2025
21st Wildlife Damage Management Conference

MISSISSIPPI STATE UNIVERSITY™
DEPARTMENT OF WILDLIFE,
FISHERIES AND AQUACULTURE

Thank you to our sponsors!

Platinum Level Sponsors

Gold Level Sponsors

Silver Level Sponsor

2025 WILDLIFE DAMAGE MANAGEMENT CONFERENCE

March 24–27, 2025 | Bost Extension Center

Monday, March 24, 2025

3:00–6:00 PM ....Registration Open

6:00–6:05 PM ....Wildlife, Fisheries & Aquaculture Dept. Head Welcome – Andy Kouba

6:05–9:00 PM ....Welcome Social/Networking (Shorty's at The Mill)

Tuesday, March 25, 2025

8:30	**Plenary Session – Organizers: Adam Rohnke and Mel Boudreau**
8:30–8:32	**WDWG Chair Welcome**
8:33–8:40	**MAFES & FWRC Directors' Welcome**
8:40–9:05	Brian E. Mills. **The Economic Impact of Deer Damage on Crop Producers: A Buck's Buck Effect.**
9:05–9:30	Kurt C. VerCauteren **How do we Assess Crop Damage? Current and Future Methodologies.**
9:30–9:55	Andy Bater/Danny Munich. **Farmers Perspective on Crop Depredation: Policy, Action, and Needs.**
9:55–10:20	Alexander Sereno. **Application of Crop Insurance for Wildlife Damage.**
10:20–10:50	Break
10:50–11:15	Andy Kellner. **Midwest State Agency Perspective on Crop Depredation: Current Programs, Observations from the Field, and Pressures.**
11:15–11:40	Russ Walsh & William McKinley. **The Value of Deer.**
11:40–12:15	**Panel Discussion** – How Do We Move Forward Together?
12:15–12:20	**Extension Director's Welcome**
12:20–1:30	**Lunch provided**

1:30	**General Paper Session I – Moderator: Roger Baldwin**
1:30–1:50	Gabrielle Nielson. **Beaver Response to Flow Control Devices in Southern Michigan**.
1:50–2:10	B. K. Babbar. **Strategies for Blue Bull (Boselaphus tragocamelus) Damage Management in Punjab: Evaluating Physical Barriers, Deterrents, and Repellents.**
2:10–2:30	Brennan Peterson Wood. **Effectiveness of 3-mercapto-3-methylbutanol Odor as Carnivore Repellent in a Semi-arid Ecosystem of Southern Africa.**
2:30–2:50	Stephanie L. Boyles Griffin. **Applications of Reproduction Management for Mitigating Human-Wildlife Conflicts.**
2:50–3:10	Caleb Garzanelli. **Effectiveness of Neck Fladry Collars in Deterring Mexican Gray Wolves.**
3:10–3:40	**Break**

3:40	**General Paper Session II (Non-lethal/Novel) Moderator: Maddie Redd**
3:40–4:00	Pat Jackson. **Rise of the Common Raven: A Conservation Blind Spot.**
4:00–4:20	Luke Maddock*. **Economic Valuation of Wetland Ecosystem Services in the United States: A Machine Learning Approach.**
4:20–4:40	Steven C. Hess*. **National Registration of a Novel Toxic Bait for Invasive Small Indian Mongooses.**
4:40–5:00	George R. Gallagher. **Effectiveness of the AVIX Handheld 500 HSS Laser as Disruptive Stimuli to Repel Birds from a Dairy and Feedlot with Opportunistic Use.**
5:00–5:20	Madeline H. Melton. **Effects of Land Use and Fence Structure on Wildlife Crossings between a Protected Area and Human Dominated Landscape.**
5:20	Dinner on your own. Enjoy some of the local restaurants or check out the MSU Baseball game!

Wednesday, March 26, 2025

8:00 AM ....Shuttle From Hotels / Registration

8:30 AM ....Welcome

10:00 AM .... Poster Session

8:30	**General Paper Session III (Outreach/Aviation) – Moderator: Chad Dacus**
8:30–8:50	Brian J. MacGowan. **Forty-five Years and Counting - Design and Impact of a Long-term National Trapping Education Program.**
8:50–9:10	Kurt C. VerCauteren. **A Call to Wildlifers: Research Needs at the One Health Interfaces.**
9:10–9:30	Levi Altringer*. **Estimating the Impact of Airport Wildlife Hazards Management on Realized Wildlife Strike Risk**
9:30–9:50	Michael J. Begier. Robust and Alive: T**he National Wildlife Strike Database, 35 Years and Counting.**
10:00–11:00	**Poster Session**

11:00	**General Paper Session IV (Regulatory/Feral Swine) Sponsored by Mississippi Farm Bureau – Moderator: Logan Pruitt**
11:00–11:20	Roger A. Baldwin. **Rodenticides for the Management of Rodent Pests: Are They Still Needed?**
11:20–11:40	Sophie C. McKee*. **Externalities in Wild Pig Damages on U.S. Crop and Livestock Farms: The Role of Landowner Actions and Landscape Heterogeneity.**
11:40–12:00	Raymond B. Iglay. **A Rapid Assessment Tool for Detecting and Mapping Wild Pigs in a Newly Invaded Landscape.**
12:00–1:00	**Lunch provided**

1:00	**General Paper Session V (Regulatory/Feral Swine) Sponsored by Pig Brig – Moderator: Justine Smith**
1:00–1:20	Sebastian Gomez-Maldonado. **Spatial Behavior of Uncaptured Wild Pigs Following Sounder Removal via Trapping.**
1:20–1:40	Sydney M. Brewer. **Proximity of Bait Drives Wild Pig (Sus Scrofa) Visitation to Bait Sites more than Presentation Method or Addition of Scent.**

1:40–2:00	Nathan P. Snow*. **Regional Variation in Demographics, Reproduction, and Body Mass Growth Rates of Wild Pigs: Implications for Population Control.**
2:00–2:20	Mark Seamans*. **Informing U.S. Fish and Wildlife Service Migratory Bird Permitting Decisions with Potential Take Level Models.**
2:20–2:50	**Break**

2:50	**General Paper Session VI (Disease) – Moderator: Jon Cepek**
2:50–3:10	Abrial Norwick. **Highly Pathogenic Avian Influenza in Dairy Cattle.**
3:10–3:30	James M. Grinolds. **ASF surveillance in the United State by USDA Wildlife Services.**
3:30–3:50	Kelly J. Koriakin. **In Touch with the Dead – Wild Pig Contact with Nonspecific Carcasses and Its Implications for Disease Management.**
3:50–4:00	Break
4:00–5:00	**Business Meeting – Wildlife Damage Management Working Group**
6:00	**Closing Social/Networking Sponsored by Hogeye/Big Pig Trap**

Thursday, March 27, 2025

| **8:30** | **National Wild Pig Task Force Meeting** |

ABSTRACTS
Oral Presentations

The Economic Impact of Deer Damage on Crop Producers: A Buck's Buck Effect

Brian E. Mills, Department of Agricultural Economics, Mississippi State University, MS State, MS, USA, b.mills@msstate.edu

A B S T R A C T: Quantifying the crop damage caused by deer is an issue faced by those in the agricultural industry. Crop insurance provides some protection to producers to help pay for these damages and an estimate of the severity of the issue. However, crop insurance does not show the full extent of the damages that occur, and producers can still suffer significant losses before insurance payments begin. This talk will give an overview of deer damage estimates across the U.S., the impact and limitations of crop insurance, and finally discuss a recent survey of Mississippi producers on the impact of deer damage on their operations.

How do we Assess Crop Damage? Current and Future Methodologies

Kurt VerCauteren, USDA Wildlife Services NWRC, kurt.c.vercauteren@usda.gov

A B S T R A C T: Quantifying the crop damage caused by deer is an issue faced by those in the agricultural industry. Crop insurance provides some protection to producers to help pay for these damages and an estimate of the severity of the issue. However, crop insurance does not show the full extent of the damages that occur, and producers can still suffer significant losses before insurance payments begin. This talk will give an overview of deer damage estimates across the U.S., the impact and limitations of crop insurance, and finally discuss a recent survey of Mississippi producers on the impact of deer damage on their operations.

Farmers' Perspective on Crop Depredation: Policy, Action, and Needs

Andy Bater**, Pennsylvania Farm Bureau, switchgrassfarmer@gmail.com

Danny Munch**, Economist, American Farm Bureau, dmunch@fb.org

A B S T R A C T: Farmers nationwide face increasing challenges from wildlife damage, ranging from black vultures and feral hogs to deer and Grizzly bears. In this session, Danny Munch (AFBF) and Andy Bater (Pennsylvania Farm Bureau) will provide state and national perspectives on these issues, discuss the need for applied research to drive effective advocacy, and highlight how Farm Bureau collaborates with academia and industry to accelerate solutions. The session will also provide updates on farmer-led policy efforts to address wildlife damage at state and federal levels.

Application of Crop Insurance for Wildlife Damage

Alexander Sereno, USDA Risk Management Agency, Raleigh, NC, USA, alexander.sereno@usda.gov

A B S T R A C T: The Federal Crop Insurance Program is a public private partnership between the USDA Risk Management Agency and private insurance companies that provides risk management tools to farmers nationwide. Wildlife damage is one of the perils covered by the program. Alexander Sereno, Director of the Risk Management Agency's Product Administration and Standards Division will provide an overview of the Federal Crop Insurance Program as a whole, as well as the way the program addresses damage from wildlife.

Midwest State Agency Perspective on Crop Depredation: Current Programs, Observations from the Field, and Pressures

Andy Kellner**, Iowa Department of Natural Resources, Mount Ayr, IA, USA, andrew.kellner@dnr.iowa.gov

A B S T R A C T: Iowa Department of Natural Resources depredation program staff work one-on-one with producers and landowners to hear and respond to concerns, identify sources of damage, and educate or implement depredation program protocol according to state code. Balancing management of the natural resource with customer service and stakeholder pressures to appease the complaints is often at odds with on the ground realities of land management decisions, hunter access, and public resource values.

The Value of White-tailed Deer

Russ Walsh**, Mississippi Department of Wildlife, Fisheries and Parks, Jackson, MS, USA

russ.walsh@wfp.ms.gov

William McKinley**, Mississippi Department of Wildlife, Fisheries and Parks, Jackson, MS, USA

A B S T R A C T: White-tailed deer restoration efforts in Mississippi are one of the most successful conservation stories in the country. The white-tailed deer population is at a record high. Over 150,000 Mississippians buy a license to hunt deer and harvested greater than 279,000 deer during the 2023/2024 deer season. White-tailed deer are a keystone herbivore, and their abundance has impacts on native flora, fauna, and agriculture. The venison produced by this number of harvested deer is critically important to many families in Mississippi. Proper deer management is necessary to keep deer populations in balance with their habitats.

Beaver Response to Flow Control Devices in Southern Michigan

Gabrielle Nielson**, Michigan State University, Department of Fish and Wildlife, East Lansing, MI, USA, nielso12@msu.edu

Brett DeGregorio, U.S. Geological Survey, Michigan Cooperative Fish and Wildlife Research Unit

Gary Roloff, Michigan State University, Department of Fish and Wildlife

Jimmy Taylor, USDA Wildlife Services NWRC, Fort Collins, CO 80521, USA.

A B S T R A C T: North American Beavers (Castor canadensis) are tenacious dam builders and are widely accepted as ecosystem engineers. However, dams built by beavers frequently instigate conflict as the above dam water rises, flooding infrastructure and critical habitat. A variety of factors have led to an increase in beaver populations across the country, leading to an increase in human-beaver conflicts. Lethal control methods have been traditionally implemented to address conflict. However, public perception of management towards beavers is shifting towards a preference for non-lethal methods. One trending method is flow control devices (FCD). Research has been conducted on the effectiveness of FCD's ability to maintain the above dam water level, but there has been no research into the behavioral response of beavers to the installation of FCD's in their dam. To address this knowledge gap, we worked with USDA Wildlife Services to trap and tag beavers at six sites in 2024. Using radio-telemetry and game cameras we monitored their behavior around the dam and lodge residency before and after installing an FCD. We present the variety of behavioral responses exhibited by the beavers over the course of the project.

Strategies for Blue Bull (Boselaphus tragocamelus) Damage Management in Punjab: Evaluating Physical Barriers, Deterrents, and Repellents

B. K. Babbar**, Department of Zoology, Punjab Agricultural University, Ludhiana-141004, India, bhupinder@pau.edu

Kiran Rani, Department of Zoology, Punjab Agricultural University, Ludhiana-141004, India

A B S T R A C T: Blue bull (Boselaphus tragocamelus), is a pest in several north Indian states including Punjab, causing more damages in crop fields near forests and water holes. This study assessed various methods like physical barriers (barbed wire, chain-link, electric fences, and nylon nets), acoustic and visual deterrents (bioacoustic device (Blue bulls hearing range peaks around 3 to 10 kHz. To ensure detection in noisy environment, call sequences were captured, amplified and compressed between 87dB to 110dB while designing this device), LED lights, reflective ribbons), and chemical repellents (phenyl, neelbo, and repellent based formulations (RBF)) for mitigating the impact of blue bulls on crops like wheat, paddy, maize, potato, moong, guava orchard. For each crop and treatment, three replicates, each measuring 0.4 hectare at three different locations were selected for both treated and untreated fields. Physical barriers, installed at heights of 7 feet or more, were most successful in providing long-term protection. While physical barriers were generally not cost efficient, they were cost-effective for maize (Nylon net & electric fencing Cost: benefit (C:B)-1:2.33 & 1:1.59), guava orchard (Electric fencing C:B-1:12.04), summer moong (nylon net C:B-1:0.89) as these crop are most favored by blue bulls. Bioacoustics and reflective ribbons showed initial success in deterring the animals, but their effectiveness waned as the animals became accustomed to them. Of the chemical repellents, RBF was the most effective, offering prolonged protection (21-69 days) and being cost-effective (Maize & wheat C:B-1:5.3 to 1:60), while phenyl and neelbo only provided short-term relief (7-14 days). The findings suggest that it may be expensive for farmers to rely solely on physical barriers, using RBF at critical crop stages can provide longer-lasting defense. A combination of deterrent methods, applied strategically, could form a more cost-effective and sustainable approach to managing blue bull damage. Rouse concentration areas. Findings are preliminary and provided for timely best science.

Effectiveness of 3-mercapto-e-methylbutanol Odor as a Carnivore Repellent in a Semi-arid Ecosystem of Southern Africa

Brennan Peterson Wood**, Warnell School of Forestry and Natural Resources, Athens, GA, USA; Savannah River Ecology Laboratory, University of Georgia, Aiken, SC, USA, brennan.petersonwood@uga.edu

Madeline Melton, Warnell School of Forestry and Natural Resources, Athens, GA, USA

Claudine Cloete, Ministry of Environment, Forestry, and Tourism, Namibia

Peter Apps, Botswana Predator Conservation, Maun, Botswana

James Beasley, Warnell School of Forestry and Natural Resources, Athens, GA, USA

A B S T R A C T: Carnivore-livestock conflict is an ever-expanding issue as the human population grows, and natural habitat is converted to human use. In impoverished areas, livestock depredation can have a significant impact on the livelihoods of people already living at the poverty line, and communities living adjacent to protected areas may be particularly vulnerable to losses. Retaliatory killings of carnivores can result in decreased genetic viability of a population and ecological degradation of the landscape. Areas adjacent to Etosha National Park (Etosha), Namibia are a hotspot of carnivore conflict and the killing of large carnivores on lands adjacent to the park has the potential to reduce Etosha's carnivore populations below sustainable levels. Current conflict reduction actions primarily rely on relocations and lethal removal. To evaluate the effectiveness of a non-lethal olfactory deterrent at reducing carnivore crossings between Etosha and the surrounding multi use landscape, we placed vials containing 3-mercapto-3-methylbutanol, a component of African leopard (Panthera pardus) urine, at gaps in the Etosha fence and monitored crossing behavior. Spotted hyena (Crocuta crocuta) and cheetah (Acinonyx jubatus) had the highest reduction in crossings at treated locations. Land-use type bordering the park also influenced carnivore crossing behavior, with no difference in crossings between Etosha and private game reserves but a reduction in crossings between Etosha and lands used for livestock production when the repellent was present. The development of low cost, non-lethal conflict mitigation tools is of the upmost importance to the long-term viability of carnivore populations in Etosha, and throughout similar multi use landscapes in southern Africa.

Applications of Reproduction Management for Mitigating Human-Wildlife Conflicts

Stephanie L. Boyles**, Botstiber Institute for Wildlife Fertility Control, 200 E. State St., Suite 307, Media, PA, USA, boylesgriffinadvisor@botstiber.org

Jessica Tegt, Botstiber Institute for Wildlife Fertility Control, 200 E. State St., Suite 307, Media, PA, USA

A B S T R A C T: As human populations increase and urbanization expands, interactions between humans and wildlife are growing exponentially, and as a result, some native and non-native wildlife species cause Human-Wildlife Conflicts (HWCs). Efforts to resolve HWCs have focused primarily on traditional management methods, including firearms, traps and toxicants, but today the use of lethal methods to mitigate HWCs is an intensely debated, polarizing, and litigious issue. In some contexts, lethal methods for managing HWCs may be restricted or logistically infeasible, illegal, or socially and/or politically unacceptable due to shifts in public values and attitudes towards wildlife. For these reasons, there is growing interest from wildlife managers, policymakers, and the public for effective, sustainable non-lethal population management alternatives, such as reproductive management methods (i.e., fertility control), that are safe, humane and can be integrated into wildlife damage management programs. Since the late 20th century, significant progress has been made in the development of fertility control agents as well as identification and delivery systems for managing native and non-native wildlife conflicts. We will present the results of a case study on the use of immunocontraceptive vaccines to manage federally protected wild burros in the northwestern Arizona. Using the case study as a template, we will explore the practical, social, economic, legal, and regulatory issues associated with incorporating fertility control methods into wildlife damage management plans, and the need for wildlife damage management professionals to provide the public and policymakers with accurate, up-to-date, science-based data on efficacy, safety, feasibility, costs, tradeoffs, and expected outcomes.

Effectiveness of Neck Fladry Collars in Deterrring Mexican Gray Wolves

Caleb Garzanelli**, USDA Wildlife Services NWRC, caleb.garzanelli@usda.gov

David Bergman, USDA Wildlife Services

Breck Steward, USDA Wildlife Services NWRC

Christopher Carillo, USDA Wildlife Services

Colby Gardner, U.S. Fish and Wildlife Service

John Oakleaf, U.S. Fish and Wildlife Service

A B S T R A C T: Fladry and turbo fladry has been proven to be an effective tool in non-lethal protection of livestock against predators. Wildlife Services employees in Arizona have used turbo-fladry specifically to deter Mexican Gray Wolves (Canis lupus baileyi) out of livestock pastures. However, many livestock pastures are too large to effectively install fladry around the whole pasture. In response to this, Wildlife Services Arizona Program employees, members of the National Wildlife Research Center (NWRC), the U.S Fish and Wildlife Service, and one livestock owner in Arizona tried the use of fladry on collars for cattle. These collars contained red fladry triangular flags and were fitted with a bell around the neck of cattle. Cattle with and without neck fladry were then moved into pastures on U.S Forest Service allotments and state leases. Results indicated that the neck fladry collars did not reduce depredations on cattle. In general, more fladry collared cattle were depredated upon while wearing the collar than uncollared cattle. Observations through the trial indicated that the collars became degraded and compromised, which may have contributed to their ineffectiveness. While this experiment was only conducted with one resource owner, it suggested that an alternative nonlethal tool may be more effective than the one tested.

Rise of the Common Raven:
A Conservation Blind Spot

Pat Jackson**, Great Basin Bird Observatory, Reno, NV, USA, pjj365@gmail.com

Peter S. Coates, U.S. Geological Survey, Dixon, CA, USA

Seth Dettenmaier, U.S. Geological Survey, Reno, NV, USA

Cali Roth, U.S. Geological Survey, Dixon, CA, USA

Shawn O'Neil, U.S. Geological Survey, Dixon, CA, USA

John Boone, Great Basin Bird Observatory, Reno, NV, USA

Tony Wasley*, Wildlife Management Institute, Reno, NV, USA

A B S T R A C T: The common raven (Corvus corax) has been identified as the most widespread nest predator of greater sage-grouse (Centrocercus urophasianus). Common raven nest predation has also been documented to negatively impact several other sensitive avian species. Although a native species and natural predator, various human subsidies including non-traditional food sources (e.g., roadkill, landfills) and artificial nesting structures (e.g., power and utility lines), dramatically increased common raven abundance as much as 1600% in some areas. Increased common raven abundance coupled with habitat loss and degradation (e.g., invasive annual grass invasion, tightened wildfire cycles and anthropogenic surface disturbance projects) is continuing to put additional negative pressures on a growing list of species. We intend to present: 1) common raven population growth, 2) potential factors that influence that population growth, 3) a summary of species impacted by this population growth 4) an overview of a Science-based Management of Ravens Tool (SMaRT), 4) a three-tiered management approach, and 5) a call for awareness and unity on a growing conservation blind spot.

Economic Valuation of Wetland Ecosystem Services in the United States: A Machine Learning Approach

Luke Maddock**, Department of Economics, Colorado State University, Fort Collins, CO, USA; USDA APHIS National Wildlife Research Center, Fort Collins, CO, USA, Luke.Maddock@colostate.edu

Frank Nelson, Statewide Resource Management, Missouri Department of Conservation

Levi Altringer, USDA APHIS National Wildlife Research Center, Fort Collins, CO, USA

Sophie McKee, Department of Economics, Colorado State University, Fort Collins, CO, USA; USDA APHIS National Wildlife Research Center, Fort Collins, CO, USA

A B S T R A C T: The economic valuation of wetland ecosystem services faces persistent challenges in addressing spatial heterogeneity and data scarcity across diverse landscapes. This paper proposes a novel methodology that combines supervised machine learning with global ecological and socioeconomic data to estimate wetland ecosystem service values. By leveraging the Ecosystem Services Valuation Database and integrating it with globally available geospatial data, our model can predict values for 15 distinct ecosystem services at any geographical location. Application to wetland conservation areas in Missouri reveals substantial variation in ecosystem service values driven by local context, with urban-adjacent sites demonstrating higher values for regulating services while rural sites show strength in supporting services. The model identifies key drivers of variation including urban proximity, human modification, and local ecological characteristics. This approach advances benefit transfer methodology by providing a systematic, globally applicable framework for more applicable ecosystem service valuation. The results suggest that effective wetland conservation strategies should consider both spatial heterogeneity and the complex interactions between human and natural systems.

National Registration of a Novel Toxic Bait for Invasive Small Indian Mongooses

Steven C. Hess**, USDA APHIS Wildlife Services NWRC, Hilo, HI, USA, steven.hess@usda.gov

Carmen C. Antaky, USDA APHIS Wildlife Services NWRC, Hilo, HI, USA

Israel L. Leinbach, USDA APHIS Wildlife Services NWRC, Hilo, HI, USA

Emily W. Ruell, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Shane R. Siers, USDA APHIS Wildlife Services NWRC, Barrigada, GU, USA

Linton Staples, Animal Control Technologies (Australia) Pty Ltd, Somerton, VIC, 3062, Australia

Robert T. Sugihara, USDA APHIS Wildlife Services NWRC, Hilo, HI, USA

A B S T R A C T: The small Indian mongoose (Urva auropunctata) was widely introduced throughout the world to control rodents in agricultural areas, but has become an invasive species, particularly on islands, where it has major detrimental effects on native wildlife. In the United States the species occurs throughout most of the Hawaiian Islands, and in Puerto Rico where mongooses are the main terrestrial wildlife reservoir of canine rabies. Accidental introduction to mongoose-free islands, difficulty of detection, and costly trapping effort necessitate a novel control method. A target-specific toxic bait can provide an additional tool to eradicate incipient populations at ports of entry, and to reduce mongoose abundance in conservation areas, thereby protecting wildlife and human health. The USDA National Wildlife Research Center (NWRC) is pursuing national registration of a toxic bait for mongooses with the U.S. Environmental Protection Agency (EPA). USDA NWRC screened a suite of bait matrices and chemical toxicants, developed a mongoose-specific bait station, conducted efficacy trials in the laboratory and in the field under an Experiment Use Permit from the EPA, to monitor efficacy and effects on non-target species. There are no other comparable invasive small mammalian carnivores for which toxic baits have been developed and registered in the United States.

Effectiveness of the AVIX Handheld 500 HSS Laser as Disruptive Stimuli to Repel Birds from a Dairy and Feedlot with Opportunistic Use

George R. Gallagher, Department of Animal Science, California Polytechnic State University, San Luis Obispo, CA, USA, gegallag@calpoly.edu

A B S T R A C T: The impact of the highly pathogenic avian influenza (HPAI) has increased in many parts of the country with direct effects on agricultural animal food production, as well as zoonotic concerns. The use of high intensity laser products to repel birds has been established. The objective of this study was to evaluate the effectiveness of a handheld laser, operated on an opportunistic basis, in repelling birds at a dairy, a beef cattle feedlot, and a feed storage area on campus. All treatments were applied by a single operator from a motor vehicle within 30 – 80m of birds on the ground or where a substantial physical background was present. Following collection of a pre-treatment photograph, laser treatment included directing the beam toward the birds with lateral followed by circular movements for up to 60-seconds. A post-treatment photograph was immediately taken following flight or after 60-seconds of laser exposure. Data collected included time of day, location, weather conditions, and laser treatment time. Pre- and post-treatment analysis of photographs included the number of blackbirds, crows, pigeons, waterfowl and other bird species as a group. The study began November 5, 2024, and continue through January 2025. Preliminary results suggest the handheld laser unit has utility in providing an acute disruptive stimulus resulting in bird flight in most cases. There do appear to be some differences in effectiveness due to the level of sunlight, species of bird and total number of birds at a given location.

Effects of Land Use and Fence Structure on Wildlife Crossings Behavior between a Protected Area and Human Dominated Landscape

Madeline H. Melton**, University of Georgia, Savannah River Ecology Laboratory, Aiken, SC, USA; University of Georgia, Warnell School of Forestry and Natural Resources, Athens, GA, USA, madeline.melton@uga.edu

Stéphanie Périquet-Pearce, Ongava Research Centre, Outjo, Namibia

J. Werner Kilian, Etosha Ecological Institute, Okaukuejo, Etosha National Park, Namibia

Claudine Cloete, Etosha Ecological Institute, Okaukuejo, Etosha National Park, Namibia

James Beasley, University of Georgia, Savannah River Ecology Laboratory, Aiken, SC, USA; University of Georgia, Warnell School of Forestry and Natural Resources, Athens, GA, USA

A B S T R A C T: Many protected areas have implemented conservation fences to decrease human-wildlife conflicts at the interface with human-dominated landscapes. However, conservation fences and their role in management are still poorly understood. In northern Namibia, Etosha National Park (ENP) is surrounded by an 820km two-meter-high fence, in addition to a veterinary cordon fence along the southern border, and elephant-proof fencing dispersed throughout high-conflict areas, yet wildlife frequently move through breaks. Using motion-activated cameras from September 2022- April 2024 deployed on the fence, we monitored 84 crossing points between ENP and three anthropogenic land-use types outside ENP to 1) determine the frequency of crossings among species of different body sizes across three taxa groups (carnivores, ungulates, and burrowing species), and 2) determine the effects of environmental attributes and fence structural elements on fence crossing behaviour. Carnivores predominantly crossed in the wet season and along the fence adjacent to game reserves. While break type and mesh wire did not affect crossing frequency, when electrification was present, crossing frequency was reduced significantly for large and medium carnivores. Ungulates crossed most frequently during the hot dry season, and into game reserves. Large and medium ungulates crossed only at large breaks without mesh, while fence structure had no effect on small ungulates. Structural elements had no effect on crossings by burrowing species. These results provide wildlife officials and land managers a better understanding of the behavioural, anthropogenic, and environmental drivers of fence crossings, which is critical for developing context-specific management strategies for target species.

Forty-five Years and Counting: Design and Impact of a Long-term National Trapping Education Program

Brian MacGowan, Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN, USA, macgowan@purdue.edu

A B S T R A C T: Trapping is an effective tool in both managing wild fur bearer populations and addressing wildlife damage issues. However, many natural resources professionals and law enforcement officers who set or enforce trapping regulations have minimal or no hands-on trapping experience. In 1980, the first Professional Trappers College Fur bearer Management Short Course taught trapping techniques and fur bearer management concepts to both trappers and professionals from around the country. This annual program has instructed over 1,000 individuals from every state in the U.S. and beyond over the past 45 years. The program is conducted over a week and includes both field and/or classroom sessions on dryland and water trapping techniques, trap modification and repair, wildlife biology and behavior, fur bearer management, wildlife disease, and more. This presentation will provide a brief review of the history of 'Trappers College', instructional concepts, format, stakeholders and partnerships, impact based on student feedback, and recommendations for future programs. Trappers College has impacted many professionals across the country, but it is one example of many impactful programs across the country. Because of its impact and length of standing, other trapping education programs across the country could benefit from the lessons learned.

A Call to Wildlifers: Research Needs at the One Health Interfaces

Kurt C. VerCauteren, USDA/APHIS/Wildlife Services, National Wildlife Research Center, Fort Collins, CO 80521, USA, kurt.c.vercauteren@usda.gov

A B S T R A C T: During high stakes conversations pertaining to how to address disease transmission threats at the interfaces amongst wildlife, livestock, and humans, the elephant in the room can quite literally be an elephant. As is coming more and more to the forefront with current variants of shared diseases, such as COVID and avian influenza, the roles wildlife can play in harboring and transmitting disease agents to livestock and humans are often poorly understood, underappreciated, and difficult to address. From local to global scales, zoonoses can impact public health, economies, and biodiversity – and the potential for spillover and epidemic ignition are higher than in the past due to a variety of patterns and circumstances. These realities impart a need for multidisciplinary studies at the interfaces that focus on wildlife, to fill voids in our current state of knowledge so that we can best inform management and policy efforts. Here we point out opportunity and need for the wildlife damage and disease community to play a primary role in taming the elephants of One Health. Diseases in wild pigs pose a significant threat to livestock producers due to the risk of transmission to domestic animals, specifically swine. In recent years, African swine fever (ASF) in Europe and Asia has resulted in substantial economic losses stemming from immediate control measures such as culling domestic swine, trade bans, and increased surveillance in production areas. An introduction of ASF to the continental US would have profound economic effects and critical gaps remain in understanding the fundamental parameters driving ASF dynamics, limiting the ability to effectively prepare for and manage potential outbreaks. Contact between uninfected wild pigs and infected carcasses is thought to be a key driver of ASF spread, yet the rate at which uninfected wild pigs contact carcasses is unknown. In this study, we estimated wild pig contact rates with conspecific carcasses to better understand the role of carcass-based transmission in a potential ASF outbreak in the US. We monitored 89 wild pig carcasses of both sexes and of varying ages removed by toxic baiting, aerial gunning, or trapping using trail cameras in a 225.1 km2 area of Texas from March 2023 to May 2023. We found varying levels of daily contact, ranging from 0 to 17 contacts with a carcass per day. We also examined the importance of environmental and carcass specific variables on the probability of wild pig visitation and contact. We recommend that removing infected carcasses from the landscape will reduce spread of ASF.

Estimating the Impact of Airport Wildlife Hazards Management on Realized Wildlife Strike Risk

Levi Altringer**, USDA APHIS Wildlife Services NWRC, Fort Collins, CO USA,

levi.altringer@usda.gov

Michael J. Begier, USDA APHIS Wildlife Services, Airport Wildlife Hazards Program, Washington, DC, USA

Jenny E. Washburn, USDA APHIS Wildlife Services, Airport Wildlife Hazards Program, Sandusky, OH, USA

Stephanie A. Shwiff, USDA APHIS Wildlife Services NWRC, Fort Collins, CO USA

A B S T R A C T: Collisions between wildlife and aircraft, commonly referred to as wildlife strikes or bird strikes, are rare events that pose considerable safety and economic risks to the aviation industry. Given the potentially dramatic consequences of such events, airports scheduled for passenger service are required to conduct wildlife hazard assessments and implement wildlife hazard management plans for the purpose of mitigating wildlife strike risk. The evaluation of such management, however, is complicated by imperfect reporting that mediates the relationship between realized wildlife strike risk and wildlife strike metrics. In this paper, we shed light on such phenomena by investigating the staggered adoption of a federal wildlife hazards management program at joint-use airports across the contiguous United States. This research design allowed us to exploit variation in both management presence across airports, over time as well as variation in the quality of wildlife strike reporting within airports. As hypothesized, we found that wildlife hazards management intervention has a significant impact on the quality of reporting, as evidenced by a substantial increase in the number of civil strikes reported over the management period. Where pre-existing reporting mechanisms were more robust, however, we found that wildlife hazards management had a significant impact on realized wildlife strike risk as evidenced by a decrease in strike-induced economic damages among military aircraft. Over-all, we found that the estimated economic benefits of the studied airport wildlife hazards management program were 7 times greater than the costs over the management period. Our results have important implications for the measurement of wildlife strike risk and the management of wildlife hazards at airports, as well as important insights pertaining to the use of observational data for causal inference, particularly in the context of risk management.

*This is a completed study recently published in Scientific Reports
(https://www.nature.com/ar-ticles/s41598-024-79946-3).

Robust and Alive: The National Wildlife Strike Database, 35 Years and Counting

Michael J. Begier, USDA APHIS Wildlife Services, Washington, DC, USA, mike.begier@usda.gov

A B S T R A C T: Long-term, high-quality data can provide a more complete understanding of natural phenomenon and better inform management decisions in a variety of contexts. The Federal Aviation Administration's National Wildlife Strike Database (NWSD), managed by the Wildlife Services program in the U.S. Department of Agriculture, documents collisions between wildlife and civil aircraft in the United States. The NWSD currently contains more than 310,000 quality-controlled records documenting individual strike events from 1990 through 2024. Over 800 wildlife species are now documented in the NWSD, most being birds (97%). The most basic function of the NWSD is to provide an understanding of how various wildlife species impact aviation safety. This in turn provides the scientific foundation for FAA safety management regulations, particularly at airports. However, the breadth of the data, combined with a rigorous quality review process now allow for more varied and enhanced uses of the data. Diverse disciplines such as safety risk management and ornithology can use the data in operations and research contexts to effect change and add to our understanding of species ecology. For example, recent analyses of the NWSD led to recommendations to enhance the safety of civil motorcraft operations in the USA while collision events have increased our knowledge of bird migration for many species. The NWSD continues to expand, and the growing scope of its use worldwide indicates the importance of this database to the aviation safety and natural resources professions.

Rodenticides for the Management of Rodent Pests: Are They Still Needed?

Roger A. Baldwin, Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, CA, USA, rabaldwin@ucdavis.edu

A B S T R A C T: Rodents cause extensive damage and health risks in urban and agricultural areas, and they pose a substantial conservation risk in many island settings. Many tools are used to manage rodents in these settings, but rodenticides have historically been extensively used given their efficacy and cost effectiveness. However, increasing concern about nontarget impacts of some rodenticides has led to recent legislative and regulatory changes that have already or will soon alter how these products can be used for rodent management. These changes will likely affect rodent management from a variety of perspectives. For example, effective or practical alternatives to rodenticides are often lacking in many settings, leaving land managers few options for reducing rodent damage and/ or associated health risks. Furthermore, it is important to note that alternative management tools that may be used in place of rodenticides often carry inherent risks to non-target species as well (e.g., non-target captures in traps, removal of species of special concern through biocontrol efforts). In this presentation, I propose alternative mitigation strategies that could be implemented to reduce non-target risks associated with rodenticide applications while still allowing for their use when needed. Such strategies are likely needed to continue to allow for effective rodent management until alternative methods can be developed to replace current toxicants.

Externalities in Wild Pig Damages on U.S. Crop and Livestock Farms: The Role of Landowner Actions and Landscape Heterogeneity

Sophie C. McKee**, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA,
sophie.mckee@colostate.edu

Nathan D. DeLay, Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, CO, USA

Daniel F. Mooney, Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, CO, USA

Stephanie A. Shwiff, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

A B S T R A C T: Invasive wild pigs can impose significant economic costs on crop and livestock farms. Many factors influence the incidence and intensity of these losses, making efforts to reduce or eradicate these populations complex. While farm and ranch operators may perceive wild pigs as agricultural pests, other landowners often see them as wild game with recreational value. This study investigates the relationship between neighboring landowners' practices that attract wild pigs and the likelihood of pig presence and damage on farm and ranch operations. It considers the farmers' own activities that attract wildlife, the heterogeneity of the surrounding landscape, and county-level factors. The findings show a significant and positive effect of neighbors' actions on the probability of wild pig presence and financial losses from wild pig damage. Additionally, increasingly heterogeneous landscapes may further exacerbate this challenge. This research indicates that the choices made by adjacent property owners can undermine the effectiveness of public and private efforts to manage wild pig populations. Conversely, the impacts of wild pig management likely extend beyond the specific management area. Managing public lands, for example, can protect neighboring private lands. Holistic eradication or population control programs should consider these externalities to adequately and efficiently address their impacts.

A Rapid Assessment Tool for Detecting and Mapping Wild Pigs in a Newly Invaded Landscape

Raymond B. Iglay**, Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS, USA, ray.iglay@msstate.edu

Tyler S. Evans, Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS, USA

Melanie R. Boudreau, Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS, USA

Bronson K. Strickland, Department of Wildlife, Fisheries and Aquaculture, Mississippi State University, Mississippi State, MS, USA

A B S T R A C T: As exotic species colonize new areas, rapid assessment tools may provide necessary information for prioritizing management efforts. Given logistical limitations associated with surveying large landscapes, investigation of sampling effort relative to assessment accuracy is necessary to improve method efficiency and adoption. We systematically surveyed wild pig (Sus scrofa) rooting and wallowing damage using transects and developed species distribution models to predict where wild pig presence would most likely occur throughout a large, recently invaded national wildlife refuge in Mississippi, USA. Considering time and effort requirements, we subsampled transect data to understand when model accuracy faltered. Approximately 25% of the refuge was predicted to have wild pigs, with presence concentrated within woody wetlands and along perennial streams. Random subsampling showed that accurate predictions ceased when <70% of the dataset was used. However, when cells were chosen based on wild pig land use tendencies, data requirements were reduced by 46.7%. In the subsequent year, transects were used to validate model predictions and test the monitoring tool's sensitivity over time. All but one cell (98%) predicted to have wild pig occurrence had detected damage, whereas 71% of cells predicted to not have wild pig occurrence had no damage. Cells predicted to not have wild pigs, but which had damage, were located adjacent to areas with damage or along refuge boundaries. Our work demonstrates that a simple, efficient monitoring tool combined with predictive modeling can reliably identify areas with wild pig presence to rapidly inform control efforts and improve monitoring efficiency.

Spatial Behavior of Uncaptured Wild Pigs Following Sounder Removal Via Trapping

Sebastian Gomez-Maldonado**, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA, szg0159@auburn.edu

Matthew T. McDonough, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

Jonathon J. Valente, U.S. Geological Survey, Alabama Cooperative Fish and Wildlife Research Unit, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

Mark D. Smith, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

Stephen S. Ditchkoff, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

A B S T R A C T: The rapid expansion of wild pigs across North America necessitates effective management strategies to mitigate their environmental and human impacts. Whole-sounder removal using corral traps is an effective method for controlling wild pigs; however, if not employed properly some sounder members may avoid capture. To date, no studies have evaluated the movement behavior of these uncaptured members after a trapping event. We studied the spatiotemporal behavior of uncaptured wild pigs post-trapping in southeast Alabama from 2022-23. To simulate missed captures, we affixed GPS collars to female wild pigs (n=18) from different sounders and released those individuals after euthanizing all other members of the captured sounder. We measured temporal variability in distance traveled from the trap site, step length, persistent velocity, space covered, and overlap area following trapping events during a 30-day post-trapping period, examining relationships with sounder composition and body condition of uncaptured members. Despite great variability among individuals, movement behavior exhibited minimal change over time since capture. Over the 30-day post-trapping period, uncaptured wild pigs travelled on average 1.2 km with a maximum of 6.37 km from the trap site. Range sizes were stable with an average overlap of 30%. Wild pigs from sounders with a greater proportion of females moved further away from traps and those in better body condition moved slower. These findings suggest that uncaptured members tend to stay close to the trap sites, rarely leaving the area. This behavior provides sufficient time for trapping programs to effectively target uncaptured individuals, enhancing management outcomes.

Proximity of Bait Drives Wild Pig (Sus Scrofa) Visitation to Bait Sites More than Presentation Method or Addition of Scent

Sydney M. Brewer**, Savannah River Ecology Laboratory, University of Georgia Warnell School of Forestry and Natural Resources, Aiken, SC, USA, Sydney.brewer@uga.edu

Nathan P. Snow, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

James C. Beasley, Savannah River Ecology Laboratory, University of Georgia Warnell School of Forestry and Natural Resources, Aiken, SC, USA

A B S T R A C T: Wild pigs (Sus scrofa) are a globally distributed species that negatively impact ecosystems where they have been introduced. To reduce populations, managers attract wild pigs to sites using bait for trapping and ground or aerial shooting. While previous studies have evaluated performance of various types of bait and scent at attracting wild pigs, few have factored movement behavior of individuals or evaluated whether bait presentation methods or the addition of scent lure influences detection. We conducted 355 experimental trials on 53 GPS collared wild pigs to quantify differences in visitation to bait sites as a function of bait presentation, scent lure addition, location within home range, and distance between the wild pig and bait site at time of placement. Our results revealed attributes of wild pig space use were the most important factors influencing whether an individual visited a bait site compared to the addition of scent or presentation of bait. Wild pigs visited more bait sites and located sites more quickly within the 40% (56%, 96.4 hours) and 70% (49%, 106.1 hours) isopleths of their home range compared to their 99% (21%, 130.3 hours), and individuals with larger home ranges were less likely to detect bait sites. For every 1000 m increase between a wild pig and a bait site at placement, the likelihood that individual visited the site decreased by 22%. These results suggest placement of sites is the most important factor for maximizing wild pig visitation, and scent lures or presentation method will not overcome poor placement.

Regional Variation in Demographics, Reproduction, and Body Mass Growth Rates of Wild Pigs: Implications for Population Control

Nathan P. Snow**, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA,
Nathan.p.snow@usda.gov

Kelly J. Koriakin, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Michael J. Lavelle, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Michael P. Glow, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Justin W. Fischer, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Justin A. Foster, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt, TX, USA

Kim M. Pepin, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Kurt C. VerCauteren, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

A B S T R A C T: Wild pigs are a destructive invasive species throughout many regions of the world and have proven difficult to control or eliminate. Their success as an invasive species is, in part, from their high reproductive potential which can vary based on available resources, ancestry, and other factors. We opportunistically collected data on demographics (i.e., age and sex), reproduction, and body mass on 2,762 wild pigs throughout various research and operation control activities in Texas, Alabama, Hawai'i, Guam (USA), and Queensland (Australia) during 2016–2024. We evaluated these data for differences among study sites that might be used to inform a better understanding of wild pig ecology and more effective control of their populations. We found that the age structures of wild pigs varied greatly among sites, with areas with more intense control having younger populations. The timing and frequency of birth pulses also varied by site. We observed large disparities in populations demonstrating the elasticities of wild pigs in invaded ranges. We hypothesized that intense population control may increase reproduction rates in younger females through increased body mass growth rates and subsequent reproductive maturity. We recommend that managers identify the seasonal birth pulses of wild pigs in their region, and then intensively focus on removing wild pigs during the 115 days (i.e., gestation period) prior to those birth pulses. We also recommend evaluating for regional-specific intensities of removal that might be required for reducing populations with specific emphasis on whether compensatory reproductive behaviors are generated and how to avoid them.

Informing U.S. Fish and Wildlife Service Migratory Bird Permitting Decisions with Potential Take Level Models

Mark Seamans**, U.S. Fish and Wildlife Service, Division of Migratory Bird management, Denver, CO, USA

Chris Dwyer, U.S. Fish and Wildlife Service, Office of Conservation Investment, Hadley, MA, USA, chris_dwyer@fws.gov

A B S T R A C T: The Migratory Bird Treaty Act (MBTA), and its conventions, require the United States to ensure the preservation of migratory birds and prohibits the take of migratory birds unless authorized. The United States Fish and Wildlife Service (USFWS) issues permits for take of migratory birds that allows the United States to meet its obligations under the MBTA. To help inform significant permitting decisions, the USFWS develops Potential Take Limit (PTL) models to evaluate the magnitude of allowable take of migratory bird species. PTL models estimate maximum allowable annual take for a species given management objectives, risk tolerance, and population size. PTL models draw upon science related to the theories of harvest management and equilibrium population dynamics. PTL models have been developed to inform decisions related annual permitted annual take of overabundant or nuisance migratory bird species such as double-crested cormorants, black vultures, and gulls, and for other needs such as falconry and species subject to nontarget take. PTL models have proven to be a useful tool for managing permit issuance in the U.S. and have helped ensure sustainable populations of nongame migratory birds relative to the amount of allowable take.

Highly Pathogenic Avian Influenza in Dairy Cattle

Abrial Norwick, USDA Wildlife Services California, Sacramento, CA, USA, abrial.norwick@usda.gov

A B S T R A C T: Highly Pathogenic Avian Influenza (HPAI) has had substantial impacts to wild birds and poultry. Dairy cattle infections, first detected in Texas in March 2024, and now detected in 16 states in over 700 dairies, have presented new challenges to the agricultural community. These cases represent some of the earliest non-avian detections in livestock production animals. Ongoing surveillance in wildlife and domestic herds and flocks is contributing to genotypic mapping of the virus across the country. The B3.13 genotype continues to spread throughout dairy and poultry facilities, and it is suspected that anthropogenic transmission is the primary cause of spread. USDA Wildlife Services has conducted surveillance in peridomestic birds and mammals at dairy cattle and poultry facilities with B3.13 spillover infections, detecting the virus in many peridomestic bird and mammal species. The animals collected and sampled help biologists determine if peridomestic birds or mammals are functioning as additional vectors or reservoirs of the virus. H5N1 has been detected and associated with illness in humans, but there have not been any confirmed cases of human-to-human transmission. Surveillance continues at and around infected dairy and poultry facilities, with the goal of providing veterinarians and wildlife disease biologists the information needed to improve biosecurity and protect the livelihood of farmers. The Wildlife Services surveillance program and results will be discussed and reviewed.

ASF surveillance in the United States by USDA Wildlife Services

James M. Grinolds**, USDA, APHIS, Wildlife Services, National Feral Swine Damage Management Program, james.m.grinolds@usda.gov

Greg Franckowiak, USDA, APHIS, Wildlife Services, National Feral Swine Damage Management Program, Gregory.franckowiak@usda.gov

Dana Cole, USDA, APHIS, Wildlife Services, National Feral Swine Damage Management Program, dana.j.cole@usda.gov

A B S T R A C T: African swine fever (ASF), a highly contagious viral disease with a devastating impact on both domestic and feral swine (Sus scrofa) as the mortality rate is 95-100% with some viral strains. While not zoonotic, it can be transmitted to pigs by either direct or indirect contact of bodily fluids from infected pigs. There are currently no approved vaccines available in the United States, which highlights the importance of ASF surveillance in both domestic and feral swine to ensure rapid detection if the virus was introduced. While the United States has to date remained ASF-free, ASF was been detected on the island of Hispaniola in July 2021. With the close proximity of Hispaniola to Puerto Rico (PR) and U.S. Virgin Islands (USVI), there was a high risk of disease transmission by means of mail, food products, and illegal boat landings. Wildlife Services integrated surveillance strategies to remove feral swine from both PR and USVI and collect whole blood and blood swab samples for feral swine on both territories. These samples were tested using both antigen-based (PCR) and antibody-based (ELISA) diagnostics. With the threat of ASF transmission from the Caribbean, Wildlife Services also started surveillance in very-high risk counties in Florida, Georgia, Louisiana, and Texas in May2022. This surveillance was then expanded to very-high risk counties from a total of twelve states to include the potential ASF introductions from global and border pathways. This talk will highlight the accomplishments Wildlife Services has had in ASF surveillance efforts.

In Touch with the Dead: Wild Pig Contact with Conspecific Carcasses and Its Implications for Disease Management

Kelly J. Koriakin**, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA,
Kelly.koriakin@usda.gov

Kim M. Pepin, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Kayleigh Chalkowski, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Ryan S. Miller, USDA APHIS Veterinary Services, Center for Epidemiology and Animal Health, Fort Collins, CO, USA

Kurt C. VerCauteren, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

Nathan P. Snow, USDA APHIS Wildlife Services NWRC, Fort Collins, CO, USA

A B S T R A C T: Diseases in wild pigs pose a significant threat to livestock producers due to the risk of transmission to domestic animals, specifically swine. In recent years, African swine fever (ASF) in Europe and Asia has resulted in substantial economic losses stemming from immediate control measures such as culling domestic swine, trade bans, and increased surveillance in production areas. An introduction of ASF to the continental US would have profound economic effects and critical gaps remain in understanding the fundamental parameters driving ASF dynamics, limiting the ability to effectively prepare for and manage potential outbreaks. Contact between uninfected wild pigs and infected carcasses is thought to be a key driver of ASF spread, yet the rate at which uninfected wild pigs contact carcasses is unknown. In this study, we estimated wild pig contact rates with conspecific carcasses to better understand the role of carcass-based transmission in a potential ASF outbreak in the US. We monitored 89 wild pig carcasses of both sexes and of varying ages removed by toxic baiting, aerial gunning, or trapping using trail cameras in a 225.1 km2 area of Texas from March 2023 to May 2023. We found varying levels of daily contact, ranging from 0 to 17 contacts with a carcass per day. We also examined the importance of environmental and carcass specific variables on the probability of wild pig visitation and contact. We recommend that removing infected carcasses from the landscape will reduce spread of ASF.

ABSTRACTS
Poster Presentations

National Disease Surveillance of Feral Swine by USDA Wildlife Services

Gregory A. Franckowiak**, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA, Gregory.Franckowiak@usda.gov

William Brooks, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA

Evan Casey, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA

Liam Fressie, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA

Lindsey Howard, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA

Aubrey Murphy, USDA APHIS Wildlife Services National Feral Swine Damage Management Program, Fort Collins, CO, USA

A B S T R A C T: The United States Department of Agriculture's (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) conducts large scale removal of feral swine within the United States. These invasive mammals are distributed across much of the U.S., and damage and disease risks associated with these animals are significant. The National Feral Swine Damage Management Program (NFSDMP) provides funding to U.S. states and territories with feral swine populations for operational activities which results in the removal of over 100,000 feral swine annually. A subset of removed feral swine (~6,000) is opportunistically sampled for endemic diseases, such as pseudorabies (PRV) and swine brucellosis (SB), as well as foreign animal diseases, including classical swine fever (CSF) and African swine fever (ASF). Feral swine serum samples are collected nationwide as part of APHIS Veterinary Services' routine surveillance stream for detecting these pathogens in the U.S. Surveilling for these pathogens is important to inform spillover risk to domestic swine and other livestock. Since the establishment of the NFSDMP in fiscal year (FY) 2014, serum samples from over 40,000 feral swine have been collected throughout the U.S. In our discussion, we will present sampling and testing methodologies, disease seroprevalence from FY18-FY24, and how this information can be used. With continuous removal and disease surveillance of feral swine in the U.S., Wildlife Services is proactively working to safeguard American pork production by minimizing disease spillover from feral to domestic swine populations.

Bullfrog Removal to Support Northern Leopard Frogs on the Kaibab National Forest

Lias Hastings**, USDA APHIS Wildlife Services, Phoenix, AZ, USA, lias.hastings@usda.gov

Christopher Carrillo, USDA APHIS Wildlife Services, Phoenix, AZ, USA

Solena Daniels, USDA U.S. Forest Service, Williams, AZ, USA

Brandon Foley, Arizona Game and Fish Department, Flagstaff, AZ, USA

Audrey Owens, Arizona Game and Fish Department, Flagstaff, AZ, USA

Shaula Hedwall, USDI U.S. Fish and Wildlife Service, Flagstaff, AZ, USA

David L. Bergman, USDA APHIS Wildlife Services, Phoenix, AZ, USA

A B S T R A C T: The American bullfrog (Lithobates catesbeianus) endemic to eastern North America has become invasive in several parts of the world. Efforts to remove bullfrog populations focus on mitigating their ecological impact on native species and habitats. Once established, they quickly outcompete and prey upon local aquatic species with devastating results. Bullfrog removal strategies include habitat modification, physical trapping, and lethal removal. Despite the challenges, removal efforts aim to restore ecological balance and protect biodiversity in affected areas. In April of 2024, US Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services in collaboration with the US Forest Service, US Fish and Wildlife Service and the Arizona Game and Fish Department, began a multi-year bullfrog removal project south of Williams, Arizona, on the Kaibab National Forest. The goal was the targeted removal of bullfrog populations when and where possible and the establishment of bullfrog free buffer zones around potential release sites for Northern leopard frogs (Lithobates pipiens). In the first year of field work, the program surveyed cattle tanks, springs, and lakes in the region to determine the extent of bullfrog presence on the landscape and delineate a removal area and buffer zones. Using various techniques of lethal removal, the program removed over 12,000 bullfrogs from 17 different water sources. Additionally, we detected and removed 19 egg masses from 2 sites. Larger reproductive adults were targeted heavily in the first year. The program plans for subsequent years of removal efforts and would incorporate the use of seining of bullfrog larvae.

Fire Ant Disturbance Frequency

Amelia K. Horner, College of Forest Resources, Mississippi State University, MS State, MS, USA, akh529@msstate.edu

A B S T R A C T: Red imported fire ants (Solenopsis invicta; hereafter fire ants) are an invasive species which mainly affect the southeastern United states and cost the economy six billion dollars of damages every year according to the USDA. Fire ants prefer disturbed areas, but the tolerance of disturbance for this species has not been determined. This study examined how disturbance affected the density and frequency of fire ant mounds, and the effect on survival and reproduction. Fire ant mounds were quantified on six acres of land, split into four equal quadrants with intermediate boundaries. Three plots were disturbed once a day, every four days, and every seven days, for four weeks, with a no-disturbance control. An active mound was determined by the presence of ants upon disturbance. The mounds were marked by GPS coordinates and flags, and disturbance was made equal with the use of a garden hoe to flatten mounds. We hypothesized that the increased disturbance would decrease the amount of fire ant mounds in each area with the most mounds disappearing from the site that is disturbed every day, and the disappearance time increasing with increased gap between disturbance. Also, that disturbance would decrease the size of each fire ant mound the more often it is disturbed. The general trends are that active mounds decreased faster with increased disturbance, but more mounds appeared within the four-week time frame, and in higher-disturbance areas. We believe this research can inform effective management and reduce costs and use of alternatives such as pesticides.

Rocket Raccoons Came in from the Dunes: A Preliminary Analysis of Raccoon Access to Beach Habitat at Cape Canaveral Beach

Natalie M. Claunch, USDA Wildlife Services Florida, Gainesville, FL, USA

Marcus Jensen, USDA Wildlife Services Florida, Gainesville, FL, USA

Justin Fischer, USDA Wildlife Services NWRC, Fort Collins, CO, USA

Parker Hall, USDA Wildlife Services Florida, Gainesville, FL, USA

Bryan Kluever, USDA Wildlife Services NWRC Florida Field Station, Gainesville, FL, USA

A B S T R A C T: Raccoons (Procyon lotor) are efficient nest predators, but little is known about their use of beach habitat. To evaluate potential shifts in space use associated with beach-nesting species, we outfitted 8 raccoons with radio-collars at Cape Canaveral Space Force Station, Florida from March to September 2023. Initial capture locations included beach (N=4) and inland sites (100-580 m from beach, N=4). Using nocturnal locations, we calculated monthly 50%, 95%, and 100% minimum convex polygons and monthly core (50%) and total (95%) - kernel utilization distributions. We then calculated the percent overlap with beach habitat and nearest distance to beach habitat. Regardless of initial capture location, all raccoons accessed beach habitat during the study. Capture location influenced percent beach overlap over time, likely driven by higher beach use by beach-captured raccoons in spring. For raccoons initially trapped on the beach, monthly beach access was nearly constant. For raccoons captured inland, access to beach appeared to increase during the summer months, though statistical inference was limited due to our small sample size. The core activity area for all raccoons included 16-18% more overlap with beach habitat in July compared to all previous months, coinciding with the nesting season for turtles and shorebirds. Six of 8 raccoons were recorded >1km from the beach, including one animal 2.7km from the beach that accessed beach habitat during nesting season. Our pilot study suggests that year-round control of raccoons within 1 km of beach habitat may reduce predation rates during sea turtle and shorebird nesting season.

GULP! Impacts of Double-crested Cormorants on Catfish Aquaculture in the Blackbelt of Alabama and Mississippi

Sarah N. Knutson, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

Mark D. Smith, College of Forestry, Wildlife and Environment, Auburn University, Auburn, AL, USA

Brian S. Dorr, USDA APHIS Wildlife Services NWRC, Mississippi State, MS, USA

Anita M. Kelly, School of Fisheries, Aquaculture and Aquatic Sciences, Alabama Fish Farming Center, Greensboro, AL, USA

Luke A. Roy, School of Fisheries, Aquaculture and Aquatic Sciences, Alabama Fish Farming Center, Greensboro, AL, USA

A B S T R A C T: With over $112 million in annual catfish (Ictalurus sp.) , the Black Belt region of Mississippi and Alabama is the second largest region of catfish production in the U.S. Regional declines in farmed water hectares highlight the importance of understanding production challenges, especially losses due to double-crested cormorant (Nannopterum auritum: cormorant) depredation. While considerable research has evaluated losses due to cormorants in the Mississippi Delta, little research has been done in the Black Belt. Our objectives were to 1) assess the distribution and relative abundance of cormorants on catfish farms in the Black Belt, 2) quantify the diet of these cormorants, and 3) evaluate the economic impacts of cormorant depredation. We conducted aerial surveys using fixed-wing aircraft every 2-4 weeks November-April to estimate the relative abundance of cormorants on 37 catfish farms. We then collected cormorants with firearms for diet analyses from a subset of these farms and cataloged prey items removed from the esophagi and proventriculi. We will use non-linear mixed models to test spatial/temporal variability among cormorant diets and occupancy and n-mixture models to predict cormorant distribution and abundance. Ultimately, we will combine this data with bioenergetics models to determine regional catfish consumption and develop enterprise budgets to examine economic losses. During our first field season (2023-2024), cormorant counts steadily increased and peaked in March. Only 29 of 74 collected cormorants contained ≥1 catfish with an overall mean weight of catfish consumed of 80.3 g/bird. Results will be used to inform timing and implementation of management practices.

Comparison of Three Electric Fence Designs for Excluding Wild Pigs and Whitetail Deer

Rebecca J. McPeake, University of Arkansas, Division of Agriculture Cooperative Extension Service, Little Rock, AR, USA, rmcpeake@uada.edu

Sarah A. Stone, University of Arkansas, Division of Agriculture Cooperative Extension Service, Forrest City, AR, USA

Dustin North**, University of Arkansas, Division of Agriculture Cooperative Extension Service, Clarendon, AR, USA

 A B S T R A C T: Evidence from prior demonstrations and field studies imply electric fencing can be a practical and cost-effective means for protecting vegetation from wildlife for gardening, small fruit and vegetable production, research plots, recreational food plots, and other uses. Our objective was to compare (1) a one-layer, three strand fence design versus (2) a two-layer, two strand electric fence design for repelling whitetail deer (Odocoileus virginianus), and (3) a novel two-layer, three strand electric fence designed for repelling both wild pigs (Sus scrofa) and deer. We constructed three 50-foot plots with these designs in fields at the Pine Tree Research Station near Colt, Arkansas, which is also managed as a public wildlife management area in cooperation with the Arkansas Game and Fish Commission. Fenced plots were pre-baited a week prior to fence installment and then baited with corn in a 3 foot-square at the plot center from December – March to compel wild pigs and deer to enter plots. In each plot, a trail camera was aimed parallel to the fence closest to the tree line, and another camera aimed at the bait pile in the plot's center. Tracks were recorded weekly within 10 feet of the fence perimeter and those inside the fence. Results from 2023-2024 and 2024-2025 field seasons will include an assessment of fence challenges, encroachments, and economic comparison of these designs.

Impact of Blackbird Depredation on Baitfish and Sportfish Aquaculture in Arkansas

Madeline E. Redd, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn, AL, USA, mer0127@auburn.edu

Mark D. Smith, College of Forestry, Wildlife, and Environment, Auburn University, Auburn, AL, USA

Luke A. Roy, School of Fisheries, Aquaculture and Aquatic Sciences, Alabama Fish Farming Center, Greensboro, AL, USA

Anita M. Kelly, School of Fisheries, Aquaculture and Aquatic Sciences, Alabama Fish Farming Center, Greensboro, AL, USA

Brian S. Dorr, USDA APHIS Wildlife Services NWRC, Mississippi State, MS, USA

A B S T R A C T: In Arkansas, Lonoke and Prairie counties produce 72% of the United States' total baitfish and sportfish sales. Producers consistently report that common grackles (Quiscalus quiscula; grackle) and other blackbirds predate baitfish and sportfish from holding vats under sheds and on spawning mats in brood ponds. Despite predation loss being a producer concern for decades, no studies have quantified the extent of these losses. Our objectives were to: 1) characterize the foraging patterns of blackbirds within holding sheds and at spawning mats in brood ponds, 2) measure the amount of prey items consumed by these blackbirds, and 3) quantify the economic impact of blackbird predation. During the 2024 field season, we conducted focal observations and camera surveys on ponds with spawning mats and vats under sheds from five baitfish and three sportfish farms between mid-March-July. After surveys, actively foraging blackbirds were collected using air rifles and gizzard contents were identified, dried, and weighed. Most grackles (64%) consumed fish from ≥5 different species. Depredation events peaked in mid-April and again at the end of May with golden shiners (Notemigonus crysoleucas) being the most targeted fish species (≥196 depredation events). Brood pond surveys documented nine other avian species, water snakes, raccoons, and mink predating fish on spawning mats. We will use multivariate analyses to compare aggregate percentage weight, frequency of occurrence, and prey richness by year, sex, and system (brood pond or fish shed). Results of this study will be used to guide best management practices for mitigating losses due to blackbird predation.

Wild Boar Population Control: Utilizing Swinepox Virus as a Viral Vector for GnRH Immunocastration

Mohammed Selman, The Amber and Adam Tarshis Foundation, Los Angeles, CA, USA,

lab@tarshisfoundation.org

Nikolas Duenas, The Amber and Adam Tarshis Foundation, Los Angeles, CA, USA

Adam Tarshis, The Amber and Adam Tarshis Foundation, Los Angeles, CA, USA

A B S T R A C T: Wild boar populations in the United States pose significant challenges due to their impact on agriculture, ecosystems, and public health. Traditional management methods, including hunting and trapping, are often expensive, labor-intensive, and inhumane. Immunocontraception presents a promising alternative for population control. We have developed a live-attenuated swinepox virus-based vaccine vector expressing gonadotropin-releasing hormone (GnRH) as a target antigen. This vaccine is designed to induce immune-mediated suppression of fertility in wild boars, while leveraging the natural host specificity of the swinepox viral vector. The swinepox-GnRH vaccine was constructed and characterized in vitro to confirm stable expression of GnRH and assess its replication dynamics. Initial safety evaluations in vivo demonstrated that the vaccine does not cause clinical disease in pigs, supporting its potential as a safe tool for wildlife management. Current studies aim to evaluate the vaccine's efficacy in inducing robust and sustained contraceptive effects in pigs, with ongoing assessments of immune responses and fertility outcomes.

Bird Window Collision: Species and Correlates at a Southeastern University

Van Truong, College of Forest Resources, Mississippi State University, MS State, MS, USA, vt292@msstate.edu

Kameryn Roberts, College of Forest Resources, Mississippi State University, MS State, MS, USA

Jared A. Elmore, Forestry and Environmental Conservation Department, Clemson, SC, USA

Kristine O. Evans, College of Forest Resources, Mississippi State University, MS State, MS, USA

Christopher R. Ayers, College of Forest Resources, Mississippi State University, MS State, MS, USA

A B S T R A C T: Bird collisions with building windows are a top source of avian mortality causing up to 1 billion bird fatalities per year in the United States and Canada. Birds often collide with windows during the day when they perceive reflections on glass or think that they can pass through windows unharmed (do not perceive glass), or at night when they are attracted to artificial light emitted from windows. While these trends have been documented and recorded in the literature, few studies have attempted to investigate the species and correlates of bird collisions in the southeastern United States, despite it being a major flyway for many migrants. With student volunteers, we monitored 10 buildings across Mississippi State University's campus in Starkville, MS over two spring migration seasons, recording building facades, species, and specific window location. The first step towards conservation and mitigation strategies includes documenting building facades with high rates of window collisions. Outcomes from this study may be used to help inform administration and building managers on the hazards of glass for birds, and suggestions of treatment options for best reducing these hazards.

RECLAIM YOUR LAND
With Hogeye Camera System and Big Pig Hog Trap

DON'T LET FERAL HOGS DESTROY YOUR LANDS AND WILDLIFE

Big Pig Trap customers catch entire sounders at once with our proven traps and Hogeye Camera System helping landowners protect nearly **1 MILLION ACRES** daily!

Monitor in real time with Hogeye Cameras and the app. Hogeye works with any trap gate from everywhere. The app allows users to trigger traps remotely for optimal captures 24/7.

To protect your land or for more information about our products go to **hogeyecameras.com & bigpigtrap.com**

MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF FOREST RESOURCES

cfr.msstate.edu