AMERICAN MUSEUM OF NATURAL HISTORY

Center for Biodiversity and Conservation

Progress Update Fall 2022

Dear CBC Friends and Colleagues,

The last six months have been full of activity here at the Center for Biodiversity and Conservation (CBC), and we are pleased to share updates through this progress report. We have worked to help the Museum address the biodiversity and climate crises through collaborative, interdisciplinary research; through a variety of activities that strengthen human capacity for conservation; and by connecting people to knowledge—and to each other—to innovate and gather strong evidence for action.

News, Awards, and Appointments

Director Dr. Ana Porzecanski and the Evidence Initiative team at the CBC have obtained new funding from the World Wildlife Fund for a review of the evidence on participatory monitoring and evaluation in conservation. The review will produce guidance on best practices and strategic directions for the WWF and other NGOs in the conservation field as they seek to implement more participatory—and effective—practices in biodiversity monitoring.

The CBC has successfully recruited two new specialists this season. Alice Wheet Antillón joined the CBC as our new Financial Administrator, and Daniel López Lozano, from Colombia, recently accepted the position of Biodiversity Informatics Specialist; he will join our team later this year. We are working closely with Museum Provost Dr. Cheryl Hayashi, who is preparing to launch the search for the next Jaffe Chief Conservation Scientist this fall.

Associate Director Dr. Felicity Arengo will be retiring next Spring after 18 years at the Museum and 25 years in the conservation field. Dr. Arengo will continue to collaborate with CBC as a Visiting Scientist and will continue to work with partners in South America on flamingo research and conservation, as the Americas Coordinator of the IUCN Flamingo Specialist Group; an advisor to the Association of Zoos and Aquariums Ciconiiformes and Phoenicopteriformes Taxon Advisory Group, the AZA Saving Animals from Extinction (SAFE) Andean Flamingo working group, and the Florida Flamingo Working Group; and an Adjunct Research Scientist at Columbia University.

The work of the Center for Biodiversity and Conservation brings strong evidence from multiple sources of knowledge and perspectives to bear on complex conservation problems and to foster collaboration on robust and equitable solutions. Below are selected updates on our work from the last few months.

Our research provides tools and evidence to support biodiversity in a changing planet.

Dr. **Mary Blair**, Rizavi Innovation in Conservation Fellow and Director of Biodiversity Informatics Research at the CBC, is leading two NASA-funded projects related to expanding the open-source species distribution modeling software *Wallace* as a conservation tool. Dr. Blair participated in extended consultation visits in Bogotá from May 18-20, 2022 with collaborators, a NASA program officer, and Colombian national parks officials to review the background, goals, and objectives of the project. Together they conducted a hands-on prioritization and ranking activity with the technical staff of the Colombia National Parks System to assess their greatest and highest-priority needs in terms of biodiversity indicators and information.

Consultation meeting in Bogotá, Colombia on May 20, 2022 including Deputy Director of the National Parks System Carolina Jarro (Center), leadership of the biodiversity indicators and modeling teams of I. Humboldt, project PIs Blair and Gutierrez-Velez, and NASA associate program officer Cindy Schmidt

Dr. Blair has also joined a new NSF-funded effort: the Study of Environmental Arctic Change (SEARCH). This project seeks to synthesize knowledge on the causes and consequences of environmental change in the Arctic, especially for aspects of human wellbeing such as safety, food security, coastal erosion, and community resilience, and share that understanding with diverse decision-makers. She was invited to join this project due to her interdisciplinary research on biodiversity informatics and environmental change and her interest in informing conservation under climate change through the lens of a biocultural approach. This approach explicitly starts with and builds upon local values, knowledge, and needs while recognizing the interplay between the cultural and biological parts of a system. Also important to her participation is her identity as a descendant of Indigenous reindeer-herding Sámi from Guovdageaidnu (Kautokeino), Norway. Dr. Blair has many family members who still herd today on traditional Sápmi lands, and can bring their perspectives to bear on the project, with human wellbeing in mind. She attended the project launch in Anchorage, Alaska in June 2022.

Dr. Blair and collaborators continue to study of the genomics of galagos and lorises—elusive, nocturnal primate species that have been understudied relative to other primate groups. This NSF-funded project aims to harness museum collections to illuminate the primate tree of life, and the team presented their results at a conference in August. Dr. Blair was also a co-author on mentored student research that revealed the difference between wild and captive squirrel monkey fecal microbiomes. Dr. Blair hosted collaborators Dr. Luca Pozzi, Assistant Professor at the University of Texas at San Antonio, and Smithsonian Fellow Anna Penna to collect samples for genomic analysis in the Museum's mammalogy collection in July.

Dr. **Mark Weckel**, Associate Director of Youth Initiatives and CBC Visiting Scientist, published research about the biodiversity of New York City (NYC)—especially coyotes, who have established a breeding population in New York City over the last few decades and whose ecology remains poorly understood. One paper advanced knowledge about domestic dog ancestry in NYC coyotes, suggesting that gene flow from domestic dogs may become an increasingly important consideration as coyotes continue to inhabit metropolitan regions. Another paper compared the diets of urban and non-urban coyotes and found some important differences that provide a window into how coyotes are adapting to metropolitan life; while both consumed a variety of plants and animals as well as human food. This included raccoons, chicken, white-tailed deer, and domestic cats, coyotes in NYC eat far less deer than non-urban coyotes do, and less domestic cats than other urban coyotes from other cities do. Finally, Dr. Weckel participated in a study using NYC camera trap data showing that mammal species richness is higher in greenspaces with larger patch sizes and lower in greenspaces surrounded by more development. These results highlight why urban greenspaces are important for maintaining biodiversity and that management of mammals in cities should concentrate on maintaining large, connected, natural greenspaces.

Trail camera photograph of a pup in the Elmjack coyote pack. Pelage pattern is unusual for a coyote and suggestive of domestic dog ancestry.
(From Caragiulo et al. 2022)

As part of our collaboration with Dr. **Eleanor Sterling**, Chief Conservation Scientist Emerita now based at the Hawai'i Institute of Marine Biology (HIMB), University of Hawai'i at Mānoa, we continue working with the National Estuarine Research Reserve System (NERRS) network to foster the inclusion of cultural ecosystem services, or benefits that nature provides to people, in estuary stewardship and management. The project team—which includes CBC Specialists **Erin Betley** and **Amanda Sigouin** and CBC Visual Creative & Research Assistant **Nadav Gazit**—has shared several new resources, including short introductory materials on cultural ecosystem services and a compilation of case studies. A longer report that builds and expands on those resources will be published later this fall. Dr. Sterling and collaborators who participated in a site exchange at Kachemak Bay National Estuarine Research Reserve (KBNERR) from May 30 to June 5 for demonstrations of methods for exploring cultural ecosystem services and planning meetings. This is part of an exchange series within the NERRS network to better understand how to ensure culturally informed metrics are used in reporting. This work draws on what has been learned from CBC collaborations with communities across the globe who have worked to share culturally-grounded indicators of success. As part of this project, Dr. Sterling and **Pua'ala Pascua**, Coordinator of the Ahupua'a Accelerator Initiative at the Hawaii Conservation and CBC Visiting Scientist, also participated in a NERRS network webinar series to share details about strategies employed and lessons learned from their work to include cultural ecosystem services in estuary stewardship and management.

Kachemak National Estuarine Research Reserve

Dr. **Suzanne Macey**, NCEP Manager and Biodiversity Scientist at the CBC, has continued to work with undergraduate students from Columbia University and Barnard College and volunteers to track Eastern box turtles at Black Rock Forest (BRF) in Cornwall, NY. Their sustained data collection contributes to a more robust dataset on these turtles' movement patterns and sets the stage for the turtles to be studied after their spring emergence. Monitoring the movements of three different populations of Eastern box turtles has allowed Black Rock Forest to initiate management discussions with local landowners, and the project has inspired BRF researchers to consider turtles when providing recommendations for large infrastructure projects, such as a possible Eco bridge over the New York State Thruway. By developing and piloting new remote monitoring technology, the project has supported BRF's development of a wireless mesh network, which has the promise to assist with many ongoing ecological projects in the forest.

We are creating evidence, resources, and spaces to train and empower conservationists everywhere.

In everything we do, we continue to prioritize open education and tools and the creation of inclusive environments so citizens, students, and all professionals can pursue their careers and engage in contributing solutions. Our software tools are used daily to support the analysis of biodiversity data and have been cited in hundreds of peer-reviewed articles and government reports. This past season we updated two software tools to take advantage of state-of-the-art machine learning frameworks, and contributed code to Microsoft's Camera Trap project. Our DotDotGoose application continues to be used to monitor diverse targets including, most recently, by the Virginia Department of Wildlife Resources to count royal terns at multiple colonies. Maxent, software co-developed and hosted by the CBC to facilitate species distribution modeling, also continues to be used for high-profile biodiversity research around the globe. The original publication for this software has been cited over 16,000 times, and Maxent has been recently used to study the ecosystem services provided by bats that are at risk in Brazil, and to study future vulnerabilities of mangrove and salt marsh species, among other uses.

Original image used for a colony count estimate at Ft. Wool.
Photo: Dr. Dan Catlin/Virginia Tech

Image after using DotDotGoose to perform the count.
Photo: Dr. Dan Catlin/Virginia Tech

Wallace software was also recently used to support endangered bird conservation in Colombia. Project collaborator Hector Arango, Junior Researcher at the Alexander von Humboldt Biological Resources Research Institute, used Wallace to produce maps for a number of endangered bird species as a part of the official bird guide for Lake Tota, an area of high conservation importance for the Andean Ecosystem. Arango noted that *Wallace* was an essential tool that he used to supplement existing datasets by producing high-quality distribution data for rare, data-limited bird species. With his results, researchers and practitioners have generated management plans and determined the most important lake areas for bird conservation. The bird guide can be downloaded for free here.

Our capacity development activities have spanned both research and training this season. Multiple CBC experts, including Dr. Porzecanski and Dr. Sterling, published their recent work in the September 2022 special issue of *Oryx—The International Journal of Conservation*, focusing on conservation capacity. The CBC contributed articles including on how to professionalize conservation, how to evaluate capacity development, and how to plan capacity development for system-wide impacts.

On the training front, in our continued efforts to strengthen capacity for conservation, the CBC's Network of Conservation Educators and Practitioners (NCEP) led four professional development events for post-secondary educators. NCEP's 2022 interactive online Studio focused on the nuts and bolts of active teaching and engaged 15 conservation faculty with the principles of evidence-based teaching, while connecting with a community of practice. The sessions were infused with practical examples applicable to both online and in-person teaching settings. In addition, a two-session Educator Exchange in October, organized in collaboration with the Society for Conservation Biology, focused on how to broaden conservation competencies and better prepare learners. Over 30 educators convened to discuss what principles and literacies should be fostered in conservation education to meet the broadening scope of conservation practice. Interested participants will have an opportunity to continue working together to develop an initial set of materials to broaden the literacies included in conservation courses.

Launched in October 2021 with NSF support, the OCELOTS (Online Content for Experiential Learning of Tropical Systems) Network brings together tropical ecology researchers, active learning pedagogy specialists, software developers, and media specialists to create an open-access online resource library of learning modules in tropical ecology. Led by NCEP Manager Dr. Suzanne Macey and collaborators at Iowa State University, the project aims to improve access to tropical ecology teaching resources and increase the participation of underrepresented minorities and women in the quantitative STEM sciences by training faculty with a diverse range of backgrounds, career states, and institutions. The first phase of the project entailed developing Author Guidelines and Toolkits for future OCELOTS content creators. In July and August, teams of educators, researchers, and software developers advanced the integration of digital data analysis tools into the online learning platform learngala.com. The first OCELOTS "Incubator" launched in September, and 26 participants are working in teams to create a suite of new interactive online teaching materials.

In July, NCEP published new case study-based exercises, including adaptations for remote learning, on the topic of human-wildlife conflict. The new exercises present a fictional case study of a community facing conflict related to living with carnivores, and the activities provide an opportunity for students to explore diverse stakeholder perspectives on living with wildlife, predator conservation, and how interests, values, and needs might vary within a community. This publication is a product from a past NCEP Conservation Teaching and Learning Studio, and it will be highlighted in the next issue of NCEP's journal, Lessons in Conservation.

Human-Wildlife Conflict: Assessing the Complexity of Stakeholder Perspectives

Case Study-Based Exercise[1]

Leo Douglas[i], Loraine Cook[ii], and Rose-Ann Smith[ii]

Photo credit: Tambako The Jaguar/ Flickr [CC BY-ND 2.0]

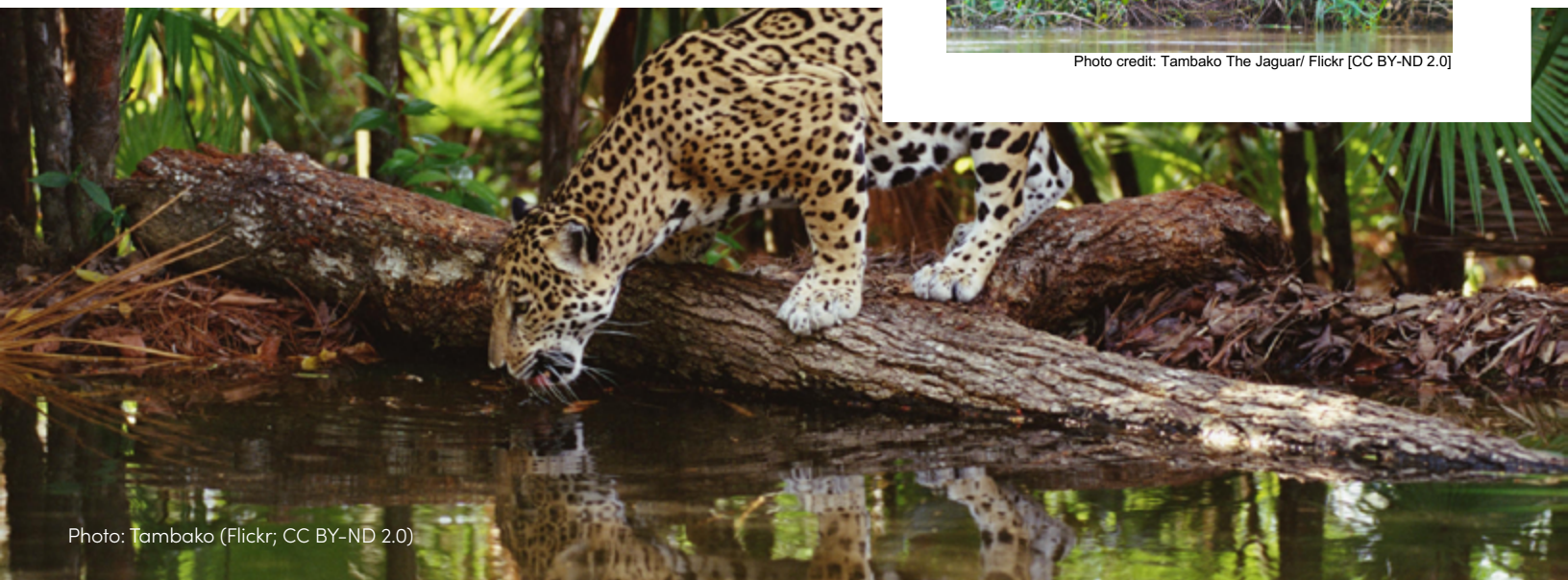

Photo: Tambako (Flickr; CC BY-ND 2.0)

Our 13th annual conference for students and early-career professionals—the *Marshall M. Weinberg Student Conference on Conservation Science-New York 2022*—was our first hybrid onsite and online Conference, and was very successful. With the benefit of a custom conference website designed in-house, we engaged over 165 participants from 20 countries and 18 states, and close to 40 mentors. The plenary speaker, Dr. Jennifer Atkinson, Associate Professor of Environmental Humanities at the University of Washington, spoke about climate anxiety and grief, and how to engage in solutions and actions to confront them. She also held a mentoring session with high school students from the Museum's Science Research Mentoring Program (SRMP).

Based on the success of last year's SCCS-NY "alumni" panel, we again invited three prior SCCS participants to share insights about their career trajectories and the impact the Conference had on their professional development. The conference also offered leadership training, workshops, and networking opportunities for participants, whose excitement and positive energy affirmed how important it is to hold at least part of the Conference in person.

SCCS-NY Alumni Panel

Suzanne Pierre
Founder and Lead Investigator, Critical Ecology Lab

"Name the problem you want to work on – the tools you need will become apparent!"

Abe Borker
Program Director, UCSC Doris Duke Conservation Scholars Program

"Conservation is a team sport, we are seeking collective outcomes not individual achievement and that requires reciprocity and gratitude."

Clare Gupta
Associate Cooperative Extension Specialist, UC Davis

"Don't feel beholden by your Masters / PhD expertise or be afraid to explore, branch out!"

We put high-quality, relevant evidence into the hands of managers and policy-makers.

We are leading numerous high-impact research collaborations under the CBC's Evidence Initiative, which harnesses rigorous evidence assessment methods to support conservation planning and is led by Dr. Porzecanski. As part of our five-year collaboration with the United States Agency for International Development (USAID), now in its third year, we are providing on-demand insight and expert advice for agency teams engaged in applying evidence to a range of decisions concerning land and resource governance, natural resource management, climate change, and sustainable artisanal mining. Ms. Betley and Dr. **Sam Cheng**, Director of Conservation Evidence at WWF and now a CBC Visiting Scientist, conducted a systematic evidence review to assess existing evidence from hundreds of peer-reviewed articles from 2005-2020 on the links between participatory natural resource management and key aspects of democracy such as representation, advocacy, rights, justice, conflict resolution, and gender equality. The review found instances of both positive effects of participatory natural resource management on democratic outcomes (for example, building social capital and fostering key alliances), and also evidence of negative outcomes (for example, reproducing exclusionary norms), which points to the importance of considering broader impacts during management decisions. Together with Dr. Porzecanski they are also completing a year-long project to guide agency research and learning around artisanal and small-scale gold mining in Colombia.

As part of a collaboration with Conservation International, Dr. Cheng and Ms. Sigouin produced a systematic map of the evidence on natural climate solutions (NCS) —climate mitigation and adaptation measures linked to how we manage nature in the wild, in cities, and in working lands. NCS represent a growing field with significant potential to mitigate climate change, yet more robust evidence is needed to support effective decision-making. Through a review of primary research studies and systematic reviews, this map builds a stronger evidence base for policy and practice in order to catalyze future investment in NCS. In April, the team published their methods for the evidence map in *Environmental Evidence* and are currently in the final stages of drafting a manuscript detailing their full findings.

The Evidence Initiative team has received new funding from the WWF to conduct a review of the evidence on participatory monitoring and evaluation in conservation. The project will systematically review evidence on the practices and outcomes of participatory practices in biodiversity monitoring and interview practitioners around the world to produce guidance on best practices and strategic directions for WWF and other NGOs in the conservation field.

Long-term research and monitoring work led by the Grupo de Conservación Flamencos Altoandinos (GCFA), the regional flamingo conservation initiative coordinated by Dr. Arengo and colleagues, provided critical data to support the justification for the creation of a new National Park in Argentina. Parque Nacional Ansenuza affords the maximum protection to more than 185,000 hectares of wetland area within Mar de Ansenuza (or Laguna Mar Chiquita), the largest saltwater wetland in South America and the fifth largest in the world. An additional 475,000 hectares will be designated a National Reserve. This extensive wetland, encompassing close to one million hectares, supports hundreds of thousands of Andean, Chilean, and Puna flamingos; it also hosts an important nesting colony of Chilean Flamingos in addition to diverse resident and migratory waterbirds and shorebirds. This area has been recognized as a Wetland of International Importance by the Ramsar Convention since 2002.

Parque Nacional Ansenuza
Photo: Ministerio de Cultura de la Nación (CC BY-SA 2.0)

We seek to take full advantage of the growth in virtual communications while reprising activities at the Museum. Catch us online or onsite!

During the *Marshall M. Weinberg Student Conference on Conservation Science-New York 2022*, and as part of the *Mack Lipkin Man and Nature* series, the CBC partnered with the Museum's public programs team to present the onsite return of the Museum's popular SciCafe series. Dr. Timon McPhearson, Professor of Urban Ecology at New York University and Director of the Urban Systems Lab, spoke about "Cool Solutions for Hot Cities"—how cities can use urban systems science and big data to adapt to climate change in equitable ways.

Dr. Porzecanski has been invited to join "The Expedition"—a one-year project and virtual journey that convenes 24 women leaders from across the world, of all ages and with very different life stories, to find and share an approach to leadership that resonates with women. The Expedition is sharing updates via a podcast, and will develop a book and a multimedia collection in several languages.

As the world learns to manage an evolving COVID-19 pandemic, and confronts the repercussions of biodiversity loss and climate change along with social and political inequity and conflict, we are committed to continuing and strengthening our critical work in conservation. Biodiversity underpins our wellbeing, and ensuring it is protected and sustained into the future will provide the essential foundation for meeting all of these challenges. Looking towards our shared future, the CBC is thoughtfully considering how to apply and scale our expertise and work to catalyze urgent action—and amplify our conservation impact.

We endeavour to enter our fouth decade with innovative plans for transformative work that moves the conservation field forward and reveals new approaches and solutions for the complex conservation challenges facing us all.

Ana Porzecanski, Ph.D.
Director

Fall 2022 | Publications

Bradfield, A. A., Nagy, C. M., **Weckel, M.,** Lahti, D. C., & Habig, B. (2022). Predictors of Mammalian Diversity in the New York Metropolitan Area. Front. Ecol. Evol, 10, 903211. https://doi.org/10.3389/fevo.2022.903211

Caragiulo, A., Gaughran, S. J., Duncan, N., Nagy, C., **Weckel, M.,** & vonHoldt, B. M. (2022). Coyotes in New York City Carry Variable Genomic Dog Ancestry and Influence Their Interactions with Humans. Genes, 13(9), 1661. https://doi.org/10.3390/genes13091661

Douglas, L., Cook, L., & Smith, R. A. (2022). Human-wildlife conflict: Assessing the complexity of stakeholder perspectives. Network of Conservation Educators and Practitioners. Available from https://ncep.amnh.org

Henger C. S., Hargous E., Nagy C. M., **Weckel M.,** Wultsch C., Krampis K., Duncan N., Gormezano L., & Munshi-South J. (2022). DNA metabarcoding reveals that coyotes in New York City consume wide variety of native prey species and human food. PeerJ 10:e13788. https://doi.org/10.7717/peerj.13788

Kass, J., Takashina, N., Friedman, N., Kusumoto, B., & **Blair, M.** (2022). Idea Paper: improving forecasts of community composition with lightweight biodiversity monitoring across ecological and anthropogenic disturbance gradients. Ecological Research 37(4) 466-470. http://dx.doi.org/10.1111/1440-1703.12294

Moore, A.C., Hierro, L., Mir, N., & Stewart, T. (2022). Mangrove cultural services and values: Current status and knowledge gaps. People and Nature, 00, 1– 15. https://doi.org/10.1002/pan3.10375

Sandor M.E., Elphick C.S., & Tingley M.W. (2022). Co-extinctions from habitat loss could accelerate the current biodiversity crisis. Ecological Applications. 32(6) e2608. https://doi.org/10.1002/eap.2608

Stark, J., S. C. Cheng, **E. Betley**, and S. Tellingator. (2022). Linkages Between Participatory Natural Resource Management and Democratic Outcomes: A Review of the Evidence. Available from: https://pdf.usaid.gov/pdf_docs/PA00ZCBG.pdf

Fall 2022 | Presentations, Posters, Workshops, and Short Courses

Arengo, F. & Derlindati, E. (2022). Flamingo research and conservation in South America. Invited presentation (Virtual). British and Irish Wild Animal Keepers workshop, Bristol Zoo Garden, UK. 14 July 2022.

Blair, M.E., Aiello-Lammens, M.E., Chang, S., **Ersts, P.J., Galante, P.J.,** Gerstner, B.E., Grisales-Betancur, V., **Horning, N.,** Johnson, B., Kass, J.M., Merow, C., López-Lozano, D., Suarez-Valencia, E., Noguera-Urbano, E.A. Paz, A., Pinilla-Buitrago, G.E., Velásquez-Tibatá, J. & Anderson, R.P. (2022). Expanding Wallace species distribution modeling software to calculate biodiversity change indicators for conservation management and planning. Podium Presentation (Virtual). International Biogeography Society Annual Meeting, Vancouver, Canada. 5 June 2022.

Blair, M.E., Galante, P.J., Aiello-Lammens, M.E., Chang, S., **Ersts, P.J.,** Gerstner, B.E., Grisales-Betancur, V., **Horning, N**., Johnson, B.A., Kass, J.M., Merow, C., López-Lozano, D., Suarez-Valencia, E., Noguera-Urbano, E.A., Paz, A., Pinilla-Buitrago, G.E., Velásquez-Tibatá, J. & Anderson, R.P. (2022). Expanding the Wallace species distribution modeling software to calculate metrics of biodiversity change for conservation management and planning. Podium Presentation (Virtual). North American Congress for Conservation Biology. Reno, NV. 20 July 2022

Blair, M.E., Le, M.D., Penna, A., Everson, K.M., Weisrock, D.W. & Pozzi, L. (2022). Unlocking museum collections for primate phylogenomics and conservation: case studies from lorisiform primates. Podium Presentation. American Society of Primatologists Annual Meeting, Denver, CO. 25-28 August 2022.

Dobson, K.M., Carlos-Shanley, C., Schapiro, S.J., Lambeth, S., Burges, C., Clark, P. & **Blair, M.E.** (2022). A First Glimpse of the Captive Saimiri Gut Microbiome – Preliminary Data. Podium Presentation. American Society of Primatologists Annual Meeting, Denver, CO. 25-28 August 2022.

Groom, M., Pratt, J. & **Porzecanski, A.L.** (2022). Conservation literacy as interwoven literacies: A sharing and learning session. Interactive Session. North American Congress for Conservation Biology, Reno, NV, USA. 22 July 2022.

Kass J. M., Gerstner, B. E., Johnson, B. A., Chang, S. & **Blair, M. E.** (2022). Interactive, reproducible, and accessible species distribution modeling for conservation with Wallace. Workshop (Hybrid). North American Congress for Conservation Biology, Reno, Nevada, USA. 17 July 2022.

Porzecanski, A.L. Connected Women Leaders (CWL) Climate Justice Roundtable. Invited contributor. The Irish Mission Roundtable at the 77th Session of the United Nations General Assembly, New York, NY, USA. 19 September 2022.

Outreach and Media

Featuring **Le, M**. and special issue co-edited with **Blair, M.E.** "Wildlife don't recognize borders, nor does climate change. Conservation should keep up" by Jim Tan**.** https://news.mongabay.com/2022/04/wildlife-dont-recognize-borders-nor-does-climate-change-conservation-should-keep-up/. 28 April 2022)

Featuring **Blair, M.E.** "Instituto Humboldt y el Museo de Historia Natural de Nueva York unen esfuerzos por la biodiversidad colombiana". By Laura Garzón. http://humboldt.org.co/es/actualidad/item/1732-instituto-humboldt-y-el-museo-de-historia-natural-de-nueva-york-unen-esfuerzos-por-la-biodiversidad-colombiana. 11 April 2022.

Featuring **Weckel, M.** and recent publication (Henger et al. 2022). "Coyotes came to New York City, but not for our Pizza." New York Times. https://www.nytimes.com/2022/10/03/science/coyotes-new-york-diets.html. 3 October 2022.