

Editorial

Regional Conservation, Research, and Education: Ways Forward

Ursula S. Bechert

School of Arts & Sciences, University of Pennsylvania, 3440 Market Street, Suite 450, Philadelphia, PA 19104, USA;
bechertu@sas.upenn.edu

There are currently over 8 billion people on Earth, a figure which grows by approximately 67 million annually; <https://www.worldometers.info/> (accessed on 3 March 2023). As an IUCN report stated over 30 years ago, “The combined distributive impacts of an affluent resource-consuming minority and a poor majority struggling to stay alive are inexorably and rapidly destroying the buffer that has always existed, at least on a global scale, between human resource consumption and the planet’s productive capacity” [1]. More and more people are relying on less and less land for sustenance; human social and economic developments are inextricably linked to biological diversity and the health of ecosystems. So, conservation is complicated.

Environmental conservation groups comprise one of the fastest growing nonprofit sectors [2], and among these are some organizations that are in fact antienvironmental in their actions [3]. Groups vie for donor support, and even when significant funding is available, large international conservation organizations often struggle to spend funds on prioritized projects [4]. Failure to understand the human cultural, political, and socioeconomic factors in a particular geographic area can contribute to the failure of conservation initiatives [5]. Transfrontier conservation areas (TFCAs) in Southern Africa conserve biodiversity across country borders by engaging people across all levels of governance (e.g., political leaders, local communities, nongovernmental organizations (NGOs), and private sector) in the process of decision making [6]. However, this process is ongoing as human populations continue to grow, wildlife habitats diminish in size, and human–wildlife conflicts increase in frequency [7]. Conservation reserves increase connectivity across protected areas to allow for the movement of animals for breeding purposes and in response to climate change, and thereby create more resilient ecosystems [8]. Connecting landscapes to preserve biodiversity is the mission of several organizations in the U.S. (e.g., the Wildlands Network) and is a common strategy for some NGOs such as The Nature Conservancy [9]. The federal government’s America the Beautiful Initiative supports locally led efforts with the goal of conserving at least 30% of the nation’s lands and waters by 2030 [10]. Such large-scale projects require collaboration across a wide range of organizations [11].

This Special Issue explores how zoos, aquaria, and botanical gardens work with different kinds of organizations on local or regional conservation projects. Zoos and aquaria represent some of the biggest nonprofits involved in ex situ conservation [12]; however, local and regional in situ conservation projects are now being pursued by more zoos, aquariums, and botanical gardens than ever before. Unfortunately, many conservation organizations operate independently from one another or with other institutions only on a project-by-project basis [13]. The inability to link different types of organizations across institutional and disciplinary boundaries frequently results in fragmented (e.g., species-specific) or unprioritized research, inefficient resource utilization, duplication, and lack of accountability regarding the long-term continuity of programs or the actual implementation of research results. Existing linkage organizations are primarily sector-specific (e.g., the American Association of Zoos and Aquariums). Most individual research and education institutions have their own libraries and database systems, but many cannot talk to one another, or their datasets are focused within and serve specific disciplines.



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Regionally organized cooperatives can serve as instruments for capacity building and disseminate scientific research results beyond traditional publications through integration into educational programs and conservation initiatives. A central organizing body can reduce the transactional costs for collaborating organizations, provide a more competitive funding platform, and improve conservation outcomes [13]. Thoughtfully considering how different partnerships should be structured and managed can contribute to long-lasting relationships and successful projects [14]. Very little research has been carried out on the management of collaborative conservation projects and their outcomes [15]. The Free Roaming Equids and Ecosystem Sustainability Network (FREES) is an example of an organizing body, pulling together disparate organizations in Utah to cooperatively manage free-roaming equid populations as a demonstration project. Similarly, zoos, botanical gardens, and aquaria often partner with a broad range of organizations [14,16,17] to pursue common conservation goals.

Most nonprofit organizations focus conservation efforts on in situ, terrestrial, state-specific projects—primarily with birds, followed by fish and then mammals [12]. Megacharismatic mammal as well as bird and fish conservation projects typically receive more funding compared to reptile, amphibian, and invertebrate projects because these species are favored by the general public and government policy agendas [18]. To counter this, zoos, aquaria, and botanical gardens are helping the public better understand the important roles that lesser-known species play in our ecosystems (e.g., Sonoyta pupfish (*Cyprinodon macularis eremus*) and Quitobaquito spring snail (*Tryonia quitobaquiae*) [17]). Zoo-based projects often focus on the conservation of a single species (e.g., amphibians [19], small mammals [16], and reptiles [20]). They frequently serve as ex situ sites for breeding endangered species, which then get released into the wild through partnerships with other organizations. However, zoos, aquaria, and botanical gardens can also get involved in advocacy, research, restoration, and rehabilitation. The sea otter (*Enhydra lutris*) rehabilitation program, initiated by the Monterey Bay Aquarium in 1984, has grown to involve multiple activities including the coordination of a stranding response, husbandry, research, veterinary care, release, population monitoring, and advocacy to implement policy change [21]. By focusing on the conservation of local or endemic species, zoos, aquaria, and botanical gardens can leverage resources from regional agencies and organizations, engage their staff and local communities in the process, and educate the public about the vital role native species play in their own backyard. Over its 70-year history, the Arizona-Sonora Desert Museum has served as a partner in advocacy, captive breeding and field research, and long-term phenology studies and as the lead for the regional management of invasive grasses; it has also helped to develop a community conservation plan [17].

Evaluation tools can be used to better understand and align an organization's goals with their conservation efforts [22]. How conservation organizations describe their mission and are structured plays a critical role in their ability to conserve biodiversity [23]. The Minnesota Zoo is designated as a state agency, so their conservation projects naturally focus on native species. They have found it relatively easy to partner with other state agencies on conservation initiatives, but project-specific grant funds have a tendency to silo personnel [24]. The North Carolina Zoo is the world's largest natural habitat zoo; they protect and manage over 2000 acres of land in collaboration with other agencies to preserve native species and provide hiking trails for the local community [25]. Collectively, this Special Issue highlights lessons learned and how creative partnerships can result in innovative conservation initiatives that would not otherwise be possible for individual organizations.

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References

- McNeely, J.A.; Miller, K.R.; Reid, W.V.; Mittermeier, R.A.; Werner, T.B. *Conserving the World's Biological Diversity*; WRI, 1709 New York Ave., N.W., Washington, D.C. 20006; CI, 2011 Crystal Dr #600, Arlington, VA 22202; WWF-US, 1250 Twenty-Fourth Street, N.W. P.O. Box 97180 Washington, DC 20090-7180; and the World Bank, 2121 Pennsylvania Avenue, NW, Washington, DC, USA; IUCN: Gland, Switzerland, 1990; pp. 1–185.
- Straughan, B.; Pollack, T. *The Broader Movement: Nonprofit Environmental and Conservation Organizations 1989–2005*; National Center for Charitable Statistics: Washington, DC, USA, 2008.
- Stein, J.; Beckel, M. A Guide to Environmental Non-Profits. Mother Jones 2006: Mar/Apr Issue. Available online: <https://www.motherjones.com/environment/2006/03/guide-environmental-non-profits/> (accessed on 23 February 2023).
- Halpern, B.S.; Pyke, C.R.; Fox, H.E.; Haney, C.; Schlaepfer, M.A.; Zaradic, P. Gaps and mismatches between global conservation priorities and spending. *Conserv. Biol.* **2006**, *20*, 56–64. [[CrossRef](#)] [[PubMed](#)]
- Bennett, N.J.; Roth, R.; Klain, S.C.; Chan, K.; Christie, P.; Clark, D.A.; Cullman, G.; Curran, D.; Durbin, T.J.; Epstein, G.; et al. Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biol. Conserv.* **2017**, *205*, 93–108. [[CrossRef](#)]
- Hanks, J. Transfrontier conservation areas (TFCAs) in southern Africa. *J. Sust. Forest.* **2003**, *17*, 127–148. [[CrossRef](#)]
- Stoldt, M.; Gottert, T.; Mann, C.; Zeller, U. Transfrontier conservation areas and human-wildlife conflict: The case of the Namibian component of the Kavango-Zambezi (KAZA) TFCA. *Sci. Rep.* **2020**, *10*, 7964. [[CrossRef](#)] [[PubMed](#)]
- Belote, R.R.; Dietz, M.S.; Jenkins, C.N.; McKinley, P.S.; Irwin, G.H.; Fullman, T.J.; Leppi, J.C.; Aplet, G.H. Wild, connected, and diverse: Building a more resilient system of protected areas. *Ecol. Applic.* **2017**, *27*, 1050–1056. [[CrossRef](#)]
- Davies, Z.G.; Kareiva, P.; Armsworth, P.R. Temporal patterns in the size of conservation land transactions. *Conserv. Lett.* **2010**, *3*, 29–37. [[CrossRef](#)]
- Fact Sheet: Biden-Harris Administration Celebrates Expansion of Locally-Led Conservation Efforts in First Year of “America the Beautiful” Initiative. 20 December 2021. Available online: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/20/fact-sheet-biden-harris-administration-celebrates-expansion-of-locally-led-conservation-efforts-in-first-year-of-america-the-beautiful-initiative/> (accessed on 22 December 2022).
- Bode, M.; Probert, W.; Turner, W.R.; Wilson, K.A.; Venter, O. Conservation planning with multiple organizations and objectives. *Conserv. Biol.* **2010**, *25*, 295–304. [[CrossRef](#)] [[PubMed](#)]
- Armsworth, P.R.; Fishburn, I.S.; Davies, Z.G.; Gilbert, J.; Leaver, N.; Gaston, K.J. The size, concentration, and growth of biodiversity-conservation nonprofits. *BioScience* **2012**, *62*, 271–281.
- Mace, G.M.; Balmford, A.; Boitani, L.; Cowlshaw, G.; Dobson, A.P.; Faith, D.P.; Gaston, K.J.; Humphries, C.J.; Vane-Wright, R.I.; Williams, P.H.; et al. It's time to work together and stop duplicating conservation efforts. *Nature* **2000**, *405*, 393. [[CrossRef](#)]
- Raschke, A.B.; Pegram, K.V.; Melkonoff, N.A.; Davis, J.; Blackwell, S.A. Collaborative conservation by botanical gardens: Unique opportunities for local to global impacts. *J. Zool. Bot. Gard.* **2022**, *3*, 463–487. [[CrossRef](#)]
- Wilkins, K.; Pejchar, L.; Carroll, S.L.; Jones, M.S.; Walker, S.E.; Shinbrot, X.A.; Huayhuaca, C.; Fernandez-Gimenez, M.E.; Reid, R.S. Collaborative conservation in the United States: A review of motivations, goals, and outcomes. *Biol. Conserv.* **2021**, *259*, 109165. [[CrossRef](#)]
- Brown, J.; Puccia, L. Ex situ breeding program with wild-caught founders provides the source for collaborative effort to augment threatened New England cottontail populations. *J. Zool. Bot. Gard.* **2022**, *3*, 573–580. [[CrossRef](#)]
- Colodner, D.; Franklin, K.; Ivanyi, C.; Wiens, J.F.; Poulin, S. Why partner with a zoo or garden? Selected lessons from seventy years of regional conservation partnerships at the Arizona-Sonora Desert Museum. *J. Zool. Bot. Gard.* **2022**, *3*, 725–737. [[CrossRef](#)]
- Czech, B.; Krausman, P.R.; Borkhataria, R. Social construction, political power, and the allocation of benefits to endangered species. *Conserv. Biol.* **1998**, *12*, 1105–1112. [[CrossRef](#)]
- Harris, T.R.; Heuring, W.L.; Allard, R.A.; Owens, A.K.; Hedwall, S.; Crawford, C.; Akins, C. Over 25 years of partnering to conserve Chiricahua Leopard frogs (*Rana chiricahuensis*) in Arizona, combining ex situ and in situ strategies. *J. Zool. Bot. Gard.* **2022**, *3*, 532–544. [[CrossRef](#)]
- Montague, G. Head-starting and conservation of endangered Timber rattlesnakes (*Crotalus horridus horridus*) at Roger Williams Park Zoo. *J. Zool. Bot. Gard.* **2022**, *3*, 581–585. [[CrossRef](#)]
- Konrad, L.; Fujii, J.A.; Hazan, S.; Johnson, A.B.; Mayer, K.A.; Murray, M.J.; Nicholson, T.E.; Staedler, M.M.; Young, C. Southern sea otter rehabilitation: Lessons and impacts from the Monterey Bay Aquarium. *J. Zool. Bot. Gard.* **2022**, *3*, 641–652. [[CrossRef](#)]
- Maynard, L.; Cadena, B.; Thompson, T.; Pence, V.; Philpott, M.; O'Neil, M.; Pritchard, M.; Glenn, J.; Reilly, B.; Hubrich, J.; et al. Local plant and insect conservation evaluated with organizational identity theory. *J. Zool. Bot. Gard.* **2023**, *4*, 214–230. [[CrossRef](#)]
- Sutherland, W.J.; Adams, W.M.; Aronson, R.B.; Aveling, R.; Blackburn, T.M.; Broad, S.; Ceballos, G.; Cote, I.M.; Cowling, R.M.; Da Fonseca, G.A.B.; et al. One hundred questions of importance to the conservation of global biological diversity. *Conserv. Biol.* **2009**, *23*, 557–567. [[CrossRef](#)]

24. Mallinger, M.; Markle, T.; Minerich, B.; Nordmeyer, C.; Runquist, E.; Stapleton, S. Understanding how the unique context of the Minnesota Zoo shapes our local conservation initiatives. *J. Zool. Bot. Gard.* **2023**.
25. Roznik, E.A.; Buckanoff, H.; Langston, R.W.; Smith, D. Conservation through collaboration: Regional conservation programs of the North Carolina Zoo. *J. Zool. Bot. Gard.* **2023**.

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