

Bridging worlds: exploring synergies between the arts and biodiversity conservation

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Collaborations between biodiversity conservation and the arts can lead to synergies and fresh approaches to intractable problems. These collaborations can yield diverse mutual benefits, such as offering reciprocal sources of inspiration, information, and learning; providing one another with new tools and resources for synthesis and innovation; securing funding; and contributing to increased visibility and influence. The arts may be uniquely poised to raise awareness, influence behavioral change, improve well-being, and assist with developing conservation tools and materials. Likewise, conservation can provide artists with relevant expertise, nature-based art material, samples, and resources, as well as inform sustainability aspects of the arts. Effective synergies between the arts and conservation will necessitate greater funding and institutional support, improved willingness to collaborate, better recognition of the benefits of artists' involvement in interdisciplinary conservation teams, and sound empirical methods to gauge such collaborations.

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Biodiversity conservation (hereafter, conservation) is an interdisciplinary pursuit aimed to tackle global environmental changes not only with science but also with creativity,

innovation, and public engagement (Clark *et al.* 2020; Gould 2023). Consequently, the value of the arts for conservation is increasingly recognized (Clark *et al.* 2020).

As a team of conservation scientists and artists involved in conservation-related art, we acknowledge that conservation scientists and practitioners (hereafter, conservationists) and artists are often motivated by the same values. Here, we highlight existing interactions between the arts and conservation, reciprocal benefits (Figures 1 and 2), and opportunities and challenges to achieve synergies.

In a nutshell:

- Collaborations between conservation and the arts can result in unique synergies and mutual benefits
- The arts can contribute to conservation as sources of inspiration, innovation, well-being, and information, as well as tools for synthesis and analysis; the arts can also support scientific publishing, communication, education, marketing, fundraising, and conservation tools, and can shape social norms and behavior
- Conservation can support the arts through expertise, information, funding, natural materials, and inspiration, while also guiding sustainable art practices

Contributions of the arts to conservation

A source of inspiration, innovation, and well-being

Conservationists can benefit from being exposed to or practicing the arts as a source of inspiration and innovation (Aslan *et al.* 2014; Gould 2023). The arts often critically reflect or reimagine society, encapsulating its values, challenges, and aspirations, and so can inform conservation objectives by promoting consideration of different perspectives, frameworks, and approaches. Artistic practice can also improve conservationists' well-being and help alleviate solastalgia or ecoanxiety (Boon 2022). It can also help communicate attitudes toward wildlife (eg biophobias; Mammola *et al.* 2025a) by stimulating dialogue and shared understanding via non-verbal communication.

A source of data and information

Historical art can provide insights into past biodiversity, references for restoration, and past societies' perceptions of, and interactions with, nature (Guagnin *et al.* 2016; Stimpson

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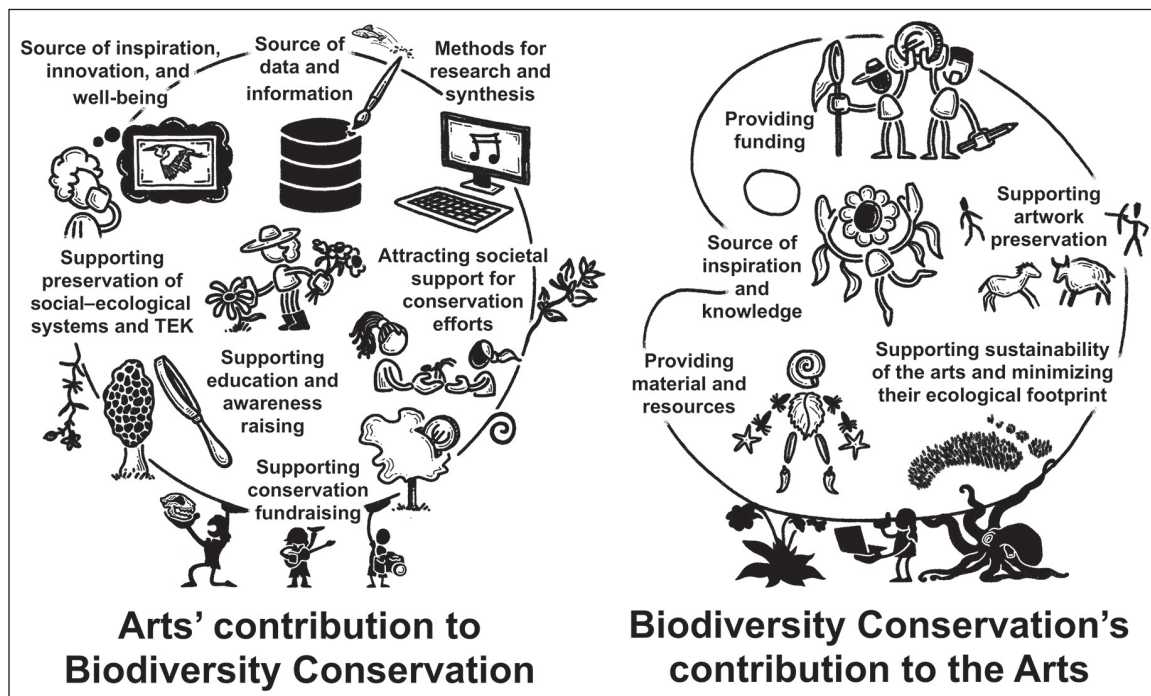


Figure 1. Different types of interactions between the arts and conservation (illustrations by J Malumbres-Olarte).

and Kemp 2023; Davis *et al.* 2025). Chinese poems of the Tang and Song dynasties (7th century CE–13th century CE) helped reconstruct past phenological records, temperature anomalies, and changes in climate (Liu *et al.* 2021). Prehistoric art can be particularly valuable for conservationists because it predates written records and can enhance our understanding of species occurrences and losses (Figure 2a; Guagnin *et al.* 2016). Yet historical figurative art should be used and interpreted with caution, as taxonomic identification from artwork can depend on the artist's skill and fidelity to the depicted subjects (Guagnin *et al.* 2016; Stimpson and Kemp 2023). Local and Indigenous knowledge and art historians can aid taxonomic identification and interpretation (De Smet and Vergauwen 2021).

The arts can also provide data for conservation culturomics—the study of human interactions with nature through the quantitative analysis of voluminous digital data (Ladle *et al.* 2016). Culturomics research can reveal societal trends in, awareness of, and attitudes toward conservation and biodiversity through the study of artworks and public responses to art. Intergenerational traditional art by Indigenous Peoples can similarly be read as a form of “long environmentalism”, unveiling ongoing changes in social–ecological systems over extensive periods of time (Banerjee 2019).

Art-based methods for research and synthesis

The arts increasingly enrich and complement conservation data collection, analysis, interpretation, and communication (Whittaker 2023; Heindorf *et al.* 2024). Moreover, the arts inspire discussions in interviews, facilitate workshops

through team-building and novel insights, and generate and record collaborative ideas (Curtis 2011; Edwards *et al.* 2016).

Art-based inquiry is a powerful method of data interpretation, uncovering hidden cultural or emotional dimensions of conservation issues (Fernández-Giménez 2015; Heras *et al.* 2021). For example, poetic inquiry can help elucidate intangible values and perspectives (Heindorf *et al.* 2024) and is increasingly used in conservation to analyze interviews and other research texts. Fernández-Giménez (2015), for instance, assessed landscape changes in the Spanish Pyrenees and communicated their research findings through poetic inquiry. Visual arts can also aid research, as demonstrated by Curtin and Papworth (2020), who worked with an artist to create imaginary animals to assess their appeal as flagship species. Beyond poetry and visual arts, methods from other art disciplines can provide untapped but legitimate forms of inquiry in scientific research (Heras *et al.* 2021).

The arts can support data synthesis through infographics, graphical abstracts, conceptual figures, artistic knowledge maps, sonification, and visual facilitation to represent nature, conservation concepts, and future scenarios (eg Pérez-Granados *et al.* 2024). Alexander von Humboldt's *Tableau Physique* (1807) is a quintessential example of such art–science contributions, presenting a compelling visual synthesis of the altitudinal distribution of vegetation zones on Ecuador's Mount Chimborazo (Figure 2b; Curtis 2011).

Applied arts can also support conservation, for instance through industrial design of conservation or research tools and products. Such collaborations can greatly improve the



Figure 2. Examples of diverse forms of interactions between art and conservation. (a) Art as a source of data and information—ancient rock engravings in Shuwaymis, Saudi Arabia, provided insights in historical local fauna and ecosystems (image credit: Saudi Heritage Commission/Wikimedia Commons [CC BY-SA 4.0]); (b) art-based methods for research and synthesis—Alexander von Humboldt’s *Tableau Physique*, presenting a synthesis of altitudinal distribution of vegetation zones on Mount Chimborazo, Ecuador (image credit: Zentralbibliothek Zürich/Wikimedia Commons [PDM 1.0]); (c) art attracting societal support for conservation efforts—*Season’s Greetings*, a mural by graffiti artist Banksy in Port Talbot, Wales, addressing the issue of air pollution (image credit: FruitMonkey/Wikimedia Commons [CC BY-SA 4.0]); (d) artwork detail, supporting education and raising awareness—*Our Story digital collages of the Underwater Realm* aimed at finding new connections with and meaning about underwater places (source: <https://doi.org/10.6084/m9.figshare.20153612.v1> [CC BY 4.0]); (e) conservation providing material and resources to artists—*Gaia micrarium* by Michal Trpák at the Biology Centre of the Czech Academy of Sciences in Ceske Budejovice, Czech Republic, representing biodiversity, made out of microscopic slides and other samples of various species (image credit: Daniela Procházková); and (f) an example of a synergy between art and conservation—the Sonic Kayak art/citizen science project, which generates sonification of underwater measurements while also monitoring the environment (source: from Griffiths *et al.* 2017 [CC BY-SA 4.0]).

quality, functionality, effectiveness, and value of conservation products (Root-Bernstein and Ladle 2010).

Attracting societal support for conservation efforts

The arts can build empathy and emotional connections; explore beliefs and values; and reach new, larger, and more diverse audiences (Jacobson *et al.* 2007; Harrower *et al.* 2018).

By improving communication and marketing, the arts can attract greater support for conservation, deepen engagement, drive broad societal and behavioral changes, and spur advocacy (Jacobson *et al.* 2007; Opermanis *et al.* 2015). Such initiatives—commonly hosted by universities, museums, science centers, and non-governmental organizations—can include information materials, logos, popular science books, comics (McDermott *et al.* 2018), music (Prior 2022), movies,

street art (Figure 2c), multimedia, and events. Visualizations and narratives can help people envision alternative futures and ways of living (Pérez-Granados *et al.* 2024; <https://radicaloceanfutures.earth>), while participatory initiatives, such as Cocina Colaboratorio, a transdisciplinary project focusing on sustainable food systems (Balvanera *et al.* 2025), can support transformative change through shared spaces and in-person events.

Artists are often involved in developing conservation-themed games and apps to attract societal support and drive behavioral changes (Sandbrook *et al.* 2015; Tsai *et al.* 2019). Such products can be used for citizen-science initiatives to help collect data or identify solutions to conservation problems (Sandbrook *et al.* 2015).

Supporting education and raising awareness

The arts can help people make meaning of surrounding environments and ongoing changes (Figure 2d). Artistic methods are fundamental for creativity, which is key to enhance learning effectiveness (Januchowski-Hartley *et al.* 2018) and address increasing public aversion to—and skepticism of—science, experts, and data. They can provide common venues for engagement and dialogue through events such as the Wild and Scenic Film Festival (<https://wildandscenicfilmfestival.org>).

The arts can communicate complex conservation concepts, issues, and field or laboratory methods in an accessible and compelling way (Krueger and Krueger 2018), and promote engagement with inconspicuous species and systems, such as deep oceans and caves (Mammola *et al.* 2025b). Artistic practices can also document collective memory of past reference points and mitigate the effects of societal extinction of species (Jarić *et al.* 2022) and shifting environmental baselines (Soga and Gaston 2018).

Supporting conservation fundraising

Artists can directly support conservation fundraising by creating artwork for campaigns, grant proposals, or auctions (eg www.artistsforconservation.org). The arts can deliver complex messages in accessible ways to support communication with diverse audiences, particularly those who are not already engaged in conservation initiatives, and to enhance donations through arts-based interventions (Shaw *et al.* 2024).

Supporting preservation of social–ecological systems and traditional ecological knowledge

Maintaining and preserving traditional artwork and practices can indirectly support conservation efforts by promoting the sustainability of social–ecological systems and traditional ecological knowledge (Rathwell and Armitage 2016). For example, initiatives focused on maintaining and documenting traditional Indigenous practices, such as basket weaving (Athayde *et al.* 2017; <https://baskets2bytes.wordpress.com>), can help preserve knowledge and promote sustainability.

Contributions of conservation to the arts

Being a source of inspiration and knowledge

Nature has long inspired artists, and their involvement in conservation often deepens that inspiration. Specific conservation issues, events, and activities, often emotional and dramatic, offer unique creative fuel (Harrower *et al.* 2018). Conservationists can inform artists, help co-conceptualize projects, provide scientific knowledge, and share different ways of thinking (Clark *et al.* 2020; Jung *et al.* 2022). Conservationists can also help artists avoid misrepresentations and effectively convey conservation issues (Harrower *et al.* 2018), which may be especially relevant for educational material (eg <http://blog.wcs.org/photo/author/smakes>).

Providing material and resources

Conservationists can directly provide artists with material and resources to create artwork, such as data, photographs, videos, audio recordings, biological samples, maps, or other products of research (Clark *et al.* 2020). For example, *Gaia*, a “micrarium” artwork representing biodiversity, was made from microscopic slides of different organisms (Figure 2e). Conservationists can also provide materials associated with environmental impacts, such as data relating to, or physical specimens of, pollution (eg macro- or microplastics).

Providing funding

Conservation efforts can support the arts through funding programs beyond artist residencies and internships (Curtis 2011). For instance, some private foundations encourage projects that fund conservationist and artist collaborations, while others are focused on art–science themes (eg Carasso Foundation). Beyond funding, conservationists can help artists by commissioning artwork, developing in-house art collections, or partnering with artists on grant proposals and citizen-science projects.

Supporting the sustainability of the arts

Conservationists can support artists by investigating the sustainability of resources used in artistic pursuits, help artists source sustainable alternative materials or methods, and highlight practices that reduce artists’ environmental impacts (Prior 2022). Ecological footprint assessments of projects can help reinforce the impact of the conservation issues raised by the artwork, and potentially inspire others to engage with the work.

Supporting artwork preservation

Conservation initiatives can indirectly help preserve artistic practices, products, and heritage. For example, protecting species and maintaining healthy populations thereof will also be valuable if products derived from those species are used for artistic purposes or supplies. Furthermore, culturally

relevant species' declines or extinctions can diminish local and traditional knowledge and associated artistic practices, such as the use of nature-based materials for clothing, jewelry, ceramics, and musical instruments (Jarić *et al.* 2022). Protected areas can help preserve artworks located within their boundaries, like ancient monuments, as seen in social-ecological systems like the UN Educational, Scientific and Cultural Organization's (UNESCO's) Man and Biosphere Programme and mixed cultural–natural UNESCO World Heritage sites, including China's Mount Emei. Finally, social-ecological systems sustainability initiatives can support conservation of intangible heritage, including the arts.

■ Achieving synergy between the arts and conservation

In conservation, the arts are sometimes perceived narrowly, as limited to illustrations for outreach and marketing (Clark *et al.* 2020). However, by collaborating and sharing perspectives, artists and conservationists can co-create knowledge, offering fresh insights into overlooked or unseen issues (Clark *et al.* 2020; Whittaker 2023). Bridging art and conservation can highlight both the ability of the arts to communicate conservation issues and conservation as a source of inspiration and tools for artistic creation (Griffiths *et al.* 2017). This is exemplified by the ArtScience or art–science concept—an integral, transdisciplinary partnership between the arts and science (Root-Bernstein *et al.* 2011; Clark *et al.* 2020). In art–science projects, artists and scientists conduct joint research on shared issues. For example, the transdisciplinary “6&6” initiative paired six artists with six scientists to co-create work regarding conservation issues in North America's Sonoran Desert and the Gulf of California (Clark *et al.* 2020). Artwork becomes a space for experimentation, where ideas are tested and refined through ongoing dialogue between the disciplines. Both the exchanges and the final outcomes are valuable, influencing ethical stances and behavioral changes, and generating unique solutions (Whittaker 2023). Conservationists and artists often share values as well; moreover, some conservationists create art and some artists have scientific backgrounds.

Conservation and the arts draw on rich cultural, artistic, and scientific knowledge, which helps to build relevant tools and methods. This synergy not only creates a creative space for risk-taking, freeing both disciplines (conservation and the arts) from their respective limits (Januchowski-Hartley *et al.* 2018), but often leads to innovative solutions by elevating the contributions of both disciplines without sacrificing the rigor expected in either discipline.

Joint projects can also have cascading impacts, leading to social action (Harrower *et al.* 2018). For example, the Sonic Kayak project is both a citizen-science initiative and a sound artwork, in which underwater environmental sensors on kayaks allow users to generate real-time sonification while simultaneously monitoring the environment (Figure 2f;

Griffiths *et al.* 2017). Similarly, the Long Term Ecological Research Network in the US has featured numerous long-standing art–science collaborations, including such sites as Harvard Forest, Andrews Forest, and the Sevilleta (<https://lternet.edu>).

Conservationists and artists often face political challenges locally and internationally. By sharing best practices and strategies, they can support each other to survive and thrive despite these obstacles, allowing them to sustain key inquiries regardless of fluctuations in institutional and financial support. In fast-changing contexts, artists excel at improvising and adapting, while conservationists may provide expertise in managing large-scale projects, navigating complex policies, and coordinating across institutions.

Collaborations among conservationists and artists can invite a process of mutual unlearning of disciplinary assumptions, methods, and hierarchies. This opens space for more reflexive and plural ways of knowing, shifting personal orientations and fostering practices rooted in humility, attentiveness, and shared curiosity (Clark *et al.* 2020).

■ Challenges and opportunities

Although becoming more frequent, collaborations between the arts and conservation are not without challenges. Major obstacles include prevalent social norms about definitions of conservation and conservationists, and limits on which outputs and metrics count toward career progression in both the arts and conservation. Furthermore, targeted funding for such interdisciplinary collaborations is still insufficient (Harrower *et al.* 2018). Art-based research methods often face academic skepticism regarding rigor, data quality, and methodological robustness, and their effectiveness can depend heavily on cultural context—making some conservationists hesitant to engage with them (Clark *et al.* 2020).

An emerging challenge for joint teams of artists and conservationists is the use of generative artificial intelligence (AI), which requires clear communication, transparency, and negotiation around its application. Some artists and conservationists may be open to critically incorporating generative AI. For instance, artist Fatimah Tuggar incorporates AI with an environmental focus (www.nigeriaimaginary.com/artists). Others can be against its use for different reasons, including concerns about ethical implications, erosion of human creativity, data privacy, copyright infringement issues, potential biases embedded in AI systems, or the commodification of artistic practices. To avoid conflicts and to clarify publishing and sharing outcomes, we suggest that all collaborators should have early and open dialogue about generative AI, with all agreements on its use or non-use clearly documented.

The arts can considerably shape cultural framings of wildlife and nature and thus also change human attitudes and behavior, both positively and negatively. However, art may at times present a stylized and simplified representation of complex socioecological systems, which can potentially lead to inadequate,

misleading, or sensationalized characterizations of biodiversity, conservation issues, scientific information, and facts. For example, artistic expression can yield negative or stereotyped portrayals of certain species (eg wolves are commonly depicted as villains in children's books), or exaggerated anthropomorphism. While such misrepresentations can affect societal awareness and attitudes, they may also include incorrect information (Balmford *et al.* 2004) and compromise the reputation of experts and organizations (Harrower *et al.* 2018). Furthermore, erroneous representations of nature as historically untouched and uninhabited can inadvertently further marginalize local communities and Indigenous Peoples, and conceal histories of dispossession (Banerjee and Dunaway 2023).

From the artists' perspective, it is important that their work is not instrumentalized or trivialized. Art should not be considered a "service discipline" for conservation—that is, as merely a means of science dissemination, or simply as a tool for securing funding or gaining visibility. This is a broader challenge in science–art collaborations. Conservationists may be well-positioned to highlight to the scientific community the value of engaging with artists on their own terms, based on successful existing partnerships, best practices, and initiatives grounded in mutually beneficial collaborations (Clark *et al.* 2020).

■ Outlook

Enhanced conservation–arts collaborations require (i) more funding for cross-disciplinary initiatives, (ii) a shared language and understanding (Clark *et al.* 2020), and (iii) recognition of the value that artists bring to interdisciplinary conservation teams (Tribot *et al.* 2022). It may also be key to develop and implement empirical methods to gauge effective collaborations between artists and conservationists (Jacobson *et al.* 2007; Prior 2022; Whittaker 2023).

Conservationists may be well-positioned to engage side-by-side with artists in pursuing scientific inquiry due to a history of complementary practices in public engagement that are geared toward social action. When such collaborations occur transnationally, they may offer opportunities for informal, non-state directed science and arts diplomacy, whereby artists and conservationists may build and maintain collaborative relationships globally despite shifts in national politics. The robustness of such transnational collaborations, when they include both conservationists and artists, can increase their resilience in the face of sudden changes and enhance their collective ability to respond.

Improved support from conservation institutions and academia could focus on providing spaces for such initiatives, including artist-in-residence programs and interdisciplinary collaborations (Harrower *et al.* 2018; Clark *et al.* 2020; Jung *et al.* 2022; <https://lternet.edu>). Citizen-science initiatives could also help promote such collaborations (Figure 2f; Griffiths *et al.* 2017). Altogether, we see great promise in shared collaborations between art and conservation, for the benefit of both endeavors, the biosphere, and beyond.

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■ Data Availability Statement

No original data were collected for this study.

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