International Urban Wildlife Conference 2023

June 4th – 7th 2023

Hamilton Hotel
Washington, DC

Thank you to our conference sponsors!

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THE WILDLIFE SOCIETY

Virginia State Chapter

DC EXHIBITS

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Land Acknowledgement

Washington, DC, the land we gather on, sits on the ancestral lands of the Anacostans (Nacotchtank) and Piscataway peoples. We honor and respect the diverse Indigenous peoples connected to this land on which we gather as well as the diverse and vibrant communities who make their home here today.

Dietary Information

We will have a selection of snacks at breaks and meals at our socials, including plant-based and gluten-free options. If you have any questions about dietary restrictions or allergies, please email urbanwildlifegroup@gmail.com.

DC Information

Pharmacies near Hamilton Hotel:
CVS
on 1199 Vermont Ave NW
or 1001 16th St NW

DC Accessibility	LGBTQI+ Bars and Restaurants	Black Lives Matter Plaza
Free Things To Do	How to get Around	National Mall

MURIEL BOWSER

MAYOR

June 4 –7, 2023

International Urban Wildlife Conference Attendees:

On behalf of the 700,000 and growing residents of Washington, DC, I am pleased to welcome you to your nation's capital and to the 2023 International Urban Wildlife Conference.

As you may know, Washington, DC has the largest proportion of parkland when compared to other cities; was named the 2022 Best Big City Park System for park access and equity by the Trust for Public Land and was named a 2019 Top 10 finalist for most wildlife friendly city by the National Wildlife Federation; passed the Migratory Local Wildlife Protection Act and the Fisheries and Wildlife Omnibus Amendment Act; became the 1st LEED Platinum city in the world; and stands as a proud signatory of the Paris Climate Agreement.

Among the many wildlife that can be found in our parks, our waterways, and our skies, are Washington, DC's official bird—the Wood Thrush, our official mammal—the Big Brown Bat, our official tree— the Scarlet Oak, and our official fruit—the Cherry. And, for those of you who are aficionados of all thing's dinosaur-related, you might be interested to know that our official dinosaur is the Capitalsaurus, named for a singular vertebrae bone found during water and sewer work in 1898. In addition, ospreys, and bald eagles are known to nest along the Anacostia River.

It brings me great pleasure that you are taking the opportunity to experience so much of what DC has to offer, including holding your opening social at Solace Outpost on the Anacostia, in the vicinity of our new, beautiful, and iconic Frederick Douglass Memorial Bridge, as well as a series of field trips to explore nature and history. I hope you will also visit our many vibrant and diverse neighborhoods and commercial corridors, our historic monumental and museum core, and our many world-class restaurants.

Washington, DC is a beautiful and diverse city with something for everyone. We are a foodie city, a center for history, nature, and culture, and we are home to many championship professional sports teams. Thank you for holding your 2023 conference here and for contributing to DC's Comeback!

Please have a great time at the 2023 International Urban Wildlife Conference!

Sincerely,

Muriel Bowser
Mayor

The Urban Wildlife Working Group

Dear Attendees,

On behalf of The Wildlife Society's Urban Wildlife Working Group, welcome to the 2023 International Urban Wildlife Conference!

We are excited to have an in-person meeting in the culturally and ecologically vibrant city of Washington DC. This city is a hub for policymakers and the media - the perfect venue for this year's conference theme of "Tell Your Story". We are especially excited to host our conference leading up to DC's Pride Week, an important reminder that everyone should be able to tell their stories authentically.

We want to give a huge thank you to our local host committee including Travis Gallo, Jennifer Mullinax, Shannon Browne, and Megan Draheim as well as Jessica Alderson for their tireless efforts to make this conference a reality. We also want to thank you - the urban wildlife scientists, managers, communicators, and educators for traveling to share your work and coming to learn about these fascinating ecosystems. We hope you reconnect with familiar faces and make new connections in our urban wildlife community.

If you enjoyed this conference, consider joining our working group to meet other urban wildlife professionals and students! Please visit our website: **www.urbanwildlifegroup.org**

Sincerely,

Maureen Murray, Chair
On behalf of the Urban Wildlife Working Group

Executive Board
Maureen Murray, Chair
Richard Heilbrun, Past Chair
Sarah Aucoin, Chair elect
Leslie Bliss-Ketchum, Treasurer/Secretary
Kaylee Byers
Morgan Farmer
Jason Luscier
Anya Patterson
Mark Patterson
Laura Young

Local Host Committee
Travis Gallo
Jennifer Mullinax
Shannon Browne

Guidelines for Professional Behavior at IUWC 2023

Did You Know? To be inclusive is a social act, fostering a sense of respect and belonging.

IUWC 2023 provides an opportunity for education, exchange of ideas, mentoring, networking, and engagement with colleagues in a variety of ways. Our hope is that each attendee will benefit from their participation during the conference. Just as we recognize the importance of and strive for diversity in our natural world, we acknowledge the contribution of individual diversity to our profession.

As stated in the long-standing TWS Position Statement on Workforce Diversity in the Wildlife Profession, "*The Wildlife Society recognizes the value of including the richness of human diversity in our efforts to discover, educate, inform policy, and involve the public in wildlife science and management*." In this light, and with the goal of ensuring that IUWC 2023 is welcoming and inclusive for all, we put forward the following guidelines for professional behavior during the conference:

• Treat all participants with respect and consideration, and value the diversity of views and opinions that may be different than those you hold
• Communicate with respect for others; critique ideas rather than individuals
• Avoid personal attacks directed towards conference participants
• Be mindful of your colleagues and your surroundings
• Exercise professionalism always

The following are examples of behavior that will not be tolerated during the conference, including oral and poster sessions and other organized meetings whether at the conference center or off-site:

• Harassment, threats, intimidation, or discrimination of any kind
• Physical or verbal abuse
• Verbal comments related to gender, sexual orientation, disability, physical appearance, race, religion, national origin which may reasonably be interpreted as offensive, insulting, or obscene
• Stalking or threatening behavior directed at any conference participant or attendee
• Excessively loud and/or disruptive behavior
• Unlawful conduct or activity of any kind

Did You Know? Inclusion is the social component of DEI, achieved in social climates perceived as welcoming people to participate as their true self.

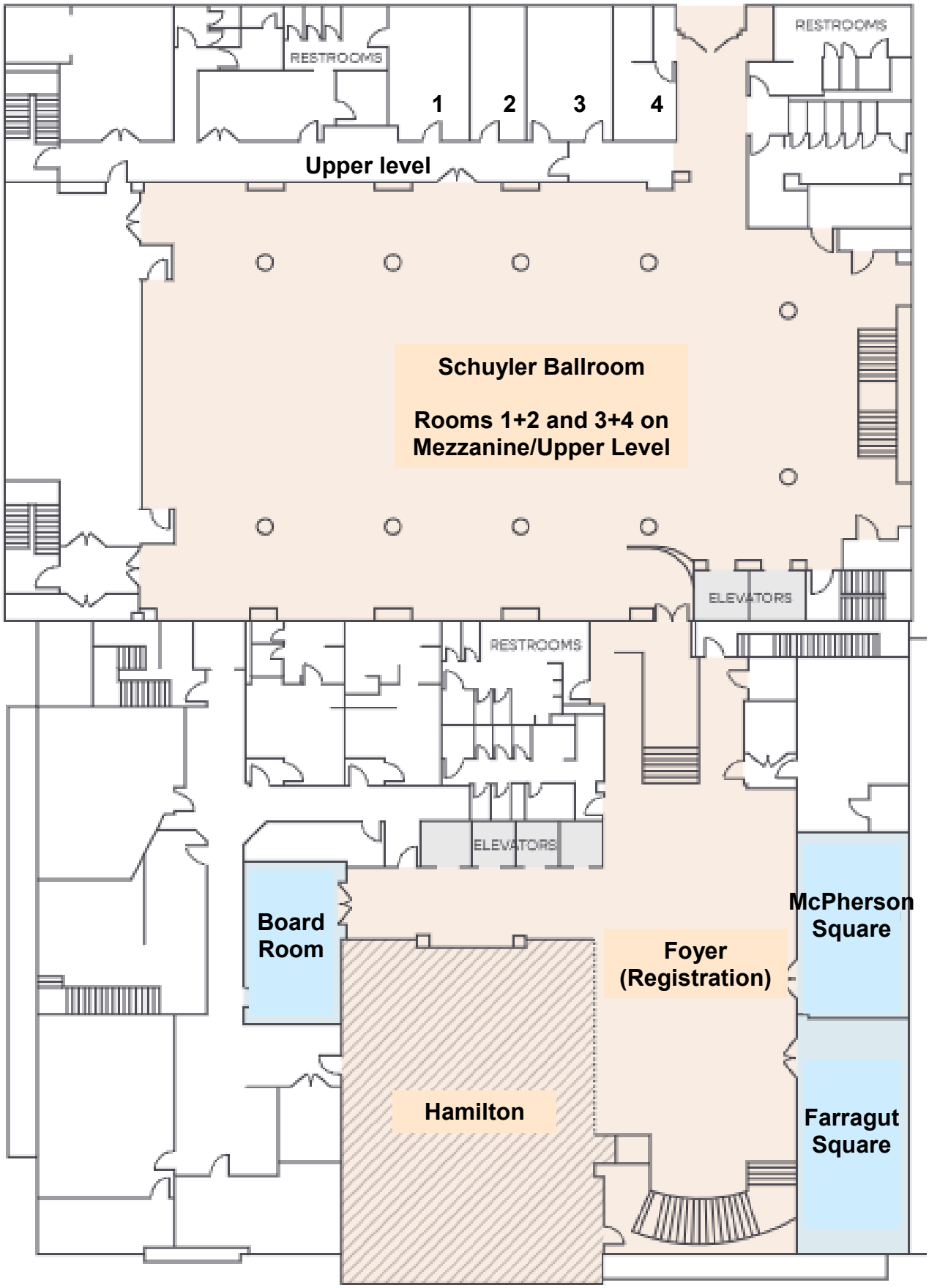
Reporting of Inappropriate Behavior:

• If you are subject to or witness conduct in violation of these guidelines at the conference, please notify a working group board member
• We will use reasonable efforts to respond and attempt to resolve the matter in a timely manner respectful of the parties and necessary to ensure the continued integrity and quality of the conference
• Anyone experiencing or witnessing behavior that constitutes an immediate or serious threat to public safety at the conference or in the hotel is advised to locate a house phone and ask for security or dial 911

The Urban Wildlife Working Group reserves the right to have individuals acting in an unprofessional manner or contrary to these guidelines removed from the conference or any meeting or event taking place at the conference, and the right to prohibit attendance at any future meeting. Attendance at IUWC 2023 is a privilege, not a right. We appreciate your attention to these guidelines and wish you a productive and meaningful conference. These guidelines were adapted from The Wildlife Society.

Hamilton Hotel Map

Franklin Park is on lobby level and accessible from 14th Street



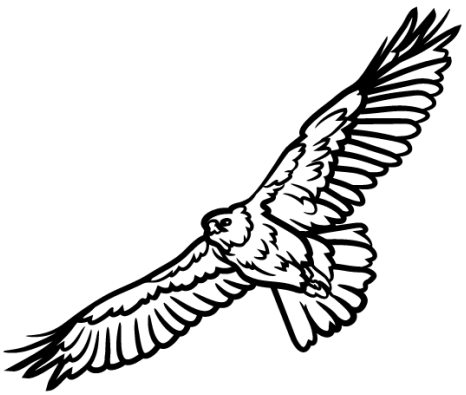
Sunday June 4th: Schedule at a Glance

Time (EDT)	Event	Location
8:00 AM - 3:00 PM	Osprey Banding and the Ecology of the National Capital Region	Transportation provided from Hamilton Hotel
2:00 PM - 3:00 PM	Behind the Scenes Reptile House Tour at the National Zoo	Entrance of the Reptile House at the National Zoo
4:00 PM - 6:00 PM	Boat Tour of the Anacostia River with the Anacostia Watershed Society	Public boat ramp in Diamond Teague Park, 100 Potomac Ave SE.
	Natural History Hike in Rock Creek Park	Carter Barron Amphitheatre in Rock Creek Park, meet in front of the large tennis complex on the parking lot side.
	Tour of Theodore Roosevelt Island with the National Park Service	Meet at the parking lot side of the foot bridge to Theodore Roosevelt Island
6:00 PM - 7:30 PM	Registration opens	Foyer in Hamilton Hotel

Monday June 5th: Schedule at a Glance

Time (EDT)	Foyer	McPherson Square	Hamilton	Board Room	Franklin Park
Registration open at Hamilton Hotel 7:00 AM - 5:00 PM					
8:30 AM to 11:50 AM	Plenary Introduction and Welcome at Eaton Hotel				
11:50 AM - 1:20 PM	Lunch				
1:20 PM	Vendors and Coffee Break	Workshop: The Value of Visuals	Urban Carnivores	Urban Wildlife Management	Reptiles and Amphibians
1:40 PM					
2:00 PM					
2:20 PM					
2:40 PM					
3:00 - 3:30 PM		Coffee Break			
3:30 PM		Workshop: The Value of Visuals Continued	Urban Habitats	Urban Wildlife Management	Environmental Impacts
3:50 PM					
4:10 PM					
4:30 PM					
4:50 PM					
6:00 PM	Off Site Social at Solace Brewing until 9:00 PM				

Tuesday June 6th: Schedule at a Glance

Time (EDT)	Schuyler Ballroom	Farragut	Schuyler 1 + 2	Schuyler 3 + 4	Franklin Park
8:00 AM	Vendors and Coffee Breaks Poster Presenters Install Posters	Community Science	Human - Wildlife Conflict Management	Symposium: The Urban Wildlife Information Network	Symposium: Co-designing Conservation
8:20 AM					
8:40 AM					
9:00 AM					
9:20 AM					
9:40 AM					
10:00 - 10: 30 AM		Coffee Break			
10:30 AM		Community Science	Human - Wildlife Conflict Management	Symposium: The Urban Wildlife Information Network	Policy, Planning and Design
10:50 AM					
11:10 AM					
11:30 AM					
11:50 AM - 1:20 PM	Lunch				
1:20 PM	Vendors and Coffee Breaks Poster Presenters Install Posters		Wildlife Health and Disease	Symposium: The Urban Wildlife Information Network	Policy, Planning and Design
1:40 PM					
2:00 PM					
2:20 PM					
2:40 PM					
3:00 - 3:30 PM	Coffee Break		Urban Wildlife Working Group Meeting 3:15 - 4:00 PM	Coffee Break	
3:30 PM					
4:00 PM	Posters and Cash Bar				
4:30 PM					
5:00 PM			Urban Wildlife Explorer Program Social		
6:00 PM					
7:00 PM					

Wednesday June 7th: Schedule at a Glance

Time (EDT)	Schuyler Ballroom	Farragut	Schuyler 1 + 2	Schuyler 3 + 4	Franklin Park
8:00 AM	Vendors and Coffee Breaks	Symposium: Urban Wildlife Management in the Nation's Capital	Symposium: One Health in Wild Cities	Symposium: Integrated Management of Free-Roaming Urban Cats	Urban Mammals
8:20 AM					
8:40 AM					
9:00 AM					
9:20 AM					
9:40 AM					
10:00 - 10: 30 AM		Coffee Break			
10:30 AM		Symposium: Urban Wildlife Management in the Nation's Capital	Symposium: One Health in Wild Cities	Urban Birds	Urban Mammals
10:50 AM					
11:10 AM					
11:30 AM					
11:50 AM - 1:20 PM	Lunch				
1:20 PM	Vendors and Coffee Breaks	Symposium: Urban Wildlife Management in the Nation's Capital	Education and Outreach	Urban Birds	Human Dimensions
1:40 PM					
2:00 PM					
2:20 PM					
2:40 PM					
3:00 - 3:30 PM	Coffee Break				
3:30 PM		Science Journalism Pitch Pit	Wildlife Acoustics Workshop: Turning Sound into Discovery	Urban Birds	Human Dimensions
3:50 PM					
4:10 PM					
4:30 PM					
5:00 PM					
6:00 PM	Banquet On Site Until 10 PM				

Plenary Speakers

Christine Dell'Amore is a managing editor at *National Geographic,* where she leads much of the storytelling strategy for the website and magazine. She is also a writer, focusing primarily on wildlife, particularly underappreciated species, and urban animals. She has reported from all seven continents, and her work in Antarctica led to her first book, *South Pole*. As an advocate of digital journalism, she co-founded and helps lead the Newsbrief Awards, which recognize excellence in short-form science writing and multimedia. Christine has written for numerous publications, including *The Washington Post* and *Smithsonian* magazine. She holds an undergraduate degree in environmental science from the University of Maryland, College Park, and a graduate degree in science journalism from the University of Colorado, Boulder. She lives in Washington, D.C. with her husband and son, who are currently accompanying her on her quest to visit every U.S. national park.

Melody Starya Mobley was the first Black female American to graduate with a degree in Forest Management from the University of Washington and the first Black female forester in the USDA Forest Service. She rose through the ranks of the Forest Service as history's first black female forester and suffered years of abuse, oppression, and tokenism that catapulted her into a lifetime of moral courage. Her mission is to create positive change for groups that have been historically excluded from natural spaces. Mobley, a forester for 45 years, retired from the USDA Forest Service in 2005 and now lives in Arlington, Virginia, with her dogs and cat. Melody serves on the Forestry and Natural Resources Commission, the NAACP Environment and Climate Justice Committee, and is on the Board of Directors for EcoAction Arlington, a non-profit that helps restore and protect natural places. She spends most of her time in retirement volunteering in her local community by registering voters in underserved communities, teaching science and math in Arlington public schools, and serving as a DEI strategist for new and established organizations focused on environmental and social justice. Melody is also the chair of the Arlington Public School Science Advisory Committee. Her USDA Forest Service uniform and tools were accepted into the Smithsonian Institution's Museum of African American History and Culture permanent collections and her name is on the Wall of Honor in the National Museum of the American Indian.

A lifelong advocate for wildlife, **Beth Pratt** has worked in environmental leadership roles for over thirty years, and in two of the country's largest national parks: Yosemite and Yellowstone. As the California Regional Executive Director for the National Wildlife Federation, Pratt leads the #SaveLACougars campaign to build the Wallis Annenberg Wildlife Crossing, which broke ground on Earth Day in 2022. The largest wildlife crossing of its kind in the world, it will help save a population of mountain lions from extinction. Her innovative conservation work has been featured by *The New Yorker, The Wall Street Journal, The Washington Post, BBC World Service, CNN, CBS This Morning, the Los Angeles Times, Men's Journal, The Guardian, NPR, AP News*, and more. Di Angelo Publications released her book, *I Heart Wildlife: A Guided Activity Journal for Connecting With the Wild World*, in 2020, and Heyday Books published *When Mountain Lions are Neighbors: People and Wildlife Working It Out In California* in 2016. Her new book, *Yosemite Wildlife*, will be published by the Yosemite Conservancy in 2024. Beth has also contributed essays to several books including *The Nature of Yosemite: A Visual Journey,* and *Inspiring Generations: 150 Years, 150 Stories in Yosemite*.

Monday June 5th: Session Details

Time (EDT)	McPherson Square	Hamilton: *Urban Carnivores*	Board Room: *Urban Wildlife Management*	Franklin Park: *Reptiles and Amphibians*
1:20 PM	Workshop: The Value of Visuals	**Tali Caspi:** DNA metabarcoding identifies urban dietary patterns of coyotes in San Francisco	**David Drake:** Post-translocation movement and survival of urban red foxes	**Kathleen Delaney:** Native stream breeding amphibians in Southern California affected by urbanization, wildfire, and drought
1:40 PM		**Lauren Stanton:** Street Smarts and Bold Behaviors: An assessment of carnivore risk-taking behavior and problem-solving ability across diverse neighborhoods in East Bay, California	**Taylor Readyhough:** Evaluating limiting factors for fecundity in an actively managed urban white-tailed deer population	**Andre Felton:** Amphibian Exposure to Microplastic Pollution Linked to Hydroperiod Dynamics in an Urban IRES System
2:00 PM		**Jasmine Grewal:** Variation in home range size and resource selection of coyotes across a gradient of development in greater Los Angeles	**Kelly Norrid:** Coyote Diet Study in Regional Houston Area	**Elizabeth Hauck:** Reproduction in relation to urban level in an invasive Florida lizard species (*Anolis sagrei*)
2:20 PM		**John Benson:** Movement decisions by mountain lions in greater Los Angeles: tradeoffs between human disturbance and foraging efficiency	**Seth Riley:** Wildlife connectivity in a highly urban landscape: 20 years of collaboration with Caltrans in the Los Angeles area to increase safe movement across roads.	**Adam Rosenblatt:** How are alligators affected by living in an urban environment?
2:40 PM			**Richard Heilbrun:** Buffering urban natural areas against feral cat colonies	**Eric Munscher:** Hidden in Plain Sight: Alligator Snapping Turtle (*Macrochelys temminckii*) Populations within Urban Waterways of Houston, Texas, Harris County, USA

Did You Know? Using technology to increase accessibility at conferences can also substantially increase age related equity, disability equity, and has the potential to also increase socio-economic equity for members.

Monday June 5th: Session Details

Time (EDT)	McPherson Square	Hamilton: *Urban Habitats*	Board Room: *Urban Wildlife Management*	Franklin Park: *Environmental Impacts*
3:30 PM	Workshop: The Value of Visuals, Continued	**Rebeca Quiñonez-Piñón:** Resilient Urban Native Habitats in South Texas to Support Urban Wildlife Species' Adaptation to Climate Change	**Brett Johnson:** Wild Hog Management in a Major City: 7 Years of Trapping	**Kerry Schutten:** Assessing the utility of nest surveys and sentinel bird species to monitor plastic pollution in an urban freshwater environment
3:50 PM		**Auxenia Grace Privett-Mendoza:** From the Theoretical to Paws on the Ground - How Predictive Are Connectivity Models for Urban Wildlife Corridors	**Shane Boehne:** Considerations for State Wildlife Agency Urban Deer Management Plans	**Phoebe Parker-Shames:** Experimental field trials for multi-species responses to anthropogenic light and noise
4:10 PM		**Monica Kaushik:** Urban green spaces: Islands of hope for urban avifauna in rapidly urbanizing Himalayan city of Dehradun, India.	**Phakhawat Thaweepworadej:** Implications of urbanisation for distribution, abundance, and hybridisation of squirrels in a tropical mega-city	**Samantha Kreling:** So overt it's covert: wildlife coloration in the city
4:30 PM		**Courtney Arches:** Planting Spirituality in Pollinator Gardens	**John Griffin:** The Humane Control of "Nuisance" Urban Wildlife:economics and alternatives from a 10-year trial	**Vedant Janapaty:** A West Coast Estuarine Case Study: A Novel, Predictive Approach to Monitor Estuarine Eutrophication

Did You Know? People from different cultures and backgrounds often use a variety of approaches to learning new skills and knowledge. Graphical abstracts allow readers to quickly review take-home messages and identify relevant papers quickly. Visuals promote cross-cultural engagement across a wider audience and can diversify minority inclusion in science.

Did You Know? Word images significantly prevent equitable equal access because screen readers only read certain file types (ie pdf, doc, xls). Screen readers are also a proxy for ESL, hearing impaired, dyslexia, multimodal learning and multi-takers.

Did You Know? Traditional Ecological Knowledge (TEK) or indigenous knowledge is beneficial to urban green space and urban wildlife habitat restoration efforts. To achieve equity and inclusion, hire indigenous persons to implement TEK based urban wildlife and green space management. Inclusion means becoming the learner. Appreciate, value, learn when perspectives may differ from what one is familiar with. This example is also applicable to fostering inclusion of those who identify as LGBTQI+, disabled, and BIPOC.

Tuesday June 6th: Session Details

Time (EDT)	**Farragut:** *Community Science*	**Schuyler 1 + 2:** *Human-Wildlife Conflict Management*	**Schuyler 3 + 4:** *The Urban Wildlife Information Network*	**Franklin Park:** *Symposium: Co-designing Conservation*
8:00 AM	**Philip Johns:** Otters in Singapore: engaging communities in urban animal behaviour research	**Sabmeet Singh:** Exploration of Ophiofaunal diversity and habitats in urban city of Rajasthan reveals human intrusions and conflicts and the need for local educative outreach programs.	**Seth Magle:** The Urban Wildlife Information Network: Past, Present, and Future	**Angelina Yost:** Overview of the U.S. Fish and Wildlife Service's '*Urban Wildlife Conservation Program*'
8:20 AM	**Kevin Vega:** Streetside Flower Visitors-Researching and promoting pollinators in Swiss public green spaces with Citizen Science	**Habeeba Fathima:** Preempting Human wildlife conflict in Kotagiri a hill town in India	**Katherine Weiss:** Is Predation Frequency Dependent Among Urban Coyotes (Canis latrans) in Phoenix, AZ?	**Kayla Cranston:** Overview of Co-Designing Conservation with (not for) Communities
8:40 AM	**Sam Kieschnick:** Know every plant and animal in your area - using citizen science for professional development	**Claire Taylor:** Creatively solving human-wildlife conflict within an urban setting while establishing an invested community	**Austin Green:** Testing the 'Weekend Effect': Variation in human activity patterns mediates periodic increases in recreational activity on mammalian behavioral response	**Cindy Corsair and April Alix:** Case Study #1- Rhode Island National Wildlife Refuge Complex
9:00 AM	**Jeffrey Brown:** Relationship Between Land Cover, Socio-Economics, and iNaturalist Uploads: An Investigation Across Four Arid Cities	**Chase Niesner:** The Curious Constraints of 'Hazing' Coyotes: Thinking with Urban Coyotes Towards a More Capacious, Multispecies Sense of Environmental Justice	**Brian Rawles:** The Relative Effects of Drought and Urbanization on Terrestrial Mammal Occupancy in Southern California	**Jason Cangelosi:** Case Study #2- Patuxent Research Refuge
9:20 AM	**Nancy Lawson:** Monarch Rx: Exploring a Little-Known Behavior of a Beloved Butterfly	**Summer Fink:** Coyote space-use in Atlanta, GA	**Amanda Zellmer:** Urban wildlife corridors: Building bridges for wildlife and people	**Ela Carpenter:** Case Study #3- Baltimore/Masonville Cove Urban Partnership
9:40 AM	**Kaitlin Goode:** Fence-Related Mortality in White-Tailed Deer in Metro-Atlanta area	**Elle Buckvold-Beirne:** Walking Potatoes & Wilder-beasts: An Examination of the Socio-Ecological Relationship between Humans & Animals in Urban Agriculture	**Mairi Poisson:** Which features of urban development most strongly affect mammals? A case study in southeast New Hampshire	**Angelina Yost:** Facilitated Question & Answer Session

Tuesday June 6th: Session Details

Time (EDT)	Farragut: *Community Science*	Schuyler 1 + 2: *Human-Wildlife Conflict Management*	Schuyler 3 + 4: *The Urban Wildlife Information Network*	Franklin Park: *Policy, Planning, & Design*
10:30 AM	**Charlotte Whorton:** Burgling bobcats - on the potential for leveraging a global network of security cameras for scientific wildlife observations & conservation		**Krista Shires:** Assessing the Health of White-Tailed Deer across an Urban Gradient using Camera Traps	**Anouk Taucher:** Can urban red squirrels help us inform policy on ecological infrastructure?
10:50 AM	**Jason D. Luscier:** CatTracker 2.0: Educating and Connecting Communities with an Ecological CATastrophe	**Brian Washburn:** Evaluation of Mitigation Translocation as a Management Tool to Reduce Conflicts Between Humans and American Kestrels	**Marufa Sultana:** Linking socioecological aspects and wildlife diversity in one of the greenest cities of Europe	**Tracy Lee:** Calgary Connect: integrating ecological connectivity into urban municipal planning
11:10 AM	**Samantha Kennett:** The ManhattAnt: How a recently introduced urban ant made it in the big city	**Brett Johnson:** Responding to High Profile Urban Wildlife Events: A Case Study in Cooperation	**Addison Gaines:** Urban Red Fox Occupancy in the United States: Influencing Factors	**Sarah Gagné:** Meta-analyses of the ecological effects of urban form: sprawl versus compact residential development
11:30 AM	**Varsha Bhaskaran:** Personal green spaces during the Pandemic-A study of people's attitudes and motivations during the COVID-19 pandemic towards urban home gardens in the city of Bangalore, India		**Elizabeth Lehrer:** Monitoring birds in cities with bioacoustics: mitigating the challenges of automated species classification and urban noise	**Brian Washburn:** A Federal Partnership to Ensure the Humane Capture, Handling, and Disposition of Migratory Birds

Did You Know? Having thoughtful field safety conversations with field techs and everyone on your team to identify and address minority fieldwork safety concerns are excellent ways to foster both equity and inclusion.

Tuesday June 6th: Session Details

Time (EDT)	Schuyler 1 + 2: *Wildlife Health & Disease*	Schuyler 3 + 4: *The Urban Wildlife Information Network*	Franklin Park: *Policy, Planning, & Design*
1:20 PM	**Amanda Tokuyama:** Parasites & the City: Characterizing the influence of urbanization on gastrointestinal parasite communities in Los Angeles area coyotes (*Canis latrans*)	**Mason Fidino:** Gentrification shapes patterns of alpha and beta diversity in cities, but not as much as habitat loss	**John Davis:** Austin's policy to prohibit honey bee hives within nature preserves: Broader implications with other species?
1:40 PM	**Rebecca Radisic:** Mass mortality of American Crows (*Corvus brachyrhynchos*) in February 2022 due to "winter mortality," *Corvid Orthoreovirus*	**Tiziana Gelmi Candusso:** The role of landscape connectivity in urban wildlife biodiversity	**Brett Johnson:** Wildlife Biologist vs. Arborist on Municipal Properties
2:00 PM	**Yasmine Hentati:** Gastrointestinal parasite communities of the coyote (*Canis Latrans*) in western Washington	**Rachel Larson:** Patterns of urban tree squirrel occupancy show strong city-level effects across their geographic range	**Judit Green:** Texas urban wildlife program partnering with an urban corporation to maintain their wildlife habitat council conservation certification
2:20 PM	**Carson Coriell:** The Impact of the Structure and Density of Small Mammal Populations on Tick-Borne Diseases in Urban Parks	**Katrina Moore:** Perceptions of safety: Effects of predation and urbanization on diel activity in defended versus undefended mammals	**Dan Herrera:** Legacy effects of urban park planning on avian diversity
2:40 PM	**Grace Hummell:** Zoonotic Implications of White-Footed Mice Habitat Selection and Territoriality in Fragmented Landscapes	**Lavendar Harris:** Assessment of Wildlife Response to Urbanization across the Southeastern United States	**Rebeca Quiñonez-Piñón:** Roadside Corridors to Promote Monarch Butterfly Conservation

Did You Know? To improve diversity, equity, and inclusion we must first get comfortable with being uncomfortable. Finding out what someone needs to be successful at a task and providing that support will make significant improvements toward creating an inclusive and equitable work space.

Tuesday June 6th: Posters

Poster #	Title	Name
1	Is the canid community the community's canids? Assessing the role of citizen science to learn about urban canids	Neville Taraporevala
2	Wisconsin Night Guardians for Songbirds: Community driven research & advocacy around urban bird collisions	Amanda Tokuyama
3	Building a Community Science Initiative to Prevent Human-Wildlife Conflict in Washington, D.C.	Deanna DePietro
4	From Data Points to Vector Lines: Using animation and education to communicate science	Katherine McGrath
5	Rat numbers increasing in cities around the world based on public reporting data	Libby McCoy
6	Temporal and Spatial Patterns of Butterfly Diversity and Abundance in Harrisonburg, Virginia USA	Amy Goodall
7	Assessing the impact of Homeowner Association Codes, Covenants, and Restrictions on Residential Land Management	Madeline Carr
8	Exploring the relationship between the luxury effect, redlining, and rapid gentrification: a case study in Philadelphia, PA	Luke Szyszkiewicz
9	How Redlining and Housing Segregation in the Nation's Capital has affected distribution and diversity of urban mammals	Merri Collins
10	DC School Garden Butterfly Project	Katherine Pontarelli
11	The Sign of Diversity, Equity, and Inclusion at the National Mall and Memorial Parks	Leslie Frattaroli
12	Sitting ducks: Landscape factors, impacts, and management strategies for black vulture conflicts near animal care facilities	Hannah Partridge
13	Assessing the impact of waterfowl migration on water quality across rural and urban bodies of water	Nicholas Woronowski
14	Mobbing behaviors of birds & heterospecific communication along an urban to rural gradient in Los Angeles	Ynez Diaz
15	Identifying drivers of Barred Owl (*Strix varia*) occupancy along a gradient of urbanization in a primarily agricultural region	Nicholas Alex
16	Bird species diversity: the implications of roadway disturbance in Le Moyne Woods	Hanna Oestrich
18	On the Hoof: A Multispecies Movement Design for Golden Gate Park	Diana Daisey
20	Factors influencing nest tree selection by the Eastern Gray squirrel in Syracuse, NY	Jack McGovern
21	Effectiveness of commercial repellents at reducing white-tailed deer damages to pansies	Rachel Lipsey
22	White-tailed deer densities along an urban-rural continuum in Durham County, North Carolina	Ashley Lynn

Tuesday June 6th: Posters

Poster #	Title	Name
23	Connecting urbanization to population dynamics: movement, resource selection and mortality risk of white-tailed deer across an urbanization gradient	Mikiah Carver-McGinn
24	Effects of urban noise and light pollution on bat occupancy and echolocation in Syracuse, NY	Carly Devereaux
25	Impacts of urban heat island intensity and artificial light at night on mammalian occupancy in urban landscapes	Emily Blackwell
26	Understanding the Biodiversity Implications of Anthropogenic Input in the Miller Knox and Big Break Regional Shorelines of East Bay Parks District	Rayna Fitzgerald
27	Urban Wildlife Monitoring in the Dallas-Fort Worth Metroplex	Rachel Richter
28	The NYC Wildlife Transect: The influence of direct human foot traffic on urban mesocarnivore distrib	Myles Davis
29	Advancing urban wildlife research through a multi-city collaboration	Kimberly Rivera
30	Ticks at the park? Investigating the relationships between people, urban wildlife, and ticks in urban greenspaces	Caleb Sandoval
31	Long-term surveillance of Sarcoptic mange within an urban coyote population	Ashlyn Halseth
32	Effects of canopy cover on habitat and space use by coyotes and gray foxes along urban-rural gradients	Danielle Gay
33	Distribution of foxes and coyotes in space and time along an urban-rural interface	Jasmine Grewal
34	Does human presence influence activity of a large carnivore in a megacity?	Maya Mathur
35	How Environmental Factors Influence Pigeon Density in Urbanized Landscapes	Daisy Lewis
36	Diet of the Eastern Coyote in Washington, D.C.	Lindsay Powers
37	Evaluating Coyote Behavior using Camera Collars in Atlanta, Georgia	Carson Daniel
38	Eastern Gray Squirrel Diets Across St. Louis City & County	Jenny Mann
39	Costa Rica Silvestre: A national initiative for improving human-wildlife interactions	Grettel Delgadillo
40	Show Me the Green: Wildlife, Greenspace, and the 'Luxury Effect' in San Gabriel Valley, California	Adrianna Elihu
41	Evaluating the Detection Probability of Mammalian Mesopredators in Response to Anthropogenic Factors along East Bay Shorelines	Tyus D Williams

Wednesday June 7th: Session Details

Time (EDT)	Farragut: *Symposium: Urban Wildlife Management in the Nation's Capital*	Schuyler 1 + 2: *Symposium: One Health in Wild Cities*	Schuyler 3 + 4: *Symposium: Integrated Management of Free-Roaming Urban Cats*	Franklin Park: *Urban Mammals*
8:00 AM	**Ryan Butler:** Great (Wildlife) Expectations: An Introduction to Managing Urban-Suburban Wildlife Around the Nation's Capital	**Kaylee Byers:** The Socio-Ecological Side of One Health in Cities	**Lisa LaFontaine:** A vision for integrated management of free-roaming urban cats	**Morgan Farmer:** Small mammals in the big city: species richness and relative abundance of the small mammal community and implications for urban canids in Madison, Wisconsin
8:20 AM	**Ann M. Gallagher:** Healthy Urban Forests Support Wildlife	**Jéssica Francine Felappi:** Urban parks through the One Health lens: Balancing people and wildlife needs	**Tyler Flockhart:** Quantifying free-roaming cat populations: Results from the D.C. Cat Count and Maui Cat Count (part A)	
8:40 AM	**Hannah Redmon:** Colonization and extinction events of songbirds in the National Capital Region	**Katherine Worsley-Tonks:** A global assessment of the challenges and opportunities in quantifying urbanization for wildlife infectious disease research	**Tyler Flockhart:** Quantifying free-roaming cat populations: Results from the D.C. Cat Count and Maui Cat Count (part B)	**Adam Parlin:** Anthropogenic drivers of color polymorphism in the Eastern Gray Squirrel (*Sciurus carolinensis*) along urban-rural clines
9:00 AM	**Guy Metzler:** A "Fledgling" Bird Community Index – How citizen scientists and breeding birds are helping us to understand habitat quality and variation on suburban-exurban park lands in Montgomery County, MD.	**Chris Stone:** How vector and host diversity shape West Nile virus transmission in urban green spaces along an urban-rural transect	**John Boone:** Tools and resources to support the integrated management of free-roaming cats	**Anna Kase:** Striped skunk colonization along an urban gradient in Chicago, Illinois
9:20 AM	**Annette Spivy:** Prioritizing Local-Scale Conservation and Restoration Areas in Washington D.C, USA based on Habitat Connectivity and Development Risk	**Maria Diuk-Wasser:** The role of New York City wildlife in tick-borne pathogen spillover risk	**Danielle Bays:** The potential contributions of animal welfare organizations to integrated management of free-roaming cats	**Sarah Benson-Amram:** Environmental, individual and social traits of free-ranging raccoons influence performance in cognitive testing
9:40 AM	**Dave Lawlor:** Restoration of a Degraded Freshwater Suburban Wetland to Improve Habitat for Breeding Marsh Birds and Wintering Waterfowl	**Christopher J. Schell:** Stressed out: Environmental health predicts variability in coyote ecophysiology in San Francisco, CA	Facilitated discussion / Q&A	**Elizabeth Carlen:** Inequity's Cloud: The Bias in Participatory Science Data

Wednesday June 7th: Session Details

Time (EDT)	Farragut: *Symposium: Urban Wildlife Management in the Nation's Capital*	Schuyler 1 + 2: *Symposium: One Health in Wild Cities*	Schuyler 3 + 4: *Urban Birds*	Franklin Park: *Urban Mammals*
10:30 AM	**Natasha Garcia Andersen and Damien Ossi:** Getting to the "Corps" of Kingman Island: Using wildlife and plant data to inform the ecological restoration of dredge-material islands and landscape-scale conservation in Washington DC	**Cesar O. Estien:** Historical redlining influences urban ecosystem health and threatens biodiversity	**Henry Adams:** The history and future of an urban population of Black-crowned Night Herons in Chicago's Lincoln Park	**George Zaragoza:** Beyond the bottleneck: Contributions of urban adaptation to the loss of genetic diversity in Florida key deer
10:50 AM	**Jon Paolo Abellera:** The Role of a County Parks System in Managing Deer-Human Conflict	**Christine E. Wilkinson:** Societal health and wealth are associated with variance in coyote movement patterns	**Jessica Alderson:** Criteria for Implementing Urban Rookery Management at the Municipality Level - A Zoned Management Approach	**Jess Proctor:** Does differential crypsis help explain urban-rural clines in coat color for eastern gray squirrels (*Sciurus carolinensis*)?
11:10 AM	**David Petersen:** Don't re-invent the wheel, just adapt it to fit your need: History and development of a wildlife management program in the shadow of the nation's Capital	**Colin Carlson:** Socioecological drivers of disease emergence: data to evidence to intervention	**Merri Collins:** Won't You be My Neighbor: Wild Turkey (*Meleagris gallopavo*) Occupancy in the Washington D.C. Metropolitan Area	**Austin Green:** Urbanization and predator avoidance alters diel activity patterns of breeding mule deer (*Odocoileus hemionus*)
11:30 AM	**Katherine Edwards:** Organized Archery Hunting to Manage White-tailed Deer in a Densely Populated, Suburban Area	**Maureen Murray:** Inequity in exposure and knowledge drives vulnerability to zoonotic disease among urban communities	**Madelyn Jamsa:** Wild Turkey (*M. gallopavo*) occupancy across an urban-rural gradient in Montgomery Co. Maryland	**Bradley Cosentino:** Natural selection on coat color in eastern gray squirrels (*Sciurus carolinensis*) along an urbanization gradient

Did You Know? The first step in empowering and amplifying voices within vulnerable communities is learning to practice self-education on the link between structural inequities and the disproportionate environmental hazards found in underprivileged communities.

Did You Know? There often exists a perceived disconnect between the stated and demonstrated values of organizations. This perception can result in behavioral conformity to majority standards which inhibit the sharing of diverse perspectives and experiences that contribute to novel advancements within the wildlife profession. By working together and leveraging individual and organizational synergies, we can foster a stronger wildlife profession with open communication, shared success, and empowered individuals (TWS DEI Vision p.13). Therefore, we must be open to perspectives and experiences that differ from our own.

Wednesday June 7th: Session Details

Time (EDT)	**Farragut:** *Symposium: Urban Wildlife Management in the Nation's Capital*	**Schuyler 1 + 2:** *Education and Outreach*	**Schuyler 3 + 4:** *Urban Birds*	**Franklin Park:** *Human Dimensions*
1:20 PM	**Scott Bates:** OK, We've Been Managing Deer – What's Next?	**Amy Greene:** An urban nature center - connecting people to their sense of place and sharing space with city wildlife	**Katrina Toal:** Shore We Can: Piping Plover Management in NYC	**Sheryl Hayes Hursh:** What informs human-nature connectivity? An exploration of factors in the context of urban park visitors and wildlife
1:40 PM	**Dan Herrera:** Spatial and temporal overlap of domestic cats and native urban wildlife	**Marcus Mueller:** Urban Wildlife Damage Management is Wildlife Conservation	**Darren Proppe:** Vocal behavior and urban avoidance in golden-cheeked warblers inhabiting exurban preserves	**Simon Moesch:** What we think of urban wildlife: Perceptions of citizens and decision-makers
2:00 PM	**Leslie Frattaroli:** On a Cultural Resource Collision Course – Bird Collisions at the Washington Monument	**Adam Rohnke:** Using ArcGIS StoryMaps® to Visualize the Story of Wildlife in our Cities	**Tracy Rittenhouse:** Mallard nest survival, brood movements, and habitat use in urban Connecticut	**Karina Sanchez:** It's not just noise: the consequences of inequitable noise for urban wildlife
2:20 PM	**Annette Spivy:** Using Ecosystem Service Valuation and Assessments to Advance Biodiversity Sensitive Urban Planning and Corridor Design	**Dana Stangel:** Coexisting on the Urban Interface: Your Backyard	**Lois Balin:** Urban Nest Site Use of Burrowing Owls in El Paso, Texas	**Nancy Lawson:** Yes, in My Backyard: Welcoming Wildlife in HOA Communities
2:40 PM	**Facilitated Discussion / Q&A**	**Christopher Mowry:** The Atlanta Coyote Project	**Benjamin Ewing:** Changes in avian mobbing responses along an urban-rural gradient in southern California	**April Linton, John Hadidian, Lisbeth Fuisz:** Wildlife Rehabilitation in the Nation's Capital: Engaging Urban Residents with Nature

Did You Know? Holistic approaches to policy making and *environmental justice* ensure that every impacted underprivileged community are supported by environmental justice efforts to reduce structural and systemic inequities faced by low-socioeconomic, disabled, and racial underprivileged communities. Systemic changes are possible when every single underprivileged community are holistically included in policy.

Did You Know? To assess Covid-19 safety, current transmission levels in all regions from which attendees are traveling as well as transmission levels in DC should be considered. To increase Covid-19 safety precautions, *mask wearing* is strongly encouraged. Conference sessions will also include a HEPA air purifier.

Wednesday June 7th: Session Details

Time (EDT)	Farragut	Schuyler 1 + 2	Schuyler 3 + 4: *Urban Birds*	Franklin Park: *Human Dimensions*
3:30 PM	Science Journalism Pitch Pit	Wildlife Acoustics Workshop: Turning Sound into Discovery		**Kaitlin Goode:** Public Attitudes Towards Urban Wildlife in Metro-Atlanta
3:50 PM			**Ketki Samel:** Tolerance for urban development varies seasonally for Connecticut birds	**Sayantani Basak:** Perceptions and attitudes to understand human-wildlife conflict in an urban landscape – a review
4:10 PM			**Jin Bai:** The ecological legacy effects of redlining on urban landscapes and bird diversity in Durham, NC	**Mikiah Carver-McGinn:** Negative emotions predict risk perceptions towards wildlife disease
4:30 PM			**Eric Wood:** The effects of over a century of urbanization on the avifauna of the Los Angeles Basin	**Meghan Vona:** Stories of Wildlife in our Cities: Listening to our Municipalities

Did You Know? For Diversity equity and inclusion are like building blocks. To have inclusion, there must first be diversity of participation. To have diversity, there must first be the equity that allows for marginalized, underrepresented communities to participate. Therefore, to successfully implement improvements to all three DEI, change starts with policy-based changes in equity, the building block to improving diversity needed to foster an inclusive social interaction. Thus, by focusing efforts on policy improvements, diversity and inclusion becomes much easier to implement.

Did You Know? For more on presenter DEI tips, go to https://tinyurl.com/Presenter-DEI-Tip-Sheet

2023 IUWC Program

Workshop descriptions

The Value of Visuals: Designing Graphical Abstracts to Share Your Science

Science communication is a rapidly evolving field that is transforming how we share and discuss science. It is increasingly being recognized that science is most impactful impactful when effectively and accessibly communicated to a wide range of audiences. This growing understanding has resulted in a range of initiatives to share science in unique and compelling ways. Visuals, in particular, are increasingly being used to distill complex information into clear and concise formats. In fact, an expanding number of scientific journals provide authors the opportunity to submit graphical abstracts as part of their manuscripts so that readers may quickly and more accessibly develop an overall understanding of the goals and findings of the research.

In this interactive, half-day workshop we will work with participants to develop their own graphical abstract. As part of this workshop, you will: 1) explore how storytelling and visuals can enhance your research and scientific goals 2) practice a storytelling exercise to help identify your communication goals and find your message; 3) discuss design principles and processes for breaking down complex concepts into clear and compelling visuals 4) apply those principles and processes to draft your own graphical abstracts and 5) discussion a number of programs/tools that can be used to help you design your next graphical abstract.

Wildlife Acoustics Workshop: Turning Sound into Discovery

City planners, biologists, ecologists, and environmental educators have their work cut out when it comes to communicating scientific research and the importance of protecting urban wildlife and wild landscapes. Those who live and work in urban areas may only glimpse wildlife occasionally and feel fearful or ambivalent about these short-lived encounters. (Or they may not even be aware of the species that coexist alongside them.) Adding bioacoustics to your research can add dimensionality and build interest and engagement with the public, media, and policymakers through sound.

This one-hour, hands-on workshop for urban planners, scientists, and educators will introduce two acoustic wildlife recorders for species monitoring, measuring anthropogenic disturbance, and engaging urban communities in citizen science. Learn how the Echo Meter Touch 2 turns a smartphone or tablet into an active bat detector that allows users to hear, record, and visualize (otherwise undetectable) bat echolocations. You'll also get an up-close look at how to set up and deploy a Song Meter Micro acoustic recorder to capture the sounds of birds, amphibians, and mammals for future playback and analysis.

Science Journalism Pitch Pit

Want more confidence telling your story to the media? Come get advice and feedback from experts at our interactive event. Bring a story from your work to get feedback on how to make it succinct, interesting, and showing that you are the best person to tell it. In this session, we will discuss the answers to questions such as ""why is this interesting?" "why do we care?" "what can someone do with this information?" and "why are you the best person to tell this story?"

CONTRIBUTED ABSTRACTS

Urban Carnivores – Monday, June 5th @ 1:20-3:00 pm

Title: DNA metabarcoding identifies urban dietary patterns of coyotes in San Francisco
Authors: Tali Caspi, Monica G. Serrano, Stevi L. Vanderzwan, Christopher J. Schell, Benjamin N. Sacks
Speaker affiliation: University of California, Davis
June 5th @ 1:20 pm
Abstract: Carnivores are increasingly establishing in urban environments where they were previously absent. Cities are novel ecosystems with greater heterogeneity in habitat and food availability and different prey assemblages compared to nonurban areas. Coyotes (*Canis latrans*) recolonized and established a breeding population in San Francisco in the early 2000s. In this study, we used non-invasive sampling and fecal DNA metabarcoding to quantify the diet composition of coyote scats collected from several green spaces throughout San Francisco at the individual level. We found that urban coyotes consumed a variety of animals and plants and that most scats contained evidence of anthropogenic foods. Pocket gophers (*Thomomys bottae*), raccoons (*Procyon lotor*), berries (*Rubus* spp.), and cherry plums (*Prunus* spp.) were the most frequently consumed natural diet items. Domestic chicken (*Gallus gallus*), pig (*Sus scrofa*), and soybean (*Glycine max*) were the most consumed anthropogenic diet items. We also considered ties between dietary variation and the spatial ecology of the region. Future work will investigate the physiological consequences of variation in diet by linking measurements of fecal hormone metabolites in these scats (glucocorticoids and thyroid hormones) to their dietary profiles.

Title: Street Smarts and Bold Behaviors: An assessment of carnivore risk-taking behavior and problem-solving ability across diverse neighborhoods in East Bay, California
Authors: Lauren Stanton, Cesar Estien, Christine Wilkinson, Christopher J. Schell
Speaker affiliation: University of Wyoming
June 5th @ 1:40 pm
Abstract: Standing hypotheses suggest that the demands of urban living promote behavioral and cognitive changes in urban wildlife, favoring certain traits like boldness, learning, and problem solving. Yet, species that are often in conflict with humans, such as carnivores, may experience retaliation by humans for capitalizing on urban resources using such cognitive skills or bold behaviors. Furthermore, heterogeneity in various features of urban environments that stem from social inequity (e.g., food waste, pollution burden) can influence animal behavior and cognitive processing ability, yielding largely unknown consequences on wildlife. Given this complexity, we do not have a clear understanding of how the demands of urban living and individual experiences of urban carnivores influence their behavior and cognition, and how this may or may not relate to conflict with humans. In our study, we quantified and compared the risk-taking behavior and problem-solving ability of urban mesocarnivores using a novel foraging task (i.e., a “puzzle”). We partnered with local residents and organizations to deploy puzzles in backyards and green spaces across different neighborhoods in the East Bay and assessed (1) which species were detected at each location, (2) how each individual and species responded to the puzzle, and (3) whether they were able to solve the puzzle to retrieve the bait contained inside. We then considered how both societal and environmental features unique to each location may have contributed to the patterns we observed over the course of the study. The results of this work contribute to our growing understanding of how humans and within-city landscape heterogeneity shapes the cognition and behavior of wildlife, and what this may imply for human-wildlife coexistence and conservation in cities.

Urban Carnivores – Monday, June 5th @ 1:20-3:00 pm

Title: Variation in home range size and resource selection of coyotes across a gradient of development in greater Los Angeles
Authors: Jasmine Grewal, Justin Brown, John Benson, Seth Riley
Speaker affiliation: University of Nebraska - Lincoln
June 5th @ 2:00 pm
Abstract: The number and size of urbanized areas continue to grow with the global population, but the presence of anthropogenic barriers and heterogeneous availability of food resources in cities can have disparate effects on the wildlife species that exploit human food sources. Coyotes (*Canis latrans*) can be found living alongside humans across the United States from highly urbanized to natural areas, but previous findings on the influence of development on their home range sizes have been inconsistent. We sought to understand shifts in coyote behavior that allow them to persist in densely populated cities. For our analysis, we used GPS collar data collected from 44 coyotes throughout the greater Los Angeles area over the past two decades. Our study area encompassed a steep gradient of urbanization from downtown Los Angeles to outlying suburban neighborhoods and agricultural regions. We assessed the size of home ranges as the level of development increased, as well as the habitats coyotes selected within their home ranges. Coyotes in agricultural areas used mostly natural habitat, in suburban areas they used mostly natural habitat as well as developed areas. Urban coyotes used altered green spaces and could persist in high levels of development with little natural habitat available. Our study sheds light on variations in resource selection that allow coyotes to thrive in the second most populous city in the United States.

Title: Movement decisions by mountain lions in greater Los Angeles: tradeoffs between human disturbance and foraging efficiency
Authors: John Benson, Kyle D. Dougherty, Jeff Sikich, Seth Riley
Speaker affiliation: UNL
June 5th @ 2:20 pm
Abstract: Understanding animal movement relative to spatially and temporally varying risks and rewards is a central pursuit for ecologists. Historically, these questions were mainly pursued for prey species in the context of forage-predation risk tradeoffs. Recently, there has been considerable interest in movement of large carnivores as they navigate human-dominated landscapes – and how their decisions influence human-caused mortality risk. Indeed, large carnivore behavior relative to human disturbance is increasingly viewed as anti-predator behavior as carnivores balance energetic demands with risk from humans. We used GPS collar data from >50 mountain lions and conducted a step-selection function analysis to quantify fine-scale movement decisions by mountain lions as they navigated greater Los Angeles. Mountain lions of all age and sex classes strongly selected shrub vegetation with dense cover and areas with the highest estimated probability of killing deer. Males selected riparian and upland woodlands, whereas females neither selected or avoided these areas. Adult females selected areas closer to open-structure prairies and meadows, while males avoided these areas. Adults avoided development more strongly than subadults suggesting that younger animals may be more willing to tolerate areas closer to human disturbance, perhaps to minimize encounters with adults or as they look for dispersal corridors. Differences in selection between age and sex classes of mountain lions may reflect habitat partitioning in the space-limited landscapes within greater Los Angeles. Our results also highlight tradeoffs between predation efficiency and human disturbance for a top predator persisting in the second largest metropolitan area in the US.

Urban Habitats – Monday, June 5th @ 3:30-4:50 pm

Title: Resilient Urban Native Habitats in South Texas to Support Urban Wildlife Species' Adaptation to Climate Change
Authors: Rebeca Quiñonez-Piñón
Speaker affiliation: National Wildlife Federation
June 5th @ 3:30 pm
Abstract: The Lower Rio Grande Valley of Texas (LRGV) is a subtropical ecosystem that supports an exceptional biodiversity, including many endemic plant and animal species. About 95% of the LRGV natural habitat was cleared for development in the 20th century, and the remaining native habitats are highly fragmented. The impacts of this fragmentation on wildlife are now exacerbated by climatic change. Urban and migratory wildlife species struggle to survive and thrive under these precarious conditions and only the most resilient ones find strategies to adapt. Recently, about 70 bird species in south Texas extended their spatial distributions beyond their historic breeding ranges, and these behaviors correspond to extreme weather events. Through the Federation's Climate-Resilient Habitats program, and in collaboration with the cities of Pharr and McAllen, TX, we are creating climate-resilient native wildflower and grassland habitats in urban vacant land to support the adaptation of wildlife species to climate change and to increase habitat connectivity. Our adaptation strategy is to eradicate any invasive, non-native plants present—when possible—and plant a diverse mix of locally adapted native plant species that collectively will respond well to current and projected climatic changes, ensuring that some nectar sources will be available year-round. Site selection is based on habitat suitability assessments. It is expected that these resilient plant communities will better support climate-vulnerable LRGV wildlife and will provide additional benefits such as increased rainwater infiltration, reduced stormwater runoff, and city beautification. In the last two years, we restored 150 acres within the urban LRGV, despite the 2021 polar vortex, extreme heat, and droughts. The LRGV residents have limited access to environmental educational materials due to the language barrier, and at least 25% of the population lives in poverty. Eighty to 95% of LRGV residents are Hispanic or of Hispanic descent, and at least 80% of the LRGV population speaks Spanish. Climate-Resilient Habitats Program also provides wildlife conservation educational opportunities to all residents through bilingual educational resources and volunteer opportunities. The expansion of this program is crucial to keep supporting LRGV wildlife, and we will closely work with LRGV mayors to engage them in adopting formal resolutions to designate other urban areas for future restoration.

Title: From the Theoretical to Paws on the Ground - How Predictive Are Connectivity Models for Urban Wildlife Corridors
Authors: Auxenia Grace Privett-Mendoza, Amanda Zellmer, Barbara Goto, John Howell, Tim Martinez, Katie Lam, Johanna Turner
Speaker affiliation: Arroyos & Foothills Conservancy
June 5th @ 3:50 pm
Abstract: Landscape connectivity modeling is a powerful tool which can be used to inform conservation and planning efforts. However, building connectivity models requires accurate landscape data and validating those models requires extensive observation, tracking, or genetic data from each target species. For conservation purposes, such theoretical models may not accurately identify feasible routes of connectivity, for instance if barriers exist that are not captured by the landscape data. This may be especially true when studying wildlife connectivity in urban areas where wildlife need to traverse many different parcels of land owned by multiple different land owners. Alternatively, ground-truthing connectivity through biological surveys, may provide a more accurate picture of potential routes of connectivity in real time, but this approach is also highly time intensive. We compared landscape connectivity models with routes identified by a team of conservation practitioners and wildlife experts within an urban wildlife corridor priority region in the Greater Los

Angeles Area. Our preliminary results suggest that while there was some agreement between the two approaches, there were some differences in predicted routes of connectivity. While connectivity modeling identified some areas that had previously not been considered by the team of experts, ground-truthing by experts identified barriers that were not visible in the connectivity models. Our results suggest that a combination of approaches is necessary for accurate connectivity modeling in complex urban landscapes.

Title: Urban green spaces: Islands of hope for urban avifauna in rapidly urbanizing Himalayan city of Dehradun, India.
Authors: Monica Kaushik
Speaker affiliation: Azim Premji University, Bangalore
June 5th @ 4:10 pm
Abstract: Urban green spaces are globally emerging as a land-based tool for ameliorating the effects of urbanization. Yet our knowledge on the significance of urban green spaces for supporting urban fauna is lacking for tropical countries such as India. We conducted a study in 18 urban green spaces in the Himalayan city of Dehradun, India. We first compared the bird community structure and composition of urban green spaces with different habitats in the surrounding matrix. Further, we investigated the effects of landscape and local scale variables in explaining the variation in bird community structure and composition in urban green spaces. We quantified landscape-level variables in the 250 m buffer around each site. We sampled vegetation and bird community during the breeding season through intensive sampling points spread across selected green spaces and the surrounding matrix. We found that overall bird species richness and density (Individual/ha) were higher in the green spaces than in the matrix's different habitat categories. The size of the urban green space at the landscape level and tree species richness at the local scale emerged as important predictors in explaining variation in bird species richness, density, and the imperiled insectivorous guild's richness within green spaces. Urban green spaces within education institutions and offices experiencing less vegetation management supported higher bird species richness and density whereas city parks were species poor. Community composition was affected more strongly by built-up cover and barren area in the landscape matrix and tree species richness at the local scale within urban green spaces. Our study establishes the value of urban green spaces for conserving urban avifauna in the study area. New urban centers must allocate green spaces within urban settings and expand the formal green spaces. Existing green spaces could be improved by augmenting the compositional and structural heterogeneity of vegetation and conserving large old native trees.

Title: Planting Spirituality in Pollinator Gardens
Authors: Courtney Arches, Danielle Wendt
Speaker affiliation: National Wildlife Federation
June 5th @ 4:30 pm
Abstract: Sacred Grounds is a National Wildlife Federation (NWF) program that recognizes congregations and faith communities that both create wildlife habitats and actively link faith practices and caring for the environment. In the Mid-Atlantic and Great Lakes regions, NWF is leading Sacred Grounds programming that connects people to nature and contributes to healthier, more resilient communities. From ecosystem health to environmental justice, this project offers an integrated pathway to support a better quality of life for both people and wildlife. Through educational workshops, direct funding for congregations, community-driven garden designs, and hands-on plantings, people without traditional conservation backgrounds will begin to understand their important role as environmental stewards. These Sacred Grounds gardens provide valuable opportunities to engage diverse faith communities, create wildlife habitat, and serve as accessible

greenspaces in highly urbanized areas. By prioritizing congregations in underserved communities, flood-prone neighborhoods, areas with little access to nature, and that represent diverse faith communities, Sacred Grounds intensifies and prioritizes environmental justice outcomes. In creating community-led designs and attempting to ease burdens in frontline communities, it is crucial to center each congregation's specific needs and capacities throughout the Sacred Grounds process. Across regions, Sacred Grounds communities continue to illustrate the impact non-traditional and often underutilized key groups, like faith institutions, can have in restoring urban habitats and building climate-resilient communities.

Urban Wildlife Management – Monday, June 5th @ 1:20-3:00 pm

Title: Post-translocation movement and survival of urban red foxes
Authors: David Drake, Morgan Farmer, Logan McCormick, Erin Lemley
Speaker affiliation: University of Wisconsin-Madison
June 5th @ 1:20 pm
Abstract: Translocation is a technique used to move plants or wildlife from one location to another and is commonly used to introduce or reintroduce species for population viability reasons or to mitigate wildlife damage issues. A wide range of wildlife species have been translocated with varying degrees of success; however, there have been no documented translocations of urban red foxes. We had an opportunity to radio-collar and translocate 7 (4 males, 3 females) subadult red fox (*Vulpes vulpes*) in Madison, WI. Therefore, the objective of our study was to evaluate post-translocation movement and survival of urban red fox. Four foxes were released at locations different from where they were captured following treatment for mange at a local wildlife rehabilitation center. Three foxes were trapped and translocated to mitigate a fox-specific damage issue at a municipal golf course. Forty-three percent (n=3) of the translocated foxes died within 2-18 days of being translocated. Three of the collars failed and did not provide spatial data, so it is possible the mortality rate may have been higher than what we are reporting. Of the 4 working collars, 75% (n=3) of the foxes moved away from the release location, moving 9-62 km from where they were released. Although all 7 foxes were trapped in urban areas and released in urban areas, 2 of the 4 foxes wearing working radio collars dispersed into rural areas. A third fox wearing a working collar also dispersed into a rural area but settled in a residential neighborhood of an urban area. The last fox wearing a working collar was killed by a vehicle shortly after release and no spatial data were collected. Our results can be used to guide future urban red fox translocations. All of our translocated foxes were subadults, which may explain their dispersal patterns. Given the relatively high mortality rate of our foxes, we would not recommend translocating subadult foxes. Instead, we would recommend releasing subadult foxes where they were trapped or mitigating fox-caused damage that does not involve translocation.

Title: Evaluating limiting factors for fecundity in an actively managed urban white-tailed deer population
Authors: Taylor Readyhough, Jonathon Cepek, Patricia Dennis, Constance Hausman, Nathan Byer, Robert Montgomery, Remington Moll
Speaker affiliation: University of New Hampshire
June 5th @ 1:40 pm
Abstract: White-tailed deer (*Odocoileus virginianus*; hereafter "deer") are keystone herbivores that exert significant influence on ecosystems. Understanding the drivers of urban deer demographic rates, including fecundity (number of fetuses/doe), is paramount to making informed and effective management decisions and the limiting negative ecological effects of local deer overabundance. While some research exists on the drivers of deer fecundity in natural and rural areas, there is an

acute research gap regarding deer fecundity in urban systems. In non-urban areas, doe age, deer population density, winter severity, and herbaceous plant productivity influence deer fecundity. In urban populations, increased forage availability (e.g., in suburban yards) during winter may dampen the effects of climatic variables on deer reproduction. However, urban deer also experience increased anthropogenic threats (e.g., automobile collisions) and stressors that may mitigate the positive effects of these anthropogenic resources. We used 20 years of data from Cleveland Metroparks' annual deer management program to investigate the factors impacting urban deer pregnancy rates and the number of fetuses carried by yearling and adult deer. In this study system, deer were once so rare that the Cleveland Metroparks Zoo maintained this species on exhibit. Today, however, deer exist at high densities throughout Cleveland and are actively managed to regulate the potential for degraded ecosystem function, intraspecific disease transmission, and elevated human-wildlife conflict. We first split female deer into three age classes: fawn (<1yr old), yearling (<2yrs old), and adults (>2yrs old). We then evaluated the effects of age, growing season precipitation, urbanization, and weather on the proportion of individuals pregnant (all age classes) and the number of fetuses per doe (for yearlings and adults only given low pregnancy rates in fawns). We found that doe age was the strongest predictor of fecundity rates. The proportion of pregnant fawns, yearlings, and adults were 0.16, 0.95, and 0.97, respectively. The number of fetuses/doe for fawns, yearlings, and adults were 0.17, 1.59, and 1.88, respectively. Growing season precipitation negatively affected the proportion of pregnant fawns but had no effect on yearling or adult fecundity. Neither urbanization (proportion of developed land) nor climate (winter snow accumulation) significantly affected the proportion of pregnant fawns, or the number of fetuses carried by yearling and adult does. These results indicate that fecundity in urban deer herds might experience fundamentally different constraints than those present for more natural or rural herds. Further investigation into the drivers of urban deer fecundity will enhance our understanding of urban deer ecology and help inform deer management as human urban populations continue to increase.

Title: Coyote Diet Study in Regional Houston Area
Authors: Kelly Norrid
Speaker affiliation: Texas Parks & Wildlife Department
June 5th @ 2:00 pm
Abstract: The number of news stories about coyote being spotted in urban Houston has increased in recent years. With this proliferation in reporting comes the issue of coyote taking domesticated livestock and pets. Studies from around the United States show discrepancies in the percentage of food consumed by coyote from anthropogenic sources. In order to provide the constituency of the Greater Houston area with the most accurate data for the region, Texas Parks and Wildlife Department, Houston Urban Wildlife Office began a preliminary study of the diet of coyote across the suburban and urban sections of the Houston/Harris County area. This presentation will go over the preliminary results received so far, issues that arose during the study, and how we are working on solving those.

Title: Wildlife connectivity in a highly urban landscape: 20 years of collaboration with Caltrans in the Los Angeles area to increase safe movement across roads.
Authors: Seth Riley, Justin Brown, Joanne Moriarty, Jeff Sikich
Speaker affiliation: National Park Service
June 5th @ 2:20 pm
Abstract: Roads of all sizes can have significant effects on wildlife, including by causing mortality through vehicle strikes and especially, for larger roads, by creating barriers. The Los Angeles area has an extensive road and freeway system, including some of the busiest freeways in the world. At

Urban Wildlife Management – Monday, June 5th @ 1:20-3:00 pm

Santa Monica Mountains National Recreation Area, we have been working closely with Caltrans to understand both the impacts of various roads and the potential value of efforts to mitigate those impacts. Since 2002, we have collaborated on seven different projects involving measuring mortality through roadkill surveys, evaluating the use of various road crossing structures, and intensively tracking wildlife, particularly mammalian carnivores, to determine their behavior relative to the road. We have also monitored the effectiveness of mitigation efforts such as clearing culverts, improving fencing, adding one-way gates, and adding a wildlife ""sidewalk."" Overall we have found that even smaller highways can form important barriers to movement for species such as bobcats, but that effective underpasses can significantly increase connectivity across them. We have also found that the response to roads can vary by species. For example coyotes regularly cross over the road surface itself, while bobcats depend more on underpasses, which means that the barrier effects may be stronger for bobcats, but that coyotes are more susceptible to vehicle mortality. In terms of mitigation, clearing culverts can significantly increase their use, but failure to consider the specific needs of wildlife can easily render crossing structures of little value. On one major project adding carpool lanes to the 405 Freeway we found that the period of construction itself, often not considered in before-after wildlife road projects, can have a significant impact on wildlife use. We have also found that the specifics of construction, where fences go, the type of fence, changes in lighting, the pattern of vegetation removal, the placement of construction facilities, can all potentially affect wildlife use. Overall, evaluating multiple different aspects of wildlife response, for as long as possible, gives the best picture of road impacts and how to reduce them.

Title: Buffering urban natural areas against feral cat colonies
Authors: Richard Heilbrun
Speaker affiliation: Texas Parks & Wildlife Department
June 5th @ 2:40 pm
Abstract: The feral cat conundrum is an ever-present discussion in the urban wildlife profession, and we have yet to find solutions that satisfy all parties, which are often severely polarized and factious. If it is unrealistic to remove or prevent the establishment of feral cat colonies within urban areas, perhaps it is possible to ensure they are not established near or in areas with high value wildlife habitat. In this presentation, we outline an attempt to identify an ideal distance with which to buffer feral cat colonies against sensitive ecological areas such as caves, springs, occupied endangered species habitat, and municipally designated “natural areas.” We conducted an ad hoc literature review to identify home range size from nearly 3 dozen studies and extrapolated the data to presume an average movement distance within those ranges. Minimum home range radii was 73 ft maximum radii was more than 4,000 ft, but the data coalesced to suggest that a buffer of 600-1200 ft may be appropriate to protect ecologically sensitive areas from feral cat colonies.

Urban Wildlife Management – Monday, June 5th @ 3:30-4:50 pm

Title: Wild Hog Management in a Major City: 7 Years of Trapping
Authors: Brett Johnson
Speaker affiliation: Dallas Park and Recreation Department
June 5th @ 3:30 pm
Abstract: Review of the wild hog trapping program in the City of Dallas over the last seven years. In the last seven years, the city's contract trappers have removed ~3,000 wild hogs from municipal properties, and seen a marked decrease in property damages. To date, there have been very few negative issues associated with this trapping program. Presentation will review the early pilot project, early stakeholder engagement, strict standards for professionalism, and challenges that presented themselves along the way.

Title: Considerations for State Wildlife Agency Urban Deer Management Plans
Authors: Shane Boehne, Gino D'Angelo, Bynum Boley, Amanda Van Buskirk, Kaitlin Goode, Tina Johannsen, Charlie Killmaster
Speaker affiliation: University of Georgia Athens
June 5th @ 3:50 pm
Abstract: In many regions of the United States (U.S.), growing urban white-tailed deer (WTD; *Odocoileus virginianus*) populations create conflicts with residents. As a result, state wildlife agencies are often tasked with resolving urban deer-human conflicts using significant personnel and financial resources. Diverse stakeholder opinions about deer make it difficult for managers to reach consensus on strategies to minimize deer-human conflicts. The objectives of this study are to: 1) characterize the status of state agency urban deer management across the U.S., 2) describe best-management practices available for urban deer management, and 3) increase understanding of stakeholder involvement in decision-making for urban deer management. We searched for digitized state WTD management plans and summarized how states manage urban deer. If plans were unavailable, we searched for additional online resources and interviewed state agency biologists to identify other ways states manage urban deer. Of the 46 states with WTD present, 41% had WTD management plans with urban deer considerations, 52% had online urban deer management resources, and 7% had no urban WTD management information. Our synthesis shows that public input is incorporated in all state plans and lethal control remains the most common management tool. Overall, states lack strategies, protocols, and supplemental resources to effectively address site-specific urban deer management. This research identified gaps in state urban deer management resources and provides recommendations for integrating urban deer management sections into state WTD management plans. Our recommendations will improve urban deer management materials and facilitate collaboration with stakeholder groups experiencing deer-human conflicts.

Title: Implications of urbanisation for distribution, abundance, and hybridisation of squirrels in a tropical mega-city
Authors: Phakhawat Thaweepworadej, Karl Evans
Speaker affiliation: Department of Biology, Faculty of Science, Mahidol University
June 5th @ 4:10 pm
Abstract: Squirrels are often present as common urban mammals across the globe. Given their ecological functions, squirrels are significant mammalian seed dispersers especially in urban ecosystems where other mammalian frugivores are relatively rare. However, urban squirrels can create management and biodiversity problems—such as gnawing electric wires, damaging agricultural operations, and increasing disease transmissions. Understanding of factors influencing their distribution and abundance to support conservation and management has been highly biased towards the temperate squirrel species, leaving an important research gap on the urban ecology of

squirrels in the tropics—the regions that support larger number of squirrel species and are experiencing higher rates of urbanisation. In this study we assess how urbanisation intensity and environmental conditions influence the distribution and abundance of squirrels in Bangkok (Thailand)—a rapidly growing tropical mega-city in Southeast Asia. Moreover, our study region is located on the Chao-Praya River, at which geographical ranges of congeneric *Callosciurus squirrels—C. finlaysonii* and *C. erythraeus*—come into contact. Whilst these congeneric squirrel species are known to hybridise, we also quantified how urbanisation influences hybridisation between Callosciurus squirrels. We first employed random stratification to select 150 1 km × 1 km grid cells along the gradient of urbanisation intensity within the Bangkok urban region. We then located a 50 m radius circular plot at the centre of each randomly selected plot and conducted 15-minute repeated point count observations. Three squirrel species were detected. *C. finlaysonii* and *C. erythraeus* were widespread across the study region whilst *Tamiops macclellandi* were extremely rare (detected in only one site). Models of species response to urbanisation intensity reveal an interspecific variation in the population responses to urbanisation intensity—with *C. erythraeus* population declining and *C. finlaysonii* population increasing as urbanisation intensity increased. Modelling of associations between abundance and environmental conditions underline the importance of improving quantity and quality of urban tree covers, reducing human disturbance, control of the feral dog population to mitigate adverse urbanisation impacts on urban squirrels. Abundance of hybrids was not significantly associated with urbanisation intensity but increased with decreasing distance to the nearest bridge that crosses the major river, indicating bridge construction could have increased the permeability of their geographic barriers. Our study highlights the ecological impacts of urbanisation on diversity and abundance of tropical squirrel species and possible urban management to mitigate these adverse impacts.

Title: The Humane Control of "Nuisance" Urban Wildlife: economics and alternatives from a 10-year trial
Authors: John Griffin, John Hadidian
Speaker affiliation: Humane Society of the United States
June 5th @ 4:30 pm
Abstract: In 2007, the Humane Society of the United States (HSUS) launched a for-fee program called Humane Wildlife Services (HWS) to provide service for customers experiencing conflicts with wildlife in the Washington, D.C. metro area. Modeled after a highly successful Canadian enterprise (AAA Wildlife Control, now Gates Wildlife Control), the objective of this program was to test an alternative model for urban wildlife "nuisance" control based on the use of eviction and exclusion technologies rather than either trapping and relocating or trapping and killing animals, still the industry standard. The purpose of the program was threefold: (1) to establish a more humane and effective approach to urban wildlife control, (2) to test existing and potential technologies and methods of wildlife control that might result in more humane outcomes and (3) to test a commercial model of urban wildlife control that might be competitive with, and in some senses superior to, the existing paradigm. We report here on that service model with an analysis of service call, job and operational cost data. Our intent is not to compare this to the still dominant model in "pest" control since data there is generally unavailable. Rather it is to simply share what we experienced during the time our own model was being tested, allowing others to draw conclusions from it as they will.

Reptiles & Amphibians – Monday, June 5th @ 1:20-3:00 pm

Title: Native stream breeding amphibians in Southern California affected by urbanization, wildfire, and drought
Authors: Kathleen Delaney, Seth Riley
Speaker affiliation: National Park Service
June 5th @ 1:20 pm
Abstract: At Santa Monica Mountains National Recreation Area (SAMO), the largest urban national park in the U.S., native stream breeding amphibians are exposed to many different stressors, including habitat fragmentation, roads, urban water run-off, extreme drought, and wildfires. Together with our partners, the National Park Service has been monitoring native stream breeding amphibians in SAMO for over 20 years. In this talk, we will examine trends in amphibian occupancy and abundance as related to the amount of urbanization in watersheds, year-to-year fluctuations in temperature and precipitation levels, fire and resulting debris flows, and co-occurrence with non-native invasive fishes and crayfish.

Title: Amphibian Exposure to Microplastic Pollution Linked to Hydroperiod Dynamics in an Urban IRES System
Authors: Andre Felton, Jeffrey Hutchinson
Speaker affiliation: University of Texas at San Antonio
June 5th @ 1:40 pm
Abstract: Microplastic (MP) pollution is ubiquitous across ecosystems and considered one of the fastest growing sources of pollution globally. Rivers serve as major unilateral pathways of MP transport between terrestrial and marine ecosystems, yet our understanding of MP migration along rivers and exposure routes into co-occurring aquatic organisms is still limited. In this study, MP distributions and anuran activity was monitored monthly at 24 sites in two urban ephemeral rivers (Leon Creek and Salado Creek) in San Antonio, Texas between June 2021 and May 2022. Microplastics were detected in surface water and sediment at all sites ranging from 2.1 to 30.48 items L-1 and 12.51 to 113.1 items kg-1. Fibers were the most abundant (~87%) MP morphotype followed by foams (7%) in both surface water and sediment samples. Potential MPs were marked and analyzed using Fourier Transform Infrared Spectroscopy (FTIR) for confirmation and polymer identification. Half of all ephemeral pool sites contained co-occurring tadpoles at various developmental stages and metamorphosed juveniles. Four different species were observed among 8 sites throughout the study. Results regarding MP intake are currently being processed and MP identifications/characterizations can be reported during presentation. This study is the first to report microplastics and potential impacts on anurans in ephemeral streams. As the global extent of IRES systems is projected to increase with continued climate change, understanding how MP concentrations behave with altered hydroperiod regimes can provide information regarding ecologically relevant levels that co-occurring organisms experience and entry-routes to food web interactions.

Title: Reproduction in relation to urban level in an invasive Florida lizard species (*Anolis sagrei*)
Authors: Elizabeth Hauck, Alison Gainsbury
Speaker affiliation: University of South Florida, St. Petersburg
June 5th @ 2:00 pm
Abstract: Adverse environmental impacts on wildlife from human activities are increasing worldwide due to increasing urbanization rates. Vertebrates located in highly urbanized areas are known to exhibit decreased reproductive rates. However, knowledge gaps exist on the impacts of urbanization on species in situ along with the impacts on their offspring. Lizards are excellent bioindicator species

due to their susceptibility to endocrine disrupting contaminants in highly urbanized areas via air, water, diet, and soil through egg deposition. To assess the impacts of urbanization on reproductive parameters in lizards and how these effects vary across urban levels, a total of 36 brown anoles (*Anolis sagrei*) were taken from 9 different field sites with urbanization levels ranging from low to moderate to high. Breeding pairs from each urban level were bred in a laboratory and reproductive parameters (hatchling survivorship, initial body size , and growth rates) were monitored. We ran a chi-square test to examine the relation between urban level and hatchling survivorship, an analysis of variance test to determine if significant differences occur in hatchling initial body size across urban levels, and a linear mixed effect model to test the impact of urban level on hatchling growth rates. We found hatchlings born from adults at high urban areas had decreased survivorship, smaller initial body sizes and slower growth rates compared to hatchlings born to adults captured from low and moderate urban areas. These results suggest high urban levels are negatively impacting *A. sagrei* reproduction, and should be prioritized for conservation efforts to mitigate the effects of urbanization on reptile hatchlings.

Title: How are alligators affected by living in an urban environment?
Authors: Adam Rosenblatt
Speaker affiliation: University of North Florida
June 5th @ 2:20 pm
Abstract: Urban areas are expanding rapidly across the southeastern U.S., a region that is also home to an abundant apex predator, the American alligator (*Alligator mississippiensis*). Alligator populations declined precipitously during the first half of the 20th century because of overhunting and habitat loss, but have since recovered with the help of legal protections, education and outreach efforts, and the expansion of alligator farming. Over the last 50 years the risk of human-alligator conflict has increased as urban areas have pushed deeper into alligator habitat, yet little research on alligator ecology in urban environments exists. This lack of research makes it difficult to predict how alligator populations may respond to the ever-increasing urban footprint, and to develop management strategies that will reduce the risk of human-alligator conflict. To help fill this gap we surveyed the alligator population in the portion of the St. Johns River watershed that runs through Jacksonville, the largest city in Florida, during 2019-2022. Our goal was to determine which environmental and anthropogenic factors affected alligator distribution in an urban environment. We found that alligator distribution at broad scales was primarily determined by the salinity gradient within the river. However, at finer scales alligator habitat choice was mainly driven by avoidance of human structures and attraction to more natural shorelines. Next, in 2022 we surveyed 76 lakes and ponds on Jacksonville's southside to determine how alligators are distributed across a patchier urban landscape. We found that alligator occurrence declined rapidly as distance from the potential source population increased, indicating that alligators likely have difficulty navigating the physical obstacles of a densely urbanized area. Collectively, our results show that alligators can persist in urban environments, but population size and distribution are negatively affected by urban development. This suggests that as urban areas continue to expand, alligator populations will decline in habitats further from the urban edge and that human-alligator conflict will most likely occur at the urban edge as well.

Reptiles & Amphibians – Monday, June 5th @ 1:20-3:00 pm

Title: Hidden in Plain Sight: Alligator Snapping Turtle (*Macrochelys temminckii*) Populations within Urban Waterways of Houston, Texas, Harris County, USA
Authors: Eric Munscher, Mandi Gordon, Tom Sankey, Arron Tuggle, Andrew Walde, Kelly Garcia, Brandi Giles
Speaker affiliation: SWCA Environmental Consultants
June 5th @ 2:40 pm
Abstract: Globally, a disproportionate number of turtle species face population decline, extirpation at the local or regional scale, or extinction. In the United States, many turtle species suffer regional population declines due to habitat alteration or loss through urbanization. Although some species may thrive in suboptimal urbanized conditions, others may be incapable of adapting to urbanization at any scale. Generally, populations which adapt to urbanization of their habitats are often smaller in comparison to those inhabiting less anthropogenically altered systems where suitable habitat may be more expansive. The Alligator Snapping Turtle (*Macrochelys temminckii*; AST) is the largest species of freshwater turtle in the United States. Though the species currently holds state-level protections in some parts of its range, this species is currently under review by the United States Fish and Wildlife Service for federal protections under the Endangered Species Act. Despite its large geographic range, population data gaps exist, notably within the westernmost portion of its range in Texas. The greater Houston metroplex, which hosts over 6 M people and produces the fourth largest gross domestic profit in the United States, is home to four major reservoirs and over 2,500 miles of waterways. In 2016, a seemingly robust population of Alligator Snapping Turtles was discovered inhabiting Buffalo Bayou, the major flood convenience for and a heavily altered waterway in Houston which has experienced impacts such as channelization, addition of impervious surfaces along banks, and installation of bridges and associated roadways. Since then, Alligator Snapping Turtles have been documented in four additional altered or impacted waterways in the Houston metroplex including: Little Cypress Creek, Cypress Creek, Spring Creek, and Luce Bayou. Monthly sampling from December 2016–November 2022 in Buffalo Bayou resulted in capture of 134 Alligator Snapping Turtles (60 males [m], 57 females [f], and 17 juveniles [jv]). Overall catch-per-unit effort (number of turtles captured per net-night; CPUE) in Buffalo Bayou was 0.40 (range: 0.00–0.83). Within additional waterbodies, sites were trapped seasonally between April 2021–October 2022 resulting in captures of 48 additional Alligator Snapping Turtles (Little Cypress Creek = 11m, 16f; Cypress Creek = 3m, 5f, 2jv; Spring Creek = 2m, 2f, 6jv; Luce Bayou = 1jv). Overall CPUE at these additional sites was 0.22 (range: 0.00-0.88). Major waterways within the Houston metroplex act as major flood conveyance arteries and will experience increased anthropogenic impacts as urbanization continues. Data collected from this collaborative effort will aid resource managers in closing knowledge gaps by establishing baseline population and demographic parameters, especially within altered urban systems. Future work in these waterways should include increased sampling effort aimed at overall population modeling and demographic analyses such as density, biomass, and annual survivability.

Environmental Impacts – Monday, June 5th @ 3:30-4:50 pm

Title: Assessing the utility of nest surveys and sentinel bird species to monitor plastic pollution in an urban freshwater environment
Authors: Kerry Schutten, Akshaya Chandrashekar, Chip Weseloh, Jennifer Provencher, Claire Jardine
Speaker affiliation: Canadian Wildlife Health Cooperative
June 5th @ 3:30 pm
Abstract: As evidence of the magnitude and dispersal of plastic pollution mounts, there is increasing data illustrating the potential harm it can have on wildlife, the environment, and human health. Many bird species move plastic through the environment for use as nest-building material, which may increase the risk of plastic ingestion and entanglement for these species, and may result in an increased accumulation of plastic waste in more remote nesting environments. Nest surveys represent a unique opportunity to understand the ecology of plastic pollution, particularly in freshwater environments where knowledge of plastic pollution and its effects on wildlife and the environment are more limited. Colonially-nesting birds often exercise high site fidelity, allowing the opportunity to collect statistically robust sample sizes in repeated breeding seasons. This annual sampling can be used to monitor a changing pollution landscape, such as the current pandemic-related influx of personal protective equipment, or to gauge the effectiveness of legislation such as regional bans on plastic straws. Additionally, protocols can be designed that are fast, cheap, and utilize readily available equipment, making nest surveys ideally suited for incorporation into citizen science projects. However, the current literature lacks consistent, repeatable methodologies, making comparison across studies challenging. In addition, the practicality and utility of methods may vary dramatically across and within species. This study evaluated three common nest survey methods to assess the use of plastic and other anthropogenic debris: deconstruction of nests in situ, visual assessment of nests in situ, and photographic assessment of nests ex situ. We compared these methods between two species with markedly different nesting behaviour at a colony in the urban Lake Ontario harbour of Hamilton, Canada; double-crested cormorants (DCCO, *Nannopterum auritum*), and ring-billed gulls (RBGU, *Larus delawarensis*). We also assessed the types, colours, and overall burden of nest plastics using DCCO as a proposed sentinel species for pollution monitoring, with the goal of improving and informing plastic production and waste management policy. In Hamilton, 65 of 75 RBGU nests visually assessed contained anthropogenic debris (% frequency of occurrence (%FO) = 87), while all 80 DCCO nests contained visible debris (%FO = 100). We deconstructed 25 of the 80 DCCO nests; these contained a total of 738 pieces of debris including 39 drinking straws and five pieces of PPE. Preliminary results suggest that for DCCO, deconstruction of nests after the breeding season is essential for detailed analysis of types and quantity of debris, while visual assessments represent a reasonable proxy for %FO. For RBGU, visible assessment was the most practical and accurate method, but full deconstruction was not feasible given the transient nature of the nests. Photographic assessments had decreased accuracy for both species. In addition to the work in Hamilton, we visually assessed 100 DCCO nests located at a colony in Lake Ontario, approximately one mile offshore of Kingston, Canada. Thirty-five of these nests contained visible debris (%FO=35). The comparison between off-shore and on-shore colonies suggests that DCCO are utilizing available debris in their environment, rather than moving it intentionally from other areas.

Environmental Impacts – Monday, June 5th @ 3:30-4:50 pm

Title: Experimental field trials for multi-species responses to anthropogenic light and noise
Authors: Phoebe Parker-Shames, Alison Smith, Peter Oboyski, Kendall Calhoun, Christopher J. Schell, Chelsea Andreozzi, Mary Power, Justin Brashares
Speaker affiliation: UC Berkeley
June 5th @ 3:50 pm
Abstract: Artificial light and noise create disturbance sources that drive a wide range of wildlife behavioral changes in human-modified systems. Understanding how these changes compare across taxa is important for predicting community-level impacts. Field experiments provide a powerful tool to explore causal relationships between disturbance sources and wildlife responses across a wide range of species. This study outlines the methods and design to monitor multi-taxa wildlife response to light and noise disturbance in experimental field trials that mimic disturbance from cannabis farms. Outdoor, mixed light, and greenhouse cannabis production present a particular concern for environmental impacts because of their use of bright lights and loud equipment, and history of production in biodiverse areas. I detail our study approach and monitoring installation and then present preliminary summary data from one season of sampling, indicating varied taxa-level responses from medium-large mammals, small mammals, reptiles, birds, bats, and flying insects. The methodology and preliminary results are promising in that they indicate a pathway to quantify relationships and response thresholds across a breadth of taxonomic groups.

Title: Revealing associations of soil metazoan biodiversity with urbanization, climate, and soil nutrients across a subtropical diversity hotspot.
Authors: Alison Gainsbury, Eva Bellemain, Ryan McMinds, David Lewis
Speaker affiliation: University of South Florida
June 5th @ 4:10 pm
Abstract: Urbanization and climate are synergistically altering ecosystems for a vast number of species. As urban areas sprawl, it is vital to understand the effects of multiple anthropogenic stressors on biodiversity. Florida is recognized as a biodiversity hotspot containing numerous endemic species experiencing multiple anthropogenic stressors, such as urbanization, climate change, and their impacts on ecosystem processes such as soil nutrient cycling. Current understanding of biodiversity is biased toward research conducted above ground; however, the soil diversity belowground provides crucial ecosystem functions that benefit humans. The array of organisms that reside belowground respire, recycle energy and matter, and process Earth's chemical elements. Yet, beyond this simple recognition that the soil biota is diverse with varied capabilities, gaps remain to be filled on how multiple anthropogenic stressors affect the soil biota. Improved understanding of human impacts on soil biodiversity is fundamental to ecosystem sustainability. Herein, we apply environmental DNA (eDNA) to assess soil metazoan biodiversity and investigate the effects of urbanization, climate, and soil nutrient supply on this underrepresented group of organisms. We conducted soil eDNA metabarcoding with the 18S-Euka02 marker to evaluate soil metazoan biodiversity across urban wildlands in central Florida. To represent urbanization, we used an established human footprint index (HFI). HFI collates multiple anthropogenic stressors, such as population density, light pollution, and land use. We also included climatic factors (temperature and precipitation seasonality) and soil nutrient pools (soil orthophosphate, nitrite + nitrate, and ammonium) as predictors of soil metazoan biodiversity across central Florida's urban wildlands. We explored the relationship between different predictors and species richness using regression. We found a synergistic effect between urbanization and temperature seasonality along with an additive effect of precipitation seasonality and soil phosphorous. Interestingly, soil metazoan richness increased as temperature had lower variability in less urbanized wildlands and greater variability in highly urbanized wildlands. Furthermore, lower variability of precipitation along with a decrease in soil

Environmental Impacts – Monday, June 5th @ 3:30-4:50 pm

phosphorous were associated to greater soil biodiversity. Thus, it is important to incorporate multiple anthropogenic stressors along with their interactions to start filling in these gaps on drivers shaping soil biodiversity across urban wildlands.

Title: So overt it's covert: wildlife coloration in the city
Authors: Samantha Kreling
Speaker affiliation: University of Washington Seattle
June 5th @ 4:30 pm
Abstract: With novel human-wildlife interaction, predation regimes, and environmental conditions, in addition to often fragmented and smaller populations, urban areas present wildlife with altered natural selection parameters and genetic drift potential compared to non-urban regions. Plumage and pelage coloration in birds and mammals has evolved as a balance between avoiding detection by predator or prey, sexual selection, and thermoregulation. However, with altered mutation rates, reduced predation risk, increased temperatures, strong genetic drift, potential founder effects, and increased interaction with people, the evolutionary contexts in which these colorations arose are radically different than what is present in urban areas. Regionally alternative color morphs, leucistic or melanistic individuals that aren't typical of most wildlife populations, may become more frequent as a result of adaptive and/or neutral evolution. Thus, I conceptualize that in urban areas conspicuous color morphologies may persist, leading to an increase in frequency of regionally non-typical pelage coloration. Here I discuss the potential for conspicuous color morphs to arise and persist in urban regions, as well as the mechanisms for such persistence, as a result of altered environmental conditions and natural selection pressures.

Community Science – Tuesday, June 6th @ 8:00-10:00 am

Title: Otters in Singapore: engaging communities in urban animal behaviour research
Authors: Philip Johns
Speaker affiliation: Yale-NUS College
June 6th @ 8:00 am
Abstract: How we interact with each other and the natural world has changed radically due to technologies. Smart phones and social media help us gather and share information more easily than we ever have before. Here I present findings on smooth-coated otter (*Lutrogale perspicillata*) behaviours in Singapore from data collected with different protocols intended for community science. These results include both regular and episodic behaviours. I discuss otter defences against heterospecific and conspecific threats, otter play, and otter vocalisations and their contexts. I talk about gleaning data from social media, working closely with communities of wildlife watchers, and present a tool designed to gather information for behavioural studies. I also discuss some pitfalls to using social media to study animal behaviour, the importance of "ground-up" vs "top-down" approaches, of encouraging communities to engage in scientific studies, and of folksonomies and their potential.

Community Science – Tuesday, June 6th @ 8:00-10:00 am

Title: Streetside Flower Visitors- Researching and promoting pollinators in Swiss public green spaces with Citizen Science
Authors: Kevin Vega, Anouk-Lisa Taucher, Sandra Gloor, Katja Rauchenstein, Kevin Vega
Speaker affiliation: ETH Zurich
June 6th @ 8:20 am
Abstract: Insect pollination plays a crucial role in our ecosystems, with around 80% of wild and cultivated plants depending on pollinating insects. This holds true both within the countryside and in the center of our cities. Cities are home to a wide diversity of pollinators; however, this diversity is increasingly threatened despite a growing interest and care for pollinators by the city's residents. While individuals can certainly work to improve their gardens and management practices, insect conservation in cities will ultimately depend on the design and management of public green spaces. In a participatory approach, the Swiss citizen science project StadtWildTiere (German for "urban wildlife") in collaboration with the ETH Zurich investigated the distribution and occurrence of wild bee species in the cities of Lucerne, St.Gallen and Zurich Switzerland from spring to fall 2022. With these surveys, we wanted to explore the role of small, informal public green spaces in the city for wild bees and highlight the opportunities for wild bees just outside of resident's doorsteps. Over 60 volunteers mapped wild bee abundance and diversity on 235 plots across the three cities from May to September 2022. The results of these mappings identify the importance of urban green space size and connectivity for wild bees and help to form the basis for concrete promotion measures in the three cities. Furthermore, our discussions with the volunteer network showcased their interest in learning local plants and bee species, the ways we can link largescale management to individual action, as well as the limitations of amateur insect identification and the best ways to mitigate these shortcomings as we move forward.

Title: Know every plant and animal in your area - using citizen science for professional development
Authors: Sam Kieschnick
Speaker affiliation: Texas Parks and Wildlife Department
June 6th @ 8:40 am
Abstract: Citizen science is a well-known way to engage the public with data collection, but it also a tool that urban wildlife biologists and naturalists can use to broaden and deepen our knowledge of local flora and fauna. iNaturalist, a citizen science tool, has been growing exponentially in the past decade. With this growth of usage and increase of biodiversity data, not only are we all getting a better idea of where and when organisms exist, but we can also utilize this to learn more about our urban ecosystems. In our recent paper in PLOS Biology, we highlight seven reasons to identify observations through iNaturalist. This process of identification can aide us in becoming regional experts on the flora and fauna as we engage with that growing community of naturalists that are using this citizen science tool.

Title: Relationship Between Land Cover, Socio-Economics, and iNaturalist Uploads: An Investigation Across Four Arid Cities
Authors: Jeffrey Brown, Luke Szyszkiewicz, Kelli Lasron, Heather Bateman
Speaker affiliation: La Salle University
June 6th @ 9:00 am
Abstract: Community-collected science provides researchers with an abundance of information on the presence of species. In urban areas, data from platforms such as eBird and iNaturalist provide insights into the distribution of wildlife and where people are interacting and engaging with nature. However, to accurately use community-collected data, scientists and practitioners must understand

biases and underlying patterns related to observation uploads. This work explores observation uploads from the iNaturalist platform across four arid cities: Phoenix, AZ; Tuscon, AZ; Albuquerque, NM; Santa Fe, NM. Using data from the American Community Survey, The Trust for Public Lands, and the United States Geological Survey, we investigate how socio-demographic factors and land cover influence the total number of observations and the species richness across the study cities. Specifically, we use a Bayesian generalized linear mixed model to assess how the income and ethnicity in a census block group, as well as the presence of parks, size of the census block group, and landcover within the census block group, correlate with the number of observations in the census block group and the observed species richness in the group. Our results indicate that income is positively associated with higher numbers of observations and species richness for most animal taxa. However, for plants, income is positively associated with species richness but negatively associated with the total number of observations. We also note that, across cities, census block groups with higher proportions of people of color tend to have fewer observations and lower species richness. Understanding these patterns is necessary for any work hoping to use community science to explore species distribution. Additionally, this work highlights potential limitations in using community-collected science and the need to promote and include diverse groups in the scientific process.

Title: Monarch Rx: Exploring a Little-Known Behavior of a Beloved Butterfly
Authors: Nancy Lawson
Speaker affiliation: The Humane Gardener, LLC
June 6th @ 9:20 am
Abstract: Most of us are well aware of the connection between monarch butterflies and milkweed. But did you know that adult monarchs sometimes visit dry or injured parts of certain plants to take up and store toxic chemicals called pyrrolizidine alkaloids (PAs)? PAs do not provide the butterflies with food but contribute to their defense. Despite being poorly documented, this behavior (""PA-pharmacophagy"") must be of relevance in the life of monarchs, but it might be plastic—and most details are yet unknown. Until now, few people have observed or looked for this behavior in the U.S. In the summer of 2019, a nature writer in Maryland, Nancy Lawson, began witnessing monarchs visiting dried and damaged leaves on boneset plants in her home habitat. Her outreach to Michael Boppré, a chemical ecologist in Germany who has studied relationships among pyrrolizidine alkaloids and insects, led to a paper in Ecological Entomology and a new citizen science project, ""Monarch Rx."" Better understanding of this curious aspect of monarch biology could contribute to successful conservation, starting with field observations to learn which plants are used, under what conditions, by which sexes, for how long, and other aspects. This presentation will help scientists and community scientists alike learn more about this fascinating and important behavior so they can help bridge the gaps in knowledge when butterfly-watching or butterfly-surveying.

Title: Fence-Related Mortality in White-Tailed Deer in Metro-Atlanta area
Authors: Kaitlin Goode, Liz Morata
Speaker affiliation: Georgia Department of Natural Resources
June 6th @ 9:40 am
Abstract: The City of Atlanta is one of the fastest growing cities in the United States. It also has one of the highest single housing densities of major cities. With the increase in human population and vast amounts of green space, human-wildlife interactions (HWI) continue to increase in the metro-Atlanta area. To address the increase in HWI, the Georgia Department of Natural Resources (GA DNR) created the Urban Wildlife Program (UWP) to respond to HWI and proactively educate Atlanta residents on living with wildlife. Since its creation in 2019, the highest number of calls for HWI come from white-tailed deer (Odocoileus virginianus; n = 1,263). Of those deer related calls, the UWP has

responded to 149 calls with a deer stuck on a fence. Almost always, the deer needs to be euthanized due to its injuries. Staff worked to figure out why (i.e., the mechanics of the fence and deer jumping) and where these calls took place (e.g., areas with more greenspace). Our hypothesis was the majority of fence related deaths would occur on wrought iron fences with decorative spears, in low density housing, high income areas. Staff collected on-site data such as fence type and height. If the fence was a wrought-iron fence, information was taken as to the decorative aspects of the fence. For example, presence of double bars at the top and whether there were decorative spears at the top. Data was collected for 2020 fence mortality locations (n = 58). The majority of fence related incident sites (79%) are deer attempting to jump over wrought-iron fences. The mean fence height for the wrought-iron fence type was 4.6 feet and the majority of those fences had a double horizontal bar (56%). Habitat and socioeconomic variables were also collected, including land cover types, household income, population density, property parcel size, and distance to stream/river. Preliminary habitat analysis for these data points show the mean distance to streams/rivers is 1,078 ft. The most frequent NLCD Land Cover classes at fence related incident sites were Developed - Open Space (n= 23) and Developed – Low Intensity (n = 22), and the average parcel size was 2 acres. Socioeconomic data showed the average household income at the census block level was $156,301, and the average population density was 1,839 (persons per square mile). Further analysis is needed to see which variables are significant in predicting where and how deer-fence mortality will occur. We plan to finish data collection at mortality sites for years 2021 and 2022 and create habitat suitability models in order to predict fence related mortality risk across the metro-Atlanta landscape. The goal of this project is to predict where these deer-fence mortalities have the highest chance of occurring and do targeted outreach and messaging for these communities. Further investigation needs to be done on how to modify these fence types to prevent deer mortality.

Community Science – Tuesday, June 6th @ 10:30-11:50 am

Title: BURGLING BOBCATS. ON THE POTENTIAL FOR LEVERAGING A GLOBAL NETWORK OF SECURITY CAMERAS FOR SCIENTIFIC WILDLIFE OBSERVATIONS & CONSERVATION
Authors: Charlotte Whorton, Rachel-Ann Arias, Auxenia Privett-Mendoza, Amanda Zellmer
Speaker affiliation: Occidental College; Arroyos & Foothills Conservancy; Department of Biology, Occidental College
June 6th @ 10:30 am
Abstract: Limited access to private property places constraints on understanding the distribution and ecology of urban wildlife. Community science has transformed our ability to collect data on wildlife observations across urban areas; however, the majority of observations recorded in community science databases like iNaturalist are observations of wildlife that are encountered by the community scientist. Relying solely on handheld devices limits our observations to wildlife that are less averse of human activity, and may exclude more elusive species. Security cameras marketed to protect homes, such as Ring and Nest, operate much like camera traps and may provide a unique opportunity to capture observations of more human-avoidant species. When security camera users post their recordings on neighborhood forums such as Nextdoor and RingNeighbors, their observations have the potential to fill in gaps in our understanding of wildlife activity in urban areas. We collected a dataset of security camera wildlife observations from the Greater Los Angeles Area to assess the distribution of wildlife sightings captured on security cameras by monitoring social media sites including Nextdoor, Ring Neighbors, and Facebook groups as well as the community science database, iNaturalist. We examined the total number of observations and proportions each species comprised to evaluate whether there was a difference in the relative frequencies of species observations captured by security cameras relative to handheld devices. Further, we tested whether

security camera observations were located in more urban areas relative to observations collected by handheld devices. We discuss the potential utility of security cameras for increasing our database of wildlife observations in urban areas. While there have been no prior studies utilizing these observations specifically for wildlife research, there is the potential to provide new insight into wildlife behavior in urban areas.

Title: CatTracker 2.0: Educating and Connecting Communities with an Ecological CATastrophe
Authors: Jason D. Luscier
Speaker affiliation: Le Moyne College
June 6th @ 10:50 am
Abstract: It is challenging to effectively communicate the negative effects from free-roaming domestic cats (*Felis catus*) on wildlife. Pet enthusiasts often do not accept the ample published evidence of these effects. CatTracker 2.0 is a smartphone application for reporting sightings of free-roaming domestic cats with the aim of increasing our understanding of the effects of domestic cats on urban food web dynamics and community structures to better inform management of native wildlife in cities. Observers record location, date, and time of a sighting as well as the number of domestic cats and behaviors observed. As of December 2022, there are 562 active users who have submitted ~700 reports across 38 states and 22 countries around the world. I have used these community-based data to model domestic cat distributions in Syracuse, NY. These community-based data are available to users, researchers, and cat management programs through the website https://research.lemoyne.edu/CatTrackerdata. The use of CatTracker may offer an opportunity for both wildlife enthusiasts and cat advocates alike to connect with this ecological issue. Also, it offers an educational opportunity at multiple levels (e.g., high school and/or college students may use CatTracker for class projects, etc.). In urban settings, community engagement in data collection can be extremely useful for understanding distributional patterns with the added benefit of enhanced awareness of and connection to local urban ecosystems.

Title: The ManhattAnt: How a recently introduced urban ant made it in the big city
Authors: Samantha Kennett, Clint Penick
Speaker affiliation: Kennesaw State University
June 6th @ 11:10 am
Abstract: The growth of urban areas has been identified as one of the primary threats to many animal populations. However, habitat complexity and novel resources in cities can provide refuge for some urban specialists and introduced species. This may be the case for a recently introduced ant species in New York City, *Lasius emarginatus*. *L. emarginatus*, a species native to Central Europe, was first discovered in New York City in 2011, and has since become one of the most common ants in the city. Its discovery made national headlines and produced the memorable nickname “ManhattAnt.” Despite this ant’s prevalence and media attention, there has been little research on its success and no formal monitoring of its expansion. Past studies suggests that unlike other urban-exploiting ant species, *L. emarginatus* does not appear to shift its diet towards novel human food sources. Instead, we hypothesize that *L. emarginatus* may be exploiting a novel urban niche space by feeding on hemipteran-produced honeydew in the canopies of urban street trees. Using stable isotopes of carbon, we quantified whether *L. emarginatus* was feeding on human food waste, and if that changed across an urban habitat gradient. Next, we compared the weights of tree foraging *L. emarginatus* specimens to determine whether *L. emarginatus* is foraging on honeydew from the canopies of street trees. Although no formal surveys have investigated *L. emarginatus’* expansion, community science reports to “Project ManhattAnt” on iNaturalist show that it is now moving outside the city and has

Community Science – Tuesday, June 6th @ 10:30-11:50 am

established populations in New Jersey. Based on our results, we will discuss how a novel urban niche space in New York City may facilitate success for *L. emarginatus* and demonstrate how community science data is used to monitor the expansion of this newly introduced ant in the Northeastern United States.

Title: Personal green spaces during the Pandemic-A study of people's attitudes and motivations during the COVID-19 pandemic towards urban home gardens in the city of Bangalore, India.
Authors: Varsha Bhaskaran
Speaker affiliation: University of Missouri - Columbia
June 6th @ 11:30 am
Abstract: The COVID-19 pandemic has brought about unprecedented changes in a short span of time in many walks of life and people's living. Being in a lockdown, especially in urban areas has led to changes in the way people perceive nature around them and within their homes. Scholarship provides limited urban ecological investigations in the cities of the global south and even fewer from Indian cities. To begin to address this gap, in this exploratory study, we looked at how people perceived, the changes they experienced in their home gardens and in the nature around their neighbourhood due to the lockdown in the Indian City of Bangalore. Data was collected by interviewing thirty, home garden owners in the city over a period of two months between June and July 2021. We recorded various perceptions and motivations by the garden owners regarding the changes in nature around them and within their gardens during the lockdown. These perceptions were then grouped into four major themes as follows. A. The perceived changes in nature around the participant's neighbourhood B. Changes in their garden and gardening practices C. Personal changes associated with home gardens by the participants and their family members and D. Challenges and concerns about the future of the domestic green space. Participants had some similar and a few diverse perceptions for the above themes. A common observation was that, most respondents felt, the lockdown had led to an increase in their curiosity and observation towards nature. Some respondents highlighted that their enthusiasm towards gardening had increased. Some participants also recognised the importance of home gardens as a safe outdoor space where they can enjoy nature. However, there were a few respondents who mentioned that they did not observe any imminent changes in the nature around them, due to the lockdown. While the lockdown has implications on a global scale, further research is needed to assess the changes at local scale to understand the impacts on people and nature.

Human-Wildlife Conflict Mgmt. – Tuesday, June 6th @ 8:00-10:00 am

Title: Exploration of Ophiofaunal diversity and habitats in urban city of Rajasthan reveals human intrusions and conflicts and the need for local educative outreach programs.
Authors: Sabmeet Singh
Speaker affiliation: Maharaja Ganga Singh University, Bikaner, Rajasthan, India.
June 6th @ 8:00 am
Abstract: ***Introduction***. Rajasthan is the largest state in India, with an average of 3722 deaths per year due to snakebites (Million Death Study, Government of India - https://www.cghr.org/projects/million-death-study-project/). Despite the creation of anti-venom and its availability, India's rural and urban illiterate population still tends to approach local healers or shrines of local deities and somehow manage to survive. This may actually be either due to a dry bite/ small amount of envenomation or non-venomous snake bite. Sometimes, victims may panic after the snake hissed and presume being bitten. Due to these reasons, people remain engaged in these practices

that do not treat or save the snakebite victim, and the dubious individuals continue to mislead people. ***Aim***. This study aimed to collate information on Ophiofauna species distribution, interspecific competition, microhabitats, prey base and conflict in urban areas inside the city limits of Kota district, Rajasthan, India where no such previous data exists. ***Methods.*** The city was divided into various strata i.e. areas near River belt, Natural water tributaries, seasonal water holes, rocky barren lands, open rainwater drainage system, parks, human habitat areas like universities, residential areas, railway stations, aerodrome etc. This study was extended to all the seasons i.e. spring, summer, monsoon, autumn, pre-winter, and winter from the year 2019-2021. Field data was gathered through stratified random sampling, Line transects, Visual encounter survey, Road walking survey, Basking survey and Qualitative interviews. Pit holes, slough, dead remains of snakes killed in Road kills/Retaliatory killings were investigated to collate direct and indirect evidence.Detailed analysis of the data was performed using descriptive statistics for estimation of the distribution of snakes in each stratum for Occupancy and Population density estimation. ***Results and Discussion.*** Out of 34 known species found in Rajasthan state, 18 species of snakes belonging to six families Pythonidae, Boidae, Colubridae, Typhlopidae, Elapidae, and Viperidae were observed. These comprised of 4 venomous and 14 non venomous snakes. A descriptive analysis resulted in elucidation of the distribution, population density of snakes of each species in pre-defined strata, habitat, conflict hot spots & patterns, interspecific competition, urban habitat diversity and prey availability maps. Over 207 snakes were rescued and details of 162 snakebite cases were recorded and monitored during this study. Lack of Urban Planning, management and policies are leading to relentless construction on barren lands for human use, which is destroying the natural habitat of ophiofauna resulting in Human-Ophiofauna Conflict and ecological disturbances. ***Conclusion.*** Study reveals species specific seasonal variations of ophiofauna in different strata resulting in increased conflict patterns. This information can be used to design custom outreach programs/ local lingual educative workshops at sub community levels that would be instrumental in enlightening the masses and help them gradually come out of their misbeliefs and myths regarding snakes or other wildlife and help mitigate human wildlife conflicts.

Title: Pre-empting Human wildlife conflict in Kotagiri a hill town in India
Authors: Habeeba Fathima, Anita Varghese
Speaker affiliation: Keystone Foundation
June 6th @ 8:20 am
Abstract: With the introduction of the man and biosphere program of UNESCO in 1971, the world pushed for promoting a sustainable connection between people and nature. With this came the Nilgiri Biosphere Reserve: India's first biosphere reserve, established in the year 1986. Such reserves have sustainable development as the main aim to bring about economic and social development. While the main aim of this reserve was to create partnerships between people and nature, the governing models and lack of transition passages between the multiple tiger reserves, national parks, protected areas, and human settlements. Restriction of free movement for both people and wildlife has caused a huge problem. It is a fact that sharing spaces with wildlife ranging from small mosquitos to large elephants is a life for many in India and unfortunate situations occur especially when there is also pressure on the natural resources. As human populations and demand for space grow, the competition for shared resources between humans and wildlife also grows. This often results in negative interactions and sometimes even conflict between species. Human-wildlife conflict cannot be attributed to a single, focused reason. Many points of focus such as livelihoods, forest health, access, and governance attribute to the conflict. A holistic approach is a solution. In the town of Kotagiri, a small town in the Nilgiris district of Nilgiris Biosphere Reserve, people share spaces with animals like the Indian Bison, Sloth bear, Leopard, and Dhole. They know the bears for raiding their temples for

food, the bison for damaging infrastructure, and leopards for taking away their dogs. While these perceptions develop through negative interactions and many negative interactions build to become a conflict over time, there is a lot of retaliation and hate for wildlife among communities. Through Keystone Foundation's work, we are currently mapping large mammals' movement in Kotagiri town through secondary sign surveys. Secondary signs include pug marks, hooves marks, scat, and scratch marks. These help us identify patterns of animal movement about multiple variables like seasonality, fences, refuge, presence of forest cover, etc. We also engage the community members to identify ground-level knowledge, and perceptions, and identify hotspots for negative interactions. With the help of the communities, we identified that some of the common causes of negative interactions are the lack of proper infrastructure, like bad lighting on the streets, improper garbage disposal, overgrowth of invasive plants along the bends of the roads, and lack of access to toilets. . To build a pro-conservation attitude and bring collaboration between people and nature, we regularly conduct nature education programs for children and young adults. Through fun programs like street plays and radio programs, we also engage the adults of the community. A holistic approach to solving conflict would not be completed without the involvement of multiple stakeholders like the local communities, governance representatives, and forest managers. Through our project, we also train and equip the frontline staff of the forest department to handle and prevent situations of conflict where needed. The results and positive outcome of this project will serve to become a model for the management of human-wildlife conflicts in and across the state of Tamil Nadu. There will be a policy brief and management plan with a special emphasis on peri-urban areas and hill towns as these are the hotspots for conflict and mitigation/adaptation mechanisms.

Title: Creatively solving human-wildlife conflict within an urban setting while establishing an invested community.
Authors: Claire Taylor
Speaker affiliation: Two Oceans Aquarium
June 6th @ 8:40 am
Abstract: The Two Oceans Aquarium, established in 1995, is situated in the V&A Waterfront, an iconic mixed-use 123-hectare neighbourhood which welcomes 26 million people annually from all over Africa, and the world. The Waterfront is situated in the oldest working harbour in the Southern Hemisphere and is a continuously growing hub that includes retail, housing, entertainment, and business facilities. It is also home to a myriad of terrestrial and marine wildlife, like Cape fur seals (*Arctocephalus pusillus pusillus*), sunfish (*Mola Mola* and others) and Cape clawless (*Aonyx capensis*) otters, which frequent the Waterfront's waterways, marine basins, parks, and gardens. Situated on the oceans' edge, with waterways that connect the neighbourhood to the city centre, the Waterfront offers a perfect space for the nurturing of human-wildlife connections. Within this urban setting, human-wildlife conflict often occurs, with "conflict" being defined as any situation where there is either human impact on wildlife, or the other way around. The Marine Wildlife Management Programme (MWMP), a collaborative effort between the Two Oceans Aquarium, Two Oceans Aquarium Education Foundation and the V&A Waterfront, actively works towards the prevention and mitigation of these conflicts. Through a creative, holistic, and comprehensive approach, Claire Taylor and the MWMP have created a mitigation programme that focuses on creating spaces where humans and wild animals can co-exist. The programme has created employment, educational opportunities, training, community involvement, government and scientific involvement, research opportunities, and has changed a dire situation into one where the community is invested in the wildlife that is found in the Waterfront area. Claire's presentation will focus on the history of the programme, the successes as well as its failures, and lessons learnt. The presentation will also touch on what is install for the Marine Wildlife Management Programme in the future. Claire will share tips and tricks on how to

mitigate some of the most intensive human-wildlife contact point, while changing the perspective of a community from negative towards the wildlife in the area, to positive and invested. Claire's presentation will also include her story and how her approach to human-wildlife conflict mitigation has changed over the past 24 years.

Title: The Curious Constraints of 'Hazing' Coyotes: Thinking with Urban Coyotes Towards a More Capacious, Multispecies Sense of Environmental Justice
Authors: Chase Niesner
Speaker affiliation: UCLA's Institute of the Environment and Sustainability
June 6th @ 9:00 am
Abstract: In this talk I will model a mixed methods approach to urban ecology, which following the philosopher of science Isabelle Stengers, I am calling a "cosmopolitical" thought experiment with coyotes. Whereas science generally asks: what is the matter? And politics asks: does it matter? Working with science and politics together, "cosmopolitics" asks: what matters? My hope is that by attending not just to the individual creatures known as urban coyotes, but to human-coyote relations, new insights into how biodiversity and social justice concerns are entangled might be revealed. I take as my starting point the widely implemented "co-existence" strategy of hazing coyotes, which is anything but straightforward. Why are people told to haze coyotes? What does it mean to haze coyotes? When does hazing coyotes work and when does it not work? What does it even mean for hazing coyotes to work? In reference to years of ethnographic fieldwork within the urban ecology of Los Angeles alongside wildlife biologists, city officials, pet owners, unhoused folks, and others, I ask these questions in order to deconstruct the activity of hazing as a "falling into form," a falling I argue, which by the very nature of the constraints required of communicating with animals who do not share our capacity for language, might also reproduce relations of domination across other domains of urban life.

Title: Coyote space-use in Atlanta, GA
Authors: Summer Fink, Michel Kohl, Kaitlin Goode
Speaker affiliation: University of Georgia
June 6th @ 9:20 am
Abstract: Human population growth is facilitating urbanization at unprecedented scales across the globe. The result is increasing urban ecosystems and associated human-wildlife interactions (HWI). To address these challenges, the Georgia Department of Natural Resources (GADNR) Urban Wildlife Program was established in 2019 to provide: 1) reactive management (e.g., technical assistance over the phone or on-site), and 2) proactive management (e.g., education and outreach). As part of this effort, GADNR has been collecting intense HWI data throughout metro-Atlanta that records species involved, date/time, location, and degree of interaction (e.g., sighting vs physical encounter). In three years, the GADNR has received approximately 5,000 reports, 12.1% from coyotes (Canis latrans) second only to white-tailed deer (17.5%; Odocoileus virginianus). Coyotes specifically are of great interest because of their highly publicized and polarizing nature during conflict situations. Thus, we aim to understand how coyote space-use relates to coyote conflict occurrence. To estimate these relationships, we deployed 15 GPS collars on adult and subadult coyotes within the Atlanta metro-area. We will assess the relationship between both coyote distribution and conflict reports as a function of landscape characteristics, such as neighborhood socioeconomics (e.g., race, income, education level), % greenspace, and % impervious surfaces. In combination, this information will allow us to develop targeted outreach material relevant to coyote interactions and conflicts occurring in Atlanta. By providing education and outreach programming, we will attempt to reduce the

occurrence of conflicts, thus decreasing GADNR personnel demand and promoting overall human-wildlife coexistence.

Title: Walking Potatoes & Wilder-beasts: An Examination of the Socio-Ecological Relationship between Humans & Animals in Urban Agriculture
Authors: Elle Buckvold-Beirne
Speaker affiliation: York University
June 6th @ 9:40 am
Abstract: Most urban landscapes are a patchwork of built environments, ranging from high rises to river valleys, from highways to wildlife corridors. As these cityscapes continue to expand, they will attract both more humans and animals, which will in turn facilitate more interactions, positive and negative. Recent research has called for an increased focus in several areas, human-wildlife shared-use infrastructure, and urban agriculture as hotspots of biodiversity and small mammal conservation, (Clucas et al., 2018; Niesner et al., 2021; Rega-Brodsky et al., 2022). This project explores the positive and negative interactions and conflicts that arise between the people and wildlife that work, visit, and live in urban farms and community gardens. This involved an anonymous survey of people that work and grow in the research sites, and the use of trail cameras to capture the animals that visited the sites. The study examined two urban agricultural sites from August to November 2022, in Toronto, ON. One urban farm and one community garden, both with proximity to urban wildlife habitat. The research displayed the complicated, nuanced relationship that growers had with the various species living in and benefitting from these miniature agricultural landscapes. The trail cameras at both sites captured numerous species, as well as several individuals who repeated their visits to the site. Conflicts at both sites generally arose from the eating and spoiling of crops by wildlife. However, some participants felt positively about their interactions with some species. Future work to develop potential mitigation strategies to those conflicts, while promoting positive interactions is needed. Finding ways to create urban agricultural landscapes that are beneficial and welcoming for urban residents and wildlife is critical to creating a sustainable future.

Human-Wildlife Conflict Mgmt. – Tuesday, June 6th @ 10:30-11:50 am

Title: Evaluation of Mitigation Translocation as a Management Tool to Reduce Conflicts Between Humans and American Kestrels
Authors: Brian Washburn
Speaker affiliation: USDA Wildlife Services National Wildlife Research Center
June 6th @ 10:50 am
Abstract: Raptor-aircraft collisions (bird strikes) pose a serious safety risk to civil aircraft. Even smaller raptors, such as American kestrels (*Falco sparverious*), can be problematic within airport environments. Given widespread declines in kestrel populations, public interest, logistical and financial constraints, and other factors, managing this species at airports presents some unique challenges. I conducted a study to determine which biological (e.g., age and sex of the bird) and logistical factors (e.g., month, translocation distance, and number of translocations for each bird) might influence the return of American kestrels live-captured and translocated from 42 civil airports and military airbases within the contiguous USA during 2016–2021. American kestrels were live-captured, banded, and translocated various distances from the airfields which were then monitored for returning kestrels. The number of times an individual kestrel was translocated was the only factor that influenced return rate. I found the odds of kestrel return increased 11.31 (95% CI = 5.22–24.51) times for each subsequent translocation event involving the same bird. Management programs that use release sites 15 km from the airfield and undertake only 1 translocation event for an individual

kestrel would increase program efficacy and decrease implementation costs. There is no scientific information available regarding the efficacy of American kestrel management programs for reducing kestrel presence on airfields. This study represents an important scientific foundation for informing such management decisions.

Title: Responding to High Profile Urban Wildlife Events: A Case Study in Cooperation
Authors: Brett Johnson, Sam Kieschnick
Speaker affiliation: Dallas Park and Recreation Department
June 6th @ 11:10 am
Abstract: Invariably, there will come a time when there is wildlife conflict in urban settings that will require cooperation between municipalities, state and federal entities. This brief overview will look at the two case studies of recent high profile wildlife events in the City of Dallas that required extensive cooperative efforts at multiple levels. Specifically, we will look at the stakeholder engagement efforts, outreach that was both proactive and reactive in nature, and the policies that resulted. What happens when you have a high profile coyote attack? What happens when you have a pair of Bald eagles nest in a less than optimal location, constituents get very emotionally attached, and the nest ultimately fails in a dramatic fashion? Everyone has to work together, and these are the lessons learned.

Wildlife Health & Disease – Tuesday, June 6th @ 1:20-3:00 pm

Title: Parasites & the City: Characterizing the influence of urbanization on gastrointestinal parasite communities in Los Angeles area coyotes (*Canis latrans*)
Authors: Amanda Tokuyama, Sarah Helman, James Lloyd-Smith
Speaker affiliation: Urban Ecology Center
June 6th @ 1:20 pm
Abstract: Parasites are able to regulate host populations and mediate species interactions, and thus they are useful indicators of ecosystem connectivity and biodiversity. Even though landscape modification alters not only the community composition of wildlife but also the parasites they host, few studies have specifically characterized the impact of urbanization on parasite prevalence and diversity. In order to address this gap, we collected helminths (intestinal worms including tapeworms, nematodes, and trematodes) from coyote (*Canis latrans*) gastrointestinal tracts through collaborations with local wildlife rehabilitation centers, animal control, and wildlife management agencies in the Los Angeles area. This area is characterized by a wide diversity of habitats, including mixed chaparral, coastal sage scrub, oak woodland, riparian areas, and introduced annual grasslands and with over 18.7 million residents, it is the second largest metropolitan area in the United States. Much of the city of LA abuts patches of greenspace, even in highly urbanized areas (e.g. Elysian Park just north of Downtown LA), creating a unique mosaic of habitat patches. To capture this we used impervious surface levels to explore spatial patterns of macroparasite presence and abundance. We found that presence is significantly influenced by urbanization measures in some parasites. Our findings suggest parasites may be absent from this highly urbanized space due to differences in abiotic and biotic factors that govern the ecology of hosts and the survival of parasites in natural versus altered landscapes. While much remains to be learned regarding parasites in coyotes and other wildlife in the Los Angeles area, and, more broadly, in other urban areas, this work demonstrates the importance of studying parasites and emphasizes the insights they provide on the health of urban ecosystems.

Wildlife Health & Disease – Tuesday, June 6th @ 1:20-3:00 pm

Title: Mass Mortality of American Crows (*Corvus brachyrhynchos*) in February 2022 due to "Winter Mortality," Corvid Orthoreovirus
Authors: Rebecca Radisic, Sherri Russell, Andrew Allison, Holly Sellers, Nicole Nemeth
Speaker affiliation: UC Davis School of Veterinary Medicine
June 6th @ 1:40 pm
Abstract: ***Background:*** Since approximately 2019, American crows (*Corvus brachyrhynchos*) were observed seasonally roosting near the Federal Court Building in St. Louis, Missouri. Usually, the flock migrated prior to the first snowfall of the year. However, this pattern changed in February 2022, when a mass mortality event began in the first week of an abnormally cold period early in the month. Federal Court Building staff collected between 5-12 dead crows per day for approximately 1 week. Live crows were observed flapping about on the ground, struggling, and unable to fly. The following week, between 12-36 dead birds were collected daily. Five fresh carcasses from the die-off were submitted to the Southeastern Cooperative Wildlife Disease Study for postmortem evaluation. ***Objective:*** To describe lesion patterns and determine the cause of death in a subset of American crows submitted from the described outbreak. ***Methods:*** Postmortem diagnostic evaluation, including gross and histopathological examination, virus isolation, RT-PCR, and Sanger sequencing, was performed on the three freshest carcasses collected during the mortality event (from February 1-14, 2022). ***Results:*** Gross examination revealed intracranial hemorrhage in 2/3 crows. Gross and histopathology showed severe necrosis of the intestinal tract, spleen, and pancreas in 3/3 crows. Samples of spleen, liver, and intestine from each of the three crows were positive for corvid orthoreovirus via virus isolation and subsequent RT-PCR and Sanger sequencing. No other viral pathogens were detected. ***Conclusions:*** Corvid orthoreovirus (genus *Orthoreovirus*, family Reoviridae) can cause "winter mortality" in crows, which often involves large numbers of fatal infections when they roost together in high numbers. High densities of roosting crows is thought to facilitate virus spread among susceptible individuals via fecal-oral transmission. The virus causes severe damage to internal organs, most notably the intestines and spleen, and leads to rapid death. Additionally, the barrier of the intestinal tract is compromised from virus-induced damage, which can lead to rapid bacterial invasion and septicemia, further contributing to death. Corvid orthoreoviruses have been linked to fatal infections in numerous members of the Corvidae family including the hooded crow (*Corvus cornix*) in Finland, common magpie (Pica pica) in England, and carrion crow (*Corvus corone*) in Belgium. Based on studies of avian reoviruses of poultry, the virus is environmentally stable and can survive on feathers, wood shavings, metal, and glass for up to 10 days and can survive in water for longer periods of time. Avian reoviruses do not pose a threat to human health. Reoviruses are commonly detected in domestic poultry, although they usually do not cause severe disease. In poultry raised for meat, these viruses can cause inflammation in the joints and tendons of the leg, leading to lameness. Malabsorption syndrome, inflammation of the heart, pneumonia, and runting have also been reported.

Title: Gastriontestinal parasite communities of the coyote (*Canis Latrans*) in western Washington
Authors: Yasmine Hentati
Speaker affiliation: University of Washington
June 6th @ 2:00 pm
Abstract: Carnivores, domestic and wild alike, are hosts to myriad species of parasites, many of which are trophically transmitted. Many wild carnivores are unable to adapt to the novelty and modification of urban areas, but the presence of domestic dogs, domestic cats, and synanthropic wild carnivores ensure the continued survival of trophically transmitted parasites in urban systems. The coyote (Canis latrans) is perhaps the most ecologically important carnivore host for parasites in North

American cities due to its ability to thrive in urban environments, its dietary generalism, and its role as a reservoir for multiple zoonotic parasites. The goals of this study were to use a combination of gastrointestinal tracts and field-collected scats to (1) quantify parasite diversity in individual coyotes throughout western Washington and (2) determine the role of urbanization on helminth parasite richness. This project is the first parasitological survey of coyotes in the region, and is part of a larger project investigating complex relationships between mechanisms driving urban carnivore population health.

Title: The Impact of the Structure and Density of Small Mammal Populations on Tick-Borne Diseases in Urban Parks
Authors: Jennifer Mullinax, Carson Coriell
Speaker affiliation: University of Maryland
June 6th @ 2:20 pm
Abstract: One primary contributor to the prevalence and distribution of tick-borne diseases is access to small mammal populations. More specifically, various small mammal species such as white-footed mice, chipmunks, and short-tailed shrews are some of the most significant tick-borne zoonotic disease reservoirs. These species can be found at great densities in urban and suburban areas. Unfortunately, there is a lack of understanding of small mammal community structure's influence on infection probability and proliferation within urban ecosystems. To provide insight into how tick-borne diseases are spread throughout urban and suburban communities, there must first be an assessment of these small mammal communities and how their characteristics increase or decrease the potential for zoonotic spread. In 2022, we trapped small mammals (n = 267 total; 170 individuals), collected attached and free-questing ticks, and evaluated adjacent camera trap photos in two unique urban parks in Montgomery County, Maryland. During small mammal trapping, species, age, sex, tick load, and infection status were documented. Additionally, free questing ticks were collected from a large 200-meter diameter circle encompassing the small mammal transects. Small mammal densities were evaluated via a Jolly-Seber model in Program Density 5.0, across 1ha. Park vegetation was assessed at the trapping-grid level as well as the park level. All ticks and small mammal tissue are being evaluated for 5 major tick-borne diseases. We calculated a general linear mixed model with disease prevalence as the dependent variable. We also developed a rapid method of assessing urban spaces for likely small mammal diversity and richness and suggest solutions for tick reduction in unique urban areas.

Title: Zoonotic Implications of White-Footed Mice Habitat Selection and Territoriality in Fragmented Landscapes
Authors: Grace Hummell, Jennifer Mullinax
Speaker affiliation: University of Maryland, College Park
June 6th @ 2:40 pm
Abstract: White-footed mice (*Peromyscus leucopus*) play a pivotal role in the spread and prevalence of several tick-borne diseases. As a generalist species, white-footed mouse populations have thrived in fragmented suburban and urban parks as well as residential spaces increasing the overall tick population and risk of disease. However, the ecological behaviors of white-footed mice are not well document in literature leaving potentially important and critical tick management devices out of current integrated pest management methods. We collected spatial data on 59 mice living at the intersection of public county parkland and private residential land in Howard County, Maryland, USA. Utilization distribution overlap, a resource selection function, and a Bayesian mixed effect models were calculated to assess characteristics of habitat use. The utilization distribution overlap indices and the resource selection function supported territoriality, coupled with site-specific space use in

these suburban mouse populations. We found evidence of relationships between mouse body weight, home range size, mouse density, and habitat which likely influenced where mice were present. Additionally, a near significant trend was identified between increasing mouse weight and mouse density. As expected, mice occurred from residential property edges into the public forest interior, and mice showed a general, strong preference for forested areas. However, the Bayesian mixed effect model showed mice captured only ~40 m into the forest rarely used the nearby private yards or human structures. That result coupled with 44% percent of all captured mice testing positive for Borrelia burgdorferi, implied mouse-targeted tick treatments should be placed both along the edge and in ~50 m into the forest. When mouse-focused management efforts are needed for any zoonotic disease mitigation, our study suggested each natural space should be assessed for the density and distribution of open or edge habitats that have high human use. Furthermore, our study highlighted the need for zoonotic disease management frameworks that are based on not only site-specific characteristics but also specific management objectives.

The Urban Wildlife Info. Net. – Tuesday, June 6th @ 8:00 am-3:00 pm

Title: The Urban Wildlife Information Network: a research alliance to increase our understanding of urban environments from local to global scales
Authors: Mason Fidino, Seth Magle
Speaker affiliation: Lincoln Park Zoo
Abstract: Most people now live in cities, in one form or another. Many cities are small, some are large, and most of them are growing in population size and extent. Yet, while social, economic, and infrastructural aspects of cities predictably scale with their size, there is dramatic uncertainty about how urban nature – and all the biodiversity within – varies across spatial scales. To better understand variation in urban biodiversity both within and among cities, the Urban Wildlife Information Network was formed in 2017. Since then, what was initially a multi-city camera trap network has expanded in multiple dimensions, from deploying autonomous recording units for passive sampling of urban birds to better understanding human-wildlife interactions and how to manage them within and among cities. In this full day symposium, we will share some of the latest results of our camera trapping research, from single-city to multi-city studies, as well as new research directions from the network that measure entirely new taxa. We hope to inspire urban wildlife researchers to think beyond their home cities and work together to understand wildlife at regional to global scales.

Title: The Urban Wildlife Information Network: Past, Present, and Future
Authors: Seth Magle
Speaker affiliation: Urban Wildlife Institute; Lincoln Park Zoo
June 6th @ 8:00 am
Abstract: The Urban Wildlife Information Network (UWIN) is an alliance of researchers in over 40 cities collecting data using systematic protocols to evaluate urban wildlife distributions and ecology across cities, and ultimately at a global scale. To open this symposium from UWIN members, I will provide an introduction to the network, including its formation, growth, organization, and current size. I will review some of our recent findings and the strengths of the network, as well as its limitations. I will summarize the work of some of UWIN's committees, and discuss the potential impacts of the network for the scientific community, as well as for educational outreach and impact, management, conservation, and human-wildlife coexistence. Finally, I will discuss some of the next steps for UWIN, including work to collect data on diverse species and taxa.

The Urban Wildlife Info. Net. – Tuesday, June 6th @ 8:00 am-3:00 pm

Title: Is Predation Frequency Dependent Among Urban Coyotes (*Canis latrans*) in Phoenix, AZ?
Authors: Katherine Weiss, Jesse S. Lewis, Savage Hess, Zachary Ziebarth, Jan Schipper, Beckett Sterner
Speaker affiliation: Arizona State University
June 6th @ 8:20 am
Abstract: Human-coyote (*Canis latrans*) conflicts in cities often center around food, particularly the consumption of domestic cats (*Felis catus*). Yet, it is unknown if coyotes make dietary decisions based predominately on prey availability (i.e., frequency dependent selection), or if predation is driven by coyote prey preferences. In addition, it is unknown how and to what extent different components of prey availability (i.e., availability as interactions in space and time) contribute to diet selection in coyotes. In association with the Central Arizona-Phoenix (CAP) LTER and Urban Wildlife Information Network (UWIN)'s Salt River Wildlife Project, we placed 41 remote wildlife cameras (21 urban, 20 reference) and collected coyote scats (151 urban, 71 reference) along ~70km of the Salt River between March – June 2021 to assess if coyote diets in the area are frequency dependent. Asymmetric species interaction models and activity overlap analyses were used to quantify interaction potential between coyotes and prey taxa in space and time. Scat data were quantified via hard parts analyses and using a generalized model of biomass estimation per collected scat. We then used a model selection approach to identify if spatial overlap, temporal overlap, or spatio-temporal overlap between coyotes and prey taxa better predicted prey consumption. Top models were then used to identify if prey consumption was frequency dependent using Pearson's correlations. Prey taxa investigated included: lagomorph species, nocturnal rodent species, squirrel species, bird species, and domestic cats. Spatio-temporal availability of prey was a good predictor of prey biomass consumed by coyotes across all sites. However, across urbanized sites, temporal availability alone significantly predicted prey biomass consumed. Domestic cat predation occurred more than expected across all sites. However, when evaluating relationships solely within urbanized or reference sites, domestic cats were not consumed more than expected, given their availability. These results suggest that domestic cat and other prey predation may be frequency dependent in the Phoenix Metropolitan Area. Further, our results indicate that different components of availability—and the inferences made therein—may be more or less important at different scales. By understanding how ecological conditions influence coyote diets and the subsequent potential for conflict near urban areas, we can better inform management approaches that promote human-coyote coexistence.

Title: Testing the 'Weekend Effect': Variation in human activity patterns mediates periodic increases in recreational activity on mammalian behavioral response
Authors: Austin Green, Çağan Hakkı Şekercioğlue, Mary E. Pendergast, Emily Young, Hailey Keller, Trayl Grace
Speaker affiliation: University of Utah
June 6th @ 8:40 am
Abstract: As the world's human population continues to concentrate within urban areas and these landscapes continue to expand worldwide, wildlife is under pressure to adapt to novel environmental disturbances. Along wild-to-urban gradients, and especially within less developed areas, human recreation can affect wildlife behavior. These effects may be most apparent during peaks in human recreational activity (e.g., on the weekend). In this study, we used data from a large-scale citizen science camera trapping project to assess whether periodic increases in human recreational activity elicits a behavioral response across multiple mammal species in northern Utah, USA. Specifically, we assessed whether increases in human recreational activity during the weekend affected mammalian temporal activity patterns at the community-wide and species-specific level. In general, we found little

evidence supporting the presence of a temporal 'weekend effect.' At the community-wide scale, we found that mammalian diel activity patterns did not change in response to periodic increases in human recreational activity during the weekend. On the species-specific scale, only elk (Cervus canadensis) and rock squirrel (*Otospermophilus variegatus*) significantly altered temporal activity patterns during the weekend. However, people significantly altered temporal activity during the weekend, with more activity occurring in midday and less activity occurring in the early evening, leading to consistent decreases in human-wildlife temporal overlap. This study highlights the possibility of altered human activity patterns during periods of increased rates of activity serving as a human-wildlife conflict mitigation strategy.

Title: The Relative Effects of Drought and Urbanization on Terrestrial Mammal Occupancy in Southern California
Authors: Brian Rawles, Theodore Stankowich, Eric Wood, Amanda Zellmer
Speaker affiliation: California State University – Los Angeles
June 6th @ 9:00 am
Abstract: Urbanization and climate change are two dominant forces that negatively affect biodiversity globally. While there has been a plethora of research on the effects of urbanization or climate change on biodiversity, few have explored how extreme weather events, which are related to climate change, have affected animal occupancy within urban ecosystems. To fill this gap, we quantified the potential for a global megacity, Greater Los Angeles Area (LA), to function as a refuge for mammalian predator and prey communities during a historic drought. We collected camera-trap data during the winter rainy season (November through March) from 2018 and 2022 at three transects situated along an urban-rural gradient in LA. During the four years of sampling, the region experienced three abnormally dry years, and one abnormally rainy year, which allowed for a comparison of mammalian occupancy patterns among the dry and wet years. Using auto-logistic occupancy modeling and multivariate analyses, we found that prey species such as rabbits (Sylvilagus spp.) and mule deer (Odocoileus hemionus) were more common during the drought years of 2018/19 and 2021/22 within the wildland-urban interface, as opposed to more natural areas, where the prey animals were more common during the wet year of 2019/20. Predators, such as the bobcat (Lynx rufus) and coyote (Canis latrans) followed similar patterns, suggesting both prey and their potential predators shifted occupancy patterns between wet and dry years. Our results highlight the effects of drought on mammalian communities within and adjacent to LA and may inform conservation e.g., wildlife corridors, through the illumination of the seasonal use of cities by wildlife.

Title: Urban wildlife corridors: Building bridges for wildlife and people
Authors: Amanda Zellmer, Barbara Goto
Speaker affiliation: Occidental College
June 6th @ 9:20 am
Abstract: Urbanization is rapidly expanding across the globe, leading to increasing threats to wildlife in and around cities. Wildlife corridors are one strategy used to connect fragmented wildlife populations; however, building wildlife corridors in urban areas remains a challenge because of the number of barriers between habitat patches and the extensive number of property owners and stakeholders involved. Successful urban wildlife corridor conservation thus requires a collaborative approach and a cohesive plan that transcends municipal boundaries. Here we demonstrate how urban wildlife corridor conservation can provide a unique opportunity to build bridges not only for wildlife but also among scientists, non-profits, government agencies, and communities. Our case study centers on the conservation of a network of wildlife corridors in one of the world's megacities, Los Angeles, and the positive feedback loop sparked by collaboration between research and non-

profit work. We discuss the benefits of and challenges to building complex collaborations for the purpose of strengthening urban resilience and redesigning sustainable cities.

Title: Which features of urban development most strongly affect mammals? A case study in southeast New Hampshire
Authors: Mairi Poisson, Fikirte Erda, Andrew Butler, Patrick Tate, Daniel Bergeron, Remington Moll
Speaker affiliation: University of New Hampshire
June 6th @ 9:40 am
Abstract: Urban wildlife ecology is primarily concerned with understanding how human development impacts wildlife communities and populations. However, there is no standard for determining which habitat features to use in these analyses. Wildlife species likely respond differently to the various features of human development (e.g., road density, building density, or more aggregate "human footprint" indices). Current research practices often do not have strong a priori rationale for which habitat feature may be most suited for a target species or community. There is a gap in our understanding of how to select features that best describe a study area and that will capture the most salient impacts on focal species. In this study, we analyzed the scale of effect of various features related to human development on a diverse mammalian community. We used a community Bayesian hierarchical model to quantify how local species abundance was associated with the various features. We collected data during 2021 and 2022 using an array of 104 camera traps stationed in rural, exurban, and suburban areas throughout southeastern New Hampshire. We chose habitat features that are frequently used in urban ecology research: road density, housing density, and impervious surface. We also chose features that are becoming more popular for these types of analyses and may be of interest to urban ecologists: wildland urban interface, human footprint index, and building density. We analyzed these features at a range of scales related to home range sizes of each mammal species. We organized the analysis at three levels: the individual species level, at the functional group level based on home range size, and at the community level. Our results found that there is no one habitat feature at any particular scale that most impacts all species, groups, or the community. Rather, our study species responded differently from one another to these varying habitat features and at varying scales. We discuss these findings and their implications for ecological inference as well as urban wildlife study design. This research highlights the need for an improved approach to selecting the best habitat features for study area and study species.

Title: Assessing the Health of White-Tailed Deer across an Urban Gradient using Camera Traps
Authors: Krista Shires
Speaker affiliation:
June 6th @ 10:30 am
Abstract: Understanding white-tailed deer health is essential not only to the function and management of wildlife and the ecosystems in which they live. The aim of our study is to assess and estimate the health of white-tailed deer across an urban gradient using an adaptation of the Smiley et al., (2020) BCS method. Photos of white-tailed deer obtained from 75 camera traps throughout the Washington, D.C. metropolitan region were manually coded to classify the BCS of each usable photo. We fit a Bayesian hierarchical multinomial model to assess the effects of road density, distance to highway, distance to water source, proportion of tree cover, proportion of new vegetation present, and human population density and income had on the body condition of white-tailed deer. We used the softmax function to estimate the influence that each of the predictor variables had on the probability of a deer observation being in each BCS category. We found a higher probability of a deer being in thin compared to ideal in areas with higher road density, less low vegetation and low human population

density. We found deer had a higher probability of being heavy compared to ideal deer in areas with higher proportion of tree cover. However, deer may be heavier before rut and during gestation, and winter coats may obscure reference points for body condition scoring. Therefore, we may be seeing deer in various life and reproductive stages that simply require differing nutritional needs. We recommend that future studies involve covering a wider gradient of urbanization, monitoring individuals, and collecting hair samples to better assess stress. These findings reveal novel insights into how urbanization impacts white-tailed deer in the Washington, D.C. area, and provide an option for wildlife managers and enthusiasts to examine the health of a key ungulate species.

Title: Linking socioecological aspects and wildlife diversity in one of the greenest cities of Europe
Authors: Marufa Sultana, Simon Moesch, Marius Huber, Titus Mußhoff, Geva Peerenboom, Ilse Storch
Speaker affiliation: University of Freiburg
June 6th @ 10:50 am
Abstract: Europe is unique because of its remarkably stable urbanization compared to any other region. It also has an increasing focus on improving biodiversity and bringing nature back into the cities in the last few decades. As a result, many European cities are now considered the model of green cities and sustainable development. However, in such green cities, understanding how socioecological aspects and wildlife diversity across urban areas are connected is still unclear though essential to contribute to the foundation of wildlife-inclusive city development. In this study, we focused on mammals in Freiburg, one of the greenest cities in Europe. Freiburg is a medium-sized city by population located in the Baden-Württemberg region of Germany. It is exceptionally popular as a forest city. Here, we explored mammal species occurrences and diversity through wildlife camera trapping in multiple seasons. At the camera trap locations, we estimated the proportions and proximity of human settlements, roads, green areas, forests, and agricultural areas to represent the urban land cover status. Then, we explored socioeconomic status and human perception of wildlife in the neighbourhood by combining a questionnaire survey using online social media platforms and circulating leaflets in the vicinity. Our results will show how species diversity relates to urban land cover and green areas. Further, it will provide evidence if higher socioeconomic status mirrors the positive attitude of the human toward wildlife and indirectly (mediating landcover factors) influences higher species composition in a green city like Freiburg.

Title: Urban Red Fox Occupancy in the United States: Influencing Factors
Authors: Addison Gaines, Morgan Farmer, David Drake
Speaker affiliation: University of Wisconsin-Madison
June 6th @ 11:10 am
Abstract: Increasing urbanization throughout the United States has forced wildlife to adapt to altering environments at a rapid rate. This adaptation has been documented in red foxes (*Vulpes vulpes*) primarily across Europe and Australia, but little is known about red fox occupancy in urban areas of the United States. Therefore, the main objective of our study is to understand the prevalence and drivers of red fox occupancy in cities across the United States. We also investigated the temporal stability of urban red fox occupancy. We predict that red fox presence would be associated with developed open spaces and medium intensity development within urban areas. We also predict that red fox occupancy would be stable over time. We obtained camera trap data from the Urban Wildlife Information Network (UWIN) for 20 cities across the United States for years 2016 through 2021. We used an occupancy model framework to understand red fox presence and detection as a function of human population, road, coyote (*Canis latrans*), and domestic dog density, biological season of red

fox, and percentage of various types of land use and cover in each city. We expect our results to elucidate how common red fox presence is in urban areas of the United States. We also expect our results to define explanatory factors of urban red fox occupancy that can be used by wildlife managers, urban planners, and others to manage presence of red fox in cities in North America.

Title: Monitoring birds in cities with bioacoustics: mitigating the challenges of automated species classification and urban noise
Authors: Elizabeth Lehrer, Mason Fidino, Seth Magle
Speaker affiliation: Urban Wildlife Institute; Lincoln Park Zoo
June 6th @ 11:30 am
Abstract: Acoustic recording technology has advanced considerably in the last ten years, making it a useful and popular technique to passively monitor wildlife. Acoustic recording devices are now relatively small and inexpensive, easy to program, and can quickly collect vast amounts of data. However, these advances come with some challenges, namely how to reliably and accurately classify species within recordings, especially for taxa that have varied and complex calls such as birds. When recording in cities, urban noise adds yet another challenge, as the frequency range of most urban noise overlaps directly with bird song. As part of the Urban Wildlife Information Network, we piloted an acoustic recording project to monitor birds using AudioMoths (Open Acoustic Devices) in collaboration with 10 partner cities. Within each city, AudioMoths were placed at 10 sites along an urbanization gradient and recorded for two weeks during the 2021 spring migration period. To classify species in these recordings, recordings were evaluated using BirdNet, Cornell University's machine learning platform. BirdNet detected over 300 species with varying levels of probability. We validated a subset of these classifications distributed across an urbanization gradient to assess differences in accuracy based on species and urbanization score (a proxy for urban noise). We will present results from our validation efforts and next steps for using this method to monitor birds in cities. (This is submitted as part of the UWIN Symposium organized by Mason Fidino)

Title: Gentrification shapes patterns of alpha and beta diversity in cities, but not as much as habitat loss
Authors: Mason Fidino, Heather Sander, Christopher J. Schell, Jesse S. Lewis, Ilanah Taves, Solny Adalsteinsson, Max Allen, Whitney Anthonysamy, Darren Minier, Caterina Myers, Elizabeth Biro
Speaker affiliation: Lincoln Park Zoo
June 6th @ 1:20 pm
Abstract: How people experience nature is often centered on where they live, and most people live in cities. Yet, access to urban nature is not equally spread among or within cities. Because urban communities have unequal access to environmental resources like greenspace, patterns of urban biodiversity likely track these disparities. For example, gentrification, or the process of neighborhood change that includes demographic and economic shifts in historically disinvested neighborhoods, can bring reinvestment to poorer neighborhoods and an influx of green infrastructure, which could increase biodiversity. Yet, gentrification can also decrease the availability of low-income housing and increase the cost of local services, which displaces the original neighborhood inhabitants. If gentrification is associated with increased biodiversity, then that would demonstrate an additional signal of inequitable access to nature in cities. We tested the hypothesis that gentrification leads to more diverse medium to large North American mammal communities with camera trap data from 23 U.S. cities that are part of the Urban Wildlife Information Network. To do so we used a meta-analytic approach. First, we fit a Bayesian multi-city multi-species occupancy model to generate detection-corrected alpha and beta diversity estimates. These estimates and their associated uncertainty were

fed into secondary models to quantify how gentrification and impervious cover were associated with variation in alpha and beta diversity within and among cities. Overall, while we did find that gentrification was associated to greater species richness as well as a shift in community composition in most cities, the magnitude of this effect was much less than the negative influence of impervious cover. We also found that gentrification had 1) the strongest influence on alpha diversity in cities on the east coast and 2) the strongest influence on beta diversity in cities on the west coast. We hypothesize that this result is related to the relatively younger age of west coast cities relative to their east coast counterparts, as older (i.e., east coast) cities often have more homogenized wildlife communities. Given our results, we do conclude that gentrification shifts urban biodiversity in cities, though not as much as a lack of available habitat.

Title: The role of landscape connectivity in urban wildlife biodiversity
Authors: Tiziana Gelmi Candusso, Marufa Sultana, Marie-Josee Fortin, Juan Vargas Soto, Mason Fidino
Speaker affiliation: University of Toronto
June 6th @ 1:40 pm
Abstract: As urbanization intensifies and the number of suitable habitat patches decreases, wildlife biodiversity declines. Habitat availability, vegetation richness, and connectivity (i.e. permeability of the landscape to animal movement) have been identified as potential drivers for biodiversity across taxa. In terms of connectivity, the presence of corridors and surrounding green patches acting as stepping-stones may influence species diversity. However, the effect of connectivity on species richness remains unclear for urban mammal populations. This research project aims to assess whether connectivity can influence urban biodiversity and whether certain species might be more affected by connectivity than others across cities. We hypothesized that (1) mammalian species richness will increase in proximity to predicted movement corridors and in relationship to the isolation of the sampling site, (2) the effect will be stronger as habitat availability decreases across cities, and as urban configuration changes (i.e. concentric, linear, multinuclear), and (3) the effect will differ across species based on habitat requirements, e.g. species needing larger patches will require higher connectivity values. Using circuit theory we assessed omnidirectional connectivity between forest patches within 26 cities in North America and Europe, identifying likely movement corridors within the city for small and large mammals. We then examined biodiversity metrics based on camera trap data in relation to the proximity of those predicted movement corridors, the surrounding connectivity values, and the betweenness centrality of the nearest forest patch. To understand whether the effect differed across cities, we integrated the effect of total forest area within the city and urban configuration. Lastly, to understand the species-specific effects of connectivity we used those parameters to analyze single-species occupancy. The results provide insights into management strategies aiming at increasing wildlife biodiversity within cities.

Title: Patterns of urban tree squirrel occupancy show strong city-level effects across their geographic range
Authors: Rachel Larson, Heather Sander
Speaker affiliation: University of Iowa
June 6th @ 2:00 pm
Abstract: Tree squirrels (*Sciurus* and *Tamiasciurus* spp.) play critical roles in urban ecosystems, as important seed predators and dispersers and prey for urban predators. Currently, our knowledge of urban squirrel distributions is based largely on studies from single cities and may or may not be translatable across a species' range. Additionally, tree squirrels are known to compete in urban areas, yet little work has been done to understand what environmental factors drive competition and

coexistence between ecologically similar species. Multi-city analyses have shown that eastern gray squirrels (*S. carolinensis*) and fox squirrels (*S. niger*) respond differently to urban intensity, land cover, and housing density, yet we still lack knowledge regarding the ways in which these squirrels respond to specific attributes of urban environments (e.g., tree canopy cover, impervious surface cover) within urban landscapes. American red squirrels (*T. hudsonicus*) remain understudied in urban areas with little information on which cities support red squirrel populations or which urban environmental variables are associated with red squirrel presence. We examined the relationships between gray, red, and fox squirrel site occupancy and co-occurrence and land-use and vegetative cover in nine North American cities by leveraging camera trap data from the Urban Wildlife Information Network, a network of researchers in over 40 cities who use a common protocol to monitor urban wildlife. Across their geographic range, all squirrel species were more likely to occupy sites with higher canopy cover; however, the strength of this relationship had high among-city variation. Fox squirrels also responded positively to increasing grassy cover, but again, the strength of this relationship varied greatly among cities. Responses to these variables also varied within cities, indicating urban squirrel site occupancy may be influenced by habitat variables at fine spatial scales. Fox squirrels were less likely to co-occur with eastern gray or red squirrels at sites with higher shrub cover, reflecting the dominance of fox squirrels in western cities. Gray and red squirrels were highly unlikely to co-occur across all cities, likely due to their different habitat preferences (broadleaf vs coniferous forest). These findings suggest that, while some general patterns exist in urban squirrel site occupancy across their geographic ranges, strong city-level effects can disrupt these patterns. Management actions to conserve urban tree squirrels thus should consider these broader patterns, the unique environment of each city, and the distributions of potentially-competing species.

Title: Perceptions of safety: Effects of predation and urbanization on diel activity in defended versus undefended mammals
Authors: Katrina Moore, Max Amaya, Travis Gallo, Mason Fidino, Seth Magle, Cria Kay, Jesse S. Lewis, Austin Green, Jacque Williamson, Mary E. Pendergast, Çağan Hakkı Şekercioğlue
Speaker affiliation: California State University, Long Beach
June 6th @ 2:20 pm
Abstract: Mammals that bear an anatomical defense (e.g., spines, armor, noxious sprays) have a lower risk of mortality from predators and may perceive risk differently than undefended mammals; therefore, defended species may show reduced behavioral responses to changes in urbanization and predation risk. We analyzed camera trap data from ten U.S. cities, investigating potential shifts in activity patterns in both defended [striped skunk (*Mephitis mephitis*) and nine-banded armadillo (*Dasypus novemcinctus*)] and undefended [Northern raccoon (*Procyon lotor*) and Virginia opossum (*Didelphis virginiana*)] mid-sized mammals in response to (1) urbanization, (2) human habitation, and (3) predator guild composition. Since these four species are primarily nocturnal, we quantified the impact of variability in these environmental factors on the proportion of nocturnal activity of each species. Preliminary results suggest that while having strong morphological defenses may reduce temporal activity shifts in response to predators and humans, the presence of a defense may not entirely change a species' reaction to external pressures, as we observed some overlap in nocturnality shifts between defended and undefended species.

The Urban Wildlife Info. Net. – Tuesday, June 6th @ 8:00 am-3:00 pm

Title: Assessment of Wildlife Response to Urbanization across the Southeastern United States
Authors: Lavendar Harris, Summer Fink, Kaitlin Goode, Adam Rohnke, Kimberly Sparks, Christopher Middaugh, Maureen McClung, Mike Wharton, Michel Kohl
Speaker affiliation: Georgia Department of Natural Resources
June 6th @ 2:40 pm
Abstract: Urbanization can have profound impacts on native wildlife leading to changes in wildlife community composition and behavior; changes that can contribute to human-wildlife conflicts. However, to date most urban wildlife studies have occurred within large cities that often lack significant levels of wildlife habitat and/or connectivity. Thus, it is unclear whether the impacts of urbanization on wildlife observed in these previous studies similarly occur in smaller size cities where urban development and fragmentation may be less pronounced. To address these questions, we focused our efforts on three mid-size cities (range 127,000 - 202,000 people) in the southeastern United States: Athens, Georgia, Little Rock, Arkansas, and Jackson, Mississippi. Across all cities we deployed remote game cameras covering an urban to rural gradient following data collection protocols established by the Urban Wildlife Information Network (UWIN). Cameras were deployed for 1 month, every three months and photos were classified by species identification, location, and time. For each mid-size city, the impact of urbanization on wildlife behavior was evaluated by quantifying diel activity as a function of % impervious surface and urban green space. To better understand how community development influences urban wildlife, we evaluated how the socio-economic characteristics calculated by the U.S. census bureau (e.g., neighborhood income, education level) for each city related to wildlife abundance. To further this analysis, we quantified the relationship between species occurrence and abundance to these same metrics. This information is being shared with the local governments to help direct future planning efforts within the southeast. More broadly, this data contributes to the UWIN research collaboration to better quantify urban wildlife ecology so that we can work toward more wildlife friendly cities.

Symp.: Co-designing Cons. – Tuesday, June 6th @ 8:00 am-10:00 am

Title: Co-designing Conservation: Application in the U.S. Fish and Wildlife Service's Urban Wildlife Conservation Program
Authors: Angelina Yost, Dr. Kayla Cranston, Cindy Corsair, April Alix
Speaker affiliation: U.S. Fish and Wildlife Service
Symposium Time: June 6th @ 8:00-10:00 am
Symposium Abstract: A growing number of environmental professionals are realizing that equitable and meaningful engagement of local community members in the development of programming is essential for catalyzing the durable, long-term action needed to conserve biodiversity. Many who attempt to co-design programs with (not for) communities find that choosing the most effective strategies to accomplish this task is crucial and can oftentimes feel daunting. In this session, we will introduce the co-design framework and identify five psychological principles professionals can use as guideposts. We will then provide at least one example of how this framework and associated strategies are being implemented by the U.S. Fish and Wildlife Service's Urban Wildlife Conservation Program to engage their surrounding communities in the co-design of locally relevant conservation programming and projects.

The number of examples that may be presented will depend on the ability of Service staff and Community Partners associated with co-design projects to travel for the conference and/or the availability of a virtual attendance option, in which case, this would be a hybrid session with some presenters in-person and some attending virtually. If time allows (we are open to a 2 or 4 hour

session), we will welcome the opportunity to end the session with a panel discussion and/or breakout sessions to encourage bidirectional dialogue between participants and the presenters.

The objectives of the session would be to:
1.Highlight the importance of approaching conservation projects (particularly in urban areas) that centers community voices with a co-design framework
2.Give examples through storytelling and case-studies of how the U.S. Fish and Wildlife Service's Urban Wildlife Conservation Program is using this approach
3.Promote bi-directional communication when ""telling our story""
4.Inspire conference participants to further explore/pursue training in co-designing conservation projects

8:00 AM: Overview of the U.S. Fish and Wildlife Service's 'Urban Wildlife Conservation Program' by Angelina Yost
8:20 AM: Overview of Co-Designing Conservation with (not for) Communities by Dr. Kayla Cranston
8:40 AM: Case Study #1- Rhode Island National Wildlife Refuge Complex by Cindy Corsair and April Alix
9:00 AM: Case Study #2- Patuxent Research Refuge by Jason Cangelosi, Visitor Services Manager
9:20 AM: Case Study #3- Baltimore/Masonville Cove Urban Partnership by Ela Carpenter
9:40 AM: Question and Answer Session facilitated by Angelina Yost

Policy, Planning & Design – Tuesday, June 6th @ 10:30-3:00 pm

Title: Can urban red squirrels help us inform policy on ecological infrastructure?
Authors: Anouk Taucher, Sandra Gloor, Daniel Hegglin, Loïc Pellissier, Fabio Bontadina
Speaker affiliation: SWILD - Urban Ecology & Wildlife Research; ETH Zurich; Swiss Federal Research Institute WSL
June 6th @ 10:30 am
Abstract: In the face of the looming biodiversity crisis, urban areas play crucial roles as habitats, refuges, stepping stones, and genetic reservoirs for many wildlife populations. Urban mammals are of particular interest to study due to their high diversity of ecological traits and habitat requirements. Their charisma and humans' positive attitude towards them, make them excellent flagship species for urban conservation and green city design. However, for effective conservation measures it is crucial to know how they use the urban ecological infrastructure (habitats and functional corridors). We used a participatory, multi-city approach to study space use and habitat selection in urban Eurasian red squirrels Sciurus vulgaris in order to inform policy and recommend evidence-based conservation measures. Eurasian red squirrels are popular mammals that can be regularly seen in urban parks and residential areas provided there are enough trees. As diurnal and not particularly shy animals, they are especially well suited to be encountered and observed by urban residents. Thus, we explored if this arboreal species is suited as a focal species for studying the role of ecological infrastructure and urban trees, particularly in densifying areas which are increasingly under pressure. We investigated habitat use of urban red squirrels using a participatory approach in three Swiss cities in 2018 and 2020. First, we collected data of incidental sightings of squirrels in urban areas with the Swiss citizen science project StadtWildTiere (urban wildlife). Using this data as a baseline, we then compared explanatory ecological variables between study areas with and without squirrel presence. For this, 75 participants measured and identified more than 6'000 trees in 643 study areas across the three cities. The results show that squirrel presence was more likely in urban areas with more large trees, higher tree diversity, and more hazel bushes Corylus avellana - a staple food source for squirrels. We then created a model to compare remotely sensed data to the data collected on site with volunteers and to test how functional connectivity affects squirrel presence in the study areas. Such spatially explicit

models help identify gaps in the urban ecological infrastructure and suggest improvements. The final model can be used in other cities by the authorities to inform policy on urban ecological infrastructure. We discussed the initial results with the participants involved in data collection, and want to further develop recommendations and priorities on how private stakeholders (e.g. home owners with gardens) can contribute to the ecological infrastructure by promoting trees and bushes on their property. Community science proved to be both a useful tool to identify habitat selection of an otherwise unmonitored mammal species and decisive in raising awareness and promoting action for urban biodiversity conservation.

Title: Calgary Connect: integrating ecological connectivity into urban municipal planning
Authors: Danah Duke, Tracy Lee, Nicole Kahal
Speaker affiliation: Miistakis Institute
June 6th @ 10:50 am
Abstract: Ecological connectivity is widely understood as important to maintain, however it is difficult to implement in urban planning as ecological requirements surpass municipal boundaries. The Calgary Connect project aims to bridge this gap by integrating knowledge on where natural connections remain in the greater Calgary region in Alberta, Canada, and developing tools to support decisions to maintain those connections, across jurisdictions. Wildlife camera-traps from urban parks provide necessary biodiversity knowledge to inform identification of core habitat and ecological corridors, as well as powerful citizen engagement through citizen science. We will present the project's process on developing a regional ecological network, which includes multi-stakeholder engagement with regional municipal representatives. As well, we will discuss decision support tools that support municipal planning, including the on-line Connectivity Risk Assessment tool that assesses impacts of proposed developments to ecological connectivity. Calgary Connect is a collaborative partnership project with the Miistakis Institute, The City of Calgary, Friends of Fish Creek Provincial Park Society, Weaselhead/Glenmore Park Preservation Society and Alberta Forestry, Parks and Tourism

Title: Meta-analyses of the ecological effects of urban form: sprawl versus compact residential development
Authors: Sara Gagne, Caroline Brinegar
Speaker affiliation: University of North Carolina at Charlotte
June 6th @ 11:10 am
Abstract: Population growth within cities and the expansion of urban residential development are among the fastest growing and least reversible drivers of global land use and land cover change. Residential development profoundly changes ecosystem structure and functioning. A central issue in the management of these impacts is the role of urban form. We define urban form as the spatial arrangement of residential development along a gradient with two extremes: compact and dispersed development. For a given human population size and landscape area, residential development can either occupy a small area at a high dwelling density (compact development) or a large area at a low dwelling density (dispersed development). Here, we report the results of the first quantitative synthesis of the ecological effects of urban form. We systematically searched the literature to identify studies that either empirically compared ecological responses in existing compact and dispersed developments or modeled the projected impacts of urban form using development scenarios. For each study, we calculated Hedges' g or the response ratio (L) as measures of effect size and made note of moderator variable values. Twenty-three journal articles met our criteria for inclusion in meta-analyses. Of these, 30% (7 articles, 5 studies) compared ecological responses between existing dispersed and compact developments and 70% (16 articles, 15 studies) modeled the projected

ecological impacts of urban form. Most studies took place in eastern North America (35%) or western Europe (22%) and measured avian or mammalian diversity as the response variable. For empirical studies, we calculated a positive overall effect (g) of 0.23 (95% CI: 0.21-0.25), indicating that compact development is associated with more positive ecological outcomes than dispersed development. The best model of the effects of moderator variables on empirical study effect sizes showed that ecological responses were more positive in compact developments only when urban form extent was large and investigators measured habitat amount or biomass. For modeling studies, the overall effect was also positive, although weaker (L = 0.02 (95% CI: 0.01-0.03)). The best models of the effects of moderator variables on modeling study effect sizes included urban form extent and urbanization intensity, which, when accounted for, resulted in non-significant overall effects of urban form as measured by model intercepts. We conclude from our results that 1) the effects of urban form depend on spatial scale and ecological response measure and 2) that heterogeneity among studies published to date precludes an easy answer to the urban land sparing/land sharing debate. In other words, current evidence indicates that the effects of urban form are context dependent. Local studies in individual municipalities are needed to bolster the power of future syntheses and to provide planners and managers with contextual evidence supporting one urban form approach over another.

Title: A Federal Partnership to Ensure the Humane Capture, Handling, and Disposition of Migratory Birds
Authors: Brian Washburn, Jennifer Miller, Antonio Celis-Murillo, Jason Suckow, Brian Millsap, Marnie Pepper, Arthur McCallum, Michael Begier
Speaker affiliation: USDA Wildlife Services National Wildlife Research Center
June 6th @ 11:30 am
Abstract: Natural resources, including migratory birds, are held in the public trust. Federal and state agencies must strive for the professional management of these resources. Federal biologists and staff from the U.S. Fish and Wildlife Service – Migratory Bird Program, the U.S. Geological Survey – Bird Banding Laboratory, and the U.S. Department of Agriculture Animal Plant Health Inspection Service Wildlife Services recently embarked on a collaborative partnership to provide guidance, policies, and resources to help ensure that the capture, handling, and disposition of migratory birds is conducted in effective and humane ways. The initial product of this partnership was the development of a technical reference document to provide guidance on the humane capture, handling, and disposition of migratory birds live-trapped for any purpose (e.g., depredation, scientific collection). Our expectation is that this technical reference document will be available as a resource for all natural resource professionals, including federal and state agency personnel, students and academics, individuals working in the private sector, and wildlife rehabilitators and educators. This document is intended to be a 'living' document and is informed by the best available science and knowledge. It will provide information designed to help guide the selection of methods from the various techniques available and ensure humane handling of migratory birds. The document is intended to be a valuable foundation for the development of future resources and regulations, including the development of standardized permit conditions, agency policies, best management practices, and an interagency training program related to the humane capture, handling, and disposition of migratory birds.

Policy, Planning & Design – Tuesday, June 6th @ 10:30-3:00 pm

Title: Austin's policy to prohibit honey bee hives within nature preserves: Broader implications with other species?
Authors: John Davis
Speaker affiliation: Austin Parks and Recreation Department
June 6th @ 1:20 pm
Abstract: On March 24, 2022, Austin, Texas became a Bee City USA affiliate. Bee City USA is an initiative of the Xerces Society with the goal "to galvanize communities to sustain pollinators, in particular the more than 3,600 species of native bees in this country, by increasing the abundance of native plants, providing nest sites, and reducing the use of pesticides." (https://beecityusa.org/) Despite being the most widely introduced bee species in the world (Danforth, Minckley and Neff 2019), exotic European (or western) honey bees have received much media attention claiming (erroneously) the species is in dire need of conservation. These two forces have combined to generate pressure from keepers of honey bees to place managed hives on Austin public lands. However, research indicates that exotic honey bees compete with native bees (Cane and Tependino 2017, Valido et al. 2019, Angella et al. 2021,) and native bees are generally in greater need of conservation (Danforth, Minckley and Neff 2019). Honey bee resource use has been estimated to significantly impact native bee reproductive capability (Cane and Tependino 2017). Honey bees have been shown to increase spread of exotic plants (Barthell et al. 2001, Goulson 2003). Therefore, Austin developed a policy to prohibit honey bee hives on nature preserves and allow them on a limited, case-by-case basis on other public lands if the primary purpose of that property is agriculture (community farms, urban agriculture sites, etc.) or education (nature centers). Instead, native bees are encouraged at all sites. Though this policy is a significant step, contemplating this issue generates broader questions. It is known that honey bees can forage 5 to 13 kilometers from the hive (Von Frisch 1967, Beekman and Ratnieks 2000). To further protect native bees in nature preserves, should policy restrict honey bee hives within an appropriate buffer of a preserve? Are there other species (feral cats?) with similar resource impacts on city lands and/or other policies that could be implemented to reduce those impacts? This session will detail the process by which Austin developed its policy and explore implications for other species and/or policies.

Title: Wildlife Biologist vs. Arborist on Municipal Properties
Authors: Brett Johnson
Speaker affiliation: Dallas Park and Recreation Department
June 6th @ 1:40 pm
Abstract: There is a big push to plant trees in municipal parks. There is a big push to save very tree possible in parks. What are the issues and what stakeholders must be engaged in regards to trees in parks? It's not an easy balancing act. There are many times that a wildlife biologist is needed in helping decide what trees provide valuable habitat components, and what species may be most appropriate to the site. But what if by arborilogical standards the tree has an increased risk? How do you balance the needs of wildlife with the safety of park users? These are major factors that municipalities are grappling with from a policy standpoint as they try to develop and enact various ""comprehensive environmental"" and/or ""urban forest master"" plans. This presentation will provide a brief case study in how the Dallas Park and Recreation Department operates its ""Branching Out"" programs that puts over 600 30 gallon trees in the ground, but is also tasked with over 400 tree removals a year due to safety concerns. This is done to help the city achieve goals laid in the recently passed Dallas Comprehensive Environmental & Climate Action Plan (CECAP) and Urban Forest Master Plan. These types of efforts are going on in most major municipalities, and there a role for urban wildlife professionals to be involved.

Policy, Planning & Design – Tuesday, June 6th @ 10:30-3:00 pm

Title: Texas urban wildlife program partnering with an urban corporation to maintain their wildlife habitat council conservation certification
Authors: Judit Green
Speaker affiliation: Texas Parks & Wildlife Department
June 6th @ 2:00 pm
Abstract: The Urban Wildlife Program of the Texas Parks & Wildlife Department (TPWD), formed in 1993, has 9 Urban Biologists that serve seven major metropolitan areas in Texas. Urban biologists try to connect with and support residents and landowners, which includes businesses, in their area to manage local natural resources for future generations. Working with corporations, who often have larger tracts of land in urban areas, affords biologists the opportunity to guide land management changes with bigger impacts. The San Antonio Urban Wildlife office has partnered with Toyota Motor Manufacturing, Texas, Inc. located in the southern part of the city for several years to help them maintain a Wildlife Habitat Council (WHC) Conservation Certification (www.wildlifehc.org). WHC, a non-profit conservation organization started 30 years ago which currently has corporate members in 48 U.S. states and in 25 countries, empowers companies to advance biodiversity, sustainability, employee engagement, and community relations goals because every act of conservation matters! The partnership between TPWD biologists and Toyota employees started because of the WHC Conservation Certification program and has resulted in habitat improvement projects on their property, as well as outreach programs to Toyota staff and the local community. The Toyota plant has approximately 20,000 visitors/year to their Visitor's Center prior to plant tours. With our help, in 2018, they installed an 11,000 sq.ft. Pollinator-Wildscape Demonstration Garden highlighting local native plants for visitors that will be expanded this year. In 2020, TPWD was also a partner in restoring Texas Horned Lizard (THL) habitat to Toyota's West Field with the goal of converting 100 acres of Bermuda grassland into native THL habitat in three phases. Phase one with 30 acres has been completed and phase two will be started this year. Toyota used both locations this past year to host a City Nature Challenge event with Texas Master Naturalist volunteers and local university students. Introducing and supporting businesses to become a member of WHC offers them additional resources, guidance, opportunity to connect with and learn from other corporations, and be recognized for their conservation efforts while enhancing biodiversity for the environment and the communities where they reside and work. The Toyota Plant in San Antonio is just one shining example of what collaborations can do to help nature along. Nature-Based Solutions for Corporate Landowners Guide: https://www.wildlifehc.org/wp-content/uploads/2022/11/WHC-NbS-Guide.pdf

Title: Legacy effects of urban park planning on avian diversity
Authors: Dan Herrera
Speaker affiliation: University of Maryland
June 6th @ 2:20 pm
Abstract: Land use planning directly governs the location, size, and shape of urban parks, which act as habitat refuges for wildlife species. Since land use planning dictates the availability and connectivity of habitat patches, historic land use decisions likely have measurable effects on modern habitat availability. Studies that attempt to find relationships between historic urban development and current biodiversity produce mixed results, likely because researchers often use development age (e.g., years since city was founded) as the sole explanatory variable. However, the events that have occurred during a time period may have greater explanatory power than the duration of a period alone – as suggested by known non-linear relationships between species diversity and time since urbanization. We digitized historic maps of Washington (DC), Minneapolis (MN) and Pittsburg (PA) in five-year increments between 1900-2020 to calculate landscape metrics of the park systems over time. We then used historic data from Christmas Bird Count surveys in these cities during these time

periods to calculate species and functional diversity metrics. Finally, we used linear regression to assess the relationship between park metrics and avian diversity over time while accounting for survey effort and regional ecological differences. Park area and connectivity have positive relationships with species and functional diversity. These findings will contribute to our understanding of the mechanisms driving urban biodiversity and will highlight the lasting impact of historic planning decisions on future biodiversity.

Title: Roadside Corridors to Promote Monarch Butterfly Conservation
Authors: Rebeca Quiñonez-Piñón, Patrick Fitzgerald, Wesley Swee
Speaker affiliation: National Wildlife Federation
June 6th @ 2:40 pm
Abstract: The North American migratory monarch butterfly (*Danaus plexippus plexippus*) has faced steep population declines, more obvious from the late 90s till 2014, challenging the species to face a long-term recovery journey. The International Union for Conservation of Nature (IUCN,2022) classified the migratory monarch as an endangered species, increasing international attention to the fact that monarchs are in jeopardy. In the U.S., the Fish & Wildlife Service warranted the protection of the monarch under the Endangered Species Act, and during the fiscal year 2024, the Service is due to submit a proposed rule listing the monarch, if the listing is still warranted. The monarch's ability to survive is threatened by the extensive loss and fragmentation of breeding and migration habitat along the central monarch flyway, exacerbated by climate change. Habitat connectivity is essential to sustain the monarch butterfly's migration. During stops in migration, monarchs need access to nectar resources to refuel, host plants to reproduce during the spring, and shelter for rest and protection. Habitat loss and fragmentation force monarchs to travel longer distances depleting their fat reserves as they search for suitable stopover habitats. The loss of these natural habitats decreases the migratory monarchs' chances of survival. Therefore, the establishment of vegetated areas along roadsides that serve as ecological corridors helps restore connectivity between natural habitats and will support monarchs and other wildlife species. The Federation's goal was to increase habitat connectivity between native green spaces that support monarch breeding and migration within the monarch central flyway. We worked collaboratively with the Texas Department of Transportation, Maramec Spring Park, and the Conservation Federation of Missouri to create roadside monarch corridors in public lands in the Lower Rio Grande Valley of Texas, and the Ozark Highlands of Missouri. The project implementation included site identification and selection, each site's preparation, native seed mix selection, and seed broadcasting with equipment and by hand. We successfully restored a total of 109 acres of roadside, native monarch-friendly habitat, of which 34 acres were in Missouri and 75 acres in the Lower Rio Grande Valley of Texas' highways. The Federation disseminated lessons learned through a story-telling video, a blog, and a webinar. During this presentation, we will provide details about the restoration process, outcomes, lessons learned, and future work. We will also present and share the blog containing the story-telling, and the guide "Roadside Monarch and Pollinator Habitat: A Guide for Communities".

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Urban Wildlife Management in the Nation's Capital: one of the greenest but administratively complex regions in the U.S.
Authors: Travis Gallo, Dan Herrera
Speaker affiliation: University of Maryland
Symposium Time: June 7th @ 8:00 am – 3:00 pm
Symposium Abstract: Washington, DC, boasts the greatest proportion of park space of any US city, and is surrounded by a similarly extensive networks of protected green space in neighboring Maryland and Virginia. Furthermore, the region is uniquely situated at the piedmont-coastal plains ecotone, which contributes to a diversity of habitat types and subsequent biodiversity. This myriad of green space is managed by an equally diverse group of stakeholders, including 15 municipalities across two states and the District of Columbia, 7 state agencies, 5 federal agencies, 3 military installations, more than 10 land holding universities, and numerous non-profit organizations and private property owners. Extensive collaboration is required across stakeholders to manage the region's wildlife effectively but is complicated by the number of parties involved. This symposium offers an opportunity for wildlife ecologists in the National Capital region to discuss topics of regional importance. Topics will include habitat restoration, deer management, endangered and threatened species, invasive species control, and other research taking place in the Nation's Capital. The symposium will encourage local collaboration and allow local urban biologists to showcase the work they are doing on the ground to manage and conserve wildlife in a highly urbanized and administratively complex region of the U.S.

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Great (Wildlife) Expectations: An Introduction to Managing Urban-Suburban Wildlife Around the Nation's Capital
Authors: Ryan Butler
Speaker affiliation: The Maryland-National Capital Park and Planning Commission
June 7th @ 8:00 am
Abstract: Across the National Capital Region, government agencies and NGO's alike, are working to meet the demands of natural resources protection and management while balancing the needs, desires, and demands of public land users, local residents, and politically engaged stakeholder groups. Wildlife species throughout this region present issues of concern intrinsically, ecologically, and socially. Myriad agencies, professionals, students, volunteers, and enthusiasts work to address wildlife management needs in service to public infrastructure, natural resources protection & management, research, and in response to the concerns of the public. Often the need for wildlife and habitat management within the urban/suburban context comes with a plethora of expectations and from all viewpoints. Navigating these expectations and managing wildlife to the benefit of the resource and to the interests of the people is no small task!

Title: Healthy Urban Forests Support Wildlife
Authors: Ann M. Gallagher
Speaker affiliation: National Park Service
June 7th @ 8:20 am
Abstract: Healthy Urban Forests Support Wildlife" compares idealized characteristics of healthy, functioning forest ecosystems to real world urban forests in the National Park System with special regard for the parks in and around Washington, DC. A range of forest-provided services are compared to wildlife requirements. Quantification of threats to forest functions are presented. A discussion of the potential consequences and recommendations for their mitigation will connect proactive management to healthy forests for healthy wildlife.

Title: Colonization and extinction events of songbirds in the National Capital Region
Authors: Hannah Redmon
Speaker affiliation:
June 7th @ 8:40 am
Abstract: Numerous studies have demonstrated patterns that influence forest bird occupancy, but we know less about the factors that influence the dynamic processes of colonization and local extinction. I used long-term forest breeding bird monitoring data to understand these dynamic processes for five interior forest bird species: Hooded Warbler (*Setophaga citrina*), Louisiana Waterthrush (*Parkesia motacilla*), Ovenbird (*Seiurus aurocapilla*), Scarlet Tanager (*Piranga olivacea*) and Wood Thrush (*Hylocichla mustelina*). I used National Park Service Inventory and Monitoring data from the National Capital Region to model the impact of local and landscape scale variables on occupancy dynamics of these songbirds. Data was collected annually at 311 sites, throughout 11 National parks, from 2007 to 2019. I used a hierarchical modeling process to simultaneously estimate four parameters: initial occupancy, colonization, extinction, and detection probability. I was primarily interested in colonization and extinction dynamics and modeled how stand age, forest cover, soil calcium, distance to forest edge, NDVI and a Lepidopteran Index influenced these processes. Protecting large stands of intact forest in urbanized areas plays an important role in providing habitat for vulnerable interior forest species. Yet, habitat protection alone may not be enough to thwart local extinction. Therefore, it is important to understand the dynamic processes influencing where these species are breeding and what habitat variables are influencing where they are colonizing and becoming locally extinct in our protected National Parks. Preliminary results indicate close association of these songbirds with forest

cover and stand age, as well as several associations with distance to forest edge, NDVI and soil calcium.

Title: A "Fledgling" Bird Community Index – How citizen scientists and breeding birds are helping us to understand habitat quality and variation on suburban-exurban park lands in Montgomery County, MD.
Authors: Guy Metzler
Speaker affiliation: Montgomery County Parks, MD
June 7th @ 9:00 am
Abstract: Birds can and often have been used as a representative/indicator species that provide us with information about the habitat where they are observed. Density and diversity of bird species can also be an indication of the overall quality, variability, and benefits provided by a habitat. The Montgomery Parks Bird Community Index Project (BCI) was developed to evaluate bird-habitat relationships on parkland, and to determine if designated management areas are serving their intended purposes. By employing the help of highly skilled volunteer birders, GIS, and other data visualization software, Parks staff hopes to use this data to provide habitat rankings which will be used to guide future management decisions.

Title: Prioritizing Local-Scale Conservation and Restoration Areas in Washington D.C, USA based on Habitat Connectivity and Development Risk
Authors: Annette Spivy
Speaker affiliation: University of Maryland
June 7th @ 9:20 am
Abstract: Proactive land-use planning that encourages both targeted conservation of urban greenspace and restoration of vacant lots could enable effective biodiversity corridor design and early identification of development risk. Given the often-small property sizes in urban areas, fine-grained data that relate to local management practices are necessary for urban planning. We present a case study of a highly urbanized city, Washington D.C. that explores the value of linking long-term, multi-taxon, wildlife survey data, and high-resolution land use and land cover datasets (1 meter) in urban planning and corridor design. To identify potential local, parcel-level conservation and restoration sites that do or can achieve the structural habitat requirements of biodiverse parks in the region, we quantified and mapped the spatial distribution of biodiversity for four taxon (birds, mammals, reptiles, and amphibians) using Hill numbers of species richness (q0), Shannon diversity (q1), and Simpson diversity (q2) and analyzed the associated structural habitat characteristics. Significant habitat characteristics of shared interest to Species of Greatest Conservation Need (SGCN), principally core forests with openings, were then used to connect the 27 surveyed parks using least-cost linkage pathways. Within the corridors, we identified 138 vacant lots considered of highest risk for future gray infrastructure: making them candidate locations for priority conservation or restoration efforts. Our results suggest that the use of high-resolution data can inform biodiversity-sensitive urban planning and corridor design by identifying target restoration and conservation sites that will drive more effective wildlife conservation and management at local levels.

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Restoration of a Degraded Freshwater Suburban Wetland to Improve Habitat for Breeding Marsh Birds and Wintering Waterfowl
Authors: Dave Lawlor
Speaker affiliation: Fairfax County, Virginia
June 7th @ 9:40 am
Abstract: Wetland loss and degradation is a well-documented environmental issue across the United States. In heavily developed areas, wetland degradation can be severe due to increased impervious surfaces, erosion and pollutants1. Fairfax County, Virginia, near Washington DC, has been developed into mostly urban and suburban landscapes. Huntley Meadows Park is the largest contiguous park in the Fairfax County Park Authority system and contains the largest freshwater nontidal wetland in Fairfax County. Construction impacts upstream of the wetland resulted in over 18" of silt deposited in the wetland and severe degradation of the 30-acre Central Wetland. Impacts of the sediment included reduced diversity in the flora and fauna including the loss of rare breeding marsh birds including King Rails (*Rallus elegans*), Pied-Billed Grebes (*Podilymbus Podiceps*), American Bitterns (*Botaurus lentiginosus*) and Least Bitterns (*Ixobrychus e*xilis). The sediment also reduced water depths, resulting in low water and drought conditions annually. Concerned citizens advocated for restoration efforts as the wetland continued to transform into a wet meadow.
In 2004, the Fairfax County Park Authority appropriated a municipal bond to begin a large-scale restoration project to improve wetland habitat for marsh birds and waterfowl. Restoration construction was completed in the fall of 2013. EBird observations of marsh birds using the wetland were compared between the nine year period pre-construction and nine year period post construction. Observations of Pied-bill Grebes and Sora (*Porzana carolina*) increased from 144 to 1082 and 157 to 933, respectively. Observations of American bitterns, Least bitterns, Virginia rail (*Rallus limicola*) and King rail decreased from 143 to 9, 20 to 17, 0 to 12 and 88 to 16, respectively. In 2016, the King Rail was the only species to successfully breed post construction. Waterfowl numbers and species diversity increased post construction. Observations of species increased from the nine years pre-construction to the nine years post construction for Northern Pintail (*Anas acuta*), Gadwall (*Mareca strepera*), Blue-winged Teal (*Spatula discors*), Green-winged Teal (*Anas crecca*) from 1,118 to 4,547, 362 to 3,219, 334 to 1,020, 1,482 to 4,200 respectively. The Canada goose (*Branta canadensis*), is known to negatively impact wetland vegetation diversity2. Vegetation surveys using the California Rapid Assessment Method documented increases in species diversity and cover post construction for the first five years. However, increasing use by Canada goose populations resulted in vegetation surveys documenting a decrease in diversity and cover since 2018.

1- Hogan, Dianna & Walbridge, Mark. (2009). Recent Land Cover History and Nutrient Retention in Riparian Wetlands. Environmental management. 44. 62-72. 10.1007/s00267-009-9313-9.
2- HARAMIS, G.M. and KEARNS, G.D. (2007), Herbivory by Resident Geese: The Loss and Recovery of Wild Rice Along the Tidal Patuxent River. The Journal of Wildlife Management, 71: 788-794. https://doi.org/10.2193/2006-350
3- Beston, Julie A., Williams Christopher K., Nichols, Theodore, Castelli, Paul M. (2016) A population model for management of Atlantic flyway resident population Canada geese. Wildlife Society Bulletin, 40 – 1: 106-111

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Getting to the "Corps" of Kingman Island: Using wildlife and plant data to inform the ecological restoration of dredge-material islands and landscape-scale conservation in Washington DC
Authors: Natasha Garcia Andersen, Damien Ossi
Speaker affiliation:
June 7th @ 10:30 am
Abstract: The District of Columbia's Department of Energy and Environment (DOEE) - Fisheries and Wildlife Division (FWD) is a state wildlife and fisheries research service in Washington, DC. DOEE manages the Kingman and Heritage Island Wildlife Conservation Area on 18 hectares of land on the Anacostia River. Kingman and Heritage Islands are dredge-material islands created by the Army Corps of Engineers in the 1920's. These islands surround a 25 ha. embayed area, called Kingman Lake, that contains 4 ha. of restored wetlands. DOEE has recently implemented a large-scale ecological restoration project on the islands, which are dominated by non-native invasive vegetation and mineral soils, and is restoring an additional 5 ha. of wetlands in Kingman Lake. Both restoration projects are informed by FWD's dataset of wildlife, fish, and plant inventories that dates to 2005. We present summaries of the wildlife and plant communities in the Kingman Island area and describe how these and other data have informed the restoration designs for the islands and the wetlands. We also discuss the unique or rare fauna and flora in the District, and how natural heritage datasets are used to implement the goals of DC's State Wildlife Action Plan and to prioritize other locations in the District of Columbia for restoration or conservation.

Title: The Role of a County Parks System in Managing Deer-Human Conflict
Authors: Jon Paolo Abellera
Speaker affiliation: Dept.of Parks and Recreation,Prince George's County-MD National Capital Park and Planning Commission
June 7th @ 10:50 am
Abstract: The white-tailed deer (*Odocoileus virginianus*), in Prince George's County in Maryland, is considered by county residents as a beautiful wildlife resource and to some, as a nuisance species. The Prince George's County Department of Parks and Recreation under The Maryland-National Capital Park and Planning Commission (M-NCPPC), has implemented a management program since 2015 to address the overabundance of deer in the county. With growing urbanization of the county, the challenge of managing the deer population is a concern. Most M-NCPPC parks in Prince George's County consists of neighborhood parks, community centers and natural areas. Majority of these parks are in urban zones and are surrounded by residential areas. Parks provide ideal habitat for deer in the county. Deer that live in parks surrounded by residential areas overbrowse landscaping, and incidences of deer-vehicle collisions go up every year around these parks. This increase in deer-human conflict contribute to the negative view of deer by county residents. Data from trail camera population surveys and deer carcass numbers on county roads because of deer-vehicle collisions, are used to determine management strategies in county parks. Lethal management strategies include regulated public hunting and a park police-based sharpshooting program. Camera surveys are done every year at specific parks to determine adaptations or changes to existing management plan. This is a long-term project that aims to lower the deer densities in county parks and help with the biological and social carrying capacities of and for white-tailed deer.

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Don't re-invent the wheel, just adapt it to fit your need: History and development of a wildlife management program in the shadow of the nation's Capital
Authors: David Petersen
Speaker affiliation:
June 7th @ 11:10 am
Abstract: Situated directly adjacent to Washington DC, the Maryland – National Capital Park & Planning Commission is a unique bi-county government agency with separate parks departments in Montgomery County and Prince George's County, Maryland. A look at more than 2 decades of managing white-tailed deer and other wildlife underscores the complex nature of the urban/suburban environment, but also reveals opportunity for sharing ideas, learning from experience, adapting methodology, and collaborating with a variety of professionals representing the various agencies and organizations throughout the region.

Title: Organized Archery Hunting to Manage White-tailed Deer in a Densely Populated, Suburban Area
Authors: Katherine Edwards, Ethan Chapmon, Earit Powell, Dave Lawlor
Speaker affiliation: Fairfax County Police Department
June 7th @ 11:30 am
Abstract: Archery hunting is an important deer management tool that can play a critical role in deer population control efforts in urban and suburban areas. Fairfax County, Virginia implemented a deer management program on public lands in 1998 to address county and state-wide deer management challenges associated with public safety, environmental damage, deer herd health, and other conflicts. Shotgun hunts and sharpshooting were implemented in a small number of county parks given strict firearms restrictions and showed limited success with an average of 221 deer harvested per year. Archery was added in 2010 to supplement existing methods given high costs associated with sharpshooting operations and limited ability to expand the program under local firearms ordinances. The archery program now includes over 100 properties county-wide totaling approximately 21,500 acres. Over 600 volunteer archers are assigned to groups and allowed to hunt specified clusters of parks. Hunters must pass screening requirements and weapons qualifications to be eligible and follow strict rules of engagement, standards of conduct, and reporting requirements. State regulations and county ordinances have contributed to increased harvest including an Urban Archery season, NOVA late antlerless season, liberal bag limits for antlerless deer, Earn-a-Buck, and no parcel size restrictions for discharge of archery tackle. The archery program has accounted for 82% of total program harvest since it was implemented. Over the past 8 years, archery harvests ranged between 726 and 1,092 deer annually ($\bar{x}$ = 921.5 ± 45.5) with 58-75% of these harvests being does ($\bar{x}$ = 66.3 ± 1.8). Opponents to the program have criticized archery deer hunting for resulting in high wounding rates and excessive suffering but non-recovery rates have varied between 3-10% and are well below the historic archery hunting reports. Herein, we present an overview of the Fairfax County Deer Management Program as a successful model of a structured urban archery deer management program in a densely populated and developed area.

Title: OK, We've Been Managing Deer – What's Next?
Authors: Scott Bates
Speaker affiliation: National Park Service
June 7th @ 1:20 pm
Abstract: At the 2010 and 2017 conferences I presented the deer management history and federal compliance needed for the National Capital Region of the National Park Service to manage deer. In 2017 four parks were managing deer. Currently there are seven parks managing deer, with an eighth

on the way in 2024. We will present how federal compliance has changed since the last conference, the population histories of the parks, and post-management tree regeneration.

Title: Spatial and temporal overlap of domestic cats and native urban wildlife
Authors: Dan Herrera
Speaker affiliation: University of Maryland
June 7th @ 1:40 pm
Abstract: Free-roaming domestic cats (*Felis catus*) are known to damage ecosystems via the transmission of zoonotic diseases and predation of native wildlife. Physical interactions are required for many of these risks to be manifested, necessitating spatial and temporal overlap between cats and wildlife. We used data from a three-year camera trap survey to model species-specific occupancy of free-roaming domestic cats and eight native mammal species across Washington, D.C., and used the model outputs to estimate the probability of spatial overlap between cats and wildlife. Additionally, we used kernel density estimations to calculate temporal overlap between cats and each wildlife species. Potential disease vector species occupancy was generally positively correlated with canopy cover and open water. Prey species were also generally positively correlated with canopy cover but displayed negative associations with human population density and inconsistent associations with average per capita income. Domestic cat occupancy was negatively correlated with natural habitat characteristics and positively correlated with human population density. Predicted spatial overlap between domestic cats and native wildlife was greatest for potential disease vector species. Temporal overlap was high between cats and all but two native wildlife species, indicating that temporal overlap is probable wherever species overlap spatially. Our findings indicate that the risk to and from domestic cats varies across urban landscapes, but primarily arises from human activities. Data-driven management to reduce such interactions can aid in cat population management, biodiversity conservation, and public health campaigns.

Title: On a Cultural Resource Collision Course – Bird Collisions at the Washington Monument
Authors: Leslie Frattaroli
Speaker affiliation: National Park Service
June 7th @ 2:00 pm
Abstract: The Washington Monument, completed in 1884, is a 555-foot marble obelisk in the center of the National Mall and Memorial Parks (NAMA). The first recorded bird collisions occurred in 1889 when 77 bird deaths were recorded, before the Washington Monument was lit up at night. Since 1932 when it was first illuminated, bird collision deaths have been recorded sporadically, the data most faithfully collected during the 1930's and 1940's. One of the most dramatic collision events occurred in September 1937, when over 576 birds dropped from the sky after colliding with the Monument. NAMA resource management staff restarted documentation of bird collision deaths in fall 2020. Since then, we've identified 23 different bird species and one species of bat that have collided with the Washington Monument. Similar to other buildings that have bird collisions, predators have capitalized on this phenomenon. Peregrine falcons often predate on migratory birds in the area, utilizing the Washington Monument as a perch to hunt from. Data collection is continuing with a goal to identify trends to inform management decisions.

Urban Wildlife Mgmt. in D.C. – Tuesday, June 6th @ 8:00-3:00 pm

Title: Using Ecosystem Service Valuation and Assessments to Advance Biodiversity Sensitive Urban Planning and Corridor Design.
Authors: Annette Spivy
Speaker affiliation: University of Maryland
June 7th @ 2:20 pm
Abstract: Making the benefits of ecosystem services explicit has been instrumental in supporting biodiversity conservation. Ecosystem services valuation metrics can be used to identify areas or actions that could benefit urban biodiversity while simultaneously supporting the economic and social goals of a city's sustainable development plan. Effectively targeting conservation and restoration areas, which have the greatest benefits per unit cost, would also assist in allocating scarce dollars more efficiently. Here, we address the economic tradeoffs of ecosystem services and wildlife protection by attaching economic value to potential conservation/restoration areas in the highly urbanized capital city of Washington D.C. We used InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) software to quantify the biophysical values of six ecosystem services that are of major importance in urban areas – climate change mitigation, heat mitigation, storm-water retention, flood risk mitigation, and pollution retention – to create the first multiple ecosystem service valuation of all green infrastructure in Washington D.C. We then mapped the distribution of the associated economic value of these six services, using high-resolution data, and identified high-value conservation/restoration areas within proposed biodiversity corridors. This unique method of incorporating ecosystem service valuation into biodiversity-sensitive urban planning and corridor design can be applied to any urban area where funding is scarce, natural habitat is minimal, and the importance of ecosystem services is most evident.

Symp.: One Health – Wednesday, June 7th @ 8:00 am-12:00 pm

Title: One Health in Wild Cities
Authors: Kaylee Byers, Maureen Murray
Speaker affiliation: Simon Fraser University, Canadian Wildlife Health Cooperative
Symposium Time: June 7th @ 8:00 am – 12:00 pm
Symposium Abstract: One Health is a concept that recognizes that the health of people, animals, and the environment is interwoven. This lens for exploring our shared health can be applied to understanding and mitigating complex health issues at local and global scales.

Wildlife are especially important aspects of One Health systems because over 60% of diseases that occur in people originate in animals. The interconnectedness of wildlife and human health is particularly salient in cities because environmental pressures such as land use change, climate change, and pollution impact wildlife and people in significant and sometimes unexpected ways. These health threats are urgent, emerging, and point to the importance of considering both social and ecological determinants of health in One Health research involving wildlife.

In this symposium, we explore a suite of One Health issues affecting wildlife in cities. Topics include infectious and vector-borne diseases, environmental contamination, and stress. Speakers describe how human and environmental factors can increase vulnerability to certain health issues, and how human actions rooted in environmental injustice have important effects on wildlife. Together, this symposium will demonstrate how more holistic and interdisciplinary approaches to studying urban wildlife through a One Health lens can resolve and reveal critical questions in the field.

Symp.: One Health – Wednesday, June 7th @ 8:00 am-12:00 pm

Title: The Socio-Ecological Side of One Health in Cities
Authors: Kaylee A. Byers, Maureen H. Murray, Julia Smith
Speaker affiliation: Simon Fraser University, Canadian Wildlife Health Cooperative
June 7th @ 8:00 am
Abstract: One Health is a lens for exploring the shared health of people, animals, and the environment and can be applied to understanding and mitigating complex health issues at local and global scales. However, much of the work framed as “One Health” continues to miss the larger determinants of health. Both social (SDoH) and ecological (EDoH) determinants of health – such as income, housing, land use change, and pollution - are important determinants of health outcomes, affecting both human and wildlife health due to differences in access to resources and environmental quality. In this study, we review the published literature to explore the extent to which research involving wildlife and under the banner of “One Health” considers social and ecological determinants of health either in study design or interpretation of findings. Specifically, we assess: 1. If, why, and how SDoH and EDoH frameworks and factors are included in wildlife health research?; 2. What are the overlaps between SDoH/EDoH and wildlife health research?; and 3. What are the gaps between SDoH/EDoH and wildlife health research? Through this process, we identify trends, knowledge gaps, and considerations for the future of this field. We argue that a more inclusive consideration of health determinants and outcomes across species and environments will broaden our understanding of health impacts and improve our ability to respond to them locally and globally.

Symp.: One Health – Wednesday, June 7th @ 8:00 am-12:00 pm

Title: Urban parks through the One Health lens: Balancing people and wildlife needs
Authors: Jéssica Francine Felappi, Jan Henning Sommera, Timo Falkenbergb, Wiltrud Terlauc, Theo Kötterd
Speaker affiliation: University of Bonn
June 7th @ 8:20 am
Abstract: In the coming decades, expansion and densification of urban areas are expected in order to accommodate the increasing share of the global population living in cities. Instead of maintaining urban development patterns that ignore the importance of natural systems and threaten the existing urban green spaces and surrounding natural habitats, we must use this opportunity to transform cities into healthier places where people and biodiversity thrive. Green infrastructure has been the main strategy promoted for this transformation due to its wide range of benefits to human well-being and biodiversity conservation. However, adopting a holistic view such as the One Health approach is necessary to understand how people and wildlife may respond differently to varying qualities of green infrastructure in urban areas. In this talk, we will present key findings from a case study applying the One Health framework in a megacity of the Global South. Recommendations will be discussed to inform green infrastructure planning and management that balance both human health and wildlife support in cities.

Title: A global assessment of the challenges and opportunities in quantifying urbanization for wildlife infectious disease research
Authors: Katherine E. L. Worsley-Tonks, James D. Forester, Stanley D. Gehrt, Nicholas P. McCann, Geoffrey Miller, Maureen H. Murray, André J. Nault, Dominic A. Travis, Meggan E. Craft
Speaker affiliation:
June 7th @ 8:40 am
Abstract: Global expansion of urban areas has increased interest in understanding wildlife diseases in the urban context, and growing evidence suggests that urbanization plays a role in shaping wildlife disease patterns. However, it has become clear that the magnitude and directionality of wildlife disease-urbanization associations can vary by host and pathogen taxa and across environmental context. Approaches used to quantify urbanization may also influence wildlife disease-urbanization associations but have thus far not been reviewed, limiting the potential to determine whether urban wildlife disease researchers are using the most appropriate urban metrics for their host-pathogen system. Here, we review the different types of urban metrics used by wildlife disease researchers to quantify urbanization and investigate their influence on the directionality of the wildlife disease-urbanization associations. To do this, we conducted a review of the literature, identifying articles from 1980 to 2022, and focused on terrestrial wildlife (specifically mammals, birds, and reptiles). Two-hundred and six articles were retained after applying our inclusion/exclusion criteria. Research described in these articles was primarily conducted in the United States, followed by Canada and Germany, and over half of articles were published after 2016. Carnivora, Passeriformes, and Rodentia were the most studied animal Orders. Pathogens transmitted via fecal-oral routes, followed by vector-borne pathogens, were the most studied pathogen types. Common urban metrics employed included landscape level composite measures (e.g., urban vs rural) and proportion urban landcovers within estimated animal home ranges. Importantly, our results indicate that the type of urban metric used can influence the directionality of the wildlife disease-urbanization association. These findings highlight important issues that should be considered when designing urban wildlife disease studies and we provide recommendations for future directions.

Symp.: One Health – Wednesday, June 7th @ 8:00 am-12:00 pm

Title: How vector and host diversity shape West Nile virus transmission in urban green spaces along an urban-rural transect
Authors: Andrew Mackay, Jiayue Yan, Chang-Hyun Kim, Maureen Murray, Seth Magle, Mike Ward, Chris Stone
Speaker affiliation: University of Illinois Urbana Champaign
June 7th @ 9:00 am
Abstract: Urban green space is associated with a wide range of societal benefits, including for conservation, human well-being, and to mitigate effects of climate change. However, green spaces can also provide habitat for avian hosts of arboviruses such as West Nile virus, and blood meals for the mosquito vectors that feed on them. Relatively little however is known regarding the importance of urban green spaces for West Nile virus transmission dynamics, for instance in relation to their size, and whether this role changes as one moves further away from the urban core. To elucidate this, we set out 4 pairs of gravid and light traps at 10 urban green areas in the Greater Chicago area in Illinois, USA that spanned a transect from the heart of the city to the rural edge. Specimens were collected at a weekly basis between June and October. Specimens were identified to species, and pools of *Culex pipiens, Cx. restuans*, and *Cx. salinarius* tested in pools for the presence of WNV. The host species from which blood meals were obtained in blood-fed females was determined through MiSeq sequencing. At each of the sites we monitored the presence of medium- and large mammals with camera traps and estimated avian abundance by performing point counts at three times during the summer. Blood-meal origins for *Cx. pipiens* and *Cx. restuans* females were predominantly from avian species such as American robins and Northern cardinals and did not differ strongly between sites in the urban (eastern side of the transect) and rural (western sites). For *Cx. salinarius*, a possible bridge vector, white-tailed deer and humans were the most common hosts, but the relative abundance of blood meals taken on humans increased in the more urban locations. West Nile infection rates differed significantly among vector species and sites. To explain variation in prevalence we assessed the impact of several land use and environmental parameters and host species composition. The amount of impervious surface around the collection site itself was only weakly associated with WNV infection rates, but the proportion of land consisting of turf grass had a significant positive relationship. WNV prevalence was also significantly associated with the community competence index, as well as with abundance of species including American robins and house sparrows. Together, this work highlights that urban green space with certain characteristics that provide ample suitable habitat for important avian host species can amplify WNV transmission and therefore risk of exposure in humans. This suggests that urban planners should take considerations regarding mosquito-borne viruses into account when designing urban and suburban green spaces.

Title: The role of New York City wildlife in tick-borne pathogen spillover risk
Authors: Maria Diuk-Wasser, Jonathan Bastard, Nichar Gregory, Pilar Fernandez, Micaela Mincone, Olivia Card, Sara Kross
Speaker affiliation: Columbia University
June 7th @ 9:20 am
Abstract: The composition of the urban wildlife community is a key driver of tick-borne disease dynamics, increasing human exposure risk through complex socio-ecological pathways. Host diversity and abundance patterns may be particularly idiosyncratic across urbanized landscapes due to trade-offs between extreme fragmentation that reduces habitat suitability and access and human activities that artificially increase resource availability for wildlife. We use camera and hair trap surveys to identify links between landscape composition and configuration, the mammalian host community, and the presence of three tick vector species at a human-wildlife interface in New York City, an emerging area within an endemic region for several tick-borne diseases. We found that

mammal species richness was generally greater in residential yards than in adjacent parks and that dissimilarity between mammal communities was determined by both nestedness and turnover patterns. We identified yard and landscape-level features associated with the presence of urban host species and identified cascading effects of hosts on tick distribution in yards. Our results challenge assumptions that biodiversity loss in human-modified areas always increases risk for tick-borne diseases. Instead, we found many residential sites had higher species richness and higher abundance of low reservoir competent ("dilution") hosts such as opossums than paired forested parks. Our study highlights the importance of disentangling the mechanisms mediating tick-borne disease hazards as a critical first step toward reducing urban tick-borne disease risk.

Title: Stressed out: Environmental health predicts variability in coyote ecophysiology in San Francisco, CA
Authors: Christopher J. Schell, Caspi, T., Cesar Estien, Christine Wilkinson, Benjamin N. Sacks
Speaker affiliation: University of California, Berkeley
June 7th @ 9:40 am
Abstract: Novel disturbances in cities frequently challenge wildlife to cope with those stressors to survive in cities. The cumulative effects of urban stressors (e.g., artificial light at night, noise pollution, chemical pollutants, etc.) can serve to dysregulate wildlife metabolic functions that disrupt their ability to maintain homeostasis. As a result, we often assume that urban wildlife populations are customarily more stressed than their nonurban conspecifics. However, evidence across stress physiology studies in mixed, suggesting that certain species demonstrate reduced stress responses toward urban living, whereas others do not vary along urban-rural gradients. The spatial distribution of urban stressors is fundamentally heterogeneous, governed principally by the same structural and societal inequities that inform segregation, racial zoning, and access to environmental (dis)amenities. Thus, interrogating how structural oppression contributes to the heterogeneous distribution of disturbances and environmental health are integral to uncovering the links among society, urban stressors, and wildlife physiological outcomes. We collected over 700 coyote (Canis latrans) fecal samples across San Francisco to assess whether glucocorticoid and thyroid concentrations were associated with variation in environmental health. Here, we used the publicly available resource – CalEnviroScreen – that combines 21 environmental and social factors to assess pollution burden at the census level. We then determined whether there were associations among pollution burden and coyote hormonal responses. By implementing this social-ecological approach, we provide evidence to suggest that human-mediated environmental health has broad-sweeping consequences for wildlife in cities.

Title: Historical redlining influences urban ecosystem health and threatens biodiversity
Authors: Cesar O. Estien, Christine E. Wilkinson, Rachel Morello-Frosch, and Christopher J. Schell
Speaker affiliation: University of California, Berkeley
June 7th @ 10:30 am
Abstract: The history of cities, including legacy effects such as redlining, has been elevated as a mechanism that governs much of the heterogeneity within cities, including the distribution of environmental pollutants and (dis)amenities. However, most of our understanding of how redlining has shaped pollution in cities and its consequences lies with humans, with little empirical evidence to suggest that redlining impacts urban wildlife ecology. In this study, we investigate (1) whether redlining is associated with the spatial distribution of disturbances (i.e., chemical pollutants, air toxicants, noise, and thermal intensity) that are particularly relevant for wildlife and (2) if biodiversity in redlined areas is reduced due to differences in disturbances. To understand how redlining shapes

urban ecosystem health and biodiversity, we used home-owner loan corporation (HOLC) maps for eight cities in California to map disturbances and understand which HOLC grades may be more burdened with pollutants. We then leverage participatory science data (iNaturalist) to measure alpha and beta diversity as a function of HOLC grade. Strengthening the link between historical segregation and present urban ecosystem health is critical for deconstructing the sweeping impacts of unjust societal legacies on cities. Our results spotlight how ecology and society are inextricably linked, amplifying the need for centering equity and justice in urban planning and social reform.

Title: Societal health and wealth are associated with variance in coyote movement patterns
Authors: Christine E. Wilkinson, Niamh Quinn, Chase Niesner, Christopher J. Schell
Speaker affiliation: University of California, Berkeley
June 7th @ 10:50 am
Abstract: Though it is well-documented how biophysical factors may shape wildlife movement and space use in cities, it is less certain how social-ecological attributes affect wildlife movement ecology. Recent studies have suggested that both socioeconomic wealth and environmental health influence species richness and biodiversity in cities, and that linear infrastructure may serve as either impediment or habitat for wildlife movement in rural areas. These same social-ecological drivers may thus be salient predictors of urban organismal responses. Here, we explored whether neighborhood socioeconomic status (i.e., median household income) and environmental health disparities were associated with coyote (Canis latrans) movement patterns in Los Angeles, California. Twenty (n=20) coyotes were fitted with GPS collars from 2019-2021 across LA county with 2-hour fix rates. We then used resource selection functions (RSF) and step selection functions (SSF) to estimate relative probabilities of selection along varying socioeconomic, infrastructure, environmental health, and ecological gradients. We found that the best-performing selection models incorporated a suite of social-ecological and infrastructure covariates. We also found that coyotes with larger home ranges experience greater pollution burden. Notably, coyotes with home ranges located in low-pollution neighborhoods select against more burdened locations, while coyotes with home ranges located in high-pollution areas select for high-burden locations within their home ranges. This study provides a unique social-ecological lens to examine the full contributions of anthropogenic drivers in shaping wildlife movement and behavior. Further, this approach is broadly applicable to urban planners and conservation practitioners, as building more equitable, healthy, and connected cities may bolster wildlife success in urban ecosystems.

Title: Socioecological drivers of disease emergence: data to evidence to intervention
Authors: Colin Carlson, Gregory F. Albery, Briana Betke, Daniel J. Becker, Rory Gibb, Sadie J. Ryan
Speaker affiliation: Georgetown University
June 7th @ 11:10 am
Abstract: In the last three decades, scientists have developed an extensive and evidence-driven process for implicating human activities in climate change and biodiversity loss. Can we apply the same logic to understand pandemic threats? I'll discuss two approaches that apply causal inference to large disease datasets to understand whether human-altered landscapes experience a higher rate of disease emergence. In the first case, approaches based on host-virus networks bring in the role of disease ecology, animal behavior, and functional biodiversity, but have limited insights into specific real landscapes or levers for intervention. In the second, spatial causal inference from outbreak records reveals that emerging infectious disease outbreaks cluster where people live alongside nature, but the fingerprint of anthropogenic change (including climate, urbanization, or wildlife hunting) is inconsistent at best, and particularly difficult to detect given surveillance limitations in the

Symp.: One Health – Wednesday, June 7th @ 8:00 am-12:00 pm

most important study systems. I'll conclude by discussing what this evidence suggests about ecological interventions for human and wildlife health (and health system interventions for conservation!).

Title: Inequity in exposure and knowledge drives vulnerability to zoonotic disease among urban communities
Authors: Alexandre Dyer, Kaylee A. Byers, Jacqueline Buckley, Danielle German, Zharia Brandon, Maureen H. Murray
Speaker affiliation: Lincoln Park Zoo
June 7th @ 11:30 am
Abstract: To prevent public health risks from zoonotic diseases in urban ecosystems, it is important to understand which urban communities are most vulnerable to rats and their associated health harms in order to predict at-risk areas for management. This requires information about rats but also about resident's experiences and knowledge, which is poorly understood. In this study, we aimed to identify predictors of two aspects of vulnerability to leptospirosis as a model rat-associated disease: 1) exposure to rat urine in the home and 2) lack of awareness that rats carry leptospirosis. We studied vulnerability to leptospirosis in Chicago, hailed the "rattiest city in America". Based on previous patterns between rat infestations and socioeconomics, we hypothesized that individuals with lower incomes would be more likely to be exposed to rat urine in their home. We also hypothesized that individuals would be less likely to be aware that rats carry leptospirosis if they only sought information about rats from informal sources or if they owned a dog, due to veterinary care. We conducted a survey in 2021 by mailing surveys to random households in communities along an income gradient. Based on 431 complete survey responses, we found that white respondents were over 3 times less likely to observe rat urine in the home than other respondents, likely because white respondents were less likely to live in areas with other indicators of environmental health burdens. We also found that dog owners and respondents who sought out information about rats, regardless of source, were more likely to be aware that rats carry leptospirosis. When we examined both aspects of vulnerability simultaneously, we found that residents most vulnerable to leptospirosis (who had been exposed to urine and were not aware that rats carry leptospirosis) were less likely to be white and less likely to be dog owners. Our results suggest that more public education is needed about rat-associated diseases spread through feces and urine and that exposure to rats can be considered another environmental health burden that is disproportionately persistent in underserved communities.

Education & Outreach – Wednesday, June 7th @ 1:20-3:00 pm

Title: An urban nature center- connecting people to their sense of place and sharing space with city wildlife.
Authors: Amy Greene
Speaker affiliation: Belle Isle Nature Center/Detroit Zoological Society
June 7th @ 1:20 pm
Abstract: The Belle Isle Nature Center in Detroit has been recently renovated to reflect the intersection between humans, infrastructure, and nature. The focus of the exhibits was intentionally shifted to highlight wildlife who share urban spaces with humans in the city. The renovated space features locations from across the city where those featured animals have been spotted living—animals who reflect the true grit of their fellow Detroiters. The interpretives were designed to encourage reflection about shared spaces, amplify urban conservation work and community science, and showcase outreach initiatives and local partnerships built around urban wildlife education

programming. Learn about how we held up the goal of immersive place setting above all else when making design decisions and the strategies we used to ensure the place-making efforts were welcoming for guests. Our interpretive exhibits were designed for updating and expansion- we invite you to join the discussion on how else we can tell the story of urban nature.

Title: Urban Wildlife Damage Management is Wildlife Conservation
Authors: Marcus Mueller, David Drake
Speaker affiliation: Skedaddle Humane Wildlife Control
June 7th @ 1:40 pm
Abstract: High densities of urban-adapted wildlife species regularly come into direct or indirect contact with humans in urban areas. Many times, these encounters are negative in nature and may be the primary type of interaction that people have with wildlife in cites. Human-wildlife conflicts come in many forms, and commonly include economic damage to personal property, including homes, yards, and even pets. Due to an absence of urban wildlife managers, Nuisance Wildlife Control Operators (NWCO's) are the primary resource for assistance with wildlife damage in urban areas. Traditional nuisance wildlife management focuses on removing the individual animal from the problem area via relocation or euthanasia; both short-term solutions. For many species, the relocation process is not successful and simply moves an animal adapted to anthropogenic resources to an area where it either causes another conflict or cannot adequately use the resources around it. Additionally, many urban residents are not supportive of lethal management practices. NWCO's are in a unique educational role because they serve a human population that often has their entire perspective on urban wildlife shaped by a specific conflict situation and may not engage with traditional education and outreach methods. Therefore, NWCO's can foster an appreciation for conservation by increasing the public's wildlife knowledge and tolerance and promote co-existing with urban wildlife. By using tools and techniques focused on solving wildlife conflict situations permanently, minimizing disturbance to local wildlife communities, and educating clients about the reality of living with urban wildlife, NWCO's can play a valuable role in the larger urban wildlife conservation picture.

Title: Using ArcGIS StoryMaps® to Visualize the Story of Wildlife in our Cities
Authors: Adam Rohnke, K. Ann Smithson, John Cartwright, Kate Grala, Nate Vernaske, Rebecca Burks, Gregory Leland, B. Eden Blackwell, Meghan Vona, Marina Denny
Speaker affiliation: Mississippi State University Extension
June 7th @ 2:00 pm
Abstract: Storytelling, especially in digital format, has gained prominence amongst wildlife professionals interested in delivering their research directly to stakeholders and communities they are serving. Digital formats offer better integration of technologies, allowing researchers to reach more diverse segments of the public. A popular platform is ArcGIS Story Map®, created by ESRI (Environmental Systems Research Institute), which combines visualization of data both through cartography and interactive narrative functions such as imagery, timelines, and video. Since 2021, the MSU Extension Jackson Metro Urban Wildlife Project, in partnership with the Urban Wildlife Information Network, has been constructing a multi-phased prototype ArcGIS StoryMaps® as a digital community engagement tool. The primary function of the story map is to communicate the project's purpose, goals, geographic scope, and recent findings through narratives and interactive map tours. Phase 2 builds upon this foundation to illustrate how the city's natural and cultural history has shaped the current wildlife community. This second phase is informed by current and historical natural resource and cultural data (e.g., publicly available print and online sources, City of Jackson Parks and Recreation archival documents, imagery, and maps). Utilizing the historical method, project partners are composing engaging and concise narratives supplemented with data visualization tools to

illustrate the connection between geology, past and current land use, cultural and natural history, and wildlife to the end user for the Jackson Metro and each public green space in which the project currently operates. This presentation will highlight the creative process, partnerships, evaluation plan, and the creation of "how to" tutorials for wildlife professionals potentially interested in using this digital tool. Additionally, the authors will explore the potential of the platform as an urban wildlife decision support tool for homeowners, municipality leaders, and urban planners.

Title: Coexisting on the Urban Interface: Your Backyard
Authors: Dana Stangel
Speaker affiliation: Teranga Ranch Wildlife
June 7th @ 2:20 pm
Abstract: The Northeast Los Angeles area faces wildlife challenges including habitat fragmentation due to freeways, loss of genetic diversity in local mountain lions, a wildlife community saturated with rodenticide, trash that isn't contained, wildlife attractants in most yards, and more. These problems are exacerbated by a lack of community education regarding these hazards, or even how to coexist with wildlife (in part because the California state curriculum/standards do not address native wildlife!). Learn how Teranga Ranch Wildlife, led by Biology teacher Dana Stangel, is addressing these issues in the community by offering educational programs both within the community and on targeted field trips, summer camps, humane interventions in backyard wildlife intrusions, a chicken depredation program and new in 2023, a catio tour designed to educate residents about native wildlife and cats. These localized programs empower people, reduce human/wildlife conflict and engage the community in working together to foster humane coexistence.

Title: The Atlanta Coyote Project
Authors: Christopher Mowry, Larry Wilson
Speaker affiliation: The Atlanta Coyote Project
June 7th @ 2:40 pm
Abstract: We launched the Atlanta Coyote Project (ACP) in 2015 with a three-fold mission: 1) to provide public education and outreach on coyotes and other forms of urban wildlife, 2) to enlist the help of citizen scientists in data gathering, and 3) to conduct scientific research. An extensive website and an active social media presence allow us to be a source of relevant and credible information for those who seek to learn more about coyote populations across the metro Atlanta area. Based on data from Google Analytics, the ACP website is visited 30-80 times per day, but traffic is often much higher, with 300+ visitors on some days, and the site has been visited over 100,000 times since its inception. Our Facebook page has over 6,000 followers and we have received over 2,000 publicly reported coyote sightings through our website. Georgia Public TV/PBS collaborated with us to produce the documentary "Urban Coyotes", which was broadcast nationally and is available for streaming on the PBS website. In 2023, the Georgia Department of Education incorporated the ACP website into a state-wide teacher's resource platform for a lesson on ecological interactions in the 7th grade science curriculum. Through our public outreach efforts, we have recruited a number of citizen scientist volunteers, and we partner with many of the other regional environmental organizations, including Georgia Audubon, Trees Atlanta, and the National Park Service. Our presentation will "Tell Our Story" and will include examples of how we communicate our science to the public, the media, and policymakers.

Symp.: Integr. Mgmt. of Cats – Wednesday, June 7th @ 8:00-10:00 am

Title: Integrated Management of Free-Roaming Urban Cats: Progress and Prospects
Authors: John Boone, Tyler Flockhart, Lisa LaFontaine, Danielle Bays
Speaker affiliation: Great Basin Bird Observatory
Symposium Time: June 7th @ 8:00-10:00 am
Symposium Abstract: Free-roaming outdoor cats are common in many urban areas. This presents concerns about the potential impacts of cats on urban wildlife and about the welfare of the cats themselves. Typical management actions taken to address free-roaming cat issues include both episodic removal and opportunistic sterilization. Neither approach, however, has been particularly effective at reducing cat populations consistently and at scale. Interest is growing in pursuing a more ethical, methodical, and sustained approach to integrated cat management that combines sterilization, selective non-lethal removal, outreach to cat owners, and science-based monitoring and assessment. Over time, this strategy has the potential to achieve significant and well-documented reductions in free-roaming cat populations in targeted areas to minimize predation pressure on urban wildlife species of concern. In addition, by addressing the critical goals and priorities of diverse stakeholder groups, it can reduce and mitigate conflict.

In this symposium, we present several facets of this new approach, including results from implementations of systematic cat counting programs in Washington D.C. and the island of Maui in Hawaii. Collectively, these presentations will provide the audience with a good understanding of the critical components of integrated cat management and the tools and resources available to assist in their deployment.

Title: A vision for integrated management of free-roaming urban cats.
Authors: Lisa LaFontaine
Speaker affiliation: Humane Rescue Alliance, Washington DC
June 7th @ 8:00 am
Abstract: The Humane Rescue Alliance (HRA) is the sole animal services and sheltering organization serving Washington, DC; through its various programs and services, the organization serves all species, including urban wildlife. HRA spearheaded the effort to develop and promote integrated FRC management through its administration of the D.C. Cat Count project and other initiatives. In this presentation, HRA's CEO Lisa LaFontaine will discuss the critical prerequisites and ingredients for integrated cat management, describe HRA's experiences with the D.C. Cat Count coalition, and present a vision for how partnerships and collaboration can help to conserve urban wildlife while also improving the welfare and care of free-roaming cats.

Title: Quantifying free-roaming cat populations: Results from the D.C. Cat Count and Maui Cat Count (part A)
Authors: Tyler Flockhart
Speaker affiliation: Flockhart Consulting
June 7th @ 8:20 am
Abstract: Reliable standardized data are necessary to accurately quantify FRC populations and develop location-specific management approaches and prioritizations. These data also enable effective collaborations by providing stakeholders with an objective basis for evaluating the successes and failures of management initiatives. The D. C. Cat Count project was designed to test, validate, and formalize methods for quantifying FRC populations in urban areas. It also explored the interactions between FRCs, owned cats, and shelter cats using a systems analysis approach. The lessons of the D. C. Cat Count have more recently been used to plan and implement a major cat counting project across the island of Maui, Hawaii, an area noted for both a large FRC population and

significant conservation concerns. In this presentation, Dr. Tyler Flockhart will present selected results from both of these projects and describe their relevance to integrated FRC management, and consider how cat counting results could be used to inform a large-scale, long-term FRC management plan for Maui.

Title: Quantifying free-roaming cat populations: Results from the D.C. Cat Count and Maui Cat Count (part B)
Authors: Tyler Flockhart
Speaker affiliation: Flockhart Consulting
June 7th @ 8:40 am
Abstract: Reliable standardized data are necessary to accurately quantify FRC populations and develop location-specific management approaches and prioritizations. These data also enable effective collaborations by providing stakeholders with an objective basis for evaluating the successes and failures of management initiatives. The D. C. Cat Count project was designed to test, validate, and formalize methods for quantifying FRC populations in urban areas. It also explored the interactions between FRCs, owned cats, and shelter cats using a systems analysis approach. The lessons of the D. C. Cat Count have more recently been used to plan and implement a major cat counting project across the island of Maui, Hawaii, an area noted for both a large FRC population and significant conservation concerns. In this presentation, Dr. Tyler Flockhart will present selected results from both of these projects and describe their relevance to integrated FRC management, and consider how cat counting results could be used to inform a large-scale, long-term FRC management plan for Maui.

Title: Tools and resources to support the integrated management of free-roaming cats. (20 minutes).
Authors: John Boone
Speaker affiliation: Great Basin Bird Observatory
June 7th @ 9:00 am
Abstract: Quantifying and monitoring wildlife populations is common practice in conservation, but it is a relatively novel approach for animal welfare organizations. Our experience in multiple cat counting projects has demonstrated that with proper guidance and support, non-professionals can collect high-quality data in field settings. However, the more technical aspects of cat counting and – such as sampling design and data analysis - require greater expertise and present potential roadblocks to wider use of cat counting. For this reason, partnerships between organizations that are well-positioned to collect data and organizations that have appropriate technical expertise can be highly beneficial. These collaborations work best when all stakeholders share a basic familiarity with topics like goal setting, sampling, data collection, data standardization, and data analysis. In this presentation, Dr. John Boone will describe the resources that have been created to make cat counting more accessible to a wider range of groups and will preview additional resources that are currently in development.

Title: The potential contributions of animal welfare organizations to integrated management of free-roaming cats (20 minutes).
Authors: Danielle Bays
Speaker affiliation: Humane Society of the United States
June 7th @ 9:20 am
Abstract: FRC cat populations are adaptable, fecund, and resilient. In many places, population recruitment by local reproduction is supplemented by immigration and abandonment of pet cats. For

these reasons, FRC populations are challenging to manage at scale. Achieving the best results requires maximizing the impact of every available resource and every possible synergy. Collaborations that assemble complementary skill sets and resources offer perhaps the most realistic opportunity for real progress. In these collaborations, science-based organizations can contribute expertise in population biology, spatial prioritization and targeting, and data analysis. In this presentation, Danielle Bays of the Humane Society of the United States will examine the potential contributions of animal welfare organizations to these collaborations. These include substantial human and financial resources, local familiarity with FRC populations, a direct connection with cat owners and caretakers, and the potential to collect large amounts of standardized field data. In addition, animal welfare groups have a unique potential to pursue integrated FRC management that incorporates sterilization, adoption, support for cat owners to reduce abandonment, and education that promotes better cat care and encourages owners to keep cats indoors. Research suggests that combining these approaches may be one of the most important strategies for making and sustaining progress.

Urban Birds – Wednesday, June 7th @ 10:30am-4:50 pm

Title: The history and future of an urban population of Black-crowned Night Herons in Chicago's Lincoln Park
Authors: Henry Adams, Mason Fidino, Maureen Murray, Seth Magle, Elizabeth Lehrer
Speaker affiliation: Urban Wildlife Institute, Lincoln Park Zoo
June 7th @ 10:30 am
Abstract: When constructed and managed with wildlife in mind, urban ecosystems can provide spaces in which even endangered wildlife may thrive. One such species with a history of success in urban spaces is the Black-crowned Night Heron (BCNH) (*Nycticorax nycticorax*). While abundant throughout the majority of its range, the BCNH is endangered in Illinois and six other Great Lake region states, largely due to habitat destruction and degradation. Fortunately, a productive breeding population of BCNH, one of the largest in Illinois, has found refuge in Chicago's Lincoln Park since 2007. Researchers at the Lincoln Park Zoo's (LPZ) Urban Wildlife Institute (UWI) have been monitoring this population since 2010 and have implemented various management practices on LPZ grounds. We carefully manage nesting habitat, provide significant privacy buffers for nesting adults, and mulch pathways to reduce impact for fledgling juveniles. The BCNH nesting at the zoo have also benefited from the naturalization of major urban green spaces, such as LPZ's Nature Boardwalk, completed in 2010. While there have been fluctuations in BCNH adult abundance year to year, the colony has been steadily growing since 2010. Additionally, the colony's reproductive success has been significantly increasing since 2010. In 2022 we detected 751 adults and 400 juveniles, marking the colony's most abundant and most reproductively successful year since we began monitoring. These population trends are encouraging and could suggest that our management strategies are in some part supporting this endangered population. Additionally, we banded 20 hatch year BCNH in 2022, collecting morphometric and demographic information. By engaging the public through education programming and popular natural history based social media, like iNaturalist, we are excited to monitor their movement with the assistance of the Chicagoland community. In the future, we will continue to monitor this colony, examine individual heron movement behavior, and investigate heron health to understand what ecological factors most impact this urban population and improve our conservation management strategies.

Urban Birds – Wednesday, June 7th @ 10:30am-4:50 pm

Title: Criteria for Implementing Urban Rookery Management at the Municipality Level - A Zoned Management Approach
Authors: Jessica Alderson
Speaker affiliation: Texas Parks and Wildlife
June 7th @ 10:50 am
Abstract: Egrets and herons play an important role in the ecosystem. They help maintain the diversity of other organisms, assist in controlling pests, and are excellent indicators of overall ecological health. Rookeries also provide unique opportunities for birdwatchers, nature enthusiasts and photographers. However, as rookeries continue to develop in urban areas, conflict will arise between humans and wildlife, often resulting in disagreement between community members on how to best manage the perceived conflict. The noise, odor, regurgitated food, large amounts of feces and even deceased birds at the rookery site can be a challenge, especially when located near playgrounds, infrastructure, or other recreational areas. As the number of rookeries occurring in urban areas increase, municipalities should adopt a systemic approach to managing urban rookeries on City owned properties. This approach will provide city staff, park managers, partners, and the general public with a level of predictability of the timing, frequency, and intensity of management practices. An overlay of city-managed properties should be created that delineates zones on which a rookery would impact park operations, negatively impact the public's ability to use park space, and/or affect human health and safety. The designated zones would assist park managers in prioritizing wildlife management actions based on a thoughtful, intentional process that prioritizes park users. These zones, designated as Green, Yellow, and Red Zones, would indicate the level of impact created by the presence of a potential rookery. Each zone is defined by a set of established criteria and includes unique management recommendations based on the zone classification. Certain situations may require an adaptive management approach, thereby necessitating changes in management strategies throughout a nesting season. However, this systemic approach should greatly reduce the number of management decisions that have to be evaluated throughout a nesting season.

Title: Won't You be My Neighbor: Wild Turkey (*Meleagris gallopavo*) Occupancy in the Washington D.C. Metropolitan Area
Authors: Merri Collins, Travis Gallo
Speaker affiliation: George Mason University, University of Maryland
June 7th @ 11:10 am
Abstract: Wild Turkey (*Meleagris gallopavo*) are a galliform native to the Eastern United States. Most turkey research has been conducted within rural ecosystems. Once extirpated from most of its range in the early 1900s, wild turkey populations have rebounded within the last 50 years. So much so, that these birds are viewed as an effective conservation effort success. As possible urban exploiters with a flexible diet, turkeys have begun to move from rural areas into cities across the US, including Washington D.C. Given differences in ecological needs between urban and rural populations, it is important for conservation and management efforts to increase our understanding of how turkey use urban landscapes. We used remotely triggered cameras at 75 long-term study sites across the Washington, D.C. region to assess habitat use. We found that turkeys were less likely to occupy sites nearest to roadways, and with high canopy cover. We also found that turkeys were more likely to occupy sites with lower landscape entropy. Our results add to the understanding of how wild turkeys use novel urban ecosystems and inform future management needs.

Urban Birds – Wednesday, June 7th @ 10:30am-4:50 pm

Title: WILD TURKEY (*M. GALLOPAVO*) OCCUPANCY ACROSS AN URBAN-RURAL GRADIENT IN MONTGOMERY CO. MARYLAND
Authors: Madelyn Jamsa, Matthew Gonnerman, Jennifer Mullinax
Speaker affiliation: University of Maryland
June 7th @ 11:30 am
Abstract: Eastern wild turkeys (*M. gallopavo*) are a game species with a unique natural history in the Mid-Atlantic region specifically, the state of Maryland. Anecdotally, wild turkey sightings are becoming increasingly common in urban landscapes. With a chronic increase in urban sprawl, it is important to understand wild turkey populations dynamics within urbanizing greenspaces. In this study, we evaluated wild turkey occupancy across the urban-rural gradient to understand what proportion of our study sites have a consistent wild turkey presence. As of April 2021, we have been consistently collecting camera data from approximately 98 Boly BG962-X36W cameras located in nine parks varying in rates of urbanization across Montgomery County, Maryland. Wild turkey occupancy varied across the urban-suburban gradient, when accounting for seasonal and site specific covariates, and generally we did not document turkeys in highly urban parks. However, our three suburban study locations observed approximately 118 wild turkey sightings across seven different camera traps. These findings will be useful for wildlife conflict management in these suburban areas as well as providing populations for demographic comparisons to rural turkey populations that are currently in decline.

Title: Shore We Can: Piping Plover Management in NYC
Authors: Katrina Toal
Speaker affiliation: NYC Parks
June 7th @ 1:20 pm
Abstract: Despite what the Ramones may sing, not everyone is hitching a ride to Rockaway Beach. Nearly 115,000 people live on the Rockaway peninsula, many within walking distance of 6.5 miles of city-maintained beach. This stretch of beach is also home to federally threatened piping plovers, state threatened common terns and least terns, and American oystercatchers. Since 1996, NYC Parks has been protecting these shorebirds while ensuring that community members have access to the beach for recreation. In this talk, I will discuss endangered species management at a beach with 4.4 million visitors. Part of that management involves community engagement. We have conducted public perception surveys on the boardwalk to gauge community support for and awareness of conservation measures. Despite widespread support for conservation, this year, we suffered a staggering act of vandalism. While this vandalism was heartbreaking, we continued our planned outreach events to promote coexistence between endangered shorebirds and beach visitors. In 2021, we began collaborating with NYC Audubon, Jamaica Bay-Rockaway Parks Conservancy, and NYC Plover Project on a “Share the Shore” educational outreach program. The goal of this program is to spread awareness in the community about threatened and endangered beach-nesting birds. Five local schools in Rockaway were engaged with educational programs where youth created conservation posters featuring their artwork. This year, 50 designs created by fourth and fifth graders were selected and printed as signs. In total, 100 of these signs were installed on the boardwalk in Rockaway.

Urban Birds – Wednesday, June 7th @ 10:30am-4:50 pm

Title: Vocal behavior and urban avoidance in golden-cheeked warblers inhabiting exurban preserves
Authors: Darren Proppe, Chris Warren, Lisa O'Donnell, Alexandra Yost
Speaker affiliation: St. Edward's University
June 7th @ 1:40 pm
Abstract: The golden-cheeked warbler is a state and federally listed species that breeds exclusively in Central Texas. Its breeding range can be characterized by regions of high- and low-density human development. The 35,000-acre Balcones Canyonlands Preserve (BCP) was set aside as mitigation land for the golden-cheeked warbler in Travis County, a region which is experiencing unprecedented human growth. The BCP is comprised of multiple land tracts, which range greatly in size and configuration. The City of Austin and Travis County, who serve as the primary owners and land managers, have been conducting intensive surveys of warbler use on 100-acre plots since 2009. They have also conducted several collaborative studies, such as an intensive song recording effort led by Chris Warren in 2008-10. We integrated new and previously collected data to assess vocal behavior and urban avoidance in golden-cheeked warblers found on BCP plots. Specifically, we compared B song composition between 2008-10 and 2021-22. Further, we assessed the impact of increasing percentages of impervious surfaces on the likelihood of detecting a golden-cheeked warbler within any particular 100-meter cell within 100-acre survey plots. Our results indicate that golden-cheeked warbler B song composition has changed significantly over time and that the species is strongly averse to impervious surfaces. While the reasons and implications of changing songs require additional exploration, the impact of impervious surfaces clearly supports the continued need for the preservation of large tracts of wildlands to maintain golden-cheeked warbler populations in exurban landscapes.

Title: Mallard nest survival, brood movements, and habitat use in urban Connecticut
Authors: Tracy Rittenhouse, Min Huang, Tracy Rittenhouse
Speaker affiliation: University of Connecticut
June 7th @ 2:00 pm
Abstract: Although mallards (*Anas platyrhynchos*) are known habitat generalists, mallard breeding ecology in urban and exurban landscapes of the Northeast U.S. is poorly understood. Mallard populations in the Northeast U.S. have declined ~30% in the past two decades, and one potential cause for this population decline is changes in habitat availability or quality from increasing urban development. Our objectives were to assess mallard nest survival and brood rearing behavior in Connecticut and to evaluate the effects of urban development on mallard reproduction. In April–July 2021 and 2022, we located and monitored 64 active mallard nests within an urban–rural interface. The public reported 26 of these nests, especially nests located in urban backyards and courtyards. We deployed GPS transmitters on 55 hens prior to nesting and 28 hens during incubation, and we monitored 33 hens as they raised their broods. We estimated nest survival using both field data and GPS transmitter data; nest survival was 0.118–0.121 in 2021 and 0.222–0.339 in 2022, which is within the typically reported range for the eastern U.S. In 2022, we followed 26 hens with broods; 5 broods hatched from nests in building courtyards, 8 from urban/suburban yards, 4 from other developed areas, and 9 from rural areas. 10 out of 23 hens with known brood fate successfully raised at least one duckling to fledge (mean = 3.9 ducklings). Most duckling mortality occurred early in the brood rearing period. Hens demonstrated different brood rearing strategies, and multiple hens made long overland moves with their broods to ponds located 2.5–3 km away from their nest site. Nest

habitat characteristics, hen prospecting behavior, brood habitat use, and brood movement patterns may be related to brood survival. While mallard nest survival in Connecticut is within the typically reported range for the eastern U.S., mallard duckling survival is low. However, ducklings raised in more developed areas had higher survival than those in less developed areas, suggesting that low duckling survival may not be driven by urban development.

Title: Urban Nest Site Use of Burrowing Owls in El Paso, Texas
Authors: Lois Balin
Speaker affiliation: Texas Parks and Wildlife
June 7th @2:20 pm
Abstract: Western Burrowing owl (*Athene cunicularia hypugaea*) populations are declining in many parts of their range due to loss of their natural habitat and lack of suitable nesting burrows. The owls are listed as endangered in Canada, subject to special federal protection in Mexico, and a Species of Greatest Conservation Need in Texas. Many burrowing owls are acclimated to human presence and known to inhabit urban environments in West Texas. Artificial nest systems (ANS) have been used in conservation efforts and management of western burrowing owls to prevent construction impacts, mitigate habitat loss, and study their breeding biology. However, few studies have documented ANS occupancy and reuse inside urban city park settings in West Texas. Texas Parks and Wildlife installed ANS at Rio Bosque Wetlands Park, a large natural-area city park (372-acres) and monitored the ANS and natural burrows for reproductive success and site reuse between 2013-2020. To further conservation efforts of western burrowing owls, it is vital to understand how the owls use smaller city parks in urban regions. Habitat occupancy, reproduction, and site reuse of the owls was monitored in six smaller park settings (5 to 55 acres) within the El Paso City limits from 2019-2022 and compared to Rio Bosque Wetlands Park (2019-2022). Reuse of the smaller inner-city parks from 2019 to 2022 ranged from 83% to 100% while site reuse at Rio Bosque Wetlands Park was 43%. Average number of fledglings at the smaller inner-city parks from 2019 to 2022 ranged from 2.1 to 5.8, while Rio Bosque Wetlands Park averaged 1.7 fledglings. Our results indicate that long-term use of ANS within city park settings has important implications for management and future conservation of this species. However, concerns over conflict with human activities in urban areas requires additional management that addresses major threats at construction sites, high human traffic in city park's recreational fields, unsafe nest sites close to traffic, parking lots, and drainage pipes, and harassment by students in schoolyards. Management strategies to address these concerns will be discussed.

Title: Changes in avian mobbing responses along an urban-rural gradient in southern California
Authors: Benjamin Ewing, Eric Wood, Ari Martinez
Speaker affiliation: California State University Long Beach
June 7th @ 2:40 pm
Abstract: Urbanization is a significant pressure facing organisms today, and it has the potential to greatly alter social information use among species. One example of social information use is the mobbing of predators by potential prey species. We tested the hypothesis that avian mobbing responses change along urban-rural gradients as a function of abiotic and biotic changes along the gradient. To do this we conducted predator simulations by using playback of screech-owl vocalizations accompanied by models at a variety of points along an urban-rural gradient in southern California, USA. We measured noise level, number of individuals and species that exhibited mobbing behavior, community turnover, and the structure of local vegetation. Data was evaluated using generalized linear mixed models. We used an information theoretic approach to evaluate which abiotic and biotic factors best described variation in the dataset to build the model which most

accurately described the observed variation. Our top model for both the number of mobbing species and individuals showed that mobbing responses are influenced by noise levels, local vegetation structure, and the presence of screech-owls in the area. Our results show that the abiotic and biotic changes associated with urbanization can significantly alter anti-predator behavior in birds, and that these changes can alter avian social eavesdropping networks.

Title: Tolerance for urban development varies seasonally for Connecticut birds
Authors: Ketki Samel, Chris Elphick
Speaker affiliation:
June 7th @ 3:50 pm
Abstract: A major focus in community ecology is to identify the mechanisms that structure species assemblages. Habitat factors act as filters, allowing only a subset of the regional pool to persist at a site; a filter's strength is the extent to which its presence reduces the probability of a species' presence. Previous studies suggest that most bird species respond negatively to anthropogenic land cover change, through which naturally vegetated areas become planted or impervious. In temperate regions, urban areas show different characteristics from surrounding areas, including increased temperatures and resources; therefore, filtering may be weaker in winter, when resources are scarce. To test this, we used logistic regression to describe species presence relative to four potential urban filters. Using data from the Connecticut Bird Atlas, we created models for a suite of 85 bird species in relation to four human-related land-cover variables in both summer and winter, and compared the strength of each filter across seasons. Across all species, the impervious-area filter was weaker in winter than in summer, while the farmed filter was significantly stronger in winter. The urban and developed filters showed no significant seasonal pattern.

Title: The ecological legacy effects of redlining on urban landscapes and bird diversity in Durham, NC.
Authors: Jin Bai, Madhusudan Katti
Speaker affiliation: North Carolina State University
June 7th @ 4:10 pm
Abstract: Residential segregation's legacy effect could persist today in many US cities that employed redlining policies by the Home Owner Loan Cooperation (HOLC) in the 1930s. Neighborhoods were categorized into grades from A, B, C to D representing best, still desirable, definitely declining, and hazardous neighborhoods. Here, we examined the ecological legacy effects of redlining on tree canopy cover, vegetation cover, urban heat islands, impervious surfaces, bird occupancy, abundance, and diversity across different HOLC-graded neighborhoods in Durham, NC. We selected urban parks in HOLC zones and a nearby nature preserve as study sites. We randomly generated sampling points for avian point counts (n = 38) with three repeat visits to each sampling point roughly a week apart in June 2022 during the breeding season. We found that tree canopy cover and vegetation cover were significantly higher in higher-graded neighborhoods. The percentage of urban heat islands is significantly higher in lower-graded neighborhoods. We found no significant difference in impervious surfaces between HOLC zones. The Occupancy Modeling results suggested that the predicted occupancy probability of European Starlings is significantly higher in C/D zones. We found no difference in occupancy probability for House Sparrows, Gray Catbirds, and Great-crested Flycatchers. There weren't significant differences in average or cumulative species richness across HOLC zones, but migratory bird species richness is higher in the rural site, and resident bird species richness is higher in C/D zones. We also found that the average, cumulative, and resident bird abundance are significantly higher in C/D zones, but migratory bird abundance is higher in the rural site. Although there is strong evidence for the urban landscape legacy effects (canopy, vegetation,

Urban Birds – Wednesday, June 7th @ 10:30am-4:50 pm

heat island), the connection between redlining and bird diversity is complex, and more environmental control variables are needed to examine the relationship.

Title: The effects of over a century of urbanization on the avifauna of the Los Angeles Basin
Authors: Eric Wood, Sean Lyon, Travis Longcore, Philip Ethington, Linnea Hall, Allison Shultz
Speaker affiliation: California State University, Los Angeles
June 7th @ 4:30 pm
Abstract: Los Angeles, California (L.A.) is a megacity that has experienced a meteoric rise in population and global stature since the early 1900s. The idea of L.A. conjures images of palm trees, beaches, and year-round beautiful weather. Few, however, appreciate the unique biodiversity of the region. Importantly, this has been preserved by a robust natural history record of bird nests and eggs collected during the latter part of the 19th century. The bird nests and egg data from L.A. are novel in that few, if any, cities have such a complete record of biodiversity before intense development. Thus, these data present an opportunity to quantify the temporal effects of urbanization on breeding avifauna, which is important given that birds are indicators of environmental change. To address this opportunity, we used over 7,000 bird nest and egg specimens, housed, and digitized at the Western Foundation of Vertebrate Zoology, coupled with occupancy modeling approaches to characterize the historical avian community of L.A. between 1870 and 1910. We then compared historical patterns of species occupancy with more contemporary patterns, using data from the Los Angeles Breeding Bird Atlas collected from 1995-1999. We found that species affiliated with grasslands e.g., the Loggerhead Shrike (*Lanius ludovicianus*), and freshwater marshes e.g., the Tricolored Blackbird (Agelaius tricolor), which were historically common, have been nearly extirpated from the region. Species affiliated with woodland habitats e.g., the Oak Titmouse (*Baeolophus inornatus*) remain common in foothill communities of the Santa Monica and San Gabriel Mountains, which retain habitat that supports their populations. Taken together, our results suggest that the near-total conversion of grassland and wetland ecosystems in the L.A. region has also, unsurprisingly, negatively affected birds that require those habitats. Restoration projects that restore grasslands and freshwater marshes could likely help return the region's avifauna closer to its historical state.

Urban Mammals – Wednesday, June 7th @ 8:00-11:50 am

Title: Small mammals in the big city: species richness and relative abundance of the small mammal community and implications for urban canids in Madison, Wisconsin
Authors: Morgan Farmer, David Drake, Timothy Van Deelen
Speaker affiliation: University of Wisconsin-Madison
June 7th @ 8:00 am
Abstract: Coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*) are both opportunistic generalists who have adapted to live in urban areas and use human-provided resources. Consumption of human-provided food by coyotes is often a precursor to human-wildlife conflict. Though there has been a recent increase in the number of studies determining urban coyote diet composition, there have been few studies that have surveyed food available to coyotes and red foxes in urban areas, especially natural prey items. As such, our objectives were to determine annual and seasonal availability of select natural prey items in an urban area. We surveyed small mammals at 27 sites throughout the city of Madison, Wisconsin. Each site was snap trapped using mouse- and rat-sized traps for three consecutive nights in October 2021, March 2022, October 2022, and March 2023 at a trap density of 50 total traps per acre. We identified individuals to species, except for *Microtis* spp. and *Peromyscus* spp., and calculated species richness and relative abundance for each site. Overall species richness was seven species, including Eastern gray squirrel (*Sciurus carolinensis*), Southern flying squirrel

(*Glaucomys Volans*), Eastern chipmunk (*Tamias striatus*), *Microtis* spp., Peromyscus spp., short-tailed shrew (*Blarina brevicauda*), and masked shrew (*Sorex cinereus*). Site-specific species richness ranged from 1 to 4 species, with an average species richness of 2.8 species. Relative abundance was both site- and species-specific. Across all sites, Peromyscus spp. had the highest relative abundance (2.72 individuals per trap night) while masked shrew (*Sorex cinereus*) had the lowest relative abundance (0.02 individuals per trap night). Cities can humanely and proactively mitigate canid-human conflict through management of attractants, including natural and human-provided food items. Furthermore, an abundance and diversity of available and used natural and human-provided food could explain the lack of apparent competition and agonistic interactions between urban coyotes and red foxes. The next phase of this project, using DNA metabarcoding to identify food items consumed by urban canids, will allow us to compare food availability and use to determine if coyotes and red foxes prefer natural or human-provided food.

Title: Anthropogenic drivers of color polymorphism in the Eastern Gray Squirrel (Sciurus carolinensis) along urban-rural clines
Authors: Adam Parlin, James P. Gibbs, Bradley Cosentino
Speaker affiliation: SUNY - College of Environmental Science and Forestry
June 7th @ 8:40 am
Abstract: Urban landscapes have unique selection pressures on wildlife that can lead to phenotypic differences within species from morphology to physiology. One unique evolutionary pressure that can drive phenotypic differences is the role of vehicle traffic on animals that live near roads. The eastern gray squirrel (*Sciurus carolinensis*) is an urban adaptor species frequently found along urban-rural gradients throughout North America and occupies habitat integrated with roads. Gray squirrels have two common coat colors, gray or black (melanic), which is inherited in a simple Mendelian fashion, and previous work shows melanism is more prevalent in cities than surrounding rural areas at higher latitudes. To better understand evolutionary processes controlling trait variation along urbanized gradients, we tested the hypothesis that human drivers are acting as a selection pressure on squirrel coat polymorphism. To test this hypothesis, we measured the proportion of each color morph among roadkill to living color morph proportions along an urban-rural cline in Syracuse, New York, USA.We conducted road cruise surveys for one month along a standard urban-rural route during the fall when squirrel activity was high. To determine whether the roadkill squirrels reflected the proportion of gray or melanic living squirrels, we assessed risk of road mortality per crossing and per day. We found the melanic morph was underrepresented among road killed squirrels, with the proportion of melanic squirrels dead on roads being 20% lower than melanics among living squirrels. Correlated random-walk simulations show that there are no significant differences in morph-specific road crossings, yet dead gray colored squirrels were found more frequently during surveys than expected by chance. Our study highlights the influence of traffic on morph-specific mortality in these urbanized environments for a ubiquitous, urban adaptive species. Furthermore, our work demonstrates the potential role of car-related mortality as a selection pressure on differential coat color in gray squirrels by favoring the melanic morph in areas of high traffic volume.

Title: Striped skunk colonization along an urban gradient in Chicago, Illinois
Authors: Anna Kase, Mason Fidino, Elizabeth Lehrer, Seth Magle
Speaker affiliation: Urban Wildlife Institute; Lincoln Park Zoo
June 7th @ 9:00 am
Abstract: The striped skunk (*Mephitis mephitis*) is a North American mesocarnivore that inhabits a wide range of habitat types throughout their distributional range. Most notably, striped skunks can thrive in urban areas, and in some cases have been found in higher abundances in heavily modified

habitats relative to undisturbed habitats. Yet, the extent to how urban tolerant this species is in the face of extreme urbanization is largely unknown. Using data from a large-scale, long-term camera trapping project throughout Chicago, Illinois, we sought to determine whether striped skunk have become more or less urban tolerant in the last decade. We hypothesized that over time striped skunks have colonized areas towards Chicago's city center. To evaluate this hypothesis, we constructed a dynamic occupancy model to determine colonization probabilities of striped skunks across 106 sites throughout the Chicagoland area using 24 seasons on detection data from 2016 to 2021. Overall, we found that colonization patterns, while possibly moving deeper into the city, were far more likely to occur at sites adjacent to areas where skunk were previously detected. Sites that did not have skunk within three kilometers of them in the previous time period only had a 0.11 probability of colonization. Conversely, colonization probability more than doubled (0.27) if a habitat patch within three kilometers had skunk present. Overall, these results indicate that skunk movements throughout urban Chicago are heavily localized, and therefore habitat connectivity for skunks is likely a very important determinant of where skunks are located throughout the city. Likewise, we also saw, on average, that skunks did start to use more urban sites through time, though the average occupancy of skunks was still relatively low over the course of the study (0.35).

Title: Environmental, individual and social traits of free-ranging raccoons influence performance in cognitive testing
Authors: Sarah Benson-Amram, Lauren Stanton, Eli Bridge, Joost Huizinga
Speaker affiliation: University of British Columbia
June 7th @ 9:20 am
Abstract: Cognitive abilities, such as learning and flexibility, are hypothesized to aid behavioral adaptation to urbanization. Although growing evidence suggests that cognition may indeed facilitate persistence in urban environments, we currently lack knowledge of the cognitive abilities of many urban taxa. Recent methodological advances, including radio frequency identification (RFID), have extended automated cognitive testing into the field but have yet to be applied to a diversity of taxa. Here, we used an RFID-enabled operant conditioning device to assess the habituation, learning and cognitive flexibility of a wild population of raccoons (*Procyon lotor*). We examined how several biological and behavioral traits influenced participation and performance in testing. We then compared the cognitive performance of wild raccoons tested in natural conditions with that of wild-caught raccoons tested in captivity from a previous study. In natural conditions, juvenile raccoons were more likely to habituate to the testing device, but performed worse in serial reversal learning, compared with adults. We also found that docile raccoons were more likely to learn how to operate the device in natural conditions, which suggests a relationship between emotional reactivity and cognitive ability in raccoons. Although raccoons in both captive and natural conditions demonstrated rapid associative learning and flexibility, raccoons in captive conditions generally performed better, likely owing to the heightened vigilance and social interference experienced by raccoons in natural conditions. Our results have important implications for future research on urban carnivores and cognition in field settings, as well as our understanding of behavioral adaptation to urbanization and coexistence with urban wildlife.

Urban Mammals – Wednesday, June 7th @ 8:00-11:50 am

Title: Inequity's Cloud: The Bias in Participatory Science Data
Authors: Elizabeth Carlen
Speaker affiliation: Washington University
June 7th @ 9:40 am
Abstract: Scientists have recently pointed to the need to incorporate sociocultural features beyond the physical landscape, such as mold complaints, access to grocery stores, and illegal trash dumping. These features contribute to non-adaptive urban wildlife patterns in ways that have yet to be uncovered and which will provide vital information on how to transform our cities to better support both wildlife and humans. Additionally, urban wildlife are expected to encounter adaptive selection pressures that differ from the surrounding non-urban area. Understanding how phenotypes change in response to the urban environment, and which genes underlie those changes, can provide empirical evidence for rapid evolution and urban eco-evolutionary dynamics, two fields which are in the relatively early stages of development. By understanding the extent of these changes and where in the genome they occur, scientists can build a better model for how urbanization shapes the evolution of wildlife.

Title: Beyond the bottleneck: Contributions of urban adaptation to the loss of genetic diversity in Florida key deer
Authors: George Zaragoza
Speaker affiliation: University of Central Florida
June 7th @ 10:30 am
Abstract: The Florida key deer (*Odocoileus virginianus clavium*) has persisted in the Florida keys for thousands of years despite recent decades of increased urbanization. Historically small population sizes, high levels of inbreeding, and extreme events (e.g. destructive hurricanes) have contributed to a reduction of genetic diversity in key deer compared to their mainland relatives (*O. virginianus* spp.). Despite this loss of diversity, the population size of key deer has increased since the 1950's which parallels the increase in development on the Florida keys. Here, I posit that the contrast between population growth and genetic variation is partially explained by adaptation to urbanization and selection for individuals tolerant to humans. To my knowledge no studies have attempted to identify and describe alleles present in the population that may be aiding species survival against increasing anthropogenic pressure. I focus on answering the following question: Are there patterns of selection in key deer similar to those seen in urban adapted or domestic species? My goal is to search for potentially adaptive alleles by comparing measures of genetic diversity across key deer genomes and identify regions with reduced levels of diversity. To differentiate adaptive processes from inbreeding and bottleneck effects, I will annotate regions potentially under selection, identify gene ontology (GO) terms functionally enriched in this gene set, and compare the genes and GO terms identified with those from previous literature on urban adaptation. These analyses will aid in determining the extent to which urban adaptation, particularly adaptation to human presence, is contributing to the loss of genetic diversity in key deer. Our results will also enable wildlife managers to identify the types of human-key deer interactions potentially detrimental to the future genetic viability of the species.

Title: Does differential crypsis help explain urban-rural clines in coat color for eastern gray squirrels (*Sciurus carolinensis*)?
Authors: Jess Proctor, Bradley Cosentino, James P. Gibbs
Speaker affiliation: SUNY ESF
June 7th @ 10:50 am
Abstract: Animal color has evolved in many species for camouflage that affects fitness. Environmental change in cities may alter the degree of background matching for different color

morphs, generating urban-rural clines in color morphology. Eastern gray squirrels (*Sciurus carolinensis*) show urban-rural clines in coat color, with the melanic morph common in cities and the gray morph more common in rural environments. We compared the degree of crypsis between color morphs in urban and rural environments, including old growth forests, secondary forests, urban yards, and roads. Gray and melanic taxidermied mounts were photographed in identical locations in replicate sites for each environment (n= 70 unique sites) over three seasons and for squirrels positioned aerially and at ground level. We developed an online citizen science game, "SquirrelSpotter", to measure crypsis (detection times) of squirrel color morphs in each environment. Based on >200 unique game players, we found the melanic morph was detected faster than the gray morph in all environments. We are quantifying the degree of background matching of each color morph in each environment to corroborate the detection time findings. Detection time results suggest coat color may be important in mediating visual detection by human observers and predators, favoring the camouflaged gray morph in rural woodlands and the conspicuous melanic morph on roads where squirrels are at risk of vehicular collisions. Overall our study suggests coat color mediates background matching, and that altered camouflage may be an important mechanism of urban adaptive evolution.

Title: Urbanization and predator avoidance alters diel activity patterns of breeding mule deer (*Odocoileus hemionus*)
Authors: Austin Green, Mary E. Pendergast, Emily Young, Aida Sinks, Danielle Terry, David Blount, Isabelle Hughes, Moani Tuitupou, Taylor Alexander
Speaker affiliation: University of Utah
June 7th @ 11:10 am
Abstract: With continuing urbanization and rapid land conversion to suburban and exurban landscapes increasing the distribution of wild-urban interfaces worldwide, it is important to understand how wildlife behavior changes in response to urbanized landscapes. In this light, it is critical that scientists understand how the makeup of these landscapes alters wildlife community structure and ecological interactions, with an emphasis on including them in conservation planning and initiatives. In this study, we investigated the effects of urbanization on mule deer (*Odocoileus hemionus*) temporal activity in both fawning and non-fawning populations. Specifically, we used data from a large-scale citizen science camera trapping project to investigate how activity in mule deer populations is altered by urbanization and how differential response across populations influences predator-prey interactions. We found that fawning mule deer altered their temporal activity in response to urbanization more than non-fawning deer. We also found that fawning mule deer decreased activity at sites where coyote were more present, providing a potential explanation for their altered patterns in urban areas. The results of this research have direct implications to mule deer management and ecology in urban areas.

Title: Natural selection on coat color in eastern gray squirrels (*Sciurus carolinensis*) along an urbanization gradient
Authors: Bradley Cosentino, John Vanek, James P. Gibbs
Speaker affiliation: Hobart and William Smith Colleges
June 7th @ 11:30 am
Abstract: In an era of unprecedented global change, understanding how urbanization affects the evolution of life is a frontier in biology. Urban areas are the fastest growing ecosystem on Earth, and environmental change in cities can drive the evolution of novel adaptations. Although phenotypic differences between urban and rural wildlife populations are well-documented, the evolutionary processes controlling trait variation along urbanization gradients are less clear. Differentiating

between adaptive and non-adaptive processes requires examining the fitness consequences of trait variation, and few studies have linked urban-rural differences in phenotype to fitness. We used spatial data on trait variation and field-based measurements of fitness to test for natural selection on coat color of eastern gray squirrels (*Sciurus carolinensis*) along an urbanization gradient in Syracuse, NY. Eastern gray squirrels have two common color morphs – gray and melanic – inherited in a Mendelian fashion. We first used camera traps and visual surveys at 76 sites to test for a cline in melanism along the urbanization gradient. We then translocated 77 squirrels and used radiotelemetry to compare survival between color morphs in urban and rural populations. Using a novel hierarchical model integrating detection and count data, we found a significant urban-rural cline in melanism. The proportion of melanic squirrels decreased from 50% in the city center to 10% in rural woodlands 25 km from the city. A Cox proportional hazards model revealed a significant interaction effect between color morph and environment on survival. Survival was significantly lower for radiotracked melanics than the gray morph in rural woodlands, whereas there was no difference in survival between color morphs in the city. These results suggest the cline in melanism is explained at least in part by natural selection favoring the gray morph in rural woodlands. Our study illustrates how trait variation between urban and rural wildlife populations can emerge from selection primarily in rural environments rather than adaptation to novel features of the city. Moreover, our work underscores the importance of linking trait variation to fitness in mechanistic studies of urban evolution.

Human Dimensions – Wednesday, June 7th @ 1:20-4:50 pm

Title: What informs human-nature connectivity? An exploration of factors in the context of urban park visitors and wildlife
Authors: Sheryl Hayes Hursh, Elizabeth Perry, David Drake
Speaker affiliation: UW Madison
June 7th @ 1:20 pm
Abstract: Human-nature connectivity (HNC) is a concept derived from research investigating the formulation and extent of an individual's identification with the natural world. This ideology is often characterized as an emotional bond to nature that develops from an individual's physical and contextual interactions, beginning in childhood. As global urban populations increase, there is growing recognition of the potential of nature-based urban green space to cultivate HNC and thereby shape the environmental identity of urban residents. Additionally, an expanding body of research has examined the extent of HNC associated with individuals who intentionally visit urban green space, particularly public parks. Using online survey results from 560 visitors to three community parks (managed primarily to provide a variety of physical and social opportunities) and three conservation parks (managed to protect native plants and wildlife) in Madison, WI, USA, we evaluated HNC as a function of factors within four categories, (1) wildlife species knowledge and sentiment pertaining to six common urban mammals, (2) park experience: main reason for visitation, prior visitation, length of visit, and distance of park to residence, (3) number and frequency of childhood and adult recreational experiences with nine recreational activities: bird watching, camping, canoeing/kayaking, fishing, gardening, hiking, hunting, nature photography, and picnicking, and (4) park visitor demographics: age category, educational level, and gender. Human-nature connectivity was measured using the abbreviated six item short form of the Nature Relatedness Scale (NR-6). Linear mixed effects models containing each factor within the four categories were separated into two model sets: community and conservation park respondents. We hypothesized that HNC would be significantly, positively associated with higher species knowledge and positive species sentiment, greater number and frequency of childhood and adult recreational experiences, "nature" as the main reason for visitation, greater prior visitation, greater length of visit, residence closer to the survey park, to

respondents who are older, female, and/or have a higher degree of education. Across park respondent groups, the number and frequency of childhood and adult recreational experiences significantly predicted HNC. For community park respondents, higher positive sentiment toward species, "nature" as main reason for visitation, greater length of visit, and age category also significantly predicted HNC. For conservation park respondents, higher species knowledge, greater prior visitation, and age category also significantly predicted HNC. This research supports the positive association between the number and frequency of childhood and adult recreational experiences, while providing evidence for differences in the expression of HNC associated with particular attributes of urban park visitors and their interactions with wildlife.

Title: What we think of urban wildlife: Perceptions of citizens and decision-makers
Authors: Simon Moesch, Dagmar Haase, Jonathan Jeschke, Stephanie Kramer-Schadt, Tanja Straka
Speaker affiliation: Humboldt Universiy of Berlin
June 7th @ 1:40 pm
Abstract: Citizens view wildlife in urban areas very differently: While some animals are seen as enrichment to cities, others are connected to damage caused to human property. Decision-makers from administration, nature protection, and hunting have the upper hand to shape human-wildlife relationships in cities and foster conflict-free coexistence. The question arises whether there is alignment between the views of citizens and decision-makers, and where there is disagreement. In this study, we undertook an online survey with the German public (n=2.997) and, in addition, semistructured interviews with stakeholders involved in wildlife management in all four German cities (n = 36): Berlin, Hamburg, Munich, and Cologne. The aim was to assess perceptions about urban wildlife with a focus on mammals and their management. The "big seven", i.e. the most frequently mentioned mammals in urban areas were: foxes, wild boars, martens, raccoons, beavers, squirrels, and hedgehogs. Citizens and decision-makers agreed on wild boars as being the least preferred mammal in urban areas, while hedgehogs and squirrels are most preferred by citizens, but did not necessarily receive the same attention among decision-makers. According to decision-makers, the benefits of urban wildlife include the joy of observation or the reconnection to nature, which are rather linked to wildlife in general, whereas conflicts are connected to certain species, like car damage through martens or garden damage through wild boar; these can also be quantified and monetized. Citizens also connected wild boars and raccoons to damage, but listed more animals as preferred as the decision-makers. In conclusion, undesired animals need to be managed adequately, while preferred animals can be excellent ambassadors to educate citizens about environmental topics.

Title: It's not just noise: the consequences of inequitable noise for urban wildlife
Authors: Karina Sanchez, Jasmine Nelson-Olivieri, Tamara Layden, Edder Antunez, Ali Khalighifar, Monica Laskey, Theresa Laverty, Graeme Shannon, Steven Starr, Anahita Verahrami, Sara Bombaci
Speaker affiliation: University of New Hampshire
June 7th @ 2:00 pm
Abstract: Understanding the extent to which systemic biases influence local ecological communities is essential for developing just and equitable environmental practices. With over 270 million people across the United States living in urban areas, understanding the socio-ecological consequences of racially-targeted zoning, such as redlining, provides crucial information for urban planning. There is a growing body of literature documenting the relationships between redlining and disparities in the distribution of environmental harms and goods, including inequities in green space cover and pollutant exposure. Yet, it remains unknown whether noise pollution is also inequitably distributed,

and whether inequitable noise is an important driver of ecological change in urban environments. We conducted 1) a spatial analysis of urban noise to determine the extent to which noise overlaps with the distribution of redlining categories and 2) a systematic literature review to summarize the effects of noise on wildlife in urban landscapes. We found strong evidence that noise is inequitably distributed in cities across the United States, and that inequitable noise may drive complex biological responses across diverse urban wildlife. These findings lay a foundation for future research that advances acoustic and urban ecology by centering equity and challenging systems of oppression.

Title: Yes, in My Backyard: Welcoming Wildlife in HOA Communities
Authors: Nancy Lawson
Speaker affiliation: The Humane Gardener, LLC
June 7th @ 2:20 pm
Abstract: It happens too often and in too many communities around the country: Responsible, environmentally conscious homeowners take the important step of converting their lawns to native plants, only to be reprimanded by their homeowners association for growing “weeds,” leaving stalks up for birds, or refusing to use pesticides. Purporting to protect property values, many HOAs have perpetuated the myth that people and wildlife cannot coexist in residential communities. And their reach and impact is staggering: In 2021, nearly 83 percent of newly constructed homes in the U.S. were in communities run by homeowners associations, and more than half of all homeowners—across 40 million houses and condos—lived in HOA communities. That’s a lot of land, a lot of people, and a lot of animals beholden to attitudes and policies that are often outdated and harmful. But even in an HOA, wildlife-friendly landscaping doesn’t have to be DOA. This presentation will discuss preemptive strategies and effective responses when making cases for wildlife habitat in HOA communities, as well as simple ways to convert landscapes into spaces that will please both humans and wild neighbors. It will include tips for handling intractable HOA boards, exploring a landmark case in Maryland that is already having national impacts and led to the passage of a state law in 2021 that prohibits HOAs from mandating turfgrass and requires them to allow wildlife-friendly gardens.

Title: Wildlife Rehabilitation in the Nation’s Capital: Engaging Urban Residents with Nature
Authors: April Linton, Jim Monsma, Anne Lewis, John Hadidian, Lisbeth Fuisz
Speaker affiliation: City Wildlife
June 7th @ 2:40 pm
Abstract: An urban wildlife rehabilitation center does much more than provide direct care to wild animals in need. It engages the community through public-facing activities: one-on-one information sharing, organized education programs, and, in coalition with other local environmental groups, advocacy for the consideration and accommodation of local wild animals. This talk will focus on how City Wildlife has accomplished community engagement, what some of the challenges have been, and what some of the future opportunities may be.
City Wildlife is the District of Columbia’s sole licensed wildlife rehabilitation facility, opening in 2013 to accept injured and orphaned wildlife with the intent to nurse for return to the wild. To date, City Wildlife has provided emergency and critical care to more than 10,000 animals of more than 100 different species, many of which are categorized as Species of Greatest Conservation Need in the District of Columbia. Beyond providing direct care, City Wildlife maintains an active phone bank to assist callers on resolving conflicts with wildlife, runs two major citizen science programs (Lights Out D.C. and Duck Watch), and engages in numerous educational, outreach, and advocacy activities. The Washington, D.C. metropolitan area, covering slightly more than 68 square miles, has some 700,000 residents,. This population, as befits the nation’s capital, is highly diverse, making it a challenge to work effectively with the different publics to address their needs and concerns about

wildlife. To help meet the needs of animals and the various communities it serves, City Wildlife has developed and continues to strengthen relationships with various institutions, both governmental and non-governmental, such as the District of Columbia's Department of Energy and Environment (DOEE), the National Park Service (NPS), and the Humane Rescue Alliance (HRA). As almost a third of the District is comprised of land under federal jurisdiction, City Wildlife interacts frequently with NPS. HRA provides direct wildlife services, working closely with City Wildlife to transport wildlife as well as direct city residents to our services. Moreover, our two citizen science projects, Lights Out DC and Duck Watch, have engaged community members, built alliances with local nonprofits, and worked with governmental agencies to effect change to benefit urban wildlife. In a November 2021 article in Urban Ecosystems, Loren B. Byrne encourages ecologists to seek partnerships with community groups but warns that they "… may not be able to develop or participate in extensive, formal partnerships…" and that "…local stakeholders may not feel comfortable in formal academic and political settings…". As a result, "… a broader array of approaches needs to be identified, developed and shared." [Byne, LB (2021) Ecology with Cities, Springer, New York] The City Wildlife model suggests that reaching out to urban wildlife rehabilitation centers may be a good place for ecologists to start. In an urban setting, a wildlife rehabilitation center may well be the organization best poised to engage and spur the public's interest in and concern for wildlife.

Title: Public Attitudes Towards Urban Wildlife in Metro-Atlanta
Authors: Kaitlin Goode, Mahi Puri, Elizabeth Pienaar, Tina Johannsen
Speaker affiliation: Georgia Department of Natural Resources
June 7th @ 3:30 pm
Abstract: Managing human-wildlife interactions (HWI) in urbanized environments is an increasing concern for wildlife management agencies. In 2019, Georgia Department of Natural Resources created the Urban Wildlife Program to address HWI in metro-Atlanta by responding to on-going wildlife issues and proactively prevent negative HWI through outreach. We conducted a two-part human dimensions study in metro-Atlanta to gather information to drive our outreach efforts and measure the Program's success. Part one of the study measured residents' wildlife tolerance level of different species or species groups. Part two of the study measured support for why agencies do not relocate conflict wildlife, and willingness to engage in appropriate measures to mitigate conflicts with wildlife. In 2022, we surveyed 1,006 residents of metro-Atlanta. We found respondents' tolerance for species included in the survey depended on their attitudes and emotional response towards the species, how they had interacted with the species, whether they perceived that they could manage conflicts with species, whether they believed that humans and wildlife can coexist, and demographics. Respondents' risk perceptions (e.g., disease transmission) did not influence their tolerance for the species. We found respondents were more likely to manage or tolerate conflicts with wildlife if they agreed with messages about why relocation is not feasible, in particular if they were presented with animal welfare consequences of relocation, adverse consequences of relocation for conflict wildlife, or wildlife agencies focus on managing entire populations of wildlife not individual animals. Messaging about the economic costs of relocation did not influence respondents' expectations that wildlife should be relocated. Our results highlight the importance of using urban wildlife outreach to generate or reinforce positive attitudes towards wildlife. We plan on using this information to assist frontline staff in providing technical assistance to customers calling with wildlife issues and to create targeted species messaging for metro-Atlanta residents.

Human Dimensions – Wednesday, June 7th @ 1:20-4:50 pm

Title: Perceptions and attitudes to understand human-wildlife conflict in an urban landscape – a review
Authors: SAYANTANI BASAK, Ekaterina Rostovskaya, Johnny Birks, Izabela A. Wierzbowska
Speaker affiliation:
June 7th @ 3:50 pm
Abstract: Substantial research and conservation resources are invested to study, protect, and manage human-wildlife conflicts (HWC) globally. But there are few scholarly investigations that focus on such conflicts in urban areas, and fewer still focus on the perceptions of urban residents about HWC. Reviewing all studies published globally (n = 124), we investigated the nuisance urban wildlife and the associated conflicts reported by human residents. We then presented an analysis of thematic patterns, trends, and biases with a focus on opportunities for future studies with reference to the need for longitudinal research. Results suggested that most studies were carried out in North America, addressed species-level issues, mostly mammals. Among the 165 taxonomical groups studied, the majority were omnivores (n = 67), closely followed by carnivores (n = 50) and herbivores (n = 40). Bears (brown, black and sloth bear; Ursus spp., Melursus ursinus) were the most conflictual species followed by grey wolf (*Canis lupus*) and coyote (*Canis latrans*). Lack of longitudinal research in understanding the urban wildlife population trends and shifts in human perception and attitudes was a key finding. Therefore, if research is not supplemented by long term follow-up studies, resolution of HWC in urban areas will be under evaluated. Furthermore, researchers should consider integrating quantitative and qualitative research methods, such as in-depth or focus group interviews to understand motivations or perceptions to present a holistic picture for urban wildlife conservation. Considered together, we believe this study can serve as a guide for planning future research, for amplifying the overall profile of HWC in urban landscapes, which can be applied globally as a means to resolve or minimise HWC.

Title: Negative emotions predict risk perceptions towards wildlife disease
Authors: Mikiah Carver-McGinn, Nils Peterson, Justin Beall, Lincoln Larson, Christopher Moorman, Mikiah Carver-McGinn, Nathan Hostetter, Moriah Boggess
Speaker affiliation: U.S. Geological Survey, North Carolina Cooperative Fish and Wildlife Research Unit
June 7th @ 4:10 pm
Abstract: People often respond to risk emotionally rather than analytically, and emotion-based reactions are the fastest unconscious drivers of human decisions. To understand how emotions affect risk perception of wildlife diseases, specifically tick-borne illnesses, Chronic Wasting Disease (CWD), and COVID-19 in deer, we surveyed residents of Durham County, North Carolina, asking participants to rank the extent to which a list of emotions would reflect how they would feel if they saw a deer on their property. To measure risk perceptions, participants indicated how much risk they associated with a list of scenarios, such as being exposed to deer infected with COVID-19 or CWD. We assessed positive emotions (curiosity, surprise, and calm) and negative emotions (fear, sadness, anger) to determine if emotions predict perceived risk of contracting a disease from wildlife. We built three regression models using the following independent variables: emotional response, age, income, and level of education, with risk of exposure to wildlife disease as the dependent variable. Each model predicted risk perception for a specific type of wildlife disease (tick-borne, CWD, and COVID-19). Negative emotions tended to predict higher risk perceptions towards exposure to wildlife disease. Of the emotions, anger was the strongest predictor of perceived risk: $\beta = 0.349$, $p < 0.003$ for being exposed to deer that carry ticks with disease; $\beta = 0.196$, $p < 0.083$ for being exposed to deer infected with CWD; and $\beta = 0.224$, and $p < 0.035$ for being exposed to deer infected with COVID-19. Perceived risk of being exposed to wildlife disease was twice as high for respondents who fell under

the “extremely angry” category, compared to respondents within the “not at all angry” column. On average, respondents ranked being exposed to deer that carry ticks with disease as moderately risky, with a mean of 3.356 on an eight-point scale. In comparison, exposure to deer infected with CWD ranked as somewhat risky with a mean of 2.225, and exposure to deer that carry ticks infected with COVID-19 ranked as slightly risky with a mean of 1.641. The proportion of respondents who reported strong feelings varied with each type of emotion. Overall, 84.97% of respondents fell in the “not at all negative” category and 3.7% respondents within “extremely negative”, with the remainder falling in the middle. For anger specifically, 5.8% of all respondents were extremely angry while 76.6% fell within the “not at all angry” category. These results indicate wildlife managers can reduce public risk perceptions by working to reduce negative emotions associated with wildlife species such as deer. Future research is needed to identify links between emotions, risk, and public support for wildlife disease management actions.

Title: Stories of Wildlife in our Cities: Listening to our Municipalities
Authors: Meghan Vona, Adam Rohnke, Marina Denny, Nate Vernaske, B. Eden Blackwell, K. Ann Smithson
Speaker affiliation: Michigan State University
June 7th @ 4:30 pm
Abstract: Understanding municipal officials' values and attitudes towards urban wildlife, current urban wildlife-related interests and issues, related technical and logistical barriers, and identification of future urban wildlife-related educational and outreach needs can inform Mississippi State University Extension programming for these stakeholders and affiliated parties. To that end, the authors conducted a needs assessment of municipality officials regarding urban wildlife in the Jackson, MS metro region, utilizing focus groups to collect data from three of six municipalities in the Jackson metro region. During summer 2022, three focus groups were conducted in the cities of Jackson (n=3 participants), Ridgeland (n=4 participants), and Pearl (n=3 participants) Mississippi. Participants included municipal employees who frequently manage urban wildlife or impact human-wildlife interactions through their daily decisions and duties within the units of animal control, parks and recreation, city planning, and public works for each municipality. Elected and upper administration officials were excluded from the sampling frame to encourage participants to speak freely during the sessions. Focus group participants also completed a wildlife values orientation survey, which captured their individual wildlife values and perceptions of wildlife and human-wildlife interactions. The authors analyzed each focus group to identify overarching themes and patterns that could inform initial extension program planning and future quantitative-based research such as resident surveys. Preliminary analysis of the transcripts revealed that some of key challenges regarding urban wildlife and human-wildlife interactions faced by the participants in their respective municipalities are political boundaries, need for employee knowledge and training, lack of citizen knowledge, insufficient educational and financial resources, and barriers to communication at the municipality, state, and citizenry levels. During this presentation we will present more complete findings from the focus groups, initial steps to addressing some of the more immediate challenges identified by the participants during this process, and the long-term Extension program plan to meet the needs of the municipalities regarding urban wildlife in their communities.

Poster Symposium - June 6th @ 4:00-6:00 pm

1. **Title: Is the canid community the community's canids? Assessing the role of citizen science to learn about urban canids**
   Authors: Neville Taraporevala, Julie Young, Jon P. Beckmann
   Speaker affiliation: Department of Wildland Studies, Utah State University
   Abstract: Coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*) are two charismatic yet controversial carnivores commonly found in urban areas due to their ability to readily exploit anthropogenic food sources and environments. However, urban canids can pose a threat to humans through disease and direct attacks on people and their pets. In order to properly manage human-canid interactions, it is important to understand how wild canids use urban spaces. This typically involves intensive fieldwork, such as the use of GPS collars and camera traps. Citizen science provides an alternative way to learn, while simultaneously engaging and educating local residents. Several projects in North American cities have started using sighting reports to build maps of canid-human interactions, but voluntary reporting may have biases as to who and what is reported. We know little about whether these different ways of collecting data provide equivalent information. Our study will test how data from reported sightings compares to data collected from GPS collars and camera traps on urban canids in Wichita, Kansas. We will set up a website for community members to report their sightings of canids. We will also track coyotes and red foxes with GPS collars and a camera grid. We will then compare these data collected at the same time from each of the methods. This study will inform whether low cost citizen science data (sightings websites) can provide comparable results to data from more invasive methods. If comparable, more cities should be encouraged to use citizen science as a useful tool for urban canid management.

2. **Title: Wisconsin Night Guardians for Songbirds: Community driven research & advocacy around urban bird collisions**
   Authors: Amanda Tokuyama, Maggie Steinhauer, Timothy Vargo
   Speaker affiliation: Urban Ecology Center
   Abstract: The City of Milwaukee is situated along the western shore of Lake Michigan, which is an important migration corridor for hundreds of bird species. Downtown Milwaukee poses a threat to migrating birds during the day as most buildings have glass exterior and at nighttime when lights interfere with their ability to navigate. As this area continues to see increased development activity, particularly with the construction of many new high-rises, collisions will continue to be a prominent issue left unmitigated. For over a decade, the Wisconsin Humane Society has coordinated the Wisconsin Night Guardians for Songbirds (WIngs), a monitoring program at several locations where nighttime bird collision mortality has been documented. In 2023, the Urban Ecology Center hopes to better understand this issue by supplementing the WIngs program through a targeted, rigorous and community-driven study, which will increase engagement with land owners as well as data stewardship and visualization. We have identified 3 buildings in the downtown Milwaukee area that community scientists will monitor during peak migration seasons from April 15th through May 30th and September 1st through October 15th. Data collectors will walk the footprint of each building each morning along a transect 6 feet from the base, scanning 6 feet to each side for dead or injured birds. Species, disposition, time, and location will be recorded to iNaturalist/survey 123. Injured birds will be taken to the Wisconsin Humane Society Wildlife Rehabilitation Center for assessment and care as needed. At the end of each season, collected data will be compiled and analyzed, identifying particular areas of each building that are hotspots for collisions. We will then share these results with site facilities, researchers and the general public to bring awareness to this issue and promote the creation of bird-friendly buildings.

Poster Symposium - June 6th @ 4:00-6:00 pm

3. **Title: Building a Community Science Initiative to Prevent Human-Wildlife Conflict in Washington, D.C.**
   Authors: Deanna DePietro, Raina DeFonza, Megan Draheim, Mrunal Bhalerao, Josh Mills
   Speaker affiliation: The District Coyote Project
   Abstract: The first recorded sighting of a coyote (*Canis latrans*) in Washington, D.C. was in 2004. Since then, reported conflict between humans and coyotes in D.C. has been minimal, highlighting an opportunity to proactively promote coexistence with the growing coyote population. The District Coyote Project (DCP) is a small, all-volunteer team whose primary goal is to combine ecological research with public outreach and education. DCP is formulating an outreach model to engage D.C. residents, spread canid awareness, and enable early conflict response. Limited resources necessitate a novel approach. DCP's Coyote Ambassador Project team will train volunteer residents to serve as Ambassadors throughout D.C. In this role, Ambassadors will conduct canid education and outreach activities and promptly notify DCP of conflict reports in their neighborhoods. The mutually beneficial project will empower Ambassadors to promote coexistence through the sharing of information. Leveraging community networks will enable broader reach and bidirectional information sharing between DCP and the public. Ultimately, this will protect the safety and well-being of both humans and wildlife. Our project scope is three-pronged: recruit, train, and provide ongoing support to Ambassadors across the city. D.C. is among the most ethnically, linguistically, and socioeconomically diverse cities in the nation. Nearly 24% of D.C.'s acreage is dedicated to parkland, and 98% of D.C. residents live within a 10 minute walk of a park. DCP aims to recruit Ambassadors representative of the city's diversity in all eight wards. Training will equip volunteers with the necessary knowledge and tools to serve as trusted messengers. DCP will maintain communication with Ambassadors and provide continuous training and resources. The Ambassador Project will add to the growing cache of community science initiatives developing across the nation. These projects have the potential to facilitate ecological research, connect the public and scientific communities, and decrease human-wildlife conflict.

4. **Title: From Data Points to Vector Lines: Using animation and education to communicate science**
   Authors: Katherine McGrath
   Speaker affiliation: Le Moyne College
   Abstract: The conservation of endangered species may be hindered by ineffective science communication and lack of ability to gain public support. Communicating issues currently effecting wildlife in a way that brings public support and action relies heavily on the use of media, from popular articles to short videos. Anthropomorphism is one way in which this can be done, although the use of it must be balanced by also showing the true nature and behaviors of the animal as to prevent over anthropomorphizing. I researched and created an animation showcasing the current threats that tigers face in the wild. The animation uses minor anthropomorphism through the exaggeration of facial expressions and body language along with natural behaviors as to create a connection to the tiger shown and promote action by the public. Alongside this animation I also analyzed two of the major conservation groups behind India's tiger conservation, the National Tiger Conservation Authority and the World Wildlife Fund for Nature. From this information the public can also educate themselves on who they would support and how well those organizations have done in their efforts to preserve the species. Ultimately, both groups have done major work in the conservation of habitat and the dealings with human-wildlife conflicts but must focus more on the genetic conservation of the tiger in the coming years. The main objective of this project is to educate the public through both a media piece that catches attention and a paper that educates

on the finer details. Animation and other media that include art allows the communication of possibly complex issues in ways that are understandable and promotes action.

5. **Title: Rat numbers increasing in cities around the world based on public reporting data**
   Authors: Libby McCoy, Jonathan Richardson
   Speaker affiliation: Georgetown University
   Abstract: Urban rats (genus *Rattus*) are a notorious set of invasive pest species that damage property, consume and contaminate food resources, and transmit dozens of zoonotic diseases. These rats thrive in cities by exploiting the resources accompanying high human population density, and billions of dollars are spent every year to control their numbers. Yet almost no information exists on whether these control efforts are working, and what long-term trends might exist for urban rats. This is likely due to the difficulty of surveying population sizes via traditional surveying and trapping efforts. However, many cities operate offices and web applications where the public can report rat sightings and request city services. Here, we use trend and time series analyses of public complaint data in 13 cities around the world to determine if there are indeed any statistical changes and trends in rat numbers over the last decade or more. Nine of the 13 cities assessed (69%) had significant increasing trends in rat numbers, including New York City, Chicago and Washington D.C. Three of 13 cities (23%) had significant decreasing trends (e.g., Tokyo and Saint Louis), while rat numbers in one city remained the same throughout the study period (6%; Dallas). Increased rat sightings over time were most strongly linked to the long-term temperature trends, indicating a potential role for climate warming in rat population growth.

6. **Title: Temporal and Spatial Patterns of Butterfly Diversity and Abundance in Harrisonburg, Virginia USA**
   Authors: Amy Goodall, Chase Briles, Patrick Cuccias, Bayan Waters
   Speaker affiliation: James Madison University
   Abstract: Butterflies can serve as a teaching tool to learn about biodiversity and the importance of conservation. In partial fulfillment of a James Madison University undergraduate advanced biogeography course offered each fall semester 2017 – 2022, students surveyed butterflies from late August through mid-October within the city of Harrisonburg, Virginia USA. Students learned species identification, survey methods, and reported observations of butterflies within city park meadows and woodlands, public elementary school gardens, university meadows, and arboretum gardens. Through time, the surveys resulted in a robust set of data about butterflies in Harrisonburg as well information about how students tend to collect and manage butterfly survey data. We studied butterfly diversity survey reports that were submitted by 30 biogeography teams of 2 – 4 students, during fall semesters over 6 years. Our objectives were to list butterfly species of Harrisonburg and to look for temporal and spatial patterns in butterfly diversity and abundance as reported across 12 study areas. We found that students confirmed observations of 51 butterfly species from 5 families. Species most observed were cabbage white (*Pieris rapae*) and sachem (*Atalopedes campestris*). There were year-to-year differences in abundance of some species such as the monarch (*Danaus plexippus*) and common buckeye (*Junonia coenia*), across some sites. Through the reported vegetation surveys and our use of remote sensing, our findings suggest that local (50m from center of study area) and landscape scale (1000m from center of study area) habitats are important for butterfly diversity in an urban environment. Study areas with greater butterfly diversity and abundance had a greater density of flowering plants at a local scale and greater connectivity among habitat patches at a landscape scale. We report findings and include our methods to normalize data for survey effort, and to filter potential data biases.

Poster Symposium - June 6th @ 4:00-6:00 pm

7. **Title: Assessing the impact of Homeowner Association Codes, Covenants, and Restrictions on Residential Land Management**
   Authors: Madeline Carr
   Speaker affiliation: University of Wisconsin-Madison
   Abstract: Homeowner's associations (HOAs) have become one of the most prominent governance structures regulating private land in the United States. HOAs can regulate property use and neighborhood behaviors through codes, covenants, and restrictions (CCRs). CCRs offer an opportunity for neighborhood-level governance requiring more sustainable landscaping from residents, therefore their role in influencing HOA member yard decisions is needed.This study uses content analysis of CCRs and yard composition surveys to address the question of how homeowners comply with sustainable landscaping clauses. Surveys were conducted in HOA and non-HOA neighborhoods in Dane, county WI. HOAs were included in the study if their landscaping CCRs had language requiring native plant species. Data was collected on front yard composition and analysis compared HOA and non-HOA percent cover of woody and herbaceous understory.

8. **Title: Exploring the relationship between the luxury effect, redlining, and rapid gentrification: a case study in Philadelphia, PA**
   Authors: Luke Szyszkiewicz, Jeffrey Brown
   Speaker affiliation: La Salle University
   Abstract: In urban systems, biodiversity is often positively associated with residents' income; this positive correlation is known as the luxury effect. Additionally, biodiversity is shaped by current sociodemographic factors but is also influenced by historical legacies, including the discriminatory practice of redlining. Across the United States, formerly D-graded areas often have lower levels of biodiversity. In many cities, formerly redlined neighborhoods are experiencing rapid onset gentrification, quickly shifting the economic makeup of these neighborhoods. In this work, we combine multiple data sources (the American Community Survey, the National Land Cover Database, the City of Philadelphia, and iNaturalist) to explore how gentrification and the resulting higher incomes of a neighborhood influence the biodiversity in a redlined neighborhood over time. Further, we compare how biodiversity in a gentrifying neighborhood compares to other D-graded neighborhoods in the city. Our results highlight that while historical legacies can shape the current distribution of biodiversity in cities, there is a high degree of variability in the strength of effects of redlining in large part due to processes such as gentrification. The results emphasize that while historical legacies must be considered when examining the processes that shape urban biodiversity, the current impacts of historical processes are unique, and researchers must consider current sociodemographic trends. Future work will expand the study across the United States, examining other D-graded neighborhoods experiencing gentrification. We also will investigate how these processes translate to younger cities with smaller or no-redlined footprints. Lastly, we look to examine ways that underserved communities in urban areas can experience the positive effects of biodiversity increase while being resistant to displacement due to rapid onset gentrification.

9. **Title: How Redlining and Housing Segregation in the Nation's Capital has affected distribution and diversity of urban mammals**
   Authors: Merri Collins, Travis Gallo
   Speaker affiliation: George Mason University, University of Maryland
   Abstract: Research has shown that urban greenspaces like natural areas, city parks, and cemeteries provide crucial habitat and resources for urban wildlife. However, historic city planning and land use decisions – often motivated by racism and classism – have played a key role in the spatial distribution and design of these urban green spaces. The distribution of urban wildlife is

directly influenced by the distribution of resources (e.g., shelter, food, water) provided by these green spaces. Thus, we hypothesize that the spatial patterns of historical discriminatory land use practices will correlate with the present-day spatial distribution of wildlife. This study uses historic land use maps and present-day wildlife observations to understand if redlining of neighborhoods has had an influence on modern day medium to large-sized mammal diversity in Washington, DC. We also assessed whether present day income influences species diversity, to better understand how historic housing segregation and present-day wealth disparities effect residents' opportunity to experience wildlife. The results of this study will help to inform management initiatives, pinpointing areas where restoration and conservation efforts should be priorities to increase nature equity.

10. **Title: DC School Garden Butterfly Project**
    Authors: Katherine Pontarelli, Travis Gallo, Divya Varier
    Speaker affiliation: George Mason University
    Abstract: Schoolyard gardens are increasing in cities to simultaneously provide students with experiential learning opportunities and local communities with increased food security. These gardens may also provide urban habitats for pollinators and opportunities for students to interact with urban wildlife. Here we assess how schoolyard gardens may provide habitat for large-bodied butterflies and discuss how they may be designed to support more butterfly diversity. Due to their charismatic nature and presence in urban spaces, butterflies can be a flagship species to reconnect urban residents with the natural environment. Therefore, we designed the project to be student-led and assessed students' participation in the data collection process. Three elementary schools with rising 1st and 3rd-grade students observe and capture large-bodied butterflies in their gardens during the summer of 2022. The species richness and abundance at school gardens were compared to butterflies caught by researchers in a corresponding natural area near each school. An N-mixture model was used to estimate the correlation between tree canopy, site area, and impervious surface to Eastern tiger swallowtail abundance. Results showed that swallowtail abundance was negatively related to the percent of impervious surface at a site regardless of the site's area and proportion of tree cover. Our results indicate that urban schools with limited green space can increase butterfly abundance by planting more vegetation around the garden and decreasing impervious cover. Student discussions provided program feedback and increased interest in butterfly ecology within urban environments. These results indicate that involving K-12 students in urban ecological research within their school grounds may increase their awareness of interactions with nature.

11. **Title: The Sign of Diversity, Equity, and Inclusion at the National Mall and Memorial Parks.**
    Authors: Leslie Frattaroli, Brittany Grouge, Meredith Hart, Glenn Klaus
    Speaker affiliation: National Park Service
    Abstract: The National Mall and Memorial Parks (NAMA) is an urban park situated in the heart of the District of Columbia. NAMA has an incredible opportunity to spread the importance of urban ecology with annual visitation at ~32 million with visitors from all over the world. The District of Columbia is also home to one of the largest d/Deaf communities in the United States. Natural Resource staff at NAMA realized the incredible opportunity available and began to expand natural resource conservation outreach to the d/Deaf community. In the fall of 2021, working in coordination with the Fish and Wildlife Service, they created an American Sign Language (ASL) video about monarch migration featured on social media and the NAMA website. The outreach grew, and with a grant from the National Park Foundation, the first Jr. Ranger ASL Angler event was held at the National Mall with ASL interpreters. The outreach has been an overwhelming

success, not only engaging with the d/Deaf community but inspiring other partner organizations to ensure they have accessible events in the future with ASL interpreters.

12. **Title: Sitting ducks: Landscape factors, impacts, and management strategies for black vulture conflicts near animal care facilities**
    Authors: Hannah Partridge, Sara Gagne, Colleen Hammelman
    Speaker affiliation: University of North Carolina at Charlotte
    Abstract: The black vulture (*Coragyps atratus*) is expanding its range across much of North and South America, leading to more human-vulture conflicts. As most human-wildlife conflicts are the results of complex and interacting social and ecological factors, situations are often unique and difficult to solve. We investigated a case study of human-black vulture conflict in the Charlotte Metropolitan Area, USA involving a large group of black vultures that regularly congregates at a wildlife rehabilitation organization, occasionally damaging property, and harming resident animals. In this research, we are identifying the landscape changes that coincide with conflicts, local perceptions of black vultures and the impacts to daily life, and the best management strategies that target the underlying factors contributing to this case study. Given the complexity of conflicts, we are using a multifaceted mixed methods approach that incorporates quantitative and qualitative methods to address our objectives. We are conducting a systematic literature review of black vulture conflicts to gather information on important relationships between black vultures, humans, and landscapes regionally and globally, specifically focusing on the factors leading to human-black vulture conflicts, the management strategies used (if any), and the impact on human lives and perceptions. We are also conducting spatial analyses in the landscape surrounding the conflict site to identify land use features and changes over time. As many details related to human-vulture conflicts are not published, we are also conducting semi-structured interviews of researchers and practitioners across the black vulture range in North and South America in search of additional similarities in factors, management strategies, and success across space. Finally, to understand local resident perceptions and actions that may be contributing to the conflict and the impacts on daily life, we are conducting semi-structured interviews of community members in the area. Preliminary findings show that black vultures may be using different landscape features and have different relationships with humans and urban areas across their range. These differences result in different perceptions, different conflicts, and different management strategies based on location. An understanding of these differences in land use and human interactions across the black vulture range and the underlying similarities will lead to better conflict prevention and management strategies and will provide researchers and practitioners worldwide more insight into human-black vulture interactions to create healthier socio-ecological relationships.

13. **Title: Assessing the Impact of Waterfowl Migration on Water Quality Across Rural and Urban Bodies of Water**
    Authors: Nicholas Woronowski, Emily D. Ledgerwood, Jason D. Luscier
    Speaker affiliation: Le Moyne College
    Abstract: An association between rising fecal bacterial levels during increased bird presence is suspected but a clear link between bird migration and coliform levels has yet to be established. Previously, a study conducted at Montezuma National Wildlife Refuge in Seneca County, New York, failed to observe a link during the 1971-1972 fall and spring migratory periods. Possible explanations included agricultural runoff, spring ice cover, or reduced water flow leading to bacterial settling. In this work, we aim to understand the contribution of agricultural runoff by comparing fecal coliform levels at both Montezuma refuge and Onondaga Lake in Onondaga County during the 2022-2023 fall and spring migration periods. Although both lakes are found

along the Atlantic Flyway, the surrounding environment of these lakes differs substantially with Onondaga Lake centered in an urban environment and Montezuma refuge surrounded by agricultural fields. Water samples were collected at three locations at each site and passed through a 0.45 um filter before transferring to either mEndo agar for selective isolation of total coliform bacteria, or mEntero agar to isolate and quantify the level of fecal streptococci. Colony counts from each site were plotted against bird counts obtained from ebird.org and the Friends of Montezuma over the migratory periods and related to percent urbanization determined by GIS mapping. Preliminary results suggest that the factors that contribute to elevated total coliform levels may differ for Montezuma refuge and Onondaga Lake, whereas fecal streptococci levels are consistent across both locations. In addition to improving our understanding of the impact of bird migration on biological water quality, this work aims to determine if urbanization is a contributing factor.

14. **Title: Mobbing behaviors of birds & heterospecific communication along an urban to rural gradient in Los Angeles**
    Authors: Ynez Diaz, Benjamin Ewing, Ari Martinez
    Speaker affiliation: California State University-Long Beach
    Abstract: Changes in patterns of biological communities along urban-rural gradients have been well-documented. Recently, more attention has been directed to understanding how biotic interactions may change along urban gradients. In addition, certain species are known to be key drivers of species interactions across many ecological systems. Using an urban rural gradient in Los Angeles County, we use playback experiments to test whether 1) species interactions change along an urban-rural gradient and 2) whether those interactions are driven by certain species. We evaluate 1) how noise, vegetation cover and percent impervious cover vary across the urban rural gradient and 2) use playbacks of different local species to determine if they vary in their importance in generating mobbing responses. We use Generalized Linear Models to evaluate the importance of abiotic (noise, cover) and biotic (species inducing mobbing) factors in influencing mobbing (species') responses across the urban-rural gradient. We found that average noise levels across an urban to rural gradient show that average noise levels are higher in urban habitats compared to rural habitats in Los Angeles although the effects on mobbing were minimal. We also found that certain species such as bushtit, California towhee, and wrentit to be more important in generating mobbing responses. Given the importance of these species in driving mobbing interactions for the whole bird community, future local management strategies should take into consideration restoration plans that favor these species.

15. **Title: Identifying drivers of Barred Owl (*Strix varia*) occupancy along a gradient of urbanization in a primarily agricultural region**
    Authors: Nicholas Alex, Heather Sander
    Speaker affiliation:
    Abstract: Earth's terrestrial systems are now overwhelmingly anthropogenic, sacrificing the ability of these systems to support a diverse set of species. For example, in regions that have been transformed to intensive agriculture, little habitat remains to support forest species, leading to dramatic declines in these species. Urbanized areas embedded in these settings contain forested green spaces and accrue trees via planting. Such cities may thus provide key habitat to support the persistence of forest species. However, we currently lack a basic understanding of the role cities in agricultural regions may play in biodiversity conservation, including the conservation of forest species. We sought to build this understanding by empirically identifying basic habitat relationships for Barred Owls (*Strix varia*) in urban areas in the US Corn Belt, a region of intensive

row-crop agriculture. We focused on two metropolitan areas in Eastern Iowa, USA, Iowa City and Cedar Rapids, that are surrounded by an extensive row-crop matrix. We used data from call-back surveys of these owls with land-cover and urban forest data for 500 m survey plots to construct occupancy models to identify key attributes of habitat for this species. Our top models included two covariates, urban intensity as indicated by impervious cover and cropland cover, both with negative relationships to Barred Owl occupancy, with a considerably stronger negative relationship for cropland cover. Contrary to our expectations, a covariate constructed to indicate the presence of mature trees was not included in our top models and thus was not an important predictor of Barred Owl occupancy. Predicted Barred Owl occupancy rates remained relatively high (up to 40%) up to the mean urban intensity of our study area but dropped to nearly 0% when cropland cover exceeded 30%. Given that landscapes surrounding cities in this region are comprised of nearly 100% row-crop agriculture, this finding suggests that urbanized areas in the study area may provide better Barred Owl habitat than the extensive cropland that surrounds them. Urban areas may thus be important sites of Barred Owl conservation in intensively agricultural regions.

16. **Title: Bird species diversity: the implications of roadway disturbance in Le Moyne Woods**
Authors: Hanna Oestrich, Marie Stewart, Timothy Baker, Jason D. Luscier, Donald McCrimmon
Speaker affiliation: Le Moyne College
Abstract: The Le Moyne College Woods (LMW) is a 14-hectare forest fragment in a sea of urban development, located in Syracuse, New York. The woods are bordered by heavily trafficked roadways, parking lots, athletic fields and campus buildings, as well as other man-made structures. The principle canopy species of the woods are black walnut (*Juglans nigra*), sugar and norway maple (*Acer* spp.), green ash (*Fraxinus pennsylvanica*), and northern catalpa (*Catalpa speciosa*); the midstory is comprised principally of European buckthorn (*Rhamnus cathartica*), bush honeysuckle (*Diervilla lonicera*), and redbud (*Cercis canadensis*); extensive vines of wild grape (*Vitis vinifera*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*) are also present. Thus, the vegetation of LMW is very different from the natural deciduous forest climax community of Central New York, and reflects the result of many decades of urban disturbance, as well as the impact of invasive species. Significant breeding bird species include gray catbirds (*Dumetella carolinensis*), northern cardinals (*Cardinalis cardinalis*), red-winged blackbirds (*Agelaius phoeniceus*), American robins (*Turdus migratorius*), American redstarts (*Setophaga ruticilla*), eastern wood-pewees (*Contopus virens*), American goldfinches (*Spinus tristis*), and many others. Migratory species include black-throated blue warblers (*Setophaga caerulescens*), black-throated green warblers (*Setophaga virens*), bay-breasted warblers (*Setophaga castanea*), chestnut-sided warblers (*Setophaga pensylvanica*), scarlet tanagers (*Piranga olivacea*), white-crowned sparrows (*Zonotrichia leucophrys*), and many others. The Master Plan for Le Moyne College considers the possibility of an entrance to campus and roadway through LMW for future development. Our objectives in this multi-year study are to provide data on the potential impact such a project might have on bird communities of LMW. We compared breeding and migrating bird species diversity at ten equidistant points using the application, Merlin, developed by the Cornell Laboratory of Ornithology. Ambient sound levels were measured using Reed sound level meters. Distances to birds were measured using Nikon laser rangefinder.

17. Canceled.

Poster Symposium - June 6th @ 4:00-6:00 pm

18. **Title: On the Hoof: A Multispecies Movement Design for Golden Gate Park**
    Authors: Diana Daisey
    Speaker affiliation:
    Abstract: Over the past 152 years, a 1,000+ acre rectangle of land in so-called San Francisco has been known as Golden Gate Park. As people—and as large mammals—we have performed enormous ecological and cultural transformations on this place, before and since its current common name. We have exploited fellow people and fellow large mammals in order to do so. Today, Golden Gate Park receives nearly 25 million human visitors per year and is home to horses, bison, and possibly deer. This project investigates the multispecies history of Golden Gate Park; evaluates its ecological and cultural function with respect to how people and hoofed mammals (ungulates) traverse and reside on the land; and proposes designs that might invite more equitable use.

19. **Canceled.**

20. **Title: Factors influencing nest tree selection by the Eastern Gray squirrel in Syracuse, NY**
    Authors: Jack McGovern, Jason D. Luscier
    Speaker affiliation: Le Moyne College
    Abstract: Human development exposes species to unique selection pressures and resource niches not encountered in the natural environment. Eastern gray squirrels (*Sciurus carolinensis*) are synanthropic, thus generally exhibiting high population densities in urban areas; however, it is not entirely clear how specific features of urban habitats affect distributional patterns. Our main objective was to evaluate the relationship between squirrel drey (i.e., nest) distribution and urban noise pollution levels, as well as the availability and proximity to food sources (food trees, open fixed trash cans, etc.), in Syracuse, New York. To accomplish this, we compared 45 occupied trees (i.e., trees with at least one drey) with nearby unoccupied trees. Unoccupied trees were identified as the nearest tree to a point 30 meters in a random direction from each occupied tree. Maximum noise (dB) over a 7-minute interval was recorded at each tree using a low frequency dB meter held at a height of 1.5 meters on the side of the trunk facing the nearest significant source of noise pollution. Sound data were collected during rush hour (16:30-18:30), Monday through Thursday, from August through October. Other observations collected include distance to nearest viable food tree (0 meters if drey was in a food tree), distance to nearest trash can, distance to nearest permanent water source, and distance to nearest road; structural variables such as DBH, tree height, and canopy connectivity were also collected. Variables identified as significant or insignificant in the strongest model will provide insight into the ways which the Eastern gray squirrel has adapted to urban life in Syracuse and could be taken into consideration in future studies attempting to explain density distribution of this mammal.

21. **Title: Effectiveness of commercial repellents at reducing white-tailed deer damages to pansies**
    Authors: Rachel Lipsey, Andrew Bolton, Megan Billson
    Speaker affiliation: University of Arkansas System Division of Agriculture
    Abstract: White-tailed deer (*Odocoileus virginianus*) are prolific in many urban areas. Their browsing comes into conflict with homeowners who invest in horticulture plantings and pollinator habitat. We conducted demonstrations in fall/winter 2021 and 2022 using purple pansies (*Viola tricolor*) to assess the effectiveness of granular and systemic repellents in Central Arkansas.

Repellents examined were Plantskydd™ granular, Natura™/Repellex™ systemic tablets, and Deer Mace™ granular. Five replicates each were installed in an ex-urban site near Roland, Arkansas with fewer deer and at a residence adjoining a community green space with abundant deer in North Little Rock, Arkansas. Untreated caged and uncaged flats served as controls to compare repellents' effectiveness and environmental factors affecting results. Percentage of browsed plants in flats of 15 was determined by visual observation every 3 to 4 days from December 1 to March 15. Data are being collected currently for the second season and results from both seasons will be reported. It is expected no repellent will be 100% effective at reducing deer browsing but may reduce browse better than no repellent at all.

22. **Title: White-tailed deer densities along an urban-rural continuum in Durham County, North Carolina**
Authors: Ashley Lynn, Nathan Hostetter, Christopher Moorman, Nils Peterson, John Kilgo, Moriah Boggess, Heather Evans, Jonathan Shaw, Elizabeth M. Kierepka
Speaker affiliation: North Carolina State University
Abstract: White-tailed deer (*Odocoileus virginianus*) populations are increasing in areas of high human density, particularly within suburban areas. These increased densities have led to numerous negative interactions between both species. To examine how deer densities vary along human development, this project used non-invasive fecal sampling to estimate deer densities along an urban-rural continuum. We expected densities to be highest in suburban areas compared to rural and urban sites. Fecal samples were collected from 10 sites in Durham County, North Carolina from February-March 2023. Each site consisted of 80 31-m diameter plots, which closely mimics the size of a suburban backyard. All fecal samples were genotyped at 10 microsatellite loci and one sex-determining locus to determine the number of individuals and recaptures within each site. Density estimates were modeled using spatially explicit capture-recapture (SECR). Density estimates were highest in suburban areas and lowest in urban areas. This could be due to increased feeding by humans and a higher percentage of ornamental and landscaped vegetation. This project is the first non-invasive white-tailed deer study to take place along an urban-rural continuum. These results provide critical data for management in highly concentrated areas of deer, like suburban Durham County.

23. **Title: Connecting urbanization to population dynamics: movement, resource selection and mortality risk of white-tailed deer across an urbanization gradient**
Authors: Mikiah Carver-McGinn, Nathan Hostetter, Christopher Moorman
Speaker affiliation: U.S. Geological Survey, North Carolina Cooperative Fish and Wildlife Research Unit
Abstract: Urbanization alters landscapes and the associated resources available for wildlife. These changes can drive new selection pressures, as individuals adapt to increased fragmentation and seasonal resources that differ from their historical environments. White-tailed deer (*Odocoileus virginianus*) are an important species to study in urbanizing landscapes because they are an adaptive generalist species that regularly interacts with human altered landscapes. We are conducting a three-year telemetry study to investigate white-tailed deer ecology across an urban-rural continuum in Durham and Orange counties in North Carolina. Our study applies a multi-scale approach to better understand how urbanization affects deer movements, resource selection, and mortality risk across these landscapes. Specifically, we are capturing male and female deer across a gradient from rural forest and farmlands to densely populated suburban areas to investigate: 1) deer movement relative to anthropogenic features and human activity, 2) seasonal home range size and how urbanization shapes landscape-level selection, and 3) deer

survival and cause-specific mortality along the urban-rural continuum. Linking deer movement, selection of home range areas, and ultimately variation in mortality risks across these landscapes will provide science-based information to better understand deer ecology in urbanized areas and inform management of deer populations in North Carolina and beyond.

24. **Title: Effects of urban noise and light pollution on bat occupancy and echolocation in Syracuse, NY**
Authors: Carly Devereaux, John Fenzl, Meg Woyciesjes, Jason D. Luscier
Speaker affiliation: Le Moyne College
Abstract: Artificial noise pollution may interfere with echolocation and thus may affect the distribution of bats in cities. Likewise, artificial light at night (ALAN) may affect distributions of urban bats due to fragmentation into bright and dark areas. Also, ALAN likely confuses their sense of time which changes their habits (i.e. when they are out for prey v.s. sleeping). Our objective was to evaluate the effects of noise pollution and ALAN on bat occupancy and echolocation in the city of Syracuse, New York, USA. We predicted that noise pollution and ALAN would negatively affect bat occupancy and that noise pollution would influence the frequency and/or duration of echolocation. We surveyed 48 locations throughout the Syracuse region. These sites were located in areas near bodies of water, secluded parks and areas with urban influence with variable noise and ALAN levels. We surveyed bats at each site with an Anabat Walkabout bat detector during two 2.5-min time periods from 30 min after sunset to 23:00 during June and July 2022. We modeled bat occupancy by noise pollution and ALAN using the program Presence and ranked the models using AIC. Overall, bat species were detected at 13 of the 48 sites. Estimated bat detectability (with SE) was 0.623 (0.120) and overall bat occupancy for the entire study area was 0.314 (0.081). The top-ranked bat occupancy model included negative effects from sound. Bat occupancy declined from 0.536 (0.081) to 0.076 (0.163) with increasing noise. ALAN had a weak negative effect on occupancy with estimates decreasing from 0.323 (0.013) at dark areas to 0.220 (0.275) at brighter areas. Further analyses of echolocation recordings will reveal the dynamics of frequency and duration in response to noise pollution. We hope that our results help to inform urban bat conservation in the city of Syracuse.

25. **Title: Impacts of urban heat island intensity and artificial light at night on mammalian occupancy in urban landscapes**
Authors: Emily Blackwell, Theodore Stankowich
Speaker affiliation: California State University, Long Beach
Abstract: While many mammal species survive and even thrive in cities, urban living is associated with many sublethal stressors that can impact occupancy and activity. The urban heat island effect leads to localized increases in temperature. Interspecific differences in thermal physiology, body size, and home range size might influence responses to urban heat islands and alter community composition across spatial gradients of heat stress. Artificial light is an anthropogenic sensory pollutant pervasive in cities. The introduction of artificial nighttime lighting to the landscape is a significant departure from the natural conditions that wildlife evolved in, and nocturnal animals who rely on dark nighttime conditions for foraging or hunting behavior may be particularly impacted. To investigate the impacts of these two stressors on wildlife, observations of common mammals made by Urban Wildlife Information Network camera traps in cities across the US will be paired with remotely sensed measurements of urban heat island intensity and artificial light levels. The resulting multi-city, multi-species occupancy models will show how these stressors affect species' spatial distribution and community composition.

Poster Symposium - June 6th @ 4:00-6:00 pm

26. **Title: Understanding the Biodiversity Implications of Anthropogenic Input in the Miller Knox and Big Break Regional Shorelines of East Bay Parks District**
    Authors: Rayna Fitzgerald, Tyus D. Williams, Christopher J. Schell
    Speaker affiliation: University of California Berkeley
    Abstract: Human activities are profoundly changing global landscapes as urbanization increases at exponential rates. Viable wildlife habitat is steadily shrinking, pushing wildlife communities further into human-dominated environments. It is thus crucial for biodiversity conservation that ecologists understand how wildlife will react to and interact with human-modified landscapes. Regional and landscape differences between cities have proven to play a critical role in how wildlife interacts with urbanization. The size, vegetation composition, landscape features, land-use legacies, zoning, and surrounding environment of urban green spaces impact their ability to support biodiversity. For this study, we measured mammalian presence over ~6 months across two sites (Big Break Regional Shoreline and Miller/Knox Regional Shoreline) in the East Bay Regional Parks District in Northern California using camera traps. The two sites were appropriate proxies for urban and nonurban environments due to their significant variations in size, shape, landscape features, and urban intensity. Multiple environmental covariates (road densities, human population densities, building densities, and NDVI) were included in the analysis to represent the impacts of urbanization and anthropogenic activity as they correlate with alpha (i.e., Shannon Diversity) and beta (i.e., Jaccard) diversity. We predicted mammalian diversity would be higher at the site with greater vegetation cover and less anthropogenic activity, with the sites showing strong differences in community composition. This study will provide region-specific information that can be used to inform policy and urban planning.

27. **Title: Urban Wildlife Monitoring in the Dallas-Fort Worth Metroplex**
    Authors: Rachel Richter
    Speaker affiliation: Texas Parks and Wildlife Department
    Abstract: In partnership with the Urban Wildlife Information Network, monitoring of wildlife along the urban to rural gradient in the Dallas-Fort Worth Metroplex began in 2021. Camera traps are placed at 25 locations along the TX-199 corridor in Tarrant and Parker Counties. Cameras are deployed in January, April, July, and October for four weeks. This poster will present the preliminary findings of this study including some unexpected observations of uncommon species in highly developed areas.

28. **Title: The NYC Wildlife Transect: The influence of direct human foot traffic on urban mesocarnivore distribution**
    Authors: Myles Davis
    Speaker affiliation: The Urban Wildlife Information Network
    Abstract: Mesocarnivores are urban adapted mammalian carnivores, known for their ability to exploit anthropogenic food sources (trash and leftovers), and are often associated with nuisance behavior (Bateman & Fleming, 2012). We have established a 50km camera trap transect across green spaces from Brooklyn to Nassau County and Staten Island to investigate how wildlife presence, specifically mesocarnivores and other mesomammals, changes across levels of urban intensity in New York City (NYC). This work was done in collaboration with the urban wildlife information network (UWIN), a long-term project focused on determining factors that explain patterns in mesomammal occupancy along urban-rural camera transects in cities across North America (Magle et al., 2019). As NYC continues to invest in regreening (Elmqvist et al., 2013), the frequency of human-wildlife interaction is likely to increase, highlighting the need for solutions that promote coexistence with local wildlife. Despite these concerns, there has not been any

comprehensive study done on mesocarnivore distributions in the city. Additionally a recent UWIN study among 10 North American cities suggests that mesocarninvore response to urbanization is sensitive to average levels of housing density in a city, highlighting the need for further study of mesocarnivore distributions in cities on the extreme ends of the average housing density spectrum. NYC has a higher average housing density than any city in Fidino's et al (2021) analysis, and in addition to filling the mesocarnivore distribution knowledge gap in NYC, we will investigate whether mesocarnivore response to urbanization follows the trends suggested in Fidino's et al (2021) study. Finally, the majority of urbanization metrics employed in urbanization studies do not explicitly consider human presence (Moll et al. 2019), however COVID-19 has increased the use of phone contact tracing technology, and we have gained access to aggregated smart phone location data for each camera site sampled in our transect. Our analysis will be the first to employ this data to determine the influence that direct human foot traffic has on mesocarnivore distributions.

29. **Title: Advancing urban wildlife research through a multi-city collaboration**
    Authors: Kimberly Rivera
    Speaker affiliation: Lincoln Park Zoo
    Abstract: With the rapid growth of urbanization, urban parks, preserves, golf courses, cemeteries, and other 'human' landscapes, have become increasingly important habitat for wildlife. The Urban Wildlife Information Network, a collaborative community of researchers housed in diverse institutions, is studying what species occupy these landscapes, how they are surviving, and in what ways they interact with the dominant species–humans. We have developed a robust, generalizable approach to wildlife monitoring that uses multiple approaches in tandem (e.g. motion-triggered cameras, ultrasonic bat monitors) along urban-to-rural gradients to study urban wildlife ecology. We collect data across seasons and years in over 45 cities across the United States and beyond (Canada, Germany, and South Africa). Through this multi-city approach, we can evaluate trends and changes in urban wildlife. We will continue to grow partnerships and expand our methodologies to collect and communicate rigorous scientific data across diverse communities and municipalities. Our data are used to provide city planners, wildlife managers, and researchers with scientific evidence and tools to make cities part of the solution to the biodiversity crisis.

30. **Title: Ticks at the park? Investigating the relationships between people, urban wildlife, and ticks in urban greenspaces**
    Authors: Caleb Sandoval, Janel Ortiz
    Speaker affiliation: California State Polytechnic University, Pomona
    Abstract: A major way the intersection between people and wildlife in expanding human landscapes may emerge is through ectoparasites, specifically ticks, and their potential spread from urban wildlife to people and their pets. This project aims to explore the dynamics of potential risks for ticks and associated disease transmission, and related conflicts with urban wildlife along a gradient of urbanization in Southern California. Camera traps are being used to document the presence and abundance of urban wildlife species and assess their potential as tick hosts. A cloth is used at each site to detect the presence and abundance of ticks, including their species and life stages. Finally, a survey of pet owners will be deployed to gauge knowledge and perceptions surrounding urban wildlife, ticks, and tickborne pathogens. This information will be synthesized into a model depicting the estimated abundance of ticks and potential urban wildlife host species at each sampling site to understand the potential risk for tickborne disease transmission along the urbanization gradient. Preliminary data has been collected, and final results will allow targeted

outreach and education to pet owners and other urban greenspace users to minimize risks to human, domestic animal, and wildlife health as the intersection between people and urban wildlife increasingly expands.

31. **Title: Long-term surveillance of Sarcoptic mange within an urban coyote population**
    Authors: Ashlyn Halseth, Stanley Gehrt, Chris Anchor
    Speaker affiliation: Ohio State University
    Abstract: Caused by the obligatory ectoparasite, *Sarcoptes scabiei* var *canis*, sarcoptic mange can cause high morbidity and mortality in wildlife populations across North America. Prevalence rates of infested coyotes are poorly understood, and previous studies have reported inconsistent results due to discrepancies in clinical signs and diagnostic tests. From 2000-2022, The Cook County Coyote Project has been assessing mange infestations among radio-collared coyotes across the Chicago metropolitan area using a combination of skin scrapings, gross lesions, and ELISA serology reports. The objective of this project is to explore long-term prevalence rates of sarcoptic mange within the population to better understand the relationship between the host and parasite in a heavily urbanized landscape. Gross lesions associated with sarcoptic mange were identified in 205/1442 (14.22%) individuals, while serology reports identified 170/260 (65.38%) additional individuals with IgG antibodies for S. scabiei var canis without identifiable clinical signs. Further analysis of infestation risk in relation to amounts of urbanized landscape within home ranges are still being conducted at this time. This project will aid in better understanding the relationship urbanization has in sarcoptic mange infestations in wild coyote populations.

32. **Title: Effects of canopy cover on habitat and space use by coyotes and gray foxes along urban-rural gradients**
    Authors: Danielle Gay
    Speaker affiliation: Texas State University
    Abstract: The coyote (*Canis latrans*) has become North America's most widespread canid, likely due to being a habitat generalist and able to live in close proximity to human settlement. Gray foxes (*Urocyon cinereoargenteus*) are widely distributed across North America. However, extensive analysis of the species' general ecology and population dynamics is lacking. My study aims to increase the fundamental understanding of gray fox habitat use and species occurrence, as well as examine how coyotes have expanded their niche to utilize both the forested and human-altered landscapes that vastly contrast with their historical habitat of open plains and prairies. My research consists of a nationwide camera trapping study on an urban-rural gradient with canopy cover and impervious surface as predictors of coyote and gray fox occurrence throughout the United States. Data on species occurrence was obtained from camera traps deployed by various wildlife monitoring programs across the United States. In ArcGIS, buffer zones at 300, 600, and 1200 m were established at each camera location, and mean percent canopy cover and impervious surface was obtained from the National Land Cover Database at each buffer zone. Preliminary results show no differences in the means of cameras that detected coyotes and those that did not for canopy cover and impervious surface. Gray foxes positively associate with canopy cover and urban landscapes. However, further analysis of these findings is needed.

Poster Symposium - June 6th @ 4:00-6:00 pm

33. **Title: Distribution of foxes and coyotes in space and time along an urban-rural interface**
Authors: Jasmine Grewal, Kyle Dougherty, John Benson
Speaker affiliation: University of Nebraska - Lincoln
Abstract: The landscape of risk and reward in urban and rural systems is shaped by human disturbance, modifying community dynamics, and spatiotemporal partitioning of resources by wildlife. For intraguild predators, variation in response to these tradeoffs can facilitate sympatry despite a high overlap in resource requirements. Stronger avoidance of humans in space and time by dominant predators may create refugia used by subordinate predators to avoid agonistic interactions (via the "human shield"). We are studying coyote, red fox, and human interactions in Lincoln, Nebraska to understand how human activity and development impacts canid use of space and time across a steep gradient of human disturbance. Accordingly, we evaluated occupancy and temporal activity patterns using data from our camera grid across urban and rural sites throughout greater Lincoln. We found that red fox occupancy was positively associated with urban sites and negatively associated with coyote occupancy. Coyote occupancy was negatively associated with development, though temporal avoidance of humans was highest in rural areas where they faced the highest threat of direct human persecution. I will present preliminary analysis of occupancy and activity patterns highlighting intraguild variation in the use and avoidance of developed areas in greater Lincoln that may contribute to the coexistence of wild canids in anthropogenic landscapes.

34. **Title: Does human presence influence activity of a large carnivore in a megacity?**
Authors: Maya Mathur, Adam Pingatore, Maya Mathur, Daniel Blumstein, Seth Riley, Jeff Sikich, Justine Smith, John Benson, Rachel Blakey
Speaker affiliation: Stanford University
Abstract: Cities are dynamic landscapes, with fluxes of humans in areas shared with wildlife varying in space and time. For animals who avoid humans, like large predators, this variability in human presence may require a flexible approach to temporal partitioning, involving changing activity patterns, in an effort to avoid human presence in the landscape. These behavioral adjustments have the potential to influence energy budgets of animals who are already experiencing multiple stressors, including habitat loss, inbreeding depression, and poaching. We evaluated the impact of human presence on mountain lions in space by comparing temporal activity patterns of 22 individual mountain lions (*Puma concolor*) across locations with varying degrees of human recreation activity (Cumulative Outdoor Index) and in time by comparing temporal activity patterns for mountain lions on weekdays (low human presence) and weekends (high human presence) in the megacity of Los Angeles, California. Mountain lions were more nocturnal in areas with higher human recreation. However, mountain lion activity timing, nocturnality, and total activity was unaffected by the weekend, regardless of human recreation activity. We suspect that in such an urbanized city, the degree of human recreational activity is less impactful on the lions' movement patterns than the presence of humans and thus, lions are adjusting their behavior to avoid humans at the diel, rather than the weekly scale. Our results add to a growing body of literature which shows that sub-lethal interactions with humans lead to behavioral alterations, and may intensify other effects of urbanization on predators.

35. **Title: How Environmental Factors Influence Pigeon Density in Urbanized Landscapes**
Authors: Daisy Lewis
Speaker affiliation:
Abstract: Urbanization is a globally occurring, anthropogenic process forcing species to adjust to urban landscapes in order to survive. Some of these urban species develop commensal

relationships with humans and become unable to survive without human influence. One of these species is Columba livia, (also known as the common pigeon, rock dove, and rock pigeon) which has become reliant on human activities and human-dominated landscapes, prospering in urbanized city centers that provide plentiful food sources and shelter. Understanding how aspects of urbanized life influence pigeon population dynamics in distinct cities could elucidate similarities and differences in how human commensals operate around the world. In this study we analyze how various factors of urban environments interact with pigeon density by performing visual encounter surveys in two different urban metropolises: St. Louis, USA and Madrid, Spain. We conducted surveys along 10, three mile transects in each city (every transect being surveyed twice), recording observations of pigeons along with environmental factors including: weather conditions, pedestrian density, presence of waste disposal/litter/food litter, and restaurants with outdoor tables. When creating our models we also added urban environmental factors including: density of roads, parks/urban greenspace/canopy cover, impervious service, and historic districts as well as presence of schools, transportation points, grocery stores, and predators. We found that pigeon density was over 3.5 times greater in Madrid than in St. Louis and that pedestrian density and restaurants with outdoor seating were positively correlated with pigeon density.

36. **Title: Diet of the Eastern Coyote in Washington, D.C.**
Authors: Lindsay Powers, Megan Draheim
Speaker affiliation: The District Coyote Project
Abstract: While coyotes (*Canis latrans*) have been studied in many other metropolitan areas, there has been little research on the population within Washington, D.C., where they arrived relatively recently in a later stage of their expansion across North America. Given that coyotes are a generalist species and often apex predators in urban ecosystems, knowledge of their diets can contribute to a better understanding of their potential impact on the prey, competitors and humans they live with. This study aimed to determine occurrences of prey species, plant species and anthropogenic food items within the diets of coyotes in Rock Creek Park, a large multi-use park partially surrounded by residential neighborhoods in the district, through the analysis of scat samples. Seven animals, including small and large mammals, and eleven plant species were identified from remains in 39 samples. Twenty-five samples (64.1%) included bones, claws and/or teeth, and 19 (48.7%) contained seeds that could be a significant component of a coyote's diet. Three samples (7.7%) contained an anthropogenic non-food item. The most frequently occurring food items included white-tailed deer and voles of unknown species among the animals, and persimmon and porcelain berry among the plants. The identified animal remains and seeds found in the scat samples suggest that at least some of the district's coyotes are likely as opportunistic as their counterparts around the country. The number of anthropogenic items identified was small and included no pet species such as cats or dogs, though their presence could indicate that some coyotes were searching for or consuming items in more developed areas inside or outside the park.

37. **Title: Evaluating Coyote Behavior using Camera Collars in Atlanta, Georgia**
Authors: Carson Daniel, Summer Fink, Kaitlin Goode, Michel Kohl
Speaker affiliation: University of Georgia
Abstract: With the rapid expansion of urban areas, humans are encroaching into wildlife habitat, leading to more human-wildlife interactions. These interactions may not always be positive, which can lead to the public having a negative perception of wildlife species. Coyotes (*Canis latrans*) are of particular interest when looking at these interactions because they have been highly successful in producing viable populations across nearly all large metropolitan areas across the United

States. Coyotes are an ideal urban wildlife species to focus on because of the increased public and media interest regarding fearful human reactions to coyotes and how the species should be managed in these areas. Direct contact between humans and coyotes, although rare, do occur on occasion, typically when humans are hand-feeding coyotes. More commonly, metro-citizens are concerned about potential conflicts between domestic pets and livestock animals. In Georgia, coyotes are found throughout metropolitan Atlanta, and are the 3rd most reported species to Georgia Department of Natural Resources (DNR). The Atlanta metroplex is currently home to more than 6 million people and has the 4th highest growth rate in the United States. Despite the high number of people and associated calls to DNR, only 9% entailed some sort of aggressive behavior towards people and/or pets. This makes Atlanta an ideal place to discover how urban expansion influences human-wildlife interactions. To evaluate citizen concerns within the metro-Atlanta area, we deployed three Lotek GPS LITETRACK Camera Collars in February 2023. The camera collars were deployed for up to three months throughout the late winter into the early summer. This presentation will provide the initial results of urban coyote predation rates on both natural and anthropogenic food sources (domesticated pets/livestock) and general diel activities and behavioral patterns of coyotes. This study will provide some of the first evidence regarding the true potential of coyote depredation of pets and livestock within an urban environment that we are aware of in the literature. This study is planned to be replicated in winter 2024 with double the amount of camera collars to further evaluate urban coyote behaviors.

38. **Title: Eastern Gray Squirrel Diets Across St. Louis City & County**
Authors: Jenny Mann
Speaker affiliation: Washington University in St. Louis
Abstract: Humans are constantly changing the environment through increased urbanization and city ecosystems are significantly different from non-urban ecosystems. In cities, humans drastically alter animal and plant biodiversity and access to resources like food and shelter. For example, humans place large amounts of food waste in dumpsters, on the streets, and purposely outside for animals. In the United States, human diets have become more reliant on animal-based products and highly processed corn-based foods. Therefore, animals in urban spaces that take advantage of human food waste, will have significantly higher corn-based diets than wildlife in non-urban environments. Moreover, historical segregation has created large swaths of poverty where impoverished areas typically have increased anthropogenic food waste that is not properly managed by the government. I am studying the diets of Eastern gray squirrels (*Sciurus carolinensis*) in St. Louis city and county using stable isotope analysis. Stable isotope analysis is a common method of studying human food consumptions in animals because fur contains unique signatures of carbon and nitrogen isotopes that can be directly linked to anthropogenic food. I will use these data to examine differences in squirrel diets across an urban to rural gradient across St. Louis county and across wealthy and poor neighborhoods in St. Louis city. I expect to find differences in diets, with squirrels in urban areas and squirrels in poorer neighborhoods having higher signatures of corn-based foods.

39. **Title: Costa Rica Silvestre: A national initiative for improving human-wildlife interactions**
Authors: Grettel Delgadillo Molina, Shirley Ramírez Carvajal, Karina Rodríguez Sáenz
Speaker affiliation: Humane Society International Latin America
Abstract: Costa Rica is home to about 6% of global biodiversity, however, the rising human population density increases the demand for resources, human activities such as vehicular traffic, expansion of human settlements, water pollution, wildlife habitat fragmentation, and more.

The Costa Rica Silvestre project is an initiative of the Costa Rica Ministry of Environment and Energy in partnership with Humane Society International / Latin America (HSI/LA), to raise awareness about human-wildlife interactions and build capacity among enforcement authorities with the goal of a healthy coexistence with our wild neighbors. HSI/LA carried out a survey of the public in Costa Rica in 2021 that found that 98% of the people interviewed recognized that the loss of natural habitats used by wildlife, vehicle strikes, electrocutions, and the bird collision on glass infrastructure are among the negative interactions that should be addressed as a national priority. Costa Rica Silvestre includes awareness-raising activities, capacity building and training for local authorities, and generation of materials on ecological aspects of the presence of wild animals in urban, suburban and rural areas. Technical-scientific information is provided on the factors, conditions and behaviors that generate some of the main negative interactions between humans and wildlife. Likewise, recommendations on how to provide effective, comprehensive and humane solutions to these issues are provided. It provides a space for different stakeholders related to the subject to provide expertise and have their voices heard, based on the best international practices and public participation. This is of vital importance in a country that has put a good deal of effort into the greenification of its cities.

40. **Title: Show Me the Green: Wildlife, Greenspace, and the 'Luxury Effect' in San Gabriel Valley, California**
    Authors: Adrianna Elihu, Janel Ortiz
    Speaker affiliation: California State Polytechnic University Pomona
    Abstract: Development of natural land is expanding; with increased urbanization, wildlife are challenged to adapt to human-dominated environments. Urban greenspace including parks, yardspace, and natural lands, provide habitat to many species. Greenspace characteristics, such as size and proximity to other greenspace, have been found to have positive effects on wildlife communities. For humans, access and greenspace availability have shown to improve health. Benefits are furthered for some by the ‘Luxury Effect’ where wealthy neighborhoods have higher rates of biodiversity compared to low-income neighborhoods. However, understanding how wildlife use the urban landscape within San Gabriel Valley, an extremely developed region of Los Angeles County, California, has yet to be discovered. Here we will identify and quantify greenspace metrics to determine relationships with wildlife diversity and determine how socioeconomic factors influence greenspace and access to wildlife. Twenty-five camera traps are set along a transect from Diamond Bar to the San Gabriel Mountains, to document wildlife. Greenspace metrics and socioeconomic variables will be analyzed using 3 m unsupervised land cover classification and 2020 U.S. Census data. I expect greenspace that is larger, complex, and in less urbanized areas to have higher species richness and areas with higher socioeconomic status to have higher species richness supporting the ‘Luxury Effect’. Twelve of the 25 sites have documented eleven species. Data analysis for the socioeconomic variables is ongoing. In recognizing significant greenspace metrics that positively affect wildlife, city planners and urban ecologists can develop greenspace that improves biodiversity, provide information to modify existing greenspace, and improve access to the outdoors and wildlife for everyone.

41. **Title: Evaluating the Detection Probability of Mammalian Mesopredators in Response to Anthropogenic Factors along East Bay Shorelines**
    Authors: Tyus D Williams
    Speaker affiliation: University of California Berkeley
    Abstract: Under the context of a rapidly changing world mediated through anthropogenic circumstances via landscape modification, urbanization, human-land use, and the shifting

paradigm of human-wildlife interactions, our interpretation of ecological frameworks in urban systems has risen exponentially. In addition, recent literature has highlighted the implications of human presence modifying the behavioral patterns of wildlife species in diverse ecosystems. This presents a prime opportunity to launch spatially explicit scale-based studies to understand the consequences of human-dominated landscapes on the movement ecology, behavioral patterns, and species interactions amongst wildlife communities. This research investigates such questions in the interest of evaluating the temporal response of mammalian mesopredators under human-dominated landscapes (e.g., the proximity of residential housing). We monitored targeted wildlife species (e.g., northern raccoons, coyotes, and free-roaming domestic cats) over an eight-month survey period (Apr. 2022-Nov. 2022) by placing 2-4 Bushnell trail cameras across ~11 East Bay Regional Shorelines in the Bay Area of Northern California. Including environmental covariates (i.e., land cover and green space availability) and anthropogenic factors (i.e., road density, housing density, residential proximity, and population size) as explanatory variables for the detection probability of mammalian mesopredators will allow us to assess how wildlife species of interest especially those of conservation or conflict concern respond to anthropogenic forces across a gradient of time in comparison to each other. With the current understanding of literature in urban ecology concerning how anthropogenic resources or human presence alters the behavioral patterns of wildlife species, we anticipate the following hypotheses: 1) if human presence modifies the behavioral ecology of wildlife, then we expect to see that mesopredator detection (excluding free-roaming domestic cats) will respond negatively to anthropogenic stimuli such as road density, housing density/proximity, and local population size reducing temporal overlap between species. Additionally, we can predict that detection probability will be substantiated by the metric of increased distance from residential areas. 2) If we understand that generalist species utilize human-food subsidies as an adaptive strategy to optimize foraging, and the human-shield effect insulates prey items and wildlife species from potential competition or predation, then mesopredators including free-roaming domestic cats will have greater detection probability and temporal overlap closer to residential areas. In sum, this research allows us to take a multidimensional approach to understanding the deeply embedded connections of human-dominated landscapes on ecosystems that may operate on the peripheral edge of urban areas. This is critical because as the foundation of human-wildlife relations changes over time providing further details on the ramifications or connections of these interactions will inform the efficacy of local conservation practices and management approaches in the future."