

**American Museum
of Natural History**

**Center for Biodiversity
and Conservation**



Progress Update Fall 2023

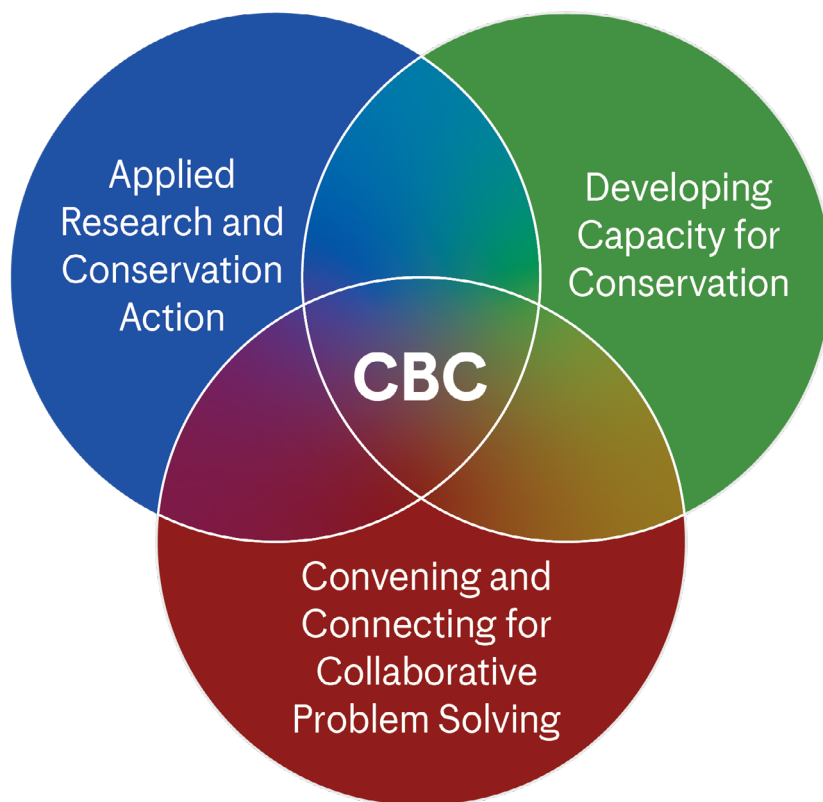
Photo: Brett Peterson / AMNH

Center for Biodiversity and Conservation

What we do

Understanding life on Earth and how to sustain it for the future is the fundamental challenge of our time. The American Museum of Natural History is devoted to understanding our universe, our planet, and our role as humans. Through its Center for Biodiversity and Conservation (CBC), the Museum acts on that understanding and advances our collective endeavor of learning to live in harmony with nature.

The CBC's work aims to bring strong evidence—from multiple sources of knowledge and perspectives—to bear on complex conservation challenges, and to foster collaboration on robust, innovative, and equitable solutions. The challenge is both scientific and social, so we work by connecting different strands of knowledge in our research, connecting people to knowledge, and connecting people to each other.



Both longstanding and new projects are helping us deepen synergies with other scientific work at the Museum, support decision-making under climate change, and contribute to local and regional conservation and climate resilience. We are pleased to share recent highlights from our work in this report.

News, Awards, and Appointments

It is an exciting time of growth, as recruitment is under way for a new Jaffe Chief Conservation Scientist and Curator, Rizavi Innovation in Conservation Fellow, and the newly launched Eleanor J. Sterling Postdoctoral Fellow!

We are pleased to share that Dr. Suzanne Macey has been promoted to Assistant Director for Capacity Development. Dr. Macey has been with CBC since 2015, and in this new role she will take a more comprehensive approach to our capacity development activities, including the Network of Conservation Educators and Practitioners, the Student Conference of Conservation Science-New York, as well as develop new collaborations.



Dr. Suzanne Macey conducting fieldwork in Black Rock Forest. Photo: Brett Peterson / AMNH

Dr. Mary Blair (Director of Biodiversity Informatics Research, CBC), was invited to join a new Specialist Group of the International Union for Conservation of Nature (IUCN) Species Survival Commission. The group is dedicated to protecting nocturnal primates and to improving awareness and knowledge to support their conservation worldwide.

A new National Aeronautics and Space Administration (NASA) award to Temple University and the CBC will allow an assessment of how NASA Earth Observation products support biodiversity decision-making. The project will focus on the application of these products in Colombia through analysis of three previous projects, including Dr. Blair's project on expanding Wallace software.

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

How are our livelihoods dependent on biodiversity? How do our actions impact biodiversity? How can we shift from being nature-negative to nature-positive? In order to answer these questions, the new Kunming-Montreal Global Biodiversity Framework urges businesses and financial institutions to monitor, assess, and disclose their risks, dependencies, and impacts on biodiversity. While our ability to measure carbon footprints has improved, we are significantly behind in measuring our footprint on biodiversity. Initial evaluations indicate that offsetting negative impacts on biodiversity will require businesses to reconsider their operations and engage with **nature-based interventions**.

Yet, nature-based interventions (NBIs)—measures to protect, manage or restore natural areas for climate change mitigation—are also poorly understood. In order to guide policymakers, investors, and researchers, the CBC participated in an important study that shows where knowledge gaps are regarding NBIs. Ms. Amanda Sigouin (Biodiversity Specialist, CBC), Dr. Ana Porzecanski (Director, CBC), and collaborators including Conservation International and World Wildlife Fund, created a systematic map of the available evidence on NBIs and their outcomes. The study sifted through thousands of peer-reviewed articles published over the last 30 or more years and identified key knowledge clusters and gaps. Among other findings, this map of the evidence shows that important types of NBIs lack significant research (see figure), and that much of the evidence relies on proxy measurements; climate mitigation outcomes are primarily measured in terms of indirect outcomes (e.g. changes in land cover and condition) and less often in terms of direct mitigation measures, such as carbon sequestration and GHG emissions, which can reduce accuracy and increase the risk of “double-counting.” Results will be published in *Environmental Evidence* at the end of October.

A “heatmap” showing the number of relevant articles that examined linkages between a given type of nature-based intervention, and climate outcomes. Most of the evidence available (dark green cells) focuses on two types of Nbi, land protection and restoration, and their outcomes for land use and condition. Comparatively, much fewer studies have investigated links to carbon sequestration and GHG emissions (last two rows). Modified from Cheng et al. 2023.

DIFFERENT NATURE-BASED INTERVENTIONS												CLIMATE CHANGE MITIGATION OUTCOMES
Protection		Forest & Other Land Use Management			Agricultural Management				Restoration			
172	64	98	17	2		20	2		44	10	Land use/ Land cover	
70	64	108	20	9		80	9	1	145	21	Land condition	
29	32	76	21	18		87	3	1	57	24	Carbon storage & sequestration	
7	3	17	11	11	8	6	1	1	6	2	Greenhouse gas emissions	

We work to protect charismatic, vulnerable species that can be ambassadors for ecosystem conservation.

Dr. Macey collaborated with Columbia University faculty and undergraduate students to expand her ongoing New York State turtle research to include spotted turtles (*Clemmys guttata*) in Summer 2023. Spotted turtles are currently being considered for federal protection under the Endangered Species Act and are found locally in Black Rock Forest, located in the Hudson Highlands, 60 miles north of New York City. This year's project used commercially-purchased GPS data loggers to collect movement and spatial ecology data of eight spotted turtles. Additionally, with support from the David Redden Conservation Research Fund, the team continues to develop simple low-cost GPS units that can be attached to small animals to collect their location data and send it through the internet to researchers at a fraction of the price of commercial units.



Eastern Box turtle fitted with a VHF radio.



Dr. Blair with colleagues at the International Primatological Society meetings in Malaysia.

In August 2023, Dr. Blair presented her work on a new species of pygmy loris at the International Primatological Society meetings in Kuching, Malaysia. In addition to being featured in talks and discussions at the congress, awareness of the new species has grown through media coverage, including by *Scientific American*. During a visit to Vietnam in May 2023, Dr. Blair met with leaders from the Hanoi University of Science (Vietnam National University, Hanoi) to advise on the planned renovation of the Hanoi Zoological Museum, where the type specimen of this new pygmy loris species is housed. Dr. Blair's discovery led to an invitation to join the new IUCN Species Survival Commission Specialist Group dedicated to nocturnal primates.

In July 2023, the CBC and its collaborators published concluding findings from a project on the interconnections between people and food in Solomon Islands. Based on data from four rural sites, the study shows that in the Pacific, a “nutrition transition” towards store-bought and processed food is implicated in poor health outcomes and lowered resilience to external influences driving biodiversity loss and the impacts of climate change. The results indicate that low dietary diversity in Solomon Islands is driven by a range of environmental and social factors including commercial logging. Art-based methods used in the study show that several components of the foodscape, including Indigenous knowledge and practice, and access to land, have supported resilience to major disturbances such as severe weather events in the past. The findings indicate that efforts to improve nutrition should leverage community and regional networks and enhance local understandings of food sovereignty. This project was part of a larger initiative to understand well-being that was led by the late Dr. Eleanor Sterling (Chief Conservation Scientist Emerita, CBC), between 2014 and 2020. The initiative was supported by two grants from the National Science Foundation (NSF), as well as The Tiffany & Co. Foundation, Lynnette and Richard Jaffe, the Jaffe Family Foundation, and the Science for Nature and People Partnership (SNAPP).



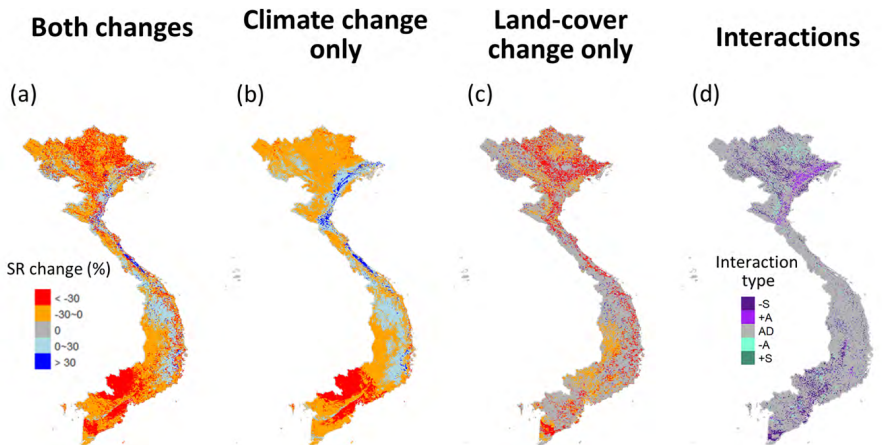
Our software tools are used daily to support the analysis of biodiversity data and have been cited in hundreds of peer-reviewed articles and government reports.

Maxent, the CBC-hosted world-renowned software for modeling species niches and distributions, has been cited more than 17,900 times; the most recent version has now been cited 1,800 times, totaling nearly 20,000 citations. For example, this past season, Maxent supported published studies on the interactive effects of climate and land-cover changes on bats in Vietnam, the endangered Sardinian grass snake, how climate change disrupts core habitats of marine species, and transmission hotspots for zoonotic disease.

ORIGINAL RESEARCH

Check for updates

Potential individual and interactive effects of climate and land-cover changes on bats and implications for conservation planning: a case study in Vietnam

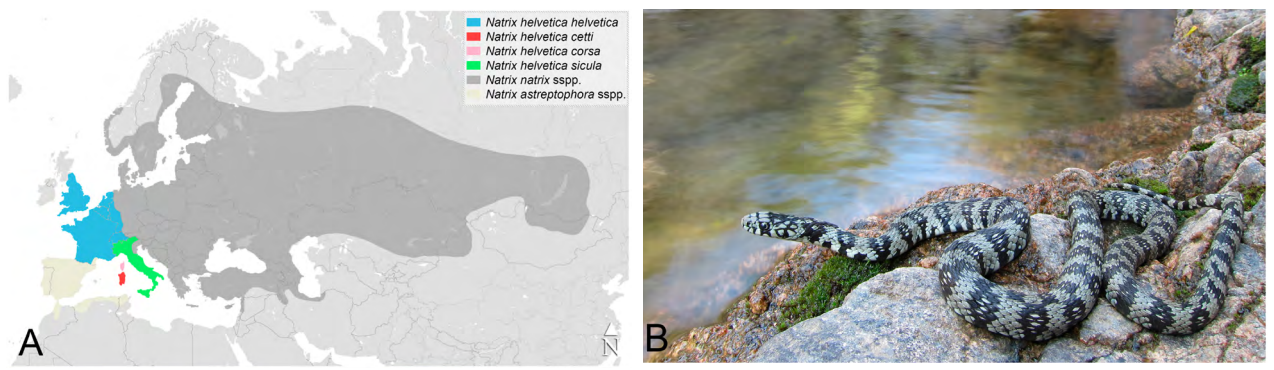


life

MDPI

Article

The Endangered Sardinian Grass Snake: Distribution Update, Bioclimatic Niche Modelling, Dorsal Pattern Characterisation, and Literature Review



Capacity Development

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

In everything we do, we continue to prioritize open education and resources and the creation of inclusive environments so citizens, students, and *all* professionals can pursue their careers and contribute solutions.

The CBC's 14th annual conference for students and early-career professionals—the *Marshall M. Weinberg Student Conference on Conservation Science-New York 2023*—marked the return of the Conference to the Museum's campus. Over 150 participants joined us at the Museum, and over 30 online, during three days of workshops and presentations by participants representing 22 states and 21 countries. Over 50 mentors provided feedback to participants at various stages of their experience, from helping participants prepare Conference applications to offering advice during the Conference's dedicated networking sessions.

The plenary speaker was Dr. Nyeema Harris (Knobloch Family Associate Professor of Wildlife and Land Conservation, Yale School of the Environment). In her plenary talk, Dr. Harris talked about how one might build an impactful career as an "ologist," in a way that is aligned with one's identity and value system, and how to leverage authenticity, passion, and commitment into a research career.

The Conference once again featured a panel of conservation practitioners who shared 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 enthusiasm and innovative work energized both peers and mentors.



Photo: Matt Shanley / AMNH

In May 2023, Dr. Blair and collaborators held a two-day workshop, titled “Developing capacity and informing priorities for ape conservation under climate change in Vietnam,” at Hanoi University of Science in Hanoi, Vietnam. Participants provided input to produce expert-informed projections for how climate change may affect gibbons in Vietnam. The CBC also provided training to participants on new machine learning methods that can predict potential changes in species distributions due to climate change. This ongoing project is supported by the Arcus Foundation.



In June 2023, the CBC's Network of Conservation and Practitioners (NCEP) convened a group of 12 post-secondary conservation educators from six states and eight countries for the CBC's 10th Conservation Teaching and Learning Studio. This Studio, which was virtual and highly interactive, was tailored to early-career professionals.



The National Science Foundation-supported OCELOTS (Online Content for Experiential Learning of Tropical Systems) Research and Coordination 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. Under the leadership of Dr. Macey and collaborators at Iowa State University, the network has grown in two years to include 75 members across 16 countries. Twelve educational modules on tropical ecology have been published and used in 71 classrooms, reaching more than 1,000 undergraduate students.



Convening and Connecting

Catalyzing connections among key actors to innovate and gather strong evidence for action.

As part of a five-year collaboration with the Integrated Natural Resource Management (INRM) consortium, the CBC is providing expert advice to the United States Agency for International Development (USAID) on land and resource governance, natural resource management, and climate change. Over the past six months, the CBC has helped USAID answer two key questions around climate change:

How can USAID support its 80+ Missions and programs in the face of a changing climate? Ms. Erin Betley (Biodiversity Specialist, CBC), was part of an INRM team that completed a year-long evidence review of how climate change information can be integrated into biodiversity programs by donor, NGO, and other organizations. The review was well-received by USAID's Biodiversity Division, and the team is integrating these and other findings into a comprehensive guide for Missions on climate-resilient biodiversity conservation.

How can USAID measure progress towards its climate strategy targets, including fostering systems change? The CBC contributed to a review of evidence and guidance documents for USAID Missions around the world focused on planning and reporting systemic change work. INRM is now working with USAID to support up to 12 Missions as they implement this guidance for the current reporting cycle.

Conservation organizations are making efforts to work in more inclusive ways with local partners. To inform these efforts, in collaboration with the World Wildlife Fund (WWF), the CBC completed a review of participatory monitoring and evaluation (PME) in conservation. This approach to monitoring has been linked to better conservation outcomes when applied to issues that are meaningful to local communities. The review highlights insights around successes and challenges, and provides recommendations to guide PME practices in the conservation field. The CBC and partners convened a symposium at the International Congress on Conservation Biology in Rwanda in Summer 2023 to present and discuss the findings and practical implications, and is preparing these for publication.



The CBC has embarked on a nascent collaboration with New York City Department of Parks and Recreation and Princeton University's High Meadows Environmental Institute to better understand the use of aquatic wildlife in New York City. Throughout New York City, and particularly in Jamaica Bay, harvest and trade of aquatic organisms such as crustaceans, fish, turtles, and mollusks are thought to be increasing, with potential significant risks to the health of wildlife and people. Enforcement efforts may also negatively impact the harvesting communities, whose motivations are poorly understood.

During Summer 2023, two undergraduate interns at Princeton University carried out a literature review, stakeholder analysis, field site visits, and informant interviews in a effort to begin to map out the ecological, social, and environmental justice dimensions of this complex issue. The interns presented their results to mentors from Princeton University, CBC, and New York City Parks in August 2023. Their findings reveal a poor understanding of the relative prevalence of recreational versus subsistence harvesting, of the effects of harvesting on the local wildlife populations, and low harvester awareness of potential pollutants, indicating a clear need for more research. Discussions on the future direction of this collaborative project are ongoing.



Outreach

We are expanding our outreach to diverse audiences. Catch us online or onsite!

Dr. Blair was featured in the August 1, 2023 episode of *The Moth* podcast, in which she shared a story about her family's Indigenous heritage as Sámi reindeer herders and how that influences her work on climate change. She was also invited by the Society of Leadership Fellows to join a podcast about how biodiversity is affected by the climate crisis.

Dr. Porzecanski was one of four community panelists to speak following Theater of War's powerful reading of *Oedipus Rex*, which the Museum hosted in the Milstein Family Hall of Ocean Life as part of Climate Week NYC. She was also the invited keynote speaker at the Summer Green Teams Final Presentations event, where undergraduate student interns in the PSEG Institute for Sustainable Studies' Green Teams Program at Montclair State University presented the outcomes of their sustainability projects.

The CBC collaborated with the Museum's public programs team to produce a conservation-oriented SciCafe event—the first one of the season. On October 4, 2023, "SciCafe: Protecting Our Crowded Planet" featured a discussion led by Dr. Nyeema Harris (Knobloch Family Associate Professor of Wildlife and Land Conservation, Yale School of the Environment), on the realities of sharing our planet with nature and protecting the ecosystems we rely so heavily upon, in light of the global initiative to protect 30 percent of the planet by 2030. Over 300 people attended the event.



Photo: Alvaro Keding / AMNH



Photo: Matt Shanley / AMNH



Fall 2023

Publications

Betley, E., Blair, M. E., & Cullman, G. (2023). Eleanor Jane Sterling (1960–2023). *Nature Ecology & Evolution*, 7(6), 790–791. <https://doi.org/10.1038/s41559-023-02054-4>

Cheng, S. H., Costedoat, S., **Sigouin, A.**, Calistro, G. F., Chamberlain, C. J., Lichtenthal, P. Mills, M., Nowakowski, A. J., **Sterling, E. J.**, Tinsman, J., Wiggins, M., Brancalion, P. H. S., Canty, S. W. J., Fritts-Penniman, A., Gurwick, N., Jagadish, A., Jones, K., Mascia, M., **Porzecanski, A. L.**, Zganjar, C., & Muñoz Brenes, C. L. (2023). Assessing evidence on the impacts of nature-based interventions for climate change mitigation: A systematic map of primary and secondary research from subtropical and tropical terrestrial regions. *Environmental Evidence* 12 (21).

McCarter, J., Cullman, G., **Betley, E.**, Albert, S., Albert, J., Holland, P., **Horning, N.**, Jupiter, S. D., Taqu, M., Woltz, H., & **Sterling, E. J.** (2023). Exploring Changes in Foodscapes in Western Province, Solomon Islands. *Human Ecology*, 51(3), 483–496. <https://doi.org/10.1007/s10745-023-00419-8>

Miller, E., Luhrs, A., Mancini, A., **Blair, M.**, & Pozzi, L. (2023). Assessing ecological divergence and speciation scenarios of the *Paragalago zanzibaricus* species complex through climatic niche modeling. *International Journal of Primatology* (In Press). <https://doi.org/10.1007/s10764-023-00374-7>

Presentations, Posters, Workshops, and Courses

Blair, M. E., Le, M. D., Nguyen, T. A., & **López-Lozano, D.** (2023). Developing capacity and informing priorities for ape conservation under climate change in Vietnam. Workshop. Hanoi University of Science, Vietnam National University, Hanoi, Vietnam. 18-19 May 2023.

Blair, M. E., Cao, G. T. H., López-Nandam, E. H., Veronese-Paniagua, D. A., Birchette, M. G., Kenyon, M., Md-Zain, B. M., Munds, R., Nekaris, K. A. I., Nijman, V., Roos, C., Thach, H. M., **Sterling, E. J.**, & Le, M. D. (2023). Molecular phylogenetic relationships and unveiling novel genetic diversity among slow and pygmy lorises, including resurrection of *Xanthonycticebus intermedius*. Podium presentation. International Primatological Society Congress, Kuching, Malaysia. 24 August 2023.

Blair, M. E. (2023). Creating supportive fieldwork environments for all primatologists. Invited podium presentation to the symposium "Diversifying perspectives: A new ethic for primatology." International Primatological Society Congress, Kuching, Malaysia. 21 August 2023.

Dobson, K. M., Pruetz, J., Schapiro, S. J., Lambeth, S., Burges, C., Clark, P., **Blair, M. E.**, & Carlos-Shanley, C. (2023). Comparing simple cores: the gut microbiome of captive housed Saimiri. Poster Presentation. American Society of Primatologists Annual Meeting, Reno, NV. 20 June 2023.

Dobson, K. M., Pruetz, J., Schapiro, S. J., Lambeth, S., Burges, C., Clark, P., **Blair, M. E.**, & Carlos-Shanley, C. (2023). Captive housing features influence on the gut microbiome of squirrel monkeys (Saimiri). Podium Presentation. American Society of Primatologists Annual Meeting, Reno, NV, 20 June 2023.

Garcia, R., **Macey, S. K.**, Fredericks, A., & Palmer, M. (2023). Home on the range where the turtles and the thermal sensors play (or stay): Assessing box turtle home ranges to determine optimal thermal sensor placement. Poster Presentation. The Hudson Highlands Research Symposium. 26 June 2023.

Gerstner, B.E., **Blair, M.E.**, Zarnetske, P.L. (2023). Exploring geodiversity as a tool to enhance species distribution models for mammals in the Northern Andes. Ecological Society of American Annual Meeting, Portland, OR, 7 August 2023.

Penna, A., **Blair, M. E.**, & Pozzi, L. (2023). Unlocking museum collections: promises and challenges of museomic studies in African galagids. Podium presentation. International Primatological Society Congress, Kuching, Malaysia. 24 August 2023.

Porzecanski, A. L., Blair, M. E., DeSalle, R., **Macey, S. K.**, Oppenheim, S., & Raxworthy, C. (2023). Foundational Papers in Ecology, Evolution and Informatics. Fall semester course for PhD students at the Richard Gilder Graduate School (RGGS), American Museum of Natural History, New York, NY. September-December 2023.

Porzecanski, A. L. (2023). From understanding to sustaining: on biodiversity and women's leadership – a session to share and explore insights from our paths in the conservation field, and how to sustain the work ahead. Invited featured speaker. Rewild WiNN (Women in Nature Network) Speaker Series. 14 September 2023.

Porzecanski, A. L. (2023). Biodiversity and You. Invited keynote speaker. Green Teams Summer Internship Program's Final Presentations event, PSEG Institute for Sustainable Studies, Montclair State University, Montclair, NJ. 2 August 2023.

Porzecanski, A. L., Sigouin, A., Gazit, N., Betley, E., Lichtenthal, P., Pacheco, P., Cheng, S.H., & Mahajan, S. (2023). Inclusive approaches to monitoring and evaluation in conservation. Invited speaker in symposium; virtual attendance. Society for Conservation Biology (SCB)'s 31st International Congress for Conservation Biology (ICCB 2023). Kigali, Rwanda. 23-27 July 2023.

Porzecanski, A. L. & Macey, S. K. (2023). The Network of Conservation Educators and Practitioners (NCEP) 10th Annual Conservation Teaching and Learning Studio: "Starting Strong: Active Teaching for Early-Career Conservation Educators." Virtual Workshop organizer and co-leader. Center for Biodiversity and Conservation at the American Museum of Natural History, New York, NY. Four dates: 21, 23, 26, 28 June 2023.

Russell, A., & **Macey, S. K.** (2022-2023). OCELOTS Incubator: Creating an online module in tropical biology. Workshop Series. Sept 2022 – May 2023.

Russell, A., & **Macey, S. K.** (2023). OCELOTS FMN: Implementing an online module in tropical biology. Workshop Series. Jan 2022 – May 2023.

Russell, A., & **Macey, S. K.** (2023). OCELOTS: Incubator - Fall 2023: Creating an online module in tropical biology. Workshop Series. September – December 2023.

Stute, M., **Macey, S. K.**, Strangas, M., Palmer, Austermann, J., M. I., Brenner, L., Hemming, S., Klopp, J., Lawrence, J., & Madajewicz, M. (2023). Environmental Science Senior Seminar. Full course for upper-class undergraduate Columbia University students in Ecology, Evolution, and Environmental Biology, Department of Earth and Environmental Science, and Sustainable Development majors, and Barnard College students in Environmental Science, Environmental Biology, and Environment and Sustainability majors. New York, NY. September 2022 – April 2023.

Thach, H. M., **Blair, M. E.**, & Nguyen, H. M. (2023). Engagement of diverse actors: Lessons learned from inclusive primate field research in Vietnam. Invited podium presentation to the symposium "Diversifying perspectives: A new ethic for primatology." International Primatological Society Congress, Kuching, Malaysia. 21 August 2023.

Outreach and Media

Blair, M. E. (2023). Cute and Ugly Pygmy Lorises are actually Two Different Species. Featured interviewee. By Nuwer, R. Scientific American 328(6). 1 June 2023. <https://www.scientificamerican.com/article/cute-and-ugly-pygmy-lorises-are-actually-two-different-species/>

Blair, M. E. (2023). "Grey Areas." The Moth Storytelling Radio Hour and Podcast. 25 July 2023. <https://themoth.org/stories/grey-areas> or <https://www.youtube.com/watch?v=XTFpcRTpLpY>

Blair, M. E. (2023). "Finding Family – and a Reindeer Herd – in Norway's Far North." By Shahbazi, A. Study of Environmental Arctic Change News Post. 26 Sept 2023. <https://searcharcticsscience.org/highlights/finding-family-and-a-reindeer-herd-in-norways-far-north/>

Levesque, C., & **Macey, S. K.** (2023). The Secrets of Black Rock Forest. Featured interviewee. By Hond, P. Columbia Magazine. Fall 2023. <https://magazine.columbia.edu/article/secrets-black-rock-forest>.

Porzecanski, A. L. (2023). "The Oedipus Project." Invited panelist. A reading of "Oedipus the King" to catalyze audience-centered conversation about climate change, ecological disaster and environmental justice. Co-presented by Theater of War Productions and the American Museum of Natural History (AMNH). New York, NY. 20 September 2023.

Porzecanski, A. L. (2023). Seminar Host for "Māori Story Telling: The Connectivity of Indigenous Narratives Told Through the Stories of Treasures." A presentation by and conversation with Dr. Hinemoa Elder. Co-hosted by the Center for Biodiversity and Conservation and the Anthropology Department. Linder Theater, American Museum of Natural History (AMNH). New York, NY. 10 October 2023.