time in and around Minnesota's many lakes. She studied Fisheries, Wildlife and Conservation Biology and Environmental Science at the University of Minnesota-Twin Cities and graduated with a bachelor's degree in 2020.

During her undergraduate studies, Claire assisted with research examining the impact of zebra mussels on walleye food webs and also worked in the fish collection at the university's natural history museum. She also had internships with the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency, and during these internships she helped to survey fish and aquatic invertebrates in lakes and rivers in order to evaluate the biological health of these bodies of water.

At Iowa State, Claire's research is focused on using acoustic telemetry to study walleye population dynamics and movement, and she will be tagging and monitoring the movements of more than 200 walleye in Big Sandy Lake in northern Minnesota. In her free time, Claire enjoys running, hiking, downhill skiing, reading, and spending time outdoors. She is excited to explore the parks and trails of Iowa while she researches walleye and pursues her degree at Iowa State!

# ANDREW RUPIPER

Andrew is a first-year environmental science master's student working with Dr. Billy Beck to quantify contributions by beavers regarding water quality, hydrology, floodplain connectivity, and nutrient storage. Andrew's love for the outdoors began at a very young age. He grew up just south of Ames in Ankeny, Iowa and was fortunate enough to have several family and friends fostering his outdoor skills. Some of the highlights of his childhood include surveying the Great Smokey Mountains for salamanders, building mountaineering and backpacking skills on the glaciers of Denali in Alaska, and curating a personal insect collection that, at last count, contains 9,589 specimens!

After a short stint at Grand View University and the University of Iowa, he joined the United States Air Force as an Explosive Ordnance Disposal Technician. His military career spanned 100+ countries, multiple combat deployments, and eventually finished with the Iowa Air National Guard as a Chaplain Assistant. This experience was always underpinned with investigations of the natural world. During down time on deployments, Andrew conducted surveys of flora and fauna in these oft neglected areas of human conflict.

During the transition to the Air National Guard, he found a home at Drake University where he received a BS in Environmental Science and Policy, primarily working with Dr. Keith Summerville and Dr. Nanci Ross. His work at Drake involved the creation of GIS products to model habitat suitability for a suite of threatened species in prairie systems, as well as an investigation into potential partial domestication of American persimmon (Diospyros virginiana) by Native Americans. After graduating and leaving the military, Andrew found himself working as a Senior Research Associate at DuPont Pioneer (now Corteva Agrisciences) studying promoter characterization and small transposable elements, under a CRISPR Cas/9 system. While in transition to graduate school Andrew also held positions with the Iowa Board of Medicine, as well as a Special Education Associate at Ankeny Centennial.

# EVIE VON BOECKMAN

Evangelin Von Boeckman (Evie) is a new graduate student in NREM at ISU studying under Dr. Adam Janke. Evie is a Mississippi native, but grew up right outside of Memphis, TN. She attended Mississippi State University and received her B.S. in Wildlife, Fisheries, and Aquaculture Science. It was here that Evie found her passion for the wildlife field and worked on a wide range of projects (waterfowl, forestry, pollinator, and fisheries studies), but she eventually developed a love and deeper appreciation for avian research and conservation. This led her to accept a technician position after graduating to study listed and endangered shorebirds in Delaware.

Evie's thesis project at ISU explores the nexus between water-quality and waterbird habitat conservation in the Iowa Prairie Pothole Region. She is thrilled to work in yet another critical area for avian conservation and hopes her enthusiasm, passion, and skills will contribute greatly to future management and conservation practices in the Prairie Pothole Region. She also hopes to contribute to the wildlife and wetland legacy established at ISU.

In her free time, Evie loves to hike, kayak, bird, or do anything fun, new, and outdoorsy. She is eager to explore all that Iowa and the Midwest has to offer and is looking forward to the next few years here.

*Photo by Kelsey Smith*

# GSO ACTIVITIES

GRADUATE STUDENT ORGANIZATION

# WELCOME PICNIC

## *9/18/21*

*GSO students new and old gathered at Brookside Park to enjoy a catered lunch, play volleyball, and watch the several NREM pups play together!*

# SOPHIE'S SIMPS SOFTBALL TEAM

*10/11/2021*

*NREM grad students under the team name "Sophie's Simps" finish out a successful softball season in Ames.*

# CRAFT N' CHAT

*9/13/21*

*Weekly Craft'n'Chat nights bring together NREM lovers of any art project from knitting to coloring books. During warm months, students gathered to craft at Moore Memorial Park.*

# SOFTBALL GAME

## *4/24/21*

*The third annual NREM Faculty – Staff – Graduate Student Softball Game and Picnic was held at South River Valley Park.*

# GSO BIKE RIDE

*10/17/21*

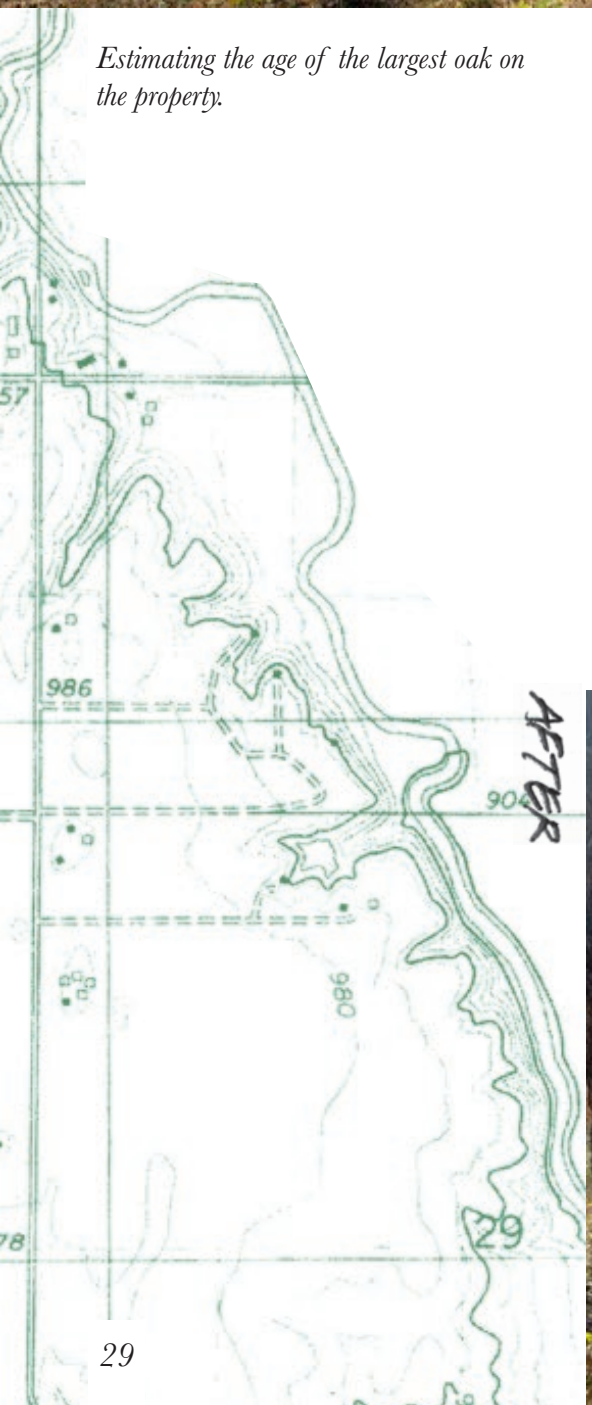
*NREM grads enjoy the beauty of fall from the High Trestle Trail.*

# VOLUNTEER DAY


*11/6/21*

*The GSO volunteered with the Iowa Natural Heritage Foundation to help restore the prairie at the Gardner property. Students removed invasive species, and at the end of the workday, enjoyed the enhanced view from the hilltop.*

*Estimating the age of the largest oak on the property.*

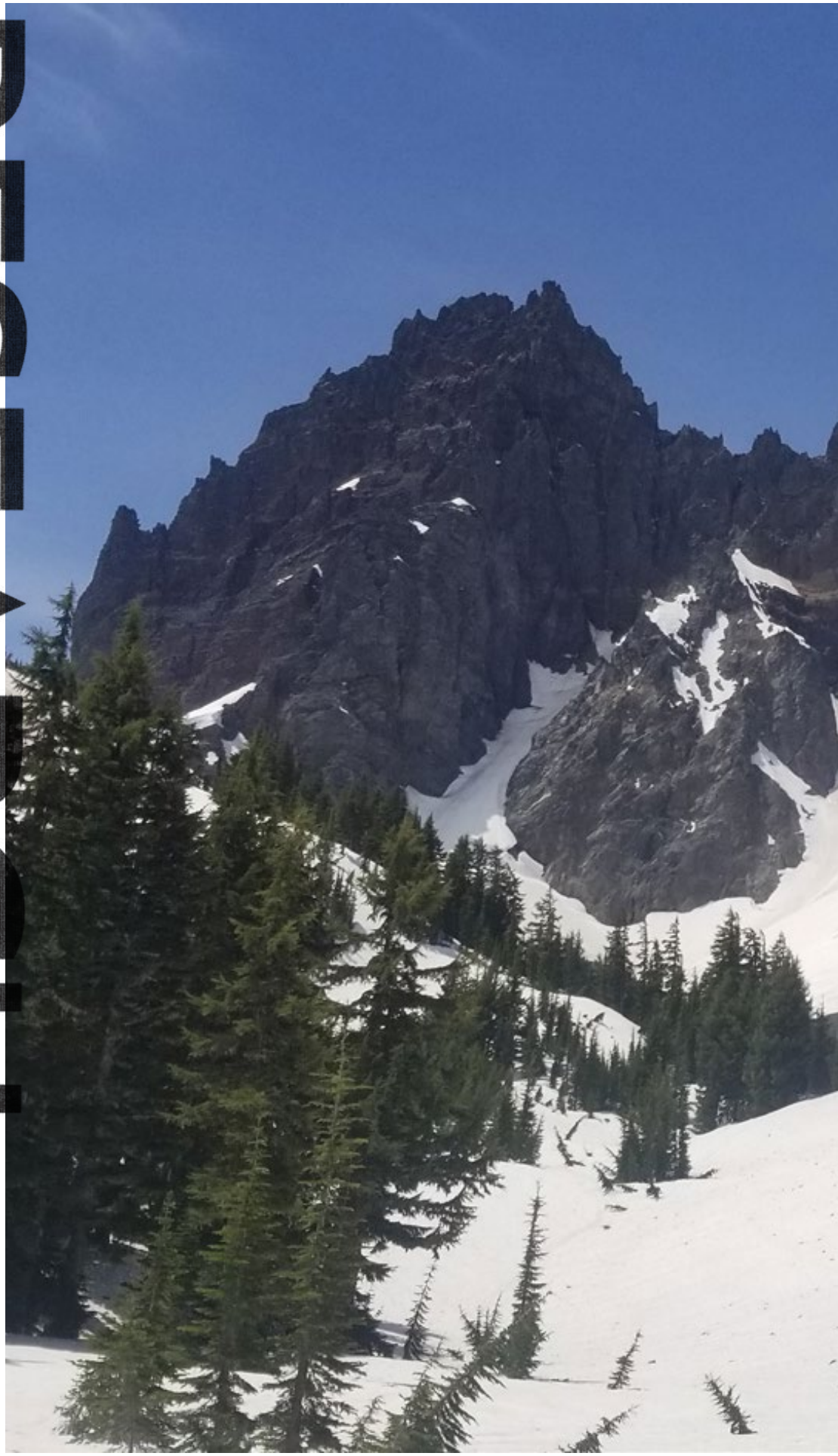



BEFORE

AFTER

# RESEARCH HIGHLIGHTS

*Photo by Kelsey Smith*



# BIRDS OF A FEATHER

By Kelsey Smith
*M.S. Student*

Likely no other game bird has impacted North American inhabitants as much as the Wild Turkey (Meleagris gallopavo), influencing both Native Americans and immigrants, as well as their descendants. Prior to European settlement, Wild Turkeys were abundant in North America, occurring in 39 of the continental states. However, colonization and growth of the nation initiated their decline into near extirpation. They soon vanished from most of their original range, disappearing from 21 states by 1920, surviving in only the most remote habitats. The fate of turkeys seemed bleak, until the 1930s, when farmlands were slowly abandoned and forest stands began to regenerate, paving the way for the repopulation of turkeys to their former range. Initial attempts utilizing farm-raised birds were largely unsuccessful though, and restoration was not successful until the invention of cannon nets in 1951, allowing flocks of Wild Turkeys to be caught and relocated to suitable habitats.

Despite initial success, North American turkey populations have declined between 6 and 15% from the 7 million birds following reintroduction efforts. The reason for this is still unknown, and it is unclear if it is a normal fluctuation or due to something more concerning (e.g., climate change or habitat loss), which might result in continued decreases. One factor in question is Lymphoproliferative Disease Virus (LPDV).

*"Despite initial success, North American turkey populations have declined between 6 and 15%"*

LPDV was first detected in 1972 in domestic turkeys in Europe, but it was not until 2009 that it was first reported in the United States, this time in a Wild Turkey. LPDV is an avian retrovirus that primarily affects birds of the order Galliformes (such as turkeys and chickens). Infected domestic birds in Europe often exhibited lymphoid tumors and mortality. While Wild Turkeys may also develop tumors, prior studies in North America have found that they are typically asymptomatic. Population level effects of LPDV on Wild Turkeys are currently unknown.

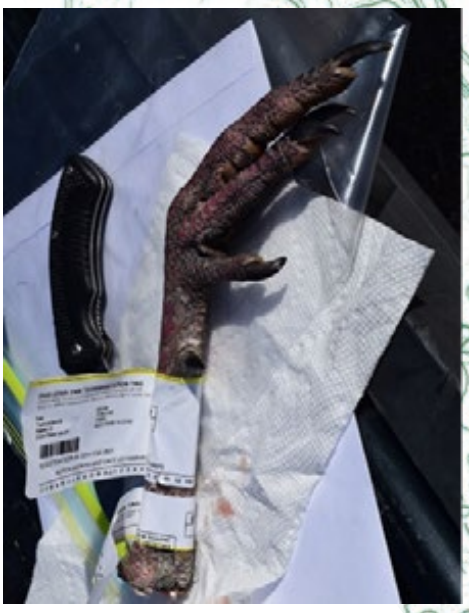


FIGURE 1. TURKEY LEG SUBMITTED FOR TESTING.

FIGURE 2. EXTRACTING BONE MARROW FROM TURKEY LEGS.

FIGURE 3. EXTRACTED BONE MARROW.

To help explore if LPDV could be an issue in Iowa, hunters were recruited to submit the leg of harvested turkeys, so they could be tested for the virus. My primary goal is to identify whether LPDV is present in Iowa, and if so, to what extent? In the process, I will also attempt to identify any risk factors of infection, and see if there are any hotspots within the state.

To do this, bone marrow is removed from turkey legs and used to extract DNA, which also contains viral DNA if the bird was infected. Polymerase chain reaction (PCR) is used to amplify the amount of DNA present. Agarose gel electrophoresis is then utilized to visualize results, producing a pink florescent band if the virus is present (figure 4).

With this data, potential risk factors can be tested for an association with an increase in probability of infection. Some of the variables of interest include the ratio of agriculture to forest, forest edge, presence or absence of water bodies, historic translocation data, and harvest data. To analyze these for each turkey, a buffer is made around the harvest location and variables calculated within. Multiple linear regression can then be used to examine if any of these are predictive of LPDV infection.

To look at spatial patterns, data are split into cases (positives) and controls (negatives) and grouped by county. Clusters can be identified with the program SaTScan, which uses Kulldorff's spatial scan statistic to detect areas with significantly higher or lower cases of LPDV than would be expected if they were randomly distributed. Preliminary results show an area of high prevalence in the northeast region of the state, and two areas of low prevalence, in the northwest and east central regions.

Understanding the presence of LPDV in Iowa Wild Turkeys is an important first step in determining if it might play a role in population declines. Identifying hotspots can help wildlife managers decide where to focus monitoring and future research. Identifying risk factors will also aid in determining which areas should be given priority, or which might be more likely to turn into a hotspot.

FIGURE 4. RESULTS FROM AGAROSE GEL ELECTROPHORESIS.

# PRAIRIE STRIPS PROVIDE WILDLIFE HABITAT WITHIN THE AGRICULTURAL MATRIX

By MATT STEPHENSON
*Ph.D. Candidate*

Take a drive on most any Iowa highway and you can tell that much of the Iowa landscape is dominated by row crop agriculture. Landscapes formerly covered by tallgrass prairie are now covered by huge fields of corn and soybeans with little grassland and even less native prairie. Modern industrialized farming practices produce food in amazing quantities and efficiencies, but this system of intensive cultivation leaves little habitat for wildlife.

In the early 2000's, a team of scientists, educators, and extension specialists came together to form the Prairie STRIPS project at Iowa State University and partner organizations to study the use of strips of native prairie as a farmland conservation practice. STRIPS researchers hypothesized that conversion of a small percentage of row crop area to contour strips of diverse native prairie would yield disproportionately large ecosystem services. Over many studies and many years, they have found significant improvements in water and nutrient runoff, erosion, and the number of pollinating insects and pollinator species (Schulte et al. 2017). Prairie strips have much higher plant species diversity than the surrounding landscape and might be expected to attract wildlife, but they are also relatively small and isolated from other high-diversity prairie patches, traits which are sometimes considered detrimental to wildlife. A patch of habitat where more individuals die than are produced is a "population sink." Sometimes a population sink appears more attractive than surrounding habitat and actually attracts wildlife despite being poor quality. These types of habitat patches are "ecological traps." The goals of my research are (1) to determine if prairie strips or other agricultural conservation practices are population sinks or ecological traps for birds, snakes, and small- and medium-sized mammals and (2) to determine how to design soil and water conservation practices to also serve as quality wildlife habitat.

From 2015 through 2020 a rotating crew of undergraduates and I (Fig. 1) spent summer months on 14 farms around central Iowa searching for bird nests, flipping cover boards looking for snakes, and setting up trail cameras to document the mammals found on the farms. We eventually found and monitored 1600 bird nests, searched 540 plot-years for nests, flipped cover boards more than twelve thousand times, and set up cameras that captured hundreds of thousands of photos (mostly of blowing grass, but also hundreds of photos of mammals). I have not yet analyzed the cover board or camera trap data, but I do have preliminary findings for bird nest density and survival on farms.

FIG. 1

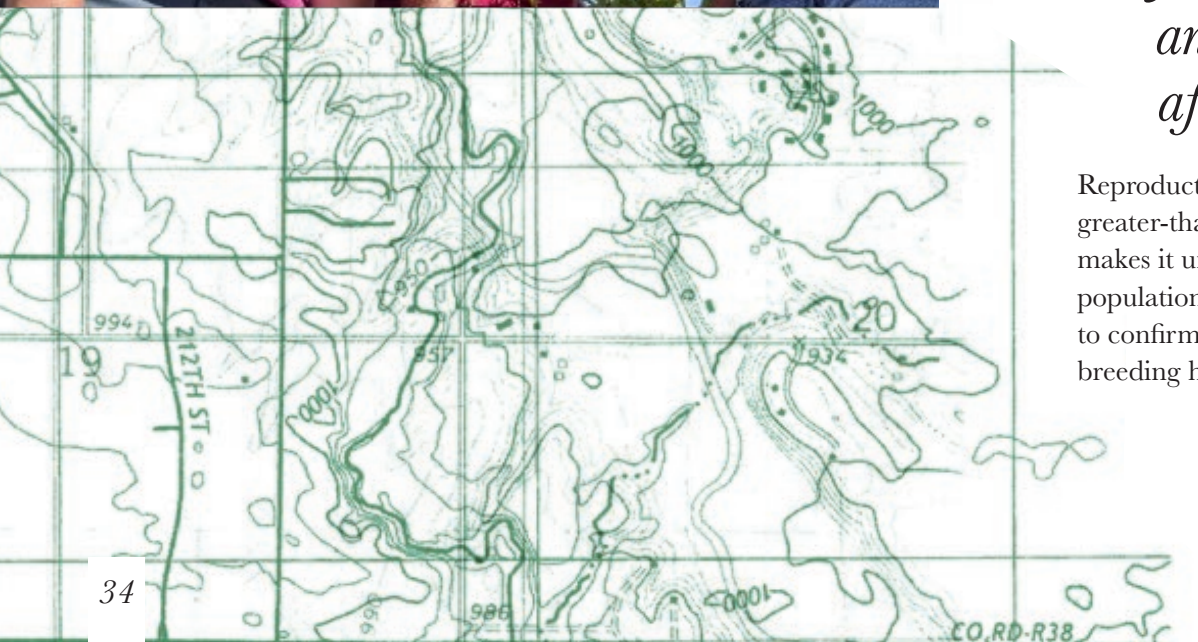



Figure 1A and 1B: My 2018 and 2019 field crews. I hired between three and six undergraduates each year to help me find enough nests and search enough plots to find the ecological signal in noise. I am extremely grateful for all their hard work, early wet mornings, and long hot afternoons.

My results are still preliminary, but it seems likely that prairie strips are not population sinks or ecological traps and that their vegetative diversity is important to improving their quality as habitat relative to more conventional practices. To determine if a conservation practice is a population sink or ecological trap I needed to know if reproductive rates were higher or lower than reference habitats and whether animals are attracted the patches to breed. I found that for Red-winged blackbirds, daily survival rates (DSR) of nests were higher in prairie strips than low-diversity contour strips, filter strips, or terraces and approximately the same as larger reference grasslands (Fig. 2, page 36).

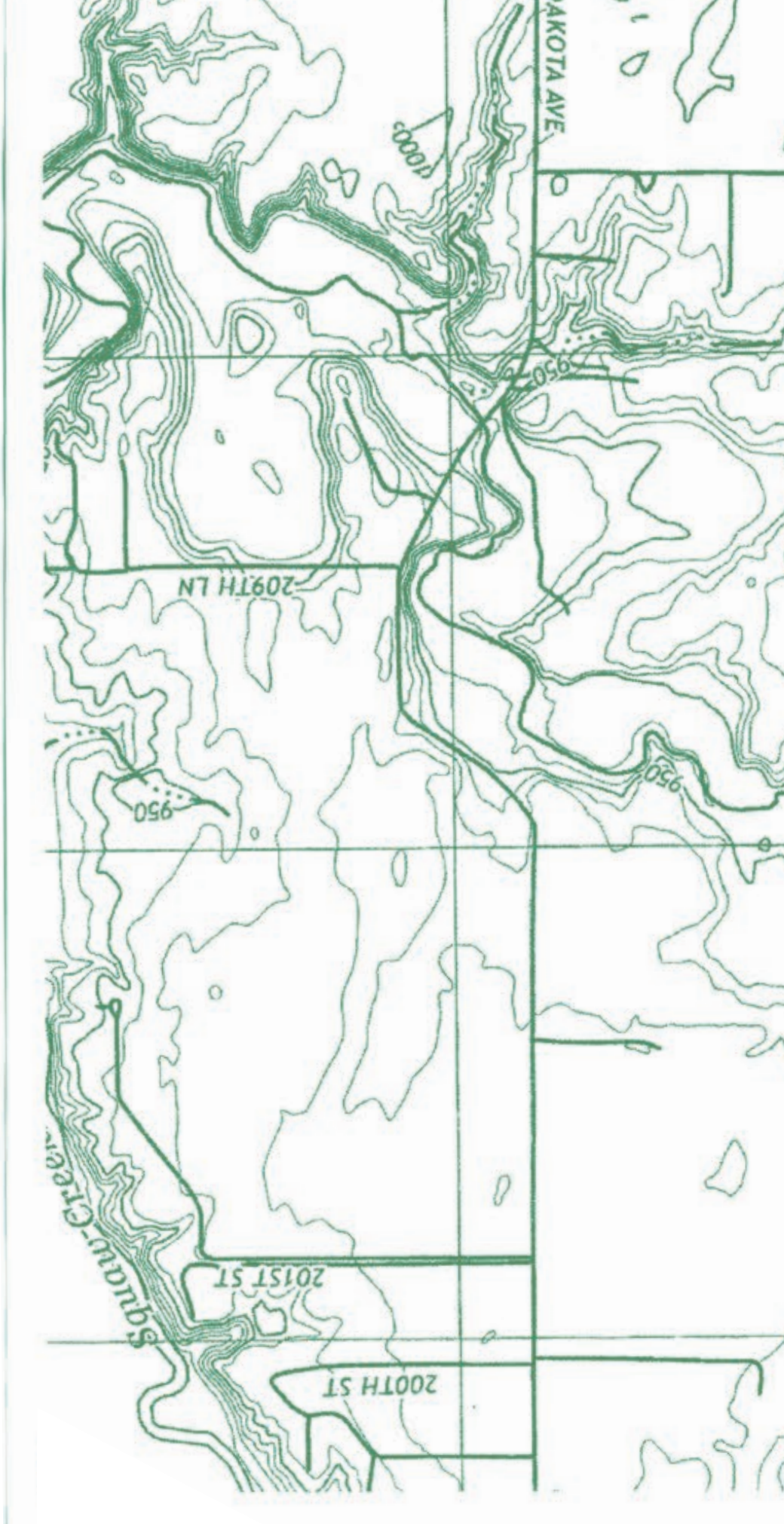
*"I am extremely grateful for all their hard work, early wet mornings, and long hot afternoons."*

Reproductive rates equal-to or greater-than nearby reference habitat makes it unlikely the prairie strips are population sinks, but we also needed to confirm they were being used as breeding habitat. To do that, our team

repeatedly searched 0.1 ha plots in each of the conservation practices to count active nests. We found that prairie strips held lower densities of Red-winged blackbird nests than filter strips (Fig. 4, page 38), likely because proximity to water was an important predictor of blackbird nest density (Fig. 5, page 39). Prairie strips had approximately the same densities of blackbird nests as low-diversity contour strips and terraces, and higher densities of blackbird nests than larger reference grasslands, albeit without complete separation in prediction intervals (Fig. 4).

Interestingly, the higher densities in patches with less habitat available nearby may indicate some crowding occurring relative to patches with more habitat nearby. This trend combined with lower survival rates in less-diverse habitats may indicate that small isolated low-diversity conservation practices could be acting as population sinks or ecological traps

Many thanks to all the undergraduate students that have worked on the project over the years, my major professors Dr. Schulte Moore and Dr. Klaver, and to our funders, the Leopold Center, the Farm Service Agency, the National Institute of Food and Agriculture, and the Department of Natural Resource Ecology and Management.



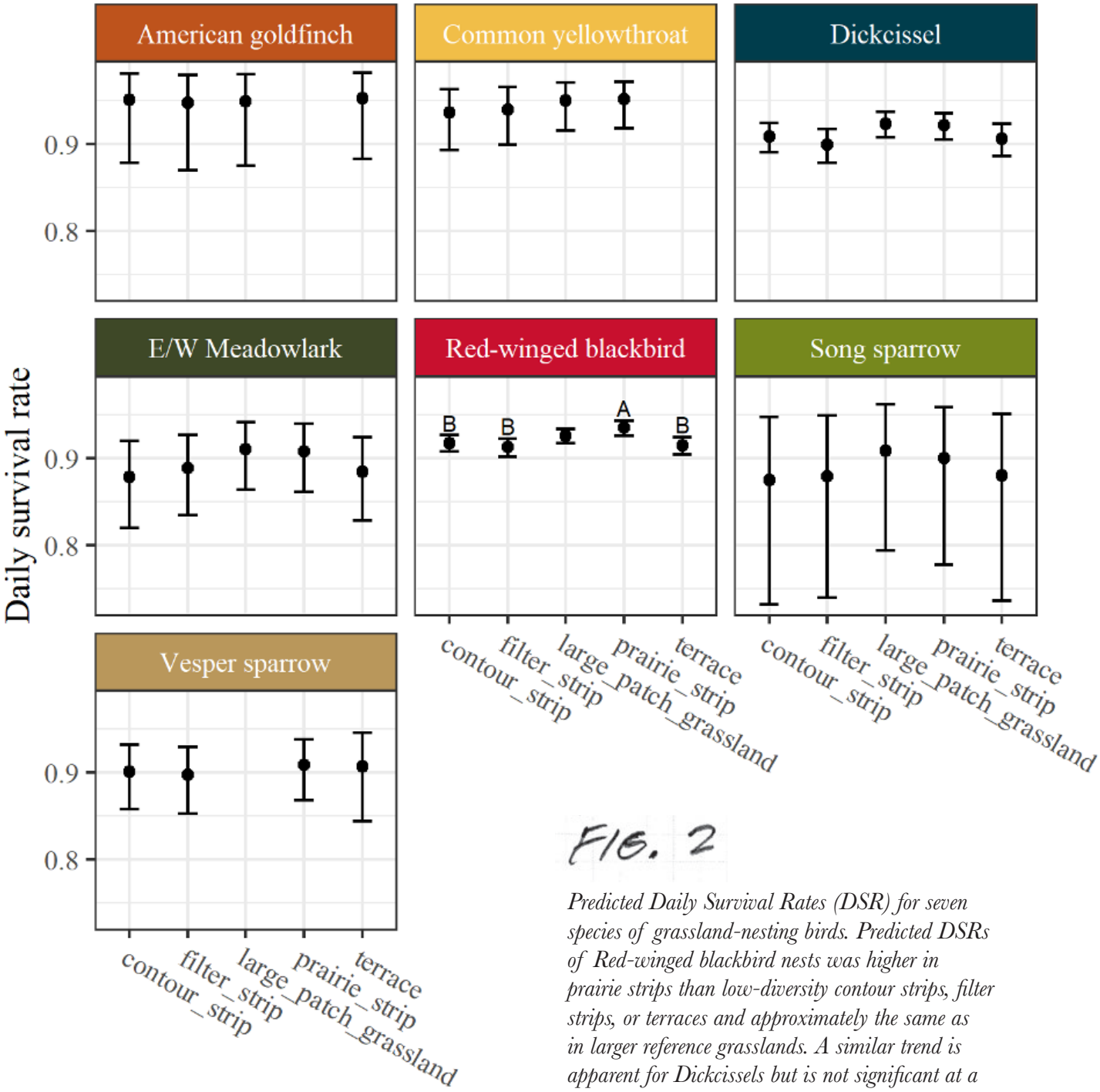



FIG. 2

*Predicted Daily Survival Rates (DSR) for seven species of grassland-nesting birds. Predicted DSRs of Red-winged blackbird nests was higher in prairie strips than low-diversity contour strips, filter strips, or terraces and approximately the same as in larger reference grasslands. A similar trend is apparent for Dickcissels but is not significant at a = 0.05. Red-winged blackbirds comprised about half of our sample (~800 nests) and Dickcissels about a quarter (~400 nests).*

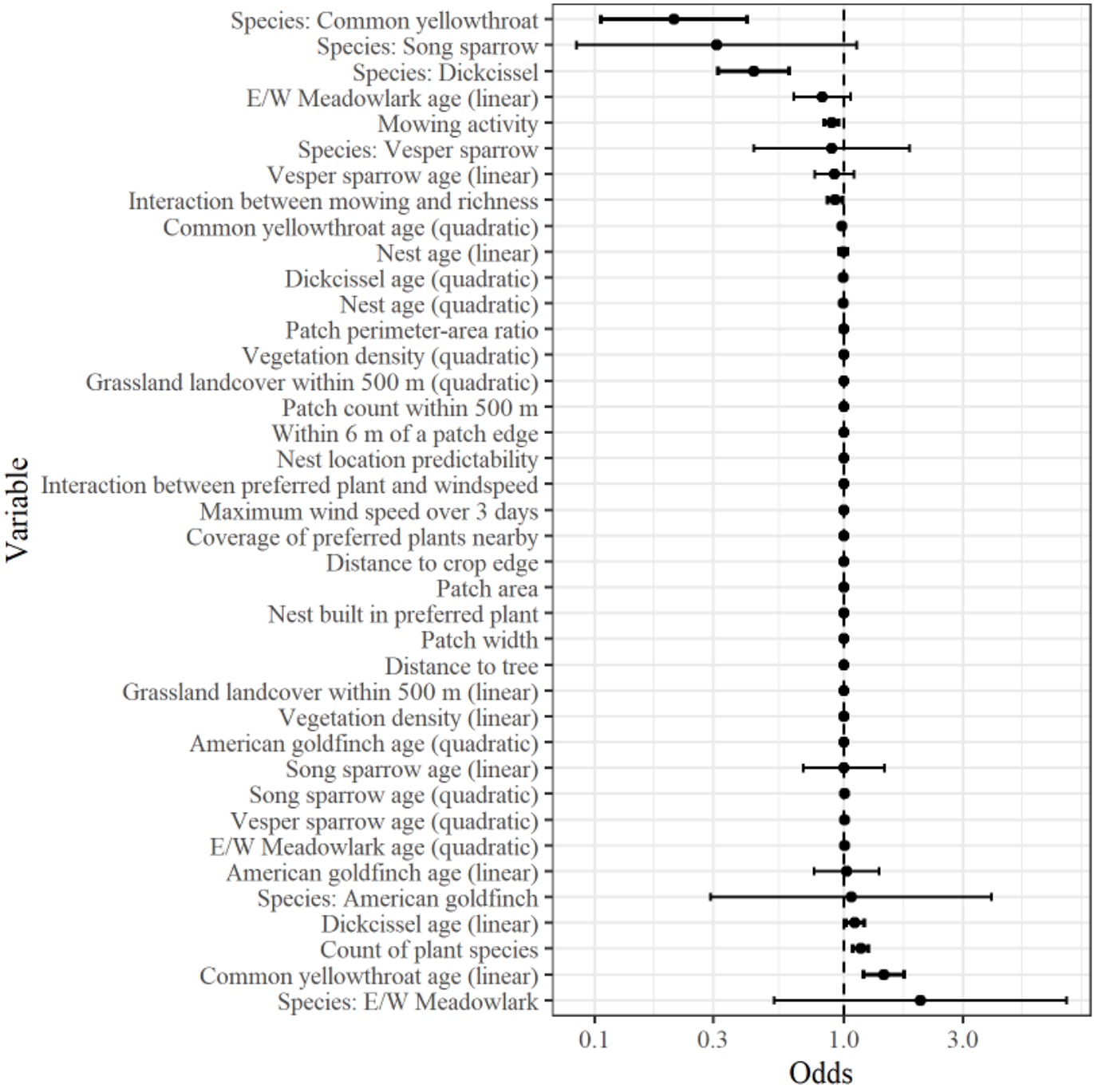



FIG. 3

*Factors which influenced Daily Survival Rates of nests. A difference of +x or −(1/x) indicates a x-fold increase or decrease in odds of a nest surviving one day. Common yellowthroats and Dickcissel nests were less likely to survive than Red-winged blackbird nests, as were nests with more mowing activity nearby. Nests with greater plant species richness nearby were more likely to survive. All other factors were not significant at a = 0.05.*

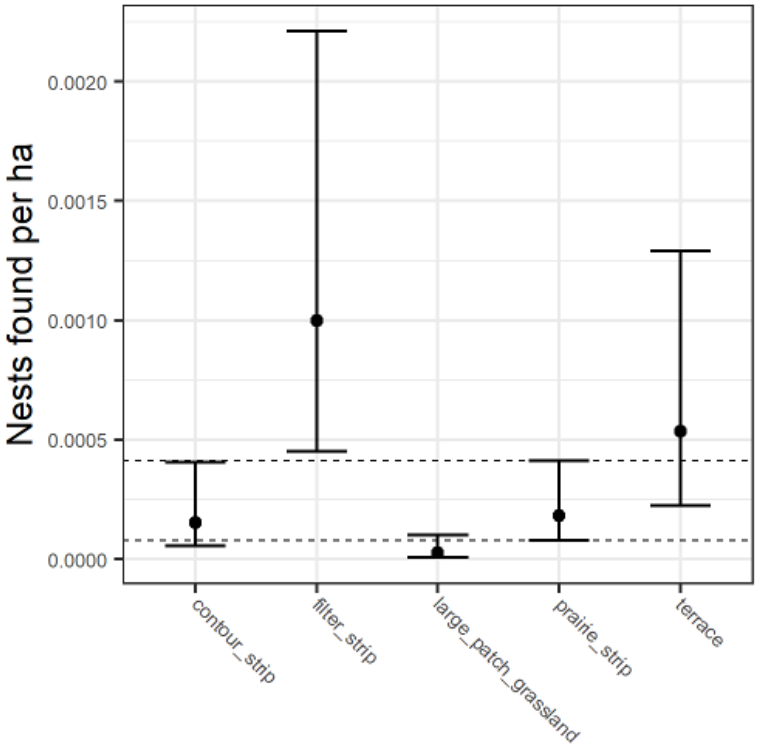



FIG. 4

*We predicted that prairie strips have lower densities of Red-winged blackbird nests than filter strips, approximately the same density as low-diversity contour strips and terraces, and trended higher densities than larger reference grasslands, although without complete separation in prediction intervals at a = 0.05.*

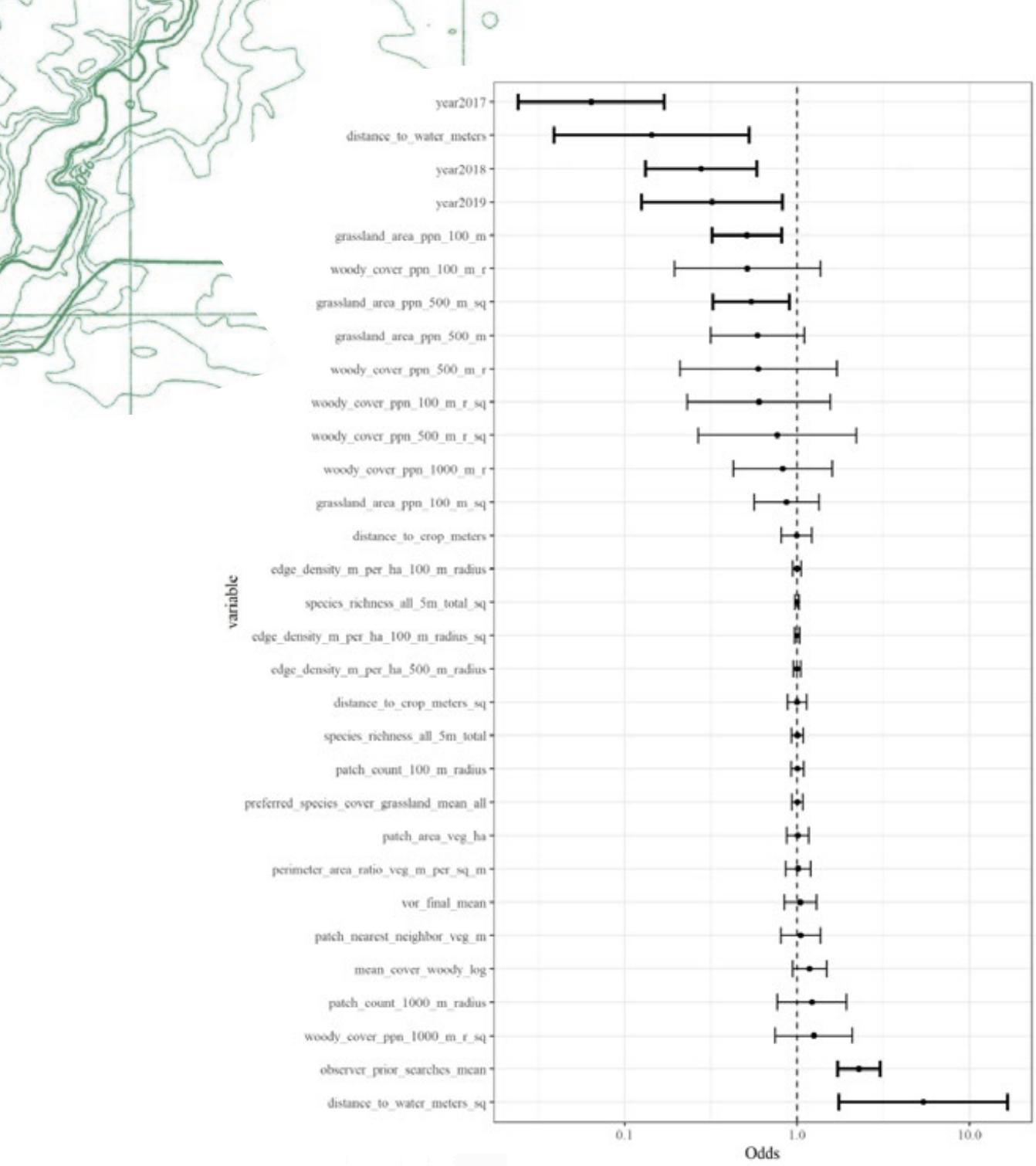



FIG. 5

*Figure 5. Factors which influenced density of Red-winged blackbird nests. A difference of +x or −(1/x) indicates a x-fold increase or decrease in odds of a plot containing a blackbird nest. Field seasons 2017, 2018, and 2019 had lower nest densities than 2016, plots further from water had fewer blackbird nests, and plots with more grassland within 100 m and 500 m had fewer nests. Plots that were searched by more experienced observers had more blackbird nests.*

# LITERATURE CITED

Schulte, L. A., J. Niemi, M. J. Helmers, M. Liebman, J. G. Arbuckle, D. E. James, R. K. Kolka, M. E. O'Neal, M. D. Tomer, J. C. Tyndall, H. Asbjornsen, P. Drobney, J. Neal, G. Van Ryswyk, and C. Witte. 2017. Prairie strips improve biodiversity and the delivery of multiple ecosystem services from corn–soybean croplands. Proceedings of the National Academy of Sciences 114:11247–11252.

# RESEARCH GONE WRONG

*Photo by Morgan Kaardal*

# ATTEMPTING TO CATCH BIRDS

By Sarah Hoepfner

When I first arrived in Utqiaġvik, Alaska on May 20th, there was still snow on the ground and temperatures were consistently below freezing. While most fieldwork and birds would wait until the snow melted before beginning nesting, my goal was to catch birds pre-breeding shortly after they arrived. The first small and consistent flocks of Dunlin were seen in the local landfill and to my surprise that is where I ended up spending the majority of my early fieldwork.

Capturing these birds was not as easy as anticipated beginning with setting up the whoosh nets. This requires several people drilling stakes into the frozen ground and some football training moves to hook the taut bungees in place, all while trying to avoid tumble weed plastic bags, old diapers, and not dropping your gloves in the gnarly dump water, and also stay warm. Once the nets were set up, we either sat in the cold car waiting for birds to walk into the capture zone, or took turns warming up to walk around the dump to flush birds closer to our net, otherwise known as "twinkling." With 24 hours of daylight this time of year in Northern Alaska, these trapping attempts occurred at all hours of the day and "night."

One particular evening we had already caught one bird and had reset the net to try for another. We waited almost two hours with our toes going numb when a bird walked into the capture zone. I gave the signal to pull the cord to trigger the net, but only half of the net deployed! After checking out the net we realized it was wet and frozen with dump water from the previous deployment. It was now a solid brick and the bungee cords were also frozen stretched out with no power to pull the net out and open. We learned our lesson and called it a night, packing everything up to unthaw back at the fieldhouse and were in bed sound asleep by 2 AM.

Another method used to capture Dunlin involved using net guns, which are large flashlight sized contraptions that fired nets about three feet in diameter at Dunlin in ponds along the road. This usually meant slow drive-bys while someone stealthily and quickly pointed the contraption out the car window. There were many fails and only one successful attempt out of about 30 tries.

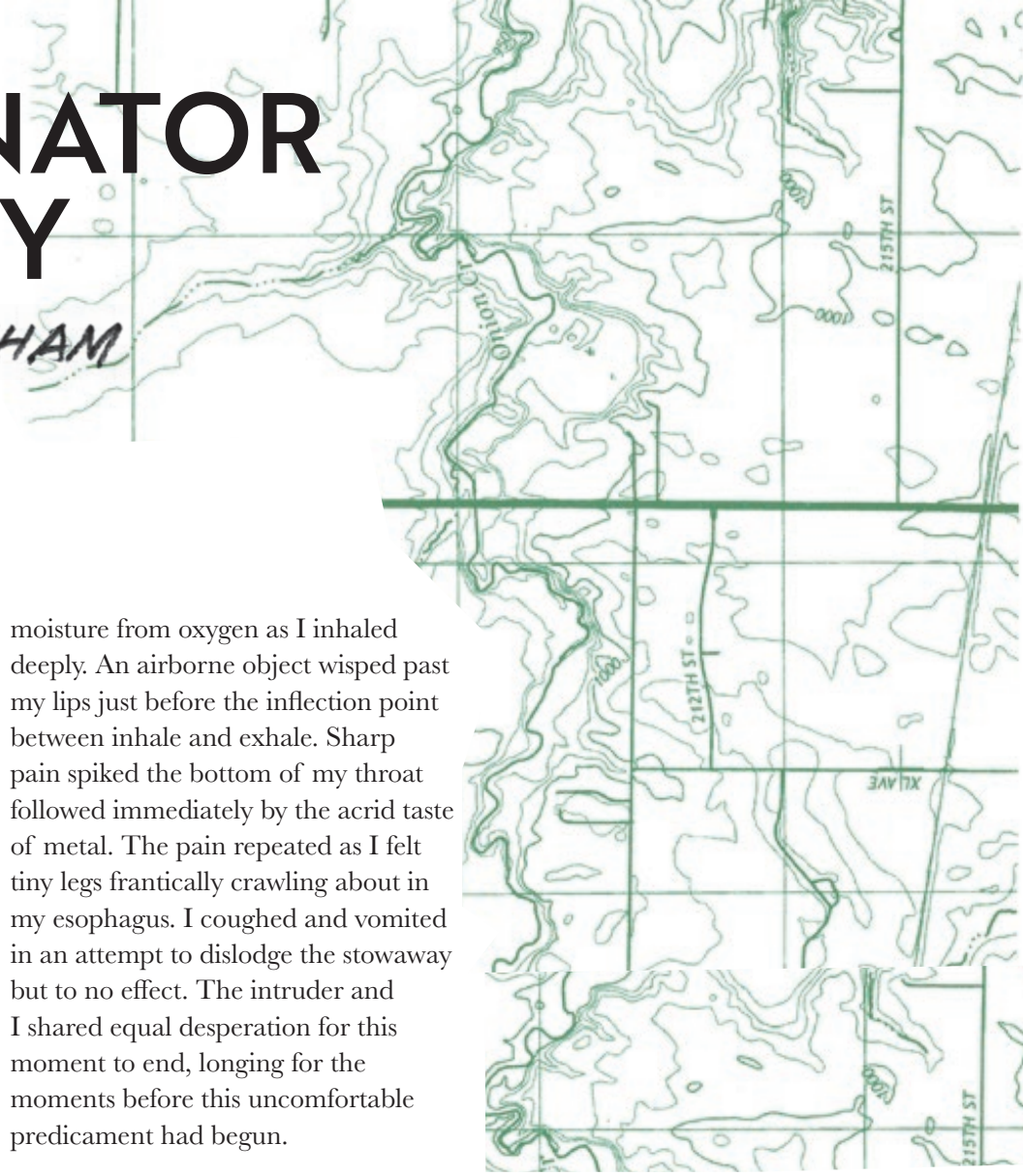

CATCHING DUNLIN IN THE LOCAL UTQIAĠVIK LANDFILL AT 11PM IN LATE-MAY

Most of the failures were malfunctions with the equipment or thumbs that were too weak or cold to be able to press the fire button. The devices also seemed to break very easily, and by the end of the season two out of three were useless. During this trapping time I spent many hours sneaking over snow banks, twinkling, and army crawling in the dump, only to learn that Dunlin do not like to be herded or coerced into anything. In the end I caught 11 Dunlin pre-breeding and the other 30 just after they began nesting. Those first birds gave us something to do in the field while waiting on snow melt, great field crew bonding with silly 1:00 a.m. conversations, and some of the best data collected all summer. Even though I spent the rest of the summer on pristine tundra away from the dump and human developments, I look forward to those first weeks next summer welcoming the Dunlin back to their breeding grounds, even if it is in the dump.

DUNLIN FITTED WITH A FANCY NEW GPS TRANSMITTER!

# A POLLINATOR APOLOGY

By Tanner Bonham




It was a muggy, mid-August day in central Iowa. The sun had passed its zenith burning the clouds from the azure sky and erasing all memory of the tepid rainstorm that had passed through the watershed the day before. I retrieved the water my automatic samplers had collected during the recent runoff, inspecting the changes in stored sediment as I made my way along the channel.

Hours passed as I journeyed to each of my sites. Thoughts of peeling off my sweat-laden chest waders, long sleeve shirt, and buff eclipsed my mind as I stepped down the bank to my final location. My sensor was nowhere to be seen under the thick shroud of detritus and fine sediments the water had delivered. The odor of decay emanated from the muck as I unearthed my submerged instrument. The intermittent flows characteristic of the drought had left behind a trail of discarded minnow. The poor creatures had found intermittent refuge in shallow, stagnant pools which inevitably led to their demise as days without precipitation became more frequent, and the depth of the pools waned.

The work was complete. My body wanted water to replenish the moisture escaping through my skin. I scrambled up the slick drainage banks and through the cumbersome vegetation.

Upon reaching the top of the bank, my lungs fought to separate the air's moisture from oxygen as I inhaled deeply. An airborne object wisped past my lips just before the inflection point between inhale and exhale. Sharp pain spiked the bottom of my throat followed immediately by the acrid taste of metal. The pain repeated as I felt tiny legs frantically crawling about in my esophagus. I coughed and vomited in an attempt to dislodge the stowaway but to no effect. The intruder and I shared equal desperation for this moment to end, longing for the moments before this uncomfortable predicament had begun.

*"My lungs fought to separate the air's moisture from oxygen as I inhaled deeply."*

In a frenzy, I ran through possible solutions realizing that only one could end this unfortunate encounter. I reached for my water and unleashed a deluge to carry the insect to its doom. My throat was clear but now the fear of the incumbent physical reaction to the venom overcame my mind. Forgetting my fatigue in the cascade of adrenaline, I sprinted the distance between myself and my vehicle. The child-proof lid caused only seconds of delay and two Benadryl joined the captive in my stomach. I hastened towards the security of the town and nearby hospitals in case the venom required a stronger combatant. Throughout my journey, I couldn't help but wonder if the trapped insect could have been a honey bee segmented from the few areas of natural habitat that still exist throughout the vast sprawl of corn and soybeans. My own pain and exhaustion dimmed in comparison to the daily struggle undertaken by Iowa's native organisms. The experience ended, not in a medical facility, but in a moment of clarity. I returned to my work the next day with a reinforced empathy and understanding of what it is to be an organism living in a landscape altered by humanity.

# RESEARCH GONE RIGHT

*Photo by Sarah Hoepfner*

# RARE BIRD ALERT

By SARAH HOEPFNER

One day in Alaska this summer I was waiting on some town errands and randomly went up the local gravel pit hill for better receiver range to try and download data. Along the way I heard and saw the usual long-tailed ducks, king eiders, Lapland longspurs, and several sandpiper species.

One bird did catch my eye, and without using my binoculars I thought it might be an American Robin, a common vagrant species to this area. I absentmindedly looked at it in my binoculars only to see that it had a blue head and was something totally different! I spent about 5-10 minutes following it up, down, and around the gravel pit hill. It showed me its rusty orange belly, white stripe on its back, and that unmistakable blue head. But I could not get close enough for a good photo and had to do with some blurry photos taken on my phone through my binoculars to look it up later.

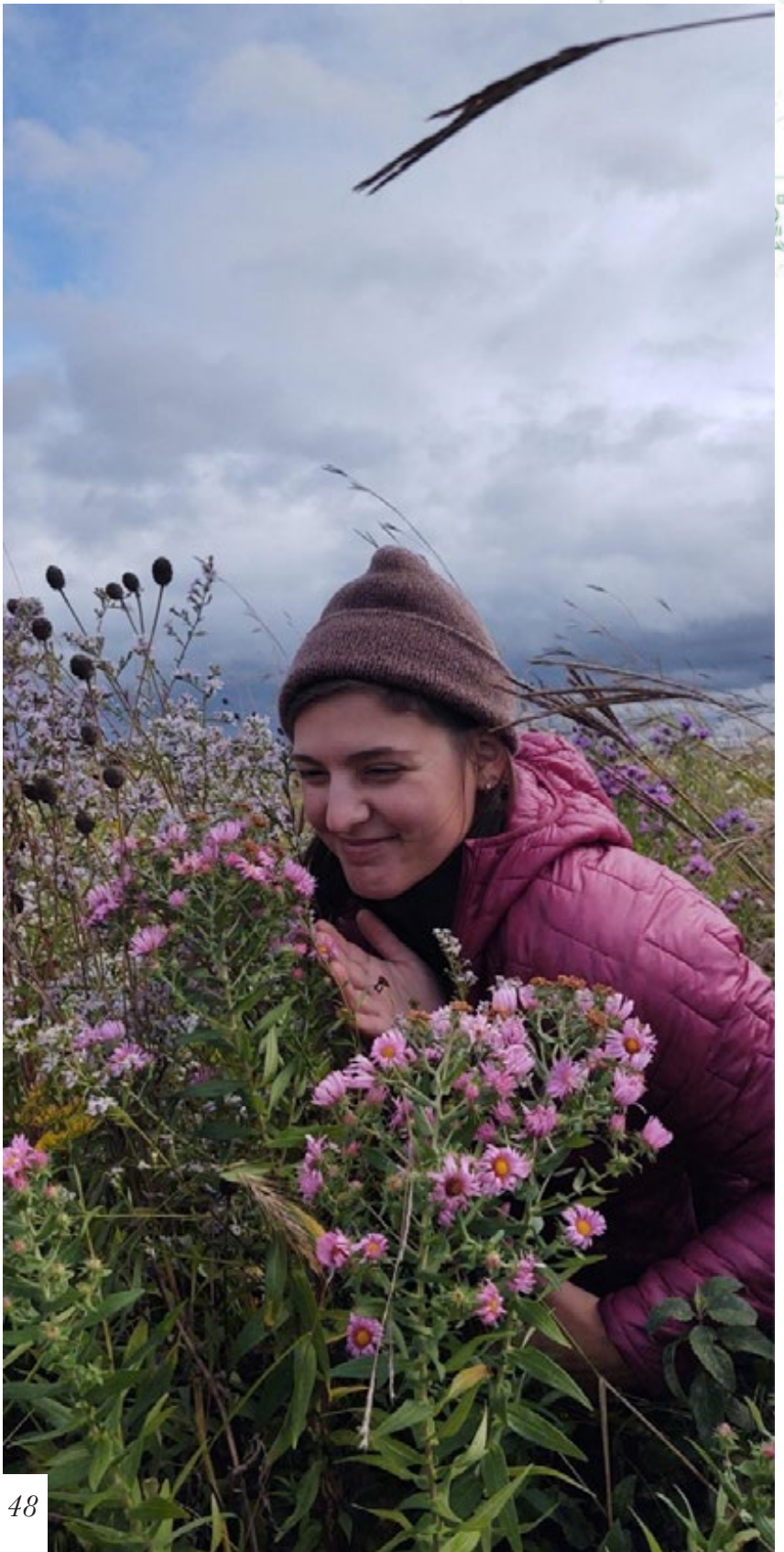
After a bit I noticed two people walking nearby with large cameras and binoculars. I wanted to share this find with someone and started to describe to them what I saw with some hand gestures of where I last saw it. Immediately and without saying a word, the younger of the two ran off to where I had indicated. This surprised me until the older gentleman explained that they had spent the last two hours looking for this bird that I had stumbled upon.

He told me this vagrant was found the night before and is called a rufous-tailed rock-thrush. Its typical range is from the Mediterranean to China, and this individual would not only be the first recorded sighting in Alaska, but in the Western Hemisphere! Turns out birders flew from all over to see this bird, but it only hung around for less than 48 hours. No one knows why or how he got to northern Alaska, but I am glad he did and it is now my greatest birding find, one that will not be easily topped.

A RUFOUS-TAILED ROCK-THRUSH

*Photo by Kelsey Smith*

# WHERE ARE THEY NOW?



# ELLEN AUDIA

Since receiving her M.Sc. in Wildlife Ecology from the NREM department in May of 2021, Ellen has been working at the Michigan State University W.K. Kellogg Biological Station in Hickory Corners, Michigan. Here, Ellen works on the Long-Term Ecological Research Site to collect data related to agricultural land use and ecosystem function. She is happy to be back in her home state of Michigan, close to family and the Great Lakes; however, she misses her NREM family dearly.

# TYLER HARMS

Tyler Harms completed his Ph.D. in Wildlife Ecology in the summer of 2021. Advised by Dr. Stephen Dinsmore and in partnership with the Iowa Department of Natural Resources (DNR), Tyler evaluated different methods for surveying and estimating breeding waterfowl populations in Iowa's Prairie Pothole Region. He is currently the Wildlife Biometrician for the Iowa DNR, a role in which he provides technical guidance on surveys, statistics, and population modeling to Wildlife Bureau staff, and coordinates various statewide wildlife surveys. Tyler also helps direct Iowa's response to Chronic Wasting Disease by evaluating disease management alternatives and establishing annual disease surveillance and monitoring goals.

# BEN LUUKKONEN

Ben Luukkonen finished his M.S. degree in Wildlife Ecology in December, 2020. Working with Dr. Bob Klaver, his research focused on movement and survival of Canada geese in urban and rural areas of Iowa and evaluated the role of hunter harvest in managing urban goose populations. After graduating from ISU, Ben began a Ph.D. research assistantship in Wildlife Biology and Management at Michigan State University. His current research aims to identify factors limiting the Great Lakes Mallard population, which has declined relative to the remainder of the mid-continent Mallard population. Using GPS-GSM transmitters, the project will examine movement, survival, habitat selection, and productivity of Mallards across 5 Great Lakes states.

# TAYLOR SHIRLEY

Taylor Shirley completed her M.S. in Wildlife Ecology with Dr. Adam Janke in the summer of 2021. Her research at ISU focused on investigating the use of cover crops by Ring-necked pheasants in southeast Iowa. After graduating, Taylor began working as a wildlife research specialist for the Iowa Department of Natural Resources through a contract with the Wildlife Management Institute. She works with the research section's waterfowl program and assists with some tasks in the upland wildlife program.

# BLAKE MITCHELL

Blake Mitchell completed his M.S. in Wildlife Ecology with Dr. Adam Janke in the summer of 2021. His research at ISU evaluated duck brood occupancy dynamics in small (≤10 ha) wetlands in cropland-dominated landscapes within the U.S. Prairie Pothole Region. After successfully defending his thesis, Blake joined the ranks of Ducks Unlimited (DU) as a wetland restoration and enhancement biologist in Fergus Falls, MN. He will help DU and the U.S. Fish and Wildlife Service improve wetland habitat for waterfowl and other wetland-dependent wildlife.


# NATHAN TILLOTSON

Nathan Tillotson completed his M.S. in Fisheries Biology in summer 2021 under the supervision of both Dr. Michael Weber and Dr. Clay Pierce. His research at ISU focused on investigating the effects of invasive Asian carp on the dynamics of zooplankton and larval fish in the Upper Mississippi River. After graduating, Nathan accepted a senior technician position with Idaho Department of Fish and Game investigating White Sturgeon population dynamics in the Snake River. Recently, Nathan accepted a promotion to Regional Fisheries Biologist in Idaho Falls and will manage such fisheries as Henry's Lake and the Teton River, among others. In his free time, Nathan enjoys many of the ample public land opportunities Idaho has to offer, including hunting, fishing, and backpacking.

# DYLAN OSTERHAUS

Dylan Osterhaus completed his M.S. in Fisheries Biology in July 2021. Under the supervision of Dr. Clay Pierce and Dr. Timothy Stewart, his research involved comparing sampling methods for oxbow wetland fish communities and examining associations between the federally listed Topeka Shiner and various fish community metrics. Additionally, field work that Dylan participated in resulted in the rediscovery of Topeka Shiner within the White Fox Creek watershed, where they had not been seen in over 35 years. After defending his thesis, Dylan moved to Las Cruces, New Mexico to begin a PhD program at New Mexico State University. Dylan will be working with Dr. Martha Desmond and Dr. Timothy Wright to examine various aspects of avian migration within the desert southwest. His research will serve to answer questions pertaining to the interaction of migrating birds with light pollution using various methods, including nocturnal acoustic recordings and NEXRAD weather radar. His field work will take place at more than 50 sites located on the White Sands Missile Range in south central New Mexico. When he is not working, Dylan spends the majority of his time exploring his new home in the desert southwest.

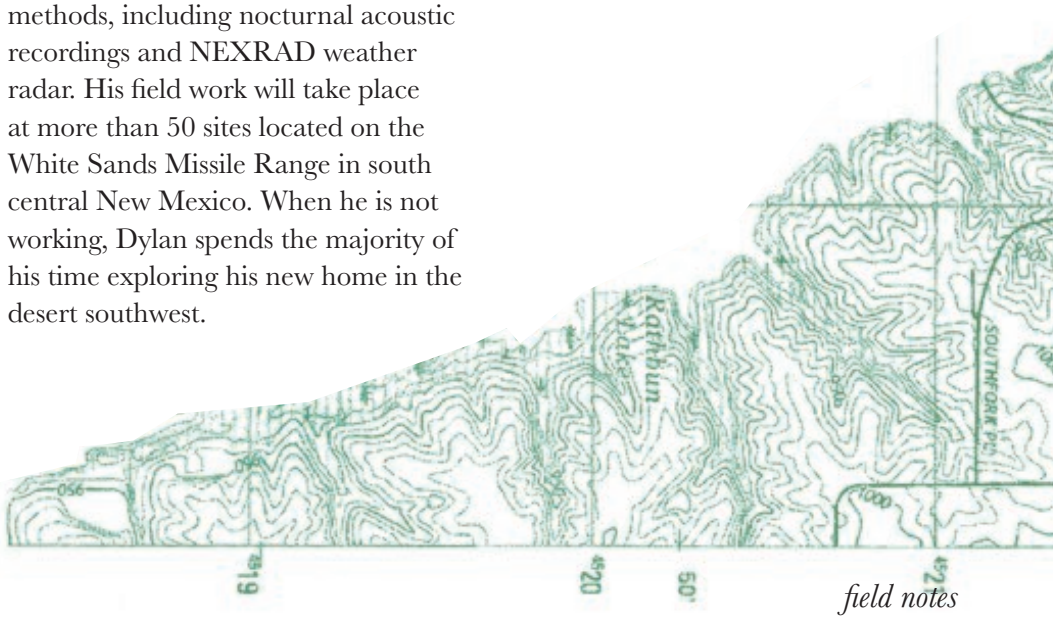
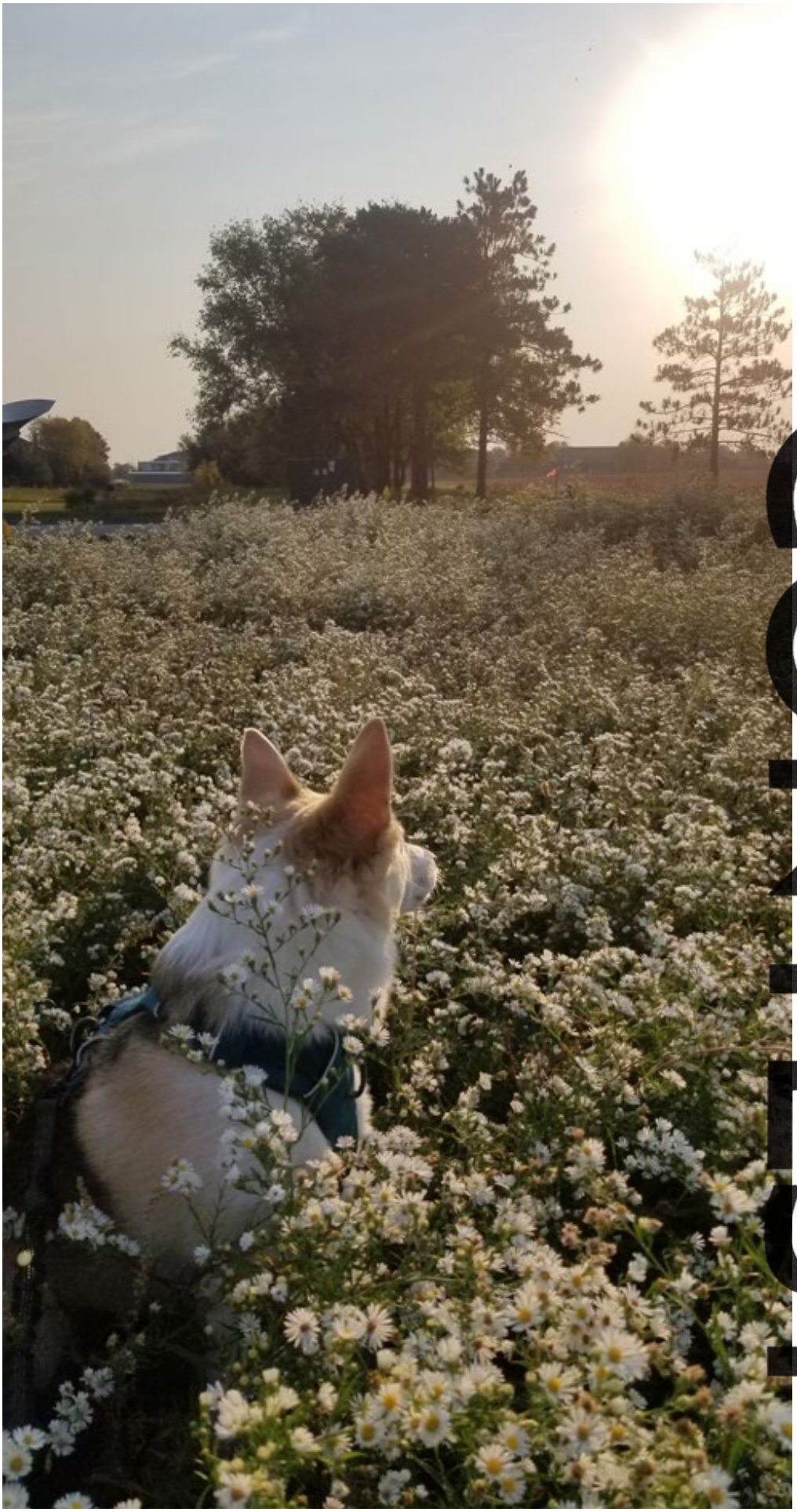
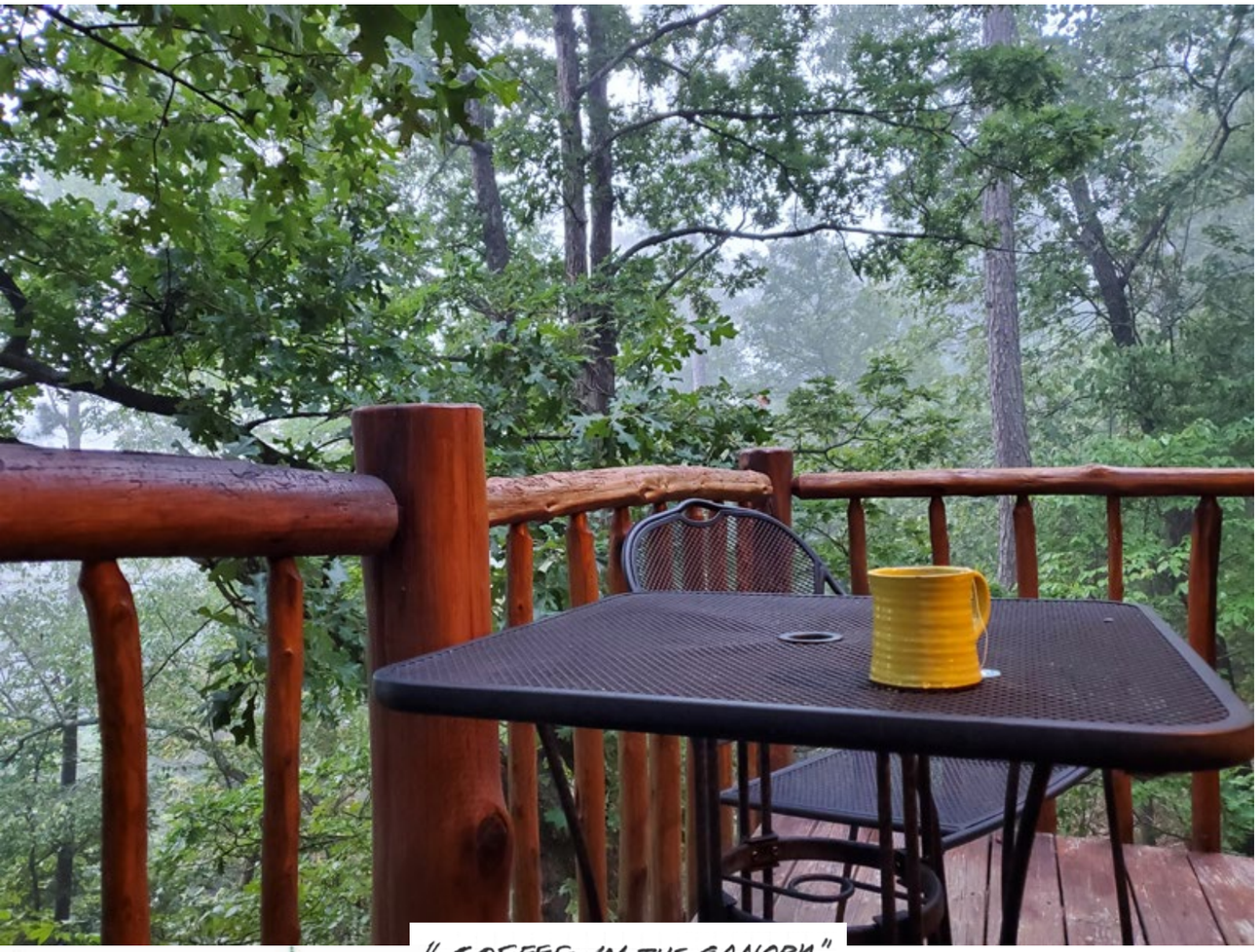


*Photo by Kelsey Smith*



# PHOTO CONTEST

# LANDSCAPES WINNERS

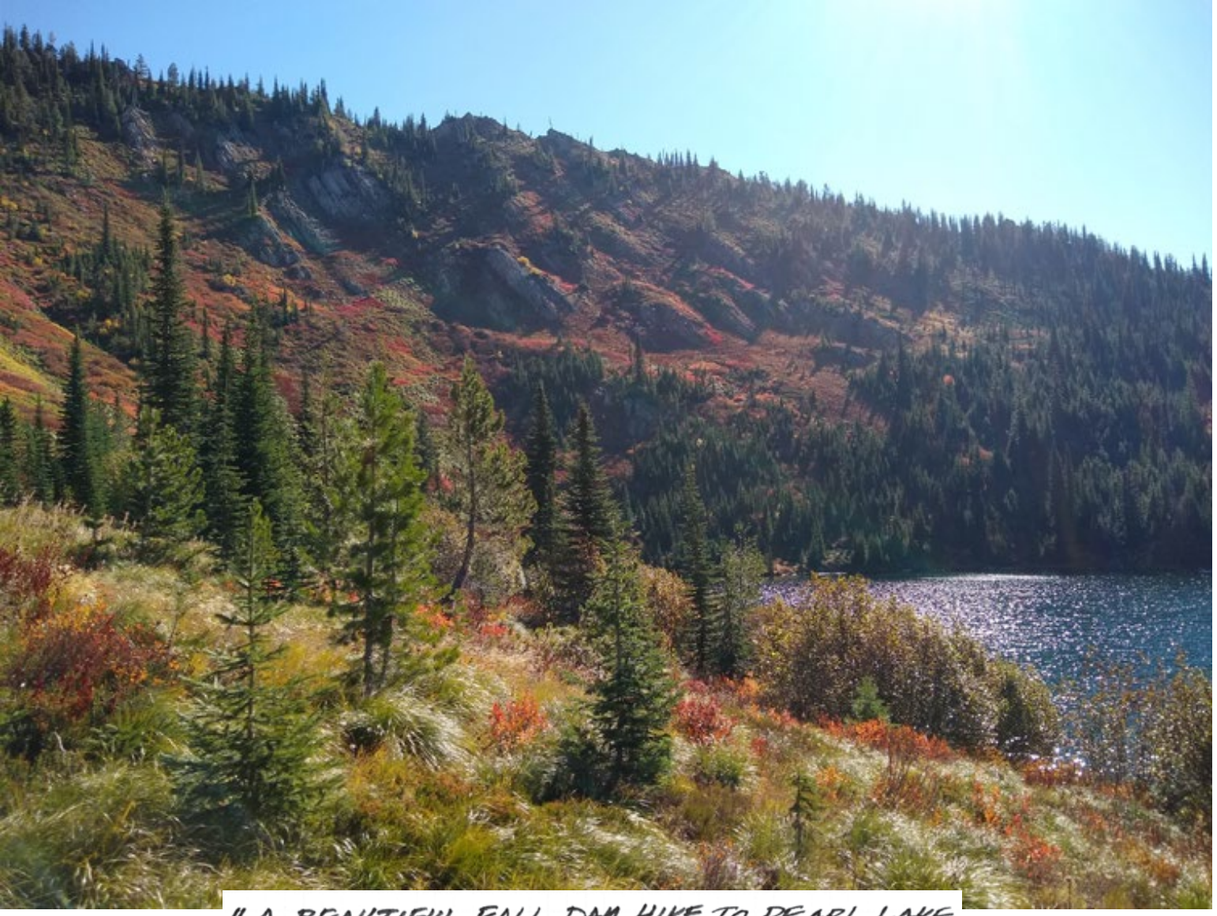


"COFFEE IN THE CANOPY"

*Bree Marmur*
*Eureka Springs, Arkansas*

"IOWA SUNSET"

*Kelsey Smith*



"A BEAUTIFUL FALL DAY HIKE TO PEARL LAKE DURING THE 2021 FALL FORESTRY CAMP"

*Jennifer Schieltz*

*NREM's Rod & Connie French Conservation Camp in Montana*





"ARCTIC OCEAN AND PERMAFROST COAST"

*Sarah Hoepfner*

# LANDSCAPES

## HONORABLE MENTIONS

"FIRE ON THE PLAINS"
*Erik Griffen*

"MIDNIGHT GOLDEN HOUR"
*Sarah Hoepfner*

"EARLY FALL COLORS ON THE TRAILS AT PETERSON PARK"
*Gabriel Johnson*

"THREE-FINGERED JACK"
*Kelsey Smith*

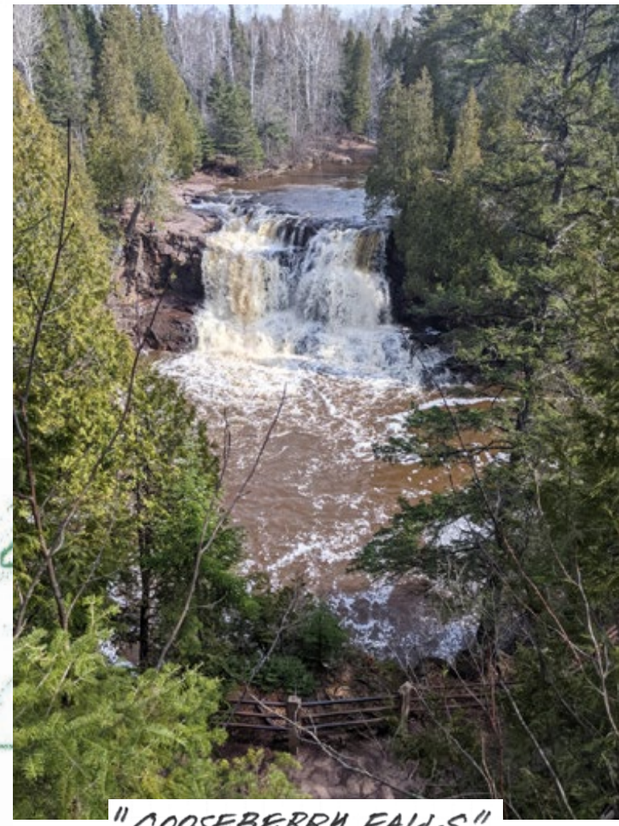
"TUNDRA AND MULTI-LAYERED CLOUDS"
*Sarah Hoepfner*

"ARCHES NATIONAL PARK"
*Morgan Kaardal*

"BRYCE CANYON"
*Morgan Kaardal*

"FALL IN DELTA JUNCTION"
*Jade Allen*

"TUNDRA WILDFLOWERS"
*Sarah Hoepfner*

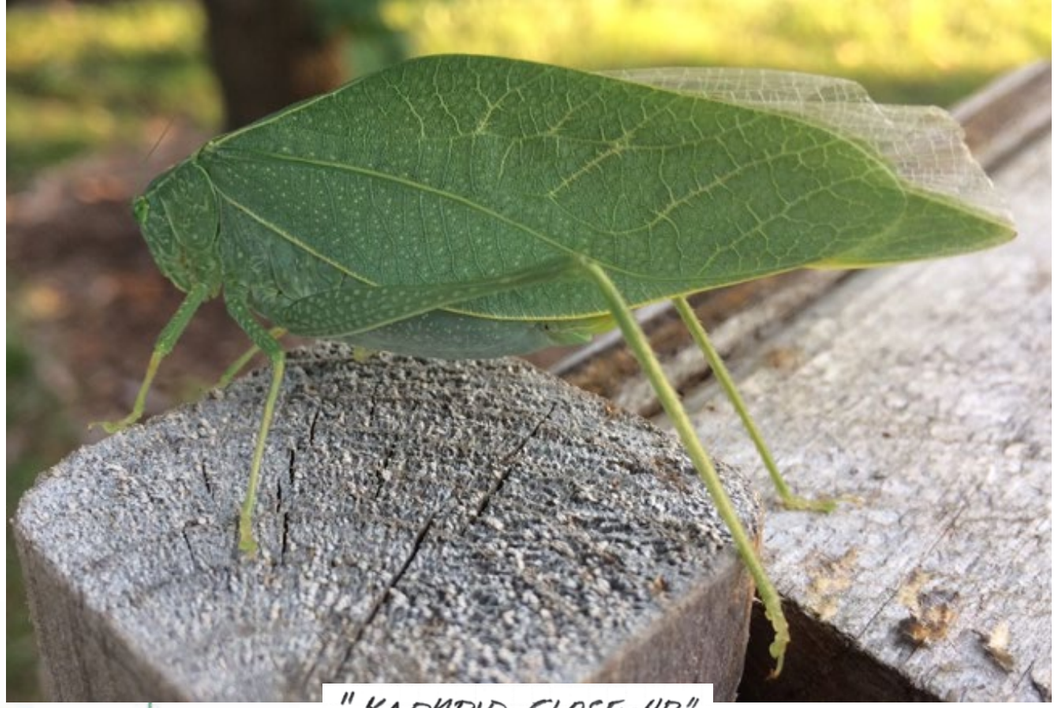


"GOOSEBERRY FALLS"
*Morgan Kaardal*

# ANIMALS WINNERS

"PRONGHORN"

*Rachel Siller*



"KATYDID CLOSE-UP"

*Tiffanie Stone*

"THE BUSINESS END"

*Erik Griffen*

# ANIMALS — HONORABLE MENTIONS

"RED PHALAROPE BABIES"

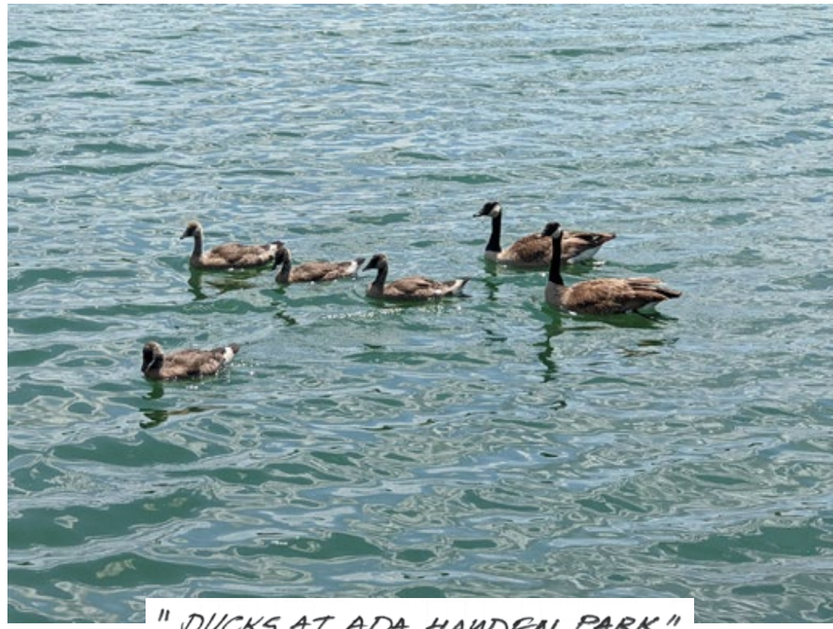
*Sarah Hoepfner*

"HATCHING MOUNTAIN PLOVERS"

*Rachel Siller*

"THICK-BILLED LONGSPUR"

*Rachel Siller*



"DUCKS AT ADA HAYDEN PARK"

*Tamara Porter*

"SUNKISSED"
*Kelsey Smith*

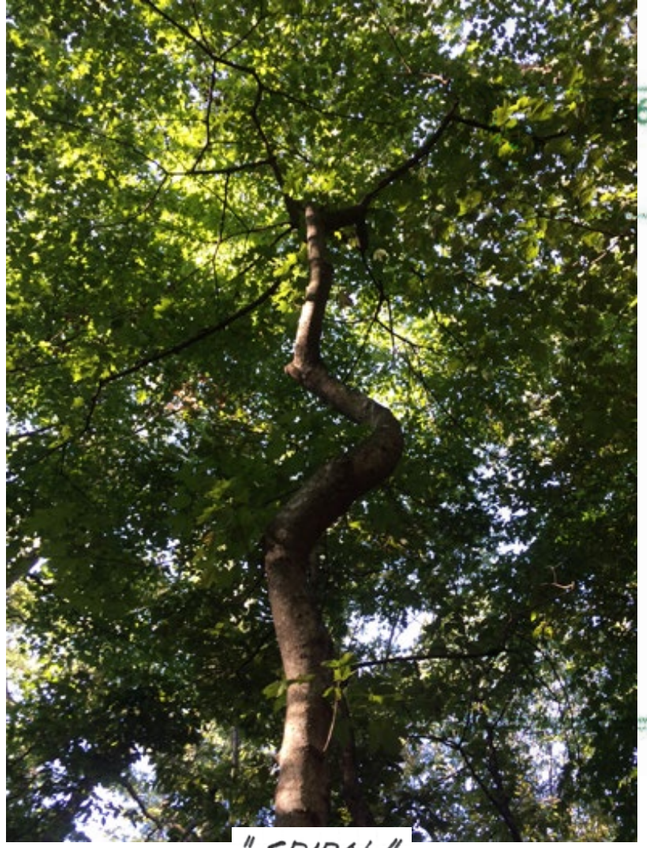
"WOOLY LOUSEWORT CLUMP"
*Sarah Hoepfner*

"INTERTWINED"
*Tiffanie Stone*

"HE HE HE..."
*Jade Allen*

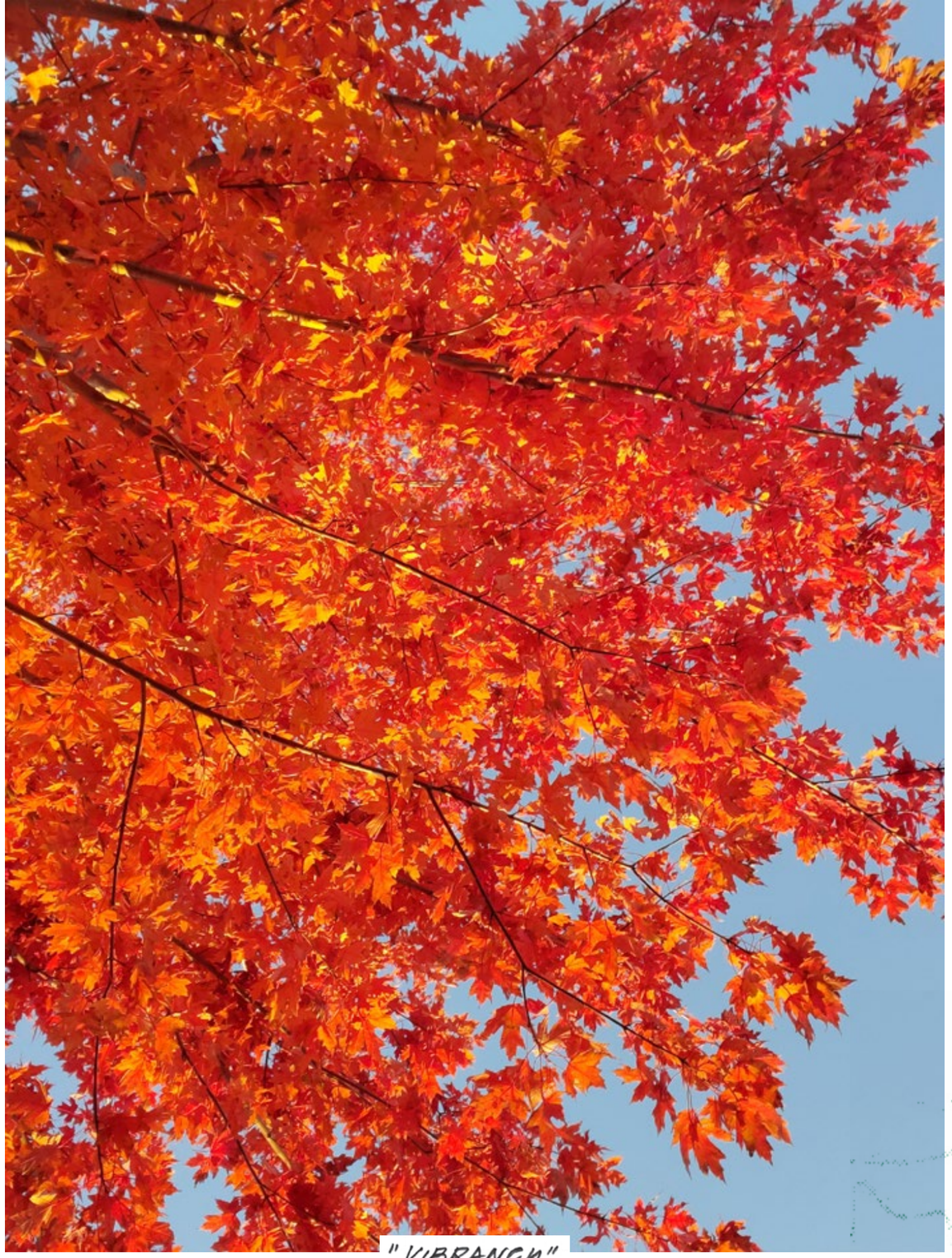
# PLANTS — HONORABLE MENTIONS

"SOME MAY SAY WEED"
*Bree Marmur*



"SPIRAL"
*Tiffanie Stone*

"SMILEY ARCTIC BUTTERCUPS"
*Sarah Hoepfner*



"VIBRANCY"

*Bree Marmur*

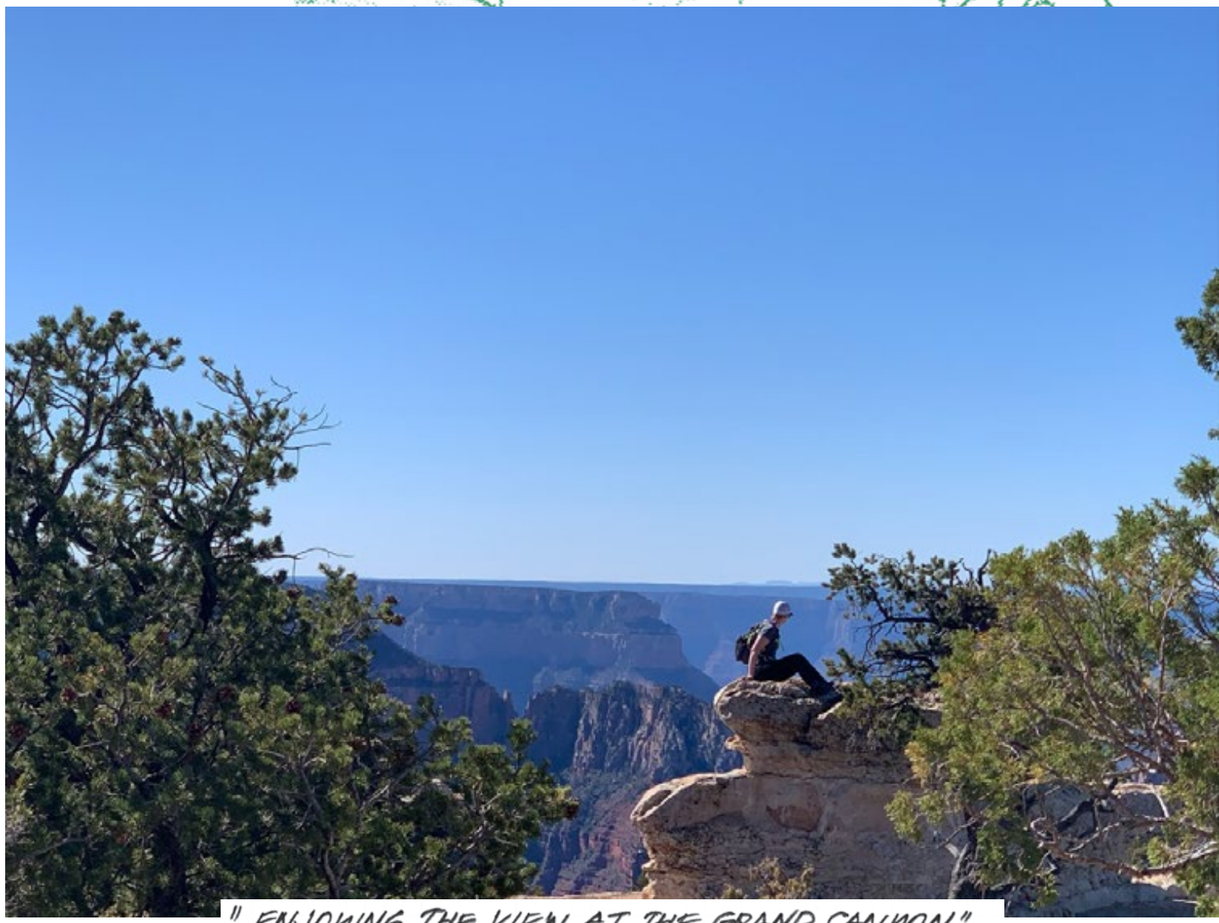
"BABY WOOLY LOUSEWART"

*Sarah Hoepfner*

# PEOPLE IN NATURE WINNERS

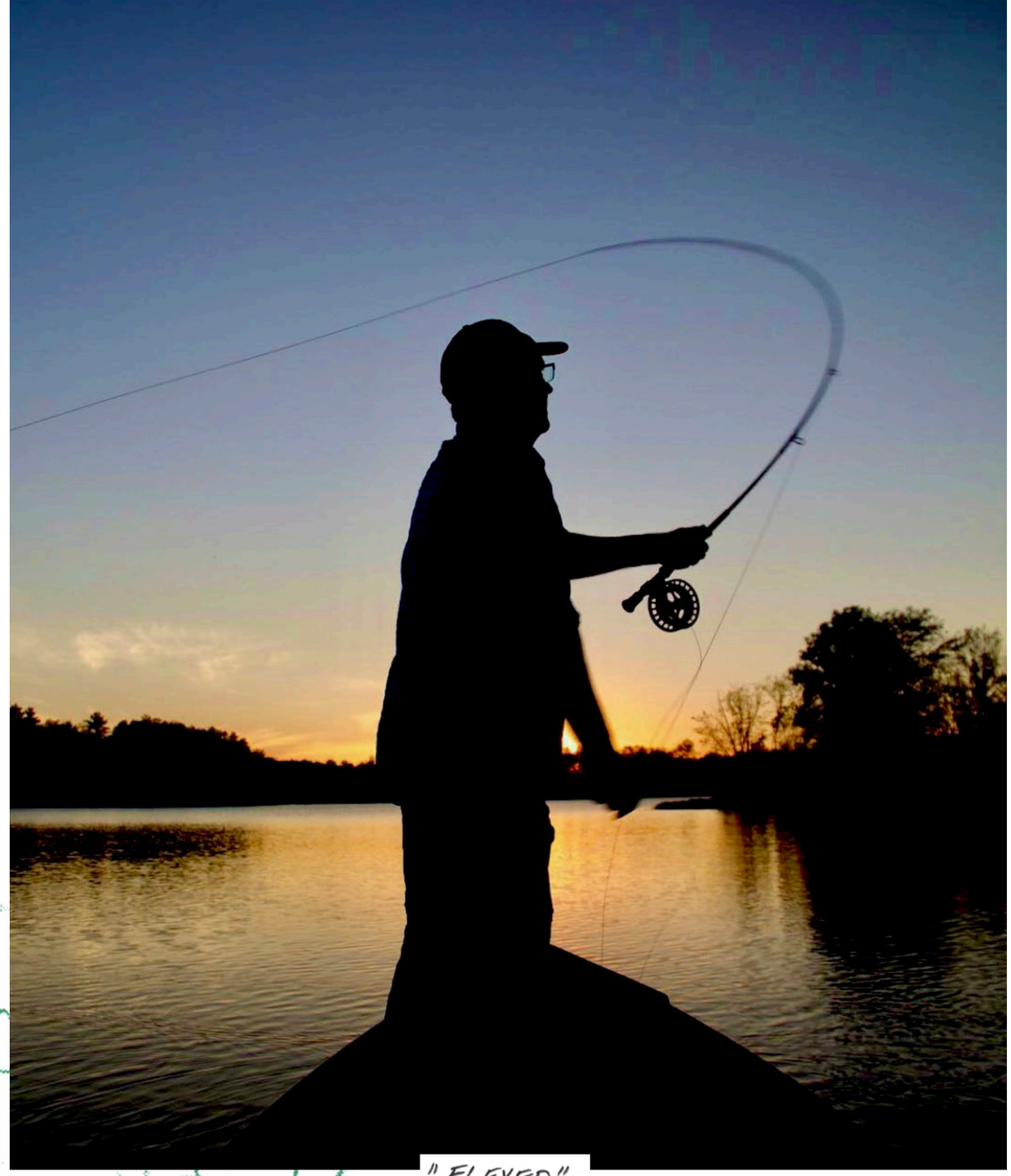
"POINT BARROW AND LAST YEAR'S BOWHEAD WHALE CARCASSES"

*Sarah Hoepfner*



"ENJOYING THE VIEW AT THE GRAND CANYON"

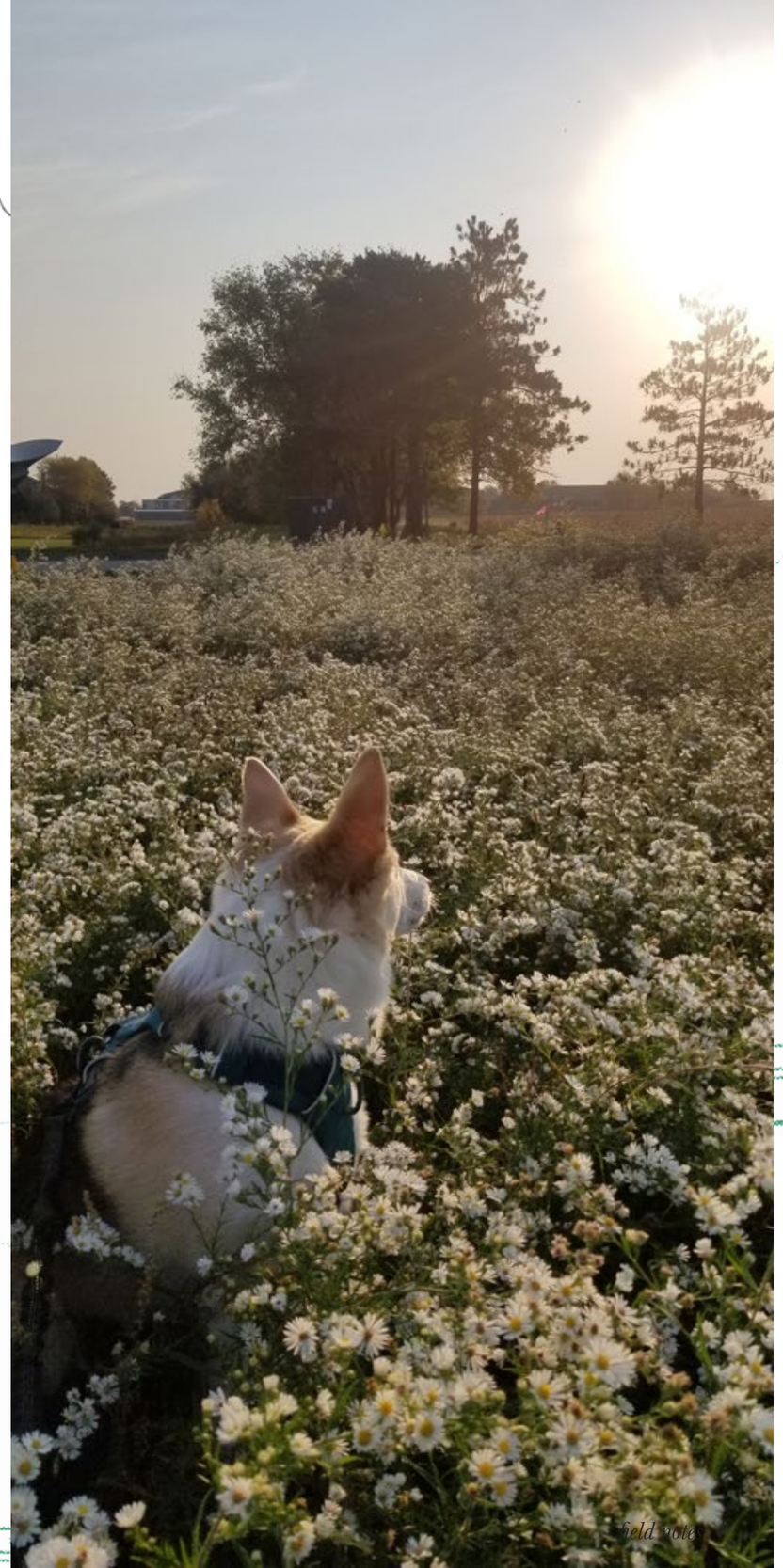
*Morgan Kaardal*



"FLEXED"
*Erik Griffen*

"SURPRISE BEHIND THE CAMPSITE"
*Jade Allen*

# PETS *WINNERS*



"FLOWER FROLICKS"
*Kelsey Smith*

"SUNBATHING"
*Jade Allen*

"OUR BEAUTIFUL BACKYARD EGG-LAYING CHICKENS: WHISKEY, TEQUILA, SCHNAPPS, BACARDI, AND LIMONCELLO."
*Jennifer Schieltz*

"REFLECTION OF A DOG(TOR)"

*Bree Marmur*

"CALM REFLECTIONS AS CLOVER SCOUTS THE WATER"

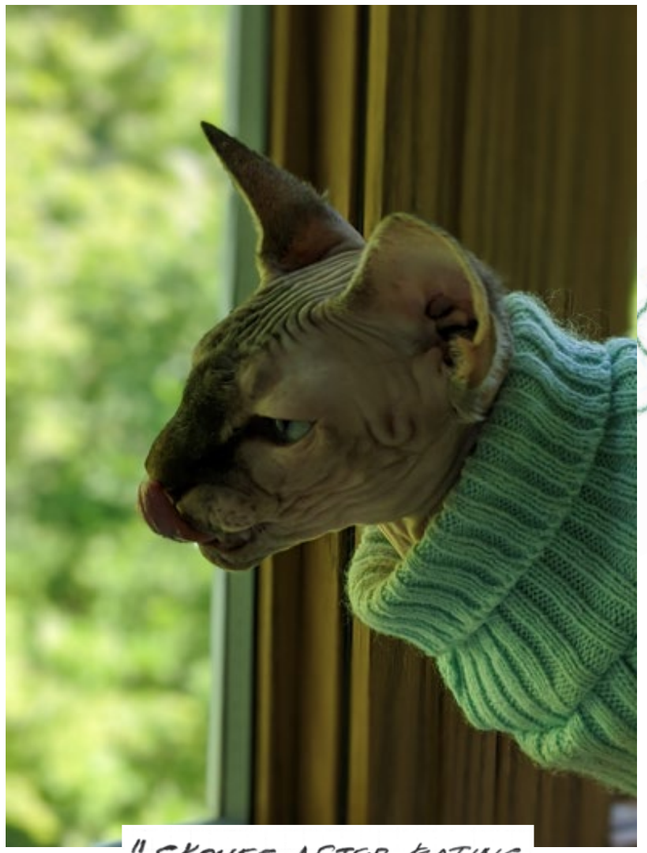
*Gabriel Johnson*

# PETS

## HONORABLE MENTIONS

"SKONES ENJOYING HER NEW SWEATER"

*Morgan Kaardal*



"SKONES AFTER EATING A TASTY WASP"

*Morgan Kaardal*

"SKONES EATING MY PLANT SHORTLY BEFORE SHE KILLED IT"

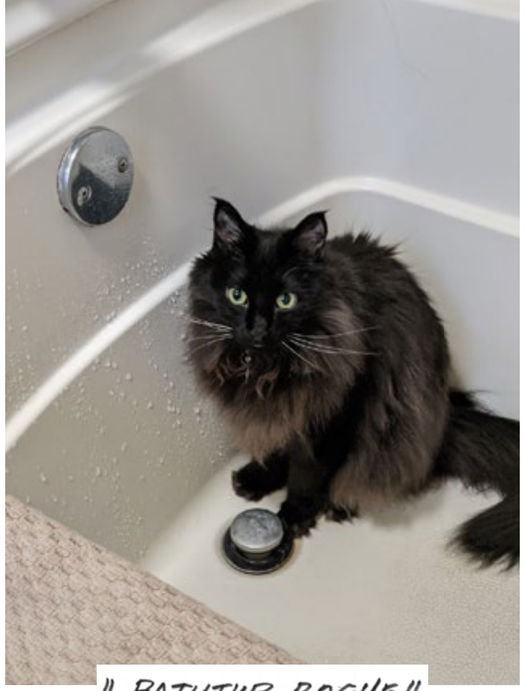
*Morgan Kaardal*

"SKONES ARTFULLY POSING NEXT TO HER TRUFFLE TREE"

*Morgan Kaardal*

" SNOWPHIE "

*Kelsey Smith*



" BATHTUB ROGUE "

*Tamara Porter*

" CRAB 1 - NREM MAIN OFFICE PET "

*Tamara Porter*

" TRUE WUV "

*Kelsey Smith*

"DARLING - NREM MAIN OFFICE PET"

*Tamara Porter*

"LEGION - NREM MAIN OFFICE PET"

*Tamara Porter*

"VALKYRIE - ACTUALLY BELONGS TO ME BUT LIVES IN THE MAIN OFFICE"

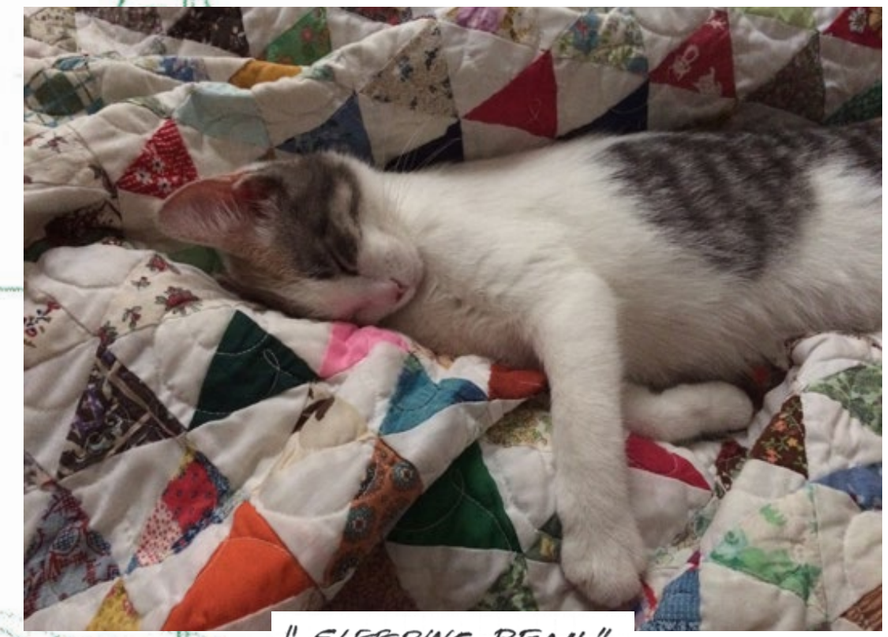
*Tamara Porter*

"DARLING 2 - NREM MAIN OFFICE PET"

*Tamara Porter*

" GLAMOUR SHOT "
*Tiffanie Stone*

" ON STAGE "
*Tiffanie Stone*

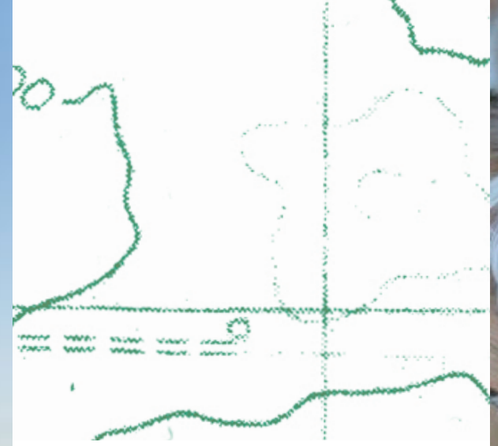


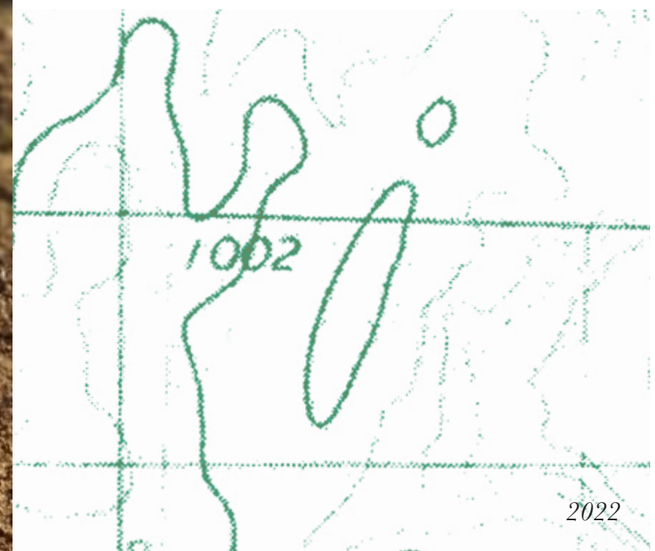
" SLEEPING BEAN "
*Tiffanie Stone*



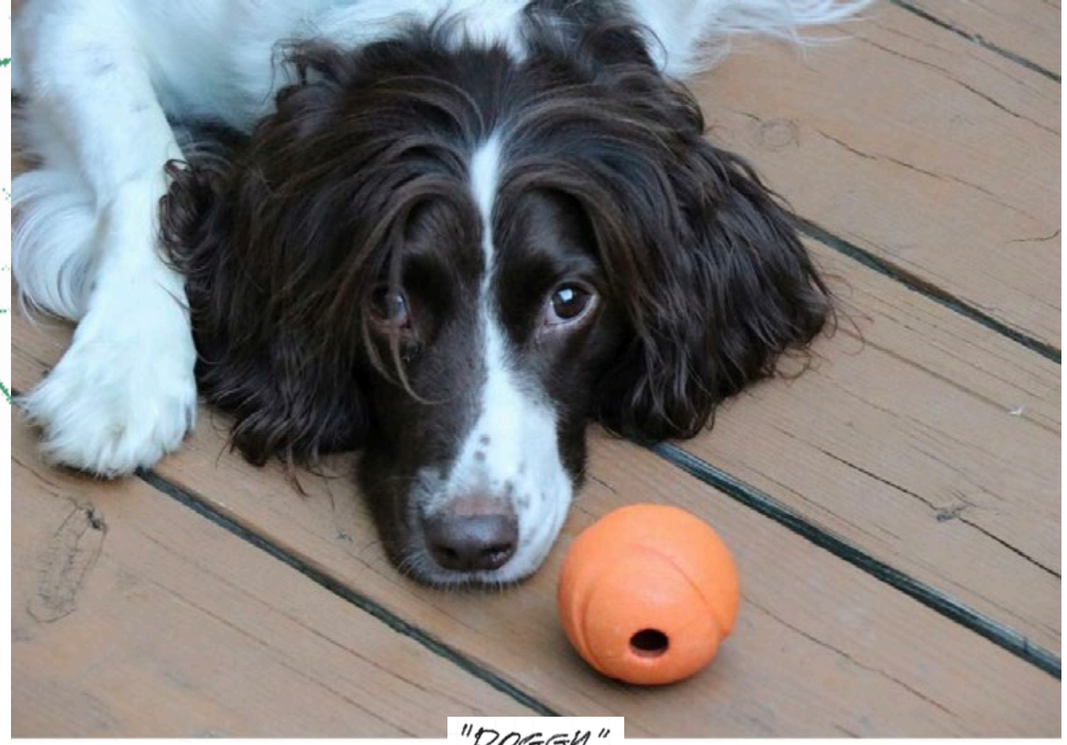
" WILLOW - MY SON'S PET CHILEAN RED HAIRED TARANTULA LIVING WITH ME WHILE HE'S AT ISU "
*Tamara Porter*

"BEACH DAYS"
*Kelsey Smith*

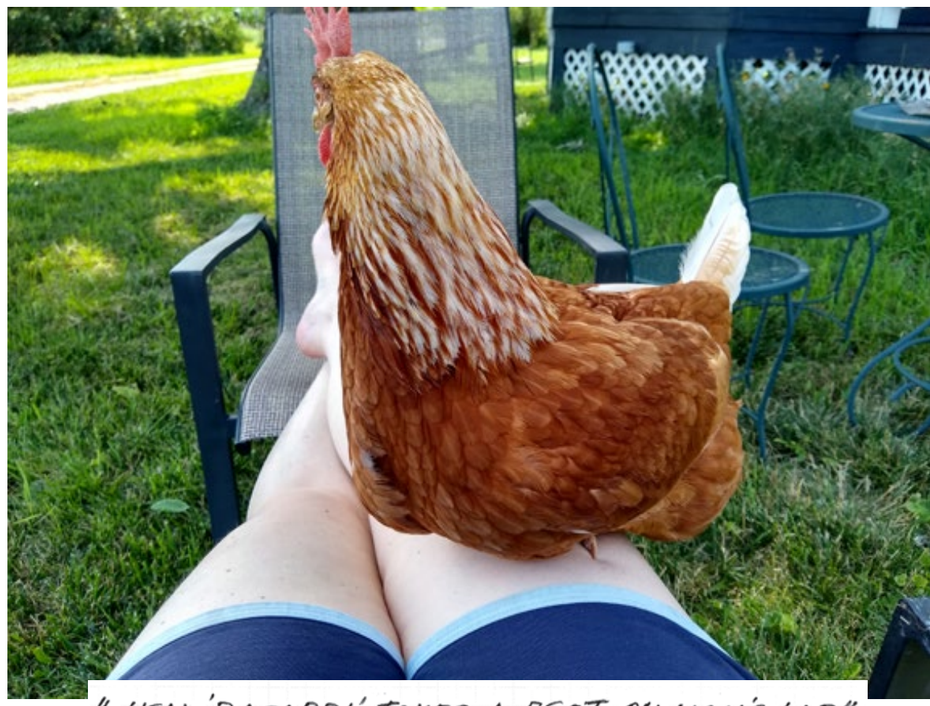




2022



"DOGGY"
*Erik Griffen*



"HEN 'BACARDI' TAKES A REST ON MOM'S LAP"
*Jennifer Schieltz*

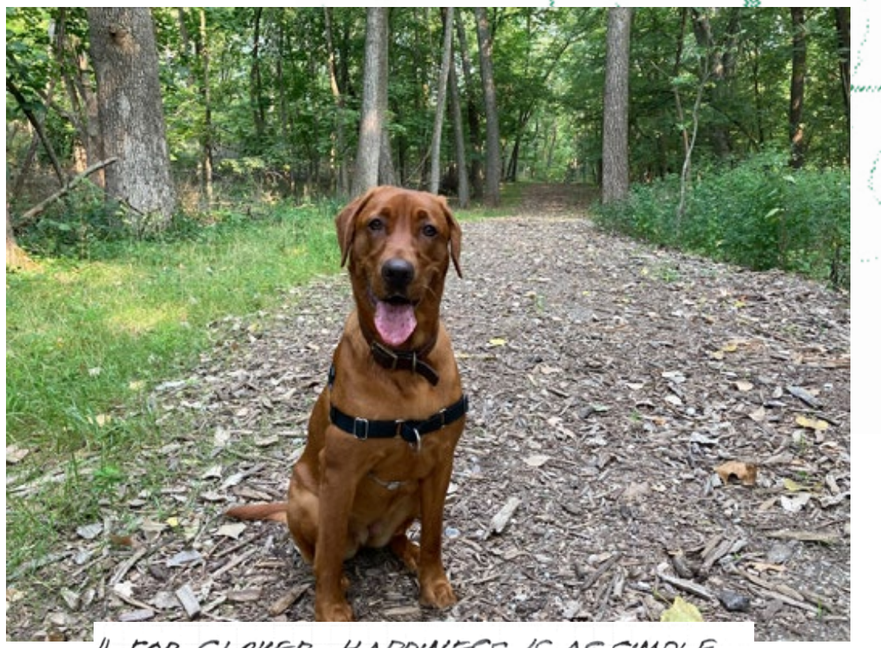
" ALL SMILES "
*Bree Marmur*

" SUNBATHING "
*Bree Marmur*

" CHAIR THIEF "
*Bree Marmur*

"CLOVER THE RED FOX LAB ENJOYING THE AUTUMN SCENTS AT PETERSON PARK"

*Gabriel Johnson*



"FOR CLOVER, HAPPINESS IS AS SIMPLE AS A WALK IN THE WOODS"

*Gabriel Johnson*

"MID-DAY SNOOZES"

*Kelsey Smith*

# EDITOR BIOS


Scale 1:15 840
5 000 Feet
1 Mile
N
(Joins sheet 3)


2'30"
1 770 000FEET
Rathbun
Lake

# JADE ALLEN

## EDITOR-IN-CHIEF

*Jade Allen is a first-year editor-in-chief of Field Notes. Jade is a MS student in environmental science researching geo-spatial applications of analyzing fluvial geomorphology in Iowa. Her major tasks include summarizing a ten-year stream bank erosion pin dataset and the impact of streambank stabilization structures. Outside of school work, Jade is still a geographer, as she enjoys exploring natural areas and walking cities.*

# BREE MARMUR

## EDITOR

*Bree Marmur has been editing Field Notes for four years and always enjoys seeing the publication come to life. Bree is a Ph.D. Candidate in Dr. Thompson's UNREAL lab where she focuses on urban stormwater management. In her free time Bree is constantly knitting or playing with her dog, Doc.*

## KELSEY SMITH
EDITOR

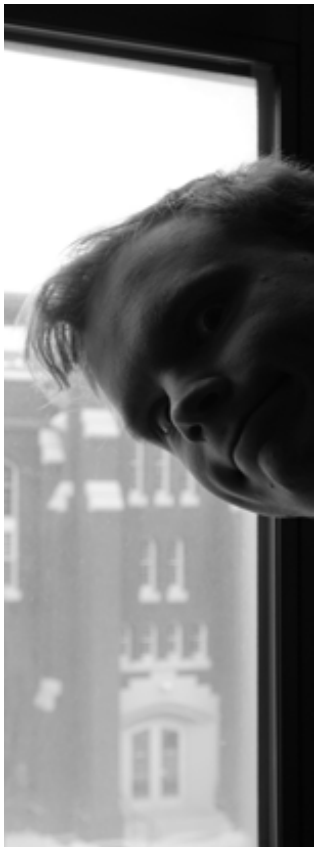
*Kelsey Smith is a first-year editor for Field Notes. For her MS in Wildlife Ecology, she is studying Lymphoproliferative Disease Virus (LPDV) in Iowa Wild Turkeys with Dr. Julie Blanchong. Her main goals are identifying infection hotspots within the state and identifying potential risk factors of infection. During her free time, you can find her exploring with her dog Sophie and making fun treats.*

## MELANIE BOGERT
EDITOR

*Melanie Bogert is a first-year editor for Field Notes. Melanie is studying sustainable agriculture and wildlife ecology with Dr. Lisa Schulte Moore and Dr. John Tyndall. Her research focuses on prairie ecology and waste disposal management with an emphasis on plant-pollinator interactions. In her free time, she enjoys running, hiking, and playing with her dog Ginny.*

# JUSTIN CUTBERTH

## GRAPHIC DESIGNER



*Justin is a Junior in Graphic Design at Iowa State. In their work, they enjoy exploring the combination of analog and digital processes. Their professional goal is to create work as a response to the modern design zeitgeist, not as a part of it. In their free time you will always find them with headphones on, listening to everything from screamo to synth pop. Aside from music, they are passionate about human rights, graphic novels, and self-improvement. They sincerely hope you've enjoyed the design in this edition of Field Notes!*

*Thanks for reading Field Notes!*